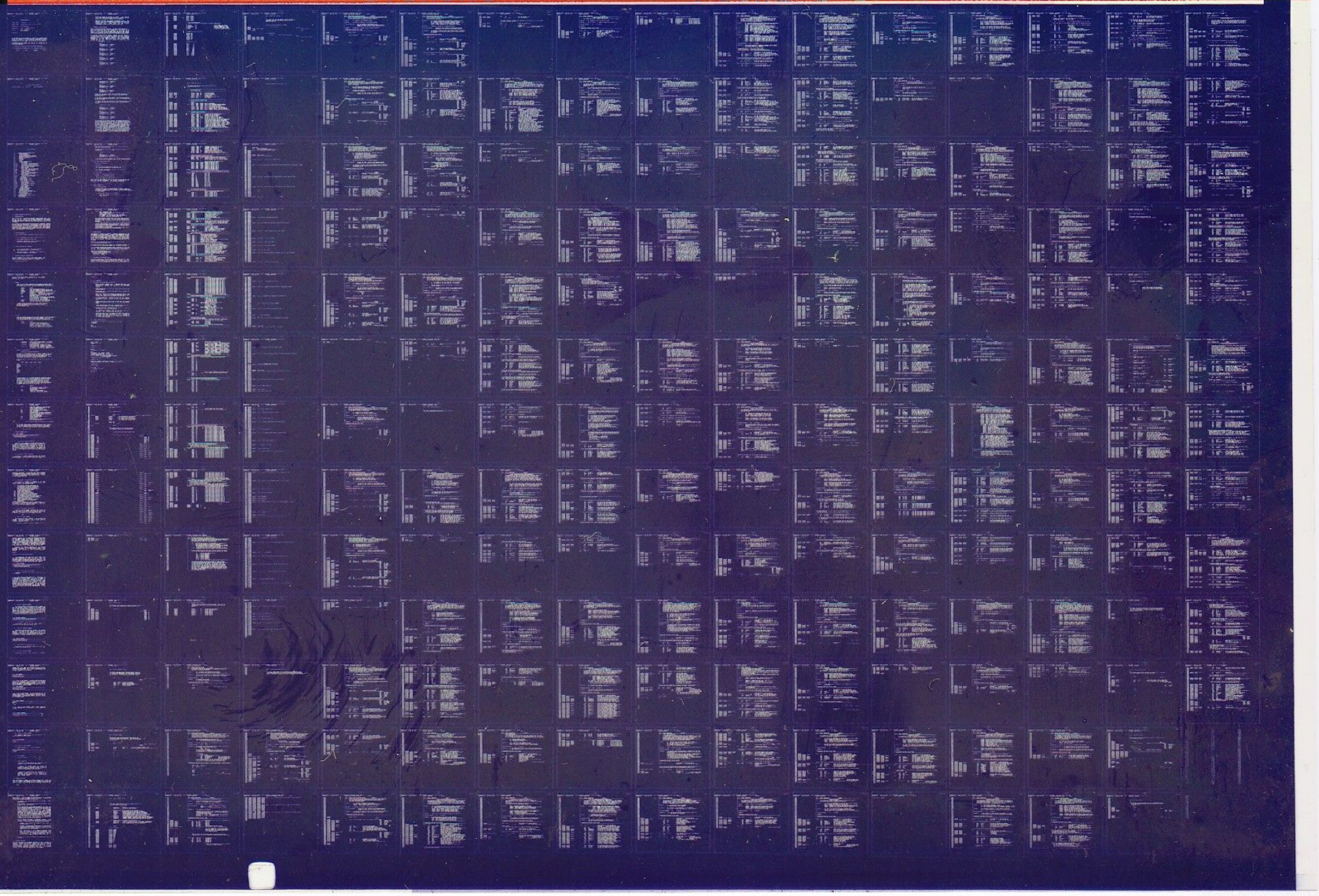
DHV11

DHV-11 FUNC TST PT3
CVDHCA0

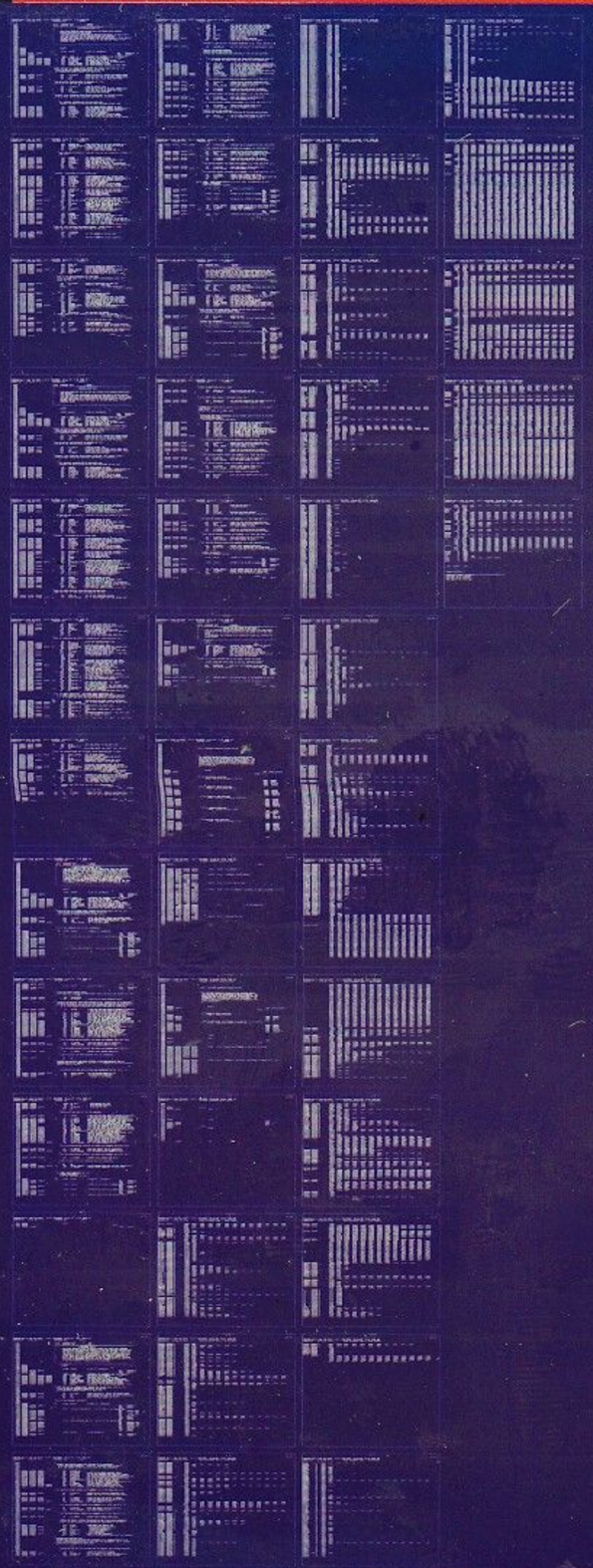
AH-T657A-MC
FICHE 1 OF 2



DHV11

DHV-11 FUNC TST PT3
CVDHCA0

AH-T657A-MC
FICHE 2 OF 2



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IDENTIFICATION

PRODUCT CODE: AC-T656A-MC

PRODUCT NAME: CVDHCA0 DHV-11 FUNC TST PART3

PRODUCT DATE: 31 OCTOBER 1983

MAINTAINER: EDSHE - DIAGNOSTICS GROUP

AUTHOR: BERT KLEINSCHMIDT
TONY GRIMSHAW

MODIFIED BY:

***** MODIFICATION HISTORY *****

ORIGINAL RELEASE: 31-OCT-83 BERT KLEINSCHMIDT

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1.0 GENERAL PROGRAM CONSIDERATIONS

1.1 PROGRAM ABSTRACT

CVDHC IS PART ONE OF THE DHV-11 FUNCTIONAL VERIFICATION TEST. THIS PART OF THE TEST VERIFIES THAT THE MAJOR COMMUNICATION FUNCTIONS OF THE BOARD WHICH USE THE UARTS ARE FUNCTIONING CORRECTLY. THIS PROGRAM EXERCISES THE BOARD BY TRANSMITTING AND RECEIVING LARGE BLOCKS OF DATA IN LOOPBACK.

THIS DIAGNOSTIC HAS BEEN WRITTEN FOR USE WITH THE DIAGNOSTIC RUNTIME SERVICES SOFTWARE (SUPERVISOR). THESE SERVICES PROVIDE THE INTERFACE TO THE OPERATOR AND TO THE SOFTWARE ENVIRONMENT. THIS PROGRAM CAN BE USED WITH XXDP+, ACT, APT, SLIDE AND PAPER TAPE. FOR A COMPLETE DESCRIPTION OF THE RUNTIME SERVICES, REFER TO THE XXDP+ USER'S MANUAL. THERE IS A BRIEF DESCRIPTION OF THE RUNTIME SERVICES IN THE OPERATING INSTRUCTIONS-COMMANDS OF THIS DOCUMENT.

1.2 SYSTEM REQUIREMENTS

THE FOLLOWING HARDWARE IS REQUIRED TO RUN THE DHV FVT:

- O LSI-11 PROCESSOR WITH AT LEAST 32 KBYTES OF RAM.
- O DHV11 BOARDS INSTALLED ON THE Q-BUS.
- O APPROPRIATE PROGRAM LOAD DEVICE SUPPORTING XXDP+ MEDIA OR A DOWN-LINE LOADING SYSTEM.

1.3 RELATED DOCUMENTS AND STANDARDS

- O DHV-11 HARDWARE MANUAL - THIS MANUAL DESCRIBES THE FUNCTIONS AND USES OF THE DHV-11 DEVICE.
- O XXDP+ USER'S MANUAL - DESCRIBES THE RUNNING OF DIAGNOSTICS UNDER THE XXDP+ MONITOR.

1.4 DIAGNOSTIC HIERARCY PREREQUISITES

THE LSI-11 PROCESSOR, THE Q-BUS, THE SYSTEM MEMORY, THE CONSOLE TERMINAL, AND THE LOAD MEDIA ARE ASSUMED TO HAVE BEEN TESTED AND FOUND WORKING BEFORE THIS PROGRAM IS RUN.

2.0 OPERATING INSTRUCTIONS

THIS SECTION CONTAINS A BRIEF DESCRIPTION OF THE RUNTIME SERVICES. FOR DETAILED INFORMATION, REFER TO THE XXDP+ USER'S MANUAL (CHQUS).

2.1 COMMANDS

THERE ARE ELEVEN LEGAL COMMANDS FOR THE DIAGNOSTIC RUNTIME SERVICES (SUPERVISOR). THIS SECTION LISTS THE COMMANDS AND GIVES A VERY BRIEF DESCRIPTION OF THEM. THE XXDP+ USER'S MANUAL HAS MORE DETAILS.

COMMAND	EFFECT
START	START THE DIAGNOSTIC FROM AN INITIAL STATE
RESTART	START THE DIAGNOSTIC WITHOUT INITIALIZING
CONTINUE	CONTINUE AT TEST THAT WAS INTERRUPTED (AFTER ^C)
PROCEED	CONTINUE FROM AN ERROR HALT
EXIT	RETURN TO XXDP+ MONITOR (XXDP+ OPERATION ONLY!)
ADD	ACTIVATE A UNIT FOR TESTING (ALL UNITS ARE CONSIDERED TO BE ACTIVE AT START TIME
DROP	DEACTIVATE A UNIT
PRINT	PRINT STATISTICAL INFORMATION (IF IMPLEMENTED BY THE DIAGNOSTIC - SEE PERFOMANCE AND PROGRESS REPORTS SECTION OF THIS DOCUMENT)
DISPLAY	TYPE A LIST OF ALL DEVICE INFORMATION
FLAGS	TYPE THE STATE OF ALL FLAGS (SEE FLAGS SECTION)
ZFLAGS	CLEAR ALL FLAGS (SEE FLAGS SECTION)

A COMMAND CAN BE RECOGNIZED BY THE FIRST THREE CHARACTERS. SO YOU MAY, FOR EXAMPLE, TYPE "STA" INSTEAD OF "START".
MORE INFORMATION CAN BE FOUND WITHIN THE SECTION LABELLED EXTENDED COMMAND SYNTAX

2.2 SWITCHES

THERE ARE SEVERAL SWITCHES WHICH ARE USED TO MODIFY SUPERVISOR OPERATION. THESE SWITCHES ARE APPENDED TO THE LEGAL COMMANDS. ALL OF THE LEGAL SWITCHES ARE TABULATED BELOW WITH A BRIEF DESCRIPTION OF EACH.
IN THE DESCRIPTIONS BELOW, A DECIMAL NUMBER IS DESIGNATED BY "DDDDD".

SWITCH	EFFECT
/TESTS:LIST	EXECUTE ONLY THOSE TESTS SPECIFIED IN THE LIST. LIST IS A STRING OF TEST NUMBERS, FOR EXAMPLE - /TESTS:1:5:7-10. THIS LIST WILL CAUSE TESTS 1,5,7,8,9,10 TO BE RUN. ALL OTHER TESTS WILL NOT BE RUN.

```
/PASS:DDDDD     EXECUTE DDDDD PASSES (DDDDD = 1 TO 64000)
/FLAGS:FLGS     SET SPECIFIED FLAGS.SEE THE FLAGS SECTION
                OF THIS DOCUMENT.
/EOP:DDDDD      REPORT END OF PASS MESSAGE AFTER EVERY
                DDDDD PASSES ONLY.  (DDDDD = 1 TO 64000)
/UNITS:LIST     TEST/ADD/DROP ONLY THOSE UNITS SPECIFIED
                IN THE LIST.  LIST EXAMPLE - /UNITS:0:5:10-12
                USE UNITS 0,5,10,11,12 (UNIT NUMBERS = 0-63)
```

EXAMPLE OF SWITCH USAGE:

```
START/TESTS:1-5/PASS:1000/EOP:100
```

THE EFFECT OF THIS COMMAND WILL BE: 1) TESTS 1 THROUGH 5 WILL BE EXECUTED, 2) ALL UNITS WILL TESTED 1000 TIMES AND 3) THE END OF PASS MESSAGES WILL BE PRINTED AFTER EACH 100 PASSES ONLY. A SWITCH CAN BE RECOGNIZED BY THE FIRST THREE CHARACTERS. YOU MAY, FOR EXAMPLE, TYPE "/TES:1-5" INSTEAD OF "/TESTS:1-5".

BELOW IS A TABLE THAT SPECIFIES WHICH SWITCHES CAN BE USED BY EACH COMMAND.

	TESTS	PASS	FLAGS	EOP	UNITS
START	X	X	X	X	X
RESTART	X	X	X	X	X
CONTINUE		X	X	X	
PROCEED			X		
DROP					X
ADD					X
PRINT					
DISPLAY					X
FLAGS					
ZFLAGS					
EXIT					

2.3 FLAGS

FLAGS ARE USED TO SET UP CERTAIN OPERATIONAL PARAMETERS SUCH AS LOOPING ON ERROR. ALL FLAGS ARE CLEARED AT STARTUP AND REMAIN CLEARED UNTIL EXPLICITLY SET USING THE FLAGS SWITCH. FLAGS ARE ALSO CLEARED AFTER A START COMMAND UNLESS SET USING THE FLAG SWITCH. THE ZFLAGS COMMAND MAY ALSO BE USED TO CLEAR ALL FLAGS. WITH THE EXCEPTION OF THE START AND ZFLAGS COMMANDS, NO COMMANDS AFFECT THE STATE OF THE FLAGS; THEY REMAIN SET OR CLEARED AS SPECIFIED BY THE LAST FLAG SWITCH.

FLAG	EFFECT
HOE	HALT ON ERROR - CONTROL IS RETURNED TO RUNTIME SERVICES COMMAND MODE
LOE	LOOP ON ERROR
IER*	INHIBIT ALL ERROR REPORTS
IBR*	INHIBIT ALL ERROR REPORTS EXCEPT FIRST LEVEL (FIRST LEVEL CONTAINS

ERROR TYPE, NUMBER, PC, TEST AND UNIT)

IXR*	INHIBIT EXTENDED ERROR REPORTS (THOSE CALLED BY PRINTX MACRO'S)
PRI	DIRECT MESSAGES TO LINE PRINTER
PNT	PRINT TEST NUMBER AS TEST EXECUTES
BOE	"BELL" ON ERROR
UAM	UNATTENDED MODE (NO MANUAL INTERVENTION)
ISR	INHIBIT STATISTICAL REPORTS (DOES NOT APPLY TO DIAGNOSTICS WHICH DO NOT SUPPORT STATISTICAL REPORTING)
IDR	INHIBIT PROGRAM DROPPING OF UNITS
ADR	EXECUTE AUTODROP CODE
LOT	LOOP ON TEST
EVL	EXECUTE EVALUATION (ON DIAGNOSTICS WHICH HAVE EVALUATION SUPPORT)

*SEE THE ERROR INFORMATION SECTION OF THIS DOCUMENT.

SEE THE XXDP+ USER'S MANUAL FOR MORE DETAILS ON FLAGS. YOU MAY SPECIFY MORE THAN ONE FLAG WITH THE FLAG SWITCH. FOR EXAMPLE, TO CAUSE THE PROGRAM TO LOOP ON ERROR, INHIBIT ERROR REPORTS AND TYPE A "BELL" ON ERROR, YOU MAY USE THE FOLLOWING STRING:

```
/FLAGS:LOE:IER:BOE
```

2.4 EXTENDED COMMAND SYNTAX

2.4.1 START COMMAND -

****
STA(RT)/TESTS:<TEST-LIST>/PASS:<PASS-CNT>/FLAGS:
   <FLAG-LIST>/EOP:<INCR>
****

2.4.1.1 TESTS SWITCH (/TESTS:<TEST-LIST>) -

<TEST-LIST> IS A SEQUENCE OF DECIMAL NUMBERS (1:2 ETC.) OR RANGES OF DECIMAL NUMBERS (1-5:8-10 ETC.), SEPERATED BY COLONS, THAT SPECIFY THE TESTS TO BE EXECUTED.TESTS WILL BE EXECUTED IN NUMERICAL ORDER REGARDLESS OF THE ORDER OF SPECIFICATION. THE DEFAULT IS TO EXECUTE ALL TESTS. ON THIS AND ALL SWITCHES, THE ANGLE BRACKETS <> ARE PUNCTUATION USED IN THE DEFINITION ONLY, AND ARE NOT TO BE TYPED BY THE OPERATOR. SEE EXAMPLE AT END OF "EFFECT OF START COMMAND" SECTION.

2.4.1.2 PASS SWITCH (/PASS:<PASS-CNT>) -

<PASS-CNT> IS A DECIMAL NUMBER INDICATING THE DESIRED NUMBER OF PASSES. A PASS IS DEFINED AS THE EXECUTION OF THE FULL DIAGNOSTIC (ALL SELECTED TESTS).THE DEFAULT IS

NON-ENDING EXECUTION. IN THIS CASE, EXIT FROM THE PROGRAM IS ACCOMPLISHED EITHER BY TYPING A CONTROL/C OR BY OCCURANCE OF AN ERROR WITH THE HALT ON ERROR FLAG BEING SET. THE EXIT IS A RETURN TO COMMAND MODE. SEE EXAMPLE AT END OF "EFFECT OF START COMMAND" SECTION.

2.4.1.3 FLAGS SWITCH (/FLAGS:<FLAG-LIST>) -

<FLAG-LIST> IS A SEQUENCE OF ELEMENTS OF THE FORM <FLAG>, <FLAG=1>, OR <FLAG=0>, SEPARATED BY COLONS, WHERE <FLAG> HAS ONE OF THE FOLLOWING VALUES:

HOE	HALT ON ERROR, CAUSING COMMAND MODE TO BE ENTERED WHEN AN ERROR IS ENCOUNTERED.
LOE	LOOP ON ERROR, CAUSING THE DIAGNOSTIC TO LOOP CONTINUOUSLY WITHIN THE SMALLEST DEFINED BLOCK OF CODING (SEGMENT, SUBTEST, OR TEST) CONTAINING THE ERROR.
IER	INHIBIT ERROR REPORTING.
IBE	INHIBIT BASIC ERROR REPORTS.
IXE	INHIBIT EXTENDED ERROR REPORTS.
PRI	DIRECT ALL MESSAGES TO A LINE PRINTER.
PNT	PRINT NUMBER OF TEST BEING EXECUTED.
BOE	BELL ON ERROR (NOT RELATED TO BELL PROMPTING).
UAM	RUN IN UNATTENDED MODE, BYPASSING MANUAL INTERVENTION (ILLEGAL FOR THIS DIAGNOSTIC).
ISR	INHIBIT STATISTICAL REPORTS.
IDU	INHIBIT DROPPING OF UNITS BY DIAGNOSTIC. (HAS NO EFFECT IN THIS DIAGNOSTIC.)
LOT	LOOP ON TEST.

THE FLAGS NAMED OR EQUATED TO 1 ARE SET, THOSE EQUATED TO 0 ARE CLEARED. A FLAG NOT SPECIFIED IS CLEARED. IF THE FLAGS SWITCH IS NOT GIVEN ALL FLAGS ARE CLEARED. SEE EXAMPLE AT END OF "EFFECT OF START COMMAND" SECTION.

2.4.1.4 END OF PASS SWITCH (/EOP:<INCR>) -

<INCR> IS A DECIMAL NUMBER INDICATING HOW OFTEN (IN TERMS OF PASSES) IT IS DESIRED THAT THE END OF PASS MESSAGE BE PRINTED. THE DEFAULT IS AT THE END OF EVERY PASS. SEE EXAMPLE AT END OF "EFFECT OF START COMMAND" SECTION.

2.4.1.5 EFFECT OF START COMMAND -

THE EFFECT OF THE START COMMAND IS TO INITIATE THE HARDWARE PARAMETER DIALOGUE, THE SOFTWARE PARAMETER DIALOGUE, THE INITIALIZATION QUESTIONS, AND THEN THE DIAGNOSTIC COMMENCES TESTING.

THE HARDWARE PARAMETER DIALOGUE COMMENCES WITH THE

QUESTION "# UNITS (D) ?" TO WHICH THE OPERATOR SHOULD REPLY WITH THE NUMBER OF UNITS TO BE TESTED. FOLLOWING THIS ARE THE QUESTIONS WHEREBY THE P-TABLES THEMSELVES ARE BUILT. EACH P-TABLE IS A CORE-RESIDENT TABLE CONTAINING ALL THE HARDWARE INFORMATION FOR ONE COMPLETE UNIT.EACH QUESTION IS FOLLOWED BY THE RESPONSE RADIX (D FOR DECIMAL, B FOR BINARY, O FOR OCTAL, L FOR YES/NO) IN PARENTHESES AND THE DEFAULT VALUE AFTER THE PARENTHESES. FOR THE ACTUAL HARDWARE P-TABLE QUESTIONS SEE THE "HARDWARE PARAMETERS" SECTION.

FOLLOWING THE HARDWARE QUESTIONS ARE THE SOFTWARE QUESTIONS TO BUILD THE SOFTWARE TABLES, WHICH DEFINE OPERATING PARAMETERS OF THE DIAGNOSTIC PROGRAM. THESE QUESTIONS ARE DESCRIBED IN THE "SOFTWARE PARAMETERS" SECTION.

EXAMPLE:

STA/TESTS:1:3-4:/PASS:3/FLAGS:IER:HOE=1

THIS COMMAND WILL CAUSE THREE PASSES TO BE MADE, WITH EACH PASS CONSISTING OF TESTS 1,3, AND 4. THERE IS NO DIFFERENCE BETWEEN SAYING <FLAG> AND SAYING <FLAG=1>. THE NOTATION <FLAG=0> IS MEANINGFUL ONLY ON A COMMAND OTHER THAN START TO CLEAR A FLAG THAT WAS PREVIOUSLY SET. NOTE THAT ON ALL COMMANDS ONLY THE FIRST THREE LETTERS ARE SCANNED.

2.4.2 RESTART COMMAND -

****
RES(TART)/TESTS:<TEST-LIST>/PASS:<PASS-CNT>/FLAGS:
  <FLAG-LIST>/UNITS:<UNIT-LIST>
****

2.4.2.1 TESTS, PASS, AND FLAGS SWITCHES -

<TEST-LIST>, <PASS-CNT>, AND <FLAG-LIST> ARE AS IN THE START COMMAND.

2.4.2.2 UNITS SWITCH (/UNITS:<UNIT-LIST>) - <UNIT-LIST> IS A SEQUENCE OF DECIMAL NUMBERS (0,1 ETC.) OR RANGES OF DECIMAL NUMBERS (0-5, 8-10 ETC.) THAT SPECIFY THE UNITS TO BE TESTED. THE NUMBERS ARE SEPARATED BY COLONS. THE NUMBERS MAY RANGE FROM 0 THRU N-1 (N IS THE NUMBER OF UNITS SPECIFIED IN THE PREVIOUS START COMMAND). THE NUMBER INDICATES THE POSITION OF THE P-TABLE AS THE DATA WAS ENTERED DURING THE HARDWARE DIAGLOGUE. THE UNITS WHICH ARE SELECTED MUST NOT HAVE BEEN DROPPED BY THE DROP COMMAND. SEE THE DISCUSSION OF ADD AND DROP COMMANDS BELOW. DEFAULT IS TO TEST ALL UNITS WHICH HAVE NOT BEEN DROPPED BY A DROP COMMAND.

2.4.2.3 EFFECT OF RESTART COMMAND -

THE RESTART COMMAND DIFFERS FROM THE START COMMAND IN THAT THE P-TABLES FROM THE PREVIOUS START COMMAND (THERE MUST HAVE BEEN ONE) ARE USED, INSTEAD OF NEW ONES BEING BUILT. THE SOFTWARE DIALOGUE MAY OPTIONALLY BE REEXECUTED (OPERATOR WILL BE ASKED). THE COMMAND CAN BE USED AFTER COMMAND MODE HAS BEEN REENTERED IN ANY OF THE THREE NORMAL WAYS: A) THE REQUESTED NUMBER OF PASSES HAVE BEEN MADE, B) AN ERROR WAS ENCOUNTERED WITH THE HALT ON ERROR FLAG SET, OR C) A CONTROL/C WAS ENTERED BY THE OPERATOR.

2.4.3 CONTINUE COMMAND -

****

CON(TINUE)/PASS:<PASS-CNT/FLAGS:<FLAG-LIST>

****

2.4.3.1 FLAG SWITCH (/FLAGS:<FLAG-LIST>) -

<FLAG-LIST> IS SAME AS IN THE START COMMAND, BUT UNSPECIFIED FLAGS RETAIN THEIR CURRENT VALUE.

2.4.3.2 EFFECT OF CONTINUE COMMAND -

CONTINUE MUST FOLLOW A START OR RESTART, AND COMMAND MODE MUST HAVE BEEN ENTERED DUE TO A HALT ON ERROR OR A CONTROL/C. THE EFFECT OF THE COMMAND IS TO GO TO THE BEGINNING OF THE TEST THAT WAS BEING EXECUTED WHEN THE HALT OR CONTROL/C TOOK PLACE. SOFTWARE DIALOGUE MAY OPTIONALLY BE REEXECUTED. HARDWARE PARAMETERS MAY NOT BE CHANGED.

2.4.4 PROCEED COMMAND -

****

PRO(CEED)/FLAGS:<FLAG-LIST>

****

2.4.4.1 FLAGS SWITCH (/FLAGS:<FLAG-LIST>) -

<FLAG-LIST> IS AS IN THE START COMMAND, BUT UNSPECIFIED FLAGS RETAIN THEIR CURRENT VALUE.

2.4.4.2 EFFECT OF PROCEED COMMAND -

PROCEED MUST FOLLOW A START, RESTART, OR CONTINUE.

COMMAND MODE MUST HAVE BEEN ENTERED VIA A HALT ON ERROR. THE EFFECT OF THE COMMAND IS TO BEGIN EXECUTION AT THE LOCATION FOLLOWING THE ERROR CALL. NEITHER HARDWARE NOR SOFTWARE PARAMETERS MAY BE ALTERED.

2.4.5 ADD COMMAND -

****

ADD/UNITS:<UNIT-LIST>

****

2.4.6 EFFECT OF ADD COMMAND - THE UNITS SPECIFIED ARE ADDED TO THE TEST SEQUENCE. EACH UNIT MUST HAVE A P-TABLE IN MEMORY DUE TO AN EARLIER HARDWARE DIALOGUE. THIS COMMAND MUST BE FOLLOWED BY A RESTART OR CONTINUE. THE UNITS SWITCH MUST BE SPECIFIED. THE ADD COMMAND IS MEANINGFUL ONLY FOR UNITS THAT WERE PREVIOUSLY DROPPED.

2.4.7 DROP COMMAND -

****

DRO(P)/UNITS:<UNIT-LIST>

****

2.4.8 EFFECT OF DROP COMMAND - THE UNITS SPECIFIED WILL BE DROPPED FROM TESTING. THE UNITS WILL BE RESELECTED ONLY BY THE EXECUTION OF AN ADD OR START COMMAND. THE UNITS SWITCH MUST BE ENTERED. THIS COMMAND MUST BE FOLLOWED BY A RESTART OR A CONTINUE COMMAND.

2.4.9 PRINT COMMAND -

****

PRI(NT)

****

2.4.9.1 EFFECT OF PRINT COMMAND - ERROR SUMMARY REPORTING IS NOT IMPLEMENTED IN THIS DIAGNOSTIC, SO THIS COMMAND HAS NO EFFECT.

2.4.10 DISPLAY COMMAND -

****

DIS(PLAY)/UNITS:<UNIT-LIST>

****

2.4.10.1 EFFECT OF DISPLAY COMMAND -

THE HARDWARE P-TABLES FOR ALL UNITS ARE PRINTED IN THE FORMAT IN WHICH THEY WERE ENTERED.

2.4.11 FLAGS COMMAND -

****
FLA(GS)
****

2.4.11.1 EFFECT OF FLAGS COMMAND -

THE CURRENT SETTINGS OF ALL FLAGS ARE PRINTED.

2.4.12 ZFLAGS COMMAND -

****
ZFL(AGS)
****

2.4.13 ZFLAGS COMMAND -

ALL FLAGS ARE CLEARED.

2.4.14 CONTROL CHARACTERS -

C A CONTROL/C (C) ENTERED DURING THE EXECUTION OF A DIAGNOSTIC CAUSES A RETURN TO COMMAND MODE.

Z A CONTROL/Z (Z) ENTERED DURING ONE OF THE TWO OPERATOR DIALOGUES-- HARDWARE P-TABLE DIALOGUE OR SOFTWARE P-TABLE DIALOGUE CAUSES THE DEFAULTS TO BE TAKEN FOR THE REMAINDER OF THAT DIALOGUE.

O A CONTROL/O (O) ENTERED DURING THE EXECUTION OF A DIAGNOSTIC CAUSES ALL TELETYPE OUTPUT TO BE SURPRESSED FOR THE REMAINDER OF THE DIAGNOSTIC OR UNTIL ANOTHER CONTROL/O IS TYPED, WHICH RESTORES NORMAL TELETYPE OUTPUT.

2.5 HARDWARE QUESTIONS

WHEN A DIAGNOSTIC IS STARTED, THE RUNTIME SERVICES WILL PROMPT THE USER FOR HARDWARE INFORMATION BY TYPING "CHANGE HW (L) ?" YOU MUST ANSWER "Y" AFTER A START COMMAND UNLESS THE HARDWARE INFORMATION HAS BEEN "PRELOADED" USING THE SETUP UTILITY (SEE CHAPTER 6 OF THE XXDP+

USER'S MANUAL). WHEN YOU ANSWER THIS QUESTION WITH A "Y", THE RUNTIME SERVICES WILL ASK FOR THE NUMBER OF UNITS (IN DECIMAL). YOU WILL THEN BE ASKED THE FOLLOWING QUESTIONS FOR EACH UNIT:

1. CSR ADDRESS - THIS QUESTION REQUESTS THE CSR ADDRESS OF THE SPECIFIED DHV11.

2. VECTOR ADDRESS - THIS QUESTION REQUESTS THE INTERRUPT VECTOR ADDRESS OF THE SPECIFIED DHV11.

3. ACTIVE LINES BIT MAP - THIS QUESTION REQUESTS AN OCTAL BIT MAP OF THE SERIAL COMMUNICATION LINES ON THE DHV11 WHICH ARE BEING SELECTED FOR TESTING. IF THE BIT IN THE BIT MAP IS SET WHICH CORRESPONDS TO A PARTICULAR LINE (I.E. BIT 3 FOR LINE 3) THAT LINE WILL BE TESTED BY THE FVT. WITH STAGGERED LOOPBACK A PAIR OF LINES WITH THE SPECIFIED TRANSMIT LINE AND ANOTHER RECEIVE LINE WILL BE TESTED. THEREFORE, TO GUARANTEE THAT BOTH THE TRANSMITTER AND RECEIVER OF A SPECIFIED LINE ARE TESTED WHEN USING THE STAGGERED LOOPBACK CONNECTOR, BOTH THE INTENDED LINE AND ITS MATE MUST BE SELECTED (IE. TO TEST LINE 1, SELECT BOTH LINE 1 AND LINE 3). IN NONSTAGGERED TESTING, A BIT IN THE ACTIVE LINES BIT MAP SELECTS THE TRANSMITTER AND RECEIVER FOR THE SAME LINE.

4. TYPE OF LOOPBACK (1=INTERNAL, 2=STAGGERED, 3=H325) - THIS QUESTION REQUESTS THE TYPE OF LOOPBACK TO BE USED IN TESTING THE DHV11. THE FOLLOWING TYPES OF LOOPBACK ARE SUPPORTED:

   - INTERNAL - ONLY INTERNAL UART LOOPBACK IS TO BE USED IN TESTING THE DHV.

   - STAGGERED - STAGGERED BERG CONNECTOR(S) ARE INSTALLED ON THE BERG CONNECTOR SOCKETS OF THE DHV11. FOR THE CIRCUIT CONNECTIONS OF THE STAGGERED LOOPBACK CONNECTOR SEE THE HARDWARE SECTION OF THIS DOCUMENT.

   - H325 - SINGLE LINE, 25 PIN LOOPBACK CONNECTORS (TYPE H325) ARE INSTALLED ON THE LINES TO BE TESTED. THESE CONNECTORS CAN BE INSTALLED ON THE DISTRIBUTION PANEL OR ON THE END OF THE TERMINAL OR MODEM CABLE. THE H325 CONNECTORS MUST HAVE THE REMOVABLE JUMPERS INSTALLED.

5. BR LEVEL - THIS QUESTIONS REQUESTS THE INTERRUPT BR LEVEL OF THE DHV11.

2.6 SOFTWARE QUESTIONS

AFTER YOU HAVE ANSWERED THE HARDWARE QUESTIONS OR AFTER A RESTART OR CONTINUE COMMAND, THE RUNTIME SERVICES WILL ASK FOR SOFTWARE PARAMETERS. THESE PARAMETERS WILL GOVERN SOME DIAGNOSTIC SPECIFIC OPERATION MODES. YOU WILL BE PROMPTED BY "CHANGE SW (L) ?" IF YOU WISH TO CHANGE ANY PARAMETERS, ANSWER BY TYPING "Y". THE FOLLOWING SOFTWARE P-TABLE QUESTIONS ARE ASKED BY THE PROGRAM IF THE OPERATOR INDICATES THAT THE SOFTWARE PARAMETERS ARE TO BE CHANGED:

1. REPORT UNIT NUMBER AS EACH UNIT IS TESTED - THIS QUESTION ASKS WHETHER THE PROGRAM SHOULD REPORT THE NUMBER OF THE UNIT WHICH IT IS TESTING AS IT BEGINS TO TEST EACH UNIT.

2. NUMBER OF INDIVIDUAL DATA ERRORS TO REPORT ON A LINE - THIS QUESTION ASKS FOR THE NUMBER OF DATA ERRORS WHICH SHOULD BE REPORTED INDIVIDUALLY BY THIS PROGRAM FOR EACH LINE FOR EACH TRANSMISSION TEST. ERRORS WHICH ARE NOT REPORTED INDIVIDUALLY ARE REPORTED IN SUMMARY ERROR REPORTS.

2.7 EXTENDED P-TABLE DIALOGUE

WHEN YOU ANSWER THE HARDWARE QUESTIONS, YOU ARE BUILDING ENTRIES IN A TABLE THAT DESCRIBES THE DEVICES UNDER TEST. THE SIMPLEST WAY TO BUILD THIS TABLE IS TO ANSWER ALL QUESTIONS FOR EACH UNIT TO BE TESTED. IF YOU HAVE A MULTIPLEXED DEVICE SUCH AS A MASS STORAGE CONTROLLER WITH SEVERAL DRIVES OR A COMMUNICATION DEVICE WITH SEVERAL LINES, THIS BECOMES TEDIOUS SINCE MOST OF THE ANSWERS ARE REPETITIOUS.

TO ILLUSTRATE A MORE EFFICIENT METHOD, SUPPOSE YOU ARE TESTING A FICTIONAL DEVICE, THE XY11. SUPPOSE THIS DEVICE CONSISTS OF A CONTROL MODULE WITH EIGHT UNITS (SUB-DEVICES) ATTACHED TO IT. THESE UNITS ARE DESCRIBED BY THE OCTAL NUMBERS 0 THROUGH 7. THERE IS ONE HARDWARE PARAMETER THAT CAN VARY AMONG UNITS CALLED THE Q-FACTOR. THIS Q-FACTOR MAY BE 0 OR 1. BELOW IS A SIMPLE WAY TO BUILD A TABLE FOR ONE XY11 WITH EIGHT UNITS.

```
# UNITS (D) ?  8<CR>

UNIT 1
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  0<CR>
Q-FACTOR (O) 0 ?  1<CR>

UNIT 2
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  1<CR>
Q-FACTOR (O) 1 ?  0<CR>

UNIT 3
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  2<CR>
Q-FACTOR (O) 0 ?  <CR>

UNIT 4
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  3<CR>
Q-FACTOR (O) 0 ?  <CR>

UNIT 5
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  4<CR>
Q-FACTOR (O) 0 ?  <CR>

UNIT 6
```

```
                CSR ADDRESS (O) ?  160000<CR>
                SUB-DEVICE # (O) ?  5<CR>
                Q-FACTOR (O) 0 ?  <CR>

                UNIT 7
                CSR ADDRESS (O) ?  160000<CR>
                SUB-DEVICE # (O) ?  6<CR>
                Q-FACTOR (O) 0 ?  1<CR>

                UNIT 8
                CSR ADDRESS (O)  160000<CR>
                SUB-DEVICE # (O) ?  7<CR>
                Q-FACTOR (O) 1 ?  <CR>
```

NOTICE THAT THE DEFAULT VALUE FOR THE Q-FACTOR CHANGES WHEN A NON-DEFAULT RESPONSE IS GIVEN. BE CAREFUL WHEN SPECIFYING MULTIPLE UNITS!

AS YOU CAN SEE FROM THE ABOVE EXAMPLE, THE HARDWARE PARAMETERS DO NOT VARY SIGNIFICANTLY FROM UNIT TO UNIT. THE PROCEDURE SHOWN IS NOT VERY EFFICIENT.

THE RUNTIME SERVICES CAN TAKE MULTIPLE UNIT SPECIFICATIONS HOWEVER. LET'S BUILD THE SAME TABLE USING THE MULTIPLE SPECIFICATION FEATURE.

```
        # UNITS (D) ?  8<CR>

        UNIT 1
        CSR ADDRESS (O) ?  160000<CR>
        SUB-DEVICE # (O) ?  0,1<CR>
        Q-FACTOR (O) 0 ?  1,0<CR>

        UNIT 3
        CSR ADDRESS (O) ?  160000<CR>
        SUB-DEVICE # (O) ?  2-5<CR>
        Q-FACTOR (O) 0 ?  0<CR>

        UNIT 7
        CSR ADDRESS (O) ?  160000<CR>
        SUB-DEVICE # (O) ?  6,7<CR>
        Q-FACTOR (O) 0 ?  1<CR>
```

AS YOU CAN SEE IN THE ABOVE DIALOGUE, THE RUNTIME SERVICES WILL BUILD AS MANY ENTRIES AS IT CAN WITH THE INFORMATION GIVEN IN ANY ONE PASS THROUGH THE QUESTIONS. IN THE FIRST PASS, TWO ENTRIES ARE BUILT SINCE TWO SUB-DEVICES AND Q-FACTORS WERE SPECIFIED. THE SERVICES ASSUME THAT THE CSR ADDRESS IS 160000 FOR BOTH SINCE IT WAS SPECIFIED ONLY ONCE. IN THE SECOND PASS, FOUR ENTRIES WERE BUILT. THIS IS BECAUSE FOUR SUB-DEVICES WERE SPECIFIED. THE "-" CONSTRUCT TELLS THE RUNTIME SERVICES TO INCREMENT THE DATA FROM THE FIRST NUMBER TO THE SECOND. IN THIS CASE, SUB-DEVICES 2, 3, 4 AND 5 WERE SPECIFIED. (IF THE SUB-DEVICE WERE SPECIFIED BY ADDRESSES, THE INCREMENT WOULD BE BY 2 SINCE ADDRESSES MUST BE ON AN EVEN BOUNDARY.) THE CSR ADDRESSES AND Q-FACTORS FOR THE FOUR ENTRIES ARE ASSUMED TO BE 160000 AND 0 RESPECTIVELY

SINCE THEY WERE ONLY SPECIFIED ONCE. THE LAST TWO UNITS ARE SPECIFIED IN THE THIRD PASS.

THE WHOLE PROCESS COULD HAVE BEEN ACCOMPLISHED IN ONE PASS AS SHOWN BELOW.

```
# UNITS (D) ?  8<CR>

UNIT 1
CSR ADDRESS (O) ?  160000<CR>
SUB-DEVICE # (O) ?  0-7<CR>
Q-FACTOR (O) 0 ?  0,1,0,,,,1,1<CR>
```

AS YOU CAN SEE FROM THIS EXAMPLE, NULL REPLIES (COMMAS ENCLOSING A NULL FIELD) TELL THE RUNTIME SERVICES TO REPEAT THE LAST REPLY.

2.8 QUICK START-UP PROCEDURE (XXDP+)

TO START-UP THIS PROGRAM:

1. BOOT XXDP+
2. GIVE THE DATE AND ANSWER THE LSI AND 50HZ (IF THERE IS A CLOCK AND THE QUESTION IS ASKED) QUESTIONS
3. TYPE "R NAME", WHERE NAME IS THE NAME OF THE BIN OR BIC FILE FOR THIS PROGRAM
4. TYPE "START"
5. ANSWER THE "CHANGE HW" QUESTION WITH "Y"
6. ANSWER ALL THE HARDWARE QUESTIONS
7. ANSWER THE "CHANGE SW" QUESTION WITH "N"

WHEN YOU FOLLOW THIS PROCEDURE YOU WILL BE USING ONLY THE DEFAULTS FOR FLAGS AND SOFTWARE PARAMETERS. FOR DEFAULT INFORMATION SEE THE SECTIONS WITHIN THIS DOCUMENT ON FLAGS,AND HARDWARE QUESTIONS.

3.0 ERROR INFORMATION

3.1 TYPES OF ERROR MESSAGES

THERE ARE THREE LEVELS OF ERROR MESSAGES THAT MAY BE ISSUED BY A DIAGNOSTIC: GENERAL, BASIC AND EXTENDED. GENERAL ERROR MESSAGES ARE ALWAYS PRINTED UNLESS THE "IER" FLAG IS SET (SEE THE FLAGS SECTION OF THIS DOCUMENT).

THE GENERAL ERROR MESSAGE IS OF THE FORM:

```
NAME  TYPE  NUMBER  ON UNIT NUMBER  TST NUMBER PC:XXXXXX
ERROR MESSAGE
```

,WHERE; NAME = DIAGNOSTIC NAME
TYPE = ERROR TYPE (SYS FATAL, DEV FATAL, HARD OR SOFT)
NUMBER = ERROR NUMBER
UNIT NUMBER = 0 - N (N IS LAST UNIT IN PTABLE)
TST NUMBER = TEST AND SUBTEST WHERE ERROR OCCURRED
PC:XXXXXX = ADDRESS OF ERROR MESSAGE CALL

BASIC ERROR MESSAGES ARE MESSAGES THAT CONTAIN SOME ADDITIONAL INFORMATION ABOUT THE ERROR. THESE ARE ALWAYS PRINTED UNLESS THE "IER" OR "IBR" FLAGS ARE SET (SEE THE FLAGS SECTION OF THIS DOCUMENT).
THESE MESSAGES ARE PRINTED AFTER THE ASSOCIATED GENERAL MESSAGE.

EXTENDED ERROR MESSAGES CONTAIN SUPPLEMENTARY ERROR INFORMATION SUCH AS REGISTER CONTENTS OR GOOD/BAD DATA. THESE ARE ALWAYS PRINTED UNLESS THE "IER", "IBR" OR "IXR" FLAGS ARE SET (SEE THE FLAGS SECTION OF THIS DOCUMENT).
THESE MESSAGES ARE PRINTED AFTER THE ASSOCIATED GENERAL ERROR MESSAGE AND ANY ASSOCIATED BASIC ERROR MESSAGES.

3.2 ERROR MESSAGES

THIS PROGRAM IS INTENDED TO PROVIDE A GO/NO-GO INDICATION OF THE FUNCTIONALITY OF DHV-11 BOARDS. TO EXECUTE THE PROGRAM IN THIS MODE THE OPERATOR CAN RUN WITH THE INHIBIT BASIC ERROR REPORTING SWITCH. IN THIS MODE THE PROGRAM PRINTS ERROR MESSAGES WHICH CONTAIN THE ERROR MESSAGE HEADER DESCRIBED ABOVE, PLUS THE NAME OF THE FAILING TEST. FOR A LIST OF THE TEST NAMES IN THIS PROGRAM SEE THE TEST SUMMARIES SECTION OF THIS DOCUMENT. AN EXAMPLE OF SUCH AN ERROR MESSAGE IS THE FOLLOWING:

```
CVDHC DVC FTL ERR 01603 ON UNIT 02 TST 015 SUB 000 PC: 015244
DEVICE REGISTER WORD READ/WRITE TEST
```

THIS ERROR INDICATES THAT A FATAL ERROR WAS ENCOUNTERED WITHIN THE TEST WHICH TESTS THE READ/WRITE CAPABILITY OF THE DHV-11 REGISTERS.

IF THE OPERATOR REQUIRES MORE EXTENSIVE ERROR REPORTING HE CAN RUN WITH ALL ERROR REPORTING ENABLED BY NOT USING THE INHIBIT REPORTING SWITCHES. THE ABOVE ERROR MESSAGE WOULD THEN BECOME THE FOLLOWING:

```
CVDHC DVC FTL ERR 01603 ON UNIT 02 TST 015 SUB 000 PC: 015244
DEVICE REGISTER WORD READ/WRITE TEST
  BAD BIT(S) IN DEVICE TBUFFAD1 REGISTER FOR LINE  7 (D).
    EXPECTED DATA: 000000 (O).
    ACTUAL DATA:   000023 (O).
```

4.0 PERFORMANCE AND PROGRESS REPORTS

AT THE END OF EACH PASS, THE PASS COUNT IS GIVEN ALONG WITH THE TOTAL NUMBER OF ERRORS REPORTED SINCE THE DIAGNOSTIC WAS STARTED. THE "EOP" SWITCH CAN BE USED TO CONTROL HOW OFTEN THE END OF PASS MESSAGE IS PRINTED. FOR FUTHER INFORMATION SEE THE SWITCHES SECTION OF THIS

DOCUMENT.

5.0 TEST SUMMARIES

THE FOLLOWING TESTS ARE INCLUDED WITHIN CVDHC:

1. DEVICE REGISTER ADDRESS TEST - VERIFIES THAT THE UUT REGISTERS WILL RESPOND WITHT THE PROPER Q-BUS HANDSHAKING WHEN ACCESSED. VERIFIES THAT THE UUT IS AT THE PROPER ADDRESS.

2. FRAMING.ERROR TEST - VERIFIES THAT FORCED FRAMING ERRORS ARE REPORTED CORRECTLY.

3. PARITY.ERROR TEST - VERIFIES THAT FORCED PARITY ERRORS ARE REPORTED CORRECTLY.

4. BREAK TEST - VERIFIES THAT SETTING THE BREAK BIT ON ANY LINE CAUSES THAT LINE TO GO TO A SPACING STATE AND THAT CLEARING THE BREAK BIT REMOVES THE LINE FROM THE SPACING STATE.

5. NO OVERRUN.ERROR TEST - VERIFIES THAT THE UUT WILL RECEIVE THE MAXIMUM NUMBER OF CHARACTERS WITHOUT CAUSING AN OVERRUN ERROR.

6. OVERRUN.ERROR TEST - VERIFIES THAT IF MORE THAN THE MAXIMUM NUMBER OF CHARACTERS ARE SENT TO THE UUT OVERRUN ERRORS OCCUR.

7. SINGLE CHARACTER MODE TX/RX TEST - VERIFIES THAT THE UUT WILL TX AND RX DATA CORRECLTY IN SINGLE CHARACTER MODE.

8. DMA MODE TX/RX TEST - VERIFIES THAT THE UUT WILL TX AND RX DATA CORRECTLY USING DMA TRANSMISSION.

9. SPLIT SPEED TEST - VERIFIES THAT THE UUT WILL WORK WITH DIFFERENT TX AND RX SPEEDS ON EACH ACTIVE LINE.

10. REPORT BMP CODES TEST - THIS PSEUDO TEST REPORTS THE FIRST 32 BMP CODES WHICH WERE DISCOVERED IN THE FIFO DURING THE EXECUTION OF THE OTHER TESTS. THIS AVOIDS THE INTERRUPTION OF OTHER TESTS BY THESE CODES, IF THEY ARE NOT CRITICAL TO THE TESTS BEING PERFORMED.

6.0 EXAMPLE ERROR FREE PASS

THE FOLLOWING IS AN EXAMPLE OF AN ERROR FREE PASS DIALOGUE:

```
.R CVDHCA0
CVDHCA0.BIC

DRS
CVDHC-A-0
DHV-11 FUNC TST PART3
```

```
CVDHCA0 DHV-11 FUNC TST PART1   MACY11 30A(1052)  12-JUL-83  13:56  PAGE 20
CVDHCA.P11    12-JUL-83 11:44          PROGRAM DOCUMENT

        UNIT IS DHV-11
        RESTART ADDR: 147670
        DR>STA

        CHANGE HW (L)  ? Y

        # UNITS (D)  ? 2

        UNIT 0
        CSR ADDRESS:  (O)  160020 ? ^Z

        UNIT 1
        CSR ADDRESS:  (O)  160020 ? 160040
        INTERRUPT VECTOR ADDRESS:  (O) 300 ? 320
        ACTIVE LINE BIT MAP:  (O)  377 ? <CR>
        TYPE OF LOOPBACK (1=INTERNAL OR NONE,2=STAGGERD,
                          3=25 PIN CONNECTOR):  (O)  2 ? 1
        INTERRUPT BR LEVEL:  (O)  4? <CR>

        CHANGE SE (L)  ? Y

        REPORT UNIT NUMBER AS EACH UNIT IS TESTED:  (L) Y ? <CR>
        NUMBER OF INDIVIDUAL DATA ERRORS TO REPORT ON A LINE:  (D)  0 ? 4

         TESTING UNIT :  0

         TESTING UNIT :  1

        CVDHC EOP    1
            0 CUMULATIVE ERRORS

         TESTING UNIT :  0
        ^C
        DR> EXIT

        .
```

&

```
                        .LIST SEQ,LOC,BIN,MEB
                        .NLIST CND



                        .SBTTL  PROGRAM HEADER


                                .MCALL  SVC
000000'                         SVC                             ; INITIALIZE SUPERVISOR MACROS
        000001          SVCINS= 1       ; LIST INSTRUCTIONS, SHIFTED RIGHT
        000001          SVCTST= 1       ; LIST TEST TAGS, SHIFTED RIGHT
        000001          SVCSUB= 1       ; LIST SUBTEST TAGS, SHIFTED RIGHT
        000001          SVCGBL= 1       ; LIST GLOBAL TAGS, SHIFTED RIGHT
        000001          SVCTAG= 1       ; LIST OTHER TAGS, SHIFTED RIGHT

                        .ENABL  ABS
                        .ENABL  AMA
        002000          .       =       2000

002000                          BGNMOD

                        ;++
                        ; THE PROGRAM HEADER IS THE INTERFACE BETWEEN
                        ; THE DIAGNOSTIC PROGRAM AND THE SUPERVISOR.
                        ;--

002000                  POINTER BGNRPT,BGNSW,BGNSFT,BGNDU,ERRTBL


002000                  HEADER  CVDHC,A,0,230,0,PRI07
002000
002000  103
002001  126
002002  104
002003  110
002004  103
002005  000
002006  000
002007  000
002010
002010  101
002011
002011  060
002012
002012  000000
002014
002014  000230
002016
002016  034274
002020
002020  034632
002022
002022  002152
002024
002024  002164
```

```
L$NAME::
        .ASCII  /C/
        .ASCII  /V/
        .ASCII  /D/
        .ASCII  /H/
        .ASCII  /C/
        .BYTE   0
        .BYTE   0
        .BYTE   0
L$REV::
        .ASCII  /A/
L$DEPO::
        .ASCII  /0/
L$UNIT::
        .WORD   0
L$TIML::
        .WORD   230
L$HPCP::
        .WORD   L$HARD
L$SPCP::
        .WORD   L$SOFT
L$HPTP::
        .WORD   L$HW
L$SPTP::
        .WORD   L$SW
```

```
1041   002026
1042   002026  035072
1043   002030
1044   002030  000000
1045   002032
1046   002032  000000
1047   002034
1048   002034  000000
1049   002036
1050   002036  000000
1051   002040
1052   002040  002124
1053   002042
1054   002042  000340
1055   002044
1056   002044  000000
1057   002046
1058   002046  000000
1059   002050
1060   002050     003
1061   002051     003
1062   002052
1063   002052  000000
1064   002054  000000
1065   002056
1066   002056  000000
1067   002060
1068   002060  005272
1069   002062
1070   002062  025652
1071   002064
1072   002064  000000
1073   002066
1074   002066  000000
1075   002070
1076   002070  000000
1077   002072
1078   002072  026540
1079   002074
1080   002074  000000
1081   002076
1082   002076  005302
1083   002100
1084   002100  104035
1085   002102
1086   002102  005222
1087   002104
1088   002104  025666
1089   002106
1090   002106  026522
1091   002110
1092   002110  026520
1093   002112
1094   002112  025660
1095   002114
1096   002114  000000
```

```
L$LADP::
        .WORD   L$LAST
L$STA::
        .WORD   0
L$CO::
        .WORD   0
L$DTYP::
        .WORD   0
L$APT::
        .WORD   0
L$DTP::
        .WORD   L$DISPATCH
L$PRIO::
        .WORD   PRI07
L$ENVI::
        .WORD   0
L$EXP1::
        .WORD   0
L$MREV::
        .BYTE   C$REVISION
        .BYTE   C$EDIT
L$EF::
        .WORD   0
        .WORD   0
L$SPC::
        .WORD   0
L$DEVP::
        .WORD   L$DVTYP
L$REPP::
        .WORD   L$RPT
L$EXP4::
        .WORD   0
L$EXP5::
        .WORD   0
L$AUT::
        .WORD   0
L$DUT::
        .WORD   L$DU
L$LUN::
        .WORD   0
L$DESP::
        .WORD   L$DESC
L$LOAD::
        EMT     E$LOAD
L$ETP::
        .WORD   L$ERRTBL
L$ICP::
        .WORD   L$INIT
L$CCP::
        .WORD   L$CLEAN
L$ACP::
        .WORD   L$AUTO
L$PRT::
        .WORD   L$PROT
L$TEST::
        .WORD   0
```

```
  1097  002116
  1098  002116  000000
  1099  002120
  1100  002120  000000
  1101
```

```
L$DLY::
        .WORD   0
L$HIME::
        .WORD   0
```

```
1102                                    .SBTTL  DISPATCH TABLE
1103
1104                                    ;++
1105                                    ; THE DISPATCH TABLE CONTAINS THE STARTING ADDRESS OF EACH TEST.
1106                                    ; IT IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST.
1107                                    ;--
1108
1109   002122                                   DISPATCH 10
1110   002122  000012                                                          .WORD   10
1111   002124                                                         L$DISPATCH::
1112   002124  026656                                                          .WORD   T1
1113   002126  027146                                                          .WORD   T2
1114   002130  027530                                                          .WORD   T3
1115   002132  030124                                                          .WORD   T4
1116   002134  030550                                                          .WORD   T5
1117   002136  031254                                                          .WORD   T6
1118   002140  032210                                                          .WORD   T7
1119   002142  032724                                                          .WORD   T8
1120   002144  033552                                                          .WORD   T9
1121   002146  034212                                                          .WORD   T10
1122
```

```
1123
1124
1125                                    .SBTTL  DEFAULT HARDWARE P-TABLE
1126
1127                                    ;++
1128                                    ; THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
1129                                    ; THE TEST-DEVICE PARAMETERS.  THE STRUCTURE OF THIS TABLE
1130                                    ; IS IDENTICAL TO THE STRUCTURE OF THE HARDWARE P-TABLES,
1131                                    ; AND IS USED AS A "TEMPLATE" FOR BUILDING THE P-TABLES.
1132                                    ;--
1133
1134  002150                                    BGNHW   DFPTBL
1135  002150  000004                                                                   .WORD   L10000-L$HW/2
1136  002152                                                                    L$HW::
1137  002152                                                                    DFPTBL::
1138
1139  002152  160020                           .WORD   160020  ;DEFAULT CSR ADDRESS
1140  002154  000300                           .WORD   300     ;DEFAULT VECTOR ADDRESS
1141  002156  177777                           .WORD   177777  ;DEFAULT ACTIVE LINES BIT MAP
1142  002160     002                           .BYTE   2       ;DEFAULT LOOPBACK MODE
1143  002161     004                           .BYTE   4       ;DEFAULT BR LEVEL
1144
1145  002162                                    ENDHW
1146  002162                                                                    L10000:
```

```
1147
1148
1149                                    .SBTTL  SOFTWARE P-TABLE
1150
1151                                    ;++
1152                                    ; THE SOFTWARE TABLE CONTAINS VARIOUS DATA USED BY THE
1153                                    ; PROGRAM AS OPERATIONAL PARAMETERS.  THESE PARAMETERS ARE
1154                                    ; SET UP AT ASSEMBLY TIME AND MAY BE VARIED BY THE OPERATOR
1155                                    ; AT RUN TIME.
1156                                    ;--
1157
1158  002162                                    BGNSW   SFPTBL
1159  002162  000002                                                                   .WORD   L10001-L$SW/2
1160  002164                                                                  L$SW::
1161  002164                                                                  SFPTBL::
1162
1163  002164  000020                           OPTION::        .WORD   20      ;BIT MAP OF PROGRAM CONTROL FLAGS
1164  002166  000000                           NDERPT::        .WORD   0       ;DEFAULT NUMBER OF INDIVIDUAL DATA ERRORS TO RPT
1165
1166  002170                                    ENDSW
1167  002170                                                                  L10001:
```

```
1168
1169                            .SBTTL  GLOBAL EQUATES SECTION
1170
1171
1172
1173
1174                            ;++
1175                            ; THE GLOBAL EQUATES SECTION CONTAINS PROGRAM EQUATES THAT
1176                            ; ARE USED IN MORE THAN ONE TEST.
1177                            ;--
1178
1179   000010                           NUMLNS==10      ;NUMBER OF LINES ON DHV11 IS 8.
1180   000377                           MAPLNS==377     ;BIT MAP OF LINES ON DHV11.
1181
1182                            ;****** DEVICE REGISTER OFFSETS FROM THE CSR'S ADDRESS ******
1183   000000                           CSR0==0         ;CSR REGISTER OFFSET FROM THE CSR ADDRESS
1184   000002                           RBUF0==2        ;RECEIVE REGISTER OFFSET FROM THE CSR ADDRESS
1185   000002                           TXCHR0==2       ;TRANSMIT REGISTER OFFSET FROM THE CSR ADDRESS
1186   000004                           LPR0==4         ;LINE PARAMETER REGISTER OFFSET FROM THE CSR ADDRESS
1187   000006                           STAT0==6        ;STATUS REGISTER OFFSET FROM THE CSR ADDRESS
1188   000010                           LNCTR0==10      ;LINE CONTROL REGISTER OFFSET FROM THE CSR ADDRESS
1189   000012                           TXAD10==12      ;TRANSMIT ADDRESS 1 REGISTER OFFSET FROM THE CSR ADDRESS
1190   000014                           TXAD20==14      ;TRANSMIT ADDRESS 2 REGISTER OFFSET FROM THE CSR ADDRESS
1191   000016                           TXBFC0==16      ;TRANSMIT COUNT REGISTER OFFSET FROM THE CSR ADDRESS
1192
1193                            ;****** EQUATES USED WITH RESPECT TO THE RX BUFFER ******
1194   000020                           RXBETX==16.     ;LEVEL OF RX BUFFER AT WHICH TO RE-ENABLE TRANSMISSION.
1195   000030                           RXBDTX==24.     ;LEVEL OF RX BUFFER AT WHICH TO DISABLE TRANSMISSION.
1196   000100                           RXBFUL==64.     ;TOTAL CHARACTER CAPACITY OF THE RX BUFFER.
1197
1198
1199   002170                                   EQUALS
1200                                   ;
1201                                   ; BIT DIFINITIONS
1202                                   ;
1203   100000                          BIT15== 100000
1204   040000                          BIT14== 40000
1205   020000                          BIT13== 20000
1206   010000                          BIT12== 10000
1207   004000                          BIT11== 4000
1208   002000                          BIT10== 2000
1209   001000                          BIT09== 1000
1210   000400                          BIT08== 400
1211   000200                          BIT07== 200
1212   000100                          BIT06== 100
1213   000040                          BIT05== 40
1214   000020                          BIT04== 20
1215   000010                          BIT03== 10
1216   000004                          BIT02== 4
1217   000002                          BIT01== 2
1218   000001                          BIT00== 1
1219                                   ;
1220   001000                          BIT9==  BIT09
1221   000400                          BIT8==  BIT08
1222   000200                          BIT7==  BIT07
1223   000100                          BIT6==  BIT06
```

```
1224    000040          BIT5==  BIT05
1225    000020          BIT4==  BIT04
1226    000010          BIT3==  BIT03
1227    000004          BIT2==  BIT02
1228    000002          BIT1==  BIT01
1229    000001          BIT0==  BIT00
1230                    ;
1231                    ; EVENT FLAG DEFINITIONS
1232                    ;   EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
1233                    ;
1234    000040          EF.START==      32.                     ; START COMMAND WAS ISSUED
1235    000037          EF.RESTART==    31.                     ; RESTART COMMAND WAS ISSUED
1236    000036          EF.CONTINUE==   30.                     ; CONTINUE COMMAND WAS ISSUED
1237    000035          EF.NEW==        29.                     ; A NEW PASS HAS BEEN STARTED
1238    000034          EF.PWR==        28.                     ; A POWER-FAIL/POWER-UP OCCURRED
1239                    ;
1240                    ;
1241                    ; PRIORITY LEVEL DEFINITIONS
1242                    ;
1243    000340          PRI07== 340
1244    000300          PRI06== 300
1245    000240          PRI05== 240
1246    000200          PRI04== 200
1247    000140          PRI03== 140
1248    000100          PRI02== 100
1249    000040          PRI01== 40
1250    000000          PRI00== 0
1251                    ;
1252                    ;OPERATOR FLAG BITS
1253                    ;
1254    000004          EVL==           4
1255    000010          LOT==          10
1256    000020          ADR==          20
1257    000040          IDU==          40
1258    000100          ISR==         100
1259    000200          UAM==         200
1260    000400          BOE==         400
1261    001000          PNT==        1000
1262    002000          PRI==        2000
1263    004000          IXE==        4000
1264    010000          IBE==       10000
1265    020000          IER==       20000
1266    040000          LOE==       40000
1267    100000          HOE==      100000
1268
```

```
1269
1270
1271                                    .SBTTL  GLOBAL DATA SECTION
1272
1273                                    ;++
1274                                    ; THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
1275                                    ; IN MORE THAN ONE TEST.
1276                                    ;--
1277
1278                                    ;*****************************************************************************
1279                                    ;       UNIT VARIBLE AREA
1280                                    ;*****************************************************************************
1281
1282  002170  000300                            RXVECA:: .WORD  300     ;RX VECTOR ADDRESS.
1283  002172  000304                            TXVECA:: .WORD  304     ;TX VECTOR ADDRESS.
1284  002174  000377                            ACTLNS:: .WORD  377     ;ACTIVE LINE BIT MAP.
1285  002176     000                            LOPBCK:: .BYTE  0       ;LOOPBACK MODE
1286  002177     004                            BRLEVL:: .BYTE  4       ;INTERRUPT BUS REQUEST LEVEL
1287  002200  000000                            UNITN:: .WORD   0       ;UNIT NUMBER.
1288
1289                                    ;*****************************************************************************
1290                                    ;       DEVICE REGISTER ADDRESS TABLE
1291                                    ;*****************************************************************************
1292  002202                                    DRADRT::
1293  002202  160000                            CSRA::  .WORD   160000  ;DHV-11 CSR ADDRESS
1294  002204  160002                    TXCHA:: RBUFA:: .WORD   160002  ;DHV-11 RECEIVE/TRANSMIT BUFFER ADDRESS
1295  002206  160004                            LPRA::  .WORD   160004  ;DHV-11 LINE PARAMETER REGISTER ADDRESS
1296  002210  160006                            STATA:: .WORD   160006  ;DHV-11 STATUS REGISTER ADDRESS
1297  002212  160010                            LNCTRA:: .WORD  160010  ;DHV-11 LINE CONTROL REGISTER ADDRESS
1298  002214  160012                            TXAD1A:: .WORD  160012  ;DHV-11 TRANSMIT BUFFER 1 REGISTER ADDRESS
1299  002216  160014                            TXAD2A:: .WORD  160014  ;DHV-11 TRANSMIT BUFFER 2 REGISTER ADDRESS
1300  002220  160016                            TXBFCA:: .WORD  160016  ;DHV-11 TRANSMIT BUFFER COUNT REGISTER ADDRESS
1301
1302                                    ;*****************************************************************************
1303                                    ;       ASSORTED GLOBAL VARIABLES:
1304                                    ;*****************************************************************************
1305  002222  000000                            CTRLCF:: .WORD  0       ;STORAGE FOR THE CONTROL-C FLAG.
1306  002224  000001                            TSTNUM:: .WORD  1       ;STORAGE FOR THE TEST NUMBER.
1307  002226  000000                            IBM::    .WORD  0       ;INACTIVE TX/RX BITS MASK.
1308  002230  031463                            LGRP1M:: .WORD  31463   ;BIT MAP OF LINES IN LINE GROUP I.
1309  002232  146314                            LGRP2M:: .WORD  146314  ;BIT MAP OF LINES IN LINE GROUP II.
1310  002234  000000                            IESTAT:: .WORD  0       ;STORAGE FOR STATES OF THE DUT INT ENABLE BITS.
1311  002236  000000                            PASCNT:: .WORD  0       ;STO'G FOR PASS COUNT USED IN ROM VERSION# TST.
1312  002240  000000                            WORD1::  .WORD  0       ;LOCATION FOR PASSING INDIRECT PARAMETERS.
1313  002242  000000                            RXTOUT:: .WORD  0       ;TIME-OUT VALUE FOR WAITING FOR LAST RX CHAR.
1314  002244  000000                            SAVTEN:: .WORD  0       ;STORAGE FOR TX.ENABLE STATES, (TXROFF, TXRON).
1315  002246  000000                            SAVPRI:: .WORD  0       ;STO'G FOR PROCESSOR PRIORITY, (TXROFF, TXRON).
1316  002250  000000                            TXENBM:: .WORD  0       ;STORAGE FOR TX.ENABLE STATES, (BUFFER MGM'NT).
1317  002252  000000                            TXINTF:: .WORD  0       ;STORAGE FOR TRANSMIT INTERRUPT FLAGS.
1318  002254  000000                            TP4VEC:: .WORD  0       ;STORAGE FOR THE NORMAL 004 TRAP VECTOR.
1319  002256  000000                            TP4FLG:: .WORD  0       ;FLAGS SET WHEN AN EXPECTED 004 TRAP OCCURS.
1320                                    ;*****************************************************************************
1321                                    ;       LINE TIME CLOCK VARIABLES AND STORAGE.
1322                                    ;*****************************************************************************
1323  002260  177546                            CLKCSR:: .WORD  177546  ;CSR ADDRESS OF THE LTC.
1324  002262  000300                            CLKBRL:: .WORD  PRI06   ;INTERRUPT PRIORITY LEVEL OF THE LTC.
```

```
1325  002264  000100                    CLKVEC:: .WORD  100     ;INTERRUPT VECTOR ADDRESS OF THE LTC.
1326  002266  000074                    CLKHRZ:: .WORD  60.     ;INTERRUPT FREQUENCY OF THE LTC.
1327  002270  000000                    TIMER1:: .WORD  0       ;HARDWARE CLOCK COUNTER #1.
1328  002272  000000                    TIMER2:: .WORD  0       ;HARDWARE CLOCK COUNTER #2.
1329  002274  000170                    TIMER3:: .WORD  120.    ;HARDWARE BREAK COUNTER LOCATION.
1330  002276  000170                    BCOUNT:: .WORD  120.    ;BREAK COUNT VALUE IN CLOCK TICKS.
1331  002300  000021                    MSTICK:: .WORD  17.     ;NUMBER OF MILLI-SECONDS PER LTC TICK.
1332  002302  000062                    MSLCNT:: .WORD  62      ;LOOP COUNT (USED BY MSLOOP) TO DELAY 1 MS.
1333
1334                                ;*****************************************************************************
1335                                ;       MEMMORY MANAGEMENT VARIABLES AND FLAGS.
1336                                ;*****************************************************************************
1337  002304  177572                    MMSR0:: .WORD   177572  ;ADDRESS OF MEM MGT STATUS REGISTER #0.
1338  002306  000000                    MMPRES:: .WORD  0       ;MEM MGT PRESENT FLAG (0 IF MM NOT PRESENT).
1339  002310  000000                    MMENAB:: .WORD  0       ;MEM MGT ENABLED FLAG (0 IF MM NOT ENABLED).
1340
1341  002312                        PARATB::                    ;BASE OF MEM MGT PAR ADDRESS TABLE.
1342  002312  172340                    PAR0A:: .WORD   172340  ;ADDRESS OF MEM MGT PAR #0.
1343  002314  172342                    PAR1A:: .WORD   172342  ;ADDRESS OF MEM MGT PAR #1.
1344  002316  172344                    PAR2A:: .WORD   172344  ;ADDRESS OF MEM MGT PAR #2.
1345  002320  172346                    PAR3A:: .WORD   172346  ;ADDRESS OF MEM MGT PAR #3.
1346  002322  172350                    PAR4A:: .WORD   172350  ;ADDRESS OF MEM MGT PAR #4.
1347  002324  172352                    PAR5A:: .WORD   172352  ;ADDRESS OF MEM MGT PAR #5.
1348  002326  172354                    PAR6A:: .WORD   172354  ;ADDRESS OF MEM MGT PAR #6.
1349  002330  172356                    PAR7A:: .WORD   172356  ;ADDRESS OF MEM MGT PAR #7.
1350  002332                        PARATE::                    ;END OF PAR ADDRESS TABLE.
1351                                ;*****************************************************************************
1352                                ;       TABLE OF WORDS WITH CORRESPONDING BIT SET FOR GENERATION OF BIT MAPS.
1353                                ;*****************************************************************************
1354  002332  000001                BITTBL:: .WORD  1               ;BIT 0 SET.
1355  002334  000002                        .WORD   2               ;BIT 1 SET.
1356  002336  000004                        .WORD   4               ;BIT 2 SET.
1357  002340  000010                        .WORD   10              ;BIT 3 SET.
1358  002342  000020                        .WORD   20              ;BIT 4 SET.
1359  002344  000040                        .WORD   40              ;BIT 5 SET.
1360  002346  000100                        .WORD   100             ;BIT 6 SET.
1361  002350  000200                        .WORD   200             ;BIT 7 SET.
1362  002352  000400                        .WORD   400             ;BIT 8 SET.
1363  002354  001000                        .WORD   1000            ;BIT 9 SET.
1364  002356  002000                        .WORD   2000            ;BIT 10 SET.
1365  002360  004000                        .WORD   4000            ;BIT 11 SET.
1366  002362  010000                        .WORD   10000           ;BIT 12 SET.
1367  002364  020000                        .WORD   20000           ;BIT 13 SET.
1368  002366  040000                        .WORD   40000           ;BIT 14 SET.
1369  002370  100000                        .WORD   100000          ;BIT 15 SET.
1370
1371                                ;*****************************************************************************
1372                                ;*      GPR SAVE AREAS ZERO AND ONE.
1373                                ;*****************************************************************************
1374  002372                        GPRS0B::                    ;BASE OF GPR SAVE AREA NUMBER ZERO.
1375  002372  000000                        .WORD   0               ;WORD 1, STORAGE FOR R1.
1376  002374  000000                        .WORD   0               ;WORD 2, STORAGE FOR R2.
1377  002376  000000                        .WORD   0               ;WORD 3, STORAGE FOR R3.
1378  002400  000000                        .WORD   0               ;WORD 4, STORAGE FOR R4.
1379  002402  000000                        .WORD   0               ;WORD 5, STORAGE FOR R5.
1380                                ;*****************************************************************************
```

```
1381                                    ;*      TRANSMISSION AND RECEPTION VARIABLES, POINTERS, AND FLAGS.
1382                                    ;*****************************************************************************
1383   002404  000000                   CHRTOT:: .WORD  0               ;TOTAL RECEIVED CHARACTER COUNTER.
1384   002406  000000                   ERSMRF:: .WORD  0               ;"PRINT ERROR SUMMARY" FLAGS.
1385   002410  000000                   TXDONF:: .WORD  0               ;TRANSMISSION DONE FLAGS.
1386   002412  000000                   RXDONF:: .WORD  0               ;RECEPTION DONE FLAGS.
1387   002414  000000                   TXDBLF:: .WORD  0               ;"TX HAS BEEN DISABLED" FLAG.
1388                                    ;*****************************************************************************
1389                                    ;       STORAGE AREA FOR THE BMP CODE QUEUE.
1390                                    ;*****************************************************************************
1391   002416  000000                   BMPCQP::        .WORD   0       ;POINTER USED TO ACCESS THE NEXT CELL IN QUE.
1392   002420  000100                   BMPCQB::        .BLKW   64.     ;STORAGE FOR 32 CELLS, TEST# PLUS BMP CODE.
1393   002620                           BMPCQE::                        ;LAST ADDRESS PLUS 2 OF THE BMP CODE QUEUE.
1394                                    ;*****************************************************************************
1395                                    ;*      RECEIVE BUFFER AND ASSOCIATED VARIABLES.
1396                                    ;*****************************************************************************
1397   002620  000000                   RXBOPT:: .WORD  0               ;RX BUFFER OUTPUT POINTER.
1398   002622  000000                   RXBIPT:: .WORD  0               ;RX BUFFER INPUT POINTER.
1399   002624  000000                   RXBCNT:: .WORD  0               ;COUNT OF NUMBER OF CHARS IN RX BUFFER.
1400   002626                           RXBSTA::                        ;LABEL AT BEGINNING OF THE RX BUFFER.
1401   002626  000100                           .BLKW   RXBFUL          ;LEAVE ENOUGH ROOM FOR A FULL BUFFER.
1402   003026  000000                   RXBEND:: .WORD  0               ;LABEL AFTER END OF RX BUFFER.
1403                                    ;*****************************************************************************
1404                                    ;*      TX/RX CONTROL BLOCK.
1405                                    ;*****************************************************************************
1406   003030                           CBB::                           ;BASE OF TX/RX CONTROL BLOCK.
1407   003030  000000                   CBLPRA:: .WORD  0               ;LINE PARAMETER REGISTER CONTENTS.
1408   003032  000000                   CBLNCA:: .WORD  0               ;LINE CONTROL REGISTER CONTENTS.
1409   003034  000000                   CBDPAA:: .WORD  0               ;START ADDRESS OF DATA PATTERN.
1410   003036  000000                   CBDPLA:: .WORD  0               ;LENGTH OF DATA PATTERN.
1411   003040  000000                   CBDPNA:: .WORD  0               ;NUMBER OF REPEAT TRANSMISSIONS OF THE DATA PATTERN.
1412   003042  000000                   CBMAPA:: .WORD  0               ;BIT MAP OF LINES TO INITIALISE.
1413   003044  000000                   CBLPBA:: .WORD  0               ;LOOPBACK MODE (AS IN LOPBCK).
1414   003046  000000                   CBOFSA:: .WORD  0               ;AMOUNT OF OFFSET BETWEEN EACH TX START.
1415                                    ;*****************************************************************************
1416                                    ;*      TRANSMISSION AND RECEPTION TABLES OF POINTERS AND COUNTERS.
1417                                    ;*****************************************************************************
1418   003050  000020                   DPENDB:: .BLKW  16.             ;TABLE OF END ADDRESSES OF DATA PATTERNS.
1419   003110  000020                   DPLENB:: .BLKW  16.             ;TABLE OF LENGTH OF DATA PATTERNS FOR LINES.
1420   003150  000020                   EXCNTB:: .BLKW  16.             ;EXTRA RECEIVED CHARACTER COUNTERS TABLE.
1421   003210  000020                   ERCNTB:: .BLKW  16.             ;CHARACTER RECEIVE ERROR COUNTERS TABLE.
1422   003250  000020                   TXPTRB:: .BLKW  16.             ;TRANSMISSION DATA POINTERS TABLE.
1423   003310  000020                   RXPTRB:: .BLKW  16.             ;RECEPTION DATA POINTERS TABLE.
1424   003350  000020                   CHCNTB:: .BLKW  16.             ;NUMBER OF CHARACTERS TO BE TXED AND RXED.
1425   003410  000020                   TXCNTB:: .BLKW  16.             ;TRANSMISSION CHARACTER COUNTERS TABLE.
1426   003450  000020                   RXCNTB:: .BLKW  16.             ;RECEPTION CHARACTER COUNTERS TABLE.
1427                                    ;*****************************************************************************
1428                                    ;       GENERAL TABLE AND BUFFER AREA--513 WORDS.
1429                                    ;*****************************************************************************
1430   003510                           BUFBAS::                        ;BASE OF MEMORY BUFFER.
1431   003510  000200                   ERLTBL::        .BLKW   128.    ;FIRST HALF OF GENERAL TABLE OR BUFFER.
1432   004110  000100                   BUFMID::        .BLKW   64.     ;SECOND HALF OF GENERAL TABLE OR BUFFER.
1433   004310  000100                   BUF3QT::        .BLKW   64.     ;LAST QUARTER OF THE BUFFER AREA.
1434   004510                           BUFEND::                        ;END OF GENERAL PURPOSE MEMORY BUFFER.
1435   004510  000020                   ENDETB::        .BLKW   16.     ;BUFFER OVERFLOW SPACE.
1436                                    ;*****************************************************************************
```

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1437                                    ;       TABLE OF DATA PATTERN RESYNC QUEUES.
1438                                    ;*******************************************************************************
1439  004550                            DPRSQB::                        ;DATA PATTERN RESYNC QUEUES TABLE BASE.
1440  004550  000004                            .BLKW   4               ;DATA PATTERN RESYNC QUEUE FOR LINE 0.
1441  004560  000004                            .BLKW   4               ;DATA PATTERN RESYNC QUEUE FOR LINE 1.
1442  004570  000004                            .BLKW   4               ;DATA PATTERN RESYNC QUEUE FOR LINE 2.
1443  004600  000004                            .BLKW   4               ;DATA PATTERN RESYNC QUEUE FOR LINE 3.
1444  004610  000004                            .BLKW   4               ;DATA PATTERN RESYNC QUEUE FOR LINE 4.
1445  004620  000004                            .BLKW   4               ;DATA PATTERN RESYNC QUEUE FOR LINE 5.
1446  004630  000004                            .BLKW   4               ;DATA PATTERN RESYNC QUEUE FOR LINE 6.
1447  004640  000004                            .BLKW   4               ;DATA PATTERN RESYNC QUEUE FOR LINE 7.
1448  004650  000004                            .BLKW   4               ;DATA PATTERN RESYNC QUEUE FOR LINE 8.
1449  004660  000004                            .BLKW   4               ;DATA PATTERN RESYNC QUEUE FOR LINE 9.
1450  004670  000004                            .BLKW   4               ;DATA PATTERN RESYNC QUEUE FOR LINE 10.
1451  004700  000004                            .BLKW   4               ;DATA PATTERN RESYNC QUEUE FOR LINE 11.
1452  004710  000004                            .BLKW   4               ;DATA PATTERN RESYNC QUEUE FOR LINE 12.
1453  004720  000004                            .BLKW   4               ;DATA PATTERN RESYNC QUEUE FOR LINE 13.
1454  004730  000004                            .BLKW   4               ;DATA PATTERN RESYNC QUEUE FOR LINE 14.
1455  004740  000004                            .BLKW   4               ;DATA PATTERN RESYNC QUEUE FOR LINE 15.
1456  004750                            DPRSQE::                        ;END OF DATA PATTERN RESYNC QUEUES TABLE.
1457                                    ;*******************************************************************************
1458                                    ;       SINGLE CHARACTER MODE LPR FIELD TABLES.
1459                                    ;*******************************************************************************
1460  004750                            SCBCTB::                        ;BASE OF NUMBER OF BITS PER CHAR FIELDS TABLE.
1461  004750  000000                            .WORD   0               ;5 BITS/CHAR LPR FIELD.
1462  004752  000010                            .WORD   10              ;6 BITS/CHAR LPR FIELD.
1463  004754  000020                            .WORD   20              ;7 BITS/CHAR LPR FIELD.
1464  004756  000030                            .WORD   30              ;8 BITS/CHAR LPR FIELD.
1465  004760                            SCBCTE::                        ;END OF NUMBER OF BITS/CHAR FIELDS TABLE.
1466  004760                            SCBRTB::                        ;BASE OF BAUDRATE FIELDS TABLE.
1467  004760  000000                            .WORD   0               ;50 BAUD LPR FIELDS.
1468  004762  073400                            .WORD   73400           ;1.2K BAUD LPR FIELDS.
1469  004764  177400                            .WORD   177400          ;38.4K BAUD LPR FIELDS.
1470  004766                            SCBRTE::                        ;END OF BAUDRATE FIELDS TABLE.
1471  004766                            SCNSTB::                        ;BASE OF NUMBER OF STOP BITS FIELDS TABLE.
1472  004766  000000                            .WORD   0               ;1 STOP BIT LPR FIELD.
1473  004770  000200                            .WORD   200             ;2 STOP BITS LPR FIELD.
1474  004772                            SCNSTE::                        ;END OF BAUDRATE FIELDS TABLE.
1475  004772                            SCTPTB::                        ;BASE OF TYPE OF PARITY FIELDS TABLE.
1476  004772  000000                            .WORD   0               ;NO PARITY LPR FIELD.
1477  004774  000040                            .WORD   40              ;ODD PARITY LPR FIELD.
1478  004776  000140                            .WORD   140             ;EVEN PARITY LPR FIELD.
1479  005000                            SCTPTE::                        ;END OF TYPE OF PARITY FIELDS TABLE.
1480
1481                                    ;*******************************************************************************
1482                                    ;       DMA MODE LPR FIELD TABLES.
1483                                    ;    SET UP WITH SPECIFIED BAUDRATES, 1 STOP BIT, ODD PARITY, 8 BITS/CHAR.
1484                                    ;*******************************************************************************
1485  005000                            DLPRTB::                        ;BASE OF DMA TEST LPR FIELDS TABLE.
1486  005000  156470                            .WORD   156470          ;9.6K BAUD.
1487  005002  167070                            .WORD   167070          ;19.2K BAUD.
1488  005004  177470                            .WORD   177470          ;38.4K BAUD.
1489  005006                            DLPRTE::                        ;END OF DMA TEST LPR FIELDS TABLE.
1490                                    ;*******************************************************************************
1491                                    ;       SPLIT SPEED LPR PARAMETER TABLE.
1492                                    ;*******************************************************************************
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1493  005006                          SPLPRB::                        ;BASE OF SPLIT SPEED LPR TABLE.
1494  005006  170070                          .WORD   170070          ;TX: 38.4K, RX: 50 BAUD, 1 STOP ODD PAR 8 BITS.
1495  005010  007470                          .WORD   7470            ;TX: 50, RX: 38.4K BAUD, 1 STOP ODD PAR 8 BITS.
1496  005012  000001                          .WORD   1               ;NUMBER OF REPEAT TRANSMISSIONS AT 50 BAUD.
1497  005014  000120                          .WORD   80.             ;NUMBER OF REPEAT TRANSMISSIONS AT 38.4K BAUD.
1498  005016  070470                          .WORD   70470           ;TX: 1200, RX: 75 BAUD, 1 STOP ODD PAR 8 BITS.
1499  005020  013470                          .WORD   13470           ;TX: 75, RX: 1200 BAUD, 1 STOP ODD PAR 8 BITS.
1500  005022  000001                          .WORD   1               ;NUMBER OF REPEAT TRANSMISSIONS AT 75 BAUD.
1501  005024  000016                          .WORD   16              ;NUMBER OF REPEAT TRANSMISSIONS AT 1200 BAUD.
1502  005026  115070                          .WORD   115070          ;TX: 2000, RX:2400 BAUD, 1 STOP ODD PAR 8 BITS.
1503  005030  124470                          .WORD   124470          ;TX: 2400, RX:2000 BAUD, 1 STOP ODD PAR 8 BITS.
1504  005032  000001                          .WORD   1               ;NUMBER OF REPEAT TRANSMISSIONS AT 2400 BAUD.
1505  005034  000002                          .WORD   2               ;NUMBER OF REPEAT TRANSMISSIONS AT 2000 BAUD.
1506  005036                          SPLPRE::                        ;END OF SPLIT SPEED LPR TABLE.
1507                                  ;*******************************************************************************
1508                                  ;       SINGLE CHARACTER DATA PATTERN TABLE.
1509                                  ;*******************************************************************************
1510  005036       000                SDPBAS::.BYTE   0       ;START OF SINGLE CHARACTER DATA PATTERN TABLE.
1511  005037       001                        .BYTE   1
1512  005040       010                        .BYTE   10
1513  005041       017                        .BYTE   17
1514  005042       063                        .BYTE   63
1515  005043       074                        .BYTE   74
1516  005044       125                        .BYTE   125
1517  005045       177                        .BYTE   177
1518  005046       200                        .BYTE   200
1519  005047       252                        .BYTE   252
1520  005050       303                        .BYTE   303
1521  005051       314                        .BYTE   314
1522  005052       360                        .BYTE   360
1523  005053       367                        .BYTE   367
1524  005054       376                        .BYTE   376
1525  005055       377                        .BYTE   377
1526  005056                          SDPEND::                        ;END OF SINGLE CHARACTER DATA PATTERN TABLE.
1527  005056       000                        .BYTE   0       ;START OF FIRST SHORT DATA PATTERN OVERFLOW AREA.
1528  005057       001                        .BYTE   1
1529  005060       010                        .BYTE   10
1530  005061       017                        .BYTE   17
1531
1532                                  ;*******************************************************************************
1533                                  ;       SINGLE CHARACTER DATA PATTERN TABLE NUMBER TWO.
1534                                  ;*******************************************************************************
1535  005062       125                SDP2B:: .BYTE   125     ;START OF SECOND SHORT DATA PATTERN.
1536  005063       252                        .BYTE   252
1537  005064       124                        .BYTE   124
1538  005065       253                        .BYTE   253
1539  005066       122                        .BYTE   122
1540  005067       255                        .BYTE   255
1541  005070       112                        .BYTE   112
1542  005071       265                        .BYTE   265
1543  005072       052                        .BYTE   52
1544  005073       325                        .BYTE   325
1545  005074       152                        .BYTE   152
1546  005075       225                        .BYTE   225
1547  005076       132                        .BYTE   132
1548  005077       245                        .BYTE   245
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1549  005100  126                     .BYTE   126
1550  005101  251                     .BYTE   251
1551  005102                  SDP2E::                 ;END OF SECOND SHORT DATA PATTERN.
1552  005102  125                     .BYTE   125     ;START OF SECOND SHORT DATA PATTERN OVERFLOW AREA.
1553  005103  252                     .BYTE   252
1554  005104  124                     .BYTE   124
1555  005105  253                     .BYTE   253
1556  005106  122                     .BYTE   122
1557  005107  255                     .BYTE   255
1558  005110  112                     .BYTE   112
1559  005111  265                     .BYTE   265
1560  005112  052                     .BYTE   52
1561  005113  325                     .BYTE   325
1562  005114  152                     .BYTE   152
1563  005115  225                     .BYTE   225
1564  005116  132                     .BYTE   132
1565  005117  245                     .BYTE   245
1566  005120  126                     .BYTE   126
1567  005121  251                     .BYTE   251
1568                          ;*****************************************************************************
1569                          ;       SINGLE CHARACTER SAFE PROPORTIONAL DELAY TABLE.
1570                          ;*****************************************************************************
1571  005122  372             PROTBL::.BYTE   250.            ;DELAY IN MILLI SECONDS AT 50 BAUD
1572  005123  252                     .BYTE   170.            ;DELAY IN MILLI SECONDS AT 75 BAUD
1573  005124  167                     .BYTE   119.            ;DELAY IN MILLI SECONDS AT 110 BAUD
1574  005125  143                     .BYTE   99.             ;DELAY IN MILLI SECONDS AT 134.5 BAUD
1575  005126  132                     .BYTE   90.             ;DELAY IN MILLI SECONDS AT 150 BAUD
1576  005127  062                     .BYTE   50.             ;DELAY IN MILLI SECONDS AT 300 BAUD
1577  005130  036                     .BYTE   30.             ;DELAY IN MILLI SECONDS AT 600 BAUD
1578  005131  024                     .BYTE   20.             ;DELAY IN MILLI SECONDS AT 1200 BAUD
1579  005132  021                     .BYTE   17.             ;DELAY IN MILLI SECONDS AT 1800 BAUD
1580  005133  020                     .BYTE   16.             ;DELAY IN MILLI SECONDS AT 2000 BAUD
1581  005134  017                     .BYTE   15.             ;DELAY IN MILLI SECONDS AT 2400 BAUD
1582  005135  015                     .BYTE   13.             ;DELAY IN MILLI SECONDS AT 4800 BAUD
1583  005136  014                     .BYTE   12.             ;DELAY IN MILLI SECONDS AT 7200 BAUD
1584  005137  014                     .BYTE   12.             ;DELAY IN MILLI SECONDS AT 9600 BAUD
1585  005140  013                     .BYTE   11.             ;DELAY IN MILLI SECONDS AT 19200 BAUD
1586  005141  012                     .BYTE   10.             ;DELAY IN MILLI SECONDS AT 38400 BAUD
1587                                  .EVEN
1588                          ;*****************************************************************************
1589                          ;* TABLE FOR STORAGE OF RX/TX LINE NUMBER ASSOCIATIONS.
1590                          ;* THE ASSOCIATIONS ARE STORED AS LINE NUMBER TIMES 2 FOR USE AS OFFSETS
1591                          ;*    WHEN ACCESSING A TABLE OF WORDS.
1592                          ;*    NOTE: DO NOT WRITE A NON-ZERO VALUE INTO THE UPPER BYTE OF ANY ENTRY.
1593                          ;*****************************************************************************
1594  005142                  TXRXLB::                        ;BASE OF TX/RX LINE NUMBER ASSOCIATION TABLE.
1595  005142  000000                  .WORD   0               ;TX/RX LINE OFFSET FOR RX/TX LINE 0.
1596  005144  000002                  .WORD   2.              ;TX/RX LINE OFFSET FOR RX/TX LINE 1.
1597  005146  000004                  .WORD   4.              ;TX/RX LINE OFFSET FOR RX/TX LINE 2.
1598  005150  000006                  .WORD   6.              ;TX/RX LINE OFFSET FOR RX/TX LINE 3.
1599  005152  000010                  .WORD   8.              ;TX/RX LINE OFFSET FOR RX/TX LINE 4.
1600  005154  000012                  .WORD   10.             ;TX/RX LINE OFFSET FOR RX/TX LINE 5.
1601  005156  000014                  .WORD   12.             ;TX/RX LINE OFFSET FOR RX/TX LINE 6.
1602  005160  000016                  .WORD   14.             ;TX/RX LINE OFFSET FOR RX/TX LINE 7.
1603  005162  000020                  .WORD   16.             ;TX/RX LINE OFFSET FOR RX/TX LINE 8.
1604  005164  000022                  .WORD   18.             ;TX/RX LINE OFFSET FOR RX/TX LINE 9.
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1605  005166  000024                    .WORD   20.             ;TX/RX LINE OFFSET FOR RX/TX LINE 10.
1606  005170  000026                    .WORD   22.             ;TX/RX LINE OFFSET FOR RX/TX LINE 11.
1607  005172  000030                    .WORD   24.             ;TX/RX LINE OFFSET FOR RX/TX LINE 12.
1608  005174  000032                    .WORD   26.             ;TX/RX LINE OFFSET FOR RX/TX LINE 13.
1609  005176  000034                    .WORD   28.             ;TX/RX LINE OFFSET FOR RX/TX LINE 14.
1610  005200  000036                    .WORD   30.             ;TX/RX LINE OFFSET FOR RX/TX LINE 15.
1611  005202                          TXRXLE::                  ;END OF TX/RX LINE NUMBER ASSOCIATION TABLE.
1612                                  .EVEN                     ;GUARANTEE THAT NEXT TABLE IS ON WORD BOUNDARY.
1613                                ;*************************************************************************
1614                                ;* TABLE OF TX/RX LINE NUMBER ASSOCIATIONS IN STAGGERED LOOPBACK.
1615                                ;* THE ASSOCIATIONS ARE STORED AS LINE NUMBER TIMES 2 FOR USE AS OFFSETS
1616                                ;*    WHEN ACCESSING A TABLE OF WORDS.
1617                                ;* THIS IS A TABLE OF DATA FOR READING ONLY.  USE TO LOAD THE ABOVE TABLE.
1618                                ;*    NOTE: MUST CONVERT FROM BYTES TO WORDS WHEN LOADING ABOVE TABLE.
1619                                ;*************************************************************************
1620  005202                        STGTRB::                  ;BASE OF STAGGERED TX/RX LINE NUMBER TABLE.
1621  005202  004                      .BYTE   4.            ;TX/RX LINE OFFSET FOR RX/TX LINE 0.
1622  005203  006                      .BYTE   6.            ;TX/RX LINE OFFSET FOR RX/TX LINE 1.
1623  005204  000                      .BYTE   0             ;TX/RX LINE OFFSET FOR RX/TX LINE 2.
1624  005205  002                      .BYTE   2.            ;TX/RX LINE OFFSET FOR RX/TX LINE 3.
1625  005206  014                      .BYTE   12.           ;TX/RX LINE OFFSET FOR RX/TX LINE 4.
1626  005207  016                      .BYTE   14.           ;TX/RX LINE OFFSET FOR RX/TX LINE 5.
1627  005210  010                      .BYTE   8.            ;TX/RX LINE OFFSET FOR RX/TX LINE 6.
1628  005211  012                      .BYTE   10.           ;TX/RX LINE OFFSET FOR RX/TX LINE 7.
1629  005212  024                      .BYTE   20.           ;TX/RX LINE OFFSET FOR RX/TX LINE 8.
1630  005213  026                      .BYTE   22.           ;TX/RX LINE OFFSET FOR RX/TX LINE 9.
1631  005214  020                      .BYTE   16.           ;TX/RX LINE OFFSET FOR RX/TX LINE 10.
1632  005215  022                      .BYTE   18.           ;TX/RX LINE OFFSET FOR RX/TX LINE 11.
1633  005216  034                      .BYTE   28.           ;TX/RX LINE OFFSET FOR RX/TX LINE 12.
1634  005217  036                      .BYTE   30.           ;TX/RX LINE OFFSET FOR RX/TX LINE 13.
1635  005220  030                      .BYTE   24.           ;TX/RX LINE OFFSET FOR RX/TX LINE 14.
1636  005221  032                      .BYTE   26.           ;TX/RX LINE OFFSET FOR RX/TX LINE 15.
1637                                  .EVEN                 ;GUARANTEE THAT NEXT TABLE IS ON WORD BOUNDARY.
1638  005222                          ERRTBL
1639  005222                                                L$ERRTBL::
1640  005222  000000                ERRTYP::    .WORD   0
1641  005224  000000                ERRNBR::    .WORD   0
1642  005226  000000                ERRMSG::    .WORD   0
1643  005230  000000                ERRBLK::    .WORD   0
1644
1645                                  .EVEN
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                        .SBTTL  GPR HANDLING ROUTINES FOR SUBROUTINE CALLS.
                        ;**************************************************************************
                        ;*      THERE ARE 4 ROUTINES AND MACRO DEFINITIONS USED FOR THE HANDLING OF
                        ;*      GPR VALUES DURING SUBROUTINE CALLS WITHIN THIS PROGRAM.  THE FOUR
                        ;*      ROUTINES/MACRO CALLS HAVE THE FOLLOWING NAMES:
                        ;*
                        ;*      SAVE - MACRO DEFINITION USED AT THE BEGINNING OF A SUBROUTINE TO
                        ;*             SAVE THE GPR CONTENTS FOR LATER RESTORATION.
                        ;*      PASS - MACRO DEFINITION USED AT THE END OF A SUBROUTINE TO RESTORE
                        ;*             THE PREVIOUSLY SAVED GPR CONTENTS AND TO LEAVE THE CONTENTS
                        ;*             OF THE SPECIFIED GPR(S) INTACT (NOT RESTORED).
                        ;*      PREG05 - SUBROUTINE WHICH IS CALLED FROM THE SAVE AND PASS MACRO
                        ;*             EXPANSIONS WHICH ACTUALLY PERFORMS THE ACTIONS ON THE GPRS.
                        ;*
                        ;*      DURING A SUBROUTINE WHICH USES THESE GPR SAVE ROUTINES THE VALUES
                        ;*      OF THE GPRS ARE STORED ON THE STACK IN THE FOLLOWING STACK FRAME:
                        ;*
                        ;*             SP    -> RET PC INTO PREG05 ROUTINE.
                        ;*             SP+2  -> GPR R0 CONTENTS.
                        ;*             SP+4  -> GPR R1 CONTENTS.
                        ;*             SP+6  -> GPR R2 CONTENTS.
                        ;*             SP+8  -> GPR R3 CONTENTS.
                        ;*             SP+10 -> GPR R4 CONTENTS.
                        ;*             SP+12 -> GPR R5 CONTENTS.
                        ;*             SP+14 -> RET PC INTO CALLER OF SUB'TNE WHICH CALLED PREG05.
                        ;*
                        ;*      EACH LEVEL OF SUB'TNE CALLING USES 8 WORDS OF STACK OVERHEAD.
                        ;*      THE SAVE AND PASS MACROS CAN ALSO BE USED IN "STRAIGHT LINE CODE"
                        ;*      TO SAVE AND RESTORE THE GPR VALUES.  IN ANY CASE, AFTER THE
                        ;*      ISSUING OF A PASS CALL THE GPRS WILL BE RESTORED TO THE VALUES
                        ;*      THEY HAD PRIOR TO THE LAST SAVE CALL (EXCEPT FOR THE EXCEPTED,
                        ;*      OR PASSED INTACT, GPRS SPECIFIED AS PARAMETERS TO THE PASS CALL)
                        ;*      AND THE SP WILL ALSO BE RESTORED TO ITS CONDITION BEFORE THE LAST
                        ;*      SAVE CALL.  THE PROGRAMMER MUST BE SURE THAT THE SP HAS THE SAME
                        ;*      VALUE WHEN THE PASS MACRO IS CALLED AS IT HAD IMMEDIATELY AFTER
                        ;*      THE SAVE MACRO WAS CALLED.
                        ;**************************************************************************
```

