DC14

TEST DC14-E/11

MD-14-DCDCA-B

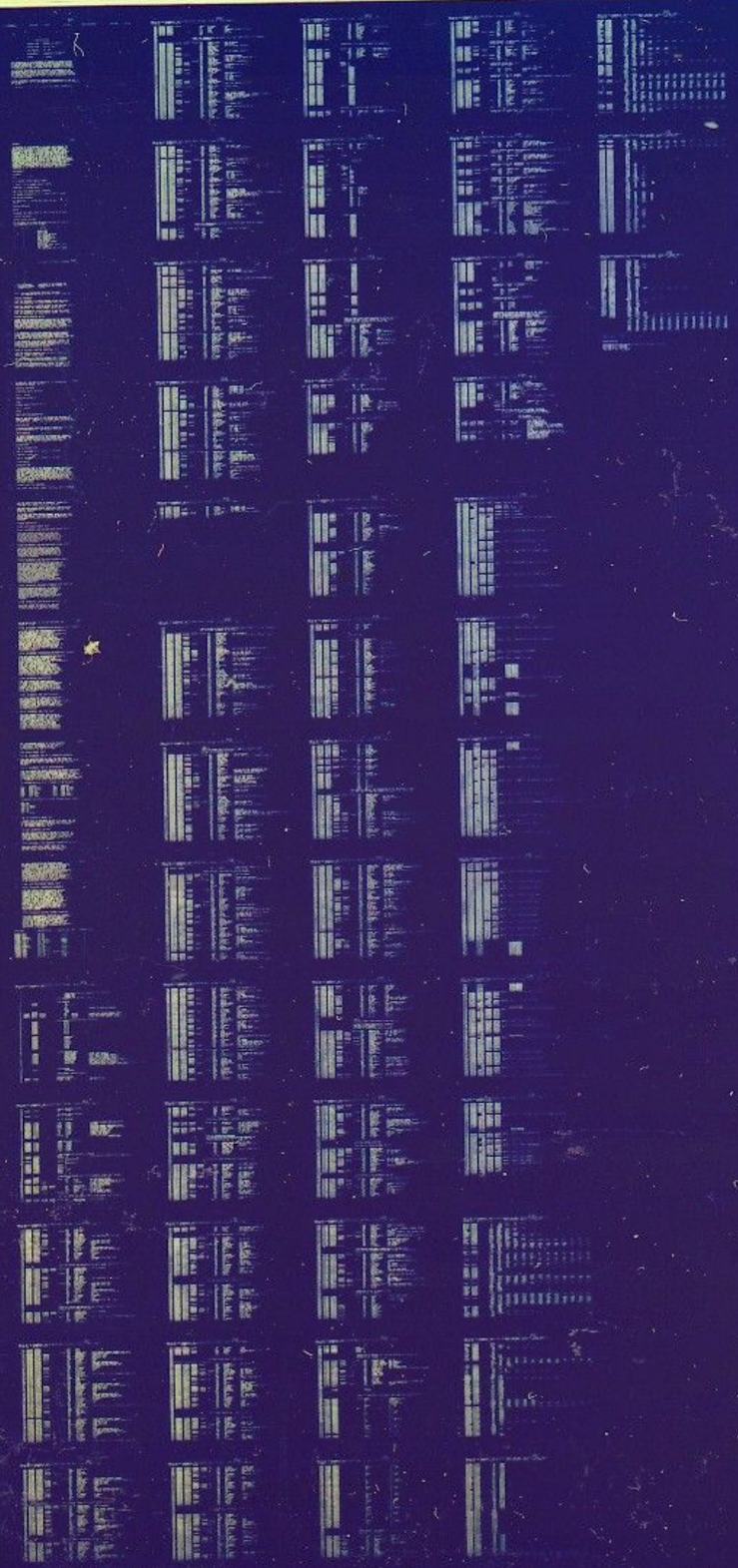
EP-DCDCA-B-DL-B

FICHE 1 OF 1

AUG 1977

digital

MADE IN USA



EOF1DZDRBESBQ411 00010000 770720 PDP10 411 72HDR1DCDCABSEQ 00010000 770720

IDENTIFICATION

PRODUCE CODE: MAINDEC-14-DCDCA-B-D

PRODUCT NAME: TEST DC-14E/11

DATE CREATED: MAY 1977

MAINTENANCE: DIAGNOSTIC ENGINEERING

AUTHOR: D. DEKNIS

1. ABSTRACT

THE PURPOSE OF THIS PROGRAM IS TO TEST AND DIAGNOSE THE OPERATION OF THE SERIAL LINE INTERFACE WHICH CONNECTS A PDP-11 AND INDUSTRIAL 14 CONTROLLERS. THERE ARE THREE PORTIONS TO THE TEST; THE FIRST PORTION CHECKS THE BASIC OPERATION OF THE MASTER CONTROL BOARD AND THE SEPARATE CHANNEL MODULES (ONE AT A TIME) WITH THE OUTPUTS OF THE TRANSMITTERS CONNECTED TO THE INPUTS OF THE RECEIVERS, RESPECTIVELY (CLOSED LOOP TESTS); THE SECOND PORTION CHECKS THE BASIC OPERATION OF THE SYSTEM WITH INDUSTRIAL 14 ATTACHED (EACH CHANNEL IS TESTED ONE AT A TIME); THE THIRD PORTION CHECKS SIMULTANEOUS OPERATION OF ALL CHANNELS WITH NO INDUSTRIAL 14 ATTACHED AND THE OUTPUTS OF THE TRANSMITTERS CONNECTED TO THE INPUTS OF THE RECEIVERS, RESPECTIVELY.

2. REQUIREMENTS

2.1 EQUIPMENT

PDP-11

DC-14 MASTER CONTROL MODULE (M8334)

AT LEAST 1 DC-14 CHANNEL MODULE (M8333)

INDUSTRIAL 14 CONTROLLER(S)

WITH M7481 HIGH SPEED SERIAL INTERFACE

2.2 THE PROGRAM OCCUPIES ALL OF 4K WORDS OF PDP-11 MEMORY

2.3 PRELIMINARY PROGRAMS

ALL INDUSTRIAL 14 CONTROLLERS SHOULD BE ABLE TO RUN TEST 143/8

3.0 LOADING PROCEDURE

3.1 METHOD

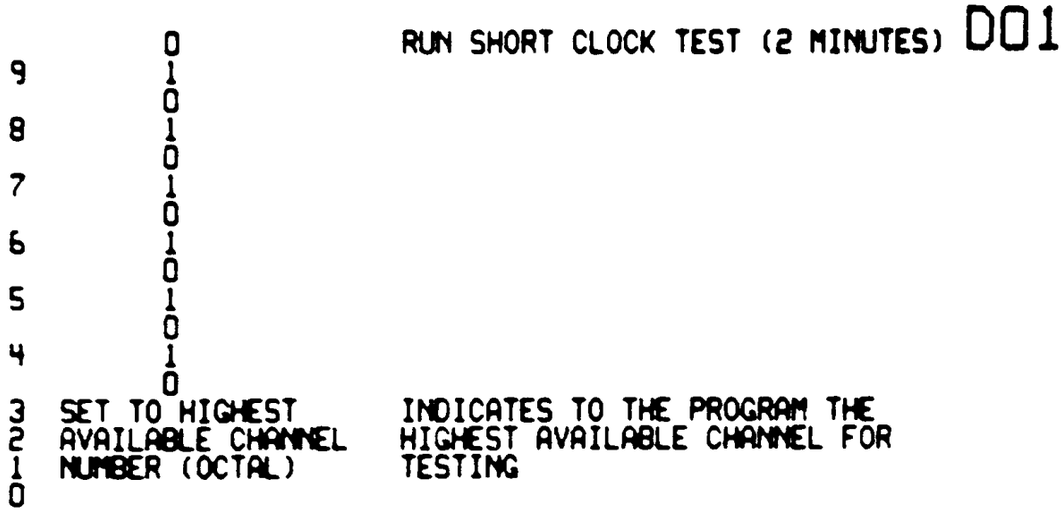
PROCEDURE FOR NORMAL ABSOLUTE TAPES SHOULD BE FOLLOWED

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

THE FOLLOWING IS A TABLE OF SWITCH REGISTER SETTINGS AND THEIR OPERATION UPON THE PROGRAM:

SR	SET AS	ACTION
15	1	SCOPE LOOP
	0	DON'T LOOP
14	1	DON'T HALT ON ERROR
	0	HALT ON ERROR
13	1	DON'T PRINT ERRORS
	0	PRINT ERRORS
12	1	LOOP ON THIS CHANNEL
	0	DON'T LOOP
11	1	REPEAT ALL TESTS (PART 1 OR 2)
	0	DON'T REPEAT
10	1	RUN LONG CLOCK TEST (24 HOURS)



NOTE: SR15 HAS PRECEDENCE OVER SR14 AND SR13
SR11 REPEATS ALL TESTS IN PART 1 EXCEPT CLOCK TEST

4.2 STARTING ADDRESSES

4.2.1 START THE PROGRAM AT LOCATION 000200 TO RUN THE CLOSED LOOP (NO INDUSTRIAL 14) UNIQUE CHANNEL TESTS (PART 1)

4.2.2 START THE PROGRAM AT LOCATION 000204 TO RUN THE OPEN LOOP (WITH INDUSTRIAL 14) UNIQUE CHANNEL TESTS (PART 2)

4.2.3 START THE PROGRAM AT LOCATION 000210 TO RUN THE CLOSED LOOP (NO INDUSTRIAL 14) SIMULTANEOUS CHANNEL TESTS (PART 3)

4.3 PROGRAM AND/OR OPERATOR ACTION

4.3.1 ASSURE THAT THE MASTER CONTROL MODULE AND THE INDIVIDUAL CHANNEL MODULES ARE SECURELY INSERTED INTO THE PDP-11 AND HAVE TOP-EDGE CONNECTORS JOINING THEM ALL TOGETHER. ALSO MAKE SURE THAT THE ROTARY SWITCHES ARE SET TO UNIQUE CONSECUTIVE NUMBERS, ON EACH CHANNEL BOARD, STARTING WITH 0 (NEXT TO MASTER CONTROL MODULE) THEN 1 (NEXT TO 0), ETC.

4.3.2 IF A INDUSTRIAL 14 IS TO BE CONNECTED TO EACH CHANNEL, ASSURE THAT THE INDIVIDUAL CABLES ARE FIRMLY ATTACHED TO THE INDUSTRIAL 14(S) AND THE CHANNEL MODULE(S), AND THAT ALL MODULE(S) ARE PRESENT AND SECURE IN THE INDUSTRIAL 14(S).

4.3.3 IF NO INDUSTRIAL 14'S ARE TO BE CONNECTED, CONNECT THE OUTPUT OF THE INDIVIDUAL CHANNEL TRANSMITTERS TO THEIR RESPECTIVE RECEIVERS EITHER AT THE MODULE OR AT THE END OF THE CABLES, WHICHEVER IS DESIRED.

4.3.4 POWER UP THE PDP-11 AND THE INDUSTRIAL 14(S)

4.3.5 LOAD THE ABSOLUTE PROGRAM INTO THE PDP-11 USING THE ABSOLUTE LOADER (NORMAL MODE).

4.3.6 SET THE APPROPRIATE STARTING ADDRESS (SEE 4.2 ABOVE) INTO THE SEITCH REGISTERS AND DEPRESS "LOAD ADDRESS"

4.3.7 SET THE SWITCH REGISTER PER 4.1 (ABOVE) (BE SURE TO SE" HIGHEST AVAILABLE CHANNEL NUMBER (OCTAL) IN SR3 TO 0 IF MORE THAN 1 CHANNEL IS TO BE TESTED). DEPRESS "START"

4.3.8 PROGRAM WILL NOW RUN TO COMPLETION (IF APPROPRIATE) (ASSUMING NO ERRORS). SEE 8.2

5. OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

(SEE 4.1 ABOVE)

5.2 SUBROUTINE ABSTRACTS

(NONE)

5.3 PROGRAM AND/OR OPERATOR ACTION

(SEE 4.3 ABOVE)

6. ERRORS

6.1 ERROR HALTS AND DESCRIPTION

MOST OF THE ERROR HALTS IN THE PROGRAM ARE PRECEDED BY ERROR TYPEOUTS. HOWEVER, IF IN DOUBT ABOUT THE CAUSE OF THE ERROR HALT, CONSULT THE LISTING (AND THE STACK POINTER).

6.2 ERROR RECOVERY

TO SCOPE AN ERROR CONDITION AFTER AN ERROR HALT, SET THE SWITCH REGISTER PER 4.1 AND DEPRESS "CONTINUE"

6.3 ERROR MESSAGES

THE ERROR MESSAGES OUTPUT BY THE PROGRAM WILL GENERALLY CONTAIN: A DESCRIPTION OF THE TEST BEING PERFORMED; THE CHANNEL FAILING; THE SPECIFIC ERROR CONDITION; AND, IF APPROPRIATE, THE CORRECT AND FAILING DATA WORDS.

7. RESTRICTIONS

7.1 STARTING RESTRICTIONS

NONE IF PROCEDURE IN 4.3 (ABOVE) IS FOLLOWED.

7.2 OPERATING RESTRICTIONS

NONE IF PROCEDURE IN 4.3 (ABOVE) IS FOLLOWED.

8. MISCELLANEOUS

8.1 EXECUTION TIME

THE EXECUTION TIME OF THE INDIVIDUAL CHANNEL TESTS (FIRST AND SECOND PORTIONS OF THE PROGRAM) IS DEPENDENT UPON HOW MANY CHANNELS ARE BEING TESTED AND IF SHORT CLOCK TEST OR LONG CLOCK TEST HAS BEEN SELECTED (IN THE FIRST PART ONLY). THE SIMULTANEOUS TEST DOES NOT END, BUT WILL RUN UNTIL STOPPED BY THE OPERATOR OR AN ERROR OCCURS. IN PARTS 1 AND 2, THE BELL ON THE TELEPRINTER WILL RING ONCE AFTER TESTING EACH CHANNEL AND ONCE WHEN ALL CHANNELS HAVE BEEN TESTED.

8.2 PROGRAM COMPLETION ADDRESSES

8.2.1 THE CLOSED LOOP UNIQUE CHANNEL TESTS WILL STOP AT 004460

WHEN THE SHORT CLOCK TEST IS COMPLETE. DEPRESSING "CONTINUE" WILL REPEAT THE CLOCK TEST ONLY.

8.2.2 THE OPEN LOOP UNIQUE CHANNEL TESTS WILL STOP AT 010626 AFTER ALL TESTS HAVE RUN. DEPRESSING "CONTINUE" WILL REPEAT ALL TESTS.

8.2.3 THE CLOSED LOOP SIMULTANEOUS CHANNEL TESTS DO NOT STOP, EXCEPT FOR ERRORS THIS TEST SHOULD BE RUN FOR AT LEAST FIVE MINUTES TO CONFIRM THE PROPER OPERATION OF THE HARDWARE.

9.0 PROGRAM DESCRIPTION

9.1 CLOSED LOOP UNIQUE CHANNEL TESTS

9.1.1 TEST01 (SA=000532) LOAD AND READ SCRS CHANNEL SELECT

THIS TEST CHECKS THE ABILITY TO LOAD INTO AND READ OUT OF THE CHANNEL SELECTION BITS OF THE SCRS REGISTER. THE COMPLEMENT OF THE DATA WORD, AND THEN THE DATA WORD ITSELF IS LOADED INTO THE SCRS, THEN THE SCRS IS READ TO CHECK ITS CONTENTS.

9.1.2 TEST02 (SA=000642) LOAD AND READ SCTS CHANNEL SELECT

THIS TEST CHECKS THE ABILITY TO LOAD INTO AND READ OUT OF THE CHANNEL SELECTION BITS OF THE SCTS REGISTER. THE COMPLEMENT OF THE DATA WORD, AND THEN THE DATA WORD ITSELF IS LOADED INTO THE SCTS, THEN THE SCTS IS READ TO CHECK ITS CONTENTS.

9.1.3 TEST03 (SA=000752) LOAD AND READ INTERRUPT ENABLES

THIS TEST CHECKS THE ABILITY TO LOAD INTO AND READ OUT THE INTERRUPT ENABLE/DISABLE BITS VIA THE SCR6. FIRST 0 IS STORED IN ALL INTERRUPT ENABLE/DISABLE BITS, THEN 1 IS STORED IN THE CURRENT CHANNEL ERROR ENABLE/DISABLE BIT, AND THEN READ BACK AT CHECKED; THIS IS REPEATED FOR THE FLAG ENABLE BIT. THEN 1 IS STORED IN ALL INTERRUPT ENABLE/DISABLE BITS, THEN 0 IS STORED IN THE CURRENT CHANNEL ERROR ENABLE/DISABLE BIT; AND THEN READ BACK AND CHECKED; THIS IS REPEATED FOR THE FLAG ENABLE BIT.

9.1.4 TEST04 (SA=001350) INTERRUPTS DISABLED AFTER "RESET"

THIS TEST CHECKS THE ABILITY TO DISABLE THE CURRENT CHANNEL INTERRUPTS VIA THE PDP-11 "RESET" INSTRUCTION. THE CURRENT CHANNEL INTERRUPTS ARE ENABLED, THEN A "RESET" INSTRUCTION IS ISSUED AND THE BITS ARE THEN CHECKED TO ASSURE THE INTERRUPTS ARE THEN DISABLED.

9.1.5 TEST05 (SA=001444) LOAD AND READ SCTS BITS 0 AND 1

THIS TEST CHECKS THE ABILITY TO LOAD AND READ BITS 0 AND 1 OF THE SCTS REGISTER. A COUNT PATTERN IS LOADED INTO, THEN READ

OUT OF BITS 0 AND 1 OF THE SCTS REGISTER, ONE NUMBER AT A TIME.

9.1.6 TEST06 (SA=001536) TRANSMISSION AND RECEPTION (NON-INTERRUPT)

THIS TEST CHECKS THE TRANSMISSION AND RECEPTION OF DATA WORDS USING A NON-INTERRUPT TYPE OF ENVIRONMENT. A DATA WORD IS TRANSMITTED USING TRANSMISSION MODE 2, THEN THE "TRANSMISSION DONE FLAG" AND "RECEIVER ACTIVE FLAG" ARE CHECKED FOR PROPER OPERATION. THEN THE PROPER CURRENT CHANNEL STATUS IS CHECKED USING THE SCRS REGISTER; THE THE PROPER RETURN DATA WORD IS CHECKED USING THE SCD REGISTER. THIS IS REPEATED FOR 4096 DATA WORDS. THIS WHOLE TEST IS REPEATED FOR TRANSMISSION MODE 3.

9.1.7 TEST07 (SA=002226) TRANSMISSION AND RECEPTION (INTERRUPT)

THIS TEST CHECKS THE TRANSMISSION AND RECEPTION OF DATA WORDS USING A INTERRUPT TYPE OF ENVIRONMENT. A DATA WORD IS TRANSMITTED USING TRANSMISSION MODE 2, THEN THE "TRANSMISSION DONE FLAG" AND "RECEIVER ACTIVE FLAG" ARE CHECKED FOR PROPER OPERATION. AFTER AN INTERRUPT OCCURS, THE PROPER CHANNEL STATUS IS CHECKED USING THE ICRS REGISTER; THEN THE PROPER RETURN DATA WORD IS CHEKCED USING THE ICD REGISTER. THIS IS REPEATED FOR 4096 DATA WORDS. THIS WHOLE TEST IS REPEATED FOR TRANSMISSION MODE 3.

9.1.8 TEST08 (SA=003120) RUN FLIP/FLOP

THIS TEST CHECKS THE "RUN FLIP/FLOP". AN "0200" IS ISSUED USING TRANSMISSION MODE 1. AFTER AN INTERRUPT OCCURS, THE PROPER CHANNEL STATUS IS CHECKED FOR RUN TO BE 0 USING THE ICRS REGISTER. AFTER A SUITABLE DELAY, RUN IS AGAIN CHECKED TO HAVE RETURNED TO THE "1" STATE.

9.1.9 TEST09 (SA=003410) WORD LOST FLIP/FLOP

THIS TEST CHECKS THE "WORD LOST FLIP/FLOP". THE "OUTPUT FLAG" IS SET TWICE BY TWO TRANSMISSIONS TO THE INDUSTRIAL 14 WITHOUT CLEARING THE "OUTPUT FLAG" BETWEEN THEM. AFTER AN INTERRUPT OCCURS, THE PROPER CHANNEL STATUS IS CHECKED FOR "WORD LOST" TO BE SET USING THE ICRS REGISTER.

9.1.19 TEST10 (SA=003726) REAL TIME CLOCK

THIS TEST CHECKS THE REAL TIME CLOCK TO FUNCTION PROPERLY. FIRST THE CLOCK BUFFERS ARE CLEARED BY A "CLR &LTS", THEN LTS IS CHECKED TO READ NON-ZERO. THEN THE "CLR & LTS" IS CHECKED TO CLEAR THE CLOCK COUNTER. THEN THE CLOCK IS MONITORED TO CHECK PROPER COUNTING FOR A PERIOD OF EITHER TWO MINUTES (SR10=0) OR INDEFINITE (SR10=1). IF THE TWO MINUTE TESTIS BEING

RUN, THR PROGRAM OUTPUTS "M" ON THE TELETYPE
AT THE END OF TWO MINUTES. IF THE LONG TEST
IS BEING RUN, THE PROGRAM OUTPUTS "D" ON
THE TELETYPE AT THE END OF 24 HOURS.

9.2 OPEN UNIQUE CHANNEL TESTS

9.2.1 TEST 20 (SA=004622) TEST OF 14 INSTRUCTION DECODING

THIS TEST VERIFIES THAT ALL ONE, TWO AND THREE WORD
INSTRUCTIONS ARE PROPERLY DECODED BY THE DC-14E. ALL FLAGS
ARE CHECKED AND TIMED TO MAKE SURE THAT THEY FUNCTION
PROPERLY.

9.2.2 TEST 21 (SA=006676) TEST OF OUTPUT REGISTER

THIS TEST CHECKS THE OUTPUT REGISTER FOR PROPER FUNCTIONING
(THAT NO OUTPUT REGISTER INSTRUCTIONS ARE LOST). THE 14
MEMORY IS LOADED WITH A SHORT PROGRAM COMPROSED OF TRANSFER PC
TO OUTPUT AND TD INSTRUCTIONS. THIS PROGRAM IS ALLOWED
TO RUN AND THE OUTPUT REGISTER IS MONITORED TO CHECK THAT
ALL TRANSFERS TO THE OUTPUT REGISTER ARE EXECUTED IN ORDER.

THE PROGRAM WRITTEN IN THE 14 MEMORY IS THE FOLLOWING:

PC	CONTENTS	PC	CONTENTS
0000	0046 (PC OUT)	0006	0046 (PC OUT)
0001	0046 (PC OUT)	0007	0046 (PC OUT)
0002	0136 (TD)	0010	0046 (PC OUT)
0003	1000 (ADDR)	0011	0136 (TD)
0004	0136 (TD)	0012	1002 (ADDR.)
0005	1001 (ADDR.)	0013	0004 (CLR PC)

THE BUFFER FROM READING THE OUTPUT REGISTER SHOULD CONTAIN:

0001 (PC)
0002 (PC)
1000 (TD RESULT)
1001 (TD RESULT)
0007 (PC)
0010 (PC)
0011 (TD RESULT)

9.2.3 TEST 22 (SA=007216) MEMORY TEST

A MEMORY TEST IS PERFORMED ON THE 14 TO CHECK THAT THE
DC-14E CAN PASS ALL BITS PROPERLY, AND THAT ALL MA AND
MD LINES WORK CORRECTLY. THE MEMORY TEST PERFORMED
IS THE ADDRESS COMPLIMENT TEST.

