RS64

TESTER

MD-11-DZRSA-A

EP DZRSA-A-DL-A

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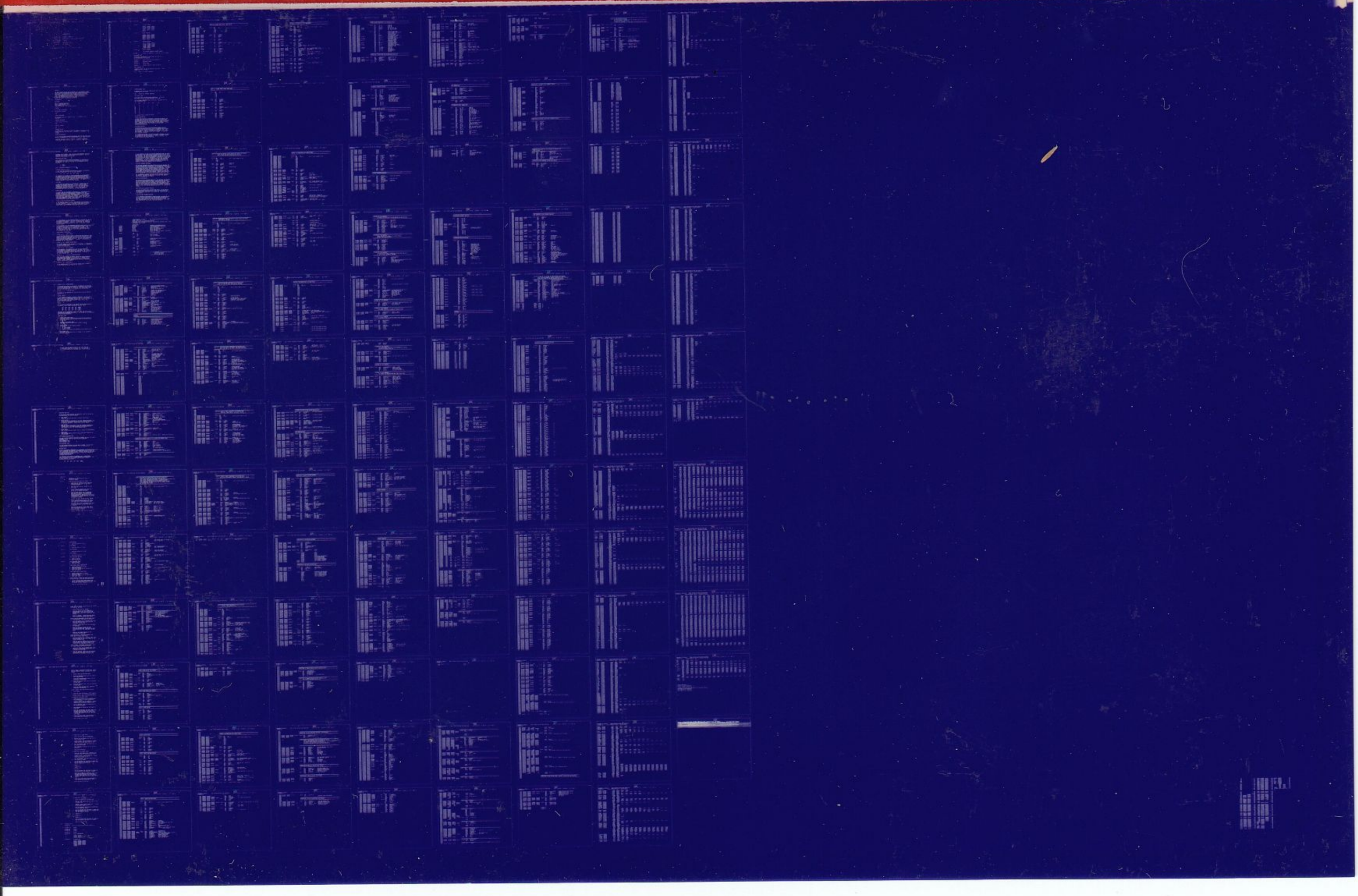

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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZRSA-A-D
PRODUCT NAME: RS64 TESTER MONITOR AND DISK EXERCISER
DATE CREATED: 1-AUG-72
MAINTAINER: DIAGNOSTIC GROUP
AUTHOR: KEN CHAPMAN

THIS PROGRAM IS FOR FACTORY CHECK-OUT AND PRODUCTION USE ONLY.

1. ABSTRACT

THE RS64 TESTER MONITOR AND EXERCISER IS A TIME-SHARING SYSTEM WHICH MONITORS AND SERVICES MULTIPLE RS64 TESTERS WHICH EXERCISE RS64 DISKS. THE OPERATOR OF EACH TESTER STATION HAS CONTROL OVER THE MONITORING OF HIS STATION THROUGH THE STATION'S TELE-TYPE. THE OPERATOR HAS THE ABILITY TO RUN AN AUTOMATIC ACCEPTANCE PROGRAM OR ANY ONE OF 20 TESTS, FOR WHICH HE MAY CHOOSE THE DATA AND ADDRESSING PARAMETERS.

