

TS11

TS11 CTRL LGC
CZTSIB0

AH E458B MC

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The main body of the document is a large grid of small, illegible data tables or charts. Each cell in the grid appears to contain a small table or diagram, possibly representing a control logic or data processing flow for the TS11 system. The text is too faint to be read, but the layout suggests a complex, multi-step process or data structure. The grid is organized into approximately 10 columns and 20 rows, with each cell containing a small, structured set of information.

IDENTIFICATION

PRODUCT CODE: AC-E457B-MC
PRODUCT NAME: CZTS1B0 TS11 CTRL LGC
MAINTAINER: DIAGNOSTIC ENGINEERING
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USER DOCUMENTATION

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GLOSSARY

ACT	AUTOMATED COMPUTER TEST
APT	AUTOMATED PRODUCT TEST SYSTEM USED IN MANUFACTURING.
BYTE/RECORD/FILE COUNT BRF	IS STORED IN THE 4TH WORD OF THE COMMAND PACKET AND IT'S USE BY THE TS04 DEPENDS ON THE TYPE OF COMMAND.
CMD	TS04 COMMAND
COMMAND PACKET CMDPKT	FOUR WORD PACKET IN THE CPU MEMORY WHICH CONTAINS ALL INFORMATION NEEDED BY THE TS04 TO EXECUTE A COMMAND.
EXTENDED STATUS	FOUR WORDS OF TS04 STATUS WHICH ARE TRANSFERRED AS PART OF THE MESSAGE PACKET AT THE COMPLETION OF A COMMAND.
MESSAGE PACKET	SEVEN WORD PACKET IN THE CPU MEMORY INTO WHICH THE TS04 STORES STATUS AT THE COMPLETION OF A COMMAND.
PC	PROGRAM COUNTER
PSW	PROCESSOR STATUS WORD
RESIDUAL FRAME COUNT RFC	THIS COUNT IS PART OF THE MESSAGE PACKET AND CONTAINS THE NUMBER OF BYTES/RECORDS /FILES REMAINING TO BE PROCESSED AT THE COMPLETION OF A COMMAND.
TERMINATION CLASS CODE TCC	THREE BIT CODE IN THE TSSR WHICH INDICATES THE TYPE OF COMMAND TERMINATION.
TSBA	TAPE SYSTEM BUS ADDRESS REGISTER.
TSDB	TAPE SYSTEM DATA BUFFER REGISTER.
TSSR	TAPE SYSTEM STATUS REGISTER.
XST0	EXTENDED STATUS REGISTER 0
XST1	EXTENDED STATUS REGISTER 1
XST2	EXTENDED STATUS REGISTER 2
XST3	EXTENDED STATUS REGISTER 3
XXDP*	XXDP* IS A 'CATCH-ALL' NAME FOR A GROUP OF PDP-11 DIAGNOSTIC PACKAGES AVAILABLE ON MULTIMEDIA.

1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

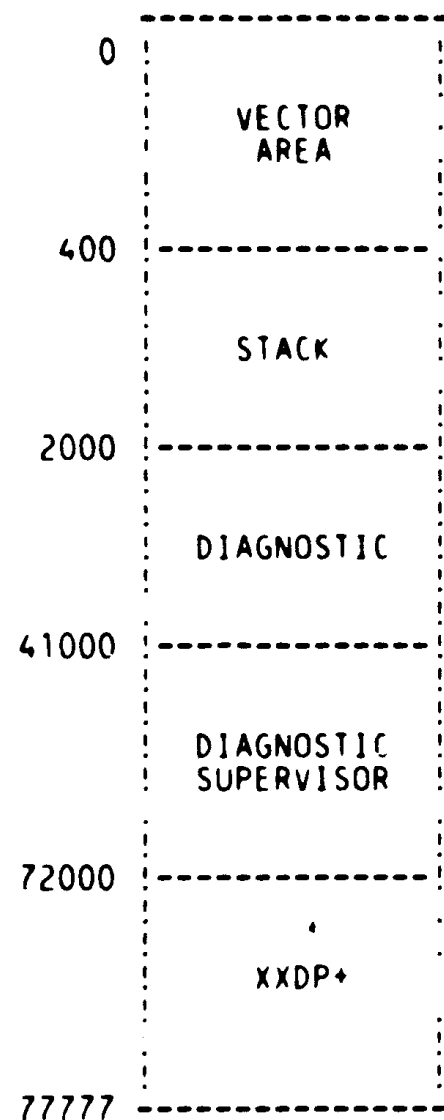
1.1.1 FUNCTIONAL DESCRIPTION

THIS PROGRAM PERFORMS CORRECTIVE MAINTENANCE BY EXECUTING TS11 AND TS04 WRAPAROUNDS FOR THE PURPOSE OF IDENTIFYING FAILED MODULES.

1.1.2 STRUCTURE OF PROGRAM

THIS DIAG IS A SINGLE PROGRAM FROM THE STANDPOINT OF THE USER, BUT IT CONTAINS A CONTROL MODULE RELEASED INDEPENDENTLY AS A DIAG SUPERVISOR.

1.1.3 MEMORY MAP



FREE MEMO SPACE RESIDES BETWEEN THE DIAG AND THE SUPERVISOR.

1.1.4 DIAGNOSTIC INFORMATION

THIS DIAGNOSTIC TESTS ONE UNIT AT A TIME, BUT WILL SEQUENTIALLY TEST UP TO 4 UNITS. THE 4 UNITS ARE ASSIGNED LOGICAL UNIT NUMBERS 0 - 3 BY THE DIAGNOSTIC. THE UNITS DO NOT HAVE TO BE ON LINE AND A TAPE DOES NOT HAVE TO BE LOADED TO RUN THIS DIAGNOSTIC.

RECOMMANDATION:

IT IS RECOMMANDED TO RUN THIS DIAG WITH NO TAPE LOADED BECAUSE OF MUCH FASTER EXECUTION TIME (SEE 2.4).

1.2 SYSTEM REQUIREMENTS

1.2.1 HARDWARE REQUIREMENTS

PDP-11 PROCESSOR WITH 16K OR MORE OF MEMORY
CONSOLE DEVICE (LA30,LA36,VT50,ETC.)
PROGRAM LOAD DEVICE

1.2.2 SOFTWARE REQUIREMENTS

DIAGNOSTIC SUPERVISOR

1.3 RELATED DOCUMENTS AND STANDARDS

XXDP+ USERS MANUAL MD- 1-CHQUS
DIAGNOSTIC SUPERVISOR PROGRAM LISTING
PDP-11 DIAGNOSTIC SUPERVISOR INTERFACE SPECIFICATION.
PDP-11 DIAGNOSTIC SUPERVISOR PROGRAMMER'S GUIDE
TS11/TS04 PROGRAMMING SPECIFICATION.
TS04/TS11 ENGINEERING SPECIFICATION.
TS11/TS04 COMMAND PACKET SPECIFICATION.

1.4 DIAGNOSTIC HIERARCHY PREREQUISITES

THIS PROGRAM SHOULD BE RUN BEFORE ANY OTHER HOST CPU DIAGNOSTIC PROGRAM.

1.5 ASSUMPTIONS

THE HARDWARE OTHER THAN THE SUBSYSTEM BEING TESTED IS ASSUMED TO WORK PROPERLY. FALSE ERRORS MAY BE REPORTED IF THE PROCESSOR, MEMORY, ETC., DO NOT FUNCTION PROPERLY.

1.6 DIAGNOSTIC HISTORY

REV A - FEB 79
- ORIGINAL RELEASE
REV B - AUG 79
-ADDED AN INTERRUPT TEST
-REVISED ALL TESTS BECAUSE OF AN HARDWARE ECO:
WATCH FOR TAPE MOTION DURING A LOAD SEQUENCE RESULTING FROM AN INIT SENT TO THE TS11.
-CONVERTED DIAG TO SUPERVISOR REV: C.
ADDED SEVERAL SECTIONS: PROTECT TABLE, AUTO-DROP CODE, HARD CODED PARAMETER TABLE...

2.0 OPERATING INSTRUCTIONS

SEQ 0008

2.1 HARDWARE PARAMETERS

ON A START COMMAND, THE DIAG ASKS: "CHANGE HW?".
ON A "N" ANSWER, THERE SHALL BE NO HARDWARE DIALOGUE AND THE
DIAG SHALL RUN ASSUMING A UNIT AT TSSR = 177522 WITH VECTOR OF
224.

ON A "Y" ANSWER TO "CHANGE HW?" QUESTION, THEN AND ONLY THEN,
THE FOLLOWING QUESTIONS WILL BE ASKED ON A START COMMAND. THE
VALUE LOCATED TO THE LEFT OF THE QUESTION MARK IS THE DEFAULT
VALUE THAT WILL BE TAKEN ON A CARRIAGE RETURN RESPONSE.

TSSR ADDRESS (172522) ?

VECTOR (224) ?

THE VALIDITY OF THESE PARAMETERS CAN BE CHECKED BEFORE RUNNING
THE TESTS BY SETTING THE FLAG "ADR" ON A STA, RES, OR CON COMMAND.
THE SO CALLED AUTO-DROP CODE SHALL THEN BE EXECUTED AFTER THE INIT
CODE AND BEFORE THE HARDWARE TESTS ARE RUN.
THAT CODE FIRST TESTS THE ADDRESS OF THE TSSR. IF NO RESPONSE FROM
THE INTERFACE, THE UNIT IS DROPPED IMMEDIATELY WITH THE FOLLOWING
MESSAGE:

BUS TRAP AT XXXXXX
INTERFACE BAD OR NOT SET TO ABOVE AD

(XXXXXX = TSSR AD)

ON A RESPONSE FROM THE INTERFACE, THE READY STATUS OF THE
UNIT IS CHECKED. IF NOT READY, THE UNIT IS DROPPED IMMEDIATELY.

2.2 SOFTWARE PARAMETERS

THE FOLLOWING QUESTION WILL BE ASKED ON REQUEST - I.E., ANSWERING
"Y" TO "CHANGE SW (L)?" QUESTION - ON A START, RESTART OR CONTINUE COMMAND:

ENABLE DATA COMPARE ERROR PRINTS FOR TESTS 4-7(L) N ?

IF "Y" IS THE RESPONSE TO THIS SOFTWARE QUESTION, THEN WILL DATA
COMPARE ERRORS BE PRINTED, PROVIDED IER FLAG IS RESET.

2.4 EXECUTION TIMES

2.4.1 SYSTEM CONFIGURATION

PDP11/70
MOS MEMORY
LA36
TS11/TS04

2.4.2 TESTS EXECUTION TIMES

TAPE NOT LOADED:	40	SEC
TAPE LOADED, UNIT OFF-LINE:	90	SEC
TAPE LOADED, UNIT ON-LINE:	145	SEC

3.0 ERROR INFORMATION

3.1 ERROR REPORTING

- 1 - COMMAND PACKET ADR NOT ON MODULO 4 BOUNDARY
- 2 - TS04 NOT READY-SSR NOT SET
- * 3 - PDP11-TS11 WRAP FAILURE
- * 4 - PDP11-TS11 WRAP FAILURE ON TSSR EXT ADDR BITS
- * 5 - PDP11-TS04 WRAP FAILURE-TSBA INCORRECT
- * 6 - PDP11-TS04 WRAP FAILURE-TSSR INCORRECT
- 7 - TRACK ACTIVE NOT 0 FOR 1 OR MORE TRACKS IN TEST4 SUB1
- 8 - TRACK ACTIVE NOT 0 FOR 1 OR MORE TRACKS IN TEST4 SUB3
- 9 - TRACK ACTIVE NOT 1 FOR 1 OR MORE TRACKS IN TEST4 SUB2
- 10 - TRACK ACTIVE NOT 1 FOR 1 OR MORE TRACKS 'N TEST4 SUB4
- 11 - TRACK ACTIVE ERROR
- 12 - PE WRAP DATA ON 0'S PATTERN
- 13 - PE WRAP DATA ERROR ON 1'S PATTERN
- 14 - PE WRAP DATA ERROR ON SHIFTING 1 PATTERN
- 15 - PE WRAP DATA ERROR ON SHIFTING 0 PATTERN
- 16 - PE SKEW ERROR
- 17 - PE DEAD TRACK ERROR
- 18 - ROM LOOKUP TABLE ERROR
- 19 - MICRO DIAGNOSTIC ERROR
- * 20 - SET CHAR ERROR-TSSR. NBA NOT SET ON COMMANDS BEFORE SET CHAR ISSUED.
- * 21 - SET CHAR ERROR-TSSR. NBA NOT CLEARED WHEN SET CHAR ISSUED
- * 22 - SET CHAR ERROR-TSBA NOT POINTING PAST MSG PACKET
- * 23 - SET CHAR ERROR-MSG PACKET CONTENTS IN DOUBT
- * 24 - SET CHAR ERROR-I/O SEQ CROM PARITY ERR (FC=1)
- * 25 - SET CHAR ERROR-SERIAL BUS PARITY ERR (FC=2)
- * 26 - SET CHAR ERROR-SILO PARITY ERR (FC=2)
- * 27 - SET CHAR ERROR-UP CROM PARITY ERROR OR FATAL MICRO ERROR HALTS (FC=2)
- * 28 - SET CHAR ERROR-AC DETECTED LOW AT TS04 (FC=3)
- * 29 - TS11 DID NOT DROP READY UPON COMMAND ISSUANCE
- 30 - PE DATA ERROR
- 31 - NO INTERRUPT

* = DEVICE FAIAL ERRORS - CALL BAD TS11 BOARD OR IO BOARDS

OTHER ERRORS ARE HARD ERRORS

NOTE: EXPECTED AND ACTUAL DATA AND/OR PRINTOUTS WILL OCCUR WITH SOME OF THE ABOVE MESSAGES WHEN APPLICABLE.

3.2 ERROR HALTS

ERROR HALTS ARE SUPPORTED PER DESCRIBED IN THE PREVIOUS SECTION WITH /FLAG:MOE. THERE ARE NO OTHER HALTS.

4.0 DEVICE INFORMATION TABLES

4.1 'DIAG' REGISTERS

;THE FOLLOWING ARE REGISTER AND BIT DEFINITIONS FOR THE TS04
;REGISTERS OF INTEREST IN THIS DIAGNOSTIC.

;FMCTLO - FORMATTER MAJOR STATE CONTROL REG
FMCTLO=4
;WRITE REGISTER 4

;THIS REGISTER IS SET UP FOR THE PORTION OF THE
;RECORD WE ARE PRESENTLY READING

FC.RD= 200 ;WE ARE DOING NORMAL READ. IF 0, WE DISABLE SOME ERROR
;CORRECTION LOGIC SO WE'RE MORE DISCRIMINATING
;FOR READ AFTER WRITE.
FC.FLO=100 ;SETTING THIS BIT CAUSES .FMFLO ON BBUS TO BE TRUE
;(NEEDED BY THE RD PE ROUTINE)
FC.DAT=10 ;DATA MODE
FC.PRE=4 ;PREAMBLE MODE
FC.VCO=2 ;VCO SYNC MODE
FC.NRZ=1 ;NRZI MODE (FORCE SKEW WINDOW TO STAY OPEN)
;CAUSES FMTAUI TO BE CLRED WHEN YOU WRITE
;TO THE FMCLDO REGISTER.

;RDCTLO - READ CONTROL REGISTER
RDCTLO=20
;WRITE REGISTER 20

;THIS REGISTER CONTROLS THE FORMATTER MODE AND THRESHOLD.

RD.REV=200 ;1 FOR REV MOTION, 0=FWD
RD.MAI=100 ;I/O FORMATTER DATA WRAPAROUND
RD.SPC=40 ;WE ARE SPACING RECORDS. (THIS BIT IS UNUSED IN
;THE HARDWARE BUT IS A SOFTWARE FLAG IN THE READ CODE)
RD.SKP=20 ;WE ARE SKIPPING FILES. (THIS BIT IS UNUSED IN
;THE HARDWARE BUT IS A SOFTWARE FLAG IN THE READ CODE)

;THE FOLLOWING THRESHOLDS ARE AVAILABLE:

RD.110=7 ;NORM USE DIAG USE
RD.90=6 ; HI PREAMP GAIN
RD.75=5 ; LO PREAMP, BAD TAPE CLEAN
RD.68=4 ; RESIDUAL ERASE CHK
RD.40=3 ; FWD/REV AMP BALANCE
RD.40=3 ;NRZ WRT
RD.20=2 ;NRZ RD, PE WRT
RD.12=1 ;PE READ, NRZ ERR RECOV RD/WRT CROSSTALK
RD.07=0 ;PE ERR RECOV ERASE FUNCTION
;DATA PORTION ONLY

```
*****
;IOSCO - I/O SEQUENCER SILO CONTROL BUFFER OUT
```

```
IOSCO=14
```

```
;WRITE
```

```
REGISTER 14
```

```
;THIS REGISTER CONTAINS THE SILO CONTROL BITS FOR DATA WRITTEN
;BY THE MAIN OR I/O MICRO TO THE SILO. THE DATA IN THIS REG
;IS PAIRED WITH THE IOSDO REG AND PUT IN THE SILO WHENEVER
;THE IOSICO REG IS CLOCKED. THIS REGISTER NEED ONLY BE WRITTEN
;ONCE IF THE SAME OLD DATA IS OK TO BE WRITTEN IN THE SILO.
```

```
;NOTE THAT IF THE I/O IS WRITING THE SILO, THE MAIN MUST PUT EVEN
;PARITY IN THE BITS 357 OR THE I/O WILL WRITE PAR ERRS IN THE SILO.
;(THE IS.DAP BIT IS DON'T CARE HERE FOR I/O WRITING THE SILO)
```

```
IS.PAR= 200 ;ODD PAR BIT FOR ALL 16 BITS (CNRTL AND DATA)
;NOTE THAT THE BITS MASKED BY 357 MUST BE
;EVEN PARITY BECAUSE THE 9 DATA BITS ARE ODD
```

```
IS.IVP= 100 ;INVERT CNTRL SILO PAR BIT BEFORE MOVING
;TO WRITE BOARD (WRITE EVEN PARITY ON TAPE)
```

```
IS.NRZ= 40 ;INVERT WRITE BUFFER BIT IF ASSOCIATED SILO
;DATA BIT IS A 1. (IF IS.NRZ=0, WE'RE IN PE MODE)
```

```
IS.DAP= 20 ;ODD PARITY FOR THE 8 DATA BITS IN IOSDO
```

```
IS.LRC= 10 ;CAUSES SYNCHRONOUS CLR ON WRT BOARD TO WRITE THE LRC CHAR
IS.WRF= 4 ;THIS FLG BIT SHOWS UP AT THE WRITE BOARD
;WITH THE CORRESPONDING DATA. THE FUNCTION OF
;THE BIT WILL BE DEFINED BY THE WRITE BOARD.
;NOTE HOWEVER THAT IF THE WRITE BOARD SEES
;THE BIT 1, THE PA.WRF BIT IN THE
;PRATNI REG WILL ALSO BE 1 (IF ENABLED
;TO AFFECT THE ATTN REG).
```

```
;THE 2 LOW BITS ARE WRITABLE AND AFFECT THE PARITY TREES BUT
;OTHERWISE ARE UNIMPLEMENTED
```

4.2 GENERAL

THE TS04 TAPE SUBSYSTEM CONSISTS OF A TS11 UNIBUS TO SERIAL BUS CONTROLLER CONNECTED TO A TS04 DRIVE. FROM A SOFTWARE VIEWPOINT THIS CONFIGURATION IS UNIQUE (FOR A UNIBUS DEVICE) IN A NUMBER OF WAYS:

- A. ONLY ONE REGISTER MAY BE WRITTEN - TSDB (TAPE SYSTEM DATA BUFFER),
- B. TWO REGISTERS MAY BE READ - TSSR AND TSBA (TAPE SYSTEM STATUS REGISTER AND TAPE SYSTEM BUS ADDRESS REGISTER),
- C. COMMANDS ARE NOT WRITTEN TO THE DRIVE; RATHER, COMMAND POINTERS ARE WRITTEN WHICH POINT TO COMMAND PACKETS SOMEWHERE IN CPU MEMORY. THE COMMAND POINTER IS USED BY THE TS04 SUBSYSTEM TO FETCH THE WORD(S) WITHIN THE COMMAND PACKET. THE WORDS WITHIN THE COMMAND PACKET ARE:

1. COMMAND WORD
 2. LOW ORDER BUFFER ADDRESS
 3. HIGH ORDER BUFFER ADDRESS
 4. BYTE COUNT
- D. THE TSSR CONTAINS ALL THE INFORMATION WHICH WILL BE NECESSARY TO DETERMINE WHETHER:
1. THE DRIVE IS READY TO ACCEPT ANOTHER COMMAND,
 2. THE PREVIOUS COMMAND WAS EXECUTED WITHOUT ERROR.
- IF EITHER OF THE ABOVE CONDITIONS IS UNTRUE AT "JOB DONE" OR "COMMAND INITIATION" TIME, IT MAY BE NECESSARY TO GET THE EXTENDED STATUS REGISTERS TO DETERMINE WHAT ACTION IS TO BE TAKEN AND/OR LOG THE ERROR INFORMATION.
- E. EXTENDED STATUS REGISTERS ARE NOT READ DIRECTLY FROM DRIVE REGISTERS; RATHER, A "GET STATUS" COMMAND IS ISSUED WHICH WILL CAUSE THE TS04 TO TRANSFER EXTENDED STATUS INFORMATION TO THE MEMORY AREA POINTED TO BY THE BUFFER ADDRESS OF THE "GET STATUS" COMMAND. THERE ARE FOUR EXTENDED STATUS REGISTERS. SEE 6.3.
- F. THE TSDB MUST BE WRITTEN WITH A DATO INSTRUCTION TO PROPERLY WRITE THE COMMAND POINTER. A DATOB WILL CAUSE A MAINTENANCE FUNCTION. A DATO TO THE TSSR WILL CAUSE SUBSYSTEM INIT.
- G. COMMAND PACKETS MUST RESIDE ON DIVIDE BY FOUR MEMORY BOUNDARIES (AS OPPOSED TO DIVIDE BY 2 OR WORD BOUNDARIES) .

4.3 UNIBUS INTERFACE SPECIFICATIONS

B 2

SEQ 0014

TS11/ TS04	INT. VECTOR	UNIBUS ADDRESS	REGISTER
FIRST	224	772520 772522	TSBA/TSDB TSSR
SECOND	154	772524 772526	TSBA/TSDB TSSR
THIRD	160	772530 772532	TSBA/TSDB TSSR
FOURTH	164	772534 772536	TSBA/TSDB TSSR

4.4 BIT DEFINITIONS FOR TS11/TS04 REGISTERS

4.4.1 TS11/TS04 REGISTER SUMMARY

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	
TSBA	A15	A14	A13	A12	A11	A10	A09	A08	A07	A06	A05	A04	A03	A02	A01	A00	
TSDB	P15	P14	P13	P12	P11	P10	P09	P08	P07	P06	P05	P04	P03	P02	P17	P16	
TSSR	SC	UPE	SPE	RMR	NXM	NBA	A17	A16	SSR	OFL	FC1	FC0	TC2	TC1	TC0		
XST0	TMK	RLS	LET	RLI	WLE	NEF	ILC	ILA	MOT	ONL	IE	VCK	PED	WLK	BOT	EOT	
XST1	DLT		COR	CRS	TIG	DBF	SCK		IPR	SYN	IPO	IED	POS	POL	UNC	MTE	
XST2	OPM	SIP	BPE	CAF		WCF		DTP	DT7	DT6	DT5	DT4	DT3	DT2	DT1	DT0	
XST3	MICRO DIAGNOSTIC ERROR CODE							LMX	OPI	REV	CRF	DCK	NOI	LXS	RIB		

TERMINATION CLASS CODES (TSSR TC0-TC2):

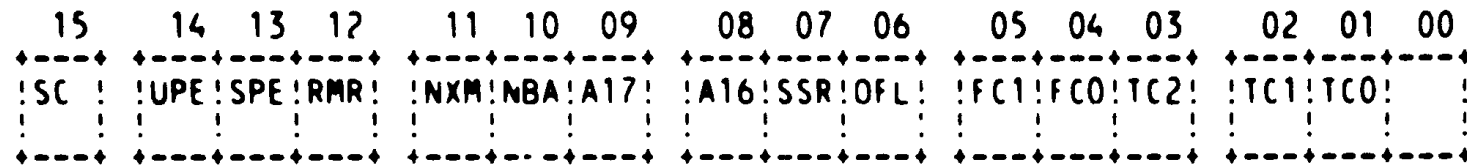
- 0 = NORMAL TERMINATION
- 1 = ATTENTION CONDITION
- 2 = TAPE STATUS ALERT
- 3 = FUNCTION REJECT
- 4 = RECOVERABLE ERROR - TAPE POSITION = ONE RECORD
DOWN TAPE FROM START OF FUNCTION
- 5 = RECOVERABLE ERROR - TAPE NOT MOVED
- 6 = UNRECOVERABLE ERROR - TAPE POSITION LOST
- 7 = FATAL CONTROLLER ERROR

FATAL CLASS CODES (TSSR FC0-FC1):

- 0 = MICRO DIAGNOSTIC FAILURE (DISPLAYED IN TS04 OPERATOR PANEL AND XST3).
- 1 = I/O SEQUENCER CROM PARITY ERROR.
- 2 = MICROPROCESSOR CROM PARITY ERROR.
SILO PARITY ERROR.
SERIAL BUS PARITY ERROR DETECTED AT TS11 (SPE).
SERIAL BUS PARITY ERROR DETECTED AT TS04 (BPE).
FATAL ERROR HALTS 1750-1777 IN TS04 PROGRAM COUNTER DISPLAY.
- 3 = LOSS OF AC POWER HAS BEEN DETECTED.

4.4.2 TS11 STATUS REGISTER (TSSR)

UNIBUS ADDRESS + 2 - READ ONLY



BIT	NAME	TCC	DEFINITION
15	SC	S	SPECIAL CONDITION. WHEN SET, INDICATES THAT THE LAST COMMAND DID NOT COMPLETE WITHOUT INCIDENT. SPECIFICALLY, EITHER AN ERROR WAS DETECTED OR AN EXCEPTION CONDITION OCCURRED. EXCEPTION CONDITIONS CAN BE TAPE MARKS ON READ COMMANDS, REVERSE MOTION AND AT BOT, EOT WHILE WRITING, ETC. MAY ALSO BE SET BY THE ERROR BITS CONTAINED IN THE TSSR REGISTER: UPE, SPE, RMR, AND NXM. THE TERMINATION CLASS BITS ARE SOMETHING OTHER THAN 0 (UNLESS RMR IS THE ONLY ERROR - SEE RMR).
14	UPE	4/5	UNIBUS PARITY ERROR. SET BY THE TS11 WHEN IT DETECTS A PARITY ERROR ON THE UNIBUS DATA WHEN TRANSFERRING TO OR FROM THE CPU'S MEMORY.
13	SPE	7	SERIAL BUS PARITY ERROR. THIS BIT IS SET BY THE TS11 WHEN IT DETECTS A SERIAL BUS PARITY ERROR ON DATA RECEIVED FROM THE TS04.
12	RMR	S	REGISTER MODIFICATION REFUSED. SET BY THE TS11 WHEN A COMMAND POINTER IS LOADED INTO TSDB AND SUB-SYSTEM READY (SSR) IS NOT SET. NOTE THAT THIS BIT CAUSES SPECIAL CONDITION BUT NO TERMINATION CLASS (IN FACT, THE TS04 NEVER SEES THIS ERROR) BECAUSE ON A SYSTEM WITH NO BUGS, THIS BIT MAY COME UP ON AN ATTENTION MESSAGE. IF ATTNS ARE NOT ENABLED, THIS BIT COMING UP IS AN INDICATION OF EITHER A FATAL CONTROLLER ERROR OR A SOFTWARE BUG.
11	NXM	4/5	NON-EXISTENT MEMORY. SET BY THE TS11 WHEN TRYING TO TRANSFER TO OR FROM A MEMORY LOCATION WHICH DOES NOT EXIST. MAY OCCUR WHEN FETCHING THE COMMAND PACKET, FETCHING OR STORING DATA, OR STORING THE MESSAGE PACKET.
10	NBA	S	NEED BUFFER ADDRESS. WHEN SET, INDICATES THAT THE TS04 NEEDS A MESSAGE BUFFER ADDRESS. THIS BIT IS CLEARED DURING THE SET CHARACTERISTICS COMMAND (IF A GOOD ADDRESS WAS GIVEN).
09	A17	S	BUS ADDRESS BIT 17. A17 AND A16 (BIT 08) TRACK

E 2

THE VALUES OF BITS 17 AND 16 OF THE TSBA REGISTER.

SEQ 0017

08	A16	S	BUS ADDRESS BIT 16. SEE A17 (BIT 09).
07	SSR	S	SUB-SYSTEM READY. WHEN SET, INDICATES THAT THE TS11/TS04 SUBSYSTEM IS NOT BUSY AND IS READY TO ACCEPT A NEW COMMAND POINTER.
06	OFL	S,1,3	OFF-LINE. WHEN SET, INDICATES THAT THE TS04 IS OFF-LINE AND UNAVAILABLE FOR ANY TAPE MOTION COMMANDS. THIS BIT CAN CAUSE A TERMINATION CLASS OF 1 (ON ATTN INTERRUPT) OR 3 (RESULTS IN NEF).
05	FC1	7	FATAL TERMINATION CLASS 01. FC1 AND FC0 (BIT 04) ARE USED TO INDICATE THE TYPE OF FATAL ERROR WHICH HAS OCCURRED ON THE TS04. THESE BITS ARE VALID ONLY WHEN SC IS SET AND THE TERMINATION CLASS CODE BITS ARE ALL SET (111).
04	FC0	7	FATAL TERMINATION CLASS 00. SEE FC1 (BIT 05).
03	TC2	S	TERMINATION CLASS BIT 02. THIS BIT, ALONG WITH THE TC1 AND TC0 BITS, ACT AS AN OFFSET VALUE WHENEVER AN ERROR OR EXCEPTION CONDITION OCCURS ON A COMMAND. EACH OF THE EIGHT POSSIBLE VALUES OF THIS FIELD REPRESENT A PARTICULAR CLASS OF ERRORS OR EXCEPTIONS. THE CONDITIONS IN EACH CLASS HAVE SIMILAR SIGNIFICANCE AND, AS APPLICABLE, RECOVERY PROCEDURES. THE CODE PROVIDED IN THIS FIELD IS EXPECTED TO BE UTILIZED AS AN OFFSET INTO A DISPATCH TABLE FOR HANDLING OF THE CONDITION.
02	TC1	S	TERMINATION CLASS BIT 01. SEE TC2 (BIT 03).
01	TC0	S	TERMINATION CLASS BIT 00. SEE TC2 (BIT 03).
00	-	-	NOT USED.

UNIBUS ADDRESS + 2 - WRITE ONLY

SUBSYSTEM INITIALIZE

4.4.3 EXTENDED STATUS REGISTER 0 (XSTAT0)

```

15  14  13  12  11  10  09  08  07  06  05  04  03  02  01  00
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
TMK! RLS! LET! RLL! WLE! NEF! ILC! ILA! MOT! ONL! IE! VCK! PED! WLK! BOT! EOT!
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+

```

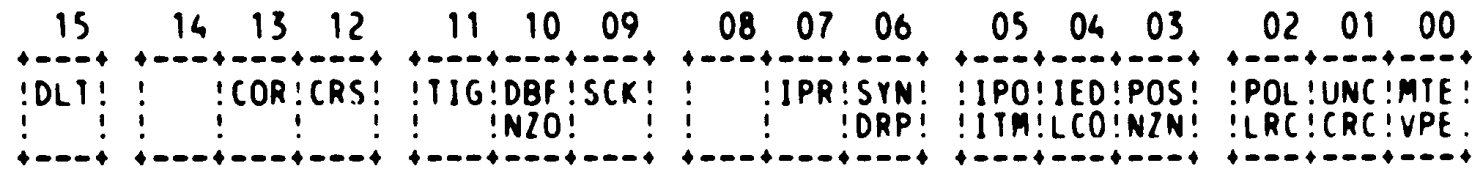
BIT	NAME	TCC	DEFINITION
15	TMK	5,2	TAPE MARK DETECTED. SET WHENEVER A TAPE MARK WAS DETECTED DURING A READ, SPACE, OR SKIP COMMAND AND AS A RESULT OF THE WRITE TAPE MARK OR WITE TAPE MARK RETRY COMMANDS.
14	RLS	2	RECORD LENGTH SHORT. THIS BIT INDICATES THAT EITHER THE RECORD'S LENGTH WAS SHORTER THAN THE BYTE COUNT ON READ OPERATIONS, A SPACE RECORD OPERATION ENCOUNTERED A TAPE MARK OR BOT BEFORE THE POSITION COUNT WAS EXHAUSTED, OR A SKIP TAPE MARKS COMMAND WAS TERMINATED BY ENCOUNTERING BOT OR A DOUBLE TAPE MARK (IF THAT OPERATIONAL MODE IS ENABLED, SEE LET) PRIOR TO EXHAUSTING THE POSITION COUNTER.
13	LET	2	LOGICAL END OF TAPE. SET ONLY ON THE SKIP TAPE MARKS COMMAND WHEN EITHER TWO CONTIGUOUS TAPE MARKS ARE DETECTED OR WHEN MOVING OFF OF BOT AND THE FIRST RECORD ENCOUNTERED IS A TAPE MARK. THE SETTING OF THIS BIT WILL NOT OCCUR UNLESS THIS MODE OF TERMINATION IS ENABLED THROUGH USE OF THE SET CHARACTERISTICS COMMAND.
12	RLL	2	RECORD LENGTH LONG. WHEN SET, THIS BIT INDICATES THAT THE RECORD READ WAS LONGER THAN THE BYTE COUNT SPECIFIED.
11	WLE	3,6	WRITE LOCK ERROR. WHEN SET, INDICATES THAT A WRITE OPERATION WAS ISSUED BUT THE MOUNTED TAPE DID NOT CONTAIN A WRITE ENABLE RING OR THE WRT LOCK SWITCH ACTIVATED DURING THE OPERATION.
10	NEF	3	NON-EXECUTABLE FUNCTION. WHEN SET, INDICATES THAT THE COMMAND COULD NOT BE EXECUTED DUE TO ONE OF THE FOLLOWING CONDITIONS: <ul style="list-style-type: none"> - THE COMMAND SPECIFIED REVERSE TAPE DIRECTION BUT THE TAPE WAS ALREADY POSITIONED AT BOT. - THE ISSUING OF ANY COMMAND, EXCEPT REWIND,

UNLCAD, OR A COMMAND WITH THE CLEAR VOLUME CHECK (CVC) BIT SET, WHEN THE VOLUME CHECK BIT IS SET.

- ANY COMMAND, EXCEPT GET STATUS OR DRIVE INITIALIZE, WHEN THE TS04 IS OFF-LINE.
- ANY WRITE COMMAND WHEN THE TAPE DOES NOT CONTAIN A WRITE ENABLE RING (WRITE LOCK STATUS - WLS).

09	ILC	3	ILLEGAL COMMAND. SET WHEN A COMMAND IS ISSUED AND EITHER ITS COMMAND FIELD OR ITS COMMAND MODE FIELD CONTAINS CODES WHICH ARE NOT SUPPORTED BY THE TS04.
08	ILA	3	ILLEGAL ADDRESS. (MORE THAN 18 BITS OR ODD WHEN AN EVEN ADDRESS IS REQUIRED.)
07	MOT	S	TAPE IS MOVING.
06	ONL	S	ON LINE. WHEN SET, INDICATES THAT THE TS04 IS ON-LINE AND OPERABLE.
05	IE	S	INTERRUPT ENABLE. REFLECTS THE STATE OF THE INTERRUPT ENABLE BIT SUPPLIED ON THE LAST COMMAND.
04	VCK	S	VOLUME CHECK. WHEN SET, INDICATES THAT THE DRIVE HAS BEEN EITHER POWERED DOWN OR TURNED OFF-LINE. CLEARED BY THE CLEAR VOLUME CHECK (CVC) BIT IN THE COMMAND HEADER WORD. THIS BIT CAN CAUSE A TERMINATION CLASS OF 3.
03	PED	S	PHASE ENCODED DRIVE. WHEN SET, INDICATES THAT THE TS04 IS CAPABLE OF READING AND WRITING ONLY 1600 BPI PHASE ENCODED DATA. WHEN RESET, INDICATES THAT THE TS04 HAS ONLY 800 BPI NRZI DATA CAPABILITIES.
02	WLK	S,3	WRITE LOCKED. WHEN SET, INDICATES THAT THE MOUNTED REEL OF TAPE DOES NOT HAVE A WRITE-ENABLE RING INSTALLED. THE TAPE IS, THEREFORE, WRITE PROTECTED.
01	BOT	S,3	BEGINNING OF TAPE. WHEN SET, INDICATES THAT THE TAPE IS POSITIONED AT THE LOAD POINT AS DENOTED BY THE BOT REFLECTIVE STRIP ON THE TAPE.
00	EOT	S,2	END OF TAPE. THIS BIT IS SET WHENEVER THE TAPE IS POSITIONED AT OR BEYOND THE END OF TAPE REFLECTIVE STRIP. DOES NOT RESET UNTIL THE TAPE PASSES OVER THE REFLECTIVE STRIP IN THE REVERSE DIRECTION UNDER PROGRAM CONTROL.

4.4.4 EXTENDED STATUS REGISTER 1 (XSTAT1)

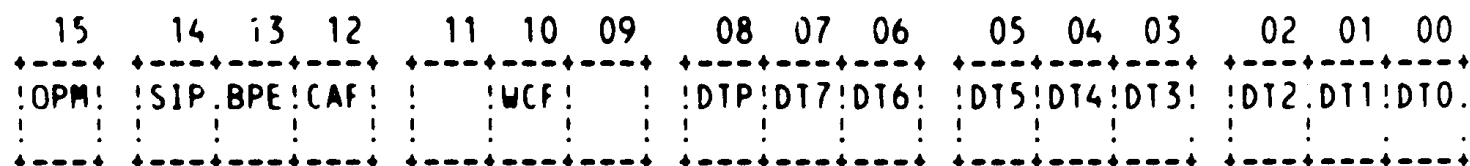


BIT	NAME	TCC	DEFINITION
15	DLT	4	DATA LATE. SET WHEN THE I/O SILO IS FULL ON A READ OR EMPTY ON A WRITE. THESE CONDITIONS OCCUR WHENEVER THE UNIBUS LATENCY EXCEEDS THE DATA TRANSFER RATE OF THE TS04.
14	-	-	NOT USED.
13	COR	5	CORRECTABLE DATA. IN PHASE ENCODED MODE, A CORRECTABLE DATA ERROR HAS BEEN ENCOUNTERED.
12	CRS	4	CREASE DETECTED. FOR NRZI, ALL DATA TRACKS DROPPED OUT FOR MORE THAN THREE CHARACTER TIMES BUT FOR LESS THAN .1 INCHES OF TAPE. FOR PE, EIGHT OUT OF NINE DATA TRACKS WENT DEAD FOR LESS THAN .1 INCHES BEFORE A VALID POSTAMBLE WAS DETECTED.
11	TIG	4	TRASH IN THE GAP. NON-ERASED DATA WAS DETECTED IN A GAP DURING A READ, WRITE, WRITE TAPE MARK, OR ERASE COMMAND.
10	DBF	4	EXCESSIVE SKEW. FOR NRZI, DATA OCCURRED BETWEEN THE 50% MARK AND THE 100% MARK OF THE NRZI DATA WINDOW. FOR PE, IT TOOK MORE THAN FIVE CHARACTERS IN READ-AFTER-WRITE OR TEN CHARACTERS IN READ TO PROPERLY CENTER THE WINDOWS OF THE FORMAT CHANNEL LOGIC.
	NZO	4	NRZ FIFO OVERRUN.
09	SCK	4	SPEED CHECK. TAPE SPEED WAS OFF BY MORE THAN 5% DURING A WRITE DATA OPERATION. NOTE THAT SPEED AVERAGED OVER 8 TICKS AND THE AVERAGE MUST BE OFF 5% TO CAUSE THIS ERROR.
08	-	-	NOT USED.
07	IPR	5,4	INVALID PREAMBLE. SET ON A PE DRIVE IF THE PREAMBLE APPEARS TO BE SHORTER THAN 36 CHARACTERS OR LONGER THAN 44 CHARACTERS. ALSO SET IF THE PREAMBLE IS INCORRECTLY ENCODED BEYOND THE FIFTEENTH CHARACTER IN READ OR THE TENTH CHARACTER IN READ-AFTER-WRITE.

06	SYN	4	SYNCH FAILURE. SET ON A PE DRIVE IF THE FORMATTER WAS UNABLE TO ACHIEVE SYNCHRONIZATION IN THE PREAMBLE.
	DRP	4	NRZ RECORD DROPPED A CHARACTER (THE NEXT CHARACTER WAS TO BE CONSIDERED CRC).
05	IPO	S,4	INVALID POSTAMBLE. SET ON A PE DRIVE DURING READ OR WRITE IF ANY OF THE FIRST 39 CHARACTERS OF THE POSTAMBLE ARE NOT READ CORRECTLY.
	ITM	S,4	ILLEGAL TAPE MARK FOR NRZ.
04	IED	4	INVALID END DATA. FOR PE, EIGHT OUT OF NINE TRACKS WENT DEAD BEFORE THE POSTAMBLE WAS DETECTED.
	LRO	4	FOR NRZI, DATA WAS NOT DETECTED IN EITHER THE LRCC OR CRCC WINDOWS. (LRC WAS ZERO)
03	POS	S,4	POSTAMBLE SHORT. SET ON PE DRIVES DURING A READ OR WRITE WHEN LESS THAN 38 ALL-ZEROES CHARACTERS ARE READ FOLLOWING THE ALL-ONES CHARACTER.
	NZN	S,4	NRZ NOISE RECORD (FEWER THAN 13(10) FRAMES).
02	POL	4	POSTAMBLE LONG. SET ON PE DRIVES DURING READ OR WRITE OPERATIONS WHEN THE POSTAMBLE EXCEEDS 42 CHARACTERS.
	LRC	4	LRC ERROR. SET ON NRZI DRIVES WHEN THE LRCC CHARACTER WAS FOUND IN ERROR.
01	UNC	4	UNCORRECTABLE DATA. SET ON PE DRIVES WHEN A PARITY ERROR OCCURRED WITHOUT A CORRESPONDING DEAD TRACK INDICATION.
	CRC	4	CRC ERROR. SET ON NRZI DRIVES WHEN THE CRC CHARACTER WAS FOUND TO BE IN ERROR.
00	MTE	4	MULTI-TRACK ERROR. SET ON PE DRIVES WHEN MORE THAN ONE DEAD TRACK OCCURRED IN THE PREAMBLE OR IN THE DATA FIELD.
	VPE	4	VERTICAL PARITY ERROR. SET ON NRZI DRIVES WHEN A CHARACTER DID NOT CONTAIN AN ODD NUMBER OF ONE BITS.

4.4.5 EXTENDED STATUS REGISTER 2 (XSTAT2)

SEQ 0022



BIT	NAME	TCC	DEFINITION
15	OPM	S	OPERATION IN PROGRESS. (TAPE MOVING)
14	SIP	7	SIL0 PARITY ERROR. CAUSES FATAL CLASS 2 BECAUSE THE ERROR MIGHT HAVE OCCURRED DURING THE TRANSMISSION OF THE MESSAGE PACKET.
13	BPE	7	SERIAL BUS PARITY ERROR AT DRIVE. SET BY THE TS04 WHEN A PARITY ERROR IS DETECTED ON DATA TRANSMITTED FROM THE TS11 TO THE TS04. CAUSES FATAL CLASS 2 BECAUSE THE ERROR MIGHT HAVE OCCURRED DURING THE TRANSMISSION OF THE MESSAGE PACKET.
12	CAF	7	CAPSTAN ACCELERATION FAIL. AFTER ACCELERATING TAPE FOR .2 INCHES, THE TAPE SPEED WAS CHECKED AND FOUND TO BE OUT OF TOLERANCE BY MORE THAN 10%.
11	-	-	NOT USED.
10	WCF	7	DESKEW BUFFER FAIL. ONE OF THE DESKEW BUFFERS FAILED TO ASSERT "OUTPUT READY" WITHIN 20 MICROSECONDS AFTER BEING ENABLED. THE DEAD TRACK BITS WILL INDICATE ON WHICH TRACKS THIS FAILURE OCCURRED.
09	-	-	NOT USED.
08	DTP	S	DEAD TRACK PARITY. THE BITS DTP THROUGH DT0 INDICATE WHICH TRACK(S) WENT DEAD, IF ANY, DURING THE LAST DATA TRANSFER OPERATION. IF DESKEW BUFFER FAIL (DBF) IS SET, THESE BITS INDICATE WHICH CHANNEL FAILED.
07	DT7	S	DEAD TRACK 7. SEE DTP.
06	DT6	S	DEAD TRACK 6. SEE DTP.
05	DT5	S	DEAD TRACK 5. SEE DTP.
04	DT4	S	DEAD TRACK 4. SEE DTP.
03	DT3	S	DEAD TRACK 3. SEE DTP.
02	DT2	S	DEAD TRACK 2. SEE DTP.

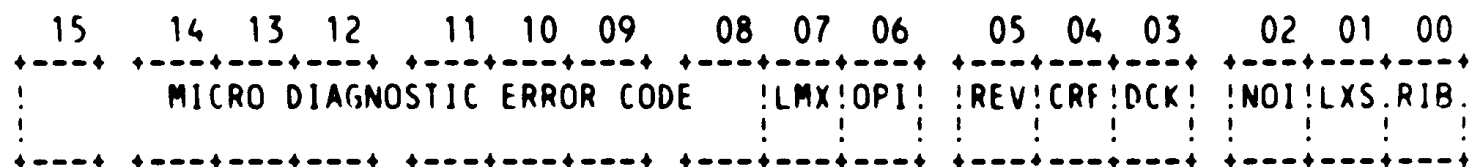
01 DT1 S DEAD TRACK 1. SEE DTP.

00 DT0 S DEAD TRACK 0. SEE DTP.

SEQ 0023

NOTE: ON A SET CHARACTERISTICS COMMAND, THE UCODE LEVEL IS RETURNED IN DT7 THRU DT0. ON A GET STATUS COMMAND, THE RESIDUAL CAPSTAN TICK COUNT (INTERNALLY R7) IS RETURNED IN DT7 THRU DT0.