9.2.4 TEST 22Z (SA=007470) CDF TEST

THE DATA FIELD OPERATION IS CHECKED IN THIS TEST TO
FUNCTION PROPERLY. A 2525 IS WRITTEN IF FIELD 0, AND
A 5252 IS WRITTEN IN FIELD, (14/35). USING THE DATA
FIELD THEY ARE READ BACK TO VERIFY THAT THE DC-14
CAN ADDRESS BOTH FIELDS CORRECTLY.

9.2.5 TEST23 (SA=010064) TURN INDUSTRIAL TRANSMITTER OFF AND ON

THIS TEST CHECKS THAT "0300" TURNS OFF THE
TRANSMITTER AT THE INDUSTRIAL AND KILLS "RUN",
AND THAT "0200" TURNS THE TRANSMITTER BACK

ON; BOTH INSTRUCTIONS ARE EXECUTED USING TRANSMISSION MODE 1. FIRST "0300" IS TRANSMITTED TO THE INDUSTRIAL 14 USING TRANSMISSION MODE 1. AFTER THE INSTRUCTION IS EXECUTED BY THE INDUSTRIAL 14, "RUN" IS CHECKED TO BE OFF AND NO INSTRUCTIONS CAN BE EXECUTED BY THE INDUSTRIAL 14. THE "0200" IS TRANSMITTED TO THE PDP-14 USING TRANSMISSION MODE 3. AFTER THE INSTRUCTION IS EXECUTED BY THE PDP-14, "RUN" IS CHECKED (AFTER A SUITABLE DELAY) TO BE ON AND INSTRUCTIONS CAN BE EXECUTED BY THE PDP-14 AGAIN.

9.3 CLOSED LOOP SIMULTANEOUS CHANNEL TESTS

9.3.1 TEST30 (SA=010710) CONSECUTIVE INTERRUPTS

THIS TEST CHECKS THAT SIMULTANEOUS INTERRUPT REQUESTS FROM MULTIPLE CHANNELS OCCUR IN CONSECUTIVE NUMERICAL ORDER. FIRST, ALL CHANNELS HAVE THEIR "EXTERNAL FLAG" SET. THEN, AFTER AN INTERRUPT OCCURS, THE ICRS REGISTER IS READ; IT SHOULD READ BACK AN INTERRUPT REQUEST FROM CHANNEL 0. SUCCESSIVE READING OF THE ICRS REGISTER SHOULD READ BACK REQUESTS FROM SUCCESSIVE CHANNELS (1,2, 3,ETC) UNTIL ALL REQUESTS ARE READ BACK. IF THE CHANNEL NUMBERS ARE NOT SEQUENTIAL, AN ERROR HAS OCCURRED.

9.3.2 TEST31 (SA=011164) MULTIPLE CHANNEL EXERCISER

THIS TEST SIMULTANEOUSLY EXERCISES ALL CHANNELS. A SPECIFIC PROGRAM IS RUN BY ALL INDUSTRIAL 14'S AND CHECKS ARE PERFORMED IN A BACKGROUND JOB SO THAT "TRANSMISSION DONE" AND "RECEIVER ACTIVE" ARE ALWAYS THE SAME. INFORMATION IS SENT TO THE INDUSTRIAL 14'S USING A NON-INTERRUPT ENVIRONMENT. THE PROGRAMS "EXECUTED" BY THE PDP-14'S IS AS FOLLOWS.

DATA WORD	EXPECTED STATUS	EXPECTED DATA WORD	TRANSMIT MODE
000060 (EEM)	EXT FLG	-------	2
000024 (JMP)	EXT FLG	-------	2
000046 (ADDRESS)	EXT FLG	-------	2
000046 (TRR PC,OT)	EXT OUT FLG	000046	3
160000 (TXD 0)	EXT, OUT FLG	160000	3
170000 (TYD 0)	EXT, OUT FLG	170000	3
000124 (JMS)	EXT FLG	------	2
000046 (ADDRESS)	EXT FLG	------	2
000046 (TRR PC,OT)	EXT, OUT FLG	000046	3
000022 (TRM)	EXT FLG	------	2
050125 (WORD)	EXT, OUT FLG	050125	3
000022 (TRM)	EXT FLG	------	2
120252 (WORD)	EXT, OUT FLG	120252	3
100226 (TRM)	EXT FLG	------	2
170377 (WORD)	EXT, OUT FLG	170377	3

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                                                .TITLE PDP-11 DC-14E DIAGNOSTIC  MD-14-DCDCA-B
                                                .ENABLE ABS
                                                .ENABLE AMA
                                        ;DC14 DIAGNOSTIC FOR THE PDP-11 (SLI-11)

                                        ;TRAP HANDLERS
                    000000                      .=0
                    000040                      .REPT   40
                                                .+2
                                                HALT                    ;TRAPPED TO PREVIOUS ADDRESS
                                                .ENDR
                    000200                      .=200
000200  000137  000500                          JMP     BEGIN1          ;CLOSED LOOP UNIQUE CHANNEL TESTS
000204  000137  004604                          JMP     BEGIN2          ;OPEN LOOP UNIQUE CHANNEL TESTS
000210  000137  010704                          JMP     BEGIN3          ;CLOSE LOOP SIMULTANEOUS CHANNEL TESTS

                                        ;SOME GENERAL PURPOSE REGISTER DEFINITIONS
                    000000                      R0=%0
                    000001                      R1=%1
                    000002                      R2=%2
                    000003                      R3=%3
                    000004                      R4=%4
                    000005                      R5=%5
                    000006                      R6=%6
                    000007                      R7=%7

                    000000                      CHANEL=R0
                    000001                      GOOD=R1
                    000002                      IN=R2
                    000003                      TEMP=R3
                    000004                      CNTR=R4
                    000005                      AC=R5
                    000006                      SP=R6
                    000007                      PC=R7

                                        ;SWITCH REGISTER BITS
                    100000                      SCOPE=100000            ;SCOPE LOOP (SR15=1)
                    040000                      NOHLT=40000             ;DON'T HALT ON ERROR (SR14=1)
                    020000                      NOPRNT=20000            ;DON'T PRINT ON ERROR (SR13=1)
                    010000                      HOLDCH=10000            ;LOOP ON THIS CHANNEL (SR12=1)
                    004000                      REPEAT=4000             ;REPEAT ALL TESTS (PART1 OR 2) (SR11=1)
                    002000                      LCLK=2000               ;RUN LONG CLOCK TEST (SR10=1)
                    001000                      MMODE=1000              ;MAINTENANCE MODE (NO OUTPUT FROM MODULE) (SR9=1)
                                                                        ;HIGHEST AVAILABLE CHANNEL (SR 3 TO 0)

                                        ;INSTRUCTIONS
                    000240                      NOP=000240

                                        ;SOME GENERAL PURPOSE POINTERS
                                        ;
                                        ;PRINTER POINTERS
000214  177564                          OUTCSR: 177564                  ;CSR FOR TTY OUT
000216  177566                          OUTDBR: 177566                  ;DBR FOR TTY OUT
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                                        ;SWITCH REGISTER POINTER
000220  177570                          SWR:    177570

                                        ;PROCESSOR STATUS POINTER
000222  177776                          PS:     177776

                                        ;DC-14  POINTERS

000224  177360                          ICRS:   177360          ;INTERRUPT CHANNEL RECEIVER STATUS
000226  177362                          ICTS:   177362          ;NO USED
000230  177364                          SCRS:   177364          ;SELECTED CHANNEL RECEIVER STATUS
000232  177366                          SCTS:   177366          ;SELECTED CHANNEL TRANSMITTER STATUS
000234  177370                          ICD:    177370          ;INTERRUPT CHANNEL DATA
000236  177372                          SCD:    177372          ;SELECTED CHANNEL DATA
000240  177374                          LTS:    177374          ;LAPSED TIME SECONDS
000242  177376                          LTH:    177376          ;LAPSED TIME HOURS
000244  000170                          DC14TV: 170             ;DC14 TRAP VECTOR (ADDRESS WORD)
000246  000172                                  172             ;                 (STATUS WORD)

                                        ;SOME DC-14 LEFT HALVES
000250  177361                          ICRS1:  177361
000252  177363                          ICTS1:  177363
000254  177365                          SCRS1:  177365
000256  177367                          SCTS1:  177367
000260  177375                          LTS1:   177375
000262  177377                          LTH1:   177377

                                        ;TEMP STORAGE AND VARIABLE CONSTANTS
000264  177760                          DELAY:  -20             ;DELAY BETWEEN TRANSMISSION AND RECEPTION
000266  000000                          TENTHS: 0
        000267                                  SECOND=TENTHS+1
000270  000000                          MINUTE: 0
        000271                                  HOUR=MINUTE+1
000272  000000                          HICLK:  0
000274  000000                          LOCLK:  0
000276  000000                          STATIO: 0
000300  177000                          DELY1:  -1000
000302  000000                          HEAD1:  0
000304  000000                          HEAD2:  0

                                        ;BEGINNING OF PROGRAM WHICH TESTS CHANNELS CLOSED LOOP (UNIQUELY)
        000500                                  .=500
000500  010706                          BEGIN1: MOV     PC,SP           ;SET UP STACK POINTER
000502  005746                                  TST     -(SP)           ;TO JUST BEFORE BEGINNING OF PROGRAM
000504  004737  013274                          JSR     PC,NOCACH       ;IF AN 11/70 CENTRAL PROCESSOR,
                                                                        ;DISABLE CACHE MEMORY.
000510  017737  177504  000276                  MOV     @SWR,STATIO     ;SET UP STATION COUNT
000516  042737  177760  000276                  BIC     #177760,STATIO  ;TO 1'S COMP
000524  005137  000276                          COM     STATIO          ;OF SWR 3 TO 0
000530  005000                                  CLR     CHANEL          ;CLEAR CHANNEL NUMBER
000532  005077  177464                  TEST00: CLR     @PS             ;GO TO PROCESSOR LEVEL 0

                                        ;TEST THE LOADING AND READING OF THE SCRS CHANNEL SELECT BITS (11 TO 8)

000536  012737  013456  000302          TEST01: MOV     #MESS1,HEAD1    ;SET UP HEADERS
000544  012737  013342  000304                  MOV     #MESS69,HEAD2
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                                                MOV     #-20,CNTR
                                TEST1B:         MOV     CNTR,TEMP
                                                COM     TEMP
                                                BICB    #360,TEMP
                                                MOVB    TEMP,@SCRS1     ;LOAD COMPLEMENT OF DATA WORD
                                                MOV     CNTR,GOOD
                                                BIC     #177760,GOOD
                                TEST1A:         MOVB    GOOD,@SCRS1     ;LOAD REAL DATA WORD
                                                MOVB    @SCRS1,IN       ;READ DATA WORD BACK
                                                JSR     PC,LOOPD        ;LOOP?
                                                BR      TEST1A          ;YES
                                                BIC     #177760,IN      ;CLEAR SUPERFLUOUS BITS
                                                CMP     GOOD,IN         ;COMPARE GOOD AND UNKNOWN DATA
                                                BEQ     .+6             ;OK?
                                                JSR     PC,ERROR1       ;NO,ERROR
                                                JSR     PC,LOOPD        ;LOOP?
                                                BR      TEST1A          ;YES
                                                INC     CNTR            ;INCREMENT DATA WORD, DONE?
                                                BNE     TEST1B          ;NO,LOOP
                                                NOP

                                ;TEST THE LOADING AND READING OF THE SCTS CHANNEL SELECT BITS (11 TO 8)

000646  012737  013516  000302  TEST02:         MOV     #MESS2,HEAD1    ;SET UP HEADERS
000654  012737  013342  000304                  MOV     #MESS69,HEAD2
000662  012704  177760                          MOV     #-20,CNTR
000666  010403                  TEST2B:         MOV     CNTR,TEMP
000670  005103                                  COM     TEMP
000672  142703  000360                          BICB    #360,TEMP
000676  110377  177354                          MOVB    TEMP,@SCTS1     ;LOAD COMPLEMENT OF DATA WORD
000702  010401                                  MOV     CNTR,GOOD
000704  042701  177760                          BIC     #177760,GOOD
000710  110177  177342          TEST2A:         MOVB    GOOD,@SCTS1     ;LOAD REAL DATA WORD
000714  117702  177336                          MOVB    @SCTS1,IN       ;READ DATA WORD BACK
000720  004737  012576                          JSR     PC,LOOPD        ;LOOP?
000724  000771                                  BR      TEST2A          ;YES
000726  042702  177760                          BIC     #177760,IN      ;CLEAR SUPERFLUOUS BITS
000732  020102                                  CMP     GOOD,IN         ;COMPARE GOOD AND UNKNOWN DATA
000734  001402                                  BEQ     .+6             ;OK?
000736  004737  012312                          JSR     PC,ERROR1       ;NO,ERROR
000742  004737  012576                          JSR     PC,LOOPD        ;LOOP?
000746  000760                                  BR      TEST2A          ;YES
000750  005204                                  INC     CNTR            ;INCREMENT DATA WORD, DONE?
000752  001345                                  BNE     TEST2B          ;NO,LOOP
000754  000240                                  NOP

                                ;TEST THE LOADING AND READING OF THE INTERRUPT ENABLE BITS OF THE
                                ;CHANNEL SET IN "CHANEL" VIA SCRS

000756  012737  013556  000302  TEST03:         MOV     #MESS3,HEAD1    ;SET UP HEADERS
000764  012737  013342  000304                  MOV     #MESS69,HEAD2
000772  012704  177760                          MOV     #-20,CNTR
000776  010403                  TO3L1:          MOV     CNTR,TEMP       ;TRY TO STORE 0 IN ALL INTERRUPT ENABLE BITS
001000  042703  177760                          BIC     #177760,TEMP
001004  000303                                  SWAB    TEMP
001006  010377  177216                          MOV     TEMP,@SCRS
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                                                        INC     CNTR
                                                        BNE     TO3L1
                                        TEST3A: MOV     CHANEL,GOOD     ;MOVE CURRENT CHANNEL NUMBER INTO GOOD
001020 062701 000020                            ADD     #20,GOOD        ;COMBINE IN "ERROR INTERRUPT ENABLE" BIT
001024 010177 177200                            MOV     GOOD,@SCRS      ;LOAD INTO SCRS
001030 017702 177174                            MOV     @SCRS,IN        ;READ DATA BACK
001034 004737 012576                            JSR     PC,LOOPO        ;LOOP?
001040 000766                                   BR      TEST3A          ;YES
001042 042702 170317                            BIC     #170317,IN      ;MASK OFF SUPERFLUOUS BITS
001046 020102                                   CMP     GOOD,IN         ;COMPARE GOOD AND UNKNOWN DATA
001050 001402                                   BEQ     .+6             ;OK(ERROR INTERRUPT ENABLE SET)?
001052 004737 012312                            JSR     PC,ERROR1       ;NO,ERROR
001056 004737 012576                            JSR     PC,LOOPO        ;LOOP?
001062 000755                                   BR      TEST3A          ;YES
001064 012704 177760                            MOV     #-20,CNTR
001070 010403                           TO3L2:  MOV     CNTR,TEMP       ;TRY TO STORE 0 IN ALL INTERRUPT ENABLE BITS
001072 042703 177760                            BIC     #177760,TEMP
001076 000303                                   SWAB    TEMP
001100 010377 177124                            MOV     TEMP,@SCRS
001104 005204                                   INC     CNTR
001106 001370                                   BNE     TO3L2
001110 010001                           TEST3B: MOV     CHANEL,GOOD     ;MOVE CURRENT CHANNEL NUMBER
001112 062701 000040                            ADD     #40,GOOD        ;COMBINE IN "FLAG INTERRUPT ENABLE" BIT
001116 010177 177106                            MOV     GOOD,@SCRS      ;LOAD INTO SCRS
001122 017702 177102                            MOV     @SCRS,IN        ;READ DATA BACK
001126 004737 012576                            JSR     PC,LOOPO        ;LOOP?
001132 000766                                   BR      TEST3B          ;YES
001134 042702 170317                            BIC     #170317,IN      ;MASK OFF SUPERFLUOUS BITS
001140 020102                                   CMP     GOOD,IN         ;COMPARE GOOD AND UNKNOWN DATA
001142 001402                                   BEQ     .+6             ;OK(FLAG INTERRUPT ENABLE SET)?
001144 004737 012312                            JSR     PC,ERROR1       ;NO,ERROR
001150 004737 012576                            JSR     PC,LOOPO        ;LOOP?
001154 000755                                   BR      TEST3B          ;YES
001156 012704 177760                            MOV     #-20,CNTR
001162 010403                           TO3L3:  MOV     CNTR,TEMP       ;TRY TO STORE 1 IN ALL INTERRUPT ENABLE BITS
001164 042703 177760                            BIC     #177760,TEMP
001170 000303                                   SWAB    TEMP
001172 062703 000060                            ADD     #60,TEMP
001176 010377 177026                            MOV     TEMP,@SCRS
001202 005204                                   INC     CNTR
001204 001366                                   BNE     TO3L3

001206 010001                           TEST3C: MOV     CHANEL,GOOD     ;MOVE CURRENT CHANNEL NUMBER
001210 062701 000040                            ADD     #40,GOOD        ;COMBINE IN "FLAG INTERRUPT ENABLE" BIT
001214 010177 177010                            MOV     GOOD,@SCRS      ;LOAD INTO SCRS
001220 017702 177004                            MOV     @SCRS,IN        ;READ DATA BACK
001224 004737 012576                            JSR     PC,LOOPO        ;LOOP?
001230 000766                                   BR      TEST3C          ;YES
001232 042702 170317                            BIC     #170317,IN      ;MASK OFF SUPERFLUOUS BITS
001236 020102                                   CMP     GOOD,IN         ;COMPARE GOOD AND UNKNOWN DATA
001240 001402                                   BEQ     .+6             ;OK (ERROR INTERRUPT ENABLE CLEAR)?
001242 004737 012312                            JSR     PC,ERROR1       ;NO,ERROR
001246 004737 012576                            JSR     PC,LOOPO        ;LOOP?
001252 000755                                   BR      TEST3C          ;YES
001254 012704 177760                            MOV     #-20,CNTR
001260 010403                           TO3L4:  MOV     CNTR,TEMP       ;TRY TO STORE 1 IN ALL INTERRUPT ENABLE BITS
```

```
225  001262  042703  017776                  BIC     #17776,TEMP
226  001266  000303                          SWAB    TEMP
227  001270  062703  000060                  ADD     #60,TEMP
228  001274  010377  176730                  MOV     TEMP,@SCRS
229  001300  005204                          INC     CNTR
230  001302  001366                          BNE     TO3L4
231  001304  010001                TEST3D:   MOV     CHANEL,GOOD     ;MOVE CURRENT CHANNEL NUMBER
232  001306  062701  000020                  ADD     #20,GOOD        ;COMBINE IN "ERROR INTERRUPT ENABLE" BIT
233  001312  010177  176712                  MOV     GOOD,@SCRS      ;LOAD INTO SCRS
234  001316  017702  176706                  MOV     @SCRS,IN        ;READ DATA BACK
235  001322  004737  012576                  JSR     PC,LOOPO        ;LOOP?
236  001326  000766                          BR      TEST3D          ;YES
237  001330  042702  170317                  BIC     #170317,IN      ;MASK OFF SUPERFLUOUS BITS
238  001334  020102                          CMP     GOOD,IN         ;COMPARE GOOD AND UNKNOWN DATA
239  001336  001402                          BEQ     .+6
240  001340  004737  012312                  JSR     PC,ERROR1       ;NO,ERROR
241  001344  004737  012576                  JSR     PC,LOOPO        ;LOOP?
242  001350  000755                          BR      TEST3D          ;YES
243  001352  000240                          NOP
244
245                                ,TEST INTERRUPT ENABLE BITS AFTER A RESET INSTRUCTION
246
247  001354  012737  013623  000302  TEST04:  MOV     #MESS4,HEAD1    ;SET UP HEADERS
248  001362  012737  013342  000304          MOV     #MESS69,HEAD2
249  001370  010003                TEST4A:   MOV     CHANEL,TEMP     ;MOVE CHANNEL NUMBER
250  001372  062703  000000                  ADD     #0,TEMP         ;ADD IN FLAG AND ERROR INTERRUPT ENABLES
251  001376  010377  176626                  MOV     TEMP,@SCRS      ;LOAD SCRS
252  001402  000005                          RESET                   ;RESET
253  001404  004737  012576                  JSR     PC,LOOPO        ;LOOP?
254  001410  000767                          BR      TEST4A          ;YES
255  001412  017702  176612                  MOV     @SCRS,IN        ;READ SCRS
256  001416  042702  170317                  BIC     #170317,IN      ;CLEAR SUPERFLUOUS BITS
257  001422  010001                          MOV     CHANEL,GOOD     ;SET UP GOOD
258  001424  062701  000060                  ADD     #60,GOOD
259  001430  020102                          CMP     GOOD,IN         ;COMPARE GOOD AND UNKNOWN DATA
260  001432  001402                          BEQ     .+6             ;OK(INTERRUPTS DISABLED)?
261  001434  004737  012312                  JSR     PC,ERROR1       ;NO,ERROR
262  001440  004737  012576                  JSR     PC,LOOPO        ;LOOP?
263  001444  000751                          BR      TEST4A          ;YES
264  001446  000240                          NOP
265
266
267                                ;TEST THE ABILITY TO LOAD AND READ BITS 1 AND 0 OF SCTS
268
269  001450  012737  013670  000302  TEST05:  MOV     #MESS5,HEAD1    ;SET UP HEADERS
270  001456  012737  013342  000304          MOV     #MESS69,HEAD2
271  001464  012704  177774                  MOV     #-4,CNTR        ;SET UP LOOP COUNTER
272  001470  010001                          MOV     CHANEL,GOOD     ;MOVE CHANNEL NUMBER
273  001472  010177  176534          TEST5A:  MOV     GOOD,@SCTS      ;MOVE DATA TO SCTS
274  001476  017702  176530                  MOV     @SCTS,IN        ;READ DATA BACK
275  001502  004737  012576                  JSR     PC,LOOPO        ;LOOP?
276  001506  000771                          BR      TEST5A          ;YES
277  001510  042702  170374                  BIC     #170374,IN      ;CLEAR SUPERFLUOUS BITS
278  001514  020102                          CMP     GOOD,IN         ;COMPARE GOOD AND UNKNOWN DATA
279  001516  001402                          BEQ     .+6             ;OK?
280  001520  004737  012312                  JSR     PC,ERROR1       ;NO,ERROR
```

```
                                                JSR     PC,LOOPD        ;LOOP?
                                                BR      TEST5A          ;YES
                                                INC     GOOD            ;INCREMENT TRANSMITTED WORD
                                                INC     CNTR            ;DONE?
                                                BNE     TEST5A          ;NO,LOOP
                                                NOP