2. REQUIREMENTS

2.1 EQUIPMENT

PDP-11 STANDARD PROCESSOR
KW11-L LINE FREQUENCY CLOCK
RS64 TESTERS (UP TO 16)
LT33-DC TELETYPES (ONE PER RS64 TESTER)

2.2 STORAGE

8K OF CORE IS REQUIRED

2.3 PRELIMINARY PROGRAMS

NONE

3. LOADING PROCEDURE

THE STANDARD ABSOLUTE LOADER IS USED. THE PROGRAM IS SELF STARTING.

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

NONE

4.2 STARTING ADDRESS

200

4.3 OPERATOR ACTION

THE OPERATOR OF STATION #0 TYPES THE NUMBER OF STATIONS ON THE SYSTEM, THE DATE, AND THE TIME, IN RESPONSE TO REQUESTS BY THE PROGRAM.

5. OPERATING PROCEDURE

ALL OF THE FOLLOWING OPERATING PROCEDURES ARE FOR EACH INDIVIDUAL STATION, INDEPENDENT OF WHAT IS BEING DONE ON ANY OTHER STATION.

THERE ARE TWO BASIC MODES OF TESTING: AUTOMATIC ACCEPTANCE (AUTO ACCEPT) MODE, AND TEST MODE. IN ADDITION, THERE ARE TWO

DIFFERENT INPUT STATES: MODE SELECTION AND PARAMETER SELECTION. THERE ARE ALSO SEVERAL CONTROL CHARACTERS DESIGNED TO AID THE OPERATOR IN MONITORING THE STATION.

5.1 MODE SELECTION STATE

UPON COMPLETION OF THE STARTING PROCEDURES, ALL STATIONS WILL AUTOMATICALLY RUN TEST 1 AND ENTER THE MODE SELECTION STATE. THE MONITOR WILL THEN WAIT FOR ONE OF TWO COMMANDS FROM THE TELETYPE:

1) TEST
2) ACCEPT

NOTE: TERMINATE COMMANDS WITH A "RETURN."

5.2 PARAMETER SELECTION STATE.

IF TEST MODE WAS SELECTED THE STATION WILL ENTER THE PARAMETER SELECTION STATE AND TYPE THE FOLLOWING HEADING:

TST PAT SEQ TRK SEC WORD

THE OPERATOR IS NOW ABLE TO ENTER WHATEVER TESTING PARAMETERS HE WISHES TO RUN (SEE SECTION 8 FOR PARAMETER DESCRIPTIONS). AFTER ENTERING EACH PARAMETER NUMBER THE OPERATOR MUST TERMINATE IT WITH A SPACE OR A TAB. WHEN ALL REQUIRED PARAMETERS ARE ENTERED THE MONITOR WILL RESPOND WITH "OK." THE OPERATOR THEN TYPES A "RETURN" TO START THE TEST RUNNING.

5.3 TEST MODE

IN TEST MODE THE MONITOR WILL AUTOMATICALLY PERFORM THE TEST SELECTED BY THE ABOVE PROCEDURE. IT WILL TYPE OUT ERROR MESSAGES WHEN ERRORS OCCUR (SEE SECTION 6 FOR ERROR MESSAGE DESCRIPTION) AND UPON COMPLETION IT WILL TYPE THE TIME, DATE AND NUMBER OF ERRORS IT DETECTED. IT WILL THEN ENTER THE PARAMETER SELECTION STATE AND WAIT FOR MORE PARAMETERS.

5.4 ACCEPT MODE

IF ACCEPT MODE WAS SELECTED (IN SECTION 5.1), THE MONITOR AUTOMATICALLY SELECTS THE PREDETERMINED PARAMETERS WHICH ARE INTENDED TO PROVIDE A DATA RELIABILITY INSPECTION OF THE RS64 DRIVE (SEE SECTION 8.7 FOR THESE PARAMETERS.) THE AUTOMATIC ACCEPTANCE TEST TAKES ABOUT 12 1/2 HOURS. EVERY HALF HOUR THE TIME, DATE AND NUMBER OF ERRORS IS TYPED, AND AT THE END, AN ACCEPTANCE MESSAGE IS TYPED. UPON COMPLETION OF AUTO ACCEPT THE MONITOR REENTERS THE MODE SELECTION STATE.

5.5 CONTROL C AND THE CONTINUE COMMAND.

5.5.1 IF THE OPERATOR WISHES TO STOP A TEST BEFORE IT HAS FINISHED, HE MAY TYPE "CONTROL C" (↑C). IF HE WAS IN TEST MODE, HE WOULD THEN RETURN TO THE PARAMETER SELECTION STATE AND IF HE WAS IN ACCEPT MODE HE WOULD RETURN TO THE MODE SELECTION STATES.

5.5.2 IF, AFTER DOING A ↑C THE OPERATOR WISHES TO CONTINUE THE TEST HE WAS RUNNING FROM WHERE IT LEFT OFF, HE MAY DO SO BY TYPING "C" FOLLOWED BY A "RETURN". (CAUTION: THE MONITOR MAY SOMETIMES SKIP PART OF AN OPERATION WHEN "↑C" AND "C" ARE USED, THEREBY CAUSING ERRORS.)

5.5.3 IF THE STATION IS IN THE PARAMETER SELECTION STATE AND A ↑C IS TYPED, THE MONITOR WILL THEN GO INTO THE MODE SELECT STATE. WHEN THIS IS DONE C (CONTINUE) WILL NO LONGER WORK. LIKEWISE IF TWO SUCCESSIVE ↑C'S ARE TYPED, NO MATTER WHAT THE ORIGINAL STATE WAS, THE STATION WILL END UP IN THE MODE SELECTION STATE AND C (CONTINUE) WILL NOT WORK.