4.4.6 EXTENDED STATUS REGISTER 3 (XSTAT3)



BIT	NAME	TCC	DEFINITION
15 TO 08			MICRO DIAGNOSTIC ERROR CODE. (SEE LIST OF CODES BELOW). ALL ERROR CODES IN THE TABLE WILL BE DISPLAYED ON THE TSO4 CONTROL PANEL BUT ONLY CODES HIGHER THAN 110 WILL BE AVAILABLE TO CPU DIAGNOSTICS FOR PRINTOUT IN THE MICRO DIAGNOSTIC ERROR CODE FIELD OF XSTAT3. THIS ERROR CODE FIELD IS VALID ONLY WHEN THE TERMINATION CLASS CODE IN THE TSSR EQUALS 7 AND THE FATAL CLASS CODE IN THE TSSR EQUALS 0, INDICATING AN INTERNAL DIAGNOSTIC FAILURE.
07	NTL	6	LIMIT EXCEEDED. SET WHEN THE TAPE TENSION ARMS HAVE EXCEEDED THEIR ALLOWABLE TRAVEL AND HAVE CAUSED THE ACTIVATION OF THE LIMIT SWITCHES. NO TENSION EXISTS ON THE MOUNTED TAPE.
06	OPI	6	OPERATION INCOMPLETE. SET WHEN A READ, SPACE, OR SKIP OPERATION HAS MOVED 25 FEET OF TAPE WITHOUT DETECTING ANY DATA ON THE TAPE.
05	REV	5	DIRECTION OF CURRENT OPERATION WAS REVERSE (BUT IS 0 IF REWIND OR FORWARD)
04	CRF	7	CAPSTAN RESPONSE FAILURE. A MOTION COMMAND WAS GIVEN TO THE CAPSTAN BUT WE DID NOT GET A TICK BACK WITHIN A REASONABLE AMOUNT OF TIME.
03	DCK	5,6	DENSITY CHECK. SET ON PE DRIVES WHEN A PE IDENTIFICATION BURST WAS NOT DETECTED WHEN MOVING OFF OF BOT. SET ON NRZI DRIVES WHEN A NON-NRZI IDENTIFICATION BURST WAS FOUND WHEN MOVING OFF OF BOT.
02	NOI	6	NOISE RECORD. SET DURING A READ OR SPACE OPERATION WHEN A BURST OF FLUX CHANGES, WHICH DO NOT QUALIFY AS A RECORD (BUT TOO MANY TO IGNORE), ARE DETECTED: NRZI: AT LEAST TWO CHARACTERS IN A ROW BUT LESS THAN TWELVE, FOLLOWED BY A CHARACTER IN EITHER THE CRCC OR LRCC WINDOWS. PE: AT LEAST 24 CHARACTERS IN A ROW THAT DO NOT QUALIFY AS A TAPE MARK OR A DATA PREAMBLE.

01 LXS S LIMIT EXCEEDED STATICALLY. THIS BIT IS SET ANY TIME THE LIMIT SWITCHES ARE EXCEEDED. THIS BIT CAN ONLY BE CLEARED BY MANUALLY LOADING THE TAPE. M 2

00 RIB 2 REVERSE INTO BOT. A READ, SPACE, OR SKIP COMMAND ALREADY IN PROGRESS HAS ENCOUNTERED THE BOT MARKER WHEN MOVING TAPE IN THE REVERSE DIRECTION. TAPE MOTION WILL BE HALTED AT BOT.

4.4.7 MICRO DIAGNOSTIC ERROR CODES

FOLLOWING IS A LIST OF THE ERRORS WHICH ARE DISPLAYED IN THE MICRO DIAGNOSTIC ERROR CODE (XSTAT3 BITS 15 - 08) AND ALSO IN THE LIGHTS ON THE TSO4 CONTROL PANEL, DUE TO FAILURES ON THE CAPSTAN BOARD, I/O BOARDS, WRITE BOARD, READ BOARD, OR FORMATTER BOARD. THE MICRO WILL BE IN A TIGHT LOOP IN THE DISPM PROGRAM, WAITING FOR OPERATOR OR CPU INTERVENTION WHILE THE ERROR IS BEING DISPLAYED IN THE CONSOLE LIGHTS. IT IS APPARENT THAT AN ERROR IS BEING DISPLAYED IF THE "UOK" LIGHT IS NOT LIGHTED, THE PROCESSOR IS NOT STOPPED, AND AN OCTAL NUMBER (100-377) IS BEING DISPLAYED IN THE LIGHTS. TO SCOPE LOOP THESE TESTS, ENTER MAINTENANCE MODE (ON-LINE SWITCH TO "OFF" POSITION, MAINTENANCE SWITCH UP, PRESS RESET), ENTER THE OFF-LINE TEST NUMBER (SEE SCOPE LOOP COLUMN BELOW) IN THE OPERATOR CONSOLE LIGHTS (ENTER ONES WITH LEFT-MOST SWITCH, ENTER ZEROES WITH RIGHT-MOST SWITCH), AND PRESS ON-LINE BUTTON. TEST WILL LOOP UNTIL ON-LINE SWITCH IS RETURNED TO OFF-LINE POSITION, ERRORS WILL BE DISPLAYED CONTINUOUSLY.

ERROR (DISPLAY)	PROGRAM	ERROR DESCRIPTION	LIKELY MODULE	SCOPE LOOP
337	OPERATIONAL CODE	CAPSTAN RUNAWAY ERROR (H3.RNY). CAPSTAN DIDN'T STOP WITHIN ACCEPTABLE WINDOW AFTER LAST COMMAND.		
100	!OTSM	BASIC I/O MICRO FAILURE (PARITY ERROR, IOATN, HANDSHAKING, AND DATA WINDOW TEST BETWEEN THE I/O AND MAIN MICROS. NOTE: CAN ALSO BE CAUSED BY THE SERIAL BUS .SHIN (SHIFT IN) STUCK ASSERTED.	M8967	14
101	!OTSM	ERROR IN I/O CONTROL REGISTER TEST	M8966 M8967	15
102	!OTSM	FAILURE OF FRAME COUNTER TEST	M8966	15
103	!OTSM	FAILURE OF I/O SILO NON-PARITY ERROR DATA TEST OR THE WRITE FLAG.	M8966 M8963	16
104	!OTSM	FAILURE OF I/O SILO PARITY ERROR	M8966	17

		TEST OR DATA LATE TEST.		
105	IOTSM	FAILURE OF SHIFT LOOP WITH ZEROES.	M8965	20
106	IOTSM	FAILURE OF SHIFT LOOP WITH ONES.	M8965	21
107	IOTSM	FAILURE OF SHIFT LENGTH MUX.	M8965	22
110	IOTSM	FAILURE TO RECEIVE CORRECT OP-CODE FROM TS11 WHEN WE SENT DATA OVER THE SERIAL BUS.	M8965 TS11 MOTHER BD SBUS CABLE	47
111	CATSM	FAILURE OF 1 KHZ CLOCK TEST. TSTS TAC SYNC FLOP AND ATTN, TOO.	G159 CBUS CABLE M8963	2
112	CATSM	LIGHT REGISTER CHANGED WHEN MOTION REGISTER WAS CLEARED.	G159	3,4
113	CATSM	FWD OR MVG BITS WRONG AFTER 1 TICK OF SIMULATED COMMAND AND TACH PULSES.	G159	3,4
114	CATSM	FAILURE OF SIMULATED CAPSTAN SPEED TEST. THE CAPSTAN SPEED COUNTER WAS OUT OF RANGE WHEN TAPE MOTION AT SPEED WAS SIMULATED.	G159	3,4
115	CATSM	FAILURE OF SIMULATED SLOW CAPSTAN TEST. SPEED COUNTER DID NOT LATCH UP WITH MAX COUNT WHEN SLOW TACH TICKS WERE SIMULATED.	G159	3,4
116	CATSM	FAILURE OF SIMULATED CAPSTAN DECEL TEST. COUNTER NOT ZERO FOR FORWARD OR 377 FOR REVERSE WHILE DECELERATING, OR MVG BIT NOT 1.	G159	3,4
117	CATSM	FAILURE OF MOVING FLOP TO GO TO ZERO AFTER STOPPING (DIRECTION REVERSAL FOR ONE TACH TICK).	G159	3,4
120	PETSM	FAILURE OF WRITE BOARD TO TURN ON AND EMPTY THE SILO, OR DATA LATE BIT DOESN'T WORK.	M8929 M8966	23
121	PETSM	FAILURE OF WRITE BOARD TO EMPTY SILO AT CORRECT SPEED.	M8929	23
124	PETSM	FORMATTER FLAG DOESN'T WORK ON THE M8922.	M8922	24
125	PETSM	FORMATTER SILO FILLING AND DATA ERROR	M8922 M8923 M8924	24
126	PETSM	PEAK SHIFT TEST ERROR	M8922 M8923 M8924	25

127

PETSM

FORMATTER TABLE LOOKUP ROM CHECKSUM
TEST ERROR

B 3
M8922 26
M8923
M8924

SEQ 0027

5.0 TEST SUMMARIES

5.1 TEST 1 - PDP-11/TS11 WRAP TEST

TEST TO INSURE PROPER COMMUNICATION BETWEEN THE PDP11 AND THE TS11 BY WRAPPING THE FOLLOWING PATTERNS:

A 1 IN A FIELD OF 0'S A 0 IN A FIELD OF 1'S.

WHEN DATA IS WRITTEN TO THE TSDB HI BYTE, THE DATA IS WRAPPED AROUND WITHIN THE TS11 AND APPEARS IN THE TSBA LO AND HI BYTES. THE 2 LOW ORDER BITS OF THE DATA WILL BE REFLECTED IN THE TSSR EXTENDED ADDRESS BITS.

R4 CONTAINS A COPY OF THE DATA SENT.

R3 CONTAINS THE EXPECTED TSBA RESULTS

R2 CONTAINS THE EXPECTED STATE OF THE TWO EXTENDED ADDRESS BITS IN THE TSSR.

5.2 TEST 2 - PDP-11/TS04 WRAP TEST

TEST TO INSURE PROPER COMMUNICATION BETWEEN THE PDP11 AND THE TS04 BY WRAPPING THE FOLLOWING PATTERN:

A 1 IN A FIELD OF 0'S; A 0 IN A FIELD OF 1'S

WHEN THE DATA IS WRITTEN TO THE TSDB LO BYTE, THE DATA IS SENT TO THE TS04, VIA THE SERIAL LINE, WHERE IT IS WRAPPED AROUND BACK OVER THE SERIAL LINE TO THE TS11. THE DATA THEN APPEARS IN THE TSBA LO AND TSSR LO BYTES.

R4 CONTAINS THE EXPECTED TSBA RESULTS AND THE EXPECTED TSSR RESULTS.

5.3 TEST 3 - SET TS04 CHARACTERISTIC

THE FUNCTION OF THIS TEST IS TO ISSUE A "SET CHARACTERISTIC" COMMAND TO TELL THE TS04 WHERE IN CORE THE MESSAGE PACKET RESIDES AND TO VERIFY THAT A MESSAGE PACKET WAS STORED.

5.4

TESTS 4 - 7 PERFORM DATA WRAPS ON THE P.E. READ FORMATTER BOARDS. COMMUNICATION BETWEEN THE PDP11 AND TS04 OCCURS BY USING THE DIA (DIAGNOSTIC) COMMAND WHICH SENDS A COPY OF THE DIABLK TABLE, RESIDING IN CORE, TO THE TS04 CONTROLLER. THE FORMAT OF THE DIABLK IS SHOWN IN THE FOLLOWING TABLE. NOTE THAT THE TABLE IS FILLED IN REVERSE ORDER, THAT IS, THE LAST LOGICAL ENTRY OF THE TABLE IS LABELED DIABLK, WHILE THE FIRST LOGICAL ENTRY OF THE TABLE IS LABELED DIABLK+DIAEXT, WHERE DIAEXT IS THE LENGTH (EXTENT) OF THE TABLE IN BYTES.

WHEN THE DIA COMMAND IS EXECUTED, THE DIABLK IS LOADED ONTO THE TS04 STACK WITH THE FIRST LOGICAL ENTRY AT THE TOP OF THE STACK, AS SHOWN BELOW. THE TS04 THEN JUMPS TO THE P.E. WRAP TASK, IN ROM, WHERE THE FUNCTION IS EXECUTED USING THE REMAINING STACK ENTRIES AS ARGUMENTS.

DIABLK+DIAEXT:	TS04 PE WRAP TASK ADDR LO	
	TS04 PE WRAP TASK ADDR HI	
	READ CONTROL	(RDCTLO)
	FORMAT CONTROL	(FMCTLO)
	DATA	
	CONTROL	(IOSCO)
	DATA	
	CONTROL	(IOSCO)
	DATA	
	CONTROL	(IOSCO)
	DATA	
	CONTROL	(IOSCO)
	DATA	
	CONTROL	(IOSCO)
DIABLK:	DATA	
	CONTROL	(IOSCO)

5.4.1 TRACK ACTIVE/TRACK INACTIVE TESTS (TEST 4)

TEST 4 CHECKS THAT THE TRACK ACTIVE FLOP CAN SET AND CLEAR IN NRZI MODE FOR ALL CHANNELS. IF THE DATA DOES NOT MAKE A TRANSITION WHEN THE WRITE FLAG IS UP, THE TRACK ACTIVE FLOP WILL CLEAR. HOWEVER, IT WILL SET IF THERE IS A DATA TRANSITION WHILE THE WRITE FLAG IS UP.

5.4.1.1 SUBTEST 1 - TRACK INACTIVE TEST

THIS TEST FORCES THE TRACK ACTIVE TO CLEAR BY WRITING ALL 0'S DATA. THE PATTERN IS AS FOLLOWS FOR EACH CHANNEL:

DATA: 000000
 WRTFLG: 011100
 TRACK ACTIVE: SHOULD BE 0 FOR ALL TRACKS

5.4.1.2 SUBTEST 2 - TRACK ACTIVE TEST

THIS TEST FORCES TRACK ACTIVE TO SET BY WRITING THE FOLLOWING PATTERN ON EACH CHANNEL:

DATA: 110000
 WRTFLG: 011100
 TRACK ACTIVE: SHOULD BE 1 FOR ALL TRACKS.

5.4.1.3 SUBTEST 3 - TRACK INACTIVE TEST

THIS TEST FORCES THE TRACK ACTIVE TO CLEAR BY WRITING THE FOLLOWING PATTERN ON EACH CHANNEL:

DATA: 111111
 WRTFLG: 011100
 TRACK ACTIVE: SHOULD BE 0 FOR ALL TRACKS

5.4.1.4 SUBTEST 4 - TRACK ACTIVE TEST

THIS TEST FORCES THE TRACK ACTIVE FLOP TO SET BY WRITING THE FOLLOWING PATTERN ON EACH CHANNEL:

DATA: 001111
 WRTFLG: 011100
 TRACK ACTIVE: SHOULD BE 1 FOR ALL TRACKS.

5.4.2 P.F. DATA TEST (TEST 5)

TEST 5 WRAPS A DATA PATTERN TO CHECK EACH TRACK FOR BIT PICKUPS AND DROPS.

REGISTER USAGE IS AS FOLLOWS:

R2 = PREAMBLE DATA FOR TRACKS 1-9 IN BIT POSITION 0-8.
 R3 = 1ST BYTE OF DATA FOR TRACKS 1-9 IN BIT POSITION 0-8.
 THIS IS THE DATA INTEREST AFTER EXECUTING THE TS04 DIA
 COMMAND.
 R4 = 2ND BYTE OF DATA FOR TRACKS 1-9 IN BIT POSITION 0-8.

5.4.2.1 SUBTEST 1 - P.E. DATA TEST/O PATTERN.

THIS TEST WRAPS AN ALL 0'S PATTERN.

5.4.2.2 SUBTEST 2 - P.E. DATA TEST/1 PATTERN.

THIS TEST WRAPS AN ALL 1'S PATTERN.

5.4.2.3 SUBTEST 3 - P.E. DATA TEST/SHIFTING 1 PATTERN.

THIS TEST RIPPLES A 1 IN A FIELD OF 0'S.

5.4.2.4 SUBTEST 4 - P.E. DATA TEST/SHIFTING 0 PATTERN.

THIS TEST RIPPLES A 0 IN A FIELD OF 1'S.

5.4.3 TEST 6 SKEWS THE DATA ON A TRACK BY ONE BYTE WITH RESPECT TO ALL THE OTHER TRACKS. THAT IS, THE DATA IS ONE BYTE LATE ON THE ONE TRACK. EACH TRACK IS TESTED FOR SKEW IN THIS MANNER. REGISTER ASSIGNMENTS ARE AS FOLLOWS:

R2 = PREAMBLE DATA

R3 = BYTE 1 DATA (WITH THE EXCEPTION OF THE SKEWED TRACK. THAT TRACK CONTAINS PREAMBLE DATA)

R4 = BYTE 2 DATA (WITH THE EXCEPTION OF THE SKEWED TRACK. THAT TRACK CONTAINS BYTE 1 DATA)

5.4.3.1 SUBTEST 1 - P.E. SKEW TEST

THIS TEST WRITE AN ALL 1'S PREAMBLE (SKEWED), AN ALL 0'S BYTE 1 (SKEWED), AND AN ALL 1'S BYTE 2 DATA (SKEWED).

5.4.3.2 SUBTEST 2 - P.E. SKEW TEST

THIS TEST SENDS AN ALL 1'S PREAMBLE (SKEWED), AN ALL 1'S BYTE 1 DATA (SKEWED) AND AN ALL 0'S BYTE 2 DATA (SKEWED).

5.4.4 TEST 7 CHECKS THE DEAD TRACK LOGIC BY RIPPLING A DEAD TRACK THRU A FIELD OF LIVE TRACKS AND ONE LIVE TRACK THRU A FIELD OF DEAD TRACKS. ADDITIONALLY, EACH SUBTEST WILL SEND 1'S DATA AND 0'S DATA IN ORDER TO TEST THE 1'S OR DEAD REGISTER AND THE 0'S OR DEAD REGISTER.

REGISTER USAGE:

R2 = PREAMBLE ALL 1'S CHARACTER

R3 = 1ST DATA BYTE (BITS 0-8)

R4 = 2ND DATA BYTE (BITS 0-8)

D*KIDN = DEAD TRACK DEFINED IN BITS 0-8 (0-LIVE TRK; 1-DEAD TRK)

5.4.4.1 SUBTEST 1 - P.E. DEAD TRACK TEST

THIS TEST RIPPLES A DEAD TRACK IN A FIELD OF LIVE TRACKS.

5.4.4.2 SUBTEST 2 - P.E. DEAD TRACK TEST

THIS TEST RIPPLES A LIVE TRACK IN A FIELD OF DEAD TRACKS.

5.5 TEST 8 - LOOKUP TABLE TEST

THIS TEST VERIFIES THAT THE CONTENTS OF THE ROM LOOKUP TABLE ARE CORRECT. THE ROM CONTENTS IN ADDRESSES 1777-0 ARE CHECKED.

DATA AND REGISTER USAGE:

ROMLKI = ROM LOOKUP TABLE ADDRESS.
ERRLFG = ERROR FLAG.
R5 = DIABLK INDEX.

5.6 TEST 9 - INLINE MICRO DIAG TEST

ALLOWS INLINE MICRO DIAGS TO RUN, THEN CHECKS THE STATUS THEY RETURN.

5.7 TEST 10 - INIT MICRO DIAG TEST

ALLOWS INIT MICRO DIAGS TO RUN, THEN CHECKS THE STATUS THEY RETURN.

3	PROGRAM HEADER
105	DISPATCH TABLE
126	DESCRIPTIVE TEXT
143	DEFAULT HARDWARE P-TABLE
161	SOFTWARE P-TABLE
184	GLOBAL EQUATES SECTION
473	GLOBAL DATA SECTION
616	GLOBAL TEXT SECTION
632	GLOBAL ERROR REPORT SECTION
1145	GLOBAL SUBROUTINES SECTION
2575	LOAD DEV PROTECTION TABLE
2590	INITIALIZE SECTION
2681	AUTO DROP SECTION
2764	CLEANUP CODING SECTION
2791	DROP UNIT SECTION
2817	ADD UNIT SECTION
2849	TEST 1: PDP11/TS11 WRAP TEST.
3002	TEST 2: PDP11/TS04 WRAP TEST.
3078	TEST 3: SET TS04 CHARACTERISTIC VERIFICATION.
3280	TEST 4: TRACK INACTIVE/ACTIVE TEST.
3582	TEST 5: P.E. DATA TEST.
3792	TEST 6: P.E. SKEW TEST
3949	TEST 7: P.E. DEAD TRACK TEST.
4117	TEST 8: LOOKUP TABLE TEST
4192	TEST 9: IN-LINE MICRO DIAGNOSTIC TEST
4217	TEST 10: INIT MICRO DIAGNOSTIC TEST
4239	HARDWARE PARAMETER CODING SECTION
4277	SOFTWARE PARAMETER CODING SECTION
4321	HARD CODED P-TABLE

1

```

2      .TITLE PROGRAM HEADER AND TABLES
3      .SBTTL PROGRAM HEADER
4
5      .ENABL ABS,AMA
6      =      2000
7
8      002000      BGNMOD
9
10     :++
11     : THE PROGRAM HEADER IS THE INTERFACE BETWEEN
12     : THE DIAGNOSTIC PROGRAM AND THE SUPERVISOR.
13     :--
14
15     002000      POINTER BGNAU,BGNDU,BGNSW,BGNSFT,BGNSETUP
16
17
18     002000      HEADER CZTSI,B,0,25,0
19     002000      L$NAME::      :DIAGNOSTIC NAME
20     002000      103      .ASCII /C/
21     002001      132      .ASCII /Z/
22     002002      124      .ASCII /T/
23     002003      123      .ASCII /S/
24     002004      111      .ASCII /I/
25     002005      000      .BYTE 0
26     002006      000      .BYTE 0
27     002007      000      .BYTE 0
28     002010      L$REV::      ;REVISION LEVEL
29     002010      102      .ASCII /B/
30     002011      L$DEPO::      ;0
31     002011      060      .ASCII /O/
32     002012      L$UNIT::      ;NUMBER OF UNITS
33     002012      000001      .WORD T$PTHV
34     002014      L$TIML::      ;LONGEST TEST TIME
35     002014      000025      .WORD 25
36     002016      L$HPCP::      ;PTR. TO H.W. PTABLE
37     002016      034066      .WORD L$HARD
38     002020      L$SPCP::      ;PTR. TO S.W. PTABLE
39     002020      034140      .WORD L$SOFT
40     002022      L$HPTP::      ;PTR. TO DEF. H.W. PTABLE
41     002022      002204      .WORD L$HW
42     002024      L$SPTP::      ;PTR. TO S.W. PTABLE
43     002024      002212      .WORD L$SW
44     002026      L$LADP::      ;DIAG. END ADDRESS
45     002026      034534      .WORD L$LAST
46     002030      L$STA::      ;RESERVED FOR APT STATS
47     002030      000000      .WORD 0
48     002032      L$CO::      .WORD 0
49     002032      000000      .WORD 0
50     002034      L$DTYP::      ;DIAGNOSTIC TYPE
51     002034      000000      .WORD 0
52     002036      L$APT::      ;APT EXPANSION
53     002036      000000      .WORD 0
54     002040      L$DTP::      ;PTR. TO DISPATCH TABLE
55     002040      002124      .WORD L$DISPATCH
56     002042      L$PRIO::      ;DIAGNOSTIC RUN PRIORITY
57     002042      000000      .WORD 0
  
```

58	002044		L\$EXP1::	;EXPANSION WORDS	.WORD	0
59	002044	000000				
60	002046		L\$EXP2::		.WORD	0
61	002046	000000				
62	002050		L\$MREV::	;SVC REV AND EDIT #	.BYTE	C\$REVISION
63	002050	003			.BYTE	C\$EDIT
64	002051	002				
65	002052		L\$EF::	;DIAG. EVENT FLAGS	.WORD	0
66	002052	000000			.WORD	0
67	002054	000000				
68	002056		L\$SPC::		.WORD	0
69	002056	000000				
70	002060		L\$DEVP::	; POINTER TO DEVICE TYPE LIST	.WORD	L\$DVTYP
71	002060	002174				
72	002062		L\$REPP::	;PTR. TO REPORT CODE	.WORD	0
73	002062	000000				
74	002064		L\$EXP4::		.WORD	0
75	002064	000000				
76	002066		L\$EXP5::		.WORD	0
77	002066	000000				
78	002070		L\$AUT::	;PTR. TO ADD UNIT CODE	.WORD	L\$AU
79	002070	030112				
80	002072		L\$DUT::	;PTR. TO DROP UNIT CODE	.WORD	L\$DU
81	002072	030074				
82	002074		L\$LUN::	; LUN FOR EXERCISERS TO FILL	.WORD	0
83	002074	000000				
84	002076		L\$DESP::	; POINTER TO DIAG. DESCRIPTION	.WORD	L\$DESC
85	002076	002150				
86	002100		L\$LOAD::	;GENERATE SPECIAL AUTOLOAD EMT	EMT	E\$LOAD
87	002100	104035				
88	002102		L\$ETP::	;POINTER TO ERRTABL	.WORD	0
89	002102	000000				
90	002104		L\$ICP::	;PTR. TO INIT CODE	.WORD	L\$INIT
91	002104	027316				
92	002106		L\$CCP::	;PTR. TO CLEAN-UP CODE	.WORD	L\$CLEAN
93	002106	030052				
94	002110		L\$ACP::	;PTR. TO AUTO CODE	.WORD	L\$AUTO
95	002110	027600				
96	002112		L\$PRT::	;PTR. TO PROTECT TABLE	.WORD	L\$PROT
97	002112	027310				
98	002114		L\$TEST::	;TEST NUMBER	.WORD	0
99	002114	000000				
100	002116		L\$DLY::	;DELAY COUNT	.WORD	0
101	002116	000000				
102	002120		L\$HIME::	;PTR. TO HIGH MEM	.WORD	0
103	002120	000000				
104						

```
105      .SBTTL DISPATCH TABLE
106
107      ;++
108      ; THE DISPATCH TABLE CONTAINS THE STARTING ADDRESS OF EACH TEST.
109      ; IT IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST.
110      ;--
111
112      DISPATCH 10
113      002122 000012                                .WORD 10
114      002124
115      002124 030130                                .WORD T1
116      002126 030464                                .WORD T2
117      002130 030644                                .WORD T3
118      002132 031336                                .WORD T4
119      002134 032232                                .WORD T5
120      002136 032674                                .WORD T6
121      002140 033256                                .WORD T7
122      002142 033640                                .WORD T8
123      002144 033774                                .WORD T9
124      002146 034042                                .WORD T10
125
126      .SBTTL DESCRIPTIVE TEXT
127
128      ;++
129      ; 2 LINES OF TEXT PRINTED TO THE OPERATOR TO IDENTIFY THE DIAG AND THE DEVICE
130      ;--
131
132      DESCRIPT      <CONTROL LOGIC TEST>
133      L$DESC::
134      002150 047503 052116 047522                .ASCIZ /CONTROL LOGIC T
135      002156 020114 047514 044507
136      002164 020103 042524 052123
137      002172      000
138      002174                                .EVEN
139      DEVTYP      <TS11>
140      L$DVTYP::
141      002174 051524 030461 000                .ASCIZ /TS11/
142      002202                                .EVEN
```

```
143 .SBTTL DEFAULT HARDWARE P-TABLE
144
145 ;++
146 ; THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
147 ; THE TEST-DEVICE PARAMETERS. THE STRUCTURE OF THIS TABLE
148 ; IS IDENTICAL TO THE STRUCTURE OF THE RUN-TIME P-TABLE.
149 ;--
150
151          BGNHW  DFPTBL
152 002202 000002
153 002204
154 002204
155
156 002204 172522          ;TSSR ADDRESS
157 002206 000224          ;VECTOR ADDRESS
158
159 002210
160 002210          ENDPHW
          L10000:
```

```
161          .SBTTL  SOFTWARE P-TABLE
162
163          ;++
164          ; THE SOFTWARE P-TABLE CONTAINS THE VALUES OF THE PROGRAM
165          ; PARAMETERS THAT CAN BE CHANGED BY THE OPERATOR.
166          ;--
167
168
169          BGNSW  SFPTBL
170          002210 000001          .WORD  L10001-L$SW/2
171          002212
172          002212
173
174          002212 000          CMPFLG:: .BYTE 0          ;ENABLE DATA COMPARE ERROR PRINT FLAG
175
176          002213 000          .BYTE 0          ;0=DO NOT ENABLE IS DEFAULT
177
178          002214          ENDSW          ;SPARE FLAG
179          002214          L10001:
180
181          002214          ENDMOD
```

```
182  
183 .TITLE GLOBAL AREAS  
184 .SBTTL GLOBAL EQUATES SECTION  
185 002214 BGNMOD  
186  
187 :  
188 :  
189 : THE GLOBAL EQUATES SECTION CONTAINS PROGRAM EQUATES THAT  
190 : ARE USED IN MORE THAN ONE TEST.  
191 :  
192 002214 EQUALS  
193 :  
194 : BIT DIFINITIONS  
195 :  
196 100000 BIT15== 100000  
197 040000 BIT14== 40000  
198 020000 BIT13== 20000  
199 010000 BIT12== 10000  
200 004000 BIT11== 4000  
201 002000 BIT10== 2000  
202 001000 BIT09== 1000  
203 000400 BIT08== 400  
204 000200 BIT07== 200  
205 000100 BIT06== 100  
206 000040 BIT05== 40  
207 000020 BIT04== 20  
208 000010 BIT03== 10  
209 000004 BIT02== 4  
210 000002 BIT01== 2  
211 000001 BIT00== 1  
212 :  
213 001000 BIT9== BIT09  
214 000400 BIT8== BIT08  
215 000200 BIT7== BIT07  
216 000100 BIT6== BIT06  
217 000040 BIT5== BIT05  
218 000020 BIT4== BIT04  
219 000010 BIT3== BIT03  
220 000004 BIT2== BIT02  
221 000002 BIT1== BIT01  
222 000001 BIT0== BIT00  
223 :  
224 : EVENT FLAG DEFINITIONS  
225 : EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION  
226 :  
227 000040 EF.START== 32. : START COMMAND WAS ISSUED  
228 000037 EF.RESTART== 31. : RESTART COMMAND WAS ISSUED  
229 000036 EF.CONTINUE== 30. : CONTINUE COMMAND WAS ISSUED  
230 000035 EF.NEW== 29. : A NEW PASS HAS BEEN STARTED  
231 000034 EF.PWR== 28. : A POWER-FAIL/POWER-UP OCCURRED  
232 :  
233 :  
234 : PRIORITY LEVEL DEFINITIONS  
235 :  
236 000340 PRI07== 340  
237 000300 PRI06== 300
```

238	000240	PR105== 240
239	000200	PR104== 200
240	000140	PR103== 140
241	000100	PR102== 100
242	000040	PR101== 40
243	000000	PR100== 0
244		:
245		; OPERATOR FLAG BITS
246		:
247	000004	EVL== 4
248	000010	LOT== 10
249	000020	ADR== 20
250	000040	IDU== 40
251	000100	ISR== 100
252	000200	UAM== 200
253	000400	BOE== 400
254	001000	PNT== 1000
255	002000	PR1== 2000
256	004000	IXE== 4000
257	010000	IBE== 10000
258	020000	IER== 20000
259	040000	LOE== 40000
260	100000	HOE== 100000

;BIT DEFINITIONS USED TO SPECIFY THE ROM ADDRESS LINES IN THE ROMLOK
;SUBROUTINE

264		
265	001000	A9== 1000
266	000400	A8== 400
267	000200	A7== 200
268	000100	A6== 100
269	000040	A5== 40
270	000020	A4== 20
271	000010	A3== 10
272	000004	A2== 4
273	000002	A1== 2
274	000001	A0== 1

THE FOLLOWING DEFINITIONS MAY CHANGE ON MICRO-CODE REASSEMBLY:

282	000005	WRPLO==5	;WRITE WRAP TASK ADR LO.
283	000200	WRPHI==200	;WRITE WRAP TASK ADR HI.
284	000000	POPJHI==0	;TS04 POPJ ADDRESS HI (RTS)
285	000033	POPJLO==33	;TS04 POPJ ADDRESS LO (RTS)

```

:
:.....
:.....
:

```



```
290 ; TSSR REGISIER BIT DEFINITIONS.
291
292 001000 TS.XA1==1000 ;EXTENDED ADDRESS BIT 1
293 000400 TS.XA0==400 ;EXTENDED ADDRESS BIT 0
294 000200 TS.SSR==200 ;SUBSYSTEM READY BIT.
295 002000 TS.NBA==2000 ;NEED BUFFER ADRESS-CLEARED BY SET CHAR
296 ; -SET BY COMD WITHOUT SET CHAR
297 020000 TS.SPE==20000 ;SERIAL BUS PARITY ERROR AT TS11
298 177717 FCMASK==177717 ;FATAL CLASS CODE MASK
299 177701 TCFCHK==177701 ;TERMINATION AND FATAL CLASSES CODE MASK
300
301 ;THE FOLLOWING ARE BIT DEFINITIONS FOR THE COMMAND WORD
302
303 100000 ACK.C==100000 ;ACKNOWLEDGE BIT
304 040000 CVC.C==40000 ;CLEAR VOLUME CHECK.
305 020000 OPP.C==20000 ;OPPOSITE BIT
306 010000 SWB.C==10000 ;SWAP BYTE BIT
307 004000 MOD.C3==4000 ;MODE BIT 3
308 002000 MOD.C2==2000 ;MODE BIT 2
309 001000 MOD.C1==1000 ;MODE BIT 1
310 000400 MOD.C0==400 ;MODE BIT 0
311 000200 IE.C==200 ;INTERRUPT ENABLE
312 000100 FMT.C1==100 ;FORMAT BIT 1
313 000040 FMT.C0==40 ;FORMAT BIT 0.
314 000020 CMD.C4==20 ;COMMAND BIT 4
315 000010 CMD.C3==10 ;COMMAND BIT 3
316 000004 CMD.C2==4 ;COMMAND BIT 2
317 000002 CMD.C1==2 ;COMMAND BIT 1
318 000001 CMD.C0==1 ;COMMAND BIT 0
319
320 ; BIT DEFINITIONS FOR DEVICE CHARACTERISTICS.
321
322 000200 CH.ESS==200
323 000040 CH.EA1==40
324 000020 CH.ER1==20
325
326 ;ROM LOOKUP TABLE BIT DEFINITIONS
327
328 000200 .MULT==200 ;MULT TRACKS
329 000100 .RDFMK==100 ;READ FILE MARK PATTERN
330 000040 .PREAM==40 ;PREAMBLE
331 000020 .9OF9==20 ;9 OF 9 TRACKS
332 000010 .0OF9==10 ;NONE OF 9 TRACKS
333 000004 .CORD==4 ;CORRECTABLE DATA
334 000002 .INCOR==2 ;INCORRECTABLE DATA
335 000001 .8OF9==1 ;8 OF 9 TRACKS
336
337 ; MISCELLANEOUS DEFINITIONS.
338
339 000340 INTPRI==PRI07 ;PRIORITY TO BE USED IN THE INTERRUPT STATE.
340 000010 SCHEXT==10 ;BUFFER LENGTH. (EVEN #)
341 000016 MSGEXT==16 ;MESSAGE BUFFER LENGTH IN BYTES. (EVEN #)
342 000020 DIAEXT==20 ;DIABLK EXTENT IN OCTAL.
343 100006 DIA==ACK.C!CMD.C2!CMD.C1 ;DIA CMD WORD.
344 140004 SCH==ACK.C!CVC.C!CMD.C2 ;SCH (SET CHAR) CMD WORD.
345 100017 GES==ACK.C!CMD.C0!CMD.C1!CMD.C2.CMD.C3 ;GET STATUS COMMAND
```

```
346      020000      BPE==20000      ;XSTAT2, SERIAL BUS PARITY ERROR AT T504
347      040000      SIP==40000      ;XSTAT2, SILO PARITY ERROR
348      000200      MOT==200        ;XSTAT0, TAPE MOVING
349      177777      ENDTBL==177777  ;END OF A TABLE FLAG
350
351      ;THE FOLLOWING INDICATES THE RELATIVE POSITIONS OF THE STATUS WORDS
352      ;IN THE MESSAGE BUFFER.
353
354      000004      MSSRFC==4        ;RESIDUAL FRAME COUNT.
355      000006      MSXS0==6        ;EXT STATUS REG 0
356      000010      MSXS1==10       ;EXT STATUS REG 1
357      000012      MSXS2==12       ;EXT STATUS REG 2
358      000014      MSXS3==14       ;EXT STATUS REG 3
359      000004      C18$OR==4       ;INDEX FOR OUTPUT READY INFO (CHAN 1-8).
360      000005      C18$D==5        ;INDEX FOR 1 OR DEAD INFO (CHAN 1-8)
361      000007      C18$TA==7       ;INDEX FOR TRACK ACTIVE INFO. (CHAN 1-8)
362      000010      C18$DA==10      ;INDEX FOR DATA INFO. (CHAN 1-8)
363      000011      C18$D==11      ;INDEX FOR TRACK DEAD INFO. (CHAN 1-8)
364      000012      C18$OD==12     ;INDEX FOR 0 OR DEAD INFO. (CHAN 1-8)
365      000013      ROM$LK==13     ;INDEX FOR LOOKUP TABLE
366      000014      PRCHST==14     ;STATUS OF THE PARITY CHANNEL (CHANNEL 9)
367      000001      CH9.OR==1       ;BIT POSITION FOR OUTPUT RDY FOR CHAN 9
368      000002      CH9.D==2       ;BIT POS FOR 1 OR DEAD INFO FOR CHAN 9.
369      000004      CH9.TA==4      ;BIT POSITION OF THE TRACK ACTIVE INFO CHAN 9.
370      000010      CH9.DA==10     ;BIT POS OF DATA INFO FOR CHAN 9.
371      000020      CH9.D==20      ;BIT POS OF TRK DEAD INFO FOR CHAN 9.
372      000040      CH9.OD==40     ;BIT POS OF 0 OR DEAD INFO FOR CHAN 9.
373
374      ;THE FOLLOWING DEFINITIONS SHOW THE RELATIVE POSITIONS OF THE COMMAND
375      ;PACKET ENTRIES.
376
377      000000      CP$CMD==0        ;CMDPKT+0==T504 COMMAND.
378      000002      CP$ADL==2       ;CMDPKT+2==BUFFER ADDRESS LOW.
379      000004      CP$ADH==4       ;CMDPKT+4==BUFFER ADDRESS HIGH.
380      000006      CP$CNT==6       ;CMDPKT+6==BYTE/FILE/RECORD COUNT.
381
```

```

382 ;THE FOLLOWING ARE REGISTER AND BIT DEFINITIONS FOR THE TS04
383 ;REGISTERS OF INTEREST IN THIS DIAGNOSTIC.
384
385 ;*****
386 ;FMCTLO - FORMATTER MAJOR STATE CONTROL REG
387 000004 FMCTLO==4
388 ;WRITE REGISTER 4
389
390 ;THIS REGISTER IS SET UP FOR THE PORTION OF THE
391 ;RECORD WE ARE PRESENTLY READING
392
393
394 000200 FC.RD== 200 ;WE ARE DOING NORMAL READ. IF 0, WE DISABLE SOME ERROR
395 ;CORRECTION LOG C SO WE'RE MORE DISCRIMINATING
396 ;FOR READ AFTER WRITE.
397
398 000100 FC.FLO==100 ;SETTING THIS BIT CAUSES .FMFLO ON BBUS TO BE TRUE
399 ;(NEEDED BY THE RD PE ROUTINE)
400 000010 FC.DAT==10 ;DATA MODE
401 000004 FC.PRE==4 ;PREAMBLE MODE
402 000002 FC.VCO==2 ;VCO SYNC MODE
403 000001 FC.NRZ==1 ;NRZI MODE (FORCE SKEW WINDOW TO STAY OPEN)
404 ;CAUSES FMTAUI TO BE CLRED WHEN YOU WRITE
405 ;TO THE FMCLDO REGISTER.
406 ;*****
407
408 ;RDCTLO - READ CONTROL REGISTER
409 000020 RDCTLO=-20
410 ;WRITE REGISTER 20
411
412 ;THIS REGISTER CONTROLS THE FORMATTER MODE AND THRESHOLD.
413
414 000200 RD.REV==200 ;1 FOR REV MOTION, 0=-FWD
415 000100 RD.MAI==100 ;I/O FORMATTER DATA WRAPAROUND
416
417 000040 RD.SPC--40 ;WE ARE SPACING RECORDS. (THIS BIT IS UNUSED IN
418 ;THE HARDWARE BUT IS A SOFTWARE FLAG IN THE READ CODE)
419
420 000020 RD.SKP==20 ;WE ARE SKIPPING FILES. (THIS BIT IS UNUSED IN
421 ;THE HARDWARE BUT IS A SOFTWARE FLAG IN THE READ CODE)
422
423 ;THE FOLLOWING THRESHOLDS ARE AVAILABLE:
424 ;NORM USE DIAG USE
425 000007 RD.110==7 ; HI PREAMP GAIN
426 000006 RD.90==6 ; LO PREAMP, BAD TAPE CLEAN
427 000005 RD.75==5 ; RESIDUAL ERASE CHK
428 000004 RD.68==4 ; FWD/REV AMP BALANCE
429 000003 RD.40==3 ; NRZ WRT
430 000002 RD.20==2 ; NRZ RD, PE I,RT
431 000001 RD.12==1 ; PE READ, NRZ ERR RECOV RD/WRT CROSSTALK
432 000000 RD.07==0 ; PE ERR RECCV ERASE FUNCTION
433 ;DATA PORTION ONLY
434

```

```

435 ;*****
436 ;IOSCO - I/O SEQUENCER SILO CONTROL BUFFER OUT
437 000014 IOSCO==14
438 ;WRITE REGISTER '4
439
440 ;THIS REGISTER CONTAINS THE SILO CONTROL BITS FOR DATA WRITTEN
441 ;BY THE MAIN OR I/O MICRO TO THE SILO. THE DATA IN THIS REG
442 ;IS PAIRED WITH THE IOSDO REG AND PUT IN THE SILO WHENEVER
443 ;THE IOSICO REG IS CLOCKED. THIS REGISTER NEED ONLY BE WRITTEN
444 ;ONCE IF THE SAME OLD DATA IS OK TO BE WRITTEN IN THE SILO.
445 ;NOTE THAT IF THE I/O IS WRITING THE SILO, THE MAIN MUST PUT EVEN
446 ;PARITY IN THE BITS 357 OR THE I,J WILL WRITE PAR ERRS IN THE SILO.
447 ;(THE IS.DAP BIT IS DON'T CARE HERE FOR I/O WRITING THE SILO)
448
449 000200 IS.PAR== 200 ;OLD PAR BIT FOR ALL 16 BITS (CNRTL AND DATA)
450 ;NOTE THAT THE BITS MASKED BY 357 MUST BE
451 ;EVEN PARITY BECAUSE THE 9 DATA BITS ARE ODD
452
453 000100 IS.IVP== 100 ;INVERT CNTRL SILO PAR BIT BEFORE MOVING
454 ;TO WRITE BOARD (WRITE EVEN PARITY ON TAPE)
455
456 000040 IS.NRZ== 40 ;INVERT WRITE BUFFER BIT IF ASSOCIATED SILO
457 ;DATA BIT IS A 1. (IF IS.NRZ==0, WE'RE IN PE MODE)
458
459 000020 IS.DAP== 20 ;ODD PARITY FOR THE 8 DATA BITS IN IOSDO
460
461 000010 IS.LRC== 10 ;CAUSES SYNCHRONOUS CLR ON WRT BOARD TO WRITE THE LRC CHA
462 000004 IS.WRF== 4 ;THIS FLG BIT SHOWS UP AT THE WRITE BOARD
463 ;WITH THE CORRESPONDING DATA. THE FUNCTION OF
464 ;THE BIT WILL BE DEFINED BY THE WRITE BOARD.
465 ;NOTE HOWEVER THAT IF THE WRITE BOARD SEES
466 ;THE BIT 1, THE PA.WRF BIT IN THE
467 ;PRATNI REG WILL ALSO BE 1 (IF ENABLED
468 ;TO AFFECT THE ATTN REG).
469 ;THE 2 LOW BITS ARE WRITABLE AND AFFECT THE PARITY TREES BUT
470 ;OTHERWISE ARE UNIMPLEMENTED
471 ;*****
472

```

```

473      .SBTTL  GLOBAL DATA SECTION
474
475      ;++
476      ; THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
477      ; IN MORE THAN ONE TEST.
478      ;--
479
480      ;      TS04 REGISTER ADDRESSES.
481
482      002214  000000      TSDB::  0      ;TS04 DATA BUFFER ADDRESS.
483      002216  000000      TSDBHI:: 0      ;TSDB HI BYTE ADDRESS.
484      002220  000000      TSBA::  0      ;TS04 BUFFER ADDRESS REG ADDRESS.
485      002222  000000      TSBAHI:: 0     ;TSBA HI BYTE ADDRESS.
486      002224  000000      TSSR::  0      ;TS04 STATUS REGISTER ADDRESS.
487      002226  000000      TSVCT:: 0      ;TS04 VECTOR ADDRESS.
488
489      ;      THE FOLLOWING IS THE TS04 COMMAND PACKET.
490      ;      (MUST BE ON A MODULO 4 BOUNDARY)
491
492      002230      .=.+3&177774      ;FORCES CMD PKT ON MODULO 4 BOUNDARY.
493
494      002230  000000      CMDPKT::0      ;1ST WORD::  TS04 COMMAND
495      002232  000000      0      ;2ND WORD::  BUFFER LOW ADDR.
496      002234  000000      0      ;3RD WORD::  BUFFER HIGH ADDR.
497      002236  000000      0      ;4TH WORD::  BYTE/RECORD/FILE COUNT.
498
499      ;SET CHAR PACKET
500
501      002240      .=.+3&177774
502
503      002240  140004      SCHPKT::SCH      ;SET CHAR CMD HEADER
504      002242  002276      SCHBLK      ;SET CHAR BLK AD LO
505      002244  000000      000000      ;SET CHAR BLK AD HI
506      002246  000010      SCHEXT      ;BPCR LENGTH OF SCHAR BLOCK
507
508      ;DIAG PACKET
509
510      002250      .-.+3&177774
511
512      002250  100006      DIAPKT::DIA      ;DIAG CMD HEADER
513      002252  002316      DIABLK      ;DIAG BLOCK AD LO
514      002254  000000      000000      ;DIAG BLOCK AD HI
515      002256  000020      DIAEXT      ;BPCR=DIABLK LENGTH
516
517      ;      THIS IS THE MESSAGE PACKET.
518
519      002260  000000      MSGPKT:: 0      ;1ST WORD::  MESSAGE WORD.
520      002262  000000      MSGDFL:: 0      ;2ND WORD::  DATA FIELD LENGTH
521      002264  000000      RFC::  0      ;3RD WORD::  RESIDUAL FRAME COUNT.
522      002266  000000      XSTAT0:: 0      ;4TH WORD::  EXTENDED STATUS REG 0.
523      002270  000000      XSTAT1:: 0      ;5TH WORD::  EXTENDED STATUS REG 1.
524      002272  000000      XSTAT2:: 0      ;6TH WORD::  EXTENDED STATUS REG 2.
525      002274  000000      XSTAT3:: 0      ;7TH WORD::  EXTENDED STATUS REG 3.
526      002276  002276      MSGEND== .      ;PAST MSG PKT POINTER
527
528      ;      THE SET CHARACTERISTIC BLOCK.