                                        ;CHECK THE TRANSMISSION AND RECEPTION OF DATA WORDS USING A NON-INTERRUPT
                                        ;TYPE OF ENVIRONMENT

                                TEST6:  MOV     #MESS6,HEAD1    ;SET UP HEADER
                                        CLR     CNTR            ;ZERO DATA
                                        MOV     CHANEL,TEMP     ;SET UP CHANNEL SELECTION
                                        ADD     #60,TEMP
                                        MOV     TEMP,@SCRS
                                        MOV     CHANEL,TEMP     ;SET UP CHANNEL SELECTION
                                        ADD     #2,TEMP
                                        BIT     #MMODE,@SWR
                                        BEQ     .+6             ;MAINTENANCE MODE?
                                        ADD     #4,TEMP         ;YES, ADD IN MAINTENANCE MODE BIT
                                        MOV     TEMP,@SCTS      ;LOAD SCTS
                                TEST6B: MOV     CNTR,@SCD       ;TRANSMIT TO INDUSTRIAL-14
                                        MOV     #MESS6F,HEAD2
                                        BIT     #200,@SCTS      ;IS TRANSMITTER DONE SET?
                                        BEQ     .+6             ;NO,OK
                                        JSR     PC,ERROR2       ;YES,ERROR
                                        MOV     #MESS6G,HEAD2
                                        MOV     DELAY,TEMP
                                        BIT     #1,@SCRS        ;RECEIVER ACTIVE?
                                        BNE     .+12            ;YES, OK
                                        INC     TEMP            ;NO, DONE TESTING
                                        BNE     .-12            ;NO, LOOP
                                        JSR     PC,ERROR2       ;YES,ERROR
                                        MOV     #MESS6H,HEAD2
                                        BIT     #200,@SCTS      ;WAIT FOR TRANSMISSION DONE
                                        BEQ     .-6
                                        MOV     DELAY,TEMP      ;DELAY A WHILE
                                        INC     TEMP
                                        BNE     .-2
                                        MOV     @SCRS,IN
                                        MOV     CHANEL,GOOD     ;MOVE CHANNEL NUMBER
                                        ADD     #260,GOOD       ;COMBINE IN EXTERNAL FLAG, INTERRUPT DISABLES
                                        CMP     GOOD,IN         ;COMPARE GOOD AND UNKNOWN STATUS
                                        BEQ     .+6             ;OK(EXTERNAL FLAG SET)?
                                        JSR     PC,ERROR1       ;NO,ERROR
                                        MOV     #MESS6J,HEAD2
                                        MOV     @SCD,IN         ;GET CHANNEL DATA
                                        MOV     CNTR,GOOD
                                        CMP     GOOD,IN         ;COMPARE GOOD AND UNKNOWN DATA
                                        BEQ     .+6             ;OK?
                                        JSR     PC,ERROR1       ;NO,ERROR
                                        JSR     PC,LOOPD        ;LOOP?
                                        BR      TEST6B          ;YES
                                        INCB    CNTR            ;INCREMENT DATA
                                        BNE     TEST6B          ;NOT ZERO, LOOP
                                        ADD     #10000,CNTR     ;INCREMENT DATA MORE
```

```
                                                BNE     TEST6B          ;NOT DONE, LOOP
                                                MOV     CHANEL,TEMP     ;SET UP CHANNEL SELECTION
                                                ADD     #3,TEMP
                                                BIT     #MMODE,@SWR
                                                BEQ     .+6
                                                ADD     #4,TEMP
                                                MOV     TEMP,@SCTS

                                TEST6C: MOV     CNTR,@SCD       ;TRANSMIT TO INDUSTRIAL-14
                                                MOV     #MESS6K,HEAD2
                                                BIT     #200,@SCTS      ;IS TRANSMITTER DONE SET?
                                                BEQ     .+6             ;NO,OK
                                                JSR     PC,ERROR2       ;YES, ERROR
                                                MOV     #MESS6L,HEAD2
                                                MOV     DELAY,TEMP
                                                BIT     #1,@SCRS        ;RECEIVER ACTIVE?
                                                BNE     .+12            ;YES, OK
                                                INC     TEMP            ;NO, DONE TESTING?
                                                BNE     .-12            ;NO, LOOP
                                                JSR     PC,ERROR2       ;YES,ERROR
                                                MOV     #MESS6M,HEAD2
                                                BIT     #200,@SCTS      ;WAIT FOR TRANSMISSION DONE
                                                BEQ     .-6
                                                MOV     DELAY,TEMP      ;DELAY A WHILE
                                                INC     TEMP
                                                BNE     .-2
                                                MOV     @SCRS,IN        ;GET CHANNEL STATUS
                                                MOV     CHANEL,GOOD     ;MOVE CHANNEL NUMBER
                                                ADD     #360,GOOD       ;COMBINE IN EXTERNAL AND OUTPUT FLAGS, INTERRUPT DISABLE
                                                CMP     GOOD,IN         ;COMPARE GOOD AND UNKNOWN STATUS
                                                BEQ     .+6             ;OK(EXTERNAL AND OUTPUT FLAGS SET)?
                                                JSR     PC,ERROR1       ;NO,ERROR
                                                MOV     #MESS6P,HEAD2
                                                MOV     @SCD,IN         ;GET CHANNEL DATA
                                                MOV     CNTR,GOOD
                                                CMP     GOOD,IN         ;COMPARE GOOD AND UNKNOWN DATA
                                                BEQ     .+6             ;OK?
                                                JSR     PC,ERROR1       ;NO,ERROR
                                                JSR     PC,LOOP0        ;LOOP
                                                BR      TEST6C          ;YES
                                TST6L1: INCB    CNTR            ;INCREMENT DATA
                                                BNE     TEST6C          ;NOT ZERO, LOOP
                                                ADD     #10000,CNTR     ;INCREMENT DATA MORE
                                                BNE     TEST6C          ;NOT DONE, LOOP
                                                NOP

                                ;CHECK THE TRANSMISSION AND RECEPTION OF DATA WORDS USING AN INTERRUPT
                                ;TYPE OF ENVIRONMENT

                                TEST07: MOV     #-20,CNTR       ;DISABLE ALL INTERRUPTS
                                T07L1:  MOV     CNTR,TEMP
                                                BIC     #177760,TEMP
                                                SWAB    TEMP
                                                ADD     #60,TEMP
                                                MOV     TEMP,@SCRS
                                                INC     CNTR
```

```
393  002260  001366                          BNE     T07L1
394  002262  000005                          RESET
395  002264  012737  014211  000302          MOV     #MESS7,HEAD1    ;SET UP HEADER
396  002272  010003                          MOV     CHANEL,TEMP     ;SET UP CHANNEL FOR INTERRUPT
397  002274  062703  000000                  ADD     #0,TEMP
398
399  002300  010377  175724                  MOV     TEMP,@SCRS
400  002304  010003                          MOV     CHANEL,TEMP     ;SELECT CURRENT CHANNEL AND TRANSMISSION MODE 2
401  002306  062703  000002                  ADD     #2,TEMP
402  002312  032777  001000  175700          BIT     #MMODE,@SWR
403  002320  001402                          BEQ     .+6
404  002322  062703  000004                  ADD     #4,TEMP
405
406  002326  010377  175700                  MOV     TEMP,@SCTS
407  002332  012777  002502  175704          MOV     #TST7R2,@DC14TV ;SET UP TRAP VECTOR
408  002340  012777  000340  175700          MOV     #340,@DC14TV+2  ;SET UP TRAP PROCESSOR STATUS
409  002346  012777  000340  175646  TEST7B: MOV     #340,@PS        ;RAISE TO LEVEL 7
410  002354  010477  175656                  MOV     CNTR,@SCD       ;TRANSMIT TO INDUSTRIAL-14
411  002360  012737  014020  000304          MOV     #MESS7F,HEAD2
412  002366  032777  000200  175636          BIT     #200,@SCTS      ;IS TRANSMIT DONE SET?
413  002374  001402                          BEQ     .+6             ;NO, OK
414  002376  004737  012434                  JSR     PC,ERROR2       ;YES, ERROR
415  002402  012737  014072  000304          MOV     #MESS7G,HEAD2
416  002410  013703  000264                  MOV     DELAY,TEMP
417  002414  032777  000001  175606          BIT     #1,@SCRS        ;RECEIVER ACTIVE?
418  002422  001004                          BNE     .+12            ;YES, OK
419  002424  005203                          INC     TEMP            ;NO, DONE TESTING?
420  002426  001372                          BNE     .-12            ;NO, LOOP
421  002430  004737  012434                  JSR     PC,ERROR2       ;YES, ERROR
422  002434  012737  014272  000304          MOV     #MESS7H,HEAD2
423  002442  032777  000200  175562          BIT     #200,@SCTS      ;WAIT FOR TRANSMISSION DONE
424  002450  001774                          BEQ     .-6
425  002452  005077  175544                  CLR     @PS             ;LOWER TO LEVEL 0
426  002456  013703  000264                  MOV     DELAY,TEMP      ;WAIT FOR INTERRUPT
427  002462  005203                          INC     TEMP
428  002464  001376                          BNE     .-2
429  002466  012777  000340  175526          MOV     #340,@PS        ;SORRY, TOO LATE, GO BACK TO LEVEL 7
430  002474  004737  012434                  JSR     PC,ERROR2
431  002500  024646                          CMP     -(SP),-(SP)
432
433  002502  012737  014141  000304  TST7R2: MOV     #MESS7I,HEAD2   ;TRAP RETURNS HERE
434  002510  022626                          CMP     (SP)+,(SP)+     ;ADD 4 TO SP
435  002512  017702  175506                  MOV     @ICRS,IN        ;GET INTERRUPTING CHANNEL STATUS
436  002516  010001                          MOV     CHANEL,GOOD     ;COMPUTE EXPECTED STATUS
437  002520  062701  000200                  ADD     #200,GOOD       ;EXTERNAL FLAG
438  002524  020102                          CMP     GOOD,IN         ;COMPARE GOOD AND UNKNOWN STATUS
439  002526  001402                          BEQ     .+6             ;OK?
440  002530  004737  012312                  JSR     PC,ERROR1       ;NO, ERROR
441  002534  012737  014166  000304          MOV     #MESS7J,HEAD2
442  002542  017702  175466                  MOV     @ICD,IN         ;GET INTERRUPTING CHANNEL DATA
443  002546  010401                          MOV     CNTR,GOOD
444  002550  020102                          CMP     GOOD,IN         ;COMPARE GOOD AND UNKNOWN DATA
445  002552  001402                          BEQ     .+6             ;OK?
446  002554  004737  012312                  JSR     PC,ERROR1       ;NO, ERROR
447  002560  004737  012576                  JSR     PC,LOOPO        ;LOOP?
448  002564  000670                          BR      TEST7B          ;YES
```

```
                                                    INCB    CNTR            ;INCREMENT DATA
                                                    BNE     TEST7B          ;NOT ZERO, LOOP
                                                    ADD     #10000,CNTR     ;INCREMENT DATA SOMEMORE
                                                    BNE     TEST7B          ;NOT ZERO, LOOP
                                                    MOV     CHANEL,TEMP     ;SELECT CURRENT CHANNEL AND TRANSMISSIONS MODE 3
                                                    ADD     #3,TEMP
                                                    BIT     #MMODE,@SWR
                                                    BEQ     .+6
                                                    ADD     #4,TEMP
                                                    MOV     TEMP,@SCTS
                                                    MOV     #TST7R3,@DC14TV ;SET UP TRAP VECTOR
                                                    MOV     #340,@DC14TV+2  ;SET UP TRAP PROCESSOR STATUS
                                    TEST7C:         MOV     #340,@PS        ;RAISE TO LEVEL 7
                                                    CMP     #200,CNTR

                                                    BEQ     TST7L1
                                                    MOV     CNTR,@SCD       ;TRANSMIT TO INDUSTRIAL-14
                                                    MOV     #MESS7K,HEAD2
                                                    BIT     #200,@SCTS      ;IS TRANSMIT DONE SET?
                                                    BEQ     .+6             ;NO, OK
                                                    JSR     PC,ERROR2       ;YES, ERROR
                                                    MOV     #MESS7L,HEAD2
                                                    MOV     DELAY,TEMP
                                                    BIT     #1,@SCRS        ;RECEIVER ACTIVE?
                                                    BNE     .+12            ;YES, OK
                                                    INC     TEMP            ;NO, DONE TESTING?
                                                    BNE     .-12            ;NO, LOOP
                                                    JSR     PC,ERROR2       ;YES, ERROR
                                                    MOV     #MESS7M,HEAD2
                                                    BIT     #200,@SCTS      ;WAIT FOR TRANSMISSION DONE
                                                    BEQ     .-6
                                                    CLR     @PS             ;LOWER TO LEVEL 0
                                                    MOV     DELAY,TEMP      ;WAIT FOR INTERRUPT
                                                    INC     TEMP
                                                    BNE     .-2
                                                    MOV     #340,@PS        ;SORRY, TOO LATE, GO BACK TO LEVEL 7
                                                    JSR     PC,ERROR2
                                                    CMP     -(SP),-(SP)

                                    TST7R3:         MOV     #MESS7N,HEAD2   ;TRAP RETURNS HERE
                                                    CMP     (SP)+,(SP)+     ;ADD 4 TO SP
                                                    MOV     @ICRS,IN        ;GET INTERRUPTING CHANNEL STATUS
                                                    MOV     CHANEL,GOOD     ;COMPUTE EXPECTED STATUS
                                                    ADD     #300,GOOD       ;EXTERNAL AND OUTPUT FLAGS
                                                    CMP     GOOD,IN         ;COMPARE GOOD AND UNKNOWN STATUS
                                                    BEQ     .+6             ;OK?
                                                    JSR     PC,ERROR1       ;NO, ERROR
                                                    MOV     #MESS7P,HEAD2
                                                    MOV     @ICD,IN         ;GET INTERRUPTING CHANNEL DATA
                                                    MOV     CNTR,GOOD
                                                    CMP     GOOD,IN         ;COMPARE GOOD AND UNKNOWN DATA
                                                    BEQ     .+6             ;OK?
                                                    JSR     PC,ERROR1       ;NO, ERROR
                                                    JSR     PC,LOOPD        ;LOOP?
                                                    BR      TEST7C          ;YES
                                    TST7L1:         INCB    CNTR            ;INCREMENT DATA
```

```
  505  003072  001263                          BNE     TEST7C          ;NOT ZERO, LOOP
  506  003074  062704  010000                  ADD     #10000,CNTR     ;INCREMENT DATA SOMEMORE
  507  003100  001260                          BNE     TEST7C          ;NOT ZERO, LOOP
  508  003102  013777  000244  175134          MOV     DC14TV,@DC14TV  ;SET UP FOR NO MORE INTERRUPTS
  509  003110  062777  000002  175126          ADD     #2,@DC14TV
  510  003116  005077  175124                  CLR     @DC14TV+2
  511  003122  000240                          NOP
  512
```

```
513
514                                     ;CHECK THE RUN FLIP/FLOP AFTER EXECUTING 0200 IN MODE (3) OF THE INDUSTRIAL-14
515                                     ;AND ITS ERROR INTERRUPT IN THE PDP-11
516
517  003124  012737  014320  000302  TEST08: MOV     #MESS8,HEAD1    ;SET UP HEADER
518  003132  010003                          MOV     CHANEL,TEMP     ;SET UP SCRS WITH ERROR INTERRUPTS ENABLED
519  003134  062703  000040                  ADD     #40,TEMP
520  003140  010377  175064                  MOV     TEMP,@SCRS
521  003144  010003                          MOV     CHANEL,TEMP
522  003146  062703  000001                  ADD     #1,TEMP
523  003152  032777  001000  175040          BIT     #MMODE,@SWR
524  003160  001402                          BEQ     .+6
525  003162  062703  000004                  ADD     #4,TEMP
526  003166  010377  175040                  MOV     TEMP,@SCTS      ;SET UP SCTS FOR TRANSMISSION MODE 3
527  003172  012737  014351  000304          MOV     #MESS8A,HEAD2
528  003200  012777  003274  175036          MOV     #TST8R1,@DC14TV ;SET UP TRAP VECTOR
529  003206  012777  000340  175032          MOV     #340,@DC14TV+2  ;SET UP TRAP PROCESSOR STATUS
530  003214  012777  000340  175000          MOV     #340,@PS        ;RAISE TO LEVEL 7
531  003222  005077  175010                  CLR     @SCD
532  003226  012777  000200  175002          MOV     #200,@SCD       ;TRY TO CAUSE INDUSTRIAL-14 TO EXECUTE A NOP
533  003234  032777  000200  174770          BIT     #200,@SCTS      ;WAIT FOR TRANSMIT DONE
534  003242  001774                          BEQ     .-6
535  003244  005077  174752                  CLR     @PS             ;LOWER TO LEVEL 0
536  003250  013703  000264                  MOV     DELAY,TEMP      ;WAIT FOR INTERRUPT
537  003254  005203                          INC     TEMP
538  003256  001376                          BNE     .-2
539  003260  012777  000340  174734          MOV     #340,@PS        ;SORRY, TOO LATE, GO BACK TO LEVEL 7
540  003266  004737  012434                  JSR     PC,ERROR2
541  003272  024646                          CMP     -(SP),-(SP)
542  003274  012737  014403  000304  TST8R1: MOV     #MESS8B,HEAD2   ;TRAP RETURNS HERE
543  003302  022626                          CMP     (SP)+,(SP)+     ;ADD 4 TO SP
544  003304  013777  000244  174732          MOV     DC14TV,@DC14TV  ;SET UP FOR NO MORE INTERRUPTS
545  003312  062777  000002  174724          ADD     #2,@DC14TV
546  003320  005077  174722                  CLR     @DC14TV+2
547  003324  017702  174674                  MOV     @ICRS,IN        ;READ CHANNEL STATUS
548  003330  010001                          MOV     CHANEL,GOOD     ;COMPUTE EXPECTED STATUS
549  003332  062701  140040                  ADD     #140040,GOOD    ;ERROR, RUN=0 BITS, FLAG INTERRUPT DISABLED
550  003336  020102                          CMP     GOOD,IN         ;COMPARE GOOD AND UNKNOWN STATUS
551  003340  001402                          BEQ     .+6             ;OK?
552  003342  004737  012312                  JSR     PC,ERROR1       ;NO, ERROR
553  003346  012737  014457  000304          MOV     #MESS8C,HEAD2
554  003354  005004                          CLR     CNTR            ;WAIT A WHILE
555  003356  005204                          INC     CNTR
556  003360  001376                          BNE     .-2
557  003362  005204                          INC     CNTR
558  003364  001376                          BNE     .-2
559  003366  017702  174636                  MOV     @SCRS,IN        ;READ SCRS
560  003372  010001                          MOV     CHANEL,GOOD     ;COMPUTE EXPECTED STATUS
561  003374  062701  000040                  ADD     #40,GOOD
562  003400  020102                          CMP     GOOD,IN         ;COMPARE GOOD AND UNKNOWN STATUS
563  003402  001402                          BEQ     .+6             ;OK?
564  003404  004737  012312                  JSR     PC,ERROR1       ;NO, ERROR
565  003410  004737  012576                  JSR     PC,LOOP0        ;LOOP?
566  003414  000643                          BR      TEST08          ;YES
567  003416  000240                          NOP
568
```