```
                        .SBTTL GPR FRAME ACCESS EQUATES
                        ;+++
                        ;EQUATES THAT ALLOW ACCESS TO THE STACK FRAME.  THESE ARE THE
                        ;OFFSETS INTO THE STACK FOR REGISTERS SAVED DURING THE PREGO5
                        ;ROUTINE.
                        ;---

000036                  LPCSLT==        36      ;OFFSET FOR LAST RETURN PC.
000016                  PCSLOT==        16      ;OFFSET FOR RETURN PC.
000014                  R5SLOT==        14      ;OFFSET FOR R5.
000012                  R4SLOT==        12      ;OFFSET FOR R4.
000010                  R3SLOT==        10      ;OFFSET FOR R3.
000006                  R2SLOT==        6       ;OFFSET FOR R2.
000004                  R1SLOT==        4       ;OFFSET FOR R1.
000002                  R0SLOT==        2       ;OFFSET FOR R0.
```

```
1698                            .SBTTL  GLOBAL MACRO DEFINITION         - SAVE -
1699                            ;*************************************************************************
1700                            ;*      THIS MACRO IS USED AT THE BEGINNING OF A SUBROUTINE TO SAVE THE
1701                            ;*      CONTENTS OF THE GPRS R0 THRU R5.
1702                            ;*
1703                            ;* INPUTS:      SP - UNCHANGED SINCE SUBROUTINE WAS ENTERED
1704                            ;*              R5SLOT - OFFSET TO STACK SLOT FOR R5 (EQUATED TO 14 OCTAL)
1705                            ;*
1706                            ;* OUTPUTS:     GPR SAVE AREA ON THE STACK IS LOADED WITH THE CONTENTS OF GPRS
1707                            ;*              TOP OF STACK - LOADED WITH THE RETURN ADDRESS INTO PREG05
1708                            ;*
1709                            ;* CALLING SEQUENCE:    SAVE
1710                            ;*
1711                            ;* COMMENTS:    NO ARGUMENTS ARE ALLOWED.
1712                            ;*              THE PASS MACRO SHOULD BE CALLED TO RESTORE THE GPR VALUES.
1713                            ;*
1714                            ;* SUBORDINATE ROUTINES CALLED: PREG05.
1715                            ;*************************************************************************
1716
1717                                    .MACRO  SAVE
1718                                    .LIST
1719                                            JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
1720                                    .NLIST
1721                                    .ENDM   SAVE
```

```
1722                            .SBTTL  GLOBAL MACRO DEFINITION          - PASS -
1723                            ;*************************************************************************
1724                            ;*      THIS MACRO IS USED IN CONJUNCTION WITH THE SAVE MACRO.  IT IS
1725                            ;*      CALLED AT END OF A SUBROUTINE TO PASS PARAMETERS IN GPRS BACK TO THE
1726                            ;*      CALLING ROUTINE BY ALTERING THE GPR SAVE AREA ON THE STACK AND THEN
1727                            ;*      RETURNING TO PREG05 TO RESTORE THE GPRS TO THEIR SAVED VALUES.
1728                            ;*
1729                            ;* INPUTS:      ONLY ALLOWED ARGUMENTS ARE "R0" THRU "R5".
1730                            ;*              R0SLOT THRU R5SLOT MUST BE EQUATED TO THEIR RESPECTIVE GPR SAVE
1731                            ;*                      SLOT OFFSETS BEFORE CALLING THIS MACRO.
1732                            ;*
1733                            ;* OUTPUTS:     THE GPR VALUES ARE PUT IN THEIR RESPECTIVE SLOTS ON THE STACK.
1734                            ;*
1735                            ;* CALLING SEQUENCE:    PASS    R0,R1,...
1736                            ;*
1737                            ;* COMMENTS:    ANY COMBINATION OF GPR ARGUMENTS MAY BE LISTED IN ANY ORDER.
1738                            ;*              FOR EXAMPLE, THE FOLLOWING ARE LEGAL:
1739                            ;*                      PASS    R1
1740                            ;*                      PASS    R4,R0,R2
1741                            ;*              THE GPRS LISTED AS ARGUMENTS WILL BE PASSED INTACT TO THE
1742                            ;*              CALLING ROUTINE, ALL OTHER GPRS WILL BE RESTORED.
1743                            ;*              THE SP MUST BE AT ITS ORIGINAL VALUE WHEN PASS IS CALLED.
1744                            ;*
1745                            ;*              THE MACRO CALL
1746                            ;*                      PASS    R0,R3
1747                            ;*              EXPANDS INTO THE FOLLOWING ASSEMBLY CODE:
1748                            ;*                      MOV     R0,R0SLOT(SP)           ;PUT R0 IN STACK SLOT.
1749                            ;*                      MOV     R3,R3SLOT(SP)           ;PUT R3 IN STACK SLOT.
1750                            ;*                      JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
1751                            ;*              IN THIS EXAMPLE GPRS R1, R2, R4, AND R5 WILL BE RESTORED TO
1752                            ;*              THEIR VALUES CONTAINED IN THE STACK FRAME AND R0 AND R3
1753                            ;*              WILL BE LEFT AT THEIR VALUES PRIOR TO THIS PASS CALL.
1754                            ;*
1755                            ;* SUBORDINATE ROUTINES CALLED: (PREGRT - LABEL WITHIN PREG05, VALUE ON STACK.)
1756                            ;*************************************************************************
1757
1758                                    .MACRO  PASS    A,B,C,D,E,F
1759                                    .IRP    X,<A,B,C,D,E,F>
1760                                    .IF     NB,X
1761                                    .LIST
1762                                            MOV     X,X'SLOT(SP)            ;PUT X IN STACK SLOT.
1763                                    .NLIST
1764                                    .ENDC
1765                                    .ENDM
1766                                    .LIST
1767                                            JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
1768                                    .NLIST
1769                                    .ENDM   PASS
```

```
1770                                    .SBTTL GLOBAL SUBROUTINE                - PREG05 -
1771                                    ;*****************************************************************************
1772                                    ;*      PRESERVE REGISTERS R0 THROUGH R5 FOR SUBROUTINE CALLS.
1773                                    ;*
1774                                    ;* INPUTS:      THE RETURN ADDRESS BACK INTO THE CALLING ROUTINE MUST BE IN
1775                                    ;*              GPR R5.  (I.E.- MACROS USE "JSR  R5,PREG05".)
1776                                    ;*
1777                                    ;* OUTPUTS:     REGISTERS R0 THROUGH R5 ARE SAVED ON THE STACK.
1778                                    ;*
1779                                    ;*CALLING SEQUENCE:     SAVE            ;MACRO EXPANSION CALLS PREG05.
1780                                    ;*                      [SUBROUTINE CODE]...
1781                                    ;*                      PASS            ;MACRO EXPANSION RECALLS PREG05.
1782                                    ;*
1783                                    ;*COMMENTS:     THIS ROUTINE IS RE-ENTRANT.
1784                                    ;*
1785                                    ;*              PARAMETERS MAY BE PASSED OUT OF A SUBROUTINE BY MODIFYING THE
1786                                    ;*              REGISTER SAVE AREA ON THE STACK.  USE THE PASS GPRN MACRO
1787                                    ;*              TO RETURN GPR VALUES INTACT.
1788                                    ;*              USE THE RNSLOT OFFSETS FROM THE SP TO PASS OTHER PARAMETERS.
1789                                    ;*              [EXAMPLE:       MOV    VALUE,R0SLOT(SP)         ]
1790                                    ;*              MAKE SURE THE SP IS AT ITS ORIGINAL VALUE WHEN YOU DO THIS.
1791                                    ;*
1792                                    ;*SUBORDINATE ROUTINES CALLED:  NONE.
1793                                    ;*****************************************************************************
1794
1795  005232                            PREG05:                 ;R5 HAS BEEN LOADED ON THE STACK BY THE SUBROUTINE CALL
1796  005232  010446                            MOV     R4,-(SP)        ;SAVE R4
1797  005234  010346                            MOV     R3,-(SP)        ;SAVE R3
1798  005236  010246                            MOV     R2,-(SP)        ;SAVE R2
1799  005240  010146                            MOV     R1,-(SP)        ;SAVE R1
1800  005242  010046                            MOV     R0,-(SP)        ;SAVE R0
1801  005244  010546                            MOV     R5,-(SP)        ;PUSH RETURN PC ON TOP OF STACK
1802  005246  016605  000014                    MOV     R5SLOT(SP),R5   ;RESTORE R5 TO VALUE IT HAD BEFORE CALLS
1803
1804  005252  004736                            JSR     PC,@(SP)+       ;CALL THE SUBROUTINE AT THE RETURN ADDRESS
1805                                                                    ;FROM THE PREG05 CALL, PUTTING THE PRESENT
1806                                                                    ;PC ON THE STACK AS A RETURN ADDRESS INTO
1807                                                                    ;THIS (PREG05) ROUTINE.
1808
1809                                            ;+++
1810                                            ;THE FOLLOWING CODE IS EXECUTED WHEN THE CALLING ROUTINE DOES A
1811                                            ;"RETURN" [JSR  PC,@(SP)+] USING THE PC DEPOSITED ON THE STACK ABOVE.
1812                                            ;---
1813
1814  005254  012605                    PREGRT:: MOV     (SP)+,R5        ;PUT RETURN PC IN R5.
1815  005256  012600                            MOV     (SP)+,R0        ;RESTORE R0.
1816  005260  012601                            MOV     (SP)+,R1        ;RESTORE R1.
1817  005262  012602                            MOV     (SP)+,R2        ;RESTORE R2.
1818  005264  012603                            MOV     (SP)+,R3        ;RESTORE R3.
1819  005266  012604                            MOV     (SP)+,R4        ;RESTORE R4.
1820
1821  005270  000205                            RTS     R5              ;RETURN TO THE SUBROUTINE WHICH CALLED PREG05.
1822                                                                      ;RESTORING R5 IN THE PROCESS.
```

```
1823                                    .SBTTL  GLOBAL TEXT SECTION
1824
1825
1826                                    ;++
1827                                    ; THE GLOBAL TEXT SECTION CONTAINS FORMAT STATEMENTS,
1828                                    ; MESSAGES, AND ASCII INFORMATION THAT ARE USED IN
1829                                    ; MORE THAN ONE TEST.
1830                                    ;--
1831
1832                                    ;
1833                                    ; NAMES OF DEVICES SUPPORTED BY PROGRAM
1834                                    ;
1835  005272                                    DEVTYP  <DHV-11>
1836  005272                                                                  L$DVTYP::
1837  005272  044104  026526  030461                                                  .ASCIZ  /DHV-11/
1838  005300     000
1839          005302                                                                  .EVEN
1840
1841
1842                                    ; TEST DESCRIPTION
1843                                    ;
1844  005302                                    DESCRIPT        <DHV-11 FUNCT TEST PART3>
1845  005302                                                                  L$DESC::
1846  005302  044104  026526  030461                                                  .ASCIZ  /DHV-11 FUNCT TE
1847  005310  043040  047125  052103
1848  005316  052040  051505  020124
1849  005324  040520  052122  000063
1850                                                                            .EVEN
1851                                    .EVEN
1852
1853
```

```
1854
1855
1856                            ;
1857                            ; FORMAT STATEMENTS USED IN PRINT CALLS
1858                            ;
1859
1860
1861
```

```
 1862
 1863                .NLIST BIN
 1864                .SBTTL  GLOBAL MESSAGE AREA
 1865                        ; ********* FORMAT STATEMENTS **********
 1866   005332   MFUNIT:: .ASCIZ /%N%A TESTING UNIT :%D4%N/
 1867   005340
 1868   005346
 1869   005354
 1870   005362
 1871   005363   EF0503:: .ASCIZ /%T%N/
 1872   005370   EF1601:: .ASCIZ /%A  %T%A ABORTED %N/
 1873   005376
 1874   005404
 1875   005412
 1876   005414   EF1603:: .ASCIZ /%A    ACTUAL DATA:   %O6%A (O).%N/
 1877   005422
 1878   005430
 1879   005436
 1880   005444
 1881   005452
 1882   005456   EF6201:: .ASCIZ \%A FRAMING/PARITY ERROR DETECTION AND REPORTING BAD ON LINES:%D2%A : %D2%N\
 1883   005464
 1884   005472
 1885   005500
 1886   005506
 1887   005514
 1888   005522
 1889   005530
 1890   005536
 1891   005544
 1892   005552
 1893   005560
 1894   005566
 1895   005571   EF6202:: .ASCIZ /%A  CHAR RECEIVED WITH FRAMING ERROR BIT %T%A, SHOULD BE %T%N/
 1896   005576
 1897   005604
 1898   005612
 1899   005620
 1900   005626
 1901   005634
 1902   005642
 1903   005650
 1904   005656
 1905   005664
 1906   005667   EF6203:: .ASCIZ /%A  CHAR RECEIVED WITH PARITY ERROR BIT %T%A, SHOULD BE %T%N/
 1907   005674
 1908   005702
 1909   005710
 1910   005716
 1911   005724
 1912   005732
 1913   005740
 1914   005746
 1915   005754
 1916   005762
 1917   005764   EF6401:: .ASCIZ /%A                                %D2%N/
```

```
1918  005772
1919  006000
1920  006006
1921  006014
1922  006022
1923  006030
1924  006033  EF7801:: .ASCIZ /%T%A ON LINE %D2%A DECIMAL.%N/
1925  006040
1926  006046
1927  006054
1928  006062
1929  006070
1930  006071  EF9001:: .ASCIZ /%A  UNEXPECTED %T%A FOUND IN RECEIVE CHAR FIFO:%N/
1931  006076
1932  006104
1933  006112
1934  006120
1935  006126
1936  006134
1937  006142
1938  006150
1939  006153  EF9002:: .ASCIZ /%A    CODE IS ASSOCIATED WITH LINE: %D2%N/
1940  006160
1941  006166
1942  006174
1943  006202
1944  006210
1945  006216
1946  006224
1947  006225  EF9003:: .ASCIZ /%A      CODE IS: %O3%N/
1948  006232
1949  006240
1950  006246
1951  006254  EF9004:: .ASCIZ /%A    %T%A VALUE: %O3%N/
1952  006262
1953  006270
1954  006276
1955  006304  EF9005:: .ASCIZ /%A    %T%A VALUE: NONE%N/
1956  006312
1957  006320
1958  006326
1959  006334
1960  006335  EF9006:: .ASCIZ /%A  %T%A %D2%N/
1961  006342
1962  006350
1963  006354  EF9007:: .ASCIZ /%A  CHARACTER RECEIVED WITH ERROR FLAG(S) SET ON LINE %D2%N/
1964  006362
1965  006370
1966  006376
1967  006404
1968  006412
1969  006420
1970  006426
1971  006434
1972  006442
1973  006450  Ef9008:: .ASCIZ /%A    CHARACTER READ AS: %O3%N/
```

```
 1974  006456
 1975  006464
 1976  006472
 1977  006500
 1978  006506
 1979  006507  EF9009:: .ASCIZ /%A      %T%A ERROR FLAG SET.%N/
 1980  006514
 1981  006522
 1982  006530
 1983  006536
 1984  006544
 1985  006546  EF9010:: .ASCIZ /%A    NUMBER OF ERRORS DETECTED ON LINE %D2%A IS %D5%N/
 1986  006554
 1987  006562
 1988  006570
 1989  006576
 1990  006604
 1991  006612
 1992  006620
 1993  006626
 1994  006634
 1995  006635  EF9012:: .ASCII /%A LINE%D2%A ONLY %T%D5%A BYTES OF%D5%A BYTE/
 1996  006642
 1997  006650
 1998  006656
 1999  006664
 2000  006672
 2001  006700
 2002  006706
 2003  006711          .ASCIZ / DATA PAT'N TX'D FROM LINE%D2%N/
 2004  006716
 2005  006724
 2006  006732
 2007  006740
 2008  006746
 2009  006751  EF9013:: .ASCIZ /%A  DATA PATTERN NOT COMPLETELY %T%N/
 2010  006756
 2011  006764
 2012  006772
 2013  007000
 2014  007006
 2015  007014
 2016  007016  EF9019:: .ASCIZ /%A  %T%A %O6%N/
 2017  007024
 2018  007032
 2019  007035  EF9020:: .ASCIZ /%A    TOO FEW TX.ACTIONS GENERATED ON LINE %D2%N/
 2020  007042
 2021  007050
 2022  007056
 2023  007064
 2024  007072
 2025  007100
 2026  007106
 2027  007114
 2028  007116  EF9101:: .ASCIZ /%N/
 2029  007121  EF9103:: .ASCIZ /%A      ERROR CONDITION ON LINE %D2%N/
```

```
2030  007126
2031  007134
2032  007142
2033  007150
2034  007156
2035  007164
2036  007167  EF9301:: .ASCIZ /%A %T%D2%A,  BMP CODE REPORTED :%O3%N/
2037  007174
2038  007202
2039  007210
2040  007216
2041  007224
2042  007232
2043  007235  EF9302:: .ASCIZ /%A  OVERFLOW OCCURRED (MORE THAN 31 BMP CODES FOUND IN QUEUE)%N/
2044  007242
2045  007250
2046  007256
2047  007264
2048  007272
2049  007300
2050  007306
2051  007314
2052  007322
2053  007330
2054                ;************* MESSAGE AREA *************
2055  007335  EM0103:: .ASCIZ /DEVICE REGISTER ACCESS ERRORS/
2056  007342
2057  007350
2058  007356
2059  007364
2060  007372
2061  007373  EM0509:: .ASCIZ /SET/
2062  007377  EM1601:: .ASCIZ /TIMEOUT OCCURRED WAITING FOR MASTER RESET TO CLEAR/
2063  007404
2064  007412
2065  007420
2066  007426
2067  007434
2068  007442
2069  007450
2070  007456
2071  007462  EM5303:: .ASCIZ /BMP CODE FOUND IN FIFO, TEST INVAILDATED/
2072  007470
2073  007476
2074  007504
2075  007512
2076  007520
2077  007526
2078  007533  EM6201:: .ASCIZ /FRAMING ERROR TEST /
2079  007540
2080  007546
2081  007554
2082  007557  EM6202:: .ASCIZ /CLEAR /
2083  007564
2084  007566  EM6301:: .ASCIZ /PARITY ERROR TEST /
2085  007574
```

```
2086  007602
2087  007610
2088  007611  EM6401:: .ASCIZ /BREAK GENERATION TEST /
2089  007616
2090  007624
2091  007632
2092  007640  EM6402:: .ASCIZ /  BREAK NOT RECEIVED ON LINE(S):/
2093  007646
2094  007654
2095  007662
2096  007670
2097  007676
2098  007701  EM6601:: .ASCIZ /NO OVERRUN ERROR TEST/
2099  007706
2100  007714
2101  007722
2102  007727  EM6602:: .ASCIZ /  OVERRUN ERROR REPORTED WHEN NONE FORCED/
2103  007734
2104  007742
2105  007750
2106  007756
2107  007764
2108  007772
2109  010000
2110  010001  EM6701:: .ASCIZ /OVERRUN ERROR TEST/
2111  010006
2112  010014
2113  010022
2114  010024  EM6702:: .ASCIZ /  NO OVERRURN ERROR REPORTED, OVERRUN FORCED/
2115  010032
2116  010040
2117  010046
2118  010054
2119  010062
2120  010070
2121  010076
2122  010101  EM9001:: .ASCIZ /SINGLE CHARACTER MODE TEST /
2123  010106
2124  010114
2125  010122
2126  010130
2127  010135  EM9003:: .ASCIZ /MODEM STATUS CODE/
2128  010142
2129  010150
2130  010156
2131  010157  EM9004:: .ASCIZ /SELFTEST CODE/
2132  010164
2133  010172
2134  010175  EM9006:: .ASCIZ /CHARACTER RECEIVED ON INACTIVE LINE, LINE:/
2135  010202
2136  010210
2137  010216
2138  010224
2139  010232
2140  010240
2141  010246
```

```
2142  010250  EM9007:: .ASCIZ /UNEXPECTED CHAR RECEIVED AFTER RX COMPLETE ON LINE/
2143  010256
2144  010264
2145  010272
2146  010300
2147  010306
2148  010314
2149  010322
2150  010330
2151  010333  EM9008:: .ASCIZ /RECEIVED CHAR MISCOMPARE AGAINST TX DATA ON LINE/
2152  010340
2153  010346
2154  010354
2155  010362
2156  010370
2157  010376
2158  010404
2159  010412
2160  010414  EM9009:: .ASCIZ /EXPECTED OR CORRECT/
2161  010422
2162  010430
2163  010436
2164  010440  EM9010:: .ASCIZ /ACTUAL OR MEASURED /
2165  010446
2166  010454
2167  010462
2168  010464  EM9011:: .ASCIZ /OVERRUN/
2169  010472
2170  010474  EM9012:: .ASCIZ /FRAMING/
2171  010502
2172  010504  EM9013:: .ASCIZ /PARITY/
2173  010512
2174  010513  EM9014:: .ASCIZ /SUMMARY REPORTS FOR LINES WITH EXCESSIVE NUMBERS OF ERRORS:/
2175  010520
2176  010526
2177  010534
2178  010542
2179  010550
2180  010556
2181  010564
2182  010572
2183  010600
2184  010606
2185  010607  EM9015:: .ASCIZ /TRANSMITTED/
2186  010614
2187  010622
2188  010623  EM9016:: .ASCIZ /RECV'D/
2189  010630
2190  010632  EM9017:: .ASCII /  FIFO WILL NOT PURGE (DATA.VALID STUCK SET),/
2191  010640
2192  010646
2193  010654
2194  010662
2195  010670
2196  010676
2197  010704
```

```
2198  010707            .ASCIZ / REMAINDER OF TEST SKIPPED./
2199  010714
2200  010722
2201  010730
2202  010736
2203  010743  EM9025:: .ASCIZ /MORE THAN TWICE THE EXPECTED NUMBER OF CHARACTERS RECEIVED./
2204  010750
2205  010756
2206  010764
2207  010772
2208  011000
2209  011006
2210  011014
2211  011022
2212  011030
2213  011036
2214  011037  EM9026:: .ASCIZ /     LPR CONTENTS: /
2215  011044
2216  011052
2217  011060
2218  011063  EM9027:: .ASCIZ /EXTRA CHAR RECEIVED WITHIN DATA PATTERN ON LINE/
2219  011070
2220  011076
2221  011104
2222  011112
2223  011120
2224  011126
2225  011134
2226  011142
2227  011143  EM9028:: .ASCIZ /SINGLE CHAR MISSING FROM RECEIVED DATA ON LINE/
2228  011150
2229  011156
2230  011164
2231  011172
2232  011200
2233  011206
2234  011214
2235  011222  EM9030:: .ASCIZ /%A  (NO TX COMPLETION INTERRUPTS RECEIVED)%N/
2236  011230
2237  011236
2238  011244
2239  011252
2240  011260
2241  011266
2242  011274
2243  011277  EM9101:: .ASCIZ /DMA TRANSMISSION MODE TEST /
2244  011304
2245  011312
2246  011320
2247  011326
2248  011333  EM9102:: .ASCIZ /DMA_START BIT SET AFTER RESET OR TX.ACTION ON LINE(S):/
2249  011340
2250  011346
2251  011354
2252  011362
2253  011370
```

```
2254  011376
2255  011404
2256  011412
2257  011420
2258  011422  EM9104:: .ASCIZ /  UNEXPECTED DATA FOUND IN FIFO FROM LINE: /
2259  011430
2260  011436
2261  011444
2262  011452
2263  011460
2264  011466
2265  011474
2266  011476  EM9201:: .ASCIZ /SPLIT SPEED TEST /
2267  011504
2268  011512
2269  011520  EM9301:: .ASCIZ /BMP CODE REPORT/
2270  011526
2271  011534
2272  011540  EM9302:: .ASCIZ /BMP CODE FOUND IN TEST /
2273  011546
2274  011554
2275  011562
2276  011570  EM9303:: .ASCIZ /THE LAST BMP CODE WAS FOUND IN TEST /
2277  011576
2278  011604
2279  011612
2280  011620
2281  011626
2282  011634
2283  011635  EM9304:: .ASCIZ /UNEXPECTED BMP CODES FOUND DURING THIS PASS/
2284  011642
2285  011650
2286  011656
2287  011664
2288  011672
2289  011700
2290  011706
2291                .EVEN
2292                        .LIST BIN
```

```
2293
2294
2295                            .SBTTL  GLOBAL ERROR REPORT SECTION
2296
2297                            ;++
2298                            ; THE GLOBAL ERROR REPORT SECTION CONTAINS MESSAGE PRINTING AREAS
2299                            ; USED BY MORE THAN ONE TEST TO OUTPUT ADDITIONAL ERROR INFORMATION.  PRINTB
2300                            ; (BASIC) AND PRINTX (EXTENDED) CALLS ARE USED TO CALL PRINT SERVICES.
2301                            ;--
```

```
                        .SBTTL  GLOBAL ERROR REPORTING ROUTINE          - ER0101 -
                        ;*****************************************************************************
                        ;*      THIS IS AN ERROR REPORTING SUBROUTINE WHICH PRINTS ADDITIONAL ERROR
                        ;*      INFORMATION IF AN ERROR IS DETECTED IN TEST 1 (REGISTER ADDRESS
                        ;*      ACCESS TEST).  THIS SUBROUTINE REPORTS THE TYPE OF ACCESS (READ OR
                        ;*      WRITE OR BOTH) WHICH CAUSED A BUS TIME-OUT TRAP (004 TRAP).
                        ;*      A MESSAGE INDICATING THAT THE DHV MAY BE AT THE WRONG Q-BUS ADDRESS
                        ;*      IS ALSO PRINTED.
                        ;*
                        ;* INPUTS:      R5 - ERROR FLAG WORD.
                        ;*                   IF BIT 0 IS SET, A READ ERROR OCCURED.
                        ;*                   IF BIT 1 IS SET, A WRITE ERROR OCCURED.
                        ;*
                        ;* OUTPUTS:     MESSAGES ARE PRINTED AT THE OPERATOR CONSOLE.
                        ;*
                        ;* CALLING SEQUENCE:    INCLUDE THE LABEL "ER0101" AS THE MESSAGE POINTER
                        ;*                      PARAMETER IN THE DRS ERROR REPORT MACRO CALL.
                        ;*
                        ;* COMMENTS:
                        ;*
                        ;* SUBORDINATE ROUTINES USED: NONE.
                        ;*****************************************************************************

011712                          BGNMSG  ER0101
011712                                                                  ER0101::
011712                          SAVE                    ;SAVE THE GPR CONTENTS.
011712  004537  005232                      JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.

011716  032705  000001          BIT     #BIT0,R5        ;TEST FOR READ ERROR.
011722  001410                  BEQ     2$              ;SKIP READ ERROR MSG IF NO READ ERROR.
011724                          PRINTB  #MSG1           ;PRINT READ ERROR MESSAGE.
011724  012746  012016                                                  MOV     #MSG1,-(SP)
011730  012746  000001                                                  MOV     #1,-(SP)
011734  010600                                                          MOV     SP,R0
011736  104414                                                          TRAP    C$PNTB
011740  062706  000004                                                  ADD     #4,SP
011744  032705  000002  2$:     BIT     #BIT1,R5        ;TEST FOR WRITE ERROR.
011750  001410                  BEQ     4$              ;SKIP WRITE ERROR MSG IF NO WRITE ERROR.
011752                          PRINTB  #MSG2           ;PRINT WRITE ERROR MESSAGE.
011752  012746  012074                                                  MOV     #MSG2,-(SP)
011756  012746  000001                                                  MOV     #1,-(SP)
011762  010600                                                          MOV     SP,R0
011764  104414                                                          TRAP    C$PNTB
011766  062706  000004                                                  ADD     #4,SP
011772                  4$:     PRINTX  #MSG3           ;SUGGEST THAT DHV MAY BE AT WRONG ADDRESS.
011772  012746  012153                                                  MOV     #MSG3,-(SP)
011776  012746  000001                                                  MOV     #1,-(SP)
012002  010600                                                          MOV     SP,R0
012004  104415                                                          TRAP    C$PNTX
012006  062706  000004                                                  ADD     #4,SP
012012                          PASS                    ;RESTORE THE GPR CONTENTS.
012012  004736                          JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
012014                          ENDMSG
012014                                                                  L10002:
012014  104423                                                          TRAP    C$MSG
```

```
2358  012016  040445  052502  020123  MSG1::  .ASCIZ  /%ABUS TIME-OUT TRAP CAUSED BY READ ATTEMPT.%N/
2359  012024  044524  042515  047455
2360  012032  052125  052040  040522
2361  012040  020120  040503  051525
2362  012046  042105  041040  020131
2363  012054  042522  042101  040440
2364  012062  052124  046505  052120
2365  012070  022456  000116
2366  012074  040445  052502  020123  MSG2::  .ASCIZ  /%ABUS TIME-OUT TRAP CAUSED BY WRITE ATTEMPT.%N/
2367  012102  044524  042515  047455
2368  012110  052125  052040  040522
2369  012116  020120  040503  051525
2370  012124  042105  041040  020131
2371  012132  051127  052111  020105
2372  012140  052101  042524  050115
2373  012146  027124  047045     000
2374  012153     045  042101  053110  MSG3::  .ASCIZ  /%ADHV MAY BE AT THE WRONG Q-BUS ADDRESS.%N%N/
2375  012160  046440  054501  041040
2376  012166  020105  052101  052040
2377  012174  042510  053440  047522
2378  012202  043516  050440  041055
2379  012210  051525  040440  042104
2380  012216  042522  051523  022456
2381  012224  022516  000116
2382
2383                                  .EVEN
```

```
                        .SBTTL  GLOBAL ERROR REPORTING ROUTINE          - ER0503 -
                        ;*****************************************************************************
                        ;*      THIS IS AN ERROR REPORTING SUBROUTINE WHICH PRINTS AN ADDITIONAL ERROR
                        ;*      MESSAGE WHOSE ADDRESS IS PASSED AS AN INPUT PARAMETER.
                        ;*
                        ;* INPUTS:      R1 - ADDRESS OF THE MESSAGE TO PRINT.
                        ;*
                        ;* OUTPUTS:     A MESSAGES IS PRINTED AT THE OPERATOR CONSOLE.
                        ;*
                        ;* CALLING SEQUENCE:    LOAD THE ADDRESS OF THE MESSAGE IN R1.
                        ;*                      INCLUDE THE LABEL "ER0503" AS THE MESSAGE POINTER
                        ;*                      PARAMETER IN THE DIAG SUPER ERROR REPORT MACRO CALL.
                        ;*
                        ;* COMMENTS:    THE MESSAGE IS PRINTED AS BASIC ERROR INFORMATION.
                        ;*
                        ;* SUBORDINATE ROUTINES USED: NONE.
                        ;*****************************************************************************

                            BGNMSG  ER0503
                                                                        ER0503::

                            PRINTB  #EF0503,R1      ;PRINT THE MESSAGE.
                                                                            MOV     R1,-(SP)
                                                                            MOV     #EF0503,-(SP)
                                                                            MOV     #2,-(SP)
                                                                            MOV     SP,R0
                                                                            TRAP    C$PNTB
                                                                            ADD     #6,SP

                            ENDMSG

                                                                        L10003:
                                                                            TRAP    C$MSG
```

```
                        .SBTTL  GLOBAL ERROR REPORTING ROUTINE          - ER1603 -
                        ;*******************************************************************************
                        ;*      THIS ERROR REPORTING ROUTINE IS USED TO PRINT OUT A BASIC ERROR
                        ;*      MESSAGE, ALONG WITH A MESSAGE INFORMING THE OPERATOR WHICH TEST IS
                        ;*      ABOUT TO BE ABORTED.
                        ;*
                        ;* INPUTS:      R1 - CONTAINS THE ADDRESS OF THE MESSAGE TO BE PRINTED.
                        ;*              ERRMSG - CONTAINS THE ADDRESS OF THE MESSAGE THAT INDICATES
                        ;*              THE TEST THAT IS BEING PERFORMED, EG DMA, BREAK ETC.
                        ;*
                        ;* OUTPUTS:     MESSAGES ARE PRINTED AT THE OPERATORS CONSOLE.
                        ;*              "TESTNAME TEST ABORTED"
                        ;*
                        ;* CALLING SEQUENCE:    INCLUDE THE LABLE "ER1603" AS THE MESSAGE POINTER
                        ;*                      PARAMETER IN THE DRS ERROR REPORT MACRO CALL.
                        ;*
                        ;* COMMENTS:
                        ;*
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;*******************************************************************************
                              BGNMSG  ER1603
012254                                                          ER1603::
012254                        SAVE                      ;SAVE THE CONTENTS OF THE GPRS.
012254  004537  005232                JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.

012260                        PRINTB #EF0503,R1         ;PRINT BASIC MESSAGE ON OPERATORS CONSOLE.
012260  010146                                                  MOV     R1,-(SP)
012262  012746  005363                                          MOV     #EF0503,-(SP)
012266  012746  000002                                          MOV     #2,-(SP)
012272  010600                                                  MOV     SP,R0
012274  104414                                                  TRAP    C$PNTB
012276  062706  000006                                          ADD     #6,SP

012302  013702  005226        MOV     ERRMSG,R2         ;GET THE "TEST MESSAGE".
012306                        PRINTB #EF1601,R2         ;PRINT "TEST ABORTED" MESSAGE.
012306  010246                                                  MOV     R2,-(SP)
012310  012746  005370                                          MOV     #EF1601,-(SP)
012314  012746  000002                                          MOV     #2,-(SP)
012320  010600                                                  MOV     SP,R0
012322  104414                                                  TRAP    C$PNTB
012324  062706  000006                                          ADD     #6,SP

012330                        PASS                      ;RESTORE THE CONTENTS OF THE GPRS.
012330  004736                        JSR     PC,@(SP)+       ;RETURN TO PREG05 SUBRT.
012332                        ENDMSG
012332                                                  L10004:
012332  104423                                                  TRAP    C$MSG
```

```
2464                            .SBTTL  GLOBAL ERROR REPORTING ROUTINE          - ER6201 -
2465                            ;*****************************************************************************
2466                            ;*      THIS IS AN ERROR REPORTING SUBROUTINE WHICH IS INTENDED FOR USE IN THE
2467                            ;*      FRAMING ERROR AND PARITY ERROR TESTS.  IT REPORTS ERROR INFORMATION
2468                            ;*      WHEN A CHARACTER HAS BEEN READ FROM THE DUT WITH THE INCORRECT
2469                            ;*      COMBINATION OF FRAMING AND PARITY ERROR BITS.
2470                            ;*
2471                            ;* INPUTS:      R2 - DATA BYTE READ FROM THE DUT, INCLUDING ERROR FLAGS.
2472                            ;*              R3 - LINE NUMBER MULTIPLIED BY 2.
2473                            ;*              R5 - MESSAGE FLAGS, WHICH MESSAGES TO REPORT.
2474                            ;*                 BIT1 AND BIT3 - INDICATE WHICH MESSAGES ARE TO BE
2475                            ;*                 REPORTED, FRAMING OR PARITY RESPECTIVELY.
2476                            ;*                 BIT0 AND BIT 2 - "SET"/"CLEAR" MESSAGE FOR
2477                            ;*                 FRAMING AND PARITY ERRORS BITS.
2478                            ;*
2479                            ;* OUTPUTS:     MESSAGES ARE PRINTED AT THE OPERATOR CONSOLE.
2480                            ;*
2481                            ;* CALLING SEQUENCE:    INCLUDE THE LABEL "ER6201" AS THE MESSAGE POINTER
2482                            ;*                      PARAMETER IN THE DIAG SUPER ERROR REPORT MACRO CALL.
2483                            ;*
2484                            ;* COMMENTS:    THE MESSAGE IS PRINTED AS BASIC AND EXTENDED ERROR INFORMATION.
2485                            ;*              THE CONTENTS OF THE INDIRECT ADDRESS REGISTER FIELD OF THE DUT
2486                            ;*              CSR MAY BE ALTERED.
2487                            ;*
2488                            ;* SUBORDINATE ROUTINES USED: PRTLPR.
2489                            ;*****************************************************************************
2490
2491  012334                            BGNMSG  ER6201
2492  012334                                                                    ER6201::
2493  012334                            SAVE                    ;SAVE THE CONTENTS OF THE GPR'S.
2494  012334  004537  005232                    JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
2495
2496  012340  016304  005142            MOV     TXRXLB(R3),R4   ;GET THE ASSOCIATED TX LINE NUMBER.
2497  012344  006203                    ASR     R3              ;CALCULATE THE RX LINE NUMBER.
2498  012346  006204                    ASR     R4              ;CALCULATE THE ASSOCIATED LINE NUMBER.
2499  012350                            PRINTB  #EF6201,R3,R4   ;REPORT THE ERROR TYPE AND LINE NUMBERS.
2500  012350  010446                                                            MOV     R4,-(SP)
2501  012352  010346                                                            MOV     R3,-(SP)
2502  012354  012746  005456                                                    MOV     #EF6201,-(SP)
2503  012360  012746  000003                                                    MOV     #3,-(SP)
2504  012364  010600                                                            MOV     SP,R0
2505  012366  104414                                                            TRAP    C$PNTB
2506  012370  062706  000010                                                    ADD     #10,SP
2507
2508                            ;+
2509                            ; REPORT FRAMING ERROR PROBLEM.
2510                            ;-
2511  012374  012704  007557            MOV     #EM6202,R4      ;SELECT THE "ERROR BIT CLEAR" MESSAGE.
2512  012400  012701  007373            MOV     #EM0509,R1      ;SELECT EXPECTED "ERROR BIT SET" MESSAGE.
2513  012404  032705  000002            BIT     #BIT1,R5        ;TEST IF FRAMING ERROR MESSAGE TO BE REPORTED.
2514  012410  001427                    BEQ     6$              ;BRANCH TO REPORT PARITY ERROR.
2515  012412  032705  000001            BIT     #BIT0,R5        ;TEST "ERROR BIT SET/CLEAR" MESSAGE FLAG.
2516  012416  001403                    BEQ     2$              ;BRANCH TO REPORT ERROR BIT "CLEAR".
2517  012420  010401                    MOV     R4,R1           ;SELECT EXPECTED "CLEAR" STATE MESSAGE.
2518  012422  012704  007373            MOV     #EM0509,R4      ;SELECT THE "ERROR BIT SET" MESSAGE.
2519  012426                    2$:     PRINTX  #EF6202,R4,R1   ;REPORT THE SOURCE OF THE PROBLEM.
2520  012426  010146                                                            MOV     R1,-(SP)
```

```
2520  012430  010446                                                          MOV     R4,-(SP)
2521  012432  012746  005571                                                  MOV     #EF6202,-(SP)
2522  012436  012746  000003                                                  MOV     #3,-(SP)
2523  012442  010600                                                          MOV     SP,R0
2524  012444  104415                                                          TRAP    C$PNTX
2525  012446  062706  000010                                                  ADD     #10,SP
2526  012452  032705  000010                BIT     #BIT3,R5        ;TEST IF PARITY ERROR MESSAGE TO BE REPORTED.
2527  012456  001424                       BEQ     10$             ;EXIT IF PARITY ERROR REPORT TO BE SKIPPED.
2528  012460  012704  007557                MOV     #EM6202,R4      ;SELECT THE "CLEAR" MESSAGE.
2529  012464  012701  007373                MOV     #EM0509,R1      ;SELECT THE EXPECTED "SET" STATE MESSAGE.
2530                                  ;+
2531                                  ; REPORT PARITY ERROR PROBLEM.
2532                                  ;-
2533
2534  012470  032705  000004          6$:     BIT     #BIT2,R5        ;TEST "SET"/"CLEAR" MESSAGE FLAG.
2535  012474  001403                       BEQ     8$              ;BRANCH TO REPORT ERROR BIT CLEAR.
2536  012476  010401                        MOV     R4,R1           ;SELECT THE EXPECTED "CLEAR" STATE MESSAGE.
2537  012500  012704  007373                MOV     #EM0509,R4      ;SELECT THE "ERROR BIT SET" MESSAGE.
2538  012504                           8$:     PRINTX  #EF6203,R4,R1   ;REPORT THE SOURCE OF THE PROBLEM.
2539  012504  010146                                                          MOV     R1,-(SP)
2540  012506  010446                                                          MOV     R4,-(SP)
2541  012510  012746  005667                                                  MOV     #EF6203,-(SP)
2542  012514  012746  000003                                                  MOV     #3,-(SP)
2543  012520  010600                                                          MOV     SP,R0
2544  012522  104415                                                          TRAP    C$PNTX
2545  012524  062706  000010                                                  ADD     #10,SP
2546
2547  012530                           10$:    PRINTX  #EF1603,R2      ;REPORT ACTUAL DATA RECEIVED.
2548  012530  010246                                                          MOV     R2,-(SP)
2549  012532  012746  005414                                                  MOV     #EF1603,-(SP)
2550  012536  012746  000002                                                  MOV     #2,-(SP)
2551  012542  010600                                                          MOV     SP,R0
2552  012544  104415                                                          TRAP    C$PNTX
2553  012546  062706  000006                                                  ADD     #6,SP
2554
2555  012552  004737  020530                JSR     PC,PRTLPR       ;REPORT THE CONTENTS OF THE LPR FOR THIS LINE.
2556  012556                           60$:    PASS                    ;RESTORE THE CONTENTS OF THE GPR'S.
2557  012556  004736                                   JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
2558  012560                                ENDMSG
2559  012560                                                          L10005:
2560  012560  104423                                                          TRAP    C$MSG
```

```
                        .SBTTL  GLOBAL ERROR REPORTING ROUTINE          - ER6401 -
                        ;*************************************************************************
                        ;*      THIS IS AN ERROR REPORTING SUBROUTINE WHICH PRINTS ADDITIONAL ERROR
                        ;*      INFORMATION AFTER THE ERROR MESSAGE HEADER.
                        ;*      THIS SUBROUTINE IS PASSED A GPR CONTAINING FLAGS WHICH INDICATE
                        ;*      THE LINE(S) FOR WHICH THE ERROR CONDITION SHOULD BE REPORTED.
                        ;*
                        ;* INPUTS:      R1 - ADDRESS OF THE MESSAGE TO BE PRINTED BY THIS ROUTINE.
                        ;*              R5 - CONTAINS THE ERROR FLAGS, (1 FLAG PER LINE).
                        ;*
                        ;* OUTPUTS:     MESSAGES ARE PRINTED AT THE OPERATOR CONSOLE.
                        ;*
                        ;* CALLING SEQUENCE:    LOAD THE ADDRESS OF THE MESSAGE IN R1.
                        ;*                      INCLUDE THE LABEL "ER6401" AS THE MESSAGE POINTER
                        ;*                      PARAMETER IN THE DIAG SUPER ERROR REPORT MACRO CALL.
                        ;*
                        ;* COMMENTS:    THE OUTPUT FORMAT OF THIS MESSAGE IS:
                        ;*                      TEXT MESSAGE
                        ;*                              #NN
                        ;*                              #NN
                        ;*                              .
                        ;*                              .
                        ;*                              .
                        ;*              WHERE EACH "#NN" IS THE NUMBER OF A LINE WITH THE ERROR.
                        ;*
                        ;* SUBORDINATE ROUTINES USED: NONE.
                        ;*************************************************************************

                              BGNMSG  ER6401
                                                                        ER6401::
                              SAVE                      ;SAVE THE CONTENTS OF THE GPRS.
012562  004537  005232              JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.

012566  005002               CLR     R2                ;CLEAR LINE NUMBER TO ZERO.
012570  012703  000010       MOV     #NUMLNS,R3        ;SET UP MAX LINE COUNT.
012574                       PRINTB  #EF0503,R1        ;PRINT MESSAGE.
012574  010146                                                  MOV     R1,-(SP)
012576  012746  005363                                          MOV     #EF0503,-(SP)
012602  012746  000002                                          MOV     #2,-(SP)
012606  010600                                                  MOV     SP,R0
012610  104414                                                  TRAP    C$PNTB
012612  062706  000006                                          ADD     #6,SP
012616  000241               CLC                       ;CLEAR CARRY.
012620  006205       2$:     ASR     R5                ;SHIFT FLAG OUT INTO CARRY BIT.
012622  103011              BCC     4$                ;SKIP ERROR REPORT IF CLEAR.
012624                       PRINTB  #EF6401,R2        ;PRINT MESSAGE.
012624  010246                                                  MOV     R2,-(SP)
012626  012746  005764                                          MOV     #EF6401,-(SP)
012632  012746  000002                                          MOV     #2,-(SP)
012636  010600                                                  MOV     SP,R0
012640  104414                                                  TRAP    C$PNTB
012642  062706  000006                                          ADD     #6,SP
012646  005202       4$:     INC     R2                ;INCREMENT LINE COUNT.
012650  020302               CMP     R3,R2             ;CHECK IF MAX LINE COUNT EXCEEDED.
012652  001362              BNE     2$                ;LOOP IF NOT DONE.
012654               60$:    PASS                      ;RESTORE THE SAVED CONTENTS OF THE GPRS.
012654  004736                      JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
012656                       ENDMSG
```

```
                                                                L10006:
 2617  012656
 2618  012656  104423                                              TRAP    C$MSG
```

```
                        .SBTTL  GLOBAL ERROR REPORTING ROUTINE          - ER7801 -
                        ;*********************************************************************
                        ;*      THIS IS AN ERROR REPORTING SUBROUTINE WHICH PRINTS AN ADDITIONAL ERROR
                        ;*      MESSAGE WHOSE ADDRESS IS PASSED AS AN INPUT PARAMETER.  A LINE NUMBER
                        ;*      IS INCLUDED AT THE END OF THE MESSAGE.
                        ;*
                        ;* INPUTS:      R1 - ADDRESS OF THE MESSAGE TO PRINT.
                        ;*              R3 - NUMBER OF LINE ON WHICH ERROR OCCURRED.
                        ;*
                        ;* OUTPUTS:     A MESSAGES IS PRINTED AT THE OPERATOR CONSOLE.
                        ;*
                        ;* CALLING SEQUENCE:    LOAD THE ADDRESS OF THE MESSAGE IN R1.
                        ;*                      LOAD THE LINE NUMBER INTO R3.
                        ;*                      INCLUDE THE LABEL 'ER7801" AS THE MESSAGE POINTER
                        ;*                      PARAMETER IN THE DIAG SUPER ERROR REPORT MACRO CALL.
                        ;*
                        ;* COMMENTS:    THE MESSAGE IS PRINTED AS BASIC ERROR INFORMATION.
                        ;*
                        ;* SUBORDINATE ROUTINES USED: NONE.
                        ;*********************************************************************

                              BGNMSG  ER7801
                                                                        ER7801::

                              PRINTB  #EF7801,R1,R3   ;PRINT THE MESSAGE.
012660  010346                                                  MOV     R3,-(SP)
012662  010146                                                  MOV     R1,-(SP)
012664  012746  006033                                         MOV     #EF7801,-(SP)
012670  012746  000003                                         MOV     #3,-(SP)
012674  010600                                                  MOV     SP,R0
012676  104414                                                  TRAP    C$PNTB
012700  062706  000010                                         ADD     #10,SP

                        ENDMSG
012704                                                  L10007:
012704  104423                                                  TRAP    C$MSG
```

```
                        .SBTTL  GLOBAL ERROR REPORTING ROUTINE          - ER9001 -
                        ;*****************************************************************************
                        ;*      THIS IS AN ERROR REPORTING SUBROUTINE WHICH REPORTS AN UNEXPECTED
                        ;*      CODE WHICH HAS BEEN FOUND IN THE DUT CSR.  THIS CODE CAN BE A BMP
                        ;*      CODE, A SELF-TEST CODE, OR A MODEM STATUS CODE.
                        ;*
                        ;* INPUTS:      R1 - ADDRESS OF MESSAGE TO PRINT FIRST.
                        ;*              R2 - SINGLE BYTE CODE WHICH HAS BEEN READ FROM THE DUT.
                        ;*              R4 - LINE NUMBER ASSOCIATED WITH THE CODE.
                        ;*
                        ;* OUTPUTS:     A MESSAGES IS PRINTED AT THE OPERATOR CONSOLE.
                        ;*
                        ;* CALLING SEQUENCE:    INCLUDE THE LABEL "ER9001" AS THE MESSAGE POINTER
                        ;*                      PARAMETER IN THE DIAG SUPER ERROR REPORT MACRO CALL.
                        ;*
                        ;* COMMENTS:    THE MESSAGE IS PRINTED AS BASIC AND EXTENDED ERROR INFORMATION.
                        ;*
                        ;* SUBORDINATE ROUTINES USED: NONE.
                        ;*****************************************************************************

012706                          BGNMSG  ER9001
012706                                                          ER9001::
012706
012706                          PRINTB  #EF9001,R1      ;REPORT TYPE OF CODE FOUND.
012706  010146                                                  MOV     R1,-(SP)
012710  012746  006071                                          MOV     #EF9001,-(SP)
012714  012746  000002                                          MOV     #2,-(SP)
012720  010600                                                  MOV     SP,R0
012722  104414                                                  TRAP    C$PNTB
012724  062706  000006                                          ADD     #6,SP
012730                          PRINTX  #EF9002,R4      ;REPORT THE LINE NUMBER OF THE CODE.
012730  010446                                                  MOV     R4,-(SP)
012732  012746  006153                                          MOV     #EF9002,-(SP)
012736  012746  000002                                          MOV     #2,-(SP)
012742  010600                                                  MOV     SP,R0
012744  104415                                                  TRAP    C$PNTX
012746  062706  000006                                          ADD     #6,SP
012752                          PRINTX  #EF9003,R2      ;REPORT THE CODE WHICH WAS FOUND.
012752  010246                                                  MOV     R2,-(SP)
012754  012746  006225                                          MOV     #EF9003,-(SP)
012760  012746  000002                                          MOV     #2,-(SP)
012764  010600                                                  MOV     SP,R0
012766  104415                                                  TRAP    C$PNTX
012770  062706  000006                                          ADD     #6,SP
012774                          ENDMSG
012774                                                  L10010:
012774  104423                                                  TRAP    C$MSG
```

```
                        .SBTTL  GLOBAL ERROR REPORTING ROUTINE          - ER9002 -
                        ;*******************************************************************************
                        ;*      THIS IS AN ERROR REPORTING SUBROUTINE WHICH IS INTENDED FOR USE IN THE
                        ;*      TRANMSISSION AND RECEPTION TESTS.  IT REPORTS THE TYPE OF ERROR WHICH
                        ;*      HAS OCCURRED WHEN INCORRECT DATA IS RECEIVED FROM THE DUT.  THIS
                        ;*      ROUTINE ALSO REPORTS THE READ AND EXPECTED DATA VALUES.
                        ;*
                        ;* INPUTS:      R1 - ADDRESS OF MESSAGE TO PRINT FIRST.
                        ;*              R2 - DATA BYTE READ FROM THE DUT.
                        ;*              R3 - LINE NUMBER MULTIPLIED BY 2.
                        ;*              R4 - EXPECTED DATA BYTE, BIT 15 SET IF 'NONE".
                        ;*
                        ;* OUTPUTS:     A MESSAGES IS PRINTED AT THE OPERATOR CONSOLE.
                        ;*
                        ;* CALLING SEQUENCE:    INCLUDE THE LABEL "ER9002" AS THE MESSAGE POINTER
                        ;*                      PARAMETER IN THE DIAG SUPER ERROR REPORT MACRO CALL.
                        ;*
                        ;* COMMENTS:    THE MESSAGE IS PRINTED AS BASIC AND EXTENDED ERROR INFORMATION.
                        ;*
                        ;* SUBORDINATE ROUTINES USED: PRTLPR.
                        ;*******************************************************************************

012776                          BGNMSG  ER9002
012776                                                          ER9002::

012776  006203                   ASR    R3              ;CALCULATE THE LINE NUMBER.
013000  042702  177400           BIC    #177400,R2      ;MASK OUT ALL BUT DATA IN READ CHAR.
013004                          PRINTB  #EF9006,R1,R3   ;PRINT THE FIRST LINE OF THE MESSAGE.
013004  010346                                                  MOV     R3,-(SP)
013006  010146                                                  MOV     R1,-(SP)
013010  012746  006335                                          MOV     #EF9006,-(SP)
013014  012746  000003                                          MOV     #3,-(SP)
013020  010600                                                  MOV     SP,R0
013022  104414                                                  TRAP    C$PNTB
013024  062706  000010                                          ADD     #10,SP
013030                          PRINTX  #EF9004,#EM9010,R2      ;PRINT ACTUAL DATA.
013030  010246                                                  MOV     R2,-(SP)
013032  012746  010440                                          MOV     #EM9010,-(SP)
013036  012746  006254                                          MOV     #EF9004,-(SP)
013042  012746  000003                                          MOV     #3,-(SP)
013046  010600                                                  MOV     SP,R0
013050  104415                                                  TRAP    C$PNTX
013052  062706  000010                                          ADD     #10,SP
013056  005704                   TST    R4              ;CHECK FOR "NONE" CODE SET IN EXPECTED DATA.
013060  100414                  BMI    2$              ;BRANCH TO PRINT "NONE" MESSAGE IF FLAG SET.
013062                          PRINTX  #EF9004,#EM9009,R4      ;PRINT EXPECTED DATA.
013062  010446                                                  MOV     R4,-(SP)
013064  012746  010414                                          MOV     #EM9009,-(SP)
013070  012746  006254                                          MOV     #EF9004,-(SP)
013074  012746  000003                                          MOV     #3,-(SP)
013100  010600                                                  MOV     SP,R0
013102  104415                                                  TRAP    C$PNTX
013104  062706  000010                                          ADD     #10,SP
013110  000412                  BR      60$             ;EXIT THIS ROUTINE.
013112                  2$:     PRINTX  #EF9005,#EM9009 ;PRINT MESSAGE INDICATING NO EXPECTED DATA.
013112  012746  010414                                          MOV     #EM9009,-(SP)
```

```
2759  013116  012746  006304                                          MOV     #EF9005,-(SP)
2760  013122  012746  000002                                          MOV     #2,-(SP)
2761  013126  010600                                                  MOV     SP,R0
2762  013130  104415                                                  TRAP    C$PNTX
2763  013132  062706  000006                                          ADD     #6,SP
2764  013136  004737  020530          60$:    JSR     PC,PRTLPR      ;PRINT CONTENTS OF THE LPR REGISTER.
2765  013142                                   ENDMSG
2766  013142                                                   L10011:
2767  013142  104423                                                  TRAP    C$MSG
```

```
                        .SBTTL  GLOBAL ERROR REPORTING ROUTINE          - ER9003 -
                        ;*******************************************************************************
                        ;*      THIS IS AN ERROR REPORTING SUBROUTINE WHICH IS INTENDED FOR USE IN THE
                        ;*      TRANMSISSION AND RECEPTION TESTS.  IT REPORTS ERROR INFORMATION WHEN
                        ;*      A CHARACTER HAS BEEN READ FROM THE DUT WITH AN ERROR FLAG OR FLAGS
                        ;*      SET (IE. OVER-RUN, FRAMING, OR PARITY FLAG).
                        ;*
                        ;* INPUTS:      R2 - DATA BYTE READ FROM THE DUT, INCLUDING ERROR FLAGS.
                        ;*              R3 - LINE NUMBER MULTIPLIED BY 2.
                        ;*
                        ;* OUTPUTS:     A MESSAGES IS PRINTED AT THE OPERATOR CONSOLE.
                        ;*
                        ;* CALLING SEQUENCE:    INCLUDE THE LABEL "ER9003" AS THE MESSAGE POINTER
                        ;*                      PARAMETER IN THE DIAG SUPER ERROR REPORT MACRO CALL.
                        ;*
                        ;* COMMENTS:    THE MESSAGE IS PRINTED AS BASIC AND EXTENDED ERROR INFORMATION.
                        ;*              THE CONTENTS OF THE INDIRECT ADDRESS REGISTER FIELD OF THE DUT
                        ;*              CSR MAY BE ALTERED.
                        ;*
                        ;* SUBORDINATE ROUTINES USED: NONE.
                        ;*******************************************************************************

013144                          BGNMSG  ER9003
013144                                                          ER9003::

013144  006203                   ASR    R3              ;CALCULATE THE LINE NUMBER.
013146                          PRINTB  #EF9007,R3      ;REPORT THE ERROR TYPE AND LINE NUMBER.
013146  010346                                                  MOV     R3,-(SP)
013150  012746  006354                                          MOV     #EF9007,-(SP)
013154  012746  000002                                          MOV     #2,-(SP)
013160  010600                                                  MOV     SP,R0
013162  104414                                                  TRAP    C$PNTB
013164  062706  000006                                          ADD     #6,SP
013170  010201                    MOV    R2,R1            ;EXTRACT THE RECEIVED CHARACTER FROM THE
013172  042701  177400            BIC    #177400,R1       ;  PASSED IN CHAR VALUE WITH FLAGS.
013176                          PRINTX  #EF9008,R1      ;REPORT THE VALUE OF THE RECEIVED CHAR.
013176  010146                                                  MOV     R1,-(SP)
013200  012746  006450                                          MOV     #EF9008,-(SP)
013204  012746  000002                                          MOV     #2,-(SP)
013210  010600                                                  MOV     SP,R0
013212  104415                                                  TRAP    C$PNTX
013214  062706  000006                                          ADD     #6,SP

                        ;+
                        ; REPORT OVERRUN FLAG SET IF NECESSARY.
                        ;-
013220  012701  010464          MOV     #EM9011,R1      ;SELECT THE OVERRUN ERROR MESSAGE.
013224  032702  000000          BIT     #BIT14,R2       ;CHECK OVERRUN ERROR FLAG IN PASSED IN CHAR.
013230  001402                  BEQ     2$              ;SKIP ERROR IF OVERRUN ERROR FLAG WAS CLEAR.
013232  004737  013274          JSR     PC,50$          ;REPORT THE OVERRUN ERROR FLAG WAS SET.

                        ;+
                        ; REPORT FRAMING FLAG SET IF NECESSARY.
                        ;-
013236  012701  010474  2$:     MOV     #EM9012,R1      ;SELECT THE FRAMING ERROR MESSAGE.
013242  032702  020000          BIT     #BIT13,R2       ;CHECK FRAMING ERROR FLAG IN PASSED IN CHAR.
013246  001402                  BEQ     4$              ;SKIP ERROR IF FRAMING ERROR FLAG WAS CLEAR.
013250  004737  013274          JSR     PC,50$          ;REPORT THE FRAMING ERROR MESSAGE.
```

```
2824                                    ;+
2825                                    ; REPORT PARITY FLAG SET IF NECESSARY.
2826                                    ;-
2827  013254  012701  010504     4$:     MOV     #EM9013,R1      ;SELECT THE PARITY ERROR MESSAGE.
2828  013260  032702  010000             BIT     #BIT12,R2       ;CHECK PARITY ERROR FLAG IN PASSED IN CHAR.
2829  013264  001415                     BEQ     60$             ;EXIT ROUTINE IF PARITY ERRO FLAG WAS CLEAR.
2830  013266  004737  013274             JSR     PC,50$          ;REPORT THE PARITY ERROR MESSAGE.
2831  013272  000412                     BR      60$             ;EXIT THIS ROUTINE.
2832
2833                                    ;+
2834                                    ; LOCAL SUBROUTINE TO REPORT AN ERROR FLAG STATUS.
2835                                    ;-
2836  013274                    50$:    PRINTX  #EF9009,R1
2837  013274  010146                                                          MOV     R1,-(SP)
2838  013276  012746  006507                                                 MOV     #EF9009,-(SP)
2839  013302  012746  000002                                                 MOV     #2,-(SP)
2840  013306  010600                                                         MOV     SP,R0
2841  013310  104415                                                         TRAP    C$PNTX
2842  013312  062706  000006                                                 ADD     #6,SP
2843  013316  000207                     RTS     PC
2844
2845  013320  004737  020530     60$:    JSR     PC,PRTLPR       ;REPORT THE LPR CONTENTS FOR THIS LINE.
2846  013324                             ENDMSG
2847  013324                                                          L10012:
2848  013324  104423                                                         TRAP    C$MSG
```

```
                        .SBTTL  GLOBAL ERROR REPORTING ROUTINE          - ER9004 -
                        ;*******************************************************************************
                        ;*      THIS IS AN ERROR REPORTING SUBROUTINE WHICH REPORTS ERROR SUMMARIES
                        ;*      FOR LINES WHICH HAVE EXCEEDED THE SPECIFIED MAXIMUM NUMBER OF
                        ;*      INDIVIDUAL RECEPTION ERRORS.
                        ;*
                        ;* INPUTS:      R1 - ADDRESS OF MESSAGE TO PRINT FIRST.
                        ;*              ERCNTB - LABEL AT BASE OF LINE ERROR COUNTERS TABLE.
                        ;*              ERSMRF - "REPORT ERROR SUMMARY FOR LINE" FLAGS.
                        ;*
                        ;* OUTPUTS:     A MESSAGE IS PRINTED AT THE OPERATOR CONSOLE.
                        ;*
                        ;* CALLING SEQUENCE:    INCLUDE THE LABEL "ER9004" AS THE MESSAGE POINTER
                        ;*                      PARAMETER IN THE DIAG SUPER ERROR REPORT MACRO CALL.
                        ;*
                        ;* COMMENTS:    THE MESSAGE IS PRINTED AS BASIC AND EXTENDED ERROR INFORMATION.
                        ;*              THE CONTENTS OF GPR'S R2, R3, R4, AND R5 ARE DESTROYED.
                        ;*
                        ;* SUBORDINATE ROUTINES USED: NONE.
                        ;*******************************************************************************

013326                          BGNMSG  ER9004
013326                                                                  ER9004::
013326                          PRINTB  #EF0503,#EM9014 ;REPORT THE SECONDARY ERROR MESSAGE.
013326  012746  010513                                                  MOV     #EM9014,-(SP)
013332  012746  005363                                                  MOV     #EF0503,-(SP)
013336  012746  000002                                                  MOV     #2,-(SP)
013342  010600                                                          MOV     SP,R0
013344  104414                                                          TRAP    C$PNTB
013346  062706  000006                                                  ADD     #6,SP
013352  005002                  CLR     R2              ;CLEAR THE LINE COUNTER.
013354  013703  002406          MOV     ERSMRF,R3       ;GET THE ERROR SUMMARY FLAGS.
013360  005004                  CLR     R4              ;CLEAR "LINE COUNTER TIMES 2" OFFSET.
013362  000241          2$:     CLC                     ;CLEAR THE CARRY FOR THE FOLLOWING ROTATE.
013364  006003                  ROR     R3              ;SHIFT ANOTHER ERROR SUMMARY FLAG INTO CARRY.
013366  103013                  BCC     4$              ;SKIP PRINTING MESSAGE IF FLAG FOR LINE CLEAR.
013370                          PRINTX  #EF9010,R2,ERCNTB(R4)
013370  016446  003210                                                  MOV     ERCNTB(R4),-(SP)
013374  010246                                                          MOV     R2,-(SP)
013376  012746  006546                                                  MOV     #EF9010,-(SP)
013402  012746  000003                                                  MOV     #3,-(SP)
013406  010600                                                          MOV     SP,R0
013410  104415                                                          TRAP    C$PNTX
013412  062706  000010                                                  ADD     #10,SP
013416  012405          4$:     MOV     (R4)+,R5        ;INCREMENT THE LINE OFFSET BY 2.
013420  005202                  INC     R2              ;INCREMT THE LINE COUNTER.
013422  005703                  TST     R3              ;CHECK THE ERROR SUMMARY FLAGS.
013424  001356                  BNE     2$              ;IF MORE FLAGS SET, LOOP TO DO OTHER LINES.

013426                          ENDMSG
013426                                                          L10013:
013426  104423                                                          TRAP    C$MSG
```

```
                        .SBTTL  GLOBAL ERROR REPORTING ROUTINE          - ER9005 -
                        ;*****************************************************************************
                        ;*      THIS IS AN ERROR REPORTING SUBROUTINE WHICH REPORTS INCOMPLETE DATA
                        ;*      TRANSMISSIONS OR RECEPTIONS.
                        ;*
                        ;* INPUTS:      R1 - EITHER "TRANSMITTED" OR "RECEIVED" TO INDICATE TX OR RX.
                        ;*              R2 - BIT MAP OF LINES WHICH DID NOT COMPLETE TX OR RX.
                        ;*              R4 - ADDRESS OF BASE OF THE CORRECT CHARACTER COUNTERS TABLE.
                        ;*              DPLENB - LABEL AT BASE OF DATA PATTERN LENGTH TABLE.
                        ;*              EM9015 - SYMBOLIC ADDRESS OF THE "TRANSMITTED" MESSAGE.
                        ;*
                        ;* OUTPUTS:     A MESSAGE IS PRINTED AT THE OPERATOR CONSOLE.
                        ;*
                        ;* CALLING SEQUENCE:    INCLUDE THE LABEL "ER9005" AS THE MESSAGE POINTER
                        ;*                      PARAMETER IN THE DIAG SUPER ERROR REPORT MACRO CALL.
                        ;*
                        ;* COMMENTS:    THE MESSAGE IS PRINTED AS BASIC AND EXTENDED ERROR INFORMATION.
                        ;*              THE CONTENTS OF THE INDIRECT ADDRESS FIELD IN THE DUT CSR MAY
                        ;*              BE ALTERED.
                        ;*
                        ;* SUBORDINATE ROUTINES USED: PRTLPR.
                        ;*****************************************************************************

013430                          BGNMSG  ER9005
013430                                                                  ER9005::
013430                          SAVE                    ;SAVE THE CONTENTS OF THE GPR'S.
013430  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.

013434                          PRINTB  #EF9013,R1      ;REPORT THE SECONDARY ERROR MESSAGE.
013434  010146                                                          MOV     R1,-(SP)
013436  012746  006751                                                  MOV     #EF9013,-(SP)
013442  012746  000002                                                  MOV     #2,-(SP)
013446  010600                                                          MOV     SP,R0
013450  104414                                                          TRAP    C$PNTB
013452  062706  000006                                                  ADD     #6,SP
013456  005003                  CLR     R3              ;CLEAR THE LINE COUNTER.
013460  022701  010607          CMP     #EM9015,R1      ;CHECK IF ADDRESS CORRESPONDS TO TX MESSAGE.
013464  001032                  BNE     6$              ;BRANCH IF RECEPTION MESSAGE TO BE PRINTED.

                        ;+
                        ; PERFORM TX INCOMPLETE ERROR MESSAGE REPORTING.
                        ;-
013466                          PRINTX  #EM9030         ;PRINT "NO TX COMPLETION INTERRUPTS RECEIVED"
013466  012746  011222                                                  MOV     #EM9030,-(SP)
013472  012746  000001                                                  MOV     #1,-(SP)
013476  010600                                                          MOV     SP,R0
013500  104415                                                          TRAP    C$PNTX
013502  062706  000004                                                  ADD     #4,SP
013506  000241          2$:     CLC                     ;CLEAR THE CARRY FOR THE FOLLOWING ROTATE.
013510  006002                  ROR     R2              ;SHIFT "TX NOT DONE" FLAG INTO CARRY.
013512  103013                  BCC     4$              ;SKIP PRINTING MESSAGE IF FLAG FOR LINE CLEAR.
013514                          PRINTX  #EF9020,R3      ;PRINT "TOO FEW TX.ACTIONS GENERATED" MSG.
013514  010346                                                          MOV     R3,-(SP)
013516  012746  007035                                                  MOV     #EF9020,-(SP)
013522  012746  000002                                                  MOV     #2,-(SP)
013526  010600                                                          MOV     SP,R0
```

```
2958  013530  104415                                                          TRAP    C$PNTX
2959  013532  062706  000006                                                  ADD     #6,SP
2960  013536  004737  020530          JSR     PC,PRTLPR       ;REPORT CONTENTS OF LPR REGISTER FOR THIS LINE.
2961  013542  005203          4$:      INC     R3              ;INCREMENT LINE COUNTER.
2962  013544  005702                   TST     R2              ;CHECK THE "TX NOT DONE FLAGS".
2963  013546  001357                   BNE     2$              ;IF MORE FLAGS SET, LOOP TO DO OTHER LINES.
2964  013550  000440                   BR      10$             ;EXIT THIS ROUTINE.
2965                                  ;+
2966                                  ; PERFORM RX INCOMPLETE ERROR MESSAGE REPORTING.
2967                                  ;-
2968  013552  000241          6$:      CLC                     ;CLEAR THE CARRY FOR THE FOLLOWING ROTATE.
2969  013554  006002                   ROR     R2              ;SHIFT "RX NOT DONE" FLAG INTO CARRY.
2970  013556  103031                   BCC     8$              ;SKIP PRINTING MESSAGE IF FLAG FOR LINE CLEAR.
2971  013560  006303                    ASL     R3              ;SHIFT LINE # TO GIVE CORRECT TABLE OFFSET.
2972  013562  016305  005142            MOV     TXRXLB(R3),R5   ;GET THE "ASSOCIATED" RECEIVE LINE OFFSET.
2973  013566  010246                    MOV     R2,-(SP)        ;SAVE THE "RX NOT DONE" FLAGS ON THE STACK.
2974  013570  010502                    MOV     R5,R2           ;COPY THE ASSOCIATED TX LINE OFFSET.
2975  013572  016505  003350            MOV     CHCNTB(R5),R5   ;GET THE TOTAL NUMBER OF EXPECTED CHARS.
2976  013576  006202                    ASR     R2              ;SHIFT THE TABLE OFFSET TO GIVE A LINE NUMBER.
2977  013600  006203                    ASR     R3              ;SHIFT TABLE OFFSET TO GIVE LINE NUMBER.
2978  013602                           PRINTX  #EF9012,R3,R1,(R4),R5,R2  ;REPORT NUMBER OF CHARS ON LINE.
2979  013602  010246                                                          MOV     R2,-(SP)
2980  013604  010546                                                          MOV     R5,-(SP)
2981  013606  011446                                                          MOV     (R4),-(SP)
2982  013610  010146                                                          MOV     R1,-(SP)
2983  013612  010346                                                          MOV     R3,-(SP)
2984  013614  012746  006635                                                  MOV     #EF9012,-(SP)
2985  013620  012746  000006                                                  MOV     #6,-(SP)
2986  013624  010600                                                          MOV     SP,R0
2987  013626  104415                                                          TRAP    C$PNTX
2988  013630  062706  000016                                                  ADD     #16,SP
2989  013634  012602                    MOV     (SP)+,R2        ;RESTORE THE "RX NOT DONE" FLAGS.
2990  013636  004737  020530           JSR     PC,PRTLPR       ;REPORT CONTENTS OF LPR REGISTER FOR THIS LINE.
2991  013642  005724          8$:      TST     (R4)+           ;INCREMENT THE CHARACTER COUNTER TABLE.
2992  013644  005203                   INC     R3              ;INCREMENT THE LINE COUNTER.
2993  013646  005702                   TST     R2              ;CHECK THE "RX NOT DONE FLAGS".
2994  013650  001340                   BNE     6$              ;IF MORE FLAGS SET, LOOP TO DO OTHER LINES.
2995  013652          10$:     PASS                            ;RESTORE THE CONTENTS OF THE GPRS.
2996  013652  004736                                   JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
2997  013654                           ENDMSG
2998  013654                                                          L10014:
2999  013654  104423                                                          TRAP    C$MSG
```

```
3000                            .SBTTL  GLOBAL ERROR REPORTING ROUTINE          - ER9102 -
3001                            ;*************************************************************************
3002                            ;*      THIS IS AN ERROR REPORTING SUBROUTINE WHICH PRINTS ADDITIONAL ERROR
3003                            ;*      INFORMATION AFTER THE ERROR MESSAGE HEADER.
3004                            ;*      THIS ROUTINE IS PASSED A BIT MAP WHICH SPECIFIES THE LINES FOR WHICH
3005                            ;*      THE ERROR CONDITION SHOULD BE REPORTED.
3006                            ;*
3007                            ;* INPUTS:      R1 - ADDRESS OF THE MESSAGE TO BE PRINTED BY THIS ROUTINE.
3008                            ;*              R2 - BIT MAP OF LINES FOR WHICH TO REPORT ERRORS.
3009                            ;*
3010                            ;* OUTPUTS:     MESSAGES ARE PRINTED AT THE OPERATOR CONSOLE.
3011                            ;*
3012                            ;* CALLING SEQUENCE:    LOAD THE ADDRESS OF THE MESSAGE IN R1.
3013                            ;*                      LOAD THE BIT MAP OF LINES WITH ERRORS IN R2.
3014                            ;*                      INCLUDE THE LABEL "ER9102" AS THE MESSAGE POINTER
3015                            ;*                         (ERRBLK) IN THE DIAG SUPER ERROR REPORT MACRO CALL.
3016                            ;*
3017                            ;* COMMENTS:    THE OUTPUT FORMAT OF THIS MESSAGE IS:
3018                            ;*              "TEXT MESSAGE POINTED TO BY R1"
3019                            ;*                      'ERROR CONDITION ON LINE NN"
3020                            ;*                      'ERROR CONDITION ON LINE ..."
3021                            ;*              THE TOP MESSAGE, AND THE MESSAGE FOR EACH LINE ARE PRINTED
3022                            ;*              AS BASIC ERROR INFORMATION.
3023                            ;*
3024                            ;* SUBORDINATE ROUTINES USED: NONE.
3025                            ;*************************************************************************
3026
3027  013656                    BGNMSG  ER9102
3028  013656                                                          ER9102::
3029  013656                    SAVE                    ;SAVE THE CONTENTS OF THE GPRS.
3030  013656  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
3031
3032  013662                    PRINTB  #EF0503,R1      ;PRINT THE FIRST LINE OF THE MESSAGE.
3033  013662  010146                                                  MOV     R1,-(SP)
3034  013664  012746  005363                                         MOV     #EF0503,-(SP)
3035  013670  012746  000002                                         MOV     #2,-(SP)
3036  013674  010600                                                 MOV     SP,R0
3037  013676  104414                                                 TRAP    C$PNTB
3038  013700  062706  000006                                         ADD     #6,SP
3039  013704  005003            CLR     R3              ;CLEAR THE LINE NUMBER.
3040  013706  000241    2$:     CLC                     ;PREPARE TO ROTATE NEXT BIT OUT OF MAP.
3041  013710  006002            ROR     R2              ;GET THE NEXT BIT OF THE BIT MAP.
3042  013712  103011            BCC     4$              ;SKIP PRINTING MESSAGE IF THE BIT IS CLEAR.
3043  013714                    PRINTB  #EF9103,R3      ;REPORT THIS LINE HAD THE ERROR.
3044  013714  010346                                                  MOV     R3,-(SP)
3045  013716  012746  007121                                         MOV     #EF9103,-(SP)
3046  013722  012746  000002                                         MOV     #2,-(SP)
3047  013726  010600                                                 MOV     SP,R0
3048  013730  104414                                                 TRAP    C$PNTB
3049  013732  062706  000006                                         ADD     #6,SP
3050  013736  005203    4$:     INC     R3              ;INCREMENT THE LINE COUNTER.
3051  013740  005702            TST     R2              ;CHECK THE BIT MAP.
3052  013742  001361            BNE     2$              ;LOOP IF NOT ALL SET BITS REMOVED FROM BIT MAP.
3053  013744                    PRINTB  #EF9101         ;PRINT A BLANK LINE.
3054  013744  012746  007116                                         MOV     #EF9101,-(SP)
3055  013750  012746  000001                                         MOV     #1,-(SP)
```

```
3056  013754  010600                                                    MOV     SP,R0
3057  013756  104414                                                    TRAP    C$PNT8
3058  013760  062706  000004                                           ADD     #4,SP
3059  013764                    60$:    PASS
3060  013764  004736                            JSR     PC,@(SP)+       ;RESTORE THE SAVED CONTENTS OF THE GPRS.
3061  013766                    ENDMSG                                  ;RETURN TO PREG05 SUBRT.
3062  013766                                                    L10015:
3063  013766  104423                                                    TRAP    C$MSG
```

```
                        .SBTTL  GLOBAL ERROR REPORTING ROUTINE          - ER9301 -
                        ;*******************************************************************************
                        ;*      THIS IS AN ERROR REPORTING SUBROUTINE WHICH PRINTS ANY BMP CODES
                        ;*      THAT ARE FOUND IN THE BMP CODE QUEUE, TOGETHER WITH THE THE NUMBER OF
                        ;*      THE TEST THAT WAS EXECUTING AT THE TIME THE BMP CODE WAS LOGGED.
                        ;*
                        ;* INPUTS:      R1 - THE ADDRESS OF THE FIRST MESSAGE TO BE REPORTED.
                        ;*              R2 - THE ADDRESS OF THE NEXT EMPTY CELL IN THE QUEUE.
                        ;*
                        ;* OUTPUTS:     THE TEST NUMBER FOLLOWED BY THE BMP CODE ARE PRINTED AT THE
                        ;*              OPERATOR CONSOLE.
                        ;*
                        ;* CALLING SEQUENCE:    INCLUDE THE LABEL "ER9301" AS THE MESSAGE POINTER
                        ;*                      PARAMETER IN THE DIAG SUPER ERROR REPORT MACRO CALL.
                        ;*
                        ;* COMMENTS:    THE MESSAGE IS PRINTED AS BASIC ERROR INFORMATION.
                        ;*
                        ;* SUBORDINATE ROUTINES USED: NONE.
                        ;*******************************************************************************

013770                          BGNMSG  ER9301
013770                                                          ER9301::
013770                          SAVE                    ;SAVE THE GPRS ON THE STACK.
013770  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.

013774                          PRINTB  #EF0503,R1      ;REPORT UNEXPECTED BMP CODES FOUND.
013774  010146                                                  MOV     R1,-(SP)
013776  012746  005363                                          MOV     #EF0503,-(SP)
014002  012746  000002                                          MOV     #2,-(SP)
014006  010600                                                  MOV     SP,R0
014010  104414                                                  TRAP    C$PNTB
014012  062706  000006                                          ADD     #6,SP
014016  012703  002420                  MOV     #BMPCQB,R3      ;GET THE START ADDRESS OF THE BMP CODE QUEUE.
014022  012705  011540                  MOV     #EM9302,R5      ;GET THE MESSAGE TO BE REPORTED.
014026  012301          2$:             MOV     (R3)+,R1        ;GET THE NUMBER OF THE TEST THAT WAS EXECUTING.
014030  012304                          MOV     (R3)+,R4        ;GET BMP CODE THAT WAS REPORTED OFF THE QUEUE.
014032  004737  014114                  JSR     PC,50$          ;GO REPORT THE BMP CODE.
014036  020302                          CMP     R3,R2           ;CHECK IF ALL CODES HAVE BEEN REPORTED.
014040  103772                          BLO     2$              ;IF IT IS NOT THE LAST BMP CODE THEN LOOP.
                        ;+
                        ; CHECK IF OVERFLOW HAS OCCURRED.
                        ;  THE CONDITIONS FOR OVERFLOW ARE: THE POINTER CONTAINS THE ADDRESS OF THE
                        ;  LAST CELL IN THE QUEUE, AND A BMP CODE HAS ALREADY BEEN WRITTEN INTO THAT
                        ;  CELL.
                        ;-
014042  020227  002614                  CMP     R2,#BMPCQE-4    ;CHECK IF THE POINTER IS AT THE LAST LOCATION.
014046  001036                          BNE     60$             ;EXIT IF NOT AT THE LAST LOCATION.
014050  005762  000002                  TST     2(R2)           ;CHECK FOR A BMP CODE IN THE LAST CELL
014054  001433                          BEQ     60$             ;EXIT IF NO OVERFLOW HAS OCCURED, CELL EMPTY.
014056  012301                          MOV     (R3)+,R1        ;GET THE TEST NUMBER OFF THE QUEUE.
014060  011304                          MOV     (R3),R4         ;GET THE BMP CODE OFF THE QUEUE.
014062  012705  011570                  MOV     #EM9303,R5      ;SELECT THE MESSAGE TO BE REPORTED.
014066                                  PRINTX  #EF9302         ;REPORT OVERFLOW CONDITION.
014066  012746  007235                                          MOV     #EF9302,-(SP)
014072  012746  000001                                          MOV     #1,-(SP)
014076  010600                                                  MOV     SP,R0
```

```
3120  014100  104415                                                          TRAP    C$PNTX
3121  014102  062706  000004                                                  ADD     #4,SP
3122  014106  004737  014114          JSR     PC,50$          ;REPORT THE LAST BMP CODE PLACED ON THE QUEUE.
3123  014112  000414                  BR      60$             ;EXIT.
3124
3125  014114                  50$:    PRINTX  #EF9301,R5,R1,R4  ;PRINT THE MESSAGE.
3126  014114  010446                                                          MOV     R4,-(SP)
3127  014116  010146                                                          MOV     R1,-(SP)
3128  014120  010546                                                          MOV     R5,-(SP)
3129  014122  012746  007167                                                  MOV     #EF9301,-(SP)
3130  014126  012746  000004                                                  MOV     #4,-(SP)
3131  014132  010600                                                          MOV     SP,R0
3132  014134  104415                                                          TRAP    C$PNTX
3133  014136  062706  000012                                                  ADD     #12,SP
3134  014142  000207                  RTS     PC              ;RETURN.
3135  014144                  60$:    PASS                    ;RESTORE THE GPR CONTENTS.
3136  014144  004736                          JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
3137
3138  014146                  ENDMSG
3139  014146                                                          L10016:
3140  014146  104423                                                          TRAP    C$MSG
```

```
                        .SBTTL  GLOBAL SUBROUTINES SECTION


                        ;++
                        ; THE GLOBAL SUBROUTINES SECTION CONTAINS THE SUBROUTINES
                        ; THAT ARE USED IN MORE THAN ONE TEST.
                        ;--
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - ALTFLD -
                        ;++ ************************************************************************
                        ;*              - ALTER DEVICE REGISTER FIELDS ROUTINE -
                        ;*      THIS SUBROUTINE ALTERS THE SPECIFIED FIELD OF THE SPECIFIED DEVICE
                        ;*      REGISTER FOR THE SPECIFIED LINES.  THIS ROUTINE CAN BE USED TO SET
                        ;*      OR CLEAR BITS WITHIN SELECTED FIELDS OF SELECTED REGISTERS.
                        ;*      USE EXAMPLES:   SET RX.BAUD.RATE FIELDS ON LINES 3 AND 6.
                        ;*                      CLEAR TX.DMA BITS ON ALL LINES.
                        ;*
                        ;* INPUTS:      R1 - ADDRESS OF THE REGISTERS TO ALTER.
                        ;*              R2 - BIT FIELDS SET TO DESIRED STATES.
                        ;*              R3 - BIT MAP OF LINES FOR WHICH TO ALTER REGISTER.
                        ;*              R4 - MASK OF BITS TO ALTER (1 INDICATES CHANGE BIT).
                        ;*              CSRA - CONTAINS THE ADDRESS OF THE DEVICE CSR.
                        ;*              IESTAT - SAVED STATES OF THE INTERRUPT ENABLE BITS.
                        ;*
                        ;* OUTPUTS:     DEVICE REGISTERS - SPECIFIED REGISTER FIELDS ALTERED.
                        ;*                  CSR IND.ADR.REG FIELD - DESTROYED.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,ALTFLD
                        ;*
                        ;* COMMENTS:    THIS ROUTINE READS THE SPECIFIED REGISTERS FOR ALL LINES
                        ;*              WITH NUMBERS LOWER THAN THE HIGHES SPECIFIED LINE.
                        ;*              THIS ROUTINE DOES NOT READ THE CSR.
                        ;*
                        ;* SUBROUTINES CALLED: NONE.
                        ;-- ************************************************************************

014150                  ALTFLD:: SAVE                   ;SAVE CONTENTS OF GPRS R0 THRU R5.
014150  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.