```

```

529
530 002276 002260 SCHBLK:: MSGPKT ;1ST WORD:: MSGPKT ADDR LO.
531 002300 000000 0 ;2ND WORD MSGPKT ADDR HI.
532 002302 000016 MSGEXT ;3RD WORD:: MSG BUFFER LENGTH(BYTES).
533 002304 000000 0 ;4TH WORD:: CHARACTERISTIC WORD.
534 ; ADDRESSES OF INTERRUPT HANDLING ROUTINES.
535
536 002306 014370 TS4INT:: TS4IN0 ;DEVICE 0.
537 002310 014400 TS4IN1 ;DEVICE 1.
538 002312 014410 TS4IN2 ;DEVICE 2.
539 002314 014420 TS4IN3 ;DEVICE 3.
540
541
542 ; THE DIAGNOSTIC COMMAND BUFFER. WHEN A DIAG COMMAND IS
543 ; EXECUTED, THE TS04 PLACES THE CONTENTS OF THIS BUFFER ONTO THE TS04
544 ; STACK IN REVERSE ORDER, THEN EXECUTES WHAT IS ON THE STACK BY
545 ; PERFORMING A COMMAND SIMILAR TO AN RTS.
546 ; THE BUFFER IS INITIALLY LOADED WITH THE TS04 CODE FOR
547 ; AN RTS COMMAND.
548
549
550 002316 000 DIABLK:: .BYTE POPJHI
551 002317 033 .BYTE POPJLO
552 002320 000 .BYTE POPJHI
553 002321 033 .BYTE POPJLO
554 002322 000 .BYTE POPJHI
555 002323 033 .BYTE POPJLO
556 002324 000 .BYTE POPJHI
557 002325 033 .BYTE POPJLO
558 002326 000 .BYTE POPJHI
559 002327 033 .BYTE POPJLO
560 002330 000 .BYTE POPJHI
561 002331 033 .BYTE POPJLO
562 002332 000 .BYTE POPJHI
563 002333 033 .BYTE POPJLO
564 002334 000 .BYTE POPJHI
565 002335 033 .BYTE POPJLO
  
```

```

566                                     ;TABLES OF FORMATTER AND WRITE CONTROL REG ACTUAL & EXPECTED
567
568 002336                               EXPTBL::                                ;TABLE 1 EXPECTED REGS
569 002336 000000                       EXORDY:: 0                            ;EXPECTED OUTPUT READY INFO
570 002340 000000                       EX1DTR:: 0                            ;EXPECTED 1 OR DEAD TRACK INFO
571 002342 000000                       EXTRAC:: 0                            ;EXPECTED TRACK ACTIVE INFO
572 002344 000000                       EXDATA:: 0                            ;EXPECTED DATA INFO
573 002346 000000                       EXTRDD:: 0                            ;EXPECTED TRACK DEAD INFO
574 002350 000000                       EXODTR:: 0                            ;EXPECTED 0 OR DEAD TRACK INFO.
575 002352 000000                       EXROML:: 0                            ;EXPECTED ROM LOOKUP TABLE INFO.
576
577 002354                               ACTTBL::                                ;TABLE 2 ACTUAL REGS
578 002354 000000                       ACORDY:: 0                            ;ACTUAL OUTPUT READY INFO
579 002356 000000                       AC1DTR:: 0                            ;ACTUAL 1'S OR DEAD TRACK INFO
580 002360 000000                       ACTRAC:: 0                            ;ACTUAL TRACK ACTIVE INFO
581 002362 000000                       ACDATA:: 0                            ;ACTUAL DATA INFO
582 002364 000000                       ACTRDD:: 0                            ;ACTUAL TRACK DEAD INFO
583 002366 000000                       ACODTR:: 0                            ;ACTUAL 0 OR DEAD TRACK INFO
584 002370 000000                       ACROML:: 0                            ;ACTUAL ROM LOOKUP TABLE INFO
585
586 002372                               ORDTBL::                                ;TABLE 3 SUBTESTS' ORED ACTUAL REGS
587 002372 000000                       ORORDY:: 0                            ;OUTPUT READY
588 002374 000000                       OR1DTR:: 0                            ;1 OR DEAD TRACK
589 002376 000000                       ORTRAC:: 0                            ;TRACK ACTIVE
590 002400 000000                       ORDATA:: 0                            ;DATA
591 002402 000000                       ORTRDD:: 0                            ;TRACK DEAD
592 002404 000000                       ORODTR:: 0                            ;0 OR DEAD TRACK
593
594 002406 000000                       ACTRK1:: 0                            ;ACTUAL TRACK ACTIVE TEST 4,SUB 1
595 002410 000000                       ACTRK2:: 0                            ;ACTUAL TRACK ACTIVE TEST 4,SUB 2
596 002412 000000                       ACTRK3:: 0                            ;ACTUAL TRACK ACTIVE TEST 4,SUB 3
597 002414 000000                       ACTRK4:: 0                            ;ACTUAL TRACK ACTIVE TEST 4,SUB 4
598
599 002416 000000                       DTKIDN:: 0                            ;DEAD TRACK IDENTIFICATION REG. (BITS 0 THRU 8)
600                                     ;1=DEAD; 0=LIVE.
601 002420 000000                       ROMLKI:: 0                            ;ROM LOOKUP TABLE ADDRESS
602 002422 000000                       UNIT:: 0                              ;CURRENT UNIT # FOR PRINTS.
603 002424 000000                       TS4CL:: 0                              ;TS04 MICRO-CODE LEVEL - STORED IN SCH TEST.
604 002426 000000                       TIME:: 0                               ;TIMEOUT COUNTER.
605 002430 000000                       TEMPO:: 0                              ;GENERAL PURPOSE LOCATION 0.
606 002432 000000                       TEMP1:: 0                              ;GENERAL PURPOSE LOCATION 1.
607 002434 000000                       TEMP2:: 0                              ;GENERAL PURPOSE LOCATION 2.
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611                                     ; PROGRAM CONTROL FLAGS.
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613 002436 000                           ERRFLG:: .BYTE 0                        ;0 = NO ERROR
614 002437 000                           CTLFLG:: .BYTE 0                        ;ALL PURPOSE PROGRAM CONTROL FLAG
615                                     .EVEN

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.SBTTL GLOBAL TEXT SECTION

;THE GLOBAL TEXT SECTION CONTAINS FORMAT STATEMENTS,
;MESSAGES, AND ASCII INFORMATION THAT ARE USED IN MORE THAN
;ONE TEST.

; ASCII MESSAGES USED IN ERROR REPORT HEADERS.

.NLIST BEX

002440	051524	032117	041440	DESCM::	.ASCIZ	/TS04 CONTROL LOGIC TEST PROGRAM/
002500	047503	046515	047101	MODUER::	.ASCIZ	/COMMAND PACKET ADDR NOT ON MODULO 4 BOUNDARY: RELOAD!/ SSROFF::
002566	051524	032060	047040	SSROFF::	.ASCIZ	/TS04 NOT READY - SSR NOT SET/
002623	124	030123	020064	SSRON::	.ASCIZ	/TS04 DID NOT DROP READY ON COMD ISSUANCE-SSP NOT 0/
002706	042120	030520	020061	WRPER1::	.ASCIZ	/PDP11 - TS11 WRAP FAILURE/
002740	042120	030520	020061	WRPER2::	.ASCIZ	/PDP11 - TS11 WRAP FAIL ON TSSR EXT ADDR BITS/
003015	120	050104	030461	WRPER3::	.ASCIZ	/PDP11 - TS04 WRAP FAILURE/
003047	123	052105	041440	SCHERR::	.ASCIZ	/SET CHARACTERISTIC ERROR/
003100	051124	041501	020113	TAER1::	.ASCIZ	/TRACK ACTIVE NOT 0 FOR 1 OR MORE TRACKS/
003150	051124	041501	020113	TAER2::	.ASCIZ	/TRACK ACTIVE NOT 1 FOR 1 OR MORE TRACKS/
003220	051124	041501	020113	TAERR::	.ASCIZ	/TRACK ACTIVE ERROR/
003243	120	042456	020056	DATER::	.ASCIZ	/P.E. DATA WRAP ERROR/
003270	027120	027105	051440	SKEWER::	.ASCIZ	/P.E. SKEW ERROR/
003310	027120	027105	042040	DDER::	.ASCIZ	/P.E. DEAD TRACK ERROR/
003336	040504	040524	047440	DASKDD::	.ASCIZ	/DATA OR SKEW OR DEAD TRK ERR/
003373	122	046517	046040	ROMER::	.ASCIZ	/ROM LOOKUP TABLE ERROR/
003422	046511	051120	050117	SPECON::	.ASCIZ	/IMPROPER TERMINATION - SPECIAL CONDITION BIT SET/
003503	116	020117	047111	NINTM::	.ASCIZ	/NO INTERRUPT/
003520	047111	042524	051122	UINTM::	.ASCIZ	/INTERRUPT OCCURRED WHEN DISABLED/
003561	115	041511	047522	MICPOE::	.ASCIZ	/MICRO DIAGNOSTIC ERROR TSSR:FC=0,TC=7/

.LIST BEX
.EVEN

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:ASCII BASIC MESSAGES USED IN ERROR REPORTS

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.NLIST BEX
003630 040445 042523 020105 TERM01:: .ASCIZ /%ASEE OP PANEL%N/
003651      045 044501 020106 TERM02:: .ASCIZ /%AIF UOK LIT THEN BAD TS11 BOARD%N/
003714 051445 022462 042501 TERM03:: .ASCIZ /%S2%ELSE OP PANEL=MICRO IO ERROR CODE 100-110%N/
003775      045 041501 042117 TERM05:: .ASCIZ /%ACODE LOOP%S10%ADESCRIPTION%S9%AMODULE(SLOT)%N2/
004056 040445 030061 020060 TERM06:: .ASCIZ /%A100 14 IO MICRO SSTEP,IOATN,...%S5%AM8967(12),M8963(11)%N/
004155      045 030501 030460 TERM07:: .ASCIZ /%A101 15 IOCNO REG TEST%S15%AM8967(12)%N/
004231      045 030501 031060 TERM10:: .ASCIZ /%A102 15 FRAME CNTR TEST%S14%AM8966(14)%N/
004306 040445 030061 020063 TERM11:: .ASCIZ /%A103 16 SILO GOOD PAR DATA - WRT FLG%S1%AM8966(14),M8963(11)%N/
004411      045 030501 032060 TERM12:: .ASCIZ /%A104 17 SILO BAD PAR - DATA LATE%S5%AM8966(14)%N/
004476 040445 030061 020065 TERM13:: .ASCIZ /%A105 20 IO LOOP-0'S%S18%AM8965(15)%N/
004547      045 030501 033060 TERM14:: .ASCIZ /%A106 21 IO LOOP-1'S%S18%AM8965(15)%N/
004620 040445 030061 020067 TERM15:: .ASCIZ /%A107 22 IO LOOP-SHIFT LENGTH MUX%S5%AM8965(15)%N/
004705      045 030501 030061 TERM16:: .ASCIZ /%A110 47 SERIAL BUS - TS11 ALIVE%S6%AM8965(15),TS11%N/
004776 051445 034463 040445 TERM17:: .ASCIZ /%S39%AMOTHER BOARD, SBUS CABLE%N/

005037      045 041101 042101 TS11BD:: .ASCIZ /%ABAD TS11 BOARD%N/
005062 040445 040502 020104 FMTCTR:: .ASCIZ /%ABAD FORMATTER CONTROL BOARD M8922 SLOT 7%N/
005136 040445 044103 041505      .ASCIZ /%ACHECK VCO ADJUST ON M8922%N/
005174 040445 040502 020104 FMTCH6:: .ASCIZ /%ABAD FORMATTER CHANNEL BOARD M8924 SLOT 6%N/
005251      045 041101 042101 FMTCH5:: .ASCIZ /%ABAD FORMATTER CHANNEL BOARD M8924 SLOT 5%N/
005326 040445 040502 020104 FMTCH4:: .ASCIZ /%ABAD FORMATTER CHANNEL BOARD M8924 SLOT 4%N/
005403      045 041101 042101 RDCH2:: .ASCIZ /%ABAD READ CHANNEL BOARD G157 SLOT 2%N/
005452 040445 040502 020104 RDCH1:: .ASCIZ /%ABAD READ CHANNEL BOARD G157 SLOT 1%N/
005521      045 041101 042101 RDCHP3:: .ASCIZ /%ABAD READ CHANNEL BOARD M8923 SLOT 3%N/
005570 040445 044103 041505      .ASCIZ /%ACHECK SKEW AND THRESHOLD ADJUSTS ON M8923%N/
005646 040445 051105 047522 IOBRD:: .ASCIZ /%AERROR IN IO BOARDS(SLOT) OR SBUS CABLE%N/
005720 040445 034115 033071      .ASCIZ /%AM8965(15),M8966(14),M8967(12)%N2/
005763      045 047501 020513 CRMSG:: .ASCIZ /%AOK.%N/

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005774

.LIST BEX
.EVEN

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648 005774
649 005774
650 005774
651 005774
652 005774 021127 177777
653 006000 001415
654 006002
655 006002 011137 006040
656 006006
657 006006 013746 006040
658 006012 012746 000001
659 006016 010600
660 006020 104414
661 006022 062706 000004
662 006026
663 006026 062701 000002
664 006032
665 006032 000760
666 006034
667 006034
668 006034 000167
669 006036 000002
670 006040 000000
671 006042
672 006042
673 006042 104423
674
675 006044
676 006044
677 006044
678 006044 012746 005037
679 006050 012746 000001
680 006054 010600
681 006056 104414
682 006060 062706 000004
683 006064
684 006064 013746 002422
685 006070 013746 002432
686 006074 010346
687 006076 012746 006122

.SBTTL GLOBAL ERROR REPORT SECTION

```

;+
; THE GLOBAL ERROR REPORT SECTION CONTAINS THE PRINTB AND PRINTX CALLS
; THAT ARE USED IN MORE THAN ONE TEST. IT ALSO INCLUDES THE ASCII MESSAGES
; THAT ARE USED BY THE PRINTB AND PRINTX CALLS..
;--

```

```

;LONG MESSAGE PRINT SUBR
;ENTER WITH R1=AD OF MSG AD TABLE
;MSG AD TABLE CONTAINS AD OF MSGS TO PRINT, ONE .WORD AD
;PER MSG. THE TABLE MUST END WITH .WORD ENDTBL=177777
;AS END OF TABLE FLAG

```

BGNMSG LONMSG

LONMSG::

WHILE (R1) NE #177777 DO

50000\$:

```

CMP (R1),#177777
BEQ 50001$

```

LET MSGADR := (R1)

MOV R1,MSGADR

PRINTB MSGADR

MOV MSGADR,-(SP)

MOV #1,-(SP)

MOV SP,R0

TRAP C\$PNTB

ADD #4,SP

LET R1 := R1 + #2

ADD #2,R1

ENDDO

BR 50000\$

EXIT MSG

50001\$:

```

.WORD JSJMP
.WORD L10002-2-.

```

MSGADR: .WORD 0

ENDMSG

L10002:

TRAP C\$MSG

BG 4SG WRAPR1

WRAPR1::

PRINTB #TS11BD

MOV #TS11BD,-(SP)

MOV #1,-(SP)

MOV SP,R0

TRAP C\$PNTB

ADD #4,SP

PRINTX #EEM1A,R3,TEMP1,UNIT

MOV UNIT,-(SP)

MOV TEMP1,-(SP)

MOV R3,-(SP)

MOV #FEM1A,-(SP)

688 006102 012746 000004
689 006106 010600
690 006110 104415
691 006112 062706 000012
692 006116
693 006116 000167
694 006120 000074
695

006122 040445 051524 040502
006150 040445 051524 040502

EEM1A: .NLIST BEX
.ASCII /%ATSBA EXPECTED=%B16%/N/
.ASCIZ /%ATSBA ACTUAL=%S2%B16%S3%AUNIT:%D1%N2/
.LIST BEX
.EVEN
ENDMSG

L10003:

696
697 006216
698 006216
699 006216 104423
700

MOV #4,-(SP)
MOV SP,R0
TRAP C\$PNTX
ADD #12,SP

.WORD JSJMP
.WORD L10003-2-

701 006220
702 006220
703 006220
704 006220 012746 005646
705 006224 012746 000001
706 006230 010600
707 006232 104414
708 006234 062706 000004
709 006240

WRAPR2: BGNMSG WRAPR2
PRINTB #IOBRD

TRAP C\$MSG

MOV #IOBRD,-(SP)
MOV #1,-(SP)
MOV SP,R0
TRAP C\$PNTB
ADD #4,SP

710 006240 013746 002422
711 006244 013746 002432
712 006250 010446
713 006252 012746 006276
714 006256 012746 000004
715 006262 010600
716 006264 104415
717 006266 062706 000012
718 006272

PRINTX #EEM2A,R4,TEMP1,UNIT

MOV UNIT,-(SP)
MOV TEMP1,-(SP)
MOV R4,-(SP)
MOV #EEM2A,-(SP)
MOV #4,-(SP)
MOV SP,R0
TRAP C\$PNTX
ADD #12,SP

719 006272 000167
720 006274 000072
721

EXIT MSG

.WORD JSJMP
.WORD L10004-2-

006276 040445 051524 040502
006323 045 052101 041123

EEM2A: .NLIST BEX
.ASCII /%ATSBA EXPECTED=%B8%/N/
.ASCIZ /%ATSBA ACTUAL=%S2%B8%S3%AUNIT:%D1%N2/
.LIST BEX
.EVEN
ENDMSG

L10004:

722
723 006370
724 006370
725 006370 104423
726

TRAP C\$MSG

727 006372
728 006372
729 006372
730 006372 012746 005646
731 006376 012746 000001
732 006402 010600
733 006404 104414
734 006406 062706 000004
735 006412

WRAPR3: BGNMSG WRAPR3
PRINTB #IOBRD

MOV #IOBRD,-(SP)
MOV #1,-(SP)
MOV SP,R0
TRAP C\$PNTB
ADD #4,SP

736 006412 013746 002422
737 006416 013746 002434

PRINTX #EEM3A,R4,TEMP2,UNIT

MOV UNIT,-(SP)
MOV TEMP2,-(SP)

738 006422 010446
739 006424 012746 006450
740 006430 012746 000004
741 006434 010600
742 006436 104415
743 006440 062706 000012
744 006444
745 006444 000167
746 006446 000072
747

006450 040445 051524 051123 EEM3A:
006475 045 052101 051523

EXIT MSG

.NLIST BEX
.ASCII /%ATSSR EXPECTED=%B8%N/
.ASCIZ /%ATSSR ACTUAL=%S2%B8%S3%AUNIT:%D1%N2/
.LIST BEX
.EVEN
ENDMSG

L10005:

748
749 006542
750 006542
751 006542 104423
752

WRAPR4:: BGNMSG WRAPR4
PRINTB #TS11BD

753 006544
754 006544
755 006544
756 006544 012746 005037
757 006550 012746 000001
758 006554 010600
759 006556 104414
760 006560 062706 000004
761 006564
762 006564 013746 002422
763 006570 013746 002434
764 006574 010246
765 006576 012746 006622
766 006602 012746 000004
767 006606 010600
768 006610 104415
769 006612 062706 000012
770 006616
771 006616 000167
772 006620 000072
773

006622 040445 051524 051123 EEM4A:
006647 045 052101 051523

PRINTX #EEM4A,R2,TEMP2,UNIT

EXIT MSG

.NLIST BEX
.ASCII /%ATSSR EXPECTED %B8%N/
.ASCIZ /%ATSSR ACTUAL=%S2%B8%S3%AUNIT:%D1%N2/
.LIST BEX
.EVEN
ENDMSG

L10006:

774
775 006714
776 006714
777 006714 104423
778

TAEM:: BGNMSG TAEM
PRINTX #TAEMA,UNIT

779 006716
780 006716
781 006716
782 006716 013746 002422
783 006722 012746 007016
784 006726 012746 000002
785 006732 010600
786 006734 104415
787 006736 062706 000006

MOV R4,-(SP)
MOV #EEM3A,-(SP)
MOV #4,-(SP)
MOV SP,R0
TRAP C\$PNTX
ADD #12,SP

.WORD JSJMP
.WORD L10005-2-

TRAP C\$MSG

MOV #TS11BD,-(SP)
MOV #1,-(SP)
MOV SP,R0
TRAP C\$PNTB
ADC #4,SP

MOV UNIT,-(SP)
MOV TEMP2,-(SP)
MOV R2,-(SP)
MOV #EEM4A,-(SP)
MOV #4,-(SP)
MOV SP,R0
TRAP C\$PNTX
ADD #12,SP

.WORD JSJMP
.WORD L10006-2-

TRAP C\$MSG

MOV UNIT,-(SP)
MOV #TAEMA,-(SP)
MOV #2,-(SP)
MOV SP,R0
TRAP C\$PNTX
ADD #6,SP

788	006742				PRINTX #TAEMB,EXTRAC		
789	006742	013746	002342			MOV	EXTRAC,-(SP)
790	006746	012746	007067			MOV	#TAEMB,-(SP)
791	006752	012746	000002			MOV	#2,-(SP)
792	006756	010600				MOV	SP,RO
793	006760	104415				TRAP	C\$PNTX
794	006762	062706	000006			ADD	#6,SP
795	006766				PRINTX #TAEMC,ACTRAC		
796	006766	013746	002360			MOV	ACTRAC,-(SP)
797	006772	012746	007123			MOV	#TAEMC,-(SP)
798	006776	012746	000002			MOV	#2,-(SP)
799	007002	010600				MOV	SP,RO
800	007004	104415				TRAP	C\$PNTX
801	007006	062706	000006			ADD	#6,SP
802	007012				EXIT MSG		
803	007012	000167				.WORD	J\$JMP
804	007014	000156				.WORD	L10007-2-
805					.NLIST BEX		
	007016	040445	051124	041501	TAEMA: .ASCIZ		/%ATRACK:%S9%S6%AP76543210%S3%AUNIT:%D1%/
	007067	045	052101	045522	TAEMB: .ASCIZ		/%ATRK ACT EXP DATA:%S4%B9%/
	007123	045	052101	045522	TAEMC: .ASCIZ		/%ATRK%S%AACI%S%AACUALL%S%ADATA:%S%B9%N2/
					.LIST BEX		
					.EVEN		
					ENDMSG		
806		007174					
807	007174						
808	007174				L10007:		
809	007174	104423				TRAP	C\$MSG
810							
811	007176				BGNMSG SKDAEM		
812	007176				SKDAEM::		
813	007176				PRINTX #DAEM,UNIT		
814	007176	013746	002422			MOV	UNIT,-(SP)
815	007202	012746	007406			MOV	#DAEM,-(SP)
816	007206	012746	000002			MOV	#2,-(SP)
817	007212	010600				MOV	SP,RO
818	007214	104415				TRAP	C\$PNTX
819	007216	062706	000006			ADD	#6,SP
820	007222				PRINTX #DAEMA		
821	007222	012746	007461			MOV	#DAEMA,-(SP)
822	007226	012746	000001			MOV	#1,-(SP)
823	007232	010600				MOV	SP,RO
824	007234	104415				TRAP	C\$PNTX
825	007236	062706	000004			ADD	#4,SP
826	007242				PRINTX #DAEMB,EXORDY,ACORDY,EX1DTR,AC1DTR		
827	007242	013746	002356			MOV	AC1DTR,-(SP)
828	007246	013746	002340			MOV	EX1DTR,-(SP)
829	007252	013746	002354			MOV	ACORDY,-(SP)
830	007256	013746	002336			MOV	EXORDY,-(SP)
831	007262	012746	007530			MOV	#DAEMB,-(SP)
832	007266	012746	000005			MOV	#5,-(SP)
833	007272	010600				MOV	SP,RO
834	007274	104415				TRAP	C\$PNTX
835	007276	062706	000014			ADD	#14,SP
836	007302				PRINTX #DAEMC,EXTRAC,ACTRAC,EXDATA,ACDATA		
837	007302	013746	002362			MOV	ACDATA,-(SP)
838	007306	013746	002344			MOV	EXDATA,-(SP)
839	007312	013746	002360			MOV	ACTRAC,-(SP)

840 007316 013746 002342
841 007322 012746 007617
842 007326 012746 000005
843 007332 010600
844 007334 104415
845 007336 062706 000014
846 007342
847 007342 013746 002366
848 007346 013746 002350
849 007352 013746 002364
850 007356 013746 002346
851 007362 012746 007701
852 007366 012746 000005
853 007372 010600
854 007374 104415
855 007376 062706 000014
856 007402
857 007402 000167
858 007404 000362
859

PRINTX #DAEMD,EXTRDD,ACTRDD,EXODTR,ACODTR

MOV EXTRAC,-(SP)
MOV #DAEMC,-(SP)
MOV #5,-(SP)
MOV SP,RO
TRAP C\$PNTX
ADD #14,SP

MOV ACODTR,-(SP)
MOV EXODTR,-(SP)
MOV ACTRDD,-(SP)
MOV EXTRDD,-(SP)
MOV #DAEMD,-(SP)
MOV #5,-(SP)
MOV SP,RO
TRAP C\$PNTX
ADD #14,SP

EXIT MSG

.WORD JSJMP
.WORD L10010-2-

007406 051445 022471 032523 DAEM: .NLIST BEX
007461 045 052101 040522 DAEMA: .ASCIZ /%S9%S5%AEEXPECTED%S7%AACTUAL%S3%AAUNIT:%D1%N/
007530 040445 052517 050124 DAEMB: .ASCIZ /%ATRACK:%S8%AP76543210%S5%AP76543210%N/
007564 040445 020061 051117 DAEMB: .ASCIZ /%AOUTPUT READY:%S%B9%S5%B9%N/
007617 045 052101 040522 DAEMC: .ASCIZ /%A1 OR DEAD:%S4%B9%S5%B9%N/
007653 045 042101 052101 DAEMC: .ASCIZ /%ATRACK ACTIVE:%S%B9%S5%B9%N/
007701 045 052101 040522 DAEMD: .ASCIZ /%ADATA:%S9%B9%S5%B9%N/
007734 040445 020060 051117 DAEMD: .ASCIZ /%ATRACK DEAD:%S3%B9%S5%B9%N/
.ASCIZ /%A0 OR DEAD:%S4%B9%S5%B9%N2/

.LIST BEX
.EVEN
ENDMSG

860
861 007770
862 007770
863 007770 104423
864
865 007772
866 007772
867 007772
868 007772 013746 002422
869 007776 013746 002370
870 010002 013746 002352
871 010006 013746 002420
872 010012 012746 010036
873 010016 012746 000005
874 010022 010600
875 010024 104415
876 010026 062706 000014
877 010032
878 010032 000167
879 010034 000102
880

L10010:

TRAP C\$MSG

BGNMSG ROMEM
ROMEM::

PRINTX #ROMEMA,ROMLKI,EXROML,ACROML,UNIT

MOV UNIT,-(SP)
MOV ACROML,-(SP)
MOV EXROML,-(SP)
MOV ROMLKI,-(SP)
MOV #ROMEMA,-(SP)
MOV #5,-(SP)
MOV SP,RO
TRAP C\$PNTX
ADD #14,SP

EXIT MSG

.WORD JSJMP
.WORD L10011-2-

010036 040445 042101 051104 ROMEMA: .NLIST BEX
010057 045 042501 050130 ROMEMA: .ASCIZ /%ADDRESS-%S%04%N/
010077 045 040501 052103 ROMEMA: .ASCIZ /%AEEXPECTED=%03%N/
.ASCIZ /%AACTUAL=%S2%03%S3%AAUNIT:%D1%N2/

.LIST BEX
.EVEN
ENDMSG

881 010140
882 010140

```

883 010140 L10011:
884 010140 104423 TRAP C$MSG
885
886 010142 040445 051524 051123 TERMA: .NLIST BEX
      .ASCIZ /%ATSSR =%S%06%S3%AUNIT:%D1%N/
      .LIST BEX
      .EVEN
887 010200
888
889 :SET CHAR ERR MSGS SCHER1-SCHETEMPO
890
891 010200 BGNMSG SCHER1
892 010200 SCHER1::
893 010200 PRINTB #TS11BD
894 010200 012746 005037 MOV #TS11BD,-(SP)
895 010204 012746 000001 MOV #1,-(SP)
896 010210 010600 MOV SP,R0
897 010212 104414 TRAP C$PNTB
898 010214 062706 000004 ADD #4,SP
899 010220 PRINTX #SCHERA
900 010220 012746 01024, MOV #SCHERA,-(SP)
901 010224 012746 000001 MOV #1,-(SP)
902 010230 010600 MOV SP,R0
903 010232 104415 TRAP C$PNTX
904 010234 062706 000004 ADD #4,SP
905 010240 EXIT MSG
906 010240 000167 .WORD JSJMP
907 010242 000064 .WORD L10012-2-.
908 010244 040445 051524 051123 SCHERA: .NLIST BEX
      .ASCIZ /%ATSSR NBA NOT SET ON COMD BEFORE SET CHAR ISSUED%N/
      .LIST BEX
      .EVEN
      ENDMSG
909
910 010330 L10012:
911 010330
912 010330 104423 TRAP C$MSG
913
914 010332 BGNMSG SCHER2
915 010332 SCHER2::
916 010332 PRINTB #TS11BD
917 010332 012746 005037 MOV #TS11BD,-(SP)
918 010336 012746 000001 MOV #1,-(SP)
919 010342 010600 MOV SP,R0
920 010344 104414 TRAP C$PNTB
921 010346 062706 000004 ADD #4,SP
922 010352 PRINTX #SCHERB
923 010352 012746 010376 MOV #SCHERB,-(SP)
924 010356 012746 000001 MOV #1,-(SP)
925 010362 010600 MOV SP,R0
926 010364 104415 TRAP C$PNTX
927 010366 062706 000004 ADD #4,SP
928 010372 EXIT MSG
929 010372 000167 .WORD JSJMP
930 010374 000046 .WORD L10013-2-.
931 010376 040445 051524 051123 SCHERB: .NLIST BEX
      .ASCIZ /%ATSSR NBA NOT CLEARED BY SET CHAR%N/
      .LIST BEX
      .EVEN
932 010444

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```

933 010444          ENDMSG
934 010444          L10013:
935 010444 104423          TRAP      C$MSG
936
937 010446          BGNMSG  SCHER3
938 010446          SCHER3::
939 010446          PRINTB  #TS11BD
940 010446 012746 005037          MOV      #TS11BD,-(SP)
941 010452 012746 000001          MOV      #1,-(SP)
942 010456 010600          MOV      SP,RO
943 010460 104414          TRAP      C$PNTB
944 010462 062706 000004          ADD      #4,SP
945 010466          PRINTX  #SCHERC
946 010466 012746 010512          MOV      #SCHERC,-(SP)
947 010472 012746 000001          MOV      #1,-(SP)
948 010476 010600          MOV      SP,RO
949 010500 104415          TRAP      C$PNTX
950 010502 062706 000004          ADD      #4,SP
951 010506          EXIT      MSG
952 010506 000167          .WORD    JSJMP
953 010510 000026          .WORD    L10014-2-.
954
955 010512 040445 051515 020107 SCHERC: .NLIST  BEX
          .ASCIZ  /%AMSG PKT IN DOUBT%N/
          .LIST   BEX
          .EVEN
          ENDMSG
956 010540          L10014:
957 010540          TRAP      C$MSG
958 010540 104423          TRAP      C$MSG
959
960
961 010542          BGNMSG  SCHER4
962 010542          SCHER4::
963 010542          PRINTB  #SCHERN
964 010542 012746 010606          MOV      #SCHERN,-(SP)
965 010546 012746 000001          MOV      #1,-(SP)
966 010552 010600          MOV      SP,RO
967 010554 104414          TRAP      C$PNTB
968 010556 062706 000004          ADD      #4,SP
969 010562          PRINTX  #SCHERD
970 010562 012746 010634          MOV      #SCHERD,-(SP)
971 010566 012746 000001          MOV      #1,-(SP)
972 010572 010600          MOV      SP,RO
973 010574 104415          TRAP      C$PNTX
974 010576 062706 000004          ADD      #4,SP
975 010502          EXIT      MSG
976 010602 000167          .WORD    JSJMP
977 010604 000076          .WORD    L10015-2-.
978
979 010606 040445 040502 020104 SCHERN: .NLIST  BEX
          010634 040445 047511 051440 SCHERD: .ASCIZ  /%ABAD M8967 SLOT 12%N/
          .ASCIZ  /%AIO SEG CROM PARITY ERROR TSSR FC=1%N/
          .LIST   BEX
          .EVEN
          ENDMSG
980 010704          L10015:
981 010704          TRAP      C$MSG
982 010704 104423          TRAP      C$MSG
983

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984
985 010706          BGNMSG  SCHER5
986 010706          SCHER5::
987 010706          PRINTB  #SCHERE
988 010706 012746 010752          MOV    #SCHERE,-(SP)
989 010712 012746 000001          MOV    #1,-(SP)
990 010716 010600          MOV    SP,R0
991 010720 104414          TRAP   C$PNTB
992 010722 062706 000004          ADD    #4,SP
993 010726          PRINTX  #SCHERF
994 010726 012746 011036          MOV    #SCHERF,-(SP)
995 010732 012746 000001          MOV    #1,-(SP)
996 010736 010600          MOV    SP,R0
997 010740 104415          TRAP   C$PNTX
998 010742 062706 000004          ADD    #4,SP
999 010746          EXIT    MSG
1000 010746 000167          .WORD  JSJMP
1001 010750 000146          .WORD  L10016-2-.
1002
    010752 040445 051524 030461  SCHERE: .NLIST  BEX
    011036 040445 042523 044522  SCHERF: .ASCIZ  /%ATS11 BOARD OR SERIAL BUS CABLE OR M8965 SLOT 15%N/
    .LIST  BEX
    .EVEN
    ENDMSG
1003
1004 011120          L10016:
1005 011120
1006 011120 104423          TRAP   C$MSG
1007
1008 011122          BGNMSG  SCHER6
1009 011122          SCHER6::
1010 011122          PRINTB  #SCHERG
1011 011122 012746 011166          MOV    #SCHERG,-(SP)
1012 011126 012746 000001          MOV    #1,-(SP)
1013 011132 010600          MOV    SP,R0
1014 011134 104414          TRAP   C$PNTB
1015 011136 062706 000004          ADD    #4,SP
1016 011142          PRINTX  #SCHERH
1017 011142 012746 011210          MOV    #SCHERH,-(SP)
1018 011146 012746 000001          MOV    #1,-(SP)
1019 011152 010600          MOV    SP,R0
1020 011154 104415          TRAP   C$PNTX
1021 011156 062706 000004          ADD    #4,SP
1022 011162          EXIT    MSG
1023 011162 000167          .WORD  JSJMP
1024 011164 000070          .WORD  L10017-2-.
1025
    011166 040445 034115 033071  SCHERG: .NLIST  BEX
    011210 040445 044523 047514  SCHERH: .ASCIZ  /%AM8966 SLOT 14%N/
    .LIST  BEX
    .EVEN
    ENDMSG
1026
1027 011256          L10017:
1028 011256
1029 011256 104423          TRAP   C$MSG
1030
1031
1032 011260          BGNMSG  SCHER7
1033 011260          SCHER7::

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1034 011260          PRINTB #SCHERI
1035 011260 012746 011350          MOV #SCHERI,-(SP)
1036 011264 012746 000001          MOV #1,-(SP)
1037 011270 010600          MOV SP,R0
1038 011272 104414          TRAP C$PNTB
1039 011274 062706 000004          ADD #4,SP
1040 011300          LET R2 := #PCHLTB
1041 011300 012702 011436          MOV #PCHLTB,R2
1042 011304          WHILE (R2) NE #177777 DO
1043 011304
1044 011304 021227 177777          50002$: CMP (R2),#177777
1045 011310 001415          BEQ 50003$
1046 011312          LET PCHTAD := (R2)
1047 011312 011237 011432          MOV (R2),PCHTAD
1048 011316          PRINTB PCHTAD
1049 011316 013746 011432          MOV PCHTAD,-(SP)
1050 011322 012746 000001          MOV #1,-(SP)
1051 011326 010600          MOV SP,R0
1052 011330 104414          TRAP C$PNTB
1053 011332 062706 000004          ADD #4,SP
1054 011336          LET R2 := R2 + #2
1055 011336 062702 000002          ADD #2,R2
1056 011342          ENDDO
1057 011342 000760          BR 50002$
1058 011344          50003$:
1059 011344          EXIT MSG          .WORD JSJMP
1060 011344 000167          .WORD L10020-2-.
1061 011346 000064
1062 011350 040445 051524 051123 SCHERI: .NLIST BEX
          .ASCIZ /%ATSSR FC=2 FATAL MICRO ERR HALTS PC-1750-1777%N2/
          .LIST BEX
1063 011432 000000          PCHTAD: .WORD 0
1064 011434          .EVEN
1065 011434          L10020: .WORD 0
1066 011434          .ASCIZ /%PC%17%ACOMMENT%13%AMODULE%N2/
1067 011434 104423          TRAP C$MSG
1068 011436 011530 011624 011674 PCHLTB: .WORD PCHDR,PCHDRA,PCHDRB
1069 011444 011736 012015 012057 .WORD PCHT50,PCHT51,PCHT52
1070 011452 012133 012215 012277 .WORD PCHT53,PCHT54,PCHT55
1071 011460 012342 012403 012444 .WORD PCHT56,PCHT57,PCHT60
1072 011460 012512 012554 012624 .WORD PCHT61,PCHT62,PCHT63
1073 011474 012702 012760 013025 .WORD PCHT64,PCHT65,PCHT66
1074 011502 013073 013141 013213 .WORD PCHT67,PCHT70,PCHT71
1075 011510 013275 013353 013435 .WORD PCHT72,PCHT73,PCHT74
1076 011516 013511 013600 013665 .WORD PCHT75,PCH75A,PCHT76,PCHT77
1077 011524 013747          .WORD ENDTBL
1078 011526 177777
1079 011526
1080
1081          .NLIST BEX
          011530 040445 041520 042440 PCHDR: .ASCIZ /%APC ERROR HALTS BAD MODULES: M8962,M8963,M8964,OR M8967%N/
          011624 051445 031462 040445 PCHDRA: .ASCIZ /%S23%ASLOT: 8 11 9 12%N/
          011674 040445 050040 022503 PCHDRB: .ASCIZ /%A PC%17%ACOMMENT%13%AMODULE%N2/
          011736 040445 033461 030065 PCHT50: .ASCIZ /%A1750 OPERATION IO PROBLEM%14%AM8967,TS11%N/
          012015 045 030501 032467 PCHT51: .ASCIZ /%A1751 SPURIOUS ATTN%22%AM8963%N/

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012057      045 030501 032467 PCHT52: .ASCIZ  /%A1752 STK PAR ERR ON OVERFLOW%S12%AM8963%N/
012133      045 030501 032467 PCHT53: .ASCIZ  /%A1753 STK NOT EMPTY AT END OF TASK M8963%N/
012215      045 030501 032467 PCHT54: .ASCIZ  /%A1754 STK PTR REG WON'T HOLD DATA M8963%N/
012277      045 030501 032467 PCHT55: .ASCIZ  /%A1755 UTSTM - BRANCH%S21%AM8962%N/
012342     040445 033461 033065 PCHT56: .ASCIZ  /%A1756 UTSTM - ZBIT%S23%AM8962%N/
012403      045 030501 032467 PCHT57: .ASCIZ  /%A1757 UTSTM - NBIT%S23%AM8962%N/
012444     040445 033461 030066 PCHT60: .ASCIZ  /%A1760 UTSTM - NOT Z BIT%S18%AM8962%N/
012512     040445 033461 030466 PCH161: .ASCIZ  /%A1761 UTSTM - C BIT%S22%AM8962%N/
012554     040445 033461 031066 PCH162: .ASCIZ  /%A1762 UTSTM - PCP LO TEST%S16%AM8962%N/
012624     040445 033461 031466 PCH163: .ASCIZ  /%A1763 UTSTM - INTERNAL REG ERROR%S9%AM8962%N/
012702     040445 033461 032066 PCH164: .ASCIZ  /%A1764 UTSTM - INTERNAL REG ERROR%S9%AM8962%N/
012760     040445 033461 032466 PCH165: .ASCIZ  /%A1765 UTSTM - ADD TEST%S19%AM8962%N/
013025      045 030501 033067 PCH166: .ASCIZ  /%A1766 UTSTM - A SUBTEST%S18%AM8962%N/
013073      045 030501 033067 PCH167: .ASCIZ  /%A1767 UTSTM - BSUB TEST%S18%AM8962%N/
013141      045 030501 033467 PCH170: .ASCIZ  /%A1770 UTSTM - SHIFT LR TEST%S14%AM8962%N/
013213      045 030501 033467 PCHT71: .ASCIZ  /%A1771 UTSTM - LOGICAL:AND,OR,XOR,NAND M8962%N/
013275      045 030501 033467 PCHT72: .ASCIZ  /%A1772 STAKM - STACK PARITY TEST%S10%AM8963%N/
013353      045 030501 033467 PCHT73: .ASCIZ  /%A1773 STAKM - STACK UNDER-OVERFLOW M8963%N/
013435      045 030501 033467 PCHT74: .ASCIZ  /%A1774 STAKM - STACK DATA TEST%S12%AM8963%N/
013511      045 030501 033467 PCHT75: .ASCIZ  /%A1775 STAKM - CAPSTAN BUS DATA TEST M8963,G159%N/
013600     040445 044103 041505 PCH75A: .ASCIZ  /%ACHECK TACH PHASE,DECEL AND SPEED ADJUSTS ON G159%N/
013665      045 030501 033467 PCHT76: .ASCIZ  /%A1776 STAKM - CBUS BRANCH TEST M8963%N/
013747      045 030501 033467 PCHT77: .ASCIZ  /%A1777 STAKM - SIMULATED LIMIT ATTN TEST M8963%N/

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1082      014032      .LIST BEX
1083     014032      .EVEN
1084     014032      BGNMSG SCHERO
1085     014032      SCHERO:: PRINTB #SCHERL
1086     014032     012746 014076      MOV #SCHERL,-(SP)
1087     014036     012746 000001      MOV #1,-(SP)
1088     014042     010600      MOV SP,R0
1089     014044     104414      TRAP C$PNTB
1090     014046     062706 000004      ADD #4,SP
1091     014052      PRINTX #SCHERM
1092     014052     012746 014121      MOV #SCHERM,-(SP)
1093     014056     012746 000001      MOV #1,-(SP)
1094     014062     010600      MOV SP,R0
1095     014064     104415      TRAP C$PNTX
1096     014066     062706 000004      ADD #4,SP
1097     014072      EXIT MSG
1098     014072     000167      .WORD JSJMP
1099     014074     000042      .WORD L10021-2-.
1100
1101     014076     040445 041501 046040 SCHERL: .ASCIZ  /%AAC LOW AT TSO4%N/
1102     014121      045 052101 051523 SCHERM: .ASCIZ  /%ATSSR FC=3%N/
1103      014140      .LIST BEX
1104     014140      .EVEN
1105     014140      ENDMSG
1106      014140      L10021:
1107     014142      TRAP C$MSG
1108     014142      BGNMSG ROMLER
1109      014142      ROMLER::

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1109 014142          PRINTB #FMTCTR
1110 014142 012746 005062          MOV #FMTCTR,-(SP)
1111 014146 012746 000001          MOV #1,-(SP)
1112 014152 010600          MOV SP,RO
1113 014154 104414          TRAP C$PNTB
1114 014156 C52706 000004          ADD #4,SP
1115 014162          ENDMSG
1116 014162          L10022:
1117 014162 104423          TRAP C$MSG
1118
1119 014164          BGNMSG MICERR
1120 014164          MICERR::
1121 014164          PRINTB #MICERA
1122 014164 012746 014230          MOV #MICERA,-(SP)
1123 014170 012746 000001          MOV #1,-(SP)
1124 014174 010600          MOV SP,RO
1125 014176 104414          TRAP C$PNTB
1126 014200 062706 000004          ADD #4,SP
1127 014204          PRINTX #MICERB
1128 014204 012746 014304          MOV #MICERB,-(SP)
1129 014210 012746 000001          MOV #1,-(SP)
1130 014214 010600          MOV SP,RO
1131 014216 104415          TRAP C$PNTX
1132 014220 062706 000004          ADD #4,SP
1133 014224          EXIT MSG
1134 014224 000167          .WORD JSJMP
1135 014226 000136          .WORD L10023-2-.
1136
1136 014230 040445 047525 020113 MICERA: .NLIST BEX
1136 014304 040445 047503 042504 MICERB: .ASCIZ /%AUOK LIGHT OFF,XTAT3-OP PANEL=ERROR CODE%N/
1136          .ASCIZ /%ACODE%S10%AERROR%S28%AMODULE(SLOT) SCOPE LOOP%N2/
1136          .LIST BEX
1136          .EVEN
1136          ENDMSG
1137
1138 014366          L10023:
1139 014366
1140 014366 104423          TRAP C$MSG
1141
1142
1143

```

```
1144
1145      .SBTTL GLOBAL SUBROUTINES SECTION
1146
1147      ;++
1148      ; THE GLOBAL SUBROUTINES SECTION CONTAINS THE SUBROUTINES
1149      ; THAT ARE USED IN MORE THAN ONE TEST.
1150      ;--
1151
1152      ;      MODULES TO HANDLE TS04 INTERRUPTS.
1153
1154      014370      BGNSRV TS4IN0      ;DEVICE 0.
1155      014370      TS4IN0::
1156      014370      112737 000001 002437      LET CTLFLG :B= #1      ;SET INTERRUPT OCCURRED FLAG.
1157      014370      MOV#      #1,CTLFLG
1158      014376      ENDSRV
1159      014376      L10024:
1160      014376      000002      RTI
1161
1162      014400      BGNSRV TS4IN1      ;DEVICE 1.
1163      014400      TS4IN1::
1164      014400      112737 000001 002437      LET CTLFLG :B= #1      ;SET INTERRUPT OCCURRED FLAG.
1165      014400      MOV#      #1,CTLFLG
1166      014406      ENDSRV
1167      014406      L10025:
1168      014406      000002      RTI
1169
1170      014410      BGNSRV TS4IN2      ;DEVICE 2.
1171      014410      TS4IN2::
1172      014410      112737 000001 002437      LET CTLFLG :B= #1      ;SET INTERRUPT OCCURRED FLAG.
1173      014410      MOV#      #1,CTLFLG
1174      014416      ENDSRV
1175      014416      L10026:
1176      014416      000002      RTI
1177
1178      014420      BGNSRV TS4IN3      ;DEVICE 3.
1179      014420      TS4IN3::
1180      014420      112737 000001 002437      LET CTLFLG :B= #1      ;SET INTERRUPT OCCURRED FLAG.
1181      014420      MOV#      #1,CTLFLG
1182      014426      ENDSRV
1183      014426      L10027:
1184      014426      000002      RTI
```