```
                                        ;TAPE 2
                                        ;CHECK THE "WORD LOST" FLIP/FLOP BY ISSUING 2 TRANSFER WORDS
                                        ;WITHOUT ACKNOWLEDGING THE FIRST
003420  012737  014535  000302  TEST09: MOV     #MESS9,HEAD1    ;SET UP HEADER
003426  010003                        MOV     CHANEL,TEMP     ;SETUP SCRS WITH NO INTERRUPTS ENABLED
003430  062703  000060                ADD     #60,TEMP
003434  010377  174570                MOV     TEMP,@SCRS
003440  010003                        MOV     CHANEL,TEMP
003442  062703  000003                ADD     #3,TEMP
003446  032777  001000  174544        BIT     #MMODE,@SWR
003454  001402                        BEQ     .+6
003456  062703  000004                ADD     #4,TEMP
003462  010377  174544                MOV     TEMP,@SCTS      ;SET UP SCTS FOR TRANSMISSION MODE 3
003466  005077  174544                CLR     @SCD            ;TRANSMIT A 0 TO THE INDUSTRIAL-14
003472  032777  000200  174532        BIT     #200,@SCTS      ;WAIT FOR TRANSMISSION DONE
003500  001774                        BEQ     .-6
003502  012777  003604  174534        MOV     #TST9R1,@DC14TV ;SET UP TRAP VECTOR
003510  012777  000340  174530        MOV     #340,@DC14TV+2  ;SET UP TRAP PROCESSOR STATUS
003516  012777  000340  174476        MOV     #340,@PS        ;RAISE TO LEVEL 7
003524  042777  000020  174476        BIC     #20,@SCRS       ;ENABLE ERROR INTERRUPT
003532  005077  174500                CLR     @SCD            ;TRANSMIT A SECOND WORD
003536  012737  014650  000304        MOV     #MESS9B,HEAD2
003544  032777  000200  174460        BIT     #200,@SCTS      ;WAIT FOR SECOND TRANSMIT DONE
003552  001774                        BEQ     .-6
003554  005077  174442                CLR     @PS             ;LOWER TO LEVEL 0
003560  013703  000264                MOV     DELAY,TEMP      ;DELAY A WHILE
003564  005203                        INC     TEMP
003566  001376                        BNE     .-2
003570  012777  000340  174424        MOV     #340,@PS        ;SORRY,TOO LATE,GO BACK TO LEVEL 7
003576  004737  012434                JSR     PC,ERROR2
003602  024646                        CMP     -(SP),-(SP)
003604  012737  014571  000304  TST9R1: MOV    #MESS9A,HEAD2   ;TRAP RETURNS HERE
003612  022626                        CMP     (SP)+,(SP)+     ;ADD 4 TO SP
003614  013777  000244  174422        MOV     DC14TV,@DC14TV  ;SET UP FOR NO MORE INTERRUPTS
003622  062777  000002  174414        ADD     #2,@DC14TV
003630  005077  174412                CLR     @DC14TV+2
003634  017702  174364                MOV     @ICRS,IN        ;READ SCRS
003640  010001                        MOV     CHANEL,GOOD     ;COMPUTE EXPECTED RESULT
003642  062701  110340                ADD     #110340,GOOD    ;ERROR, WORD LOST, OUTPUT FLAG, FLAG INTERRUPTS DISABLED
003646  020102                        CMP     GOOD,IN         ;COMPARE GOOD AND UNKNOWN STATUS WORDS
003650  001402                        BEQ     .+6             ;OK?
003652  004737  012312                JSR     PC,ERROR1       ;NO,ERROR
003656  004737  012576                JSR     PC,LOOP0        ;LOOP?
003662  000656                        BR      TEST09          ;YES
003664  000240                        NOP
003666  004737  012472                JSR     PC,BELL         ;RING BELL AFTER CHANNEL DONE
003672  004737  012614                JSR     PC,LOOP1        ;LOOP THIS CHANNEL?
003676  000137  000532                JMP     TEST00          ;YES
003702  062700  000400                ADD     #400,CHANEL     ;NO, BUMP CHANNEL NUMBER
003706  005237  000276                INC     STAT10          ;DONE ALL CHANNELS?
003712  001402                        BEQ     .+6             ;YES
003714  000137  000532                JMP     TEST00          ;NO, LOOP
003720  004737  012472                JSR     PC,BELL         ;RING BELL AFTER ALL CHANNELS
003724  004737  012632                JSR     PC,LOOP2        ;REPEAT ALL TESTS?
003730  000137  000500                JMP     BEGIN1          ;YES, GO BACK, DON'T DO CLOCK
```

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                                        CLR     CHANEL          ;ZERO CHANNEL NUMBER, DO CLOCK

                                ;CHECK THE REAL TIME CLOCK TO FUNCTION PROPERLY

003736  012737  014704  000302 TEST10: MOV     #MESS10,HEAD1   ;SET UP HEADERS
003744  012737  014736  000304         MOV     #MES10A,HEAD2
003752  005077  174262                CLR     @LTS            ;CLEAR CLOCK INITIALLY
003756  005777  174256         TST10A: TST     @LTS            ;WAIT FOR A NON-ZERO SECONDS READING
003762  001005                        BNE     TST10B
003764  013703  000264                MOV     DELAY,TEMP      ;DELAY A WHILE
003770  005203                        INC     TEMP
003772  001376                        BNE     .-2
003774  000770                        BR      TST10A          ;TRY AGAIN
003776  005077  174230         TST10B: CLR     @LTS            ;CLEAR CLOCK AGAIN
004002  005777  174232                TST     @LTS            ;ZERO THIS TIME?
004006  001407                        BEQ     TST10C          ;YES, OK
004010  005077  174224                CLR     @LTS            ;NO, CLEAR CLOCK
004014  005777  174220                TST     @LTS            ;TRY AGAIN
004020  001402                        BEQ     .+6             ;OK?
004022  004737  012434                JSR     PC,ERROR2       ;NO, ERROR
004026  005037  000266         TST10C: CLR     TENTHS
004032  005037  000270                CLR     MINUTE
004036  017737  174176  000274 T10L1:  MOV     @LTS,LOCLK      ;READ CLOCK COUNTERS
004044  017737  174172  000272         MOV     @LTH,HICLK
004052  113702  000274                MOVB    LOCLK,IN        ;MOVE TENTHS TO IN
004056  123702  000266                CMPB    TENTHS,IN       ;DID CLOCK COUNT TENTHS OF SECONDS?
004062  001002                        BNE     .+6
004064  000137  004476                JMP     T10L2           ;NO,CHECK FOR NO RIPPLE OF CARRIES
004070  105237  000266                INCB    TENTHS          ;YES,BUMP TENTHS
004074  122737  000012  000266        CMPB    #12,TENTHS      ;DID TENTHS COUNT OVERFLOW?
004102  001002                        BNE     .+6             ;NO
004104  105037  000266                CLRB    TENTHS          ;YES, CLEAR TENTHS
004110  012737  015004  000304        MOV     #MES10B,HEAD2
004116  113701  000266                MOVB    TENTHS,GOOD
004122  120102                        CMPB    GOOD,IN         ;COMPARE EXPECTED AND UNKNOWN DATA
004124  001402                        BEQ     .+6             ;OK?
004126  004737  012312                JSR     PC,ERROR1       ;NO, ERROR
004132  105737  000266                TSTB    TENTHS          ;DID TENTHS OVERFLOW?
004136  001157                        BNE     T10L2           ;NO, CHECK FOR NO RIPPLE OF CARRIES
004140  113702  000275                MOVB    LOCLK+1,IN      ;YES, MOVE SECONDS TO IN
004144  012737  015044  000304        MOV     #MES10C,HEAD2
004152  123702  000267                CMPB    SECOND,IN       ;DID SECONDS CLOCK CHANGE?
004156  001002                        BNE     .+6             ;YES,OK
004160  004737  012434                JSR     PC,ERROR2       ;NO,ERROR
004164  105237  000267                INCB    SECOND          ;YES,BUMP SECONDS
004170  122737  000074  000267        CMPB    #74,SECOND      ;DID SECONDS COUNT OVERFLOW?
004176  001002                        BNE     .+6             ;NO
004200  105037  000267                CLRB    SECOND          ;YES, CLEAR SECONDS
004204  012737  015074  000304        MOV     #MES10D,HEAD2
004212  113701  000267                MOVB    SECOND,GOOD

004216  120102                        CMPB    GOOD,IN         ;COMPARE EXPECTED AND UNKNOWN DATA
004220  001402                        BEQ     .+6             ;OK?
004222  004737  012312                JSR     PC,ERROR1       ;NO,ERROR
004226  105737  000267                TSTB    SECOND          ;DID SECONDS OVERFLOW?
004232  001134                        BNE     T10L3           ;NO, CHECK FOR NO RIPPLE OF CARRIES
```

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681  004234  113702  000272           MOVB    HICLK,IN        ;MOVE MINUTES TO IN
682  004240  012737  015122  000304   MOV     #MES10E,HEAD2
683  004246  123702  000270           CMPB    MINUTE,IN       ;DID MINUTES CLOCK CHANGE?
684  004252  001002                   BNE     .+6             ;YES OK
685  004254  004737  012434           JSR     PC,ERROR2       ;NO, ERROR
686  004260  105237  000270           INCB    MINUTE          ;YES, BUMP MINUTES
687  004264  122737  000074  000270   CMPB    #74,MINUTE      ;DID MINUTES COUNT OVERFLOW?
688  004272  001002                   BNE     .+6             ;NO
689  004274  105037  000270           CLRB    MINUTE          ;YES, CLEAR MINUTES
690  004300  012737  015152  000304   MOV     #MES10F,HEAD2
691  004306  113701  000270           MOVB    MINUTE,GOOD
692  004312  120102                   CMPB    GOOD,IN         ;COMPARE EXPECTED AND UNKNOWN DATA
693  004314  001402                   BEQ     .+6             ;OK?
694  004316  004737  012312           JSR     PC,ERROR1       ;NO, ERROR
695  004322  032777  002000  173670   BIT     #LCLK,@SWR      ;LONG OR SHORT TEST?
696  004330  001446                   BEQ     T10L1A          ;SHORT
697  004332  105737  000270           TSTB    MINUTE          ;DID MINUTES OVERFLOW?
698  004336  001105                   BNE     T10L4           ;NO,CHECK FOR NO RIPPLE OF CARRIES
699  004340  113702  000273           MOVB    HICLK+1,IN      ;MOVE HOURS TO IN
700  004344  012737  015200  000304   MOV     #MES10G,HEAD2
701  004352  123702  000271           CMPB    HOUR,IN         ;DID HOURS CLOCK CHANGE
702  004356  001002                   BNE     .+6             ;YES,OK
703  004360  004737  012434           JSR     PC,ERROR2       ;NO,ERROR
704  004364  105237  000271           INCB    HOUR            ;YES, BUMP HOURS
705  004370  122737  000030  000271   CMPB    #30,HOUR        ;DID HOURS COUNT OVERFLOW?
706  004376  001002                   BNE     .+6             ;NO
707  004400  105037  000271           CLRB    HOUR            ;YES, CLEAR HOUR
708  004404  012737  015226  000304   MOV     #MES10H,HEAD2
709  004412  113701  000271           MOVB    HOUR,GOOD
710  004416  120102                   CMPB    GOOD,IN         ;COMPARE EXPECTED AND UNKNOWN DATA
711  004420  001402                   BEQ     .+6             ;OK?
712  004422  004737  012312           JSR     PC,ERROR1       ;NO, ERROR
713  004426  105737  000271           TSTB    HOUR            ;DID HOURS CLOCK OVERFLOW?
714  004432  001201                   BNE     T10L1           ;NO, GO BACK FOR NEXT CLOCK TICK
715  004434  012777  000104  173554   MOV     #104,@OUTDBR    ;YES, PRINT "D" (FOR DAY)
716  004442  000137  004036           JMP     T10L1           ;GO BACK FOR NEXT CLOCK TICK
717
718  004446  122737  000002  000270 T10L1A: CMPB    #2,MINUTE       ;2 MINUTES COMPLETE?
719  004454  003402                   BLE     .+6
720  004456  000137  004036           JMP     T10L1           ;NO, GO BACK FOR NEXT CLOCK TICK
721  004462  012777  000115  173526   MOV     #115,@OUTDBR    ;YES, PRINT "M" (FOR MINUTE)
722  004470  000000                   HALT                    ;STOP
723  004472  000137  003736           JMP     TEST10          ;LOOP
724  004476  113702  000275 T10L2:    MOVB    LOCLK+1,IN      ;EXTRACT SECONDS
725  004502  113701  000267           MOVB    SECOND,GOOD
726  004506  012737  015252  000304   MOV     #MES10I,HEAD2
727  004514  120102                   CMPB    GOOD,IN         ;DID SECONDS CLOCK CHANGE?
728  004516  001402                   BEQ     .+6             ;NO, OK
729  004520  004737  012434           JSR     PC,ERROR2       ;YES, ERROR
730  004524  113702  000272 T10L3:    MOVB    HICLK,IN        ;EXTRACT MINUTES
731  004530  113701  000270           MOVB    MINUTE,GOOD
732  004534  012737  015300  000304   MOV     #MES10J,HEAD2
733  004542  120102                   CMPB    GOOD,IN         ;DID MINUTES CLOCK CHANGE?
734  004544  001402                   BEQ     .+6             ;NO, OK
735  004546  004737  012434           JSR     PC,ERROR2       ;YES, ERROR
736  004552  113702  000273 T10L4:    MOVB    HICLK+1,IN      ;EXTRACT HOURS
```

```
                                                MOVB    HOUR,GOOD
                                                MOV     #MESIOK,HEAD2
                                                CMPB    GOOD,IN         ;DID HOURS CLOCK CHANGE?
                                                BEQ     .+6             ;NO, OK
                                                JSR     PC,ERROR2       ;YES, ERROR
                                                JMP     TIOL1           ;GO GET NEXT CLOCK TICK

                                        ;TESTS WITH INDUSTRIAL-14 ATTACHED

                                        BEGIN2: MOV     #BEGIN1,SP      ;SET UP STACK POINTER
                                                JSR     PC,NOCACH       ;IF AN 11/70 CENTRAL PROCESSOR,
                                                                        ;DISABLE CACHE MEMORY.
                                                MOV     @SWR,STATIO     ;SET UP STATION COUNT
                                                BIC     #177760,STATIO  ;TO 1'S COMP
                                                COM     STATIO          ;OF SWR 3 TO 0
                                                CLR     CHANEL          ;CLEAR CHANNEL NUMBER
                                        ;
                                        ;TEST OF INSTRUCTION DECODING
                                        ;ALL INSTRUCTIONS ARE TRANSMITTED AND CHECKED FOR
                                        ;PROPER DECODING AS ONE, TWO OR THREE WORD INST.

                                        TEST20: MOV     CHANEL,TEMP     ;SET OP SCRS
                                                ADD     #60,TEMP        ;WITH NO INTERRUPTS
                                                MOV     TEMP,@SCRS      ;ENABLED
                                                MOV     CHANEL,TEMP
                                                ADD     #3,TEMP         ;SELECT CHANNEL AND GNI
                                                MOV     TEMP,@SCTS
                                                MOV     #060,TEMP
                                                JSR     PC,EXEQT

                                        ;
                                        ;EXECUTE ONE WORD INSTRUCTIONS USING MODE 2; LDE
                                        ;

                                                MOV     #MESSA,HEAD1    ;SET ERROR HEADINGS
                                                MOV     #MES1,HEAD2
                                                MOV     #37,ONCNT       ;GET LIST LENGTH
                                                MOV     #ONEWRD,CNTR    ;GET LIST START
                                                CLRB    @SCTS
                                                ADD     #2,@SCTS        ;SET MODE 2; LDE
                                        TST20A: MOV     (CNTR),@SCD     ;GET INSTRUCTION
                                                MOV     #1,EXECNT       ;SET TIMEOUT
                                        1$:     BIT     #200,@SCRS      ;EXTERNAL FLAG?
                                                BNE     2$              ;YES
                                                INC     EXECNT          ;INC TIMEOUT
                                                BNE     1$              ;CHECK AGAIN
                                                JSR     PC,ERROR4       ;ERROR, NO EXT FLAG
                                        2$:     MOV     DELAY,EXECNT    ;GET TIMEOUT
                                        4$:     BIT     #200,@SCTS      ;TRANSMISSION DONE?
                                                BNE     3$              ;YES
                                                INC     EXECNT          ;NO, INC TIMEOUT
                                                BNE     4$              ;CHECK AGAIN
                                                JSR     PC,ERROR4       ;TRANSMISSION NOT DONE
                                        3$:     MOV     @SCRS,IN
                                                JSR     PC,LOOP0        ;CHECK FOR LOOP
                                                BR      TST20A          ;LOOP
```