5.6 OTHER CONTROL CHARACTERS.

5.6.1 CONTROL L (↑L) - LOOP ON TEST

IF THE OPERATOR WISHES TO REPEAT A PARTICULAR TEST OVER AND OVER AGAIN, I.E. LOOP ON THAT TEST, HE MAY DO SO BY TYPING A ↑L. THE MONITOR AUTOMATICLY RESTARTS THAT TEST WITH THE SAME PARAMETERS EVERY TIME IT HAS COMPLETED THE TEST. TO STOP THE LOOPING, THE OPERATOR SIMPLY TYPES ANOTHER ↑L. (CAUTION: THIS SWITCH IS DESIGNED FOR TEST MODE ONLY!)

5.6.2 CONTROL A (↑A) - ABORT 5 MINUTE READ.

THE ↑A ONLY WORKS ON TEST 20 WHILE IT IS RUNNING. IT TERMINATES THE READING BEFORE THE 5 MINUTES IS UP. (SEE TEST 20 DESCRIPTION IN SEC 8 FOR MORE DETAIL)

5.6.3 CONTROL B (↑B) - BELL ON ERROR

FOR CALIBRATING, THE OPERATOR MAY WANT TO KNOW IMMEDIATELY WHEN AN ERROR IS OCCURING AND WHEN IT GOES AWAY. BY TYPING ↑D (TO SUPPRESS THE ERROR MESSAGES) AND THEN ↑B, THE BELL ON THE TELETYPE WILL RING EVERY TIME AN ERROR OCCURS. A SECOND ↑B WILL SHUT THE BELL OFF.

5.6.4 CONTROL D (↑D) - DISCONTINUE ERROR MESSAGES

SINCE THE ERROR MESSAGE IS RATHER LENGTHY AND TIME CONSUMMING, THE OPERATOR MAY SUPPRESS IT BY TYPING ↑D. A SECOND ↑D WILL RETURN THE ERROR MESSAGE, PROVIDED LESS THAN 64 ERRORS HAVE OCCURED. (NOTE: ERROR MESSAGES ARE AUTOMATICALLY SUPPRESSED AFTER 64 ERRORS HAVE OCCURED).

5.6.5 CONTROL E (↑E) - ERROR COUNT

IF THE OPERATOR WANTS TO KNOW HOW MANY ERRORS HAVE OCCURRED ON THE TEST BEING RUN HE MAY FIND OUT BY TYPING ↑E

5.6.6 CONTROL S (↑S) - STATUS REPORT

IF THE OPERATOR WISHES TO MONITOR THE PROGRESS OF THE TEST HE IS RUNNING, HE MAY DO SO BY TYPING ↑S. THE MONITOR WILL RESPOND WITH THE PARAMETERS THAT THE TESTER IS ON AT THAT MOMENT (SEE SECTION 8 FOR MORE DETAIL), FOLLOWED BY THE TIME AND DATE.

5.6.7 CONTROL T (↑T) - TIME AND DATE.

BY TYPING ↑T THE OPERATOR MAY FIND OUT WHAT TIME THE COMPUTER THINKS IT IS.

5.7 ILLEGAL INPUTS.

IF THE OPERATOR ACCIDENTLY STRIKES A WRONG KEY, THE MONITOR CAN USUALLY DETECT IT IMMEDIATELY AND WILL TYPE A "?" AND THEN WANT HIM TO START THE COMMAND STRING OVER. ALSO IF THE STATION IS IS IN A RUN MODE (TEST MODE OR ACCEPT MODE) IT WILL ONLY ACCEPT CONTROL CHARACTERS.

6. ERRORS

WHEN AN ERROR IS DETECTED BY THE TESTER, THE FOLLOWING MESSAGE IS NORMALLY TYPED (WHERE N REPRESENT AN OCTAL DIGIT):

TST	PAT	SEQ	TRK	SEC	WORD
NN	NN	NN	NN	NN	NNNNNN
ERR	OP	WCT	TRK	SEC	DB
NN	NN	NN	NN	NN	NNNNNN

THE FIRST SET OF PARAMETERS (FIRST TWO LINES) ARE THE MONITOR PARAMETERS AS DESCRIBED IN SECTION 8. THE SECOND SET OF PARAMETERS ARE THE TESTER PARAMETERS.

6.1 ERROR CODE (ERR)

01 ADDRESS SEEK ERROR (ASE):
INDICATES THAT ON A READ SECTOR OR WRITE SECTOR OPERATION, THE SECTOR ADDRESS WAS NOT FOUND IN ONE FULL REVOLUTION OF OF THE DISK

02 ADDRESS PARITY ERROR (APE):
INDICATES A SECTOR ADDRESS PARITY ERROR OCCURRED.

04 CD BIT ERROR:
INDICATES ONE OF FOUR POSSIBLE ERRORS:
A. NO GAP
B. NO CLOCK STROBE
C. NO DATA STROBE
D. THE A.C. LOW SIGNAL WAS GENERATED WHILE RUNNING A TEST

10 DATA ERROR (DE):
INDICATES THE DATA READ DID NOT COMPARE TO THE CONTENTS OF THE DATA REGISTER.

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246                                     IF MORE THAN ONE ERROR OCCURES AT ONE TIME, THE SUM
247                                     OF THE ERROR CODES WILL BE TYPED, I.E. 12 INDICATES
248                                     BOTH A DATA ERROR AND AN ADDRESS PARITY ERROR OCCIRRED.
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6.2 OPERATION CODE (OP)

THE FOLLOWING CODES INDICATE THE OPERATION WHICH THE TESTER WAS PERFORMING WHEN THE ERROR OCCURRED.