                        ;+
                        ; SET UP TO LOOP FOR EACH LINE:
                        ;    PREPARE THE WORD TO BE ORED INTO THE REGISTER CONTENTS.
                        ;    SET UP THE WORD TO WRITE INTO THE IND.ADR.REG FIELD OF THE CSR.
                        ;-
014154  010400                      MOV     R4,R0           ;CALCULATE THE NEW CONTENTS OF THE
014156  005100                      COM     R0              ;  REGISTER FIELDS WHICH ARE TO BE
014160  040002                      BIC     R0,R2           ;  ALTERRED BY THIS ROUTINE.
014162  013705  002234              MOV     IESTAT,R5       ;SET UP TO WRITE IND.ADR.REG FIELD TO 0.
                        ;+
                        ; LOOP ONCE FOR EACH LINE, ALTERING THE SPECIFIED FIELD IN THE SPECIFIED
                        ;    REGISTER IF THE LINE HAS BEEN SELECTED FOR ALTERING.
                        ; EXIT THE LOOP IF NO MORE LINES TO ALTER, OR IF WE HAVE ALTERED THE MAX
                        ;    ALLOWABLE NUMBER OF LINES (AS SPECIFIED BY NUMLNS).
                        ;-
014166  000241                      CLC                     ;PREPARE FOR ROTATE, "TST R5" DOES THIS BELOW.
014170  006003          2$:         ROR     R3              ;GET THE LINE SELECT BIT FOR THIS LINE.
014172  103006                      BCC     4$              ;SKIP SETUP IF LINE IS NOT SELECTED.
014174  010577  166002              MOV     R5,@CSRA        ;SET DUT CSR IND.ADR.REG FIELD TO THIS LINE.
014200  011100                      MOV     (R1),R0         ;GET THE PRESENT CONTENTS OF THE REG TO ALTER.
014202  040400                      BIC     R4,R0           ;CLEAR THE BIT FIELDS WE ARE TO ALTER.
014204  050200                      BIS     R2,R0           ;OR IN THE NEW STATES OF THE FIELDS.
014206  010011                      MOV     R0,(R1)         ;WRITE THE NEW REGISTER CONTENTS TO THE REG.
014210  005205          4$:         INC     R5              ;SET LINE NUMBER TO THE NEXT LINE.
014212  005703                      TST     R3              ;CHECK FOR UNHANDLED LINES, CLEAR CARRY FLAG.
```

```
3204  014214  001365                    BNE     2$              ;LOOP IF SELECTED LINE(S) IS NOT HANDLED.
3205
3206  014216                    60$:    PASS                    ;RESTORE GPRS.
3207  014216  004736                            ISR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
3208  014220  000207                    RTS     PC              ;RETURN TO CALLING ROUTNE.
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - CALMSL -
                        ;++ ************************************************************************
                        ;*              - CALIBRATE MILLI SECOND LOOP COUNT SUBROUTINE -
                        ;*      THIS SUBROUTINE CALIBRATES THE TIMING LOOP WHICH IS USED IN THE MSLOOP
                        ;*      ROUTINE.  THIS SUBROUTINE CALCULATES A VALUE FOR THE MSLCNT VARIABLE
                        ;*      WHICH IS THE NUMBER OF SOFTWARE LOOPS WHICH TAKES 1 MS TO EXECUTE IN
                        ;*      THE MSLOOP ROUTINE.  THIS ROUTINE CALIBRATES THE COUNT BY USING THE
                        ;*      LINE TIME CLOCK (LTC), SO IF NO LTC IS AVAILABLE THE DEFAULT VALUE FOR
                        ;*      THE DELAY COUNT MUST BE USED.
                        ;*
                        ;*
                        ;* INPUTS:      MSLCNT - DEFAULT 1 MS DELAY LOOP COUNT VALUE, OR
                        ;*                       VALUE FROM PREVIOUS CALIBRATION.
                        ;*              MSTICK - NUMBER OF MS PER LTC CLOCK TICK.
                        ;*              TIMER1 - TIMER COUNTER CHANGED BY LTC INTERRUPT SERVICE RTN.
                        ;*              CLKHRZ - NUMBER OF LTC CLICKS PER SECOND (50 OR 60).
                        ;*
                        ;* OUTPUTS:     CARRY - SET IF LTC IS AVAILABLE, AND NEW CALIBRATION PERFORMED.
                        ;*              MSLCNT - NEW 1 MS DELAY LOOP COUNT VALUE IF LTC AVAILABLE, OR
                        ;*                       UNCHANGED IF NO LTC IS AVAILABLE.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,CALMSL
                        ;*
                        ;* COMMENTS:
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: UNSDIV,OOPS.
                        ;-- ************************************************************************

014222                  CALMSL:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
014222  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
014226  005037  014442          CLR     62$                     ;CLEAR THE 2ND TIME FLAG.
                        ;+
                        ; SYNCHRONIZE WITH THE LTC.
                        ;-
014232  012705  000001          2$:     MOV     #1,R5           ;SET OUTER LOOP COUNTER TO 1 LOOP.
                                                        ;INCREASE THE VALUE LOADED INTO THIS COUNTER IF THE <**
                                                        ;FOLLOWING LOOP FAILS ON FUTURE, FASTER PROCESSORS. <**
014236  005000                  CLR     R0              ;CLEAR THE WAIT FOR CLOCK INT COUNTER.
014240  012737  000001  002270  MOV     #1,TIMER1       ;SET UP COUNT OF 1 TO SYNCH WITH LTC.
014246  005737  002270  4$:     TST     TIMER1          ;CHECK FOR COUNTER HAVING GONE TO ZERO.
014252  001410                  BEQ     6$              ;JUMP OUT OF LOOP IF LTC HAS INTERRUPTED.
014254  005200                  INC     R0              ;COUNT THIS ITERATION OF THE INNER LOOP.
014256  001373                  BNE     4$              ;LOOP IF COUNTER HAS NOT TURNED OVER.
014260  005305                  DEC     R5              ;DECREMENT THE INNER LOOP COUNTER.
014262  003371                  BGT     4$              ;LOOP IF OUTER LOOP COUNT NOT UP.
                        ;+
                        ; IF WE GOT NO LTC INTERRUPT, INDICATE THAT THERE IS NO LTC AVAILABLE.
                        ; LTC MUST BE FLAKEY, OR NOT REALLY AN LTC AT ALL.
                        ;-
014264  005037  002266          CLR     CLKHRZ          ;CLEAR LTC FREQUENCY WORD TO INDICATE NO LTC.
014270  000241                  CLC                     ;INDICATE FAILURE FOR RETURN.
014272  000461                  BR      60$             ;BYPASS THE FOLLOWING CALIBRATION PROCEDURES.
                        ;+
                        ; WE ARE NOW SYNCHRONIZED WITH THE LTC.
                        ; SET UP FOR THE CALIBRATION LOOP.
                        ;-
```

```
3265  014274  012704  002270          6$:     MOV     #TIMER1,R4      ;WILL TEST TIMER1 IN THE LOOP BELOW.
3266  014300  005001                          CLR     R1              ;CLEAR THE OUTER LOOP COUNTER.
3267  014302  005002                          CLR     R2              ;INDICATE TO CHECK ALL BITS OF TIMER1.
3268  014304  005003                          CLR     R3              ;INDICATE TO CHECK FOR TIMER1 CLEAR.
3269  014306  012714  000001                  MOV     #1,(R4)         ;LOAD TIMER1 WITH COUNT OF 1.
3270
3271  014312  013705  002302          8$:     MOV     MSLCNT,R5       ;LOAD MS LOOP COUNT.
3272  014316  011400                  10$:    MOV     (R4),R0         ;GET THE TIMER1 VALUE.
3273  014320  010037  014444                  MOV     R0,64$          ;SAVE WORD (LIKE IN THE REAL LOOP).
3274  014324  040200                          BIC     R2,R0           ;LEAVE ALL THE BITS.
3275  014326  020003                          CMP     R0,R3           ;COMPARE AGAINST ZERO.
3276  014330  000261                          SEC                     ;SET CARRY IN CASE OF SUCCESS.
3277  014332  001406                          BEQ     12$             ;EXIT LOOP IF TIMER1 HAS CLEARED.
3278  014334  005305                          DEC     R5              ;COUNT DOWN THE INSIDE MS LOOP COUNT.
3279  014336  001367                          BNE     10$             ;LOOP IF MS NOT UP.
3280  014340  005301                          DEC     R1              ;DECREMENT THE MS TIME COUNT.
3281  014342  001363                          BNE     8$              ;KEEP LOOPING.
3282  014344  004737  020024                  JSR     PC,OOPS         ;WE OVERFLOWED, SOMETHING IS WRONG, ABORT.
3283                                  ;+
3284                                  ; WE HAVE NOW HAVE LOOP COUNT INFORMATION FOR ONE CLOCK TICK.
3285                                  ; WE HAVE NEGATIVE OF NUMBER OF OUTER LOOPS IN R1, EACH IS MSLCNT INNER LOOPS.
3286                                  ; WE HAVE THE PORTION OF THE LAST OUTER LOOP NOT EXECUTED, IN R5.
3287                                  ; NOW WE CALCULATE THE TOTAL NUMBER OF INNER LOOPS EXECUTED.
3288                                  ;-
3289  014350  005401                  12$:    NEG     R1              ;GET NUMBER OF OUTER LOOPS.
3290  014352  013702  002302                  MOV     MSLCNT,R2       ;GET THE NUMBER OF INNER LOOPS PER OUTER LOOP.
3291  014356  010203                          MOV     R2,R3           ;COPY NUMBER OF LOOPS FOR MULTIPLY.
3292  014360  160502                          SUB     R5,R2           ;CALC # OF INNER LOOPS DONE IN LAST OUTER LOOP
3293  014362  010204                          MOV     R2,R4           ;  AND ADD TO ACCUMULATOR LSWORD.
3294  014364  005005                          CLR     R5              ;CLEAR ACCUMULATOR MSWORD.
3295  014366  005301                  14$:    DEC     R1              ;CHECK R1 FOR 0 CONDITION
3296  014370  100403                          BMI     16$             ; SKIP MULTIPLICATION IF ZERO
3297  014372  060304                          ADD     R3,R4           ;MULTIPLY NUMBER OF INNER
3298  014374  005505                          ADC     R5              ; LOOPS PER OUTER LOOP BY
3299  014376  000773                          BR      14$             ;NUMBER OF OUTER LOOPS PERFORMED.
3300                                  ;+
3301                                  ; DIVIDE THE TOTAL NUMBER OF INNER LOOPS BY THE NUMBER OF MS PER LTC TICK.
3302                                  ;-
3303  014400  013701  002300          16$:    MOV     MSTICK,R1       ;# OF MS PER LTC TICK IS DIVISOR.
3304  014404  010403                          MOV     R4,R3           ;LSWORD OF LOOP COUNT IS LSWORD OF DIVIDEND.
3305  014406  010502                          MOV     R5,R2           ;MSWORD OF LOOP COUNT IS MSWORD OF DIVIDEND.
3306  014410  004737  024310                  JSR     PC,UNSDIV       ;DIVIDE NUMBER OF LOOPS BY MS PER LTC TICK.
3307  014414  103402                          BCS     18$             ;BYPASS OOPS IF WE'RE OK.
3308  014416  004737  020024                  JSR     PC,OOPS         ;CLOCK ROUTINES ARE NOT LONG ENOUGH, OR BUG.
3309  014422  010137  002302          18$:    MOV     R1,MSLCNT       ;SET NEW VALUE FOR MS LOOP COUNT.
3310  014426  005137  014442                  COM     62$             ;SET THE 2ND ITERATION FLAGS IF 1ST ITERATION.
3311  014432  001277                          BNE     2$              ;BRANCH IF ONLY ONE ITERATION DONE.
3312  014434  000261                          SEC                     ;SET THE SUCCESS FLAG FOR EXIT.
3313
3314  014436                          60$:    PASS                    ;RESTORE GPRS,
3315  014436  004736                                  JSR     PC,@(SP)+       ;RETURN TO PREG05 SUBRT.
3316  014440  000207                          RTS     PC              ; CARRY - SUCCESS FLAG. SET IF SUCCESS.
3317
3318  014442  000000          62$:    .WORD   0                       ;2ND CALIBRATION ITERATION FLAGS.
3319  014444  000000          64$:    .WORD   0                       ;DUMMY WORD FOR STORAGE OF THE READ WORD.
```

```
                                .SBTTL  GLOBAL SUBROUTINE                - CHKBMP -
                                ;++ ************************************************************************************
                                ;*                        - CHECK IF CHARACTER IS A BMP CODE -
                                ;*      THIS SUBROUTINE IS USED TO CHECK FOR BMP CODES.
                                ;*      IF A BMP CODE IS DETECTED, IT WILL BE SAVED ON THE QUEUE TO BE REPORTED
                                ;*      LATER.  THE CARRY IS USED AS A FLAG TO INDICATE A CODE HAS BEEN FOUND.
                                ;*
                                ;* INPUTS:      R2 - CONTAINS THE DATA TO BE CHECKED.
                                ;*
                                ;* OUTPUTS:     R1 - CONTIANS THE MESSAGE TO BE REPORTED.
                                ;*              ERRBLK - CONTAINS THE ERROR REPORTING ROUTINE.
                                ;*              CARRY BIT IS USED TO INDICATE A BMP CODE FOUND, CARRY SET.
                                ;*
                                ;* CALLING SEQUENCE:    JSR     PC,CHKBMP
                                ;*
                                ;* COMMENTS:
                                ;*
                                ;* SUBORDINATE ROUTINES CALLED: SAVBMP.
                                ;-- ************************************************************************************

014446                          CHKBMP:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
014446  004537  005232                          JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
014452  012700  170301                  MOV     #170301,R0              ;SET UP THE FLAGS OF A BMP CODE.
014456  040200                          BIC     R2,R0                   ;TRY TO CLEAR THE BMP CODE FLAGS.
014460  001011                          BNE     2$                      ;IF NOT A BMP CODE, EXIT WITH FAILURE.
014462  004737  022400                  JSR     PC,SAVBMP               ;SAVE THE BMP CODE ON THE QUEUE.
014466  012701  007462                  MOV     #EM5303,R1              ;PASS THE MESSAGE TO BE REPORTED.
014472  012737  012254  005230          MOV     #ER1603,ERRBLK          ;SELECT THE CORRECT ERROR REPORTING ROUTINE.
014500  000261                          SEC                             ;PASS FLAG TO INDICATE SUCCESS, BMP CODE FOUND.
014502  000401                          BR      60$                     ;EXIT.
014504  000241                  2$:     CLC                             ;PASS FLAG TO INDICATE FAILURE.
014506                          60$:    PASS    R1                      ;RESTORE GPRS, EXCEPT
014506  010166  000004                                  MOV             R1,R1SLOT(SP)           ;PUT R1 IN STACK SLOT.
014512  004736                                          JSR             PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
                                                                        ;R1 - CONTAINS THE ADDRESS OF ERROR MESSAGE.
                                                                        ;CARRY BIT - SET INDICATES SUCCESS.
014514  000207                          RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - CHKEXT -
                        ;++ ************************************************************************************
                        ;*                        - CHECK FOR EXTRA CHARACTER ROUTINE -
                        ;*      THIS SUBROUTINE CHECKS FOR THE CONDITION WHICH INDICATES THAT AN EXTRA
                        ;*      CHARACTER HAS BEEN RECEIVED DURING THE RECEPTION OF A DATA PATTERN.
                        ;*      IF THIS ROUTINE DETERMINES THAT IT IS LIKELY THAT AN EXTRA CHARACTER
                        ;*      HAS BEEN RECEIVED IT INDICATES THIS IN THE STATUS INFORMATION RETURNED
                        ;*      TO THE CALLING ROUTINE.
                        ;*
                        ;* INPUTS:      R3 - RX LINE NUMBER MULTIPLIED BY 2 (OFFSET INTO WORD TABLES).
                        ;*              R4 - BASE ADDRESS OF RESYNC QUE CONTAINING RX CHARS.
                        ;*              R5 - MASK OF "INACTIVE" (NON-DATA) BITS OF RX AND TX CHARS.
                        ;*              CHCNTB - BASE OF NUMBER OF CHARS TO TX ON EACH LINE TABLE.
                        ;*              RXCNTB - BASE OF THE RX CHARACTER COUNTERS TABLE.
                        ;*              RXPTRB - BASE OF THE RX CHARACTER POINTERS TABLE.
                        ;*              TXRXLB - BASE OF TX/RX LINE NUMBER ASSOCIATION TABLE.
                        ;*
                        ;* OUTPUTS:     CARRY - SET IF EXTRA CHARACTER CONDITION IS VERIFIED.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,CHKEXT
                        ;*
                        ;* COMMENTS:  THE FOLLOWING SYMBOLS ARE USED IN LINE COMMENTS:
                        ;*              CHR0 - CHARACTER AT BOTTOM OF RESYNC QUE (FIRST RECEIVED).
                        ;*              CHR1, CHR2 - 2 CHARACTERS RECEIVED AFTER CHR0.
                        ;*              EXP0 - CHARACTER EXPECTED TO BE RECEIVED NEXT.
                        ;*              EXP1, EXP2 - CHARACTER EXPECTED TO BE RECEIVED AFTER EXP0, ETC.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************************
014516                  CHKEXT:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
014516 004537 005232                     JSR     R5,PREG05      ;CALL REGISTER SAVE SUBRT.
014522 016302 003310            MOV     RXPTRB(R3),R2   ;GET THE RX DATA POINTER.
014526 005724                   TST     (R4)+           ;INCREMENT R4 BY 2 TO POINT TO CHR1.
014530 012400                   MOV     (R4)+,R0        ;GET CHR1 FROM THE QUE, DATA.VALID INTO N FLAG.
014532 100026                   BPL     52$             ;EXIT WITH "FAILURE" IF CHR1 NOT VALID.
014534 040500                   BIC     R5,R0           ;REMOVE INACTIVE BITS FROM CHR1 VALUE.
014536 112201                   MOVB    (R2)+,R1        ;GET EXP0 FROM THE DATA PATTERN.
014540 040501                   BIC     R5,R1           ;REMOVE INACTIVE BITS FROM EXP0 VALUE.
014542 120100                   CMPB    R1,R0           ;COMPARE CHR1 AND EXP0.
014544 001021                   BNE     52$             ;EXIT WITH "FAILURE" IF CHR1 <> EXP0.
014546 016300 003450            MOV     RXCNTB(R3),R0   ;COMPARE THE PRESENT RX CHARACTER COUNT PLUS 1
014552 005200                   INC     R0              ;  WITH THE EXPECTED NUMBER OF CHARS TO RX ON
014554 016301 005142            MOV     TXRXLB(R3),R1   ;  LINE (NUMBER TRANSMITTED AND LOOPED BACK) TO
014560 020061 003350            CMP     R0,CHCNTB(R1)   ;  DETERMINE IF CHR1 IS LAST EXPECTED CHAR.
014564 001407                   BEQ     50$             ;EXIT WITH "SUCCESS" IF CHR1 IS LAST CHAR.
014566 011400                   MOV     (R4),R0         ;GET CHR2 FROM THE QUE, DATA.VALID INTO N FLAG.
014570 100005                   BPL     50$             ;EXIT WITH "SUCCESS" IF CHR1 WAS LAST IN QUE.
014572 040500                   BIC     R5,R0           ;REMOVE INACTIVE BITS FROM CHR2 VALUE.
014574 111201                   MOVB    (R2),R1         ;GET THE EXP1 VALUE.
014576 040501                   BIC     R5,R1           ;REMOVE INACTIVE BITS FROM EXP1 VALUE.
014600 020001                   CMP     R0,R1           ;COMPARE CHR2 AND EXP1.
014602 001002                   BNE     52$             ;EXIT WITH "FAILURE" IF CHR2 <> EXP1.

                        ;+
                        ; IT IS LIKELY THAT WE RECEIVED AN EXTRA CHARACTER WITHIN THE DATA PATTERN.
                        ; INDICATE "SUCCESS" AND EXIT.
```

```
3413                                    ;-
3414  014604  000261                    50$:    SEC                     ;SET THE SUCCESS FLAG.
3415  014606  000401                            BR      60$             ;EXIT THE ROUTINE.
3416
3417                                    ;+
3418                                    ; WE DIDN'T RECEIVE A SINGLE EXTRA CHARACTER AT THIS POINT IN THE DATA PATTERN.
3419                                    ; INDICATE "FAILURE" AND EXIT.
3420                                    ;-
3421  014610  000241                    52$:    CLC                     ;CLEAR THE SUCCESS FLAG.
3422
3423  014612                            60$:    PASS                    ;RESTORE GPRS.
3424  014612  004736                                    JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
3425  014614  000207                            RTS     PC              ;CARRY - SET IF SUCCESS (EXTRA CHAR RXED).
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - CHKLOS -
                        ;++ ************************************************************************
                        ;*                      - CHECK FOR LOST CHARACTER ROUTINE -
                        ;*      THIS SUBROUTINE CHECKS FOR THE CONDITION WHICH INDICATES THAT A CHAR
                        ;*      HAS BEEN "LOST" FROM THE LOOPED BACK DATA PATTERN DURING A TRANSMISSION
                        ;*      AND RECEPTION TEST.  IF THIS ROUTINE DETERMINES THAT IT IS LIKELY THAT
                        ;*      A CHARACTER HAS BEEN LOST, IT INDICATES THIS IN THE STATUS INFORMATION
                        ;*      RETURNED TO THE CALLING ROUTINE.
                        ;*
                        ;* INPUTS:      R3 - RX LINE NUMBER MULTIPLIED BY 2 (OFFSET INTO WORD TABLES).
                        ;*              R4 - BASE ADDRESS OF RESYNC QUE CONTAINING RX CHARS.
                        ;*              R5 - MASK OF "INACTIVE" (NON-DATA) BITS OF RX AND TX CHARS WITH
                        ;*                   ALL SET BITS IN A SINGLE, LEFT JUSTIFIED GROUP.
                        ;*              CHCNTB - BASE OF NUMBER OF CHARS TO TX ON EACH LINE TABLE.
                        ;*              RXCNTB - BASE OF THE RX CHARACTER COUNTERS TABLE.
                        ;*              RXPTRB - BASE OF THE RX CHARACTER POINTERS TABLE.
                        ;*              TXRXLB - BASE OF TX/RX LINE NUMBER ASSOCIATION TABLE.
                        ;*
                        ;* OUTPUTS:     CARRY - SET IF LOST CHARACTER CONDITION IS VERIFIED.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,CHKLOS
                        ;*
                        ;* COMMENTS:  THE FOLLOWING SYMBOLS ARE USED IN LINE COMMENTS:
                        ;*              CHR0 - CHARACTER AT BOTTOM OF RESYNC QUE (FIRST RECEIVED).
                        ;*              CHR1, CHR2 - 2 CHARACTERS RECEIVED AFTER CHR0.
                        ;*              EXP0 - CHARACTER EXPECTED TO BE RECEIVED NEXT.
                        ;*              EXP1, EXP2 - CHARACTER EXPECTED TO BE RECEIVED AFTER EXP0, ETC.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************
014616                  CHKLOS:: SAVE                    ;SAVE CONTENTS OF GPRS R0 THRU R5.
014616  004537  005232                   JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
014622  016301  003450          MOV     RXCNTB(R3),R1   ;COMPARE THE PRESENT RX CHARACTER COUNT PLUS 1
014626  005201                  INC     R1              ;  WITH THE EXPECTED NUMBER OF CHARS TO RX ON
014630  016300  005142          MOV     TXRXLB(R3),R0   ;  LINE (NUMBER TXED AND LOOPED BACK) TO
014634  016002  003350          MOV     CHCNTB(R0),R2   ;  DETERMINE IF THE POSSIBLE LOST CHAR
014640  020102                  CMP     R1,R2           ;  WOULD BE THE LAST EXPECTED RX CHAR.
014642  001423                  BEQ     52$             ;EXIT WITH "FAILURE" IF LOST CHR WOULD BE LAST.
014644  005201                  INC     R1              ;DETERMINE (AS ABOVE) IF CHR0 WOULD BE THE LAST
014646  160201                  SUB     R2,R1           ;  RX CHAR AND SAVE RESULT FOR LATER.
014650  016302  003310          MOV     RXPTRB(R3),R2   ;GET THE RX DATA POINTER.
014654  005202                  INC     R2              ;CALCULATE POINTER TO EXP1 LOCATION.
014656  112200                  MOVB    (R2)+,R0        ;GET EXP1 VALUE FROM DATA PATTERN.
014660  162400                  SUB     (R4)+,R0        ;COMPARE CHR0 AND EXP1 VALUES.
014662  040500                  BIC     R5,R0           ;REMOVE INACTIVE BITS FROM RESULT.  (NO ACTIVE
                                                        ;  BITS ALLOWED TO LEFT OF ANY INACTIVE BITS.)
014664  001012                  BNE     52$             ;EXIT WITH "FAILURE" IF CHR0 <> EXP1.
014666  005701                  TST     R1              ;CHECK CHR0 TEST RESULT SAVED ABOVE.
014670  001406                  BEQ     50$             ;EXIT WITH "SUCCESS" IF CHR0 IS LAST CHAR.
014672  011401                  MOV     (R4),R1         ;GET CHR1 FROM THE QUE, DATA.VALID INTO N FLAG.
014674  100004                  BPL     50$             ;EXIT WITH "SUCCESS" IF CHR0 WAS LAST QUE CHAR.
014676  111200                  MOVB    (R2),R0         ;GET THE EXP2 VALUE FROM THE DATA PATTERN.
014700  160001                  SUB     R0,R1           ;COMPARE THE EXP2 AND THE CHR1 VALUES.
014702  040501                  BIC     R5,R1           ;REMOVE INACTIVE BITS FROM RESULT OF COMPARE.
                                                        ;  (NO ACTIVE BITS LEFT OF INACTIVE BITS.)
014704  001002                  BNE     52$             ;EXIT WITH "FAILURE" IF CHR1 <> EXP2.
```

```
3482
3483                                    ;+
3484                                    ; IT IS LIKELY THAT WE LOST A CHARACTER FROM THE DATA PATTERN.
3485                                    ; INDICATE "SUCCESS" AND EXIT.
3486                                    ;-
3487  014706  000261                   50$:    SEC                     ;SET THE SUCCESS FLAG.
3488  014710  000401                           BR      60$             ;EXIT THE ROUTINE.
3489
3490                                    ;+
3491                                    ; WE DIDN'T LOSE A SINGLE EXTRA CHARACTER AT THIS POINT IN THE DATA PATTERN.
3492                                    ; INDICATE 'FAILURE" AND EXIT.
3493                                    ;-
3494  014712  000241                   52$:    CLC                     ;CLEAR THE SUCCESS FLAG.
3495
3496  014714                            60$:    PASS                    ;RESTORE GPRS.
3497  014714  004736                                    JSR     PC,@(SP)+       ;RETURN TO PREG05 SUBRT.
3498  014716  000207                           RTS     PC              ;CARRY - SET IF SUCCESS (LOST CHAR LIKELY).
```

```
3499                                    .SBTTL  GLOBAL SUBROUTINE                - CHRMSK -
3500                                    ;++ ************************************************************************
3501                                    ;*              - FORM A BIT MASK OF UNUSED TX/RX BITS ROUTINE -
3502                                    ;*      THIS SUBROUTINE CONSTRUCTS A BIT MASK OF CHARACTER BITS WHICH ARE NOT
3503                                    ;*      USED DURING TRANSMISSION AND RECEPTION.  THIS MASK CAN BE USED
3504                                    ;*      TO REMOVE THE FLAGS, LINE NUMBER, DATA.VALID BITS, AND UNUSED DATA BITS
3505                                    ;*      FROM A CHARACTER WORD WHICH HAS BEEN READ FROM THE DUT FIFO.
3506                                    ;*
3507                                    ;* INPUTS:      R1 - DUT LPR CONTENTS USED TO DETERMINE CHARACTER LENGTH.
3508                                    ;*
3509                                    ;* OUTPUTS:     IBM - BIT MASK OF UNUSED TX/RX BITS (INCLUDING UPPER BYTE):
3510                                    ;*                    EXAMPLES: 177400 RETURNED FOR 8 BITS/CHAR.
3511                                    ;*                              177700 RETURNED FOR 6 BITS/CHAR.
3512                                    ;*
3513                                    ;* CALLING SEQUENCE:    JSR     PC,CHRMSK
3514                                    ;*
3515                                    ;* COMMENTS:    IF THIS MASK IS TO BE USED TO JUST REMOVE THE INACTIVE BITS
3516                                    ;*              WITHIN THE DATA BYTE OF A WORD READ FROM THE DUT FIFO, THE
3517                                    ;*              UPPER BYTE OF THE MASK MUST BE CLEARED.
3518                                    ;*
3519                                    ;* SUBORDINATE ROUTINES CALLED: NONE.
3520                                    ;-- ************************************************************************
3521
3522  014720                            CHRMSK:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
3523  014720  004537  005232                           JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
3524  014724  052701  177740                   BIS     #177740,R1              ;PREPARE TO COUNT BITS SHIFTED INTO MASK BY
3525                                                                            ;  USING THE LPR BITS/CHAR FIELD CONTENTS.
3526  014730  012703  177400                   MOV     #177400,R3              ;CLEAR THE UNUSED BIT MAP LOWER BYTE.
3527  014734  062701  000010           2$:     ADD     #10,R1                  ;DETERMINE IF ANOTHER BIT WOULD BE TOO MANY.
3528  014740  103402                   BCS     4$                              ;EXIT THE SHIFT LOOP IF IT WOULD BE TOO MANY.
3529  014742  006203                    ASR     R3                              ;SHIFT A BIT INTO THE UNUSED BIT MASK LOW BYTE.
3530  014744  000773                   BR      2$                              ;LOOP TO CHECK FOR DONE.
3531
3532  014746  010337  002226           4$:     MOV     R3,IBM                  ;LOAD THE INACTIVE BITS MASK STORAGE IN MEMORY.
3533
3534  014752                            60$:    PASS                            ;RESTORE GPRS.
3535  014752  004736                                            JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
3536  014754  000207                   RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - CKCHR -
                        ;++ ************************************************************************
                        ;*                      - CHECK CHARACTER FOR ERRORS ROUTINE -
                        ;*      THIS SUBROUTINE CHECKS THE CHARACTER AT THE BOTTOM OF THE RESYNC QUEUE
                        ;*      TO DETERMINE IF IT IS CORRECT.  POINTERS AND COUNTERS WHICH ARE RELATED
                        ;*      TO THE RECEPTION OF THE CHARACTER ARE UPDATED.  IF THE CHARACTER IS
                        ;*      INCORRECT, AN ANALYSIS OF THE ERROR IS DONE AND PARAMETERS ARE SET UP
                        ;*      FOR THE REPORTING OF THE CORRECT ERROR.
                        ;*
                        ;* INPUTS:      R3 - LINE OFFSET FOR ACCESS OF WORD TABLES OF LINE VARIABLES.
                        ;*              R4 - BASE ADDRESS OF THE RESYNC QUEUE FOR THIS LINE.
                        ;*              R5 - MASK OF THE INACTIVES BITS IN A TX OR RX CHAR BYTE.
                        ;*              BITTBL - TABLE OF WORDS WITH BITS SET FOR USE IN FORMING MAPS.
                        ;*              DPRSQ - DATA PATTERN RESYNC QUE WITH VALID CHAR AT BOTTOM.
                        ;*              EXCNTB - BASE OF THE EXTRA CHARACTER COUTERS TABLE.
                        ;*              RXDONF - RECEIVE DONE FLAGS.
                        ;*              RXPTRB - BASE OF THE RX CHARACTER POINTERS TABLE.
                        ;*              ERROR MESSAGE LABELS - EM6407,EM6408,EM6427,EM6428
                        ;*
                        ;* OUTPUTS:     R1 - CONTAINS THE ADDRESS OF THE ERROR MESSAGE TO BE REPORTED.
                        ;*              R2 - CONTAINS THE ACTUAL RECEIVED DATA.
                        ;*              R4 - CONTAINS THE EXPECTED DATA.
                        ;*              CARRY - "SUCCESS" FLAG (SET IF NO ERROR IS FOUND).
                        ;*            FOLLOWING VARIABLES UPDATED FOR LINE ON WHICH CHAR WAS RECEIVED:
                        ;*              EXCNT - COUNT OF THE NUMBER OF EXTRA CHARS RECEIVED ON LINE.
                        ;*              RXCNT - COUNT OF THE NUMBER OF CHARACTERS RECEIVED ON LINE.
                        ;*              RXPTR - UPDATED TO POINT TO THE NEXT EXPECTED CHAR ON LINE.
                        ;*              ERRBLK - CONTENTS DESTROYED.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,CKCHR
                        ;*
                        ;* COMMENTS:
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: CHKEXT,CHKLOS,UPDCHR.
                        ;-- ************************************************************************
014756                  CKCHR:: SAVE                            ;SAVE CONTENTS OF GPRS R0 THRU R5.
014756  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
                        ;+
                        ; CHECK FOR THE RX OF A CHAR AFTER RX SHOULD BE COMPLETE ON THIS LINE.
                        ;-
014762  036337  002332  002412          BIT     BITTBL(R3),RXDONF       ;TEST THE RX DONE FLAG FOR THIS LINE.
014770  001407                  BEQ     2$                      ;SKIP ERROR REPORT IF RX NOT COMPLETE ON LINE.
                        ;+
                        ; WE HAVE RECEIVED AN EXTRA CHARACTER ON THIS LINE.
                        ; SET UP FOR ERROR REPORT AND EXIT TO REPORT THE ERROR.
                        ; COUNT THE EXTRA CHARACTER.
                        ; EXIT TO REPORT 'UNEXPECTED CHAR RECEIVED AFTER RX COMPLETE ON LINE NN"
                        ;-
014772  012701  010250          MOV     #EM9007,R1              ;SELECT "EXTRA CHAR ON LINE" ERROR MESSAGE.
014776  011402                  MOV     (R4),R2                 ;GET THE ACTUAL DATA FOR ERROR REPORT.
015000  040502                  BIC     R5,R2                   ;REMOVE THE INACTIVE BITS.
015002  052704  100000          BIS     #BIT15,R4               ;INDICATE "NONE" EXPECTED DATA FOR ERROR RPT.
015006  000452                  BR      12$                     ;GO COUNT EXTRA CHAR AND EXIT WITH "FAILURE".
                        ;+
                        ; GET THE POINTER TO THE NEXT EXPECTED RECEIVE DATA CHARACTER.
                        ;-
```

```
3593  015010  016302  003310          2$:     MOV     RXPTRB(R3),R2
3594                                  ;+
3595                                  ; COMPARE THE ACTUAL DATA WITH THE EXPECTED DATA.
3596                                  ;-
3597  015014  011400                          MOV     (R4),R0         ;GET THE ACTUAL DATA.
3598  015016  040500                          BIC     R5,R0           ;REMOVE THE INACTIVE BITS.
3599  015020  111201                          MOVB    (R2),R1         ;GET THE EXPECTED DATA.
3600  015022  040501                          BIC     R5,R1           ;REMOVE THE INACTIVE BITS.
3601  015024  120001                          CMPB    R0,R1           ;COMPARE ACTUAL AND EXPECTED.
3602  015026  001003                         BNE     4$              ;CHECK FURTHER IF DATA MISCOMPARE.
3603  015030  004737  024444                  JSR     PC,UPDCHR       ;UPDATE PTRS AND COUNTERS FOR THE CHAR.
3604  015034  000446                         BR      50$             ;EXIT WITH "SUCCESS", NO ERROR FOUND.
3605                                  ;+
3606                                  ; ACTUAL AND EXPECTED DATA MISCOMPARE.
3607                                  ; DETERMINE IF IT'S LIKELY WE RECEIVED AN EXTRA CHAR WITHIN THE DATA PATTERN.
3608                                  ;-
3609  015036  004737  014516          4$:     JSR     PC,CHKEXT       ;CHECK FOR EXTRA CHAR RX'ED IN PATTERN.
3610  015042  103010                  BCC     6$              ;GO CHECK FOR LOST CHAR IF NO EXTRA CHAR.
3611                                  ;+
3612                                  ; IT IS LIKELY THAT WE RECEIVED AN EXTRA CHARACTER WITHIN THE DATA PATTERN.
3613                                  ; COUNT THE CHAR AS AN EXTRA CHAR, DON'T COUNT AS A STANDARD CHAR.
3614                                  ; REPORT "EXTRA CHAR RECEIVED WITHIN DATA PATTERN ON LINE NN"
3615                                  ;-
3616  015044  012701  011063                  MOV     #EM9027,R1      ;SELECT "EXTRA CHAR ON LINE" ERROR MSG.
3617  015050  111200                          MOVB    (R2),R0         ;GET THE EXPECTED RECEIVE DATA.
3618  015052  040500                          BIC     R5,R0           ;REMOVE THE INACTIVE BITS FROM EXPECTED DATA.
3619  015054  011402                          MOV     (R4),R2         ;GET THE ACTUAL RECEIVE DATA.
3620  015056  040502                          BIC     R5,R2           ;REMOVE THE INACTIVE BITS FROM ACTUAL DATA.
3621  015060  010004                          MOV     R0,R4           ;PASS EXPECTED DATA TO ERROR REPORT ROUTINE.
3622  015062  000424                         BR      12$             ;GO COUNT EXTRA CHAR AND EXIT WITH "FAILURE".
3623                                  ;+
3624                                  ; ACTUAL AND EXPECTED DATA MISCOMPARE.
3625                                  ; NOT LIKELY THAT WE RECEIVED AN EXTRA CHARACTER WITHIN THE DATA PATTERN.
3626                                  ; DETERMINE IF IT'S LIKELY WE LOST A CHARACTER FROM THE DATA PATTERN.
3627                                  ;-
3628  015064  004737  014616          6$:     JSR     PC,CHKLOS       ;CHECK FOR A LOST CHAR CONDITION.
3629  015070  103012                  BCC     8$              ;GO REPORT BAD RX DATA IF NOT LOST CHAR.
3630                                  ;+
3631                                  ; IT IS LIKELY THAT WE LOST A CHARACTER FROM THE DATA PATTERN.
3632                                  ; COUNT THE CHAR IN THE RX CHAR COUNT AS IF IT HAD BEEN RECEIVED.
3633                                  ; ALSO, COUNT CHR0 AS A VALID CHAR, BECAUSE WE HAVE VERIFIED IT ABOVE.
3634                                  ; REPORT "SINGLE CHAR MISSING FROM RECEIVED DATA ON LINE NN"
3635                                  ;-
3636  015072  012701  011143                  MOV     #EM9028,R1      ;SELECT "LOST CHAR ON LINE" ERROR MSG. ^^^^^
3637  015076  111200                          MOVB    (R2),R0         ;GET THE EXPECTED RECEIVE DATA.
3638  015100  040500                          BIC     R5,R0           ;REMOVE THE INACTIVE BITS FROM EXPECTED DATA.
3639  015102  011402                          MOV     (R4),R2         ;GET THE ACTUAL RECEIVE DATA.
3640  015104  040502                          BIC     R5,R2           ;REMOVE THE INACTIVE BITS FROM ACTUAL DATA.
3641  015106  010004                          MOV     R0,R4           ;PASS EXPECTED DATA TO ERROR REPORT ROUTINE.
3642  015110  004737  024444                  JSR     PC,UPDCHR       ;UPDATE PTRS AND COUNTERS FOR THE CHAR.
3643  015114  000404                         BR      10$             ;GO EXIT WITH "FAILURE".
3644                                  ;+
3645                                  ; DID NOT LOSE OR GAIN A SINGLE CHARACTER FROM/TO THE DATA PATTERN.
3646                                  ; REPORT "RECEIVED CHAR MISCOMPARE AGAINST TX DATA ON LINE NN"
3647                                  ;-
3648  015116  010002                  8$:     MOV     R0,R2           ;PASS ACTUAL DATUM TO ERROR REPORT ROUTINE.
```

```
3649  015120  010104                        MOV     R1,R4           ;PASS EXPECTED DATUM TO ERROR REPORT ROUTINE.
3650  015122  012701  010333                MOV     #EM9008,R1      ;SELECT THE "DATA MISCOMPARE" MESSAGE.
3651                                  ;+
3652                                  ; UPDATE THE CHARACTER COUNTER AND RX DATA PATTERN POINTER FOR THIS LINE.
3653                                  ;-
3654  015126  004737  024444          10$:    JSR     PC,UPDCHR       ;UPDATE RX PTR AND COUNTER FOR THIS LINE.
3655  015132  000405                          BR      14$             ;GO EXIT WITH "FAILURE".
3656                                  ;+
3657                                  ; COUNT THE CHARACTER AS AN EXTRA CHARACTER.
3658                                  ;-
3659  015134  005263  003150          12$:     INC    EXCNTB(R3)      ;INCREMENT THE EXTRA CHAR COUNT FOR THIS LINE.
3660  015140  001002                        BNE     14$             ;EXIT WITH FAILURE IF NO OVERFLOW.
3661  015142  005363  003150                 DEC    EXCNTB(R3)      ;DECREMENT BACK TO -1 (MAX VALUE) IF OVERFLOW.
3662                                  ;+
3663                                  ; INDICATE "FAILURE" AND EXIT.
3664                                  ;-
3665  015146  000241                  14$:    CLC                     ;CLEAR THE "SUCCESS" FLAG.
3666  015150  000401                          BR      60$             ;EXIT THE ROUTINE.
3667
3668                                  ;+
3669                                  ; NO ERROR WAS FOUND.
3670                                  ; SET "SUCCESS" FLAG AND EXIT.
3671                                  ;-
3672  015152  000261                  50$:    SEC                     ;SET THE "SUCCESS" FLAG.
3673
3674  015154                          60$:    PASS    R1,R2,R4        ;RESTORE GPRS, EXCEPT
3675  015154  010166  000004                         MOV     R1,R1SLOT(SP)           ;PUT R1 IN STACK SLOT.
3676  015160  010266  000006                         MOV     R2,R2SLOT(SP)           ;PUT R2 IN STACK SLOT.
3677  015164  010466  000012                         MOV     R4,R4SLOT(SP)           ;PUT R4 IN STACK SLOT.
3678  015170  004736                          JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
3679                                                  ;R1 - CONTAINS THE ADDRESS OF THE ERROR REPORT.
3680                                                  ;R2 - CONTAINS THE ACTUAL DATA RECEIVED.
3681                                                  ;R4 - CONTAINS THE EXPECTED DATA.
3682  015172  000207                          RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - CKFRPR -
                        ;++ ************************************************************************
                        ;*              - CHECK FRAMING AND PARITY ERROR REPORTING -
                        ;*      THIS SUBROUTINE IS USED IN THE FRAMING ERROR AND PARITY ERROR TESTS.
                        ;*      IT READS THE CHARACTERS FROM THE DUT RECEIVER CHARACTER FIFO,
                        ;*      AND CHECKS FOR THE CORRECT COMBINATION OF PARITY AND FRAMING
                        ;*      ERROR BITS IN THE MSB.  IF CHARACTERS STOP APPEARING IN THE FIFO WITH
                        ;*      DATA.VALID SET OR IF MORE THAN THE ALLOWABLE NUMBER OF CHARACTERS
                        ;*      HAS BEEN READ FROM THE DUT THIS ROUTINE EXITS WITH AN RX COMPLETE
                        ;*      INDICATION.  EACH READ CHAR IS ANALYSED AND ANY NECESSARY ERRORS ARE
                        ;*      REPORTED.
                        ;*
                        ;* INPUTS:      R5 - TEST FLAG, BIT15 SET = FRAMING ERR, CLEAR = PARITY ERR.
                        ;*              ERRNBR - SET TO ERROR NUMBER OF FIRST ERROR IN THIS ROUTINE.
                        ;*              OSTEND - ADDRESS OF THE END OF THE OUTPUT STORAGE FIFO BUFFER.
                        ;*              OSTPTR - POINTER TO THE NEXT BYTE TO READ FROM OSTORE.
                        ;*
                        ;* OUTPUTS:     RXCNTB - RECEIVE CHARATER COUNT UPDATED FOR EACH LINE.
                        ;*              RXPNTB - RECEIVE CHARACTER PIONTER IS UPDATED FOR EACH LINE.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,CKFRPR
                        ;*
                        ;* COMMENTS:    THIS ROUTINE REPORTS ERRORS WITH NUMBERS INITIAL ERRNBR
                        ;*              THRU INITIAL ERRNBR + 4.
                        ;*              ERRNBR IS RESTORED BEFORE THIS ROUTINE RETURNS.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: PRFRME,PRPARE,WAIBIS.
                        ;-- ************************************************************************

015174                  CKFRPR:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
015174  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
015200  013704  005224          MOV     ERRNBR,R4               ;PRESERVE THE INITIAL ERROR NUMBER.
015204  004737  023642        JSR     PC,TXIE1                ;ENABLE TX INTERRUPTS.
                        ;+
                        ; WAIT FOR A CHARACTER TO APPEAR IN THE FIFO.
                        ; IF NO CHARACTER APPEARS WITHIN TIME-OUT PERIOD: EXIT ROUTINE, WE'RE DONE.
                        ;-
015210  013701  002242          MOV     RXTOUT,R1               ;GET MINIMUM TIME OUT VALUE.
015214  023737  002410  002174  2$:     CMP     TXDONF,ACTLNS   ;CHECK FOR TRANSMISSION DONE ON ACTIVE LINES.
015222  001402                BEQ     4$                      ;SKIP ADDING 50 MS DELAY IF TX DONE ALL LINES.
015224  062701  000062          ADD     #50.,R1                 ;ADD 50 MILLI SEC TO DELAY IF NOT LAST CHAR.
015230  052701  170000          4$:     BIS     #170000,R1      ;INDICATE TO TEST DATA.VALID BIT.
015234  013702  002204          MOV     RBUFA,R2                ;INDICATE TO CHECK DUT RECEIVE BUFFER (FIFO).
015240  004737  024740          JSR     PC,WAIBIS               ;WAIT FOR RECEIVED CHAR OR TIME-OUT.
015244  103033                BCC     60$                     ;EXIT ROUTINE IF TIME-OUT, WE'RE DONE.

015246  005337  002404          DEC     CHRTOT                  ;DECREMENT THE TOTAL CHAR COUNTER.
015252  001011                BNE     6$                      ;SKIP ERROR IF NOT TOO MANY CHARS RECEIVED.
015254  010437  005224          MOV     R4,ERRNBR               ;SET ERROR NUMBER TO INITIAL ERRNBR.
015260  012701  010743          MOV     #EM9025,R1              ;SELECT THE ERROR MESSAGE TO BE REPORTED.
015264  012737  012230  005230  MOV     #ER0503,ERRBLK          ;SELECT THE ERROR REPORT ROUTINE.
                        ;+
                        ; REPORT ERROR AT INITIAL ERRNBR.
                        ; 'MORE THAN TWICE THE EXPECTED NUMBER OF CHARACTERS RECEIVED''
                        ;-
015272                  ERROR                   ;               >>>>> ERROR <<<<<.
```

```
                                                                                    TRAP    C$ERROR
3739  015272  104460
3740  015274  000417                        BR      60$             ;EXIT THIS ROUTINE WE HAVE GIVEN UP.
3741
3742                                  ;+
3743                                  ; EXTRACT THE LINE NUMBER OF THE NEW CHARACTER.
3744                                  ; CALCULATE OFFSET FOR ACCESSING TABLES OF LINE VARIABLES.
3745                                  ;-
3746  015276  010203                  6$:     MOV     R2,R3           ;COPY THE READ CHARACTER.
3747  015300  000303                          SWAB    R3              ;GET THE LINE NUMBER IN THE LSB.
3748  015302  042703  177760                 BIC     #177760,R3      ;CLEAR THE UNWANTED BITS.
3749  015306  006303                          ASL     R3              ;SHIFT LEFT TO FORM OFFSET INTO TABLES.
3750                                  ;+
3751                                  ; PROCESS THE READ CHARACTERS AS DICTATED BY THE TEST FLAG.
3752                                  ;-
3753  015310  010505                          MOV     R5,R5           ;DETERMIN WHICH TEST CALLED THIS ROUTINE.
3754  015312  100003                         BPL     8$              ;BRANCH TO PROCESS CHARACTER IN PARITY TEST.
3755
3756  015314  004737  020252                 JSR     PC,PRFRME       ;PROCESS FRAMING ERRORS RECEIVED.
3757  015320  000402                          BR      10$             ;SKIP PROCESSING CHARACTERS FOR PARITY TEST.
3758  015322  004737  020350          8$:     JSR     PC,PRPARE       ;PROCESS PARITY ERRORS RECEIVED.
3759
3760  015326  004737  024444          10$:    JSR     PC,UPDCHR       ;UPDATE POINTERS AND COUNTERS FOR THIS LINE.
3761  015332  000730                          BR      2$              ;LOOP TO READ NEXT CHAR FROM FIFO.
3762
3763  015334  010437  005224          60$:     MOV    R4,ERRNBR       ;RESTORE THE ERROR NUMBER TO ITS INITIAL VALUE.
3764  015340                                  PASS                    ;RESTORE GPRS.
3765  015340  004736                                  JSR     PC,@(SP)+               ;RETURN TO PREGOS SUBRT.
3766  015342  000207                          RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - CKINAC -
                        ;++ ************************************************************************
                        ;*              - CHECK FOR NEW CHARACTER ON INACTIVE LINE ROUTINE -
                        ;*      THIS SUBROUTINE CHECKS A CHARACTER TO DETERMINE IF THE CHARACTER
                        ;*      WAS RECEIVED ON AN ACTIVE LINE.  IF THE CHARACTER WAS RECEIVED ON
                        ;*      AN INACTIVE LINE THIS ROUTINE RECORDS THE FACT THAT THE CHARACTER
                        ;*      WAS RECEIVED ON AN INACTIVE LINE, PREPARES AN ERROR MESSAGE FOR
                        ;*      THE CALLING ROUTINE, AND RETURNS A "FAILURE" STATUS.
                        ;*
                        ;* INPUTS:      R2 - THE RX CHARACTER INCLUDING ERROR FLAGS AND LINE NUMBER.
                        ;*              ACTLNS - BIT MAP OF ACTIVE DUT LINES.
                        ;*              BITTBL - TABLE OF WORDS WITH BITS SET FOR FORMING BIT MAPS.
                        ;*              EM9006 - LABEL AT "RX ON INACTIVE LINE" ERROR MESSGE.
                        ;*              EXCNTB - BASE OF THE EXTRA CHARACTER COUTERS TABLE.
                        ;*              TXRXLB - BASE OF TX/RX LINE NUMBER ASSOCIATION TABLE.
                        ;*
                        ;* OUTPUTS:     CARRY - "SUCCESS" FLAG (SET IF NO ERROR FOUND).
                        ;*              R1 - IF ERROR FOUND, ADDRESS OF ERROR MESSAGE.
                        ;*              R3 - LINE NUMBER OFFSET OF PASSED IN CHARACTER.
                        ;*              R4 - IF ERROR FOUND, EXPECTED DATA INDICATION FOR ERROR RPT.
                        ;*              EXCNT - EXTRA CHARACTER COUNT FOR LINE (UPDATED IF ERROR).
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,CKINAC
                        ;*
                        ;* COMMENTS:
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************

015344                  CKINAC:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
015344  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
                        ;+
                        ; EXTRACT THE LINE NUMBER FROM THE PASSED IN CHARACTER AND USE THE LINE
                        ;   NUMBER TO FORM AN OFFSET FOR ACCESSING TABLES OF LINE VARIABLES.
                        ;-
015350  010203                  MOV     R2,R3           ;EXTRACT THE LINE NUMBER
015352  000303                  SWAB    R3              ;  FROM THE CHARACTER WE
015354  042703  177760          BIC     #177760,R3      ;  ARE COMPARING.
015360  006303                  ASL     R3              ;FORM OFFSET INTO WORD TABLE FROM LINE NUMBER.
                        ;+
                        ; IF THE CHARACTER IN QUESTION IS NOT A VALID CHARACTER, EXIT WITH "SUCCESS".
                        ;-
015362  005702                  TST     R2              ;CHECK DATA.VALID BIT.
015364  100021                 BPL     50$             ;EXIT WITH SUCCESS IF CHAR IS NOT VALID.
                        ;+
                        ; IF THE TX LINE WHICH IS ASSOCIATED WITH THIS RX LINE IS AN ACTIVE LINE,
                        ;  EXIT THE ROUTINE WITH "SUCCESS".
                        ;-
015366  016301  005142          MOV     TXRXLB(R3),R1   ;GET THE TX LINE # OFFSET FOR THIS RX LINE.
015372  036137  002332  002174  BIT     BITTBL(R1),ACTLNS  ;DETERMINE IF TX LINE IS AN ACTIVE LINE.
015400  001013                 BNE     50$             ;EXIT ROUTINE WITH SUCCESS IF LINE IS ACTIVE.
                        ;+
                        ; THE CHARACTER IN QUESTION WAS RECEIVED ON AN INACTIVE LINE.
                        ; COUNT THIS CHARACTER AS AN EXTRA CHAR.
                        ; SET UP ERROR INFORMATION.
                        ; EXIT ROUTINE WITH "FAILURE" INDICATION.
```

```
3823                                    ;-
3824  015402  005263  003150                    INC     EXCNTB(R3)      ;INCREMENT THE EXTRA CHAR COUNT FOR THIS LINE.
3825  015406  001002                          BNE     2$              ;SKIP SETTING TO MAX VALUE IF NO OVERFLOW.
3826  015410  005363  003150                    DEC     EXCNTB(R3)      ;DECREMENT BACK TO -1 (MAX VALUE) IF OVERFLOW.
3827  015414  012701  010175          2$:       MOV     #EM9006,R1      ;SET UP RX ON INACTIVE LINE MESSAGE.
3828  015420  012704  100000                    MOV     #BIT15,R4       ;SET UP "NONE" EXPECTED DATA INDICATION.
3829  015424  000241                            CLC                     ;CLEAR THE "SUCCESS" FLAG.
3830  015426  000401                          BR      60$             ;GO REPORT RX CHAR ON INACTIVE LINE.
3831
3832                                    ;+
3833                                    ; WE HAVE NOT FOUND A "CHAR ON INACTIVE LINE" ERROR SITUATION.
3834                                    ; SET THE "SUCCESS" FLAG AND EXIT THE ROUTINE.
3835                                    ;-
3836  015430  000261                    50$:     SEC                     ;SET THE "SUCCESS" FLAG.
3837
3838  015432                            60$:    PASS    R1,R3,R4        ;RESTORE GPRS, EXCEPT OUTPUT GPRS.
3839  015432  010166  000004                                    MOV     R1,R1SLOT(SP)           ;PUT R1 IN STACK SLOT.
3840  015436  010366  000010                                    MOV     R3,R3SLOT(SP)           ;PUT R3 IN STACK SLOT.
3841  015442  010466  000012                                    MOV     R4,R4SLOT(SP)           ;PUT R4 IN STACK SLOT.
3842  015446  004736                                    JSR     PC,@(SP)+               ;RETURN TO PREGOS SUBRT.
3843  015450  000207                          RTS     PC              ;CARRY - SUCCESS FLAG (SET IF NO ERROR).
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - CKTRAP -
                        ;*****************************************************************************
                        ;*      CHECK TRAP ROUTINE -
                        ;*      THIS SUBROUTINE IS USED TO CHECK FOR A BUS TIME-OUT TRAP (004 TRAP)
                        ;*      WHICH IS CAUSED BY AN ACCESS TO A NON-EXISTENT MEMORY OR I/O LOCATION.
                        ;*      IF THE TRAP DOES NOT OCCUR, THIS ROUTINE RETURNS A SUCCESS INDICATION.
                        ;*
                        ;* INPUTS:      R0 - SOURCE ADDRESS FOR MOVE.
                        ;*              R1 - DESTINATION ADDRESS FOR MOVE.
                        ;*              (R0) - SOURCE FOR THE MOVE.
                        ;*
                        ;* OUTPUTS:     (R1) - WRITTEN TO THE CONTENTS OF (R0).
                        ;*              CARRY FLAG - SET ON RETURN IF NO 004 TRAP DETECTED.
                        ;*              TP4FLG - NONZERO IF TRAP OCCURRED, CLEARED OTHERWISE.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,CKTRAP
                        ;*
                        ;* COMMENTS:    IF THIS SUBROUTINE CAUSES A TRAP, EITHER THE ADDRESS WHICH
                        ;*              IS LABELED ADRPTR WILL BE THE TRAP PC ADDRESS ON THE STACK.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;*****************************************************************************

015452                  CKTRAP:: SAVE                   ;SAVE CONTENTS OF GPRS R0 THRU R5.
015452  004537  005232          JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
015456  005037  002256          CLR     TP4FLG          ;CLEAR THE 004 TRAP FLAGS.
015462  011011                  MOV     (R0),(R1)       ;PERFORM THE MOVE IN QUESTION.
015464  005737  002256  ADRPTR:: TST     TP4FLG          ;CHECK FOR OCCURENCE OF TRAP.
015470  000261                  SEC                     ;INDICATE SUCCESS.
015472  001401                  BEQ     60$             ;EXIT WITH SUCCESS IF TRAP DID NOT OCCUR.
015474  000241                  CLC                     ;INDICATE FAILURE.
015476          60$:    PASS                            ;RESTORE GPRS.
015476  004736                          JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
015500  000207                  RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - CLNRST -
                        ;*****************************************************************************
                        ;*              - CLEAN RESET OF THE DEVICE UNDER TEST -
                        ;*      THIS SUBROUTINE IS USED TO RESET THE DUT TO A KNOWN STATE.
                        ;*      THE DUT'S SELF-TEST IS SKIPPED,AND THE FIFO IS PURGED OF ANY ERROR
                        ;*      CODES, ETC.
                        ;*      IF THE RESET DOES NOT SUCCESFULLY COMPLETE, THEN THE CARRY BIT IS
                        ;*      PASSED BACK TO THE CALLING ROUTINE (CLEAR).
                        ;*
                        ;* INPUTS:      CSRA - CONTAINS THE ADDRESS OF THE CSR
                        ;*              TXBFCA - CONTAINS ADDRESS OF DUT DMA BUFFER COUNT REGISTER.
                        ;*              ERRNBR - ERROR NUMBER FOR POSSIBLE ERROR REPORT.
                        ;*              ERRTBL- ERRTYP,ERNBR,AND ERRMSG SET UP CORRECTLY.
                        ;*
                        ;* OUTPUTS:     THE DUT PERFORMS ITS RESET FUNCTION INTO A KNOWN STATE.
                        ;*              CARRY - CLEAR INDICATES THE TEST IS TO BE ABORTED.
                        ;*              ERRBLK - VALUE MAY BE DESTROYED.
                        ;*              IESTAT - TX AND RX INTERRUPT FLAGS ARE CLEARED.
                        ;*              TX AND RX INTERRUPT ENABLE BITS IN THE DUT'S CSR ARE CLEARED.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,CLNRST
                        ;*
                        ;* COMMENTS:    THIS SUBROUTINE CAN REPORT ERRORS WITH NUMBERS ERRNBR.
                        ;*              THIS ROUTINE DOES NOT DESTROY THE VALUE OF ERRNBR.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: DELAY,MSLGET,PUFIFO,RESETT.
                        ;*****************************************************************************

015502                  CLNRST:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
015502  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
                        ;+
                        ; RESET THE DUT.
                        ;  THIS ROUTINE REPORTS ERRORS WITH NUMBERS FROM ERRNBR THRU ERRNBR+2.
                        ;-
015506  004737  021712          JSR     PC,RESETT       ;RESET THE DUT TO A KNOWN STATE.
015512  103002                  BCC     60$             ;EXIT ROUTINE WITH ABORT TEST INDICATOR.
                        ;+
                        ; PURGE THE FIFO OF ERROR CODES, SAVE ANY BMP CODES FOUND.
                        ;-
015514  004737  020612          JSR     PC,PUFIFO       ;PURGE THE FIFO.

015520                  60$:                            ;EXIT THE TEST USING RESETT OR PUFIFO STATUS.
015520                          PASS                    ;RESTORE GPRS, PASS THE FOLLOWING INTACT:
015520  004736                          JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
                                                        ;CARRY BIT:IF CLEAR, THEN ABORT THE TEST.
015522  000207                  RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - CLR16W -
                        ;++ ************************************************************************
                        ;*                        - CLEAR SIXTEEN WORDS ROUTINE -
                        ;*      THIS SUBROUTINE CLEARS 16 WORDS STARTING WITH THE SPECIFIED WORD.
                        ;*
                        ;* INPUTS:      R0 - ADDRESS OF THE FIRST WORD TO CLEAR.
                        ;*
                        ;* OUTPUTS:     (R0) TO (R0+15) - 16 WORDS OF MEMORY ARE CLEARED TO 0.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,CLR16W
                        ;*
                        ;* COMMENTS:
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************

015524                  CLR16W:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
015524  004537  005232                 JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
015530  012701  000020         MOV     #16.,R1                 ;SET THE LOOP COUNTER TO 16.
015534  005020         2$:      CLR     (R0)+                   ;CLEAR A WORD OF MEMORY.
015536  005301                   DEC     R1                      ;COUNT THIS LOOP.
015540  001375                 BNE     2$                      ;LOOP IF NOT 16 WORD CLEARED.
015542                  60$:    PASS                            ;RESTORE GPRS.
015542  004736                         JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
015544  000207         RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - CONMAP -
                        ;++ ************************************************************************
                        ;*                      - CONVERT LINE BIT MAP.
                        ;*      THIS SUBROUITNE IS USED TO CONVERT A BIT MAP PASSED TO IT , INTO
                        ;*      ANOTHER LINE BIT MAP THAT IS BASED UPON THE ASSOCIATED TX/RX LINE
                        ;*      NUMBER/OFFSET TABLE.
                        ;*
                        ;* INPUTS:      R5 - CONTAINS THE LINE BIT MAP TO BE TRANSFORMED.
                        ;*              TXRXLB - BASE ADDRESS OF ASSOCIATED TX/RX LINE NUMBER TABLE.
                        ;*
                        ;* OUTPUTS:     R5 - CONTAINS AN ASSOSCIATED LINE BIT MAP.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,CONMAP
                        ;*
                        ;* COMMENTS:    THE TX/RX ASSOCIATION TABLE MUST BE INITIALISED BEFORE THIS
                        ;*              ROUTINE IS CALLED.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************

015546                  CONMAP::SAVE                            ;SAVE CONTENTS OF GPRS R0 THRU R5.
015546  004537  005232          JSR     R5,PREG05               ;CALL REGISTER SAVE SUBRT.
015552  012702  005142          MOV     #TXRXLB,R2              ;GET THE BASE ADDRESS OF THE LINE ASSOC TABLE.
015556  010503                  MOV     R5,R3                   ;COPY THE BIT MAP TO BE TRANSFORMED.
015560  012704  000010          MOV     #NUMLNS,R4              ;SET MAX LINE COUNTER.
015564  005005                  CLR     R5                      ;CLEAR ASSOCIATED LINE BIT MAP.
015566  006203          2$:     ASR     R3                      ;SHIFT ACTLNS BIT MAP INT BOOLEAN REGISTER.
015570  103005                  BCC     4$                      ;SKIP SETTING ASSOCIATED LINE NUMBER BIT MAP.
015572  011201                  MOV     (R2),R1                 ;GET ASSOCIATED LINE NUMBER OFFSET FROM TABLE.
015574  006201                  ASR     R1                      ;SHIFT RIGHT TO GET LINE NUMB FROM OFFSET.
015576  004737  017260          JSR     PC,LINBIT               ;GENERATE AN SINGLE BIT MAP FOR THIS LINE.
015602  050005                  BIS     R0,R5                   ;SET BIT FOR THIS LINE IN ASSOCIATED BIT MAP.
015604  005722          4$:     TST     (R2)+                   ;INCREMENT ADDRESS FOR THE NEXT LINE NUMBER.
015606  005304                  DEC     R4                      ;DECREMENT LINE COUNT.
015610  001366                  BNE     2$                      ;LOOP IF NOT DONE.
015612                  60$:    PASS    R5                      ;RESTORE GPRS, EXCEPT
015612  010566  000014                  MOV     R5,R5SLOT(SP)           ;PUT R5 IN STACK SLOT.
015616  004736                  JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
                                                                ;R5 - CONTAINS THE ASSOCIATED LINE BIT MAP.
015620  000207                  RTS     PC
```

```
                                .SBTTL  GLOBAL SUBROUTINE                - DELAY -
                                ;*****************************************************************************
                                ;*                                - DELAY SUBROUTINE -
                                ;*      THIS SUBROUTINE IS USED TO DELAY A VARIABLE NUMBER OF MILLI-SECONDS.
                                ;*
                                ;* INPUTS:      R4 - CONTAINS THE NUMBER OF MS TO DELAY.
                                ;*                MSLCNT.
                                ;*
                                ;* OUTPUTS:     NONE.
                                ;*
                                ;* CALLING SEQUENCE:    JSR     PC,DELAY
                                ;*
                                ;* COMMENTS:    IF NO HARDWARE CLOCK INTERRUPTS ARE OCCURING, CONTROL-CS WILL
                                ;*              NOT BE HONORED FOR THE DURATION OF THE DELAY.
                                ;*
                                ;* SUBORDINATE ROUTINES CALLED: NONE.
                                ;*****************************************************************************

015622                          DELAY:: SAVE                    ;SAVE CONTENTS OF GPRS R0 THRU R5.
015622  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
015626  010401                  MOV     R4,R1                   ;PASS NUMBER OF MS DELAY AS TIME-OUT VALUE.
015630  012702  177777          MOV     #-1,R2                  ;TELL MSLOOP ROUTINE TO CHECK ALL BITS.
015634  005003                  CLR     R3                      ;TELL MSLOOP RTN TO CHECK FOR ALL BITS CLEAR.
015636  012704  015660          MOV     #62$,R4                 ;TELL MSLOOP TO CHECK DUMMY NON-ZERO WORD.
015642  004737  017454          JSR     PC,MSLOOP               ;DELAY THE REQUESTED # OF MS.
015646  103002                  BCC     60$                     ;EXIT ROUTINE IF WE TIMED-OUT.]
015650  004737  020024          JSR     PC,OOPS                 ;IF NO TIME-OUT, BAD PROGRAM OR HOST MACHINE.
015654                          60$:    PASS                    ;RESTORE GPRS.
015654  004736                          JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
015656  000207                  RTS     PC

015660  177777                  62$:    .WORD   -1              ;DUMMY, NON-ZERO WORD.
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - DODMA -
                        ;++ ************************************************************************
                        ;*                      - INITIATE DMA TRANSMISSION ROUTINE -
                        ;*      THIS ROUTINE WRITES THE DMA PARAMETER TO THE SPECIFIED DEVICE AND
                        ;*      INITIATES THE DMA TRANSMISSION.
                        ;*
                        ;* INPUTS:      R1 - LINE NUMBER ON WHICH TO INITIATE THE DMA.
                        ;*              R2 - START ADDRESS OF THE DMA BUFFER (16 BIT VIRTUAL).
                        ;*              R3 - CHARACTER COUNT OF THE DMA BUFFER.
                        ;*              CSRA - CONTAINS ADDRESS OF THE DUT CSR.
                        ;*              IESTAT - STORAGE FOR STATES OF THE INTERRUPT ENABLE BITS.
                        ;*              MMENAB - MEMMORY MANAGEMENT FLAG (0 IF MEM MGT NOT ENABLED).
                        ;*              HOST MEM MGT PAR REGISTERS - IF MEM MGT IS IN USE.
                        ;*              TXAD1A - CONTAINS ADDRESS OF DMA TX BUFFER ADDRESS REG #1.
                        ;*              TXAD2A - CONTAINS ADDRESS OF DMA TX BUFFER ADDRESS REG #2.
                        ;*              TXBFCA - CONTAINS ADDRESS OF DMA CHARACTER COUNT REGISTER.
                        ;*
                        ;* OUTPUTS:     CARRY - SUCCESS FLAG (SET IF DMA_START FOUND CLEAR).
                        ;*              DUT TBUFFAD1 - LS 16 BITS OF DMA BUFFER ADDRESS (INITIALIZED).
                        ;*              DUT TBUFFAD2 - MS 6 BITS OF DMA BUFFER ADDRESS (INITIALIZED),
                        ;*                             DMA_START BIT SET.
                        ;*              DUT TBUFFCT - DMA BUFFER CHARACTER COUNT (INITIALIZED).
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,DODMA
                        ;*
                        ;* COMMENTS:    THIS ROUTINE DETERMINES IF MEMORY MANAGEMENT IS BEING USED
                        ;*              AND SETS UP THE FULL 22 BIT PHYSICAL ADDRESS IF NECESSARY.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************

015662                  DODMA:: SAVE                    ;SAVE CONTENTS OF GPRS R0 THRU R5.
015662  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
015666  012704  000200          MOV     #200,R4         ;PREPARE TO CLEAR UPPER 6 BITS OF DMA BUFF ADR.
015672  005737  002310          TST     MMENAB          ;CHECK FOR MEMORY MANAGEMENT IN USE.
015676  001427                BEQ     6$              ;GOTO SET UP DEVICE IF MEM MGT NOT IN USE.
                        ;+
                        ; MEMMORY MANAGEMENT IS IN USE.
                        ; CONSTRUCT 22 BIT PHYSICAL ADDRESS FROM THE 16 BIT VIRTUAL ADDRESS.
                        ;-
015700  010205          MOV     R2,R5           ;STRIP THE MOST SIGNIFICANT 3 BITS OF THE
015702  012700  000005          MOV     #5,R0           ;  DMA BUFFER VIRTUAL ADDRESS AND MULTIPLY
015706  006105          2$:     ROL     R5              ;  THEIR VALUE BY TWO TO GET AN OFFSET INTO
015710  005300          DEC     R0              ;  THE TABLE OF MEMMORY MANAGEMENT PAGE
015712  001375          BNE     2$              ;  ADDRESS REGISTERS (PAR).
015714  042705  177761          BIC     #177761,R5      ;
015720  063705  002312          ADD     PAR0A,R5        ;ADD IN THE BASE VALUE OF THE MM PAR REGISTERS.
015724  011505          MOV     (R5),R5         ;GET THE 16 BIT PHYSICAL ADDRESS BLOCK COUNT.
015726  012700  000006          MOV     #6,R0           ;SHIFT UPPER 6 BITS OF THE PHYSICAL ADDRESS
015732  006305          4$:     ASL     R5              ;  BLOCK COUNT (GOTTEN FROM THE PROPER PAR)
015734  006104          ROL     R4              ;  INTO THE LS 6 BITS OF THE WORD TO WRITE
015736  005300          DEC     R0              ;  INTO THE DUT TBUFFAD2 REGISTER.
015740  001374          BNE     4$              ;
015742  042702  160000          BIC     #160000,R2      ;ADD THE 13 BIT DISPLACEMENT FIELD FROM VIRTUAL
015746  060502          ADD     R5,R2           ;  ADR TO THE SHIFTED BLOCK NUMBER FROM THE
015750  005504          ADC     R4              ;  MEMMORY MANAGEMENT PAR.
```

```
4077  015752  052704  000200                BIS    #200,R4          ;SET THE DMA_START BIT IN WORD FOR TBUFFAD2.
4078                                        ;+
4079                                        ; WRITE THE DMA PARAMETERS OUT TO THE DUT DMA REGISTERS.
4080                                        ;    DISABLE INTERRUPTS.
4081                                        ;    SET UP DUT CSR IND.ADR.REG FIELD.
4082                                        ;    WRITE THE DMA TRANSMIT CHARACTER COUNT.
4083                                        ;    WRITE THE LEAST SIGNIFICANT 16 BITS OF THE DMA BUFFER START ADDRESS.
4084                                        ;    WRITE THE MOST SIGNIFICANT 6 BITS OF THE ADDRESS,
4085                                        ;      SETTING THE DMA_START BIT, AND INITIATING THE DMA TRANSMISSION.
4086                                        ;-
4087  015756                                6$:    GETPRI  R5               ;GET THE PRESENT PROCESSOR PRIORITY.
4088  015756  104440                                                         TRAP    C$GPRI
4089  015760  010005                                                         MOV     R0,R5
4090  015762                                       SETPRI  #PRI07           ;DISABLE ALL HARDWARE INTERRUPTS.
4091  015762  012700  000340                                                MOV     #PRI07,R0
4092  015766  104441                                                         TRAP    C$SPRI
4093  015770  053701  002234                       BIS    IESTAT,R1         ;PREPARE FOR SETUP OF LINE NUMBER IN DUT CSR.
4094  015774  010177  164202                       MOV    R1,@CSRA          ;SET UP THE DUT CSR IND.ADR.REG FIELD.
4095  016000  105777  164212                       TSTB   @TXAD2A           ;TEST THE DUT DMA_START BIT.
4096  016004  000241                              CLC                      ;INDICATE FAILURE IN CASE DMA.HO BIT IS SET.
4097  016006  100411                              BMI    60$               ;EXIT WITH FAILURE IF DMA.HO BIT IS SET.
4098  016010  010377  164204                       MOV    R3,@TXBFCA        ;WRITE THE DMA CHARACTER COUNT.
4099  016014  010277  164174                       MOV    R2,@TXAD1A        ;WRITE THE LS 16 BITS OF BUFFER ADDRESS.
4100  016020  110477  164172                       MOVB   R4,@TXAD2A        ;WRITE MS 6 BITS OF ADR AND START DMA TX.
4101  016024                                       SETPRI  R5               ;RESTORE THE PROCESSOR PRIORITY.
4102  016024  010500                                                         MOV     R5,R0
4103  016026  104441                                                         TRAP    C$SPRI
4104  016030  000261                              SEC                      ;INDICATE SUCCESS.
4105
4106  016032                                60$:   PASS
4107  016032  004736                                      JSR     PC,@(SP)+          ;RETURN TO PREG05 SUBRT.
4108  016034  000207                              RTS     PC                ;  CARRY - SUCCESS FLAG (SET IF SUCCESS).
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - FINACT -
                        ;++ ************************************************************************
                        ;*                      - FIND FIRST ACTIVE LINE -
                        ;*      THIS SUBROUTINE CALCULATES THE NUMBER OF THE FIRST ACTIVE LINE THAT
                        ;*      IS FOUND IN THE ACTIVE LINE BIT MAP ACTLNS.
                        ;*
                        ;* INPUTS:      ACTLNS - CONTAINS THE ACTIVE LINE BIT MAP.
                        ;*
                        ;* OUTPUTS:     R1 - CONTAINS THE NUMBER OF THE FIRST ACTIVE LINE.
                        ;*              R5 - CONTAINS THE BIT MAP REPRESENTATION OF THE ACTIVE LINE.
                        ;*              CARRY SET INDICATES SUCCESS.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,FINACT
                        ;*
                        ;* COMMENTS:
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************

016036                  FINACT:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
016036  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
                            ;+
                            ; FIND AN ACTIVE LINE ON WHICH TO PERFORM THE TEST.
                            ;-
016042  005001                  CLR     R1                      ;CLEAR THE LINE NUMBER COUNTER.
016044  012703  000010          MOV     #NUMLNS,R3              ;GET MAX LINE NUMBER.
016050  013700  002174          MOV     ACTLNS,R0               ;GET THE ACTIVE LINE BIT MAP.
016054  012705  000001          MOV     #1,R5                   ;SET UP A LINE BIT MASK.
016060  030500          2$:     BIT     R5,R0                   ;LOOK FOR AN ACTIVE LINE.
016062  001006                  BNE     4$                      ;BRANCH TO BEGIN TEST IF A LINE HAS BEEN FOUND.
016064  006305                  ASL     R5                      ;SHIFT THE BIT MASK FOR THE NEXT LINE.
016066  005201                  INC     R1                      ;INCREMENT THE LINE NUMBER COUNTER.
016070  020103                  CMP     R1,R3                   ;CHECK IF ALL LINES HAVE BEEN TRIED.
016072  002772                  BLT     2$                      ;LOOP TO TRY THE NEXT LINE.
016074  000241                  CLC                             ;CLEAR CARRY BIT, NO ACTIVE LINE FOUND.
016076  000401                  BR      60$                     ;EXIT WITH FAILURE.
016100  000261          4$:     SEC                             ;SET CARRY, SUCCESS.

016102                  60$:    PASS    R1,R5                   ;RESTORE GPRS, EXCEPT
016102  010166  000004                          MOV     R1,R1SLOT(SP)           ;PUT R1 IN STACK SLOT.
016106  010566  000014                          MOV     R5,R5SLOT(SP)           ;PUT R5 IN STACK SLOT.
016112  004736                              JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
                                                ;R1 - CONTAINS THE NUMBER OF FIRST ACTIVE LINE.
                                                ;R5 - CONTAINS THE BIT MAP OF THE ACTIVE LINE.
                                                ;CARRY - SET INDICATES SUCCESS.
016114  000207                  RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - FRPSUP -
                        ;++ ************************************************************************
                        ;*              - FRAMING AND PARITY ERROR TRANSMISSION/RECEPTION SET-UP -
                        ;*
                        ;*              THIS ROUTINE IS USED TO INITIALISE BOTH THE DUT AND THE
                        ;*              TRANSMISSION/RECEPTION CONTROL PARAMETERS TO THE CORRECT
                        ;*              STATE, PRIOR TO A FRAMING OR PARITY ERROR DETECTION AND
                        ;*              REPORTING TEST.
                        ;*
                        ;* INPUTS:      R0 - LPR CONTENTS FOR LINES IN THE BIT MAP IN GPR4.
                        ;*              R1 - LPR CONTENTS FOR LINES NOT IN THE BIT MAP IN GPR4.
                        ;*              R2 - START ADDRESS OF DATA PATTERN TO TRANSMIT.
                        ;*              R3 - LENGTH OF THE DATA PATTERN TO TX.
                        ;*              R4 - LOCAL LINE GROUP BIT MAP.
                        ;*              ACTLNS - CONTAINS A BIT MAP OF ALL CURRENTLY ACTIVE LINES.
                        ;*              LOPBCK - CONTAINS THE TYPE OF LOOPBACK MODE SELECTED.
                        ;*              CBB - LABEL AT BASE OF TX/RX CONTROL BLOCK.
                        ;*
                        ;* OUTPUTS:     THE CONTENTS OF THE TXRCB ARE DESTROYED.
                        ;*              THE INDIRECT ADDRESS FIELD OF THE DUT CSR MAY BE DESTROYED.
                        ;*              THE DUT'S LPR'S AND LNC'S MAY BE MODIFIED.
                        ;*              THE FOLLOWING POINTERS AND COUNTERS ARE INITIALISED:
                        ;*              CHCNT,CHRTOT,DPEND,DPLEN,EXCNT,RXCNT,RXDONF,RXPTR,TXCNT,
                        ;*              TXDONF,TXPTR,TXRXL.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,FRPSUP
                        ;*
                        ;* COMMENTS:    THIS ROUTINE SHOULD BE CALLED TWICE DURING THE TESTING OF
                        ;*              THE FRAMING AND PARITY ERROR DETECTION AND REPORTING TEST.
                        ;*              SO THAT BOTH LINE GROUPS ARE TESTED ON TRANSMISSION AND
                        ;*              RECEPTION.
                        ;*                JSR   PC,FRPSUP       ; DO SET-UP.
                        ;*                EXECUTE TEST FOR THE ABOVE SET-UP.
                        ;*                COMPLEMENT THE LINE GROUP BIT MAP.
                        ;*                JSR   PC,FRPSUP       ;DO SET UP AGAIN.
                        ;*                EXECUTE TEST AGAIN.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: TXRINI.
                        ;-- ************************************************************************

016116                  FRPSUP:: SAVE                           ;SAVE THE CONTENTS OF THE GPR'S.
016116  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
016122  010037  016356          MOV     R0,70$                  ;SAVE LPR PARAMETER FOR LINE TX.
016126  010137  016360          MOV     R1,72$                  ;SAVE LPR PARAMETER FOR LINE RX.
                        ;+
                        ;  SET UP THE TRANSMISSION/RECEPTION CONTROL BLOCK TO INITIALISE THE
                        ;  ACTIVE LINES IN THE BIT MAP PASSED INTO THIS ROUTINE.
                        ;-
016132  010037  003030          MOV     R0,CBB                  ;SET CONTENTS OF LPR PARAMS IN TX/RX C.BLK.
016136  012700  003032          MOV     #CBB+2,R0               ;GET ADDRESS OF THE NEXT WORD IN THE CNTRL BLK.
016142  012720  000004          MOV     #4,(R0)+                ;LNCTRL PARAMETER, ENABLE RECEIVERS.
016146  010220                  MOV     R2,(R0)+                ;START ADDRESS OF DATA PATTERN.
016150  010320                  MOV     R3,(R0)+                ;SET DATA PATTERN LENGTH.
016152  012720  000001          MOV     #1,(R0)+                ;NUMBER OF DATA PATTERNS TO TRANSMIT.
016156  013710  002174          MOV     ACTLNS,(R0)             ;BIT MAP OF LINES TO INITIALISE.
016162  005104                  COM     R4                      ;GENERATE A BIT MAP OF ACTIVE LINES IN GRP1.
```

```
4211  016164  040420                    BIC   R4,(R0)+        ;CLEAR THE UNWANTED LINES.
4212  016166  113720  002176            MOVB  LOPBCK,(R0)+    ;SET LOOPBACK MODE,STAGGARED.
4213  016172  005200                    INC   R0              ;INCREMENT ADDRESS TO GET NEXT WORD IN TABLE.
4214  016174  012710  000001            MOV   #1,(R0)         ;SET AMMOUNT OF OFFSET FOR EACH TX START.
4215
4216                                    ;+
4217                                    ; INITIALISE THE DUT AND THE ASSOCIATED POINTERS AND COUNTERS, TO THE STATE
4218                                    ; DICTATED BY THE CONTENTS OF THE TX/RX CONTROL BLOCK.
4219                                    ;-
4220  016200  004737  023666                JSR   PC,TXRINI       ;INITIALISE DUT.
4221
4222                                    ;+
4223                                    ; SET UP CONTROL BLOCK FOR LINES IN GROUP 2.
4224  016204  012700  003030            ;-
4225  016210  010120                    MOV   #CBB,R0         ;GET START ADDRESS OF CONTROL BLOCK.
4226  016212  062700  000010            MOV   R1,(R0)+        ;SET LPR PARAMETER FOR RX LINES.
4227  016216  013710  002174            ADD   #10,R0          ;SELECT THE ADDRESS OF THE LINE BIT MAP IN C.B.
4228  016222  005104                    MOV   ACTLNS,(R0)     ;BIT MAP OF LINES TO INITIALISE.
4229  016224  040410                    COM   R4              ;GENERATE A BIT MAP OF LINES IN GRP 2.
4230                                    BIC   R4,(R0)         ;CLEAR THE UNWANTED LINES.
4231                                    ;+
4232                                    ; INITIALISE THE DUT AND THE ASSOCIATED POINTERS AND COUNTERS, TO THE STATE
4233                                    ; DICTATED BY THE CONTENTS OF THE TX/RX CONTROL BLOCK.
4234  016226  004737  023666            ;-
4235                                        JSR   PC,TXRINI       ;INITIALISE DUT.
4236
4237                                    ;+
4238                                    ; SET-UP THE REQUIRED LPR PARAMETERS NEEDED FOR THE CORRECT RECEPTION OF DATA
4239                                    ; ON ASSOCIATED IN-ACTIVE LINES.
4240                                    ;-
4241                                    ;+
4242                                    ; INITIALISE LPR PARAMETERS FOR INACTIVE LINES IN GROUP 2.
4243  016232  012701  000377            ;-
4244  016236  013702  002174                MOV   #MAPLNS,R1      ;SET UP BIT MAP CORRESPONDING TO ALL LINES.
4245  016242  005101                        MOV   ACTLNS,R2       ;GET THE ACTIVE (TX) LINE BIT MAP.
4246  016244  005102                        COM   R1              ;GENERATE A BIT MAP OF NONE EXISTANT LINES.
4247  016246  040102                        COM   R2              ;GENERATE A BIT MAP OF INACTIVE LINES.
4248  016250  040402                        BIC   R1,R2           ;CLEAR ANY 'NONE EXISTANT' INACTIVE LINES.
4249  016252  010237  003042                BIC   R4,R2           ;
4250  016256  005037  003040                MOV   R2,CBMAPA       ;SET UP BIT MAP IN CONTROL BLOCK.
4251  016262  013737  016360  003030        CLR   CBDPNA          ;CLEAR REPEAT TX COUNT IN CONTROL BLOCK.
4252  016270  004737  023666                MOV   72$,CBLPRA      ;SET-UP COMPLEMENTARY LPR PARM.
4253                                        JSR   PC,TXRINI       ;INITIALISE INACTIVE LINES.
4254                                    ;+
4255                                    ; INITIALISE LPR PARAMETERS FOR INAACTIVE LINES IN GROUP 1.
4256  016274  013702  002174            ;-
4257  016300  005102                        MOV   ACTLNS,R2       ;GET THE ACTIVE (TX) LINE BIT MAP.
4258  016302  040102                        COM   R2              ;GENERATE A BIT MAP OF INACTIVE LINES.
4259  016304  005104                        BIC   R1,R2           ;CLEAR ANY NONE EXISTANT INACTIVE LINES.
4260  016306  040402                        COM   R4              ;
4261  016310  010237  003042                BIC   R4,R2           ;ONLY PASS LGRP2 ASSOCIATED LINE BIT MAP.
4262  016314  013737  016356  003030        MOV   R2,CBMAPA       ;SET-UP BIT MAP IN CONTROL BLOCK.
4263  016322  004737  023666                MOV   70$,CBLPRA      ;SET-UP COMPLAMENTARY LPR PARAM FOR LGRP1.
4264                                        JSR   PC,TXRINI       ;INITIALISE INACTIVE LINES IN LGRP1.
4265                                    ;+
4266                                    ; DISABLE RECEIVERS ON ALL LINES TO ENSURE THAT ONLY THE RECEIVERS OF THE
                                        ; ASSOCIATED ACTIVE (TX) LINES ARE ENABLED.(STAGGARED LOOPBACK)
```

```
                                ;  RE-ENABLE RECEPTION ON THE CORRECT ASSOCIATED LINES.
                                ;-
016326  012705  000377                MOV     #MAPLNS,R5      ;SET-UP BIT MAP FOR ALL LINES.
016332  004737  022124              JSR     PC,RXDSBL       ;DISABLE RX ON ALL LINES.
                                ;+
                                ; ENABLE RECEIVERS ON ASSOCIATED (RX) LINES.
                                ;-
016336  013705  002174                MOV     ACTLNS,R5       ;GET ACTIVE (TX) LINE BIT MAP.
016342  004737  015546              JSR     PC,CONMAP       ;GENERATE AN ASSOCIATED (RX) LINE BIT MAP.
016346  004737  022220              JSR     PC,RXENBL       ;ENABLE RECEIVERS ON ASSOCIATED LINES.

016352                          60$:    PASS                    ;RESTORE GRP'S.
016352  004736                                  JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
016354  000207                          RTS     PC
016356  000000                  70$:    .WORD   0               ;LOCAL STORAGE OF LPR PARAMETER TX.
016360  000000                  72$:    .WORD   0               ;LOCAL STORAGE OF LPR PARAMETER RX.
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - GETCHR -
                        ;++ ************************************************************************
                        ;*              - GET A CHARACTER FROM THE RX BUFFER ROUTINE -
                        ;*      THIS SUBROUTINE GETS A CHARACTER FROM THE RX BUFFER WHICH IS IN THE
                        ;*      HOST SYSTEM MEMORY.  IF THE BUFFER IS EMPTY UPON ENTRY OF THIS ROUTINE
                        ;*      THIS ROUTINE RETURNS A NULL CHARACTER WITH DATA.VALID CLEAR AND A
                        ;*      BUFFER EMPTY INDICATION.
                        ;*
                        ;* INPUTS:      RXBCNT - RX BUFFER CHARACTER COUNT.
                        ;*              RXBEND - LABEL AFTER END OF THE RX BUFFER AREA IN MEMORY.
                        ;*              RXBETX - EQUATED TO RX BUFFER LEVEL AT WHICH TO ENABLE TX.
                        ;*              RXBOPT - POINTER TO NEXT AVAILABLE INPUT SLOT OF RX BUFFER.
                        ;*              RXBSTA - LABEL AT START OF RX BUFFER AREA IN MEMORY.
                        ;*
                        ;* OUTPUTS:     R2 - CHARACTER WHICH IS READ FROM THE BUFFER.
                        ;*              RXBOPT - UPDATED TO POINT TO NEXT INPUT SLOT OF RX BUFFER.
                        ;*              RXBCNT - RX BUFFER CHARACTER COUNT (UPDATED).
                        ;*              CARRY - "SUCCESS" FLAG (SET IF BUFFER IS NOT EMPTY ON ENTRY).
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,GETCHR
                        ;*
                        ;* COMMENTS:
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************

016362                  GETCHR:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
016362  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
016366  005000          CLR     R0      ;CLEAR THE "RE-ENABLE" TX FLAG (SUBRTN OUTPUT).
016370  005002          CLR     R2      ;GET NULL CHAR IN CASE BUFFER IS EMPTY.
016372  005737  002624  TST     RXBCNT  ;CHECK FOR RX BUFFER EMPTY, CLEAR CARRY.
016376  001416          BEQ     60$     ;EXIT THE ROUTINE IF BUFFER IS EMPTY.
016400  013704  002620  MOV     RXBOPT,R4       ;GET THE BUFFER OUTPUT POINTER.
016404  011402          MOV     (R4),R2 ;GET A CHARACTER FROM THE BUFFER.
016406  005024          CLR     (R4)+   ;DELETE THE READ CHARACTER FROM THE BUFFER.
016410  020427  003026  CMP     R4,#RXBEND      ;CHECK IF POINTER SHOULD WRAP AROUND.
016414  103402          BLO     2$      ;SKIP WRAPAROUND IF POINTER IS NOT AT END.
016416  012704  002626  MOV     #RXBSTA,R4      ;WRAP INPUT POINTER AROUND.
016422  010437  002620  2$:     MOV     R4,RXBOPT       ;UPDATE THE OUTPUT POINTER STORAGE.

016426  005337  002624  DEC     RXBCNT  ;REMOVE THIS CHAR FROM THE BUFFER COUNT.
016432  000261          SEC             ;SET SUCCESS FLAG, BUFFER WAS NOT EMPTY.

016434                  60$:    PASS    R2      ;RESTORE GPRS, EXCEPT
016434  010266  000006                  MOV     R2,R2SLOT(SP)           ;PUT R2 IN STACK SLOT.
016440  004736                  JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
                                ;R2 - CONTAINS THE CHARACTER READ FROM BUFFER.
                                ;CARRY-"SUCCESS" FLAG, SET IF BUFFER NOT EMPTY.
016442  000207          RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - GETLP1 -
                        ;++ ************************************************************************
                        ;*              - GET LINE PARAMETERS ROUTINE NUMBER ONE -
                        ;*      THIS ROUTINE IS USED TO REPEATEDLY GET COMBINATIONS OF LINE PARAMETER
                        ;*      CONTENTS FOR THE SINGLE CHARACTER MODE TX/RX TEST (SHORT DATA PATTERN).
                        ;*      EACH TIME THIS ROUTINE IS CALLED IT GETS ANOTHER COMBINATION OF THE
                        ;*      PARAMTERS IN THE PARAMTER TABLES UNTIL ALL COMBINATIONS HAVE BEEN
                        ;*      RETURNED AT WHICH POINT IT RETURNS A "FAILURE" INDICATION.
                        ;*
                        ;* INPUTS:      SINGLE CHARACTER MODE, SHORT DATA PATTERN TX/RX TABLES:
                        ;*                      SCBCT - NUMBER OF BITS PER CHAR TABLE (4 ENTRIES).
                        ;*                      SCBRT - BAUDRATES TABLE (3 ENTRIES).
                        ;*                      SCNST - NUMBER OF STOP BITS BITS TABLE (2 ENTRIES).
                        ;*                      SCTPT - TYPE OF PARITY TABLE (3 ENTRIES).
                        ;*              EACH TABLE HAS A BASE AND END LABEL CONSISTING OF THE NAME OF
                        ;*              THE TABLE WITH A "B" AND "E" APPENDED RESPECTIVELY.
                        ;*              R1 THRU R4 - POINTERS INTO SCBCT THRU SCTPT TABLES RESPECTIVLY.
                        ;*                  R1 IS CLEAR IF THIS IS THE FIRST CALL OF GETLP1.
                        ;*
                        ;* OUTPUTS:     R0 - COMPOSED LPR CONTENTS, CLEAR IF FAILURE (DONE).
                        ;*              R1 THRU R4 - TABLE POINTERS (UPDATED).
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,GETLP1
                        ;*
                        ;* COMMENTS:    THIS ROUTINE SHOULD BE USED IN CONGUNCTION WITH A SWAPX
                        ;*              ROUTINE TO AVOID DESTROYING THE GPR CONTENTS.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************

016444                  GETLP1:: SAVE                    ;SAVE CONTENTS OF GPRS R0 THRU R5.
016444  004537  005232                   JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
016450  005701                    TST     R1              ;TEST FOR THIS BEING FIRST CALL OF GETLP1.
016452  001010                   BNE     2$              ;SKIP ORIGINAL SET UP IF NOT FIRST CALL.
016454  012701  004750            MOV     #SCBCTB,R1      ;INITIALIZE BITS PER CHAR TABLE POINTER.
016460  012702  004760            MOV     #SCBRTB,R2      ;INITIALIZE BAUDRATE TABLE POINTER.
016464  012703  004766            MOV     #SCNSTB,R3      ;INITIALIZE # OF STOP BITS TABLE POINTER.
016470  012704  004772            MOV     #SCTPTB,R4      ;INITIALIZE TYPE OF PARITY TABLE POINTER.
                        
016474  020427  005000  2$:       CMP     R4,#SCTPTE      ;CHECK FOR POINTER AT END OF TABLE.
016500  103425                   BLO     4$              ;GO GET LPR CONTENTS IF NOT AT END OF TABLE.
016502  012704  004772            MOV     #SCTPTB,R4      ;RESET POINTER TO BEGINNING OF TABLE.
016506  005723                    TST     (R3)+           ;INC THE # OF STOP BITS TABLE POINTER BY 2.
016510  020327  004772            CMP     R3,#SCNSTE      ;CHECK FOR POINTER AT END OF TABLE.
016514  103417                   BLO     4$              ;GO GET LPR CONTENTS IF NOT AT END OF TABLE.
016516  012703  004766            MOV     #SCNSTB,R3      ;RESET POINTER TO BEGINNING OF TABLE.
016522  005722                    TST     (R2)+           ;INC BAUD RATES TABLE POINTER BY 2.
016524  020227  004766            CMP     R2,#SCBRTE      ;CHECK FOR POINTER AT END OF TABLE.
016530  103411                   BLO     4$              ;GO GET LPR CONTENTS IF NOT AT END OF TABLE.
016532  012702  004760            MOV     #SCBRTB,R2      ;RESET POINTER TO BEGINNING OF TABLE.
016536  005721                    TST     (R1)+           ;INC THE BITS PER CHAR TABLE POINTER BY 2.
016540  020127  004760            CMP     R1,#SCBCTE      ;CHECK FOR POINTER AT END OF TABLE.
016544  103403                   BLO     4$              ;GO GET LPR CONTENTS IF NOT AT END OF TABLE.
016546  005000                    CLR     R0              ;PREPARE TO PASS OUT CLEAR LPR FIELDS.
016550  000241                    CLC                     ;INDICATE "FAILURE" FOR EXIT.
016552  000405                   BR      60$             ;EXIT WITH "FAILURE", WE'RE DONE.
```

```
 4389
 4390  016554  011100                  4$:     MOV     (R1),R0         ;GET THE BITS/CHAR FIELD OF NEW LPR CONTENTS.
 4391  016556  051200                          BIS     (R2),R0         ;INCLUDE THE BAUD RATE FIELDS.
 4392  016560  051300                          BIS     (R3),R0         ;INCLUDE THE NUMBER OF STOP BITS FIELD.
 4393  016562  052400                          BIS     (R4)+,R0        ;INCLUDE THE TYPE OF PARITY FIELD.
 4394
 4395  016564  000261                      SEC                         ;INDICATE "SUCCESS" FOR EXIT.
 4396
 4397  016566                              60$:    PASS    R0,R1,R2,R3,R4  ;RESTORE GPR R5, LEAVE THE FOLLOWING INTACT:
 4398  016566  010066  000002                                    MOV     R0,R0SLOT(SP)           ;PUT R0 IN STACK SLOT.
 4399  016572  010166  000004                                    MOV     R1,R1SLOT(SP)           ;PUT R1 IN STACK SLOT.
 4400  016576  010266  000006                                    MOV     R2,R2SLOT(SP)           ;PUT R2 IN STACK SLOT.
 4401  016602  010366  000010                                    MOV     R3,R3SLOT(SP)           ;PUT R3 IN STACK SLOT.
 4402  016606  010466  000012                                    MOV     R4,R4SLOT(SP)           ;PUT R4 IN STACK SLOT.
 4403  016612  004736                                            JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
 4404  016614  000207                      RTS     PC                      ;  R1 THRU R4 - POINTERS, R0 - NEW LPR FIELDS.
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - GETLP2 -
                        ;++ ************************************************************************
                        ;*              - GET LINE PARAMETERS ROUTINE NUMBER TWO -
                        ;*      THIS ROUTINE IS USED TO REPEATEDLY GET COMBINATIONS OF LINE PARAMETER
                        ;*      CONTENTS FOR THE SINGLE CHARACTER MODE TX/RX TEST (LONG DATA PATTERN).
                        ;*      EACH TIME THIS ROUTINE IS CALLED IT GETS ANOTHER COMBINATION OF THE
                        ;*      PARAMTERS IN THE PARAMTER TABLES UNTIL ALL COMBINATIONS HAVE BEEN
                        ;*      RETURNED AT WHICH POINT IT RETURNS A "FAILURE" INDICATION.
                        ;*
                        ;* INPUTS:      SINGLE CHARACTER MODE, SHORT DATA PATTERN TX/RX TABLES:
                        ;*                      SCBCT - NUMBER OF BITS PER CHAR TABLE (4 ENTRIES).
                        ;*                      SCNST - NUMBER OF STOP BITS BITS TABLE (2 ENTRIES).
                        ;*                      SCTPT - TYPE OF PARITY TABLE (3 ENTRIES).
                        ;*              EACH TABLE HAS A BASE AND END LABEL CONSISTING OF THE NAME OF
                        ;*              THE TABLE WITH A "B" AND "E" APPENDED RESPECTIVELY.
                        ;*              R1 THRU R3 - POINTERS INTO SCBCT, SCNST, SCTPT TABLES
                        ;*                  R1 IS CLEAR IF THIS IS THE FIRST CALL OF GETLP2.
                        ;*
                        ;* OUTPUTS:     R0 - COMPOSED LPR CONTENTS, CLEAR IF FAILURE (DONE),
                        ;*                  38.4K BAUDRATE IS SELECTED.
                        ;*              R1 THRU R3 - TABLE POINTERS (UPDATED).
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,GETLP2
                        ;*
                        ;* COMMENTS:    THIS ROUTINE SHOULD BE USED IN CONGUNCTION WITH A SWAPX
                        ;*              ROUTINE TO AVOID DESTROYING THE GPR CONTENTS.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************

016616                  GETLP2:: SAVE                    JSR     R5,PREG05       ;SAVE CONTENTS OF GPRS R0 THRU R5.
016616  004537  005232                                                            ;CALL REGISTER SAVE SUBRT.
016622  005701                           TST     R1              ;TEST FOR THIS BEING FIRST CALL OF GETLP2.
016624  001006                           BNE     2$              ;SKIP ORIGINAL SET UP IF NOT FIRST CALL.
016626  012701  004750                   MOV     #SCBCTB,R1      ;INITIALIZE BITS PER CHAR TABLE POINTER.
016632  012702  004766                   MOV     #SCNSTB,R2      ;INITIALIZE # OF STOP BITS TABLE POINTER.
016636  012703  004772                   MOV     #SCTPTB,R3      ;INITIALIZE TYPE OF PARITY TABLE POINTER.