```
                                        ;
                                        ;TEST ONE WORD INSTRUCTIONS - GNI (MODE 3)
                                        ;
005042  012737  000037  006246         MOV     #37,ONCNT
005050  012704  006570                 MOV     #ONEWRD,CNTR    ;SET UP TEST
005054  105077  173152                 CLRB    @SCTS
005060  062777  000003  173144         ADD     #3,@SCTS        ;SET MODE 3 - GNI
005066  011477  173144         TST20B: MOV     (CNTR),@SCD     ;GET INST
005072  012737  000000  013270         MOV     #0,EXECNT       ;SET TIMEOUT
005100  032777  000200  173122 1$:     BIT     #200,@SCRS      ;EXTERNAL FLAG SET?
005106  001005                         BNE     2$              ;YES
005110  005237  013270                 INC     EXECNT          ;INC TIMEOUT
005114  001371                         BNE     1$              ;CHECK AGAIN
005116  004737  006216                 JSR     PC,ERROR4       ;ERROR, EXTERNAL FLAG
005122  013737  000264  013270 2$:     MOV     DELAY,EXECNT    ;SET DELAY
005130  032777  000200  173074 4$:     BIT     #200,@SCTS      ;TRANSMISSION DONE?
005136  001005                         BNE     3$              ;YES
005140  005237  013270                 INC     EXECNT          ;INC DELAY
005144  001371                         BNE     4$              ;CHECK AGAIN
005146  004737  006216                 JSR     PC,ERROR4       ;ERROR, TRANS NOT DONE
005152  017702  173052         3$:     MOV     @SCRS,IN
005156  004737  012576                 JSR     PC,LOOP0        ;CHECK FOR LOOP
005162  000741                         BR      TST20B          ;LOOP
005164  062704  000002                 ADD     #2,CNTR         ;GET NEXT INST
005170  005337  006246                 DEC     ONCNT           ;DONE WITH LIST
005174  001334                         BNE     TST20B
                                        ;
                                        ;TWO WORD INSTRUCTIONS - MODE 2 (LDE)
                                        ;
005176  012737  000006  006246         MOV     #6,ONCNT        ;SET UP TEST
005204  012704  006666                 MOV     #TWOWD,CNTR
005210  105077  173016                 CLRB    @SCTS
005214  062777  000002  173010         ADD     #2,@SCTS        ;SET MODE 2 LDE
005222  011477  173010         TST20C: MOV     (CNTR),@SCD     ;SEND FIRST WORD
005226  013737  000264  013270         MOV     DELAY,EXECNT    ;SET TIMEOUT
005234  032777  000200  172766 7$:     BIT     #200,@SCRS      ;CHECK FOR PREMATURE EXT FLG
005242  001402                         BEQ     2$              ;NO
005244  004737  006216                 JSR     PC,ERROR4       ;PREMATURE EXT FLG
005250  032777  000200  172754 2$:     BIT     #200,@SCTS
005256  001005                         BNE     3$              ;YES
005260  005237  013270                 INC     EXECNT          ;INC TIMEOUT
005264  001363                         BNE     7$              ;CHECK AGAIN
005266  004737  006216                 JSR     PC,ERROR4       ;ERROR, TRANS TIMEOUT
005272  012777  000000  172736 3$:     MOV     #0,@SCD         ;SEND SECOND WORD
005300  012737  000000  013270         MOV     #0,EXECNT       ;SET TIME OUT
005306  032777  000200  172714 5$:     BIT     #200,@SCRS      ;CHECK FOR EXT FLG
005314  001005                         BNE     6$              ;FLAG SET
005316  005237  013270                 INC     EXECNT          ;INC TIMEOUT
005322  001371                         BNE     5$              ;CHECK AGAIN
005324  004737  006216                 JSR     PC,ERROR4       ;ERROR, NO EXT FLAG
005330  017702  172674         6$:     MOV     @SCRS,IN
```

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                005334  004737  012576                  JSR     PC,LOOPO        ;LOOP?
                005340  000730                          BR      TST20C          ;LOOP
                005342  062704  000002                  ADD     #2,CNTR         ;UP DATE FOR NEXT INST
                005346  005337  006246                  DEC     ONCNT           ;DONE W/ LIST
                005352  001323                          BNE     TST20C          ;NO

                                        ;
                                        ;TWO WORD INSTRUCTIONS - MODE 3 (GNI)
                                        ;

                005354  012737  000006  006246          MOV     #6,ONCNT        ;SET UP TEST
                005362  012704  006666                  MOV     #TWOWD,CNTR     ;
                005366  105077  172640                  CLRB    @SCTS
                005372  062777  000003  172632          ADD     #3,@SCTS        ;SET MODE 3 - GNI
                005400  011477  172632          TST20D: MOV     (CNTR),@SCD     ;GET 1ST WORD
                005404  013737  000264  013270          MOV     DELAY,EXECNT    ;SET TIMEOUT
                005412  032777  000200  172610  7$:     BIT     #200,@SCRS      ;EXT FLAG SET
                005420  001402                          BEQ     2$              ;NO
                005422  004737  006216                  JSR     PC,ERROR4       ;ERROR, PREMATURE FLAG
                005426  032777  000200  172576  2$:     BIT     #200,@SCTS
                005434  001005                          BNE     3$              ;YES
                005436  005237  013270                  INC     EXECNT          ;NO, INC TIMEOUT
                005442  001363                          BNE     7$              ;CHECK BACK
                005444  004737  006216                  JSR     PC,ERROR4       ;ERROR, TRANS DONE FLAG NOT SET
                005450  012777  000000  172560  3$:     MOV     #0,@SCD         ;SECOND WORD
                005456  012737  000000  013270          MOV     #0,EXECNT       ;SET TIMEOUT
                005464  032777  000200  172536  5$:     BIT     #200,@SCRS      ;EXTERNAL FLAG?
                005472  001005                          BNE     6$              ;YES
                005474  005237  013270                  INC     EXECNT          ;NO, INC TIMEOUT
                005500  001371                          BNE     5$              ;NO, CHECK AGAIN
                005502  004737  006216                  JSR     PC,ERROR4       ;ERROR, NO EXT FLAG
                005506  017702  172516          6$:     MOV     @SCRS,IN
                005512  004737  012576                  JSR     PC,LOOPO        ;LOOP?
                005516  000730                          BR      TST20D          ;LOOP
                005520  062704  000002                  ADD     #2,CNTR         ;NEXT INST
                005524  005337  006246                  DEC     ONCNT           ;DONE W/ LIST?
                005530  001323                          BNE     TST20D          ;NO

                                        ;
                                        ;TEST 3 WORD INSTRUCTION - MODE 2 - LDE
                                        ;

                005532  012737  000004  006246          MOV     #4,ONCNT        ;SET UP TEST
                005540  012704  006702                  MOV     #THREWD,CNTR
                005544  105077  172462                  CLRB    @SCTS
                005550  062777  000002  172454          ADD     #2,@SCTS        ;MODE 2 - LDE
                005556  011477  172454          TST20F: MOV     (CNTR),@SCD     ;FIRST WORD
                005562  013737  000264  013270          MOV     DELAY,EXECNT
                005570  032777  000200  172432  9$:     BIT     #200,@SCRS      ;CHECK FOR PREMATURE EXT FLG
                005576  001402                          BEQ     2$
                005600  004737  006216                  JSR     PC,ERROR4       ;PREMATURE EXT FLAG
                005604  032777  000200  172420  2$:     BIT     #200,@SCTS
                005612  001005                          BNE     3$              ;YES
                005614  005237  013270                  INC     EXECNT          ;INC TIMEOUT
                005620  001363                          BNE     9$              ;CHECK AGAIN
                005622  004737  006216                  JSR     PC,ERROR4       ;TRANS FLAG NOT SET
```

```
005626  012777  000000  172402  3$:     MOV     #0,@SCD         ;SECOND WORD
005634  013737  000264  013270          MOV     DELAY,EXECNT    ;SET TIMEOUT
005642  032777  000200  172360  8$:     BIT     #200,@SCRS      ;PREMATURE EXT FLAG?
005650  001402                          BEQ     4$              ;NO
005652  004737  006216                  JSR     PC,ERROR4       ;PREMATURE FLAG
005656  032777  000200  172346  4$:     BIT     #200,@SCTS
005664  001005                          BNE     5$              ;YES
005666  005237  013270                  INC     EXECNT          ;NO
005672  001363                          BNE     8$
005674  004737  006216                  JSR     PC,ERROR4       ;TRANS NOT SET
005700  012777  000000  172330  5$:     MOV     #0,@SCD         ;THIRD WORD
005706  012737  000000  013270          MOV     #0,EXECNT       ;SET TIMEOUT
005714  032777  000200  172306  6$:     BIT     #200,@SCRS      ;EXT FLAG SET?
005722  001005                          BNE     7$              ;YES
005724  005237  013270                  INC     EXECNT          ;NO
005730  001371                          BNE     6$
005732  004737  006216                  JSR     PC,ERROR4       ;ERROR, NO EXT FLAG
005736  017702  172266          7$:     MOV     @SCRS,IN
005742  004737  012576                  JSR     PC,LOOPO        ;LOOP?
005746  000703                          BR      TST2OF          ;LOOP
005750  062704  000002                  ADD     #2,CNTR
005754  005337  006246                  DEC     ONCNT
005760  001276                          BNE     TST2OF

                                ;
                                ;TEST THREE WORD INSTRUCTION - MODE 3 - GNI
                                ;

005762  012737  000004  006246          MOV     #4,ONCNT        ;SET UP TEST
005770  012704  006702                  MOV     #THREWD,CNTR
005774  105077  172232                  CLRB    @SCTS
006000  062777  000003  172224          ADD     #3,@SCTS        ;GNI
006006  011477  172224          TST2OG: MOV     (CNTR),@SCD     ;INST
006012  013737  000264  013270          MOV     DELAY,EXECNT    ;SET TIMEOUT
006020  032777  000200  172202  9$:     BIT     #200,@SCRS      ;PREMATURE FLAG?
006026  001402                          BEQ     2$              ;NO
006030  004737  006216                  JSR     PC,ERROR4       ;PREMATURE FLAG
006034  032777  000200  172170  2$:     BIT     #200,@SCTS
006042  001005                          BNE     3$              ;YES
006044  005237  013270                  INC     EXECNT          ;INC TIMEOUT
006050  001363                          BNE     9$
006052  004737  006216                  JSR     PC,ERROR4       ;TIMEOUT - TRANS NOT DONE
006056  012777  000000  172152  3$:     MOV     #0,@SCD         ;SECOND WORD
006064  013737  000264  013270          MOV     DELAY,EXECNT
006072  032777  000200  172130  8$:     BIT     #200,@SCRS      ;PREMATURE FLAG?
006100  001402                          BEQ     4$              ;NO
006102  004737  006216                  JSR     PC,ERROR4       ;PREMATURE FLAG
006106  032777  000200  172116  4$:     BIT     #200,@SCTS
006114  001005                          BNE     5$              ;YES
006116  005237  013270                  INC     EXECNT
006122  001363                          BNE     8$
006124  004737  006216                  JSR     PC,ERROR4       ;ERROR, TRANSMISSION NOT DONE
006130  012777  000000  172100  5$:     MOV     #0,@SCD         ;THIRD WORD
006136  012737  000000  013270          MOV     #0,EXECNT
006144  032777  000200  172056  6$:     BIT     #200,@SCRS      ;EXT FLAG SET?
006152  001005                          BNE     7$              ;YES
```

```
                                                INC     EXECNT
                                                BNE     6$
                                                JSR     PC,ERROR4       ;EXT FLAG NOT SET
                                        7$:     MOV     @SCRS,IN
                                                JSR     PC,LOOP0        ;LOOP?
                                                BR      TST20G          ;LOOP
                                                ADD     #2,CNTR
                                                DEC     ONCNT
                                                BNE     TST20G
                                                JMP     TEST21

                                        ;
                                        ;SUBROUTINE TO FIX ROUTINE ERROR1 FOR PROPER USE
                                        ;
006216  004737  006534                  ERROR4: JSR     PC,FORM         ;GET INST INTO "IN"
006222  011601                                  MOV     (SP),GOOD       ;SET PC OF ERROR
006224  162701  000004                          SUB     #4,GOOD
006230  005237  006532                          INC     ER4FLP          ;SET ERROR FLOP
006234  004737  012312                          JSR     PC,ERROR1       ;ERROR
006240  005037  006532                          CLR     ER4FLP          ;CLEAR ERROR FLOP
006244  000207                                  RTS     PC

                                        ;
006246  000000                          ONCNT:  0
006250  000000                          ONCNT1: 0
006252  177776                          WRITE:  -2
006254  000022                                  000022
006256  000000                                  000000
006260  000001                          OUTLST: 000001
006262  000002                                  000002
006264  020000                                  020000
006266  020001                                  020001
006270  000007                                  000007
006272  000010                                  000010
006274  000011                                  000011
006276  020002                                  020002

006300  000046                          MEMLST: 000046
006302  000046                                  000046
006304  000136                                  000136
006306  020000                                  020000
006310  000136                                  000136
006312  020001                                  020001
006314  000046                                  000046
006316  000046                                  000046
006320  000046                                  000046
006322  000136                                  000136
006324  020002                                  020002
006326  000004                                  000004

                                        ;
                                        ;ROUTINE TO DO MULTIPLE WORD INSTRUCTIONS
                                        ;
006330  012337  006504                  MEXEC:  MOV     (TEMP)+,CNT     ;GET INSTRUCTION LENGTH
006334  012377  171676                  2$:     MOV     (TEMP)+,@SCD    ;SEND WORD
006340  005237  006504                          INC     CNT
006344  001405                                  BEQ     1$
```

```
1017  006346  032777  000200  171656  3$:     BIT     #200,@SCTS
1018  006354  001367                          BNE     2$
1019  006356  000773                          BR      3$
1020  006360  000137  013114          1$:     JMP     EXEQT+4
1021                                  ;
1022                                  ;
1023                                  ;
1024  006364  000000                  OUTBUF: 0
1025
1026
1027          006504                          .=OUTBUF+120
1028
1029
1030  006504  000000                  CNT:    0
1031  006506  000000                  CORSIZ: 0
1032  006510  177776                  JUMP:   -2
1033  006512  000024                          0024
1034  006514  000000                          0000
1035  006516  177776                  ROMEM:  -2
1036  006520  000026                          0026
1037  006522  000000                          0000
1038  006524  177776                  STATWD: -2
1039  006526  000036                          0036
1040  006530  170377                          170377
1041  006532  000000                  ER4FLP: 0
1042
1043  006534  011405                  FORM:   MOV     (CNTR),AC
1044  006536  042705  177400          FORM1:  BIC     #177400,AC
1045  006542  010502                          MOV     AC,IN
1046  006544  011405                          MOV     (CNTR),AC
1047  006546  042705  007777                  BIC     #7777,AC
1048  006552  000241                          CLC
1049  006554  006005                          ROR     AC
1050  006556  006005                          ROR     AC
1051  006560  006005                          ROR     AC
1052  006562  006005                          ROR     AC
1053  006564  060502                          ADD     AC,IN
1054  006566  000207                          RTS     PC
1055
1056                                  ;
1057                                  ;
1058
1059  006570  000000                  ONEWRD: 000000
1060  006572  000002                          000002
1061  006574  000010                          000010
1062  006576  000004                          000004
1063  006600  000005                          000005
1064  006602  000006                          000006
1065  006604  000014                          000014
1066  006606  000015                          000015
1067  006610  000016                          000016
1068  006612  000046                          000046
1069  006614  000056                          000056
1070  006616  000054                          000054
1071  006620  000045                          000045
1072  006622  020000                          020000
```

```
1073  006624  040000                          040000
1074  006626  060000                          060000
1075  006630  100000                          100000
1076  006632  120000                          120000
1077  006634  140000                          140000
1078  006636  160000                          160000
1079  006640  050000                          050000
1080  006642  000020                          000020
1081  006644  000030                          000030
1082  006646  000130                          000130
1083  006650  000140                          000140
1084  006652  000150                          000150
1085  006654  000160                          000160
1086  006656  000170                          000170
1087  006660  010300                          010300
1088  006662  010200                          010200
1089  006664  000060                          000060
1090                                  ;
1091                                  ;
1092  006666  000024                  TWOWD:  000024
1093  006670  000025                          000025
1094  006672  000026                          000026
1095  006674  000022                          000022
1096  006676  000036                          000036
1097  006700  000136                          000136
1098                                  ;
1099                                  ;
1100  006702  000023                  THREWD: 000023
1101  006704  000033                          000033
1102  006706  000133                          000133
1103  006710  000123                          000123
1104
1105                                  ;TEST TO CHECK THAT OUTPUT REGISTER OF DC-14E FUNCTIONS
1106                                  ;PROPERLY IN THAT IT WILL ACCEPT ALL 14/30, 14/35
1107                                  ;OUTPUT REGISTER INSTRUCTIONS IN PROPER ORDER
1108
1109  006712  012737  016143  000302  TEST21: MOV     #MESSB,HEAD1
1110  006720  012737  016171  000304          MOV     #MES2,HEAD2
1111  006726  105077  171300                  CLRB    @SCTS
1112  006732  062777  000001  171272          ADD     #1,@SCTS        ;MODE 1
1113  006740  012777  000200  171270          MOV     #200,@SCD       ;START TRANSMISSION
1114  006746  032777  040000  171254  1$:     BIT     #40000,@SCRS    ;RUN
1115  006754  001374                          BNE     1$              ;NO, CHECK AGAIN
1116  006756  105077  171250                  CLRB    @SCTS
1117  006762  062777  000003  171242          ADD     #3,@SCTS        ;MODE 3
1118  006770  012703  000060                  MOV     #60,TEMP        ;ENTER EXTERNAL MODE
1119  006774  004737  013110                  JSR     PC,EXEQT
1120  007000  012737  000014  006246          MOV     #14,ONCNT       ;SET UP TABLE LENGTH
1121  007006  012703  000004                  MOV     #4,TEMP         ;CLEAR PC
1122  007012  004737  013110                  JSR     PC,EXEQT
1123  007016  012704  006300                  MOV     #MEMLST,CNTR
1124  007022  012437  006256          2$:     MOV     (CNTR)+,WRITE+4
1125  007026  012703  006252                  MOV     #WRITE,TEMP
1126  007032  004737  006330                  JSR     PC,MEXEC        ;WRITE
1127  007036  012703  000010                  MOV     #10,TEMP        ;SKIP
1128  007042  004737  013110                  JSR     PC,EXEQT
```

```
1129  007046  005337  006246                  DEC     ONCNT
1130  007052  001363                          BNE     2$
1131
1132                                  ;NOW LFT 14 RUN, MONITOR OUTPUT REGISTER
1133                                  ;
1134
1135  007054  012703  000004                  MOV     #4,TEMP
1136  007060  004737  013110                  JSR     PC,EXEQT
1137  007064  012704  000050                  MOV     #50,CNTR
1138  007070  017701  171142                  MOV     @SCD,GOOD
1139  007074  012701  006364                  MOV     #OUTBUF,GOOD
1140  007100  012703  000040                  MOV     #40,TEMP        ;LEAVE EXTERNAL MODE
1141  007104  004737  013110                  JSR     PC,EXEQT
1142  007110  032777  000100  171112  3$:     BIT     #100,@SCRS      ;OUTPUT REG FLAG SET?
1143  007116  001774                          BEQ     3$              ;NO
1144  007120  017721  171112                  MOV     @SCD,(GOOD)+    ;MOV OUTREG INTO  BUFFER
1145  007124  005304                          DEC     CNTR
1146  007126  001370                          BNE     3$
1147
1148                                  ;
1149                                  ;TABLE FULL NOW VERIFY IT'S CORRECTNESS
1150                                  ;
1151
1152  007130  012737  000005  006246          MOV     #5,ONCNT
1153  007136  012704  006364                  MOV     #OUTBUF,CNTR
1154  007142  012737  000010  006250  6$:     MOV     #10,ONCNT1
1155  007150  012703  006260                  MOV     #OUTLST,TEMP
1156  007154  012301                  7$:     MOV     (TEMP)+,GOOD
1157  007156  012402                          MOV     (CNTR)+,IN
1158  007160  020102                          CMP     GOOD,IN
1159  007162  001010                          BNE     8$
1160  007164  005337  006250          9$:     DEC     ONCNT1
1161  007170  001371                          BNE     7$
1162  007172  005337  006246                  DEC     ONCNT
1163  007176  001361                          BNE     6$
1164  007200  000137  007232                  JMP     TEST22
1165  007204  005237  006532          8$:     INC     ER4FLP
1166  007210  004737  012312                  JSR     PC,ERROR1
1167  007214  005037  000302                  CLR     HEAD1
1168  007220  005037  000304                  CLR     HEAD2
1169  007224  005037  006532                  CLR     ER4FLP
1170  007230  000755                          BR      9$
1171
```

```
1172
1173
1174                                    ;MEMORY TEST - ADDRESS COMPLIMENT TEST
1175                                    ;
1176
1177  007232  105077  170774          TEST22: CLRB    @SCTS
1178  007236  062777  000003  170766          ADD     #3,@SCTS        ;MODE 3
1179  007244  012703  000060                  MOV     #60,TEMP        ;ENTER EXTERNAL MODE
1180  007250  004737  013110                  JSR     PC,EXEQT
1181  007254  012703  000004                  MOV     #4,TEMP         ;CLR PC
1182  007260  004737  013110                  JSR     PC,EXEQT
1183  007264  005001                          CLR     GOOD
1184  007266  010102                  1$:     MOV     GOOD,IN
1185  007270  005102                          COM     IN              ;COMPLIMENT
1186  007272  004737  010050                  JSR     PC,MK1218       ;GET IN DC-14 FORMAT
1187  007276  010437  006256                  MOV     CNTR,WRITE+4    ;MOVE IT TO WRITE ROUTINE
1188  007302  012703  006252                  MOV     #WRITE,TEMP
1189  007306  004737  006330                  JSR     PC,MEXEC        ;WRITE
1190  007312  012703  000010                  MOV     #10,TEMP
1191  007316  004737  013110                  JSR     PC,EXEQT        ;SKIP
1192  007322  005201                          INC     GOOD
1193  007324  022701  010000                  CMP     #10000,GOOD     ;DONE?
1194  007330  001356                          BNE     1$
1195
1196                                    ;
1197                                    ;WRITE DONE - VERIFY
1198                                    ;
1199
1200  007332  012737  016236  000302          MOV     #MEMMES,HEAD1
1201  007340  012737  016265  000304          MOV     #MS3,HEAD2
1202  007346  005237  006532                  INC     ER4FLP
1203  007352  012703  010200                  MOV     #10200,TEMP
1204  007356  004737  013110                  JSR     PC,EXEQT        ;CDF 0
1205  007362  005001                          CLR     GOOD
1206  007364  010102                  2$:     MOV     GOOD,IN
1207  007366  004737  010050                  JSR     PC,MK1218
1208  007372  010437  006522                  MOV     CNTR,RDMEM+4
1209  007376  012703  006516                  MOV     #RDMEM,TEMP
1210  007402  004737  006330                  JSR     PC,MEXEC
1211  007406  012704  013050                  MOV     #OTEMP,CNTR
1212  007412  017714  170620                  MOV     @SCD,(CNTR)
1213  007416  004737  006534                  JSR     PC,FORM
1214  007422  010205                          MOV     IN,AC
1215  007424  005105                          COM     AC
1216  007426  042705  170000                  BIC     #170000,AC
1217  007432  020501                          CMP     AC,GOOD
1218  007434  001014                          BNE     4$
1219  007436  005201                  6$:     INC     GOOD
1220  007440  022701  001000                  CMP     #1000,GOOD
1221  007444  001347                          BNE     2$
1222  007446  005037  006532                  CLR     ER4FLP
1223  007452  004737  012576                  JSR     PC,LOOPO
1224  007456  000401                          BR      5$
1225  007460  000411                          BR      TST22Z
1226  007462  000137  007232          5$:     JMP     TEST22
1227
```

```
1228  007466  004737  012312          4$:     JSR     PC,ERROR1
1229  007472  005037  000302                  CLR     HEAD1
1230  007476  005037  000304                  CLR     HEAD2
1231  007502  000755                          BR      6$
1232
1233                                  ;
1234                                  ;TEST CDF FLOP
1235                                  ;
1236
1237  007504  012703  006524          TST22Z: MOV     #STATWD,TEMP
1238  007510  005037  000302                  CLR     HEAD1
1239  007514  004737  006330                  JSR     PC,MEXEC        ;STATUS WORD
1240  007520  005037  006506                  CLR     CORSIZ
1241  007524  017702  170506                  MOV     @SCD,IN
1242  007530  032702  020000                  BIT     #20000,IN       ;BIT 2 SET 4K/8K
1243  007534  001402                          BEQ     2$
1244  007536  005237  006506                  INC     CORSIZ          ;4K/8K
1245  007542  012703  000004          2$:     MOV     #4,TEMP
1246  007546  004737  013110                  JSR     PC,EXEQT
1247  007552  012737  050125  006256          MOV     #050125,WRITE+4 ;WRITE 2525 IN FLD 0
1248  007560  012703  005252                  MOV     #WRITE,TEMP
1249  007564  004737  006330                  JSR     PC,MEXEC
1250  007570  005737  006506                  TST     CORSIZ          ;8K?
1251  007574  001417                          BEQ     3$              ;NO
1252  007576  012703  000030                  MOV     #30,TEMP
1253  007602  004737  013110                  JSR     PC,EXEQT
1254  007606  012703  006510                  MOV     #JUMP,TEMP
1255  007612  004737  006330                  JSR     PC,MEXEC
1256  007616  012737  120252  006256          MOV     #120252,WRITE+4 ;WRITE 5252 IN FLD1
1257  007624  012703  006252                  MOV     #WRITE,TEMP
1258  007630  004737  006330                  JSR     PC,MEXEC
1259
1260  007634  012703  000004          3$:     MOV     #4,TEMP
1261  007640  004737  013110                  JSR     PC,EXEQT
1262  007644  005037  006522                  CLR     RDMEM+4
1263  007650  012703  010200                  MOV     #10200,TEMP
1264  007654  004737  013110                  JSR     PC,EXEQT
1265  007660  012703  006516                  MOV     #RDMEM,TEMP
1266  007664  004737  006330                  JSR     PC,MEXEC
1267  007670  022777  050125  170340          CMP     #50125,@SCD     ;FLD0, EXP 2525
1268  007676  001402                          BEQ     .+6
1269  007700  000137  010020                  JMP     TST22A          ;ERROR
1270  007704  012703  010300          TST22D: MOV     #10300,TEMP
1271  007710  004737  013110                  JSR     PC,EXEQT
1272  007714  012703  006516                  MOV     #RDMEM,TEMP
1273  007720  004737  006330                  JSR     PC,MEXEC
1274  007724  005005                          CLR     AC
1275  007726  005737  006506                  TST     CORSIZ          ;4K/8K
1276  007732  001402                          BEQ     6$              ;8K; EXP. 5252
1277  007734  012705  120252                  MOV     #120252,AC      ;4K; EXP. 0000
1278  007740  020577  170272          6$:     CMP     AC,@SCD
1279  007744  001402                          BEQ     .+6
1280  007746  000137  010034                  JMP     TST22B
1281  007752  004737  012576          TST22C: JSR     PC,LOOP0
1282  007756  000401                          BR      .+4
1283  007760  000402                          BR      .+6
```

```
1284  007762  000137  007504                    JMP     TST22Z
1285  007766  012703  000004                    MOV     #4,TEMP
1286  007772  004737  013110                    JSR     PC,EXEQT
1287  007776  012737  000140  006256            MOV     #140,WRITE+4
1288  010004  012703  006252                    MOV     #WRITE,TEMP
1289  010010  004737  006330                    JSR     PC,MEXEC
1290  010014  000137  010100                    JMP     TEST23
1291
1292  010020  012737  016206  000304  TST22A:  MOV     #MSCDF0,HEAD2
1293  010026  004737  012434                    JSR     PC,ERROR2
1294  010032  000724                            BR      TST22D
1295
1296  010034  012737  016222  000304  TST22B:  MOV     #MSCDF1,HEAD2
1297  010042  004737  012434                    JSR     PC,ERROR2
1298  010046  000741                            BR      TST22C
1299
1300  010050  010204                  MK1218:   MOV     IN,CNTR
1301  010052  042704  177400                    BIC     #177400,CNTR
1302  010056  042702  170377                    BIC     #170377,IN
1303  010062  000241                            CLC
1304  010064  006102                            ROL     IN
1305  010066  006102                            ROL     IN
1306  010070  006102                            ROL     IN
1307  010072  006102                            ROL     IN
1308  010074  060204                            ADD     IN,CNTR
1309  010076  000207                            RTS     PC
1310                                  ;TEST 0300 TO TURN OFF THE TRANSMITTER AT THE INDUSTRIAL-14 AND
1311                                  ;KILL RUN; 0200 TO TURN THE TRANSMITTER BACK ON, ALL USING MODE 1
1312
1313  010100  012737  015352  000302  TEST23:  MOV     #MESS23,HEAD1
1314  010106  010003                            MOV     CHANEL,TEMP     ;SET OP SCRS
1315  010110  062703  000060                    ADD     #60,TEMP        ;WITH NO INTERRUPTS
1316  010114  010377  170110                    MOV     TEMP,@SCRS      ;ENABLED
1317  010120  010003                            MOV     CHANEL,TEMP
1318  010122  062703  000003                    ADD     #3,TEMP         ;MODE 3
1319  010126  010377  170100                    MOV     TEMP,@SCTS
1320  010132  012703  000060                    MOV     #60,TEMP
1321  010136  004737  013110                    JSR     PC,EXEQT
1322  010142  017702  170062                    MOV     @SCRS,IN
1323  010146  105077  170060                    CLRB    @SCTS
1324  010152  062777  000001  170052            ADD     #1,@SCTS        ;SET UP MODE 1
1325  010160  032777  000001  170042  TST23A:  BIT     #1,@SCRS        ;MAKE SURE RECEIVER IS NOT ACTIVE
1326  010166  001374                            BNE     TST23A
1327  010170  012777  000300  170040            MOV     #300,@SCD       ;EXECUTE 0300
1328  010176  032777  000200  170026            BIT     #200,@SCTS      ;WAIT FOR TRANSMISSION DONE
1329  010204  001774                            BEQ     .-6
1330  010206  032777  000001  170014            BIT     #1,@SCRS        ;WAIT FOR RECEIVER ACTIVE TO COME
1331  010214  001774                            BEQ     .-6
1332  010216  032777  000001  170004            BIT     #1,@SCRS        ;AND GO
1333  010224  001374                            BNE     .-6
1334  010226  012737  015405  000304            MOV     #MES23A,HEAD2
1335  010234  032777  040000  167766            BIT     #40000,@SCRS    ;IS RUN CLEARED?
1336  010242  001002                            BNE     .+6             ;YES, OK
1337  010244  004737  012434                    JSR     PC,ERROR2       ;NO, ERROR
1338  010250  005004                            CLR     CNTR            ;SET UP CNTR
1339  010252  012737  014141  000304            MOV     #MES23C,HEAD2
```

```
1340  010260  010001                                MOV     CHANEL,GOOD     ;COMPUTE GOOD STATUS
1341  010262  062701  140060                        ADD     #140060,GOOD    ;ERROR FLAG, RUN=0, INTERRUPTS DISABLED
1342  010266  017702  167736          T23L1:        MOV     @SCRS,IN        ;GET CURRENT STATUS
1343  010272  020102                                CMP     GOOD,IN         ;COMPARE GOOD AND UNKNOWN STATUS
1344  010274  001402                                BEQ     .+6             ;OK?
1345  010276  004737  012312                        JSR     PC,ERROR1       ;NO, ERROR
1346  010302  005204                                INC     CNTR            ;DONE ENOUGH TIMES?
1347  010304  001370                                BNE     T23L1           ;NO, LOOP
1348  010306  105077  167720                        CLRB    @SCTS
1349  010312  062777  000003  167712                ADD     #3,@SCTS        ;SET MODE 3
1350  010320  012777  160000  167710                MOV     #160000,@SCD    ;ATTEMPT TO EXECUTE A "TYN 0"
1351  010326  032777  000200  167676                BIT     #200,@SCTS      ;WAIT FOR TRANSMISSION DONE
1352  010334  012704  000000                        MOV     #0,CNTR         ;SET UP CNTR
1353  010340  012737  015431  000304                MOV     #MES23D,HEAD2
1354  010346  032737  000001  000230  T23L2:        BIT     #1,SCRS         ;IS RECEIVER ACTIVE SET?
1355  010354  001402                                BEQ     .+6             ;NO, OK
1356  010356  004737  012434                        JSR     PC,ERROR2       ;YES,ERROR
1357  010362  005204                                INC     CNTR            ;DONE ENOUGH TIMES?
1358  010364  001370                                BNE     T23L2           ;NO, LOOP
1359  010366  012737  015475  000304                MOV     #MES23E,HEAD2
1360  010374  032777  040000  167626                BIT     #40000,@SCRS    ;IS THE 14 RUNNING?
1361  010402  001002                                BNE     .+6             ;NO, OK
1362  010404  004737  012434                        JSR     PC,ERROR2       ;YES, ERROR
1363  010410  105077  167616                        CLRB    @SCTS
1364  010414  062777  000001  167610                ADD     #1,@SCTS        ;SET MODE 1
1365  010422  012777  000200  167606                MOV     #200,@SCD       ;EXECUTE 0200
1366  010430  032777  000200  167574                BIT     #200,@SCTS      ;WAIT FOR TRANSMIT DONE
1367  010436  001774                                BEQ     .-6
1368  010440  012737  015516  000304                MOV     #MES23F,HEAD2
1369  01044   032777  040000  167554                BIT     #40000,@SCRS    ;IS THE 14 RUNNING?
1370  01045   001002                                BNE     .+6             ;NO, OK
1371  010456  004737  012434                        JSR     PC,ERROR2       ;YES, ERROR
1372  010462  012737  014141  000304                MOV     #MES23G,HEAD2
1373  010470  012704  000000                        MOV     #0,CNTR
1374  010474  005204                                INC     CNTR
1375  010476  001376                                BNE     .-2
1376  010500  005204                                INC     CNTR            ;WAIT A WHILE
1377  010502  001376                                BNE     .-2
1378  010504  017702  167520                        MOV     @SCRS,IN        ;GET CHANNEL STATUS
1379
1380  010510  010001                                MOV     CHANEL,GOOD     ;COMPUTE EXPECTED STATUS (RUN=1, RECEIVER ACTIVE=0)
1381  010512  062701  000060                        ADD     #60,GOOD        ;(INTERRUPTS DISABLED)
1382  010516  020102                                CMP     GOOD,IN         ;OK?
1383  010520  001402                                BEQ     .+6             ;YES
1384  010522  004737  012312                        JSR     PC,ERROR1       ;NO,ERROR
1385  010526  012737  015555  000304                MOV     #MES23H,HEAD2
1386  010534  105077  167472                        CLRB    @SCTS
1387  010540  062777  000003  167464                ADD     #3,@SCTS                ;SET MODE 3
1388  010546  012777  160000  167462                MOV     #160000,@SCD    ;EXECUTE A "TYN 0"
1389  010554  032777  000200  167450                BIT     #200,@SCTS      ;WAIT FOR TRANSMIT DONE
1390  010562  001774                                BEQ     .-6
1391  010564  005004                                CLR     CNTR
1392  010566  032777  000001  167434  T23L3:        BIT     #1,@SCRS        ;RECEIVER ACTIVE SET?
1393  010574  001004                                BNE     T23L4           ;YES,OK
1394  010576  005204                                INC     CNTR            ;DONE TESTING
1395  010600  001372                                BNE     T23L3           ;NO, LOOP
```

```
1396  010602  004737  012434                T23L4:  JSR     PC,ERROR2       ;YES ERROR
1397  010606  105777  167416                        TSTB    @SCRS           ;WAIT FOR
1398  010612  100375                              BPL     T23L4           ;EXTERNAL FLAG
1399  010614  004737  012576                        JSR     PC,LOOP0        ;LOOP?
1400  010620  000401                              BR      .+4             ;YES
1401  010622  000402                              BR      .+6             ;NO
1402  010624  000137  010160                        JMP     TST23A          ;LOOP
1403  010630  004737  012472                        JSR     PC,BELL         ;RING BELL AFTER CHANNEL DONE
1404  010634  004737  012614                        JSR     PC,LOOP1        ;LOOP ON THIS CHANNEL?
1405  010640  000137  004636                        JMP     TEST20          ;YES
1406  010644  062700  000400                        ADD     #400,CHANEL     ;NO, INCREMENT CHANNEL
1407  010650  005237  000276                        INC     STATIO          ;DONE ALL CHANNELS?
1408  010654  001402                              BEQ     .+6             ;YES
1409  010656  000137  004636                        JMP     TEST20          ;NO, LOOP
1410  010662  004737  012472                        JSR     PC,BELL         ;RING BELL AFTER ALL CHANNELS
1411  010666  004737  012632                        JSR     PC,LOOP2        ;REPEAT ALL TESTS
1412  010672  000137  004604                        JMP     BEGIN2          ;YES
1413  010676  000000                              HALT                    ;NO
1414  010700  000137  004604                        JMP     BEGIN2          ;GO BACK
1415
1416                                          ;TAPE 3
1417                                          ;MULTIPLE CHANEL SIMULTANEOUS CLOSED LOOP TESTS
1418
1419                                          ;ROUTINE TO CHECK SIMULTANEOUS INTERRUPTS
1420                                          ;FROM MULTIPLE CHANNELS
1421                                          ;TO OCCUR IN CONSECUTIVE NUMERICAL ORDER
1422
1423  010704  012706  000500          BEGIN3: MOV     #BEGIN1,SP      ;SET UP STACK POINTER
1424  010710  017737  167304  000266          MOV     @SWR,TENTHS     ;SET UP STATION COUNT
1425  010716  042737  177760  000266          BIC     #177760,TENTHS  ;TO 1'S COMP
1426  010724  005137  000266                  COM     TENTHS          ;OF SWR 3 TO 0
1427  010730  012737  015636  000302  TEST30: MOV     #MESS30,HEAD1
1428  010736  012777  000340  167256          MOV     #340,@PS        ;RAISE TO LEVEL 7
1429  010744  005000                  TST30A: CLR     CHANEL          ;ZERO CHANNEL NUMBER
1430  010746  013737  000266  000276          MOV     TENTHS,STATIO   ;SET UP LOOP COUNT
1431  010754  010003                  TST30B: MOV     CHANEL,TEMP
1432  010756  062703  000000                  ADD     #0,TEMP
1433  010762  010377  167242                  MOV     TEMP,@SCRS      ;SET UP SCRS
1434  010766  010003                          MOV     CHANEL,TEMP
1435  010770  062703  000002                  ADD     #2,TEMP
1436  010774  032777  001000  167216          BIT     #MMODE,@SWR
1437  011002  001402                          BEQ     .+6
1438  011004  062703  000004                  ADD     #4,TEMP
1439  011010  010377  167216                  MOV     TEMP,@SCTS      ;SET UP SCTS FOR MODE 2
1440  011014  005077  167216                  CLR     @SCD            ;XMIT TO PDP-14
1441  011020  032777  000200  167204          BIT     #200,@SCTS      ;WAIT FOR TRANSMIT DONE
1442  011026  001774                          BEQ     .-6
1443  011030  062700  000400                  ADD     #400,CHANEL     ;INCREMENT CHANNEL NUMBER
1444  011034  105237  000276                  INCB    STATIO          ;DONE ALL CHANNELS?
1445  011040  001345                          BNE     TST30B          ;NO
1446  011042  005004                          CLR     CNTR
1447  011044  005204                          INC     CNTR            ;WAIT A LITTLE WHILE
1448  011046  001376                          BNE     .-2
1449  011050  013737  000266  000276          MOV     TENTHS,STATIO   ;SET UP STATION COUNTER
1450  011056  005000                          CLR     CHANEL          ;ZERO CHANNEL NUMBER
1451  011060  012737  015666  000304          MOV     #MES30A,HEAD2
```