```

1185      ;      SUBROUTINE TO WAIT UP TO 1 MINUTE FOR THE SSR BIT
1186      ;      TO SET - REPORT AN ERROR IF IT DOESN'T SET AND ATTEMPT TO DROP UNIT
1187
1188 014430 005037 002426      WT4SSR:: CLR      TIME      ;INIT TIMEOUT COUNTER.
1189 014434      1$:      BREAK      ;GO TO SUPERVISOR.
1190 014434 104422      TRAP      C$BRK
1191 014436 105777 165562      TSTB     @TSSR      ;READY?
1192 014442 100432      BMI      2$      ;BR IF SO
1193 014444 005337 002426      DEC      TIME      ;WAIT...
1194 014450 001371      BNE      1$      ;DONE WAITING? BR IF NOT.
1195 014452 017737 165546 002434      MOV      @TSSR,TEMP2 ;GET TSSR
1196 014460 012701 014532      MOV      #TERMTB,R1 ;
1197 014464      ERRDF     2,SSROFF,LONMSG ;IF SO, REPORT AN ERR IF SSR NOT SET YET.
1198 014464 104455      TRAP      C$ERDF
1199 014466 000002      .WORD     2
1200 014470 002566      .WORD     SSROFF
1201 014472 005774      .WORD     LONMSG
1202 014474      PRINTX   #TERMA,TEMP2,UNIT ;PRINT TSSR CONTENTS
1203 014474 013746 002422      MOV      UNIT,-(SP)
1204 014500 013746 002434      MOV      TEMP2,-(SP)
1205 014504 012746 010142      MOV      #TERMA,-(SP)
1206 014510 012746 000003      MOV      #3,-(SP)
1207 014514 010600      MOV      SP,RO
1208 014516 104415      TRAP      C$PNTX
1209 014520 062706 000010      ADD      #10,SP
1210 014524      CALL     DROPU      ;ATTEMPT TO DROP UNIT
1211 014524 004737 014570      JSR      PC,DROPU
1212      ;IF DROPPED PROG ABORTS CURRENT PASS
1213      ;IF INHIBIT DROP FLAG SET BY OPERATOR (IDU)
1214      ;THEN PROGRAM CONTINUES
1215 014530 000207      2$:      RTS      PC      ;RETURN.
1216
1217 014532 003630 003651 003714      TERMTB: .WORD     TERM01,TERM02,TERM03
1218 014540 003775 004056      .WORD     TERM05,TERM06
1219 014544 004155 004231 004306      .WORD     TERM07,TERM10,TERM11
1220 014552 004411 004476 004547      .WORD     TERM12,TERM13,TERM14
1221 014560 004620 004705 004776      .WORD     TERM15,TERM16,TERM17
1222 014566 177777      .WORD     ENDTBL
1223
1224      ;      SUBR TO ATTEMPT TO DROP A UNIT FLAGGED WITH A DEVICE FATAL ERROR
1225
1226 014570      DROPU:: DODU LUNIT      ;EXECUTE DROP MACRO
1227 014570 013700 027574      MOV      LUNIT,RO
1228 014574 104451      TRAP      C$DODU
1229 014576      GPHARD   LUNIT,TIME      ;IS UNIT DROPPED
1230 014576 013700 027574      MOV      LUNIT,RO
1231 014602 104442      TRAP      C$GPHRD
1232 014604 010037 002426      MOV      PO,TIME
1233 014610      BCOMPLETE 1$      ;NO RETURN TO CALLER TO PROCEED
1234 014610 103401      BCS      1$
1235 014612      DOCLN      ;YES EXEC CEAN-UP CODE TO START NEW PASS
1236 014612 104444      TRAP      C$DCLN
1237 014614 000207      1$:      RTS      PC
1238
1239      ;
1240      ;      SUBR TO WAIT AN EXTRA LONG TIME FOR THE SSR BIT TO SET

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1241      :      NEEDED AFTER AN INIT IS SENT TO TS11 TO WAIT FOR LOAD SEQ
1242      :      TO COMPLETE. REPORT ERROR AND DROP UNIT IF EXTRA
1243      :      TIME IS EXCEEDED.
1244
1245      :      WAITSR::BEGIN COUNTER1
1246      :      INCR TIME FROM #1 TO #13 BY #1
1247      014616      012737      000001      002426
1248      014624      000402
1249      014626
1250      014626      005237      002426
1251      014632
1252      014632      023727      002426      000013
1253      014640      003023
1254      014642
1255      014642      032777      000200      165354
1256      014650      001401
1257      014652
1258      014652      000416
1259      014654
1260      014654
1261      014654
1262      014654      012727      001750
1263      014660      000000
1264      014662      013727      002116
1265      014666      000000
1266      014670      005367      177772
1267      014674      001375
1268      014676      005367      177756
1269      014702      001367
1270      014704
1271      014704      104422
1272      014706
1273      014706
1274      014706
1275      014706      000747
1276      014710
1277      014710
1278      014710
1279      014710
1280      014710      023727      002426      000013
1281      014716      003511
1282      014720
1283      014720      012746      015144
1284      014724      012746      000001
1285      014730      010600
1286      014732      104417
1287      014734      062706      000004
1288      014740
1289      014740
1290      014740      012737      000001      002426
1291      014746      000402
1292      014750
1293      014750      005237      002426
1294      014754
1295      014754      023727      002426      000160
1296      014762      003023

```

```

MOV      #1,TIME
BR      50005$
50006$:
INC      TIME
50005$:
CMP      TIME,#13
BGT      50007$
BIT      #TS.SSR,@TSSR
BEQ      50010$
BR      50004$
50010$:
MOV      #1000.,(PC)+
.WORD   0
MOV      L$DLY,(PC)+
.WORD   0
DEC      -6(PC)
BNE      .-4
DEC      -22(PC)
BNE      .-20
TRAP    C$BRK
50011$:
BR      50006$
50007$:
50004$:
CMP      TIME,#13
BLE      50012$
MOV      #WAITMR,-(SP)
MOV      #1,-(SP)
MOV      SP,R0
TRAP    C$PNTF
ADD      #4,SP
MOV      #1,TIME
BR      50014$
50015$:
INC      TIME
50014$:
CMP      TIME,#160
BGT      50016$

```

1297	014764				IF #TS.SSR SETIN @TSSR THEN		
1298	014764	032777	000200	165232		BIT	#TS.SSR,@TSSR
1299	014772	001401				BFO	50017\$
1300	014774				LEAVE COUNTER2		
1301	014774	000416				BR	50013\$
1302	014776				ELSE		
1303	014776				DELAY 1000.	50017\$:	
1304	014776						
1305	014776	012727	001750			MOV	#1000.,(PC)+
1306	015002	000000				.WORD	0
1307	015004	013727	002116			MOV	L\$DLY,(PC)+
1308	015010	000000				.WORD	0
1309	015012	005367	177772			DEC	-6(PC)
1310	015016	001375				BNE	.-4
1311	015020	005367	177756			DEC	-22(PC)
1312	015024	001367				BNE	.-20
1313	015026				BREAK		
1314	015026	104422				TRAP	C\$BRK
1315	015030				ENDIF		
1316	015030				ENDINC	50020\$:	
1317	015030						
1318	015030	000747				BR	50015\$
1319	015032					50016\$:	
1320	015032				END COUNTER2	50013\$:	
1321	015032				IF TIME GT #160 THEN		
1322	015032						
1323	015032	023727	002426	000160		CMP	TIME,#160
1324	015040	003430				BLE	50021\$
1325	015042				LET TEMP2 := @TSSR		
1326	015042	017737	165156	002434		MOV	@TSSR,TEMP2
1327	015050				LET R1 := #TERMTB		
1328	015050	012701	014532			MOV	#TERMTB,R1
1329	015054				ERRDF 2,SSROFF,LONMSG		
1330	015054	104455				TRAP	C\$ERDF
1331	015056	000002				.WORD	2
1332	015060	002566				.WORD	SSROFF
1333	015062	005774				.WORD	LONMSG
1334	015064				PRINTX #TERMA,TEMP2,UNIT		
1335	015064	013746	002422			MOV	UNIT,-(SP)
1336	015070	013746	002434			MOV	TEMP2,-(SP)
1337	015074	012746	010142			MOV	#TERMA,-(SP)
1338	015100	012746	000003			MOV	#3,-(SP)
1339	015104	010600				MOV	SP,R0
1340	015106	104415				TRAP	C\$PNTX
1341	015110	062706	000010			ADD	#10,SP
1342	015114	004737	014570		JSR PC,DROPU		
1343	015120				ELSE		
1344	015120	000410				BR	50022\$
1345	015122					50021\$:	
1346	015122				PRINTF #CRMSG		
1347	015122	012746	005763			MOV	#CRMSG,-(SP)
1348	015126	012746	000001			MOV	#1,-(SP)
1349	015132	010600				MOV	SP,R0
1350	015134	104417				TRAP	C\$PNTF
1351	015136	062706	000004			ADD	#4,SP
1352	015142				ENDIF		


```
1353 015142
1354 015 42          ENDIF
1355 015 42
1356 01c142 000207    RTS PC
1357
1358 0c5144 047045 040445 040527 WAITMR. .ASCIZ /%N%AWAITING FOR RDY.../
1359 0c5152 052111 047111 020107
1360 015160 047506 020122 042122
1361 015166 027131 027056 000
1362          015174          .EVEN
1363
1364
1365
```

500228:

500128:

```

1366
1367
1368
1369
1370 015174 000240
1371 015176 000240
1372 015200 000240
1373 015202 000240
1374 015204
1375 015204 032737 000200 002266
1376 015212 001501
1377 015214
1378 015214 012746 015420
1379 015220 012746 000001
1380 015224 010600
1381 015226 104417
1382 015230 062706 000004
1383 015234
1384 015234
1385 015234 012737 000001 002426
1386 015242 000402
1387 015244
1388 015244 005237 002426
1389 015250
1390 015250 023727 002426 000160
1391 015256 003031
1392 015260
1393 015260 012737 100017 002230
1394 015266
1395 015266 012777 002230 164720
1396 015274
1397 015274 012727 001750
1398 015300 000000
1399 015302 013727 002116
1400 015306 000000
1401 015310 005367 177772
1402 015314 001375
1403 015316 005367 177756
1404 015322 001367
1405 015324
1406 015324 104422
1407 015326
1408 015326 032737 000200 002266
1409 015334 001001
1410 015336
1411 015336 000401
1412 015340
1413 015340
1414 015340
1415 015340 000741
1416 015342
1417 015342
1418 015342
1419 015342
1420 015342 023727 002426 000160
1421 015350 003412

```

```

: SUBR TO WAIT FOR TAPE MOTION TO CEASE WHEN AN INIT TO THE
: ON-LINE TS11 INITIATED A LOAD SEQUENCE.

```

```

WAITMT:: NOP
NOP
NOP
NOP
IF #MOT SETIN XSTATO THEN

PRINTF #WAITMS

BEGIN COUNTER
INCR TIME FROM #1 TO #160 BY #1

LET CMDPKT := #GES
LET @TSDB := #CMDPKT
DELAY 1000.

BREAK
IF #MOT NOTSETIN XSTATO THEN

LEAVE COUNTER
ENDIF
ENDINC

END COUNTER
IF TIME GT #160 THEN

```

```

BIT #MOT,XSTATO
BEQ 50023$

MOV #WAITMS,-(SP)
MOV #1,-(SP)
MOV SP,R0
TRAP C$PNTF
ADD #4,SP

MOV #1,TIME
BR 50025$
50026$: INC TIME
50025$: CMP TIME,#160
BGT 50027$

MOV #GES,CMDPKT
MOV #CMDPKT,@TSDB

MOV #1000,(PC)+
.WORD 0
MOV L$DLY,(PC)+
.WORD 0
DEC -6(PC)
BNE -4
DEC -22(PC)
BNE -20

TRAP C$BRK

BIT #MOT,XSTATO
BNE 50030$

BR 50024$
50030$: BR 50026$
50027$: BR 50024$
50024$: CMP TIME,#160
BLE 50031$

```

1422	015352								
1423	015352	012746	015456						MOV #WAITEM,-(SP)
1424	015356	012746	000001						MOV #1,-(SP)
1425	015362	010600							MOV SP,R0
1426	015364	104414							TRAP C\$PNTB
1427	015366	062706	000004						ADD #4,SP
1428	015372								
1429	015372	104444							TRAP C\$DCLN
1430	015374								
1431	015374	000410							BR 50052\$
1432	015376							50031\$:	
1433	015376								
1434	015376	012746	005763						MOV #CRMSG,-(SP)
1435	015402	012746	000001						MOV #1,-(SP)
1436	015406	010600							MOV SP,R0
1437	015410	104417							TRAP C\$PNTF
1438	015412	062706	000004						ADD #4,SP
1439	015416								
1440	015416								50032\$:
1441	015416								
1442	015416								50023\$:
1443	015416	000207							
1444									
1445									
1446	015420	040445	040527	052111	WAITMS: .ASCIZ	/%AWAITING FOR TAPE TO STOP.../			
1447	015426	047111	020107	047506					
1448	015434	020122	040524	042520					
1449	015442	052040	020117	052123					
1450	015450	050117	027056	000056					
1451	015456	040445	040527	052111	WAITEM: .ASCII	/%AWAIT TOO LONG%/			
1452	015464	052040	047517	046040					
1453	015472	047117	022507	116					
1454	015477	045	051501	044527	.ASCIZ	/%ASWITCH UNIT OFF-LINE, RESTART DIAG%/			
1455	015504	041524	020110	047125					
1456	015512	052111	047440	043106					
1457	015520	046055	047111	026105					
1458	015526	051040	051505	040524					
1459	015534	052122	042040	040511					
1460	015542	022507	000116						
1461									
1462					.EVEN				

```
1463 ;S/R TO GENERATE AN EVEN OR ODD PAR BIT. ENTER WITH R1 CONTAINING THE #
1464 ;FOR WHICH YOU WISH TO HAVE PAR GEN. EXIT WITH THE PARITY BIT IN THE
1465 ;LOW ORDER BIT OF TEMPO. CLOBBEREDS TEMPO
1466
1467 015546 012737 000001 002430 ODDPAR:: MOV #1,TEMPO ;INIT THIS REG FOR ADD PAR.
1468 015554 000137 015564 JMP PARGEN ;CONTINUE
1469 015560 005037 002430 EVNPAR: CLR TEMPO ;INIT THIS REG FOR EVEN PAR.
1470 015564 012737 000020 002434 PARGEN: MOV #20,TEMP2 ;INIT COUNTER
1471 015572 005337 002434 1$: DEC TEMP2 ;DONE ALL BITS?
1472 015576 100405 BMI 2$ ;BR IF SO
1473 015600 006001 ROR R1 ;ROTATE THE DATA.
1474 015602 103773 BCS 1$
1475 015604 005237 002430 INC TEMPO
1476 015610 000770 BR 1$ ;DO IT AGAIN
1477
1478 015612 006001 2$: ROR R1 ;ROTATE ONCE MORE TO GET ORIG CONTENTS
1479 015614 042737 177776 002430 BIC #177776,TEMPO ;CLR ALL BUT LO ORDER BIT IN TEMPO.
1480 ;LO ORDER BIT IS THE PAR BIT
1481 ;RETURNED TO THE CALLING ROUTINE.
1482 015622 000241 CLC ;CLR CARRY BIT
1483 015624 000207 RTS PC ;RETURN
1484
1485
1486
1487
1488 ;S/R TO LOAD THE DIABLK WITH R3 (DATA) BITS AND R4 (CONTROL) BITS WITH
1489 ;CORRECT PARITY.
1490 ;
1491 ; INPUTS: R3 DATA, R4 CONTROL, R5 DIABLK INDEX.
1492 ;
1493 ; OUTPUTS: R3 DATA (UNCHANGED), R4 CONTROL (WITH GOOD PARITY), R5
1494 ; UPDATED DIABLK INDEX.
1495 ;
1496 ; CALLS: ODDPAR SUBROUTINE
1497
1498 TALOAD:: MOVB R3,-(R5) ;LOAD DATA
1499 015626 110345 TST R3 ;ALL 0'S DATA?
1500 015630 005703 BEQ 1$ ;BR IF SO
1501 015632 001403 BIS #15.DAP,R4 ;IF NOT, SET THE PARITY DATA ALSO IN R4 (CNTRL W
1502 015634 052704 000020 BR 3$ ;CONTINUE.
1503
1504 1$: BIC #15.DAP,R4 ;CLR THE PAR DATA BIT IN CNTRL WORD.
1505 015642 042704 000020 3$: MOV R4,R1 ;SAVE IT.
1506 015646 010401 JSR PC,ODDPAR ;CALC CONTROL WORD PARITY.
1507 015650 004737 015546 TST TEMPO ;IS PARITY BIT SET?
1508 015654 005737 002430 BEQ 2$ ;BR IF NOT
1509 015660 001402 BIS #15.PAR,R4 ;IF SO, SET THE PAR BIT.
1510 015662 052704 000200 2$: MOVB R4,-(R5) ;LOAD THE CONTROL WORD
1511 015666 110445 RTS PC ;RETURN.
1512 015670 000207
```

```

1509 ;S/R TO COMPLETE FILLING THE DIABLK WITH ENTRIES WHOSE FORMAT THE TS04
1510 ;RECOGNIZES. UNUSED DIABLK LOCATIONS TO CONTAIN A TS04 RTS COMMAND.
1511
1512 015672 020527 002317 FIXDIA:: CMP R5,#DIABLK+1 ;ARE WE ON DIABLK ODD BOUNDARY?
1513 015676 001406 BEQ 1$ ;BR IF SU
1514 015700 100407 BMI 2$ ;ARE WE ON DIABLK EVEN BOUNDARY?
1515 ;BR IF SO-WE'RE DONE.
1516 015702 112745 000033 MOVB #POPJLO,-(R5) ;LOAD TS04
1517 015706 112745 000000 MOVB #POPJHI,-(R5) ;RTS COMMAND.
1518 015712 000767 BR FIXDIA ;REPEAT.
1519
1520
1521 015714 112745 177777 1$: MOVB #-1,-(R5) ;MUST END ON AN EVEN BOUNDARY.
1522 015720 000207 2$: RTS PC ;RETURN.
1523
1524
1525
1526 ;S/R TO SETUP THE TS04 COMMAND PACKET AND INITIATE EXECUTION OF THE DIA
1527 ;COMMAND.
1528 ; CALLS:: WT4SSR SUBROUTINE.
1529
1530 015722 004737 014430 DIAEXE:: JSR PC,WT4SSR ;SEE IF SSR IS SET. SHOULD BE
1531 015726 004737 015772 JSR PC,INITM ;INITIALIZE THE MESSAGE PACKET.
1532 015732 012777 002250 164254 MOV #DIAPKT,@TSDB ;INITIATE EXECUTION
1533 015740 004737 014430 JSR PC,WT4SSR ;WAIT FOR SSR TO SET
1534 015744 000207 RTS PC

```

```

1535 ;S/R TO SETUP THE COMMAND PACKET TO DO AN SCH COMMAND AND ISSUE THE
1536 ;COMMAND.
1537
1538 . CALLS:: WT4SSR SUBROUTINE.
1539
1540 015746 004737 014616 SCHEXE:: JSR PC,WAITSR ;WAIT FOR SSR BIT '0 SET.
1541 015752 004737 015772 JSR PC,INITM ;INITIALIZE THE MESSAGE PACKET.
1542 015756 012777 002240 164230 MOV #SCHPKT,@TSDB ;INITIATE EXECUTION.
1543 015764 004737 014616 JSR PC,WAITSR ;WAIT FOR SSR.
1544 015770 000207 RTS PC ;RETURN.
1545
1546
1547
1548 ;S/R TO INITIALIZE THE MESSAGE PACKET WITH ALL ONES.
1549 ; REGISTERS USED: R1
1550
1551 015772 INITM: LET R1 := #0 ;CLEAR LOCATION COUNTER.
1552 015772 005001 ; CLR R1
1553 015774 WHILE R1 NE #MSGEXT DO ;WHILE THERE ARE MORE LOCATIONS:
1554 015774 ; 50033$:
1555 015774 020127 000016 ; CMP R1,#MSGEXT
1556 016000 001406 ; BEQ 50034$
1557 016002 LET MSGPKT(R1) := #-1 ;INIT ONE LOCATION IN MSG PACKET.
1558 016002 012761 177777 002260 ; MOV #-1,MSGPKT(R1)
1559 016010 LET R1 := R1 + #2 ;UPDATE COUNTER
1560 016010 062701 000002 ; ADD #2,R1
1561 016014 ENDDO ;END OF INIT LOOP.
1562 016014 000767 ; BR 50033$
1563 016016 ; 50034$:
1564 016016 000207 RTS PC ;RETURN.

```

```

1565 ;S/R TO SHIFT BYTE A 1 IN A FIELD OF 0'S. WHEN WE'RE THROUGH
1566 ;DOING THAT, SHIFT BYTE A 0 IN A FIELD OF 1'S.
1567
1568 : INPUTS: R4=DATA TO SHIFT.
1569 : OUTPUTS: R4-SHIFTED DATA.
1570
1571 016020 006204 SHWRAP:: ASR R4 ;SHIFT THE DATA.
1572 016022 105704 TSTB R4 ;SHIFTING A 1 OR A 0?
1573 016024 100404 BMI 1$ ;BR IF SHIFTING A 0.
1574 016026 001005 BNE 2$ ;DONE SHIFTING A 1? BR IF NOT.
1575 016030 012704 177577 MOV #177577,R4 ;IF SO, SETUP TO SHIFT 0 IN FIELD OF 1'S.
1576 016034 000402 BR 2$ ;CONTINUE.
1577
1578 016036 052704 000200 1$: BIS #200,R4 ;SET THE MSB.
1579 016042 000207 2$: RTS PC ;RETURN.
1580
1581
1582
1583 ;S/R TO CHECK FOR TRACK ACTIVE ERRORS.
1584 :
1585 :
1586 : OUTPUTS:ACTRAC CONTAINS THE ACTUAL TRACK ACTIVE DATA IN BITS 0 THRU 8
1587
1588 016044 113737 002267 002360 TKACER:: MOVB MSGPKT+C18$TA,ACTRAC ;GET ACTUAL STATE OF ACTIVE BITS FOR CHANS 1-8.
1589 016052 LET R2 :B= MSGPKT+PRCHST ;GET THE TRK ACT DATA FOR CHAN 9
1590 016052 113702 002274 MOVB MSGPKT+PRCHST,R2
1591 016056 032702 000004 BIT #CH9.TA,R2 ;IS IT SET?
1592 016062 001404 BEQ 1$ ;BR IF NOT
1593 016064 052737 000400 002360 BIS #BIT8,ACTRAC ;IF SO, SET THE APPROPRIATE BIT IN "ACTUAL" REG
1594 016072 000403 BR 3$ ;CONTINUE.
1595
1596 016074 042737 000400 002360 1$: BIC #BIT8,ACTRAC ;CLEAR THE BIT IN "ACTUAL" REG.
1597 016102 042737 177000 002360 3$: BIC #177000,ACTRAC ;CLR GARBAGE.
1598 016110 023737 002342 002360 CMP EXTRAC,ACTRAC ;EXPECTED & ACTUAL DATA IDENTICAL?
1599 016116 001402 BEQ 2$ ;BR IF SO.
1600 016120 105237 002436 INCB ERRFLG ;SET THE ERR FLAG.
1601 016124 000207 2$: RTS PC ;RETURN.
1602

```

```

1603      ;COMMON S/R USED BY THE PE DATA TESTS TO BUILD THE DIABLK
1604      ;IN CORE.
1605      :
1606      :       INPUTS:
1607      :       R2      =      PREAMBLE DATA.
1608      :       R3      =      BYTE 1 DATA.
1609      :
1610 016126 004737 016154      DATBLD:: JSR      PC,PEINIT      ;GO SET THE WRAP TASK ADDR IN DIABLD
1611      :                               ;AND INIT DIABLK INDEX.
1612 016132 112745 000012      MOV      #FC.DAT!FC.VCO,-(R5) ;SET DATA & VCO MODE IN FMT CNTRL.
1613 016136 010304      MOV      R3,R4      ;SETUP SECOND BYTE OF DATA.
1614 016140 005104      COM      R4      ;COMPLEMENT THE BYTE 2 DATA.
1615 016142 042704 177000      BIC      #177000,R4 ;CLR GARBAGE BITS.
1616 016146 004737 016176      JSR      PC,PEDATA ;LOAD THE PREAMBLE AND THE 2 DATA BYTES
1617      :                               ;IN DIABLK
1618 016152 000207      RTS      PC      ;RETURN.
1619      :
1620      :
1621      :
1622      ;S/R TO LOAD THE DIABLK WITH THE TS04 WRAP TASK ADDRESS,
1623      ;AND SETUP THE READ CONTROL WORD (RDCTLO) FOR MAINTENANCE MODE.
1624      :
1625      ;IMPLICIT INPUTS:      DIABLK, DIAEXT, WRPLO, WRPHI
1626      ;OUTPUTS:              R5=DIABLK INDEX.
1627      :
1628 016154 012705 002336      PEINIT:: MOV      #DIABLK+DIAEXT,R5 ;SAVE ADR OF LAST WORD IN DIABLK
1629      :                               ;SO WE CAN FILL DIABLK IN REVERSE ORDER.
1630      :                               ;LOAD THE NEW WRAP TASK ADDR LO
1631 016160      LET      -(R5) .B= #WRPLO ;LOAD THE NEW WRAP TASK ADDR LO
1632 016160 112745 000005      MOV      #WRPHI,-(R5) ;LOAD WRAP TASK ADDR HI.
1633 016164 112745 000200      MOV      #RD.MAI,-(R5) ;SET MAINT MODE IN RDCTLO.
1634 016174 000207      RTS      PC
1635
1636

```



```

1637 ;S/R TO LOAD THE DIABLK WITH THE ALL 1'S PREAMBLE CHARACTER AND 2 BYTES
1638 ;OF DATA AND CONTROL. IT ALSO LOADS THE EXPECTED UNDESKEWED DATA IN THE
1639 ;FORMATTER AND WRITE CONTROL REGISTERS.
1640
1641 :
1642 :       INPUTS: R2=PREAMBLE ALL 1'S CHARACTER.
1643 :               R3=1ST BYTE OF DATA
1644 :               R4=2ND BYTE OF DATA
1645 :
1646 :       CALLS: PELOAD SUBROUTINE
1647
1646 016176 010237 002432 PEDATA:: MOV R2,TEMP1 ;SETUP TO LOAD DIABLK PREAMBLE
1647 016202 004737 016334 JSR PC,PELOAD ;DO IT
1648 016206 010337 002432 MOV R3,TEMP1 ;SETUP TO LOAD DIABLK & 1ST DATA BYTE
1649 016212 004737 016334 JSR PC,PELOAD ;DO IT
1650 016216 010437 002432 MOV R4,TEMP1 ;SETUP TO LOAD DIABLK WITH 2ND DATA BYTE
1651 016222 004737 016334 JSR PC,PELOAD ;DO IT
1652
1653 ;LOAD THE EXPECTED RESULTS.
1654
1655 016226 013737 002416 002342 48: MOV DTKIDN,EXTRAC ;IDENTIFY DEAD TRACKS.
1656 016234 005137 002342 COM EXTRAC ;ALL TRACKS NOT DEAD ARE ACTIVE.
1657 016240 042737 177000 002342 BIC #177000,EXTRAC ;CLR GARBAGE.
1658 016246 013737 002416 002346 MOV DTKIDN,EXTRDD ;TRACKS DEAD DEFINED IN DTKIDN REG.
1659 016254 012737 000777 002336 MOV #777,EXORDY ;OUTPUT READY HI ON ALL TRACKS.
1660 016262 010337 002344 MOV R3,EXDATA ;EXPECTED DATA INFO (NOT SO FOR SKEW TEST)
1661 016266 043737 002416 002344 BIC DTKIDN,EXDATA ;ZERO THE DATA CORRESPONDING TO THE DEAD TRACKS.
1662 016274 013737 002416 002340 MOV DTKIDN,EX1DTR ;EXPECTED ONES OR DEAD TRK INFO.
1663 016302 050337 002340 BIS R3,EX1DTR
1664 016306 005103 COM R3 ;COMPLEMENT DATA.
1665 016310 013737 002416 002350 MOV DTKIDN,EXODTR ;EXPECTED 0 OR DEAD TRK INFO.
1666 016316 050337 002350 BIS R3,EXODTR
1667 016322 005103 COM R3 ;RESTORE R3.
1668 016324 042737 177000 002350 BIC #177000,EXODTR ;CLR GARBAGE.
1669 016332 000207 RTS PC ;RETURN
1670

```

```

1671 ;S/R TO LOAD CONTENTS OF TEMP1 INTO THE DIABLK BY GENERATING THE TWO
1672 ;BIT CELLS OF DATA AND CONTROL. THE ROUTINE ALSO LOADS DATA TO SIMULATE
1673 ;DEAD TRACKS.
1674
1675
1676 :
1677 : INPUT: TEMP1=DATA TO LOAD.
1678 : R5=DIABLK INDEX.
1679 : DTKIDN=DEAD TRACK IDEN REG. 1-DEAD; 0=LIVE.
1680
1681 :CLOBBERS TEMPO,K1,TEMP1
1682
1683 : OUTPUT: UPDATED DIABLK DATA
1684 : UPDATED DIABLK INDEX
1685
1686 :NOTE THAT A LOGICAL "1" IS SENT TO THE TS04 AS A 1 TO 0 TRANSITION.
1687 :LIKewise, THE TS04 INTERPRETS A 0 TO 1 TRANSITION AS A LOGICAL 0.
1688 :THEREFORE, A LOGICAL 1 HAS A 1 BIT CELL FOLLOWED BY A 0 BIT CELL, AND
1689 :LOGICAL 0 CONSISTS OF A 0 BIT CELL FOLLOWED BY A 1 BIT CELL. THE FIRST
1690 :PASS OF THIS SUBROUTINE LOADS THE FIRST BIT CELL, WHILE THE SECOND PASS
1691 :LOADS BIT CELL 2.
1692 :DEAD TRACK BIT CELLS ARE EITHER BOTH 0 OR BOTH 1. (NO TRANSITION.)
1693 016334 012701 000044 PELOAD:: MOV #IS.NRZ!IS.WRF,R1 ;INIT CONTROL WORD STORAGE REG
1694 016340 113745 002432 1$: MOVB TEMP1,-(R5) ;LOAD DATA WORD (BIT CELL)
1695 016344 000301 SWAB R1 ;LOAD THE
1696 016346 153701 002432 BISB TEMP1,R1 ;DATA WORD IN R1 ALSO TO
1697 016352 000301 SWAB R1 ;GENERATE PARITY.
1698 016354 032737 000400 002432 BIT #BIT8,TEMP1 ;WHAT ABOUT PARITY TRACK. SET?
1699 016362 001402 BEQ 2$ ;BR IF NOT
1700 016364 052701 000020 BIS #IS.DAP,R1 ;IF SO, SET THE BIT IN THE CNTRL WORD.
1701 016370 004737 015546 2$: JSR PC,ODDPAR ;CALCULATE ODD PARITY. RESULT IN TEMPO BIT 1
1702 016374 005737 002430 TST TEMPO ;PARITY BIT SET?
1703 016400 001402 BEQ 3$ ;BR IF NOT
1704 016402 052701 000200 BIS #IS.PAR,R1 ;IF SO SET PARITY BIT FOR BOTH THE
1705 ;DATA AND CONTROL WORD.
1706 016406 110145 3$: MOVB R1,-(R5) ;LOAD THE CNTRL WORD (BIT CELL)
1707 016410 005737 002432 TST TEMP1 ;DONE WITH PASS 2?
1708 016414 100432 BMI 4$ ;BR IF SO
1709 016416 005737 002416 TST DTKIDN ;LOOKING FOR ANY DEAD TRACKS?
1710 016422 001424 BEQ 5$ ;BR IF NOT.
1711
1712 ;XOR THE DATA WITH THE DEAD TRACKS SO NO TRANSITIONS OCCUR ON
1713 ;THE DEAD TRACK BIT CELLS.
1714 ;XOR = (A)(NOT B) + (NOT A)(B) = NOT(A + NOT B) + NOT(NOT A + B)
1715
1716 016424 013737 002432 002430 MOV TEMP1,TEMPO ;SAVE ARG A.
1717 016432 013701 002416 MOV DTKIDN,R1 ;SAVE ARG B.
1718 016436 005137 002430 COM TEMPO ;INVERT ARG A.
1719 016442 005101 COM R1 ;INVERT ARG B.
1720 016444 053701 002432 BIS TEMP1,R1 ;GENERATE (A) + (NOT B)
1721 016450 053737 002416 002430 BIS DTKIDN,TEMPO ;GENERATE (NOT A) + (B)
1722 016456 005137 002430 COM TEMPO ;INVERT
1723 016462 005101 COM R1 ;INVERT
1724 016464 053701 002430 BIS TEMPO,R1 ;OR THE TWO ARGUMENTS TO GIVE THE XOR.
1725 016470 010137 002432 MOV R1,TEMP1 ;TEMP1 = TEMP1 XOR DTKIDN
1726 016474 005137 002432 5$: COM TEMP1 ;SET UP TO LOAD BIT CELL 2.

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GLOBAL SUBROUTINES SECTION

SEQ 0076

1727 016500 000715
1728 016502 000207
1729

4\$: BR PELOAD :DO IT
RTS PC :RETURN

```

1730 ;S/R TO RETRIEVE THE TS04 FORMATTER AND WRITE CONTROL REGISTERS AND
1731 ;CHECK TO SEE IF THEY CONTAIN EXPECTED DATA.
1732
1733 INPUTS: EXPECTED DATA PREVIOUSLY SET UP IN PEDATA SUBROUTINE
1734 MSGPKT - TS04 MESSAGE PACKET.
1735
1736 OUTPUT: ERROR FLAG, ACTUAL DATA
1737
1738 ;CLOBBERS R5,R1
1739
1740 PEERCK:: INCR R1 FROM #0 TO #12 BY #2
1741
1742 CLR R1
1743 BR 50035$
1744 50036$: ADD #2,R1
1745 50035$: CMP R1,#12
1746 BGT 50037$
1747 LET ACTTBL(R1) := #0 ;CLEAR 6 LOC OF ACTUAL WRAP REG
1748 ENDINC ;CLR ACTTBL(R1)
1749
1750 BR 50036$
1751 50037$:
1752
1753
1754
1755 MOV# MSGPKT+C18$OR,ACORDY ;ACTUAL OUTPUT READY INFO
1756 MOV# MSGPKT+C18$ID,AC1DTR ;ACTUAL 1'S OR DEAD TRACK INFO.
1757 MOV# MSGPKT+C18$TA,ACTRAC ;ACTUAL TRACK ACTIVE INFO
1758 MOV# MSGPKT+C18$DA,ACDATA ;ACTUAL DATA INFO
1759 MOV# MSGPKT+C18$TD,ACTRDD ;ACTUAL TRACK DEAD INFO
1760 MOV# MSGPKT+C18$OD,ACODTR ;ACTUAL 0 OR DEAD TRACK INFO.
1761 LET TEMP2 :B= MSGPKT+PRCHST ;GET THE TRK ACT DATA FOR CHAN 9
1762 MOV# MSGPKT+PRCHST,TE
1763
1764 MOV #6,TEMP1 ;INIT COUNTER
1765 MOV #ACTTBL,R1 ;SET INDEX OF THE FORMATTER AND
1766 ;WRITE CONTROL REG., TABLE.
1767 1$: ASR TEMP2 ;SHIFT CHAN 9 DATA INTO CARRY BIT
1768 BCC 2$ ;BR IF DATA WAS CLR.
1769 BIS #BIT8,(R1)+ ;IF DATA WAS SET THEN SET THE CHAN 9
1770 ;BIT IN THE APPROPRIATE "ACTUAL" REG.
1771 BR 3$
1772 2$: BIC #BIT8,(R1)+ ;IF CLR, THEN CLR THE CHAN 9 BIT IN
1773 ;THE APPROPRIATE "ACTUAL" REG.
1774 3$: DEC TEMP1 ;DONE CHECKING ALL THE NEEDED BITS?
1775 BNE 1$ ;BR IF NOT
1776
1777 ;NOW COMPARE THE ACTUAL & EXPECTED DATA AND SET THE ERROR FLAG
1778 ;IF WE HAD AN INVALID COMPARISON.
1779
1780 MOV #EXPTBL,R1 ;SAVE "ACTUAL" TABLE INDEX
1781 MOV #6,TEMP1 ;INIT COUNTER
1782 4$: LET R5 := (R1) XOR 16(R1)
1783 MOV (R1),R5
1784 MOV 16(R1),-(SP)
1785 BIC R5,(SP)
1786 BIC 16(R1),R5

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GLOBAL SUBROUTINES SECTION

SEQ 0078

```
1786 016670 052605
1787 016672
1788 016672 005705
1789 016674 001402
1790 016676 005237 002436
1791 016702
1792 016702
1793 016702
1794 016702 050561 000034
1795 016706
1796 016706 062701 000002
1797
1798 016712 005337 002432
1799 016716 001356
1800 016720 000207

IF R5 NE #0 THEN
    INC ERRFLG
ENDIF
LET 34(R1) := 34(R1) SET.BY R5
LET R1 := R1 + #2

50040$:
BIS (SP)+,R5
TST R5
BEQ 50040$
BIS R5,34(R1)
ADD #2,R1

DEC TEMP1
BNE 4$
RTS PC
;DONE CHECKNING ALL DATA?
;BR IF NOT
```

```

1801 ;S/R TO SETUP THE DIABLK IN SUCH A WAY THAT WILL ENABLE THE ROM
1802 ;LOOKUP TABLE LOCATION, SPECIFIED IN ROMLKI, TO BE EXAMINED.
1803
1804 ;10.0 ADDRESS BITS ARE NEEDED TO ADDRESS THE ROM FROM 0-1777. THE 9 LOW
1805 ;ORDER ROM ADDRESS BITS ARE GATED FROM THE TRACK ACTIVE DATA WHILE THE
1806 ;MSB OF THE ROM ADDRESS IS GATED FROM THE VERTICAL PARITY ERROR (VPE).
1807
1808 ;THIS S/R LOADS THE DIABLK WITH AN ALL 1'S PREAMBLE; CAUSES A VPE TO SET
1809 ;OR CLEAR IN BYTE 1 DEPENDING ON THE STATE OF ROMLKI (BIT 9); AND CAUSES
1810 ;DEAD TRACKS IN BYTE 2 CORRESPONDING TO BITS 0-8 OF ROMLKI.
1811
1812
1813 016722 005037 002416 ROMLOK:: CLR DTKIDN ;CLR DEAD TRACK REG.
1814 016726 012737 000777 002432 MOV #777,TEMP1 ;SET UP TO LOAD ALL 1'S PREAMBLE
1815 016734 004737 016334 JSR PC,PELOAD ;LOAD PREAMBLE & CONTROL.
1816 016740 032737 001000 002420 BIT #BIT9,ROMLKI ;MSB OF ROM ADDR SET?
1817 016744 001403 BEQ 1$ ;BR IF NOT
1818 016750 005037 002432 CLR TEMP1 ;CAUSE VPE=1.
1819 016754 000403 BR 2$ ;CONTINUE
1820
1821 016756 012737 000777 002432 1$: MOV #777,TEMP1 ;CAUSE VPE=0.
1822 016764 004737 016334 2$: JSR PC,PELOAD ;LOAD BYTE 1 + CNTRL.
1823 016770 005037 002432 CLR TEMP1 ;INIT TEMP1.
1824 016774 013737 002420 002416 MOV ROMLKI,DTKIDN ;LOAD ROM ADDR IN DEAD TRACK REG.
1825 017002 005137 002416 COM DTKIDN ;INVERT IT.
1826 017006 042737 177000 002416 BIC #177000,DTKIDN ;CLR GARBAGE. MSB ADDRESS
1827 ;WAS TAKEN CARE OF IN BYTE 1.
1828 017014 004737 016334 JSR PC,PELOAD ;LOAD BYTE 2 DATA AND CONTROL.
1829 017020 000207 RTS PC ;RE*UPN.

```

1830 :S/R TO GENERATE THE EXPECTED ROM LOOKUP TABLE OUTPUT FROM THE ADDRESS
1831 :IN ROMLKI.

1832 :
1833 : INPUTS: ROMLKI = ROM ADDRESS
1834 : OUTPUTS: EXPOML = EXPECTED ROM LOOKUP TABLE OUTPUT.
1835 : CLOBBERS: TEMPO, R1, R2
1836 :

1837 :THE ROM CONTENTS ARE SHOWN IN THE FOLLOWING TABLE:

OUTPUT	ADDRESSES WHICH ASSERT*	COMMENTS
	AAAAAAAAAA 9876543210	

MULT (MSB)	X-----	X = DON'T CARE. MULT = 1 IF ANY 2 ADDRESS LINES (OTHER THAN A9) ARE 1.
RDTMK	xxx0100x11 x110x001xx	X = DON'T CARE.
PREAM	XAACBCCABB	X = DON'T CARE. MUST HAVE AT LEAST ONE OF A & B & C. MUST HAVE ALL OF A OR B OR C.
9 OF 9	x111111111	X = DON'T CARE.
0 OF 9	x000000000	X = DON'T CARE.
COR DATA	1000000001 1000000010 1000000100 1000001000 1000010000 1000100000 1001000000 1010000000	
INCOR DATA	1000000000	
8 OF 9 (LSB)	x111111111 x111111110 x111111101 x111111011 x111110111 x111101111 x111011111 x110111111 x101111111 x011111111	X = DON'T CARE.

1880 :
1881 :
1882 : * = A0-A7 = MUX 2(0)-2(7)
1883 : A8 = MUX PARITY
1884 : A9 = LATCHED PARITY ERROR

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1885 017022 005037 002352 ROMEX:: CLR EXROML ;INIT. EXPECTED ROM REG.
1886
1887 ;CHECK FOR 8 OF 9.
1888
1889 017026 012702 000001 X8OF9: MOV #1,R2 ;INIT 0'S CNTR.
1890 017032 012737 000011 002430 MOV #11,TEMPO ;LOAD BIT CNTR. NOT INTERESTED IN BIT10.
1891 017040 013701 002420 MOV ROMLKI,R1 ;SAVE ROM TABLE ADDRESS
1892 017044 000241 1$: CLC ;CLR CARRY TO PREPARE FOR SHIFT
1893 017046 006201 ASR R1 ;SHIFT IT. WAS IS A 1?
1894 017050 103401 BCS 2$ ;BR IF SO
1895 017052 005302 DEC R2 ;DECR 0 CNTR.
1896 017054 005337 002430 2$: DEC TEMPO ;DECR BIT CNTR DONE?
1897 017060 001371 BNE 1$ ;BR IF NOT
1898 017062 005702 TST R2 ;8 OF 9?
1899 017064 100403 BMI XCORDA ;BR IF NOT
1900 017066 052737 000001 002352 BIS #.8OF9,EXROML ;IF SO, SET THE BIT
1901
1902 ;CHECK FOR CORRECTABLE DATA
1903
1904 017074 032737 001000 002420 XCORDA: BIT #A9,ROMLKI ;COULD THIS BE CORRECTABLE DATA
1905 017102 001427 BEQ XINCOR ;BR IF NOT
1906 017104 032737 000400 002420 BIT #A8,ROMLKI ;COULD THIS BE CORRECTABLE DATA?
1907 017112 001023 BNE XINCOR ;BR IF NOT.
1908 017114 012702 000002 MOV #2,R2 ;INIT 1'S CNTR.
1909 017120 012737 000012 002430 MOV #12,TEMPO ;LOAD BIT CNTR. NOT INTERESTED IN MSB.
1910 017126 013701 002420 MOV ROMLKI,R1 ;SAVE ROM TABLE ADDR.
1911 017132 000241 1$: CLC ;INIT CARRY TO PREPARE FOR SHIFT.
1912 017134 006201 ASR R1 ;SHIFT IT. WAS IT A 1?
1913 017136 103001 BCC 2$ ;BR IF NOT
1914 017140 005302 DEC R2 ;DECR. 1'S CNTR.
1915 017142 005337 002430 2$: DEC TEMPO ;DECR BIT CNTR. DONE?
1916 017146 001371 BNE 1$ ;BR IF NOT
1917 017150 005702 TST R2 ;CORRECTABLE DATA?
1918 017152 001003 BNE XINCOR ;BR IF NOT
1919 017154 052737 000004 002352 BIS #.CORD,EXROML ;IF SO, SET THE BIT.
1920
1921 ;CHECK FOR INCORRECTABLE DATA
1922
1923 017162 022737 001000 002420 XINCOR: CMP #1000,ROMLKI ;INCORRECTABLE DATA?
1924 017170 001003 BNE X0OF9 ;BR IF NOT
1925 017172 052737 000002 002352 BIS #.INCOR,EXROML ;IF SO, SET THE "INCOR" BIT.
1926
1927 ;CHECK FOR 0 OF 9
1928
1929 017200 032737 000777 002420 X0OF9: BIT #777,ROMLKI ;0 OF 9?
1930 017206 001003 BNE X9OF9 ;BR IF NOT
1931 017210 052737 000010 002352 BIS #.0OF9,EXROML ;IF SO, SET THE BIT.
1932
1933 ;CHECK FOR 9 OF 9
1934
1935 017216 022737 000777 002420 X9OF9: CMP #777,ROMLKI ;9 OF 9?
1936 017224 001404 BEQ 1$ ;BR IF SO
1937 017226 022737 001777 002420 CMP #1777,ROMLKI ;9 OF 9?
1938 017234 00.003 BNE XMULT ;BR IF NOT
1939 017236 052737 000020 002352 1$: BIS #.9OF9,EXROML ;SET THE BIT.
1940

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1941                                     ;CHECK FOR MULTIPLE TRACKS
1942
1943 017244 012702 000001                XMULT: MOV    #1,R2                ;INIT 1'S CNTR.
1944 017250 012737 000011 002430        MOV    #11,TEMPO                ;LOAD BIT CNTR.
1945 017256 013701 002420                MOV    ROMLKI,R1                ;SAVE ROM TABLE ADDR
1946 017262 000241                        1$:  CLC                          ;INIT CARRY TO PREPARE FOR SHIFT.
1947 017264 006201                        ASR    R1                        ;SHIFT IT WAS IT A 1?
1948 017266 103001                        BCC    2$                        ;BR IF NOT
1949 017270 005302                        DEC    R2                        ;DECR 1'S CNTR.
1950 017272 005337 002430                2$:  DEC    TEMPO                ;DECR BIT CNTR. DONE?
1951 017276 001371                        BNE    1$                        ;BR IF NOT
1952 017300 005702                        TST    R2                        ;MULTIPLE TRACKS?
1953 017302 100003                        BPL    XPREAM                    ;BR IF NOT
1954 017304 052737 000200 002352        BIS    #.MULT,EXROML            ;IF SO, SET BIT BIT
1955
1956                                     ;CHECK FOR PREAMBLE
1957                                     ;ADDR LINES 9876543210
1958                                     ;XAACBCCABB
1959                                     ;PREAM=1 IF HAVE ONE OF A&B&C AND
1960                                     ;ALL OF A OR B OR C.                x = 0 OR 1.
1961
1962 017312 005002                XPREAM: CLR    R2
1963 017314 013701 002420                MOV    ROMLKI,R1                ;SAVE ROM TABLE ADDRESS.
1964 017320 010137 002430                MOV    R1,TEMPO                ;GENERATE THE
1965 017324 005137 002430                COM    TEMPO                    ;COMPLIMENT OF THE ADDR.
1966 017330 032737 000604 002430        BIT    #A8!A7!A2,TEMPO        ;ALL OF GROUP A?
1967 017336 001003                BNE    1$                        ;BR IF NOT
1968 017340 052702 000011                BIS    #BIT0!BIT3,R2          ;SET '1 OF A' AND '1 OF A' INDICATION
1969 017344 000405                BR     2$
1970
1971 017346 032701 000604                1$:  BIT    #A8!A7!A2,R1        ;1 OF GROUP A?
1972 017352 001440                BEQ    7$                        ;BR IF NOT - NOT A PREAM
1973 017354 052702 000001                BIS    #BIT0,R2                ;SET '1 OF A' INDICATION.
1974 017360 032737 000043 002430        2$:  BIT    #A5!A1!A0,TEMPO    ;ALL OF GROUP B ACTIVE?
1975 017366 001003                BNE    3$                        ;BR IF NOT
1976 017370 052702 000012                BIS    #BIT1!BIT3,R2          ;SET 'ALL OF B' + '1 OF B'.
1977 017374 000405                BR     4$                        ;CONTINUE
1978 017376 032701 000043                3$:  BIT    #A5!A1!A0,R1        ;'1 OF B' ACTIVE.
1979 017402 001424                BEQ    7$                        ;BR IF NOT - NOT A PREAM.
1980 017404 052702 000002                BIS    #BIT1,R2                ;SET '1 OF B' INDICATION.
1981 017410 032737 000130 002430        4$:  BIT    #A6!A4!A3,TEMPO    ;ALL OF GROUP C ACTIVE?
1982 017416 001003                BNE    5$                        ;BR IF NOT
1983 017420 052702 000014                BIS    #BIT2!E 3,R2            ;SET ALL OF C AND 1 OF C
1984 017424 000405                BR     6$                        ;INDICATION.
1985 017426 032701 000130                5$:  BIT    #A6!A4!A3,R1        ;1 OF C?
1986 017432 001410                BEQ    7$                        ;BR IF NOT-NO PREAMBLE
1987 017434 052702 000004                BIS    #BIT2,R2                ;SET 1 OF C INDICATION.
1988
1989                                     ;IN ORDER FOR THE PREAMBLE CONDITION TO BE TRUE, R2 MUST CONTAIN
1990                                     ;17 AT THIS POINT.
1991
1992 017440 022702 000017                6$:  CMP    #17,R2                ;PREAMBLE?
1993 017444 001003                BNE    7$                        ;BR IF NOT
1994 017446 052737 000040 002352        BIS    #.PREAM,EXROML          ;IF SO, SET THE PREAMBLE BIT IN
1995                                     ;EXPECTED LOOKUP TABLE REG.
1996 017454 000240                7$:  NOP

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2004
2005 017456 013701 002420      XRDFMK: MOV    ROMLK1,R1      ;SAVE ROM TABLE ADDR.
2006 017462 010137 002430      MOV    R1,TEMPO      ;GENERATE THE
2007 017466 005137 002430      COM    TEMPO         ;COMPLIMENT OF THE ADDR.
2008 017472 032701 000130      BIT    #A6:A4:A3,R1  ;CHECK THE 0'S IN COND 1 AND COND 2.
2009 017476 001013              BNE    3$            ;BR IF COND 1 AND COND 2 NOT TRUE
2010 017500 032737 000043 002430  BIT    #A5:A1:A0,TEMPO ;CHECK 1'S IN COND 1.
2011 017506 001404              BEQ    2$            ;BR IF COND 1 IS TRUE
2012 017510 032737 000604 002430  BIT    #A8:A7:A2,TEMPO ;CHECK 1'S IN CONDITION 2
2013 017516 001003              BNE    3$            ;BR IF COND 2 IS FALSE
2014 017520 052737 000100 002352 2$:  BIS    #.RDFMK,EXROML ;WE ARE READING A FILE MARK.
2015
2016 017526 000207              3$:   RTS    PC      ;SET APPROPRIATE BIT.
                                ;RETURN
```

```

2017 ;S/R TO RETRIEVE THE ACTUAL ROM LOOKUP TABLE OUTPUT AND COMPARE IT
2018 ;WITH THE EXPECTED OUTPUT.
2019 :
2020 : INPUT: EXROML - EXPECTED ROM OUTPUT.
2021 : MSGPKT - TSO4 MESSAGE PACKET.
2022 :
2023 : OUTPUT: ERRFLG - ERROR FLAG
2024 : ACROML - ACTUAL ROM OUTPUT.
2025 :
2026 :
2027 :
2028 017530 ROMCK:: LET ACROML :B= MSGPKT+ROM$LK ;GET THE ACTUAL ROM OUTPUT
2029 017530 113737 002273 002370 ;MOV B,MSGPKT+ROM$LK,AC
2030 017536 123737 002370 002352 ;CMPB ACROML,EXROML ;ARE THEY THE SAME.
2031 017544 001407 ;BEQ 1$ ;BR IF SO
2032 017546 005237 002436 ;INC ERRFLG ;IF NOT SET THE ERROR FLAG
2033 017552 000207 1$: RTS PC

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: SUBROUTINES MSORT 1 AND MSORT2 SELECT BAD BOARD. H TESTS 4 - 7 PER
: TABLE BELOW WHERE:

22 = M8922 57 = G157
24 = M8924 23 = M8923

BAD BOARD SELECTION TABLE			
R5	BD/SLOT/BITS	MASK	PRINTB MSG
0	22/7/0-8		FMTCTR
1	24/6/0,1,2	R2=7	FMTCH6
2	24/5/3,4,5	R3=70	FMTCH5
3	24/4/6,7,8	R4=700	FMTCH4
400	57/2/0,1,5,6	R2=143	RDCH2
1000	57/1/2,3,4,7	R3=234	RDCH1
1400	23/3/8	R4=400	RDCHP3

: TEST 4 -- MODULE SORT