016642  020327  005000          2$:      CMP     R3,#SCTPTE      ;CHECK FOR POINTER AT END OF TABLE.
016646  103417                           BLO     4$              ;GO GET LPR CONTENTS IF NOT AT END OF TABLE.
016650  012703  004772                   MOV     #SCTPTB,R3      ;RESET POINTER TO BEGINNING OF TABLE.
016654  005722                           TST     (R2)+           ;INC THE # OF STOP BITS TABLE POINTER BY 2.
016656  020227  004772                   CMP     R2,#SCNSTE      ;CHECK FOR POINTER AT END OF TABLE.
016662  103411                           BLO     4$              ;GO GET LPR CONTENTS IF NOT AT END OF TABLE.
016664  012702  004766                   MOV     #SCNSTB,R2      ;RESET POINTER TO BEGINNING OF TABLE.
016670  005721                           TST     (R1)+           ;INC BAUD RATES TABLE POINTER BY 2.
016672  020127  004760                   CMP     R1,#SCBCTE      ;CHECK FOR POINTER AT END OF TABLE.
016676  103403                           BLO     4$              ;GO GET LPR CONTENTS IF NOT AT END OF TABLE.
016700  005000                           CLR     R0              ;PREPARE TO PASS OUT CLEAR LPR FIELDS.
016702  000241                           CLC                     ;INDICATE "FAILURE" FOR EXIT.
016704  000406                           BR      60$             ;EXIT WITH "FAILURE", WE'RE DONE.

016706  012700  177400          4$:      MOV     #177400,R0      ;SET BAUD RATE FIELDS FOR 38.4 K BAUD.
016712  051100                           BIS     (R1),R0         ;GET THE BITS/CHAR FIELD OF NEW LPR CONTENTS.
016714  051200                           BIS     (R2),R0         ;INCLUDE THE NUMBER OF STOP BITS FIELD.
016716  052300                           BIS     (R3)+,R0        ;INCLUDE THE TYPE OF PARITY FIELD.
```

```
 4461
 4462  016720  000261                    SEC                     ;INDICATE "SUCCESS" FOR EXIT.
 4463
 4464  016722                    60$:    PASS    R0,R1,R2,R3     ;RESTORE GPRS R4 & R5, LEAVE FOLLOWING INTACT:
 4465  016722  010066  000002                    MOV             R0,R0SLOT(SP)           ;PUT R0 IN STACK SLOT.
 4466  016726  010166  000004                    MOV             R1,R1SLOT(SP)           ;PUT R1 IN STACK SLOT.
 4467  016732  010266  000006                    MOV             R2,R2SLOT(SP)           ;PUT R2 IN STACK SLOT.
 4468  016736  010366  000010                    MOV             R3,R3SLOT(SP)           ;PUT R3 IN STACK SLOT.
 4469  016742  004736                            JSR             PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
 4470  016744  000207                    RTS     PC              ;  R1 THRU R3 - POINTERS, R0 - NEW LPR FIELDS.
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - GETTIM -
                        ;++ ************************************************************************
                        ;*              - GET TIME-OUT VALUE BASED ON MINIMUM BAUDRATE ROUTINE -
                        ;*      THIS SUBROUTINE GETS THE NECESSARY TIME-OUT VALUE TO VERIFY THAT ALL
                        ;*      CHARS HAVE BEEN RECEIVED AT THE COMPLETION OF THE TX/RX OF A DATA
                        ;*      PATTERN.  THIS USES THE SLOWEST BAUDRATE WHICH IS SPECIFIED IN THE
                        ;*      PASSED IN DUT LPR CONTENTS TO CALCULATE THIS TIME-OUT VALUE.
                        ;*
                        ;* INPUTS:      R1 - DUT LPR CONTENTS.
                        ;*
                        ;* OUTPUTS:     RXTOUT - TIME-OUT VALUE FOR WAITING FOR LAST RX CHAR.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,GETTIM
                        ;*
                        ;* COMMENTS:
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************

016746                  GETTIM:: SAVE                   ;SAVE CONTENTS OF GPRS R0 THRU R5.
016746  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
016752  000301                  SWAB    R1              ;PUT THE BAUD RATE FIELDS IN THE LOW BYTE.
016754  042701  177400          BIC     #177400,R1      ;CLEAR STOP,PARITY,AND CHAR FIELDS.
016760  010102                  MOV     R1,R2           ;COPY BAUD RATE FIELDS.
016762  042701  000360          BIC     #360,R1         ;SELECT RX BAUD RATE FIELD ONLY.
016766  006202                  ASR     R2              ;SHIFT TX BAUD RATE FIELD
016770  006202                  ASR     R2              ; TO OCCUPY THE LOW FOUR BYTES.
016772  006202                  ASR     R2              ;
016774  006202                  ASR     R2              ;
016776  020102                  CMP     R1,R2           ;CHECK IF SAME BAUD RATE IN EACH FIELD.
017000  101401                  BLOS    2$              ;BRANCH IF RX BAUD RATE IS LOWER OR SAME.
017002  010201                  MOV     R2,R1           ;TX BAUD RATE IS THE SLOWER OF THE TWO.
017004  116102  005122  2$:     MOVB    PROTBL(R1),R2   ;GET PROPORTIONAL DELAY FROM TABLE.
017010  042702  177400          BIC     #177400,R2      ;CLEAR UPPER BYTE BECAUSE OF SIGN EXTENSION.
017014  010237  002242          MOV     R2,RXTOUT       ;LOAD THE RX TIME-OUT VARIABLE.

017020                  60$:    PASS                    ;RESTORE GPRS.
017020  004736                          JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
017022  000207                  RTS     PC
```

```
                                .SBTTL  GLOBAL SUBROUTINE                - INDATP -
                                ;++ ************************************************************************
                                ;*                        - INITIALISE DATA PATTERN -
                                ;*      THIS SUBROUTINE IS USED TO INITIALISE AN INCREMENTAL BYTE DATA PATTERN
                                ;*      IN THE GENERAL BUFFER AREA.
                                ;*      THE DATA PATTERN WILL BE SEQUENTIAL FROM 0 TO 255 (DECIMAL).
                                ;*
                                ;* INPUTS:      BUFBAS - ADDRESS OF THE START OF THE GENERAL BUFFER AREA.
                                ;*              BUFMID - ADDRESS OF THE 255 TH LOCATION.
                                ;*
                                ;* OUTPUTS:     THE FIRST 255 LOCATIONS OF THE GENERAL BUFFER AREA CONTAIN DATA
                                ;*
                                ;* CALLING SEQUENCE:    JSR     PC,INIDATP
                                ;*
                                ;* COMMENTS:
                                ;*
                                ;* SUBORDINATE ROUTINES CALLED: NONE.
                                ;-- ************************************************************************

017024                          INDATP:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
017024  004537  005232                           JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.

017030  012702  003510                  MOV     #BUFBAS,R2      ;INITIALIZE THE DATA PATTERN IN THE GENERAL
017034  005003                          CLR     R3              ;  DATA BUFFER TO A 256 BYTE PATTERN.
017036  110322                  2$:     MOVB    R3,(R2)+        ;
017040  005203                          INC     R3              ;SELECT THE NEXT CHARACTER.
017042  020227  004110                  CMP     R2,#BUFMID      ;CHECK IF WE HAVE 256 DATA PATTERNS.
017046  103773                          BLO     2$              ;

017050                          60$:    PASS                    ;RESTORE GPRS.
017050  004736                                  JSR     PC,@(SP)+       ;RETURN TO PREG05 SUBRT.
017052  000207                          RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - INICHR -
                        ;++ ************************************************************************************
                        ;*                          - SEND INITIAL CHARACTERS ROUTINE -
                        ;*      THIS ROUTINE IS USED TO INITIATE SINGLE CHARACTER TRANSMISSION.
                        ;*      THIS ROUTINE SENDS THE INITIAL CHARACTERS TO EACH ACTIVE LINES TO
                        ;*      CAUSE FUTURE TX INTERRUPTS WHICH WILL CONTINUE THE TRANSMISSION IF
                        ;*      MORE THAN ONE CHARACTER IS TO BE SENT TO EACH ACTIVE LINE.
                        ;*
                        ;* INPUTS:      ACTLNS - BIT MAP OF ACTIVE DUT LINES.
                        ;*              BITTBL - LABEL OF TABLE OF WORDS EACH WITH A BIT SET.
                        ;*              CSRA - CONTAINS THE ADDRESS OF THE DUT CSR.
                        ;*              DPENDB - BASE OF THE DATA PATTERN END TABLE (ENTRY PER LINE).
                        ;*              DPLENB - BASE OF THE DATA PATTERN LENGTH TABLE.
                        ;*              IBM - BIT MASK OF INACTIVE TX/RX BITS.
                        ;*              IESTAT - STATES OF DUT INT ENABLE BITS (OTHER BITS CLEAR).
                        ;*              NUMLNS - EQUATED TO THE NUMBER OF LINES ON THE DUT.
                        ;*              TXCHRA - CONTAINS THE ADDRESS OF THE DUT TXCHAR REGISTER.
                        ;*              TXCNTB - LABLE AT BASE OF THE TX CHARACTER COUNTER TABLE.
                        ;*              TXPTRB - LABEL AT BASE OF THE TX DATA PATTERN POINTERS TABLE.
                        ;*
                        ;* OUTPUTS:     CSR - DUT CSR IND.ADR.REG FIELD IS DESTROYED.
                        ;*              TXCHAR - DUT TXCHAR HAS WORD WRITTEN TO IT.
                        ;*              TXCNTX - COUNTERS INCREMENTED FOR LINES ON WHICH CHARS SENT.
                        ;*              TXPTRB - EACH POINTER IN TABLE POINTS TO NEXT TX CHAR FOR LINE.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,INICHR
                        ;*
                        ;* COMMENTS:    THIS ROUTINE ASSUMES THAT AT LEAST ONE CHARACTER SHOULD BE
                        ;*              TRANSMITTED ON EACH ACTIVE LINE.
                        ;*              INTERRUPTS MUST BE DISABLED WHEN CALLING THIS ROUTINE.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************************
017054                  INICHR:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
017054  004537  005232          JSR     R5,PREG05               ;CALL REGISTER SAVE SUBRT.
017060  013701  002234          MOV     IESTAT,R1               ;GET STATE OF TX.IE, RX.IE FOR USE IN SETTING
                                                                ;  UP THE IND.ADR.REG FIELD OF THE DUT CSR.
017064  005002                  CLR     R2                      ;SET LINE NUMBER OFFSET TO LINE 0.
017066  036237  002332  002174  2$:     BIT     BITTBL(R2),ACTLNS  ;TEST THE ACTIVE LINES BIT FOR THIS LINE.
017074  001424                  BEQ     6$                      ;DON'T TX ON THIS LINE IF IT IS NOT ACTIVE.
017076  010177  163100          MOV     R1,@CSRA                ;SET UP THE IND.ADR.REG FIELD OF THE CSR.
017102  016205  003250          MOV     TXPTRB(R2),R5           ;GET THE TX DATA PATTERN POINTER FOR THIS LINE.
017106  112504                  MOVB    (R5)+,R4                ;GET THE CHAR TO TX ON THIS LINE, INC POINTER.
017110  020562  003050          CMP     R5,DPENDB(R2)           ;COMPARE POINTER WITH DATA PATTERN END ADR.
017114  103402                  BLO     4$                      ;SKIP POINTER WRAPAROUND IF NOT AT PATTERN END.
017116  166205  003110          SUB     DPLENB(R2),R5           ;WRAP TX POINTER AROUND TO BEGINNING OF PAT'N.
017122  010562  003250  4$:     MOV     R5,TXPTRB(R2)           ;UPDATE THE TX POINTER STORAGE TABLE FOR LINE.
017126  043704  002226          BIC     IBM,R4                  ;CLEAR INACTIVE BITS OF TX CHARACTER WORD.
017132  052704  100000          BIS     #BIT15,R4               ;SET THE TX.DATA.VALID BIT IN THE WORD.
017136  010477  163042          MOV     R4,@TXCHA               ;TX THE FIRST CHARACTER FOR THIS LINE.
017142  005262  003410          INC     TXCNTB(R2)              ;INCREMENT TX CHARACTER COUNTER FOR THIS LINE.
017146  005201  6$:     INC     R1                              ;INCREMENT WORD FOR IND.ADR.REG FIELD SET UP.
017150  062702  000002          ADD     #2,R2                   ;SET LINE NUMBER OFFSET TO NEXT LINE.
017154  020227  000020          CMP     R2,#NUMLNS*2            ;COMPARE LINE OFFSET WITH TWICE THE # OF LINES.
017160  002742                  BLT     2$                      ;LOOP TO SEND CHAR TO ANOTHER LINE IF NOT DONE.
```

```
 4598  017162                          60$:    PASS                    ;RESTORE GPRS.
 4599  017162  004736                                  JSR     PC,@(SP)+       ;RETURN TO PREG05 SUBRT.
 4600  017164  000207                          RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - INIDMA -
                        ;++ ************************************************************************
                        ;*                        - INITIATE DMA TRANSMISSIONS ROUTINE -
                        ;*      THIS ROUTINE IS USED TO INITIATE DMA MODE TRANSMISSION.  IT SENDS
                        ;*      THE INITIAL DMA BUFFER ON EACH ACTIVE LINE TO CAUSE FUTURE TX
                        ;*      INTERRUPTS WHICH WILL CONTINUE THE TRANSMISSION IF MORE THAN ONE
                        ;*      BUFFER IS TO BE SENT.
                        ;*
                        ;* INPUTS:      ACTLNS - ACTIVE LINES BIT MAP.
                        ;*              BITTBL - LABEL OF TABLE OF WORDS EACH WITH A BIT SET.
                        ;*              CSRA - CONTAINS THE ADDRESS OF THE DUT CSR.
                        ;*              DPENDB - BASE OF THE DATA PATTERN END TABLE (ENTRY PER LINE).
                        ;*              DPLENB - BASE OF THE DATA PATTERN LENGTH TABLE.
                        ;*              IESTAT - PRESERVED STATES OF THE DUT INTERRUPT ENABLE BITS.
                        ;*              NUMLNS - EQUATED TO NUMBER OF LINES ON A DUT.
                        ;*              TXCNTB - LABLE AT BASE OF THE TX CHARACTER COUNTER TABLE.
                        ;*              TXPTRB - LABEL AT BASE OF THE TX DATA PATTERN POINTERS TABLE.
                        ;*
                        ;* OUTPUTS:     CSR - DUT CSR IND.ADR.REG FIELD IS DESTROYED.
                        ;*              <<<<<<<<<<<<<<<<< ADD COMMENTS <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
                        ;*              TXCNTX - COUNTERS INCREMENTED FOR LINES ON WHICH CHARS SENT.
                        ;*              TXINTF - TX INT FLAGS (BIT SET IF DMA.HO FOUND SET ON LINE).
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,INIDMA
                        ;*
                        ;* COMMENTS:    THIS ROUTINE ASSUMES THAT AT LEAST ONE DATA PATTERN SHOULD BE
                        ;*              TRANSMITTED ON EACH ACTIVE LINE.
                        ;*              INTERRUPTS MUST BE DISABLED WHEN CALLING THIS ROUTINE.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: DODMA.
                        ;-- ************************************************************************
017166                  INIDMA:: SAVE                    ;SAVE CONTENTS OF GPRS R0 THRU R5.
017166  004537  005232          JSR     R5,PREG05        ;CALL REGISTER SAVE SUBRT.
017172  013705  002174          MOV     ACTLNS,R5        ;GET THE ACTIVE LINES BIT MAP.
                        ;+
                        ; SET UP LOOP WHICH HANDLES ONE LINE PER ITERATION.
                        ;-
017176  005001                  CLR     R1               ;CLEAR THE LINE NUMBER COUNTER.
                            ;+
                            ; GET A BIT MAP OF THE SELECTED LINE.
                            ; IF THE LINE IS INACTIVE SKIP TO SELECT THE NEXT LINE.
                            ;-
017200  010104          2$:     MOV     R1,R4            ;CALCULATE AN OFFSET TO THE PROPER LINE
017202  006304                  ASL     R4               ;  ENTRY IN A WORD TABLE (LINE # TIMES 2).
017204  016402  002332          MOV     BITTBL(R4),R2    ;GET A BIT MAP FOR THIS LINE.
017210  030205                  BIT     R2,R5            ;TEST THE ACTIVE LINES BIT FOR THIS LINE.
017212  001414                 BEQ      10$              ;DON'T TX ON THIS LINE IF IT IS NOT ACTIVE.
                        ;+
                        ; LINE IS ACTIVE.
                        ; INITIATE DMA ON THIS LINE.
                        ;    GET THE DATA PATTERN LENGTH FOR THIS LINE.
                        ;-
017214  016403  003110          MOV     DPLENB(R4),R3    ;GET DATA PATTERN LENGTH FOR THIS LINE.
017220  016402  003250          MOV     TXPTRB(R4),R2    ;PREPARE TO PASS DATA PATTERN ADR TO DODMA RTN.
                            ;+
                            ; WRITE DMA PARAMETERS TO THE DUT.
```

```
                        ;-
017224  004737  015662          JSR     PC,DODMA
017230  103403                  BCS     6$              ;SKIP ERROR IF DODMA WAS SUCCESSFUL.
                        ;+
                        ; SET THE PROPER BIT OF THE TX INTERRUPT FLAGS TO INDICATE THE LINE ERROR.
                        ;-
017232  050537  002252          BIS     R5,TXINTF       ;INDICATE THE ERROR.
017236  000402                  BR      10$             ;SKIP UPDATING POINTERS AND COUNTERS.
                        ;+
                        ; UPDATE THE TX CHARACTER COUNT FOR THIS LINE.
                        ;-
017240  060364  003410  6$:      ADD     R3,TXCNTB(R4)   ;ADD THE DATA PATTERN LENGTH TO TX CHAR COUNT.
                        ;+
                        ; INCREMENT LINE COUNTER,GOTO NEXT LINE IF NOT DONE.
                        ;-
017244  005201          10$:    INC     R1              ;INCREMENT THE LINE COUNTER.
017246  020127  000010          CMP     R1,#NUMLNS      ;COMPARE THE LINE COUNTER WITH NUMBER OF LINES.
017252  002752                  BLT     2$              ;LOOP TO SEND CHAR TO ANOTHER LINE IF NOT DONE.

017254                  60$:    PASS                    ;RESTORE GPRS.
017254  004736                          JSR     PC,@(SP)+               ;RETURN TO PREGO5 SUBRT.
017256  000207                  RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - LINBIT -
                        ;++ ************************************************************************
                        ;*              - LINE NUMBER TO BIT MAP CONVERSION SUBROUTINE -
                        ;*      THIS SUBROUTINE IS USED TO GENERATE A BIT MAP (ONE BIT OF 16 SET)
                        ;*      BASED ON A LINE NUMBER (RANGE: 1 TO 16).  ONLY THE LS 4 BITS OF THE
                        ;*      LINE NUMBER WORD ARE USED, THE OTHERS ARE MASKED OUT (SO UNMASKED
                        ;*      MSBYTES OF DUT CSRS CAN BE PASSED TO THIS ROUTINE WITHOUT ERROR).
                        ;*
                        ;* INPUTS:      R1 - LINE NUMBER (ONLY LS 4 BITS USED, OTHERS DISREGARDED).
                        ;*              BITTBL - BASE LABEL OF A 16 WORD BIT TABLE.
                        ;*
                        ;* OUTPUTS:     R0 - BIT MAP, BIT CORRESPONDING TO LINE NUMBER IS SET:
                        ;*                      IF LINE NUMBER IS 3, THEN BIT3 IS SET, ETC.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,LINBIT
                        ;*
                        ;* COMMENTS:    NO CHECKING IS PERFORMED TO VERIFY THAT THE LINE NUMBER IS
                        ;*              A LEGAL LINE NUMBER FOR THE DUT (IE - LESS THAN NUMLNS).
                        ;*              NOTE: THE LINE NUMBER IS NOT DESTROYED OF ALTERED, SO THIS
                        ;*                      ROUTINE CAN BE USED EASILY IN LOOPS.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************

017260                  LINBIT:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
017260  004537  005232          JSR     R5,PREGOS       ;CALL REGISTER SAVE SUBRT.
017264  042701  177760          BIC     #177760,R1      ;MASK OUT ALL BUT 4 LSBITS OF THE LINE #.
017270  006301                  ASL     R1              ;MULTIPLY LINE # BY 2 TO GET WORD TABLE OFFSET.
017272  016100  002332          MOV     BITTBL(R1),R0   ;GET THE SINGLE BIT BIT MAP.
017276                  60$:    PASS    R0              ;RESTORE GPRS, EXCEPT THE FOLLOWING,
017276  010066  000002                  MOV     R0,R0SLOT(SP)           ;PUT R0 IN STACK SLOT.
017302  004736                  JSR     PC,@(SP)+               ;RETURN TO PREGOS SUBRT.
017304  000207          RTS     PC              ;R0 - BIT MAP WITH LINE # BIT SET.
```

```
4712                                    .SBTTL  GLOBAL SUBROUTINE                - MAPCNT -
4713                                    ;++ ************************************************************************
4714                                    ;*                      - COUNT BITS IN BIT MAP ROUTINE -
4715                                    ;*      THIS SUBROUTINE COUNTS THE NUMBER OF BITS WHICH ARE SET IN A BIT MAP.
4716                                    ;*
4717                                    ;* INPUTS:      R2 - THE BIT MAP FOR WHICH TO COUNT THE BITS.
4718                                    ;*
4719                                    ;* OUTPUTS:     R2 - COUNT OF THE NUMBER OF BITS THAT WERE SET.
4720                                    ;*
4721                                    ;* CALLING SEQUENCE:    JSR     PC,MAPCNT
4722                                    ;*
4723                                    ;* COMMENTS:
4724                                    ;*
4725                                    ;* SUBORDINATE ROUTINES CALLED: NONE.
4726                                    ;-- ************************************************************************
4727
4728  017306                            MAPCNT:: SAVE                   ;SAVE CONTENTS OF GPRS R0 THRU R5.
4729  017306  004537  005232                    JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
4730  017312  010201                            MOV     R2,R1
4731  017314  001405                            BEQ     60$             ;EXIT WITH ZERO IF NO BITS ARE SET IN MAP.
4732
4733  017316  005002                            CLR     R2              ;CLEAR THE BIT COUNT.
4734  017320  000261                            SEC                     ;COUNT THE LAST BIT TO BE SHIFTED OUT.
4735
4736  017322  005502                    2$:     ADC     R2              ;COUNT THE BIT IF IT WAS SET.
4737  017324  006301                            ASL     R1              ;SHIFT ANOTHER BIT OUT OF THE MAP.
4738  017326  001375                            BNE     2$              ;LOOP IF ALL BITS NOT SHIFTED OUT OF MAP.
4739
4740  017330                            60$:    PASS    R2              ;RESTORE GPRS, EXCEPT THE FOLLOWING:
4741  017330  010266  000006                            MOV     R2,R2SLOT(SP)   ;PUT R2 IN STACK SLOT.
4742  017334  004736                            JSR     PC,@(SP)+       ;RETURN TO PREG05 SUBRT.
4743  017336  000207                            RTS     PC              ;  R2 - COUNT OF BITS SET IN BIT MAP.
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - MSLGET -
                        ;*****************************************************************************
                        ;*      - MILLI SECONDS LOOP WHICH RETURNS READ WORD AND REMAINING TIME -
                        ;*      THIS SUBROUTINE IS A GENERAL PURPOSE TEST LOOP SUBROUTINE.  IT IS USED
                        ;*      TO VERIFY THAT A CERTAIN ACTION OCCURS BEFORE A TIME-OUT PERIOD.  THE
                        ;*      CALLING ROUTINE PASSES IN WHICH BITS SHOULD BE SET AND CLEARED FOR THE
                        ;*      DESIRED CONDITION AND THE TIME-OUT VALUE IN MILLI-SECONDS.
                        ;*      THIS ROUTINE CHECKS FOR THE DESIRED CONDITION UPON ENTRANCE INTO THE
                        ;*      ROUTINE AND THEN ONCE EACH MILLI-SECOND THERE AFTER.
                        ;*      UPON RETURN, THE LAST WORD WHICH WAS READ TO CHECK FOR THE CONDITION
                        ;*      IS RETURNED BY THIS SUBROUTINE.
                        ;*
                        ;* INPUTS:      R1 - TIME-OUT VALUE IN MILLI-SECONDS (UP TO 64K MS).
                        ;*              R2 - BIT MAP OF BITS TO TEST (1 INDICATES TO TEST THE BIT).
                        ;*              R3 - DESIRED STATES OF THE INDICATED FIELDS IN R2.
                        ;*              R4 - ADDRESS OF THE WORD TO TEST.
                        ;*              MSLCNT - MILLI SECOND SOFTWARE LOOP COUNT.
                        ;*
                        ;* OUTPUTS:     R0 - THE LAST WORD WHICH WAS READ TO CHECK FOR THE CONDITION.
                        ;*              R1 - REMAINING NUMBER OF MS IN TIME-OUT TIME.
                        ;*              CARRY - SUCCESS FLAG (SET IF CONDITION IS MET BEFORE TIME-OUT).
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,MSLGET
                        ;*
                        ;* COMMENTS:    THIS ROUTINE WORKS WITH OR WITHOUT A HARDWARE CLOCK, BUT THE
                        ;*              CALIBRATION IS ONLY GUARENTEED WHEN A LINE CLOCK IS AVAILABLE
                        ;*              ON THE SYSTEM.
                        ;*              THIS ROUTINE CAN BE USED AS A DELAY ROUTINE, BY SPECIFYING THE
                        ;*              DESIRED DELAY AS THE TIME-OUT AND SPECIFYING A CONDITION TO
                        ;*              LOOK FOR WHICH WILL NOT BE MET DURING THE DELAY.
                        ;*              IF A TIME-OUT VALUE OF 0 IS SPECIFIED, THIS ROUTINE CHECKS FOR
                        ;*              THE DESIRED CONDITION BEFORE RETURNING.  IT INDICATES SUCCESS
                        ;*              IF THE CONDITION IS MET, FAILURE OTHERWISE.
                        ;*
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;*****************************************************************************

017340                  MSLGET:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
017340  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
                        ;+
                        ; SET UP MASK FOR REMOVING UNUSED BITS IN THE TEST WORD, AND CLEAR UNUSED
                        ; BITS IN THE DESIRED STATE WORD TO ALLOW DIRECT COMPARISON.
                        ;-
017344  005102                  COM     R2              ;GET MASK OF UNUSED BITS.
017346  040203                  BIC     R2,R3           ;MASK OUT UNUSED BITS IN DESIRED STATE WORD.
                        ;+
                        ; HANDLE THE TEST AND EXIT IF WE HAVE A 0 TIME-OUT VALUE.
                        ;-
017350  005701                  TST     R1              ;TEST THE TIME-OUT VALUE FOR ZERO.
017352  001011                  BNE     2$              ;IF NON-ZERO TIME-OUT, GO LOOP AND TEST.
017354  011400                  MOV     (R4),R0         ;GET THE WORD TO TEST BEFORE EXITING.
017356  010037  017452          MOV     R0,62$          ;SAVE VALUE SO WE CAN RETURN IT.
017362  040200                  BIC     R2,R0           ;MASK OUT UNTESTED BITS OF WORD.
017364  020003                  CMP     R0,R3           ;COMPARE AGAINST DESIRED STATE WORD.
017366  000261                  SEC                     ;INDICATE SUCCESS IN CASE WORDS ARE EQUAL.
```

```
4800  017370  001420                        BEQ     6$              ;EXIT WITH SUCCESS IF WORDS ARE EQUAL.
4801  017372  000241                        CLC                     ;INDICATE FAILURE (TIME-OUT).
4802  017374  000416                        BR      6$              ;EXIT WITH FAILURE, WORDS AREN'T EQUAL.
4803                                ;+
4804                                ; NON-ZERO TIME-OUT VALUE.  LOOP, WAITING FOR CONDITION OR TIME-OUT.
4805                                ;-
4806  017376  013705  002302       2$:     MOV     MSLCNT,R5       ;LOAD MS LOOP COUNT.
4807  017402  011400                4$:     MOV     (R4),R0         ;GET THE WORD TO TEST.
4808  017404  010037  017452               MOV     R0,62$          ;SAVE WORD IN CASE THIS IS THE LAST.
4809  017410  040200                        BIC     R2,R0           ;MASK OUT UNTESTED BITS OF WORD.
4810  017412  020003                        CMP     R0,R3           ;COMPARE AGAINST DESIRED STATE WORD.
4811  017414  000261                        SEC                     ;SET CARRY IN CASE OF SUCCESS.
4812  017416  001405                        BEQ     6$              ;EXIT WITH SUCCESS IF WORDS ARE EQUAL.
4813  017420  005305                        DEC     R5              ;COUNT DOWN THE INSIDE MS LOOP COUNT.
4814  017422  001367                        BNE     4$              ;LOOP IF MS NOT UP.
4815  017424  005301                        DEC     R1              ;DECREMENT THE MS TIME COUNT.
4816  017426  001363                        BNE     2$              ;IF TIME NOT UP, LOOP TO COUNT ANOTHER MS.
4817  017430  000241                        CLC                     ;CLEAR CARRY, WE TIMED-OUT.
4818                                ;+
4819                                ; HAVE EITHER FOUND CONDITION, OR TIMED-OUT (POSSIBLY FROM 0 TIME-OUT VALUE).
4820                                ; RESTORE THE LAST CONTENTS READ FROM THE TEST WORD.  EXIT ROUTINE.
4821                                ;-
4822  017432  013700  017452       6$:     MOV     62$,R0          ;PASS OUT THE LAST READ WORD.
4823  017436                        60$:    PASS    R0,R1           ;RESTORE GPRS, EXCEPT THE FOLLOWING:
4824  017436  010066  000002                        MOV     R0,R0SLOT(SP)           ;PUT R0 IN STACK SLOT.
4825  017442  010166  000004                        MOV     R1,R1SLOT(SP)           ;PUT R1 IN STACK SLOT.
4826  017446  004736                                JSR     PC,@(SP)+               ;RETURN TO PREGOS SUBRT.
4827                                                 ;R0 - LAST READ WORD CHECKED FOR CONDITION.
4828                                                 ;R1 - REMAINING TIME (0 IF TIME-OUT OCCURED).
4829  017450  000207                        RTS     PC              ;CARRY - SET IF SUCCESS, CLEAR IF TIME-OUT.
4830                                ;+
4831                                ; LOCAL STORAGE.
4832                                ;-
4833  017452  000000               62$:    .WORD   0               ;STORAGE FOR THE LAST READ WORD.
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - MSLOOP -
                        ;*************************************************************************
                        ;*      - TEST LOOP SUBROUTINE -
                        ;*      THIS SUBROUTINE IS A GENERAL PURPOSE TEST LOOP SUBROUTINE.  IT IS USED
                        ;*      TO VERIFY THAT A CERTAIN ACTION OCCURS BEFORE A TIME-OUT PERIOD.  THE
                        ;*      CALLING ROUTINE PASSES IN WHICH BITS SHOULD BE SET AND CLEARED FOR THE
                        ;*      DESIRED CONDITION AND THE TIME-OUT VALUE IN MILLI-SECONDS.
                        ;*      THIS ROUTINE CHECKS FOR THE DESIRED CONDITION UPON ENTRANCE INTO THE
                        ;*      ROUTINE AND THEN ONCE EACH MILLI-SECOND THEREAFTER.
                        ;*
                        ;* INPUTS:      R1 - TIME-OUT VALUE IN MILLI-SECONDS (UP TO 64K MS).
                        ;*              R2 - BIT MAP OF BITS TO TEST (1 INDICATES TO TEST THE BIT).
                        ;*              R3 - DESIRED STATES OF THE INDICATED FIELDS IN R2.
                        ;*              R4 - ADDRESS OF THE WORD TO TEST.
                        ;*              MSLCNT - MILLI SECOND SOFTWARE LOOP COUNT.
                        ;*
                        ;* OUTPUTS:     CARRY - SUCCESS FLAG (SET IF CONDITION IS MET BEFORE TIME-OUT).
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,MSLOOP
                        ;*
                        ;* COMMENTS:    THIS ROUTINE WORKS WITH OR WITHOUT A HARDWARE CLOCK, BUT THE
                        ;*              CALIBRATION IS ONLY GUARENTEED WHEN A LINE CLOCK IS AVAILABLE
                        ;*              ON THE SYSTEM.
                        ;*              THIS ROUTINE CAN BE USED AS A DELAY ROUTINE, BY SPECIFYING THE
                        ;*              DESIRED DELAY AS THE TIME-OUT AND SPECIFYING A CONDITION TO
                        ;*              LOOK FOR WHICH WILL NOT BE MET DURING THE DELAY.
                        ;*              IF A TIME-OUT VALUE OF 0 IS SPECIFIED, THIS ROUTINE CHECKS FOR
                        ;*              THE DESIRED CONDITION BEFORE RETURNING.  IT INDICATES SUCCESS
                        ;*              IF THE CONDITION IS MET, FAILURE OTHERWISE.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: MSLGET.
                        ;*************************************************************************

017454                  MSLOOP:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
017454  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.

                        ;+
                        ; CALLING THE MSLGET ROUTINE FROM THE MSLOOP ROUTINE ISOLATES THE CALLER OF
                        ; MSLOOP FROM THE RETURNED TEST WORD AND REMAINING TIME-OUT VALUES.
                        ;-
017460  004737  017340          JSR     PC,MSLGET       ;CALL THE MULTI-PURPOSE MS LOOP AND SEARCH RTN.

017464                  60$:    PASS                    ;RESTORE GPRS,
017464  004736                          JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
017466  000207          RTS     PC                      ;CARRY - SET IF SUCCESS, CLEAR IF TIME-OUT.
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - MUL16U -
                        ;++ ************************************************************************
                        ;*                      - 16 BIT UNSIGNED MULTIPLY ROUTINE -
                        ;*      THIS ROUTINE MULTIPLIES 2 16 BIT UNSIGNED NUMBERS AND RETURNS A 16 BIT
                        ;*      UNSIGNED RESULT.  THE MULTIPLICATION IS PERFORMED BY ITERATIVE
                        ;*      ADDITION OF ONE NUMBER TO A SUM WHILE DECREMENTING THE OTHER NUMBER
                        ;*      TO ZERO.  IF OVERFLOW OCCURRS (177777 TO 0) THE PRODUCT IS INVALID.
                        ;*
                        ;* INPUTS:      R1 - MULTIPLICAND (16 BIT UNSIGNED).
                        ;*              R2 - MULTIPLIER (16 BIT UNSIGNED).
                        ;*
                        ;* OUTPUTS:     R1 - PRODUCT (16 BIT UNSIGNED), -1 IF OVERFLOW.
                        ;*              CARRY - SET IF SUCCESS (NO OVERFLOW), CLEAR OTHERWISE.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,MUL16U
                        ;*
                        ;* COMMENTS:    NOTE: FOR MINIMUM EXECUTION TIME R2 SHOULD CONTAIN THE
                        ;*                    SMALLER OF THE 2 ARGUMENTS.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************

017470                  MUL16U:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
017470  004537  005232                JSR     R5,PREGOS       ;CALL REGISTER SAVE SUBRT.
017474  005003                  CLR     R3              ;CLEAR THE PRODUCT.
017476  005702                  TST     R2              ;CHECK THE MULTIPLIER.
017500  001003                BNE     2$              ;GO TO DO MULTIPLICATION IF NOT ZERO.
017502  005001                  CLR     R1              ;RETURN A PRODUCT OF ZERO.
017504  000261                  SEC                     ;INDICATE SUCCESS.
017506  000412                BR      60$             ;EXIT THE ROUTINE.

017510  060103          2$:     ADD     R1,R3           ;ADD THE MULTIPLICAND TO THE PRODUCT.
017512  103405                BCS     50$             ;EXIT WITH OVERFLOW IF ONE OCCURRED.
017514  005302                  DEC     R2              ;DECREMENT THE MULTIPLIER.
017516  001374                BNE     2$              ;LOOP IF MULTIPLIER NOT ZERO.
017520  010301                  MOV     R3,R1           ;PREPARE TO PASS OUT THE PRODUCT.
017522  000261                  SEC                     ;INDICATE SUCCESS.
017524  000403                BR      60$             ;EXIT WITH SUCCESS.

017526  012701  177777    50$:    MOV     #-1,R1          ;FORCE PRODUCT TO MAX VALUE, WE OVERLFOWED.
017532  000241                  CLC                     ;INDICATE FAILURE.

017534                  60$:    PASS    R1                      ;RESTORE GPRS, EXCEPT THE FOLLOWING:
017534  010166  000004                            MOV     R1,R1SLOT(SP)           ;PUT R1 IN STACK SLOT.
017540  004736                                    JSR     PC,@(SP)+               ;RETURN TO PREGOS SUBRT.
                                                ;  R1 - PRODUCT (16 BIT UNSIGNED),
017542  000207                RTS     PC              ;  CARRY - SET IF SUCCESS (NO OVERFLOW).
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - NEWCHR -
                        ;++ ************************************************************************************
                        ;*                        - NEW CHARACTER HANDLING ROUTINE -
                        ;*      THIS SUBROUTINE HANDLES A NEW CHARACTER WHICH HAS BEEN READ FROM
                        ;*      THE DUT.  THE COUNTERS AND POINTERS WHICH ARE INVOLVED WITH THE
                        ;*      CHARACTER ARE UPDATED.  THE CHARACTER IS CHECKED FOR ERRORS AND
                        ;*      ANY ERRORS WHICH ARE FOUND ARE REPORTED.
                        ;*
                        ;* INPUTS:      R2 - THE READ CHARACTER INCLUDING ERROR FLAGS AND LINE NUMBER.
                        ;*              R3 - MASK OF THE INACTIVES BITS IN A TX OR RX CHAR BYTE.
                        ;*              ACTLNS  - BIT MAP OF ACTIVE DUT LINES.
                        ;*              DPRSQB - LABEL AT DATA PATTERN RESYNC QUEUES TABLE BASE.
                        ;*              TXRXLB - BASE OF TX/RX LINE NUMBER ASSOCIATION TABLE.
                        ;*              BITTBL - TABLE OF WORDS WITH BITS SET FOR USE IN FORMING MAPS.
                        ;*              ERSMRF - "PRINT ERROR SUMMARY FOR LINE" FLAGS.
                        ;*              ERRTBL - ERROR INFORMATION (ERRNBR, ERRMSG, ERRTYP).
                        ;*              ERCNTB - BASE OF THE RX CHARACTER ERROR COUNTERS TABLE.
                        ;*              NDERPT - CONTAINS NUMBER OF CHAR ERRORS TO REPORT ON A LINE.
                        ;* INPUTS TO SUBROUTINES:       CHCNTB, DPENDB, DPLEN, DPRSQE, EXCNTB, RXCNTB,
                        ;*                              RXPTRB, ERRNBR, ERMSG, ERRTYP.
                        ;*
                        ;* OUTPUTS:     ERRBLK - CONTENTS DESTROYED.
                        ;*            FOLLOWING VARIABLES UPDATED FOR LINE ON WHICH CHAR WAS RECEIVED:
                        ;*              DPRSQ - DATA PATTERN RESYNC QUE OF RECEIVED CHARACTERS.
                        ;*              ERCNT - COUNT OF THE NUMBER OF CHARACTER ERRORS ON LINE.
                        ;*              ERSMRF - UPDATED "PRINT ERROR SUMMARY FOR LINE" FLAGS.
                        ;*              EXCNT - COUNT OF THE NUMBER OF EXTRA CHARS RECEIVED ON LINE.
                        ;*              RXCNT - COUNT OF THE NUMBER OF CHARACTERS RECEIVED ON LINE.
                        ;*              RXPTR - UPDATED TO POINT TO THE NEXT EXPECTED CHAR ON LINE.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,NEWCHR
                        ;*
                        ;* COMMENTS:    THIS ROUTINE CAN REPORT ERRORS WITH NUMBERS INITIAL ERRNBR
                        ;*              AND INITIAL ERRNBR + 1.  ERRNBR IS RESTORED TO ITS INITIAL
                        ;*              VALUE BEFORE THIS ROUTINE RETURNS.
                        ;*
                        ;* SUBROUTINES CALLED:  CKCHR,CKINAC,TXROFF,TXRON.
                        ;* INDIRECT SUBROUTINES:  CHKEXT,CHKLOS,ER9002,ER9003,UPDCHR.
                        ;-- ************************************************************************************

017544                  NEWCHR:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
017544  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
017550  010305                  MOV     R3,R5                   ;GET THE BIT MAP OF INACTIVE DATA BYTE BITS.
017552  052705  177400          BIS     #177400,R5              ;ALL UPPER BITS OF EXPECTED DATA ARE INACTIVE.
017556  005037  020022          CLR     70$                     ;CLEAR THE "ERROR FOUND" FLAG.
                        ;+
                        ; IF THE NEW CHARACTER IS VALID ON AN INACTIVE LINE, GO REPORT ERROR.
                        ; ROUTINE USED ALSO EXTRACTS LINE NUMBER FROM THE NEW CHARACTER.
                        ;-
017562  004737  015344          JSR     PC,CKINAC               ;CHECK FOR CHAR ON INACTIVE LINE.
017566  103043                  BCC     4$                      ;GO REPORT ERROR IF ON INACTIVE LINE.
                        ;+
                        ; PUSH THE NEW CHARACTER ON THE RESYNC QUE FOR THIS LINE.
                        ;-
017570  010304                  MOV     R3,R4                   ;CALCULATE BASE ADDRESS OF THE
017572  006304                  ASL     R4                      ;  DATA PATTERN RESYNCH QUEUE
```

```
 4982  017574  006304                        ASL     R4              ;  (QUEUE IS 4 WORDS LONG) FOR
 4983  017576  062704  004550                ADD     #DPRSQB,R4      ;  THIS LINE.
 4984  017602  010401                        MOV     R4,R1           ;GET THE BASE OF THE QUEUE.
 4985  017604  016121  000002                MOV     2(R1),(R1)+     ;MOVE FROM CHR1 SLOT TO CHR0 SLOT.
 4986  017610  016121  000002                MOV     2(R1),(R1)+     ;MOVE FROM CHR2 SLOT TO CHR1 SLOT.
 4987  017614  010211                        MOV     R2,(R1)         ;PUT NEW CHAR INTO CHR2 SLOT.
 4988                                  ;+
 4989                                  ; CHECK THE DATA.VALID FOR THE CHARACTER AT THE BOTTON OF THE QUEUE.
 4990                                  ; IF DATA.VALID IS CLEAR, EXIT THE ROUTINE--NOTHING TO ANALYZE.
 4991                                  ;-
 4992  017616  011402                        MOV     (R4),R2         ;GET CHR0 VALUE, SET FLAGS.
 4993  017620  100076                        BPL     60$             ;EXIT ROUTINE IF DATA.VALID IS CLEAR.
 4994                                  ;+
 4995                                  ; TEST FOR ANY OF THE ERROR BITS SET IN CHR0.
 4996                                  ;-
 4997  017622  032702  070000                BIT     #70000,R2       ;TEST FOR ANY CHR0 ERROR BITS SET.
 4998  017626  001420                        BEQ     2$              ;SKIP THIS ERROR IF NO ERROR BITS SET.
 4999                                  ;+
 5000                                  ; WE HAVE AT LEAST ONE ERROR FLAG SET ON THE RECEIVED CHAR.
 5001                                  ; REPORT DATA ERROR FLAG ERROR IF NOT IN SUMMARY MODE.
 5002                                  ;-
 5003  017630  005337  020022                DEC     70$             ;SET THE "ERROR FOUND" FLAG.
 5004  017634  016300  005142                MOV     TXRXLB(R3),R0   ;GET THE TX LINE OFFSET FOR THIS RX LINE.
 5005  017640  036037  002332  002406        BIT     BITTBL(R0),ERSMRF  ;CHECK THE ERROR SUMMARY FLAG FOR TX LINE.
 5006  017646  001010                        BNE     2$              ;IF ERROR SUMMARY FLAG SET, SKIP NEXT REPORT.
 5007  017650  012737  013144  005230        MOV     #ER9003,ERRBLK  ;SELECT THE ER9003 ERROR REPORT ROUTINE.
 5008  017656  004737  024142                JSR     PC,TXROFF       ;TURN OFF TX AND RX DURING ERROR REPORTING.
 5009  017662                                ERROR                   ;                >>>>> ERROR <<<<<.
 5010  017662  104460                                                                        TRAP    C$ERROR
 5011  017664  004737  024202                JSR     PC,TXRON        ;TURN TX AND RX BACK ON.
 5012                                  ;+
 5013                                  ; CHECK THE CHARACTER AT THE BOTTOM OF THE RESYNC QUE FOR DATA ERRORS.
 5014                                  ;-
 5015  017670  004737  014756        2$:     JSR     PC,CKCHR        ;CHECK THE CHR0 CHAR FOR ERRORS.
 5016  017674  103424                        BCS     6$              ;SKIP ERROR REPORT IF CHR0 IS CORRECT.
 5017                                  ;+
 5018                                  ; WE HAVE SOME SORT OF DATA ERROR SO REPORT IT (UNLESS IN SUMMARY REPORT MODE).
 5019                                  ;-
 5020  017676  005337  020022        4$:     DEC     70$             ;SET THE "ERROR FOUND" FLAG.
 5021  017702  016300  005142                MOV     TXRXLB(R3),R0   ;GET THE TX LINE OFFSET FOR THIS RX LINE.
 5022  017706  036037  002332  002406        BIT     BITTBL(R0),ERSMRF  ;CHECK THE ERROR SUMMARY FLAG FOR THIS LINE.
 5023  017714  001014                        BNE     6$              ;SKIP ERROR REPORT IF ERROR SUMMARY FLAG SET.
 5024  017716  012737  012776  005230        MOV     #ER9002,ERRBLK  ;SELECT THE ER9002 ERROR REPORT ROUTINE.
 5025  017724  005237  005224                INC     ERRNBR          ;SELECT INITIAL ERRNBR + 1.
 5026  017730  004737  024142                JSR     PC,TXROFF       ;TURN OFF TX AND RX DURING ERROR REPORTING.
 5027  017734                                ERROR                   ;                >>>>> ERROR <<<<<.
 5028  017734  104460                                                                        TRAP    C$ERROR
 5029  017736  004737  024202                JSR     PC,TXRON        ;TURN TX AND RX BACK ON.
 5030  017742  005337  005224                DEC     ERRNBR          ;RESTORE INITIAL ERRNBR.
 5031                                  ;+
 5032                                  ; COUNT A CHARACTER ERROR IF ONE OCCURRED.
 5033                                  ; UPDATE THE "REPORT ERROR SUMMARY" FLAG FOR LINE BASED ON ERROR COUNT.
 5034                                  ;-
 5035  017746  005737  020022        6$:     TST     70$             ;CHECK THE "ERROR FOUND" FLAG.
 5036  017752  001421                        BEQ     60$             ;SKIP COUNTING AN ERROR IF FLAG IS CLEAR.
 5037  017754  005263  003210                INC     ERCNTB(R3)      ;INCREMENT THE ERROR COUNTER FOR THIS LINE.
```

```
5038  017760  001002                        BNE     8$              ;SKIP SETTING COUNTER TO MAX IF NO OVERFLOW.
5039  017762  005363  003210                 DEC     ERCNTB(R3)      ;RESET THE ERROR COUNTER TO -1 (MAX VALUE).
5040  017766  005737  002166          8$:    TST     NDERPT          ;DISABLE ERROR SUMMARY FUNCTION IF
5041  017772  001411                        BEQ     60$             ; NUMBER OF DATA ERRORS TO REPORT IS 0.
5042  017774  026337  003210  002166         CMP     ERCNTB(R3),NDERPT  ;COMPARE ERROR COUNT WITH # OF ERR'S TO RPT.
5043  020002  103405                        BLO     60$             ;SKIP SETTING OF SUMMARY FLAG IF NOT TOO MANY.
5044  020004  016300  005142                 MOV     TXRXLB(R3),R0   ;GET THE TX LINE OFFSET FOR THIS RX LINE.
5045  020010  056037  002332  002406         BIS     BITTBL(R0),ERSMRF  ;SET 'PRINT ERROR SUMMARY' FLAG FOR LINE.
5046
5047  020016                        60$:    PASS                    ;RESTORE GPRS.
5048  020016  004736                                JSR     PC,@(SP)+       ;RETURN TO PREG05 SUBRT.
5049  020020  000207                        RTS     PC
5050
5051  020022  000000                70$:    .WORD   0               ;LOCAL STORAGE FOR ERROR OCCURRED FLAG.
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - OOPS -
                        ;++ ************************************************************************
                        ;*                        - PROGRAM ABORT SUBROUTINE -
                        ;*      THIS SUBROUTINE IS USED TO ABORT THE PROGRAM WHEN A FATAL ERROR IS
                        ;*      DETECTED IN THE PROGRAM OR THE HOST SYSTEM HARDWARE.  AN ERROR MESSAGE
                        ;*      IS PRINTED GIVING SOME INFORMATION ABOUT THE NATURE OF THE ABORT.
                        ;*
                        ;* INPUTS:      R1 - ERROR CODE GIVING REASON FOR ABORT.
                        ;*
                        ;* OUTPUTS:     AN ERROR MESSAGE IS PRINTED.
                        ;*              A LIST OF RETURN PC VALUES FOR ALL SUBROUTINE CALLS IS PRINTED.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,OOPS
                        ;*
                        ;* COMMENTS:
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************

020024                  OOPS::  SAVE                    ;SAVE CONTENTS OF GPRS R0 THRU R5.
020024  004537  005232                JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
                            ; REPORT "HOST COMPUTER HARDWARE OR SOFTWARE BUG ENCOUNTERED." ERROR.
020030                          ERRSF   101,EM0101
020030  104454                                                                  TRAP    C$ERSF
020032  000145                                                                  .WORD   101
020034  020070                                                                  .WORD   EM0101
020036  000000                                                                  .WORD   0
                            ; REPORT "PROGRAM HUNG, WAITING FOR A CONTROL-C."
020040                          PRINTF  #EM0102
020040  012746  020154                                                          MOV     #EM0102,-(SP)
020044  012746  000001                                                          MOV     #1,-(SP)
020050  010600                                                                  MOV     SP,R0
020052  104417                                                                  TRAP    C$PNTF
020054  062706  000004                                                          ADD     #4,SP
020060                  2$:     BREAK                   ;LOOK FOR OPERATOR CONTROL-C INPUT.
020060  104422                                                                  TRAP    C$BRK
020062  000776                  BR      2$              ;INFINITE LOOP.
020064                  60$:    PASS                    ;DON'T NEED THIS, BUT SOMEBODY MAY CHANGE THIS
020064  004736                          JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
020066  000207                  RTS     PC              ; ROUTINE IN THE FUTURE, SO BE CONSISTANT.

020070  047510  052123  041440  EM0101:: .ASCIZ /HOST COMPUTER HARDWARE OR SOFTWARE BUG ENCOUNTERED./
020076  046517  052520  042524
020104  020122  040510  042122
020112  040527  042522  047440
020120  020122  047523  052106
020126  040527  042522  041040
020134  043525  042440  041516
020142  052517  052116  051105
020150  042105  000056
020154  047045  040445  051120  EM0102:: .ASCIZ /%N%APROGRAM HUNG, WAITING FOR A CONTROL-C. <**************%N%N/
020162  043517  040522  020115
020170  052510  043516  020054
020176  040527  052111  047111
020204  020107  047506  020122
020212  020101  047503  052116
```

```
 5108  020220  047522  026514  027103
 5109  020226  036040  025052  025052
 5110  020234  025052  025052  025052
 5111  020242  025052  022452  022516
 5112  020250  000116
 5113                                  .EVEN
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - PRFRME -
                        ;++ ************************************************************************
                        ;*                      - PROCESS FRAMING ERRORS -
                        ;*      THIS SUBROUTINE IS USED IN THE FRAMING ERROR BIT TEST, TO VERIFY THAT
                        ;*      ALL RECEIVED CHARACTERS HAVE THEIR FRAMING ERROR BIT SET AND PARITY
                        ;*      ERROR BIT CLEAR.
                        ;*
                        ;* INPUTS:      R2 - CONTAINS THE CHARACTER READ FROM THE FIFO.
                        ;*              ERRNBR - ERROR NUMBER OF ERRORS IN THIS ROUTINE.
                        ;*              ERSMRF - "REPORT ERROR SUMMARY FOR LINE" FLAGS
                        ;*
                        ;* OUTPUTS:     ERRBLK - THE CONTENTS OF THIS WORD ARE DESTROYED.
                        ;*              ERCNTB - THE ERROR COUNT FOR THIS LINE IS UPDATED.
                        ;*              MESSAGES MAY BE PRINTED AT THE OPERATORS CONSOLE.
                        ;*
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,PRFRME
                        ;*
                        ;* COMMENTS:    THIS ROUTINE REPORTS ERRORS WITH INITIAL NUMBER.
                        ;*              ERRNBR IS RESTORED TO ITS INITIAL VALUE BEFORE THIS SUBROUTINE
                        ;*              RETURNS.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: ER6201.
                        ;-- ************************************************************************

020252                  PRFRME::SAVE                    ;SAVE CONTENTS OF GPRS R0 THRU R5.
020252  004537  005232          JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
020256  013704  005224          MOV     ERRNBR,R4       ;SAVE THE CONTENTS OF THE INITIAL ERROR NUMBER.
020262  005005                  CLR     R5              ;CLEAR ERROR/MESSAGE FLAGS.

                        ;+
                        ; TEST FRAMING AND PARITY ERROR BITS IN TURN.  REPORT ANY ERRORS FOUND, IE.
                        ;  FRAMING ERROR BIT CLEAR, OR PARITY ERROR BIT SET.
                        ;-
020264  012737  012334  005230          MOV     #ER6201,ERRBLK  ;SET UP THE ADDRESS OF THE ERROR ROUTINE.
020272  032702  020000          BIT     #BIT13,R2       ;CHECK ON STATE OF THE FRAMING ERROR BIT.
020276  001002                  BNE     6$              ;BRANCH IF FRAMING ERROR BIT SET.
020300  052705  000002          BIS     #BIT1,R5        ;SET REPORT FRAMING ERROR FLAG.

020304  032702  010000  6$:     BIT     #BIT12,R2       ;CHECK ON THE STATE OF THE PARITY ERROR BIT.
020310  001402                  BEQ     8$              ;BRANCH IF PARITY ERROR BIT CLEAR.
020312  052705  000014          BIS     #14,R5          ;SET REPORT "PARITY ERROR SET" FLAGS.
020316  005705          8$:     TST     R5              ;CHECK IF ANY ERROR FLAGS SET.
020320  001407                  BEQ     60$             ;EXIT IF ALL FLAGS CLEAR.
020322  036337  002332  002406          BIT     BITTBL(R3),ERSMRF  ;CHECK THE ERROR SUMMARY FLAG FOR THIS LINE.
020330  001001                  BNE     10$             ;SKIP ERROR REPORT IF ERROR SUMMARY FLAG SET.

                        ;REPORT ERROR "CHARACTER RECEIVED WITH PARITY/FRAMING ERROR BIT SET".
020332                  ERROR                   ;                       >>>>> ERROR <<<<<.
020332  104460                                                          TRAP    C$ERROR
020334  005263  003210  10$:    INC     ERCNTB(R3)      ;INCREMENT ERROR COUNT FOR THIS LINE.
020340  010437  005224  60$:    MOV     R4,ERRNBR       ;RESTORE ERROR NUMBER.
020344                  PASS                    ;RESTORE GPRS.
020344  004736                          JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
020346  000207                  RTS     PC
```

```
5169                            .SBTTL  GLOBAL SUBROUTINE                - PRPARE -
5170                            ;++ ************************************************************************
5171                            ;*                        - PROCESS PARITY ERRORS -
5172                            ;*      THIS SUBROUTINE IS USED IN THE PARITY ERROR TEST, TO VERIFY THAT
5173                            ;*      ALL RECEIVED CHARACTERS HAVE THEIR PARITY ERROR BIT SET AND FRAMMING
5174                            ;*      ERROR BIT CLEAR.
5175                            ;*
5176                            ;* INPUTS:      R2 - CONTAINS THE CHARACTER READ FROM THE FIFO.
5177                            ;*              R3 - CONTAINS 2 * LINE NUMBER OF THE READ CHAR.
5178                            ;*              ERRNBR - ERROR NUMBER OF ERRORS IN THIS ROUTINE.
5179                            ;*              ERSMRF - "REPORT ERROR SUMMARY FOR LINE" FLAGS
5180                            ;*
5181                            ;* OUTPUTS:     ERRBLK - THE CONTENTS OF THIS WORD ARE DESTROYED.
5182                            ;*              ERCNTB - THE ERROR COUNT FOR THIS LINE IS UPDATED.
5183                            ;*              MESSAGES MAY BE PRINTED AT THE OPERATORS CONSOLE.
5184                            ;*
5185                            ;*
5186                            ;* CALLING SEQUENCE:    JSR     PC,PRPARE
5187                            ;*
5188                            ;* COMMENTS:    THIS ROUTINE REPORTS ERRORS WITH INITIAL ERRNBR THRU ERRNBR+1.
5189                            ;*              ERRNBR IS RESTORED TO ITS INITIAL VALUE BEFORE THIS SUBROUTINE
5190                            ;*              RETURNS.
5191                            ;*              THE CONTENTS OF THE ERRBLK ARE DESTROYED.
5192                            ;*
5193                            ;* SUBORDINATE ROUTINES CALLED: ER9002,ER6201.
5194                            ;-- ************************************************************************
5195
5196  020350                    PRPARE::SAVE                    ;SAVE CONTENTS OF GPRS R0 THRU R5.
5197  020350  004537  005232            JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
5198  020354  013746  005224            MOV     ERRNBR,-(SP)    ;SAVE THE CONTENTS OF THE INITIAL ERROR NUMBER.
5199  020360  005005                    CLR     R5              ;CLEAR ERROR/MESSAGE FLAGS.
5200
5201                            ;+
5202                            ; TEST FRAMMING AND PARITY ERROR BITS IN TURN.  REPORT ANY ERRORS FOUND, IE.
5203                            ;   PARITY ERROR BIT CLEAR, OR FRAMMING ERROR BIT SET.
5204                            ;-
5205  020362  012737  012334  005230            MOV     #ER6201,ERRBLK  ;SET UP THE ADDRESS OF THE ERROR ROUTINE.
5206  020370  032702  010000            BIT     #BIT12,R2       ;CHECK ON STATE OF THE PARITY ERROR BIT.
5207  020374  001002                    BNE     6$              ;BRANCH IF PARITY ERROR BIT SET.
5208  020376  052705  000010            BIS     #BIT3,R5        ;SET REPORT PARITY ERROR FLAG.
5209  020402  032702  020000    6$:     BIT     #BIT13,R2       ;CHECK ON THE STATE OF THE FRAMMING ERROR BIT.
5210  020406  001402                    BEQ     8$              ;BRANCH IF FRAMMING ERROR BIT CLEAR.
5211  020410  052705  000003            BIS     #3,R5           ;SET REPORT "FRAMMING ERROR SET" FLAGS.
5212  020414  005705            8$:     TST     R5              ;CHECK IF ANY ERROR FLAGS SET.
5213  020416  001405                    BEQ     12$             ;BRANCH TO MAKE DATA CHECK IF ALL FLAGS CLEAR.
5214  020420  036337  002332  002406        BIT     BITTBL(R3),ERSMRF  ;CHECK THE ERROR SUMMARY FLAG FOR THIS LINE.
5215  020426  001024                    BNE     14$             ;SKIP ALL ERROR REP IF IN ERROR SUMMARY MODE.
5216                                    ;REPORT ERROR "CHAR RECEIVED WITH PARITY/FRAMMING ERROR BIT SET/CLEAR".
5217  020430                            ERROR                   ;                       >>>>> ERROR <<<<<.
5218  020430  104460                                                                            TRAP    C$ERROR
5219
5220                            ;+
5221                            ; COMPARE ACTUAL DATA WITH EXPECTED DATA TO CHECK FOR MULTIPLE ERRORS.
5222                            ;-
5223  020432  005237  005224    12$:    INC     ERRNBR          ;INCREMENT ERROR NUMBER.
5224  020436  016304  003310            MOV     RXPTRB(R3),R4   ;GET THE POINTER TO THE EXPECTED DATA.
```

```
5225  020442  111404                        MOVB    (R4),R4         ;GET THE EXPECTED DATA.
5226  020444  120204                        CMPB    R2,R4           ;COMPARE ACTUAL AND EXPECTED DATA.
5227  020446  001424                        BEQ     18$             ;SKIP ERROR REPORT IF DATA CORRECT.
5228  020450  042704  100000                BIC     #BIT15,R4       ;CLEAR 'NONE" EXPECTED MESSAGE FLAG.
5229  020454  036337  002332  002406        BIT     BITTBL(R3),ERSMRF  ;CHECK THE ERROR SUMMARY FLAG FOR THIS LINE.
5230  020462  001014                        BNE     16$             ;SKIP ERROR REPORT IF ERROR SUMMARY FLAG SET.
5231  020464  036337  002332  002412        BIT     BITTBL(R3),RXDONF  ; CHECK FOR RECEPTION COMPLETE ON THIS LINE.
5232  020472  001402                        BEQ     14$             ;SKIP SETTING NONE EXPECTED FLAG.
5233  020474  052704  100000                BIS     #BIT15,R4       ;SET 'NONE" EXPECTED MESSAGE FLAG.
5234  020500  012701  010333        14$:    MOV     #EM9008,R1      ;SELECT ERROR MESSAGE TO BE REPORTED.
5235  020504  012737  012776  005230        MOV     #ER9002,ERRBLK  ;SELECT ERROR REPORTING ROUTINE.
5236                                        ;REPORT ERROR'RECEIVE CHARACTER MISCOMPARE"
5237  020512                                ERROR
5238  020512  104460                                                                TRAP    C$ERROR
5239
5240  020514  005263  003210        16$:    INC     ERCNTB(R3)      ;INCREMENT ERROR COUNT FOR THIS LINE.
5241  020520  012637  005224        18$:    MOV     (SP)+,ERRNBR    ;RESTORE ERROR NUMBER.
5242
5243  020524                        60$:    PASS                    ;RESTORE GPRS.
5244  020524  004736                                JSR     PC,@(SP)+               ;RETURN TO PREGO5 SUBRT.
5245  020526  000207                        RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - PRTLPR -
                        ;++ ************************************************************************
                        ;*                      -PRINT THE CONTENTS OF THE LPR.
                        ;*      THIS ROUTINE IS USED TO PRINT OUT EXTENDED INFORMATION ON THE
                        ;*      CONTENTS OF THE LINE PARAMETER REGISTER (LPR).
                        ;*
                        ;* INPUTS:      R3 - CONTAINS THE NUMBER OF THE LINE YOU WISH TO EXAMINE.
                        ;*              CSRA - CONTAINS THE ADDRESS OF THE DUT'S CSR.
                        ;*              IESTAT - CONTAINS THE CURRENT STATUS OF THE TX AND RX INTERRUPT
                        ;*                       ENABLE BITS IN THE DUT'S CSR.
                        ;*              LPRA - CONTAINS THE ADDRESS OF THE DUT'S LPR REGISTER.
                        ;*
                        ;* OUTPUTS:     AN EXTENDED INFORMATION MESSAGE IS PRINTED ON THE OPERATORS
                        ;*              CONSOLE.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,PRTLPR
                        ;*
                        ;* COMMENTS:    THIS ROUTINE CHANGES THE INDIRECT ADDRESS FIELD OF THE DEVICE
                        ;*              UNDER TEST'S CSR.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************

020530                  PRTLPR::SAVE                    ;SAVE CONTENTS OF GPRS R0 THRU R5.
020530  004537  005232          JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
020534  013701  002202          MOV     CSRA,R1         ;GET THE CSR ADDRESS.
020540  013702  002206          MOV     LPRA,R2         ;GET THE LPR ADDRESS.
020544  042703  177760          BIC     #177760,R3      ;CLEAR ANY UNWANTED BITS.
020550  053703  002234          BIS     IESTAT,R3       ;SET STATE OF TX AND RX INTERRUPT ENABLE BITS.
020554  010311                  MOV     R3,(R1)         ;SELECT LINE.
020556  011204                  MOV     (R2),R4         ;GET CONTENTS OF THE LPR.
                                ;PRINT MESSAGE''CONTENTS OF THE LPR:NNNNNN''
020560                          PRINTX #EF9019,#EM9026,R4;PRINT OUT MESSAGE ON OPERATORS CONSOLE.
020560  010446                                                  MOV     R4,-(SP)
020562  012746  011037                                          MOV     #EM9026,-(SP)
020566  012746  007016                                          MOV     #EF9019,-(SP)
020572  012746  000003                                          MOV     #3,-(SP)
020576  010600                                                  MOV     SP,R0
020600  104415                                                  TRAP    C$PNTX
020602  062706  000010                                          ADD     #10,SP
020606          60$:    PASS                    ;RESTORE GPRS.
020606  004736                          JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
020610  000207                  RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - PUFIFO -
                        ;*****************************************************************************
                        ;*      - PURGE THE FIFO
                        ;*      THIS ROUTINE TRIES TO REMOVE ALL THE CHARACTERS FROM THE FIFO.
                        ;*      ANY BMP CODES THAT ARE FOUND ARE SAVED ON THE BMP CODE QUEUE.
                        ;*
                        ;* INPUTS:      RBUFA- CONTAINS THE  ADDRESS OF THE RECEIVER.
                        ;*
                        ;*
                        ;* OUTPUTS:     CARRY BIT - INDICATES THE STATE OF THE FIFO, SET:= PURGED.
                        ;*              BMPCQ - THE CONTENTS OF THE BMP CODE QUEUE MAY BE UPDATED.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,PUFIFO
                        ;*
                        ;* COMMENTS:
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: SAVBMP.
                        ;*****************************************************************************

020612                  PUFIFO::SAVE                            ;SAVE CONTENTS OF GPRS R0 THRU R5.
020612  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
020616  012701  001000          MOV     #512.,R1                ;SET MAXIMUM TRY COUNT OF 512.
020622  013704  002204          MOV     RBUFA,R4                ;GET ADDRESS OF THE RECEIVER BUFFER REGISTER.

020626  011402                  2$:     MOV     (R4),R2         ;GET THE CONTENTS OF THE RECEIVER BUFFER REG.
020630  100016                  BPL     6$                      ;EXIT IF THE FIFO IS EMPTY, DATA_VALID CLR.
                        ;+
                        ; CHECK IF THE READ CHARACTER IS ACTUALLY A BMP CODE.
                        ;  IF IT IS, THEN SAVE IT ON THE BMP CODE QUEUE TO BE REPORTED LATER.
                        ;-
020632  012700  070000          MOV     #70000,R0               ;GENERATE A BIT MAP OF CHAR ERROR BITS
020636  040200                  BIC     R2,R0                   ; WHICH ARE NOT SET FOR CHAR.
020640  001006                  BNE     4$                      ;THROW CHAR AWAY IF NOT BMP OR SELFTEST CODE.
                          ;+
                          ; CHECK IF THE READ DATA IS MODEM STATUS , BMP OR SELFTEST?.
                          ;-
020642  012700  000300          MOV     #300,R0                 ; CHECK IF BMP OR SELFTEST?.
020646  040200                  BIC     R2,R0                   ;TRY TO CLEAR BMP FLAGS IN THE READ DATA.
020650  001002                  BNE     4$                      ;IF IT IS MODEM OR SELFTEST CODE THROW IT AWAY.
020652  004737  022400          JSR     PC,SAVBMP               ;SAVE BMP CODE ON THE QUEUE.

020656  005301                  4$:     DEC     R1              ;DECREMENT THE TRY COUNT.
020660  001362                  BNE     2$                      ;LOOP TO TRY AGAIN.
020662  000241                   CLC                            ;CLEAR CARRY,TO INDICATE FIFO NOT PURGED.
020664  000401                  BR      60$                     ;EXIT WITH CARRY CLEAR.
020666  000261                  6$:     SEC                     ;SET CARRY, TO INDICATE FIFO PURGED.

020670                          60$:    PASS                    ;RESTORE GPRS,
020670  004736                                  JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
                                                                ;CARRY BIT, SET INDICATES FIFO PURGED.
020672  000207                  RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - PUFIFR -
                        ;*************************************************************************
                        ;*      - PURGE FIFO REPORT ANY ERRORS FOUND.
                        ;*      THIS ROUTINE REMOVES ALL DATA FROM THE FIFO.  ANY BMP CODES THAT ARE
                        ;*      FOUND ARE SAVE ON THE QUEUE TO BE REPORTED LATER IN THE BMP REPORT TEST.
                        ;*      ANY UNXEPECTED DATA (IE ANY NONE STATUS INFORAMTION) THAT ARE FOUND,
                        ;*      ARE REPORTED AS AN ERROR.
                        ;*      IF THE FIFO WILL NOT PURGE AFTER 512 ATTEMPTS, THEN THE CURRENT TEST
                        ;*      THAT CALLED THIS ROUTINE RECEIVES A FAILURE FLAG THAT SHOULD BE USED
                        ;*      TO ABORT THE TEST.
                        ;*
                        ;* INPUTS:      ERRTBL - ERRTYPE, ERRMSG, ERRNBR ARE SET UP CORRECTLY.
                        ;*              RBUFA- CONTAINS THE  ADDRESS OF THE RECEIVER.
                        ;*
                        ;* OUTPUTS:     CARRY BIT - ABORT TEST FLAG, CLR = ABORT TEST, SET = OK.
                        ;*              ERRBLK - VALUE WILL BE DASTROYED.
                        ;*              BMPCQP - THE BMP CODE QUEUE POINTER MAY BE UPDATED.
                        ;*              THE CONTENTS OF THE BMP CODE QUEUE MAY BE UDATED.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,PUFIFR
                        ;*
                        ;* COMMENTS:    THIS ROUTINE REPORTS ERRORS WITH NUMBERS INITIAL ERRNBR
                        ;*              THRU TO ERRNBR+2.
                        ;*              THE ERRNBR IS RESTORED TO ITS INITIAL VALUE BEFORE RETURNING.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: ER1603,ER9001,ER9002,SAVBMP.
                        ;*************************************************************************

020674                  PUFIFR::SAVE                    ;SAVE CONTENTS OF GPRS R0 THRU R5.
020674  004537  005232          JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
020700  013746  005224          MOV     ERRNBR,-(SP)    ;SAVE THE CONTENTS OF THE ERROR NUMBER.
020704  012705  001000          MOV     #512.,R5        ;SET MAXIMUM READ COUNTER TO 2*FIFO SIZE.
                        ;+
                        ; READ DATA FROM THE FIFO UNTIL DATA VALID IS CLEAR OF READ COUNTER IS ZERO.
                        ;  REPORT ANY BMP OR UNEXPECTED DATA AS ERRORS.
                        ;-
020710  017702  161270  2$:     MOV     @RBUFA,R2       ;GET THE CONTENTS OF THE RECEIVER BUFFER REG.
020714  100056          BPL     8$                      ;EXIT IF DATA VALID CLEAR, IE. FIFO PURGED.
                        ;+
                        ; CHECK IF READ DATA IS STATUS OR UNEXPECTED CHARACTER.
                        ;-
020716  012700  070000          MOV     #70000,R0       ;GENERATE A BIT MAP OF CHAR ERROR BITS
020722  040200                  BIC     R2,R0           ; WHICH ARE NOT SET FOR CHAR.
020724  001012                  BNE     4$              ;SKIP BMP CHECK IF IT IS UNEXPECTED DATA.
                        ;+
                        ; CHECK IF THE READ DATA IS MODEM STATUS , BMP OR SELFTEST?.
                        ;  IF IT IS A BMP CODE THEN SAVE IT ON THE QUEUE.
                        ;-
020726  012737  012706  005230          MOV     #ER9001,ERRBLK  ;SET UP THE CORRECT ERROR REPORTING ROUTINE.
020734  012700  000300          MOV     #300,R0         ; CHECK IF BMP OR SELFTEST?.
020740  040200                  BIC     R2,R0           ;TRY TO CLEAR BMP FLAGS IN THE READ DATA.
020742  001003                  BNE     4$              ;SKIP BMP ERROR REPORT IF MODEM OR SELFTEST?.
020744  004737  022400          JSR     PC,SAVBMP       ;SAVE THE BMP CODE ON THE QUEUE.
020750  000423                  BR      6$              ;BRANCH TO CHECK READ COUNT.
                        ;+
                        ; CHECK IF THE READ DATA IS MODEM, SELFTEST OR UNEXPECTED DATA.
```

```
5396                                    ;-
5397  020752  032702  000001      4$:     BIT     #BIT0,R2        ;TEST THE MODEM STATUS INDICATION BIT.
5398  020756  001420                    BEQ     6$              ;DO NOT REPORT ANY ERROR IF MODEM STATUS.
5399  020760  012701  011422            MOV     #EM9104,R1      ;PASS THE CORRECT ERROR MESSAGE TO REPORT.
5400  020764  010203                    MOV     R2,R3           ;EXTRACT THE LINE NUMBER FROM
5401  020766  000303                    SWAB    R3              ; THE READ DATA.
5402  020770  042703  177760            BIC     #177760,R3      ;
5403  020774  052704  100000            BIS     #BIT15,R4       ;SET THE "NONE" EXPECTED MAESSAGE FLAG.
5404  021000  005237  005224            INC     ERRNBR          ;SET ERROR NUMBER TO INTIAL ERRBR+1.
5405  021004  012737  012776  005230    MOV     #ER9002,ERRBLK  ;SELECT THE CORRECT ERROR REPORTING ROUTINE.
5406                                    ;REPORT ERROR "UNEXPECTED DATA FOUND IN FIFO".
5407  021012                            ERROR                   ;                   >>>>> ERROR <<<<<.
5408  021012  104460                                                                      TRAP    C$ERROR
5409  021014  005337  005224            DEC     ERRNBR          ;RESTORE ERROR NUMBER TO INTIAL ERRNBR.
5410
5411  021020  005305              6$:     DEC     R5              ;DECREMENT READ COUNTER.
5412  021022  001332                    BNE     2$              ;LOOP TO READ NEXT CHAR FROM FIFO IF COUNT > 0.
5413                                    ;+
5414                                    ; THE FIFO WILL NOT CLEAR, REPORT THE ERROR AND INDICATE THAT THE TEST IS TO
5415                                    ; BE ABORTED.
5416                                    ;-
5417  021024  062737  000002  005224    ADD     #2,ERRNBR       ;SET ERROR NUMBER TO INTIAL ERRNBR+2.
5418  021032  012737  012254  005230    MOV     #ER1603,ERRBLK  ;SELECT THE CORRECT ERROR REPORTING ROUTINE.
5419  021040  012701  010632            MOV     #EM9017,R1      ;PASS THE MESSAGE TO BE REPORTED.
5420                                    ;REPORT THE ERROR "FIFO WILL NOT PURGE, (DATA VALID STUCK SET)"
5421                                    ;                       "?????? TEST ABORTED".
5422  021044                            ERROR                   ;                   >>>>> ERROR <<<<<.
5423  021044  104460                                                                      TRAP    C$ERROR
5424  021046  000241                    CLC                     ;INDICATE THE TEST IS TO BE ABORTED.
5425  021050  000401                    BR      10$             ;EXIT THIS ROUTINE AND ABORT THE CURRENT TEST.
5426
5427  021052  000261              8$:     SEC                     ;SET THE CARRY, DO NOT ABORT THE TEST.
5428
5429  021054  012637  005224      10$:    MOV     (SP)+,ERRNBR    ;RESTORE INITIAL ERROR NUMBER.
5430  021060                      60$:    PASS                    ;RESTORE GPRS,
5431  021060  004736                            JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
5432                                    ;CARRY BIT, SET INDICATES FIFO PURGED, DO NOT
5433                                    ; ABORT THE TEST.
5434  021062  000207                    RTS     PC
```

```
5435                                    .SBTTL  GLOBAL SUBROUTINE                - PURRXB -
5436                                    ;++ ************************************************************************
5437                                    ;*                    - PURGE THE RX BUFFER IN MEMORY ROUTINE -
5438                                    ;*      THIS SUBROUTINE IS USED BEFORE THE BEGINNING OF A TX/RX OF DATA
5439                                    ;*      PATTERNS TO CLEAR OUT THE RX BUFFER AND TO INITIALIZE THE VARIOUS
5440                                    ;*      COUNTERS AND POINTERS RELATED TO THAT BUFFER.
5441                                    ;*
5442                                    ;* INPUTS:      RXBSTA - LABEL AT THE BEGINNING OF THE RX BUFFER.
5443                                    ;*
5444                                    ;* OUTPUTS:     RXBCNT - COUNT OF # OF CHARS IN RX BUFFER (CLEARED).
5445                                    ;*              RXBIPT - INPUT POINTER TO RX BUFFER (INITIALIZED).
5446                                    ;*              RXBOPT - OUTPUT POINTER TO RX BUFFER (INITIALIZED).
5447                                    ;*              THE CONTENTS OF THE RX BUFFER ARE CLEARED.
5448                                    ;*
5449                                    ;* CALLING SEQUENCE:    JSR     PC,PURRXB
5450                                    ;*
5451                                    ;* COMMENTS:
5452                                    ;*
5453                                    ;* SUBORDINATE ROUTINES CALLED: NONE.
5454                                    ;-- ************************************************************************
5455
5456  021064                            PURRXB:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
5457  021064  004537  005232                           JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
5458
5459  021070  012701  002620                    MOV     #RXBOPT,R1      ;GET THE ADDRESS OF THE RX OUTPUT POINTER.
5460  021074  012721  002626                    MOV     #RXBSTA,(R1)+   ;INITIALIZE THE RX BUFFER OUTPUT POINTER.
5461  021100  012721  002626                    MOV     #RXBSTA,(R1)+   ;INITIALIZE THE RX BUFFER INPUT POINTER.
5462  021104  005021                    2$:     CLR     (R1)+           ;CLEAR CHAR COUNT AND THE BUFFER AREA.
5463  021106  020127  003026                    CMP     R1,#RXBEND      ;CHECK IF LAST LOCATION HAS BEEN CLEARED.
5464  021112  101774                            BLOS    2$              ;LOOP IF NOT DONE.
5465
5466  021114                            60$:    PASS                            ;RESTORE GPRS.
5467  021114  004736                                            JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
5468  021116  000207                            RTS     PC
```

```
5469                                    .SBTTL  GLOBAL SUBROUTINE                - RDCHRS -
5470                                    ;++ ************************************************************************
5471                                    ;*              - READ AND COMPARE INPUT CHARACTERS ROUTINE -
5472                                    ;*      THIS SUBROUTINE READS THE CHARACTERS FROM THE RX BUFFER IN MEMORY.
5473                                    ;*      IF CHARACTERS STOP APPEARING IN THE BUFFER WITH DATA.VALID SET
5474                                    ;*      OR IF MORE THAN THE ALLOWABLE NUMBER OF CHARACTERS HAS BEEN READ FROM
5475                                    ;*      THE BUFFER THIS ROUTINE EXITS WITH AN RX COMPLETE INDICATION.
5476                                    ;*      EACH READ CHAR IS ANALYZED AND ANY NECESSARY ERRORS ARE REPORTED.
5477                                    ;*
5478                                    ;* INPUTS:      ACTLNS - BIT MAP OF THE ACTIVE DUT LINES.
5479                                    ;*              ERRNBR - SET TO ERROR NUMBER OF FIRST ERROR IN THIS ROUTINE.
5480                                    ;*              IBM - MASK OF THE INACTIVE BITS IN A TX OR RX CHAR BYTE.
5481                                    ;*              OSTEND - ADDRESS OF THE END OF THE OUTPUT STORAGE FIFO BUFFER.
5482                                    ;*              OSTPTR - POINTER TO THE NEXT BYTE TO READ FROM OSTORE.
5483                                    ;*              RXBOPT - POINTER INTO THE RX CHAR BUFFER IN MEMORY.
5484                                    ;*              RXTOUT - TIME-OUT VALUE FOR RX OF LAST CHAR.
5485                                    ;*
5486                                    ;* OUTPUTS:     ERROR MESSAGES MAY BE PRINTED AT THE OPERATOR'S CONSOLE.
5487                                    ;*              TXDBLF - TX/RX DISABLED FLAG (CLEARED).
5488                                    ;*              TXENBM - TX.ENABLE STATE MASK (DESTROYED).
5489                                    ;*              SAVPRI - STORAGE FOR PROCESSOR PRIORITY (DESTROYED).
5490                                    ;*              SAVTEN - STORAGE FOR TX.ENABLE STATES (DESTROYED).
5491                                    ;*
5492                                    ;* CALLING SEQUENCE:    JSR     PC,RDCHRS
5493                                    ;*
5494                                    ;* COMMENTS:    THIS ROUTINE REPORTS ERRORS WITH NUMBERS INITIAL ERRNBR
5495                                    ;*              THRU INITIAL ERRNBR + 4.
5496                                    ;*              ERRNBR IS RESTORED BEFORE THIS ROUTINE RETURNS.
5497                                    ;*
5498                                    ;* SUBROUTINES CALLED:  CKCHR,NEWCHR,REPCOD,RXIE0,RXIE1,TXENBL,TXIE0,TXIE1,
5499                                    ;*                      WAIBIS.
5500                                    ;-- ************************************************************************
5501
5502  021120                            RDCHRS:: SAVE                    ;SAVE CONTENTS OF GPRS R0 THRU R5.
5503  021120  004537  005232                    JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
5504  021124  013704  005224                    MOV     ERRNBR,R4       ;PRESERVE THE INITIAL ERROR NUMBER.
5505  021130  013703  002226                    MOV     IBM,R3          ;GET THE INACTIVE BIT MASK.
5506  021134  005037  002414                    CLR     TXDBLF          ;CLEAR THE TX DISABLED FLAG.
5507  021140  004737  022354                    JSR     PC,RXIE1        ;TURN ON DUT RECEPTION INTERRUPTS.
5508  021144  004737  023642                    JSR     PC,TXIE1        ;TURN ON DUT TRANSMISSION INTERRUPTS.
5509
5510                                    ;+
5511                                    ; CLEAR ALL RESYNC QUEUES FOR ALL LINES.
5512                                    ;-
5513  021150  012701  004550                    MOV     #DPRSQB,R1      ;GET BASE ADDRESS OF RESYNC QUEUES TABLE.
5514  021154  012702  004750                    MOV     #DPRSQE,R2      ;GET END ADDRESS OF RESYNC QUEUES TABLE.
5515  021160  005021                    2$:     CLR     (R1)+           ;CLEAR A WORD OF THE TABLE.
5516  021162  020102                            CMP     R1,R2           ;CHECK IF POINTER AT END OF TABLE.
5517  021164  103775                            BLO     2$              ;LOOP UNTIL TABLE IS CLEAR.
5518                                    ;+
5519                                    ; WAIT FOR A CHARACTER TO APPEAR IN THE FIFO.
5520                                    ; IF NO CHARACTER APPEARS WITHIN TIME-OUT PERIOD: EXIT ROUTINE, WE'RE DONE.
5521                                    ;-
5522  021166  013701  002242            4$:     MOV     RXTOUT,R1       ;GET TIME-OUT FOR SLOWEST BAUD RATE IN USE.
5523  021172  023737  002410  002174            CMP     TXDONF,ACTLNS   ;CHECK FOR TRANSMISSION DONE ON ACTIVE LINES.
5524  021200  001402                            BEQ     6$              ;SKIP ADDING 50 MS DELAY IF TX DONE ALL LINES.
```

```
5525  021202  062701  000062            ADD     #50.,R1          ;ADD 50 MILLI SEC TO DELAY IF NOT LAST CHAR.
5526  021206  052701  170000     6$:    BIS     #170000,R1       ;INDICATE TO TEST DATA.VALID BIT.
5527  021212  013702  002620            MOV     RXBOPT,R2        ;INDICATE TO CHECK MEMORY RECEIVE BUFFER.
5528  021216  004737  024740            JSR     PC,WAIBIS        ;WAIT FOR RECEIVED CHAR OR TIME-OUT.
5529  021222  103076                    BCC     18$              ;EXIT ROUTINE IF TIME-OUT, WE'RE DONE.
5530
5531  021224  004737  016362            JSR     PC,GETCHR        ;READ A CHARACTER FROM THE MEMORY BUFFER.
5532                                ;+
5533                                ; CHECK IF THE TX ISR IS DISABLED.
5534                                ; RE-ENABLE RX ISR IF THE SPACE FOR NEW CHARS IS LOW ENOUGH.
5535                                ;  IF THE BUFFER CAN ACCOMODATE MORE CHARS THEN RE-ENABLE TRANSMISSION.
5536                                ;-
5537  021230  005737  002414     8$:    TST     TXDBLF           ;CHECK IF TX IS DISABLED.
5538  021234  100027                    BPL     10$              ;SKIP RX/TX CHECK IF TX NOT DISABLED.
5539  021236  023727  002624  000020    CMP     RXBCNT,#RXBETX   ;COMPARE BUFFER COUNT WITH LEVEL TO ENABLE RX.
5540  021244  101023                    BHI     10$              ;SKIP ENABLE RX IF BUFFER TOO FULL.
5541  021246  004737  022354            JSR     PC,RXIE1         ;ENABLE RECEPTION INTERRUPTS.
5542  021252  013705  002250            MOV     TXENBM,R5        ;GET THE PRESERVED TX.ENABLE STATES.
5543  021256  023727  002624  000020    CMP     RXBCNT,#RXBETX   ;COMPARE BUFFER COUNT WITH LEVEL TO ENABLE TX.
5544  021264  101013                    BHI     10$              ;SKIP ENABLING TX IF BUFFER TOO FULL.
5545  021266                            GETPRI  R1               ;SAVE THE CURRENT PROCESSOR PRIORITY.
5546  021266  104440                                                     TRAP    C$GPRI
5547  021270  010001                                                     MOV     R0,R1
5548  021272                            SETPRI  #PRI07           ;DISABLE INTERRUPTS.
5549  021272  012700  000340                                            MOV     #PRI07,R0
5550  021276  104441                                                     TRAP    C$SPRI
5551  021300  004737  023412            JSR     PC,TXENBL        ;ENABLE TRANSMISSION.
5552  021304  005037  002414            CLR     TXDBLF           ;CLEAR THE TX DISABLE FLAG.
5553  021310                            SETPRI  R1               ;RE-ENABLE INTERUPTS.
5554  021310  010100                                                     MOV     R1,R0
5555  021312  104441                                                     TRAP    C$SPRI
5556  021314                      10$:
5557
5558  021314  005337  002404            DEC     CHRTOT           ;DECREMENT THE TOTAL CHAR COUNTER.
5559  021320  001011                    BNE     12$              ;SKIP ERROR IF NOT TOO MANY RECEIVED.
5560  021322  010437  005224            MOV     R4,ERRNBR        ;SET ERROR NUMBER TO INITIAL ERRNBR.
5561  021326  012701  010743            MOV     #EM9025,R1       ;SELECT THE PROPER ERROR MESSAGE.
5562  021332  012737  012230  005230    MOV     #ER0503,ERRBLK   ;SELECT THE PROPER ERROR REPORT ROUTINE.
5563                                ;+
5564                                ; REPORT ERROR AT INITIAL ERRNBR.
5565                                ; "MORE THAN TWICE THE EXPECTED NUMBER OF CHARACTERS RECEIVED."
5566                                ;-
5567  021340                            ERROR                    ;                >>>>> ERROR <<<<<.
5568  021340  104460                                                     TRAP    C$ERROR
5569  021342  000452                    BR      60$              ;EXIT THE ROUTINE, WE'RE GIVING UP.
5570                                ;+
5571                                ; DETERMINE IF THE CHARACTER IS DATA OR A STATUS CODE.
5572                                ;-
5573  021344  012700  070000     12$:   MOV     #70000,R0        ;GENERATE A BIT MAP OF CHARACTER ERROR BITS
5574  021350  040200                    BIC     R2,R0            ;  WHICH ARE NOT SET FOR THE CHARACTER.
5575  021352  001007                    BNE     14$              ;SKIP REPORTING OF ERROR CODE IF WE HAVE CHAR.
5576                                ;+
5577                                ; THE DATA IS EITHER A BMP CODE OR A MODEM STATUS CODE.
5578                                ; REPORT THAT THE CODE WAS FOUND.
5579                                ; ERRORS REPORTED WITH ERROR NUMBERS >>>>> ERRNBR+1 AND ERRNBR+2 <<<<<.
5580                                ;-
```

```
 5581  021354  010437  005224                 MOV     R4,ERRNBR       ;GET THE ERROR NUMBER PASSED INTO THIS ROUTINE.
 5582  021360  005237  005224                 INC     ERRNBR          ;SET ERROR NUMBER TO INITIAL ERRNBR+1.
 5583  021364  004737  021532                 JSR     PC,REPCOD       ;REPORT THE BMP OR MODEM STATUS CHANGE CODE.
 5584  021370  000407                         BR      16$             ;BRANCH TO GET THE NEXT CHARACTER.
 5585                                  ;+
 5586                                  ; THE DATA IS A VALID CHARACTER:
 5587                                  ;    COMPARE THE READ DATA WITH THE EXPECTED DATA.
 5588                                  ;    UPDATE EXPECTED DATA POINTER.
 5589                                  ;    ERRORS REPORTED WITH ERROR NUMBERS >>>>> ERRNBR+3 AND ERRNBR+4 <<<<<.
 5590                                  ;-
 5591  021372  010437  005224          14$:    MOV     R4,ERRNBR       ;CALCULATE THE STARTING ERROR NUMBER FOR THE
 5592  021376  062737  000003  005224         ADD     #3,ERRNBR       ;  NEXT ROUTINE CALL (INITIAL ERRNBR+3).
 5593  021404  004737  017544                 JSR     PC,NEWCHR       ;HANDLE THE NEW DATA CHARACTER.
 5594                                  ;+
 5595                                  ; DONE PROCESSING THIS CHARACTER.
 5596                                  ; READ ANOTHER CHAR FROM THE DUT FIFO.
 5597                                  ; IF DATA.VALID IS SET, LOOP TO CHECK THE RECEIVED CHARACTER.
 5598                                  ; IF DATA.VALID IS CLEAR LOOP TO WAIT FOR IT SET OR TIME-OUT.
 5599                                  ;-
 5600  021410  004737  016362          16$:    JSR     PC,GETCHR       ;READ A CHARACTER FROM THE RX BUFFER.
 5601  021414  103705                         BCS     8$              ;IF DATA.VALID SET, GO TO CHECK THE RX CHAR.
 5602  021416  000663                         BR      4$              ;LOOP TO WAIT CHAR OR TIME-OUT IF BUFFER EMPTY.
 5603                                  ;+
 5604                                  ; USE DUMMY CHARACTERS TO FORCE ANALYSIS OF CHARACTERS IN RESYNC QUEUES.
 5605                                  ;-
 5606  021420  004737  022314          18$:    JSR     PC,RXIE0        ;TURN OFF DUT RX INTERRUPTS.
 5607  021424  004737  023206                  JSR     PC,TXDONE       ;CHECK IF TX DONE, TURN OFF DUT TX INTERRUPTS.
 5608  021430  005002                          CLR     R2              ;CLEAR THE DUMMY CHARACTER.
 5609  021432  005001                          CLR     R1              ;CLEAR THE LOOP COUNTER.
 5610  021434  004737  017544          20$:    JSR     PC,NEWCHR       ;FORCE ONE RESYNC QUE CHAR TO BE ANALYZED.
 5611  021440  062702  000400                  ADD     #400,R2         ;INCREMENT THE LINE NUMBER IN THE DUMMY CHAR.
 5612  021444  005201                          INC     R1              ;INCREMENT THE LOOP COUNTER.
 5613  021446  120127  000010                  CMPB    R1,#NUMLNS      ;TEST FOR LOOP COUNTER EQUAL TO # OF DUT LINES.
 5614  021452  002770                         BLT     20$             ;LOOP IF LOOP COUNT IS NOT ALL LINES DONE.
 5615  021454  005701                          TST     R1              ;CHECK FOR SECOND TIME AROUND OUTER LOOP.
 5616  021456  100404                         BMI     60$             ;EXIT IF OUTER LOOP DONE TWICE.
 5617  021460  005002                          CLR     R2              ;CLEAR THE DUMMY CHAR FOR 2ND TIME AROUND LOOP.
 5618  021462  012701  100000                  MOV     #100000,R1      ;CLEAR LOOP COUNT, SET OUTER LOOP FLAG.
 5619  021466  000762                          BR      20$             ;LOOP THE SECOND TIME AROUND OUTER LOOP.
 5620
 5621  021470  010437  005224          60$:    MOV     R4,ERRNBR       ;RESTORE THE ERROR NUMBER TO ITS INITIAL VALUE.
 5622  021474                                  PASS                    ;RESTORE GPRS.
 5623  021474  004736                                          JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
 5624  021476  000207                         RTS     PC
```