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1452  011066  012777  011110  167150          MOV     #TST30C,@DC14TV ;SET UP TRAP VECTOR
1453  011074  012777  000340  167144          MOV     #340,@DC14TV+2
1454  011102  005077  167114                  CLR     @PS             ;LOWER TO LEVEL 0
1455  011106  000001                          WAIT                    ;WAIT FOR INTERRUPT
1456  011110  022626                  TST30C: CMP     (SP)+,(SP)+     ;ADD 4 TO SP
1457  011112  012777  000340  167102          MOV     #340,@PS
1458  011120  013777  000244  167116          MOV     DC14TV,@DC14TV  ;SETUP FOR NO MORE INTERRUPTS
1459  011126  062777  000002  167110          ADD     #2,@DC14TV
1460  011134  005077  167106                  CLR     @DC14TV+2
1461  011140  017702  167060          TST30D: MOV     @ICRS,IN        ;GET INTERRUPTING CHANNEL STATUS
1462  011144  010001                          MOV     CHANEL,GOOD     ;COMPUTE EXPECTED RESULTS
1463  011146  062701  000200                  ADD     #200,GOOD       ;EXTERNAL FLAG, FLAG AND INTERRUPT ENABLES
1464  011152  020102                          CMP     GOOD,IN         ;COMPARE GOOD AND UNKNOWN STATUS
1465  011154  001402                          BEQ     .+6             ;OK?
1466  011156  004737  012312                  JSR     PC,ERROR1       ;NO,ERROR
1467  011162  062700  000400                  ADD     #400,CHANEL             ;INCREMENT CHANNEL NUMBER
1468  011166  005237  000276                  INC     STATIO          ;DONE ALL CHANNELS?
1469  011172  001362                          BNE     TST30D          ;NO,LOOP
1470  011174  004737  012576                  JSR     PC,LOOPD        ;LOOP
1471  011200  000661                          BR      TST30A          ;YES
1472  011202  000240                          NOP
1473
1474                                  ;MULTIPLE CHANNEL EXERCISER
1475                                  ;
1476                                  ;THIS PORTION STARTS THE BALL ROLLING
1477
1478  011204  012737  015717  000302  TEST31: MOV     #MESS31,HEAD1
1479  011212  017737  167002  000266          MOV     @SWR,TENTHS     ;SET UP STATION COUNT
1480  011220  042737  177760  000266          BIC     #177760,TENTHS  ;TO 1'S COMP
1481  011226  005137  000266                  COM     TENTHS          ;OF SWR 3 TO 0
1482  011232  013737  000266  000276          MOV     TENTHS,STATIO
1483  011240  005000                          CLR     CHANEL
1484  011242  004737  011546          TST31A: JSR     PC,SETUP        ;SET UP TABLE POINTERS
1485  011246  012777  012120  000352          MOV     #CHARTB,@CHRPNT ;SETUP CHRPNT DATA
1486  011254  004737  011630                  JSR     PC,XMIT         ;SET UP TABLED DATA, TRANSMIT TO STATION
1487  011260  062700  000400                  ADD     #400,CHANEL             ;INCREMENT CHANNEL NUMBER
1488  011264  005237  000276                  INC     STATIO          ;DONE ALL CHANNELS?
1489  011270  001364                          BNE     TST31A          ;NO, LOOP
1490  011272  005000                          CLR     CHANEL
1491  011274  013737  000266  000276          MOV     TENTHS,STATIO
1492  011302  005137  000276                  COM     STATIO
1493
1494                                  ;THIS PORTION IS THE BACKGROUND ROUTINE
1495
1496  011306  010077  166720          TST31B: MOV     CHANEL,@SCTS    ;SELECT CURRENT STATION
1497  011312  012737  015752  000304          MOV     #MES31A,HEAD2
1498  011320  013704  000300                  MOV     DELY1,CNTR
1499  011324  032777  000200  166700          BIT     #200,@SCTS      ;TRANSMIT DONE FLAG SET?
1500  011332  001022                          BNE     TST31F          ;YES
1501  011334  032777  000001  166666  TST31C: BIT     #1,@SCRS        ;IS RECEIVER ACTIVE?
1502  011342  001004                          BNE     TST31D          ;YES,OK
1503  011344  005204                          INC     CNTR            ;NO, DONE TESTING?
1504  011346  001372                          BNE     TST31C          ;NO, LOOP
1505  011350  004737  012434                  JSR     PC,ERROR2       ;YES, ERROR
1506  011354  010003          TST31D: MOV     CHANEL,TEMP
1507  011356  000303                  SWAB    TEMP
```

```
1508  011360  020337  00027E                      CMP     TEMP,STATIO     ;DONE ALL CHANNELS?
1509  011364  001403                              BEQ     TST31E          ;YES
1510  011366  062700  000400                      ADD     #400,CHANEL             ;NO, INCREMENT CHANNEL NUMBER
1511  011372  000745                              BR      TST31B          ;GO, BACK
1512  011374  005000                      TST31E: CLR     CHANEL          ;DONE ALL CHANNELS, ZERO CHANNEL NUMBER
1513  011376  000743                              BR      TST31B          ;GO BACK
1514  011400  012737  016025  000304      TST31F: MOV     #MES31B,HEAD2   ;HERE IF TRANSMISSION DONE IS SET
1515  011406  017702  166616              TST31G: MOV     @SCRS,IN
1516  011412  032702  000001                      BIT     #1,IN           ;RECEIVER STILL ACTIVE?
1517  011416  001404                              BEQ     TST31H          ;NO, OK, CHECK STATUS
1518  011420  005204                              INC     CNTR            ;YES, DONE TESTING?
1519  011422  001371                              BNE     TST31G          ;NO, GO BACK
1520  011424  004737  012434                      JSR     PC,ERROR2       ;YES,ERROR
1521
1522                                      ;THIS PORTION CONTINUALLY SENDS DATA TO THE PDP-14'S
1523                                      ;USING THE NON-INTERRUPT ENVIRONMENT IN THE 11 TO RECEIVE DATA
1524
1525  011430  012737  014141  000304      TST31H: MOV     #MES31C,HEAD2
1526  011436  004737  011546                      JSR     PC,SETUP        ;SET UP PARAMETERS
1527  011442  017701  000154                      MOV     @STATUM,GOOD    ;COMPUTE EXPECTED STATUS
1528  011446  060001                              ADD     CHANEL,GOOD
1529  011450  020102                              CMP     GOOD,IN         ;COMPARE GOOD AND UNKNOWN STATUS
1530  011452  001402                              BEQ     .+6             ;OK?
1531  011454  004737  012312                      JSR     PC,ERROR1       ;NO, ERROR
1532  011460  032702  000100                      BIT     #100,IN         ;WAS OUTPUT FLAG SET?
1533  011464  001413                              BEQ     TST31I          ;NO
1534  011466  017702  166544                      MOV     @SCD,IN         ;YES, GET DATA WORD
1535  011472  017701  000126                      MOV     @DATUM,GOOD     ;COMPUTE EXPECTED DATA WORD
1536  011476  012737  014166  000304              MOV     #MES31D,HEAD2
1537  011504  020102                              CMP     GOOD,IN         ;COMPARE GOOD AND UNKNOWN DATA
1538  011506  001402                              BEQ     .+6             ;OK?
1539  011510  004737  012312                      JSR     PC,ERROR1       ;NO, ERROR
1540  011514  062777  000010  000104      TST31I: ADD     #10,@CHRPNT     ;BUMP CHARACTER POINTER TO NEXT ENTRY
1541  011522  022777  012310  000076              CMP     #END,@CHRPNT    ;END OF TABLE?
1542  011530  001003                              BNE     .+10            ;NO
1543  011532  012777  012120  000066              MOV     #CHARTB,@CHRPNT ;YES, RESET POINTER DATA
1544  011540  004737  011630                      JSR     PC,XMIT         ;SET UP TABLED DATA, TRANSMIT TO STATION
1545  011544  000703                              BR      TST31D
1546
1547                                      ;SUBROUTINE TO SET UP TABLE POINTERS
1548                                      ;CALLED BY JSR  PC,SETUP
1549
1550  011546  010003                      SETUP:  MOV     CHANEL,TEMP     ;COMPUTE TABLE ENTRY
1551  011550  000303                              SWAB    TEMP
1552  011552  006103                              ROL     TEMP            ;(CHANNEL NUMBER X 10)
1553  011554  006103                              ROL     TEMP
1554  011556  006103                              ROL     TEMP
1555  011560  042703  000007                      BIC     #7,TEMP
1556  011564  062703  011720                      ADD     #TABLE,TEMP     ;(+ TABLE)
1557  011570  010337  011620                      MOV     TEMP,CHAR
1558  011574  005723                              TST     (TEMP)+
1559  011576  010337  011622                      MOV     TEMP,STATUM
1560  011602  005723                              TST     (TEMP)+
1561  011604  010337  011624                      MOV     TEMP,DATUM
1562  011610  005723                              TST     (TEMP)+
1563  011612  010337  011626                      MOV     TEMP,CHRPNT
```

```
1564  011616  000207                          RTS     PC              ;EXIT
1565  011620  000000                  CHAR:   0
1566  011622  000000                  STATUM: 0
1567  011624  000000                  DATUM:  0
1568  011626  000000                  CHRPNT: 0
1569
1570                                  ;SUBROUTINE TO TRANSMIT TO A STATION AFTER SETTING UP NEW DATA
1571                                  ;CALLED BY JSR  PC,XMIT
1572
1573  011630  017703  177772          XMIT:   MOV     @CHRPNT,TEMP    ;SET UP:
1574  011634  012377  177760                  MOV     (TEMP)+,@CHAR   ;NEW CHARACTER
1575  011640  012377  177756                  MOV     (TEMP)+,@STATUM ;NEW STATUS
1576  011644  012377  177754                  MOV     (TEMP)+,@DATUM  ;NEW DATA
1577  011650  011305                          MOV     @TEMP,AC        ;NEW TRANSMIT MODE
1578  011652  010003                          MOV     CHANEL,TEMP     ;SET UP CHANNEL FOR NO RECEIVER INTERRUPTS
1579  011654  062703  000060                  ADD     #60,TEMP
1580  011660  010377  166344                  MOV     TEMP,@SCRS
1581  011664  010003                          MOV     CHANEL,TEMP
1582  011666  032777  001000  166324          BIT     #MMODE,@SWR
1583  011674  001402                          BEQ     .+6
1584  011676  062703  000004                  ADD     #4,TEMP
1585  011702  060503                          ADD     AC,TEMP
1586  011704  010377  166322                  MOV     TEMP,@SCTS      ;SET UP TRANSMITTER FOR PROPER MODE
1587  011710  017777  177704  166320          MOV     @CHAR,@SCD      ;TRANSMIT TO PDP-14
1588  011716  000207                          RTS     PC              ;EXIT
1589
1590          011720                          TABLE=.
1591          012120                          .=.+200
1592
1593
1594                                  ;TABLE OF CHARACTERS,STATUS WORDS, DATA WORDS AND TRANSMIT MODE
1595
1596  012120  000060                  CHARTB: 000060                  ;CHARACTER - EEM
1597  012122  000260                          260                     ;STATUS - EXT
1598  012124  000000                          0                       ;DATA WORD
1599  012126  000002                          2                       ;TRANSMIT MODE
1600  012130  000024                          000024                  ;C - JMP
1601  012132  000260                          260                     ;S - EXT
1602  012134  000000                          0                       ;D
1603  012136  000002                          2                       ;T.M.
1604  012140  000046                          46                      ;C - ADDR
1605  012142  000260                          260                     ;S - EXT
1606  012144  000000                          0                       ;D
1607  012146  000002                          2                       ;T.M.
1608  012150  000046                          46                      ;C - TRR PC,OT
1609  012152  000360                          360                     ;S - EXT, OUT
1610  012154  000046                          46                      ;D
1611  012156  000003                          3                       ;T.M.
1612  012160  160000                          160000                  ;C - TXD 0
1613  012162  000360                          360                     ;S - EXT, OUT
1614  012164  160000                          160000                  ;D
1615  012166  000003                          3                       ;T.M.
1616  012170  170000                          170000                  ;C - TYD 0
1617
1618  012172  000360                          360                     ;S - EXT, OUT
1619  012174  170000                          170000                  ;D
```