```

MSORT1:: CLR      TEMP1          ;TEPM1=BOARDS 24 SELECTION FLAG
          LET R2 := R1 AND #7    ;R2=BOARD 24/6 MASK
                                          MOV      R1,R2
                                          MOV      R2,-(SP)
          BIC      #7,(SP)
          BIC      (SP)+,R2
          LET R3 := R1 AND #70   ;R3=BOARD 24/5 MASK
                                          MOV      R1,R3
                                          MOV      R3,-(SP)
          BIC      #70,(SP)
          BIC      (SP)+,R3
          LET R4 := R1 AND #700  ;R4=BOARD 24/4 MASK
                                          MOV      R1,R4
                                          MOV      R4,-(SP)
          BIC      #700,(SP)
          BIC      (SP)+,R4
          LET R5 := #0          ;R5=BOARD 22/7 FLAG
          JSR      PC,PAIRST     ;SORT 22 AND 24 BOARDS, RESULT IN R5 LO BYTE
          IF R5 EQ #0 THEN
          PRINTB  #FMTCTR       ;22 BOARD SELECTED, CALL BAD 22/7
          BNE      50041$
          MOV      #FMTCTR,-(SP)
          MOV      #1,-(SP)
          MOV      SP,R0
          TRAP    C$PNTB
          ADD     #4,SP
          ELSE                  ;24 BOARD SELECTED, CONTINUE SORTING
          BR      50042$
          BR      50041$
    
```

2090	017652		LET R2 := R1 AND #143	;R2 BOARD 57/2 MASK	
2091	017652	010102			MOV R1,R2
2092	017654	010246			MOV R2,-(SP)
2093	017656	042716	000143		BIC #143,(SP)
2094	017662	042602			BIC (SP)+,R2
2095	017664		LET R3 := R1 AND #234	;R3-BOARD 57/1 MASK	
2096	017664	010103			MOV R1,R3
2097	017666	010346			MOV R3,-(SP)
2098	017670	042716	000234		BIC #234,(SP)
2099	017674	042603			BIC (SP)+,R3
2100	017676		LET R4 := R1 AND #400	;R4-BOARD 23/3 MASK	
2101	017676	010104			MOV R1,R4
2102	017700	010446			MOV R4,-(SP)
2103	017702	042716	000400		BIC #400,(SP)
2104	017706	042604			BIC (SP)+,R4
2105	017710		LET R5 := SWAP R5		
2106	017710	000305			SWAB R5
2107	017712	004737	JSR PC,PAIRST	;SORT 57 AND 23 BOARDS,	RESULT IN R5 HI BYTE
2108	017716		LET R5 := SWAP R5	;ANALYZE R5 LO BYTE	
2109	017716	000305			SWAB R5
2110	017720		IF R5 EQ #1 THEN		
2111	017720	020527	000001		CMP R5,#1
2112	017724	001011			BNE 50043\$
2113	017726		PRINTB #FMTCH6	;CALL BAD 24/6	
2114	017726	012746	005174		MOV #FMTCH6,-(SP)
2115	017732	012746	000001		MOV #1,-(SP)
2116	017736	010600			MOV SP,R0
2117	017740	104414			TRAP C\$PNTB
2118	017742	062706	000004		ADD #4,SP
2119	017746		ELSE		
2120	017746	000432			BR 50044\$
2121	017750				50043\$:
2122	017750		IF R5 EQ #2 THEN		
2123	017750	020527	000002		CMP R5,#2
2124	017754	001011			BNE 50045\$
2125	017756		PRINTB #FMTCH5	;CALL BAD 24/5	
2126	017756	012746	005251		MOV #FMTCH5,-(SP)
2127	017762	012746	000001		MOV #1,-(SP)
2128	017766	010600			MOV SP,R0
2129	017770	104414			TRAP C\$PNTB
2130	017772	062706	000004		ADD #4,SP
2131	017776		ELSE		
2132	017776	000416			BR 50046\$
2133	020000				50045\$:
2134	020000		IF R5 EQ #3 THEN		
2135	020000	020527	000003		CMP R5,#3
2136	020004	001011			BNE 50047\$
2137	020006		PRINTB #FMTCH4	;CALL BAD 24/4	
2138	020006	012746	005326		MOV #FMTCH4,-(SP)
2139	020012	012746	000001		MOV #1,-(SP)
2140	020016	010600			MOV SP,R0
2141	020020	104414			TRAP C\$PNTB
2142	020022	062706	000004		ADD #4,SP
2143	020026		ELSE		
2144	020026	000402			BR 50050\$
2145	020030				50047\$:

```

2146 020030 005237 002432          INC TEMP1          ;TEPM1 NOT=0 WHEN NO BAD 24 WERE CALLED
2147 020034                          ENDIF
2148 020034                          50050$:
2149 020034                          ENDIF
2150 020034                          50046$:
2151 020034                          ENDIF
2152 020034                          50044$:
2153 020034          IF TEMP1 NE #0 THEN          ;IF NO BAD 24 BOARDS CALLED, CONTINUE SORT
2154 020034 005737 002432          TST          TEMP1
2155 020040 001465          BEQ          50051$
2156 020042          LET R1 := ACTRK1 OR ACTRK3          ;ANALYZE TRACK INACTIVE SUBTSTS RESULTS
2157 020042 013701 002406          MOV          ACTRK1,R1
2158 020046 053701 002412          BIS          ACTRK3,R1
2159 020052          IF R1 NE #0 THEN          ;R1 NOT=0, TRACK INACTIVE FAILED
2160 020052 065701          TST          R1
2161 020054 001430          BEQ          50052$
2162 020056          LET R1 := R5          ;SAVE R5
2163 020056 010501          MOV          R5,R1
2164 020060          LET R5 := R5 AND #3          ;KEEP 2 LSB'S
2165 020060 010546          MOV          R5,-(SP)
2166 020062 042716 000003          BIC          #3,(SP)
2167 020066 042605          BIC          (SP)+,R5
2168 020070 004737 020440          JSR PC,FMTSEL          ;CALL APPROPRIATE BAD 24
2169 020074          PRINTB #FMTCTR          ;CALL BAD 22
2170 020074 012746 005062          MOV          #FMTCTR,-(SP)
2171 020100 012746 000001          MOV          #1,-(SP)
2172 020104 010600          MOV          SP,R0
2173 020106 104414          TRAP          C$PNTB
2174 020110 062706 000004          ADD          #4,SP
2175 020114          LET R5 := SWAP R1          ;FETCH R5 HI BYTE
2176 020114 010105          MOV          R1,R5
2177 020116 000305          SWAB          R5
2178 020120          LET R5 := R5 AND #3          ;KEEP 2 LSB'S
2179 020120 010546          MOV          R5,-(SP)
2180 020122 042716 000003          BIC          #3,(SP)
2181 020126 042605          BIC          (SP)+,R5
2182 020130 004737 020562          JSR PC,RDCSEL          ;CALL APPROPRIATE BAD 57/23
2183 020134          ELSE          ;R1=0,TRACK INACTIVE DID NOT FAIL
2184 020134 000427          BR          50053$
2185 020136          50052$:
2186 020136          LET R1 := R5          ;SAVE R5
2187 020136 010501          MOV          R5,R1
2188 020140          LET R5 := SWAP R5
2189 020140 000305          SWAB          R5
2190 020142          LET R5 := R5 AND #3          ;KEEP 2 LSB'S OF HI BYTE
2191 020142 010546          MOV          R5,-(SP)
2192 020144 042716 000003          BIC          #3,(SP)
2193 020150 042605          BIC          (SP)+,R5
2194 020152 004737 020562          JSR PC,RDCSEL          ;CALL APPROPRIATE BAD 57/23
2195 020156          LET R5 := R1 AND #3          ;FETCH 2 LSB'S OF R5 LO BYTE
2196 020156 010105          MOV          R1,R5
2197 020160 010546          MOV          R5,-(SP)
2198 020162 042716 000003          BIC          #3,(SP)
2199 020166 042605          BIC          (SP)+,R5
2200 020170 004737 020440          JSR PC,FMTSEL          ;CALL APPROPRIATE BAD 24
2201 020174          PRINTB #FMTCTR          ;CALL BAD 22

```

2202 020174 012746 005062
2203 020200 012746 000001
2204 020204 010600
2205 020206 104414
2206 020210 062706 000004
2207 020214
2208 020214
2209 020214
2210 020214
2211 020214
2212 020214
2213 020214 000207

ENDIF
ENDIF
ENDIF
RTS PC

50053\$:
50051\$:
50042\$:

MOV #FMTCTR,-(SP)
MOV #1,-(SP)
MOV SP,RO
TRAP C\$PNTB
ADD #4,SP

```

2214
2215 ; TEST 5 - 7 -- MODULE SORT
2216
2217 020216 MSORT2:: IF R1 NE #0 THEN ;ERROR FROM 24 BOARDS, WHICH ONE?
2218 020216 005701 TST R1
2219 020220 001442 BEQ 50054$
2220 020222 LET R2 := R1 AND #7 ;R2=24/6 MASK
2221 020222 010102 MOV R1,R2
2222 020224 010246 MOV R2,-(SP)
2223 020226 042716 000007 BIC #7,(SP)
2224 020232 042602 BIC (SP)+,R2
2225 020234 LET R3 := R1 AND #70 ;R3=24/5 MASK
2226 020234 010103 MOV R1,R3
2227 020236 010346 MOV R3,-(SP)
2228 020240 042716 000070 BIC #70,(SP)
2229 020244 042603 BIC (SP)+,R3
2230 020246 LET R5 := R1 AND #700 ;R4=24/4 MASK
2231 020246 010105 MOV R1,R5
2232 020250 010546 MOV R5,-(SP)
2233 020252 042716 000700 BIC #700,(SP)
2234 020256 042605 BIC (SP)+,R5
2235 020260 LET R5 := #0 ;R5=22/7 FLAG
2236 020260 005005 CLR R5
2237 020262 004737 020372 JSR PC,PAIRST ;SOPT 22 AND 24 BOARDS
2238 020266 IF R5 EQ #0 THEN ;
2239 020266 005705 TST R5
2240 020270 001011 BNE 50055$
2241 020272 PRINTB #FMTCTR ;CALL 22/7
2242 020272 012746 005062 MOV #FMTCTR,-(SP)
2243 020276 012746 000001 MOV #1,-(SP)
2244 020302 010600 MOV SP,R0
2245 020304 104414 TRAP C$PNTB
2246 020306 062706 000004 ADD #4,SP
2247 020312 ELSE ;24 SELECTED, WHICH ONE?
2248 020312 000404 BR 50056$
2249 020314 50055$:
2250 020314 004737 020440 JSR PC,FMTSEL ;CALL APPROPRIATE 24
2251 020320 004737 020334 JSR PC,DTRCHK ;CHECK OR FUNCTION OF 22
2252 020324 ENDIF
2253 020324 50056$:
2254 020324 ELSE
2255 020324 000402 BR 50057$
2256 020326 50054$:
2257 020326 004737 020334 JSR PC,DTRCHK ;NO ERROR FROM 24, CHECK OR FUNCTION OF 22
2258 020332 ENDIF
2259 020332 50057$:
2260 020332 000207 RTS PC
2261
2262 ;CHECK DEAD TRACK ORING ON 22 BOARD
2263
2264 020334 DTRCHK: LET R1 := OR1DTR OR ORODTR ;GET OR DATA
2265 020334 013701 002374 MOV OR1DTR,R1
2266 020340 053701 002404 BIS ORODTR,R1
2267 020344 IF R1 NE #0 THEN
2268 020344 005701 TST R1
2269 020346 001410 BEQ 50060$

```


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SEQ 0090

2270	020350		
2271	020350	012746	005062
2272	020354	012746	000001
2273	020360	010600	
2274	020362	104414	
2275	020364	062706	000004
2276	020370		
2277	020370		
2278	020370	000207	

PRINTB #FMTCTR

;OR DATA BAD, CALL 22 BOARD

MOV	#FMTCTR,-(SP)
MOV	#1,-(SP)
MOV	SP,R0
TRAP	(SPNTB
ADD	#4,SP

ENDIF

50060\$:

RTS PC

```

2279      ;PAIR OF BOARDS SORTING SUBR
2280
2281      ;(R2)(R3) + (R2)(R4) + (R3)(R4) NEQ 0 ----> R5=0
2282
2283      ; R2 NEQ 0 ----> R5=1
2284      ; R3 NEQ 0 ----> R5=2
2285      ; R4 NEQ 0 ----> R5=3
2286
2287 020372      PAIRST: IF R2 NE #0 THEN
2288 020372      005702
2289 020374      001407
2290 020376
2291 020376      005703
2292 020400      001004
2293 020402      005704
2294 020404      001002
2295 020406
2296 020406      052705 000001
2297 020412
2298 020412
2299 020412
2300 020412      000411
2301 020414
2302 020414
2303 020414      005703
2304 020416      001405
2305 020420
2306 020420      005704
2307 020422      001002
2308 020424
2309 020424      052705 000002
2310 020430
2311 020430
2312 020430
2313 020430      000402
2314 020432
2315 020432
2316 020432      052705 000003
2317 020436
2318 020436
2319 020436
2320 020436
2321 020436      000207
2322
2323      ;FORMATTERS 24 SELECT
2324
2325      FMTSEL: SELECT R5 OF 3 VERIFY
2326 020440      010546
2327 020442      003403
2328 020444      021627 000003
2329 020450      003402
2330 020452
2331 020452      012716 000004
2332 020456
2333 020456      006316
2334 020460      000716

```

TST R2
 BEQ 50061\$
 TST R3
 BNE 50062\$
 TST R4
 BNE 50062\$
 BIS #1,R5
 50062\$:
 BR 50063\$
 50061\$:
 TST R3
 BEQ 50064\$
 TST R4
 BNE 50065\$
 BIS #2,R5
 50065\$:
 BR 50066\$
 50064\$:
 BIS #3,R5
 50066\$:
 50063\$:
 MOV R5, -(SP)
 BLE 50067\$
 CMP (SP), #3
 BLE 50070\$
 50067\$:
 MOV #4, (SP)
 50070\$:
 ASL (SP)
 ADD PC, (SP)

2335 020462 063607
 2336 020464
 2337 020464 000010
 2338 020466 000032
 2339 020470 000054
 2340 020472 000074
 2341 020474
 2342 020474
 2343 020474
 2344 020474 012746 005174
 2345 020500 012746 000001
 2346 020504 010600
 2347 020506 104414
 2348 020510 062706 000004
 2349 020514
 2350 020514 000421
 2351 020516
 2352 020516
 2353 020516 012746 005251
 2354 020522 012746 000001
 2355 020526 010600
 2356 020530 104414
 2357 020532 062706 000004
 2358 020536
 2359 020536 000410
 2360 020540
 2361 020540
 2362 020540 012746 005326
 2363 020544 012746 000001
 2364 020550 010600
 2365 020552 104414
 2366 020554 062706 000004
 2367 020560
 2368 020560
 2369 020560 000207
 2370
 2371
 2372
 2373 020562
 2374 020562 010546
 2375 020564 003403
 2376 020566 021627 000003
 2377 020572 003402
 2378 020574
 2379 020574 012716 000004
 2380 020600
 2381 020600 006316
 2382 020602 060716
 2383 020604 063607
 2384 020606
 2385 020606 000010
 2386 020610 000032
 2387 020612 000054
 2388 020614 000074
 2389 020616
 2390 020616

CASE 1
 PRINTB #FMTCH6
 CASE 2
 PRINTB #FMTCH5
 CASE 3
 PRINTB #FMTCH4
 ENDSELECT
 RTS PC
 ;READ CHANNEL 57/23 SELECT
 RDCSEL: SELECT R5 OF 3 VERIFY

CASE 1

50071\$: ADD @ (SP)+,PC
 .WORD 50075\$-50071\$
 .WORD 50074\$-50071\$
 .WORD 50073\$-50071\$
 .WORD 50072\$-50071\$
 50075\$:
 MOV #FMTCH6,-(SP)
 MOV #1,-(SP)
 MOV SP,R0
 TRAP C\$PNTB
 ADD #4,SP
 BR 50072\$
 50074\$:
 MOV #FMTCH5,-(SP)
 MOV #1,-(SP)
 MOV SP,R0
 TRAP C\$PNTB
 ADD #4,SP
 BR 50072\$
 50073\$:
 MOV #FMTCH4,-(SP)
 MOV #1,-(SP)
 MOV SP,R0
 TRAP C\$PNTB
 ADD #4,SP
 50072\$:
 MOV R5,-(SP)
 BLE 50076\$
 CMP (SP),#3
 BLE 50077\$
 50076\$:
 MOV #4,(SP)
 50077\$:
 ASL (SP)
 ADD PC,(SP)
 ADD @ (SP)+,PC
 50100\$:
 .WORD 50104\$-50100\$
 .WORD 50103\$-50100\$
 .WORD 50102\$-50100\$
 .WORD 50101\$-50100\$
 50104\$:

2391	020616			PRINTB	#RDCH2		
2392	020616	012746	005403			MOV	#RDCH2,-(SP)
2393	020622	012746	000001			MOV	#1,-(SP)
2394	020626	010600				MOV	SP,R0
2395	020630	104414				TRAP	C\$PNTB
2396	020632	062706	000004			ADD	#4,SP
2397	020636			CASE 2			
2398	020636	000421				BR	50101\$
2399	020640					50103\$:	
2400	020640			PRINTB	#RDCH1		
2401	020640	012746	005452			MOV	#RDCH1,-(SP)
2402	020644	012746	000001			MOV	#1,-(SP)
2403	020650	010600				MOV	SP,R0
2404	020652	104414				TRAP	C\$PNTB
2405	020654	062706	000004			ADD	#4,SP
2406	020660			CASE 3			
2407	020660	000410				BR	50101\$
2408	020662					50102\$:	
2409	020662			PRINTB	#RDCHP3		
2410	020662	012746	005521			MOV	#RDCHP3,-(SP)
2411	020666	012746	000001			MOV	#1,-(SP)
2412	020672	010600				MOV	SP,R0
2413	020674	104414				TRAP	C\$PNTB
2414	020676	062706	000004			ADD	#4,SP
2415	020702			ENDSELECT			
2416	020702					50101\$:	
2417	020702	000207		RTS	PC		

```
2418
2419      ;      TEST 9, 10 -- MODULE SORT
2420
2421      MSORT3:: LET R1 := @TSSR CLR.BY #TCFCMK ;GET TERMINATION AND FATAL CLASS CODES
2422      020704 017701 161314      MOV      @TSSR,R1
2423      020710 042701 177701      BIC      #TCFCMK,R1
2424      020714      IF R1 EQ #16 THEN      ;FC=0, TC=7
2425      020714 020127 000016      CMP      R1,#16
2426      020720 001075      BNE      50105$
2427      020722      ERRHRD 19,MICROE,MICERR
2428      020722 104456      TRAP     C$ERHRD
2429      020724 000023      .WORD   19
2430      020726 003561      .WORD   MICROE
2431      020730 014164      .WORD   MICERR
2432      020732      LET R1 := SWAP XSTAT3      ;INPUT MICRO CODE ERROR
2433      020732 013701 002274      MOV      XSTAT3,R1
2434      020736 000301      SWAB     R1
2435      020740      LET R1 := R1 CLR.BY #177400 ;KEEP 8 LSB'S
2436      020740 042701 177400      BIC      #177400,R1
2437      020744      IF R1 EQ #337 THEN
2438      020744 020127 000337      CMP      R1,#337
2439      020750 001011      BNE      50106$
2440      020752      PRINTB #COD337
2441      020752 012746 027256      MOV      #COD337,-(SP)
2442      020756 012746 000001      MOV      #1,-(SP)
2443      020762 010600      MOV      SP,R0
2444      020764 104414      TRAP     C$PNTB
2445      020766 062706 000004      ADD      #4,SP
2446      020772      ELSE
2447      020772 000450      BR       50107$
2448      020774      50106$:
2449      020774      IF R1 LOS #127 THEN
2450      020774 020127 000127      CMP      R1,#127
2451      021000 101034      BHI      50110$
2452      021002      LET R1 := R1 CLR.BY #177740
2453      021002 042701 177740      BIC      #177740,R1
2454      021006      LET R1 := R1 SHIFT 1      ;R1X2 FOR WORD ADDRESSING
2455      021006 006301      ASL     R1
2456      021010      LET R1 := R1 + #LOOKTB      ;INDEX INTO LOOK-UP TBL
2457      021010 062701 021116      ADD      #LOOKTB,R1
2458      021014      LET R2 := (R1) SHIFT 1      ;GET WORD OFFSET INTO CODTBL FROM LOOKTB
2459      021014 111102      MOV     (R1),R2
2460      021016 106302      ASLB    R2
2461      021020      LET R2 := R2 + #CODTBL      ;INDEX INTO CODTBL
2462      021020 062702 021176      ADD      #CODTBL,R2
2463      021024      LET R3 := SWAP (R1)      ;GET NO OF LINE TO PRINT
2464      021024 011103      MOV     (R1),R3
2465      021026 000303      SWAB    R3
2466      021030      LET R3 := R3 AND #377      ;FROM LOOKTB
2467      021030 010346      MOV     R3,-(SP)
2468      021032 042716 000377      BIC     #377,(SP)
2469      021036 042603      BIC     (SP)+,R3
2470      021040      REPEAT
2471      021040      50111$:
2472      021040      PRINTB (R2)      ;PRINT CURRENT LINE
2473      021040 011246      MOV     (R2),-(SP)
```

2474	021042	012746	000001			MOV	#1,-(SP)
2475	021046	010600				MOV	SP,R0
2476	021050	104414				TRAP	C\$PNTB
2477	021052	062706	000004			ADD	#4,SP
2478	021056			LET R2 := R2 + #2	; THEN THE NEXT,		
2479	021056	062702	000002			ADD	#2,R2
2480	021062			LET R3 := R3 - #1	; IF ANY		
2481	021062	005303				DEC	R3
2482	021064			UNTIL R3 EQ #0			
2483	021064	005703				TST	R3
2484	021066	001364				BNE	50111\$
2485	021070			ELSE			
2486	021070	000411				BR	50112\$
2487	021072						50110\$:
2488	021072			PRINTB #CODXXX,R1			
2489	021072	010146				MOV	R1,-(SP)
2490	021074	012746	027220			MOV	#CODXXX,-(SP)
2491	021100	012746	000002			MOV	#2,-(SP)
2492	021104	010600				MOV	SP,R0
2493	021106	104414				TRAP	C\$PNTB
2494	021110	062706	000006			ADD	#6,SP
2495	021114			ENDIF			50112\$:
2496	021114						
2497	021114			ENDIF			50107\$:
2498	021114						
2499	021114			ENDIF			50105\$:
2500	021114						
2501	021114	000207		RTS PC			
2502							

2503 ;MICRO DIAG ERROCR CODE LOOKUP TABLE
2504 ;COD00 THRU COD27
2505 ;COD22, COD23, COD30 AND ABOVE, ARE UNDEFINED

2506				LOOKTB: .BYTE	0,3
2507	021116	000	003	.BYTE	3,2
2508	021120	003	002	.BYTE	5,1
2509	021122	005	001	.BYTE	6,2
2510	021124	006	002	.BYTE	10,2
2511	021126	010	002	.BYTE	12,1
2512	021130	012	001	.BYTE	13,1
2513	021132	013	001	.BYTE	14,1
2514	021134	014	001	.BYTE	15,3
2515	021136	015	003	.BYTE	20,3
2516	021140	020	003	.BYTE	23,2
2517	021142	023	002	.BYTE	25,3
2518	021144	025	003	.BYTE	30,4
2519	021146	030	004	.BYTE	34,4
2520	021150	034	004	.BYTE	40,4
2521	021152	040	004	.BYTE	44,3
2522	021154	044	003	.BYTE	47,2
2523	021156	047	002	.BYTE	51,2
2524	021160	051	002	.BYTE	53,1
2525	021162	053	001	.BYTE	54,1
2526	021164	054	001	.BYTE	55,2
2527	021166	055	002	.BYTE	57,3
2528	021170	057	003	.BYTE	62,3
2529	021172	062	003	.BYTE	65,3
2530	021174	065	003	.BYTE	65,3

2531 :
2532 :
2533 :
2534 :
! -----> NO OF LINES TO PRINT, IN HI BYTE (ODD,
-----> OFFSET IN CODTBL, IN LO BYTE (EVEN)

```

2535 ;MICRO CODE ERROR AD TABLE
2536
2537 021176 021356 021464 021551 COD1BL: .WORD COD00,COD00A,COD00B ;0 3
2538 021204 021633 021732 .WORD COD01,COD01A ;3 2
2539 021210 021754 .WORD COD02 ;5 1
2540 021212 022047 022155 .WORD COD03,COD03A ;6 2
2541 021216 022233 022341 .WORD COD04,COD04A ;10 2
2542 021222 022370 .WORD COD05 ;12 1
2543 021224 022467 .WORD COD06 ;13 1
2544 021226 022564 .WORD COD07 ;14 1
2545 021230 022655 022763 023065 .WORD COD10,COD10A,COD10B ;15 3
2546 021236 023116 023201 023265 .WORD COD11,COD11A,COD11B ;20 3
2547 021244 023365 023470 .WORD COD12,COD12A ;23 2
2548 021250 023550 023647 023721 .WORD COD13,COD13A,COD13B ;25 3
2549 021256 024001 024103 024163 .WORD COD14,COD14A,COD14B,COD14C ;30 4
2550 021264 024236
2551 021266 024316 024417 024503 .WORD COD15,COD15A,COD15B,COD15C ;34 4
2552 021274 024557
2553 021276 024637 024741 025021 .WORD COD16,COD16A,COD16B,COD16C ;40 4
2554 021304 025103
2555 021306 025163 025267 025346 .WORD COD17,COD17A,COD17B ;44 3
2556 021314 025426 025534 .WORD COD20,COD20A ;47 2
2557 021320 025634 025742 .WORD COD21,COD21A ;51 2
2558 021324 025770 .WORD COD22 ;53 1
2559 021326 026025 .WORD COD23 ;54 1
2560 021330 026062 026170 .WORD COD24,COD24A ;55 2
2561 021334 026226 026334 026410 .WORD COD25,COD25A,COD25B ;57 3
2562 021342 026505 026570 026644 .WORD COD26,COD26A,COD26B ;62 3
2563 021350 026741 027047 027123 .WORD COD27,COD27A,COD27B ;65 3
2564 :
2565 :
2566 :OFFSET INTO THIS TABLE <-----
2567 :NO OF .WORDS NO OF LINES TO PRINT <-----

```


2568
2569
2570

:MICRO CODE ERROR MSGS

Address	Offset	Code	Label	Description	Frequency
021356	040445	030061	020060	COD00: .ASCIZ /%A100 BASIC IO MICRO FAIL:PAR ERR, IOATN,HANDSHAKE, M8967(12)	14%N/
021464	040445	020040	020040	COD00A: .ASCIZ /%A DATA WINDOW TEST BETWEEN IO AND MAIN MICROS,%N/	
021551	045	020101	020040	COD00B: .ASCIZ /%A SERIAL BUS.SHIN (SHIFT IN) STUCK TRUE,...%N/	
021633	045	030501	030460	COD01: .ASCIZ /%A101 ERROR IN IO CONTROL REGISTER TEST%S13%AM8966(14)	15%N/
021732	051445	030065	040445	COD01A: .ASCIZ /%S50%AM8967(12)%N/	
021754	040445	030061	020062	COD02: .ASCIZ /%A102 FAILURE OF FRAME COUNTER TEST%S17%AM8966(14)	15%N/
022047	045	030501	031460	COD03: .ASCIZ /%A103 FAILURE OF IO SILO NON-PARITY ERROR DATA	M8966(14) 16%N/
022155	045	020101	020040	COD03A: .ASCIZ /%A TEST OR THE WRITE FLAG%S24%AM8963(11)%N/	
022233	045	030501	032060	COD04: .ASCIZ /%A104 FAILURE OF IO SILO PARITY ERROR TEST OR	M8966(14) 17%N/
022341	045	020101	020040	COD04A: .ASCIZ /%A DATA LATE TEST%N/	
022370	040445	030061	020065	COD05: .ASCIZ /%A105 FAILURE OF SHIFT LOOP WITH ZEROES%S13%AM8965(15)	20%N/
022467	045	030501	033060	COD06: .ASCIZ /%A106 FAILURE OF SHIFT LOOP WITH ONES%S15%AM8965(15)	21%N/
022564	040445	030061	020067	COD07: .ASCIZ /%A107 FAILURE OF SHIFT LENGTH MUX%S19%AM8965(15)	22%N/
022655	045	030501	030061	COD10: .ASCIZ /%A110 FAILURE TO RECEIVE CORRECT OP-CODE FROM TS1!	M8965(15) 47%N/
022763	045	020101	020040	COD10A: .ASCIZ /%A WHEN DATA SENT OVER THE SERIAL BUS%S12%ATS11,MOTHER BOARD%N/	
023065	045	032523	022460	COD10B: .ASCIZ /%S50%ASERIAL BUS CABLE%N/	
023116	040445	030461	020061	COD11: .ASCIZ /%A111 FAILURE OF 1KHZ CLOCK TEST%S20%AG159%S9%A2%N/	
023201	045	020101	020040	COD11A: .ASCIZ /%A TSTS TAC SYNC FLOP AND ATTN%S19%ACBUS CABLE%N/	
023265	045	041501	042510	COD11B: .ASCIZ /%ACHECK TACH PHASE,SKEW,SPEED ADJUSTS ON G159	M8963(11)%N/
023365	045	030501	031061	COD12: .ASCIZ /%A112 LIGHT REG CHANGED WHEN MOTION REG WAS CLEARED G159%S9%A3,4%N/	
023470	040445	044103	041505	COD12A: .ASCIZ /%ACHECK TACH PHASE,SKEW,SPEED ADJUSTS ON G159%N/	
023550	040445	030461	020063	COD13: .ASCIZ /%A113 FWD OR MVG BITS WRONG AFTER 1 TICK OF%S9%AG159%S9%A3,4%N/	
023647	045	020101	020040	COD13A: .ASCIZ /%A SIMULATED COMMAND AND TACH PULSES%N/	
023721	045	041501	042510	COD13B: .ASCIZ /%ACHECK TACH PHASE,SKEW,SPEED ADJUSTS ON G159%N/	
024001	045	030501	032061	COD14: .ASCIZ /%A114 FAILURE OF SIMULATED CAPSTAN SPEED TEST:%S6%AG159%S9%A3,4%N/	
024103	045	020101	020040	COD14A: .ASCIZ /%A CAPSTAN SPEED COUNTER OUT OF RANGE WHEN%N/	
024163	045	020101	020040	COD14B: .ASCIZ /%A TAPE MOTION AT SPEED WAS SIMULATED%N/	
024236	040445	044103	041505	COD14C: .ASCIZ /%ACHECK TACH PHASE,SKEW,SPEED ADJUSTS ON G159%N/	
024316	040445	030461	020065	COD15: .ASCIZ /%A115 FAILURE OF SIMULATED SLOW CAPSTAN TEST:%S7%AG159%S9%A3,4%N/	
024417	045	020101	020040	COD15A: .ASCIZ /%A SPEED COUNTER NOT LATCHED UP WITH MAX COUNT%N/	
024503	045	020101	020040	COD15B: .ASCIZ /%A WHEN SLOW TACK TICKS WERE SIMULATED%N/	
024557	045	041501	042510	COD15C: .ASCIZ /%ACHECK TACH PHASE,SKEW,SPEED ADJUSTS ON G159%N/	
024637	045	030501	033061	COD16: .ASCIZ /%A116 FAILURE OF SIMULATED CAPSTAN DECEL TEST:%S6%AG159%S9%A3,4%N/	
024741	045	020101	020040	COD16A: .ASCIZ /%A COUNTER NOT ZERO FOR FORWARD OR 377 FOR%N/	
025021	045	020101	020040	COD16B: .ASCIZ /%A REVERSE WHILE DECELERATING OR MVG BIT-0%N/	
025103	045	041501	042510	COD16C: .ASCIZ /%ACHECK TACH PHASE,SKEW,SPFED ADJUSTS ON G159%N/	
025163	045	030501	033461	COD17: .ASCIZ /%A117 FAILURE OF MOVING FLOP TO RESET AFTER STOP%S4%AG159%S9%A3,4%N/	
025267	045	020101	020040	COD17A: .ASCIZ /%A (DIRECTION REVERSAL FOR ONE TACH TICK)%N/	
025346	040445	044103	041505	COD17B: .ASCIZ /%ACHECK TACH PHASE,SKEW,SPEED ADJUSTS ON G159%N/	
025426	040445	031061	020060	COD20: .ASCIZ /%A120 FAILURE OF WRITE BOARD TO TURN ON AND EMPTY	M8929(13) 23%N/
025534	040445	020040	020040	COD20A: .ASCIZ /%A THE SILO OR DATA LATE BIT NOT WORKING	M8966(14)%N/
025634	040445	031061	020061	COD21: .ASCIZ /%A121 FAILURE OF WRITE BOARD TO EMPTY SILO AT	M8929(13) 23%N/
025742	040445	020040	020040	COD21A: .ASCIZ /%A CORRECT SPEED%N/	
025770	040445	031061	020062	COD22: .ASCIZ /%A122 UNDEFINED ERROR CODE%N/	
026025	045	030501	031462	COD23: .ASCIZ /%A123 UNDEFINED ERROR CODE%N/	
026062	040445	031061	020064	COD24: .ASCIZ /%A124 FORMATTER CTRL BOARD: FORMATTER FLAG FAILED	M8922(7) 24%N/
026170	040445	044103	041505	COD24A: .ASCIZ /%ACHECK VCO ADJUST ON M8922%N/	
026226	040445	031061	020065	COD25: .ASCIZ /%A125 FORMATTER SILO FILLING AND DATA ERROR	M8922(7) 24%N/
026334	040445	044103	041505	COD25A: .ASCIZ /%ACHECK VCO ADJUST ON M8922%S25%AM8923(3)%N/	
026410	040445	044103	041505	COD25B: .ASCIZ /%ACHECK SKEW, THRESHOLD ADJUSTS ON M8923%S12%AM8924(4,5,6)%N/	
026505	045	030501	033062	COD26: .ASCIZ /%A126 PEAK SHIFT TEST ERROR%S25%AM8922(7)%S5%A25%N/	
026570	040445	044103	041505	COD26A: .ASCIZ /%ACHECK VCO ADJUST ON M8922%S25%AM8923(3)%N/	
026644	040445	044103	041505	COD26B: .ASCIZ /%ACHECK SKEW, THRESHOLD ADJUSTS ON M8923%S12%AM8924(4,5,6)%N/	

026741 045 030501 033462 COD27: .ASCIZ /%A127 FORMATTER TABLE LOOKUP ROM CHECKSUM TEST ERR M8922(7) 26%N/
027047 045 041501 042510 COD27A: .ASCIZ /%ACHECK VCO ADJUST ON M8922%S25%AM8923(3)%N/
027123 045 041501 042510 COD27B: .ASCIZ /%ACHECK SKEW, THRESHOLD ADJUSTS ON M8923%S12%AM8924(4,5,6)%N/

027220 047445 022463 020101 CODXXX: .ASCIZ /%O3%A UNDEFINED ERROR CODE%N/
027256 040445 031463 020067 COD337: .ASCIZ /%A337 CAPSTAN RUNAWAY%N/

2571
2572
2573 027310
2574
2575
2576
2577
2578
2579
2580
2581
2582 027310
2583 027310
2584 027310 000000
2585 027312 177777
2586 027314 177777
2587 027316

.LIST BEX
.EVEN
ENDMOD
.SBTTL LOAD DEV PROTECTION TABLE
:++
:TABLE FOR SUPERVISOR TO IDENTIFY P-TBL FOR LOAD DEV
:AND TO WARN OPERATOR WHEN HE TRIES TO TEST THE LOAD DEVICE
:--
BGNPRCT
L\$PROT::
.WORD 0 ;P-TBL OFFSET OF TSSR
.WORD -1 ;P-TBL OFFSET OF MASS BUS UNIT#: -1 - NOT A MASS BUS DEV
.WORD -1 ;P-TBL OFFSET OF DRIVE #: -1 - NONE, ONE DRIVE PER UNIBU
ENDPROT


```

2644 027436 104442
2645 027440
2646 027440 103362
2647 027442 011037 002224
2648 027446 013737 002224 002214
2649 027454 162737 000002 002214
2650 027462 013737 002214 002220
2651 027470 013737 002220 002222
2652 027476 062737 000001 002222
2653 027504 013737 002214 002216
2654 027512 062737 000001 002216
2655 027520 016037 000002 002226
2656 027526
2657 027526 013705 027574
2658 027532 006305
2659 027534
2660 027534 012746 000340
2661 027540 016546 002306
2662 027544 013746 002226
2663 027550 012746 000003
2664 027554 104437
2665 027556 062706 000010
2666 027562
2667 027562 013737 027574 002422
2668 027570
2669 027570 104432
2670 027572 000004
2671
2672
2673
2674 027574 000000
2675
2676
2677
2678 027576
2679 027576
2680 027576 104411
2681
2682
2683
2684
2685
2686
2687
2688
2689 027600
2690 027600
2691
2692 027600
2693 027600 105037 030050
2694 027604
2695 027604 012746 000340
2696 027610 012746 030042
2697 027614 012746 000004
2698 027620 012746 000003
2699 027624 104437

      TRAP      C$GPHRD
      BCC      3$
      ;BR IF THIS UNIT HAS BEEN DROPPED.
      ;GET THE TSSR ADDR.
      ;CALCULATE THE
      ;TSDB ADDRESS.
      ;LOAD TSBA ADDRESS.
      ;CALCULATE THE TSBA
      ;HI BYTE ADDRESS.
      ;CALCULATE THE
      ;TSDB HI BYTE ADDR.
      ;GET THE VECTOR ADDRESS.
      ;GET LOGICAL UNIT # X 2.
      MOV      LUNIT,R5
      ASL
      ;SET UP INTERRUPT PROCESSING CONDITIONS.
      MOV      #INTPRI,-(SP)
      MOV      TS4INT(R5),-(SP)
      MOV      TSVCT,-(SP)
      MOV      #3,-(SP)
      TRAP      C$SVEC
      ADD      #10,SP
      LET UNIT := LUNIT
      ;SET UP UNIT # FOR PRINTOUTS.
      MOV      LUNIT,UNIT
      TRAP      C$EXIT
      .WORD    L10031-.
      ; LOCAL STORAGE THAT IS USED ONLY DURING THE INITIALIZE SECTION.
      LUNIT: .WORD 0
      ;CURRENT LOGICAL UNIT #.
      .EVEN
      ENDINIT
      L10031:
      .SBTTL  AUTO DROP SECTION
      TRAP      C$INIT
      ;++
      ;SECTION EXECUTED AFTER THE INI CODE WHEN 'ADR' FLAG IS SET BY OPERATOR
      ;SECTION CHECKS FOR A VALID INTERFACE LOCATION. DROPS UNIT IF NO RESPONSE
      ;FROM INTERFACE
      ;--
      BGNAUTO
      L$AUTO::
      LET TRAPD4 :B= #0
      CLR      TRAPD4
      SETVEC #4,#TRAP4,#PRI07
      MOV      #PRI07,-(SP)
      MOV      #TRAP4,-(SP)
      MOV      #4,-(SP)
      MOV      #3,-(SP)
      TRAP      C$SVEC
  
```

```

2700 027626 062706 000010          ADD      #10,SP
2701 027632          LET R1 := @TSSR          MOV      @TSSR,R1
2702 027632 017701 152366          CLRVEC #4          MOV      #4,R0
2703 027636          IFB TRAPD4 NE #0 THEN TRAP     C$CVEL
2704 027636 012700 000004          TSTB     TRAPD4
2705 027642 104436          BEQ      50114$
2706 027644          PRINTF #AUTODM,TSSR          MOV      TSSR,-(SP)
2707 027644 105737 030050          MOV      #AUTODM,-(SP)
2708 027650 001415          PRINTF #AUTODM,TSSR          MOV      #2,-(SP)
2709 027652          JSR PC,DROPU          MOV      SP,R0
2710 027652 013746 002224          ELSE          TRAP     C$PNTF
2711 027656 012746 027746          TRAP     C$CVEL
2712 027662 012746 000002          JSR PC,DROPU
2713 027666 010600          ELSE          ADD      #6,SP
2714 027670 104417          IF #TS.SSR NOTSETIN @TSSR THEN          BR      50115$
2715 027672 062706 000006          PRINTF #SSROFF,UNIT          BIT      #TS.SSR,@TSSR
2716 027676 004737 014570          JSR PC,DROPU          BNE     50116$
2717 027702          ENDIF          MOV      UNIT,-(SP)
2718 027702 000420          PRINTF #SSROFF,UNIT          MOV      #SSROFF,-(SP)
2719 027704          JSR PC,DROPU          MOV      #2,-(SP)
2720 027704          ELSE          MOV      SP,R0
2721 027704 032777 000200 152312          TRAP     C$PNTF
2722 027712 001014          JSR PC,DROPU          ADD      #6,SP
2723 027714          ENDIF          BR      50116$
2724 027714 013746 002422          PRINTF #SSROFF,UNIT          BR      50115$
2725 027720 012746 002566          JSR PC,DROPU
2726 027724 012746 000002          ENDIF
2727 027730 010600          ENDIF
2728 027732 104417          ENDAUTO
2729 027734 062706 000006          L10032:
2730 027740 004737 014570          TRAP     C$AUTO
2731 027744          ENDIF
2732 027744          ENDAUTO
2733 027744          ENDAUTO
2734 027744          ENDAUTO
2735          ENDAUTO
2736 027744          ENDAUTO
2737 027744          ENDAUTO
2738 027744 104461          ENDAUTO
2739          ENDAUTO
2740 027746 040445 052502 020123  AUTODM: .ASCII /%ABUS TRAP AT %06%/
2741 027754 051124 053101 040440
2742 027762 020124 047445 022466
2743 027770 116
2744 027771 045 044501 052116 .ASCIIZ /%AINTERFACE BAD OR NOT SET TO ABOVE AD%/
2745 027776 051105 040506 042503
2746 030004 041040 042101 047440
2747 030012 020122 047516 020124
2748 030020 042523 020124 047524
2749 030026 040440 047502 042526
2750 030034 040440 022504 000116
2751          .EVEN
2752          :
2753          : DEVICE BUS TRAP HANDLER
2754          : OUTPUT: TRAPD4 BYTE 1: TRAPED AT 4
2755          : 0: NO TRAP

```

```
2756  
2757 030042 TRAP4: LET TRAPD4 :B= TRAPD4 + #1  
2758 030042 105237 030050 INCB TRAPD4  
2759 030046 000002 RTI  
2760  
2761 030050 000 TRAPD4: .BYTE 0 ;TRAPED AT 4 FLAG  
2762 030052 .EVEN  
2763
```