00 DISK CLEAR:
CLEAR THE TEST SET AND DISK TO INITIAL CONDITIONS.

02 WRITE SECTOR:
WRITE THE SECTOR INDICATED BY THE DISK ADDRESS REGISTER. ALL 32 WORDS OF THE SECTOR ARE WRITTEN WITH THE WORD CONTAINED IN THE DATA REGISTER. CHECKS FOR A "CD BIT" ERROR.

04 READ SECTOR:
READ THE SECTOR INDICATED BY THE DISK ADDRESS REGISTER AND COMPARE EACH TO THE WORD CONTAINED IN THE DATA REGISTER. ALSO CHECKS "CD BIT" AND SECTOR ADDRESS PARITY.

12 WRITE TRACK:
SAME AS WRITE SECTOR, EXCEPT THAT IT WRITES THE ENTIRE TRACK.

14 READ TRACK:
SAME AS READ SECTOR EXCEPTS THAT IT READS AND COMPARES THE ENTIRE TRACK.

6.3 DISK ADDRESS REGISTER (DA)

THE DISK ADDRESS REGISTER CONTAINS THE ADDRESS AT WHICH THE ERROR OCCURRED. IT IS TYPED AS THREE SEPERATE PARAMETERS.
WORD COUNT (WCT)
TRACK ADDRESS (TRK)
SECTOR ADDRESS (SEC)

6.4 DATA REGISTER (DB)

THE DATA BUFFER CONTAINS THE WORD READ IN ERROR. IF THE ERROR OCCURRED DURING A WRITE OPERATION, THIS IS MEANINGLESS.

7. RESTRICTIONS

BECAUSE THE SYSTEM IS DESIGNED FOR TIMESHARING THE PROGRAM SHOULD NEVER HALT. THEREFORE THE OPERATOR IS SOMEWHAT RESTRICTED IN WHAT HE CAN EXAMINE WHEN AN ERROR OCCURES. HOWEVER, BECAUSE OF THE VARIETY OF TESTS AVAILABLE HE SHOULD BE ABLE TO TRACE MOST PROBLEMS BY WORKING WITHIN THE SYSTEM.

8. PARAMETER DESCRIPTIONS

THE STATUS OF THE MONITOR IS DEPENDENT ON SIX PARAMETERS. WHEN THE STATUS IS TYPED IN ERROR MESSAGES, STATUS REPORTS, AND BY THE OPERATOR, THE FOLLOWING FORMAT IS USED (WHERE N REPRESENTS AN OCTAL DIGIT):

TST	PAT	SEQ	TRK	SEC	WORD
NN	NN	NN	NN	NN	NNNNNN

8.1 TESTS (TST)

TEST 00 PERFORM ALL OF THE FOLLOWING TESTS IN SEQUENTIAL ORDER.

TEST 01 CLEAR THE DISK AND CHECK THE TESTER.

A. CHECK THE CLR COMMAND TO MAKE SURE THE ATTENTION BIT WILL SET AND THE ERROR BITS ARE CLEARED

B. WRITE THE DISK WITH ALL ZEROES, A TRACK AT A TIME.

C. SELECT A RANDOM ADDRESS AND WRITE THAT SECTOR WITH A RANDOM DATA WORD.

D. READ THE SAME SECTOR WITH A DIFFERENT DATA WORD IN THE DB. THIS SHOULD GENERATE A DATA ERROR, WHICH THE MONITOR CHECKS FOR AND, IF DATA READ BY THE TESTER CORRESPONDS TO THE DATA ORIGINALLY WRITTEN, THE ERROR IS IGNORED.