```
1620  012176  000003                          3                       ;T.M.
1621  012200  000124                          000124                  ;C - JMS
1622  012202  000260                          260                     ;S. - EXT
1623  012204  000000                          0                       ;D
1624  012206  000002                          2                       ;T.M.
1625  012210  000046                          00046                   ;C - ADDR
1626  012212  000260                          260                     ;S - EXT
1627  012214  000000                          0                       ;D
1628  012216  000002                          2                       ;T.M.
1629  012220  000046                          46                      ;C - TRRPC,OT
1630  012222  000360                          360                     ;S - EXT,OUT
1631  012224  000046                          46                      ;D
1632  012226  000003                          3                       ;T.M.
1633  012230  000022                          000022                  ;C - TRM
1634  012232  000260                          260                     ;S - EXT
1635  012234  000000                          0                       ;D
1636  012236  000002                          2                       ;T.M.
1637  012240  050125                          050125                  ;C - WORD
1638  012242  000360                          360                     ;S - EXT, OUT
1639  012244  050125                          05C125                  ;D
1640  012246  000003                          3                       ;T.M.
1641  012250  100226                          100226                  ;C - TRM
1642  012252  000260                          260                     ;S - EXT
1643  012254  000000                          0                       ;D
1644  012256  000002                          2                       ;T.M.
1645  012260  120252                          120252                  ;C - WORD
1646  012262  000360                          360                     ;S - EXT,OUT
1647  012264  120252                          120252                  ;D
1648  012266  000003                          3                       ;T.M.
1649  012270  100226                          100226                  ;C - TRM
1650  012272  000260                          260                     ;S - EXT
1651  012274  000000                          0                       ;D
1652  012276  000002                          2                       ;T.M.
1653  012300  170377                          170377                  ;C - WORD
1654  012302  000360                          360                     ;S - EXT,OUT
1655  012304  170377                          170377                  ;D
1656  012306  000003                          3                       ;T.M.
1657  012310  000000                  END:    0
1658
1659                                  ;ERROR HANDER - DATA ERROR WITH TYPE OUT OF CONTENTS OF "GOOD" AND "IN"
1660                                  ;CALLED BY JSR  PC,ERROR1
1661
1662  012312  004737  012576          ERROR1: JSR     PC,LOOPO        ;SCOPE LOOP?
1663  012316  000207                          RTS     R7              ;YES
1664  012320  032777  020000  165672          BIT     #NOPRNT,@SWR    ;SUPPRESS TYPEOUT?
1665  012326  001034                          BNE     ERR1B           ;YES
1666  012330  004737  012504                  JSR     PC,HEDTYP       ;TYPE OUT HEADER
1667  012334  005737  000304                  TST     HEAD2           ;OUTPUT FORMAT?
1668  012340  001413                          BEQ     ERR1A           ;NO
1669  012342  005737  006532                  TST     ER4FLP
1670  012346  001010                          BNE     ERR1A
1671  012350  005037  000304                  CLR     HEAD2
1672  012354  012705  013343                  MOV     #FORMES,AC      ;YES, OUTPUT FORMAT MESSAGE
1673  012360  004737  012650                  JSR     PC,MESAGE
1674  012364  004737  013066                  JSR     PC,CRLF
1675  012370  010105                  ERR1A:  MOV     GOOD,AC         ;OUTPUT GOOD DATA IN OCTAL
```

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1676  012372  004737  012676                    JSR     PC,OPRINT
1677  012376  012705  000040                    MOV     #40,AC          ;SPACE
1678  012402  004737  013052                    JSR     PC,TYPE
1679  012406  010205                            MOV     IN,AC           ;OUTPUT BAD DATA IN OCTAL
1680  012410  004737  012676                    JSR     PC,OPRINT
1681  012414  004737  013066                    JSR     PC,CRLF
1682  012420  032777  040000  165572  ERR1B:    BIT     #NOHLT,@SWR     ;HALT ON ERROR?
1683  012426  001001                            BNE     .+4             ;NO
1684  012430  000000                  ER1HLT:   HALT                    ;YES
1685  012432  000207                            RTS     R7              ;EXIT
1686
1687
1688                                    ;ERROR HANDLER - NO DATA ERROR, STATEMENTS ONLY
1689                                    ;CALLED BY JSR  PC,ERROR2
1690
1691  012434  004737  012576           ERROR2:  JSR     PC,LOOPD        ;SCOPE LOOP?
1692  012440  000207                            RTS     R7              ;YES
1693  012442  032777  020000  165550            BIT     #NOPRNT,@SWR    ;SUPPRESS TYPEOUT?
1694  012450  001002                            BNE     ERR2A           ;YES
1695  012452  004737  012504                    JSR     PC,HEDTYP       ;TYPE OUT HEADER
1696  012456  032777  040000  165534  ERR2A:    BIT     #NOHLT,@SWR     ;HALT ON ERROR?
1697  012464  001001                            BNE     .+4             ;NO
1698  012466  000000                  ER2HLT:   HALT                    ;YES
1699  012470  000207                            RTS     R7              ;EXIT
1700
1701                                    ;SUBROUTINE TO RING BELL ON TTY
1702                                    ;CALLED BY JSR PC, BELL
1703
1704  012472  012705  000007           BELL:    MOV     #7,AC           ;MOVE BELL CODE TO AC
1705  012476  004737  013052                    JSR     PC,TYPE         ;PRINT IT (DING!)
1706  012502  000207                            RTS     PC              ;EXIT
1707
1708                                    ;SUBROUTINE TO TYPE OUT HEADERS
1709                                    ;CALLED BY      JSR     PC,HEDTYP       WITH MESSAGE ADDRESSES IN HEAD1 AND HEAD2
1710
1711  012504  004737  013066           HEDTYP:  JSR     PC,CRLF
1712  012510  013705  000302                    MOV     HEAD1,AC        ;HEAD1 ALREADY PRINTED?
1713  012514  001420                            BEQ     HED1            ;YES, TRY HEAD2
1714  012516  004737  012650                    JSR     PC,MESAGE       ;NO, PRINT IT
1715  012522  004737  013066                    JSR     PC,CRLF
1716  012526  005037  000302                    CLR     HEAD1
1717  012532  012705  013332                    MOV     #CHMESS,AC      ;PRINT "CHANNEL"
1718  012536  004737  012650                    JSR     PC,MESAGE
1719  012542  010005                            MOV     CHANEL,AC       ;PRINT CHANNEL NUMBER
1720  012544  000305                            SWAB    AC
1721  012546  004737  012676                    JSR     PC,OPRINT
1722  012552  004737  013066                    JSR     PC,CRLF
1723  012556  013705  000304           HED1:    MOV     HEAD2,AC        ;HEAD2 ALREADY PRINTED?
1724  012562  001404                            BEQ     HEDX            ;YES, EXIT
1725  012564  004737  012650                    JSR     PC,MESAGE       ;NO, PRINT IT
1726  012570  004737  013066                    JSR     PC,CRLF
1727  012574  000207                  HEDX:     RTS     PC              ;EXIT
1728
1729                                    ;SCOPE LOOP TEST SUBROUTINE - EXIT TO CALL+2 IF SCOPE LOOP, CALL+4 IF NOT
1730                                    ;CALLED BY      JSR     PC,LOOPD
1731
```

```
1732  012576  032777  100000  165414  LOOP0:  BIT     #SCOPE,@SWR     ;SCOPE SWITCH SET?
1733  012604  001002                          BNE     .+6             ;YES, DON'T BUMP RETURN ADDRESS
1734  012606  062716  000002                  ADD     #2,@SP          ;NO, BUMP RETURN ADDRESS
1735  012612  000207                          RTS     PC              ;EXIT
1736
1737                                  ;LOOP ON CURRENT CHANNEL TEST SBUROUTINE - EXIT TO CALL+2 IF LOOP, CALL+6 IF NOT
1738                                  ;CALLED BY      JSR     PC,LOOP1
1739
1740  012614  032777  010000  165376  LOOP1:  BIT     #HOLDCH,@SWR    ;HOLD CHANNEL SWITCH SET?
1741  012622  001002                          BNE     .+6             ;YES, DON'T BUMP RETURN ADDRESS
1742  012624  062716  000004                  ADD     #4,@SP          ;NO, BUMP RETURN ADDRESS
1743  012630  000207                          RTS     PC              ;EXIT
1744
1745                                  ;REPEAT ALL TESTS TEST SUBROUTINE - EXIT TO CALL+2 OF REPEAT, CALL+6 IF NOT
1746                                  ;CALLED BY      JSR     PC,LOOP2
1747
1748  012632  032777  004000  165360  LOOP2:  BIT     #REPEAT,@SWR    ;REPEAT SWITCH SET?
1749  012640  001002                          BNE     .+6             ;YES, DON'T BUMP RETURN ADDRESS
1750  012642  062716  000004                  ADD     #4,@SP          ;NO, BUMP RETURN ADDRESS
1751  012646  000207                          RTS     PC              ;EXIT
1752
1753                                  ;SUBROUTINE TO TYPE OUT MESSAGE WHOSE ADDRESS IS IN AC
1754                                  ;CALLED BY      JSR PC,MESAGE
1755  012650  010337  013050          MESAGE: MOV     TEMP,@TEMP
1756  012654  010503                          MOV     AC,TEMP
1757
1758  012656  112305                  MLOOP:  MOVB    (TEMP)+,AC      ;MOVE CHARACTER INTO AC
1759  012660  001003                          BNE     1$              ;ZERO (DONE)?
1760  012662  013703  013050                  MOV     @TEMP,TEMP
1761  012666  000207                          RTS     PC              ;YES, EXIT
1762  012670  004737  013052          1$:     JSR     PC,TYPE         ;NO, TYPE OUT CHARACTER
1763  012674  000770                          BR      MLOOP           ;LOOP
1764
1765                                  ;SUBROUTINE TO TYPE OUT THE DONTENTS OF AC IN OCTAL
1766                                  ;CALLED BY JSR  PC,OPRNT
1767
1768  012676  012737  177773  013044  OPRINT: MOV     #-5,OCNT        ;SET UP COUNTER FOR 5 CHARACTERS
1769  012704  012737  013036  013046          MOV     #OTAB+4,OPNT    ;SET UP POINTER FOR CHARACTER STORE, BACKWARDS
1770  012712  010537  013050          OLOOP1: MOV     AC,@TEMP        ;SAVE AC
1771  012716  042705  000370                  BIC     #370,AC         ;CLEAR ALL BUT BITS 2-0
1772  012722  062705  000060                  ADD     #60,AC          ;ADD IN ASCII CODE
1773  012726  110577  000114                  MOVB    AC,@OPNT        ;STORE IN TABLE
1774  012732  005337  013046                  DEC     OPNT            ;DECREMENT POINTER
1775  012736  013705  013050                  MOV     @TEMP,AC        ;RESTORE AC
1776  012742  006005                          ROR     AC              ;MOVE 3 PLATE RIGHT
1777  012744  006005                          ROR     AC
1778  012746  006005                          ROR     AC
1779  012750  005237  013044                  INC     OCNT            ;INCREMENT COUNTER, DONE?
1780  012754  001356                          BNE     OLOOP1          ;NO, LOOP
1781  012756  042705  000376                  BIC     #376,AC         ;YES, MASK OFF TO BIT 0
1782  012762  062705  000060                  ADD     #60,AC          ;ADD IN ASCII CODE
1783  012766  004737  013052                  JSR     PC,TYPE         ;TYPE CHARACTER
1784  012772  012737  177773  013044          MOV     #-5,OCNT        ;SET UP COUNTER FOR 5 CHARACTERS
1785  013000  012737  013032  013046          MOV     #OTAB,OPNT      ;SET UP POINTER FOR CHARACTER PICKUP, FORWARD
1786  013006  117705  000034          OLOOP2: MOVB    @OPNT,AC        ;GET CHARACTER
1787  013012  004737  013052                  JSR     PC,TYPE         ;TYPE CHARACTER
```

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1788  013016  005237  013046                  INC     OPNT            ;INCREMENT POINTER
1789  013022  005237  013044                  INC     OCNT            ;INCREMENT COUNTER, DONE?
1790  013026  001367                          BNE     OLOOP2          ;NO, LOOP
1791  013030  000207                          RTS     PC              ;YES, EXIT
1792  013032  000000                  OTAB:   0                       ;CHARACTER TABLE
1793  013034  000000                          0
1794  013036  000000                          0
1795  013040  000000                          0
1796  013042  000000                          0
1797  013044  000000                  OCNT:   0                       ;COUNTER
1798  013046  000000                  OPNT:   0                       ;POINTER
1799  013050  000000                  OTEMP:  0                       ;TEMP STORAGE
1800
1801                                  ;SUBROUTINE TO PRINT THE CONTENTS OF AC
1802                                  ;CALLED BY      JSR     PC,TYPE
1803
1804  013052  010577  165140          TYPE:   MOV     AC,@OUTDBR
1805  013056  105777  165132                  TSTB    @OUTCSR
1806  013062  100375                          BPL     .-4
1807  013064  000207                          RTS     PC
1808
1809                                  ;SUBROUTINE TO PRINT A CR-LF COMBINATION
1810                                  ;CALLED BY JSR  PC,CRLF
1811
1812  013066  012705  000015          CRLF:   MOV     #15,AC
1813  013072  004737  013052                  JSR     PC,TYPE
1814  013076  012705  000012                  MOV     #12,AC
1815  013102  004737  013052                  JSR     PC,TYPE
1816  013106  000207                          RTS     PC
1817
1818                                  ;SUBROUTINE TO EXECUTE AN INSTRUCTION IN THE INDUSTRIAL-14
1819                                  ;MODE OF TRANSMISSION HAS ALREADY BEEN SET IN SCTS
1820                                  ;WORD TO BE SENT TO INDUSTRIAL-14 IS IN "TEMP"
1821                                  ;EXIT AFTER "EXTERNAL FLAG" WITH CURRENT CHANNEL STATUS IN "IN"
1822
1823  013110  010377  165122          EXEQT:  MOV     TEMP,@SCD       ;TRANSMIT WORD TO PDP-14
1824  013114  012737  000000  013270          MOV     #0,EXECNT       ;SET UP WAIT PERIOD
1825  013122  017702  165102          EXEQT1: MOV     @SCRS,IN        ;GET CURRENT CHANNEL STATUS
1826  013126  032702  040000                  BIT     #40000,IN       ;DOES RUN=0
1827  013132  001032                          BNE     RUNERR
1828  013134  032702  000200                  BIT     #200,IN         ;IS EXTERNAL FLAG SET?
1829  013140  001054                          BNE     EXEQT2          ;YES, CHECK RECEIVER ACTIVE
1830  013142  005237  013270                  INC     EXECNT          ;NO, DONE TESTING?
1831  013146  001365                          BNE     EXEQT1          ;NO, LOOP
1832  013150  004737  013066          HUNGER: JSR     PC,CRLF         ;YES,CRLF
1833  013154  012705  013332                  MOV     #CHMESS,AC      ;PRINT "CHANNEL"
1834  013160  004737  012650                  JSR     PC,MESAGE
1835  013164  010005                          MOV     CHANEL,AC       ;PRINT CHANNEL NUMBER
1836  013166  000305                          SWAB    AC
1837  013170  004737  012676                  JSR     PC,OPRINT
1838  013174  004737  013066                  JSR     PC,CRLF
1839  013200  012705  013356                  MOV     #HUNMES,AC      ;PRINT "INDUSTRIAL-14 HUNG"
1840  013204  004737  012650                  JSR     PC,MESAGE
1841  013210  004737  013066                  JSR     PC,CRLF
1842
1843  013214  000000          HUNHLT: HALT                            ;UNCONDITIONAL HALT
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1844  013216  000207                          RTS     PC              ;EXIT
1845  013220  004737  013066          RUNERR: JSR     PC,CRLF         ;STOPPED RUNNING
1846  013224  012705  013332                  MOV     #CHMESS,AC      ;PRINT "CHANNEL"
1847  013230  004737  012650                  JSR     PC,MESAGE
1848  013234  010005                          MOV     CHANEL,AC       ;PRINT CHANNEL NUMBER
1849  013236  000305                          SWAB    AC
1850  013240  004737  012676                  JSR     PC,OPRINT
1851  013244  004737  013066                  JSR     PC,CRLF
1852  013250  012705  013366                  MOV     #RUNMES,AC      ;PRINT "INDUSTRIAL-14 STOPPED"
1853  013254  004737  012650                  JSR     PC,MESAGE
1854  013260  004737  013066                  JSR     PC,CRLF
1855  013264  000000          RUNHLT: HALT                            ;UNCONDITIONAL HALT
1856  013266  000207                          RTS     PC              ;EXIT
1857  013270  000000          EXECNT: 0
1858  013272  000207          EXEQT2: RTS     PC
1859
1860                          ;SUBROUTINE TO SIZE FOR AN 11/70 CENTRAL PROCESSOR
1861                          ;       IF IT IS AN 11/70 CPU, CACHE WILL BE DISABLED.
1862                          ;       IF NOT AN 11/70 CPU, NO ACTION WILL BE PERFORMED.
1863                          ;
1864                          ;       CALLED BY       JSR PC,NOCACH
1865                          ;                       NO ARGUMENTS ARE PASSED
1866
1867  013274  013746  000004 NOCACH: MOV     @#4,-(SP)       ;SAVE ERROR VECTOR
1868  013300  012737  013322  000004  MOV     #1$,@#4         ;SET UP ERROR VECTOR
1869  013306  005737  177746          TST     @#177746        ;TRY TO REFERENCE THE 11/70'S MEMORY
1870                                                           ;CONTROL REGISTER.  IF THE PROCESSOP
1871                                                           ;IS NOT AN 11/70, A TIME-OUT TRAP WILL
1872                                                           ;OCCUR.
1873  013312  012737  000014  177746  MOV     #14,@#177746    ;NO TIME-OUT OCCURED AND THE 11/70'S
1874                                                           ;HIGH-SPEED CACHE MEMORY WILL BE DISABLED
1875  013320  000401                  BR      2$              ;BRANCH IF NO TIME-OUT
1876  013322  022626          1$:     CMP     (SP)+,(SP)+     ;ADJUST STACK POINTER
1877  013324  012637  000004  2$:     MOV     (SP)+,@#4       ;RESTORE ERROR VECTOR
1878  013330  000207                  RTS     PC              ;RETURN TO CALLER
1879
```

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1880  013332  044103  047101  042516  CHMESS: .ASCII  "CHANNEL "
1881  013340  020114
1882  013342     000                  MESS69: .BYTE   0
1883  013343     107  047517  020104  FORMES: .ASCIZ  "GOOD   BAD"
1884  013350  020040  040502  000104
1885  013356  032061  044040  047125  HUNMES: .ASCIZ  "14 HUNG"
1886  013364  000107
1887  013366  032061  051440  047524  RUNMES: .ASCIZ  "14 STOPPED"
1888  013374  050120  042105     000
1889  013401     122  041505  044505  RECMES: .ASCIZ  "RECEIVER ACTIVE TOO LONG AFTER EXTERNAL FLAG"
1890  013406  042526  020122  041501
1891  013414  044524  042526  052040
1892  013422  047517  046040  047117
1893  013430  020107  043101  042524
1894  013436  020122  054105  042524
1895  013444  047122  046101  043040
1896  013452  040514  000107
1897  013456  047514  042101  040440  MESS1:  .ASCIZ  "LOAD AND READ SCRS BITS 11 TO 8"
1898  013464  042116  051040  040505
1899  013472  020104  041523  051522
1900  013500  041040  052111  020123
1901  013506  030461  052040  020117
1902  013514  000070
1903  013516  047514  042101  040440  MESS2:  .ASCIZ  "LOAD AND READ SCTS BITS 11 TO 8"
1904  013524  042116  051040  040505
1905  013532  020104  041523  051524
1906  013540  041040  052111  020123
1907  013546  030461  052040  020117
1908  013554  000070
1909  013556  047514  042101  040440  MESS3:  .ASCIZ  "LOAD AND READ SCRS INTERRUPT ENABLES"
1910  013564  042116  051040  040505
1911  013572  020104  041523  051522
1912  013600  044440  052116  051105
1913  013606  052522  052120  042440
1914  013614  040516  046102  051505
1915  013622     000
1916  013623     124  051505  020124  MESS4:  .ASCIZ  "TEST INTERRUPT ENABLES AFTER 'RESET'"
1917  013630  047111  042524  051122
1918  013636  050125  020124  047105
1919  013644  041101  042514  020123
1920  013652  043101  042524  020122
1921  013660  051047  051505  052105
1922  013666  000047
1923  013670  047514  042101  040440  MESS5:  .ASCIZ  "LOAD AND READ SCTS TRANSMIT MODE BITS"
1924  013676  042116  051040  040505
1925  013704  020104  041523  051524
1926  013712  052040  040522  051516
1927  013720  044515  020124  047515
1928  013726  042504  041040  052111
1929  013734  000123
1930  013736  051124  047101  046523  MESS6:  .ASCIZ  "TRANSMIT AND RECEIVE IN NON-INTERRUPT ENVIRONMENT"
1931  013744  052111  040440  042116
1932  013752  051040  041505  044505
1933  013760  042526  044440  020116
1934  013766  047516  026516  047111
1935  013774  042524  051122  050125
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1936  014002  020124  047105  044526
1937  014010  047522  046516  047105
1938  014016  000124
1939  014020  051124  047101  046523  MESS6A: .ASCIZ  "TRANSMIT DONE NOT CLEARED BY TRANSMISSION"
1940  014026  052111  042040  047117
1941  014034  020105  047516  020124
1942  014042  046103  040505  042522
1943  014050  020104  054502  052040
1944  014056  040522  051516  044515
1945  014064  051523  047511  000116
1946  014072  042522  042503  053111  MESS6B: .ASCIZ  "RECEIVER NOT ACTIVE AFTER TRANSMISSION"
1947  014100  051105  047040  052117
1948  014106  040440  052103  053111
1949  014114  020105  043101  042524
1950  014122  020122  051124  047101
1951  014130  046523  051511  044523
1952  014136  047117     000
1953  014141     103  040510  047116  MESS6C: .ASCIZ  "CHANNEL STATUS ERROR"
1954  014146  046105  051440  040524
1955  014154  052524  020123  051105
1956  014162  047522  000122
1957  014166  044103  047101  042516  MESS6E: .ASCIZ  "CHANNEL DATA ERROR"
1958  014174  020114  040504  040524
1959  014202  042440  051122  051117
1960  014210     000
1961          014020                          MESS6F=MESS6A
1962          014072                          MESS6G=MESS6B
1963          014141                          MESS6H=MESS6C
1964          014166                          MESS6J=MESS6E
1965          014020                          MESS6K=MESS6A
1966          014072                          MESS6L=MESS6B
1967          014141                          MESS6M=MESS6C
1968          014166                          MESS6P=MESS6E
1969  014211     124  040522  051516  MESS7:  .ASCIZ  "TRANSMIT AND RECEIVE IN AN INTERRUPT ENVIRONMENT"
1970  014216  044515  020124  047101
1971  014224  020104  042522  042503
1972  014232  053111  020105  047111
1973  014240  040440  020116  047111
1974  014246  042524  051122  050125
1975  014254  020124  047105  044526
1976  014262  047522  046516  047105
1977  014270  000124
1978          014020                          MESS7A=MESS6A
1979          014072                          MESS7B=MESS6B
1980  014272  047516  044440  052116  MESS7C: .ASCIZ  "NO INTERRUPT OCCURRED"
1981  014300  051105  052522  052120
1982  014306  047440  041503  051125
1983  014314  042522  000104
1984          014141                          MESS7D=MESS6C
1985          014166                          MESS7E=MESS6E
1986          014020                          MESS7F=MESS6A
1987          014072                          MESS7G=MESS6B
1988          014272                          MESS7H=MESS7C
1989          014141                          MESS7I=MESS6C
1990          014166                          MESS7J=MESS6E
1991          014020                          MESS7K=MESS6A
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                                                        MESS7L=MESS6B
                                                        MESS7M=MESS7C
                                                        MESS7N=MESS6C
                                                        MESS7P=MESS6E
1996  014320  052522  020116  046106  MESS8:  .ASCIZ  "RUN FLIP/FLOP AND '0200'"
1997  014326  050111  043057  047514
1998  014334  020120  047101  020104
1999  014342  030047  030062  023460
2000  014350     000
2001  014351     116  020117  047111  MESS8A: .ASCIZ  "NO INTERRUPT ON RUN ERROR"
2002  014356  042524  051122  050125
2003  014364  020124  047117  051040
2004  014372  047125  042440  051122
2005  014400  051117     000
2006  014403     103  040510  047116  MESS8B: .ASCIZ  "CHANNEL STATUS ERROR AFTER EXECUTING '0200'"
2007  014410  046105  051440  040524
2008  014416  052524  020123  051105
2009  014424  047522  020122  043101
2010  014432  042524  020122  054105
2011  014440  041505  052125  047111
2012  014446  020107  030047  030062
2013  014454  023460     000
2014  014457     103  040510  047116  MESS8C: .ASCIZ  "CHANNEL STATUS ERROR AFTER DELAY AFTER '0200'"
2015  014464  046105  051440  040524
2016  014472  052524  020123  051105
2017  014500  047522  020122  043101
2018  014506  042524  020122  042504
2019  014514  040514  020131  043101
2020  014522  042524  020122  030047
2021  014530  030062  023460     000
2022  014535     103  042510  045503  MESS9:  .ASCIZ  "CHECK 'WORD LOST' FLIP/FLOP"
2023  014542  023440  047527  042122
2024  014550  046040  051517  023524
2025  014556  043040  044514  027520
2026  014564  046106  050117     000
2027  014571     103  040510  047116  MESS9A: .ASCIZ  "CHANNEL STATUS ERROR AFTER SECOND TRANSMISSION"
2028  014576  046105  051440  040524
2029  014604  052524  020123  051105
2030  014612  047522  020122  043101
2031  014620  042524  020122  042523
2032  014626  047503  042116  052040
2033  014634  040522  051516  044515
2034  014642  051523  047511  000116
2035  014650  047516  044440  052116  MESS9B: .ASCIZ  "NO INTERRUPT ON 'WORD LOST'"
2036  014656  051105  052522  052120
2037  014664  047440  020116  053447
2038  014672  051117  020104  047514
2039  014700  052123  000047
2040  014704  044103  041505  020113  MESS10: .ASCIZ  "CHECK THE REAL TIME CLOCK"
2041  014712  044124  020105  042522
2042  014720  046101  052040  046511
2043  014726  020105  046103  041517
2044  014734  000113
2045  014736  046103  041517  020113  MES10A: .ASCIZ  "CLOCK COUNTER NOT CLEARED BY DATA OUT"
2046  014744  047503  047125  042524
2047  014752  020122  047516  020124
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2048  014760  046103  040505  042522
2049  014766  020104  054502  042040
2050  014774  052101  020101  052517
2051  015002  000124
2052
2053  015004  042524  052116  051510  MES10B: .ASCIZ  "TENTHS OF SECONDS COUNTER ERROR"
2054  015012  047440  020106  042523
2055  015020  047503  042116  020123
2056  015026  047503  047125  042524
2057  015034  020122  051105  047522
2058  015042  000122
2059  015044  047516  051440  041505  MES10C: .ASCIZ  "NO SECONDS CLOCK CHANGE"
2060  015052  047117  051504  041440
2061  015060  047514  045503  041440
2062  015066  040510  043516  000105
2063  015074  042523  047503  042116  MES10D: .ASCIZ  "SECONDS COUNTER ERROR"
2064  015102  020123  047503  047125
2065  015110  042524  020122  051105
2066  015116  047522  000122
2067  015122  047516  046440  047111  MES10E: .ASCIZ  "NO MINUTES CLOCK CHANGE"
2068  015130  052125  051505  041440
2069  015136  047514  045503  041440
2070  015144  040510  043516  000105
2071  015152  044515  052516  042524  MES10F: .ASCIZ  "MINUTES COUNTER ERROR"
2072  015160  020123  047503  047125
2073  015166  042524  020122  051105
2074  015174  047522  000122
2075  015200  047516  044040  052517  MES10G: .ASCIZ  "NO HOURS CLOCK CHANGE"
2076  015206  051522  041440  047514
2077  015214  045503  041440  040510
2078  015222  043516  000105
2079  015226  047510  051125  020123  MES10H: .ASCIZ  "HOURS COUNTER ERROR"
2080  015234  047503  047125  042524
2081  015242  020122  051105  047522
2082  015250  000122
2083  015252  042523  047503  042116  MES10I: .ASCIZ  "SECONDS CLOCK CHANGED"
2084  015260  020123  046103  041517
2085  015266  020113  044103  047101
2086  015274  042507  000104
2087  015300  044515  052516  042524  MES10J: .ASCIZ  "MINUTES CLOCK CHANGED"
2088  015306  020123  046103  041517
2089  015314  020113  044103  047101
2090  015322  042507  000104
2091  015326  047510  051125  020123  MES10K: .ASCIZ  "HOURS CLOCK CHANGED"
2092  015334  046103  041517  020113
2093  015342  044103  047101  042507
2094  015350  000104
2095          014141                  MES20A=MESS6C
2096          014166                  MES20B=MESS6E
2097          014141                  MES20D=MESS6C
2098          014166                  MES20E=MESS6E
2099          014141                  MES21A=MESS6C
2100          014141                  MES21B=MESS6C
2101          014141                  MES21C=MESS6C
2102          014166                  MES21D=MESS6E
2103          014141                  MES21F=MESS6C
```