```
2764 .SBTTL CLEANUP CODING SECTION
2765
2766
2767 :++
2768 : THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
2769 : AT THE END OF EACH PASS.
2770 :--
2771 030052 BGNCLN
2772 030052 L$CLEAN::
2773
2774 030052 CLRVEC TSVCT ;RELEASE THE INTERRUPT VECTOR.
2775 030052 013700 002226 MOV TSVCT,RO
2776 030056 104436 TRAP C$CVEC
2777 030060 SETPRI PRI07
2778 030060 013700 000340 MOV PRI07,RO
2779 030064 104441 TRAP C$SPRI
2780
2781 030066 EXIT CLN
2782 030066 104432 TRAP C$EXIT
2783 030070 000002 .WORD L10033-.
2784
2785
2786 .EVEN
2787
2788 030072 ENDCLN
2789 030072 L10033:
2790 030072 104412 TRAP C$CLEAN
```

```
2791 .SBTTL DROP UNIT SECTION
2792
2793 :++
2794 : THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
2795 : TO NO LONGER BE TESTED.
2796 :--
2797
2798 030074 BGNDU
2799 030074 L$DU::
2800
2801
2802 030074 000240 NOP
2803 030076 000240 NOP
2804 030100 000240 NOP
2805 030102 000240 NOP
2806
2807 030104 EXIT DU
2808 030104 000167 .WORD JSJMP
2809 030106 000000 .WORD L10034-2-.
2810
2811
2812 .EVEN
2813
2814 030110 ENDDU
2815 030110 L10034:
2816 030110 104453 TRAP C$DU
```


2817
2818
2819
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2833
2834
2835
2836
2837
2838
2839
2840
2841
2842
2843
2844
2845
2846

030112
030112

030112 000240
030114 000240
030116 000240
030120 000240

030122
030122 000167
030124 000000

030126
030126
030126 104452

030130

.SBTTL ADD UNIT SECTION

;++
: THE ADD-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
: TO BE (A) TESTED FOR THE FIRST TIME, OR (B) RESUMED IN TESTING. IF
: 'EF.AUNIT' IS SET, THE UNIT WILL BE TESTED AS A NEW UNIT.
:--

EGNAU
L\$AU::

NOP
NOP
NOP
NOP

EXIT AU

.WORD JSJMP
.WORD L10035-2-

.EVEN

ENDAU
L10035:

TRAP CSAU

ENDMOD

```

2847 .TITLE HARDWARE TESTS
2848
2849 .SBTTL TEST 1: PDP11/TS11 WRAP TEST.
2850 030130 BGNMOD
2851
2852 :++
2853 : TEST TO INSURE PROPER COMMUNICATION BETWEEN THE PDP11 AND THE TS11 BY
2854 : WRAPPING THE FOLLOWING PATTERNS:
2855 : A 1 IN A FIELD OF 0'S; A 0 IN A FIELD OF 1'S.
2856
2857 : WHEN DATA IS WRITTEN TO THE TSDB HI BYTE, THE DATA IS WRAPPED
2858 : AROUND WITHIN THE TS11 AND APPEARS IN THE TSBA LO
2859 : AND HI BYTES. THE 2 LOW ORDER BITS OF THE DATA WILL BE
2860 : REFLECTED IN THE TSSR EXTENDED ADDRESS BITS.
2861 : R4 CONTAINS A COPY OF THE DATA SENT.
2862 : R3 CONTAINS THE EXPECTED TSBA RESULTS
2863 : R2 CONTAINS THE EXPECTED STATE OF THE TWO EXTENDED ADDRESS
2864 : BITS IN THE TSSR.
2865 :--
2866
2867
2868
2869 030130 BGNTST
2870 030130 T1::
2871
2872 030130 BGNSUB
2873 030130 T1.1:
2874 030130 104402 TRAP CSBSUB
2875 030132 BGNSEG TRAP CSBSEG
2876 030132 104404 ;RESET THE BUS. TRAP CSRESET
2877 030134 BRESET
2878 030134 104433 IF #TS.SSR SETIN @TSSR THEN
2879 030136 BIT #TS.SSR,@TSSR
2880 030136 032777 000200 152060 BEQ 50117$
2881 030144 001416
2882 030146 ERRDF 29,SSRON TRAP CSERDF
2883 030146 104455 .WORD 29
2884 030150 000035 .WORD SSRON
2885 030152 002623 .WORD 0
2886 030154 000000
2887 030156 PRINTB #TS11BD MOV #TS11BD,-(SP)
2888 030156 012746 005037 MOV #1,-(SP)
2889 030162 012746 000001 MOV SP,R0
2890 030166 010600 TRAP CS$PNTB
2891 030170 104414 ADD #4,SP
2892 030172 062706 000004 CALL DROPU JSR PC,DROPU
2893 030176 CALL DROPU
2894 030176 004737 014570 JSR PC,DROPU
2895 030202 ENDIF
2896 030202 50117$.
2897 030202 ENDSEG
2898 030202 10000$:
2899 030202 104405 TRAP CSESEG
2900 030204 CALL WAITSR JSR PC,WAITSR
2901 030204 004737 014616
2902 030210 ENDSUB
  
```

```

2903 030210 L10037:
2904 030210 104403 TRAP C$ESUB
2905 030212 012704 000200 MOV #200,R4 ;INIT THE DATA.
2906 ;REPEAT FOLLOWING UNTIL DATA ALL SHIFTED
2907 030216 005002 T1DATA: CLR R2 ;R2 WILL HOLD X ADDR BITS.
2908 030220 032704 000001 BIT #BIT0,R4 ;BIT 0 SET IN DATA?
2909 030224 001402 BEQ 1$ ;BR IF NOT.
2910 030226 052702 000400 BIS #TS.XA0,R2 ;IF SO SET THE BIT.
2911 030232 032704 000002 1$: BIT #BIT1,R4 ;BIT 1 SET IN DATA?
2912 030236 001402 BEQ 2$ ;BR IF NOT.
2913 030240 052702 001000 BIS #TS.XA1,R2 ;IF SO SET THE BIT.
2914 ;R2 NOW CONTAINS THE EX ADDR BITS
2915 ;EXPECTED IN THE TSSR.
2916 030244 005003 2$: CLR R3 ;CLR TSBA EXP RESULTS REG.
2917 030246 150403 BISB R4,R3 ;SETUP R3 TO LOOK LIKE
2918 030250 000303 SWAB R3 ;THE TSBA (EXPECTED RESULTS).
2919 030252 150403 BISB R4,R3 ;R3 NOW CONTAINS THE TSBA EXPECTED RESULTS.
2920 030254 BGNSUB
2921 030254 T1.2:
2922 030254 104402 TRAP C$BSUB
2923 030256 BCNSEG
2924 030256 104404 TRAP C$BSEG
2925 030260 004737 014616 JSR PC,WAITSR ;GO WAIT FOR SSR BIT TO SET.
2926 030264 IF #TS.SSR SET IN @TSSR THEN
2927 030264 032777 000200 151732 BIT #TS.SSR,@TSSR
2928 030272 001402 BEQ 50120$
2929 030274 004737 030332 JSR PC,T1WRAP
2930 030300 ENDIF
2931 030300 50120$:
2932 030300 ENDSEG
2933 030300 10000$:
2934 030300 104405 TRAP C$ESEG
2935 030302 005077 151716 CLR @TSSR ;SUBSYSTEM INIT.
2936 030306 CALL WAITSR
2937 030306 004737 014616 JSR PC,WAITSR
2938 030312 CALL SHWRAP JSR PC,SHWRAP
2939 030312 004737 016020 JSR PC,SHWRAP
2940 030316 ENDSUB
2941 030316 L10040:
2942 030316 104403 TRAP C$ESUB
2943 030320 120427 000377 CMPB R4,#377
2944 030324 001334 BNE T1DATA
2945
2946 030326 EXIT TST
2947 030326 104432 TRAP C$EXIT
2948 030330 000132 .WORD L10036-
2949
2950 ;TEST 1 SUBR TO WRAP AND CHECK DATA
2951 030332 110477 151660 T1WRAP: MOV R4,@TSDBHI ;SEND THE DATA.
2952 030336 DELAY 10. ;GO TO SUPERVISOR, WAIT 1 MSEC.
2953 030336 012727 000012 MOV #10.,(PC)+
2954 030342 000000 .WORD 0
2955 030344 013727 002116 MOV LSDLY,(PC)+
2956 030350 000000 .WORD 0
2957 030352 005367 177772 DEC -6(PC)
2958 030356 001375 BNE .-4

```

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2959 030360 005367 177756
2960 030364 001367
2961 030366 017737 151626 002432      MOV @TSBA,TEMP1      ;SAVE THE TSBA REG.
2962 030374
2963 030374 020337 002432      IF R3 NE TEMP1 THEN
2964 030400 001406
2965 030402      ERRDF 3,WRPER1,WRAPR1
2966 030402 104455
2967 030404 000003
2968 030406 002706
2969 030410 006044
2970 030412      CALL DROPU
2971 030412 004737 014570
2972 030416      ENDIF
2973 030416
2974 030416 017737 151602 002434      MOV @TSSR,TEMP2      ;GET TSSR.
2975 030424 012701 001400      MOV #TS.XA0!TS.XA1,R1 ;MASK OFF THE XADDR BITS.
2976 030430 005101      COM R1                ;BIT CLR ALL BUT THE
2977 030432 040137 002434      BIC R1,TEMP2          ;EXTENDED ADDR BITS.
2978 030436
2979 030436 020237 002434
2980 030442 001406
2981 030444      ERRDF 4,WRPER2,WRAPR4
2982 030444 104455
2983 030446 000004
2984 030450 002740
2985 030452 006544
2986 030454      CALL DROPU
2987 030454 004737 014570
2988 030460      ENDIF
2989 030460
2990 030460 000207      RTS PC
2991
2992
2993
2994
2995
2996      .EVEN
2997
2998 030462      L10036:      ENDTST
2999 030462
3000 030462 104401      TRAP CSETST
3001

```

```
3002 .SBITL TEST 2: PDP11/TS04 WRAP TEST.
3003
3004 : TEST TO INSURE PROPER COMMUNICATION BETWEEN THE PDP11 AND
3005 : THE TS04 BY WRAPPING THE FOLLOWING PATTERN:
3006 : A 1 IN A FIELD OF 0'S; A 0 IN A FIELD OF 1'S
3007
3008 : WHEN THE DATA IS WRITTEN TO THE TSDB LO BYTE, THE DATA IS
3009 : SENT TO THE TS04, VIA THE SERIAL LINE, WHERE IT IS WRAPPED
3010 : AROUND BACK OVER THE SERIAL LINE TO THE TS11. THE DATA THEN
3011 : APPEARS IN THE TSBA LO AND TSSR LO BYTES.
3012 : R4 CONTAINS THE EXPECTED TSBA RESULTS AND THE
3013 : EXPECTED TSSR RESULTS.
3014
3015 030464 BGNTST
3016 030464 T2::
3017
3018 030464 012704 000200 MOV #200,R4 ;INIT THE DATA.
3019 ;REPEAT FOLLOWING UNTIL DATA ALL SHIFTED
3020 030470 005077 151530 T2WRAP: CLR @TSSR
3021 030474 CALL WAITSR
3022 030474 004737 014616 JSR PC,WAITSR
3023 030500 032777 000200 151516 BIT #TS.SSR,@TSSR
3024 030506 001452 BEQ T2SHFT
3025 030510
3026 030510 T2.1: BGNSUB
3027 030510 104402 TRAP CSBSUB
3028 030512 110477 151476 MOVB R4,@TSDB ;SEND DATA.
3029 030516 DELAY 10. ;GO TO SUPERVISOR, WAIT 1 MSEC.
3030 030516 012727 000012 MOV #10.,(PC)+
3031 030522 000000 .WORD 0
3032 030524 013727 002116 MOV L$DLY,(PC)+
3033 030530 000000 .WORD 0
3034 030532 005367 177772 DEC -6(PC)
3035 030536 001375 BNE -4
3036 030540 005367 177756 DEC -22(PC)
3037 030544 001367 BNE -20
3038 030546 017737 151446 002432 MOV @TSBA,TEMP1 ;SAVE TSBA.
3039 030554 IFB TEMP1 NE R4 THEN
3040 030554 123704 002432 CMPR TEMP1,R4
3041 030560 001406 BEC 50123$
3042 030562 ERRDF 5,WRPER3,WRAPR2
3043 030562 104455 TRAP CSERDF
3044 030564 000005 .WORD 5
3045 030566 003015 .WORD WRPER3
3046 030570 006220 .WORD WRAPR2
3047 030572 CALL DROPU
3048 030572 004737 014570 JSR PC,DROPU
3049 030574 ENDF
3050 030576
3051 030576 017737 151422 002434 MOV @TSSR,TEMP2 ;SAVE TSSR.
3052 030604 IFB TEMP2 NE R4 THEN
3053 030604 123704 002434 CMPB TEMP2,R4
3054 030610 001406 BEQ 50124$
3055 030612 ERRDF 6,WRPER3,WRAPR3
3056 030612 104455 TRAP CSERDF
3057 030614 000006 .WORD 6
```

3058	030616	003015						.WORD	WRPER3
3059	030620	006372						.WORD	WRAPR3
3060	030622			CALL	DROPU				
3061	030622	004737	014570					JSR	PC,DROPU
3062	030626			ENDIF					
3063	030626						501248:		
3064	030626			ENDSUB					
3065	030626			L10042:					
3066	030626	104403						TRAP	C&ESUB
3067	030630			CALL	SHWRAP				
3068	030630	004737	016020					JSR	PC,SHWRAP
3069	030634	120427	000377	T2SHFT:	CMPB	R4,#377			
3070	030640	001313			BNE	T2WRAP			
3071									
3072									
3073					.EVEN				
3074									
3075	030642				ENDTST				
3076	030642			L10041:					
3077	030642	104401						TRAP	C&ETST

```
3078 .SBTTL TEST 3: SET TS04 CHARACTERISTIC VERIFICATION.
3079
3080 ; THE FUNCTION OF THIS TEST IS TO ISSUE A "SET CHARACTERISTIC" COMMAND
3081 ; TO TELL THE TS04 WHERE IN CORE THE MESSAGE PACKET RESIDES.
3082
3083 030644 BGNTST
3084 030644 T3::
3085
3086 030644 BGNSUB
3087 030644 T3.1:
3088 030644 104402 TRAP C$SUB
3089 030646 105037 002437 CLR CTLFLG
3090 030652 005077 151346 CLR @TSSR ;INIT TS11-TS04
3091 030656 004737 014616 JSR PC,WAITSR
3092 030662 IF #TS.NBA NOTSET IN @TSSR THEN ;NBA SHOULD BE SET SINCE A COMD
3093 030662 032777 002000 151334 BIT #TS.NBA,@TSSR
3094 030670 001006 BNE 50125$
3095 030672 ERRDF 20,SCHERR,SCHER1 ;WAS ISSUED WITHOUT SET CHAR ISSUED FIRST
3096 030672 104455 TRAP C$ERDF
3097 030674 000024 .WORD 20
3098 030676 003047 .WORD SCHERR
3099 030700 010200 .WORD SCHER1
3100 030702 CALL DROPU ;IF NBA NOTSET, THEN CALL ERROR, DROP UNIT
3101 030702 004737 014570 JSR PC,DROPU
3102 030706 ENDIF
3103 030706 50125$:
3104 030706 ENDSUB
3105 030706 L10044:
3106 030706 104403 TRAP C$ESUB
3107
3108 030710 BGNSUB
3109 030710 T3.2:
3110 030710 104402 TRAP C$SUB
3111 030712 CALL SCHEXE JSR PC,SCHEXE
3112 030712 004737 015746 IF #TS.NBA SET IN @TSSR THEN
3113 030716 IF #TS.NBA SET IN @TSSR THEN
3114 030716 032777 002000 151300 BIT #TS.NBA,@TSSR
3115 030724 001406 BEQ 50126$
3116 030726 ERRDF 21,SCHERR,SCHER2 TRAP C$ERDF
3117 030726 104455 .WORD 21
3118 030730 000025 .WORD SCHERR
3119 030732 003047 .WORD SCHER2
3120 030734 010332 CALL DROPU JSR PC,DROPU
3121 030736 004737 014570 ENDIF
3122 030736 50126$:
3123 030742 IF @TSBA NE #MSGEND THEN
3124 030742 IF @TSBA NE #MSGEND THEN
3125 030742 027727 151252 002276 CMP @TSBA,#MSGEND
3126 030742 001406 BEQ 50127$
3127 030750 ERRDF 22,SCHERR,SCHER3 TRAP C$ERDF
3128 030752 104455 .WORD 22
3129 030752 000026 .WORD SCHERR
3130 030754 003047 .WORD SCHER3
3131 030756 010446 CALL DROPU
```

3134	030762	004737	014570			JSR	PC,DROPU
3135	030766			ENDIF			
3136	030766					501278:	
3137	030766			IF MSGPKT EQ #177777 OR MSGDFL EQ #177777 THEN			
3138	030766	023727	002260	177777		CMP	MSGPKT,#177777
3139	030774	001404				BEQ	501308
3140	030776	023727	002262	177777		CMP	MSGDFL,#177777
3141	031004	001006				BNE	501318
3142	031006					501308:	
3143	031006			ERRDF 23, SCHERR, SCHER3			
3144	031006	104455				TRAP	C\$ERDF
3145	031010	000027				.WORD	23
3146	031012	003047				.WORD	SCHERR
3147	031014	010446				.WORD	SCHER3
3148	031016			CALL DROPU			
3149	031016	004737	014570			JSR	PC,DROPU
3150	031022			ENDIF			
3151	031022					501318:	
3152	031022			LET R1 := @TSSR CLR.BY #FCMASK			
3153	031022	017701	151176			MOV	@TSSR,R1
3154	031026	042701	177717			BIC	#FCMASK,R1
3155	031032			LET R1 := R1 SHIFT -4			
3156	031032	006201				ASR	R1
3157	031034	006201				ASR	R1
3158	031036	006201				ASR	R1
3159	031040	006201				ASR	R1
3160	031042			SELECT R1 OF 3 VERIFY			
3161	031042	010146				MOV	R1,-(SP)
3162	031044	003403				BLE	501328
3163	031046	021627	000003			CMP	(SP),#3
3164	031052	003402				BLE	501338
3165	031054					501328:	
3166	031054	012716	000004			MOV	#4,(SP)
3167	031060					501338:	
3168	031060	006316				ASL	(SP)
3169	031062	060716				ADD	PC,(SP)
3170	031064	063607				ADD	@(SP)+,PC
3171	031066					501348:	
3172	031066	000010				.WORD	501408-501348
3173	031070	000022				.WORD	501378-501348
3174	031072	000110				.WORD	501368-501348
3175	031074	000120				.WORD	501358-501348
3176	031076			CASE 1			
3177	031076					501408:	
3178	031076			ERRDF 24, SCHERR, SCHER4			
3179	031076	104455				TRAP	C\$ERDF
3180	031100	000030				.WORD	24
3181	031102	003047				.WORD	SCHERR
3182	031104	010542				.WORD	SCHER4
3183	031106			CASE 2			
3184	031106	000437				BR	501358
3185	031110					501378:	
3186	031110			IF #TS.SPE SETIN @TSSR OR #BPE SETIN XSTAT2 THEN			
3187	031110	032777	020000	151106		BIT	#TS.SPE,@TSSR
3188	031116	001004				BNE	501418
3189	031120	032737	020000	002272		BIT	#BPE,XSTAT2

3190	031126	001405									
3191	031130										
3192	031130										
3193	031130	104455									
3194	031132	000031									
3195	031134	003047									
3196	031136	010706									
3197	031140										
3198	031140	000415									
3199	031142										
3200	031142										
3201	031142	032737	040000	002272							
3202	031150	001405									
3203	031152										
3204	031152	104455									
3205	031154	000032									
3206	031156	003047									
3207	031160	011122									
3208	031162										
3209	031162	000404									
3210	031164										
3211	031164										
3212	031164	104455									
3213	031166	000033									
3214	031170	003047									
3215	031172	011260									
3216	031174										
3217	031174										
3218	031174										
3219	031174										
3220	031174										
3221	031174	000404									
3222	031176										
3223	031176										
3224	031176	104455									
3225	031200	000034									
3226	031202	003047									
3227	031204	014032									
3228	031206										
3229	031206										
3230	031206										
3231	031206										
3232	031206	104403									
3233	031210										
3234	031210	012700	000000								
3235	031214	104441									
3236	031216										
3237	031216	105037	002437								
3238	031222										
3239	031222	052737	000200	002240							
3240	031230										
3241	031230	012777	002240	150756							
3242	031236										
3243	031236	004737	014616								
3244	031242										
3245	031242	105737	002437								

L10045:

50141\$:	BEQ	50142\$
	TRAP	C\$ERDF
	.WORD	25
	.WORD	SCHERR
	.WORD	SCHERS
50142\$:	BR	50143\$
	BIT	#SIP,XSTAT2
	BEQ	50144\$
	TRAP	C\$ERDF
	.WORD	26
	.WORD	SCHERR
	.WORD	SCHER6
50144\$:	BR	50145\$
	TRAP	C\$ERDF
	.WORD	27
	.WORD	SCHERR
	.WORD	SCHER7
50145\$:		
50143\$:		
	BR	50135\$
50136\$:		
	TRAP	C\$ERDF
	.WORD	28
	.WORD	SCHERR
	.WORD	SCHERO
50135\$:		
	TRAP	C\$ESUB
	MOV	#PRI00,RO
	TRAP	C\$SPRI
	CLRB	CTLFLG
	BIS	#IE.C,SCHPKT
	MOV	#SCHPKT,@TSDB
	JSR	PC,WAITSR
	TSTB	CTLFLG

3246	031246	001014					BNE	501468
3247	031250				ERRDF #31,NINTM			
3248	031250	104455					TRAP	C\$ERDF
3249	031252	000037					.WORD	31
3250	031254	003503					.WORD	NINTM
3251	031256	000000					.WORD	0
3252	031260				PRINTB #IOBRD			
3253	031260	012746	005646				MOV	#IOBRD,-(SP)
3254	031264	012746	000001				MOV	#1,-(SP)
3255	031270	010600					MOV	SP,RO
3256	031272	104414					TRAP	C\$PNTB
3257	031274	062706	000004				ADD	#4,SP
3258	031300				ENDIF			
3259	031300							501468:
3260	031300				LET SCHPKT := SCHPKT CLR.BY #IE.C			
3261	031300	042737	000200	002240			BIC	#IE.C,SCHPKT
3262	031306				SETPRI #PRI07			
3263	031306	012700	000340				MOV	#PPI07,RO
3264	031312	104441					TRAP	C\$SPRI
3265								
3266	031314				LET TS4CL := MSGPKT+MS\$XS2 CLR.BY #177400 ;SAVE MICRO-CODE REV LEVEL.		MOV	MSGPKT+MS\$XS2,TS
3267	031314	013737	002272	002424			BIC	#177400,TS4CL
3268	031322	042737	177400	002424				
3269								
3270	031330				EXIT TST			
3271	031330	104432					TRAP	C\$EXIT
3272	031332	000002					.WORD	L10043-
3273					.EVEN			
3274								
3275	031334				ENDTST			
3276	031334				L10043:			
3277	031334	104401					TRAP	C\$ETST
3278								
3279								

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.SBTTL TEST 4: TRACK INACTIVE/ACTIVE TEST.

:TESTS 4 - 7 PERFORM DATA WRAPS ON THE P.E. READ FORMATTER
:BOARDS. COMMUNICATION BETWEEN THE PDP11 AND TS04 OCCURS BY USING
:THE DIA (DIAGNOSTIC) COMMAND WHICH SENDS A COPY OF THE DIABLK TABLE,
:RESIDING IN CORE, TO THE TS04 CONTROLLER. THE FORMAT OF THE DIABLK IS
:SHOWN IN THE FOLLOWING TABLE. NOTE THAT THE TABLE IS FILLED IN REVERSE
:ORDER, THAT IS, THE LAST LOGICAL ENTRY OF THE TABLE IS LABELED DIABLK,
:WHILE THE FIRST LOGICAL ENTRY OF THE TABLE IS LABELED DIABLK+DIAEXT, WHERE
:DIAEXT IS THE LENGTH (EXTENT) OF THE TABLE IN BYTES.

:WHEN THE DIA COMMAND IS EXECUTED, THE DIABLK IS LOADED ONTO THE TS04 STACK
:WITH THE FIRST LOGICAL ENTRY AT THE TOP OF THE STACK, AS SHOWN BELOW.
:THE TS04 THEN JUMPS TO THE P.E. WRAP TASK, IN ROM, WHERE THE FUNCTION IS
:EXECUTED USING THE REMAINING STACK ENTRIES AS ARGUMENTS.

```

:
:
:          DIABLK+DIAEXT:  TS04 PE WRAP TASK ADDR LO
:                          TS04 PE WRAP TASK ADDR HI
:                          READ CONTROL  (RDCTLO)
:                          FORMAT CONTROL (FMCTLO)
:                          DATA
:                          CONTROL        (IOSCO)
:                          DATA
:                          CONTROL        (IOSCO)
:                          DATA
:                          CONTROL        (IOSCO)
:                          DATA
:                          CONTROL        (IOSCO)
:                          DATA
:                          CONTROL        (IOSCO)
:                          DATA
:          D!ABLK:        CONTROL        (IOSCO)
:

```

:TEST 4 CHECKS THAT THE TRACK ACTIVE FLOP CAN SET AND CLEAR
:IN NRZI MODE FOR ALL CHANNELS. IF THE DATA DOES NOT MAKE A TRANSITION
:WHEN THE WRITE FLAG IS UP, THE TRACK ACTIVE FLOP WILL CLEAR.
:HOWEVER, IT WILL SET IF THERE IS A DATA TRANSITION WHILE THE
:WRITE FLAG IS UP.

```

3323 031336          BGNTST
3324 031336          T4.:
3325
3326 031336          CALL    SCHEXE          ;SET CHAR
3327 031336 004737 015746          JSR    PC,SCHEXE
3328 031342          CALL    WAITMT
3329 031342 004737 015174          JSR    PC,WAITMT
3330
3331          :          THIS SUBTEST FORCES THE TRACK ACTIVE TO CLEAR BY WRITING
3332          :          ALL 0'S DATA.  THE PATTERN IS AS FOLLOWS FOR EACH CHANNEL:
3333          :
3334          :          DATA:          000000
3335          :          WRTFLG:         011100
3336          :          TRACK ACTIVE:   SHOULD BE 0 FOR ALL TRACKS
3337          :
3338          :          ;INITIALIZAITON
3339
3340 031346          BGNSUB
3341 031346          T4.1:
3342 031346 104402          TRAP    C$BSUB
3343
3344 031350 004737 016154          JSR    PC,PEINIT          ;GO LOAD DIABLK INDEX AND TS04 TASK ADDRESS
3345 031354 112745 000001          MOVB   #FC.NRZ,-(R5)      ;SET NRZ1 MODE IN FMT CNTRL.
3346
3347          ;SETUP DATA & CONTROL WORDS IN DIABLK.
3348
3349 031360 005003          CLR    R3                ;SETUP DATA FOR WORD 1
3350 031362 012704 000040          MOV    #IS.NRZ,R4        ;SETUP CONTROL WORD 1
3351 031366 004737 015626          JSP   PC,TALOAD          ;LOAD IT.
3352 031372 012704 000044          MOV    #IS.NRZ!IS.WRF,R4 ;SET WRITE FLAG IN CONTROL WORD 2
3353 031376 004737 015626          JSR   PC,TALOAD          ;LOAD DATA & CNTRL WORD 2
3354 031402 004737 015626          JSR   PC,TALOAD          ;LOAD DATA & CNTRL WORD 3
3355 031406 004737 015626          JSR   PC,TALOAD          ;LOAD DATA & CNTRL WORD 4
3356 031412 012704 000040          MOV    #IS.NRZ,R4        ;SETUP CNTRL WORD 5
3357 031416 004737 015626          JSR   PC,TALOAD          ;LOAD DATA & CNTRL WORD 5
3358 031422 004737 015626          JSR   PC,TALOAD          ;LOAD DATA & CNTRL WORD 6.
3359 031426 004737 015722          JSR   PC,DIAEXE          ;EXECUTE THE CMD.
3360
3361          ;NOW CHECK FOR ERRORS.
3362
3363 031432 005037 002436          CLR    ERRFLG            ;CLR THE ERROR FLAG.
3364 031436 005037 002342          CLR    EXTRAC            ;TRACK ACTIVE 0 FOR ALL CHAN
3365 031442 004737 016044          JSR    PC,TKACER         ;CHECK FOR ERRORS.
3366 031446
3367 031446 013737 002360 002406          LET   ACTRK1 := ACTRAC
3368 031454
3369 031454 105737 002436          IFB   ERRFLG NE #0 ANDB CMPFLG NE #0 THEN
3370 031460 001407          TSTB   ERRFLG
3371 031462 105737 002212          BEQ   50147$
3372 031466 001404          TSTB   CMPFLG
3373 031470          BEQ   50147$
3374 031470 104456          FPPHRD 7,TAER1,TAEM
3375 031472 000007          TRAP   C$ERHRD
3376 031474 005100          .WORD 7
3377 031476 006716          .WORD TAER1
3378 031500          .WORD TAEM
          ENDIF

```

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3379 031500
3380
3381 031500
3382 031500
3383 031500 104403
3384
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3392 031502
3393 031502
3394 031502 104402
3395
3396
3397
3398 031504 004737 016154
3399 031510 112745 000001
3400
3401
3402
3403 031514 012703 177777
3404 031520 012704 000040
3405 031524 004737 015626
3406 031530 012704 000044
3407 031534 004737 015626
3408 031540 005003
3409 031542 004737 015626
3410 031546 004737 015626
3411 031552 012704 000040
3412 031556 004737 015626
3413 031562 004737 015626
3414 031566 004737 015722
3415
3416
3417
3418 031572 005037 002436
3419 031576 012737 000777 002342
3420 031604 004737 016044
3421 031610
3422 031610 013737 002360 002410
3423 031616 005137 002410
3424 031622
3425 031622 042737 177000 002410
3426 031630
3427 031630 105737 012436
3428 031634 001407
3429 031636 105737 002212
3430 031642 001404
3431 031644
3432 031644 104456
3433 031646 000011
3434 031650 003150

```

501478:

```

ENDSUB
L10047:
; THIS SUBTEST FORCES TRACK ACTIVE TO SET BY WRITING THE FOLLOWING
; PATTERN ON EACH CHANNEL:
;
; DATA:          110000
; WRTFLG:        011100
; TRACK ACTIVE:  SHOULD BE 1 FOR ALL TRACKS.
BGNSUB
T4.2:
;
; INITIALIZATION
JSR    PC,PEINIT
MOV    #FC.NRZ,-(R5)
; NRZI MODE
; SET UP DATA & CNTRL WORDS IN DIABLK
MOV    #-1,R3
MOV    #IS.NRZ,R4
JSR    PC,TALOAD
MOV    #IS.NRZ.IS.WRF,R4
JSR    PC,TALOAD
CLP    R3
JSR    PC,TALOAD
JSR    PC,TALOAD
MOV    #IS.NRZ,R4
JSR    PC,TALOAD
JSR    PC,TALOAD
JSR    PC,TALOAD
; CHECK FOR ERRORS
CLR    ERRFLG
MOV    #777,EXTRAC
JSR    PC,*KACER
LET    ACTRK2 := COMP ACTRAC
LET    ACTRK2 := ACTRK2 CLR.BY #177000
IFB   ERRFLG NE #0 ANDB CMPFLG NE #0 THEN
ERRHRD 9,TAER2,TAEM

```

```

;WORD 1 DATA
;WORD 1 CONTROL
;LOAD IT
;WORD 2 CONTROL--WRT FLAG SET
;LOAD IT WORD 2 (DATA & CONTROL)
;WORD 3 DATA.
;LOAD DATA & CNTRL - WORD 3
;LOAD DATA & CNTRL - WORD 4
;CLR WRITE FLAG IN WORD 5
;LOAD DATA & CNTRL WORD 5
;LOAD DATA & CNTRL WORD 6
;DO THE TS04 WRAP.
;INIT ERROR FLAG.
;SHOULD BE DATA.
;CHECK FOR ERRORS
MOV    ACTRAC,ACTRK2
COM    ACTRK2
BIC    #177000,ACTRK2
TSTB   ERRFLG
BEQ    50150$
TSTB   CMPFLG
BEQ    50150$
TRAP   C$ERHRD
.WORD  9
.WORD  TAER2

```

```

3435 031652 006716                                .WORD  TAEM
3436 031654                                ENDIF
3437 031654                                50150$:
3438
3439 031654                                ENDSUB
3440 031654                                L10050:
3441 031654 104403                                TRAP  C$ESUB
3442
3443                                ;THIS SUBTEST FORCES THE TRACK ACTIVE TO CLEAR BY WRITING THE FOLLOWING
3444                                ;PATTERN ON EACH CHANNEL:
3445                                :
3446                                :       DATA:          111111
3447                                :       WRTFLG:         011100
3448                                :       TRACK ACTIVE:   SHOULD BE 0 FOR ALL TRACKS
3449                                :
3450 031656                                BGNSUB
3451 031656                                T4.3:
3452 031656 104402                                TRAP  C$BSUB
3453
3454                                ;   INITIALIZATION
3455
3456 031660 004737 016154                        JSR   PC,PEINIT
3457 031664 112745 000001                       MOVB  #FC.NRZ,-(R5)           ;NRZI MODE.
3458
3459                                ;SET UP DATA AND CONTROL WORDS IN DIABLK.
3460
3461 031670 012703 177777                        MOV   #-1,R3                ;SET UP DATA.
3462 031674 012704 000040                        MOV   #IS.NRZ,R4           ;SET UP CNTRL WORD.
3463 031700 004737 015626                        JSR   PC,TALOAD            ;LOAD DATA & CNTRL WORD 1
3464 031704 012704 000044                        MOV   #IS.NRZ.IS.WRF,R4   ;WORD 2 CNTRL
3465 031710 004737 015626                        JSR   PC,TALOAD            ;LOAD DATA - CNTRL WORD 2
3466 031714 004737 015626                        JSR   PC,TALOAD            ;LOAD DATA - CNTRL WORD 3
3467 031720 004737 015626                        JSR   PC,TALOAD            ;LOAD DATA - CNTRL WORD 4
3468 031724 012704 000040                        MOV   #IS.NRZ,R4           ;CNTRL WORD 5
3469 031730 004737 015626                        JSR   PC,TALOAD            ;LOAD DATA - CNTRL WORD 5
3470 031734 004737 015626                        JSR   PC,TALOAD            ;LOAD DATA - CNTRL WORD 6
3471 031740 004737 015722                        JSR   PC,DIAEXE           ;DO THE WRAP.
3472
3473                                ;CHECK FOR ERRORS
3474
3475 031744 005037 002436                        CLR   ERRFLG               ;INIT ERROR FLAG.
3476 031750 005037 002342                        CLR   EXTRAC               ;SHOULD BE DATA=0.
3477 031754 004737 016044                        JSR   PC,TKACER           ;CHECK FOR ERRORS
3478 031760
3479 031760 013737 002360 002412                LET  ACTRK3 := ACTRAC
3480 031766
3481 031766 105737 002436                        IFB  ERRFLG NE #0 ANDB  CMPFLG NE #0 THEN
3482 031772 001407                                TSTB  ERRFLG
3483 031774 105737 002212                                BEQ   50151$
3484 032000 001404                                TSTB  CMPFLG
3485 032002                                BEQ   50151$
3486 032002 104456                                ERRHRD 8,TAER1,TAEM
3487 032004 000010                                TRAP  C$ERHRD
3488 032006 003100                                .WORD 8
3489 032010 006716                                .WORD TAER1
3490 032012                                .WORD TAEM
                                ENDIF

```

3491 032012
3492
3493 032012
3494 032012
3495 032012 104403
3496
3497
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3500
3501
3502
3503
3504
3505 032014
3506 032014
3507 032014 104402
3508
3509
3510
3511 032016 004737 016154
3512 032022 112745 000001
3513
3514
3515
3516 032026 005003
3517 032030 012704 000040
3518 032034 004737 015626
3519 032040 012704 000044
3520 032044 004737 015626
3521 032050 012703 177777
3522 032054 004737 015626
3523 032060 004737 015626
3524 032064 012704 000040
3525 032070 004737 015626
3526 032074 004737 015626
3527 032100 004737 015722
3528
3529
3530
3531 032104 005037 002436
3532 032110 012737 000777 002342
3533 032116 004737 016044
3534 032122
3535 032122 013737 002360 002414
3536 032130 005137 002414
3537 032134
3538 032134 042737 177000 002414
3539 032142
3540 032142 105737 002436
3541 032146 001407
3542 032150 105737 002212
3543 032154 001404
3544 032156
3545 032156 104456
3546 032160 000012

501518:

ENDSUB
L10051:

TRAP C\$ESUB

;THIS SUBTEST FORCES THE TRACK ACTIVE FLOP TO SET BY WRITING THE FOLLOWING
;PATTERN ON EACH CHANNEL:

DATA: 001111
WRTFLG: 011100
TRACK ACTIVE: SHOULD BE 1 FOR ALL TRACKS.

BGNSUB
T4.4:

TRAP C\$BSUB

; INITIALIZATION.

JSR PC,PFINIT
MOVB #FC.NRZ,-(R5) ;NRZI MODE

;SET UP DATA AND CNTRL WORD IN DIABLK.

CLR R3 ;WORD 1 DATA
MOV #IS.NRZ,R4 ;WORD 1 CNTRL - WRITE FLAG CLR
JSR PC,TALOAD ;LOAD DATA & CNTRL WORD 1
MOV #IS.NRZ!IS.WRF,R4 ;WORD 2 CNTRL-SET WRT FLAG
JSR PC,TALOAD ;LOAD DATA & CNTRL WORD 2
MOV #-1,R3 ;WORD 3 DATA-DO A DATA TRANSITION
JSR PC,TALOAD ;LOAD DATA & CNTRL WORD 3
JSR PC,TALOAD ;LOAD DATA & CNTRL WORD 4
MOV #IS.NRZ,R4 ;CNTRL WORD 5 - CLR WRITE FLAG.
JSR PC,TALOAD ;LOAD DATA & CNTRL WORD 5
JSR PC,TALOAD ;LOAD DATA & CNTRL WORD 6
JSR PC,DIAEXE ;GO WRAP THE DATA.

;CHECK FOR ERRORS.

CLR ERRFLG ;INIT ERROR FLAG.
MOV #777,EXTRAC ;TRACK ACTIVE SHOULD BE SET FOR ALL TRACKS.
JSR PC,iKACER ;CHECK FOR ERRORS.

LET ACTRK4 := COMP ACTRAC

MOV ACTRAC,ACTRK4
COM ACTRK4

LET ACTRK4 := ACTRK4 CLR.BY #177000

BIC #177000,ACTRK4

IFB ERRFLG NE #0 ANDB CMPFLG NE #0 THEN

TSTB ERRFLG
Q 501528
,TB CMPFLG
BEQ 501528

ERRHRD 10,TAER2,TAEM

TRAP C\$ERRHRD
.WORD 10

3582
3583
3584
3585
3586
3587
3588
3589
3590
3591
3592
3593 032232
3594 032232
3595
3596 032232
3597 032232 004737 015746
3598 032236
3599 032236 004737 015174
3600 032242
3601 032242 005001
3602 032244 000402
3603 032246
3604 032246 062701 000002
3605 032252
3606 032252 020127 000012
3607 032256 003003
3608 032260
3609 032260 005061 002372
3610 032264
3611 032264 000770
3612 032266
3613
3614 032266
3615 032266
3616 032266 104402
3617
3618
3619
3620 032270 005037 002416
3621 032274 012702 000777
3622 032300 005003
3623 032302 004737 016126
3624 032306 004737 015722
3625
3626
3627
3628 032312 005037 002436
3629 032316 004737 016504
3630 032322
3631 032322 105737 002436
3632 032326 001407
3633 032330 105737 002212
3634 032334 001404
3635 032336
3636 032336 104456
3637 032340 000014

```
.SBITL TEST 5: P.E. DATA TEST.

;TEST 5 WRAPS A DATA PATTERN TO CHECK EACH
;TRACK FOR BIT PICKUPS AND DROPS.

;REGISTER USAGE IS AS FOLLOWS:
; R2=PREAMBLE DATA FOR TRACKS 1-9 IN BIT POSITION 0-8.
; R3=1ST BYTE OF DATA FOR TRACKS 1-9 IN BIT POSITION 0-8. THIS
; IS THE DATA OF INTEREST AFTER EXECUTING THE TSO4 DIA COMMAND.
; R4=2ND BYTE OF DATA FOR TRACKS 1-9 IN BIT POSITION 0-8.

T5::
    BGNTST
    CALL SCHEXE ;SET CHAR
    JSR PC,SCHEXE
    CALL WAITMT
    JSR PC,WAITMT
    INCR R1 FROM #0 TO #12 BY #2
    CLR R1
    BR 50154$
    ADD #2,R1
    50155$:
    50154$:
    CMP R1,#12
    BGT 50156$
    LET ORDTBL(R1) :- #0 ;CLEAR 6 LOC OF ORED WRAP REG TABLE
    CLR ORDTBL(R1)
    ENDINC
    BR 50155$
    50156$:

    BGNSUB
T5.1:
    TRAP C$BSUB

;THIS SUBTEST WRAPS AN ALL 0'S PATTERN.

    CLR DTKIDN ;CLR DEAD TRK REG.
    MOV #777,R2 ;SETUP THE PREAMBLE DATA.
    CLR R3 ;BYTE 2 DATA. ALL 0'S.
    JSR PC,DATBLD ;BUILD THE DIAG BLK.
    JSR PC,DIAEXE ;EXECUTE IT.

;CHECK FOR ERRORS.