```
                                .SBTTL  GLOBAL SUBROUTINE                - RDMAST -
                                ;++ ************************************************************************************
                                ;*              - REPORT DMA_START BIT ERRORS ROUTINE -
                                ;*      THIS SUBROUTINE CHECKS FOR LINES WHICH HAVE DMA_START BIT ERRORS
                                ;*      DURING THE JUST COMPLETED DMA TRANSMISSION.  IF ANY ARE FOUND,
                                ;*      THEY ARE REPORTED.
                                ;*
                                ;* INPUTS:      ERRMSG - ADDRESS OF PRIMARY ERROR MESSAGE FOR THIS ROUTINE.
                                ;*              ERRNBR - ERROR NUMBER OF ERROR REPORTED IN THIS ROUTINE.
                                ;*              TXINTF - CONTAINS BIT MAP OF LINES WITH DMA_START BIT ERRORS.
                                ;*
                                ;* OUTPUTS:     ERRBLK - ADDRESS OF THE ERROR REPORTING ROUTINE (DESTROYED).
                                ;*              MESSAGES MAY BE PRINTED AT THE OPERATOR CONSOLE.
                                ;*
                                ;* CALLING SEQUENCE:    JSR     PC,RDMAST
                                ;*
                                ;* COMMENTS:    IF NO LINES HAVE DMA_START BIT ERRORS, NO MESSAGES ARE PRINTED.
                                ;*
                                ;* SUBORDINATE ROUTINES CALLED: ER9102.
                                ;-- ************************************************************************************

021500                          RDMAST:: SAVE                    ;SAVE CONTENTS OF GPRS R0 THRU R5.
021500  004537  005232                          JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
021504  013702  002252                  MOV     TXINTF,R2       ;GET COPY OF THE DMA_START ERRORS BIT MAP.
021510  001406                          BEQ     60$             ;EXIT IF NO DMA_START ERROR BITS ARE SET.
                                ;+
                                ; WE HAVE SOME DMA_START BIT ERRORS TO REPORT.
                                ;-
021512  012737  013656  005230          MOV     #ER9102,ERRBLK  ;SELECT THE ERROR REPORTING ROUTINE.
021520  012701  011333                  MOV     #EM9102,R1      ;INDICATE THAT WE HAVE DMA_START BIT ERROR.
                                ;+
                                ; REPORT 'DMA_START BIT SET AFTER RESET OR TX.ACTION ... ON LINES(S):''
                                ;-
021524                              ERROR                       ;               >>>>> ERROR <<<<<.
021524  104460                                                                          TRAP    C$ERROR

021526                          60$:    PASS                    ;RESTORE GPRS.
021526  004736                                  JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
021530  000207                          RTS     PC
```

```
                                .SBTTL  GLOBAL SUBROUTINE                - REPCOD -
                                ;++ ************************************************************************
                                ;*                - ROUTINE TO REPORT ERROR CODE FROM DUT -
                                ;*      THIS ROUTINE REPORTS AN ERROR CODE WHICH HAS BEEN READ FROM THE DUT
                                ;*      FIFO.  THE CODE IS CHECKED TO DETERMINE WHETHER IT IS A SELFTEST CODE
                                ;*      AN MODEM STATUS CHANGE CODE OR A BMP CODE.  THIS ROUTINE ASSUMES THAT
                                ;*      THE CODE INDICATES AN ERROR.  IF A BMP CODE IS FOUND IT IS NOT REPORTED
                                ;*      IMMEDIATELY, BUT IS SAVED ON THE BMP CODE QUEUE TO BE REPORTED LATER.
                                ;*
                                ;* INPUTS:      R2 - CONTAINS THE ERROR CODE COMPLETE WITH FLAGS AND LINE #.
                                ;*              ERRTBL - ERRTYP,ERRNBR,AND ERRMSG SET UP CORRECTLY.
                                ;*
                                ;* OUTPUTS:     ERRBLK - VALUE MAY BE DESTROYED.
                                ;*              BMPCQP - MAYBE UPDATED IF A BMP CODE IS ADDED TO THE QUEUE.
                                ;*
                                ;* CALLING SEQUENCE:    JSR     PC,REPCOD
                                ;*
                                ;* COMMENTS:    ERRNBR IS RESTORED TO ITS ENTERING VALUE BY THIS ROUTINE.
                                ;*              THIS ROUTINE REPORTS ERRORS WITH NUMBERS ERRNBR THRU ERRNBR+1.
                                ;*
                                ;* SUBORDINATE ROUTINES CALLED: ER9001,SAVBMP.
                                ;-- ************************************************************************
021532                          REPCOD:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
021532  004537  005232                         JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
021536  012737  012706  005230          MOV     #ER9001,ERRBLK  ;SELECT THE ERROR REPORTING ROUTINE.
021544  013703  005224                  MOV     ERRNBR,R3       ;PRESERVE THE ERROR NUMBER.
021550  010204                          MOV     R2,R4           ;EXTRACT THE LINE NUMBER FIELD
021552  000304                          SWAB    R4              ;  FROM THE ERROR CODE WHICH WAS
021554  042704  177760                  BIC     #177760,R4      ;  PASSED INTO THIS ROUTINE.
                                ;+
                                ; DETERMINE THE TYPE OF CODE WHICH IS TO BE REPORTED.
                                ;-
021560  012701  010135                  MOV     #EM9003,R1      ;SELECT MODEM STATUS CODE MESSAGE.
021564  032702  000001                  BIT     #BIT0,R2        ;TEST THE MODEM STATUS INDICATION BIT.
021570  001422                          BEQ     4$              ;GOTO REPORT ERROR IF MODEM STATUS CODE.
021572  005237  005224                  INC     ERRNBR          ;SELECT THE SELFTEST CODE ERROR NUMBER.
021576  012701  010157                  MOV     #EM9004,R1      ;SELECT SELFTEST CODE MESSAGE.
021602  012700  000300                  MOV     #300,R0         ;CHECK IF SELF-TEST OR BMP CODE.
021606  040200                          BIC     R2,R0           ;TRY TO CLEAR BMP BITS.
021610  001003                          BNE     2$              ;GO CHECK FOR SELFTEST CODE IF NOT BMP.
021612  004737  022400                  JSR     PC,SAVBMP       ;SAVE THE BMP CODE ON THE QUEUE.
021616  000420                          BR      60$             ;EXIT THIS ROUTINE.
021620  122702  000201          2$:     CMPB    #201,R2         ;CHECK FOR SELF TEST NULL CODE.
021624  001413                          BEQ     6$              ;EXIT ROUTINE IF NULL CODE FOUND.
021626  122702  000203                  CMPB    #203,R2         ;CHECK FOR SKIP SELF TEST CODE.
021632  001410                          BEQ     6$              ;EXIT ROUTINE IF SKIP SELF TEST CODE FOUND.
021634  000400                          BR      4$              ;GO REPORT SELF TEST ERROR.
                                ;+
                                ; REPORT 'UNEXPECTED XXXXX CODE FOUND IN RECEIVE CHAR FIFO."
                                ;-
021636  042702  177400          4$:     BIC     #177400,R2      ;REMOVE UPPER BYTE OF CODE TO BE REPORTED.
021642  004737  024142                  JSR     PC,TXROFF       ;TURN OFF TX AND RX DURING ERROR REPORTING.
021646                                  ERROR                   ;               >>>>> ERROR <<<<<.
021646  104460                                                                          TRAP    CSERROR
021650  004737  024202                  JSR     PC,TXRON        ;TURN TX AND RX BACK ON.
                                ;+
```

```
5720                                    ; RESTORE THE INITIAL ERROR NUMBER.
5721                                    ;-
5722  021654  010337  005224            6$:     MOV     R3,ERRNBR
5723
5724  021660                            60$:    PASS                    ;RESTORE GPRS.
5725  021660  004736                                    JSR     PC,@(SP)+       ;RETURN TO PREGO5 SUBRT.
5726  021662  000207                            RTS     PC
```

```
5727                                    .SBTTL  GLOBAL SUBROUTINE                - REPSMR -
5728                                    ;++ ************************************************************************
5729                                    ;*                      - REPORT ERROR SUMMARY ROUTINE -
5730                                    ;*      THIS SUBROUTINE REPORTS AN ERROR SUMMARY FOR THOSE LINES WHICH HAVE
5731                                    ;*      EXCEEDED THE NUMBER OF INDIVIDUAL ERRORS TO REPORT FOR A SINGLE LINE
5732                                    ;*      IN A SINGLE TEST.  THIS PARAMETER CAN BE SPECIFIED BY THE OPERATOR IF
5733                                    ;*      HE/SHE ANSWERS THE SOFTWARE PARAMETER QUESTIONS.
5734                                    ;*
5735                                    ;* INPUTS:      ERCNTB - LABEL AT BASE OF LINE ERROR COUNTERS TABLE.
5736                                    ;*              ERRMSG - ADDRESS OF PRIMARY ERROR MESSAGE.
5737                                    ;*              ERRNBR - ERROR NUMBER OF ERRORS IN THIS ROUTINE.
5738                                    ;*              ERSMRF - "REPORT ERROR SUMMARY FOR LINE" FLAGS.
5739                                    ;*
5740                                    ;* OUTPUTS:     ERRBLK - ADDRESS OF ERROR REPORTING ROUTINE (DESTROYED).
5741                                    ;*              SUMMARY MESSAGES MAY BE PRINTED AT THE OPERATOR CONSOLE.
5742                                    ;*
5743                                    ;* CALLING SEQUENCE:    JSR     PC,REPSMR
5744                                    ;*
5745                                    ;* COMMENTS:    IF NO LINES HAVE EXCEEDED THE MAXIMUM NUMBER OF INDIVIDUAL
5746                                    ;*              ERRORS TO REPORT, NO MESSAGES ARE PRINTED BY THIS ROUTINE.
5747                                    ;*              ERROR SUMMARIES IN THIS ROUTINE ARE REPORTED AS ERRORS.
5748                                    ;*              THE CONTENTS OF ERRBLK ARE DESTROYED.
5749                                    ;*
5750                                    ;* SUBORDINATE ROUTINES CALLED:
5751                                    ;-- ************************************************************************
5752
5753  021664                            REPSMR:: SAVE                    ;SAVE CONTENTS OF GPRS R0 THRU R5.
5754  021664  004537  005232                    JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
5755  021670  005737  002406                    TST     ERSMRF          ;CHECK THE "PRINT LINE ERROR SUMMARY" FLAGS.
5756  021674  001404                            BEQ     60$             ;EXIT WITHOUT ACTION IF NO SUMMARY FLAGS SET.
5757                                    ;+
5758                                    ; WE HAVE SOME ERROR SUMMARIES TO REPORT.
5759                                    ;-
5760  021676  012737  013326  005230            MOV     #ER9004,ERRBLK  ;SELECT ERROR REPORTING ROUTINE.
5761                                    ;+
5762                                    ; REPORT
5763                                    ;       "ERROR SUMMARY REPORT FOR LINES WITH EXCESSIVE NUMBERS OF ERRORS:"
5764                                    ;-
5765  021704                                    ERROR
5766  021704  104460                                                                    TRAP    C$ERROR
5767
5768  021706                            60$:    PASS                     ;RESTORE GPRS.
5769  021706  004736                                    JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
5770  021710  000207                            RTS     PC
```

```
5771                                    .SBTTL  GLOBAL SUBROUTINE                - RESETT -
5772                                    ;*****************************************************************************
5773                                    ;*              - RESET DEVICE UNDER TEST -
5774                                    ;*      THIS SUBROUTINE IS USED TO RESET THE DUT TO A KNOWN STATE.
5775                                    ;*      IF RESET DOES NOT SUCCESFULLY COMPLETE, IE. TIME-OUT OCCURS, THEN
5776                                    ;*      AN ABORT TEST ERROR MESSAGE IS REPORTED.
5777                                    ;*
5778                                    ;* INPUTS:      CSRA - CONTAINS THE ADDRESS OF THE CSR
5779                                    ;*              TXBFCA - CONTAINS ADDRESS OF DUT DMA BUFFER COUNT REGISTER.
5780                                    ;*              ERRTBL- ERRTYP,ERNBR,AND ERRMSG SET UP CORRECTLY.
5781                                    ;*
5782                                    ;* OUTPUTS:     THE DUT PERFORMS ITS RESET FUNCTION INTO A KNOWN STATE.
5783                                    ;*              CARRY - CLEAR INDICATES THE TEST IS TO BE ABORTED.
5784                                    ;*              ERRBLK - VALUE MAY BE DESTROYED.
5785                                    ;*              IESTAT - TX AND RX INTERRUPT FLAGS ARE CLEARED.
5786                                    ;*              TX AND RX INTERRUPT ENABLE BITS IN THE DUT'S CSR ARE CLEARED.
5787                                    ;*
5788                                    ;* CALLING SEQUENCE:    JSR     PC,RESETT
5789                                    ;*
5790                                    ;* COMMENTS:    THIS SUBROUTINE CAN REPORT ERRORS WITH NUMBERS INITIAL ERRNBR
5791                                    ;*              THIS ROUTINE DOES NOT DESTROY THE VALUE OF ERRNBR.
5792                                    ;*
5793                                    ;* SUBORDINATE ROUTINES CALLED: DELAY,MSLGET.
5794                                    ;*****************************************************************************
5795
5796  021712                            RESETT:: SAVE                   ;SAVE CONTENTS OF GPRS R0 THRU R5.
5797  021712  004537  005232                           JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
5798  021716  012702  000040                   MOV     #BIT05,R2       ;SET BIT MASK OF MASTER RESET BIT.
5799                                    ;+
5800                                    ; TEST THE STATE OF THE MASTER RESET BIT IN THE CSR.
5801                                    ;  IF MR IS SET THEN WAIT FOR SELF-TEST TO COMPLETE.
5802                                    ;   IF TIME-OUT OCCURS, REPORT THE ERROR AND PASS-OUT ABORT TEST INDICATOR.
5803                                    ;-
5804  021722  013704  002202                   MOV     CSRA,R4         ;GET THE ADDRESS OF THE DUT'S CSR.
5805  021726  030214                    BIT     R2,(R4)         ;CHECK STATE OF MASTER RESET BIT.
5806  021730  001406                   BEQ     2$              ;DON'T DELAY IF MR IS ALREADY CLEAR.
5807  021732  005003                    CLR     R3              ;SET UP DESIRED STATE OF MASTER RESET BIT.
5808  021734  012701  004704            MOV     #2500.,R1       ;PASS TIME-OUT VALUE OF 2.5 SECONDS.
5809  021740  004737  017340           JSR     PC,MSLGET       ;WAIT FOR SELF-TEST TO COMPLETE, MR CLEAR.
5810  021744  103012                   BCC     4$              ;GO REPORT ERROR IF TIMEOUT OCCURRED.
5811
5812                                    ;+
5813                                    ; SET MASTER RESET BIT IN CSR.  CLEAR TX AND RX ENABLE BITS, ETC.
5814                                    ;  SKIP THE SELFTEST.
5815                                    ;  TIME-OUT OF 2.5 SECS, JUST IN CASE THE SELF-TEST EXECUTES.
5816                                    ;-
5817  021746  010277  160230            2$:     MOV     R2,@CSRA        ;SET MASTER RESET BIT, DISABLE TX AND RX INTS.
5818  021752  004737  022446           JSR     PC,SKPSTS       ;TRY TO SKIP THE SELFTEST.
5819                                      ;+
5820                                      ;   SET SELF-TEST TIME-OUT OF 2.5 SECONDS, AND WAIT FOR M.R TO CLEAR.
5821                                      ;   IF TIME-OUT OCCURS, THEN REPORT THE FATAL ERROR AND PASS-OUT THE ABORT
5822                                      ;   TEST INDICATOR.
5823                                      ;-
5824  021756  005003                    CLR     R3              ;SET UP DESIRED STATE OF MASTER RESET BIT.
5825  021760  012701  004704            MOV     #2500.,R1       ;PASS TIME-OUT VALUE OF 2.5 SECONDS.
5826  021764  004737  017340           JSR     PC,MSLGET       ;WAIT FOR SELF-TEST TO COMPLETE, MR CLEAR.
```

```
CVDHCA0 DHV-11 FUNC TST PART1   MACY11 30A(1052)  12-JUL-83  13:56  PAGE 140
CVDHCA.P11    12-JUL-83 11:44           GLOBAL SUBROUTINE                - RESETT -

  5827  021770  103410                          BCS     6$               ;SKIP ERROR REPORT IF MR CLEARED IN TIME.
  5828                                  ;+
  5829                                  ; SET UP ERROR MESSAGE TO REPORT 'FATAL ERROR FOUND DURING RESET,TEST ABORTED'.
  5830                                  ; INDICATE TEST IS TO BE ABORTED BY CLEARING THE CARRY BIT.
  5831                                  ;-
  5832  021772  012701  007377          4$:     MOV     #EM1601,R1       ;PASS ERROR MESSAGE TO REPORT.
  5833  021776  012737  012254  005230          MOV     #ER1603,ERRBLK ;PASS ADDRESS OF ERROR HANDLING ROUTINE.
  5834                                          ;REPORT ERROR "TIME-OUT OCCURRED WAITING FOR MASTER RESET TO CLEAR"
  5835                                          ; "TEST ABORTED"
  5836  022004                                  ERROR                    ;                  >>>>> ERROR <<<<<
  5837  022004  104460                                                                                  TRAP    C$ERROR
  5838  022006  000241                          CLC                      ;INDICATE TEST IS TO BE ABORTED.
  5839  022010  000403                          BR      60$              ;EXIT THIS SUBROUTINE, ABORT TEST INDICATOR.
  5840                                  ;+
  5841                                  ; CLEAR TX AND RX INTERRUPT ENABLE STATUS FLAGS IN IESTAT.
  5842                                  ; EXIT WITH CONTINUE TEST INDICATOR SET (IE,CARRY SET).
  5843                                  ;-
  5844  022012  005037  002234          6$:      CLR    IESTAT           ;CLEAR TX AND RX INTERRUPT STATUS FLAGS.
  5845  022016  000261                           SEC                     ;INDICATE SUCCESS, CONTINUE TEST.
  5846
  5847  022020                          60$:    PASS                     ;RESTORE GPRS, PASS THE FOLLOWING INTACT:
  5848  022020  004736                                  JSR     PC,@(SP)+                ;RETURN TO PREG05 SUBRT.
  5849                                                                   ;CARRY BIT:IF CLEAR,INDICATES ABORT TEST.
  5850  022022  000207                          RTS     PC
  5851
```

```
5852                                    .SBTTL  GLOBAL SUBROUTINE                - RRXNDN -
5853                                    ;++ ************************************************************************
5854                                    ;*              - REPORT RECEPTION NOT COMPLETED ROUTINE -
5855                                    ;*      THIS SUBROUTINE CHECKS FOR LINES WHICH DID NOT RECEIVE THE COMPLETE
5856                                    ;*      DATA PATTERN.  IF ANY ARE FOUND, THEY ARE REPORTED.
5857                                    ;*
5858                                    ;* INPUTS:      R5 - LOCAL ACTIVE LINES BIT MAP.
5859                                    ;*              DPLENB - BASE OF TABLE OF DATA PATTERN LENGTHS.
5860                                    ;*              ERRMSG - ADDRESS OF PRIMARY ERROR MESSAGE FOR THIS ROUTINE.
5861                                    ;*              ERRNBR - ERROR NUMBER OF ERROR REPORTED IN THIS ROUTINE.
5862                                    ;*              RXCNTB - LABEL AT BASE OF THE RX CHARACTER COUNTERS TABLE.
5863                                    ;*              RXDONF - RECEPTION DONE FLAGS.
5864                                    ;*
5865                                    ;* OUTPUTS:     ERRBLK - ADDRESS OF THE ERROR REPORTING ROUTINE (DESTROYED).
5866                                    ;*              MESSAGES MAY BE PRINTED AT THE OPERATOR CONSOLE.
5867                                    ;*
5868                                    ;* CALLING SEQUENCE:    JSR     PC,RRXNDN
5869                                    ;*
5870                                    ;* COMMENTS:    IF NO LINES FAILED TO COMPLETE THEIR RECEPTION, NO MESSAGES
5871                                    ;*              ARE PRINTED.
5872                                    ;*
5873                                    ;* SUBORDINATE ROUTINES CALLED: ER9005.
5874                                    ;-- ************************************************************************
5875
5876  022024                            RRXNDN:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
5877  022024  004537  005232                           JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
5878  022030  010502                            MOV     R5,R2                   ;GET COPY OF THE LOCAL ACTIVE LINES BIT MAP.
5879  022032  043702  002412                    BIC     RXDONF,R2               ;GET MAP OF ACTIVE LINES WITH RX DONE FLAG CLR.
5880  022036  001410                            BEQ     60$                     ;EXIT IF NO ACTIVE LINES HAVE RX DONE FLAG CLR.
5881                                    ;+
5882                                    ; WE HAVE SOME "RX NOT COMPLETED" ERRORS TO REPORT.
5883                                    ;-
5884  022040  012737  013430  005230            MOV     #ER9005,ERRBLK  ;SELECT THE ERROR REPORTING ROUTINE.
5885  022046  012701  010623                    MOV     #EM9016,R1      ;INDICATE THAT WE ARE DEALING WITH RECEPTION.
5886  022052  012704  003450                    MOV     #RXCNTB,R4      ;PASS BASE OF RX CHAR COUNTERS TABLE TO ER9005.
5887                                        ;+
5888                                        ; REPORT "SINGLE CHARACTER MODE TEST ERROR:"
5889                                        ;       "DATA PATTERN NOT COMPLETELY RECEIVED ON ALL LINES:"
5890                                        ;           ...
5891                                        ;-
5892  022056                                    ERROR
5893  022056  104460                                                                   TRAP    C$ERROR
5894
5895
5896  022060                            60$:    PASS                            ;RESTORE GPRS.
5897  022060  004736                                    JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
5898  022062  000207                            RTS     PC
```

```
5899                                    .SBTTL  GLOBAL SUBROUTINE                - RTXNDN -
5900                                    ;++ ************************************************************************
5901                                    ;*              - REPORT TRANSMISSION NOT COMPLETED ROUTINE -
5902                                    ;*      THIS SUBROUTINE CHECKS FOR LINES WHICH DID NOT TRANSMIT THE COMPLETE
5903                                    ;*      DATA PATTERN.  IF ANY ARE FOUND, THEY ARE REPORTED.
5904                                    ;*
5905                                    ;* INPUTS:      R5 - LOCAL ACTIVE LINES BIT MAP.
5906                                    ;*              DPLENB - LABEL AT BASE OF DATA PATTERN LENGTH TABLE.
5907                                    ;*              ERRMSG - ADDRESS OF PRIMARY ERROR MESSAGE FOR THIS ROUTINE.
5908                                    ;*              ERRNBR - ERROR NUMBER OF ERROR REPORTED IN THIS ROUTINE.
5909                                    ;*              TXCNTB - LABEL AT BASE OF THE TX CHARACTER COUNTERS TABLE.
5910                                    ;*              TXDONF - TRANSMISSION DONE FLAGS.
5911                                    ;*
5912                                    ;* OUTPUTS:     ERRBLK - ADDRESS OF THE ERROR REPORTING ROUTINE (DESTROYED).
5913                                    ;*              MESSAGES MAY BE PRINTED AT THE OPERATOR CONSOLE.
5914                                    ;*
5915                                    ;* CALLING SEQUENCE:    JSR     PC,RTXNDN
5916                                    ;*
5917                                    ;* COMMENTS:    IF NO LINES FAILED TO COMPLETE THEIR TRANSMISSION, NO MESSAGES
5918                                    ;*              ARE PRINTED.
5919                                    ;*
5920                                    ;* SUBORDINATE ROUTINES CALLED: ER9005.
5921                                    ;-- ************************************************************************
5922
5923  022064                            RTXNDN:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
5924  022064  004537  005232                           JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
5925  022070  010502                            MOV     R5,R2                   ;GET COPY OF THE LOCAL ACTIVE LINES BIT MAP.
5926  022072  043702  002410                    BIC     TXDONF,R2               ;GET MAP OF ACTIVE LINES WITH TX DONE FLAG CLR.
5927  022076  001410                            BEQ     60$                     ;EXIT IF NO ACTIVE LINES HAVE TX DONE FLAG CLR.
5928                                    ;+
5929                                    ; WE HAVE SOME "TX NOT COMPLETED" ERRORS TO REPORT.
5930                                    ;-
5931  022100  012737  013430  005230            MOV     #ER9005,ERRBLK          ;SELECT THE ERROR REPORTING ROUTINE.
5932  022106  012701  010607                    MOV     #EM9015,R1              ;INDICATE WE ARE DEALING WITH TRANSMISSION.
5933  022112  012704  003410                    MOV     #TXCNTB,R4              ;PASS BASE OF TX CHAR COUNTERS TO TABLE ER0805.
5934
5935                                            ;+
5936                                            ; REPORT "SINGLE CHARACTER MODE TEST ERROR:"
5937                                            ;    'DATA PATTERN NOT COMPLETELY TRANSMITTED ON ALL LINES:"
5938                                            ;      ...
5939                                            ;-
5940  022116                                    ERROR                   ;               >>>>> ERROR <<<<<.
5941  022116  104460                                                                              TRAP    C$ERROR
5942
5943
5944  022120                            60$:    PASS                    ;RESTORE GPRS.
5945  022120  004736                                    JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
5946  022122  000207                            RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - RXDSBL -
                        ;++ ************************************************************************
                        ;*                        - DISABLE RECEIVERS -
                        ;*      THIS SUBROUTINE IS USED TO DISABLE RECEPTION ON SELECTED LINES BY,
                        ;*      CLEARING THE ASSOCIATED RX_ENABLE BIT ON THE DUT.
                        ;*
                        ;* INPUTS:      R5 - BIT'S SET CORRESPOND TO LINES ON WHICH TO CLEAR RX_ENABLE.
                        ;*              CSRA - CONTAINS THE ADDRESS OF THE DUT CSR.
                        ;*              IESTAT - CONTAINS THE STATE OF TXIE AND RXIE BITS IN THE CSR.
                        ;*              NUMLNS - EQUATED TO BE THE MAXIMUM NUMBER OF LINES AVAILABLE.
                        ;*              LNCTRA - CONTAINS THE ADDRESS OF THE LNCTRL REGISTER.
                        ;*
                        ;* OUTPUTS:     R5 - BIT'S SET INDICATE INITIAL STATES OF ALL RX_ENBLE BITS.
                        ;*              LNCTRA - THE STATE OF THE RX_ENBLE BIT MAY BE ALTERED.
                        ;*              THE CONTENTS OF THE IND_ADD_REG FIELD IN THE CSR ARE DESTROYED.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,RXDSBL
                        ;*
                        ;* COMMENTS:
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************

022124                  RXDSBL:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
022124  004537  005232                 JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
022130  010500                  MOV     R5,R0                   ;COPY BIT MAP OF LINES TO DISABLE RECEPTION.
022132  012701  000001          MOV     #BIT0,R1                ;INITIALIZE THE SELECTED LINE BIT MASK.
022136  013702  002212          MOV     LNCTRA,R2               ;GET THE ADDRESS OF THE LNCTRL REGISTER.
022142  012703  000010          MOV     #NUMLNS,R3              ;GET MAXIMUM LINE NUMBER PLUS ONE.
022146  013704  002234          MOV     IESTAT,R4               ;GET THE STATES OF THE INT ENABLE BITS.
022152  005005                  CLR     R5                      ;LOG POSSIBLE RX DISABLED ON ALL LINES.
                        ;+
                        ; SELECT EVERY LINE IN TURN, AND LOG THE STATE OF EACH RX_ENABLE BIT.
                        ;-
022154  010477  160022  2$:     MOV     R4,@CSRA                ;WRITE TO DUT CSR TO SELECT LINE REGISTERS.
022160  032712  000004          BIT     #BIT2,(R2)              ;CHECK STATE OF RX_ENABLE BIT ON SELECTED LINE.
022164  001401                  BEQ     4$                      ;SKIP NEXT INSTRUCTION IF RX_ENABLE CLEAR.
022166  050105                  BIS     R1,R5                   ;LOG RX ENABLE BIT SET FOR SELECTED LINE.
                        ;+
                        ; CLEAR RX_ENBLE ON LINES THAT HAVE A CORRESPONDING BIT SET IN THE RX DISABLE
                        ; LINE BIT MAP.
                        ;-
022170  030100          4$:     BIT     R1,R0                   ;CHECK STATE OF DISABLE LINE BIT MAP.
022172  001402                  BEQ     6$                      ;BRANCH IF THIS LINE TO REMAIN UNALTERED.
022174  042712  000004          BIC     #BIT2,(R2)              ;CLEAR RX_ENABLE BIT ON SELECTED LINE.
022200  005204          6$:     INC     R4                      ;PREPARE TO SELECT REGISTERS FOR NEXT LINE.
022202  006301                  ASL     R1                      ;SHIFT BIT MAP FOR NEXT LINE.
022204  005303                  DEC     R3                      ;DECREMENT LINE NUMBER.
022206  001362                  BNE     2$                      ;LOOP TO CHECK NEXT LINE.

022210                  60$:    PASS    R5                      ;RESTORE GPRS,EXCEPT
022210  010566  000014                          MOV     R5,R5SLOT(SP)           ;PUT R5 IN STACK SLOT.
022214  004736                          JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
                                                                ;R5 - PREVIOUS STATES OF ALL RX_ENABLE BITS.
022216  000207                  RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - RXENBL -
                        ;++ ************************************************************************************
                        ;*                          - ENABLE RECEIVER -
                        ;*      THIS SUBROUTINE IS USED TO ENABLE RECEPTION ON SELECTED LINES BY
                        ;*      SETTING THE ASSOCIATED RX.ENABLE BIT ON THE DUT.
                        ;*
                        ;* INPUTS:      R5 - BIT'S SET CORRESPOND TO LINES ON WHICH TO SET RX.ENABLE.
                        ;*              CSRA - CONTAINS THE ADDRESS OF THE DUT CSR.
                        ;*              IESTAT - CONTAINS THE STATE OF TXIE AND RXIE BITS IN THE CSR.
                        ;*              NUMLNS - EQUATED TO BE THE MAXIMUM NUMBER OF LINES AVAILABLE.
                        ;*              LNCTRA - CONTAINS THE ADDRESS OF THE LNCTRL REGISTER.
                        ;*
                        ;* OUTPUTS:     R5 - BIT'S SET INDICATE PREVIOUSLY DISABLED LINES.
                        ;*              LNCTRA - THE STATE OF THE RX.ENABLE BIT MAY BE ALTERED.
                        ;*              THE CONTENTS OF THE IND.ADD.REG FIELD IN THE CSR ARE DESTROYED.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,RXENBL
                        ;*
                        ;* COMMENTS:
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************************

 022220                 RXENBL:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
 022220  004537  005232                 JSR     R5,PREGOS       ;CALL REGISTER SAVE SUBRT.
 022224  010500                 MOV     R5,R0                   ;COPY BIT MAP OF LINES TO ENABLE.
 022226  012701  000001         MOV     #BIT0,R1                ;INITIALIZE THE SELECTED LINE BIT MASK.
 022232  013702  002212         MOV     LNCTRA,R2               ;GET THE ADDRESS OF THE LNCTRL REGISTER.
 022236  012703  000010         MOV     #NUMLNS,R3              ;GET MAXIMUM LINE NUMBER.
 022242  013704  002234         MOV     IESTAT,R4               ;GET THE STATES OF THE INT ENABLE BITS.
 022246  005005                 CLR     R5                      ;CLEAR RX.ENABLE BIT LOG OF DISABLED LINES.
                        ;+
                        ; SELECT EVERY LINE IN TURN,AND LOG ANY RX.ENBLE BIT THAT IS CLEAR.
                        ;-
 022250  010477  157726 2$:      MOV     R4,@CSRA                ;WRITE TO DUT CSR TO SELECT LINE REGISTERS.
 022254  032712  000004         BIT     #BIT2,(R2)              ;CHECK STATE OF RX.ENABLE BIT ON SELECTED LINE.
 022260  001001                 BNE     4$                      ;SKIP NEXT INSTRUCTION IF RX.ENABLE SET.
 022262  050105                 BIS     R1,R5                   ;LOG RX ENABLE BIT CLEAR FOR SELECTED LINE.
                        ;+
                        ; SET RX.ENBLE ON LINES THAT HAVE A CORRESPONDING BIT SET IN THE RX ENABLE
                        ; LINE BIT MAP.
                        ;-
 022264  030100         4$:     BIT     R1,R0                   ;CHECK STATE OF RX.ENABLE LINE BIT MAP.
 022266  001402                 BEQ     6$                      ;BRANCH IF THIS LINE TO REMAIN UNALTERED.
 022270  052712  000004         BIS     #BIT2,(R2)              ;ENABLE RECEPTIONON SELECTED LINE.
 022274  005204         6$:     INC     R4                      ;PREPARE TO SELECT REGISTERS FOR NEXT LINE.
 022276  006301                 ASL     R1                      ;SHIFT BIT MAP FOR NEXT LINE.
 022300  005303                 DEC     R3                      ;DECREMENT LINE NUMBER.
 022302  001362                 BNE     2$                      ;LOOP TO CHECK NEXT LINE.

 022304                 60$:    PASS    R5                      ;RESTORE GPRS,EXCEPT
 022304  010566  000014                         MOV     R5,R5SLOT(SP)           ;PUT R5 IN STACK SLOT.
 022310  004736                                 JSR     PC,@(SP)+               ;RETURN TO PREGOS SUBRT.
                                                ;R5 - LINE BIT MAP CORRESPONDING TO THE
                                                ; PREVIOUS LINES THAT WERE DISABLED.
 022312  000207                 RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - RXIE0 -
                        ;++ ************************************************************************************
                        ;*                          - RECEIVER INTERRUPT DISABLE -
                        ;*      THIS ROUTINE IS USED TO DISABLE RECEIVER INTERRUPTS IN THE DHV11.
                        ;*
                        ;* INPUTS:       NONE.
                        ;*
                        ;* OUTPUTS:      THE RX.INT.ENBL BIT IS CLEARED IN THE DUT CSR.
                        ;*               IESTST -CONTAINS THE UPDATED STATUS OF THE TX AND RX INTERRUPT
                        ;*               ENABLE BITS.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,RXIE0
                        ;*
                        ;* COMMENTS:     THE CONTENTS OF THE INDIRECT ADDRESS REGISTER FIELD IN
                        ;*               THE DUT CSR ARE DESTROYED.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************************
022314  010046         RXIE0::  MOV     R0,-(SP)        ;SAVE CONTENTS OF R0 ON THE STACK.
022316                           GETPRI  -(SP)           ;SAVE PROCESSOR PRIORITY ON STACK.
022316  104440                                                            TRAP    C$GPRI
022320  010046                                                            MOV     R0,-(SP)
022322                           SETPRI  #PRI07          ;IGNORE ANY INTERRUPT THAT MAY BE GENERATED.
022322  012700  000340                                                    MOV     #PRI07,R0
022326  104441                                                            TRAP    C$SPRI
022330  042737  137777  002234        BIC     #137777,IESTAT  ;CLEAR RX.INT.ENBL BIT IN IESTAT.
022336  013777  002234  157636        MOV     IESTAT,@CSRA    ;DISABLE RX INTERRUPTS.
022344                           SETPRI  (SP)+           ;ENABLE INTERRUPTS TO THE PROCESSOR AGAIN.
022344  012600                                                            MOV     (SP)+,R0
022346  104441                                                            TRAP    C$SPRI
022350  012600                   MOV     (SP)+,R0        ;RESTORE R0.
022352  000207                  RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - RXIE1 -
                        ;++ ************************************************************************
                        ;*                          - RECEIVER INTERRUPT ENABLE -
                        ;*      THIS ROUTINE IS USED TO ENABLE RECEIVER INTERRUPTS IN THE DHV11.
                        ;*
                        ;* INPUTS:      NONE.
                        ;*
                        ;* OUTPUTS:     THE RX.INT.ENBL BIT IS SET IN THE DUT CSR.
                        ;*              IESTST -CONTAINS THE UPDATED STATUS OF THE TX AND RX INTERRUPT
                        ;*              ENABLE BITS.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,RXIE1
                        ;*
                        ;* COMMENTS:    THE CONTENTS OF THE INDIRECT ADDRESS REGISTER FIELD IN
                        ;*              THE DUT CSR ARE DESTROYED.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************

 022354  052737  000100  002234  RXIE1::  BIS     #BIT06,IESTAT   ;SET RX.INT.ENBL BIT IN IESTAT.
 022362  042737  137677  002234           BIC     #137677,IESTAT  ;CLEAR ALL OTHER BITS, EXCEPT TX AND RX I.E.
 022370  013777  002234  157604           MOV     IESTAT,@CSRA    ;ENABLE RX INTERRUPTS.
 022376  000207                           RTS     PC
```

```
                                .SBTTL  GLOBAL SUBROUTINE                - SAVBMP -
                                ;++ ************************************************************************************
                                ;*                          - SAVE BMP CODES ROUTINE -
                                ;*      THIS ROUTINE SAVES THE PARAMETER PASSED IN, ONTO THE BMP CODE QUEUE
                                ;*      TOGETHER WITH THE NUMBER OF THE CURRENTLY EXECUTING TEST.
                                ;*
                                ;* INPUTS:      R2 - CONTAINS THE BMP CODE THAT IS TO BE PLACED ON THE QUEUE.
                                ;*              BMPCQP - CONTAINS ADDRESS OF NEXT LOCATION IN THE BMP QUEUE.
                                ;*              BMPCQB - LABEL AT BASE OF THE BMP CODE QUEUE.
                                ;*              BMPCQE - LABEL OF NEXT LOCATION AFTER THE END OF THE BMP QUEUE.
                                ;*              TSTNUM - CONTAINS THE NUMBER OF THE CURRENT TEST.
                                ;*
                                ;* OUTPUTS:     BMPCQP -  INCREMENTED BY 4.
                                ;*              THE CONTENTS OF THE BMP CODE QUEUE ARE UPDATED.
                                ;*
                                ;* CALLING SEQUENCE:    JSR     PC,SAVBMP
                                ;*
                                ;* COMMENTS:    IF THE OVERFLOW OCCURS THEN THE LAST LOCATION WILL BE
                                ;*              OVERWRITTEN BY ANY SUBSEQUENT ATTEMPTS TO UPDATE THE QUEUE.
                                ;*
                                ;* SUBORDINATE ROUTINES CALLED: NONE.
                                ;-- ************************************************************************************

022400                          SAVBMP:: SAVE                    ;SAVE CONTENTS OF GPRS R0 THRU R5.
022400  004537  005232                         JSR     R5,PREGOS       ;CALL REGISTER SAVE SUBRT.
022404  013704  002416                 MOV     BMPCQP,R4       ;GET THE POINTER TO THE NEXT LOCATION IN QUEUE.
022410  113724  002224                 MOVB    TSTNUM,(R4)+    ;SAVE THE CURRENT TEST NUMBER ON THE QUEUE.
022414  005204                         INC     R4              ;INCREMENT THE POINTER TO GIVE AN EVEN ADDRESS.
022416  042702  177400                 BIC     #177400,R2      ;CLEAR THE UNWANTED BITS FROM THE BMP CODE.
022422  010224                         MOV     R2,(R4)+        ;SAVE THE BMP CODE ON THE QUEUE.
022424  020427  002620                 CMP     R4,#BMPCQE      ;CHECK IF OVERFLOW WILL OCCUR THE NEXT TIME.
022430  103402                        BLO     2$              ;GO SAVE THE POINTER IF WE WILL NOT OVERFLOW.
022432  162704  000004                 SUB     #4,R4           ;RESET THE POINTER TO THE LAST LOCATION IN QUE.
022436  010437  002416         2$:     MOV     R4,BMPCQP       ;SAVE THE POINTER.
022442                          60$:    PASS                    ;RESTORE GPRS.
022442  004736                                 JSR     PC,@(SP)+               ;RETURN TO PREGOS SUBRT.
022444  000207                         RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - SKPSTS -
                        ;++ ************************************************************************
                        ;*                        - SKIP SELFTEST ROUTINE -
                        ;*      THIS SUBROUTINE IS USED TO SKIP THE SELFTEST AFTER A DUT RESET HAS BEEN
                        ;*      INITIATED.  IT MUST BE ENTERED IMMEDIATELY AFTER SETTING THE DUT MASTER
                        ;*      RESET ROUTINE OR AFTER THE EXECUTION OF A BUS RESET (BECAUSE OF TIMING
                        ;*      CONSIDERATIONS).
                        ;*
                        ;* INPUTS:      CSRA - CONTAINS ADDRESS OF THE DUT CSR.
                        ;*              TXBFCA - CONTAINS ADDRESS OF DUT DMA BUFFER COUNT REGISTER.
                        ;*
                        ;* OUTPUTS:     SKIP SELFTEST CODES ARE WRITTEN TO THE DUT REGISTERS.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,SKPSTS
                        ;*
                        ;* COMMENTS:
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: DELAY.
                        ;-- ************************************************************************

022446                  SKPSTS:: SAVE                    ;SAVE CONTENTS OF GPRS R0 THRU R5.
022446  004537  005232                   JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
022452  012704  000012           MOV     #10.,R4         ;PASS DELAY VALUE OF 10 MILLI-SECONDS.
022456  004737  015622           JSR     PC,DELAY        ;DELAY FOR 10 MILLI-SECONDS.
                        ;+
                        ; WRITE SKIP SELF-TEST CODE (52525) TO ALL THE INDEXED DUT REGISTERS.
                        ;-
022462  012701  000050           MOV     #NUMLNS!BIT05,R1 ;FORM IND.ADR.REG FIELD (PLUS M.R. BIT) WORD.
                        ;THE ABOVE INCLUSION OF THE M.R. BIT IS NECESSARY BECAUSE OF THE
                        ;  LACK OF A M.R. BIT WRITE LOCK-OUT ON THE DHV-11.
022466  012703  052525           MOV     #52525,R3       ;INITIALISE THE SKIP SELF-TEST CODE.
022472  005301          4$:      DEC     R1              ;SELECT THE NEXT SET OF DEVICE REGISTERS.
022474  013704  002202           MOV     CSRA,R4         ;GET THE ADDRESS OF THE CSR OF THE DUT.
022500  010124                   MOV     R1,(R4)+        ;SELECT A BANK OF DUT REGISTERS.
022502  010324          6$:      MOV     R3,(R4)+        ;WRITE THE CODE TO A DUT REGISTER.
022504  020437  002220           CMP     R4,TXBFCA       ;COMPARE POINTER WITH LAST REGISTER ADDRESS.
022510  103774                   BLO     6$              ;LOOP IF NOT ALL REGS DONE IN THIS BANK.
022512  032701  000017           BIT     #17,R1          ;TEST FOR IND.ADR.REG FIELD DECREMENTED TO 0.
022516  001365                   BNE     4$              ;LOOP UNTIL ALL REGISTERS CONTAIN THE CODE.

022520                  60$:     PASS                    ;RESTORE GPRS.
022520  004736                             JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
022522  000207                   RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - SPLSUP -
                        ;++ ************************************************************************
                        ;*              - SPLIT SPEED TRANSMISSION/RECEPTION SET-UP -
                        ;*
                        ;*              THIS ROUTINE IS USED TO INITIALISE BOTH THE DUT AND THE
                        ;*              TRANSMISSION/RECEPTION CONTROL PARAMETERS TO THE CORRECT
                        ;*              STATE, PRIOR TO SPLIT SPEED TRANSMISSION/RECEPTION.
                        ;*
                        ;* INPUTS:      R0 - TX,RX LPR CONTENTS FOR LINES IN GROUP II.
                        ;*              R1 - TX,RX LPR CONTENTS FOR LINES IN GROUP I.
                        ;*              R2 - START ADDRESS OF DATA PATTERN TO TRANSMIT.
                        ;*              R3 - NUMBER OF TIME DATA PATTERN TO BE TX ON LINES IN LINGRP1.
                        ;*              R4 - NUMBER OF TIME DATA PATTERN TO BE TX ON LINES IN LINGRP2.
                        ;*              ACTLNS - CONTAINS A BIT MAP OF ALL CURRENTLY ACTIVE LINES.
                        ;*              LGRP1M - CONTAINS THE BIT MAP OF LINE GROUP I LINES.
                        ;*              LOPBCK - CONTAINS THE TYPE OF LOOPBACK MODE SELECTED.
                        ;*              CBB - LABEL AT BASE OF TX/RX CONTROL BLOCK.
                        ;*
                        ;* OUTPUTS:     THE CONTENTS OF THE CONTROL BLOCK ARE DESTROYED.
                        ;*              THE INDIRECT ADDRESS FIELD OF THE DUT CSR MAY BE DESTROYED.
                        ;*              THE DUT'S LPR'S AND LNC'S MAY BE MODIFIED.
                        ;*              THE FOLLOWING POINTERS AND COUNTERS ARE INITIALISED;
                        ;*              CHCNT,CHRTOT,DPEND,DPLEN,EXCNT,RXCNT,RXDONF,RXPTR,TXCNT,
                        ;*              TXDONF,TXPTR,TXRXL.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,SPLSUP
                        ;*
                        ;* COMMENTS:    THIS ROUTINE SHOULD BE CALLED TWICE DURING THE TESTING OF
                        ;*              THE SPLIT SPEED CAPABILITIES OF THE DUT.
                        ;*              SO THAT BOTH LINE GROUPS ARE TESTED ON TRANSMISSION AND
                        ;*              RECEPTION.
                        ;*              EG,     R1 - LPR CONTENTS FOR LINES IN LGRP2M,TX=Y,RX=Z BAUD.
                        ;*                      R2 - LPR CONTENTS FOR LINES IN LGRP1M,TX=Z,RX=Y BAUD.
                        ;*                      R3 - REPEAT TX ON LINES IN LINE GROUP 1 = X TIMES.
                        ;*                      R4 - REPEAT TX ON LINES IN LINE GROUP 2 = W TIMES.
                        ;*                JSR   PC,SPLSUP       ; DO SET-UP.
                        ;*                EXECUTE TEST FOR THE ABOVE SET-UP.
                        ;*                SWAP THE CONTENTS OF R1 AND R2.
                        ;*                SWAP THE CONTENTS OF R3 AND R4.
                        ;*                      R1 - LPR CONTENTS FOR LINES IN LGRP2M,TX=Z,RX=Y BAUD.
                        ;*                      R2 - LPR CONTENTS FOR LINES IN LGRP1M,TX=Y,RX=Z BAUD.
                        ;*                      R3 = REPEAT TX ON LINES IN LINE GROUP 1 = W TIMES.
                        ;*                      R4 - REPEAT TX ON LINES IN LINE GROUP 2 = X TIMES.
                        ;*                JSR   PC,SPLSUP       ;DO SET UP AGAIN.
                        ;*                EXECUTE TEST AGAIN.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: CONMAP,RXDSBL,RXENBL,TXRINI.
                        ;-- ************************************************************************

 022524                 SPLSUP:: SAVE                   ;SAVE CONTENTS OF THE GPR'S R0 THRU R5.
 022524  004537  005232                   JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
 022530  010037  023020          MOV     R0,70$          ;SAVE LPR PARAMETER FOR LINE GRP2.
 022534  010137  023022          MOV     R1,72$          ;SAVE LPR PARAMETER FOR LINE GRP1.
 022540  005037  002410          CLR     TXDONF          ;CLEAR THE TX DONE FLAGS FOR ALL LINES.
 022544  005037  002412          CLR     RXDONF          ;CLEAR THE RX DONE FLAGS FOR ALL LINES.
                        ;+
```

```
                        ;  SET UP THE TRANSMISSION/RECEPTION CONTROL BLOCK TO INITIALISE THE LINES
                        ;  IN GROUP II.
                        ;-
022550  010037  003030          MOV     R0,CBB          ;SET CONTENTS OF LPR PARAMS IN TX/RX C.BLK.
022554  012700  003032          MOV     #CBB+2,R0       ;GET BASE ADDRESS OF CONTROL BLOCK.
022560  012720  000004          MOV     #4,(R0)+        ;LNCTRL PARAMETER, ENABLE RECEIVERS.
022564  010220                  MOV     R2,(R0)+        ;START ADDRESS OF DATA PATTERN.
022566  012720  000020          MOV     #16.,(R0)+      ;DATA PATTERN LENGTH SET TO 16.
022572  010420                  MOV     R4,(R0)+        ;NUMBER OF DATA PATTNS TO TRANSMIT ON LINGRP2.
022574  013710  002174          MOV     ACTLNS,(R0)     ;BIT MAP OF LINES TO INITIALISE.
022600  043720  002230          BIC     LGRP1M,(R0)+    ;CLEAR THE UNWANTED LINES FROM BIT MAP.
022604  113720  002176          MOVB    LOPBCK,(R0)+    ;SET LOOPBACK MODE.
022610  005200                  INC     R0              ;INCREMENT ADDRESS TO ACCESS NEXT WORD.
022612  012710  000002          MOV     #2,(R0)         ;SET OFFSET FOR EACH TRANSMISSION START TO 2.
                        ;+
                        ; INITIALISE THE DUT AND THE ASSOCIATED POINTERS AND COUNTERS, TO THE STATE
                        ; DICTATED BY THE CONTENTS OF THE TX/RX CONTROL BLOCK.
                        ;-
022616  004737  023666          JSR     PC,TXRINI       ;INITIALISE DUT.
                        ;+
                        ; SET UP CONTROL BLOCK FOR LINES IN GROUP I.
                        ;-
022622  012700  003030          MOV     #CBB,R0         ;GET START ADDRESS OF CONTROL BLOCK.
022626  010120                  MOV     R1,(R0)+        ;SET LPR PARAMETER FOR LINES TO RECEIVE DATA.
022630  012720  000004          MOV     #4,(R0)+        ;LNCTRL PARAMETER, ENABLE RECEIVERS.
022634  010220                  MOV     R2,(R0)+        ;START ADDRESS OF DATA PATTERN.
022636  012720  000020          MOV     #16.,(R0)+      ;DATA PATTERN LENGTH SET TO 16.
022642  010320                  MOV     R3,(R0)+        ;NUMBER OF DATA PATTNS TO TRANSMIT ON LINGRP1.
022644  013710  002174          MOV     ACTLNS,(R0)     ;BIT MAP OF LINES TO INITIALISE.
022650  043720  002232          BIC     LGRP2M,(R0)+    ;CLEAR THE UNWANTED LINES FROM BIT MAP.
022654  113720  002176          MOVB    LOPBCK,(R0)+    ;SET LOOPBACK MODE.
022660  005200                  INC     R0              ;INCREMENT ADDRESS TO ACCESS NEXT WORD.
022662  012710  000002          MOV     #2,(R0)         ;SET OFFSET FOR EACH TRANSMISSION START TO 2.
                        ;+
                        ; INITIALISE THE DUT AND THE ASSOCIATED POINTERS AND COUNTERS, TO THE STATE
                        ; DICTATED BY THE CONTENTS OF THE TX/RX CONTROL BLOCK.
                        ;-
022666  004737  023666          JSR     PC,TXRINI       ;INITIALISE DUT.
                        ;+
                        ; SET-UP THE REQUIRED LPR PARAMETERS NEEDED FOR THE CORRECT RECEPTION OF DATA
                        ; ON ASSOCIATED IN-ACTIVE LINES.
                        ;-
                        ;+
                        ; INITIALISE LPR PARAMETERS FOR LINE GROUP 1.
                        ;-
022672  012701  000377          MOV     #MAPLNS,R1      ;SET UP BIT MAP CORRESPONDING TO ALL LINES.
022676  013702  002174          MOV     ACTLNS,R2       ;GET THE ACTIVE (TX) LINE BIT MAP.
022702  005101                  COM     R1              ;GENERATE A BIT MAP OF NONE EXISTANT LINES.
022704  005102                  COM     R2              ;GENERATE A BIT MAP OF INACTIVE LINES.
022706  040102                  BIC     R1,R2           ;CLEAR ANY "NONE EXISTANT" INACTIVE LINES.
022710  043702  002232          BIC     LGRP2M,R2       ;ONLY PASS LGRP1 ASSOCIATED LINE BIT MAP.
022714  010237  003042          MOV     R2,CBMAPA       ;SET UP BIT MAP IN CONTROL BLOCK.
022720  005037  003040          CLR     CBDPNA          ;CLEAR REPEAT TX COUNT IN CONTROL BLOCK.
022724  013737  023022  003030  MOV     72$,CBLPRA      ;SET-UP COMPLEMENTARY LPR PARM FOR LGRP2.
022732  004737  023666          JSR     PC,TXRINI       ;INITIALISE INACTIVE LINES IN LGRP2.
```

```
                                        ;+
                                        ; INITIALISE LPR PARAMETERS FOR LINE GROUP 2.
                                        ;-
022736  013702  002174                        MOV     ACTLNS,R2       ;GET THE ACTIVE (TX) LINE BIT MAP.
022742  005102                              COM     R2              ;GENERATE A BIT MAP OF INACTIVE LINES.
022744  040102                              BIC     R1,R2           ;CLEAR ANY NONE EXISTANT INACTIVE LINES.
022746  043702  002230                      BIC     LGRP1M,R2       ;ONLY PASS LGRP2 ASSOCIATED LINE BIT MAP.
022752  010237  003042                      MOV     R2,CBMAPA       ;SET-UP BIT MAP IN CONTROL BLOCK.
022756  013737  023020  003030              MOV     70$,CBLPRA      ;SET-UP COMPLAMENTARY LPR PARAM FOR LGRP1.
022764  004737  023666                    JSR     PC,TXRINI       ;INITIALISE INACTIVE LINES IN LGRP1.
                                        ;+
                                        ; DISABLE RECEIVERS ON ALL LINES TO ENSURE THAT ONLY THE RECEIVERS OF THE
                                        ; ASSOCIATED ACTIVE (TX) LINES ARE ENABLED.(STAGGARED LOOPBACK)
                                        ;  RE-ENABLE RECEPTION ON THE CORRECT ASSOCIATED LINES.
                                        ;-
022770  012705  000377                        MOV     #MAPLNS,R5      ;SET-UP BIT MAP FOR ALL LINES.
022774  004737  022124                    JSR     PC,RXDSBL       ;DISABLE RX ON ALL LINES.
                                        ;+
                                        ; ENABLE RECEIVERS ON ASSOCIATED (RX) LINES.
                                        ;-
023000  013705  002174                        MOV     ACTLNS,R5       ;GET ACTIVE (TX) LINE BIT MAP.
023004  004737  015546                    JSR     PC,CONMAP       ;GENERATE AN ASSOCIATED (RX) LINE BIT MAP.
023010  004737  022220                    JSR     PC,RXENBL       ;ENABLE RECEIVERS ON ASSOCIATED LINES.

023014                          60$:    PASS                            ;RESTORE GRP'S.
023014  004736                                  JSR     PC,@(SP)+               ;RETURN TO PREGO5 SUBRT.
023016  000207                          RTS     PC
023020  000000                  70$:    .WORD   0               ;LOCAL STORAGE OF LPR PARAMETER LGRP2.
023022  000000                  72$:    .WORD   0               ;LOCAL STORAGE OF LPR PARAMETER LGRP1.
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - SWAP0 -
                        ;++ ************************************************************************
                        ;*                      - SWAP GPRS WITH GPR SET 0 ROUTINE -
                        ;*      THIS SUBROUTINE SWAPS THE PRESENT CONTENTS OF GPRS R1 THRU R5 WITH
                        ;*      THE CONTENTS OF THE NUMBER ZERO GPR SAVE AREA.  THE CONTENTS OF R0
                        ;*      ARE NOT ALTERED BY THIS SUBROUTINE.
                        ;*
                        ;* INPUTS:      GPR CONTENTS R1 THRU R5.
                        ;*              GPRS0B - LABEL AT BASE OF GPR SAVE AREA NUMBER ZERO.
                        ;*
                        ;* OUTPUTS:     R1 THRU R5 CONTAIN THE PREVIOUS CONTENTS OF GPR SAVE AREA
                        ;*                      ZERO WORDS 1 THRU 5 RESPECTIVELY.
                        ;*              GPRS0 - GPR SAVE AREA 0 WORDS 1 THRU 5, CONTAIN PREVIOUS
                        ;*                      CONTENTS OF GPRS R1 THRU R5 RESPECTIVELY.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,SWAP0
                        ;*
                        ;* COMMENTS:    THE STATE OF THE CARRY FLAG IS NOT ALTERRED BY THIS ROUTINE.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************

023024  010046          SWAP0::  MOV    R0,-(SP)        ;SAVE THE CONTENTS OF R0.
                        ;+
                        ; LOAD THE STACK FROM THE GPRS.
                        ;-
023026  010146                   MOV    R1,-(SP)        ;SAVE THE CONTENTS OF R1.
023030  010246                   MOV    R2,-(SP)        ;SAVE THE CONTENTS OF R2.
023032  010346                   MOV    R3,-(SP)        ;SAVE THE CONTENTS OF R3.
023034  010446                   MOV    R4,-(SP)        ;SAVE THE CONTENTS OF R4.
023036  010546                   MOV    R5,-(SP)        ;SAVE THE CONTENTS OF R5.
                        ;+
                        ; LOAD THE GPRS FROM THE GPR SAVE AREA 0.
                        ;-
023040  012700  002372           MOV    #GPRS0B,R0      ;GET THE BASE ADDRESS OF GPR SAVE AREA 0.
023044  012001                   MOV    (R0)+,R1        ;LOAD R1 WITH GPR SAVE AREA 0 WORD 1.
023046  012002                   MOV    (R0)+,R2        ;LOAD R1 WITH GPR SAVE AREA 0 WORD 2.
023050  012003                   MOV    (R0)+,R3        ;LOAD R1 WITH GPR SAVE AREA 0 WORD 3.
023052  012004                   MOV    (R0)+,R4        ;LOAD R1 WITH GPR SAVE AREA 0 WORD 4.
023054  012005                   MOV    (R0)+,R5        ;LOAD R1 WITH GPR SAVE AREA 0 WORD 5.
                        ;+
                        ; LOAD THE GPR SAVE AREA 0 FROM THE STACK.
                        ;-
023056  012640                   MOV    (SP)+,-(R0)     ;LOAD GPR SAVE AREA 0 WORD 5 WITH SAVED R5.
023060  012640                   MOV    (SP)+,-(R0)     ;LOAD GPR SAVE AREA 0 WORD 4 WITH SAVED R4.
023062  012640                   MOV    (SP)+,-(R0)     ;LOAD GPR SAVE AREA 0 WORD 3 WITH SAVED R3.
023064  012640                   MOV    (SP)+,-(R0)     ;LOAD GPR SAVE AREA 0 WORD 2 WITH SAVED R2.
023066  012640                   MOV    (SP)+,-(R0)     ;LOAD GPR SAVE AREA 0 WORD 1 WITH SAVED R1.

023070  012600                   MOV    (SP)+,R0        ;RESTORE THE INITIAL VALUE OF R0.

023072  000207                  RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - TSABRT -
                        ;++ ************************************************************************
                        ;*                      - TEST ABORT ROUTINE -
                        ;*      THIS SUBROUTINE IS USED WHEN A NON-TEST RELATED ERROR HAS BEEN FOUND
                        ;*      DURING THE EXECUTION OF THE CURRENT TEST.
                        ;*      IT IS USED TO INFORM THE OPERATOR THAT THE CURRENT TEST HAS BEEN
                        ;*      ABORTED.
                        ;*
                        ;* INPUTS:      ERRMSG - CONTAINS THE NAME OF THE CURRENT TEST.
                        ;*              ERRNBR - CONTAINS THE CORRECT ERROR NUMBER.
                        ;*              THE REMAINDER OF THE ERRTBL IS CORRECTLY INITIALISED.
                        ;*
                        ;* OUTPUTS:     MESSAGES ARE REPORTED TO THE OPERATOR.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,TSABRT
                        ;*
                        ;* COMMENTS:
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: ER1603.
                        ;-- ************************************************************************

023074                  TSABRT:: SAVE                   ;SAVE CONTENTS OF GPRS R0 THRU R5.
023074  004537  005232          JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
023100  012701  023116          MOV     #2$,R1          ;PASS ADDRESS OF FIRST MESSAGE TO BE REPORTED.
023104  012737  012254  005230  MOV     #ER1603,ERRBLK  ;SET-UP THE ERROR REPORTING ROUTINE.
023112                          ERROR                   ;               >>>>> ERROR <<<<<.
023112  104460                                                          TRAP    C$ERROR
023114  000432                  BR      60$             ;
023116  047040  047117  051055  2$:     .ASCIZ / NON-RELATED TEST ERROR FOUND DURING TEST EXECUTION/
023124  046105  052101  042105
023132  052040  051505  020124
023140  051105  047522  020122
023146  047506  047125  020104
023154  052504  044522  043516
023162  052040  051505  020124
023170  054105  041505  052125
023176  047511  000116
                        .EVEN
023202                  60$:    PASS                    ;RESTORE GPRS.
023202  004736                          JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
023204  000207                  RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - TXDONE -
                        ;++ ************************************************************************
                        ;*                          - TRANSMISSION DONE -
                        ;*      THIS SUBROUTINE IS USED IN THE TRANSMISSION/RECEPTION TESTS TO ALLOW
                        ;*      TIME FOR TRANSMISSION TO COMPLETE ON OUTSTANDING LINES.
                        ;*
                        ;* INPUTS:      ACTLNS - CONTAINS BIT MAP OF ALL ACTIVE LINES.
                        ;*              TXDONF - TX DONE FLAGS, SET FOR LINES THAT HAVE SENT ALL CHARS.
                        ;*              CHCNT - TABLE CONTANING THE NUMBER OF CHARS TO BE TX'D.
                        ;*
                        ;*
                        ;* OUTPUTS:     TRANSMISSION INTERRUPTS ARE DISABLED.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,TXDONE
                        ;*
                        ;* COMMENTS:
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: MSLOOP,MUL16U.
                        ;-- ************************************************************************

023206                  TXDONE:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
023206  004537  005232                 JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
                        ;+
                        ; CHECK IF ALL ACTIVE LINES HAVE COMPLETED TRANSMISSION.
                        ;  IF ANY HAVE NOT YET COMPLETED, DETERMINE THE TX CHAR COUNT FOR A
                        ;  LINE THAT HAS OUTSTANDING CHARACTERS TO TRANSMIT.  USING THIS VALUE,
                        ;  CALCULATE THE TIME-OUT VALUE NEEDED AT THE CURRENTLY SELECTED BAUD RATE.
                        ;-
023212  013703  002174          MOV     ACTLNS,R3       ;GET THE ACTIVE LINE BIT MAP.
023216  013702  002410          MOV     TXDONF,R2       ;GET THE BIT MAP OF LINES THAT HAVE COMPLETED.
023222  040203                  BIC     R2,R3           ;GENERATE A BIT MAP OF LINES THAT ARE STILL TX.
023224  005703                  TST     R3              ;CHECK IF ALL LINES HAVE COMPLETED TX.
023226  001427                 BEQ     6$              ;GO DISABLE TX INTERRUPTS IF ALL DONE.
                          ;+
                          ; FIND A LINE THAT HAS NOT COMPLETED TRANSMISSION.
                          ; OBTAIN THE EXPECTED CHARACTER COUNT FOR THAT LINE (WHICH IS THE SAME FOR
                          ; ALL OTHER LINES WITH OUTSTANDING TX'S).
                          ; CALCULATE TIME-OUT VALUE.
                          ;-
023230  005004                  CLR     R4              ;CLEAR LINE NUMBER COUNTER.
023232  012702  000001          MOV     #1,R2           ;SELECT BIT MAP FOR THE FIRST LINE.
023236  030203          2$:     BIT     R2,R3           ;SEE IF THIS LINE HAS COMPLETED.
023240  001003                  BNE     4$              ;BRANCH IF THIS LINE HAS NOT COMPLETED TX.
023242  006102                  ROL     R2              ;SHIFT THE LINE BIT MAP FOR THE NEXT LINE.
023244  005204                  INC     R4              ;INCREMENT THE LINE NUMBER COUNTER.
023246  000773                 BR      2$              ;LOOP TO CHECK THE NEXT LINE.
023250  006304          4$:     ASL     R4              ;LINE NUMBER X 2 TO OBTAIN OFFSET INTO TABLE.
023252  016401  003350          MOV     CHCNTB(R4),R1   ;GET THE EXPECTED NUMBER OF CHARS TO BE TX'D.
023256  013702  002242          MOV     RXTOUT,R2       ;GET THE CURRENT TIME-OUT VALUE FOR ONE CHAR.
023262  004737  017470          JSR     PC,MUL16U       ;(NUMBER OF CHARS TO TX) X (TIME-OUT OF 1 CHAR)
023266  006301                  ASL     R1              ;MULTIPLY DELAY TIME BY 2 TO GIVE A SAFE VALUE.
                          ;+
                          ; WAIT FOR ALL OUSTANDING TRANSMISSIONS TO COMPLETE OR TIME-OUT.
                          ; DISABLE ALL TRANSMISSION INTERRUPTS.
                          ;-
023270  013702  002174          MOV     ACTLNS,R2       ;PASS A BIT MAP OF THE BITS TO TEST.
```

```
 6484  023274  010203                        MOV     R2,R3           ;PASS THE EXPECTED STATE OF THE TXDONF.
 6485  023276  012704  002410                MOV     #TXDONF,R4      ;PASS THE ADDRESS OF THE WORD TO TEST.
 6486  023302  004737  017454                JSR     PC,MSLOOP       ;WAIT FOR TIME-OUT OF TX COMPLETION.
 6487  023306  004737  023602        6$:     JSR     PC,TXIE0        ;DISABLE ALL TX INTERRUPTS.
 6488
 6489  023312                        60$:    PASS                    ;RESTORE GPRS.
 6490  023312  004736                                JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
 6491  023314  000207                        RTS     PC
```

```
6492
6493                                    .SBTTL  GLOBAL SUBROUTINE                - TXDSBL -
6494                                    ;++ ************************************************************************
6495                                    ;*                      - TRANSMITTER DISABLE -
6496                                    ;*      THIS SUBROUTINE IS USED TO DISABLE TRANSMISSION ON SELECTED LINES BY,
6497                                    ;*      CLEARING THE ASSOCIATED TX.ENABLE BIT ON THE DUT.
6498                                    ;*
6499                                    ;* INPUTS:      R5 - BIT'S SET CORRESPOND TO LINES ON WHICH TO CLEAR TX.ENABLE.
6500                                    ;*              CSRA - CONTAINS THE ADDRESS OF THE DUT CSR.
6501                                    ;*              IESTAT - CONTAINS THE STATE OF TXIE AND RXIE BITS IN THE CSR.
6502                                    ;*              NUMLNS - EQUATED TO BE THE MAXIMUM NUMBER OF LINES AVAILABLE.
6503                                    ;*              TXAD2A - CONTAINS THE ADDRESS OF THE TBUFFAD2 REGISTER.
6504                                    ;*
6505                                    ;* OUTPUTS:     R5 - BIT'S SET INDICATE THE INITIAL STATES OF ALL TX.ENBLE BITS.
6506                                    ;*              TBUFFAD2 - THE STATE OF THE TX.ENBLE BIT MAY BE ALTERED.
6507                                    ;*              THE CONTENTS OF THE IND.ADD.REG FIELD IN THE CSR ARE DESTROYED.
6508                                    ;*
6509                                    ;* CALLING SEQUENCE:    JSR     PC,TXDSBL
6510                                    ;*
6511                                    ;* COMMENTS:
6512                                    ;*
6513                                    ;* SUBORDINATE ROUTINES CALLED: NONE.
6514                                    ;-- ************************************************************************
6515
6516  023316                            TXDSBL:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
6517  023316  004537  005232                           JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
6518  023322  010500                            MOV     R5,R0                   ;COPY BIT MAP OF LINES TO DISABLE TRANSMISSION.
6519  023324  012701  000001                    MOV     #BIT0,R1                ;INITIALIZE THE SELECTED LINE BIT MASK.
6520  023330  013702  002216                    MOV     TXAD2A,R2               ;GET THE ADDRESS OF THE TBUFFAD2 REGISTER.
6521  023334  005202                            INC     R2                      ;GET THE ADDRESS OF THE MSBYTE OF TBUFFAD2 REG.
6522  023336  012703  000010                    MOV     #NUMLNS,R3              ;GET MAXIMUM LINE NUMBER PLUS ONE.
6523  023342  013704  002234                    MOV     IESTAT,R4               ;GET THE STATES OF THE INT ENABLE BITS.
6524  023346  005005                            CLR     R5                      ;LOG POSSIBLE TX DISABLED ON ALL LINES.
6525                                    ;+
6526                                    ; SELECT EVERY LINE IN TURN, AND LOG THE STATE OF EACH TX.ENABLE BIT.
6527                                    ;-
6528  023350  010477  156626           2$:     MOV     R4,@CSRA                ;WRITE TO DUT CSR TO SELECT LINE REGISTERS.
6529  023354  105712                            TSTB    (R2)                    ;CHECK STATE OF TX.ENABLE BIT ON SELECTED LINE.
6530  023356  100001                          BPL     4$                      ;SKIP NEXT INSTRUCTION IF TX.ENABLE CLEAR.
6531  023360  050105                            BIS     R1,R5                   ;LOG TX ENABLE BIT SET FOR SELECTED LINE.
6532                                    ;+
6533                                    ; CLEAR TX.ENBLE ON LINES THAT HAVE A CORRESPONDING BIT SET IN THE TX DISABLE
6534                                    ; LINE BIT MAP.
6535                                    ;-
6536  023362  030100                    4$:     BIT     R1,R0                   ;CHECK STATE OF DISABLE LINE BIT MAP.
6537  023364  001402                          BEQ     6$                      ;BRANCH IF THIS LINE TO REMAIN UNALTERED.
6538  023366  142712  000200                    BICB    #BIT7,(R2)              ;CLEAR TX.ENABLE BIT ON SELECTED LINE.
6539  023372  005204                    6$:     INC     R4                      ;PREPARE TO SELECT REGISTERS FOR NEXT LINE.
6540  023374  006301                            ASL     R1                      ;SHIFT BIT MAP FOR NEXT LINE.
6541  023376  005303                            DEC     R3                      ;DECREMENT LINE NUMBER.
6542  023400  001363                          BNE     2$                      ;LOOP TO CHECK NEXT LINE.
6543
6544  023402                            60$:    PASS    R5                      ;RESTORE GPRS,EXCEPT
6545  023402  010566  000014                                    MOV     R5,R5SLOT(SP)           ;PUT R5 IN STACK SLOT.
6546  023406  004736                                            JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
6547                                                            ;R5 - PREVIOUS STATES OF ALL TX.ENABLE BITS.
```

```
 6548  023410  000207                          RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - TXENBL -
                        ;++ ************************************************************************
                        ;*                          - TRANSMITTER ENABLE -
                        ;*      THIS SUBROUTINE IS USED TO ENABLE TRANSMISSION ON SELECTED LINES BY
                        ;*      SETTING THE ASSOCIATED TX.ENABLE BIT ON THE DUT.
                        ;*
                        ;* INPUTS:      R5 - BIT'S SET CORRESPOND TO LINES ON WHICH TO SET TX.ENABLE.
                        ;*              CSRA - CONTAINS THE ADDRESS OF THE DUT CSR.
                        ;*              IESTAT - CONTAINS THE STATE OF TXIE AND RXIE BITS IN THE CSR.
                        ;*              NUMLNS - EQUATED TO BE THE MAXIMUM NUMBER OF LINES AVAILABLE.
                        ;*              TXAD2A - CONTAINS THE ADDRESS OF THE TBUFFAD2 REGISTER.
                        ;*
                        ;* OUTPUTS:     R5 - BIT'S SET INDICATE PREVIOUSLY DISABLED LINES.
                        ;*              TBUFFAD2 - THE STATE OF THE TX.ENBLE BIT MAY BE ALTERED.
                        ;*              THE CONTENTS OF THE IND.ADD.REG FIELD IN THE CSR ARE DESTROYED.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,TXENBL
                        ;*
                        ;* COMMENTS:
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************

023412                  TXENBL:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
023412  004537  005232                 JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
023416  010500                  MOV     R5,R0                   ;COPY BIT MAP OF LINES TO ENABLE.
023420  012701  000001          MOV     #BIT0,R1                ;INITIALIZE THE SELECTED LINE BIT MASK.
023424  013702  002216          MOV     TXAD2A,R2               ;GET THE ADDRESS OF THE TBUFFAD2 REGISTER.
023430  005202                  INC     R2                      ;GET THE ADDRESS OF THE MSBYTE OF TBUFFAD2 REG.
023432  012703  000010          MOV     #NUMLNS,R3              ;GET MAXIMUM LINE NUMBER.
023436  013704  002234          MOV     IESTAT,R4               ;GET THE STATES OF THE INT ENABLE BITS.
023442  005005                  CLR     R5                      ;CLEAR TX.ENABLE BIT LOG OF DISABLED LINES.
                        ;+
                        ; SELECT EVERY LINE IN TURN,AND LOG ANY TX.ENBLE BIT THAT IS CLEAR.
                        ;-
023444  010477  156532  2$:     MOV     R4,@CSRA                ;WRITE TO DUT CSR TO SELECT LINE REGISTERS.
023450  105712                  TSTB    (R2)                    ;CHECK STATE OF TX.ENABLE BIT ON SELECTED LINE.
023452  100401                BMI     4$                      ;SKIP NEXT INSTRUCTION IF TX.ENABLE SET.
023454  050105                  BIS     R1,R5                   ;LOG TX ENABLE BIT CLEAR FOR SELECTED LINE.
                        ;+
                        ; SET TX.ENBLE ON LINES THAT HAVE A CORRESPONDING BIT SET IN THE TX ENABLE
                        ; LINE BIT MAP.
                        ;-
023456  030100          4$:     BIT     R1,R0                   ;CHECK STATE OF TX.ENABLE LINE BIT MAP.
023460  001402                BEQ     6$                      ;BRANCH IF THIS LINE TO REMAIN UNALTERED.
023462  152712  000200          BISB    #BIT7,(R2)              ;ENABLE TRANSMISSION ON SELECTED LINE.
023466  005204          6$:     INC     R4                      ;PREPARE TO SELECT REGISTERS FOR NEXT LINE.
023470  006301                  ASL     R1                      ;SHIFT BIT MAP FOR NEXT LINE.
023472  005303                  DEC     R3                      ;DECREMENT LINE NUMBER.
023474  001363                BNE     2$                      ;LOOP TO CHECK NEXT LINE.

023476                  60$:    PASS    R5                      ;RESTORE GPRS,EXCEPT
023476  010566  000014                          MOV     R5,R5SLOT(SP)           ;PUT R5 IN STACK SLOT.
023502  004736                              JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
                                                                ;R5 - LINE BIT MAP CORRESPONDING TO THE
                                                                ; PREVIOUS LINES THAT WERE DISABLED.
```

```
  6605  023504  000207                        RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - TXFRPR -
                        ;++ ************************************************************************
                        ;*                      - TRANSMIT FRAMMING ERROR DATA ROUTINE -
                        ;*      THIS ROUTINE IS USED TO INITIATE DMA MODE TRANSMISSION
                        ;*      IN THE FRAMMING ERROR TEST.  IT SENDS A SINGLE CHARACTER DMA BUFFER ON
                        ;*      EACH ACTIVE LINE IN THE BIT MAP, TO CAUSE FUTURE TX INTERRUPTS WHICH
                        ;*      WILL CONTINUE THE TRANSMISSION IF MORE THAN ONE BUFFER IS TO BE SENT.
                        ;*
                        ;* INPUTS:      R4 - CONTAINS THE LINES ON WHICH TX IS TO TAKE PLACE.
                        ;*              ACTLNS - ACTIVE LINES BIT MAP.
                        ;*              BITTBL - LABEL OF TABLE OF WORDS EACH WITH A BIT SET.
                        ;*              CSRA - CONTAINS THE ADDRESS OF THE DUT CSR.
                        ;*              DPENDB - BASE OF THE DATA PATTERN END TABLE (ENTRY PER LINE).
                        ;*              DPLENB - BASE OF THE DATA PATTERN LENGTH TABLE.
                        ;*              IESTAT - PRESERVED STATES OF THE DUT INTERRUPT ENABLE BITS.
                        ;*              NUMLNS - EQUATED TO NUMBER OF LINES ON A DUT.
                        ;*              TXCNTB - LABLE AT BASE OF THE TX CHARACTER COUNTER TABLE.
                        ;*              TXPTRB - LABEL AT BASE OF THE TX DATA PATTERN POINTERS TABLE.
                        ;*
                        ;* OUTPUTS:     CSR - DUT CSR IND.ADR.REG FIELD IS DESTROYED.
                        ;*              TXCNTX - COUNTERS INCREMENTED FOR LINES ON WHICH CHARS SENT.
                        ;*              TXINTF - TX INT FLAGS (BIT SET IF DMA.HO FOUND SET ON LINE).
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,TXFRPR
                        ;*
                        ;* COMMENTS:    THIS ROUTINE ASSUMES THAT AT LEAST ONE DATA PATTERN SHOULD BE
                        ;*              TRANSMITTED ON EACH ACTIVE LINE.
                        ;*              INTERRUPTS MUST BE DISABLED WHEN CALLING THIS ROUTINE.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: DODMA.
                        ;-- ************************************************************************
023506                  TXFRPR:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
023506  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
023512  013705  002174          MOV     ACTLNS,R5               ;GET THE ACTIVE LINE BIT MAP.
023516  005104                  COM     R4                      ;GET BIT MAP OF LINES THAT WILL RECEIVE DATA.
023520  040405                  BIC     R4,R5                   ;CLEAR LINES THAT WILL RX FROM TX LINE BIT MAP.
                        ;+
                        ; SET UP LOOP WHICH HANDLES ONE LINE PER ITERATION.
                        ;-
023522  005001                  CLR     R1                      ;CLEAR THE LINE NUMBER COUNTER.
                            ;+
                            ; IF THE LINE IS INACTIVE SKIP TO SELECT THE NEXT LINE.
                            ;-
023524  000241          2$:         CLC                         ;CLEAR BOOLEAN REGISTER.
023526  006205                  ASR     R5                      ;SHIFT BIT MAP OF LINES TO TX ON INTO BOOL.REG.
023530  103017                BCC     6$                      ;DON'T TX ON THIS LINE IF IT IS NOT ACTIVE.
                        ;+
                        ; LINE IS ACTIVE.
                        ; INITIATE DMA ON THIS LINE.
                        ;   GET THE DATA PATTERN LENGTH FOR THIS LINE.
                        ;-
023532  010104                  MOV     R1,R4                   ;COPY LINE NUMBER.
023534  006304                  ASL     R4                      ;CALCULATE WORD OFFSET FOR THIS LINE.
023536  016403  003110          MOV     DPLENB(R4),R3           ;GET DATA PATTERN LENGTH FOR THIS LINE.
023542  016402  003250          MOV     TXPTRB(R4),R2           ;PREPARE TO PASS DATA PATTERN ADR TO DODMA RTN.
                            ;+
```

```
                        ;WRITE DMA PARAMETERS TO THE DUT.
                        ;-
023546  004737  015662          JSR     PC,DODMA
023552  103404                  BCS     4$              ;SKIP ERROR IF DODMA WAS SUCCESSFUL.
                        ;+
                        ;SET THE PROPER BIT OF THE TX INTERRUPT FLAGS TO INDICATE THE LINE ERROR.
                        ;-
023554  056437  002332  002252      BIS     BITTBL(R4),TXINTF       ;INDICATE THE ERROR.
023562  000402                  BR      6$              ;SKIP UPDATING POINTERS AND COUNTERS.
                        ;+
                        ;UPDATE THE TX CHARACTER COUNT FOR THIS LINE.
                        ;-
023564  060364  003410  4$:       ADD     R3,TXCNTB(R4)   ;ADD THE DATA PATTERN LENGTH TO TX CHAR COUNT.
                        ;+
                        ;INCREMENT LINE COUNTER,GOTO NEXT LINE IF NOT DONE.
                        ;-
023570  005201          6$:       INC     R1              ;INCREMENT THE LINE COUNTER.
023572  005705                    TST     R5              ;TEST THE TX LINE BIT MAP.
023574  001353                  BNE     2$              ;LOOP TO SEND CHAR TO ANOTHER LINE IF NOT DONE.