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2104            014141                                  MES21G=MESS6C
2105            014141                                  MES21H=MESS6C
2106            014166                                  MES21I=MESS6E
2107            014141                                  MES22A=MESS6C
2108            014141                                  MES22C=MESS6C
2109  015352   031060  030060  040440  MESS23: .ASCIZ  "0200 AND 0300 USING MODE 1"
2110  015360   042116  030040  030063
2111  015366   020060  051525  047111
2112  015374   020107  047515  042504
2113  015402   030440     000
2114  015405      061  020064  052522  MES23A: .ASCIZ  "14 RUN=1 AFTER 0300"
2115  015412   036516  020061  043101
2116  015420   042524  020122  031460
2117  015426   030060     000
2118            014141                                  MES23C=MESS6C
2119  015431      067  030060  020060  MES23D: .ASCIZ  "7000 AFTER 0300 SET RECEIVER ACTIVE"
2120  015436   043101  042524  020122
2121  015444   031460  030060  051440
2122  015452   052105  051040  041505
2123  015460   044505  042526  020122
2124  015466   041501  044524  042526
2125  015474      000
2126  015475      122  047125  030475  MES23E: .ASCIZ  "RUN=1 AFTER 7000"
2127  015502   040440  052106  051105
2128  015510   033440  030060  000060
2129  015516   032061  051040  047125  MES23F: .ASCIZ  "14 RUNS IMMEDIATELY AFTER 0200"
2130  015524   020123  046511  042515
2131  015532   044504  052101  046105
2132  015540   020131  043101  042524
2133  015546   020122  031060  030060
2134  015554      000
2135            014141                                  MES23G=MESS6C
2136  015555      067  030060  020060  MES23H: .ASCIZ  "7000 AFTER 0200 DELAY DIDN'T SET RECEIVER ACTIVE"
2137  015562   043101  042524  020122
2138  015570   031060  030060  042040
2139  015576   046105  054501  042040
2140  015604   042111  023516  020124
2141  015612   042523  020124  042522
2142  015620   042503  053111  051105
2143  015626   040440  052103  053111
2144  015634   000105
2145  015636   044523  052515  052114  MESS30: .ASCIZ  "SIMULTANEOUS INTERRUPTS"
2146  015644   047101  047505  051525
2147  015652   044440  052116  051105
2148  015660   052522  052120  000123
2149  015666   047516  026516  042523  MES30A: .ASCIZ  "NON-SEQUENTIAL INTERRUPT"
2150  015674   052521  047105  044524
2151  015702   046101  044440  052116
2152  015710   051105  052522  052120
2153  015716      000
2154  015717      115  046125  044524  MESS31: .ASCIZ  "MULTIPLE CHANNEL EXERCISER"
2155  015724   046120  020105  044103
2156  015732   047101  042516  020114
2157  015740   054105  051105  044503
2158  015746   042523  000122
2159  015752   047516  051040  041505  MES31A: .ASCIZ  "NO RECEIVER ACTIVE WITH TRANSMITTER ACTIVE"
```

```
2160  015760  044505  042526  020122
2161  015766  041501  044524  042526
2162  015774  053440  052111  020110
2163  016002  051124  047101  046523
2164  016010  052111  042524  020122
2165  016016  041501  044524  042526
2166  016024     000
2167  016025     116  020117  042522  MES31B: .ASCIZ  "NO RECEIVER INACTIVE WITH TRANSMITTER INACTIVE"
2168  016032  042503  053111  051105
2169  016040  044440  040516  052103
2170  016046  053111  020105  044527
2171  016054  044124  052040  040522
2172  016062  051516  044515  052124
2173  016070  051105  044440  040516
2174  016076  052103  053111  000105
2175          014141                          MES31C=MESS6C
2176          014166                          MES31D=MESS6E
2177
2178  016104  051124  047101  046523  MESSA:  .ASCIZ  "TRANSMISSION ERROR"
2179  016112  051511  044523  047117
2180  016120  042440  051122  051117
2181  016126     000
2182  016127     120  020103  020040  MES1:   .ASCIZ  "PC      INST"
2183  016134  020040  047111  052123
2184  016142     000
2185  016143     117  052125  052520  MESSB:  .ASCIZ  "OUTPUT REGISTER ERROR"
2186  016150  020124  042522  044507
2187  016156  052123  051105  042440
2188  016164  051122  051117     000
2189  016171     105  050130  042047  MES2:   .ASCIZ  "EXP'D  REC'D"
2190  016176  020040  042522  023503
2191  016204  000104
2192  016206  042103  020106  020060  MSCDF0: .ASCIZ  "CDF 0 ERROR"
2193  016214  051105  047522  000122
2194  016222  042103  020106  020061  MSCDF1: .ASCIZ  "CDF 1 ERROR"
2195  016230  051105  047522  000122
2196  016236  042515  047515  054522  MEMMES: .ASCIZ  "MEMORY COMPLIMENT TEST"
2197  016244  041440  046517  046120
2198  016252  046511  047105  020124
2199  016260  042524  052123     000
2200  016265     101  042104  020122  MS3:    .ASCIZ  "ADDR   CONT"
2201  016272  020040  047503  052116
2202  016300     000
2203          000001                          .END
```

```
BEGIN1  000500              15     99#    624    746   1423
BEGIN2  004604              16    746#   1412   1414
BEGIN3  010704              17   1423#
BELL    012472             615    622    1403   1410   1704#
CHAR    011620            1557*  1565#  1574*  1587
CHARTB  012120            1485   1543   1596#
CHMESS  013332            1717   1833   1846   1880#
CHRPNT  011626            1485*  1540*  1541   1543*  1563*  1568#  1573
CNT     006504            1013*  1015*  1030#
CORSIZ  006506            1031#  1240*  1244*  1250   1275
CRLF    013066            1674   1681   1711   1715   1722   1726   1812#  1832   1838   1841   1845   1851   1854
DATUM   011624            1535   1561*  1567#  1576*
DC14TV  000244              73#   407*   408*   459*   460*   508*   509*   510*   528*   529*   544*   545*   546*
                           586*   587*   603*   604*   605*  1452*  1453*  1458*  1459*  1460*
DELAY   000264              85#   308    317    351    360    416    426    471    481    536    595    634    784
                           810    832    864    896    906    938    948
DELY1   000300              93#  1498
END     012310            1541   1657#
ERROR1  012312             127    152    180    199    220    240    26'    280    325    331    368    374    440
                           446    495    501    552    564    611    661    678    694    712    980   1166   1228
                          1345   1384   1466   1531   1539   1662#
ERROR2  012434             306    313    349    356    414    421    430    469    476    485    540    599    644
                           668    685    703    729    735    741   1293   1297   1337   1356   1362   1371   1396
                          1505   1520   1691#
ERROR4  006216             783    789    809    815    835    840    847    867    872    879    899    904    909
                           914    921    941    946    951    956    963    976#
ERR1A   012370            1668   1670   1675#
ERR1B   012420            1665   1682#
ERR2A   012456            1694   1696#
ER1HLT  012430            1684#
ER2HLT  012466            1698#
ER4FLP  006532             979*   981*  1041#  1165*  1169*  1202*  1222*  1669
EXECNT  013270             778*   781*   784*   787*   804*   807*   810*   813*   832*   838*   842*   845*   864*
                           870*   874*   877*   896*   902*   906*   912*   916*   919*   938*   944*   948*   954*
                           958*   961*  1824*  1830*  1857#
EXEQT   013110             765   1020   1119   1122   1128   1136   1141   1180   1182   1191   1204   1246   1253
                          1261   1264   1271   1286   1321  1823#
EXEQT1  013122            1825#  1831
EXEQT2  013272            1829   1858#
FORM    006534             976   1043#  1213
FORMES  013343            1672   1883#
FORM1   006536            1044#
HEAD1   000302              94#   111*   136*   162*   247*   269*   291*   395*   517*   573*   629*   771*  1109*
                          1167*  1200*  1229*  1238*  1313*  1427*  1478*  1712   1716*
HEAD2   000304              95#   112*   137*   163*   248*   270*   303*   307*   314*   326*   346*   350*   357*
                           369*   411*   415*   422*   433*   441*   466*   470*   477*   488*   496*   527*   542*
                           553*   591*   601*   630*   657*   665*   673*   682*   690*   700*   708*   726*   732*
                           738*   772*  1110*  1168*  1201*  1230*  1292*  1296*  1334*  1339*  1353*  1359*  1368*
                          1372*  1385*  1451*  1497*  1514*  1525*  1536*  1667   1671*  1723
HEDTYP  012504            1666   1695   1711#
HEDX    012574            1724   1727#
HED1    012556            1713   1723#
HICLK   000272              90#   648*   681    699    730    736
HOLDCH= 010000              42#  1740
HOUR  = 000271              89#   701    704*   705    707*   709    713    737
HUNGER  013150            1832#
```

```
HUNHLT  013214           1843#
HUNMES  013356           1839    1885#
ICD     000234             69#    442     497
ICRS    000224             65#    435     490     547     606     1461
ICRS1   000250             77#
ICTS    000226             66#
ICTS1   000252             78#
JUMP    006510           1032#   1254
LCLK  = 002000             44#    695
LOCLK   000274             91#    647*    649     664     724
LOOP0   012576            122     128     147     153     175     181     194     200     215     221     235     241     253
                          262     275     281     332     375     447     502     565     612     791     817     849     881
                          923     965    1223    1281    1399    1470    1662    1691    1732#
LOOP1   012614            616    1404    1740#
LOOP2   012632            623    1411    1748#
LTH     000242             72#    648
LTH1    000262             82#
LTS     000240             71#    631*    632     638*    639     641*    642     647
LTS1    000260             81#
MEMLST  006300            998#   1123
MEMMES  016236           1200    2196#
MESAGE  012650           1673    1714    1718    1725    1755#   1834    1840    1847    1853
MESSA   016104            771    2178#
MESSB   016143           1109    2185#
MESS1   013456            111    1897#
MESS10  014704            629    2040#
MESS2   013516            136    1903#
MESS23  015352           1313    2109#
MESS3   013556            162    1909#
MESS30  015636           1427    2145#
MESS31  015717           1478    2154#
MESS4   013623            247    1916#
MESS5   013670            269    1923#
MESS6   013736            291    1930#
MESS6A  014020           1939#   1961    1965    1978    1986    1991
MESS6B  014072           1946#   1962    1966    1979    1987    1992
MESS6C  014141           1953#   1963    1967    1984    1989    1994    2095    2097    2099    2100    2101    2103    2104
                         2105    2107    2108    2118    2135    2175
MESS6E  014166           1957#   1964    1968    1985    1990    1995    2096    2098    2102    2106    2176
MESS6F= 014020            303    1961#
MESS6G= 014072            307    1962#
MESS6H= 014141            314    1963#
MESS6J= 014166            326    1964#
MESS6K= 014020            346    1965#
MESS6L= 014072            350    1966#
MESS6M= 014141            357    1967#
MESS6P= 014166            369    1968#
MESS69  013342            112     137     163     248     270    1882#
MESS7   014211            395    1969#
MESS7A= 014020           1978#
MESS7B= 014072           1979#
MESS7C  014272           1980#   1988    1993
MESS7D= 014141           1984#
MESS7E= 014166           1985#
MESS7F= 014020            411    1986#
MESS7G= 014072            415    1987#
```

```
MESS7H= 014272            422    1988#
MESS7I= 014141            433    1989#
MESS7J= 014166            441    1990#
MESS7K= 014020            466    1991#
MESS7L= 014072            470    1992#
MESS7M= 014272            477    1993#
MESS7N= 014141            488    1994#
MESS7P= 014166            496    1995#
MESS8   014320            517    1996#
MESS8A  014351            527    2001#
MESS8B  014403            542    2006#
MESS8C  014457            553    2014#
MESS9   014535            573    2022#
MESS9A  014571            601    2027#
MESS9B  014650            591    2035#
MES1    016127            772    2182#
MES10A  014736            630    2045#
MES10B  015004            657    2053#
MES10C  015044            665    2059#
MES10D  015074            673    2063#
MES10E  015122            682    2067#
MES10F  015152            690    2071#
MES10G  015200            700    2075#
MES10H  015226            708    2079#
MES10I  015252            726    2083#
MES10J  015300            732    2087#
MES10K  015326            738    2091#
MES2    016171           1110    2189#
MES20A= 014141           2095#
MES20B= 014166           2096#
MES20D= 014141           2097#
MES20E= 014166           2098#
MES21A= 014141           2099#
MES21B= 014141           2100#
MES21C= 014141           2101#
MES21D= 014166           2102#
MES21F= 014141           2103#
MES21G= 014141           2104#
MES21H= 014141           2105#
MES21I= 014166           2106#
MES22A= 014141           2107#
MES22C= 014141           2108#
MES23A  015405           1334    2114#
MES23C= 014141           1339    2118#
MES23D  015431           1353    2119#
MES23E  015475           1359    2126#
MES23F  015516           1368    2129#
MES23G= 014141           1372    2135#
MES23H  015555           1385    2136#
MES30A  015666           1451    2149#
MES31A  015752           1497    2159#
MES31B  016025           1514    2167#
MES31C= 014141           1525    2175#
MES31D= 014166           1536    2176#
MEXEC   006330           1013#   1126    1189    1210    1239    1249    1255    1258    1266    1273    1289
MINUTE  000270             88#     89     646#    683     686#    687     689#    691     697     718     731
```

```
MK1218  010050          1186    1207    1300#
MLOOP   012656          1758#   1763
MMODE = 001000            45#    298     340     402     455     523     579    1436    1582
MSCDF0  016206          1292    2192#
MSCDF1  016222          1296    2194#
MS3     016265          1201    2200#
NOCACH  013274           101     747    1867#
NOHLT = 040000            40#   1682    1696
NOP   = 000240            49#
NOPRNT= 020000            41#   1664    1693
OCNT    013044          1768*   1779*   1784*   1789*   1797#
OLOOP1  012712          1770#   1780
OLOOP2  013006          1786#   1790
ONCNT   006246           773*    794*    799*    820*    827*    852*    859*    884*    891*    926*    933*    968*    984#
                        1120*   1129*   1152*   1162*
ONCNT1  006250           985#   1154*   1160*
ONEWRD  006570           774     800    1059#
OPNT    013046          1763*   1773*   1774*   1785*   1786    1788*   1798#
OPRINT  012676          1676    1680    1721    1768#   1837    1850
OTAB    013032          1769    1785    1792#
OTEMP   013050          1211    1755*   1760    1770*   1775    1799#
OUTBUF  006364          1024#   1027    1139    1153
OUTCSR  000214            54#   1805
OUTDBR  000216            55#    715*    721*   1804*
OUTLST  006260           989#   1155
PS      000222            61#    107*    409*    425*    429*    461*    480*    484*    530*    535*    539*    588*    594*
                         598*   1428*   1454*   1457*
ROMEM   006516          1035#   1208*   1209    1262*   1265    1272
RECMES  013401          1889#
REPEAT= 004000            43#   1748
RUNERR  013220          1827    1845#
RUNHLT  013264          1855#
RUNMES  013366          1852    1887#
SCD     000236            70#    302*    327     345*    370     410*    465*    531*    532*    583*    590*    777*    803*
                         831*    841*    863*    873*    895*    905*    915*    937*    947*    957*   1014*   1113*   1138
                        1144    1212    1241    1267    1278    1327*   1350*   1365*   1388*   1440*   1534    1587*   1823*
SCOPE = 100000            39#   1732
SCRS    000230            67#    168*    173*    174     187*    192*    193     207*    213*    214     228*    233*    234
                         251*    255     295*    309     320     352     363     391*    399*    417     472     520*    559
                         576*    589*    760*    779     790     805     816     833     843     848     865     875     880
                         897     907     917     922     939     949     959     964    1114    1142    1316*   1322    1325
                        1330    1332    1335    1342    1354    1360    1369    1378    1392    1397    1433*   1501    1515
                        1580*   1825
SCRS1   000254            79#    117*    120*    121
SCTS    000232            68#    273*    274     301*    304     315     343*    347     358     406*    412     423     458*
                         467     478     526*    533     582*    584     592     763*    775*    776*    785     801*    802*
                         811     829*    830*    836     861*    862*    868     893*    894*    900     910     935*    936*
                         942     952    1017    1111*   1112*   1116*   1117*   1177*   1178*   1319*   1323*   1324*   1328
                        1348*   1349*   1351    1363*   1364*   1366    1386*   1387*   1389    1439*   1441    1496*   1499
                        1586*
SCTS1   000256            80#    142*    145*    146
SECOND= 000267            87#    666     669*    670     672*    674     679     725
SETUP   011546          1484    1526    1550#
STATIO  000276            92#    103*    104*    105*    619*    749*    750*    751*   1407*   1430*   1444*   1449*   1468*
                        1482*   1488*   1491*   1492*   1508
STATUM  011622          1527    1559*   1566#   1575*
```

```
STATAD  006524          1038#   1237
SWR     000220            58#    103     298     340     402     455     523     579     695     749    1424    1436    1479
                         1582   1664    1682    1693    1696    1732    1740    1748
TABLE = 011720           1556   1590#
TENTHS  000266            86#     87     645*    650     653*    654     656*    658     662    1424*   1425*   1426*   1430
                         1449   1479*   1480*   1481*   1482    1491
TEST00  000532            107#    617     621
TEST01  000536            111#
TEST02  000646            136#
TEST03  000756            162#
TEST04  001354            247#
TEST05  001450            269#
TEST06  001542            291#
TEST07  002232            386#
TEST08  003124            517#    566
TEST09  003420            573#    613
TEST1A  000600            120#    123     129
TEST1B  000556            114#    131
TEST10  003736            629#    723
TEST2A  000710            145#    148     154
TEST2B  000666            139#    156
TEST2C  004636            758#   1405    1409
TEST21  006712            970    1109#
TEST22  007232           1164    1177#   1226
TEST23  010100           1290    1313#
TEST3A  001016            171#    176     182
TEST3B  001110            190#    195     201
TEST3C  001206            211#    216     222
TEST3D  001304            231#    236     242
TEST3E  010730           1427#
TEST31  011204           1478#
TEST4A  001370            249#    254     263
TEST5A  001472            273#    276     282     285
TEST6B  001612            302#    333     335     337
TEST6C  002034            345#    376     378     380
TEST7B  002346            409#    448     450     452
TEST7C  002642            461#    503     505     507
THREE%D 006702            892     934    1100#
TST10A  003756            632#    637
TST10B  003776            633     638#
TST10C  004026            640     645#
TST20A  004732            777#    792     795
TST20B  005066            803#    818     821
TST20C  005222            831#    850     853
TST20D  005400            863#    882     885
TST20F  005556            895#    924     927
TST20G  006006            937#    966     969
TST22A  010020           1269    1292#
TST22B  010034           1280    1296#
TST22C  007752           1281#   1298
TST22D  007704           1270#   1294
TST22Z  007504           1225    1237#   1284
TST23A  010160           1325#   1326    1402
TST30A  010744           1429#   1471
TST30B  010754           1431#   1445
TST30C  011110           1452    1456#
```

```
TST30D  011140           1461#   1469
TST31A  011242           1484#   1489
TST31B  011306           1496#   1511    1513
TST31C  011334           1501#   1504
TST31D  011354           1502    1506#   1545
TST31E  011374           1509    1512#
TST31F  011400           1500    1514#
TST31G  011406           1515#   1519
TST31H  011430           1517    1525#
TST31I  011514           1533    1540#
TST6L1  002216            377#
TST7L1  003070            464     504#
TST7R2  002502            407     433#
TST7R3  003004            459     488#
TST8R1  003274            528     542#
TST9R1  003604            586     601#
TWOWD   006666            828     860     1092#
TYPE    013052           1678    1705     1762    1783    1787    1804#   1813    1815
T03L1   000776            165#    170
T03L2   001070            184#    189
T03L3   001162            203#    209
T03L4   001260            224#    230
T07L1   002236            387#    393
T10L1   004036            647#    714     716     720     742
T10L1A  004446            696     718#
T10L2   004476            652     663     724#
T10L3   004524            680     730#
T10L4   004552            698     736#
T23L1   010266           1342#   1347
T23L2   010346           1354#   1358
T23L3   010566           1392#   1395
T23L4   010606           1393    1397#   1398
WRITE   006252            986#   1124#   1125    1187#   1188    1247#   1248    1256#   1257    1287#   1288
XMIT    011630           1486    1544    1573#
.     = 016301              9#      14#     98#     126     151     179     198     219     239     260     279     299     305
                          310     312     316     319     324     330     341     348     353     355     359     362     367
                          373     403     413     418     420     424     428     439     445     456     468     473     475
                          479     483     494     500     524     534     538     551     556     558     563     580     585
                          593     597     610     620     636     643     651     655     660     667     671     677     684
                          688     693     702     706     711     719     728     734     740    1027#   1268    1279    1282
                         1283    1329    1331    1333    1336    1344    1355    1361    1367    1370    1375    1377    1383
                         1390    1400    1401    1408    1437    1442    1448    1465    1530    1538    1542    1583    1590
                         1591#   1683    1697    1733    1741    1749    1806

. ABS.  016301      000

 ERRORS DETECTED:  0

 DSKZ:DCDCAB.BIN,DSKZ:DCDCAB.LST/CRF/SOL/NL:TOC=DSKZ:DCDCAB.P11
 RUN-TIME:  1 4  .6 SECONDS
 RUN-TIME RATIO: 158/7=22.5
 CORE USED:  25K  (49 PAGES)
```