    CLR ERRFLG ;INIT ERROR FLAG.
    JSR PC,PEERCK ;CHECK FOR ERRORS.
    IFB ERRFLG NE #0 ANDB CMPFLG NE #0 THEN

    TSTB ERRFLG
    BEQ 50157$
    TSTB CMPFLG
    BEQ 50157$

    ERRHRD 12,DATER,SKDAEM

    TRAP C$ERHRD
    .WORD 12
```

```

3638 032342 003243 .WORD DATER
3639 032344 007176 .WORD SKDAEM
3640 032346          ENDIF
3641 032346          50157$:
3642
3643 032346          ENDSUB
3644 032346 L10054:
3645 032346 104403 TRAP C$ESUB
3646
3647 032350          BGNSUB
3648 032350 15.2:
3649 032350 104402 TRAP C$BSUB
3650
3651          ;THIS SUBTEST WRAPS AN ALL 1'S PATTERN.
3652
3653 032352 005037 002416 CLR DTKIDN ;CLR DEAD TRK IDN REG.
3654 032356 012702 000777 MOV #777,R2 ;LOAD PREAMBLE REG.
3655 032362 012703 000777 MOV #777,R3 ;BYTE 1 DATA.
3656 032366 004737 016126 JSR PC,DATBLD ;BUILD THE DIA BLK.
3657 032372 004737 015722 JSR PC,DIAEXE ;EXECUTE IT.
3658
3659          ;CHECK FOR ERRORS.
3660
3661 032376 005037 002436 CLR ERRFLG ;INIT ERROR FLAG.
3662 032402 004737 016504 JSR PC,PEERCK ;CHECK FOR ERRORS.
3663 032406          IFB ERRFLG NE #0 ANDB CMPFLG NE #0 THEN
3664 032406 105737 002436 TSTB ERRFLG
3665 032412 001407          BEQ 50160$
3666 032414 105737 002212 TSTB CMPFLG
3667 032420 001404          BEQ 50160$
3668 032422          ERRHRD 13,DATER,SKDAEM
3669 032422 104456 TRAP C$ERHRD
3670 032424 000015 .WORD 13
3671 032426 003243 .WORD DATER
3672 032430 007176 .WORD SKDAEM
3673 032432          ENDIF
3674 032432          50160$:
3675
3676 032432          ENDSUB
3677 032432 L10055:
3678 032432 104403 TRAP C$ESUB
3679
3680 032434          BGNSUB
3681 032434 15.3:
3682 032434 104402 TRAP C$BSUB
3683
3684          ;THIS SUBTEST RIPPLES A 1 IN A FIELD OF 0'S.
3685
3686
3687 032436 005037 002416 CLR DTKIDN ;CLR DEAD TRK IDN REG.
3688 032442 012702 000777 MOV #777,R2 ;SETUP THE PREAMBLE DATA IN R2 BITS 0-8.
3689 032446 012703 000400 MOV #400,R3 ;SETUP 1ST BYTE OF DATA.
3690 032452 005037 002416 CLR DTKIDN ;NO DEAD TRACKS DESIRED.
3691 032456 004737 016126 JSR PC,DATBLD ;BUILD THE DIAG BLOCK.
3692 032462 004737 015722 JSR PC,DIAEXE ;EXECUTE THE DATA WRAP
3693

```

```
3694 ;CHECK FOR ERRORS & REPORT IF ANY
3695
3696 032466 005037 002436 CLR ERRFLG ;INIT ERROR FLAG.
3697 032472 004737 016504 JSR PC,PEERCK ;CHECK FOR ERRORS
3698 032476 IFB ERRFLG NE #0 ANDB CMPFLG NE #0 THEN
3699 032476 105737 002436 TSTB ERRFLG
3700 032502 001407 BEQ 50161$
3701 032504 105737 002212 TSTB CMPFLG
3702 032510 001404 BEQ 50161$
3703 032512 ERRHRD 14,DATER,SKDAEM
3704 032512 104456 TRAP C$ERHRD
3705 032514 000016 .WORD 14
3706 032516 003243 .WORD DATER
3707 032520 007176 .WORD SKDAEM
3708 032522
3709 032522 ENDIF
3710
3711 ;IF NOT DONE, SHIFT THE 1 AND DO IT AGAIN.
3712
3713 032522 000241 CLC ;CLEAR THE CARRY BIT
3714 032524 006203 ASR R3 ;SHIFT THE DATA
3715 032526 103353 BCC 1$ ;BRANCH IF THE SHIFTING '1' HASN'T
;BEEN SHIFTED INTO THE CARRY POSITION
;YET.
3716
3717
3718 ENDSUB
3719 032530 L10056:
3720 032530
3721 032530 104403 TRAP C$ESUB
3722
3723 032532 T5.4: BGNSUB
3724 032532
3725 032532 104402 TRAP C$BSUB
3726
3727 ;THIS SUBTEST RIPPLES A 0 IN A FIELD OF 1'S.
3728
3729 032534 005037 002416 CLR DTKIDN ;CLR DEAD TRK IDN REG.
3730 032540 012702 000777 MOV #777,R2 ;SETUP THE PREAMBLE DATA IN R2 BITS 0-8.
3731 032544 012703 000377 MOV #377,R3 ;SETUP 1ST BYTE OF DATA.
3732 032550 004737 016126 JSR PC,DATBLD ;BUILD THE DIA BLK.
3733 032554 004737 015722 JSR PC,DIAEXE ;EXECUTE THE DATA WRAP.
3734
3735 ;CHECK FOR ERRORS & REPORT IF ANY.
3736
3737 032560 005037 002436 CLR ERRFLG ;INIT ERROR FLAG.
3738 032564 004737 016504 JSR PC,PEERCK ;CHECK FOR ERRORS
3739 032570 IFB ERRFLG NE #0 ANDB CMPFLG NE #0 THEN
3740 032570 105737 002436 TSTB ERRFLG
3741 032574 001407 BEQ 50162$
3742 032576 105737 002212 TSTB CMPFLG
3743 032602 001404 BEQ 50162$
3744 032604 ERRHRD 15,DATER,SKDAEM
3745 032604 104456 TRAP C$ERHRD
3746 032606 000017 .WORD 15
3747 032610 003243 .WORD DATER
3748 032612 007176 .WORD SKDAEM
3749 032614 ENDIF
```

```
3750 032614                                50162$:
3751
3752
3753                                ;IF NOT DONE, SHIFT THE 0 AND DO IT AGAIN.
3754
3755 032614 052703 001000                BIS    #BIT9,R3    ;PREPARE FOR SHIFT.
3756 032620 006203                        ASR    R3          ;SHIFT THE DATA. HAS THE SHIFTING 0
3757                                        ;REACHED THE CARRY BIT YET?
3758 032622 103752                        BCS    1$         ;IF NOT, CONTINUE.
3759
3760 032624                                ENDSUB
3761 032624                                L10057:
3762 032624 104403                                TRAP   C$ESUB
3763
3764
3765 032626                                LET R1 := ORORDY OR ORTRAC OR ORDATA
3766 032626 013701 002372                    MOV    CRORDY,R1
3767 032632 053701 002376                    BIS    ORTRAC,R1
3768 032636 053701 002400                    BIS    ORDATA,R1
3769 032642                                LET R1 := R1 OR ORTRDD
3770 032642 053701 002402                    BIS    ORTRDD,R1
3771 032646                                IF R1 NE #0 THEN
3772 032646 005701
3773 032650 001406                                ERRHRD    30,DATER
3774 032652
3775 032652 104456                                TRAP   C$ERHRD
3776 032654 000036                                .WORD  30
3777 032656 003243                                .WORD  DATER
3778 032660 000000                                .WORD  0
3779 032662                                CALL  MSORT2
3780 032662 004737 020216                    JSR   PC,MSORT2
3781 032666                                ENDIF
3782 032666                                50163$:
3783
3784 032666                                EXIT   TST
3785 032666 104432                                TRAP   C$EXIT
3786 032670 000002                                .WORD  L10053-.
3787
3788                                .EVEN
3789 032672                                ENDTST
3790 032672                                L10053:
3791 032672 104401                                TRAP   C$ETST
```

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3799
3800
3801
3802
3803
3804
3805 032674
3806 032674
3807
3808 032674
3809 032674 004737 015746
3810 032700
3811 032700 004737 015174
3812 032704
3813 032704 005001
3814 032706 000402
3815 032710
3816 032710 062701 000002
3817 032714
3818 032714 020127 000012
3819 032720 003003
3820 032722
3821 032722 005061 002372
3822 032726
3823 032726 000770
3824 032730
3825
3826 032730
3827 032730
3828 032730 104402
3829
3830
3831
3832
3833 032732 005037 002416
3834 032736 012702 000377
3835 032742 004737 016154
3836 032746 112745 000012
3837 032752 010203
3838 032754 005103
3839 032756 042703 177000
3840 032762 010204
3841 032764 004737 016176
3842 032770 005037 002344
3843 032774 012737 000777 002350
3844
3845 033002 005037 002340
3846 033006 004737 015722
3847

.SBTTL TEST 6: P.E. SKEW TEST

;THE NEXT TWO SUBTESTS SKEW THE DATA ON A TRACK BY ONE BYTE WITH RESPECT TO ALL
;THE OTHER TRACKS. THAT IS, THE DATA IS ONE BYTE LATE ON THE ONE TRACK.
;EACH TRACK IS TESTED FOR SKEW IN THIS MANNER. REGISTER ASSIGNMENTS
;ARE AS FOLLOWS:

:
: R2=PREAMBLE DATA
: R3=BYTE 1 DATA (WITH THE EXCEPTION OF THE SKEWED TRACK. THAT
: TRACK CONTAINS PREAMBLE DATA)
: R4=BYTE 2 DATA (WITH THE EXCEPTION OF THE SKEWED TRACK. THAT
: TRACK CONTAINS BYTE 1 DATA)
;

T6:: BGNTST

CALL SCHEXE

JSR PC,SCHEXE

CALL WAITMT

JSR PC,WAITMT

INCR R1 FROM #0 TO #12 BY #2

CLR R1

BR 50164\$

50165\$:

ADD #2,R1

50164\$:

CMP R1,#12

BGT 50166\$

LET ORDTBL(R1) := #0

;CLEAR 6 LOC OF ORED WRAP REG TABLES

CLR ORDTBL(R1)

ENDIN

BR 50165\$

50166\$:

T6.1: BGNSUB

TRAP C\$BSUB

;THIS SUBTEST WRITES AN ALL 1'S PREAMBLE (SKEWED), AN ALL 0'S
;BYTE 1 DATA (SKEWED), AND AN ALL 1'S BYTE 2 DATA (SKEWED).

1\$:

CLR DTKIDN

;CLR DEAD TRK IDN REG.

MOV #377,R2

;SET UP PREAMBLE DATA. START BY SKEWING TRK 9.

JSR PC,PEINIT

;SET WRAP TASK ADDR IN DIABLK AND INIT INDEX.

MOVB #FC.DAT!FC.VCO,-(R5)

;SET DATA & VCO MODE IN FORMAT CNTRL.

MOV R2,R3

;SETUP BYTE 1 DATA

COM R3

;=0

BIC #177000,R3

;CLR GARBAGE BITS

MOV R2,R4

;SETUP BYTE 2 DATA-1.

JSR PC,PEDATA

;LOAD DATA IN DIABLK

CLR EXDATA

;THE EXPECTED DESKEWED DATA IN EXDAT IS 0

MOV #777,EXODTR

;THE EXPECTED DESKEWED DATA IN EXODTR IS

;1 FOR EACH TRACK.

CLR EXIDTR

;THE EXPECTED DESKEWED DATA IN EXIDTR IS 0

JSR PC,DIAEXE

;EXECUTE THE DATA WRAP.

```

3848 ;CHECK FOR ERRORS AND REPORT IF ANY
3849
3850 033012 005037 002436 CLR ERRFLG ;INIT ERROR FLAG.
3851 033016 004737 016504 JSR PC,PEERCK ;CHECK FOR ERRORS
3852 033022 IFB ERRFLG NE #0 ANDB CMPFLG NE #0 THEN
3853 033022 105737 002436 TSTB ERRFLG
3854 033026 001407 BEQ 50167$
3855 033030 105737 002212 TSTB CMPFLG
3856 033034 001404 BEQ 50167$
3857 033036 ERRHRD 16,SKEWER,SKDAEM
3858 033036 104456 TRAP C$ERHRD
3859 033040 000020 .WORD 16
3860 033042 003270 .WORD SKEWER
3861 033044 007176 .WORD SKDAEM
3862 033046
3863 033046 ENDIF
3864
3865 ;SHIFT THE SKEW TO THE NEXT TRACK AND REPEAT.
3866
3867 033046 052702 001000 BIS #BIT9,R2 ;PREPARE FOR SHIFT OF SKEWED TRK.
3868 033052 006202 ASR R2 ;SHIFT THE PREAMBLE DATA. HAVE ALL THE
3869 ;TRACKS BEEN SKEWED?
3870 033054 103732 BCS 1$ ;BR IF NOT. CONTINUE.
3871
3872 033056 ENDSUB
3873 033056 L10061:
3874 033056 104403 TRAP C$ESUB
3875
3876 033060 BGNSUB
3877 033060 T6.2:
3878 033060 104402 TRAP C$BSUB
3879
3880 ;THIS SUBTEST SENDS AN ALL 1'S PREAMBLE (SKEWED), AN ALL 1'S
3881 ;BYTE 1 DATA (SKEWED) AND AN ALL 0'S BYTE 2 DATA (SKEWED).
3882
3883 033062 005037 002416 CLR DTKIDN ;CLR DEAD TRK IDEN REG.
3884 033066 012702 000377 MOV #377,R2 ;SET UP PREAMBLE DATA. START WITH CHAN 9 SKEWED.
3885 033072 004737 016154 JSR PC,PEINIT ;SET WRAP TASK ADR IN DIABLK & INIT INDEX.
3886 033076 112745 000012 MOV #FC.DAT!FC.VCO,-(R5) ;SET DATA & VCO MODE IN FMT CNTRL.
3887 033102 012703 000777 MOV #777,R3 ;SETUP BYTE 1 DATA=1
3888 033106 010204 MOV R2,R4 ;SETUP BYTE 2 DATA
3889 033110 005104 COM R4 ;=0
3890 033112 042704 177000 BIC #177000,R4 ;CLR GARBAGE BITS
3891 033116 004737 016176 JSR PC,PEDATA ;LOAD THE DATA IN DIABLK
3892 033122 012737 000777 MOV #777,EXDATA ;THE EXPECTED DESKEWED DATA IS 1
3893 033130 005037 002350 CLR EXODTR ;THE EXPECTED '0 OR DEAD' DATA=1 FOR EACH TRACK.
3894 033134 012737 000777 MOV #777,EX1DTR ;THE EXPECTED DESKEWED '1 OR DEAD' DATA=1 FOR ALL TRACKS
3895 033142 004737 015722 JSR PC,DIAEXE ;EXECUTE THE WRAP.
3896
3897 ;CHECK FOR ERRORS
3898
3899 033146 005037 002436 CLR ERRFLG ;INIT ERROR FLAG.
3900 033152 004737 016504 JSR PC,PEERCK ;CHECK FOR ERRORS.
3901 033156 IFB ERRFLG NE #0 ANDB CMPFLG NE #0 THEN
3902 033156 105737 002436 TSTB ERRFLG
3903 033162 001407 BEQ 50170$

```

```
3904 033164 105737 002212          TSTB  CMPFLG
3905 033170 001404                    BEQ   50170$
3906 033172          ERRHRD 16,SKEWER,SKDAEM
3907 033172 104456                    TRAP  C$ERHRD
3908 033174 000020                    .WORD 16
3909 033176 003270                    .WORD SKEWER
3910 033200 007176                    .WORD SKDAEM
3911 033202          ENDIF
3912 033202                    50170$:
3913
3914          ;SHIFT THE SKEW TO THE NEXT TRACK AND REPEAT.
3915
3916 033202 052702 001000          BIS   #BIT9,R2      ;PREPARE TO SHIFT SKEWED TRK.
3917 033206 006202          ASR   R2            ;SKEW THE NEXT TRACK. ARE WE DONE YET?
3918 033210 103730          BCS   1$           ;BR IF NOT.
3919
3920 033212          ENDSUB
3921 033212          L10062:
3922 033212 104403                    TRAP  C$ESUB
3923
3924 033214          LET R1 := ORORDY OR ORTRAC OR ORDATA
3925 033214 013701 002372          MOV   ORORDY,R1
3926 033220 053701 002376          BIS   ORTRAC,R1
3927 033224 053701 002400          BIS   ORDATA,R1
3928 033230          LET R1 := R1 OR ORTRDD
3929 033230 053701 002402          BIS   ORTRDD,R1
3930 033234          IF R1 NE #0 THEN
3931 033234 005701                    TST   R1
3932 033236 001406                    BEQ   50171$
3933 033240          ERRHRD 16,SKEWER
3934 033240 104456                    TRAP  C$ERHRD
3935 033242 000020                    .WORD 16
3936 033244 003270                    .WORD SKEWER
3937 033246 000000                    .WORD 0
3938 033250          CALL MSORT2
3939 033250 004737 020216          JSR   PC,MSORT2
3940 033254          ENDIF
3941 033254                    50171$:
3942
3943          .EVEN
3944
3945
3946 033254          L10060: ENDTST
3947 033254
3948 033254 104401                    TRAP  C$ETST
```

```

3949          .SBTTL TEST 7: P.E. DEAD TRACK TEST.
3950
3951          ;TEST 7 CHECKS THE DEAD TRACK LOGIC BY RIPPLING A DEAD TRACK THRU
3952          ;A FIELD OF LIVE TRACKS AND ONE LIVE TRACK THRU A FIELD OF DEAD
3953          ;TRACKS.  ADDITIONALLY, EACH SUBTEST WILL SEND 1'S DATA AND 0'S
3954          ;DATA  IN ORDER TO TEST THE 1'S OR DEAD REGISTER AND THE
3955          ;0'S OR DEAD REGISTER.
3956
3957          ;REGISTER USAGE:
3958          ;      R2=PREAMBLE ALL 1'S CHARACTER
3959          ;      R3=1ST DATA BYTE (BITS 0-8)
3960          ;      R4=2ND DATA BYTE (BITS 0-8)
3961
3962          ;      DTKIDN=DEAD TRACK DEFINED IN BITS 0-8 (0=LIVE TRK; 1-DEAD TRK.)
3963
3964 033256      BGNTST
3965 033256      T7::
3966
3967 033256      CALL SCHEXE
3968 033256 004737 015746      JSR PC,SCHEXE
3969 033262      CALL WAITMT
3970 033262 004737 015174      JSR PC,WAITMT
3971 033266      INCR R1 FROM #0 TO #12 BY #2
3972 033266 005001      CLR R1
3973 033270 000402      BR 50172$
3974 033272      50173$:
3975 033272 062701 000002      ADD #2,R1
3976 033276      50172$:
3977 033276 020127 000012      CMP R1,#12
3978 033302 003003      BGT 50174$
3979 033304      LET ORDTBL(R1) := #0      ;CLEAR 6 LOC OF ORED WRAP REG TABLES
3980 033304 005061 002372      CLR ORDTBL(R1)
3981 033310      ENDINC
3982 033310 000770      BR 50173$
3983 033312      50174$:
3984
3985 033312      BGNSUB
3986 033312      T7.1:
3987 033312 104402      TRAP C$BSUB
3988
3989          ;THIS SUBTEST RIPPLES A DEAD TRACK IN A FIELD OF LIVE TRACKS.
3990
3991 033314 012702 000777      MOV #777,R2      ;PREAMBLE
3992 033320 012703 000777      MOV #777,R3      ;BYTE 1 DATA.
3993 033324 005004      CLR R4      ;BYTE 2 DATA.
3994 033326 012737 000400 002416 1$:      MOV #400,DTKIDN      ;SETUP TO SHIFT 1 DEAD TRACK.
3995 033334 004737 016154      JSR PC,PEINIT      ;SET DATA AND VCO MODE IN FMT CONTROL.
3996 033340 112745 000012      MOVB #FC.DAT!FC.VCO,-(R5)
3997 033344 004737 016176      JSR PC,PEDATA      ;LOAD DATA IN DIABLK AND CALCULATE EXPECTED DATA
3998 033350 004737 015722      JSR PC,DIAEXE      ;EXECUTE IT.
3999
4000          ;CHECK FOR ERRORS AND REPORT IF ANY.
4001
4002 033354 005037 002436      CLR ERRFLG      ;INIT ERROR FLAG.
4003 033360 004737 016504      JSR PC,PEERCK      ;CHECK FOR ERRORS.
4004 033364      IFB ERRFLG NE #0 ANDB CMPFLG NE #0 THEN

```



```

4005 033364 105737 002436
4006 033370 001407
4007 033372 105737 002212
4008 033376 001404
4009 033400
4010 033400 104456
4011 033402 000021
4012 033404 003310
4013 033406 007176
4014 033410
4015 033410
4016
4017
4018
4019 033410 000241
4020 033412 006237 002416
4021 033416 103346
4022
4023
4024
4025 033420 105703
4026 033422 001404
4027 033424 005003
4028 033426 012704 000777
4029 033432 000735
4030 033434
4031 033434 104432
4032 033436 000002
4033
4034 033440
4035 033440
4036 033440 104403
4037
4038 033442
4039 033442
4040 033442 104402
4041
4042
4043
4044 033444 012702 000777
4045 033450 012703 000777
4046 033454 005004
4047 033456 012737 000377 002416 1$:
4048 033464 004737 016154 2$:
4049 033470 112745 000012
4050 033474 004737 016176
4051 033500 004737 015722
4052
4053
4054
4055 033504 005037 002436
4056 033510 004737 016504
4057 033514
4058 033514 105737 002436
4059 033520 001407
4060 033522 105737 002212

ERRHRD 17,DDER,SKDAEM

ENDIF

50175$:

;SHIFT THE DEAD TRACK AND REPEAT.

CLC ;CLR CARRY TO PREPARE FOR SHIFT.
ASR DTKIDN ;SHIFT DEAD TRACK
BCC 2$ ;BR IF ALL TRACKS NOT KILLED YET.

;CHANGE THE DATA AND REPEAT.

TSTB R3 ;DONE?
BEQ 4$ ;BR IF SO.
CLR R3 ;BYTE 1 DATA.
MOV #777,R4 ;BYTE 2 DATA.
BR 1$ ;REPEAT TEST WITH COMPLEMENTED DATA.
EXIT SUB

TRAP C$EXIT
.WORD L10064-.

ENDSUB
L10064:

TRAP C$ESUB

BGNSUB
T7.2:

TRAP C$BSUB

;THIS SUBTEST RIPPLES A LIVE TRACK IN A FIELD OF DEAD TRACKS.

MOV #777,R2 ;PREAMBLE.
MOV #777,R3 ;BYTE 1 DATA.
CLR R4 ;BYTE 2 DATA.
MOV #377,DTKIDN ;SETUP TO SHIFT 1 LIVE TRACK.
JSR PC,PEINIT ;SET WRAP TSK ADR AND DIABLK INDEX.
MOVB #FC.DAT!FC.VCO,-(R5) ;SET DATA AND VCO MODE IN FMT CNTRL.
JSR PC,PEDATA ;LOAD DIABLD AND GENERATE EXPECTED DATA.
JSR PC,DIAEXE ;DO IT.

;CHECK FOR ERRORS.

CLR ERRFLG ;INIT ERROR FLAG.
JSR PC,PEERCK ;CHECK FOR ERRORS.
IFB ERRFLG NE #0 ANDB CMPFLG NE #0 THEN

TSTB ERRFLG
BEQ 50176$
TSTB CMPFLG

```

```

4061 033526 001404                                BEQ      50176$
4062 033530                                ERRHRD  17,DDER,SKDAEM
4063 033530 104456                                TRAP    C$ERHRD
4064 033532 000021                                .WORD  17
4065 033534 003310                                .WORD  DDER
4066 033536 007176                                .WORD  SKDAEM
4067 033540                                ENDIF
4068 033540                                50176$:
4069
4070                                ;SHIFT THE LIVE TRACK AND REPEAT.
4071
4072 033540 052737 001000 002416                BIS     #BIT9,DTKIDN      ;PREPARE FOR DATA SHIFT.
4073 033546 006237 002416                ASR     DTKIDN            ;SHIFT IT. DONE?
4074 033552 103744                BCS     2$                ;BR IF NOT, CONTINUE.
4075
4076                                ;CHANGE DATA AND REPEAT
4077
4078 033554 105703                TSTB   R3                ;DONE?
4079 033556 001404                BEQ    4$                ;BR IF SO.
4080 033560 005003                CLR    R3                ;BYTE 1 DATA.
4081 033562 012704 000777                MOV    #777,R4           ;BYTE 2 DATA.
4082 033566 000733                BR     1$                ;CONTINUE.
4083
4084
4085 033570                                4$:  EXIT    SUB
4086 033570 104432                                TRAP    C$EXIT
4087 033572 000002                                .WORD  L10065-.
4088
4089 033574                                ENDSUB
4090 033574                                L10065:
4091 033574 104403                                TRAP    C$ESUB
4092
4093 033576                                LET R1 := OROPDY OR ORTRAC OR ORDATA
4094 033576 013701 002372                                MOV     ORORDY,R1
4095 033602 053701 002376                                BIS     ORTRAC,R1
4096 033606 053701 002400                                BIS     ORDATA,R1
4097 033612                                LET R1 := R1 OR ORTRDD
4098 033612 053701 002402                                BIS     ORTRDD,R1
4099 033616                                IF R1 NE #0 THEN
4100 033616 005701                                TST    R1
4101 033620 001406                                BEQ    50177$
4102 033622                                ERRHRD  17,DDER
4103 033622 104456                                TRAP    C$ERHRD
4104 033624 000021                                .WORD  17
4105 033626 003310                                .WORD  DDER
4106 033630 000000                                .WORD  0
4107 033632                                CALL  MSORT2
4108 033632 004737 020216                                JSR    PC,MSORT2
4109 033636                                ENDIF
4110 033636                                50177$:
4111
4112                                .EVEN
4113
4114 033636                                L10063:  ENDTST
4115 033636
4116 033636 104401                                TRAP    C$ETST

```

```

4117 .SBTTL TEST 8: LOOKUP TABLE TEST
4118
4119 ;THIS TEST VEFIFIES THAT THE CONTENTS OF THE ROM LOOKUP TABLE ARE CORRECT.
4120 ;THE ROM CONTENTS IN ADDRESS 0-1777 ARE CHECKED.
4121
4122 :
4123 : DATA & REGISTER USAGE:
4124 :
4125 : ROMLKI = ROM LOOKUP TABLE ADDRESS.
4126 : ERRFLG = ERROR FLAG.
4127 : R5 = DIABLK INDEX.
4128 :
4129 033640 BGNTST
4130 033640 T8::
4131
4132 ;OPEN A ROM LOOKUP TABLE LOCATION.
4133
4134 033640 004737 015746 JSR PC,SCHEXE ;EXECUTE AN SCH COMMAND.
4135 033644 CALL WAITMT
4136 033644 004737 015174 JSR PC,WAITMT
4137 033650 012737 001777 002420 MOV #1777,ROMLKI ;INIT THE ROM TABLE ADDRESS
4138 033656 004737 016154 1$: JSR PC,PEINIT ;SETUP TASK ADR + READ CNTRL.
4139 033662 112745 000003 MOVB #FC.VCO!FC.NRZ,-(R5) ;SET VCO + NRZ1 MODE IN FORMAT CNTRL.
4140 033666 004737 016722 JSR PC,ROMLOK ;LOAD THE DIABLK.
4141 033672 004737 015722 JSR PC,DIAEXE ;EXECUTE IT.
4142
4143 ;CHECK FOR VALID DATA IN THAT LOCATION.
4144
4145 033676 005037 002476 CLR ERRFLG ;INIT ERROR FLAG
4146 033702 004737 017022 JSR PC,ROMEX ;GET EXPECTED DATA
4147 033706 004737 017530 JSR PC,ROMCK ;GET ACTUAL DAIA AND COMPARE WI H
4148 ;EXPECTED.
4149 033712 IFB ERRFLG NE #0 THEN
4150 033712 105737 002436 TSTB ERRFLG
4151 033716 001411 BEQ 50200$
4152 033720 105237 002437 INCB CTLFLG
4153 033724 IFB CMPFLG NE #0 THEN
4154 033724 105737 002212 TSTB CMPFLG
4155 033730 001404 BEQ 50201$
4156 033732 ERRHRD 18,ROMER,ROMEM
4157 033732 104456 TRAP C$ERHRD
4158 033734 000022 .WORD 18
4159 033736 003373 .WORD ROMER
4160 033740 007772 .WORD ROMEM
4161 033742 ENDIF
4162 033742 50201$:
4163 033742 ENDIF 50200$:
4164 033742
4165
4166 ;UPDATE THE ADDRESS AND REPEAT THE TEST UNTIL DONE.
4167
4168 033742 005337 002420 DEC ROMLKI ;DECR ROM ADDRESS - DONE?
4169 033746 100343 BPL 1$ ;OR IF NOT.
4170 033750 IFB CTLFLG NE #0 THEN
4171 033750 105737 002437 TSTB CTLFLG
4172 033754 001404 BEQ 50202$

```

4173	033756		ERRHRD 18,ROMER,ROMLER		
4174	033756	104456			TRAP CSETR.D
4175	033760	000022			.WORD 18
4176	033762	003373			.WORD ROMER
4177	033764	014142			.WORD ROMLER
4178	033766		ENDIF		
4179	033766			502028:	
4180					
4181					
4182					
4183	033766		EXIT TST		
4184	033766	104432			TRAP CSEXIT
4185	033770	000002			.WORD L10066-
4186			.EVEN		
4187					
4188	033772		ENDTST		
4189	033772		L10066:		
4190	033772	104401			TRAP CSETST

```
4191
4192
4193
4194 033774
4195 033774
4196
4197 033774
4198 033774 004737 015746
4199 034000
4200 034000 004737 015174
4201 034004
4202 034004 012727 000764
4203 034010 000000
4204 034012 013727 002116
4205 034016 000000
4206 034020 005367 177772
4207 034024 001375
4208 034026 005367 177756
4209 034032 001367
4210 034034
4211 034034 004737 020704
4212
4213 034040
4214 034040
4215 034040 104401

          .SBTTL TEST 9: IN-LINE MICRO DIAGNOSTIC TEST
          BGNTST
T9::
          CALL SCHEXE
          JSR PC,SCHEXE
          CALL WAITMT
          JSR PC,WAITMT
          DELAY 500.
          MOV #500.,(PC)+
          .WORD 0
          MOV L$DLY,(PC)+
          .WORD 0
          DEC -6(PC)
          BNE .-4
          DEC -22(PC)
          BNE .-20
          CALL MSORT3
          JSR PC,MSORT3
          ENDTST
L10067:
          TRAP C$ETST
```

```
4216
4217
4218
4219 034042
4220 034042
4221
4222 034042 005077 146156
4223 034046
4224 034046 004737 014616
4225 034052
4226 034052 004737 015746
4227 034056
4228 034056 004737 020704
4229
4230
4231 034062
4232 034062
4233 034062 104401
4234
4235 034064
4236
```

```

.SBTTL TEST 10: INIT MICRO DIAGNOSTIC TEST
BGNTST
T10::
CLR @TSSR
CALL WAITSR
CALL SCHEXE
CALL MSORT3
.EVEN
ENDTST
L10070:
TRAP CSETST
ENDMOD
JSR PC,WAITSR
JSR PC,SCHEXE
JSR PC,MSORT3
```

4237
4238
4239
4240
4241
4242
4243
4244
4245
4246
4247
4248
4249
4250
4251
4252
4253
4254
4255
4256
4257
4258
4259
4260
4261
4262
4263
4264
4265
4266
4267
4268
4269
4270
4271
4272
4273
4274
4275
4276

034064

034064 000024
034066
034066 000031
034070 034112
034072 160002
034074 177564
034076
034076 001032
034100 034127
034102 000777
034104 000060
034106 000776

034110
034110 013004

034112 051524 051123 040440
034127 126 041505 047524

034136
034136

.TITLE PARAMETER CODING
SBTTL HARDWARE PARAMETER CODING SECTION
BGNMOD
:
:++
: THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS
: THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES. THE
: MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
: INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES. THE
: MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
: WITH THE OPERATOR.
:--
BGNHRD
LSHARD::
GPRMA TS4ADR,0,0,160002,177564,YES
GPRMD TS4VCT,2,0,777,60,776,YES
EXIT HRD
.NLIST BEX
.ASCIZ /TSSR ADDRESS/
.ASCIZ /VECTOR/
.LIST BEX
.EVEN
ENDHRD
L10071:

.WORD L10071-LSHARD/2

.WORD TSCODE
.WORD TS4ADR
.WORD T\$LOLIM
.WORD T\$HILIM

.WORD TSCODE
.WORD TS4VCT
.WORD 777
.WORD T\$LOLIM
.WORD T\$HILIM

.WORD TSCODE

.EVEN