E. REWRITE THE ABOVE SECTOR WITH ALL ZEROES.

F. SELECT ANOTHER RANDOM ADDRESS AND WRITE THAT TRACK WITH A NEW RANDOM DATA WORD.

G. READ THIS TRACK WITH A DIFFERENT DATA WORD IN THE DB AND MAKE THE SAME CHECKS AS IN STEP D.

H. READ JUST ONE SECTOR ON THE ABOVE TRACK WITH A DIFFERENT DATA WORD IN THE DB AND AGAIN CHECK AS IN STEP D.

I. REWRITE THE ABOVE TRACK WITH ALL ZEROES.

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                                TEST 02         READ SECTORS.
                                                A.  READ ONE SECTOR AT A TIME.
                                TEST 03         READ TRACKS.
                                                A.  READ ONE TRACK AT A TIME.
                                TEST 04         WRITE SECTORS
                                                A.  WRITE ONE SECTOR AT A TIME.
                                TEST 05         WRITE TRACKS
                                                A.  WRITE ONE TRACK AT A TIME.
                                TEST 06         WRITE AND READ SECTORS
                                                A.  WRITE A SECTOR
                                                B.  READ THAT SECTOR
                                TEST 07         WRITE AND READ TRACK
                                                A.  WRITE A TRACK
                                                B.  READ THAT TRACK
                                TEST 10         CLEAR, READ, WRITE, READ SECTOR.
                                                A.  WRITE A SECTOR WITH ZEROES.
                                                B.  READ THAT SECTOR
                                                C.  WRITE THAT SECTOR WITH A PATTERN WORD
                                                D.  READ THAT SECTOR.
                                TEST 11         CLEAR, READ, WRITE, READ TRACK
                                                A.  WRITE A TRACK WITH ALL ZEROES
                                                B.  READ THAT TRACK
                                                C.  WRITE THAT TRACK WITH A PATTERN WORD.
                                                D.  READ THAT TRACK.
                                TEST 12         WRITE A SECTOR, CHANGE THE TRACKS AND REPEAT
                                                FOR REST OF DISK, THEN READ SECTORS WRITTEN.
                                                A.  WRITE A SECTOR, THEN CHANGE TRACKS AND
                                                    WRITE THE CORRESPONDING SECTOR ON THAT TRACK
                                                    AND REPEAT FOR ALL TRACKS ON THE DISK.
                                                B.  READ ALL THE SECTORS WRITTEN.
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                                TEST 13         CLEAR, WRITE A SECTOR, CHANGE TRACKS AND REPEAT,
                                                THEN READ ALL SECTORS.

                                                A.  WRITE A TRACK WITH ALL ZEROES

                                                B.  WRITE ONE SECTOR ON THAT TRACK WITH A
                                                    PATTERN WORD.  THEN CHANGE TRACKS AND
                                                    REPEAT A AND B UNTIL ALL TRACKS HAVE BEEN
                                                    WRITTEN.

                                                C.  READ ALL SECTORS.  THERE SHOULD BE ZEROES
                                                    ON ALL SECTORS BUT ONE OF EACH TRACK.

                                TEST 14         WRITE A SECTOR COMPLEMENT PATTERN WORD, WRITE
                                                ALL OTHER SECTORS, THEN READ ALL SECTORS.

                                                A.  WRITE ONE SECTOR WITH A PATTERN WORD, THEN
                                                    WRITE THE REST OF THAT TRACK WITH THE
                                                    COMPLEMENT PATTERN WORD.

                                                B.  WRITE ALL OTHER TRACKS WITH THE COMPLEMENT
                                                    PATTERN WORD.

                                                C.  READ THE ORIGINAL SECTOR WITH THE
                                                    ORIGINAL PATTERN WORD, THEN READ THE REST
                                                    OF THE TRACK WITH THE COMPLEMENT PATTERN
                                                    WORD.

                                                D.  READ ALL THE OTHER TRACKS WITH THE
                                                    COMPLEMENT PATTERN WORD.

                                TEST 15         WRITE ONE SECTOR, COMPLEMENT PATTERN WORD,
                                                WRITE REST OF TRACK, READ TRACK.

                                                A.  WRITE ONE SECTOR WITH A PATTERN WORD, THEN
                                                    WRITE THE REST OF THAT TRACK WITH THE COM-
                                                    PLEMENT PATTERN WORD.

                                                B.  READ THE ORIGINAL SECTOR WITH THE ORIGINAL
                                                    PATTERN WORD, THEN READ THE REST OF THE
                                                    TRACK WITH THE COMPLEMENT PATTERN WORD.

                                TEST 16         WRITE A TRACK, COMPLEMENT PATTERN WORD, WRITE
                                                ALL OTHER TRACKS, THEN READ THE DISK.

                                                A.  WRITE ONE TRACK WITH A PATTERN WORD, THEN
                                                    WRITE ALL OF THE OTHER TRACKS WITH THE
                                                    COMPLEMENT PATTERN WORD.

                                                B.  READ THE ORIGINAL TRACK WITH THE ORIGINAL
                                                    PATTERN WORD THEN READ THE REST OF THE
                                                    DISK WITH THE COMPLEMENT PATTERN WORD.
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                                TEST 17         WRITE A TRACK, COMPLEMENT PATTERN WORD, WRITE
                                                THE TWO ADJACENT TRACKS, THEN READ ALL THREE
                                                TRACKS.

                                                A.  WRITE A TRACK WITH PATTERN WORD

                                                B.  WRITE ONE ADJACENT TRACK WITH THE COMPLE-
                                                    MENT PATTERN WORD.

                                                C.  WRITE THE OTHER ADJACENT TRACK WITH THE
                                                    COMPLEMENT PATTERN WORD.

                                                D.  READ THE ORIGINAL TRACK WITH THE ORIGINAL
                                                    PATTERN WORD.

                                                E.  READ ONE ADJACENT TRACK WITH THE COMPLEMENT
                                                    PATTERN WORD.

                                                F.  READ THE OTHER ADJACENT TRACK WITH THE
                                                    COMPLEMENT PATTERN WORD.

                                TEST 20         WRITE A TRACK, THEN READ IT FOR 5 MINUTES.

                                                A.  WRITE TRACK

                                                B.  READ THE TRACK CONTINUOUSLY FOR 5 MINUTES.

                                                C.  REPEAT STEPS A AND B FOR REMAINING TRACKS.

                                TEST 21         DC POWER FAIL ON A WRITE TRACK

                                                A.  WRITE ALL THE TRACKS WITH A PATTERN WORD,
                                                    THEN WRITE PART OF THEM A SECOND TIME.