023576                  60$:    PASS                    ;RESTORE GPRS.
023576  004736                            JSR     PC,@(SP)+               ;RETURN TO PREGO5 SUBRT.
023600  000207                  RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - TXIE0 -
                        ;++ ************************************************************************
                        ;*                        - TRANSMITTER INTERRUPT DISABLE -
                        ;*      THIS ROUTINE IS USED TO DISABLE TRANSMITTER INTERRUPTS IN THE DHV11.
                        ;*
                        ;* INPUTS:       NONE.
                        ;*
                        ;* OUTPUTS:      THE TX.INT.ENBL BIT IS CLEARED IN THE DUT CSR.
                        ;*               IESTST -CONTAINS THE UPDATED STATUS OF THE TX AND RX INTERRUPT
                        ;*               ENABLE BITS.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,TXIE0
                        ;*
                        ;* COMMENTS:     THE CONTENTS OF THE INDIRECT ADDRESS REGISTER FIELD IN
                        ;*               THE DUT CSR ARE DESTROYED.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************
023602  010046          TXIE0:: MOV     R0,-(SP)        ;SAVE CONTENTS OF R0 ON THE STACK.
023604                          GETPRI  -(SP)           ;SAVE CURRENT PROCESSOR PRIORITY ON THE STACK.
023604  104440                                                          TRAP    C$GPRI
023606  010046                                                          MOV     R0,-(SP)
023610                          SETPRI  #PRI07          ;IGNORE ANY INTERRUPTS THAT MAY BE GENERATED.
023610  012700  000340                                                  MOV     #PRI07,R0
023614  104441                                                          TRAP    C$SPRI
023616  042737  177677  002234         BIC     #177677,IESTAT  ;CLEAR TX.INT.ENBL BIT IN IESTAT.
023624  013777  002234  156350         MOV     IESTAT,@CSRA    ;DISABLE TX INTERRUPTS.
023632                                 SETPRI  (SP)+           ;ENABLE INTERRUPTS TO THE PROCESSOR AGAIN.
023632  012600                                                          MOV     (SP)+,R0
023634  104441                                                          TRAP    C$SPRI
023636  012600                         MOV     (SP)+,R0        ;RESTORE R0.
023640  000207                 RTS     PC
```

```
                                .SBTTL  GLOBAL SUBROUTINE                - TXIE1 -
                                ;++ ************************************************************************
                                ;*                        - TRANSMITTER INTERRUPT ENABLE -
                                ;*      THIS ROUTINE IS USED TO ENABLE TRANSMITTER INTERRUPTS IN THE DHV11.
                                ;*
                                ;* INPUTS:       NONE.
                                ;*
                                ;* OUTPUTS:      THE TX.INT.ENBL BIT IS SET IN THE DUT CSR.
                                ;*               IESTST -CONTAINS THE UPDATED STATUS OF THE TX AND RX INTERRUPT
                                ;*               ENABLE BITS.
                                ;*
                                ;* CALLING SEQUENCE:    JSR     PC,TXIE1
                                ;*
                                ;* COMMENTS:     THE CONTENTS OF THE INDIRECT ADDRESS REGISTER FIELD IN
                                ;*               THE DUT CSR ARE DESTROYED.
                                ;*
                                ;* SUBORDINATE ROUTINES CALLED: NONE.
                                ;-- ************************************************************************

023642  052737  040000  002234  TXIE1::  BIS     #BIT14,IESTAT   ;SET TX.INT.ENBL BIT IN IESTAT.
023650  042737  137677  002234          BIC     #137677,IESTAT  ;CLEAR ALL BITS EXCEPT TX RX I.E BITS.
023656  013777  002234  156316          MOV     IESTAT,@CSRA    ;DISABLE TX INTERRUPTS.
023664  000207                        RTS     PC
```

```
6740                    .SBTTL  GLOBAL SUBROUTINE                - TXRINI -
6741                    ;++ ******************************************************************************
6742                    ;*              - TRANSMIT AND RECEIVE INITIALIZATION ROUTINE -
6743                    ;*      THIS SUBROUTINE PERFORMS THE INITIALIZATION OF THE VARIOUS POINTERS,
6744                    ;*      COUNTERS, AND FLAGS WHICH ARE USED DURING THE TRANSMISSION AND
6745                    ;*      RECEPTION PORTION OF A TEST.  THIS INITIALIZATION IS PERFORMED ON
6746                    ;*      THE SPECIFIED LINES ONLY, OTHER LINE VARIABLES REMAIN UNCHANGED.
6747                    ;*
6748                    ;* INPUTS:      CHCNTB - LABEL AT BASE OF LINE CHARACTER COUNT TABLE.
6749                    ;*              CHRTOT - MAX # OF CHARS TO RX ON LINES ALREADY INITIALIZED.
6750                    ;*              DPENDB - LABEL AT BASE OF LINE DATA PATTERN END TABLE.
6751                    ;*              DPLENB - LABEL AT BASE OF LINE DATA PATTERN LENGTH TABLE.
6752                    ;*              EXCNTB - LABEL AT BASE ADDRESS OF EXTRA CHAR COUNTERS TABLE.
6753                    ;*              IESTAT - PRESENT STATE OF THE RX.IE AND TX.IE BITS.
6754                    ;*              NUMLNS - EQUATED TO NUMBER OF LINES ON THE DUT.
6755                    ;*              RXCNTB - LABEL AT BASE ADDRESS OF RX CHARACTER COUNTERS TABLE.
6756                    ;*              RXPTRB - LABLE AT BASE ADR OF "NEXT RX CHAR" POINTERS TABLE.
6757                    ;*              TXCNTB - LABEL AT BASE ADDRESS OF TX CHARACTER COUNTERS TABLE.
6758                    ;*              TXPTRB - LABEL AT BASE ADR OF "NEXT TX CHAR" POINTERS TABLE.
6759                    ;*              CBB - LABEL AT BASE OF TX/RX CONTROL BLOCK.
6760                    ;*              CB CONTENTS - TX/RX CONTROL BLOCK CONTAINS THE FOLLOWING:
6761                    ;*                  CBLPRA - DUT LPR CONTENTS.
6762                    ;*                  CBLNCA - DUT LNCTRL CONTENTS.
6763                    ;*                  CBDPAA - ADDRESS OF BEGINNING OF DATA PATTERN.
6764                    ;*                  CBDPLA - LENGTH IN BYTES OF DATA PATTERN.
6765                    ;*                  CBDPNA - NUMBER OF DATA PATTERNS TO TRANSMIT.
6766                    ;*                  CBMAPA - BIT MAP OF LINES TO BE INITIALIZED.
6767                    ;*                  CBLPBA - TYPE OF LOOPBACK TO BE USED FOR TEST.
6768                    ;*                  CBOFSA - AMOUNT TO OFFSET EACH TX START IN THE DATA PAT.
6769                    ;*              TXRXLB - LABEL AT BASE OF TX/RX LINE ASSOCIATION TABLE.
6770                    ;*
6771                    ;* OUTPUTS:     CHCNT - TABLE OF NUMBER OF LINE TX CHARACTERS (INITIALIZED).
6772                    ;*              CHRTOT - MAXIMUM NUMBER OF CHARS TO RECEIVE (2 * PAT LENGTH).
6773                    ;*              DPEND - TABLE OF DATA PATTERN ENDS (INITIALIZED).
6774                    ;*              DPLEN - TABLE OF DATA PATTERN LENGTHS (INITIALIZED).
6775                    ;*              DUT LNCTRL - LINE CONTROL REGISTERS (INITIALIZED).
6776                    ;*              DUT LPR - LINE PARAMETER REGISTERS (INITIALIZED).
6777                    ;*              EXCNT - TABLE OF EXTRA RX CHAR COUNTS (CLRED, SELECTED LINES).
6778                    ;*              RXCNT - TABLE OF RX CHARACTER COUNTS (CLRED, SELECTED LINES).
6779                    ;*              RXDONF - "RECEPTION DONE" FLAGS (CLEARED FOR SELECTED LINES).
6780                    ;*              RXPTR - TABLE OF RECEIVE POINTERS (INITIALIZED).
6781                    ;*              TXCNT - TABLE OF TX CHARACTER COUNTERS (CLRED, SELECTED LINES).
6782                    ;*              TXDONF - "TRANSMISSION DONE" FLAGS (CLRED FOR SELECTED LINES).
6783                    ;*              TXPTR - TABLE OF TRANSMIT POINTERS (INITIALIZED).
6784                    ;*              TXRXL - TX/RX LINE ASSOCIATION TABLE (INITIALIZED).
6785                    ;*
6786                    ;* CALLING SEQUENCE:    JSR     PC,TXRINI
6787                    ;*
6788                    ;* COMMENTS:    IF THE CALCULATION OF THE CHRTOT VALUE (2 TIMES THE DATA
6789                    ;*              PATTERN LENGTH) RESULTS IN A NUMBER GREATER THAN 64K THEN
6790                    ;*              CHRTOT IS INITIALIZED TO 64K - 1.
6791                    ;*              THIS ROUTINE WILL NOT FORCE INTERNAL LOOPBACK BASED ON THE
6792                    ;*              LOOPBACK TYPE IN CBLPBA.  THE USER MUST SET UP CBLNCA CORRECTLY
6793                    ;*              TO GET INTERNAL LOOPBACK.
6794                    ;*
6795                    ;* SUBORDINATE ROUTINES CALLED: WTWLNC,WTWLPR,
```

```
6796                                    ;-- ************************************************************************
6797  023666                            TXRINI:: SAVE                   ;SAVE CONTENTS OF GPRS R0 THRU R5.
6798  023666  004537  005232                   JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
6799                                    ;+
6800                                    ; SET UP THE LPR AND LNCTRL REGISTERS AS SPECIFIED IN THE TX/RX CONTROL BLOCK.
6801                                    ;-
6802  023672  013705  003042                    MOV     CBMAPA,R5       ;GET THE BIT MAP OF SELECTED LINES.
6803  023676  013700  003032                    MOV     CBLNCA,R0       ;GET THE NEW LNCTRL CONTENTS.
6804  023702  023727  003044  000001            CMP     CBLPBA,#1       ;CHECK IF INTERNAL LOOPBACK HAS BEEN SELECTED.
6805  023710  001002                           BNE     2$              ;SKIP SETTING INT. LOPBCK IN MAINTENANCE FIELD.
6806  023712  052700  000200                    BIS     #200,R0         ;SET INTERNAL LOOPBACK IN MAINTENANCE FIELD.
6807  023716  004737  025014            2$:     JSR     PC,WTWLNC       ;SET UP THE LNCTRL REGS FOR SELECTED LINES.
6808  023722  013700  003030                    MOV     CBLPRA,R0       ;GET THE NEW LPR CONTENTS.
6809  023726  004737  025044                   JSR     PC,WTWLPR       ;SET UP THE LPR REGISTERS FOR SELECTED LINES.
6810  023732  004737  023412                   JSR     PC,TXENBL       ;ENABLE TX FOR ALL SELECTED LINES.
6811                                    ;+
6812                                    ; SET UP AND BEGIN LOOP WHICH HANDLES ONE LINE PER ITERATION.
6813                                    ;-
6814  023736  005004                            CLR     R4              ;CLEAR THE LINE OFFSET.
6815  023740  013705  003034                    MOV     CBDPAA,R5       ;INITIALIZE THE TX START ADDRESS VALUE.
6816  023744  013703  003036                    MOV     CBDPLA,R3       ;GET THE LENGTH OF THE DATA PATTERN.
6817  023750  060503                            ADD     R5,R3           ;CALCULATE END ADDRESS OF THE DATA PATTERN.
6818  023752  036437  002332  003042  4$:       BIT     BITTBL(R4),CBMAPA  ;CHECK IF THIS LINE IS SELECTED FOR INIT.
6819  023760  001452                           BEQ     12$             ;SKIP SET UP IF LINE IS NOT SELECTED.
6820                                    ;+
6821                                    ; THIS LINE IS SELECTED FOR INITIALIZATION.
6822                                    ;    SET UP PROPER ENTRY IN NUMBER OF CHARS TO TX AND RX TABLE.
6823                                    ;    INCLUDE CHAR COUNT ON THIS LINE IN MAX ALLOWABLE CHAR TOTAL FOR ALL LINES.
6824                                    ;-
6825  023762  013701  003036                    MOV     CBDPLA,R1       ;GET THE LENGTH OF THIS LINE'S DATA PATTERN.
6826  023766  013702  003040                    MOV     CBDPNA,R2       ;GET THE NUMBER OF PATTERNS TO TX AND RX.
6827  023772  004737  017470                   JSR     PC,MUL16U       ;CALCULATE THE TOTAL NUMBER OF CHARS TO TX/RX.
6828  023776  010164  003350                    MOV     R1,CHCNTB(R4)   ;SET UP THE NUMBER OF TX/RX CHARS FOR LINE.
6829  024002  060137  002404                    ADD     R1,CHRTOT       ;ADD TWICE THE NUMBER OF CHARACTERS TO TX/RX
6830  024006  103403                           BCS     6$              ;  ON THIS LINE TO THE TOTAL NUMBER OF CHARS
6831  024010  060137  002404                    ADD     R1,CHRTOT       ;  WHICH WE WILL ALLOW TO BE RECEIVED ON
6832  024014  103003                           BCC     8$              ;  ALL LINES.
6833  024016  012737  177777  002404  6$:       MOV     #-1,CHRTOT      ;  SET MAX CHAR TOTAL TO -1 IF OVERFLOW.
6834  024024                          8$:
6835                                    ;+
6836                                    ; SET UP THE DATA PATTERN END AND LENGTH FOR THIS LINE.
6837                                    ;-
6838  024024  013764  003036  003110            MOV     CBDPLA,DPLENB(R4)  ;SET UP TX DATA PATTERN LENGTH FOR THIS LINE.
6839  024032  010364  003050                    MOV     R3,DPENDB(R4)   ;SET UP TX DATA PAT END ADDRESS FOR THIS LINE.
6840                                    ;+
6841                                    ; SET UP THE TX COUNTER AND CHARACTER POINTER FOR THIS LINE.
6842                                    ;-
6843  024036  005064  003410                    CLR     TXCNTB(R4)      ;CLEAR THE TX COUNTER FOR THIS LINE.
6844  024042  010564  003250                    MOV     R5,TXPTRB(R4)   ;SET UP THE TX CHAR POINTER FOR THIS LINE.
6845                                    ;+
6846                                    ; SET UP THE TX/RX LINE ASSOCIATION OFFSET TABLE ENTRY FOR THIS LINE.
6847                                    ;-
6848  024046  010402                            MOV     R4,R2           ;SELECT LINE OFFSET FOR NON-STAGGERED LPBK.
6849  024050  023727  003044  000002            CMP     CBLPBA,#2       ;TEST FOR STAGGERED LOOPBACK.
6850  024056  001003                           BNE     10$             ;SKIP SETTING STAGGERED LPBK IF NOT.
6851  024060  006202                            ASR     R2              ;FORM BYTE OFFSET INTO TABLE FROM TX LINE #.
```

```
6852  024062  116202  005202                  MOVB    STGTRB(R2),R2   ;GET THE RX LINE CORRESPONDING WITH TX LINE.
6853  024066  010264  005142          10$:    MOV     R2,TXRXLB(R4)   ;LOAD TX TABLE ENTRY WITH RX LINE OFFSET.
6854                                        ;+
6855                                        ; SET UP THE RX COUNTERS AND CHARACTER POINTER FOR THE RX LINE WHICH
6856                                        ;   IS ASSOCIATED WITH THIS TX LINE.
6857                                        ;-
6858  024072  005062  003450                   CLR     RXCNTB(R2)      ;CLEAR THE RX COUNTER FOR THIS RX LINE.
6859  024076  005062  003150                   CLR     EXCNTB(R2)      ;CLEAR THE EXTRA CHAR COUNTER FOR THIS RX LINE.
6860  024102  010562  003310                   MOV     R5,RXPTRB(R2)   ;SET UP THE RX CHAR POINTER FOR THIS RX LINE.
6861                                        ;+
6862                                        ; UPDATE THE TX START POINTER IN PREPARATION FOR THE NEXT LINE.
6863                                        ;-
6864  024106  063705  003046          12$:    ADD     CBOFSA,R5       ;ADD THE TX OFFSET TO THE TX START POINTER.
6865  024112  020503                   14$:    CMP     R5,R3           ;COMPARE TX START WITH END OF DATA PATTERN.
6866  024114  103403                          BLO     16$             ;SKIP WRAPAROUND IF START IS BEFORE PAT END.
6867  024116  163705  003036                   SUB     CBDPLA,R5       ;SUBTRACT DATA PATTERN LENGTH FROM START.
6868  024122  000773                          BR      14$             ;LOOP UNTIL START IS WITHIN DATA PATTERN.
6869                                        ;+
6870                                        ; UPDATE THE TX LINE NUMBER OFFSET TO THE NEXT LINE.
6871                                        ;-
6872  024124  005204                   16$:    INC     R4
6873  024126  005204                           INC     R4
6874                                        ;+
6875                                        ; TEST FOR DONE HANDLING ALL POSSIBLE LINES ON THE DEVICE.
6876                                        ;-
6877  024130  020427  000020                   CMP     R4,#NUMLNS*2    ;COMPARE OFFSET WITH 2 TIMES MAX # OF LINES.
6878  024134  002706                          BLT     4$              ;LOOP IF NOT ALL LINES DONE.
6879
6880  024136                            60$:  PASS                    ;RESTORE GPRS.
6881  024136  004736                                  JSR     PC,@(SP)+       ;RETURN TO PREG05 SUBRT.
6882  024140  000207                          RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - TXROFF -
                        ;++ ************************************************************************
                        ;*                      - TURN TX AND RX OFF ROUTINE -
                        ;*      THIS SUBROUTINE IS USED TO TURN OFF DUT TRANSMISSION AND RECEPTION.
                        ;*      THIS ROUTINE ACHIEVES THIS BY BOOSTING PROCESSOR PRIORITY TO 5 TO
                        ;*      AVOID RX INTERRUPTS AND BY CLEARING ALL THE DUT TX.ENABLE BITS TO
                        ;*      HALT TX (EITHER DMA OR SINGLE CHARACTER TX).  THE STATES OF THE
                        ;*      TX.ENABLE BITS AND THE PROCESSOR PRIORITY ARE SAVED FOR RESTORATION
                        ;*      WHEN TX AND RX ARE RE-ENABLED.
                        ;*
                        ;* INPUTS:      MAPLNS - BIT MAP OF ALL POSSIBLE LINES ON THE DUT.
                        ;*
                        ;* OUTPUTS:     SAVPRI - SAVED PROCESSOR PRIORITY.
                        ;*              SAVTEN - BIT MAP OF TX.ENBL BITS (BIT SETIF TX.ENBL WAS SET).
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,TXROFF
                        ;*
                        ;* COMMENTS:
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: TXDSBL.
                        ;-- ************************************************************************

024142                  TXROFF:: SAVE                   ;SAVE CONTENTS OF GPRS R0 THRU R5.
024142  004537  005232          JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
024146          GETPRI  SAVPRI          ;GET THE PRESENT PROCESSOR PRIORITY.
024146  104440                                          TRAP    C$GPRI
024150  010037  002246                                  MOV     R0,SAVPRI
024154          SETPRI  #PRI05          ;DISABLE DUT INTERRUPTS.
024154  012700  000240                                  MOV     #PRI05,R0
024160  104441                                          TRAP    C$SPRI
024162  012705  000377                  MOV     #MAPLNS,R5      ;PREPARE TO DISABLE TX ON ALL DUT LINES.
024166  004737  023316                  JSR     PC,TXDSBL       ;CLEAR ALL DUT TX.ENABLE BITS.
024172  010537  002244                  MOV     R5,SAVTEN       ;PRESERVE THE PREVIOUS TX.ENABLE BIT STATES.
024176                          60$:    PASS                    ;RESTORE GPRS.
024176  004736                                          JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
024200  000207                  RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - TXRON -
                        ;++ ************************************************************************
                        ;*                        - TURN TX AND RX ON ROUTINE -
                        ;*      THIS SUBROUTINE IS USED TO TURN ON DUT TRANSMISSION AND RECEPTION.
                        ;*      THIS ROUTINE RESTORES THE DUT TX.ENABLE BITS AND THE PROCESSOR PRIORITY
                        ;*      TO THE STATES SAVED BY THE TXROFF ROUTINE.
                        ;*
                        ;* INPUTS:      SAVPRI - SAVED PROCESSOR PRIORITY.
                        ;*              SAVTEN - BIT MAP OF TX.ENBL BITS (BIT SETIF TX.ENBL WAS SET).
                        ;*
                        ;* OUTPUTS:     DUT TX.ENABLE BITS - SET TO SPECIFIED STATES.
                        ;*              PROCESSOR PRIORITY - SET TO SPECIFIED PRIORITY.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,TXRON
                        ;*
                        ;* COMMENTS:
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: TXENBL.
                        ;-- ************************************************************************

024202                  TXRON:: SAVE                    ;SAVE CONTENTS OF GPRS R0 THRU R5.
024202  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
024206  013705  002244          MOV     SAVTEN,R5       ;GET THE SAVED STATES OF THE TX.ENABLE BITS.
024212  004737  023412          JSR     PC,TXENBL       ;SET THE SPECIFIED TX.ENABLE BITS.
024216                          SETPRI  SAVPRI          ;RESTORE THE PROCESSOR PRIORITY.
024216  013700  002246                                                  MOV     SAVPRI,R0
024222  104441                                                          TRAP    C$SPRI
024224                  60$:    PASS                    ;RESTORE GPRS.
024224  004736                          JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
024226  000207          RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - TXRREP -
                        ;++ ************************************************************************
                        ;*                      - REPORT FINAL TX/RX ERRORS ROUTINE -
                        ;*      THIS SUBROUTINE REPORTS ERRORS WHICH ARE FOUND AFTER THE COMPLETION
                        ;*      OF THE TX, RX, AND VERIFICATION OF DATA PATTERNS.  IT REPORTS ERRORS
                        ;*      DEALING WITH INCOMPLETE TX OR RX AND WITH DMA_START BITS.
                        ;*
                        ;* INPUTS:      ACTLNS - BIT MAP OF ACTIVE DUT LINES.
                        ;*              DPLENB - LABEL AT BASE OF THE DATA PATTERN LENGTHS TABLE.
                        ;*              ERRMSG - ADDRESS OF PRIMARY ERROR MESSAGE FOR THIS ROUTINE.
                        ;*              ERRNBR - ERROR NUMBER OF ERROR REPORTED IN THIS ROUTINE.
                        ;*              RXCNTB - LABEL AT BASE OF THE RX CHARACTER COUNTERS TABLE.
                        ;*              RXDONF - RECEPTION DONE FLAGS.
                        ;*              TXCNTB - LABEL AT BASE OF THE TX CHARACTER COUNTERS TABLE.
                        ;*              TXDONF - TRANSMISSION DONE FLAGS.
                        ;*              TXINTF - CONTAINS BIT MAP OF LINES WITH DMA_START BIT ERRORS.
                        ;*
                        ;* OUTPUTS:     CARRY FLAG - RESTORED TO ITS ENTERING VALUE.
                        ;*              ERRBLK - ADDRESS OF THE ERROR REPORTING ROUTINE (DESTROYED).
                        ;*              MESSAGES MAY BE PRINTED AT THE OPERATOR CONSOLE.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,TXRREP
                        ;*
                        ;* COMMENTS:    THIS ROUTINE REPORTS ERRORS AT INITIAL ERRNBR THRU
                        ;*              INITIAL ERRMBR+2.
                        ;*              IF NO LINES FAILED TO COMPLETE THEIR RECEPTION OR FAILED TO
                        ;*              COMPLETE THEIR TRANSMISSION OR HAD DMA_START BIT ERRORS
                        ;*              THEN NO MESSAGES ARE PRINTED.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: CONMAP,ER9005,ER9102,RDMAST,RRXNDN,RTXNDN.
                        ;-- ************************************************************************

024230                  TXRREP:: SAVE                   ;SAVE CONTENTS OF GPRS R0 THRU R5.
024230  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
024234  006003          ROR     R3      ;ROTATE CARRY INTO GPR TO SAVE CARRY STATE.
024236  013704  005224  MOV     ERRNBR,R4       ;SAVE THE INITIAL ERROR NUMBER VALUE.
024242  013705  002174  MOV     ACTLNS,R5       ;GET THE ACTIVE LINES BIT MAP.
024246  004737  021500  JSR     PC,RDMAST       ;REPORT ANY DMA_START BIT ERRORS.
024252  005237  005224  INC     ERRNBR          ;SELECT INTIAL ERROR NUMBER + 1.
024256  004737  022064  JSR     PC,RTXNDN       ;REPORT TX NOT COMPLETE IF NECESSARY.
024262  005237  005224  INC     ERRNBR          ;SELECT INITIAL ERROR NUMBER + 2.
024266  004737  015546  JSR     PC,CONMAP       ;GENERATE AN ASSOCIATED LINE BIT MAP.
024272  004737  022024  JSR     PC,RRXNDN       ;REPORT RX NOT COMPLETE IF NECESSARY.
024276  010437  005224  MOV     R4,ERRNBR       ;RESTORE THE INITIAL ERROR NUMBER VALUE.

024302  006103          ROL     R3              ;ROTATE SAVED CARRY STATE BACK INTO CARRY.
024304                  60$:    PASS            ;RESTORE GPRS, THIS ROUTINE PRESERVES THE
024304  004736                          JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
024306  000207          RTS     PC              ;  INITIAL CARRY STATE.
```

```
                        .SBTTL  GLOBAL SUBROUTINE               - UNSDIV -
                        ;++ ************************************************************************
                        ;*                      - UNSIGNED DIVIDE ROUTINE -
                        ;*      THIS SUBROUTINE IS USED TO DIVIDE A 32 BIT UNSIGNED DIVIDEND BY A
                        ;*      16 BIT UNSIGNED DIVISOR GIVING A 16 BIT QUOTIENT.  ALL NUMBERS ARE
                        ;*      CONSIDERED TO BE UNSIGNED.  A SUCCESS FLAG IS NOT SET ON RETURN IF
                        ;*      THE QUOTIENT WAS TOO BIG TO BE CONTAINED IN 16 BITS.
                        ;*
                        ;* INPUTS:      R1 - THE DIVISOR, UNSIGNED, 16 BITS.
                        ;*              R2 - MOST SIGNIFICANT WORD OF THE DIVIDEND, UNSIGNED, 16 BITS.
                        ;*              R3 - LEAST SIGNIFICANT WORD OF THE DIVIDEND, UNSIGNED, 16 BITS.
                        ;*
                        ;* OUTPUTS:     R1 - QUOTIENT, UNSIGNED, 16 BITS (177777 IF OVERFLOW).
                        ;*              CARRY - SUCCESS FLAG, SET IF COMPLETE QUOTIENT FITS IN 16 BITS.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,UNSDIV
                        ;*
                        ;* COMMENTS:    IF THE DIVISOR IS 0 THE QUOTIENT IS RETURNED AS ALL ONES
                        ;*              (177777) AND THE CARRY IS CLEAR REGARDLESS OF THE DIVIDEND.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************

024310                  UNSDIV:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
024310  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
                        ;+
                        ; CHECK FOR QUOTIENT GREATER THAN 16 BITS CONDITION.
                        ;-
024314  010204                  MOV     R2,R4                   ;GET MSW OF DIVIDEND FOR SUBTRACT.
024316  160104                  SUB     R1,R4                   ;SUBTRACT DIVISOR FROM MSW OF DIVIDEND.
024320  103403                  BCS     2$                      ;IF IT DIDN'T GO, WE HAVE QUOTIENT < 16 BITS.
024322  012701  177777          MOV     #-1,R1                  ;SET QUOTIENT TO ALL ONES (177777),
024326  000442                  BR      60$                     ;EXIT WITH CARRY CLEAR.
                        ;+
                        ; SET UP COUNTERS AND VARIOUS WORKING GPRS.
                        ;-
024330  005004          2$:     CLR     R4                      ;CLEAR THE LSW OF THE DIVISOR.
024332  000241                  CLC                             ;CLEAR CARRY FOR THE SHIFT OF THE DIVISOR.
024334  006001                  ROR     R1                      ; DIVISOR BY
024336  006004                  ROR     R4                      ; 2(UNSIGNED)
024340  012700  000020          MOV     #16.,R0                 ;SET UP INITIAL SHIFT COUNT TO 16.
                        ;+
                        ; THE SUBTRACT AND SHIFT LOOP.
                        ;-
024344  010246          4$:     MOV     R2,-(SP)                ;SAVE MSWORD OF DIVIDEND.
024346  010346                  MOV     R3,-(SP)                ;SAVE LSWORD OF DIVIDEND.
024350  160403                  SUB     R4,R3                   ;LSWORD DIVIDEND - LSWORD OF DIVISOR.
024352  005602                  SBC     R2                      ;MSWORD DIVIDEND - BORROW .
024354  103402                  BCS     6$                      ;IF BORROW FROM BORROW SUBTRACT, IT DIDN'T GO.
024356  160102                  SUB     R1,R2                   ;MSWORD DIVIDEND - MSWORD OF DIVISOR.
024360  103003                  BCC     8$                      ;IF NO BORROW, IT WENT, CARRY IS CLEAR.
                            ;+
                            ; IT DIDN'T GO, SO WE SHIFT A 1 INTO THE QUOTIENT (COMPLEMENTED LATER).
                            ; CARRY IS SET.
                            ;-
024362  012603          6$:     MOV     (SP)+,R3                ;RESTORE LSWORD OF DIVIDEND.
```

```
7054  024364  012602                        MOV     (SP)+,R2        ;RESTORE MSWORD OF DIVIDEND.
7055  024366  000401                        BR      10$             ;GOTO SHIFT 1 INTO THE QUOTIENT.
7056                                    ;+
7057                                    ; IT WENT, SO WE RESTORE THE STACK AND SHIFT A 0 INTO QUOTIENT (WILL BE
7058                                    ; COMPLEMENTED LATER).   CARRY IS CLEAR.
7059                                    ;-
7060  024370  012626                    8$:     MOV     (SP)+,(SP)+     ;POP THE SAVED DIVIDEND OFF OF THE STACK.
7061                                    ;+
7062                                    ; SHIFT THE RESULT OF THE SUBTRACT ATTEMPT INTO THE QUOTIENT SHIFT REG.
7063                                    ;-
7064  024372  006105                    10$:    ROL     R5              ;SHIFT NEXT BIT INTO THE INVERTED QUOTIENT.
7065  024374  000241                        CLC                     ;DIVIDE THE
7066  024376  006001                        ROR     R1              ;  DEVISOR BY
7067  024400  006004                        ROR     R4              ;  2 (UNSIGNED).
7068  024402  005300                        DEC     R0              ;COUNT THIS SHIFT AND SUBTRACT.
7069  024404  001357                        BNE     4$              ;LOOP FOR ANOTHER SHIFT & SUB IF NOT DONE.
7070  024406  005105                        COM     R5              ;GET QUOTIENT FROM INVERTED QUOTIENT.
7071                                    ;+
7072                                    ; NOW WE EITHER ROUND UP OR LEAVE QUOTIENT ALONE.
7073                                    ;-
7074  024410  000241                        CLC                     ;CLEAR THE CARRY FOR THE SHIFT OF THE DIVIDEND.
7075  024412  006103                        ROL     R3              ;MULTIPLY LSWORD OF DIVIDEND BY 2, MSWORD IS 0.
7076  024414  103402                        BCS     12$             ;IF CARRY FROM SHIFT, ROUND UP.
7077  024416  160403                        SUB     R4,R3           ;SUBTRACT DIVISOR FROM DIVIDEND.
7078  024420  103403                        BCS     14$             ;IF BORROW, DON'T ROUND UP.
7079                                    ;+
7080                                    ; ROUND UP, EXTRA SUBTRACT WENT.
7081                                    ;-
7082  024422  005205                    12$:    INC     R5              ;INCREMENT THE QUOTIENT BY ONE.
7083  024424  001001                        BNE     14$             ;IF NO OVERFLOW, WE LEAVE THE ROUND UP.
7084  024426  005305                        DEC     R5              ;DON'T LET ROUNDING CAUSE OVERFLOW.
7085                                    ;+
7086                                    ; ALL DONE, PASS QUOTIENT AND EXIT.
7087                                    ;-
7088  024430  010501                    14$:    MOV     R5,R1           ;PASS QUOTIENT BACK IN R1.
7089  024432  000261                        SEC                     ;INDICATE NO OVERFLOW.
7090
7091  024434                            60$:    PASS    R1                      ;RESTORE GPRS, LEAVE THE FOLLOWING INTACT:
7092  024434  010166  000004                                    MOV     R1,R1SLOT(SP)           ;PUT R1 IN STACK SLOT.
7093  024440  004736                                            JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
7094                                                                     ;R1 - 16 BIT, UNSIGNED QUOTIENT,
7095  024442  000207                        RTS     PC                      ;CARRY - SET INDICATES NO OVERFLOW (SUCCESS).
```

```
7096                            .SBTTL  GLOBAL SUBROUTINE                - UPDCHR -
7097                            ;++ ************************************************************************
7098                            ;*              - UPDATE CHARACTER POINTERS AND COUNTERS ROUTINE -
7099                            ;*      THIS SUBROUTINE UPDATES THE POINTERS AND COUNTERS ASSOCIATED WITH
7100                            ;*      THE RECEPTION OF A CHARACTER ON A SPECIFIED LINE.  THE RECEIVE CHAR
7101                            ;*      POINTER IS SET TO THE NEXT EXPECTED CHARACTER, THE RECEIVE CHAR COUNT
7102                            ;*      IS INCREMENTED, AND THE COUNT IS CHECKED TO DETERMINE IF THE RECEPTION
7103                            ;*      IS COMPLETE.  IF THE RECEPTION IS COMPLETE THE RECEPTION DONE FLAG
7104                            ;*      IS SET FOR THE SPECIFIED LINE.
7105                            ;*
7106                            ;* INPUTS:      R3 - LINE NUMBER TIMES 2 OF LINE ON WHICH CHAR WAS RECEIVED.
7107                            ;*              BITTBL - LABEL OF TABLE OF WORDS USED TO FORM SINGLE BIT MAPS.
7108                            ;*              CHCNTB - BASE OF NUMBER OF CHARS TO TX ON EACH LINE TABLE.
7109                            ;*              DPENDB - BASE OF DATA PATTERN END ADDRESSES TABLE.
7110                            ;*              DPLENB - BASE OF DATA PATTERN LENGTHS TABLE.
7111                            ;*              RXCNTB - BASE OF THE RX CHARACTER COUNTERS TABLE.
7112                            ;*              RXPTRB - BASE OF THE RX CHARACTER POINTERS TABLE.
7113                            ;*              TXRXLB - BASE OF TX/RX LINE NUMBER ASSOCIATION TABLE.
7114                            ;*
7115                            ;* OUTPUTS:   FOLLOWING VARIABLES UPDATED FOR LINE ON WHICH CHAR WAS RECEIVED:
7116                            ;*              RXCNT - COUNT OF THE NUMBER OF CHARACTERS RECEIVED ON LINE.
7117                            ;*              RXDONF - RX DONE FLAGS WITH BIT0 FOR LINE 0 ... (UPDATED).
7118                            ;*              RXPTR - UPDATED TO POINT TO THE NEXT EXPECTED CHAR ON LINE.
7119                            ;*
7120                            ;* CALLING SEQUENCE:    JSR     PC,UPDCHR
7121                            ;*
7122                            ;* COMMENTS:
7123                            ;*
7124                            ;* SUBORDINATE ROUTINES CALLED: NONE.
7125                            ;-- ************************************************************************
7126  024444                    UPDCHR:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
7127  024444  004537  005232                   JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
7128  024450  016302  005142            MOV     TXRXLB(R3),R2   ;GET TX LINE NUMBER OFFSET FOR THIS RX LINE.
7129                            ;+
7130                            ; UPDATE THE RX DATA POINTER WITH WRAPAROUND AT THE END OF THE DATA PATTERN.
7131                            ;-
7132  024454  016301  003310            MOV     RXPTRB(R3),R1   ;GET THE RX DATA POINTER FROM THE RX PTR TABLE.
7133  024460  005201                    INC     R1              ;INCREMENT THE RX POINTER VALUE BY 1.
7134  024462  020162  003050            CMP     R1,DPENDB(R2)   ;CMP RX PTR VALUE WITH ADR OF END OF DATA PAT.
7135  024466  103402                   BLO     2$              ;SKIP WRAPPING RX PTR AROUND IF NOT AT END.
7136  024470  166201  003110            SUB     DPLENB(R2),R1   ;WRAP RX PTR AROUND TO START OF DATA PATTERN.
7137  024474  010163  003310    2$:     MOV     R1,RXPTRB(R3)   ;UPDATE THE RX POINTER WITH THE NEW VALUE.
7138                            ;+
7139                            ; UPDATE THE RX CHARACTER COUNT WITH OVERFLOW DETECTION.
7140                            ;-
7141  024500  016301  003450            MOV     RXCNTB(R3),R1   ;GET THE RX CHARACTER COUNT.
7142  024504  005201                    INC     R1              ;INCREMENT THE RX CHAR COUNT VALUE BY 1.
7143  024506  001002                   BNE     4$              ;SKIP SETTING COUNT TO MAX IF NO OVERFLOW.
7144  024510  012701  177777            MOV     #-1,R1          ;SET RX CHAR COUNT VALUE TO MAX VALUE.
7145  024514  010163  003450    4$:     MOV     R1,RXCNTB(R3)   ;UPDATE THE RX CHAR COUNT WITH NEW VALUE.
7146                            ;+
7147                            ; CHECK FOR RX COMPLETION ON THIS LINE.
7148                            ; IF RX IS COMPLETE ON THIS LINE, SET THE CORRECT RX DONE FLAG.
7149                            ;-
7150  024520  016204  003350            MOV     CHCNTB(R2),R4   ;GET THE NUMBER OF TX CHARS IN COMPLETE TX.
7151  024524  020104                    CMP     R1,R4           ;COMPARE RX CHAR COUNT WITH NUMBER OF TX CHARS.
```

```
 7152  024526  103403                    BLO     60$                ;EXIT ROUTINE IF NOT ALL CHARS RECEIVED.
 7153  024530  056337  002332  002412     BIS     BITTBL(R3),RXDONF  ;SET THE RX DONE FLAG FOR THIS LINE.
 7154
 7155  024536                    60$:    PASS                       ;RESTORE GPRS.
 7156  024536  004736                            JSR     PC,@(SP)+          ;RETURN TO PREG05 SUBRT.
 7157  024540  000207                    RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - VANSUP -
                        ;++ ************************************************************************
                        ;*              - TRANSMISSION / RECEPTION SET-UP ROUTINE -
                        ;*
                        ;*              THIS ROUTINE IS USED TO INITIALISE BOTH THE DUT AND THE
                        ;*              TRANSMISSION/RECEPTION CONTROL PARAMETERS TO THE CORRECT
                        ;*              STATE, PRIOR TO A SINGLE CHARACTER OR DMA TRANMISSION,
                        ;*              RECEPTION TEST.
                        ;*
                        ;* INPUTS:      R1 - TX, RX LPR CONTENTS.
                        ;*              R2 - START ADDRESS OF DATA PATTERN TO TRANSMIT.
                        ;*              R3 - LENGTH OF DATA PATTERN.
                        ;*              R4 - NUMBER OF PATTERNS TO TRANSMIT.
                        ;*              ACTLNS - CONTAINS A BIT MAP OF ALL CURRENTLY ACTIVE LINES.
                        ;*              LOPBCK - CONTAINS THE TYPE OF LOOPBACK MODE SELECTED.
                        ;*              CBB - LABEL AT BASE OF TX/RX CONTROL BLOCK.
                        ;*
                        ;* OUTPUTS:     THE CONTENTS OF THE TX/RX CONTROL BLOCK (CCB) ARE DESTROYED.
                        ;*              THE INDIRECT ADDRESS FIELD OF THE DUT CSR MAY BE DESTROYED.
                        ;*              THE DUT'S LPR'S AND LNC'S MAY BE MODIFIED.
                        ;*              THE FOLLOWING POINTERS AND COUNTERS ARE INITIALISED;
                        ;*              CHCNT,CHRTOT,DPEND,DPLEN,EXCNT,RXCNT,RXPTR,TXCNT,
                        ;*              TXPTR,TXRXL.
                        ;*              CHRTOT, RXDONF, TXDONF AND TXINTF ARE CLEARED.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,VANSUP
                        ;*
                        ;* COMMENTS:    MODEM LOOPBACK MODE IS INHIBITED IF IT HAS BEEN SELECTED
                        ;*              VIA HARDWARE P-TABLE QUESTIONS, AND INTERNAL LOOPBACK MODE
                        ;*              IS FORCED TO TAKE PLACE.
                        ;*
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: CONMAP,RXENBL,TXRINI.
                        ;-- ************************************************************************

024542                  VANSUP:: SAVE                   ;SAVE CONTENTS OF THE GPR'S R0 THRU R5.
024542  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
024546  005037  002404          CLR     CHRTOT          ;CLEAR TOTAL RECEIVED CHAR COUNTER.
024552  005037  002252          CLR     TXINTF          ;CLEAR FLAGS USED TO LOG DMA H.OVER ERRORS.
024556  005037  002410          CLR     TXDONF          ;CLEAR THE TX DONE FLAGS.
024562  005037  002412          CLR     RXDONF          ;CLEAR THE RX DONE FLAGS.
                        ;+
                        ;  SET UP THE TRANSMISSION/RECEPTION CONTROL BLOCK TO THE DESIRED STATE.
                        ;-
024566  010137  003030          MOV     R1,CBB          ;SET CONTENTS OF LPR PARAMS IN TX/RX C.BLK.
024572  012701  003030          MOV     #CBB,R1         ;GET BASE ADDRESS OF CONTROL BLOCK.
024576  005201                  INC     R1              ;INCREMENT ADDRESS FOR NEXT WORD
024600  005201                  INC     R1              ;INITIALISE THE FOLLOWING IN THE CNTRL.BLK:
024602  012721  000004          MOV     #4,(R1)+        ; LNCTRL PARAMETER, ENABLE RECEIVERS.
024606  010221                  MOV     R2,(R1)+        ; START ADDRESS OF DATA PATTERN.
024610  010321                  MOV     R3,(R1)+        ; DATA PATTERN LENGTH.
024612  010421                  MOV     R4,(R1)+        ; NUMBER OF DATA PATTERNS TO TRANSMIT.
024614  013721  002174          MOV     ACTLNS,(R1)+    ; BIT MAP OF LINES TO INITIALISE.
024620  032737  000004  002176  BIT     #BIT2,LOPBCK    ;TEST IF MODEM LOOPBACK MODE HAS BEEN SELECTED.
024626  001404                  BEQ     2$              ;DONT SELECT INTERNL LOPBCK IF STAGRD OR LOCAL.
024630  012702  000001          MOV     #1,R2           ;FORCE INTERNAL LOOPBACK MODE TO BE SELECTED.
```

```
7214  024634  110221                          MOVB    R2,(R1)+        ;INITIALISE LOOPBACK MODE IN CONTROL BLOCK.
7215  024636  000402                        BR      4$              ;SKIP NEXT INSTRUCTION IF IN MODEM LOOPBACK.
7216  024640  113721  002176        2$:     MOVB    LOPBCK,(R1)+    ;SET LOOPBACK MODE.
7217  024644  005201                4$:     INC     R1              ;INCREMENT ADDRESS FOR THE NEXT WORD.
7218  024646  012711  000002                MOV     #2,(R1)         ;SET AMOUNT OF OFFSET EACH TX STARTS AT TO 2.
7219                                        ;+
7220                                        ; INITIALISE THE DUT AND THE ASSOCIATED POINTERS AND COUNTERS, TO THE STATE
7221                                        ; DICTATED BY THE CONTENTS OF THE TX/RX CONTROL BLOCK.
7222                                        ;-
7223  024652  004737  023666                JSR     PC,TXRINI       ;INITIALISE DUT.
7224                                        ;+
7225                                        ; INITIALISE POINTERS AND COUNTERS FOR INACTIVE LINES TO ZERO.
7226                                        ;-
7227  024656  012701  000377                MOV     #MAPLNS,R1      ;GET THE LINE BIT MAP FOR ALL LINES.
7228  024662  013702  002174                MOV     ACTLNS,R2       ;GET THE ACTIVE LINE BIT MAP.
7229  024666  005101                        COM     R1              ;
7230  024670  005102                        COM     R2              ;
7231  024672  040102                        BIC     R1,R2           ;GENERATE AN IN-ACTIVE LINE BIT MAP.
7232  024674  010237  003042                MOV     R2,CBMAPA       ;MOVE BIT MAP TO THE CONTROL BLOCK.
7233  024700  005037  003040                CLR     CBDPNA          ;CLEAR THE REPEAT TX COUNT IN CNTRL BLCK.
7234  024704  004737  023666              JSR     PC,TXRINI       ;SET UP PARAMETERS FOR INACTIVE LINES.
7235                                        ;+
7236                                        ; DISABLE RECEIVERS ON ALL LINES TO ENSURE CORRECT INITIALISATION OF ONLY THE
7237                                        ; LINES THAT ARE SELECTED.
7238                                        ;-
7239  024710  012705  000377                MOV     #MAPLNS,R5      ;SET-UP BIT MAP FOR ALL LINES.
7240  024714  004737  022124              JSR     PC,RXDSBL       ;DISABLE RX ON ALL LINES.
7241                                      ;+
7242                                      ; ENABLE RECEIVERS ON ASSOCIATED (RX) LINES.
7243                                      ;-
7244  024720  013705  002174               MOV     ACTLNS,R5       ;GET THE ACTIVE LINE BIT MAP.
7245  024724  004737  015546             JSR     PC,CONMAP       ;GENERATE AN ASSOCIATED LINE BIT MAP.
7246  024730  004737  022220             JSR     PC,RXENBL       ;ENABLE RECEIVERS ON ASSOCIATED LINES.
7247  024734                        60$:    PASS                    ;RESTORE GPR'S.
7248  024734  004736                                JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
7249  024736  000207                        RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - WAIBIS -
                        ;++ ************************************************************************
                        ;*                      - WAIT FOR BIT SET ROUTINE -
                        ;*      THIS SUBROUTINE WAITS FOR THE SPECIFIED BIT TO BECOME SET.  IF THE
                        ;*      SPECIFIED BIT GOES TO A SET STATE WITHIN THE SPECIFIED TIME-OUT
                        ;*      PERIOD A SUCCESS INDICATION IS RETURNED BY THIS ROUTINE.
                        ;*      THE LAST VALUE WHICH IS READ LOOKING FOR THE CONDITION IS RETURNED TO
                        ;*      ALLOW THE USE OF THIS ROUTINE TO LOOK FOR DESTRUCTIVE READ CONDITIONS.
                        ;*
                        ;* INPUTS:      R1 - TIME-OUT VALUE AND BIT NUMBER INDICATION:
                        ;*                BITS 15 THRU 12 - NUMBER OF BIT TO TEST (RANGE 0 THRU 15).
                        ;*                BITS 11 THRU 0  - TIME-OUT VALUE IN MILLI-SECONDS (4095 MAX).
                        ;*              R2 - ADDRESS OF WORD CONTAINING THE BIT TO TEST.
                        ;*                   MSLCNT.
                        ;*
                        ;* OUTPUTS:     R2 - THE LAST WORD WHICH WAS READ TO CHECK FOR THE CONDITION.
                        ;*              CARRY - SUCCESS FLAG (CARRY SET IF BIT SET BEFORE TIME-OUT).
                        ;*
                        ;* CALLING SEQUENCE:    MOV     #130040,R1      ;PASS BIT 11 (13 OCTAL) AND
                        ;*                                              ;  32 (40 OCTAL) MS DELAY.
                        ;*                      MOV     #LABEL,R2       ;TEST BIT IN WORD AT "LABEL".
                        ;*                      JSR     PC,WAIBIS       ;WAIT 32 MS FOR BIT 11 TO SET.
                        ;*
                        ;* COMMENTS:
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: MSLGET.
                        ;-- ************************************************************************

024740                  WAIBIS:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
024740  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
024744  010204                  MOV     R2,R4                   ;SET UP THE ADDRESS PARAMETER FOR MSLGET.
024746  010102                  MOV     R1,R2
024750  042701  170000          BIC     #170000,R1              ;SEPERATE DELAY COUNT OUT OF PASSED PARAMETER.
024754  042702  007777          BIC     #7777,R2                ;SEPERATE LINE NUMBER FIELD OF PASSED PARAM.
024760  000302                  SWAB    R2                      ;PUT LINE NUMBER FIELD IN LSBYTE.
024762  006202                  ASR     R2                      ;SHIFT THE LINE NUMBER FIELD INTO THE PROPER
024764  006202                  ASR     R2                      ;  POSITION TO USE IT AS A WORD TABLE OFFSET
024766  006202                  ASR     R2                      ;  FOR THE TABLE LOOKUP OF THE LINE BIT MAP.
024770  016202  002332          MOV     BITTBL(R2),R2           ;GET BIT MAP OF LINE TO TEST FROM TABLE.
024774  010203                  MOV     R2,R3                   ;INDICATE THAT THE BIT SHOULD BE SET.
024776  004737  017340          JSR     PC,MSLGET               ;WAIT FOR THE BIT TO BE SET WITHIN TIME-OUT.
                                                                ;  CARRY IS CORRECT UPON MSLGET RETURN.
025002  010002                  MOV     R0,R2                   ;PASS LAST VALUE READ AS OUTPUT PARAMETER.
025004                  60$:    PASS    R2                      ;RESTORE GPRS, EXCEPT THE FOLLOWING:
025004  010266  000006                          MOV     R2,R2SLOT(SP)           ;PUT R2 IN STACK SLOT.
025010  004736                              JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
                                                                ;  R2 - LAST VALUE READ LOOKING FOR CONDITION.
025012  000207                  RTS     PC                      ;  CARRY - SUCCESS FLAG (SET IF BIT FOUND SET).
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - WTWLNC -
                        ;++ ************************************************************************
                        ;*                      - LINE CONTROL REGISTER SETUP ROUTINE -
                        ;*      THIS SUBROUTINE IS USED TO SET THE DEVICE UNDER TEST (DUT) LINE
                        ;*      CONTROL REGISTERS (LNCTRL) TO THE SPECIFIED STATE.  ONLY THE LNCTRLS
                        ;*      FOR THE SPECIFIED LINES ARE ALTERED.
                        ;*
                        ;* INPUTS:      R0 - NEW LINE PARAMETERS.
                        ;*              R5 - BIT MAP OF LINES TO BE ALTERED.
                        ;*              CSRA - CONTAINS ADDRESS OF THE DUT CSR.
                        ;*              IESTAT - CONTAINS THE CURRENT STATE OF THE TX AND RX INTERRUPT
                        ;*               ENABLE BITS IN THE CSR.
                        ;*              LNCTRA - CONTAINS ADDRESS OF THE DUT LNCTRL REGISTERS.
                        ;*
                        ;* OUTPUTS:     LNCTRL - SPECIFIED DUT LINE CONTROL REGISTERS ARE ALTERED.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,WTWLNC
                        ;*
                        ;* COMMENTS:
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: ALTFLD.
                        ;-- ************************************************************************

025014                  WTWLNC:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
025014  004537  005232                  JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
                        ;+
                        ; SET UP THE PARAMETERS FOR THE CALL TO ALTFLD.
                        ;-
025020  013701  002212          MOV     LNCTRA,R1       ;SET UP THE REGISTER ADDRESS PARAMETER.
025024  010002                  MOV     R0,R2           ;SET UP THE DESIRED REGISTER CONTENTS.
025026  010503                  MOV     R5,R3           ;SET UP THE BIT MAP OF LINES TO ALTER.
025030  012704  177777          MOV     #-1,R4          ;SELECT ALL REGISTER BITS TO BE ALTERED.
                        ;+
                        ; CALL THE SUBROUTINE WHICH ALTERS THE REGISTER CONTENTS.
                        ;-
025034  004737  014150          JSR     PC,ALTFLD       ;ALTER THE REGISTER CONTENTS.

025040                  60$:    PASS                    ;RESTORE GPRS.
025040  004736                          JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
025042  000207                  RTS     PC
```

```
                        .SBTTL  GLOBAL SUBROUTINE                - WTWLPR -
                        ;++ ************************************************************************
                        ;*                      - LINE PARAMETER REGISTER SETUP ROUTINE -
                        ;*      THIS SUBROUTINE IS USED TO SET THE DEVICE UNDER TEST (DUT) LINE
                        ;*      PARAMETER REGISTERS (LPR) TO THE SPECIFIED STATE.  ONLY THE LPRS FOR
                        ;*      THE SPECIFIED LINES ARE ALTERED.
                        ;*
                        ;* INPUTS:      R0 - NEW LINE PARAMETERS.
                        ;*              R5 - BIT MAP OF LINES TO BE ALTERED.
                        ;*              CSRA - CONTAINS ADDRESS OF THE DUT CSR.
                        ;*              IESTAT - CONTAINS THE CURRENT STATE OF THE TX AND RX INTERRUPT
                        ;*               ENABLE BITS IN THE CSR.
                        ;*              LPRA - CONTAINS ADDRESS OF THE DUT LPR.
                        ;*
                        ;* OUTPUTS:     LPR - SPECIFIED DUT LINE PARAMTER REGISTERS ARE ALTERED.
                        ;*
                        ;* CALLING SEQUENCE:    JSR     PC,WTWLPR
                        ;*
                        ;* COMMENTS:
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: ALTFLD.
                        ;-- ************************************************************************

025044                  WTWLPR:: SAVE                           ;SAVE CONTENTS OF GPRS R0 THRU R5.
025044  004537  005232                JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
                        ;+
                        ; SET UP THE PARAMETERS FOR THE CALL TO ALTFLD.
                        ;-
025050  013701  002206          MOV     LPRA,R1         ;SET UP THE REGISTER ADDRESS PARAMETER.
025054  010002                  MOV     R0,R2           ;SET UP THE DESIRED REGISTER CONTENTS.
025056  010503                  MOV     R5,R3           ;SET UP THE BIT MAP OF LINES TO ALTER.
025060  012704  177777          MOV     #-1,R4          ;SELECT ALL REGISTER BITS TO BE ALTERED.
                        ;+
                        ; CALL THE SUBROUTINE WHICH ALTERS THE REGISTER CONTENTS.
                        ;-
025064  004737  014150          JSR     PC,ALTFLD       ;ALTER THE REGISTER CONTENTS.

025070                  60$:    PASS                            ;RESTORE GPRS.
025070  004736                          JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
025072  000207                  RTS     PC
```

```
                                .SBTTL  INTERRUPT SERVICE ROUTINE       - CLKINT -
                                ;++ ************************************************************************
                                ;*      THIS ROUTINE IS EXECUTED CLKHRZ TIMES PER SECOND.  IT DECREMENTS THE
                                ;*      TWO TIMER COUNTERS DOWN TO ZERO.
                                ;*
                                ;* INPUTS:      TIMER1 - TIMER COUNTER #1.
                                ;*              TIMER2 - TIMER COUNTER #2.
                                ;*              TIMER3 - TIMER COUNTER FOR CALL OF BREAK MACRO.
                                ;*
                                ;* OUTPUTS:     THE 2 TIMER COUNTERS ARE DECREMENTED IF THEY ARE NOT ZERO.
                                ;*
                                ;* CALLING SEQUENCE:    PUT #CLKINT IN THE CLOCK INTERRUPT VECTOR SLOT.
                                ;*                      PUT THE DESIRED TIME PERIOD (SECONDS TIMES CLKHRZ) IN
                                ;*                      EITHER TIMER1 OR TIMER2 AND POLL THE RESPECTIVE TIMER
                                ;*                      COUNTER TO DETECT ITS GOING TO 0 ON TIME-OUT.
                                ;*
                                ;* COMMENTS:    THE 2 COUNTERS WILL NOT WRAPAROUND BUT WILL STOP AT 0.  THIS
                                ;*              ALLOWS THE DETECTION OF A TIME-OUT ANY TIME AFTER THE TIME-OUT
                                ;*              HAS OCCURRED UNTIL THE TIMER COUNTER IS SET TO ANOTHER VALUE.
                                ;*
                                ;* SUBORDINATE ROUTINES CALLED: NONE.
                                ;-- ************************************************************************

7401  025074  005737  002270   CLKINT:: TST     TIMER1          ;CHECK FOR TIMER1 AT ZERO.
7402  025100  001402                   BEQ     2$              ;BRANCH TO LEAVE IT AT ZERO IF IT IS ZERO.
7403  025102  005337  002270           DEC     TIMER1          ;DECREMENT TIME COUNT.
7404  025106  005737  002272   2$:     TST     TIMER2          ;CHECK FOR TIMER2 AT ZERO.
7405  025112  001402                   BEQ     4$              ;BRANCH TO LEAVE IT ALONE IF IT'S ALREADY ZERO.
7406  025114  005337  002272           DEC     TIMER2          ;DECREMENT TIME COUNT.
7407  025120  005337  002274   4$:     DEC     TIMER3          ;DECREMENT THE BREAK COUNT.
7408  025124  001006                   BNE     60$             ;EXIT IF NOT TIME TO CALL BREAK.
7409  025126  013737  002276  002274   MOV     BCOUNT,TIMER3   ;SET UP TIME TILL NEXT BREAK.
7410  025134  010046                   MOV     R0,-(SP)        ;SAVE CONTENTS OF R0 FROM BREAK MACRO.
7411  025136                           BREAK                   ;CHECK FOR OPERATOR CONTROL/C.
7412  025136  104422                                                   TRAP    C$BRK
7413  025140  012600                   MOV     (SP)+,R0        ;RESTORE CONTENTS OF R0.
7414  025142  000002           60$:    RTI
```

```
                        .SBTTL  INTERRUPT SERVICE ROUTINE       - RXCHRS -
                        ;++ ************************************************************************
                        ;*              - DMA RECEIVE INTERRUPT SERVICE ROUTINE -
                        ;*      THIS ROUTINE EXECUTES IN RESPONSE TO AN INTERRUPT CAUSED BY THE DUT
                        ;*      RX.DATA.AVAIL BIT BECOMING ACTIVE.  THIS ROUTINE READS CHARACTERS FROM
                        ;*      THE DUT RECEIVE CHARACTER FIFO AND DEPOSITS THEM INTO THE RECEIVE
                        ;*      BUFFER IN MEMORY.  IF THE NUMBER OF CHARACTERS IN THE RECEIVE BUFFER
                        ;*      EXCEEDS A SPECIFIED THRESHOLD, TRANSMISSION IS HALTED (BY CLEARING ALL
                        ;*      DUT TX.ENABLE BITS) AND IF THE RECEIVE BUFFER IS FULL RECEPTION IS
                        ;*      HALTED (BY DISABLING RX INTERRUPTS).  THE ROUTINE EXITS IF THE RECEIVE
                        ;*      BUFFER BECOMES FULL OR IF A CHARACTER IS READ FROM THE FIFO WITH THE
                        ;*      DATA.VALID BIT CLEAR.
                        ;*
                        ;* INPUTS:      RBUFA - CONTAINS ADDRESS OF THE DUT RX CHARACTER FIFO.
                        ;*              RXBCNT - RX BUFFER CHARACTER COUNT.
                        ;*              RXBDTX - EQUATED TO RX BUFFER LEVEL AT WHICH TO DISABLE TX.
                        ;*              RXBEND - LABEL AFTER END OF THE RX BUFFER AREA IN MEMORY.
                        ;*              RXBFUL - EQUATED TO THE CAPACITY OF THE RX BUFFER.
                        ;*              RXBIPT - POINTER TO NEXT AVAILABLE INPUT SLOT OF RX BUFFER.
                        ;*              RXBSTA - LABEL AT START OF RX BUFFER AREA IN MEMORY.
                        ;*
                        ;* OUTPUTS:     RXBIPT - UPDATED TO POINT TO NEXT INPUT SLOT OF RX BUFFER.
                        ;*              RXBCNT - RX BUFFER CHARACTER COUNT (INCREMENTED).
                        ;*              TXENBM - MAP OF PREVIOUS DUT TX.ENABLE STATES.
                        ;*              CARRY - "SUCCESS" FLAG (SET IF BUFFER IS NOT FULL).
                        ;*
                        ;* CALLING SEQUENCE:    PUT THE ADDRESS OF THE LABEL RXCHRS IN THE VECTOR
                        ;*                      LOCATION.
                        ;*
                        ;* COMMENTS:    IF THE RX BUFFER IS FULL UPON ENTRY, THIS ROUTINE ABORTS THE
                        ;*              PROGRAM.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: RXIE0,TXDSBL.
                        ;-- ************************************************************************

 025144 010246          RXCHRS::        MOV     R2,-(SP)        ;SAVE CONTENTS OF GPR R2.
 025146 017702 155032   2$:     MOV     @RBUFA,R2       ;READ A CHARACTER FROM THE DUT RX FIFO.
 025152 100054                  BPL     60$             ;EXIT THE ROUTINE IF THE DATA.VALID BIT IS CLR.

 025154 023727 002624 000100            CMP     RXBCNT,#RXBFUL  ;COMPARE BUFFER COUNT WITH BUFFER CAPACITY.
 025162 103402                  BLO     4$              ;SKIP ABORT IF BUFFER IS NOT FULL.
 025164 004737 020024           JSR     PC,OOPS         ;ABORT, MUST BE A PROGRAM BUG.
 025170 010277 155426   4$:     MOV     R2,@RXBIPT      ;PUT THE CHAR IN THE BUFFER.
 025174 062737 000002 002622            ADD     #2,RXBIPT       ;UPDATE POINTER TO THE NEXT BUFFER SLOT.
 025202 023727 002622 003026            CMP     RXBIPT,#RXBEND  ;CHECK IF POINTER SHOULD WRAP AROUND.
 025210 103403                  BLO     6$              ;SKIP WRAPAROUND IF POINTER IS NOT AT END.
 025212 012737 002626 002622            MOV     #RXBSTA,RXBIPT  ;WRAP INPUT POINTER AROUND.

 025220 005237 002624   6$:     INC     RXBCNT          ;COUNT THIS CHARACTER AS BEING IN THE BUFFER.
 025224 023727 002624 000030            CMP     RXBCNT,#RXBDTX  ;CHECK FOR BUFFER AT DISABLE TX LEVEL.
 025232 001016                  BNE     8$              ;SKIP DISABLING TX IF BUFFER LEVEL NOT CORRECT.
 025234 005737 002414           TST     TXDBLF          ;CHECK STATE OF TX DISABLE FLAG.
 025240 100413                  BMI     8$              ;BRANCH IF TRANSMISSION ALREADY DISABLED.
 025242 010546                  MOV     R5,-(SP)        ;SAVE THE VALUE OF GPR R5.
 025244 012705 000377           MOV     #MAPLNS,R5      ;SPECIFY THAT ALL LINES SHOULD BE AFFECTED.
 025250 004737 023316           JSR     PC,TXDSBL       ;CLEAR THE TX ENABLES FOR ALL LINES.
```

```
 7471  025254  010537  002250                    MOV     R5,TXENBM       ;SAVE PREVIOUS TX ENABLE STATES IN STORAGE.
 7472  025260  012605                            MOV     (SP)+,R5        ;RESTORE GPR R5.
 7473  025262  012737  100000  002414            MOV     #BIT15,TXDBLF   ;PREVENT TX FROM BEING DISABLED AGAIN.
 7474
 7475  025270  023727  002624  000100  8$:       CMP     RXBCNT,#RXBFUL  ;CHECK FOR BUFFER FULL CONDITION.
 7476  025276  103723                            BLO     2$              ;LOOP TO READ ANOTHER CHAR IF BUFFER NOT FULL.
 7477
 7478  025300  004737  022314                    JSR     PC,RXIE0        ;BUFFER IS FULL, DISABLE RX INTERRUPTS.
 7479
 7480  025304  012602                    60$:    MOV     (SP)+,R2        ;RESTORE R2 TO ITS SAVED VALUE.
 7481  025306  000002                            RTI
```

```
                        .SBTTL  GLOBAL TRAP SERVICE ROUTINE     - TP4RTN -
                        ;*************************************************************************
                        ;*      BUS TIME-OUT TRAP (004 TRAP) SERVICE ROUTINE -
                        ;*      THIS ROUTINE IS USED DURING THE DEVICE REGISTER ADDRESS ACCESS TEST.
                        ;*      IT DETERMINES IF THE 004 TRAP WAS CAUSED BY AN 'EXPECTED" ERROR OR
                        ;*      NOT BY EXAMINING THE RETURN PC VALUE ON THE STACK.  IF THE TRAP IS
                        ;*      UNEXPECTED, THIS ROUTINE JUMPS TO THE NORMAL DIAGNOSTIC SUPERVISOR
                        ;*      004 TRAP HANDLING ROUTINE.
                        ;*
                        ;* INPUTS:      SP - POINTS TO THE PC WHERE THE TRAP OCCURED.
                        ;*              ADRPTR - LABEL AT THE ADDRESS WHERE 'EXPECTED" TRAPS OCCUR.
                        ;*              TP4FLG - 004 TRAP FLAGS.
                        ;*
                        ;* OUTPUTS:     TP4FLG - BIT 15 IS SET IF 'EXPECTED" TRAP OCCURED.
                        ;*
                        ;* CALLING SEQUENCE:    PUT ADDRESS POINTED TO BY TP4RTN IN 004 VECTOR.
                        ;*                      OCCURENCE OF 004 TRAP VECTORS TO THIS ROUTINE.
                        ;*
                        ;* COMMENTS:    ANY 004 TRAP WHICH OCCURS AT AN ADDRESS OTHER THAN THAT LABELED
                        ;*              ADRPTR WILL BE HANDLED BY THE NORMAL 004 TRAP SERVICE ROUTINE.
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;*************************************************************************

025310  021627  015464        TP4RTN:: CMP     (SP),#ADRPTR    ;COMPARE EXPECTED ADR AGAINST TRAP RET PC.
025314  001402                  BEQ     2$              ;IF THEY MATCH, CONTINUE THIS ROUTINE.
025316  000177  154732          JMP     @TP4VEC         ;IF NOT,JUMP TO NORMAL 004 TRAP SERVICE RTN.
025322  052737  100000  002256  2$:     BIS     #BIT15,TP4FLG   ;SET THE 004 TRAP OCCURED FLAG.
025330  000002                  RTI                     ;ALL DONE, GO BACK TO THE TEST.
```

```
                        .SBTTL  INTERRUPT SERVICE ROUTINE       - TXDMA -
                        ;++ ************************************************************************************
                        ;*              - DMA TRANSMIT INTERRUPT SERVICE ROUTINE -
                        ;*      THIS ROUTINE EXECUTES IN RESPONSE TO AN INTERRUPT CAUSED BY THE DUT
                        ;*      TX.ACTION BIT BECOMING ACTIVE.  THIS ROUTINE INITIATES THE TX OF A
                        ;*      NEW DMA BUFFER OF CHARACTERS OR SETS THE TX DONE FLAG FOR THE CORRECT
                        ;*      LINE IF TX IS COMPLETE ON THAT LINE.
                        ;*
                        ;* INPUTS:      BITTBL - LABEL OF TABLE OF WORDS EACH WITH A BIT SET.
                        ;*              CNCNTB - BASE OF # OF CHARS TO TX/RX TABLE.
                        ;*              CSRA - CONTAINS THE ADDRESS OF THE DUT CSR.
                        ;*              DPENDB - BASE OF THE DATA PATTERN END TABLE (ENTRY PER LINE).
                        ;*              DPLENB - BASE OF THE DATA PATTERN LENGTH TABLE.
                        ;*              IESTAT - PRESERVED STATES OF THE DUT INTERRUPT ENABLE BITS.
                        ;*              TXCNTB - LABLE AT BASE OF THE TX CHARACTER COUNTER TABLE.
                        ;*              TXPTRB - LABEL AT BASE OF THE TX DATA PATTERN POINTERS TABLE.
                        ;*
                        ;* OUTPUTS:     TXCNTX - COUNTERS INCREMENTED FOR LINES ON WHICH CHARS SENT.
                        ;*              TXDONF - TX DONE FLAGS SET FOR LINES WHICH HAVE SENT ALL CHARS.
                        ;*              TXINTF - TX INT FLAGS (BIT SET IF DMA.HO FOUND SET ON LINE).
                        ;*
                        ;* CALLING SEQUENCE:    PUT THE ADDRESS OF THE LABEL TXDMA IN THE VECTOR
                        ;*                      LOCATION.
                        ;*
                        ;* COMMENTS:
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: DODMA.
                        ;-- ************************************************************************************

 025332                 TXDMA:: SAVE                    ;SAVE CONTENTS OF GPRS R0 THRU R5.
 025332 004537 005232           JSR     R5,PREG05       ;CALL REGISTER SAVE SUBRT.
 025336 017701 154640           MOV     @CSRA,R1        ;READ THE CONTENTS OF THE DUT CSR.
 025342 010100                  MOV     R1,R0           ;SAVE INITIAL CONTENTS OF IND.ADR.REG FIELD.
 025344 000402                  BR      4$              ;BRANCH TO SKIP DOUBL READING OF DUT CSR.
                        ;+
                        ; READ THE CONTENTS OF THE DUT CSR.  THIS WILL CLEAR THE TX.ACTION CSR BIT.
                        ; IF TX.ACTION IS NOT SET, EXIT THIS ROUTINE.
                        ; DETERMINE THE LINE FOR WHICH THE TX.ACTION WAS SET.
                        ; CALCULATE AN OFFSET FOR USE IN ACCESSING TABLES (2 TIMES THE LINE NUMBER).
                        ; GET THE BIT MAP OF THIS LINE.
                        ;-
 025346 017701 154630   2$:     MOV     @CSRA,R1        ;READ THE CONTENTS OF THE DUT CSR.
 025352 100033          4$:    BPL     6O$             ;EXIT ROUTINE IF TX.ACTION IS CLEAR.
 025354 000301                  SWAB    R1              ;CALCULATE THE LINE NUMBER OF THE LINE WHICH IS
 025356 042701 177760           BIC     #177760,R1      ;  ASSOCIATED WITH THE TX.ACTION.
 025362 010104                  MOV     R1,R4           ;CALCULATE AN OFFSET FOR USE IN ACCESSING
 025364 006304                  ASL     R4              ;  LINE COUNTER AND POINTER IN TABLES.
 025366 016405 002332           MOV     BITTBL(R4),R5   ;GET THE BIT MAP OF THIS LINE.
                        ;+
                        ; GET THE TX CHARACTER COUNTER FOR THIS LINE.
                        ; IF ALL THE CHARACTERS HAVE BEEN SENT FOR THIS LINE:
                        ;    SET THE TX DONE FLAG FOR THIS LINE.
                        ;    DON'T SEND A CHAR TO THE LINE (NO MORE TX.ACTIONS ON THIS LINE).
                        ;    LOOP TO CHECK THE TX.ACTION FOR ANOTHER LINE.
                        ;-
 025372 026464 003410 003350            CMP     TXCNTB(R4),CHCNTB(R4) ;COMPARE # CHARS SENT AND TX COUNT.
```

```
 7567  025400  103403                        BLO     6$                      ;GO TO SEND A CHAR IF NOT ALL CHARS SENT.
 7568  025402  050537  002410                 BIS     R5,TXDONF               ;SET THIS LINE'S TX DONE FLAG.
 7569  025406  000757                        BR      2$                      ;LOOP TO CHECK TX.ACTION AGAIN.
 7570                                  ;+
 7571                                  ; START THE DMA OF THE NEXT BUFFER (DATA PATTERN) ON THIS LINE.
 7572                                  ;    GET THE DATA PATTERN LENGTH FOR THIS LINE.
 7573                                  ;    GET THE START ADDRESS OF THE DATA PATTERN.
 7574                                  ;-
 7575  025410  016403  003110          6$:      MOV     DPLENB(R4),R3   ;PASS DATA PATTERN LENGTH FOR LINE TO DODMA.
 7576  025414  016402  003250                   MOV     TXPTRB(R4),R2   ;PASS THE TX START ADR TO DODMA.
 7577                                      ;+
 7578                                      ; WRITE DMA PARAMETERS TO THE DUT.
 7579                                      ;-
 7580  025420  004737  015662                   JSR     PC,DODMA
 7581  025424  103403                           BCS     8$              ;SKIP ERROR IF DODMA WAS SUCCESSFUL.
 7582                                      ;+
 7583                                      ; SET THE PROPER BIT OF THE TX INTERRUPT FLAGS TO INDICATE THE LINE ERROR.
 7584                                      ;-
 7585  025426  050537  002252                    BIS     R5,TXINTF       ;INDICATE THE ERROR.
 7586  025432  000402                           BR      10$             ;SKIP UPDATING POINTERS AND COUNTERS.
 7587                                      ;+
 7588                                      ; UPDATE THE TX CHARACTER FOR THIS LINE.
 7589                                      ; UPDATE THE TX BUFFER POINTER FOR THIS LINE.
 7590                                      ;-
 7591  025434  060364  003410          8$:      ADD     R3,TXCNTB(R4)   ;ADD THE DATA PAT LENGTH TO THE TX COUNT.
 7592                                  ;+
 7593                                  ; LOOP TO CHECK THE TX.ACTION BIT FOR ANOTHER LINE.
 7594                                  ;-
 7595  025440  000742                  10$:    BR      2$              ;LOOP BACK TO CHECK TX.ACTION BIT AGAIN.
 7596
 7597  025442  013701  002234          60$:     MOV     IESTAT,R1       ;GET THE PRESENT STATES OF TX.IE & RX.IE BITS.
 7598  025446  042700  177760                   BIC     #177760,R0      ;GET SAVED IND.ADR.REG FIELD BITS.
 7599  025452  050001                           BIS     R0,R1           ;COMBINE IND.ADR.REG FIELD BITS WITH IE BITS.
 7600  025454  010177  154522                   MOV     R1,@CSRA        ;RESTORE THE DUT CSR IND.ADR.REG FIELD.
 7601  025460                                  PASS                    ;RESTORE GPRS.
 7602  025460  004736                                          JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
 7603  025462  000002                          RTI
```

```
                        .SBTTL  INTERRUPT SERVICE ROUTINE       - TXSCHR -
                        ;++ ************************************************************************
                        ;*      - SINGLE CHARACTER MODE TRANSMIT INTERRUPT SERVICE ROUTINE -
                        ;*      THIS ROUTINE EXECUTES IN RESPONSE TO AN ITERRUPT CAUSED BY THE DUT
                        ;*      TX.ACTION BIT BECOMING ACTIVE.  THIS ROUTINE SENDS THE NEXT TX CHAR
                        ;*      OR SETS THE TX DONE FLAG FOR THE CORRECT LINE IF TX IS COMPLETE ON
                        ;*      THAT LINE.
                        ;*
                        ;* INPUTS:      ACTLNS - BIT MAP OF ACTIVE DUT LINES.
                        ;*              BITTBL - LABEL OF TABLE OF WORDS EACH WITH A BIT SET.
                        ;*              CHCNTB - BASE OF # OF CHARS TO TX/RX TABLE.
                        ;*              CSRA - CONTAINS THE ADDRESS OF THE CSR.
                        ;*              DPENDB - BASE OF THE DATA PATTERN END TABLE (ENTRY PER LINE).
                        ;*              DPLENB - BASE OF THE DATA PATTERN LENGTH TABLE.
                        ;*              IACBIT - BIT MASK OF INACTIVE TX/RX BITS.
                        ;*              IBM - INACTIVE BITS MASK (REFLECTING BITS PER CHAR).
                        ;*              TXCHRA - CONTAINS THE ADDRESS OF THE DUT TXCHAR REGISTER.
                        ;*              TXCNTB - LABEL AT BASE OF TX CHARACTER COUNTERS TABLE.
                        ;*              TXPTRB - LABEL AT THE BASE ADDRESS OF THE TX POINTERS TABLE.
                        ;*
                        ;* OUTPUTS:     CSR - DUT CSR IND.ADR.REG FIELD IS DESTROYED.
                        ;*              TXCHAR - DUT TXCHARS HAVE WORDS WRITTEN TO THEM.
                        ;*              TXCNTX - COUNTERS INCREMENTED FOR LINES ON WHICH CHARS SENT.
                        ;*              TXDONF - TX DONE FLAGS SET FOR LINES WHICH HAVE SENT ALL CHARS.
                        ;*              TXPTRB - EACH POINTER IN TABLE POINTS TO NEXT TX CHAR FOR LINE.
                        ;*
                        ;* CALLING SEQUENCE:    PUT THE ADDRESS OF THE LABEL TXSCHR IN THE VECTOR
                        ;*                      LOCATION.
                        ;*
                        ;* COMMENTS:
                        ;*
                        ;* SUBORDINATE ROUTINES CALLED: NONE.
                        ;-- ************************************************************************

                        TXSCHR:: SAVE                   ;SAVE CONTENTS OF GPRS R0 THRU R5.
                                 JSR    R5,PREG05       ;CALL REGISTER SAVE SUBRT.
                                 MOV    @CSRA,R1        ;READ THE CONTENTS OF THE DUT CSR.
                                 MOV    R1,R5           ;SAVE THE CONTENTS OF THE DUT IND.ADR.REG
                                 BIC    #137660,R5      ;  FIELD FOR RESTORATION BEFORE RETURN.
                                 MOV    R5,-(SP)        ;SAVE THE DUT IN.ADD FIELD ON THE STACK.
                                 CLR    R5              ;CLEAR CHARACTER TRANSMISSION COUNTER.
                                 TST    R1              ;SET FLAG FOR TEST AFTER THE FOLLOWING BRANCH.
                                BR      4$              ;GO HANDLE THE LINE THAT GOT THE TX.ACTION.
                        ;+
                        ; READ THE CONTENTS OF THE DUT CSR.  THIS WILL CLEAR THE TX.ACTION CSR BIT.
                        ; IF TX.ACTION IS NOT SET, EXIT THIS ROUTINE.
                        ; DETERMINE THE LINE FOR WHICH THE TX.ACTION WAS SET.
                        ; CALCULATE AN OFFSET FOR USE IN ACCESSING TABLES (2 TIMES THE LINE NUMBER).
                        ; DETERMINE THE STATES OF THE DUT CSR INTERRUPT ENABLE BITS.
                        ;-
                        2$:      MOV    @CSRA,R1        ;READ THE CONTENTS OF THE DUT CSR.
                        4$:     BPL     60$             ;EXIT ROUTINE IF TX.ACTION IS CLEAR.
                                 MOV    R1,R2           ;CALCULATE THE LINE NUMBER
                                 SWAB   R2              ;  OF THE LINE WHICH IS
                                 BIC    #177760,R2      ;  ASSOCIATED WITH THE TX.ACTION.
                                 MOV    R2,R3           ;CALCULATE AN OFFSET FOR USE IN ACCESSING
```

```
7660  025532  006303                        ASL     R3                      ;  LINE COUNTER AND POINTER IN TABLES.
7661  025534  042701  137677                BIC     #137677,R1              ;GET BIT MASK OF INTERRUPT ENABLE STATES.
7662                                  ;+
7663                                  ; GET THE TX CHARACTER COUNTER FOR THIS LINE.
7664                                  ; IF ALL THE CHARACTERS HAVE BEEN SENT FOR THIS LINE:
7665                                  ;    SET THE TX DONE FLAG FOR THIS LINE.
7666                                  ;    DON'T SEND A CHAR TO THE LINE (NO MORE TX.ACTIONS ON THIS LINE).
7667                                  ;    LOOP TO CHECK THE TX.ACTION FOR ANOTHER LINE.
7668                                  ;-
7669  025540  026363  003410  003350          CMP     TXCNTB(R3),CHCNTB(R3)  ;COMPARE TX CHAR COUNT AND # TO TX.
7670  025546  103404                       BLO     6$                      ;GO TO SEND A CHAR IF NOT ALL CHARS SENT.
7671  025550  056337  002332  002410         BIS     BITTBL(R3),TXDONF       ;SET THIS LINE'S TX DONE FLAG.
7672  025556  000757                       BR      4$                      ;LOOP TO CHECK TX.ACTION AGAIN.
7673                                  ;+
7674                                  ; SEND THE NEXT CHAR TO THE SPECIFIED LINE.
7675                                  ;    SET UP THE IND.ADR.REG FIELD OF THE DUT CSR USING THE PREVIOUSLY READ
7676                                  ;       STATES OF THE INTERRUPT ENABLE BITS.
7677                                  ;    FETCH THE CORRECT CHARACTER FROM THE DATA PATTERN.
7678                                  ;    UPDATE THE DATA PATTERN POINTER FOR THIS LINE USING WRAPAROUND.
7679                                  ;    MASK OUT INACTIVE DATA BITS AND SEND THE CHARACTER.
7680                                  ;    COUNT THE CHARACTER ON THE TX CHAR COUNTER FOR THE LINE.
7681                                  ;    DECREMENT THE FIFO SLACK COUNT TO RESERVE ROOM FOR THIS CHAR IN THE FIFO.
7682                                  ;    EXIT IF A MAXIMUM OF 8 CHARACTERS HAVE BEEN TRANSMITTED, IE.GIVE RECEPTION
7683                                  ;    A CHANCE TO REMOVE CHARACTERS FROM THE FIFO.
7684                                  ;-
7685  025560  050201                  6$:     BIS     R2,R1                   ;SET UP THE IND.ADR.REG FIELD OF THE DUT CSR
7686  025562  010177  154414                  MOV     R1,@CSRA                ;  WITHOUT AFFECTING THE INTERRUPT ENABLES.
7687  025566  016304  003250                  MOV     TXPTRB(R3),R4           ;FETCH THE TX POINTER FOR THIS LINE.
7688  025572  112400                          MOVB    (R4)+,R0                ;GET THE NEXT CHAR FOR THIS LINE.
7689  025574  020463  003050                  CMP     R4,DPENDB(R3)           ;COMPARE POINTER WITH END OF DATA PATTERN.
7690  025600  103402                       BLO     8$                      ;SKIP RESETTING OF POINTER IF NOT PAST END.
7691  025602  166304  003110                  SUB     DPLENB(R3),R4           ;WRAP POINTER AROUND TO BEGINNING OF PATTERN.
7692  025606  010463  003250          8$:     MOV     R4,TXPTRB(R3)           ;UPDATE THE TX POINTER FOR THIS LINE.
7693  025612  043700  002226                  BIC     IBM,R0                  ;CLEAR UNUSED BITS OF THE TX CHAR WORD.
7694  025616  052700  100000                  BIS     #BIT15,R0               ;SET THE TX.DATA.VALID BIT OF TX CHAR WORD.
7695  025622  010077  154356                  MOV     R0,@TXCHA               ;SEND THE CHAR TO THE DUT.
7696  025626  005205                          INC     R5                      ;INCREMENT TX CHAR COUNT.
7697  025630  005263  003410                  INC     TXCNTB(R3)              ;INCREMENT THE TX CHAR COUNT FOR THIS LINE.
7698                                  ;+
7699                                  ; LOOP TO CHECK THE TX.ACTION BIT FOR ANOTHER LINE.
7700                                  ;-
7701  025634  020527  000010                  CMP     R5,#NUMLNS              ;CHECK IF MAX NUMBER OF CHAR HAVE BEEN TX'D.
7702  025640  103724                       BLO     2$                      ;LOOP BACK TO CHECK TX.ACTION BIT AGAIN.
7703  025642  012677  154334          60$:    MOV     (SP)+,@CSRA             ;RESTORE THE IND.ADR.REG FIELD OF THE DUT CSR.
7704  025646                          PASS                                    ;RESTORE GPRS.
7705  025646  004736                                  JSR     PC,@(SP)+               ;RETURN TO PREG05 SUBRT.
7706  025650  000002                  RTI
```

```
7707
7708
7709                                    .SBTTL  REPORT CODING SECTION
7710
7711                                    ;++
7712                                    ; THE REPORT CODING SECTION CONTAINS THE
7713                                    ; 'PRINTS" CALLS THAT GENERATE STATISTICAL REPORTS.
7714                                    ;--
7715
7716  025652                                    BGNRPT
7717  025652                                                                  L$RPT::
7718
7719  025652                                    EXIT    RPT
7720  025652  000167                                                                .WORD   J$JMP
7721  025654  000000                                                                .WORD   L10017-2-.
7722
7723                                    .EVEN
7724
7725  025656                                    ENDRPT
7726  025656                                                                  L10017:
7727  025656  104425                                                                TRAP    C$RPT
```

```
 7728                                   .SBTTL  PROTECTION TABLE
 7729
 7730
 7731                                   ;++
 7732                                   ; THIS TABLE IS USED BY THE RUNTIME SERVICES
 7733                                   ; TO PROTECT THE LOAD MEDIA.
 7734                                   ;--
 7735
 7736  025660                                   BGNPROT
 7737  025660                                                                  L$PROT::
 7738
 7739  025660  177777                          -1              ;OFFSET INTO P-TABLE FOR CSR ADDRESS
 7740  025662  177777                          -1              ;OFFSET INTO P-TABLE FOR MASSBUS ADDRESS
 7741  025664  177777                          -1              ;OFFSET INTO P-TABLE FOR DRIVE NUMBER
 7742
 7743  025666                                   ENDPROT
 7744
```

```
                                .SBTTL  INITIALIZE SECTION
                                ;++
                                ;*****************************************************************************
                                ;*      THIS SECTION CONTAINS THE CODE WHICH IS PERFORMED AT THE BEGINNING OF
                                ;*      EACH PASS OR AFTER A CONTINUE COMMAND.
                                ;*      THIS CODE PERFORMS THE FOLLOWING ACTIONS:
                                ;*
                                ;*      MOVES THE INFORMATION HELD IN THE HARDWARE P-TABLE INTO THE GLOBAL
                                ;*      DATA AREA.
                                ;*
                                ;*****************************************************************************
                                ;--
025666                                  BGNINIT
025666                                                                  L$INIT::
                                ;SEE IF PROGRAM JUST STARTED, BR IF YES
025666                                  READEF  #EF.START
025666  012700  000040                                                  MOV     #EF.START,R0
025672  104447                                                          TRAP    C$REFG
025674                                  BCOMPLETE       NEWSTA
025674  103416                                                          BCS     NEWSTA
                                ;SEE IF PROGRAM JUST RESTARTED, BR IF YES
025676                                  READEF  #EF.RESTART
025676  012700  000037                                                  MOV     #EF.RESTART,R0
025702  104447                                                          TRAP    C$REFG
025704                                  BCOMPLETE       NEWRES
025704  103556                                                          BCS     NEWRES
                                ;SEE IF THIS IS A NEW PASS, BR IF YES
025706                                  READEF  #EF.NEW
025706  012700  000035                                                  MOV     #EF.NEW,R0
025712  104447                                                          TRAP    C$REFG
025714                                  BCOMPLETE       NEWPAS
025714  103555                                                          BCS     NEWPAS
                                ;SEE IF PROGRAM WAS JUST CONTINUED
025716                                  READEF  #EF.CONTINUE
025716  012700  000036                                                  MOV     #EF.CONTINUE,R0
025722  104447                                                          TRAP    C$REFG
025724                                  BNCOMPLETE      GETPRM
025724  103161                                                          BCC     GETPRM
025726  000137  026510                  JMP     ENDIT
025732                          NEWSTA:
025732                                  BRESET                  ;RESET THE BUS TO PREVENT ILLEGAL INTERRUPTS.
025732  104433                                                          TRAP    C$RESET
                                ;+
                                ; SET UP FOR LINE TIME CLOCK INTERRUPTS.
                                ;-
025734                                  CLOCK   L,R1            ;GET THE CLOCK PARAMETERS.
025734  012700  000114                                                  MOV     #'L,R0
025740  104462                                                          TRAP    C$CLCK
025742  010001                                                          MOV     R0,R1
025744  012137  002260                  MOV     (R1)+,CLKCSR            ;STORE CLOCK CSR ADDRESS.
025750  012137  002262                  MOV     (R1)+,CLKBRL            ;STORE CLOCK BUS REQ INT LEVEL.
025754  012137  002264                  MOV     (R1)+,CLKVEC            ;STORE CLOCK INTERRUPT VECTOR.
025760  012137  002266                  MOV     (R1)+,CLKHRZ            ;STORE CLOCK FREQUENCY.
025764  023727  002266  000062          CMP     CLKHRZ,#50.             ;TEST FOR 50HZ LINE FREQUENCY.
```

```
7801  025772  001004                        BNE     2$                      ;BRANCH IF CLOCK IS NOT 50HZ.
7802  025774  012737  000024  002300        MOV     #20.,MSTICK             ;INDICATE 20MS PER CLOCK TICK.
7803  026002  000403                        BR      4$
7804  026004  012737  000021  002300  2$:   MOV     #17.,MSTICK             ;INDICATE 17 MS PER CLOCK TICK.
7805  026012                          4$:   SETVEC  CLKVEC,#CLKINT,PRI06    ;INITIALIZE CLOCK INTERRUPT VECTOR.
7806  026012  013746  000300                                                        MOV     PRI06,-(SP)
7807  026016  012746  025074                                                        MOV     #CLKINT,-(SP)
7808  026022  013746  002264                                                        MOV     CLKVEC,-(SP)
7809  026026  012746  000003                                                        MOV     #3,-(SP)
7810  026032  104437                                                                TRAP    C$SVEC
7811  026034  062706  000010                                                        ADD     #10,SP
7812  026040  013700  002266                MOV     CLKHRZ,R0               ;INITIALIZE THE BREAK COUNT
7813  026044  006300                        ASL     R0                      ; TO CAUSE A BREAK
7814  026046  010037  002276                MOV     R0,BCOUNT               ; EVERY 2 SECONDS.
7815  026052                                SETPRI  #PRI05                  ;ALLOW CLOCK INTERRUPTS DISABLE OTHERS.
7816  026052  012700  000240                                                        MOV     #PRI05,R0
7817  026056  104441                                                                TRAP    C$SPRI
7818                                  ;+
7819                                  ; ENABLE THE LINE TIME CLOCK (LTC) CHECKING TO MAKE SURE THAT THE CSR
7820                                  ; IS ACCESSABLE.
7821                                  ;    FIRST SET UP TO CATCH ANY 004 TRAPS WHICH OCCUR:
7822                                  ;-
7823  026060  013737  000004  002254        MOV     4,TP4VEC        ;SAVE THE EXISTING 004 TRAP VECTOR.
7824  026066  012737  025310  000004        MOV     #TP4RTN,4       ;SET 004 TRAP VECTOR TO OUR SERVICE RTN ADR.
7825                                  ;+
7826                                  ;    ENABLE LTC CHECKING FOR 004 TRAP IN CASE CSR IS NOT THERE.
7827                                  ;-
7828  026074  005037  002256                CLR     TP4FLG          ;CLEAR THE 004 TRAP FLAG.
7829  026100  012737  000100  002240        MOV     #BIT6,WORD1     ;SET UP TO SET BIT6 OF THE LTC CSR.
7830  026106  012700  002240                MOV     #WORD1,R0       ;SET UP WORD1 AS THE CKTRAP MOVE SOURCE.
7831  026112  013701  002260                MOV     CLKCSR,R1       ;SET UP LTC CSR AS DESTINATION FOR CKTRAP MOVE.
7832  026116  004737  015452                JSR     PC,CKTRAP       ;MOVE AND CHECK FOR TRAP.
7833  026122  013737  002254  000004        MOV     TP4VEC,4        ;RESTORE THE NORMAL 004 TRAP VECTOR.
7834  026130  103403                        BCS     6$              ;IF NO TRAP, LTC IS THERE SO CONTINUE.
7835  026132  005037  002266                CLR     CLKHRZ          ;CLEAR LTC FREQUENCY WORD TO INDICATE NO LTC.
7836  026136  000402                        BR      8$              ;BYPASS THE FOLLOWING CALIBRATION PROCEDURES.
7837                                  ;+
7838                                  ; CALIBRATE THE DELAY ROUTINE MILLI-SECOND DELAY COUNT VALUE.
7839                                  ;-
7840  026140  004737  014222        6$:     JSR     PC,CALMSL
7841                                  ;+
7842                                  ; CHECK FOR MEMMORY MANAGEMENT PRESENT ON THIS MACHINE.
7843                                  ; IF MEM MGT IS PRESENT, DISABLE IT.
7844                                  ;-
7845  026144  013737  000004  002254  8$:     MOV     4,TP4VEC        ;SAVE THE EXISTING 004 TRAP VECTOR.
7846  026152  012737  025310  000004        MOV     #TP4RTN,4       ;SET 004 TRAP VECTOR TO OUR SERVICE RTN ADR.
7847  026160  005037  002256                CLR     TP4FLG          ;CLEAR THE 004 TRAP FLAG.
7848  026164  005037  002240                CLR     WORD1           ;PREPARE TO CLEAR THE MEM MGT SR0 REGISTER.
7849  026170  012700  002240                MOV     #WORD1,R0       ;SELECT CLEARED WORD AS CKTRAP RTN SOURCE.
7850  026174  013701  002304                MOV     MMSR0,R1        ;SELECT MEM MGT SR0 REGISTER AS DESTINATION.
7851  026200  005037  002306                CLR     MMPRES          ;INDICATE NO MEM MGT PRESENT IN CASE IT ISN'T.
7852  026204  005037  002310                CLR     MMENAB          ;INDICATE MEM MGT IS NOT ENABLED.
7853  026210  004737  015452                JSR     PC,CKTRAP       ;CLEAR THE MEM MCT SR0 REG AND CHECK FOR TRAP.
7854  026214  013737  002254  000004        MOV     TP4VEC,4        ;RESTORE THE NORMAL 004 TRAP VECTOR.
7855  026222  103003                        BCC     10$             ;SKIP INDICATING MEM MGT PRESENT IF IT ISN'T.
7856  026224  012737  000001  002306        MOV     #1,MMPRES       ;INDICATE THAT MEM MGT IS PRESENT.
```

```
7857  026232  005037  002236          10$:    CLR     PASCNT          ;CLR COUNTER USED IN REPORTING ROM VERSION #.
7858  026236  000137  026250                  JMP     NEWPAS          ;SKIP AROUND THE BUS RESET, IT'S BEEN DONE.
7859
7860  026242                          NEWRES: BRESET                  ;RESET THE BUS TO PREVENT ILLEGAL INTERRUPTS.
7861  026242  104433                                                                  TRAP    C$RESET
7862  026244  005037  002236                  CLR     PASCNT          ;CLR COUNTER USED IN REPORTING ROM VERSION #.
7863
7864  026250                          NEWPAS:
7865  026250  012737  177777  002200          MOV     #-1,UNITN       ;RESET LOGICAL DEVICE TO -1
7866                                  ;+
7867                                  ; INCREMENT THE PASS COUNTER, CORRECT FOR ANY OVERFLOW.
7868                                  ;  THIS COUNTER IS USED IN THE ROM VERSION TEST.
7869                                  ;-
7870  026256  005237  002236           INC     PASCNT          ;INCREMENT THE PASS COUNTER.
7871  026262  001002                  BNE     GETPRM          ;BRANCH IF WE HAVE NOT YET! OVERFLOWED.
7872  026264  005337  002236           DEC     PASCNT          ;SET PASS COUNT TO 177777 OCTAL.
7873
7874                                  ; GET THE HARDWARE PARAMETERS FOR THIS UNIT.
7875  026270                          GETPRM:
7876  026270  005237  002200          INC     UNITN           ;INCREMENT LOGICAL DEVICE NUMBER
7877  026274  023737  002200  002012  CMP     UNITN,L$UNIT    ;SEE IF MAXIMUM UNIT NO. EXCEEDED
7878  026302  002362                  BGE     NEWPAS          ;BR IF YES
7879
7880  026304                          GPHARD  UNITN,R1        ;GET P-TABLE POINTER INTO R1
7881  026304  013700  002200                                                  MOV     UNITN,R0
7882  026310  104442                                                          TRAP    C$GPHRD
7883  026312  010001                                                          MOV     R0,R1
7884  026314                          BCOMPLETE       30$     ;BR IF DEVICE AVAILABLE
7885  026314  103401                                                          BCS     30$
7886  026316  000764                  BR      GETPRM          ;SKIP THIS DEVICE
7887
7888
7889                                  ;************ HARDWARE PARAMETER MOVING CODE *****************
7890  026320  012137  002202  30$:    MOV     (R1)+,CSRA      ;STORE DHV-11 CSR ADDRESS IN DEV.REG.ADDRESS TABLE
7891  026324  012102                  MOV     (R1)+,R2        ;GET THE RX INTERRUPT VECTOR ADDRESS.
7892  026326  010237  002170          MOV     R2,RXVECA       ;STORE RX INT VECTOR ADDRESS.
7893  026332  062702  000004          ADD     #4,R2           ;CALCULATE TX INTERRUPT VECTOR ADDRESS.
7894  026336  010237  002172          MOV     R2,TXVECA       ;STORE TX INT VECTOR ADDRESS.
7895  026342  012137  002174          MOV     (R1)+,ACTLNS    ;STORE DHV-11 ACTIVE LINE BIT MAP
7896  026346  012702  000377          MOV     #MAPLNS,R2      ;GET THE BIT MAP FOR ALL LINES.
7897  026352  005102                  COM     R2              ;GET A BIT MAP OF NON-EXISTANT LINES.
7898  026354  040237  002174          BIC     R2,ACTLNS       ;CLEAR NON-EXISTANT LINES FROM ACTLNS.
7899  026360  112137  002176          MOVB    (R1)+,LOPBCK    ;STORE DHV-11 LOOPBACK MODE
7900  026364  112137  002177          MOVB    (R1)+,BRLEVL    ;STORE DHV-11 INTERUPT BUS REQUEST LEVEL
7901                                  ;+
7902                                  ; CALCULTATE DEVICE REGISTER ADDRESSES,AND PUT THEM IN THE
7903                                  ; DEVICE REGISTER ADDRESS TABLE.
7904                                  ;-
7905  026370  013701  002202          MOV     CSRA,R1         ;COPY CSR ADDRESS
7906  026374  005201                  INC     R1              ;INCREMENT CSR ADDRESS
7907  026376  005201                  INC     R1              ; COPY BY 2.
7908  026400  012703  000007          MOV     #7,R3           ;SET UP REGISTER COUNT
7909  026404  012702  002204          MOV     #RBUFA,R2       ;GET LOCATION WHERE RBUF ADDRESS GOES IN TABLE
7910  026410  010122          12$:    MOV     R1,(R2)+        ;STORE REGISTER ADDRESS IN TABLE
7911  026412  005201                  INC     R1              ;INCREMENT REGISTER ADDRESS
7912  026414  005201                  INC     R1              ; BY 2,FOR THE NEXT DEVICE REGISTER.
```

```
7913  026416  005303                    DEC     R3              ;DECREMENT REGISTER COUNT
7914  026420  001373                    BNE     12$             ;LOOP IF NOT DONE
7915
7916                                    ;+
7917                                    ; INITIALISE THE BMP CODE QUEUE.
7918                                    ;-
7919  026422  012700  002420                    MOV     #BMPCQB,R0      ;GET THE START ADDRESS OF THE QUEUE.
7920  026426  012701  002620                    MOV     #BMPCQE,R1      ;GET THE END ADDRESS OF THE QUEUE.
7921  026432  010037  002416                    MOV     R0,BMPCQP       ;SET THE POINTER TO THE START OF THE QUEUE.
7922  026436  005020                    14$:    CLR     (R0)+           ;CLEAR OUT THE CONTENTS OF THE QUEUE.
7923  026440  020001                            CMP     R0,R1           ;CHECK IF END OF QUEUE HAS BEEN REACHED.
7924  026442  103775                            BLO     14$             ;LOOP IF NOT ALL DONE.
7925                                    ;+
7926                                    ; REPORT THE UNIT NUMBER IF THE SOFTWARE P-TABLE QUESTION WAS ANSWERED YES,
7927                                    ;  AND THE MAXIMUM UNIT NUMBER IS GREATER THAN 1.
7928                                    ;-
7929  026444  032737  000020  002164             BIT     #BIT4,OPTION    ;CHECK IF THE QUESTION WAS ANSWERED YES.
7930  026452  001416                    BEQ     16$             ;SKIP REPORTING UNIT NUMBER IF IT IS DISABLED.
7931  026454  023727  002012  000001             CMP     L$UNIT,#1       ;CHECK MAXIMUM NUMBER OF UNITS SELECTED.
7932  026462  003412                    BLE     16$             ;DO NOT REPORT UNIT NUMBER IF MAX NUMBER < 1.
7933  026464                            PRINTF  #MFUNIT,UNITN   ;REPORT UNIT NUMBER.
7934  026464  013746  002200                                                    MOV     UNITN,-(SP)
7935  026470  012746  005332                                                    MOV     #MFUNIT,-(SP)
7936  026474  012746  000002                                                    MOV     #2,-(SP)
7937  026500  010600                                                            MOV     SP,R0
7938  026502  104417                                                            TRAP    C$PNTF
7939  026504  062706  000006                                                    ADD     #6,SP
7940  026510                    16$:
7941
7942  026510                    ENDIT:
7943                                    ;+
7944                                    ; SET THE PROCESSOR PRIORITY TO ALLOW LTC INTERRUPTS BUT NOT OTHERS.
7945                                    ;-
7946  026510                            SETPRI  #PRI07                  ;SET PROCESSOR PRIORITY TO 5.
7947  026510  012700  000340                                                    MOV     #PRI07,R0
7948  026514  104441                                                            TRAP    C$SPRI
7949
7950  026516                            ENDINIT
7951  026516                                                            L10021:
7952  026516  104411                                                            TRAP    C$INIT
```

```
                                .SBTTL  AUTODROP SECTION


                                ;++
                                ; THIS CODE IS EXECUTED IMMEDIATELY AFTER THE INITIALIZE CODE IF
                                ; THE "ADR" FLAG WAS SET.  THE UNIT(S) UNDER TEST ARE CHECKED TO
                                ; SEE IF THEY WILL RESPOND.  THOSE THAT DON'T ARE IMMEDIATELY
                                ; DROPPED FROM TESTING.
                                ;--

026520                                  BGNAUTO
026520                                                          L$AUTO::

026520                                  ENDAUTO
026520                                                          L10022:
026520  104461                                                          TRAP    C$AUTO
```

```
                                .SBTTL  CLEANUP CODING SECTION

                                ;++
                                ; THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
                                ; AFTER THE HARDWARE TESTS HAVE BEEN PERFORMED.
                                ;--

026522                                  BGNCLN
026522                                                                  L$CLEAN::

026522  005737  002222                   TST     CTRLCF          ;DID WE GET HERE BY CTRL-C FROM TEST?
026526  001401                          BEQ     2$              ;CTRL-C FROM TEST?  NO, SKIP BUS RESET.
026530                                  BRESET                  ;YES, CLR ANY DMAS OR OUTSTANDING INTERRUPTS.
026530  104433                                                                  TRAP    C$RESET
026532                          2$:
026532                                  EXIT    CLN
026532  104432                                                                  TRAP    C$EXIT
026534  000002                                                                  .WORD   L10023-.

                                .EVEN

026536                                  ENDCLN
026536                                                                  L10023:
026536  104412                                                                  TRAP    C$CLEAN
```

```
                                .SBTTL  DROP UNIT SECTION

                                ;++
                                ; THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
                                ; TO NO LONGER BE TESTED.
                                ;--

                                        BGNDU
                                                                                L$DU::
                                         PRINTF #DROP,R0        ;REPORT UNIT THAT HAS BEEN DROPPED.
026540  010046                                                                  MOV     R0,-(SP)
026542  012746  026564                                                          MOV     #DROP,-(SP)
026546  012746  000002                                                          MOV     #2,-(SP)
026552  010600                                                                  MOV     SP,R0
026554  104417                                                                  TRAP    C$PNTF
026556  062706  000006                                                          ADD     #6,SP
026562  000427                  BR      EDROP           ;BRANCH AROUND THE MESSAGE.

026564  040445  052440  044516  DROP:   .ASCIZ/%A UNIT%D6%A DROPPED FROM FURTHER TESTING.%N/
026572  022524  033104  040445
026600  042040  047522  050120
026606  042105  043040  047522
026614  020115  052506  052122
026622  042510  020122  042524
026630  052123  047111  027107
026636  047045     000
        026642                  .EVEN
026642                  EDROP:

                                        EXIT    DU
026642  000167                                                          .WORD   J$JMP
026644  000000                                                          .WORD   L10024-2-.

                                        ENDDU
                                                                L10024:
026646  104453                                                          TRAP    C$DU
```

```
8039
8040
8041                                    .SBTTL  ADD UNIT SECTION
8042
8043                                    ;++
8044                                    ; THE ADD-UNIT SECTION CONTAINS ANY CODE THE PROGRAMMER WISHES
8045                                    ;  TO BE EXECUTED IN CONJUNCTION WITH THE ADDING OF A UNIT BACK
8046                                    ;  TO THE TEST CYCLE.
8047                                    ;--
8048
8049  026650                                    BGNAU
8050  026650                                                                  L$AU::
8051  026650                                    EXIT    AU
8052  026650  000167                                                                .WORD   J$JMP
8053  026652  000000                                                                .WORD   L10025-2-.
8054
8055
8056                                    .EVEN
8057
8058  026654                                    ENDAU
8059  026654                                                                  L10025:
8060  026654  104452                                                                TRAP    C$AU
8061
```

```
                                .SBTTL  HARDWARE TEST           - ADRA -
                                ;++
                                ;*****************************************************************************
                                ;*                          - REGISTER ADDRESS TEST -
                                ;*
                                ;*      THIS TEST VERIFIES THAT THE Q-BUS CAN READ AND WRITE TO THE DHV11
                                ;*      DEVICE REGISTERS.  IF THE DHV11 DOES NOT RESPOND TO THE ACCESS
                                ;*      ATTEMPTS (IF THE DHV11 IS AT THE WRONG ADDRESS, FOR EXAMPLE) THE
                                ;*      004 BUS TIME-OUT TRAP IS DETECTED BY THIS ROUTINE AND AN ERROR
                                ;*      IS REPORTED.
                                ;*
                                ;*****************************************************************************
                                ;--

                                        BGNTST
                                                                                T1::
                                        TNUM == 1               ;THIS TEST MUST ALWAYS BE INCLUDED AS TEST 1.
026656  012737  000001  002224          MOV     #TNUM,TSTNUM    ;SET THE TEST NUMBER TO 1.
026664  012737  177777  002222          MOV     #-1,CTRLCF      ;INDICATE THAT WE ARE IN A TEST.