```

4277      .SBTTL  SOFTWARE PARAMETER CODING SECTION
4278
4279      :++
4280      :IT CONTAINS MACRO THAT ARE USED BY THE SUPERVISOR
4281      :TO BUILD SOFT P-YABLES.  THE MACROS ARE INTERPRETED
4282      :BY THE SUPERVISOR AS DATA STRUCTURES.  THE MACROS
4283      :ALLOW THE SUPERVISOR TO COMMUNICATE WITH THE OPERATOR.
4284      :--
4285
4286      034136      BGNSFT
4287      034136      000034
4288      034140      L$SOFT::
4289
4290      034140      GPRML  ENBMSG,0,1,YES
4291      034140      000130
4292      034142      034150
4293      034144      000001
4294
4295      034146      EXIT SFT
4296      034146      031004
4297
4298      034150      047105  041101  042514  ENBMSG: .NLIST BEX
4299      .ASCIZ /ENABLE DATA COMPARE ERROR PRINTS FOR TESTS 4-7/
4300      034230      .LIST BEX
4301
4302      034230      .EVEN
4303
4304      034230      ENDSFT
4305
4306      L10072:
4307      :*****
4308      :
4309      :      PATCH AREA
4310      034230      000140  PATCH:: .BLKW 96.
4311      :*****
4312
4313      034530      LASTAD
4314
4315      034530      034552
4316      034532      000007
4317      034534      L$LAST::
4318
4319      034534      ENDMOD
4320
4321      .SBTTL  HARD CODED P-TABLE
4322
4323      :++
4324      :DIAG  IS PRE-PARAMETERIZED PER TBL
4325      :--
4326
4327      034534      BGNSETUP 1
4328      034534      BGNPTAB
4329      034534      000000
4330      034536      000000

```


4331 034540 000000
4332 034542 000000
4333 034544 000002
4334 034546
4335 034546 172522
4336 034550 000224
4337 034552
4338 034552
4339 034552
4340
4341 000001

L10073: 172522
224
ENDPTAB
L10075: ENDSETUP
.END

.WORD 0
.WORD 0
.WORD L10075-.12-1

M 11

PARAMETER CODING MACY11 30(1046) 19-AUG-79 20:27 PAGE 114
 CZTSIB.P11 19-AUG-79 20:26 CROSS REFERENCE TABLE -- USER SYMBOLS SEQ 0142

CSGETB= 000026	4#												
CSGETW= 000027	4#												
CSGMAN= 000043	4#												
CSGPHR= 000042	4#	1231	2644										
CSGPLO= 000030	4#												
CSGPRI= 000040	4#												
CSINIT= 000011	4#	2680											
CSINLP= 000020	4#												
CSMANI= 000050	4#												
CSMEM = 000031	4#												
CSMSG = 000023	4#	673	699	725	751	777	809	863	884	912	935	958	982
	1006	1029	1067	1104	1117	1140							
CSOPEN= 000034	4#												
CSPNTB= 000014	4#	660	681	707	733	759	897	920	943	967	991	1014	1038
	1052	1089	1113	1125	1426	2085	2117	2129	2141	2173	2205	2245	2274
	2347	2356	2365	2395	2404	2413	2444	2476	2493	2891	3256		
CSPNTF= 000017	4#	1280	1350	1381	1437	2714	2728						
CSPNTS= 000016	4#												
CSPNTX= 000015	4#	690	716	742	768	786	793	800	818	824	834	844	854
	875	903	926	949	973	997	1020	1095	1131	1208	1340		
CSQIO = 000377	4#												
CSRDBU= 000007	4#												
CSREFG= 000047	4#	2621	2628										
CSRESE= 000033	4#	2878											
CSREVI= 000003	4#	63											
CSRFLA= 000021	4#												
CSRPT = 000025	4#												
CSSEFG= 000046	4#												
CSSPRI= 000041	4#	2779	3235	3264									
CSSEVC= 000037	4#	2664	2699										
CSTPRI= 000013	4#												
C18SDA= 000010 G	362#	1758											
C18SOR= 000004 G	359#	1755											
C18STA= 000007 G	361#	1588	1757										
C18STD= 000011 G	363#	1759											
C18SOD= 000012 G	364#	1760											
C18SID= 000005 G	360#	1756											
DAEM 007406	815	859#											
DAEMA 007461	821	859#											
DAEMB 007530	831	859#											
DAEMC 007617	841	859#											
DAEMD 007701	851	859#											
DASKDD 003336 G	625#												
DATBLD 016126 G	1610#	3623	3656	3691	3732								
DATER 003243 G	625#	3638	3671	3706	3747	3777							
DDER 003310 G	625#	4012	4065	4105									
DESCM 002440 G	625#												
DFPTBL 002204 G	154#												
DIA = 100006 G	343#	512											
DIABLK 002316 G	513	550#	1512	1628									
DIAEXE 015722 G	1530#	3359	3414	3471	3527	3624	3657	3692	3733	3846	3895	3998	4051
	4141												
DIAEXT= 000020 G	342#	515	1628										
DIAGMC= 000000	4												
DIAPKT 002250 G	512#	1532											
DROPU 014570 G	1211	1226#	1342	2716	2730	2894	2971	2987	3048	3061	3101	3122	3134

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CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0143

DTKIDN	002416	G	3149												
			599#	1655	1658	1661	1662	1665	1709	1717	1721	1813*	1824*	1825*	1826*
			3620*	3653*	3687*	3690*	3729*	3833*	3883*	3994*	4020*	4047*	4072*	4073*	
DTRCHK	020334		2251	2257	2264#										
EEM1A	006122		687	695#											
EEM2A	006276		713	721#											
EEM3A	006450		739	747#											
EEM4A	006622		765	773#											
EF.CON=	000036	G	229#												
EF.NEW=	000035	G	230#	2620											
EF.PWR=	000034	G	231#	2627											
EF.RES=	000037	G	228#												
EF.STA=	000040	G	227#												
ENBMSG	034150		4292	4298#											
ENDTBL=	177777	G	349#	1079	1222										
ERRFLG	002436	G	613#	1600*	1790*	2032*	3363*	3369	3418*	3427	3475*	3481	3531*	3540	3628*
			3631	3661*	3664	3696*	3699	3737*	3740	3850*	3853	3899*	3902	4002*	4005
			4055*	4058	4145*	4150									
EVL =	000004	G	247#												
EVNPAR	015560		1469#												
EXDATA	002344	G	572#	838	1660*	1661*	3842*	3892*							
EXORDY	002336	G	569#	830	1659*										
EXPTBL	002336	G	568#	1779											
EXROML	002352	G	575#	870	1885*	1900*	1919*	1925*	1931*	1939*	1954*	1994*	2014*	2030	
EXTRAC	002342	G	571#	789	840	1598	1655*	1656*	1657*	3364*	3419*	3476*	3532*		
EXTRDD	002346	G	573#	850	1658*										
EXODTR	002350	G	574#	848	1665*	1666*	1668*	3843*	3893*						
EX1DTR	002340	G	570#	828	1662*	1663*	3845*	3894*							
ESEND =	002100		4#												
ESLOAD=	000035		4#	87											
FCMASK=	177717	G	298#	3154											
FC.DAT=	000010	G	400#	1612	3836	3886	3996	4049							
FC.FLO=	000100	G	398#												
FC.NRZ=	000001	G	403#	3345	3399	3457	3512	4139							
FC.PRE=	000004	G	401#												
FC.RD =	000200	G	394#												
FC.VCO=	000002	G	402#	1612	3836	3886	3996	4049	4139						
FIXDIA	015672	G	1512#	1518											
FMCTLO=	000004	G	387#												
FMTCH4	005326	G	629#	2138	2362										
FMTCH5	005251	G	629#	2126	2353										
FMTCH6	005174	G	629#	2114	2344										
FMTCTR	005062	G	629#	1110	2082	2170	2202	2242	2271						
FMTSEL	020440		2168	2200	2250	2325#									
FMT.CO=	000040	G	313#												
FMT.C1=	000100	G	312#												
FSAU =	000015		4#	2826	2842										
FSAUTO=	000020		4#	2690	2737										
F\$BGN =	000040		4#	9	182	186	649	670	676	695	702	721	728	747	754
			773	780	805	812	859	866	880	892	908	915	931	938	954
			962	978	986	1002	1009	1025	1033	1062	1084	1100	1108	1120	1136
			1155	1163	1171	1179	2574	2583	2592	2598	2669	2690	2772	2782	2799
			2810	2826	2837	2846	2851	2870	2873	2876	2903	2921	2924	2941	2947
			2999	3016	3026	3065	3076	3084	3087	3105	3109	3231	3271	3276	3324
			3341	3382	3393	3440	3451	3494	3506	3553	3579	3594	3615	3644	3648
			3677	3681	3720	3724	3761	3785	3790	3806	3827	3873	3877	3921	3947

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SEQ 0146

LOT	= 000010	G	248#							
LUNIT	027574		1227	1230	2625*	2632*	2634	2657	2667	2674#
LSACP	002110	G	94#							
LSAPT	002036	G	52#							
LSAU	030112	G	79	2826#						
LSAUT	002070	G	78#							
LSAUTO	027600	G	95	2690#						
LSCCP	002106	G	92#							
LSCLEA	030052	G	93	2772#						
LSCO	002032	G	48#							
LSDEPO	002011	G	30#							
LSDESC	002150	G	85	133#						
LSDESP	002076	G	84#							
LSDEVP	002060	G	70#							
LSDISP	002124	G	55	114#						
LSDLY	002116	G	100#	1264	1307	1399	2611	2955	3032	4204
LSDTP	002040	G	54#							
LSDTYP	002034	G	50#							
LSDU	030074	G	81	2799#						
LSDUT	002072	G	80#							
LSDVTY	002174	G	71	140#						
LSEF	002052	G	65#							
LBETP	002102	G	88#							
LSEXP1	002044	G	58#							
LSEXP2	002046	G	60#							
LSEXP4	002064	G	74#							
LSEXP5	002066	G	76#							
LSHARD	034066	G	37	4253	4254#					
LSHIME	002120	G	102#							
LSHPCP	002016	G	36#							
LSHPTP	002022	G	40#							
LSHW	002204	G	41	152	153#					
LSICP	002104	G	90#							
LSINIT	027316	G	91	2598#						
LSLADP	002026	G	44#							
LSLAST	034534	G	45	4317#	4340					
LSLOAD	002100	G	86#							
LSLUN	002074	G	82#							
LSMREV	002050	G	62#							
LSNAME	002000	G	19#							
LSPRIO	002042	G	56#							
LSPROT	027310	G	97	2583#						
LSPRT	002112	G	96#							
LSREPP	002062	G	72#							
LSREV	002010	G	28#							
LSSOFT	034140	G	39	4287	4288#					
LSSPC	002056	G	68#							
LSSPCP	002020	G	38#							
LSSPTP	002024	G	42#							
LSSTA	002030	G	46#							
LSSW	002212	G	43	170	171#					
LSTEST	002114	G	98#							
LSTIML	002014	G	34#							
LSUNIT	002012	G	32#							
L10000	002210		152	160#						
L10001	002214		170	179#						

L10002	006042	669	672#	
L10003	006216	694	698#	
L10004	006300	720	724#	
L10005	006542	746	750#	
L10006	006714	772	776#	
L10007	007174	804	808#	
L10010	007770	858	862#	
L10011	010140	879	883#	
L10012	010330	907	911#	
L10013	010444	930	934#	
L10014	010540	953	957#	
L10015	010704	977	981#	
L10016	011120	1001	1005#	
L10017	011256	1024	1028#	
L10020	011434	1061	1066#	
L10021	014140	1099	1103#	
L10022	014162	1116#		
L10023	014366	1135	1139#	
L10024	014376	1159#		
L10025	014406	1167#		
L10026	014416	1175#		
L10027	014426	1183#		
L10031	027576	2670	2679#	
L10032	027744	2737#		
L10033	030072	2783	2789#	
L10034	030110	2809	2815#	
L10035	030126	2836	2842#	
L10036	030462	2948	2999#	
L10037	030210	2903#		
L10040	030316	2941#		
L10041	030642	3076#		
L10042	030626	3065#		
L10043	031334	3272	3276#	
L10044	030706	3105#		
L10045	031206	3231#		
L10046	032230	3579#		
L10047	031500	3382#		
L10050	031654	3440#		
L10051	032012	3494#		
L10052	032166	3553#		
L10053	032672	3786	3790#	
L10054	032346	3644#		
L10055	032432	3677#		
L10056	032530	3720#		
L10057	032624	3761#		
L10060	033254	3947#		
L10061	033056	3873#		
L10062	033212	3921#		
L10063	033636	4115#		
L10064	033440	4032	4035#	
L10065	033574	4087	4090#	
L10066	033772	4185	4189#	
L10067	034040	4214#		
L10070	034062	4232#		
L10071	034136	4253	4269	4276#
L10072	034230	4287	4296	4304#

RD.90 = 000006 G	426#																		
RFC 002264 G	521#																		
ROMCK 017530 G	2028#	4147																	
ROMEM 007772 G	866#	4160																	
ROMEMA 010036	372	880#																	
ROMER 003373 G	625#	4159	4176																
ROMEX 017022 G	1885#	4146																	
ROMLER 014142 G	1108#	4177																	
ROMLKI 002420 G	601#	871	1816	1824	1891	1904	1906	1910	1923	1929	1935	1937	1945						
	1963	2005	4137*	4168*															
ROPLOK 016722 G	1813#	4140																	
ROMBLK= 000013 G	365#	2029																	
SCM = 140004 G	344#	503																	
SCHBLK 002276 G	504	530#																	
SCHERA 010244	900	908#																	
SCHERB 010376	923	931#																	
SCHERC 010512	946	954#																	
SCHERD 010634	970	978#																	
SCHERE 010752	988	1002#																	
SCHERF 011036	994	1002#																	
SCHERG 011166	1011	1025#																	
SCHERH 011210	1017	1025#																	
SCHERI 011350	1035	1062#																	
SCHERL 014076	1086	1100#																	
SCHERM 014121	1092	1100#																	
SCHERN 010606	964	978#																	
SCHERR 003047 G	625#	3098	3119	3131	3146	3181	3195	3206	3214	3226									
SCHERO 014032 G	1084#	3227																	
SCHER1 010200 G	892#	3099																	
SCHER2 010332 G	915#	3120																	
SCHER3 010446 G	938#	3132	3147																
SCHER4 010542 G	962#	3182																	
SCHER5 010706 G	986#	3196																	
SCHER6 011122 G	1009#	3207																	
SCHER7 011260 G	1033#	3215																	
SCHEXE 015746 G	1540#	3112	3327	3597	3809	3968	4134	4198	4226										
SCHEXT= 000010 G	340#	506																	
SCHPKT 002240 G	503#	1542	3239*	3241	3261*														
SFPTBL 002212 G	172#																		
SHWRAP 016020 G	1571#	2939	3068																
SIP = 040000 G	347#	3201																	
SKDAEM 007176 G	812#	3639	3672	3707	3748	3861	3910	4013	4066										
SKWER 003270 G	625#	3860	3909	3936															
SPECOM 003422 G	625#																		
SSROFF 002566 G	625#	1200	1332	2725															
SSRON 002623 G	625#	2885																	
SVCGBL= 000000	4#	19	20	28	29	30	31	32	33	34	35	36	37						
	38	39	40	41	42	43	44	45	46	47	48	49	50						
	51	52	53	54	55	56	57	58	59	60	61	62	63						
	65	66	68	69	70	71	72	73	74	75	76	77	78						
	79	80	81	82	83	84	85	86	87	88	89	90	91						
	92	93	94	95	96	97	98	99	100	101	102	103	114						
	115	133	134	140	141	153	154	155	171	172	173	649	650						
	676	677	702	703	728	729	754	755	780	781	812	813	866						
	867	892	893	915	916	938	939	962	963	986	987	1009	1010						
	1033	1034	1084	1085	1108	1109	1120	1121	1155	1156	1163	1164	1171						

SVCINS= 000001

1172	1179	1180	2583	2584	2598	2599	2690	2691	2772	2773	2799	2800
2826	2827	4254	4255	4288	4289	4317#	4318					
4#	20	21	22	23	24	25	26	27	29	31	33	35
37	39	41	43	45	47	49	51	53	55	57	59	61
63	64	66	67	69	71	73	75	77	79	81	83	85
87	89	91	93	95	97	99	101	103	113	115	116	117
118	119	120	121	122	123	124	134	138	141	142	152	170
657	658	659	660	661	668	669	673	678	679	680	681	682
684	685	686	687	688	689	690	691	693	694	699	704	705
706	707	708	710	711	712	713	714	715	716	717	719	720
725	730	731	732	733	734	736	737	738	739	740	741	742
743	745	746	751	756	757	758	759	760	762	763	764	765
766	767	768	769	771	772	777	782	783	784	785	786	787
789	790	791	792	793	794	796	797	798	799	800	801	803
804	809	814	815	816	817	818	819	821	822	823	824	825
827	828	829	830	831	832	833	834	835	837	838	839	840
841	842	843	844	845	847	848	849	850	851	852	853	854
855	857	858	863	868	869	870	871	872	873	874	875	876
878	879	884	894	895	896	897	898	900	901	902	903	904
906	907	912	917	918	919	920	921	923	924	925	926	927
929	930	935	940	941	942	943	944	946	947	948	949	950
952	953	958	964	965	966	967	968	970	971	972	973	974
976	977	982	988	989	990	991	992	994	995	996	997	998
1000	1001	1006	1011	1012	1013	1014	1015	1017	1018	1019	1020	1021
1023	1024	1029	1035	1036	1037	1038	1039	1049	1050	1051	1052	1053
1060	1061	1067	1086	1087	1088	1089	1090	1092	1093	1094	1095	1096
1098	1099	1104	1110	1111	1112	1113	1114	1117	1122	1123	1124	1125
1126	1128	1129	1130	1131	1132	1134	1135	1140	1160	1168	1176	1184
1190	1198	1199	1200	1201	1203	1204	1205	1206	1207	1208	1209	1227
1228	1230	1231	1232	1234	1236	1262	1263	1264	1265	1266	1267	1268
1269	1271	1283	1284	1285	1286	1287	1305	1306	1307	1308	1309	1310
1311	1312	1314	1330	1331	1332	1333	1335	1336	1337	1338	1339	1340
1341	1347	1348	1349	1350	1351	1378	1379	1380	1381	1382	1397	1398
1399	1400	1401	1402	1403	1404	1406	1423	1424	1425	1426	1427	1429
1434	1435	1436	1437	1438	2087	2083	2084	2085	2086	2114	2115	2116
2117	2118	2126	2127	2128	2129	2130	2138	2139	2140	2141	2142	2170
2171	2172	2173	2174	2202	22	2204	2205	2206	2242	2243	2244	2245
2246	2271	2272	2273	2274	2275	2344	2345	2346	2347	2348	2353	2354
2355	2356	2357	2362	2363	2364	2365	2366	2392	2393	2394	2395	2396
2401	2402	2403	2404	2405	2410	2411	2412	2413	2414	2428	2429	2430
2431	2441	2442	2443	2444	2445	2473	2474	2475	2476	2477	2489	2490
2491	2492	2493	2494	2604	2605	2606	2607	2609	2610	2611	2612	2613
2614	2615	2616	2620	2621	2623	2627	2628	2630	2639	2644	2646	2660
2661	2662	2663	2664	2665	2669	2670	2680	2695	2696	2697	2698	2699
2700	2704	2705	2710	2711	2712	2713	2714	2715	2724	2725	2726	2727
2728	2729	2738	2775	2776	2778	2779	2782	2783	2790	2808	2809	2816
2835	2836	2843	2874	2876	2878	2883	2884	2885	2886	2888	2889	2890
2891	2892	2899	2904	2922	2924	2934	2942	2947	2948	2953	2954	2955
2956	2957	2958	2959	2960	2966	2967	2968	2969	2982	2983	2984	2985
3000	3027	3030	3031	3032	3033	3034	3035	3036	3037	3043	3044	3045
3046	3056	3057	3058	3059	3066	3077	3088	3096	3097	3098	3099	3106
3110	3117	3118	3119	3120	3129	3130	3131	3132	3144	3145	3146	3147
3179	3180	3181	3182	3193	3194	3195	3196	3204	3205	3206	3207	3212
3213	3214	3215	3224	3225	3226	3227	3232	3234	3235	3248	3249	3250
3251	3253	3254	3255	3256	3257	3263	3264	3271	3272	3277	3342	3374
3375	3376	3377	3383	3394	3432	3433	3434	3435	3441	3452	3486	3487

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SEQ 0154

TSGMAN= 000000
TSHILI= 000776
TSLAST= 000001
TSLOLI= 000060
TLSYM= 010000

4#													
4257#	4260	4262#	4266										
4#	4315#	4328											
4257#	4259	4262#	4265										
4#	161	180	673	699	725	751	777	809	863	884	912	935	
958	982	1006	1029	1067	1104	1117	1140	1160	1168	1176	1184	2680	
2738	2790	2816	2843	2904	2942	3000	3066	3077	3106	3232	3277	3383	
3441	3495	3554	3580	3645	3678	3721	3762	3791	3874	3922	3948	4036	
4091	4116	4190	4215	4233	4277	4305							

TSLTNO= 000012
T\$NEST= 177777

4318#													
4#	9#	152#	160#	170#	179#	182#	186#	649#	672#	676#	698#	702#	
724#	728#	750#	754#	776#	780#	808#	812#	862#	866#	883#	892#	911#	
915#	934#	938#	957#	962#	981#	986#	1005#	1009#	1028#	1033#	1066#	1084#	
1103#	1108#	1116#	1120#	1139#	1155#	1159#	1163#	1167#	1171#	1175#	1179#	1183#	
2574#	2583#	2588#	2592#	2598#	2679#	2690#	2737#	2772#	2789#	2799#	2815#	2826#	
2842#	2846#	2851#	2871#	2874#	2876#	2898#	2903#	2922#	2924#	2933#	2941#	2999#	
3017#	3027#	3065#	3076#	3085#	3088#	3105#	3110#	3231#	3276#	3325#	3342#	3382#	
3394#	3440#	3452#	3494#	3507#	3553#	3579#	3595#	3616#	3644#	3649#	3677#	3682#	
3720#	3725#	3761#	3790#	3807#	3828#	3873#	3878#	3921#	3947#	3966#	3987#	4035#	
4040#	4090#	4115#	4131#	4189#	4196#	4214#	4221#	4232#	4236#	4242#	4253#	4269	
4275#	4287#	4296	4303#	4320#									

T\$NSO = 000000
T\$NS1 = 000005

9#	182	186#	2574	2583#	2588	2592#	2846	2851#	4236	4242#	4320		
152#	160	170#	179	649#	672	676#	698	702#	724	728#	750	754#	
776	780#	808	812#	862	866#	883	892#	911	915#	934	938#	957	
962#	981	986#	1005	1009#	1028	1033#	1066	1084#	1103	1108#	1116	1120#	
1139	1155#	1159	1163#	1167	1171#	1175	1179#	1183	2598#	2679	2690#	2737	
2772#	2789	2799#	2815	2826#	2842	2871#	2999	3017#	3076	3085#	3276	3325#	
3579	3595#	3790	3807#	3947	3966#	4115	4131#	4189	4196#	4214	4221#	4232	

T\$NS2 = 000002

4253#	4269	4275	4287#	4296	4303								
2874#	2903	2922#	2941	3027#	3065	3088#	3105	3110#	3231	3342#	3382	3394#	
3440	3452#	3494	3507#	3553	3616#	3644	3649#	3677	3682#	3720	3725#	3761	
3828#	3873	3878#	3921	3987#	4035	4040#	4090						

T\$NS3 = 000003
T\$PCNT= 000000
T\$PTAB= 010074
T\$PTMV= 000001
T\$PTNU= 000001
T\$SAVL= 177777
T\$SEGL= 177777
T\$SEKO= 010000
T\$SIZE= 000007
T\$SUBN= 000000

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PARAMETER CODING
CZTSIB.P11

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CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0157

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1291	1293#	1294	1297	1326#	1327	1328#	1329	1395#	1386	1388#	1389	1392		
1393#	1394	1395#	1396	1552#	1553	1558#	1559	1560#	1561	1590#	1591	1631#		
1632	1741#	1742	1744#	1745	1748	1749#	1750	1762#	1763	1782#	1783#	1787		
1794#	1795	1796#	1797	2029#	2030	2061#	2062#	2065	2066#	2067#	2070	2071#		
2072#	2075	2076#	2077	2091#	2092#	2095	2096#	2097#	2100	2101#	2102#	2105		
2106#	2107	2109#	2110	2157#	2158#	2159	2163#	2164	2165#	2168	2176#	2178		
2179#	2182	2187#	2188	2189#	2190	2191#	2194	2196#	2197#	2200	2221#	2222#		
2225	2226#	2227#	2230	2231#	2232#	2235	2236#	2237	2265#	2266#	2267	2296#		
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2454	2455#	2456	2457#	2458	2459#	2460#	2461	2462#	2463	2464#	2466	2467#		
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2659	2667#	2668	2693#	2694	2702#	2703	2758#	2759	2894#	2901#	2937#	2939#		
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\$F\$CAS= 000150
\$F\$DEC= 000220
\$F\$DO = 000340
\$F\$FAL= 000405
\$F\$GOO= 000400

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2191	2194	2196	2197	2200	2218	2221	2222	2225	2226	2227	2230	2231
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SFSLOO = 000200

SFSNAM = 000160

SFSNO = 000403

PARAMETER CODING
CZTSIB.P11

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CROSS REFERENCE TABLE -- USER SYMBOLS

E 13

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\$LSTCN 177777

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2467	2468	2469	2479	2481	2483	2484	2486	2625	2632	2634	2636	2637	
2657	2658	2667	2693	2702	2707	2708	2718	2721	2722	2758	2880	2881	
2894	2901	2927	2928	2937	2939	2963	2964	2971	2979	2980	2987	3022	
3040	3041	3048	3053	3054	3061	3068	3093	3094	3101	3112	3114	3115	
3122	3126	3127	3134	3138	3139	3140	3141	3149	3153	3154	3156	3157	
3158	3159	3161	3162	3163	3164	3166	3168	3169	3170	3172	3173	3174	
3175	3184	3187	3188	3189	3190	3198	3201	3202	3209	3221	3237	3239	
3241	3243	3245	3246	3261	3267	3268	3327	3329	3367	3369	3370	3371	
3372	3422	3423	3425	3427	3428	3429	3430	3479	3481	3482	3483	3484	
3535	3536	3538	3540	3541	3542	3543	3558	3559	3560	3562	3564	3565	
3572	3597	3599	3601	3602	3604	3606	3607	3609	3611	3631	3632	3633	
3634	3664	3665	3666	3667	3699	3700	3701	3702	3740	3741	3742	3743	
3766	3767	3768	3770	3772	3773	3780	3809	3811	3813	3814	3816	3818	
3819	3821	3823	3853	3854	3855	3856	3902	3903	3904	3905	3925	3926	
3927	3929	3931	3932	3939	3968	3970	3972	3973	3975	3977	3978	3980	
3982	4005	4006	4007	4008	4058	4059	4060	4061	4094	4095	4096	4098	
4100	4101	4108	4136	4150	4151	4154	4155	4171	4172	4198	4200	4211	
4224	4226	4228											
	4#	651	652	654	665	666	1043	1044	1046	1057	1058	1246	1247
1249	1250	1251	1254	1255	1257	1260	1261	1273	1275	1276	1278	1280	
1282	1289	1290	1292	1293	1294	1297	1298	1300	1303	1304	1316	1318	
1319	1321	1323	1325	1344	1345	1346	1353	1355	1375	1377	1384	1385	
1387	1388	1389	1392	1408	1410	1413	1415	1416	1418	1420	1422	1431	
1432	1433	1440	1442	1554	1555	1557	1562	1563	1741	1743	1744	1745	
1748	1751	1752	1788	1790	1792	2079	2081	2088	2089	2090	2111	2113	
2120	2121	2122	2123	2125	2132	2133	2134	2135	2137	2144	2145	2146	
2148	2150	2152	2154	2156	2160	2162	2184	2185	2186	2208	2210	2212	
2218	2220	2239	2241	2248	2249	2250	2253	2255	2256	2257	2259	2268	
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2308	2311	2313	2314	2315	2318	2320	2326	2328	2330	2337	2342	2343	
2350	2351	2352	2359	2360	2361	2368	2369	2374	2376	2378	2385	2390	
2391	2398	2399	2400	2407	2408	2409	2416	2417	2425	2427	2438	2440	
2447	2448	2449	2450	2452	2471	2472	2483	2486	2487	2488	2496	2498	
2500	2636	2638	2641	2707	2709	2718	2719	2720	2721	2723	2732	2734	
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3042	3050	3053	3055	3063	3093	3095	3103	3114	3116	3124	3126	3128	
3136	3138	3143	3151	3161	3163	3165	3172	3177	3178	3184	3185	3186	
3187	3192	3198	3199	3200	3201	3203	3209	3210	3211	3217	3219	3221	
3222	3223	3229	3230	3245	3247	3259	3369	3373	3379	3427	3431	3437	
3481	3485	3491	3540	3544	3550	3564	3566	3574	3601	3603	3604	3605	
3608	3611	3612	3631	3635	3641	3664	3668	3674	3699	3703	3709	3740	
3744	3750	3772	3774	3782	3813	3815	3816	3817	3820	3823	3824	3853	
3857	3863	3902	3906	3912	3931	3933	3941	3972	3974	3975	3976	3979	

\$LSTST= 177777

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SEQ 0162

	3982	3983	4005	4009	4015	4058	4062	4068	4100	4102	4110	4150	4152
\$LSITA = 000001	4154	4156	4162	4164	4171	4173	4179						
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	1303	1316	1319	1321	1345	1353	1355	1387	1389	1413	1416	1418	1432
	1440	1442	1554	1563	1743	1745	1752	1792	2089	2121	2133	2145	2148
	2150	2152	2185	2208	2210	2212	2249	2253	2256	2259	2277	2298	2301
	2311	2314	2318	2320	2330	2332	2336	2342	2351	2360	2368	2378	2380
	2384	2390	2399	2408	2416	2448	2471	2487	2496	2498	2500	2641	2719
	2732	2734	2896	2931	2973	2989	3050	3063	3103	3124	3136	3142	3151
	3165	3167	3171	3177	3185	3191	3199	3210	3217	3219	3222	3229	3259
	3379	3437	3491	3550	3574	3603	3605	3612	3641	3674	3709	3750	3782
	3815	3817	3824	3863	3912	3941	3974	3976	3983	4015	4068	4110	4162
	4164	4179											
\$MCALL = 000000	2#	4											
\$NESTL = 177777	4#	651#	665#	1043#	1057#	1246#	1247#	1255#	1260	1273#	1275#	1278#	1280#
	1289#	1290#	1298#	1303	1316#	1318#	1321#	1323#	1344	1353#	1355#	1375#	1384#
	1385#	1408#	1413#	1415#	1418#	1420#	1431	1440#	1442#	1554#	1562#	1741#	1751#
	1788#	1792#	2079#	2088	2111#	2120	2123#	2132	2135#	2144	2148#	2150#	2152#
	2154#	2160#	2184	2208#	2210#	2212#	2218#	2239#	2248	2253#	2255	2259#	2268#
	2277#	2288#	2291#	2298#	2300	2303#	2306#	2311#	2313	2318#	2320#	2326#	2342
	2350	2359	2368#	2374#	2390	2398	2407	2416#	2425#	2438#	2447	2450#	2471#
	2483#	2486	2496#	2498#	2500#	2636#	2641#	2707#	2718	2721#	2732#	2734#	2880#
	2896#	2927#	2931#	2963#	2973#	2979#	2989#	3040#	3050#	3053#	3063#	3093#	3103#
	3114#	3124#	3126#	3136#	3138#	3151#	3161#	3177	3184	3187#	3198	3201#	3209
	3217#	3219#	3221	3229#	3245#	3259#	3369#	3379#	3427#	3437#	3481#	3491#	3540#
	3550#	3564#	3574#	3601#	3611#	3631#	3641#	3664#	3674#	3699#	3709#	3740#	3750#
	3772#	3782#	3813#	3823#	3853#	3863#	3902#	3912#	3931#	3941#	3972#	3982#	4005#
	4015#	4058#	4068#	4100#	4110#	4150#	4154#	4162#	4164#	4171#	4179#		
\$NSKO - 000110	651#	665	1043#	1057	1246#	1278	1280#	1355	1375#	1442	1554#	1562	1741#
	1751	1788#	1792	2079#	2088	2212	2218#	2255	2259	2268#	2277	2288#	2300
	2320	2326#	2342	2350	2359	2368	2374#	2390	2398	2407	2416	2425#	2500
	2636#	2641	2707#	2718	2734	2880#	2896	2927#	2931	2963#	2973	2979#	2989
	3040#	3050	3053#	3063	3093#	3103	3114#	3124	3126#	3136	3138#	3151	3161#
	3177	3184	3221	3229	3245#	3259	3369#	3379	3427#	3437	3481#	3491	3540#
	3550	3564#	3574	3601#	3611	3631#	3641	3664#	3674	3699#	3709	3740#	3750
	3772#	3782	3813#	3823	3853#	3863	3902#	3912	3931#	3941	3972#	3982	4005#
	4015	4058#	4068	4100#	4110	4150#	4164	4171#	4179				
\$NSK1 = 000110	1247#	1275	1289#	1321	1323#	1344	1353	1384#	1418	1420#	1431	1440	2111#
	2120	2152	2154#	2210	2239#	2248	2253	2291#	2298	2303#	2313	2318	2438#
	2447	2498	2721#	2732	3187#	3198	3219	4154#	4162				
\$NSK2 = 000110	1255#	1260	1273	1290#	1318	1385#	1415	2123#	2132	2150	2160#	2184	2208
	2306#	2311	2450#	2486	2496	3201#	3209	3217					
\$NSK3 = 000130	1298#	1303	1316	1408#	1413	2135#	2144	2148	2471#	2483			
\$SAVLE = 177777	4#	665#	666#	1057#	1058#	1250#	1254#	1293#	1297#	1388#	1392#	1562#	1563#
	1744#	1748#	2328#	2330#	2376#	2378#	3163#	3165#	3604#	3608#	3816#	3820#	3975#
	3979#												
\$SSKO = 050173	665#	666	1057#	1058	1250#	1254	1293#	1297	1388#	1392	1562#	1563	1744#
	1748	2328#	2330	2376#	2378	3163#	3165	3604#	3608	3816#	3820	3975#	3979
\$TAGLE = 177777	4#	652#	654#	665#	1044#	1046#	1057#	1249#	1251#	1254#	1257#	1260#	1261#
	1273#	1275#	1276#	1282#	1292#	1294#	1297#	1300#	1303#	1304#	1316#	1318#	1319#
	1325#	1345#	1346#	1353#	1355#	1377#	1387#	1389#	1392#	1410#	1413#	1415#	1416#
	1422#	1432#	1433#	1440#	1442#	1555#	1557#	1562#	1743#	1745#	1748#	1751#	1752#
	1790#	1792#	2081#	2089#	2090#	2113#	2121#	2122#	2125#	2133#	2134#	2137#	2145#
	2146#	2148#	2150#	2152#	2156#	2162#	2185#	2186#	2208#	2210#	2212#	2220#	2241#
	2240#	2250#	2253#	2256#	2257#	2259#	2270#	2277#	2290#	2295#	2298#	2301#	2302#
	2305#	2308#	2311#	2314#	2315#	2318#	2320#	2337#	2342	2350	2351	2359	2360

PARAMETER CODING
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H 13

SEQ 0163

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2720#	2723#	2732#	2734#	2882#	2896#	2929#	2931#	2965#	2973#	2981#	2989#	3042#
3050#	3055#	3063#	3095#	3103#	3116#	3124#	3128#	3136#	3143#	3151#	3172#	3177
3184	3185	3192#	3199#	3200#	3203#	3210#	3211#	3217#	3219#	3221	3222	3229#
3230#	3247#	3259#	3373#	3379#	3431#	3437#	3485#	3491#	3544#	3550#	3566#	3574#
3603#	3605#	3608#	3611#	3612#	3635#	3641#	3668#	3674#	3703#	3709#	3744#	3750#
3774#	3782#	3815#	3817#	3820#	3823#	3824#	3857#	3863#	3906#	3912#	3933#	3941#
3974#	3976#	3979#	3982#	3983#	4009#	4015#	4062#	4068#	4102#	4110#	4152#	4156#
4162#	4164#	4173#	4179#									
4#	651	652#	653	654#	1043	1044#	1045	1046#	1246#	1248	1249#	1250#
1253	1254#	1256	1257#	1261#	1281	1282#	1289#	1291	1292#	1293#	1296	1297#
1299	1300#	1304#	1324	1325#	1344	1346#	1376	1377#	1384#	1386	1387#	1388#
1391	1392#	1409	1410#	1421	1422#	1431	1433#	1554	1555#	1556	1557#	1742
1743#	1744#	1747	1748#	1789	1790#	2080	2081#	2088	2090#	2112	2113#	2120
2122#	2124	2125#	2132	2134#	2136	2137#	2144	2146#	2155	2156#	2161	2162#
2184	2186#	2219	2220#	2240	2241#	2248	2250#	2255	2257#	2269	2270#	2289
2290#	2292	2294	2295#	2300	2302#	2304	2305#	2307	2308#	2313	2315#	2327
2328#	2329	2332	2333#	2336	2337#	2375	2376#	2377	2380	2381#	2384	2385#
2426	2427#	2439	2440#	2447	2449#	2451	2452#	2471	2472#	2486	2488#	2637
2638#	2708	2709#	2718	2720#	2722	2723#	2881	2882#	2928	2929#	2964	2965#
2980	2981#	3041	3042#	3054	3055#	3094	3095#	3115	3116#	3127	3128#	3139
3141	3142	3143#	3162	3163#	3164	3167	3168#	3171	3172#	3188	3190	3191
3192#	3198	3200#	3202	3203#	3209	3211#	3246	3247#	3370	3372	3373#	3428
3430	3431#	3482	3484	3485#	3541	3543	3544#	3565	3566#	3602	3603#	3604#
3607	3608#	3632	3634	3635#	3665	3667	3668#	3700	3702	3703#	3741	3743
3744#	3773	3774#	3814	3815#	3816#	3819	3820#	3854	3856	3857#	3903	3905
3906#	3932	3933#	3973	3974#	3975#	3978	3979#	4006	4008	4009#	4059	4061
4062#	4101	4102#	4151	4152#	4155	4156#	4172	4173#				
655#	656#	663#	664#	665#	666#	1041#	1042#	1047#	1048#	1055#	1056#	1057#
1058#	1157#	1158#	1165#	1166#	1173#	1174#	1181#	1182#	1251#	1254#	1260#	1273#
1275#	1276#	1278#	1279	1294#	1297#	1303#	1316#	1318#	1319#	1321#	1322	1326#
1327#	1328#	1329#	1344#	1345#	1353#	1355#	1389#	1392#	1393#	1394#	1395#	1396#
1413#	1415#	1416#	1418#	1419	1431#	1432#	1440#	1442#	1552#	1553#	1558#	1559#
1560#	1561#	1562#	1563#	1590#	1591#	1631#	1632#	1745#	1748#	1749#	1750#	1751#
1752#	1762#	1763#	1782#	1787#	1792#	1794#	1795#	1796#	1797#	2029#	2030#	2061#
2065#	2066#	2070#	2071#	2075#	2076#	2077#	2088#	2089#	2091#	2095#	2096#	2100#
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2150#	2152#	2157#	2159#	2163#	2164#	2165#	2168#	2176#	2178#	2179#	2182#	2184#
2185#	2187#	2188#	2189#	2190#	2191#	2194#	2196#	2200#	2208#	2210#	2212#	2221#
2225#	2226#	2230#	2231#	2235#	2236#	2237#	2248#	2249#	2253#	2255#	2256#	2259#
2265#	2267#	2277#	2296#	2297#	2298#	2300#	2301#	2309#	2310#	2311#	2313#	2314#
2316#	2317#	2318#	2320#	2330#	2337#	2338#	2339#	2340#	2342#	2350#	2351#	2359#
2360#	2368#	2369#	2378#	2385#	2386#	2387#	2388#	2390#	2398#	2399#	2407#	2408#
2416#	2417#	2422#	2424#	2433#	2435#	2436#	2437#	2447#	2448#	2453#	2454#	2455#
2456#	2457#	2458#	2459#	2461#	2462#	2463#	2464#	2466#	2467#	2470#	2479#	2480#
2481#	2482#	2483#	2484	2486#	2487#	2496#	2498#	2500#	2625#	2626#	2632#	2633#
2634#	2635#	2641#	2657#	2659#	2667#	2668#	2693#	2694#	2702#	2703#	2718#	2719#
2732#	2734#	2758#	2759#	2896#	2931#	2973#	2989#	3050#	3063#	3103#	3124#	3136#
3151#	3153#	3155#	3156#	3160#	3165#	3172#	3173#	3174#	3175#	3177#	3184#	3185#
3198#	3199#	3209#	3210#	3217#	3219#	3221#	3222#	3229#	3230#	3237#	3238#	3239#
3240#	3241#	3242#	3259#	3261#	3262#	3267#	3269#	3367#	3368#	3379#	3422#	3424#
3425#	3426#	3437#	3479#	3480#	3491#	3535#	3537#	3538#	3539#	3550#	3558#	3560#
3561#	3562#	3563#	3574#	3605#	3608#	3609#	3610#	3611#	3612#	3641#	3674#	3709#
3750#	3766#	3768#	3769#	3770#	3771#	3782#	3817#	3820#	3821#	3822#	3823#	3824#
3863#	3912#	3925#	3927#	3928#	3929#	3930#	3941#	3976#	3979#	3980#	3981#	3982#

STAGNU= 050203

STEMP - 050202

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SEQ 0164

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1562	1743#	1745	1748#	1752	1790#	1792	2081#	2089	2090#	2212	2220#	2256
2257#	2259	2270#	2277	2290#	2301	2302#	2320	2337#	2369	2385#	2417	2427#
2500	2638#	2641	2709#	2719	2720#	2734	2882#	2896	2929#	2931	2965#	2973
2981#	2989	3042#	3050	3055#	3063	3095#	3103	3116#	3124	3128#	3136	3143#
3151	3172#	3230	3247#	3259	3373#	3379	3431#	3437	3485#	3491	3544#	3550
3566#	3574	3603#	3605	3608#	3612	3635#	3641	3668#	3674	3703#	3709	3744#
3750	3774#	3782	3815#	3817	3820#	3824	3857#	3863	3906#	3912	3933#	3941
3974#	3976	3979#	3983	4009#	4015	4062#	4068	4102#	4110	4152#	4164	4173#
4179												

\$TSK1 = 050201

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1353	1387#	1389	1392#	1416	1422#	1432	1433#	1440	1557#	1562	1748#	1751
2113#	2121	2122#	2152	2156#	2210	2241#	2249	2250#	2253	2295#	2298	2305#
2314	2315#	2318	2337#	2360	2361#	2369	2385#	2408	2409#	2417	2440#	2448
2449#	2498	2723#	2732	3172#	3222	3223#	3230	3608#	3611	3820#	3823	3979#
3982	4156#	4162										

\$TSK2 = 1 '77

1257#	1260	1261#	1273	1297#	1318	1392#	1415	2125#	2133	2134#	2150	2162#
2185	2186#	2208	2308#	2311	2337#	2351	2352#	2369	2385#	2399	2400#	2417
2452#	2487	2488#	2496	3172#	3185	3186#	3230					

\$TSK3 = 177777

1300#	1303	1304#	1316	1410#	1413	2137#	2145	2146#	2148	2337#	2342	2343#
2369	2385#	2390	2391#	2417	2472#	2483	3172#	3177	3178#	3230		
2337#	2350	2359	2368	2385#	2398	2407	2416	3172#	3184	3221	3229	

\$TSK4 = 050135

3192#	3199	3200#	3219									
-------	------	-------	------	--	--	--	--	--	--	--	--	--

\$TSK5 = 050143

3203#	3210	3211#	3217									
-------	------	-------	------	--	--	--	--	--	--	--	--	--

\$TSK6 = 050145

4#												
----	--	--	--	--	--	--	--	--	--	--	--	--

\$\$ARGC= 000000

\$\$BYTE= 000402

4#	652#	1044#	1255#	1280#	1298#	1323#	1375#	1408#	1420#	1555#	1788#	2079#
2111#	2123#	2135#	2154#	2160#	2218#	2239#	2268#	2288#	2291#	2293#	2303#	2306#
2425#	2438#	2450#	2636#	2707#	2721#	2880#	2927#	2963#	2979#	3040#	3053#	3093#
3114#	3126#	3138#	3140#	3187#	3189#	3201#	3245#	3369#	3371#	3427#	3429#	3481#
3483#	3540#	3542#	3564#	3631#	3633#	3664#	3666#	3699#	3701#	3740#	3742#	3772#
3853#	3855#	3902#	3904#	3931#	4005#	4007#	4058#	4060#	4100#	4150#	4154#	4171#
4#	2341#	2342#	2350	2351#	2359	2360#	2389#	2390#	2398	2399#	2407	2408#

\$\$CASE= 000404

3176#	3177#	3184	3185#	3221	3222#							
4#	1783#	2062#	2067#	2072#	2092#	2097#	2102#	2165#	2179#	2191#	2197#	2222#
2227#	2232#	2467#										

\$\$DST = 000003

\$\$ELOC= 000402

4#	1255#	1259#	1260	1273#	1280#	1298#	1302#	1303	1316#	1323#	1344	1353#
1355#	1375#	1408#	1412#	1413#	1420#	1431	1440#	1442#	1788#	1792#	2079#	2088
2111#	2120	2123#	2132	2135#	2144	2148#	2150#	2152#	2154#	2160#	2184	2208#
2210#	2212#	2218#	2239#	2248	2253#	2255	2259#	2268#	2277#	2288#	2291#	2298#
2300	2303#	2306#	2311#	2313	2318#	2320#	2425#	2438#	2447	2450#	2486	2496#
2498#	2500#	2636#	2641#	2707#	2718	2721#	2732#	2734#	2880#	2896#	2927#	2931#
2963#	2973#	2979#	2989#	3040#	3050#	3053#	3063#	3093#	3103#	3114#	3124#	3126#
3136#	3138#	3151#	3187#	3198	3201#	3209	3217#	3219#	3245#	3259#	3369#	3379#
3427#	3437#	3481#	3491#	3540#	3550#	3564#	3574#	3631#	3641#	3664#	3674#	3699#
3709#	3740#	3750#	3772#	3782#	3853#	3863#	3902#	3912#	3931#	3941#	4005#	4015#
4058#	4068#	4100#	4110#	4150#	4154#	4162#	4164#	4171#	4179#			

\$\$ERFL= 000000

\$\$FLAG= 000001

4#	1278#	1321#	1418#									
4#	651#	652#	654#	1043#	1044#	1046#	1255#	1257#	1273#	1280#	1282#	1298#
1300#	1316#	1323#	1325#	1353#	1355#	1375#	1377#	1408#	1410#	1413#	1420#	1422#
1440#	1442#	1554#	1555#	1557#	1788#	1790#	1792#	2079#	2081#	2111#	2113#	2123#
2125#	2135#	2137#	2148#	2150#	2152#	2154#	2156#	2160#	2162#	2208#	2210#	2212#
2218#	2220#	2239#	2241#	2253#	2259#	2268#	2270#	2277#	2288#	2290#	2291#	2293#
2295#	2298#	2303#	2305#	2306#	2308#	2311#	2318#	2320#	2425#	2427#	2438#	2440#
2450#	2452#	2496#	2498#	2500#	2636#	2638#	2641#	2707#	2709#	2721#	2723#	2732#
2734#	2880#	2882#	2896#	2927#	2929#	2931#	2963#	2965#	2973#	2979#	2981#	2989#

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CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0165

	3040#	3042#	3050#	3053#	3055#	3063#	3093#	3095#	3103#	3114#	3116#	3124#	3126#
	3128#	3136#	3138#	3140#	3143#	3151#	3187#	3189#	3192#	3201#	3203#	3217#	3219#
	3245#	3247#	3259#	3369#	3371#	3373#	3379#	3427#	3429#	3431#	3437#	3481#	3483#
	3485#	3491#	3540#	3542#	3544#	3550#	3564#	3566#	3574#	3631#	3633#	3635#	3641#
	3664#	3666#	3668#	3674#	3699#	3701#	3703#	3709#	3740#	3742#	3744#	3750#	3772#
	3774#	3782#	3853#	3855#	3857#	3863#	3902#	3904#	3906#	3912#	3931#	3933#	3941#
	4005#	4007#	4009#	4015#	4058#	4060#	4062#	4068#	4100#	4102#	4110#	4150#	4152#
	4154#	4156#	4162#	4164#	4171#	4173#	4179#						
\$\$FROM- 000000	4#	1211#	2894#	2901#	2937#	2939#	2971#	2987#	3022#	3048#	3061#	3068#	3101#
	3112#	3122#	3134#	3149#	3243#	3327#	3329#	3572#	3597#	3599#	3780#	3809#	3811#
\$\$LOC = 033754	3939#	3968#	3970#	4108#	4136#	4198#	4200#	4211#	4224#	4226#	4228#		
	4#	653#	654	1045#	1046	1256#	1257	1281#	1282	1299#	1300	1324#	1325
	1376#	1377	1409#	1410	1421#	1422	1556#	1557	1789#	1790	2080#	2081	2112#
	2113	2124#	2125	2136#	2137	2155#	2156	2161#	2162	2219#	2220	2240#	2241
	2269#	2270	2289#	2290	2292#	2293	2294#	2295	2304#	2305	2307#	2308	2329#
	2330	2377#	2378	2426#	2427	2439#	2440	2451#	2452	2484#	2485	2637#	2638
	2708#	2709	2722#	2723	2881#	2882	2928#	2929	2964#	2965	2980#	2981	3041#
	3042	3054#	3055	3094#	3095	3115#	3116	3127#	3128	3141#	3142	3164#	3165
	3190#	3191	3202#	3203	3246#	3247	3370#	3371	3372#	3373	3428#	3429	3430#
	3431	3482#	3483	3484#	3485	3541#	3542	3543#	3544	3565#	3566	3632#	3633
	3634#	3635	3665#	3666	3667#	3668	3700#	3701	3702#	3703	3741#	3742	3743#
	3744	3773#	3774	3854#	3855	3856#	3857	3903#	3904	3905#	3906	3932#	3933
	4006#	4007	4008#	4009	4059#	4060	4061#	4062	4101#	4102	4151#	4152	4155#
	4156	4172#	4173										
\$\$LOCN= 000000	4#												
\$\$REG = 177777	4#												
\$\$RETU= 000000	4#												
\$\$RTN1= 000000	4#												
\$\$RTN2= 000000	4#												
\$\$SRC = 000027	4#	1783#	2062#	2067#	2072#	2092#	2097#	2102#	2165#	2179#	2191#	2197#	2222#
	2227#	2232#	2467#										
\$\$TGSV= 050135	4#	2337#	2338	2339	2340	2368#	2369	2385#	2386	2387	2388	2410#	2417
	3172#	3173	3174	3175	3229#	3230							
\$\$TGS1= 000001	4#	2342#	2343	2351#	2352	2360#	2361	2390#	2391	2399#	2400	2408#	2409
	3177#	3178	3185#	3186	3222#	3223							
\$\$TGS2= 000000	4#												
\$\$TO = 000000	4#	1211#	1212	2894#	2895	2901#	2902	2937#	2938	2939#	2940	2971#	2972
	2987#	2988	3022#	3023	3048#	3049	3061#	3062	3068#	3069	3101#	3102	3112#
	3113	3122#	3123	3134#	3135	3149#	3150	3243#	3244	3327#	3328	3329#	3330
	3572#	3573	3597#	3598	3599#	3600	3780#	3781	3809#	3810	3811#	3812	3939#
	3940	3968#	3969	3970#	3971	4108#	4109	4136#	4137	4198#	4199	4200#	4201
	4211#	4212	4224#	4225	4226#	4227	4228#	4229					
\$\$TAG- 050000	4#												
= 034552	6#	138#	142#	492#	501#	510#	526	630#	653	654	669	694	720
	746	772	804	806#	858	879	881#	887#	907	930	932#	953	955#
	977	979#	1001	1024	1026#	1045	1046	1061	1082#	1099	1101#	1135	1256
	1257	1267	1269	1281	1282	1299	1300	1310	1312	1324	1325	1362#	1376
	1377	1402	1404	1409	1410	1421	1422	1556	1557	1789	1790	2080	2081
	2112	2113	2124	2125	2136	2137	2155	2156	2161	2162	2219	2220	2240
	2241	2269	2270	2289	2290	2292	2293	2294	2295	2304	2305	2307	2308
	2329	2330	2377	2378	2425	2427	2439	2440	2451	2452	2484	2485	2571#
	2614	2616	2637	2638	2670	2708	2709	2722	2723	2762#	2783	2809	2836
	2881	2882	2928	2929	2948	2958	2960	2964	2965	2980	2981	3035	3037
	3041	3042	3054	3055	3094	3095	3115	3116	3127	3128	3141	3142	3164
	3165	3190	3191	3202	3203	3246	3247	3272	3370	3371	3372	3373	3428
	3429	3430	3431	3482	3483	3484	3485	3541	3542	3543	3544	3565	3566

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SEQ 0166

3632	3633	3634	3635	3665	3666	3667	3668	3700	3701	3702	3703	3741
3742	3743	3744	3773	3774	3786	3854	3855	3856	3857	3903	3904	3905
3906	3932	3933	4006	4007	4008	4009	4032	4059	4060	4061	4062	4087
4101	4102	4151	4152	4155	4156	4172	4173	4185	4207	4209	4269	4296
4300#	4310#	4333	4340									

.CORD = 000004 G
 .INCOR= 000002 G
 .MULT = 000200 G
 .PREAM= 000040 G
 .RDFMK= 000100 G
 .OOF9 = 000010 G
 .8OF9 = 000001 G
 .9OF9 - 000020 G

333# 1919
 334# 1925
 328# 1954
 330# 1994
 329# 2014
 332# 1931
 335# 1900
 331# 1939

HEADER	2#	4#	18												
IF	2#	1254	1279	1297	1322	1374	1407	1419	1787	2078	2110	2122	2134	2153	2159
	2217	2238	2267	2287	2290	2302	2305	2424	2437	2449	2635	2720	2879	2926	2962
IFB	2#	2706	3039	3052	3244	3368	3426	3480	3539	3630	3663	3698	3739	3852	3901
	4004	4057	4149	4153	4170										
IFCOND	2#														
IF.ERR	2#														
IF.NO.	2#														
INCR	2#	1246	1289	1384	1740	3600	3812	3971							
INCRU	2#														
INLINE	2#														
INLOOP	2#	4#													
IOSETU	2#	4#													
IOSTAR	2#	4#													
KT11	2#	4#													
LASTAD	2#	4#	4313												
LEAVE	2#	1257	1300	1410											
LET	2#	654	662	1040	1046	1054	1156	1164	1172	1180	1325	1327	1392	1394	1551
	1557	1559	1589	1630	1748	1761	1781	1793	1795	2028	2060	2065	2070	2075	2090
	2095	2100	2105	2108	2156	2162	2164	2175	2178	2186	2188	2190	2195	2220	2225
	2230	2235	2264	2295	2308	2315	2421	2432	2435	2452	2454	2456	2458	2461	2463
	2466	2478	2480	2624	2631	2633	2656	2660	2692	2701	2757	3152	3155	3236	3238
	3240	3260	3266	3366	3421	3424	3478	3534	3537	3557	3560	3561	3608	3765	3768
	3769	3820	3924	3927	3928	3979	4093	4096	4097						
LOCAL	2#														
LOOP	2#														
MANUAL	2#	4#													
MEMORY	2#	4#													
MSBYTE	2#	4#	19#	25	26	27									
MSCHEC	2#	4#	668#	693#	719#	745#	771#	803#	857#	878#	906#	929#	952#	976#	1000#
	1023#	1060#	1098#	1134#	2669#	2782#	2808#	2835#	2947#	3271#	3785#	4031#	4086#	4184#	4269#
MSCNTO	2#	4#	4257#	4262#	4291#										
MSCOUN	2#	4#	657#	678#	684#	704#	710#	730#	736#	756#	762#	782#	789#	796#	814#
	821#	827#	837#	847#	868#	894#	907#	917#	923#	940#	946#	964#	970#	988#	994#
	1011#	1017#	1035#	1049#	1086#	1092#	1110#	1122#	1128#	1203#	1283#	1335#	1347#	1378#	1423#
	1434#	2082#	2114#	2126#	2138#	2170#	2202#	2242#	2271#	2344#	2353#	2362#	2392#	2401#	2410#
	2441#	2473#	2489#	2710#	2724#	2888#	3253#								
MSDATA	2#	4#	19#	28	30	32	34	36	38	40	42	44	46	48	50
	52	54	56	58#	60	62	65	68	70	72	74	76	78	80	82
	84	86	88	90	92	94	96	98	100	102	133#	140#			
MSDECR	2#	4#	160#	179#	182#	672#	698#	724#	750#	776#	808#	862#	883#	911#	934#
	957#	981#	1005#	1028#	1066#	1103#	1116#	1139#	1159#	1167#	1175#	1183#	2574#	2588#	2679#
	2737#	2789#	2815#	2842#	2846#	2898#	2903#	2933#	2941#	2999#	3065#	3076#	3105#	3231#	3276#
	3382#	3440#	3494#	3553#	3579#	3644#	3677#	3720#	3761#	3790#	3873#	3921#	3947#	4035#	4090#
	4115#	4189#	4214#	4232#	4236#	4275#	4303#	4320#	4329#						
MSDEFA	2#	4#	4257#	4262#	4291#										
MSENDE	2#	4#	160#	179#	182#	672#	698#	724#	750#	776#	808#	862#	883#	911#	934#
	957#	981#	1005#	1028#	1066#	1103#	1116#	1139#	1159#	1167#	1175#	1183#	2574#	2679#	2737#
	2789#	2815#	2842#	2846#	2898#	2903#	2933#	2941#	2999#	3065#	3076#	3105#	3231#	3276#	3382#
	3440#	3494#	3553#	3579#	3644#	3677#	3720#	3761#	3790#	3873#	3921#	3947#	4035#	4090#	4115#
	4189#	4214#	4232#	4236#	4275#	4303#	4320#								
MSERRI	2#	4#	1198#	1330#	2428#	2604#	2883#	2966#	2982#	3043#	3050#	3096#	3117#	3129#	3144#
	3179#	3193#	3204#	3212#	3224#	3248#	3374#	3432#	3486#	3545#	3567#	3636#	3669#	3704#	3745#
	3775#	3858#	3907#	3934#	4010#	4063#	4103#	4157#	4174#						

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CROSS REFERENCE TABLE -- MACRO NAMES

SEQ 0170

MSFSCA	2#	4#													
MSESCS	2#	4#													
MSEXCP	2#	4#	4257#	4262#											
MSEXIT	2#	4#	668#	693#	719#	745#	771#	803#	857#	878#	906#	929#	952#	976#	1000#
	1023#	1060#	1098#	1134#	2669#	2670#	2782#	2783#	2808#	2835#	2947#	2948#	3271#	3272#	3785#
	3786#	4031#	4032#	4086#	4087#	4184#	4155#	4269#	4296#						
MSEXSE	2#	4#	668#	693#	719#	745#	771#	803#	857#	878#	906#	929#	952#	976#	1000#
	1023#	1060#	1098#	1134#	2669#	2782#	2808#	2835#	2947#	3271#	3785#	4031#	4086#	4184#	4269#
	4296#														
MSEXTJ	2#	4#	668#	669#	693#	694#	719#	720#	745#	746#	771#	772#	803#	804#	857#
	858#	878#	879#	906#	907#	929#	930#	952#	953#	976#	977#	1000#	1001#	1023#	1024#
	1060#	1061#	1098#	1099#	1134#	1135#	2669#	2782#	2808#	2809#	2835#	2836#	2947#	3271#	3785#
	4031#	4086#	4184#	4269#	4296#										
MSGEN	2#	4#	19#	28#	30#	32#	34#	36#	38#	40#	42#	44#	46#	48#	50#
	52#	54#	56#	58#	60#	62#	65#	68#	70#	72#	74#	76#	78#	80#	82#
	84#	86#	88#	90#	92#	94#	96#	98#	100#	102#	114#	133#	140#	153#	154#
	160#	171#	172#	179#	649#	672#	676#	698#	702#	724#	728#	750#	754#	776#	780#
	808#	812#	862#	866#	883#	892#	911#	915#	934#	938#	957#	962#	981#	986#	1005#
	1009#	1028#	1033#	1066#	1084#	1103#	1108#	1116#	1120#	1139#	1155#	1159#	1163#	1167#	1171#
	1175#	1179#	1183#	2583#	2598#	2679#	2690#	2737#	2772#	2789#	2799#	2815#	2826#	2842#	2870#
	2873#	2898#	2903#	2921#	2933#	2941#	2999#	3016#	3026#	3065#	3076#	3084#	3087#	3105#	3109#
	3231#	3276#	3324#	3341#	3382#	3393#	3440#	3451#	3494#	3506#	3553#	3579#	3594#	3615#	3644#
	3048#	3677#	3681#	3720#	3724#	3761#	3790#	3806#	3827#	3873#	3877#	3921#	3947#	3965#	3986#
	4035#	4039#	4090#	4115#	4130#	4189#	4195#	4214#	4220#	4232#	4254#	4276#	4288#	4304#	4317#
	4334#	4338#													
MSGENB	2#	4#													
MSGETS	2#	4#	160#	179#	182#	672#	698#	724#	750#	776#	808#	862#	883#	911#	934#
	957#	981#	1005#	1028#	1066#	1103#	1116#	1139#	1159#	1167#	1175#	1183#	2574#	2588#	2679#
	2737#	2789#	2815#	2842#	2846#	2898#	2903#	2933#	2941#	2999#	3065#	3076#	3105#	3231#	3276#
	3382#	3440#	3494#	3553#	3579#	3644#	3677#	3720#	3761#	3790#	3873#	3921#	3947#	4035#	4090#
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PARAMETER CODING
CZTSIB.P11

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CROSS REFERENCE TABLE -- MACRO NAMES

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 CZTSIB.P11 19-AUG-79 20:26 CROSS REFERENCE TABLE -- MACRO NAMES SEQ 0178

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	3674	3709	3750	3782	3817	3820	3823	3824	3863	3912	3941	3976	3979	3982	3983		
	4015	4068	4110	4162	4164	4179											
\$SEGETT	2#	1260	1303	1344	1431	2088	2120	2132	2144	2184	2248	2255	2300	2313	2342		
	2350	2351	2359	2360	2390	2398	2399	2407	2408	2447	2486	2718	3177	3184	3185		
	3198	3209	3221	3222													
\$SELPCN	2#	1250	1293	1388	1744	3604	3816	3975									
\$SEPOP	2#	665	666	1057	1058	1251	1254	1260	1273	1275	1276	1278	1294	1297	1303		
	1316	1318	1319	1321	1345	1353	1355	1389	1392	1413	1415	1416	1418	1432	1440		
	1442	1562	1563	1745	1748	1751	1752	1792	2089	2121	2133	2145	2148	2150	2152		
	2185	2208	2210	2212	2249	2253	2256	2259	2277	2298	2301	2311	2314	2318	2320		
	2330	2368	2369	2378	2416	2417	2448	2483	2487	2496	2498	2500	2641	2719	2732		
	2734	2896	2931	2973	2989	3050	3063	3103	3124	3136	3151	3165	3199	3210	3217		

	3219	3229	3230	3259	3379	3437	3491	3550	3574	3605	3608	3611	3612	3641	3674
	3709	3750	3782	3817	3820	3823	3824	3863	3912	3941	3976	3979	3982	3983	4015
	4068	4110	4162	4164	4179										
SSPUSH	2#	651	652	654	665	1043	1044	1046	1057	1246	1247	1249	1250	1254	1255
	1257	1261	1280	1282	1289	1290	1292	1293	1297	1298	1300	1304	1323	1325	1346
	1375	1377	1384	1385	1387	1388	1392	1408	1410	1420	1422	1433	1554	1555	1557
	1562	1741	1743	1744	1748	1788	1790	2079	2081	2090	2111	2113	2122	2123	2125
	2134	2135	2137	2146	2154	2156	2160	2162	2186	2218	2220	2239	2241	2250	2257
	2268	2270	2288	2290	2291	2295	2302	2303	2305	2306	2308	2315	2326	2328	2337
	2374	2376	2385	2425	2427	2438	2440	2449	2450	2452	2471	2472	2488	2636	2638
	2707	2709	2720	2721	2723	2880	2882	2927	2929	2963	2965	2979	2981	3040	3042
	3053	3055	3093	3095	3114	3116	3126	3128	3138	3143	3161	3163	3172	3187	3192
	3200	3201	3203	3211	3245	3247	3369	3373	3427	3431	3481	3485	3540	3544	3564
	3566	3601	3603	3604	3608	3631	3635	3664	3668	3699	3703	3740	3744	3772	3774
	3813	3815	3816	3820	3853	3857	3902	3906	3931	3933	3972	3974	3975	3979	4005
	4009	4058	4062	4100	4102	4150	4152	4154	4156	4171	4173				
SSSELE	2#	2337	2338	2339	2340	2385	2386	2387	2388	3172	3173	3174	3175		
SSSETS	2#	651	652	654	665	1043	1044	1046	1057	1246	1247	1249	1250	1254	1255
	1257	1261	1280	1282	1289	1290	1292	1293	1297	1298	1300	1304	1323	1325	1346
	1375	1377	1384	1385	1387	1388	1392	1408	1410	1420	1422	1433	1554	1555	1557
	1562	1741	1743	1744	1748	1788	1790	2079	2081	2090	2111	2113	2122	2123	2125
	2134	2135	2137	2146	2154	2156	2160	2162	2186	2218	2220	2239	2241	2250	2257
	2268	2270	2288	2290	2291	2295	2302	2303	2305	2306	2308	2315	2326	2328	2337
	2343	2352	2361	2374	2376	2385	2391	2400	2409	2425	2427	2438	2440	2449	2450
	2452	2471	2472	2488	2636	2638	2707	2709	2720	2721	2723	2880	2882	2927	2929
	2963	2965	2979	2981	3040	3042	3053	3055	3093	3095	3114	3116	3126	3128	3138
	3143	3161	3163	3172	3178	3186	3187	3192	3200	3201	3203	3211	3223	3245	3247
	3369	3373	3427	3431	3481	3485	3540	3544	3564	3566	3601	3603	3604	3608	3631
	3635	3664	3668	3699	3703	3740	3744	3772	3774	3813	3815	3816	3820	3853	3857
	3902	3906	3931	3933	3972	3974	3975	3979	4005	4009	4058	4062	4100	4102	4150
SSSETT	2#	2343	2352	2361	2391	2400	2409	3178	3186	3223					

. ABS. 034552 000

ERRORS DETECTED: 0

CZTSIB,CZTSIB/CRF/SOL/EQ:ONEFILE=NLISTF.P11,SVC.SML,SPMAC.SML,LISTF.P11,CZTSIB.P11
 RUN-TIME: 71 77 7 SECONDS
 RUN-TIME RATIO: 170/156-1.0
 CORE USED: 28K (56 PAGES)