                                                B.  DURING A WRITE, TURN DC POWER OFF (IGNORE
                                                    ERRORS WHICH OCCUR WHILE POWER IS OFF)

                                                C.  WAIT 20 SECONDS, THEN TURN POWER BACK ON
                                                    AND CLEAR THE TESTER.

                                                D.  WAIT ANOTHER 20 SECONDS FOR THE POWER TO
                                                    STABILIZE.

                                                E.  READ THE SECTOR WHICH WAS MOST LIKELY THE
                                                    ONE BEING WRITTEN WHEN THE POWER FAIL
                                                    OCCURED, THEN READ THE REST OF THE TRACK.
                                                    (THE MONITOR IGNORES THE FIRST ERROR ON
                                                    THAT TRACK.)

                                                F.  AFTER THE FIRST ERROR IS ENCOUNTERED, ALL
                                                    OTHER ERRORS ARE CONSIDERED AS VALID.

                                                G.  READ THE REST OF THE DISK.
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                                TEST 22         DC POWER FAIL ON A REAL TRACK

                                                A.  WRITE THE DISK WITH A PATTERN WORD.

                                                B.  READ ALL OF THE TRACKS ONCE AND PART OF
                                                    THEM A SECOND TIME.

                                                C.  DURING A READ, TURN DC POWER OFF (IGNORE
                                                    ERRORS WHICH OCCUR WHILE POWER IS OFF.)

                                                D.  WAIT 20 SECONDS, THEN TURN POWER BACK ON
                                                    AND CLEAR THE TESTER.

                                                E.  WAIT ANOTHER 20 SECONDS FOR THE POWER TO
                                                    STABILIZE.

                                                F.  READ THE ENTIRE DISK.

                                TEST 23         AC POWER FAIL ON A WRITE TRACK

                                                A.  WRITE ALL THE TRACKS WITH A PATTERN WORD,
                                                    THEN WRITE PART OF THEM A SECOND TIME.

                                                B.  DURING A WRITE, TURN AC POWER OFF (IGNORE
                                                    ERRORS WHILE POWER IS OFF).

                                                C.  WAIT 20 SECONDS, THEN TURN POWER BACK ON
                                                    AND CLEAR THE TESTER.

                                                D.  WAIT 20 SECONDS FOR THE POWER TO STABILIZE
                                                    AND THE MOTOR TO GET BACK UP TO SPEED, THEN
                                                    TURN AC POWER BACK OFF AGAIN.

                                                E.  REPEAT OF C

                                                F.  REPEAT OF D

                                                G.  REPEAT OF C

                                                H.  WAIT 20 SECONDS FOR THE POWER TO STABILIZE
                                                    AND THE MOTOR TO GET BACK UP TO SPEED.

                                                I.  READ THE SECTOR WHICH WAS MOST LIKELY THE
                                                    ONE BEING WRITTEN WHEN THE POWER FAIL
                                                    OCCURED, THEN READ THE REST OF THE TRACK.
                                                    (THE MONITOR IGNORES THE FIRST ERROR ON THAT
                                                    TRACK).

                                                J.  AFTER THE FIRST ERROR IS ENCOUNTERED, ALL
                                                    OTHER ERRORS ARE CONSIDERED AS VALID.

                                                K.  READ THE REST OF THE DISK.
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TEST 24 AC POWER FAIL ON A READ.

A. WRITE THE DISK WITH A PATTERN WORD

B. READ ALL THE TRACKS ONCE AND PART OF THEM A SECOND TIME.

C. DURING A READ, TURN AC POWER OFF. (IGNORE ERRORS WHILE POWER IS OFF.)

D. WAIT 20 SECONDS, THEN TURN THE POWER BACK ON AND CLEAR THE TESTER.

E. WAIT 20 SECONDS FOR THE POWER TO STABILIZE AND THE MOTOR TO GET BACK UP TO SPEED, THEN TURN AC POWER OFF AGAIN.

F. REPEAT OF D

G. REPEAT OF E

H. REPEAT OF D

I. WAIT 20 SECONDS FOR THE POWER TO STABILIZE AND THE MOTOR TO GET BACK UP TO SPEED.

J. READ THE ENTIRE DISK.

8.2 PATTERNS (PAT)

PATTERN 00 ALL OF THE FOLLOWING EXCEPT PATTERN 12.

PATTERN 01 000000

PATTERN 02 177777

PATTERN 03 125252

PATTERN 04 052525

PATTERN 05 OCTAL CHECKERBOARD:

107070, 070707,
143434, 034343,
161616, 016161,

PATTERN 06 FLOATING ONE:

000001, 000002, 000004,
000010, 000020, 000040,
000100, 000200, 000400,
001000, 002000, 004000,
010000, 020000, 040000,
100000

PATTERN 07 FLOATING ZEROES:

177776, 177775, 177773,
177767, 177757, 177737,
177677, 177577, 177377,
176777, 175777, 173777,
167777, 157777, 137777,
077777

PATTERN 10 ONE'S TRANSFER:

000000, 000001, 000003,
000007, 000017, 000037,
000077, 000177, 000377,
000777, 001777, 003777,
007777, 017777, 037777,
077777, 177777

PATTERN 11 ZERO'S TRANSFER:

177777, 177776, 177774,
177770, 177760, 177740,
177700, 177600, 177400,
177000, 176000, 174000,
170000, 160000, 140000,
100000, 000000

PATTERN 12 RANDOM NUMBERS:

4096 PROGRAM GENERATED RANDOM NUMBERS

PATTERN X ALLOWS THE OPERATOR TO CHOOSE ANY 16 BIT NUMBER.