                                ;+
                                ; SET UP TO CATCH ANY 004 TRAPS WHICH OCCUR:
                                ;-
026672  013737  000004  002254          MOV     4,TP4VEC        ;SAVE THE EXISTING 004 TRAP VECTOR.
026700  012737  025310  000004          MOV     #TP4RTN,4       ;SET 004 TRAP VECTOR TO OUR SERVICE RTN ADR.
026706  005005                          CLR     R5              ;CLEAR THE ERROR FLAGS.

                                ;+
                                ; SET UP FOR THE INITIAL ITERATION OF THE TEST LOOP:
                                ;-
026710  005004                          CLR     R4              ;CLEAR THE LINE COUNTER.

                                ;+
                                ; HERE BEGINS THE LOOP TO TEST THE REGISTERS FOR A LINE.
                                ;    FIRST TEST THE CSR AND SET THE IND.ADR.REG (I.A.R) FIELD.
                                ;-
026712  005037  002256          2$:     CLR     TP4FLG          ;CLEAR THE 004 TRAP FLAG.
026716  013700  002202                  MOV     CSRA,R0         ;SET UP CSR AS THE CKTRAP MOVE SOURCE.
026722  012701  027136                  MOV     #52$,R1         ;SET UP DESTINATION LOCATION FOR CKTRAP MOVE.
026726  004737  015452                  JSR     PC,CKTRAP       ;MOVE AND CHECK FOR TRAP.
026732  103402                          BCS     4$              ;IF NO TRAP, BYPASS ERROR.
026734  052705  100001                  BIS     #100001,R5      ;SET FATAL READ ERROR FLAGS.
026740  042737  000017  027136  4$:     BIC     #17,52$         ;CLEAR THE I.A.R FIELD OF THE CSR DATA.
026746  050437  027136                  BIS     R4,52$          ;OR IN THE LINE COUNTER TO THE I.A.R FIELD.
026752  010100                          MOV     R1,R0           ;USE OLD DESTINATION FOR SOURCE OF CKTRAP MOVE.
026754  013701  002202                  MOV     CSRA,R1         ;SET UP CSR AS THE CKTRAP MOVE DESTINATION.
026760  004737  015452                  JSR     PC,CKTRAP       ;MOVE AND CHECK FOR TRAP.
026764  103403                          BCS     6$              ;IF NO TRAP, BYPASS ERROR.
026766  052705  100002                  BIS     #100002,R5      ;SET FATAL WRITE ERROR FLAGS.
026772  000440                          BR      40$             ;EXIT AND REPORT FATAL ERROR.

                                ;+
                                ;    NOW, WE TEST EACH REGISTER FOR THIS LINE.
                                ;-
026774  012702  000010          6$:     MOV     #10,R2          ;INIT REGISTER COUNTER TO 8.
027000  013737  002202  027134          MOV     CSRA,50$                ;INITIALIZE THE REGISTER POINTER.
027006  012700  027134          8$:     MOV     #50$,R0         ;SET UP REGISTER AS THE SOURCE FOR CKTRAP MOVE.
027012  012701  027136                  MOV     #52$,R1         ;SET UP LOCAL STORAGE AS THE DES FOR CKTRAP.
```

```
 8118  027016  004737  015452                JSR     PC,CKTRAP       ;PERFORM THE MOVE, CHECK FOR TRAP.
 8119  027022  103402                        BCS     10$             ;IF NO TRAP, BYPASS THE SETTING OF ERROR FLAGS.
 8120  027024  052705  100001                 BIS     #100001,R5      ;SET FATAL READ ERROR FLAGS.
 8121  027030  010100                10$:     MOV     R1,R0           ;USE OLD DEST AS SRC FOR CKTRAP MOVE.
 8122  027032  012701  027134                 MOV     #50$,R1         ;SET UP REGISTER AS THE DEST FOR CKTRAP MOVE.
 8123  027036  004737  015452                JSR     PC,CKTRAP       ;PERFORM THE MOVE, CHECK FOR TRAP.
 8124  027042  103402                        BCS     12$             ;IF NO TRAP, BYPASS THE SETTING OF ERROR FLAGS.
 8125  027044  052705  100002                 BIS     #100002,R5      ;SET FATAL WRITE ERROR FLAGS.
 8126  027050  005237  027134        12$:     INC     50$             ;INCREMENT THE REGISTER
 8127  027054  005237  027134                 INC     50$             ; POINTER BY 2.
 8128  027060  005302                         DEC     R2              ;COUNT THE REGISTER.
 8129  027062  001351                        BNE     8$              ;LOOP TO TEST THE NEXT REGISTER ADDRESS.
 8130
 8131                                  ;+
 8132                                  ; NOW WE SET UP TO TEST THE NEXT LINE, OR TO EXIT IF WE ARE DONE.
 8133                                  ;-
 8134  027064  005204                         INC     R4              ;INCREMENT THE LINE COUNTER.
 8135  027066  020427  000010                 CMP     R4,#NUMLNS      ;COMPARE LINE COUNTER AGAINST NUMBER OF LINES.
 8136  027072  002707                        BLT     2$              ;LOOP TO TEST THE NEXT LINE IF WE'RE NOT DONE.
 8137
 8138                                  ;+
 8139                                  ; DONE CHECKING DEVICE REGISTER ADDRESSES.
 8140                                  ;    REPORT ANY ERRORS AND EXIT.
 8141                                  ;-
 8142  027074  013737  002254  000004 40$:     MOV     TP4VEC,4        ;RESTORE THE NORMAL 004 TRAP VECTOR.
 8143  027102  005705                         TST     R5              ;CHECK THE ERROR FLAGS.
 8144  027104  100015                        BPL     60$             ;EXIT ROUTINE IF NO ERRORS.
 8145                                  ; REPORT 'DEVICE REGISTER ACCESS ERRORS''
 8146  027106                                 ERRDF   101,EM0103,ER0101;              >>>>> ERROR #101 <<<<<.
 8147  027106  104455                                                                 TRAP    C$ERDF
 8148  027110  000145                                                                 .WORD   101
 8149  027112  007335                                                                 .WORD   EM0103
 8150  027114  011712                                                                 .WORD   ER0101
 8151
 8152  027116                                 DODU    UNITN           ;DROP THIS UNIT FROM FUTHER TESTING.
 8153  027116  013700  002200                                                        MOV     UNITN,R0
 8154  027122  104451                                                                TRAP    C$DODU
 8155  027124  005037  002222                 CLR     CTRLCF          ;INDICATE NO CTRL-C ABORT FROM TEST.
 8156  027130                                 DOCLN                   ;ABORT THIS SUB PASS.
 8157  027130  104444                                                                TRAP    C$DCLN
 8158  027132  000402                        BR      60$             ;
 8159                                  ;+
 8160                                  ; LOCAL STORAGE.
 8161                                  ;-
 8162  027134  000000                50$:     .WORD   0       ;STORAGE FOR THE SOURCE OR DEST OF THE CKTRAP MOVE.
 8163  027136  000000                52$:     .WORD   0       ;STORAGE FOR THE SOURCE OR DEST OF THE CKTRAP MOVE.
 8164  027140  005037  002222        60$:     CLR     CTRLCF          ;INDICATE THAT WE ARE NOT WITHIN A TEST.
 8165  027144                                 ENDTST
 8166  027144                                                                 L10026:
 8167  027144  104401                                                                TRAP    C$ETST
```

```
                                .SBTTL  HARDWARE TEST           - FRMERR -
                                ;++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                                ;*                          - FRAMING ERROR GENERATION TEST -
                                ;*
                                ;*      THIS TEST IS USED TO VERIFY THE FRAMING ERROR DETECTION CAPABILITIES
                                ;*      OF THE DHV11.
                                ;*      WHEN IN STAGGARED LOOPBACK MODE, CHARACTERS ARE TRANSMITTED FROM
                                ;*      ONE GROUP OF LINES AT 8 BITS/CHAR,AND RECEIVED BY THE OTHER GROUP
                                ;*      AT 5 BITS/CHAR.THIS WILL GENERATE A FRAMING ERROR FOR EACH CHARACTER.
                                ;*      THIS TEST WILL ONLY EXECUTE IF THE STAGGARED LOOPBACK MODE IS SELECTED.
                                ;*      THE SPECIAL STAGGARED LOOPBACK BERG CONNECTOR MUST BE FITTED.
                                ;*      THE ACTIVE LINES BIT MASK IS USED TO INDICATE WHICH LINES HAVE BEEN
                                ;*      REMOVED FROM FURTHER TESTING.
                                ;*
                                ;--++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
027146                                  BGNTST
027146                                                                          T2::
                                ;+
                                ; EXECUTE THIS TEST IN  STAGGARED LOOPBACK MODE ONLY.
                                ;-
027146  123727  002176  000002          CMPB    LOPBCK,#2       ;CHECK MODE SELECTED.
027154  001162                          BNE     60$             ;EXIT IF STAGGERD LOOPBACK MODE NOT SELECTED.
027156                                  SETPRI  #PRI05          ;ALLOW LTC INTERRUPTS.
027156  012700  000240                                                  MOV     #PRI05,R0
027162  104441                                                          TRAP    C$SPRI
027164  012737  177777  002222          MOV     #-1,CTRLCF      ;INDICATE THAT WE ARE IN A TEST.
        000002                          TNUM == TNUM + 1        ;INCREMENT THE ASSEMBLY TIME TEST COUNTER.
027172  012737  000002  002224          MOV     #TNUM,TSTNUM    ;SET UP THE TEST NUMBER.        (62)
027200  012737  000001  005222          MOV     #1,ERRTYP       ;SET ERROR TYPE IN ERROR TABLE.
027206  012737  014071  005224          MOV     #6201.,ERRNBR   ;SET THE FIRST ERROR NUMBER IN ERROR TABLE.
027214  012737  007533  005226          MOV     #EM6201,ERRMSG  ;SET ERROR MESSAGE ADDRESS IN ERROR TABLE.
027222  005037  002406                  CLR     ERSMRF          ;INITIALIZE THE "REPORT ERROR SUMMARY" FLAGS.
                                ;+
                                ; RESET THE DUT TO A KNOWN STATE, REMOVE STATUS CODES FROM THE FIFO.
                                ;  CLEAR TX AND  RX INTERRUPT ENABLE BITS.
                                ; THIS SUBROUTINE REPORTS ERROR >>>>> 6201 <<<<<.
                                ;-
027226  004737  015502                  JSR     PC,CLNRST       ;RESET THE DUT.
027232  103133                          BCC     60$             ;ABORT THE TEST IF FATAL ERROR FOUND IN RESET.
                                ;+
                                ; DISABLE ALL INTERRUPTS.
                                ; SET UP  DMA TX AND RX INTERRUPT SERVICE ROUTINES.
                                ;-
027234                                  SETPRI  #PRI07          ;DISABLE ALL INTERRUPTS.
027234  012700  000340                                                  MOV     #PRI07,R0
027240  104441                                                          TRAP    C$SPRI
027242                                  SETVEC  TXVECA,#TXDMA,#PRI05    ;SELECT DMA TX INT SERVICE RTN.
027242  012746  000240                                                  MOV     #PRI05,-(SP)
027246  012746  025332                                                  MOV     #TXDMA,-(SP)
027252  013746  002172                                                  MOV     TXVECA,-(SP)
027256  012746  000003                                                  MOV     #3,-(SP)
027262  104437                                                          TRAP    C$SVEC
027264  062706  000010                                                  ADD     #10,SP
027270                                  SETPRI  #PRI03          ;ALLOW INTERRUPTS.
027270  012700  000140                                                  MOV     #PRI03,R0
027274  104441                                                          TRAP    C$SPRI
```

```
8224                                    ;+
8225                                    ; CLEAR TX, RX, AND DMA_START ERROR FLAGS.
8226                                    ;-
8227  027276  005037  002410                   CLR     TXDONF          ;CLEAR TX DONE FLAGS FOR ALL LINES.
8228  027302  005037  002412                   CLR     RXDONF          ;CLEAR RX DONE FLAGS FOR ALL LINES.
8229  027306  005037  002252                   CLR     TXINTF          ;CLEAR TX ERROR FLAGS FOR ALL LINES.
8230                                    ;+
8231                                    ; SET UP ERROR TABLE AND DATA PATTERN TABLE.
8232                                    ;  THE NUMERICAL VALUE OF THE CHARACTER INDICATES THE NUMBER OF THE LINE
8233                                    ;  THAT TRANSMITTED IT.
8234                                    ;-
8235  027312  012700  003210                   MOV     #ERCNTB,R0      ;PASS THE ADDRESS OF THE TABLE TO BE CLEARED.
8236  027316  004737  015524                  JSR     PC,CLR16W       ;CLEAR THE RX ERROR COUNTERS TABLE.
8237  027322  005037  003510                   CLR     BUFBAS          ;SET SINGLE CHAR DATA TO BE A NULL.
8238                                    ;+
8239                                    ; INITIALISE DMA PARAMETERS IN THE CONTROL BLOCK.
8240                                    ;  TRANSMISSION ON LINE GROUP 1 AT 8 BITS/CHAR,1 STOP BITS,ODD PARITY.
8241                                    ;  RECEPTION ON LINE GROUP 2 AT 5 BITS/CHAR,1 STOP,ODD PARITY.
8242                                    ;-
8243  027326  012700  156470                   MOV     #156470,R0      ;PASS LPR PARAMETER FOR 8 BITS/CHAR.
8244  027332  012701  156440                   MOV     #156440,R1      ;PASS LPR PARAMETER FOR 5 BITS/CHAR.
8245  027336  004737  016746                  JSR     PC,GETTIM       ;GET TIME-OUT BASED ON MINIMUM BAUDRATE IN USE.
8246  027342  012702  003510                   MOV     #BUFBAS,R2      ;PASS START ADDRESS OF DATA PATTERN.
8247  027346  012703  000001                   MOV     #1,R3           ;PASS LENGTH OF DATA PATTERN.
8248  027352  013704  002230                   MOV     LGRP1M,R4       ;PASS LINE GROUP OF LINES THAT ARE TO TX.
8249  027356  004737  016116                  JSR     PC,FRPSUP       ;SET UP DUT FOR TRANSMISSION AND RECEPTION.
8250
8251                                    ;+
8252                                    ; PURGE THE FIFO OF ANY UN-WANTED CHARACTERS. THIS ROUTINE REPORTS ERRORS
8253                                    ;  WITH WITH ERROR NUMBERS FROM >>>>> 6202 THRU 6204 <<<<<.
8254                                    ; PERFORM TRANSMISSION AND RECEPTION AT 9600 BAUD.
8255                                    ;  REPORT ANY ERRORS FOUND, IE. FRAMING ERROR BIT CLEAR OR PARITY ERROR SET.
8256                                    ;-
8257  027362  005237  005224                    INC     ERRNBR          ;SET THE ERROR REPORT NUMBER TO 6202.
8258  027366  004737  020674                  JSR     PC,PUFIFR       ;CLEAN OUT THE FIFO.
8259  027372  103053                         BCC     60$             ;ABORT THIS TEST IF FIFO WOULD NOT PURGE.
8260  027374  012737  014075  005224            MOV     #6205.,ERRNBR   ;SET THE ERROR NUMBER TO 6205.
8261  027402  004737  023506                  JSR     PC,TXFRPR       ;TX DATA PATTERN ON SELECTED ACTIVE LINES.
8262  027406  012705  100000                   MOV     #100000,R5      ;PASS FRAMING ERROR TEST FLAG.
8263                                    ;+
8264                                    ; THIS SUBROUTINE REPORTS ERROR NUMBER >>>>> 6205 <<<<<.
8265                                    ;-
8266  027412  004737  015174                  JSR     PC,CKFRPR       ;READ CHARACTERS, REPORT ANY ERRORS FOUND.
8267                                    ;+
8268                                    ; REVERSE TRANSMISSION/RECEPTION ROLES ON ALL ACTIVE LINES, AND REPEAT TEST.
8269                                    ;-
8270  027416  005104                          COM     R4              ;REVERSE ROLES FOR TRANSMISSION AND RECEPTION.
8271  027420  004737  016116                  JSR     PC,FRPSUP       ;SET UP DUT FOR TRANSMISSION AND RECEPTION.
8272  027424  005237  005224                    INC     ERRNBR          ;SET ERROR NUMBER TO 6206.
8273                                    ;+
8274                                    ; THIS ROUTNE REPORTS ERRORS WITH NUMBERS >>>>> 6206 THRU 6208 <<<<<.
8275                                    ;-
8276  027430  004737  020674                  JSR     PC,PUFIFR       ;CLEAN OUT THE FIFO.
8277  027434  103032                         BCC     60$             ;ABORT THIS TEST IF FIFO WOULD NOT PURGE.
8278  027436  012737  014101  005224            MOV     #6209.,ERRNBR   ;SET ERROR NUMBER TO 6209.
8279  027444  004737  023506                  JSR     PC,TXFRPR       ;TX DATA PATTERN ON SELECTED ACTIVE LINES.
```

```
8280  027450  012705  100000                  MOV     #100000,R5      ;PASS FRAMING ERROR TEST FLAG.
8281                                        ;+
8282                                        ; THIS SUBROUTINE REPORTS ERRORS >>>>> 6209 <<<<<.
8283                                        ;-
8284  027454  004737  015174                  JSR     PC,CKFRPR       ;READ CHARACTERS, REPORT ANY ERRORS FOUND.
8285  027460  005237  005224                   INC     ERRNBR          ;SET ERROR NUMBER TO 6210.
8286                                        ;+
8287                                        ;    DISABLE INTERRUPTS.
8288                                        ;    CLEAR THE INTERRUPT VECTORS.
8289                                        ;    UPDATE THE ACTIVE LINES BIT MAP TO REFLECT LINES REMOVED FROM TESTING.
8290                                        ;     THIS SUBROUTINE REPORTS ERRORS >>>>> 6210 THRU 6212 <<<<<.
8291                                        ;-
8292  027464  004737  023602                  JSR     PC,TXIE0        ;DISABLE ALL TX INTERRUPTS.
8293  027470  004737  024230                  JSR     PC,TXRREP       ;REPORT FINAL ERRORS FROM TX/RX.
8294
8295  027474                                  SETPRI  #PRI07          ;DISABLE ALL INTERRUPTS.
8296  027474  012700  000340                                                  MOV     #PRI07,R0
8297  027500  104441                                                          TRAP    C$SPRI
8298  027502                                  CLRVEC  TXVECA          ;RETURN TX INT VECTOR TO UNUSED POOL.
8299  027502  013700  002172                                                  MOV     TXVECA,R0
8300  027506  104436                                                          TRAP    C$CVEC
8301  027510  012737  014105  005224            MOV     #6213.,ERRNBR   ;SET ERROR NUMBER TO 6213.
8302                                        ;+
8303                                        ; THIS SUBROUTINE REPORTS ERRORS >>>>> 6213 <<<<<.
8304                                        ;-
8305  027516  004737  021664                  JSR     PC,REPSMR       ;REPORT ERROR SUMMARIES IF CALLED FOR.
8306  027522  005037  002222          60$:     CLR     CTRLCF          ;INDICATE THAT WE ARE NOT WITHIN A TEST.
8307
8308  027526                                  ENDTST
8309  027526                                                  L10027:
8310  027526  104401                                                  TRAP    C$ETST
```

```
                        .SBTTL  HARDWARE TEST           - PARERR -
                        ;++*****************************************************************************
                        ;*                          - PARITY ERROR GENERATION TEST -
                        ;*
                        ;*      THIS TEST IS USED TO VERIFY THE PARITY ERROR DETECTION AND REPORT
                        ;*      CAPABILITIES OF THE DUT.
                        ;*      WHEN STAGGARED LOOPBACK MODE IS SELECTED, DATA IS TRANSMITTED
                        ;*      ON ALL ACTIVE LINES IN LINE GROUP 1 WITH ODD PARITY SELECTED,
                        ;*      AND RECEIVED ON LINES IN GROUP 2 WITH EVEN PARITY SELECTED.
                        ;*      THIS WILL GENERATE A PARITY ERROR FOR EACH CHARACTER RECEIVED.
                        ;*      THE PARITY SELECTION IS THEN REVERSED ON THE LINES IN EACH GROUP
                        ;*      AND THE TEST IS REPEATED.
                        ;*      THIS TEST WILL ONLY EXECUTE IF THE STAGGARED LOOPBACK MODE IS SELECTED.
                        ;*      THE SPECIAL STAGGARED LOOPBACK BERG CONNECTOR MUST BE FITTED.
                        ;*
                        ;--*****************************************************************************
027530                          BGNTST
027530                                                                  T3::
                        ;+
                        ; EXECUTE THIS TEST IN  STAGGARED LOOPBACK MODE ONLY.
                        ;-
027530  123727  002176  000002          CMPB    LOPBCK,#2       ;CHECK MODE SELECTED.
027536  001167                        BNE     60$             ;EXIT IF STAGGERD LOOPBACK MODE NOT SELECTED.
027540                                SETPRI  #PRI05          ;ALLOW LTC INTERRUPTS.
027540  012700  000240                                                        MOV     #PRI05,R0
027544  104441                                                                TRAP    C$SPRI
027546  012737  177777  002222          MOV     #-1,CTRLCF      ;INDICATE THAT WE ARE IN A TEST.
                                        TNUM == TNUM + 1        ;INCREMENT THE ASSEMBLY TIME TEST COUNTER.
000003
027554  012737  000003  002224          MOV     #TNUM,TSTNUM    ;SET UP THE TEST NUMBER.        (63)
027562  012737  000001  005222          MOV     #1,ERRTYP       ;SET ERROR TYPE IN ERROR TABLE.
027570  012737  014235  005224          MOV     #6301.,ERRNBR   ;SET THE FIRST ERROR NUMBER IN ERROR TABLE.
027576  012737  007566  005226          MOV     #EM6301,ERRMSG  ;SET ERROR MESSAGE ADDRESS IN ERROR TABLE.
027604  005037  002406                  CLR     ERSMRF          ;INITIALIZE THE "REPORT ERROR SUMMARY" FLAGS.
                        ;+
                        ; RESET THE DUT TO A KNOWN STATE, REMOVE STATUS CODES FROM THE FIFO.
                        ;  CLEAR TX AND  RX INTERRUPT ENABLE BITS.
                        ; THIS SUBROUTINE REPORTS ERROR >>>>> 6301 <<<<<.
                        ;-
027610  004737  015502                JSR     PC,CLNRST       ;RESET THE DUT.
027614  103140                        BCC     60$             ;ABORT THE TEST IF FATAL ERROR FOUND IN RESET.
                        ;+
                        ; DISABLE ALL INTERRUPTS.
                        ; SET UP  DMA TX AND RX INTERRUPT SERVICE ROUTINES.
                        ;-
027616                                SETPRI  #PRI07          ;DISABLE ALL INTERRUPTS.
027616  012700  000340                                                        MOV     #PRI07,R0
027622  104441                                                                TRAP    C$SPRI
027624                                SETVEC  TXVECA,#TXDMA,#PRI05    ;SELECT DMA TX INT SERVICE RTN.
027624  012746  000240                                                        MOV     #PRI05,-(SP)
027630  012746  025332                                                        MOV     #TXDMA,-(SP)
027634  013746  002172                                                        MOV     TXVECA,-(SP)
027640  012746  000003                                                        MOV     #3,-(SP)
027644  104437                                                                TRAP    C$SVEC
027646  062706  000010                                                        ADD     #10,SP
027652                                SETPRI  #PRI03          ;ALLOW INTERRUPTS.
027652  012700  000140                                                        MOV     #PRI03,R0
```

```
 8367  027656  104441                                                          TRAP    C$SPRI
 8368                                  ;+
 8369                                  ; CLEAR TX/RX  FLAGS.
 8370                                  ;-
 8371  027660  005037  002410                 CLR     TXDONF          ;CLEAR TX DONE FLAGS FOR ALL LINES.
 8372  027664  005037  002412                 CLR     RXDONF          ;CLEAR RX DONE FLAGS FOR ALL LINES.
 8373  027670  005037  002252                 CLR     TXINTF          ;CLEAR TX ERROR FLAGS FOR ALL LINES.
 8374                                  ;+
 8375                                  ; SET UP ERROR COUNTER TABLE.
 8376                                  ;-
 8377  027674  012700  003210                 MOV     #ERCNTB,R0      ;PASS THE ADDRESS OF THE TABLE TO BE CLEARED.
 8378  027700  004737  015524                 JSR     PC,CLR16W       ;CLEAR THE RX ERROR COUNTERS TABLE.
 8379
 8380                                  ;+
 8381                                  ; INITIALISE DMA PARAMETERS IN THE CONTROL BLOCK.
 8382                                  ;-
 8383  027704  012700  156470                 MOV     #156470,R0      ;PASS LPR PARAMETER WITH ODD PARITY.
 8384  027710  012701  156570                 MOV     #156570,R1      ;PASS LPR PARAMETER WITH EVEN PARITY.
 8385  027714  004737  016746                 JSR     PC,GETTIM       ;GET TIME-OUT BASED ON MINIMUM BAUDRATE IN USE.
 8386  027720  012702  005062                 MOV     #SDP2B,R2       ;PASS START ADDRESS OF DATA PATTERN.
 8387  027724  012703  000020                 MOV     #16.,R3         ;PASS LENGTH OF DATA PATTERN.
 8388  027730  013704  002230                 MOV     LGRP1M,R4       ;PASS BIT MAP OF LINES TO BE SET WITH ODD PAR.
 8389  027734  004737  016116                 JSR     PC,FRPSUP       ;SET UP DUT FOR TRANSMISSION AND RECEPTION.
 8390
 8391                                  ;+
 8392                                  ; PURGE THE FIFO OF ANY UN-WANTED CHARACTERS.
 8393                                  ; PERFORM TRANSMISSION AND RECEPTION OF THE 16 BYTE DATA PATTERN AT 9600 BAUD.
 8394                                  ;  TRANSMISSION ON LINE IN  GROUP 1, 8 BITS/CHAR, 1 STOP BITS, ODD PARITY.
 8395                                  ;  RECEPTION ON LINES IN  GROUP 2 AT 8 BITS/CHAR, 1 STOP, EVEN PARITY.
 8396                                  ;  REMOVE CHARACTERS FROM THE FIFO AND LOOK FOR THE PARITY ERROR BIT BEING SET.
 8397                                  ;  REPORT ANY ERRORS FOUND, IE. FRAMMING ERROR BIT SET OR PARITY ERROR CLEAR.
 8398                                  ;-
 8399                                    ;+
 8400                                    ; THIS ROUTINE REPORTS ERRORS WITH NUMBERS >>>>> 6302 THRU 6304 <<<<<.
 8401                                    ;-
 8402  027740  004737  020674                   JSR     PC,PUFIFR       ;CLEAN OUT THE FIFO.
 8403  027744  103064                           BCC     60$             ;ABORT THIS TEST IF FIFO WOULD NOT PURGE.
 8404  027746  012737  014241  005224           MOV     #6305.,ERRNBR   ;SET ERROR NUMBER TO 6305
 8405  027754  004737  017166                   JSR     PC,INIDMA       ;TX DATA PATTERN ON ALL ACTIVE LINES.
 8406  027760  005005                           CLR     R5              ;PASS PARITY ERROR TEST FLAG.
 8407                                  ;+
 8408                                  ; THIS SUBROUTINE REPORTS ERROR NUMBER  >>>>> 6305 <<<<<.
 8409                                  ;-
 8410  027762  004737  015174                   JSR     PC,CKFRPR       ;READ CHARACTERS, REPORT ANY ERRORS FOUND.
 8411  027766  005237  005224                   INC     ERRNBR          ;SET ERROR NUMBER TO 6306.
 8412                                  ;+
 8413                                  ;  THIS SUBROUTINE REPORTS ERRORS WITH NUMBERS >>>>> 6306 THRU 6309 <<<<<
 8414                                  ;-
 8415  027772  004737  024230                   JSR     PC,TXRREP       ;REPORT FINAL ERRORS FROM TX/RX.
 8416  027776  012737  014246  005224           MOV     #6310.,ERRNBR   ;SET ERROR NUMBER TO 6310.
 8417  030004  005037  002410                   CLR     TXDONF          ;CLEAR TX DONE FLAGS FOR ALL LINES.
 8418  030010  005037  002412                   CLR     RXDONF          ;CLEAR RX DONE FLAGS FOR ALL LINES.
 8419  030014  005037  002252                   CLR     TXINTF          ;CLEAR TX DMA HANDOVER ERROR FLAGS.
 8420                                  ;+
 8421                                  ; REVERSE TRANSMISSION/RECEPTION ROLES ON ALL ACTIVE LINES, AND REPEAT TEST.
 8422                                  ;-
```

```
8423  030020  005104                          COM     R4              ;REVERSE ROLES FOR TRANSMISSION AND RECEPTION.
8424  030022  004737  016116                  JSR     PC,FRPSUP       ;SET UP DUT FOR TRANSMISSION AND RECEPTION.
8425                                        ;+
8426                                        ; THIS ROUTINE REPORTS ERRORS WITH NUMBERS >>>>> 6310 THRU 6311 <<<<<.
8427                                        ;-
8428  030026  004737  020674                  JSR     PC,PUFIFR       ;CLEAN OUT THE FIFO.
8429  030032  103031                          BCC     60$             ;ABORT THIS TEST IF FIFO WOULD NOT PURGE.
8430  030034  012737  014250  005224          MOV     #6312.,ERRNBR   ;SET ERROR NUMBER TO 6312.
8431  030042  004737  017166                  JSR     PC,INIDMA       ;TX DATA PATTERN ON SELECTED ACTIVE LINES.
8432                                        ;+
8433                                        ; THIS SUBROUTINE REPORTS ERRORS WITH NUMBERS >>>>> 6312 THRU 6316 <<<<<.
8434                                        ;-
8435  030046  004737  015174                  JSR     PC,CKFRPR       ;READ CHARACTERS, REPORT ANY ERRORS FOUND.
8436  030052  012737  014255  005224          MOV     #6317.,ERRNBR   ;SET ERROR NUMBER TO 6317.
8437                                        ;+
8438                                        ;    DISABLE INTERRUPTS.
8439                                        ;    CLEAR THE INTERRUPT VECTORS.
8440                                        ;    UPDATE THE ACTIVE LINES BIT MAP TO REFLECT LINES REMOVED FROM TESTING.
8441                                        ;-
8442  030060  004737  023602                  JSR     PC,TXIE0        ;DISABLE ALL TX INTERRUPTS.
8443                                        ;+
8444                                        ;    THIS SUBROUTINE REPORTS ERRORS >>>>> 6317 THRU 6320 <<<<<.
8445                                        ;-
8446  030064  004737  024230                  JSR     PC,TXRREP       ;REPORT FINAL ERRORS FROM TX/RX.
8447
8448  030070                                  SETPRI  #PRI07          ;DISABLE ALL INTERRUPTS.
8449  030070  012700  000340                                                  MOV     #PRI07,R0
8450  030074  104441                                                          TRAP    C$SPRI
8451  030076                                  CLRVEC  TXVECA          ;RETURN TX INT VECTOR TO UNUSED POOL.
8452  030076  013700  002172                                                  MOV     TXVECA,R0
8453  030102  104436                                                          TRAP    C$CVEC
8454
8455                                        ;+
8456                                        ; THIS SUBROUTINE REPORTS ERRORS WITH NUMBERS >>>>> 6321 <<<<<.
8457                                        ;-
8458  030104  012737  014261  005224          MOV     #6321.,ERRNBR   ;SET ERROR NUMBER TO 6321.
8459  030112  004737  021664                  JSR     PC,REPSMR       ;REPORT ERROR SUMMARIES IF CALLED FOR.
8460
8461  030116  005037  002222          60$:    CLR     CTRLCF          ;INDICATE THAT WE ARE NOT WITHIN A TEST.
8462  030122                                  ENDTST
8463  030122                                                      L10030:
8464  030122  104401                                                      TRAP    C$ETST
```

```
                                .SBTTL  HARDWARE TEST           - BREAKB -
                                ;+*************************************************************************
                                ;*                      - BREAK GENERATION TEST -
                                ;*      THIS TEST VERIFIES THAT ALL SERIAL TRANSMIT LINES CAN GENERATE A BREAK
                                ;*      BY SETTING THE BRK BIT IN THE ASSOCIATED LNCTRL REGISTER.
                                ;*      USE OF THE INTERNAL LOOPBACK FEATURE OF THE DUARTS IS MADE TO MINIMISE
                                ;*      ANY EXTERNAL EFFECTS CAUSED ON THE SERIAL LINES BY THIS TEST.
                                ;*      FRAMING ERROR DETECTION IS USED TO INDICATE THE PRESENCE OF A BREAK,
                                ;*      BY SETTING THE APPROPRIATE BIT IN THE RBUF REGISTER.
                                ;--*************************************************************************

                                        BGNTST
                                                                                T4::

030124  012737  177777  002222          MOV     #-1,CTRLCF      ;INDICATE THAT WE ARE IN A TEST.
        000004                          TNUM == TNUM + 1        ;INCREMENT THE ASSEMBLY TIME TEST COUNTER.
030132  012737  000004  002224          MOV     #TNUM,TSTNUM    ;SET UP THE TEST NUMBER.        (64)
030140  012737  000001  005222          MOV     #1,ERRTYP       ;SET ERROR TYPE AS FATAL IN ERROR TABLE.
030146  012737  014401  005224          MOV     #6401.,ERRNBR   ;SET THE FIRST ERROR NUMBER IN ERROR TABLE.
030154  012737  007611  005226          MOV     #EM6401,ERRMSG  ;SET ERROR MESSAGE ADDRESS IN ERRTBL.
                                ;+
                                ; RESET THE DUT TO A KNOWN STATE, REMOVE THE STATUS CODES FROM THE FIFO.
                                ;  CLEAR TX AND RX INTERRUPT ENABLE BITS IN THE CSR.
                                ; THIS SUBROUTINE REPORTS ERROR >>>>> 6401 <<<<<.
                                ;-
030162  004737  015502                  JSR     PC,CLNRST       ;RESET THE DHV-11, REPORT ANY ERRORS FOUND.
030166  103165                          BCC     60$             ;EXIT TEST IF FATAL ERROR FOUND.
                                ;+
                                ; SET UP DEVICE UNDER TEST (DUT) TO:
                                ;    DISABLE TRANSMISSION AND RECEPTION INTERRUPTS.
                                ;    DELAY FOR 10 MILLI-SECONDS TO ALLOW TIME TO CLEAR ANY BREAKS.
                                ;-
030170  004737  023602                  JSR     PC,TXIE0        ;DISABLE TRANSMISSION INTERRUPTS.
030174  004737  022314                  JSR     PC,RXIE0        ;DISABLE RECEPTION INTERRUPTS.
030200  012705  000377                  MOV     #MAPLNS,R5      ;PASS ACTIVE LINE BIT MAP.
030204  012700  000200                  MOV     #200,R0         ;PASS INTERNAL LOOPBACK MODE.
030210  004737  025014                  JSR     PC,WTWLNC       ;SELECT INTERNAL LOOPBACK,DISABLE DMA.
030214  012704  000012                  MOV     #10.,R4         ;PASS DELAY TIME OF 10 MILLI SECONDS.
030220  004737  015622                  JSR     PC,DELAY        ;DELAY TO ALLOW ANY BREAKS TO BE CLEARED.
                                ;+
                                ; SET UP TRANSMISSION AN RECEPTION PARAMETERS FOR ALL LINES.
                                ; 9600 BAUD,8 CHAR,1 STOPBIT,NO PARITY.
                                ;-
030224  012700  156430                  MOV     #156430,R0      ;SET UP BAUD RATE,ETC.
030230  004737  025044                  JSR     PC,WTWLPR       ;SET COMMUNICATION PARAMETERS ON ALL LINES.
                                ;+
                                ; ENABLE TRANSMITTERS ON ALL ACTIVE LINES.
                                ;-
030234  013705  002174                  MOV     ACTLNS,R5       ;PASS ACTIVE LINE BIT MAP.
030240  004737  023412                  JSR     PC,TXENBL       ;ENABLE TRANSMISSIONS ON ALL LINES.
                                ;+
                                ; PURGE THE FIFO OF ANY UNWANTED CHARACTERS.
                                ; THIS ROUTINE REPORTS ERRORS WITH NUMBERS >>>>> 6402 THRU 6404 <<<<<.
                                ;-
030244  005237  005224                  INC     ERRNBR          ;SET ERROR NUMBER TO 6402.
030250  004737  020674                  JSR     PC,PUFIFR       ;PURGE FIFO.
```

```
8521  030254  103132                        BCC     60$             ;ABORT TEST IF FIFO WILL NOT CLEAR.
8522                                  ;+
8523                                  ; VERIFY BREAK GENERATION ON INDIVIDUAL LINES.
8524                                  ;  CLEAR BREAKS ON ALL LINES.
8525                                  ;  DELAY FOR 10 MILLI-SECONDS TO ALLOW TIME FOR ANY BREAKS TO BE CLEARED.
8526                                  ;  SELECT LINE,SET BREAK BIT IN LNCTRL REGISTER.
8527                                  ;  TEST FOR A CHARACTER IN THE FIFO WITH FRAME ERROR.
8528                                  ;-
8529  030256  005002                  2$:     CLR     R2              ;CLEAR LINE COUNTER.
8530  030260  012703  000001                  MOV     #1,R3           ;SET UP ACTIVE LINE BIT MASK.
8531  030264  030337  002174          4$:     BIT     R3,ACTLNS       ;CHECK IF THIS LINE IS ACTIVE.
8532  030270  001434                          BEQ     8$              ;GO SELECT NEXT LINE IF THIS ONE IS INACTIVE.
8533  030272  012700  000200                  MOV     #200,R0         ;SET UP PARAMETER TO CLEAR BREAK BITS.
8534  030276  004737  025014                  JSR     PC,WTWLNC       ;CLEAR BREAK BIT,RESELECT INTERNAL LOOPBACK.
8535  030302  012704  000012                  MOV     #10.,R4         ;PASS DELAY TIME OF 10 MILLI SECONDS.
8536  030306  004737  015622                  JSR     PC,DELAY        ;DELAY TO ALLOW BREAKS TO BE CLEARED.
8537                                  ;+
8538                                  ; SET BREAK BIT ON SELECTED LINE.
8539                                  ;  SET UP PARAMETERS TO TEST FOR THE FRAME ERROR BIT SET IN RBUF.
8540                                  ;  TIME-OUT = 5 MILLI SECONDS.
8541                                  ;  CALL ROUTINE TO CHECK FOR CONDITION FOUND.
8542                                  ;-
8543  030312  010305                  6$:     MOV     R3,R5           ;COPY ACTIVE LINE BIT MASK.
8544  030314  012700  000214                  MOV     #214,R0         ;SET BREAK,RESELECT LOOPBACK,ENABLE RECEPTION.
8545  030320  004737  025014                  JSR     PC,WTWLNC       ;SET BREAK ON SELECTED LINE.
8546                                  ;+
8547                                  ; DELAY FOR 5 MS TO ALLOW TIME FOR BREAK TO BE GENERATED AND RECEIVED.
8548                                  ; VERIFY RECEPTION OF A CHARACTER WITH FRAME ERROR BIT SET.
8549                                  ;-
8550  030324  012704  000005                  MOV     #5.,R4          ;SET DELAY VALUE TO 5 MILLI SECS.
8551  030330  004737  015622                  JSR     PC,DELAY        ;ALLOW TIME FOR CHARACTER RECEPTION.
8552  030334  017700  151644                  MOV     @RBUFA,R0       ;GET CHARACTER FROM RBUF REGISTER.
8553  030340  032700  020000                  BIT     #BIT13,R0       ;CHECK FOR FRAME ERROR BIT.
8554  030344  001006                          BNE     8$              ;SKIP ERROR REPORT IF SET.
8555  030346  012701  007640                  MOV     #EM6402,R1      ;SELECT MESSAGE TO BE PRINTED.
8556                                  ;REPORT ERROR'BREAK NOT RECEIVED ON LINE #NN''
8557  030352                                  ERRDF   6405,EM6401,ER6401 ;            >>>>> ERROR #6405 <<<<<.
8558  030352  104455                                                                  TRAP    C$ERDF
8559  030354  014405                                                                  .WORD   6405
8560  030356  007611                                                                  .WORD   EM6401
8561  030360  012562                                                                  .WORD   ER6401
8562  030362  006303                  8$:     ASL     R3              ;SHIFT BIT MASK FOR NEXT LINE.
8563  030364  005202                          INC     R2              ;NEXT LINE
8564  030366  020227  000010                  CMP     R2,#NUMLNS      ;CHECK FOR MAX LINE COUNT.
8565  030372  001334                          BNE     4$              ;IF <>,LOOP TO CHECK NEXT LINE
8566                                  ;+
8567                                  ; VERIFY BREAK GENERATION ON ALL LINES SIMULTANEOUSLY.
8568                                  ;  CLEAR BREAKS ON ALL LINES.
8569                                  ;  DELAY FOR 10 MILLI-SECONDS TO ALLOW TIME FOR ANY BREAKS TO BE CLEARED.
8570                                  ;  PURGE THE FIFO.
8571                                  ;  SET BREAK BIT IN LNCTRL REGISTERS ON ALL ACTIVE LINES.
8572                                  ;  TEST FOR CHARACTERS IN THE FIFO WITH FRAME ERROR.
8573                                  ;-
8574  030374  012705  000377                  MOV     #MAPLNS,R5      ;SET UP LINE TO CLEAR BREAKS ON.
8575  030400  012700  000200                  MOV     #200,R0         ;SET UP PARAMETER TO CLEAR BREAK BITS.
8576  030404  004737  025014                  JSR     PC,WTWLNC       ;CLEAR BREAK BIT,RESELECT INTERNAL LOOPBACK.
```

```
8577  030410  012704  000012                  MOV     #10.,R4         ;PASS DELAY TIME OF 10 MILLI SECONDS.
8578  030414  004737  015622                  JSR     PC,DELAY        ;DELAY TO ALLOW BREAKS TO BE CLEARED.
8579                                          ;+
8580                                          ; PURGE THE FIFO OF UNWANTED CHARACTERS.
8581                                          ;-
8582  030420  004737  020612                  JSR     PC,PUFIFO       ;PURGE FIFO.
8583  030424  103044                          BCC     50$             ;GO REPORT ERROR IF FAILED TO CLEAN_OUT FIFO.
8584                                          ;+
8585                                          ; SET UP PARAMETERS FOR SETTING THE BREAK BIT ON ALL ACTIVE LINES.
8586                                          ; THEN CALL ROUTINE TO DO IT.
8587                                          ;-
8588  030426  013705  002174          10$:    MOV     ACTLNS,R5       ;SET UP ACTIVE LINE BIT MASK.
8589  030432  012700  000214                  MOV     #214,R0         ;SET BREAK,RESELECT LOOPBACK,ENABLE RECEPTION.
8590  030436  004737  025014                  JSR     PC,WTWLNC       ;SET BREAK ON SELECTED LINES.
8591                                          ;+
8592                                          ; DELAY FOR 10 MILLI SECONDS,TO ALLOW TIME FOR RECEPTION.
8593                                          ; TEST FOR CHARACTERS IN FIFO WITH FRAME ERROR BIT SET.
8594                                          ;-
8595  030442  012704  000012                  MOV     #10.,R4         ;SET DELAY VALUE TO 10 MILLI SECS.
8596  030446  004737  015622                  JSR     PC,DELAY        ;ALLOW TIME FOR CHARACTER RECEPTION.
8597  030452  010502                          MOV     R5,R2           ;COPY ACTIVE LINE BIT MAP.
8598  030454  004737  017306                  JSR     PC,MAPCNT       ;COUNT THE NUMBER OF LINES AVAILABLE.
8599  030460  017701  151520          12$:    MOV     @RBUFA,R1       ;GET CHARACTER FROM RBUF REGISTER.
8600  030464  100011                          BPL     14$             ;BRANCH IF DATA_VALID NOT SET.
8601  030466  032701  020000                  BIT     #BIT13,R1       ;CHECK FOR FRAME ERROR BIT.
8602  030472  001406                          BEQ     14$             ;DO NOT CLR FLG FOR THIS LINE IF FRAME BIT CLR.
8603  030474  000301                          SWAB    R1              ;GET LINE NUMBER IN LOW BYTE.
8604  030476  042701  177400                  BIC     #177400,R1      ;CLEAR EVERTHING BUT THE LINE NUMBER.
8605  030502  004737  017260                  JSR     PC,LINBIT       ;CALC BIT MASK FROM LINE NUMBER.
8606  030506  040005                          BIC     R0,R5           ;CLEAR LINE FLAG.
8607  030510  005302          14$:    DEC     R2              ;DECREMENT THE LINE NUMBER COUNTER.
8608  030512  001362                  BNE     12$             ;LOOP TO GET THE NEXT CHARACTER.
8609  030514  005705                  TST     R5              ;CHECK IF ANY BREAKS NOT RECEIVED.
8610  030516  001411                  BEQ     60$             ;EXIT TEST IF ALL CLEAR.
8611  030520  012701  007640                  MOV     #EM6402,R1      ;SELECT MESSAGE TO BE PRINTED.
8612                                  ;REPORT ERROR'BREAK NOT RECEIVED ON LINE #NN'.
8613  030524                                  ERRDF   6406,EM6401,ER6401;             >>>>> ERROR #6407 <<<<<.
8614  030524  104455                                                                          TRAP    C$ERDF
8615  030526  014406                                                                          .WORD   6406
8616  030530  007611                                                                          .WORD   EM6401
8617  030532  012562                                                                          .WORD   ER6401
8618  030534  000402                  BR      60$             ;EXIT THE TEST.
8619
8620  030536  004737  023074          50$:    JSR     PC,TSABRT       ;ABORT THE TEST.
8621  030542  005037  002222          60$:    CLR     CTRLCF          ;INDICATE THAT WE ARE NOT WITHIN A TEST.
8622  030546                                  ENDTST
8623  030546                                                                  L10031:
8624  030546  104401                                                                  TRAP    C$ETST
```

```
                                        .SBTTL  HARDWARE TEST           - NORERR -
                                        ;*******************************************************************************
                                        ;*                      - NO OVERRUN ERROR TEST -
                                        ;*
                                        ;*              THIS TEST VERIFIES THAT THE DUT WILL NOT REPORT DATA OVERRUN
                                        ;*              ERRORS WHEN THEY DO NOT OCCURR.
                                        ;*              THIS TEST PUTS 256 CHARACTERS IN THE DUT FIFO PLUS 4 IN EACH ACTIVE
                                        ;*              UART AND VERIFIES THAT NO OVERRUN ERRORS ARE REPORTED.
                                        ;*              ANY BMP CODE FOUND WILL INVALIDATE THE TEST AND CAUSE IT TO BE ABORTED.
                                        ;*              HOWEVER THE BMP CODE WILL BE PLACED ON THE BMP CODE QUEUE, TO BE
                                        ;*              REPORTED LATER.
                                        ;*
                                        ;--*****************************************************************************

 030550                                         BGNTST
 030550                                                                                 T5::
 030550                                         SETPRI  #PRIO5          ;ALLOW LTC INTERRUPTS.
 030550  012700  000240                                                                                 MOV     #PRIO5,R0
 030554  104441                                                                                         TRAP    C$SPRI
         000005                                  TNUM == TNUM + 1        ;INCREMENT THE ASSEMBLY TIME TEST COUNTER.
 030556  012737  000005  002224                  MOV     #TNUM,TSTNUM    ;SET UP THE TEST NUMBER.       (66)
 030564  012737  177777  002222                  MOV     #-1,CTRLCF      ;INDICATE THAT WE ARE IN A TEST.
 030572  012737  000001  005222                  MOV     #1,ERRTYP       ;SET ERROR TYPE AS FATAL IN ERROR TABLE.
 030600  012737  014711  005224                  MOV     #6601.,ERRNBR   ;SET ERROR NUMBER TO 6601.
 030606  012737  007701  005226                  MOV     #EM6601,ERRMSG  ;SET ERROR MESSAGE ADDRESS IN ERROR TABLE.
                                        ;+
                                        ; RESET THE DUT TO A KNOWN STATE, REMOVE THE STATUS CODES FROM THE FIFO.
                                        ;  CLEAR TX AND RX INTERRUPT ENABLE BITS IN THE CSR.
                                        ; THIS SUBROUTINE REPORTS ERROR >>>>> 6601 <<<<<.
                                        ;-
 030614  004737  015502                         JSR     PC,CLNRST       ;RESET THE DHV-11, REPORT ANY ERRORS FOUND.
 030620  103402                                 BCS     .+6             ;SKIP EXIT OF TEST IF NO FATAL ERROR FOUND.
 030622  000137  031246                         JMP     60$             ;EXIT THE TEST, FATAL ERROR WAS FOUND.
                                        ;+
                                        ; FIND AN ACTIVE LINE ON WHICH TO PERFORM THE TEST.
                                        ; INITIALIZE THE 256 BYTE DATA PATTERN.
                                        ;-
 030626  004737  016036                         JSR     PC,FINACT       ;FIND AN ACTIVE LINE.
 030632  103402                                 BCS     .+6             ;SKIP EXIT OF TEST IF NO FATAL ERROR FOUND.
 030634  000137  031246                         JMP     60$             ;EXIT THE TEST, FATAL ERROR WAS FOUND.
 030640  004737  017024                         JSR     PC,INDATP       ;INITIALISE DATA PATTERN.
                                        ;+
                                        ; TRANSMIT A 265 CHARACTER DATA PATTERN USING DMA, ON A SINGLE CHANNEL
                                        ; AT 38.4K BAUD, 8 BITS PER CHARACTER, ODD PARITY, 2 STOP BITS.
                                        ;-
                                                ;+
                                                ; SET INTERNAL LOOPBACK ON THE SELECTED LINE.
                                                ; TRANSMIT THE DATA PATTERN ON THE FIRST AVAILABLE ACTIVE LINE.
                                                ;-
 030644  005237  005224                          INC     ERRNBR          ;SET THE ERROR REPORT NUMBER TO 6602.
 030650  012700  000204                          MOV     #204,R0         ;PASS PARAMETER FOR INTERNAL LOPBCK,ENABLE RX.
 030654  004737  025014                         JSR     PC,WTWLNC       ;INITILAISE THE LINE CONTROL REGISTER.
 030660  012700  177670                          MOV     #177670,R0      ;PASS THE LPR CONTENTS.
 030664  004737  025044                         JSR     PC,WTWLPR       ;SET THE LPR CONTENTS TO 38.4K BAUD.
 030670  013704  000012                          MOV     10.,R4          ;PASS DELAY TIME OF 10 MILLI SECONDS.
 030674  004737  015622                         JSR     PC,DELAY        ;WAIT FOR LNCTRL AND LPR REGS TO BE UPDATED.
```

```
8681  030700  012702  003510                  MOV     #BUFBAS,R2      ;PASS THE START OF THE DATA PATTERN TO TX.
8682  030704  012703  000400                  MOV     #BUFMID-BUFBAS,R3 ;PASS THE LENGTH OF THE DATA PATTERN.
8683  030710  004737  015662                  JSR     PC,DODMA        ;TRANSMIT THE DATA PATTERN.
8684  030714  103152                          BCC     50$             ;EXIT IF ERROR FOUND DURING DMA TX.
8685                                  ;+
8686                                  ; WAIT FOR DMA TO COMPLETE, THEN WAIT FOR THE LAST CHARACTER TO ARRIVE IN
8687                                  ; THE FIFO.
8688                                  ;-
8689  030716  005237  005224                  INC     ERRNBR          ;SET ERROR NUMBER TO 6603.
8690  030722  012701  170454                  MOV     #170454,R1      ;PASS TIME-OUT VALUE OF 300 MILLI SECS.
8691  030726  013702  002202                  MOV     CSRA,R2         ;PASS THE ADDRESS OF THE CSR.
8692  030732  004737  024740                  JSR     PC,WAIBIS       ;WAIT FOR DMA TO COMPLETE, TX ACTION SET.
8693  030736  103141                          BCC     50$             ;ABORT THE TEST IF TIME-OUT ON DMA COMPLETION.
8694  030740  012704  000005                  MOV     #5,R4           ;PASS DELAY OF 5 MILLI SECS.
8695  030744  004737  015622                  JSR     PC,DELAY        ;WAIT FOR LAST CHAR TO ARRIVE IN THE FIFO.
8696
8697                                  ;+
8698                                  ; TRANSMIT 4 CHARACTERS ON EACH ACTIVE LINE.
8699                                  ;-
8700  030750  013705  002174                  MOV     ACTLNS,R5       ;ALTER PARAMETERS FOR ALL ACTIVE LINES.
8701  030754  012700  000204                  MOV     #204,R0         ;PASS PARAMETER FOR INTERNAL LOPBCK,ENABLE RX.
8702  030760  004737  025014                  JSR     PC,WTWLNC       ;INITILAISE THE LINE CONTROL REGISTER.
8703  030764  012700  177670                  MOV     #177670,R0      ;PASS THE LPR CONTENTS.
8704  030770  004737  025044                  JSR     PC,WTWLPR       ;SET THE LPR CONTENTS TO 38.4K BAUD.
8705  030774  013704  000012                  MOV     10.,R4          ;PASS DELAY TIME OF 10 MILLI SECONDS.
8706  031000  004737  015622                  JSR     PC,DELAY        ;WAIT FOR LNCTRL AND LPR REGS TO BE UPDATED.
8707
8708  031004  012702  003510                  MOV     #BUFBAS,R2      ;PASS THE START OF THE DATA PATTERN TO TX.
8709  031010  012703  000004                  MOV     #4,R3           ;PASS THE LENGTH OF THE DATA PATTERN.
8710  031014  005001                          CLR     R1              ;CLEAR THE LINE COUNTER.
8711  031016  005237  005224                  INC     ERRNBR          ;SET ERROR NUMBER TO 6604.
8712  031022  010100                  2$:     MOV     R1,R0
8713  031024  006300                          ASL     R0              ;CALCULATE THE LINE OFFSET FROM THE LINE #.
8714  031026  036037  002332  002174          BIT     BITTBL(R0),ACTLNS  ;TEST FOR THIS LINE BEING ACTIVE.
8715  031034  001403                          BEQ     4$              ;SKIP THE TX ON THIS LINE IF IT IS NOT ACTIVE.
8716  031036  004737  015662                  JSR     PC,DODMA        ;TRANSMIT THE 5 CHAR DATA PATTERN.
8717  031042  103077                          BCC     50$             ;ABORT IF ERROR FOUND DURING DMA TX.
8718  031044  005201                  4$:     INC     R1              ;INCREMENT THE LINE COUNTER.
8719  031046  020127  000010                  CMP     R1,#NUMLNS      ;TEST FOR ALL POSSIBLE LINES HANDLED
8720  031052  002763                          BLT     2$              ;LOOP IF NOT ALL LINES HANDLED.
8721
8722  031054  005237  005224                  INC     ERRNBR          ;SET ERROR NUMBER TO 6605.
8723  031060  012701  170040                  MOV     #170040,R1      ;PASS TIME-OUT VALUE OF 32 MILLI SECS.
8724  031064  013702  002202                  MOV     CSRA,R2         ;PASS THE ADDRESS OF THE CSR.
8725  031070  004737  024740                  JSR     PC,WAIBIS       ;WAIT FOR A DMA TO COMPLETE, TX ACTION SET.
8726  031074  103062                          BCC     50$             ;ABORT THE TEST IF TIME-OUT ON DMA COMPLETION.
8727  031076  012704  000005                  MOV     #5,R4           ;PASS DELAY OF 5 MILLI SECS.
8728  031102  004737  015622                  JSR     PC,DELAY        ;WAIT FOR LAST CHAR TO ARRIVE IN THE FIFO.
8729                                  ;+
8730                                  ; READ THE FIFO CHECKING FOR OVERRUN ERRORS.  REPORT ERRORS IF FOUND.
8731                                  ; ABORT THE TEST IF A BMP CODE WAS FOUND IN THE FIFO.
8732                                  ;-
8733  031106  013702  002174                  MOV     ACTLNS,R2
8734  031112  004737  017306                  JSR     PC,MAPCNT       ;GET THE NUMBER OF ACTIVE LINES.
8735  031116  006302                          ASL     R2
8736  031120  006302                          ASL     R2              ;MULTIPLY NUMBER OF ACTIVE LINES BY 4.
```

```
 8737  031122  012705  000400                    MOV     #256.,R5
 8738  031126  060205                            ADD     R2,R5           ;CALCULATE NUMBER OF CHARACTERS TO RX.
 8739  031130  005004                            CLR     R4              ;CLEAR THE CHARACTER COUNTER.
 8740  031132  012737  014716  005224  6$:       MOV     #6606.,ERRNBR   ;SET UP ERROR NUMBER EACH TIME AROUND LOOP.
 8741  031140  017702  151040                    MOV     @RBUFA,R2       ;READ A CHARACTER FROM THE FIFO.
 8742  031144  100032                          BPL     10$             ;EXIT THE READ LOOP IF THE FIFO IS EMPTY.
 8743                                  ;+
 8744                                  ; CHECK IF THE READ CHARACTER IS A BMP CODE.
 8745                                  ;  IF IT IS A BMP CODE SAVE IT ON THE QUEUE TO BE REPORTED LATER, AND
 8746                                  ;  ABORT THE TEST.
 8747                                  ;-
 8748  031146  004737  014446                    JSR     PC,CHKBMP       ;CHECK IF CHARACTER IS A BMP CODE.
 8749  031152  103002                            BCC     8$              ;BRANCH IF NOT A BMP CODE.
 8750  031154                                    ERROR                   ;                  >>>>> ERROR #6606 <<<<<.
 8751  031154  104460                                                                              TRAP    C$ERROR
 8752  031156  000433                            BR      60$             ;EXIT THIS TEST.
 8753
 8754  031160  005237  005224          8$:       INC     ERRNBR          ;SET ERROR NUMBER TO 6607.
 8755  031164  005204                            INC     R4              ;COUNT THIS CHARACTER.
 8756  031166  020405                          CMP     R4,R5           ;COMPARE # OF CHARS WITH MAX # OF CHARS.
 8757  031170  003024                            BGT     50$             ;ABORT TEST IF TOO MANY VALID CHARS READ.
 8758  031172  032702  040000                  BIT     #BIT14,R2       ;TEST THE OVERRUN BIT OF THE READ CHAR.
 8759  031176  001755                            BEQ     6$              ;LOOP TO READ THE NEXT CHAR IF NO ERROR.
 8760  031200  005237  005224                    INC     ERRNBR          ;SET ERROR NUMBER TO 6608.
 8761  031204  012737  012660  005230            MOV     #ER7801,ERRBLK  ;SELECT THE CORRECT ERROR REPORTING ROUTINE.
 8762  031212  012701  007727                    MOV     #EM6602,R1      ;PASS THE MESSAGE TO BE REPORTED.
 8763  031216  010203                            MOV     R2,R3
 8764  031220  000303                            SWAB    R3
 8765  031222  042703  177760                    BIC     #177760,R3      ;GET FAILING LINE NUMBER.
 8766                                  ;REPORT "OVERRUN ERROR REPORTED WHEN NONE FORCED, ON LINE NN ..."
 8767  031226                                    ERROR                   ;                  >>>>> ERROR  #6608 <<<<<.
 8768  031226  104460                                                                              TRAP    C$ERROR
 8769  031230  000740                            BR      6$              ;LOOP TO READ THE NEXT CHAR.
 8770
 8771  031232  005237  005224          10$:      INC     ERRNBR          ;SET ERROR NUMBER TO 6609.
 8772  031236  020405                          CMP     R4,R5           ;COMPARE NUMBER OF CHARS READ WITH EXPECTED.
 8773  031240  001402                            BEQ     60$             ;EXIT TEST WITHOUT ABORT IF CORRECT # OF CHARS.
 8774
 8775  031242  004737  023074          50$:      JSR     PC,TSABRT       ;ABORT THE TEST, NON-RELATED TEST ERROR FOUND.
 8776  031246  005037  002222          60$:      CLR     CTRLCF          ;INDICATE THAT WE ARE NOT WITHIN A TEST.
 8777  031252                                    ENDTST
 8778  031252                                                                          L10032:
 8779  031252  104401                                                                          TRAP    C$ETST
```

```
                                .SBTTL  HARDWARE TEST           - ORERR -
                                ;++*************************************************************************
                                ;*                      - OVERRUN ERROR TEST -
                                ;*
                                ;*      THIS TEST VERIFIES THAT THE DUT WILL REPORT DATA OVERRUN ERRORS WHEN
                                ;*      THEY OCCURR.
                                ;*      THIS TEST PUTS 256 CHARACTERS IN THE DUT FIFO PLUS 5 IN EACH ACTIVE
                                ;*      UART AND VERIFIES THAT OVERRUN ERRORS ARE REPORTED ON ALL ACTIVE LINES.
                                ;*      ANY BMP CODE FOUND WILL INVALIDATE THE TEST AND CAUSE IT TO BE ABORTED.
                                ;*      HOWEVER THE BMP CODE WILL BE PLACED ON THE BMP CODE QUEUE, TO BE
                                ;*      REPORTED LATER.
                                ;*
                                ;--*************************************************************************

                                        BGNTST
                                                                                T6::
031254                                  SETPRI  #PRI05          ;ALLOW LTC INTERRUPTS.
031254                                                                          MOV     #PRI05,R0
031254  012700  000240                                                         TRAP    C$SPRI
031260  104441
                000006                   TNUM == TNUM + 1       ;INCREMENT THE ASSEMBLY TIME TEST COUNTER.
031262  012737  000006  002224           MOV     #TNUM,TSTNUM   ;SET UP THE TEST NUMBER.        (67)
031270  012737  177777  002222           MOV     #-1,CTRLCF     ;INDICATE THAT WE ARE IN A TEST.
031276  012737  000001  005222           MOV     #1,ERRTYP      ;SET ERROR TYPE AS FATAL IN ERROR TABLE.
031304  012737  015055  005224           MOV     #6701.,ERRNBR  ;SET ERROR NUMBER TO 6701.
031312  012737  010001  005226           MOV     #EM6701,ERRMSG ;SET ERROR MESSAGE ADDRESS IN ERROR TABLE.
                                ;+
                                ; RESET THE DUT TO A KNOWN STATE, REMOVE THE STATUS CODES FROM THE FIFO.
                                ;  CLEAR TX AND RX INTERRUPT ENABLE BITS IN THE CSR.
                                ; THIS SUBROUTINE REPORTS ERROR >>>>> 6701 <<<<<.
                                ;-
031320  004737  015502                   JSR     PC,CLNRST      ;RESET THE DHV-11, REPORT ANY ERRORS FOUND.
031324  103402                           BCS     .+6            ;SKIP EXIT OF TEST IF NO FATAL ERROR FOUND.
031326  000137  032202                   JMP     60$            ;EXIT THE TEST, FATAL ERROR WAS FOUND.
                                ;+
                                ; FIND AN ACTIVE LINE ON WHICH TO PERFORM THE TEST.
                                ; INITIALIZE THE 256 BYTE DATA PATTERN.
                                ;-
031332  004737  016036                   JSR     PC,FINACT      ;FIND AN ACTIVE LINE.
031336  103402                           BCS     .+6            ;IF ACTIVE LINE IS FOUND, DON'T ABORT TEST.
031340  000137  032202                   JMP     60$            ;ABORT THE TEST,. NO ACTIVE LINES WERE FOUND.
031344  004737  017024                   JSR     PC,INDATP      ;INITIALISE DATA PATTERN.
                                ;+
                                ; TRANSMIT A 265 CHARACTER DATA PATTERN USING DMA, ON A SINGLE CHANNEL
                                ; AT 38.4K BAUD, 8 BITS PER CHARACTER, ODD PARITY, 2 STOP BITS.
                                ;-
                                    ;+
                                    ; SET INTERNAL LOOPBACK ON THE SELECTED LINE.
                                    ; TRANSMIT THE DATA PATTERN ON THE FIRST AVAILABLE ACTIVE LINE.
                                    ;-
031350  005237  005224                   INC     ERRNBR         ;SET ERROR NUMBER TO 6702.
031354  012700  000204                   MOV     #204,R0        ;PASS PARAMETER FOR INTERNAL LOPBCK,ENABLE RX.
031360  004737  025014                   JSR     PC,WTWLNC      ;INITILAISE THE LINE CONTROL REGISTER.
031364  012700  177670                   MOV     #177670,R0     ;PASS THE LPR CONTENTS.
031370  004737  025044                   JSR     PC,WTWLPR      ;SET THE LPR CONTENTS TO 38.4K BAUD.
031374  013704  000012                   MOV     10.,R4         ;PASS DELAY TIME OF 10 MILLI SECONDS.
031400  004737  015622                   JSR     PC,DELAY       ;WAIT FOR LNCTRL AND LPR REGS TO BE UPDATED.
```

```
8836  031404  012702  003510                  MOV     #BUFBAS,R2      ;PASS THE START OF THE DATA PATTERN TO TX.
8837  031410  012703  000400                  MOV     #BUFMID-BUFBAS,R3 ;PASS THE LENGTH OF THE DATA PATTERN.
8838  031414  004737  015662                  JSR     PC,DODMA        ;TRANSMIT THE DATA PATTERN.
8839  031420  103402                          BCS     .+6             ;IF NO ERROR FOUND DURING DMA TX, DON'T ABORT.
8840  031422  000137  032176                  JMP     50$             ;ABORT TEST, ERROR FOUND DURING DMA TX.
8841                                  ;+
8842                                  ; WAIT FOR DMA TO COMPLETE, THEN WAIT FOR THE LAST CHARACTER TO ARRIVE IN
8843                                  ; THE FIFO.
8844                                  ;-
8845  031426  005237  005224                  INC     ERRNBR          ;SET ERROR NUMBER TO 6703.
8846  031432  012701  170454                  MOV     #170454,R1      ;PASS TIME-OUT VALUE OF 300 MILLI SECS.
8847  031436  013702  002202                  MOV     CSRA,R2         ;PASS THE ADDRESS OF THE CSR.
8848  031442  004737  024740                  JSR     PC,WAIBIS       ;WAIT FOR DMA TO COMPLETE, TX ACTION SET.
8849  031446  103402                          BCS     .+6             ;IF NO TIME-OUT ON DMA COMPLETION, DON'T ABORT.
8850  031450  000137  032176                  JMP     50$             ;ABORT TEST, TIME-OUT ON DMA COMPLETION.
8851  031454  012704  000005                  MOV     #5,R4           ;PASS DELAY OF 5 MILLI SECS.
8852  031460  004737  015622                  JSR     PC,DELAY        ;WAIT FOR LAST CHAR TO ARRIVE IN THE FIFO.
8853                                  ;+
8854                                  ; TRANSMIT 5 CHARACTERS ON EACH ACTIVE LINE.
8855                                  ;-
8856  031464  013705  002174                  MOV     ACTLNS,R5       ;ALTER PARAMETERS FOR ALL ACTIVE LINES.
8857  031470  012700  000204                  MOV     #204,R0         ;PASS PARAMETER FOR INTERNAL LOPBCK,ENABLE RX.
8858  031474  004737  025014                  JSR     PC,WTWLNC       ;INITILAISE THE LINE CONTROL REGISTER.
8859  031500  012700  177670                  MOV     #177670,R0      ;PASS THE LPR CONTENTS.
8860  031504  004737  025044                  JSR     PC,WTWLPR       ;SET THE LPR CONTENTS TO 38.4K BAUD.
8861  031510  013704  000012                  MOV     10.,R4          ;PASS DELAY TIME OF 10 MILLI SECONDS.
8862  031514  004737  015622                  JSR     PC,DELAY        ;WAIT FOR LNCTRL AND LPR REGS TO BE UPDATED.
8863
8864  031520  012702  003510                  MOV     #BUFBAS,R2      ;PASS THE START OF THE DATA PATTERN TO TX.
8865  031524  012703  000005                  MOV     #5,R3           ;PASS THE LENGTH OF THE DATA PATTERN.
8866  031530  005001                          CLR     R1              ;CLEAR THE LINE COUNTER.
8867  031532  005237  005224                  INC     ERRNBR          ;SET ERROR NUMBER TO 6704.
8868  031536  010100                  2$:     MOV     R1,R0
8869  031540  006300                          ASL     R0              ;CALCULATE LINE OFFSET FROM THE LINE #.
8870  031542  036037  002332  002174          BIT     BITTBL(R0),ACTLNS  ;TEST FOR THIS LINE BEING ACTIVE.
8871  031550  001405                          BEQ     4$              ;SKIP THE TX ON THIS LINE IF IT IS NOT ACTIVE.
8872  031552  004737  015662                  JSR     PC,DODMA        ;TRANSMIT THE 5 CHAR DATA PATTERN.
8873  031556  103402                          BCS     .+6             ;IF NO TIME-OUT ON DMA COMPLETION, DON'T ABORT.
8874  031560  000137  032176                  JMP     50$             ;ABORT TEST, TIME-OUT ON DMA COMPLETION.
8875  031564  005201                  4$:     INC     R1              ;INCREMENT THE CHARACTER COUNTER.
8876  031566  020127  000010                  CMP     R1,#NUMLNS      ;TEST FOR ALL POSSIBLE LINES HANDLED
8877  031572  002761                          BLT     2$              ;LOOP IF NOT ALL LINES HANDLED.
8878
8879  031574  005237  005224                  INC     ERRNBR          ;SET ERROR NUMBER TO 6705.
8880  031600  012701  170040                  MOV     #170040,R1      ;PASS TIME-OUT VALUE OF 32 MILLI SECS.
8881  031604  013702  002202                  MOV     CSRA,R2         ;PASS THE ADDRESS OF THE CSR.
8882  031610  004737  024740                  JSR     PC,WAIBIS       ;WAIT FOR A DMA TO COMPLETE, TX ACTION SET.
8883  031614  103170                          BCC     50$             ;ABORT THE TEST IF TIME-OUT ON DMA COMPLETION.
8884  031616  012704  000005                  MOV     #5,R4           ;PASS DELAY OF 5 MILLI SECS.
8885  031622  004737  015622                  JSR     PC,DELAY        ;WAIT FOR LAST CHAR TO ARRIVE IN THE FIFO.
8886                                  ;+
8887                                  ; READ 256 CHARS FROM THE FIFO CHECKING FOR BMP CODES.
8888                                  ; ABORT THE TEST IF A BMP CODE WAS FOUND IN THE FIFO.
8889                                  ;-
8890  031626  012704  000400                  MOV     #256.,R4        ;SET UP THE CHARACTER COUNTER.
8891  031632  012737  015062  005224  6$:     MOV     #6706.,ERRNBR   ;SET UP ERROR NUMBER EACH TIME AROUND LOOP.
```

```
8892  031640  017702  150340                    MOV     @RBUFA,R2       ;READ A CHARACTER FROM THE FIFO.
8893  031644  100154                            BPL     50$             ;ABORT THE TEST IF DATA.VALID IS CLEAR.
8894  031646  005237  005224                    INC     ERRNBR          ;SET ERROR NUMBER TO 6707.
8895  031652  004737  014446                    JSR     PC,CHKBMP       ;CHECK IF CHARACTER IS A BMP CODE.
8896  031656  103545                            BCS     24$             ;REPORT ERROR AND ABORT TEST IF A BMP CODE.
8897  031660  005304                            DEC     R4              ;COUNT THIS CHARACTER.
8898  031662  001363                            BNE     6$              ;LOOP IF NOT 256 CHARS READ FROM FIFO.
8899                                        ;+
8900                                        ; READ THE REMAINING AND VERIFY 1 OVERRUN PLUS 1 CHAR FROM EACH LINE.
8901                                        ;-
8902  031664  005004                            CLR     R4              ;CLEAR THE OVERRUN ERROR FLAGS.
8903  031666  012700  003450                    MOV     #RXCNTB,R0
8904  031672  004737  015524                    JSR     PC,CLR16W       ;CLEAR RX CHAR COUNT TABLE.
8905  031676  012737  015064  005224  8$:       MOV     #6708.,ERRNBR   ;SET UP ERROR NUMBER EACH TIME AROUND LOOP.
8906  031704  017702  150274                    MOV     @RBUFA,R2       ;READ A CHARACTER FROM THE FIFO.
8907  031710  100047                            BPL     14$             ;GO ANALYZE THE RESULTS IF ALL CHARS READ.
8908  031712  004737  014446                    JSR     PC,CHKBMP       ;CHECK IF CHAR IS A BMP CODE.
8909  031716  103525                            BCS     24$             ;REPORT ERROR AND ABORT TEST IF A BMP CODE.
8910  031720  005237  005224                    INC     ERRNBR          ;SET ERROR NUMBER TO 6709.
8911  031724  010200                            MOV     R2,R0
8912  031726  000300                            SWAB    R0
8913  031730  042700  177760                    BIC     #177760,R0      ;CALCULATE THE LINE NUMBER OF THE CHAR.
8914  031734  006300                            ASL     R0              ;FORM WORD TABLE OFFSET FOR TABLE ACCESS.
8915  031736  042702  007400                    BIC     #7400,R2        ;REMOVE LINE NUMBER FROM THE READ CHAR.
8916  031742  036037  002332  002174            BIT     BITTBL(R0),ACTLNS       ;TEST FOR ACTIVE LINE.
8917  031750  001512                            BEQ     50$             ;ABORT TEST IF FOR INACTIVE LINE.
8918  031752  005237  005224                    INC     ERRNBR          ;SET ERROR NUMBER TO 6710.
8919  031756  005760  003450                    TST     RXCNTB(R0)      ;CHECK THE RX CHAR COUNTER FOR THIS LINE.
8920  031762  001006                            BNE     10$             ;IS THIS FIRST CHAR ON LINE?
8921  031764  020227  140000                    CMP     R2,#140000      ;YES, TEST FOR NULL CHAR WITH OVERRUN.
8922  031770  001414                            BEQ     12$             ;IS CHAR A NULL?
8923  031772  056004  002332                    BIS     BITTBL(R0),R4   ;NO, SET THE OVERRUN BIT ERROR FLAG FOR LINE.
8924  031776  000411                            BR      12$             ;GO COUNT THE CHAR AND CONTINUE.
8925  032000  026027  003450  000004  10$:       CMP     RXCNTB(R0),#4
8926  032006  002073                            BGE     50$             ;5TH CHAR ON THIS LINE?  YES, ABORT.
8927  032010  032702  040000                    BIT     #BIT14,R2       ;NO, CHECK OVERRUN BIT.
8928  032014  001402                            BEQ     12$             ;IS OVERRUN BIT CLEAR?  YES, GO COUNT CHAR.
8929  032016  056004  002332                    BIS     BITTBL(R0),R4   ;NO, SET THE OVERRUN BIT ERROR FLAG FOR LINE.
8930  032022  005260  003450            12$:     INC     RXCNTB(R0)      ;COUNT THIS CHARACTER.
8931  032026  000723                            BR      8$              ;LOOP UNTIL ALL CHARS ARE READ FROM FIFO.
8932                                        ;+
8933                                        ; TEST FOR ABORT CONDITIONS.  ONLY NONE ABORT CONDITIONS ARE:
8934                                        ;    1) 2 CHARS RXED ON A LINE AND NO OVERRUN ERROR BIT FAILURE DETECTED.
8935                                        ;    2) 2 TO 4 CHARS RXED ON A LINE AND AN OVERRUN BIT FAILURE DETECTED.
8936                                        ;-
8937  032030  005001                    14$:     CLR     R1              ;INITIALIZE LINE LOOP, CLEAR LINE OFFSET.
8938  032032  012737  015067  005224    16$:     MOV     #6711.,ERRNBR   ;SET UP ERROR NUMBER EACH TIME AROUND LOOP.
8939  032040  036137  002332  002174            BIT     BITTBL(R1),ACTLNS
8940  032046  001415                            BEQ     18$             ;LINE ACTIVE?  NO, NEXT LINE.
8941  032050  026127  003450  000002            CMP     RXCNTB(R1),#2   ;YES.
8942  032056  002447                            BLT     50$             ;FEWER THAN 2 CHARS RXED?  YES, ABORT.
8943  032060  036104  002332                    BIT     BITTBL(R1),R4   ;NO.
8944  032064  001006                            BNE     18$             ;OVERRUN BIT ERROR FLAG SET?  YES, NEXT LINE.
8945  032066  005237  005224                    INC     ERRNBR          ;SET LINE NUMBER TO 6712.
8946  032072  026127  003450  000002            CMP     RXCNTB(R1),#2
8947  032100  001036                            BNE     50$             ;NOT 2 CHARS RXED?  YES, ABORT.  NO, NEXT LINE.
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8948  032102  062701  000002          18$:    ADD     #2,R1               ;SET LINE OFFSET TO THE NEXT LINE.
8949  032106  020127  000020                  CMP     R1,#NUMLNS*2
8950  032112  002747                        BLT     16$                 ;ALL LINES DONE?  NO, LOOP.  YES, CONTINUE.
8951                                        ;+
8952                                        ; CHECK FOR OVERRUN ERROR BIT FAILURES, PRINT ERROR MESSAGE IF FOUND.
8953                                        ;-
8954  032114  012737  015071  005224              MOV     #6713.,ERRNBR   ;SET UP ERROR NUMBER.
8955  032122  005001                              CLR     R1              ;INITIALIZE LOOP.  CLEAR LINE OFFSET.
8956  032124  010102                      20$:    MOV     R1,R2           ;COPY THE LINE OFFSET.
8957  032126  036104  002332                    BIT     BITTBL(R1),R4   ;OVERRUN BIT FAILURE FLAGS ARE IN R4.
8958  032132  001411                            BEQ     22$             ;ERROR FLAG CLEAR?  YES, NEXT LINE.
8959  032134  010103                            MOV     R1,R3
8960  032136  006203                            ASR     R3              ;CALCULATE LINE NUMBER FROM LINE OFFSET.
8961  032140  012737  012660  005230            MOV     #ER7801,ERRBLK  ;SELECT THE CORRECT ERROR REPORTING ROUTINE.
8962  032146  012701  010024                    MOV     #EM6702,R1      ;PASS THE MESSAGE TO BE REPORTED.
8963                                      ;REPORT "OVERRUN ERROR NOT REPORTED CORRECTLY WHEN FORCED, ON LINE NN ..."
8964  032152                                    ERROR                   ;                   >>>>> ERROR  #6713 <<<<<.
8965  032152  104460                                                                                TRAP    C$ERROR
8966  032154  010201                            MOV     R2,R1           ;RESTORE THE LINE OFFSET THAT WAS DESTROYED.
8967  032156  046104  002332              22$:    BIC     BITTBL(R1),R4   ;CLEAR THE LINE ERROR FLAG WE JUST HANDLED.
8968  032162  001407                            BEQ     60$             ;ALL FAILURE BITS HANDLED?  YES, EXIT TEST.
8969  032164  062701  000002                    ADD     #2,R1           ;NO, INCREMENT THE LINE OFFSET.
8970  032170  000755                            BR      20$             ;LOOP TO HANDLE THE NEXT LINE.
8971
8972  032172                              24$:  ;REPORT "BMP CODE FOUND IN FIFO, TEST INVAILDATED."
8973  032172                                    ERROR                   ;                   >>>>> ERROR <<<<<.
8974  032172  104460                                                                                TRAP    C$ERROR
8975  032174  000402                            BR      60$             ;EXIT THIS TEST.
8976
8977  032176  004737  023074        50$:  JSR     PC,TSABRT       ;ABORT THE TEST.  ERROR # INDICATES FAULT TYPE.
8978  032202  005037  002222        60$:   CLR     CTRLCF          ;INDICATE THAT WE ARE NOT WITHIN A TEST.
8979
8980  032206                              ENDTST
8981  032206                                                                                L10033:
8982  032206  104401                                                                                TRAP    C$ETST
```

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                        .SBTTL  HARDWARE TEST           - SINGLC -
                        ;++ ************************************************************************
                        ;*              - SINGLE CHARACTER MODE TEST -
                        ;*      THIS TEST VERIFIES THAT THE DEVICE UNDER TEST (DUT) WILL PERFORM
                        ;*      TRANSMISSION AND RECEPTION CORRECTLY USING THE SINGLE CHARACTER
                        ;*      MODE INTERRUPTS.  THE TEST IS PERFORMED AT 3 BAUDRATES (SLOWEST,
                        ;*      MIDDLE, AND HIGHEST) AT ALL COMBINATIONS OF # OF STOP BITS, # OF
                        ;*      BITS PER CHARACTER, AND TYPES OF PARITY USING SHORT DATA PATTERNS.
                        ;*      A HIGH SPEED TEST IS ALSO PERFORMED AT THE HIGHEST BAUDRATE WITH ALL
                        ;*      COMBINATIONS OF LINE PARAMETERS USING LONGER DATA PATTERNS.
                        ;*      THIS TEST IS PERFORMED IN INTERNAL LOOPBACK REGARDLESS OF THE TYPE
                        ;*      OF LOOPBACK WHICH IS SELECTED FOR THE DUT IN THE HARDWARE P-TABLE.
                        ;*
                        ;-- ************************************************************************

032210                          BGNTST
032210                                                          T7::
032210                          SETPRI  #PRI05          ;ALLOW LTC INTERRUPTS.
032210  012700  000240                                                  MOV     #PRI05,R0
032214  104441                                                          TRAP    C$SPRI
                                 TNUM == TNUM + 1       ;INCREMENT THE ASSEMBLY TIME TEST COUNTER.
032216  012737  000007  002224   MOV     #TNUM,TSTNUM    ;SET UP THE TEST NUMBER.        (90)
032224  012737  177777  002222   MOV     #-1,CTRLCF      ;INDICATE THAT WE ARE IN A TEST.
032232  012737  000001  005222   MOV     #1,ERRTYP       ;SET ERROR TYPE AS FATAL IN ERROR TABLE.
032240  012737  021451  005224   MOV     #9001.,ERRNBR   ;SET THE FIRST ERROR NUMBER IN ERROR TABLE.
032246  012737  010101  005226   MOV     #EM9001,ERRMSG  ;SET ERROR MESSAGE ADDRESS IN ERRTBL.
032254  005037  002406           CLR     ERSMRF          ;INITIALIZE THE "REPORT ERROR SUMMARY" FLAGS.
                        ;+
                        ; RESET THE DUT TO A KNOWN STATE, REMOVE THE STATUS CODES FROM THE FIFO.
                        ;  CLEAR TX AND RX INTERRUPT ENABLE BITS IN THE CSR.
                        ; THIS SUBROUTINE REPORTS ERROR >>>>> 9001 <<<<<.
                        ;-
032260  004737  015502           JSR     PC,CLNRST       ;RESET THE DHV-11, REPORT ANY ERRORS FOUND.
032264  103402                   BCS     .+6             ;IF NO ERROR FOUND DURING RESETT, DON'T ABORT.
032266  000137  032674           JMP     60$             ;ABORT THE TEST, FATAL ERROR WAS FOUND.
032272  012737  021452  005224    MOV     #9002.,ERRNBR   ;SET THE ERROR NUMBER.

                        ;+
                        ; SET UP FOR TRANSMIT AND RECEIVE INTERRUPTS.
                        ;-
032300                          SETPRI  #PRI07          ;DISABLE ALL INTERRUPTS.
032300  012700  000340                                                  MOV     #PRI07,R0
032304  104441                                                          TRAP    C$SPRI
032306                          SETVEC  TXVECA,#TXSCHR,#PRI05   ;SELECT SINGLE CHAR TX INT SERVICE RTN.
032306  012746  000240                                                  MOV     #PRI05,-(SP)
032312  012746  025464                                                  MOV     #TXSCHR,-(SP)
032316  013746  002172                                                  MOV     TXVECA,-(SP)
032322  012746  000003                                                  MOV     #3,-(SP)
032326  104437                                                          TRAP    C$SVEC
032330  062706  000010                                                  ADD     #10,SP
032334                          SETVEC  RXVECA,#RXCHRS,#PRI05   ;SELECT RX INT SERVICE RTN.
032334  012746  000240                                                  MOV     #PRI05,-(SP)
032340  012746  025144                                                  MOV     #RXCHRS,-(SP)
032344  013746  002170                                                  MOV     RXVECA,-(SP)
032350  012746  000003                                                  MOV     #3,-(SP)
032354  104437                                                          TRAP    C$SVEC
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9039  032356  062706  000010                                                    ADD     #10,SP
9040  032362
9041  032362  012700  000140          SETPRI  #PRI03          ;ALLOW INTERRUPTS.  MOV     #PRI03,R0
9042  032366  104441                                                           TRAP    C$SPRI
9043                                  ;+
9044                                  ; CLEAR THE ERROR COUNTER TABLE.
9045                                  ; THIS TABLE WILL ACCUMULATE ERROR COUNT TOTALS FOR EACH LINE DURING THIS TEST.
9046                                  ;-
9047  032370  012700  003210                MOV     #ERCNTB,R0
9048  032374  004737  015524                JSR     PC,CLR16W       ;CLEAR THE RX ERROR COUNTERS TABLE.
9049                                  ;+
9050                                  ; TRANSMIT AND RECEIVE SHORT DATA PATTERN IN ALL COMBINATIONS OF 3 BAUDRATES,
9051                                  ; ALL #S OF STOP BITS, ALL #S OF BITS PER CHARACTER, AND ALL TYPES OF PARITY.
9052                                  ;    SET UP LINE CONTROL PARAMETERS FOR SINGLE CHAR MODE DUT OPERATION.
9053                                  ;-
9054  032400  005037  002372                CLR     GPRS0B          ;CLEAR THE GPR SAVE AREA R1 STORAGE TO INDICATE
9055                                                                  ;   THAT THIS IS THE FIRST TIME IN GETLP1.
9056  032404  004737  023024          2$:   JSR     PC,SWAP0        ;SWAP GPRS WITH GPR SAVE AREA ZERO FOR GETLP1.
9057  032410  004737  016444                JSR     PC,GETLP1       ;GET NEXT SET OF LPR CONTENTS, OR CARRY CLEAR.
9058  032414  004737  023024                JSR     PC,SWAP0        ;SWAP BACK GPRS AND GPR SAVE AREA ZERO.
9059  032420  103041                       BCC     4$              ;EXIT LOOP IF ALL COMBINATIONS OF LPRS DONE.
9060  032422  010001                        MOV     R0,R1           ;PASS THE LPR CONTENTS TO GETTIM AND VANSUP.
9061  032424  004737  016746                JSR     PC,GETTIM       ;GET TIME-OUT BASED ON MINIMUM BAUDRATE IN USE.
9062  032430  012702  005036                MOV     #SDPBAS,R2      ;SET UP POINTER TO START OF SHORT DATA PATTERN.
9063  032434  012703  000020                MOV     #SDPEND-SDPBAS,R3  ;SET UP THE DATA PATTRN LENGTH.
9064  032440  012704  000001                MOV     #1,R4           ;SPECIFY TO SEND 1 DATA PATTERN TO EACH LINE.
9065  032444  004737  024542                JSR     PC,VANSUP       ;SET UP "VANILLA FLAVORED" TX/RX.
9066  032450  004737  014720                JSR     PC,CHRMSK       ;GET THE BIT MASK OF UNUSED TX/RX BITS.
9067  032454  004737  020612                JSR     PC,PUFIFO       ;PURGE THE DUT RECEIVE CHARACTER FIFO.
9068  032460  004737  021064                JSR     PC,PURRXB       ;PURGE THE RX CHAR BUFFER IN MEMORY.
9069  032464  004737  017054                JSR     PC,INICHR       ;SEND INITIAL CHARS TO ALL ACTIVE LINES.
9070  032470  012737  021452  005224         MOV     #9002.,ERRNBR   ;SET THE ERROR NUMBER TO 9002.
9071                                  ;+
9072                                  ; THE FOLLOWING ROUTINE REPORTS THE ERROR WITH NUMBERS 9002 THRU 9008.
9073                                  ;-
9074  032476  004737  021120             JSR     PC,RDCHRS       ;READ AND VERIFY THE RX CHARACTERS.
9075  032502  012737  021461  005224      MOV     #9009.,ERRNBR   ;SET THE ERROR NUMBER TO 9009.
9076                                  ;+
9077                                  ; THE FOLLOWING ROUTINE REPORTS THE ERROR WITH NUMBERS 9009 THRU 9012.
9078                                  ;-
9079  032510  004737  024230             JSR     PC,TXRREP       ;REPORT FINAL ERRORS FROM RX/RX.
9080                                  ;+
9081                                  ; LOOP TO SELECT THE NEXT BAUDRATE AND LINE PARAMETERS.
9082                                  ;-
9083  032514  000733                     BR      2$
9084                                ;+
9085                                ; TRANSMIT AND RECEIVE LONG DATA PATTERNS AT MAXIMUM BAUDRATE AND ALL
9086                                ; COMBINATIONS OF ALL NUMBERS OF STOP BITS, ALL NUMBERS OF BITS PER CHARACTER,
9087                                ; AND ALL TYPES OF PARITY.
9088                                ;-
9089                                   ;+
9090                                   ; INITIALIZE THE LONG DATA PATTERN AND PARAMETERS FOR THE SCHTST CALL.
9091                                   ;-
9092  032516  012737  021465  005224      MOV     #9013.,ERRNBR   ;SET THE ERROR NUMBER TO 9013.
9093  032524  012702  003510        4$:   MOV     #BUFBAS,R2      ;INITIALIZE THE LONG DATA
9094  032530  005003                      CLR     R3              ;   PATTERN IN THE GENERAL
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 9095  032532  110322                  6$:     MOVB    R3,(R2)+        ;  DATA BUFFER TO A 256
 9096  032534  005203                          INC     R3              ;  BYTE PATTERN COUNTING
 9097  032536  020227  004110                  CMP     R2,#BUFMID      ;  FROM ZERO TO 255.
 9098  032542  103773                        BLO     6$              ;
 9099                                      ;+
 9100                                      ; INITIALIZE FOR, AND GET THE LPR CONTENTS.
 9101                                      ;-
 9102  032544  005037  002372                  CLR     GPRS0B          ;CLEAR THE GPR SAVE AREA R1 STORAGE TO INDICATE
 9103                                                                  ;  THAT THIS IS THE FIRST TIME IN GETLP2.
 9104  032550  004737  023024          8$:     JSR     PC,SWAP0        ;SWAP GPRS WITH GPR SAVE AREA ZERO FOR GETLP1.
 9105  032554  004737  016616                  JSR     PC,GETLP2       ;GET NEXT SET OF LPR CONTENTS, OR CARRY CLEAR.
 9106  032560  004737  023024                  JSR     PC,SWAP0        ;SWAP BACK GPRS AND GPR SAVE AREA ZERO.
 9107  032564  103036                        BCC     10$             ;EXIT LOOP IF ALL COMBINATIONS OF LPRS DONE.
 9108  032566  010001                          MOV     R0,R1           ;PASS THE LPR CONTENTS TO GETTIM AND VANSUP.
 9109  032570  004737  016746                JSR     PC,GETTIM       ;GET TIME-OUT BASED ON MINIMUM BAUDRATE IN USE.
 9110  032574  012702  003510                  MOV     #BUFBAS,R2      ;SET UP POINTER TO START OF SHORT DATA PATTERN.
 9111  032600  012703  000400                  MOV     #BUFMID-BUFBAS,R3  ;SET UP THE DATA PATTRN LENGTH.
 9112  032604  012704  000001                  MOV     #1,R4           ;SPECIFY TO SEND 1 DATA PATTERN TO EACH LINE.
 9113  032610  004737  024542                JSR     PC,VANSUP       ;SET UP "VANILLA FLAVORED" TX/RX.
 9114  032614  004737  014720                JSR     PC,CHRMSK       ;GET THE BIT MASK OF UNUSED TX/RX BITS.
 9115  032620  004737  020612                JSR     PC,PUFIFO       ;PURGE THE DUT RECEIVE CHARACTER FIFO.
 9116  032624  004737  021064                JSR     PC,PURRXB       ;PURGE THE RX CHAR BUFFER IN MEMORY.
 9117  032630  004737  017054                JSR     PC,INICHR       ;SEND INITIAL CHARS TO ALL ACTIVE LINES.
 9118  032634  012737  021465  005224          MOV     #9013.,ERRNBR   ;SET THE ERROR NUMBER TO 9013.
 9119                                      ;+
 9120                                      ; THE FOLLOWING ROUTINE REPORTS THE ERROR WITH NUMBERS 9013 THRU 9018.
 9121                                      ;-
 9122  032642  004737  021120                  JSR     PC,RDCHRS       ;READ AND VERIFY THE RX CHARACTERS.
 9123  032646  012737  021473  005224          MOV     #9019.,ERRNBR   ;SET THE ERROR REPORT NUMBER TO 9019.
 9124                                      ;+
 9125                                      ; THE FOLLOWING ROUTINE REPORTS THE ERROR WITH NUMBERS 9019 THRU 9022.
 9126                                      ;-
 9127  032654  004737  024230                  JSR     PC,TXRREP       ;REPORT FINAL ERRORS FROM RX/RX.
 9128                                      ;+
 9129                                      ; LOOP TO SELECT THE NEXT BAUDRATE AND LINE PARAMETERS.
 9130                                      ;-
 9131  032660  000733                          BR      8$
 9132  032662  012737  021477  005224  10$:     MOV     #9023.,ERRNBR   ;SELECT NUMBER 9023 FOR THE NEXT ERROR REPORT.
 9133  032670  004737  021664                  JSR     PC,REPSMR       ;REPORT ERROR SUMMARIES IF CALLED FOR.
 9134
 9135                                    ;+
 9136                                    ; ALL DONE, HAVE COMPLETED THE TEST.
 9137                                    ;    DISABLE INTERRUPTS.
 9138                                    ;    CLEAR THE INTERRUPT VECTORS.
 9139                                    ;-
 9140  032674                          60$:    SETPRI  #PRI07          ;DISABLE ALL INTERRUPTS.
 9141  032674  012700  000340                                                          MOV     #PRI07,R0
 9142  032700  104441                                                                  TRAP    C$SPRI
 9143  032702                                  CLRVEC  TXVECA          ;RETURN TX INT VECTOR TO UNUSED POOL.
 9144  032702  013700  002172                                                         MOV     TXVECA,R0
 9145  032706  104436                                                                  TRAP    C$CVEC
 9146  032710                                  CLRVEC  RXVECA          ;RETURN RX INT VECTOR TO UNUSED POOL.
 9147  032710  013700  002170                                                         MOV     RXVECA,R0
 9148  032714  104436                                                                  TRAP    C$CVEC
 9149  032716  005037  002222                  CLR     CTRLCF          ;INDICATE THAT WE ARE NOT WITHIN A TEST.
 9150
```

```
 9151  032722                          ENDTST
 9152  032722
 9153  032722  104401                                L10034:
                                                          TRAP    C$ETST
```

```
                        .SBTTL  HARDWARE TEST           - DMA -
                        ;++ ************************************************************************
                        ;*                          - DMA MODE TEST -
                        ;*      THIS TEST VERIFIES THAT THE DEVICE UNDER TEST (DUT) WILL PERFORM
                        ;*      TRANSMISSION AND RECEPTION CORRECTLY USING THE DMA MODE TRANSMISSION.
                        ;*      THE TEST IS PERFORMED AT ALL BAUDRATES (EXCEPT 50 BAUD), 8 BITS PER
                        ;*      CHARACTER, 1 STOP BIT, AND WITH PARITY CHECKING (BOTH ODD AND EVEN).
                        ;*      A HIGH SPEED TEST IS ALSO PERFORMED AT THE HIGHEST 3 BAUDRATES AT
                        ;*      BOTH 5 AND 8 BITS PER CHARACTER, 1 STOP BIT, AND NO PARITY CHECKING.
                        ;*      THIS TEST IS PERFORMED WITH THE TYPE OF LOOPBACK WHICH WAS SPECIFIED
                        ;*      IN THE DUT HARDWARE P-TABLE ON ALL ACTIVE LINES.
                        ;*
                        ;-- ************************************************************************
032724                          BGNTST
                                                                        T8::
032724                          SETPRI  #PRI05          ;ALLOW LTC INTERRUPTS.
032724  012700  000240                                                  MOV     #PRI05,R0
032730  104441                                                          TRAP    C$SPRI
        000010           TNUM == TNUM + 1       ;INCREMENT THE ASSEMBLY TIME TEST COUNTER.
032732  012737  000010  002224    MOV     #TNUM,TSTNUM    ;SET UP THE TEST NUMBER.        (91)
032740  012737  177777  002222    MOV     #-1,CTRLCF      ;INDICATE THAT WE ARE IN A TEST.
032746  012737  000001  005222    MOV     #1,ERRTYP       ;SET ERROR TYPE AS FATAL IN ERROR TABLE.
032754  012737  021615  005224    MOV     #9101.,ERRNBR   ;SET THE FIRST ERROR NUMBER IN ERROR TABLE.
032762  012737  011277  005226    MOV     #EM9101,ERRMSG  ;SET ERROR MESSAGE ADDRESS IN ERRTBL.
032770  005037  002406            CLR     ERSMRF          ;INITIALIZE THE 'REPORT ERROR SUMMARY'' FLAGS.
                        ;+
                        ; RESET THE DUT TO A KNOWN STATE, REMOVE THE STATUS CODES FROM THE FIFO.
                        ;   CLEAR TX AND RX INTERRUPT ENABLE BITS IN THE CSR.
                        ; THIS SUBROUTINE REPORTS ERROR >>>>> 9101 <<<<<.
                        ;-
032774  004737  015502            JSR     PC,CLNRST       ;RESET THE DHV-11, REPORT ANY ERRORS FOUND.
033000  103402                    BCS     2$              ;SKIP AROUND TEST EXIT IF NO FATAL ERROR FOUND.
033002  000137  033536            JMP     60$             ;RESET FAILURE, ABORT THIS TEST.
                        ;+
                        ; SET UP FOR TRANSMIT INTERRUPTS.
                        ;-
033006                  2$:     SETPRI  #PRI07          ;DISABLE ALL INTERRUPTS.
033006  012700  000340                                                  MOV     #PRI07,R0
033012  104441                                                          TRAP    C$SPRI
033014                          SETVEC  TXVECA,#TXDMA,#PRI05    ;SELECT DMA TX INT SERVICE RTN.
033014  012746  000240                                                  MOV     #PRI05,-(SP)
033020  012746  025332                                                  MOV     #TXDMA,-(SP)
033024  013746  002172                                                  MOV     TXVECA,-(SP)
033030  012746  000003                                                  MOV     #3,-(SP)
033034  104437                                                          TRAP    C$SVEC
033036  062706  000010                                                  ADD     #10,SP
033042                          SETVEC  RXVECA,#RXCHRS,#PRI05   ;SELECT RX INT SERVICE RTN.
033042  012746  000240                                                  MOV     #PRI05,-(SP)
033046  012746  025144                                                  MOV     #RXCHRS,-(SP)
033052  013746  002170                                                  MOV     RXVECA,-(SP)
033056  012746  000003                                                  MOV     #3,-(SP)
033062  104437                                                          TRAP    C$SVEC
033064  062706  000010                                                  ADD     #10,SP
033070                          SETPRI  #PRI03          ;ALLOW INTERRUPTS.
033070  012700  000140                                                  MOV     #PRI03,R0
033074  104441                                                          TRAP    C$SPRI
```

```
9210                                    ;+
9211                                    ; TRANSMIT AND RECEIVE SHORT DATA PATTERN AT ALL BAUDRATES,
9212                                    ;   WITH 8 BITS PER CHARACTER, 1 STOP BIT, AND BOTH TYPES OF PARITY.
9213                                    ;   BOTH LINE GROUPS (LGPRS) TX AND RX WITH THE SAME PARAMETERS.
9214                                    ;-
9215  033076  012700  003210                    MOV     #ERCNTB,R0
9216  033102  004737  015524                   JSR     PC,CLR16W       ;CLEAR THE RX ERROR COUNTERS TABLE.
9217  033106  012701  010470                    MOV     #10470,R1       ;SET UP LPR CONTENTS FOR TX/RX AT 75 BAUD.
9218  033112  004737  016746            4$:     JSR     PC,GETTIM       ;GET TIME-OUT BASED ON MINIMUM BAUDRATE IN USE.
9219  033116  012702  005062                    MOV     #SDP2B,R2       ;SET UP THE START ADR OF THE DATA PATTERN.
9220  033122  012703  000020                    MOV     #SDP2E-SDP2B,R3 ;SET UP THE DATA PATTERN LENGTH.
9221  033126  012704  000001                    MOV     #1,R4           ;SPECIFY TO SEND 1 DATA PATTERN TO EACH LINE.
9222  033132  004737  024542                   JSR     PC,VANSUP       ;SET UP "VANILLA FLAVORED" TX/RX.
9223  033136  012737  177400  002226            MOV     #177400,IBM     ;FORM BIT MAP OF UNUSED TX/RX BITS.
9224  033144  012737  021616  005224            MOV     #9102.,ERRNBR   ;SET THE ERROR REPORT NUMBER TO 9102.
9225                                    ;+
9226                                    ; THIS ROUTINE REPORTS ERRORS WITH NUMBERS >>>>> 9102 THRU 9104 <<<<<.
9227                                    ;-
9228  033152  004737  020674                   JSR     PC,PUFIFR       ;PURGE THE DUT RECEIVE CHARACTER FIFO.
9229  033156  103167                    BCC     60$             ;ABORT THIS TEST IF FIFO WOULD NOT PURGE.
9230
9231  033160  004737  021064                   JSR     PC,PURRXB       ;PURGE THE RX CHAR BUFFER IN MEMORY.
9232  033164  004737  017166                   JSR     PC,INIDMA       ;SEND THE FIRST BATCH OF DATA PATTERNS.
9233  033170  012737  021621  005224            MOV     #9105.,ERRNBR   ;SET ERROR NUMBER TO 9105.
9234                                    ;+
9235                                    ; THIS ROUTINE REPORTS ERRORS WITH NUMBERS >>>>> 9105 THRU 9110 <<<<<.
9236                                    ;-
9237  033176  004737  021120                   JSR     PC,RDCHRS       ;READ AND VERIFY THE RX CHARACTERS.
9238  033202  012737  021627  005224            MOV     #9111.,ERRNBR   ;SET ERROR NUMBER TO 9111.
9239                                    ;+
9240                                    ; THIS ROUTINE REPORTS ERRORS WITH NUMBERS >>>>> 9111 THRU 9114 <<<<<.
9241                                    ;-
9242  033210  004737  024230                   JSR     PC,TXRREP       ;REPORT FINAL ERRORS FROM RX/RX.
9243                                    ;+
9244                                    ; TOGGLE THE PARITY TYPE BIT SPECIFIER IN THE TX/RX SETUP PARAMETERS.
9245                                    ; SELECT THE NEXT BAUDRATE AND PERFORM THE TEST AGAIN IF NOT DONE.
9246                                    ;-
9247  033214  010100                        MOV     R1,R0           ;COMPLEMENT THE PARITY TYPE
9248  033216  042701  000100               BIC     #100,R1         ;  BIT IN THE TX/RX LPR SETUP
9249  033222  005100                        COM     R0              ;  PARAMETER LEAVING THE
9250  033224  042700  177677               BIC     #177677,R0      ;  OTHER LPR PARAMETER
9251  033230  050001                        BIS     R0,R1           ;  BITS UNCHANGED.
9252  033232  062701  010400               ADD     #10400,R1       ;SELECT THE NEXT BAUDRATE.
9253  033236  103325                      BCC     4$              ;LOOP TO TX/RX AGAIN IF NOT PAST LAST BAUDRATE.
9254                                  ;+
9255                                  ; PERFORM WIDE OPEN DMA TEST.
9256                                  ; TRANSMIT AND RECEIVE 512 BYTE DATA PATTERNS AT ALL COMBINATIONS OF 9.6K,
9257                                  ; 19.2K, AND 38.4K BUADRATES AND 5 AND 8 BITS PER CHARACTER.  USE 1 STOP BIT
9258                                  ; AND NO PARITY GENERATION OR DETECTION.
9259                                  ;-
9260                                      ;+
9261                                      ; INITIALIZE THE 512 BYTE PATTERN AND THE VARIOUS DATA PATTERN POINTERS.
9262                                      ;-
9263  033240  005001                        CLR     R1              ;CLEAR THE DATA BYTE COUNTER.
9264  033242  012702  003510               MOV     #BUFBAS,R2      ;GET THE BASE OF THE DATA PATTERN BUFFER.
9265  033246  110122                6$:     MOVB    R1,(R2)+        ;WRITE A BYTE OF THE DATA PATTERN.
```