8.3 SEQUENCES (SEQ).

THE SEQUENCE DETERMINES IN WHAT ORDER THE TRACK AND/OR SECTOR ADDRESSES ARE SELECTED.

SEQUENCE 0 BOTH OF THE FOLLOWING SEQUENCES

SEQUENCE 1 SEQUENCIAL ORDER

SEQUENCE 2 RANDOM ORDER

SEQUENCE X CHOOSE A SPECIFIC TRACK AND SECTOR.

8.4 TRACK ADDRESS (TRK)

A SPECIFIC TRACK CAN ONLY BE SELECTED WHEN SEQ=X. TRACK NUMBERS ARE 0 TO 37 OCTAL.

TRK=X SELECT ALL TRACKS, SEQUENCE 1

8.5 SECTOR ADDRESS (SEC)

A SPECIFIC SECTOR CAN ONLY BE SELECTED WHEN SEQ=X. SECTOR NUMBERS ARE 0 TO 77 OCTAL.

SEC=X SELECT ALL SECTORS, SEQUENCE 1

8.6 DATA WORD (WORD)

ANY 16 BIT WORD CAN BE SELECTED WHEN PAT=X. IT CAN BE SPECIFIED AS A SIX OR LESS CHARACTER OCTAL WORD.

8.7 THE FOLLOWING PARAMETERS ARE AUTOMATICALLY SELECTED FOR THE AUTO ACCEPTANCE TEST.

TST	PAT	SEQ	TRK	SEC	(TIME)
1	1	1	-	-	
2	1	1	-	-	
7	0	1	-	-	
21	3	X	*	X	
22	3	X	*	X	
23	3	X	*	X	
24	3	X	*	X	
15	5	X	*	X	
16	5	1	-	-	
17	5	1	-	-	
20	12	1	-	-	(10:40)

*= A SINGLE TRACK CHOOSEN AT RANDOM

9. PROGRAM DESCRIPTION

THE RS64 DISK MONITOR IS DESIGNED TO MONITOR AND SERVICE THE THE RS64 TEST SETS WHICH CONTROL THE RS64 DISKS UNDER TEST. THE OPERATOR OF EACH TEST STATION HAS CONTROL OVER THE MONITOR THROUGH THE STATION'S TELETYPE WHICH OPERATES UNDER INTERRUPT MODE. THERE ARE THREE MAIN SECTIONS TO THIS PROGRAM: (1) THE MONITORING SECTION, (2) THE INTERRUPT ROUTINES, AND (3) THE MONITOR STATUS BUFFERS.

9.1 MONITORING SECTION

THE MONITORING SECTION IS THE BACKGROUND PROGRAM WHICH IS CONSTANTLY POLLING STATIONS ON LINE TO DETERMINE THEIR STATUS. IF A STATION IS "ACTIVE", MEANING IT IS RUNNING A TEST, THE MONITOR CHECKS TO SEE IF THE OPERATION IS DONE OR IF AN ERROR HAS OCCURRED. IF NEITHER CONDITION IS PRESENT, IT GOES AND POLLS THE NEXT STATION.

IF AN ERROR HAS OCCURED, THE MONITOR STORES A MESSAGE CODE FOR THE TELEPRINTER SERVICE ROUTINE, INCREMENTS THE ERROR COUNTER AND PROCEEDS TO THE NEXT OPERATION. AFTER 64 ERRORS, IT NO LONGER INITIATES THE ERROR PRINTOUT.

IF THE OPERATION IS DONE THE MONITOR DETERMINES FROM THE STATUS BUFFERS WHICH TEST THAT STATION IS EXECUTING AND GOES TO THAT TEST ROUTINE. THE TEST ROUTINE UPDATES THE DATA IN THE MONITOR STATUS BUFFERS AND SENDS THE NECESSARY INFORMATION TO THE TESTER FOR EXECUTION OF THE NEXT OPERATION. IF THE TEST IS DONE THE MONITOR CHECKS IT TO SEE IF OTHER TESTS ARE TO BE PERFORMED AUTOMATICALLY. IF NOT, IT BUFFERS A MESSAGE INDICATING THE NUMBER OF ERRORS AND "DEACTIVATES" THE STATION, ALLOWING THE OPERATOR TO ENTER NEW COMMANDS AND/OR PARAMETERS.

9.2 TELETYPE INTERRUPT ROUTINES

THE TELETYPE INTERRUPT ROUTINES SERVE AS THE LINK BETWEEN THE STATION OPERATOR AND THE MONITOR. THE KEYBOARD INTERRUPT ROUTINE HANDLES THE OPERATOR'S INSTRUCTIONS TO THE MONITOR. INITIALLY THE OPERATOR CAN SELECT "ACCEPT" MODE OR "TEST" MODE. "ACCEPT" MODE AUTOMATICALLY SELECTS PREDETERMINED PARAMETERS FOR THE STATUS BUFFER AND ACTIVATES THE MONITORING SECTION. IN THE "TEST" MODE, THE ROUTINE WAITS FOR THE OPERATOR TO ENTER THE PARAMETERS HE WANTS FROM THE KEYBOARD. WHEN HE HAS ENTERED A SET OF PARAMETERS, THE MONITOR SECTION BEGINS EXECUTING THEM.