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9266  033250  105201                          INCB    R1              ;GET THE NEXT BYTE FOR THE DATA PATTERN.
9267  033252  001375                          BNE     6$              ;LOOP UNTIL FIRST 1/2 OF PATTERN IS DONE.
9268  033254  105301                  8$:     DECB    R1              ;GET THE NEXT BYTE FOR THE DATA PATTERN.
9269  033256  110122                          MOVB    R1,(R2)+        ;WRITE A BYTE OF THE DATA PATTERN.
9270  033260  105701                          TSTB    R1              ;CHECK FOR DONE WRITING DATA PATTERN.
9271  033262  001374                          BNE     8$              ;LOOP IF DATA PATTERN IS NOT DONE.
9272  033264  110122                  10$:    MOVB    R1,(R2)+        ;WRITE A BYTE OF THE 32 BYTE OVERFLOW REGION.
9273  033266  005201                          INC     R1              ;COUNT THIS BYTE.
9274  033270  020127  000040                  CMP     R1,#32.         ;TEST FOR 32 BYTES WRITTEN.
9275  033274  001373                      BNE     10$                 ;LOOP UNTIL 32 BYTES ARE WRITTEN.
9276                                    ;+
9277                                    ; PREPARE TO LOOP ON THE 3 DIFFERENT BAUDRATES (9.6K, 19.2K, AND 38.4K).
9278                                    ;-
9279  033276  012705  005000                   MOV    #DLPRTB,R5      ;GET THE BASE ADR OF THE DMA BAUDRATE TABLE.
9280                                    ;+
9281                                    ; SPECIFY THE PROPER BAUDRATE.
9282                                    ; SPECIFY 8 BITS PER CHARACTER.
9283                                    ; PERFORM DMA TRANSMISSION AND RECEPTION OF 512 BYTE DATA PATTERN.
9284                                    ;-
9285                                        ;+
9286                                        ; THE FOLLOWING ROUTINE REPORTS THE ERROR WITH NUMBERS 914 THRU 921.
9287                                        ;    LPR CHANGE BIT ERROR FLAGS MAY BE SET BY THIS SUBROUTINE.
9288                                        ;-
9289  033302  012501                  12$:    MOV     (R5)+,R1        ;SET UP LPR PARAM AT NEXT BAUD, 8 BITS/CHAR.
9290  033304  004737  016746                  JSR     PC,GETTIM       ;GET TIME-OUT BASED ON MINIMUM BAUDRATE IN USE.
9291  033310  012702  003510                   MOV    #BUFBAS,R2      ;SET UP THE START ADR OF THE DATA PATTERN.
9292  033314  012703  001000                   MOV    #512.,R3        ;SET UP THE DATA PATTERN LENGTH.
9293  033320  012704  000001                   MOV    #1,R4           ;SPECIFY TO SEND 1 DATA PATTERN TO EACH LINE.
9294  033324  004737  024542                  JSR     PC,VANSUP       ;SET UP "VANILLA FLAVORED" TX/RX.
9295  033330  012737  177400  002226           MOV    #177400,IBM     ;FORM BIT MAP OF UNUSED BITS FOR 8 BITS/CHAR.
9296  033336  012737  021633  005224           MOV    #9115.,ERRNBR   ;SET ERROR NUMBER TO 9115.
9297                                        ;+
9298                                        ; THIS ROUTINE REPORTS ERROS WITH NUMBERS >>>>> 9115 THRU 9117 <<<<<.
9299                                        ;-
9300  033344  004737  020674                  JSR     PC,PUFIFR       ;PURGE THE DUT RECEIVE CHARACTER FIFO.
9301  033350  103072                          BCC     60$             ;ABORT THIS TEST IF FIFO WOULD NOT PURGE.
9302  033352  012737  021636  005224           MOV    #9118.,ERRNBR   ;SET ERROR NUMBER TO 9118.
9303
9304  033360  004737  021064                  JSR     PC,PURRXB       ;PURGE THE RX CHAR BUFFER IN MEMORY.
9305  033364  004737  017166                  JSR     PC,INIDMA       ;SEND THE FIRST BATCH OF DATA PATTERNS.
9306                                    ;+
9307                                    ; THIS ROUTINE REPORTS THE ERROR WITH NUMBERS >>>>> 9118 THRU 9123 <<<<<.
9308                                    ;-
9309  033370  004737  021120                  JSR     PC,RDCHRS       ;READ AND VERIFY THE RX CHARACTERS.
9310  033374  012737  021644  005224           MOV    #9124.,ERRNBR   ;SET ERROR NUMBER TO 9124.
9311                                    ;+
9312                                    ; THIS ROUTINE REPORTS ERRORS WITH NUMBERS >>>>> 9124 THRU 9127 <<<<<.
9313                                    ;-
9314  033402  004737  024230                  JSR     PC,TXRREP       ;REPORT FINAL ERRORS FROM RX/RX.
9315  033406  012737  021650  005224           MOV    #9128.,ERRNBR   ;SET ERROR NUMBER TO 9128.
9316                                    ;+
9317                                    ; SPECIFY 5 BITS PER CHARACTER.
9318                                    ; PERFORM DMA TRANSMISSION AND RECEPTION OF 512 BYTE DATA PATTERN.
9319                                    ;-
9320  033414  042701  000030                   BIC    #30,R1          ;SET UP CHAR LENGTH PARAM TO 5 BITS/CHAR.
9321  033420  004737  024542                  JSR     PC,VANSUP       ;SET UP "VANILLA FLAVORED" TX/RX.
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 9322  033424  012737  177740  002226          MOV     #177740,IBM     ;FORM BIT MAP OF UNUSED BITS FOR 5 BITS/CHAR.
 9323                                        ;+
 9324                                        ; THIS  ROUTINE REPORTS THE ERROR WITH NUMBERS >>> 9128 THRU 9131 <<<.
 9325                                        ;-
 9326  033432  004737  020674                JSR     PC,PUFIFR       ;PURGE THE DUT RECEIVE CHARACTER FIFO.
 9327  033436  103037                        BCC     60$             ;ABORT THIS TEST IF FIFO WOULD NOT PURGE.
 9328  033440  012737  021654  005224          MOV     #9132.,ERRNBR   ;SET THE ERROR REPORT NUMBER TO 9132.
 9329
 9330  033446  004737  021064                JSR     PC,PURRXB       ;PURGE THE RX CHAR BUFFER IN MEMORY.
 9331  033452  004737  017166                JSR     PC,INIDMA       ;SEND THE FIRST BATCH OF DATA PATTERNS.
 9332                                      ;+
 9333                                      ; THIS ROUTINE REPORTS THE ERROR WITH NUMBERS >>>>> 9132 THRU 9137 <<<<<.
 9334                                      ;-
 9335  033456  004737  021120                JSR     PC,RDCHRS       ;READ AND VERIFY THE RX CHARACTERS.
 9336  033462  012737  021662  005224          MOV     #9138.,ERRNBR   ;SET ERROR NUMBER TO 9138.
 9337                                      ;+
 9338                                      ; THIS ROUTINE REPORTS THE ERROR WITH NUMBERS >>>>> 9138 THRU 9141 <<<<<.
 9339                                      ;-
 9340  033470  004737  024230                JSR     PC,TXRREP       ;REPORT FINAL ERRORS FROM RX/RX.
 9341  033474  020527  005006                CMP     R5,#DLPRTE      ;COMPARE DMA BAUDRATE TABLE PTR WITH TABLE END.
 9342  033500  103700                        BLO     12$             ;LOOP IF NOT ALL BAUDRATES DONE YET.
 9343                                    ;+
 9344                                    ; ALL DONE.  HAVE EITHER RUN OUT OF ACTIVE LINES, OR COMPLETED THE TEST.
 9345                                    ;    DISABLE INTERRUPTS.
 9346                                    ;    CLEAR THE INTERRUPT VECTORS.
 9347                                    ;-
 9348  033502                            12$:    SETPRI  #PRI07          ;DISABLE ALL INTERRUPTS.
 9349  033502  012700  000340                                                    MOV     #PRI07,R0
 9350  033506  104441                                                            TRAP    C$SPRI
 9351  033510                                    CLRVEC  TXVECA          ;RETURN TX INT VECTOR TO UNUSED POOL.
 9352  033510  013700  002172                                                    MOV     TXVECA,R0
 9353  033514  104436                                                            TRAP    C$CVEC
 9354  033516                                    CLRVEC  RXVECA          ;RETURN RX INT VECTOR TO UNUSED POOL.
 9355  033516  013700  002170                                                    MOV     RXVECA,R0
 9356  033522  104436                                                            TRAP    C$CVEC
 9357
 9358  033524  012737  021666  005224          MOV     #9142.,ERRNBR   ;SELECT NUMBER 9142 FOR THE NEXT ERROR REPORT.
 9359  033532  004737  021664                JSR     PC,REPSMR       ;REPORT ERROR SUMMARIES IF CALLED FOR.
 9360  033536                            60$:    SETPRI  #PRI07          ;DISABLE ALL INTERRUPTS.
 9361  033536  012700  000340                                                    MOV     #PRI07,R0
 9362  033542  104441                                                            TRAP    C$SPRI
 9363  033544  005037  002222                CLR     CTRLCF          ;INDICATE THAT WE ARE NOT WITHIN A TEST.
 9364  033550                                    ENDTST
 9365  033550                                                          L10035:
 9366  033550  104401                                                            TRAP    C$ETST
```

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                                .SBTTL  HARDWARE TEST           - SPLSPD -
                                ;++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                                ;*                      - SPLIT SPEED TEST -
                                ;*      THIS TEST IS USED TO VERIFY THE SPLIT SPEED CAPABILITIES OF THE DHV11,
                                ;*      AND THE CORRECT OPERATION OF THE A & B BAUD RATE GROUP SELECTION.
                                ;*      THE TEST USES THREE SETS OF BAUD RATES (38.4,50; 1200,75; 2000,2400).
                                ;*      THIS TEST WILL ONLY EXECUTE IF THE STAGGARED LOOPBACK MODE IS SELECTED.
                                ;*      THE SPECIAL STAGGARED LOOPBACK BERG CONNECTOR MUST BE FITTED.
                                ;*
                                ;--++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                                        BGNTST
                                                                                T9::
033552  123727  002176  000002          CMPB    LOPBCK,#2       ;CHECK MODE SELECTED.
033560  001402                          BEQ     2$              ;DO NOT EXIT IF STAGGERD LOPBCK MODE SELECTED.
033562  000137  034204                  JMP     60$             ;EXIT THIS TEST.
033566                          2$:     SETPRI  #PRI05          ;ALLOW LTC INTERRUPTS.
033566  012700  000240                                                  MOV     #PRI05,R0
033572  104441                                                          TRAP    C$SPRI
        000011                  TNUM == TNUM + 1                ;INCREMENT THE ASSEMBLY TIME TEST COUNTER.
033574  012737  000011  002224          MOV     #TNUM,TSTNUM    ;SET UP THE TEST NUMBER.        (92)
033602  012737  177777  002222          MOV     #-1,CTRLCF      ;INDICATE THAT WE ARE IN A TEST.
033610  012737  000001  005222          MOV     #1,ERRTYP       ;SET ERROR TYPE IN ERROR TABLE.
033616  012737  021761  005224          MOV     #9201.,ERRNBR   ;SET THE FIRST ERROR NUMBER IN ERROR TABLE.
033624  012737  011476  005226          MOV     #EM9201,ERRMSG  ;SET ERROR MESSAGE ADDRESS IN ERROR TABLE.
033632  005037  002406                  CLR     ERSMRF          ;INITIALIZE THE 'REPORT ERROR SUMMARY'' FLAGS.
                                ;+
                                ; RESET THE DUT TO A KNOWN STATE, REMOVE STATUS CODES FROM THE FIFO.
                                ;  CLEAR TX AND  RX INTERRUPT ENABLE BITS.
                                ; THIS SUBROUTINE REPORTS ERROR >>>>> 9201 <<<<<.
                                ;-
033636  004737  015502                  JSR     PC,CLNRST       ;RESET THE DUT.
033642  103160                          BCC     60$             ;ABORT THE TEST IF FATAL ERROR FOUND IN RESET.
                                ;+
                                ; DISABLE ALL INTERRUPTS.
                                ; SET UP  DMA TX AND RX INTERRUPT SERVICE ROUTINES.
                                ;-
033644                                  SETPRI  #PRI07          ;DISABLE ALL INTERRUPTS.
033644  012700  000340                                                  MOV     #PRI07,R0
033650  104441                                                          TRAP    C$SPRI
033652                                  SETVEC  TXVECA,#TXDMA,#PRI05    ;SELECT DMA TX INT SERVICE RTN.
033652  012746  000240                                                  MOV     #PRI05,-(SP)
033656  012746  025332                                                  MOV     #TXDMA,-(SP)
033662  013746  002172                                                  MOV     TXVECA,-(SP)
033666  012746  000003                                                  MOV     #3,-(SP)
033672  104437                                                          TRAP    C$SVEC
033674  062706  000010                                                  ADD     #10,SP
033700                                  SETVEC  RXVECA,#RXCHRS,#PRI05   ;SELECT RX INT SERVICE RTN.
033700  012746  000240                                                  MOV     #PRI05,-(SP)
033704  012746  025144                                                  MOV     #RXCHRS,-(SP)
033710  013746  002170                                                  MOV     RXVECA,-(SP)
033714  012746  000003                                                  MOV     #3,-(SP)
033720  104437                                                          TRAP    C$SVEC
033722  062706  000010                                                  ADD     #10,SP
033726                                  SETPRI  #PRI03          ;ALLOW INTERRUPTS.
033726  012700  000140                                                  MOV     #PRI03,R0
033732  104441                                                          TRAP    C$SPRI
```

```
 9423                                   ;+
 9424                                   ; ENABLE TRANSMITTERS ON ALL LINES.
 9425                                   ;-
 9426  033734  012705  000377                   MOV    #MAPLNS,R5      ;PASS ACTIVE LINE BIT MAP.
 9427  033740  004737  023412                  JSR    PC,TXENBL       ;ENABLE TRANSMISSIONS ON ALL LINES.
 9428
 9429                                   ;+
 9430                                   ; CLEAR ERROR TABLE PRIOR TO PERFOMING TX/RX TEST.
 9431                                   ;-
 9432  033744  012700  003210                   MOV    #ERCNTB,R0      ;GET THE BASE ADDRESS OF THE ERROR COUNTER TBL.
 9433  033750  004737  015524                  JSR    PC,CLR16W       ;CLEAR THE RX ERROR COUNTERS TABLE.
 9434
 9435                                   ;+
 9436                                   ; PERFORM SPLIT SPEED DMA TX AND RX ON ALL SELECTED LINES AT THE FOLLOWING
 9437                                   ; BAUD RATES.
 9438                                   ; 38.4K, 50 ; 1200, 75 ; 2000, 2400.
 9439                                   ;-
 9440                                    ;+
 9441                                    ; INITIALISE DMA TX/RX PARAMETERS IN THE CONTROL BLOCK FR EACH OF THE BAUD
 9442                                    ; RATES MENTIONED ABOVE.
 9443                                    ;  8 BITS/CHAR,1 STOP BITS,ODD PARITY.
 9444                                    ;-
 9445  033754  012705  005006                   MOV    #SPLPRB,R5      ;GET BASE ADDRESS OF LPR PARAMETER TABLE.
 9446  033760  012500                   4$:     MOV    (R5)+,R0        ;GET LPR CONTENTS FOR LINGRP II.
 9447  033762  012501                           MOV    (R5)+,R1        ;GET LPR CONTENTS FOR LINGRP I.
 9448  033764  004737  016746                  JSR    PC,GETTIM       ;GET TIME-OUT BASED ON MINIMUM BAUDRATE IN USE.
 9449  033770  012702  005062                   MOV    #SDP2B,R2       ;SET UP THE START ADR OF THE DATA PATTERN.
 9450  033774  012503                           MOV    (R5)+,R3        ;GET NUMBER OF REPEAT TRANSMISSION ON LINGRPII.
 9451  033776  012504                           MOV    (R5)+,R4        ;GET NUMBER OF REPEAT TRANSMISSION ON LINGRPI.
 9452  034000  004737  022524                  JSR    PC,SPLSUP       ;SET UP CONTROL BLOCK ETC, FOR TX/RX.
 9453  034004  012737  021762  005224           MOV    #9202.,ERRNBR   ;SET THE ERROR NUMBER TO 9202.
 9454                                  ;+
 9455                                  ; THIS ROUTINE REPORTS ERRORS WITH NUMBERS >>>>> 9202 THRU 9204 <<<<<.
 9456                                  ;-
 9457  034012  004737  020674                  JSR    PC,PUFIFR       ;PURGE THE DUT RECEIVE CHARACTER FIFO.
 9458  034016  103072                  BCC    60$             ;ABORT THIS TEST IF FIFO WOULD NOT PURGE.
 9459  034020  012737  021765  005224           MOV    #9205.,ERRNBR   ;SET ERROR NUMBER TO 9205.
 9460
 9461  034026  004737  021064                  JSR    PC,PURRXB       ;PURGE THE RX CHAR BUFFER IN MEMORY.
 9462  034032  004737  017166                  JSR    PC,INIDMA       ;SEND THE FIRST BATCH OF DATA PATTERNS.
 9463                                   ;+
 9464                                   ; THIS ROUTINE REPORTS ERRORS WITH NUMBERS >>>>> 9205 THRU 9210 <<<<<.
 9465                                   ;-
 9466  034036  004737  021120                  JSR    PC,RDCHRS       ;READ AND VERIFY THE RX CHARACTERS.
 9467  034042  012737  021773  005224           MOV    #9211.,ERRNBR   ;SET THE ERROR NUMBER TO 9211.
 9468                                   ;+
 9469                                   ; THIS ROUTINE REPORTS ERRORS WITH NUMBERS >>>>> 9211 THRU 9214 <<<<<.
 9470                                   ;-
 9471  034050  004737  024230                  JSR    PC,TXRREP       ;REPORT FINAL ERRORS FROM RX/RX.
 9472  034054  012737  021777  005224           MOV    #9215.,ERRNBR   ;SET ERROR NUMBER TO 9215.
 9473                                  ;+
 9474                                  ; SWAP PARAMETERS TO ALLOW FOR BOTH CHANNELS TO BE EXERCISED.
 9475                                  ;-
 9476  034062  010246                           MOV    R2,-(SP)        ;PUSH THE START ADDRESS ONTO THE STACK.
 9477  034064  010002                           MOV    R0,R2           ;
 9478  034066  010100                           MOV    R1,R0           ;
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 9479  034070  010201                          MOV     R2,R1           ;SWAP THE TWO SETS OF
 9480  034072  010302                          MOV     R3,R2           ; PARAMETERS OVER.
 9481  034074  010403                          MOV     R4,R3           ;
 9482  034076  010204                          MOV     R2,R4           ;
 9483  034100  012602                          MOV     (SP)+,R2        ;RESTORE THE START ADDRESS.
 9484  034102  004737  022524                  JSR     PC,SPLSUP       ;SET UP CONTROL BLOCK ETC, FOR TX/RX.
 9485
 9486                                  ;+
 9487                                  ; THIS ROUTINE REPORTS ERRORS WITH NUMBERS >>>>> 9215 THRU 9217 <<<<<.
 9488                                  ;-
 9489  034106  004737  020674                  JSR     PC,PUFIFR       ;PURGE THE DUT RECEIVE CHARACTER FIFO.
 9490  034112  103034                          BCC     60$             ;ABORT THIS TEST IF FIFO WOULD NOT PURGE.
 9491  034114  012737  022002  005224           MOV     #9218.,ERRNBR   ;SET ERROR NUMBER TO 9218.
 9492
 9493  034122  004737  021064                  JSR     PC,PURRXB       ;PURGE THE RX CHAR BUFFER IN MEMORY.
 9494  034126  004737  017166                  JSR     PC,INIDMA       ;SEND THE FIRST BATCH OF DATA PATTERNS.
 9495                                  ;+
 9496                                  ; THIS ROUTINE REPORTS ERRORS WITH NUMBERS >>>>> 9218 THRU 9223 <<<<<.
 9497                                  ;-
 9498  034132  004737  021120                  JSR     PC,RDCHRS       ;READ AND VERIFY THE RX CHARACTERS.
 9499  034136  012737  022010  005224           MOV     #9224.,ERRNBR   ;SET ERROR NUMBER TO 9224.
 9500                                  ;+
 9501                                  ; THIS ROUTINE REPORTS ERRORS WITH NUMBERS >>>>> 9224 THRU 9227 <<<<<.
 9502                                  ;-
 9503  034144  004737  024230                  JSR     PC,TXRREP       ;REPORT FINAL ERRORS FROM RX/RX.
 9504  034150  020527  005036                   CMP     R5,#SPLPRE      ;CHECK IF ALL PARAMETERS HAVE BEEN DONE.
 9505  034154  103701                           BLO     4$              ;IF NOT DONE LOOP TO SELECT THE NEXT PARAMETER.
 9506                                  ;+
 9507                                  ;    DISABLE INTERRUPTS.
 9508                                  ;    CLEAR THE INTERRUPT VECTORS.
 9509                                  ;-
 9510  034156                                  SETPRI  #PRI07          ;DISABLE ALL INTERRUPTS.
 9511  034156  012700  000340                                                          MOV     #PRI07,R0
 9512  034162  104441                                                                  TRAP    C$SPRI
 9513  034164                                  CLRVEC  TXVECA          ;RETURN TX INT VECTOR TO UNUSED POOL.
 9514  034164  013700  002172                                                          MOV     TXVECA,R0
 9515  034170  104436                                                                  TRAP    C$CVEC
 9516
 9517  034172  012737  022014  005224           MOV     #9228.,ERRNBR   ;SELECT NUMBER 9228 FOR THE NEXT ERROR REPORT.
 9518  034200  004737  021664                  JSR     PC,REPSMR       ;REPORT ERROR SUMMARIES IF CALLED FOR.
 9519  034204  005037  002222           60$:    CLR     CTRLCF          ;INDICATE THAT WE ARE NOT WITHIN A TEST.
 9520  034210                                  ENDTST
 9521  034210                                                                  L10036:
 9522  034210  104401                                                                  TRAP    C$ETST
```

```
                                .SBTTL  HARDWARE TEST           - REPBMP -
                                ;++ ************************************************************************
                                ;*                      - REPORT ANY BMP CODES IN THE QUEUE -
                                ;*      THIS IS A PSEUDO-TEST USED TO REPORT ANY BMP CODES THAT WERE FOUND
                                ;*      IN THE DUT'S FIFO DURING PREVIOUS TEST, AND LOGGED IN THE BMP CODE
                                ;*      QUEUE.
                                ;*      IT IS UNLIKELY THAT RUNNING THIS PSEUDO-TEST ALONE WILL PRODUCE ANY
                                ;*      ERROR REPORTS.
                                ;*
                                ;-- ************************************************************************
                                        BGNTST
                                                                                        T10::
                                         TNUM == TNUM + 1       ;INCREMENT THE ASSEMBLY TIME TEST COUNTER.
034212  012737  000012  002224         MOV    #TNUM,TSTNUM     ;SET UP THE TEST NUMBER.        (93)
034220  012737  177777  002222         MOV    #-1,CTRLCF       ;INDICATE THAT WE ARE IN A TEST.
034226  013702  002416                 MOV    BMPCQP,R2        ;GET THE CONTENTS OF THE POINTER.
034232  012703  002420                 MOV    #BMPCQB,R3       ;GET THE START ADDRESS OF THE QUEUE.
034236  020203                         CMP    R2,R3            ;SEE IF THE POINTER HAS MOVED FROM THE BASE.
034240  001411                        BEQ    60$              ;EXIT NO CODES IN THE QUEUE.
                                ;+
                                ; THERE IS AT LEAST ONE BMP CODE IN THE QUEUE. REPORT THE ERROR.
                                ;-
                                        ;REPORT ERROR BMP CODE FOUND IN TEST NN, BMP CODE:NNNNNN''

034242  012701  011635                 MOV    #EM9304,R1       ;PASS THE FIRST MESSAGE TO BE REORTED.
034246                                 ERRDF  9301,EM9301,ER9301 ;                    >>>>> ERROR #9301 <<<<<.
                                                                                        TRAP    C$ERDF
034246  104455                                                                        .WORD   9301
034250  022125                                                                        .WORD   EM9301
034252  011520                                                                        .WORD   ER9301
034254  013770

034256  012737  002420  002416         MOV    #BMPCQB,BMPCQP   ;SET POINTER BACK TO THE BEGINING OF THE QUE.

034264  005037  002222          60$:    CLR    CTRLCF           ;INDICATE THAT WE ARE NOT WITHIN A TEST.
034270                                 ENDTST
                                                                                        L10037:
034270  104401                                                                        TRAP    C$ETST
```

```
                                .SBTTL  HARDWARE PARAMETER CODING SECTION



                                ;++
                                ; THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS
                                ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
                                ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
                                ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
                                ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
                                ; WITH THE OPERATOR.
                                ;--

034272                                  BGNHRD
034272  000027                                                  .WORD L10040-L$HARD/2
034274                                                  L$HARD::

                                ;DEVICE CSR ADDRESS QUESTION:
034274                                  GPRMA   HWPTQ1,0,0,160000,177776,YES
034274  000031                                                  .WORD   T$CODE
034276  034352                                                  .WORD   HWPTQ1
034300  160000                                                  .WORD   T$LOLIM
034302  177776                                                  .WORD   T$HILIM

                                ;DEVICE INTERRUPT VECTOR QUESTION:
034304                                  GPRMA   HWPTQ2,2,0,40,776,YES
034304  001031                                                  .WORD   T$CODE
034306  034370                                                  .WORD   HWPTQ2
034310  000040                                                  .WORD   T$LOLIM
034312  000776                                                  .WORD   T$HILIM

                                ;ACTIVE LINES BIT MAP QUESTION:
034314                                  GPRMD   HWPTQ3,4,0,MAPLNS,0,177777,YES
034314  002032                                                  .WORD   T$CODE
034316  034423                                                  .WORD   HWPTQ3
034320  000377                                                  .WORD   MAPLNS
034322  000000                                                  .WORD   T$LOLIM
034324  177777                                                  .WORD   T$HILIM

                                ;TYPE OF LOOPBACK QUESTION:
034326                                  GPRMD   HWPTQ4,6,0,377,1,3,YES
034326  003032                                                  .WORD   T$CODE
034330  034451                                                  .WORD   HWPTQ4
034332  000377                                                  .WORD   377
034334  000001                                                  .WORD   T$LOLIM
034336  000003                                                  .WORD   T$HILIM

                                ;INTERRUPT BR LEVEL QUESTION:
034340                                  GPRMD   HWPTQ5,6,0,177400,0,6,YES
034340  003032                                                  .WORD   T$CODE
034342  034603                                                  .WORD   HWPTQ5
034344  177400                                                  .WORD   177400
034346  000000                                                  .WORD   T$LOLIM
034350  000006                                                  .WORD   T$HILIM


034352                                  ENDHRD
                                                                .EVEN
```

```
 9616  034352                                                              L10040:
 9617
 9618
 9619  034352  051503  020122  042101          HWPTQ1: .ASCIZ  /CSR ADDRESS: /
 9620  034360  051104  051505  035123
 9621  034366  000040
 9622  034370  047111  042524  051122          HWPTQ2: .ASCIZ  /INTERRUPT VECTOR ADDRESS: /
 9623  034376  050125  020124  042526
 9624  034404  052103  051117  040440
 9625  034412  042104  042522  051523
 9626  034420  020072     000
 9627  034423     101  052103  053111          HWPTQ3: .ASCIZ  /ACTIVE LINE BIT MAP: /
 9628  034430  020105  044514  042516
 9629  034436  041040  052111  046440
 9630  034444  050101  020072     000
 9631  034451     124  050131  020105          HWPTQ4: .ASCII  /TYPE OF LOOPBACK (1=INTERNAL OR NONE,2=STAGGERD,/<15><12>
 9632  034456  043117  046040  047517
 9633  034464  041120  041501  020113
 9634  034472  030450  044475  052116
 9635  034500  051105  040516  020114
 9636  034506  051117  047040  047117
 9637  034514  026105  036462  052123
 9638  034522  043501  042507  042122
 9639  034530  006454     012
 9640  034533     040  020040  020040                .ASCIZ  /                3=25 PIN CONNECTOR): /
 9641  034540  020040  020040  020040
 9642  034546  020040  020040  020040
 9643  034554  031440  031075  020065
 9644  034562  044520  020116  047503
 9645  034570  047116  041505  047524
 9646  034576  024522  020072     000
 9647  034603     111  052116  051105          HWPTQ5: .ASCIZ  /INTERRUPT BR LEVEL: /
 9648  034610  052522  052120  041040
 9649  034616  020122  042514  042526
 9650  034624  035114  000040
 9651
 9652                                          .EVEN
```

```
                                .SBTTL  SOFTWARE PARAMETER CODING SECTION

                                ;++
                                ; THE SOFTWARE PARAMETER CODING SECTION CONTAINS MACROS
                                ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
                                ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
                                ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
                                ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
                                ; WITH THE OPERATOR.
                                ;--

034630                                  BGNSFT
034630  000010                                                  .WORD L10041-L$SOFT/2
034632                                                  L$SOFT::

                                ;UNIT NUMBER PRINTOUT QUESTION:
034632                                  GPRML   SWPTQ1,0,20,YES
034632  000130                                                  .WORD   T$CODE
034634  034652                                                  .WORD   SWPTQ1
034636  000020                                                  .WORD   20

                                ;NUMBER OF INDIVIDUAL DATA ERRORS TO REPORT ON A LINE QUESTION:
034640                                  GPRMD   SWPTQ2,2,D,177777,0,177777,YES
034640  001052                                                  .WORD   T$CODE
034642  034726                                                  .WORD   SWPTQ2
034644  177777                                                  .WORD   177777
034646  000000                                                  .WORD   T$LOLIM
034650  177777                                                  .WORD   T$HILIM

                                .EVEN

034652                          ENDSFT
                                                        .EVEN
034652                                          L10041:

034652  042522  047520  052122  SWPTQ1: .ASCIZ  /REPORT UNIT NUMBER AS EACH UNIT IS TESTED: /
034660  052440  044516  020124
034666  052516  041115  051105
034674  040440  020123  040505
034702  044103  052440  044516
034710  020124  051511  052040
034716  051505  042524  035104
034724  000040
034726  052516  041115  051105  SWPTQ2: .ASCIZ  /NUMBER OF INDIVIDUAL DATA ERRORS TO REPORT ON A LINE: /
034734  047440  020106  047111
034742  044504  044526  052504
034750  046101  042040  052101
034756  020101  051105  047522
034764  051522  052040  020117
034772  042522  047520  052122
035000  047440  020116  020101
035006  044514  042516  020072
035014    000
          035016        .EVEN
```

```
 9709
 9710
 9711  035016                          $PATCH::
 9712  035016  000024                          .BLKW   24
 9713
 9714
 9715
 9716
 9717
 9718  035066                          LASTAD
 9719                                                                .EVEN
 9720  035066  000000                                                .WORD   0
 9721  035070  000000                                                .WORD   0
 9722  035072                          L$LAST::
 9723  035072                          ENDMOD
 9724
 9725
 9726
 9727
 9728
 9729
 9730
 9731          000001                          .END
```

```
ACTLNS  002174 G  1284# 3721 3816 4135 4209 4227 4244 4256 4274 4580 4634 5523 6259
                  6278 6297 6309 6326 6456 6483 6639 6985 7210 7228 7244 7895* 7898*
                  8513 8531 8588 8700 8714 8733 8956 8870 8916 8939
ADR   = 000020 G  1256#
ADRPTR  015464 G  3871# 7506
ALTFLD  014150 G  3176# 7333 7373
ASSEMB= 000010     995
BCOUNT  002276 G  1330# 7409 7814*
BITTBL  002332 G  1354# 3577 3816 4580 4645 4707 5005 5022 5045 5158 5214 5229 5231
                  6669 6818 7153 7288 7558 7671 8714 8870 8916 8923 8929 8939 8943
                  8957 8967
BIT0  = 000001 G  1229# 2330 2514 5397 5697 5973 6028 6519 6575
BIT00 = 000001 G  1218# 1229
BIT01 = 000002 G  1217# 1228
BIT02 = 000004 G  1216# 1227
BIT03 = 000010 G  1215# 1226
BIT04 = 000020 G  1214# 1225
BIT05 = 000040 G  1213# 1224 5798 6178
BIT06 = 000100 G  1212# 1223 6109
BIT07 = 000200 G  1211# 1222
BIT08 = 000400 G  1210# 1221
BIT09 = 001000 G  1209# 1220
BIT1  = 000002 G  1228# 2338 2512 5151
BIT10 = 002000 G  1208#
BIT11 = 004000 G  1207#
BIT12 = 010000 G  1206# 2828 5153 5206
BIT13 = 020000 G  1205# 2821 5149 5209 8553 8601
BIT14 = 040000 G  1204# 2814 6736 8758 8927
BIT15 = 100000 G  1203# 3588 3828 4590 5228 5233 5403 7473 7509 7694
BIT2  = 000004 G  1227# 2534 5982 5991 6037 6046 7211
BIT3  = 000010 G  1226# 2526 5208
BIT4  = 000020 G  1225# 7929
BIT5  = 000040 G  1224#
BIT6  = 000100 G  1223# 7829
BIT7  = 000200 G  1222# 6538 6594
BIT8  = 000400 G  1221#
BIT9  = 001000 G  1220#
BMPCQB  002420 G  1392# 3096 7919 9539 9554
BMPCQE  002620 G  1393# 3109 6143 7920
BMPCQP  002416 G  1391# 6138 6146* 7921* 9538 9554*
BOE   = 000400 G  1260#
BRLEVL  002177 G  1286# 7900*
BUFBAS  003510 G  1430# 4532 8237* 8246 8681 8682 8708 8836 8837 8864 9093 9110 9111
                  9264 9291
BUFEND  004510 G  1434#
BUFMID  004110 G  1432# 4536 8682 8837 9097 9111
BUF3QT  004310 G  1433#
CALMSL  014222 G  3237# 7840
CBB     003030 G  1406# 4203* 4204 4224 6253* 6254 6272 7202* 7203
CBDPAA  003034 G  1409# 6815
CBDPLA  003036 G  1410# 6816 6825 6838 6867
CBDPNA  003040 G  1411# 4250* 6303* 6826 7233*
CBLNCA  003032 G  1408# 6803
CBLPBA  003044 G  1413# 6804 6849
CBLPRA  003030 G  1407# 4251* 4262* 6304* 6314* 6808
CBMAPA  003042 G  1412# 4249* 4261* 6302* 6313* 6802 6818 7232*
```

```
CBOFSA  003046 G          1414#  6864
CHCNTB  003350 G          1424#  2975  3400  3461  6475  6828*  7150  7566  7669
CHKBMP  014446 G          3340#  8748  8895  8908
CHKEXT  014516 G          3386#  3609
CHKLOS  014616 G          3456#  3628
CHRMSK  014720 G          3522#  9066  9114
CHRTOT  002404 G          1383#  3729*  5558*  6829*  6831*  6833*  7195*
CKCHR   014756 G          3572#  5015
CKFRPR  015174 G          3712#  8266  8284  8410  8435
CKINAC  015344 G          3796#  4975
CKTRAP  015452 G          3867#  7832  7853  8100  8107  8118  8123
CLKBRL  002262 G          1324#  7797*
CLKCSR  002260 G          1323#  7796*  7831
CLKHRZ  002266 G          1326#  3258*  7799*  7800  7812  7835*
CLKINT  025074 G          7401#  7807
CLKVEC  002264 G          1325#  7798*  7808
CLNRST  015502 G          3906#  8205  8349  8490  8655  8810  9015  9184  9397
CLR16W  015524 G          3940#  8236  8378  8904  9048  9216  9433
CONMAP  015546 G          3969#  4275  6327  6990  7245
CSRA    002202 G          1293#  3197*  4094*  4582*  5271  5804  5817*  5981*  6036*  6084*  6111*  6183  6528*
                          6584*  6711*  6738*  7542  7552  7600*  7640  7654  7686*  7703*  7890*  7905  8098
                          8106  8115  8691  8724  8847  8881
CSRO  = 000000 G          1183#
CTRLCF  002222 G          1305#  7985  8080*  8155*  8164*  8193*  8306*  8337*  8461*  8479*  8621*  8646*  8776*
                          8801*  8978*  9005*  9149*  9174*  9363*  9387*  9519*  9537*  9556*
C$AU  = 000052             995#  8060
C$AUTO= 000061             995#  7971
C$BRK = 000022             995#  5087  7412
C$BSEG= 000004             995#
C$BSUB= 000002             995#
C$CEFG= 000045             995#
C$CLCK= 000062             995#  7794
C$CLEA= 000012             995#  7999
C$CLOS= 000035             995#
C$CLP1= 000006             995#
C$CVEC= 000036             995#  8300  8453  9145  9148  9353  9356  9515
C$DCLN= 000044             995#  8157
C$DODU= 000051             995#  8154
C$DRPT= 000024             995#
C$DU  = 000053             995#  8038
C$EDIT= 000003             995#  1061
C$ERDF= 000055             995#  8147  8558  8614  9549
C$ERHR= 000056             995#
C$ERRO= 000060             995#  3739  5010  5028  5163  5218  5238  5408  5423  5568  5659  5717  5766
                          5837  5893  5941  6413  8751  8768  8965  8974
C$ERSF= 000054             995#  5075
C$ERSO= 000057             995#
C$ESCA= 000010             995#
C$ESEG= 000005             995#
C$ESUB= 000003             995#
C$ETST= 000001             995#  8167  8310  8464  8624  8779  8982  9153  9366  9522  9559
C$EXIT= 000032             995#  7991
C$GETB= 000026             995#
C$GETW= 000027             995#
C$GMAN= 000043             995#
C$GPHR= 000042             995#  7882
```

```
C$GPLO= 000030            995#
C$GPRI= 000040            995#  4088  5546  6078  6705  6908
C$INIT= 000011            995#  7952
C$INLP= 000020            995#
C$MANI= 000050            995#
C$MEM = 000031            995#
C$MSG = 000023            995#  2356  2415  2463  2560  2618  2654  2702  2767  2848  2901  2999  3063
                         3140
C$OPEN= 000034            995#
C$PNTB= 000014            995#  2336  2344  2410  2447  2456  2505  2599  2609  2649  2683  2736  2799
                         2878  2935  3037  3048  3057  3094
C$PNTF= 000017            995#  5084  7938  8016
C$PNTS= 000016            995#
C$PNTX= 000015            995#  2350  2524  2544  2552  2690  2697  2744  2754  2762  2808  2841  2892
                         2948  2958  2987  3120  3132  5284
C$QIO = 000377            995#
C$RDBU= 000007            995#
C$REFG= 000047            995#  7764  7770  7776  7782
C$RESE= 000033            995#  7788  7861  7988
C$REVI= 000003            995#  1060
C$RFLA= 000021            995#
C$RPT = 000025            995#  7727
C$SEFG= 000046            995#
C$SPRI= 000041            995#  4092  4103  5550  5555  6082  6087  6709  6714  6912  6945  7817  7948
                         8192  8213  8223  8297  8336  8357  8367  8450  8643  8798  9002  9025  9042
                         9142  9171  9192  9209  9350  9362  9384  9405  9422  9512
C$SVEC= 000037            995#  7810  8219  8363  9031  9038  9198  9205  9411  9418
C$TPRI= 000013            995#
DELAY   015622 G         4007#  6174  8503  8536  8551  8578  8596  8680  8695  8706  8728  8835  8852
                         8862  8885
DFPTBL  002152 G         1137#
DIAGMC= 000000            995
DLPRTB  005000 G         1485#  9279
DLPRTE  005006 G         1489#  9341
DODMA   015662 G         4052#  4658  6664  7580  8683  8716  8838  8872
DPENDB  003050 G         1418#  4585  6839* 7134  7689
DPLENB  003110 G         1419#  4587  4653  6659  6838* 7136  7575  7691
DPRSQB  004550 G         1439#  4983  5513
DPRSQE  004750 G         1456#  5514
DRADRT  002202 G         1292#
DROP    026564           8013  8020#
EDROP   026642           8018  8029#
EF.CON= 000036 G         1236#  7781
EF.NEW= 000035 G         1237#  7775
EF.PWR= 000034 G         1238#
EF.RES= 000037 G         1235#  7769
EF.STA= 000040 G         1234#  7763
EF0503  005363 G         1871#  2407  2444  2596  2875  3034  3091
EF1601  005370 G         1872#  2453
EF1603  005414 G         1876#  2549
EF6201  005456 G         1882#  2502
EF6202  005571 G         1895#  2521
EF6203  005667 G         1906#  2541
EF6401  005764 G         1917#  2606
EF7801  006033 G         1924#  2646
EF9001  006071 G         1930#  2680
```

EF9002	006153	G	1939#	2687			
EF9003	006225	G	1947#	2694			
EF9004	006254	G	1951#	2741	2751		
EF9005	006304	G	1955#	2759			
EF9006	006335	G	1960#	2733			
EF9007	006354	G	1963#	2796			
EF9008	006450	G	1973#	2805			
EF9009	006507	G	1979#	2838			
EF9010	006546	G	1985#	2889			
EF9012	006635	G	1995#	2984			
EF9013	006751	G	2009#	2932			
EF9019	007016	G	2016#	5281			
EF9020	007035	G	2019#	2955			
EF9101	007116	G	2028#	3054			
EF9103	007121	G	2029#	3045			
EF9301	007167	G	2036#	3129			
EF9302	007235	G	2043#	3117			
EM0101	020070	G	5077	5093#			
EM0102	020154	G	5081	5102#			
EM0103	007335	G	2055#	8149			
EM0509	007373	G	2061#	2511	2517	2529	2537
EM1601	007377	G	2062#	5832			
EM5303	007462	G	2071#	3346			
EM6201	007533	G	2078#	8198			
EM6202	007557	G	2082#	2510	2528		
EM6301	007566	G	2084#	8342			
EM6401	007611	G	2088#	8484	8560	8616	
EM6402	007640	G	2092#	8555	8611		
EM6601	007701	G	2098#	8649			
EM6602	007727	G	2102#	8762			
EM6701	010001	G	2110#	8804			
EM6702	010024	G	2114#	8962			
EM9001	010101	G	2122#	9008			
EM9003	010135	G	2127#	5696			
EM9004	010157	G	2131#	5700			
EM9006	010175	G	2134#	3827			
EM9007	010250	G	2142#	3585			
EM9008	010333	G	2151#	3650	5234		
EM9009	010414	G	2160#	2750	2758		
EM9010	010440	G	2164#	2740			
EM9011	010464	G	2168#	2813			
EM9012	010474	G	2170#	2820			
EM9013	010504	G	2172#	2827			
EM9014	010513	G	2174#	2874			
EM9015	010607	G	2185#	2938	5932		
EM9016	010623	G	2188#	5885			
EM9017	010632	G	2190#	5419			
EM9025	010743	G	2203#	3732	5561		
EM9026	011037	G	2214#	5280			
EM9027	011063	G	2218#	3616			
EM9028	011143	G	2227#	3636			
EM9030	011222	G	2235#	2945			
EM9101	011277	G	2243#	9177			
EM9102	011333	G	2248#	5654			
EM9104	011422	G	2258#	5399			
EM9201	011476	G	2266#	9390			

```
EM9301  011520 G        2269#  9551
EM9302  011540 G        2272#  3097
EM9303  011570 G        2276#  3115
EM9304  011635 G        2283#  9547
ENDETB  004510 G        1435#
ENDIT   026510          7785   7942#
ERCNTB  003210 G        1421#  2887   5037*  5039*  5042   5164*  5240*  8235   8377   9047   9215   9432
ERLTBL  003510 G        1431#
ERRBLK  005230 G        1643#  3347*  3733*  5007*  5024*  5148*  5205*  5235*  5388*  5405*  5418*  5562*  5653*
                        5688*  5760*  5833*  5884*  5931*  6411*  8761*  8961*
ERRMSG  005226 G        1642#  2450   8198*  8342*  8484*  8649*  8804*  9008*  9177*  9390*
ERRNBR  005224 G        1641#  3714   3731*  3763*  5025*  5030*  5141   5165*  5198   5223*  5241*  5370   5404*
                        5409*  5417*  5429*  5504   5560*  5581*  5582*  5591*  5592*  5621*  5689   5699*  5722*
                        6984   6987*  6989*  6992*  8197*  8257*  8260*  8272*  8278*  8285*  8301*  8341*  8404*
                        8411*  8416*  8430*  8436*  8458*  8483*  8519*  8648*  8674*  8689*  8711*  8722*  8740*
                        8754*  8760*  8771*  8803*  8829*  8845*  8867*  8879*  8891*  8894*  8905*  8910*  8918*
                        8938*  8945*  8954*  9007*  9018*  9070*  9075*  9092*  9118*  9123*  9132*  9176*  9224*
                        9233*  9238*  9296*  9302*  9310*  9315*  9328*  9336*  9358*  9389*  9453*  9459*  9467*
                        9472*  9491*  9499*  9517*
ERRTYP  005222 G        1640#  8196*  8340*  8482*  8647*  8802*  9006*  9175*  9388*
ERSMRF  002406 G        1384#  2881   5005   5022   5045*  5158   5214   5229   5755   8199*  8343*  9009*  9178*
                        9391*
ER0101  011712 G        2326#  8150
ER0503  012230 G        2403#  3733   5562
ER1603  012254 G        2438#  3347   5418   5833   6411
ER6201  012334 G        2492#  5148   5205
ER6401  012562 G        2588#  8561   8617
ER7801  012660 G        2641#  8761   8961
ER9001  012706 G        2676#  5388   5688
ER9002  012776 G        2726#  5024   5235   5405
ER9003  013144 G        2791#  5007
ER9004  013326 G        2871#  5760
ER9005  013430 G        2926#  5884   5931
ER9102  013656 G        3028#  5653
ER9301  013770 G        3085#  9552
EVL   = 000004 G        1254#
EXCNTB  003150 G        1420#  3659*  3661*  3824*  3826*  6859*
E$END = 002100           995#
E$LOAD= 000035           995#  1084
FINACT  016036 G        4128#  8662   8817
FRPSUP  016116 G        4195#  8249   8271   8389   8424
F$AU  = 000015           995#  8050   8059
F$AUTO= 000020           995#  7966   7970
F$BGN = 000040           995#  1006   2326   2403   2438   2492   2588   2641   2676   2726   2791   2871   2926
                        3028   3085   7717   7722   7737   7760   7966   7982   7991   8010   8034   8050   8054
                        8077   8166   8184   8309   8328   8463   8477   8623   8640   8778   8795   8981   8999
                        9152   9168   9365   9378   9521   9534   9558   9576   9667   9724
F$CLEA= 000007           995#  7982   7998
F$DU  = 000016           995#  8010   8037
F$END = 000041           995#  1006   2357   2416   2464   2561   2619   2655   2703   2768   2849   2902   3000
                        3064   3141   7720   7728   7953   7972   7991   8000   8032   8039   8052   8061   8077
                        8166   8168   8184   8309   8311   8328   8463   8465   8477   8623   8625   8640   8778
                        8780   8795   8981   8983   8999   9152   9154   9168   9365   9367   9378   9521   9523
                        9534   9558   9560   9617   9688   9724
F$HARD= 000004           995#  9576   9615
F$HW  = 000013           995#  1135   1146
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F$INIT= 000006            995#  7760  7951
F$JMP = 000050            995#  7720  7991  8032  8052
F$MOD = 000000            995#  1006  9724
F$MSG = 000011            995#  2326  2355  2403  2414  2438  2462  2492  2559  2588  2617  2641  2653
                         2676  2701  2726  2766  2791  2847  2871  2900  2926  2998  3028  3062  3085
                         3139
F$PROT= 000021            995#  7737  7744
F$PWR = 000017            995#
F$RPT = 000012            995#  7717  7726
F$SEG = 000003            995#
F$SOFT= 000005            995#  9667  9686
F$SRV = 000010            995#
F$SUB = 000002            995#
F$SW  = 000014            995#  1159  1167
F$TEST= 000001            995#  8078  8166  8185  8309  8329  8463  8478  8623  8641  8778  8796  8981
                         9000  9152  9169  9365  9379  9521  9535  9558
GETCHR  016362 G          4310#  5531  5600
GETLP1  016444 G          4363#  9057
GETLP2  016616 G          4435#  9105
GETPRM  026270            7784  7871  7875#  7886
GETTIM  016746 G          4490#  8245  8385  9061  9109  9218  9290  9448
GPRSOB  002372 G          1374#  6369  9054*  9102*
G$CNTO= 000200            995#
G$DELM= 000372            995#
G$DISP= 000003            995#
G$EXCP= 000400            995#
G$HILI= 000002            995#
G$LOLI= 000001            995#
G$NO  = 000000            995#
G$OFFS= 000400            995#  9581  9587  9593  9600  9607  9672  9677
G$OFSI= 000376            995#  9581  9587  9593  9600  9607  9672  9677
G$PRMA= 000001            995#  9581  9587
G$PRMD= 000002            995#  9593  9600  9607  9677
G$PRML= 000000            995#  9672
G$RADA= 000140            995#
G$RADB= 000000            995#
G$RADD= 000040            995#  9677
G$RADL= 000120            995#  9672
G$RADO= 000020            995#  9581  9587  9593  9600  9607
G$XFER= 000004            995#
G$YES = 000010            995#  9581  9587  9593  9600  9607  9672  9677
HELP  = 000000              1#   988   995  1000  1014  1102  1123  1147  1168  1171  1199  1269  1638
                        1824  1841  1853  1854  1860  1862  2293  3142  7707  7729  7745  7953  7968
                        7972  7984  7994  8000  8011  8039  8051  9560  9579  9618  9653  9670  9690
                        9709  9714
HOE   = 100000 G          1267#
HWPTQ1  034352            9582  9619#
HWPTQ2  034370            9588  9622#
HWPTQ3  034423            9594  9627#
HWPTQ4  034451            9601  9631#
HWPTQ5  034603            9608  9647#
IBE   = 010000 G          1264#
IBM     002226 G          1307#  3532*  4589  5505  7693  9223*  9295*  9322*
IDU   = 000040 G          1257#
IER   = 020000 G          1265#
IESTAT  002234 G          1310#  3187  4093  4577  5274  5844*  5976  6031  6083*  6084  6109*  6110*  6111
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CVDHCA0 DHV-11 FUNC TST PART1 MACY11 30A(1052) 12-JUL-83 13:56 PAGE 238
CVDHCA.P11 12-JUL-83 11:44 CROSS REFERENCE TABLE -- USER SYMBOLS

```
                        6523    6579    6710*   6711    6736*   6737*   6738    7597
INDATP  017024 G        4529#   8665    8820
INICHR  017054 G        4575#   9069    9117
INIDMA  017166 G        4632#   8405    8431    9232    9305    9331    9462    9494
ISR    = 000100 G       1258#
IXE    = 004000 G       1263#
I$AU   = 000041          995#   8050#   8061#
I$AUTO= 000041           995#   7966#   7972#
I$CLN  = 000041          995#   7982#   7991    8000#
I$DU   = 000041          995#   8010#   8039#
I$HRD  = 000041         9576#   9617#
I$INIT= 000041           995#   7760#   7953#
I$MOD  = 000041          995#   1006#   9724#
I$MSG  = 000041          995#   2326#   2357#   2403#   2416#   2438#   2464#   2492#   2561#   2588#   2619#   2641#   2655#
                        2676#   2703#   2726#   2768#   2791#   2849#   2871#   2902#   2926#   3000#   3028#   3064#   3085#
                        3141#
I$PROT= 000040           995#   7737#
I$PTAB= 000041           995#
I$PWR  = 000041          995#
I$RPT  = 000041          995#   7717#   7728#
I$SEG  = 000041          995#   8077    8184    8328    8477    8640    8795    8999    9168    9378    9534
I$SETU= 000041           995#
I$SFT  = 000041         9667#   9688#
I$SRV  = 000041          995#
I$SUB  = 000041          995#   8077    8184    8328    8477    8640    8795    8999    9168    9378    9534
I$TST  = 000041          995#   8077#   8166#   8168#   8184#   8309#   8311#   8328#   8463#   8465#   8477#   8623#   8625#
                        8640#   8778#   8780#   8795#   8981#   8983#   8999#   9152#   9154#   9168#   9365#   9367#   9378#
                        9521#   9523#   9534#   9558#   9560#

J$JMP  = 000167          995#   7720    8032    8052
LGRP1M  002230 G        1308#   6260    6312    8248    8388
LGRP2M  002232 G        1309#   6279    6301
LINBIT  017260 G        3979    4703#   8605
LNCTRA  002212 G        1297#   5974    6029    7326
LNCTRO= 000010 G        1188#
LOE    = 040000 G       1266#
LOPBCK  002176 G        1285#   4212    6261    6280    7211    7216    7899*   8188    8332    9379
LOT    = 000010 G       1255#
LPCSLT= 000036 G        1690#
LPRA    002206 G        1295#   5272    7366
LPRO   = 000004 G        1186#
L$ACP   002110 G        1091#
L$APT   002036 G        1049#
L$AU    026650 G        8050#
L$AUT   002070 G        1075#
L$AUTO  026520 G        1092    7966#
L$CCP   002106 G        1089#
L$CLEA  026522 G        1090    7982#
L$CO    002032 G        1045#
L$DEPO  002011 G        1027#
L$DESC  005302 G        1082    1845#
L$DESP  002076 G        1081#
L$DEVP  002060 G        1067#
L$DISP  002124 G        1052    1111#
L$DLY   002116 G        1097#
L$DTP   002040 G        1051#
L$DTYP  002034 G        1047#
```

CVDHCA0 DHV-11 FUNC TST PART1 MACY11 30A(1052) 12-JUL-83 13:56 PAGE 239
CVDHCA.P11 12-JUL-83 11:44 CROSS REFERENCE TABLE -- USER SYMBOLS

```
L$DU    026540 G          1078    8010#
L$DUT   002072 G          1077#
L$DVTY  005272 G          1068    1836#
L$EF    002052 G          1062#
L$ENVI  002044 G          1055#
L$ERRT  005222 G          1086    1639#
L$ETP   002102 G          1085#
L$EXP1  002046 G          1057#
L$EXP4  002064 G          1071#
L$EXP5  002066 G          1073#
L$HARD  034274 G          1034    9576    9577#
L$HIME  002120 G          1099#
L$HPCP  002016 G          1033#
L$HPTP  002022 G          1037#
L$HW    002152 G          1038    1135    1136#
L$ICP   002104 G          1087#
L$INIT  025666 G          1088    7760#
L$LADP  002026 G          1041#
L$LAST  035072 G          1042    9722#
L$LOAD  002100 G          1083#
L$LUN   002074 G          1079#
L$MREV  002050 G          1059#
L$NAME  002000 G          1016#
L$PRIO  002042 G          1053#
L$PROT  025660 G          1094    7737#
L$PRT   002112 G          1093#
L$REPP  002062 G          1069#
L$REV   002010 G          1025#
L$RPT   025652 G          1070    7717#
L$SOFT  034632 G          1036    9667    9668#
L$SPC   002056 G          1065#
L$SPCP  002020 G          1035#
L$SPTP  002024 G          1039#
L$STA   002030 G          1043#
L$SW    002164 G          1040    1159    1160#
L$TEST  002114 G          1095#
L$TIML  002014 G          1031#
L$UNIT  002012 G          1029#   7877    7931
L10000  002162            1135    1146#
L10001  002170            1159    1167#
L10002  012014            2355#
L10003  012252            2414#
L10004  012332            2462#
L10005  012560            2559#
L10006  012656            2617#
L10007  012704            2653#
L10010  012774            2701#
L10011  013142            2766#
L10012  013324            2847#
L10013  013426            2900#
L10014  013654            2998#
L10015  013766            3062#
L10016  014146            3139#
L10017  025656            7721    7726#
L10021  026516            7951#
L10022  026520            7970#
```

```
L10023  026536            7992    7998#
L10024  026646            8033    8037#
L10025  026654            8053    8059#
L10026  027144            8166#
L10027  027526            8309#
L10030  030122            8463#
L10031  030546            8623#
L10032  031252            8778#
L10033  032206            8981#
L10034  032722            9152#
L10035  033550            9365#
L10036  034210            9521#
L10037  034270            9558#
L10040  034352            9576    9616#
L10041  034652            9667    9687#
MAPCNT  017306 G          4728#   8598    8734
MAPLNS= 000377 G          1180#   4243    4269    6296    6321    6913    7227    7239    7469    7896    8499    8574    9426
                          9595
MFUNIT  005332 G          1866#   7935
MMENAB  002310 G          1339#   4055    7852*
MMPRES  002306 G          1338#   7851*   7856*
MMSR0   002304 G          1337#   7850
MSG1    012016 G          2333    2358#
MSG2    012074 G          2341    2366#
MSG3    012153 G          2347    2374#
MSLCNT  002302 G          1332#   3271    3290    3309*   4806
MSLGET  017340 G          4782#   4874    5809    5826    7290
MSLOOP  017454 G          4013    4867#   6486
MSTICK  002300 G          1331#   3303    7802*   7804*
MUL16U  017470 G          4901#   6477    6827
NDERPT  002166 G          1164#   5040    5042
NEWCHR  017544 G          4966#   5593    5610
NEWPAS  026250            7778    7858    7864#   7878
NEWRES  026242            7772    7860#
NEWSTA  025732            7766    7786#
NUMLNS= 000010 G          1179#   2593    3973    4134    4595    4673    5613    5975    6030    6178    6522    6578    6877
                          7701    8135    8564    8719    8876    8949
OOPS    020024 G          3282    3308    4015    5071#   7456
OPTION  002164 G          1163#   7929
O$APTS= 000000             995#   1043
O$AU  = 000000             995#   1075
O$BGNR= 000001             995#   1013#   1069
O$BGNS= 000001             995#   1013#   1035
O$DU  = 000001             995#   1013#   1077
O$ERRT= 000001             995#   1013#   1085
O$GNSW= 000001             995#   1013#   1039
O$POIN= 000001             995#   1013#   1101
O$SETU= 000000             995#   1029    9720
PARATB  002312 G          1341#
PARATE  002332 G          1350#
PAR0A   002312 G          1342#   4067
PAR1A   002314 G          1343#
PAR2A   002316 G          1344#
PAR3A   002320 G          1345#
PAR4A   002322 G          1346#
PAR5A   002324 G          1347#
```

```
PAR6A   002326 G          1348#
PAR7A   002330 G          1349#
PASCNT  002236 G          1311#  7857*  7862*  7870*  7872*
PCSLOT= 000016 G          1691#
PNT    = 001000 G          1261#
PREGRT  005254 G          1814#
PREG05  005232            1795#  2328   2440   2494   2590   2928   3030   3087   3177   3238   3341   3387   3457
                          3523   3573   3713   3797   3868   3907   3941   3970   4008   4053   4129   4196   4311
                          4364   4436   4491   4530   4576   4633   4704   4729   4783   4868   4902   4967   5072
                          5140   5197   5270   5309   5369   5457   5503   5647   5687   5754   5797   5877   5924
                          5971   6026   6137   6172   6244   6409   6449   6517   6573   6638   6798   6906   6940
                          6982   7022   7127   7194   7279   7322   7362   7541   7639
PRFRME  020252 G          3756   5139#
PRI    = 002000 G          1262#
PRI00  = 000000 G          1250#
PRI01  = 000040 G          1249#
PRI02  = 000100 G          1248#
PRI03  = 000140 G          1247#  8222   8366   9041   9208   9421
PRI04  = 000200 G          1246#
PRI05  = 000240 G          1245#  6911   7816   8191   8215   8335   8359   8642   8797   9001   9027   9034   9170
                          9194   9201   9383   9407   9414
PRI06  = 000300 G          1244#  1324   7806
PRI07  = 000340 G          1054   1243#  4091   5549   6081   6708   7947   8212   8296   8356   8449   9024   9141
                          9191   9349   9361   9404   9511
PROTBL  005122 G          1571#  4503
PRPARE  020350 G          3758   5196#
PRTLPR  020530 G          2555   2764   2845   2960   2990   5269#
PUFIFO  020612 G          3917   5308#  8582   9067   9115
PUFIFR  020674 G          5368#  8258   8276   8402   8428   8520   9228   9300   9326   9457   9489
PURRXB  021064 G          5456#  9068   9116   9231   9304   9330   9461   9493
RBUFA   002204 G          1294#  3725   5311   5376   7451   7909   8552   8599   8741   8892   8906
RBUFO  = 000002 G          1184#
RDCHRS  021120 G          5502#  9074   9122   9237   9309   9335   9466   9498
RDMAST  021500 G          5646#  6986
REPCOD  021532 G          5583   5686#
REPSMR  021664 G          5753#  8305   8459   9133   9359   9518
RESETT  021712 G          3912   5796#
RRXNDN  022024 G          5876#  6991
RTXNDN  022064 G          5923#  6988
RXBCNT  002624 G          1399#  4314   4324*  5539   5543   7454   7463*  7464   7475
RXBDTX= 000030 G          1195#  7464
RXBEND  003026 G          1402#  4319   5463   7459
RXBETX= 000020 G          1194#  5539   5543
RXBFUL= 000100 G          1196#  1401   7454   7475
RXBIPT  002622 G          1398#  7457*  7458*  7459   7461*
RXBOPT  002620 G          1397#  4316   4322*  5459   5527
RXBSTA  002626 G          1400#  4321   5460   5461   7461
RXCHRS  025144 G          7450#  9035   9202   9415
RXCNTB  003450 G          1426#  3397   3458   5886   6858*  7141   7145*  8903   8919   8925   8930*  8941   8946
RXDONF  002412 G          1386#  3577   5231   5879   6248*  7153*  7198*  8228*  8372*  8418*
RXDSBL  022124 G          4270   5970#  6322   7240
RXENBL  022220 G          4276   6025#  6328   7246
RXIE0   022314 G          5606   6076#  7478   8498
RXIE1   022354 G          5507   5541   6109#
RXPTRB  003310 G          1423#  3388   3466   3593   5224   6860*  7132   7137*
RXTOUT  002242 G          1313#  3720   4505*  5522   6476
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RXVECA  002170 G          1282#  7892*  9036   9147   9203   9355   9416
R0SLOT= 000002 G          1697#  4398*  4465*  4709*  4824*
R1SLOT= 000004 G          1696#  3352*  3675*  3839*  4148*  4399*  4466*  4825*  4922*  7092*
R2SLOT= 000006 G          1695#  3676*  4328*  4400*  4467*  4741*  7294*
R3SLOT= 000010 G          1694#  3840*  4401*  4468*
R4SLOT= 000012 G          1693#  3677*  3841*  4402*
R5SLOT= 000014 G          1692#  1802   3985*  4149*  5998*  6053*  6545*  6601*
SAVBMP  022400 G          3345   5328   5392   5704   6136#
SAVPRI  002246 G          1315#  6909*  6944
SAVTEN  002244 G          1314#  6915*  6941
SCBCTB  004750 G          1460#  4367   4439
SCBCTE  004760 G          1465#  4384   4451
SCBRTB  004760 G          1466#  4368   4382
SCBRTE  004766 G          1470#  4380
SCNSTB  004766 G          1471#  4369   4378   4440   4449
SCNSTE  004772 G          1474#  4376   4447
SCTPTB  004772 G          1475#  4370   4374   4441   4445
SCTPTE  005000 G          1479#  4372   4443
SDPBAS  005036 G          1510#  9062   9063
SDPEND  005056 G          1526#  9063
SDP2B   005062 G          1535#  8386   9219   9220   9449
SDP2E   005102 G          1551#  9220
SFPTBL  002164 G          1161#
SKPSTS  022446 G          5818   6171#
SPLPRB  005006 G          1493#  9445
SPLPRE  005036 G          1506#  9504
SPLSUP  022524 G          6243#  9452   9484
STATA   002210 G          1296#
STATO = 000006 G          1187#
STGTRB  005202 G          1620#  6852
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                          1115   1116   1117   1118   1119   1120   1121   1135   1159   1837   1839   1846   1850
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                          2350   2351   2356   2406   2407   2408   2409   2410   2411   2415   2443   2444   2445
                          2446   2447   2448   2452   2453   2454   2455   2456   2457   2463   2500   2501   2502
                          2503   2504   2505   2506   2519   2520   2521   2522   2523   2524   2525   2539   2540
                          2541   2542   2543   2544   2545   2548   2549   2550   2551   2552   2553   2560   2595
                          2596   2597   2598   2599   2600   2605   2606   2607   2608   2609   2610   2618   2644
                          2645   2646   2647   2648   2649   2650   2654   2679   2680   2681   2682   2683   2684
                          2686   2687   2688   2689   2690   2691   2693   2694   2695   2696   2697   2698   2702
                          2731   2732   2733   2734   2735   2736   2737   2739   2740   2741   2742   2743   2744
                          2745   2749   2750   2751   2752   2753   2754   2755   2758   2759   2760   2761   2762
                          2763   2767   2795   2796   2797   2798   2799   2800   2804   2805   2806   2807   2808
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                    5084    5085    5087    5163    5218    5238    5279    5280    5281    5282    5283    5284    5285
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                    6713    6714    6908    6909    6911    6912    6944    6945    7412    7720    7721    7727    7763
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SVCSUB= 000001        995#    997#
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                     8623    8778    8981    9152    9365    9521    9558    9616    9687
SVCTST= 000001        995#    996#    8077    8184    8328    8477    8640    8795    8999    9168    9378    9534
SWAP0   023024 G     6357#    9056    9058    9104    9106
SWPTQ1  034652        9673    9690#
SWPTQ2  034726        9678    9698#
S$LSYM= 010000         995#    1147#   1168#   2356#   2415#   2463#   2560#   2618#   2654#   2702#   2767#   2848#   2901#
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TIMER1  002270 G     1327#    3247*   3248    3265    7401    7403*
TIMER2  002272 G     1328#    7404    7406*
TIMER3  002274 G     1329#    7407*   7409*
TNUM   = 000012 G     8078#    8079    8194#   8195    8338#   8339    8480#   8481    8644#   8645    8799#   8800    9003#
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TP4FLG  002256 G     1319#    3869*   3871    7509*   7828*   7847*   8097*
TP4RTN  025310 G     7506#    7824    7846    8085
TP4VEC  002254 G     1318#    7508    7823*   7833    7845*   7854    8084*   8142
TSABRT  023074 G     6408#    8620    8775    8977
TSTNUM  002224 G     1306#    6139    8079*   8195*   8339*   8481*   8645*   8800*   9004*   9173*   9386*   9536*
TXAD1A  002214 G     1298#    4099*
TXAD10= 000012 G     1189#
TXAD2A  002216 G     1299#    4095    4100*   6520    6576
TXAD20= 000014 G     1190#
TXBFCA  002220 G     1300#    4098*   6186
TXBFC0= 000016 G     1191#
TXCHA   002204 G     1294#    4591*   7695*
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TXCNTB  003410 G     1425#    4592*   4668*   5933    6674*   6843*   7566    7591*   7669    7697*
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TXDMA   025332 G        7540#  8216   8360   9195   9408
TXDONE  023206 G        5607   6448#
TXDONF  002410 G        1385#  3721   5523   5926   6247*  6457   6485   7197*  7568*  7671*  8227*  8371*  8417*
TXDSBL  023316 G        6516#  6914   7470
TXENBL  023412 G        5551   6572#  6810   6942   8514   9427
TXENBM  002250 G        1316#  5542   7471*
TXFRPR  023506 G        6637#  8261   8279
TXIE0   023602 G        6487   6703#  8292   8442   8497
TXIE1   023642 G        3715   5508   6736#
TXINTF  002252 G        1317#  4663*  5648   6669*  7196*  7585*  8229*  8373*  8419*
TXPTRB  003250 G        1422#  4583   4588*  4654   6660   6844*  7576   7687   7692*
TXRINI  023666 G        4220   4234   4252   4263   6268   6287   6305   6315   6797#  7223   7234
TXROFF  024142 G        5008   5026   5715   6905#
TXRON   024202 G        5011   5029   5718   6939#
TXRREP  024230 G        6981#  8293   8415   8446   9079   9127   9242   9314   9340   9471   9503
TXRXLB  005142 G        1594#  2496   2972   3399   3460   3815   3971   5004   5021   5044   6853*  7128
TXRXLE  005202 G        1611#
TXSCHR  025464 G        7638#  9028
TXVECA  002172 G        1283#  7894*  8217   8299   8361   8452   9029   9144   9196   9352   9409   9514
T$ARGC= 000002          1017#  1018#  1019#  1020#  1021#  1022#  2333#  2337   2341#  2345   2347#  2351   2406#
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                        2595#  2600   2605#  2610   2644#  2650   2679#  2684   2686#  2691   2693#  2698   2731#
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                        2874#  2879   2887#  2893   2931#  2936   2945#  2949   2954#  2959   2979#  2988   3033#
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                        5279#  5285   7934#  7939   8012#  8017
T$CODE= 001052          9581#  9587#  9593#  9600#  9607#  9672#  9677#
T$ERRN= 022125           995#  5076#  8148#  8559#  8615#  9550#
T$EXCP= 000000          9581#  9585   9587#  9591   9593#  9598   9600#  9605   9607#  9612   9677#  9682
T$FLAG= 000050          7720#  7722   7991#  8032#  8034   8052#  8054
T$GMAN= 000000           995#
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T$LTNO= 000012          9723#
T$NEST= 177777           995#  1006#  1135#  1146#  1159#  1167#  2326#  2355#  2403#  2414#  2438#  2462#  2492#
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T$NS0  = 000000         1006#  9724
T$NS1  = 000005         1135#  1146   1159#  1167   2326#  2355   2403#  2414   2438#  2462   2492#  2559   2588#
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                        3028#  3062   3085#  3139   7717#  7726   7737#  7744   7760#  7951   7966#  7970   7982#
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T$PTNU= 000000           995#
T$SAVL= 177777           995#
T$SEGL= 177777           995#
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T$TEST= 000012                995#  8077#  8184#  8328#  8477#  8640#  8795#  8999#  9168#  9378#  9534#  9723
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                             2754   2762   2767   2799   2808   2841   2848   2878   2892   2901   2935   2948   2958
                             2987   2999   3037   3048   3057   3063   3094   3120   3132   3140   3739   4088   4092
                             4103   5010   5028   5075   5084   5087   5163   5218   5238   5284   5408   5423   5546
                             5550   5555   5568   5659   5717   5766   5837   5893   5941   6078   6082   6087   6413
                             6705   6709   6714   6908   6912   6945   7412   7727   7764   7770   7776   7782   7788
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T$TSTS= 000001                995#  8078#  8185#  8329#  8478#  8641#  8796#  9000#  9169#  9379#  9535#
T$$AU = 010025               8050#  8052   8059
T$$AUT= 010022               7966#  7970
T$$CLE= 010023               7982#  7991   7998
T$$DU = 010024               8010#  8032   8037
T$$HAR= 010040               9576#  9616
T$$HW = 010000               1135#  1146
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T$$MSG= 010016               2326#  2355   2403#  2414   2438#  2462   2492#  2559   2588#  2617   2641#  2653   2676#
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T$$PRO= 010020               7737#
T$$RPT= 010017               7717#  7720   7726
T$$SOF= 010041               9667#  9687
T$$SW = 010001               1159#  1167
T$$TES= 010037               8078#  8166   8185#  8309   8329#  8463   8478#  8623   8641#  8778   8796#  8981   9000#
                             9152   9169#  9365   9379#  9521   9535#  9558

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T10       034212 G           1121   9534#
T2        027146 G           1113   8184#
T3        027530 G           1114   8328#
T4        030124 G           1115   8477#
T5        030550 G           1116   8640#
T6        031254 G           1117   8795#
T7        032210 G           1118   8999#
T8        032724 G           1119   9168#
T9        033552 G           1120   9378#
UAM    =  000200 G           1259#
UNITN     002200 G           1287#  7865*  7876*  7877   7881   7934   8153
UNSDIV    024310 G           3306   7021#
UPDCHR    024444 G           3603   3642   3654   3760   7126#
VANSUP    024542 G           7193#  9065   9113   9222   9294   9321
WAIBIS    024740 G           3726   5528   7278#  8692   8725   8848   8882
WORD1     002240 G           1312#  7829*  7830   7848*  7849
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X$FALS= 000040             995#
X$OFFS= 000400             995#
X$TRUE= 000020             995#
$PATCH  035016 G          9711#
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BGNHW	1#	995#	1134										
BGNINI	1#	995#	7759										
BGNMOD	1#	995#	1005										
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BGNSEG	1#	995#											
BGNSET	1#	995#											
BGNSFT	1#	995#	9666										
BGNSRV	1#	995#											
BGNSUB	1#	995#											
BGNSW	1#	995#	1158										
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BNERRO	1#	995#											
BREAK	1#	995#	5086	7411									
BRESET	1#	995#	7787	7860	7987								
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CLOCK	1#	995#	7792										
CLOSE	1#	995#											
CLRVEC	1#	995#	8298	8451	9143	9146	9351	9354	9513				
COMMEN	1#	995#											
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DESCRI	1#	995#	1844										
DEVTYP	1#	995#	1835										
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DISPLA	1#	995#											
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DORPT	1#	995#											
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CVDHCA0 DHV-11 FUNC TST PART1 MACY11 30A(1052) 12-JUL-83 13:56 PAGE 249
CVDHCA.P11 12-JUL-83 11:44 CROSS REFERENCE TABLE -- MACRO NAMES

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HEADER     1#   995#  1015
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                2595#   2599    2605#   2609    2617#   2618    2644#   2649    2653#   2654    2679#   2683    2686#   2690    2693#
                2697    2701#   2702    2731#   2736    2739#   2744    2749#   2754    2758#   2762    2766#   2767    2795#   2799
                2804#   2808    2837#   2841    2847#   2848    2874#   2878    2887#   2892    2900#   2901    2931#   2935    2945#
                2948    2954#   2958    2979#   2987    2998#   2999    3033#   3037    3044#   3048    3054#   3057    3062#   3063
                3090#   3094    3117#   3120    3126#   3132    3139#   3140    3739#   4088#   4091#   4092    4102#   4103    5010#
                5028#   5075    5081#   5084    5087#   5163#   5218#   5238#   5279#   5284    5408#   5423#   5546#   5549#   5550
                5554#   5555    5568#   5659#   5717#   5766#   5837#   5893#   5941#   6078#   6081#   6082    6086#   6087    6413#
                6705#   6708#   6709    6713#   6714    6908#   6911#   6912    6944#   6945    7412#   7720#   7726#   7727    7763#
                7764    7769#   7770    7775#   7776    7781#   7782    7788#   7793#   7794    7806#   7810    7816#   7817    7861#
                7881#   7882    7934#   7938    7947#   7948    7951#   7952    7970#   7971    7988#   7991#   7998#   7999    8012#
                8016    8032#   8037#   8038    8052#   8059#   8060    8147    8153#   8154    8157#   8166#   8167    8191#   8192
                8212#   8213    8215#   8219    8222#   8223    8296#   8297    8299#   8300    8309#   8310    8335#   8336    8356#
                8357    8359#   8363    8366#   8367    8449#   8450    8452#   8453    8463#   8464    8558    8614    8623#   8624
                8642#   8643    8751#   8768#   8778#   8779    8797#   8798    8965#   8974#   8981#   8982    9001#   9002    9024#
                9025    9027#   9031    9034#   9038    9041#   9042    9141#   9142    9144#   9145    9147#   9148    9152#   9153
                9170#   9171    9191#   9192    9194#   9198    9201#   9205    9208#   9209    9349#   9350    9352#   9353    9355#
                9356    9361#   9362    9365#   9366    9383#   9384    9404#   9405    9407#   9411    9414#   9418    9421#   9422
                9511#   9512    9514#   9515    9521#   9522    9549    9558#   9559
MSTLAB             1#    995#   2336#   2344#   2350#   2356#   2410#   2415#   2447#   2456#   2463#   2505#   2524#   2544#   2552#
                2560#   2599#   2609#   2618#   2649#   2654#   2683#   2690#   2697#   2702#   2736#   2744#   2754#   2762#   2767#
                2799#   2808#   2841#   2848#   2878#   2892#   2901#   2935#   2948#   2958#   2987#   2999#   3037#   3048#   3057#
                3063#   3094#   3120#   3132#   3140#   3739#   4088#   4092#   4103#   5010#   5028#   5075#   5084#   5087#   5163#
                5218#   5238#   5284#   5408#   5423#   5546#   5550#   5555#   5568#   5659#   5717#   5766#   5837#   5893#   5941#
                6078#   6082#   6087#   6413#   6705#   6709#   6714#   6908#   6912#   6945#   7412#   7727#   7764#   7770#   7776#
                7782#   7788#   7794#   7810#   7817#   7861#   7882#   7938#   7948#   7952#   7971#   7988#   7991#   7999#   8016#
                8038#   8060#   8147#   8154#   8157#   8167#   8192#   8213#   8219#   8223#   8297#   8300#   8310#   8336#   8357#
                8363#   8367#   8450#   8453#   8464#   8558#   8614#   8624#   8643#   8751#   8768#   8779#   8798#   8965#   8974#
                8982#   9002#   9025#   9031#   9038#   9042#   9142#   9145#   9148#   9153#   9171#   9192#   9198#   9205#   9209#
                9350#   9353#   9356#   9362#   9366#   9384#   9405#   9411#   9418#   9422#   9512#   9515#   9522#   9549#   9559#
MSTSTL             1#    995#   2336#   2344#   2350#   2356#   2410#   2415#   2447#   2456#   2463#   2505#   2524#   2544#   2552#
                2560#   2599#   2609#   2618#   2649#   2654#   2683#   2690#   2697#   2702#   2736#   2744#   2754#   2762#   2767#
                2799#   2808#   2841#   2848#   2878#   2692#   2901#   2935#   2948#   2958#   2987#   2999#   3037#   3048#   3057#
                3063#   3094#   3120#   3132#   3140#   3739#   4088#   4092#   4103#   5010#   5028#   5075#   5084#   5087#   5163#
                5218#   5238#   5284#   5408#   5423#   5546#   5550#   5555#   5568#   5659#   5717#   5766#   5837#   5893#   5941#
                6078#   6082#   6087#   6413#   6705#   6709#   6714#   6908#   6912#   6945#   7412#   7727#   7764#   7770#   7776#
                7782#   7788#   7794#   7810#   7817#   7861#   7882#   7938#   7948#   7952#   7971#   7988#   7991#   7999#   8016#
                8038#   8060#   8147#   8154#   8157#   8167#   8192#   8213#   8219#   8223#   8297#   8300#   8310#   8336#   8357#
                8363#   8367#   8450#   8453#   8464#   8558#   8614#   8624#   8643#   8751#   8768#   8779#   8798#   8965#   8974#
                8982#   9002#   9025#   9031#   9038#   9042#   9142#   9145#   9148#   9153#   9171#   9192#   9198#   9205#   9209#
                9350#   9353#   9356#   9362#   9366#   9384#   9405#   9411#   9418#   9422#   9512#   9515#   9522#   9549#   9559#
MSWORD             1#    995#   1055#   1064    1110#   1112    1113    1114    1115    1116    1117    1118    1119    1120    1121
                5075#   5076    5077    5078    7720#   7991#   8032#   8052#   8147#   8148    8149    8150    8558#   8559    8560
```

CVDHCA0 DHV-11 FUNC TST PART1 MACY11 30A(1052) 12-JUL-83 13:56 PAGE 253
CVDHCA.P11 12-JUL-83 11:44 CROSS REFERENCE TABLE -- MACRO NAMES

```
          8561    8614#   8615    8616    8617    9549#   9550    9551    9552    9581#   9587#   9593#   9600#   9607#   9672#
          9677#   9720    9721
M$XFER       1#    995#
OPEN         1#    995#
PASS      1758#   2352    2459    2556    2614    2995    3059    3135    3206    3314    3351    3423    3496    3534    3674
          3764    3838    3875    3920    3946    3984    4016    4106    4147    4278    4327    4397    4464    4507    4539
          4598    4676    4708    4740    4823    4876    4921    5047    5089    5166    5243    5286    5336    5430    5466
          5622    5661    5724    5768    5847    5896    5944    5997    6052    6148    6191    6330    6425    6489    6544
          6600    6682    6880    6916    6946    6995    7091    7155    7247    7293    7335    7375    7601    7704
POINTE       1#    995#   1012
PRINTB       1#    995#   2332    2340    2405    2442    2451    2499    2594    2604    2643    2678    2730    2794    2873
          2930    3032    3043    3053    3089
PRINTF       1#    995#   5080    7933    8011
PRINTS       1#    995#
PRINTX       1#    995#   2346    2518    2538    2547    2685    2692    2738    2748    2757    2803    2836    2886    2944
          2953    2978    3116    3125    5278
READBU       1#    995#
READEF       1#    995#   7762    7768    7774    7780
RFLAGS       1#    995#
SAVE      1717#   2327    2439    2493    2589    2927    3029    3086    3176    3237    3340    3386    3456    3522    3572
          3712    3796    3867    3906    3940    3969    4007    4052    4128    4195    4310    4363    4435    4490    4529
          4575    4632    4703    4728    4782    4867    4901    4966    5071    5139    5196    5269    5308    5368    5456
          5502    5646    5686    5753    5796    5876    5923    5970    6025    6136    6171    6243    6408    6448    6516
          6572    6637    6797    6905    6939    6981    7021    7126    7193    7278    7321    7361    7540    7638
SETPRI       1#    995#   4090    4101    5548    5553    6080    6085    6707    6712    6910    6943    7815    7946    8190
          8211    8221    8295    8334    8355    8365    8448    8641    8796    9000    9023    9040    9140    9169    9190
          9207    9348    9360    9382    9403    9420    9510
SETVEC       1#    995#   7805    8214    8358    9026    9033    9193    9200    9406    9413
SLASH        1#    995#
STARS        1#    995#
SVC          1#    993#    994
XFER         1#    995#   7720#   7991#   8032#   8052#
XFERF        1#    995#
XFERT        1#    995#

. ABS.  035072     000

 ERRORS DETECTED:  0

 CVDHCA.BIC,CVDHCA.LST/CRF/SOL/NL:TOC=SVC34R.MLB,CVDHCA.P11
 RUN-TIME: 25 36 2 SECONDS
 RUN-TIME RATIO: 96/64=1.4
 CORE USED:  16K  (31 PAGES)
```