THE TELEPRINTER INTERRUPT ROUTINE BUFFERS MESSAGES REQUESTED BY THE MONITOR, ALLOWING THE MONITOR TO CONTINUE TIME SHARING WHILE THE TELEPRINTER IS TYPING.

9.3 MONITOR STATUS BUFFER

THE MONITOR STATUS BUFFERS SERVE AS A LINK BETWEEN THE MONITOR SECTION AND THE TELETYPE ROUTINES. INPUT FROM THE KEYBOARD ROUTINE IS STORED THERE FOR USE BY THE MONITOR SECTION. WHENEVER THE MONITOR HAS OUTPUT MESSAGES, THEY ARE STORED IN THE MONITOR STATUS BUFFER FOR THE TELEPRINTER INTERRUPT ROUTINE TO HANDLE. ALSO, THE MONITOR USES THE STATUS BUFFERS TO DETERMINE WHERE IT IS IN THE TESTING SEQUENCE AND WHAT IT IS SUPPOSED TO DO NEXT.

9.4 REAL TIME CLOCK INTERRUPT ROUTINE

THIS ROUTINE KEEPS TRACK OF WHAT TIME IT IS. IT IS USED TO DETERMINE WHEN A READ INSTRUCTION SHOULD BE TERMINATED AND IT CONTROLS WAIT ROUTINES, THUS LEAVING THE COMPUTER FREE FOR TIME SHARING.

9.5 POWER FAILURE INTERRUPT ROUTINE.

IF THE PROCESSOR EXPERIENCES A POWER FAILURE, THE MONITOR WILL WAIT 30 SECONDS AFTER POWER HAS BEEN RESTORED BEFORE DOING ANYTHING, THUS INSURING ALL DISK MOTORS ARE UP TO SPEED. IT THEN TRANSFERS BACK INTO THE TESTER THE PARAMETERS WHICH WERE BEING EXECUTED AT THE TIME OF THE POWER FAILURE.

10. LISTING

%

```
                                .TITLE  MAINDEC-11-DZRSA-A      RS64 TESTER MONITOR AND EXERCISER
                                .ENABL  ABS
                                ;RS64 DISK TESTER AND DIAGNOSTIC MONITOR
                                ;COPYRIGHT 1970, BY DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASS. 01754
                                ;PROGRAMMER: KEN CHAPMAN

                                ;DEFINITIONS
            177776              PS=177776                   ;ADDRESS OF PROCESSOR STATUS
            000006              RETIME=6                    ;TIME ALLOWED FOR A READ>67MS
            000240              SP=240                      ;ASCII FOR SPACE
            000215              CR=215                      ;ASCII FOR CARRIAGE RETURN
            000212              LF=212                      ;ASCII FOR LINE FEED
            000207              BELL=207                    ;ASCII FOR BELL
            106612              CRLF=106612                 ;ASCII FOR CARRIAGE RETURN, LINE FEED

            000000              .=0                         ;INTERRUPT VECTORS
                                .REPT   100
                                        .+2                 ;NEXT LOCATION
                                        HALT                ;HALT ON INTERRUPT
                                .ENDR
            000024              .=24
000024  022026                          POWER               ;POWER FAILURE INTERUP VECTOR
000026  000340                          340                 ;PRIORITY=7
            000060              .=60
000060  010412                          KIN                 ;KEYBOARD INTERRUPT
000062  000240                          240                 ;PRIORITY=5
000064  014046                          PIN                 ;TELEPRINTER INTERRUPT
000066  000240                          240                 ;PRIORITY=5
            000100              .=100
000100  017052                          CLOCK               ;LINE CLOCK INTERRUPT
000102  000340                          340                 ;PRIORITY=7
            000200              .=200
000200  000167  000574          LOAD:   JMP     BEGIN
000204  000000                          HALT

            000500              .=500
000500  007020                  CYCLE:  7020                ;AC LINE FREQUENCY IN CYCLES PER MINUTE
                                                            ;       7020 FOR 60 HERTZ
                                                            ;       5670 FOR 50 HERTZ
000502  000010                  NUMBER: 10                  ;NUMBER OF STATIONS ON SYSTEM * 10
```

```
                                ;*****************************************************************
                    001000      .=1000
001000  012706  000500          BEGIN:  MOV     #500,%6         ;INITIALIZE STACK POINTER
001004  000005                          RESET                   ;RESET ALL DEVICES ON THE UNIBUS
001006  012767  000340  176762          MOV     #340,PS         ;PRIORITY=7
001014  004767  016420                  JSR     7,DATIN         ;INPUT THE DATE AND TIME
001020  004767  020700                  JSR     7,SETCYC
001024  012777  000100  016404          MOV     #100,@LKS       ;ENABLE LINE FREQUENCY CLOCK
001032  012700  030000                  MOV     #STAT0,%0       ;START OF STATUS BUFFERS
001036  012701  001100                  MOV     #1100,%1        ;$LENGTH OF BUFFERS
001042  005020                  LOGIN:  CLR     (0)+            ;CLEAR BUFFERS
001044  005301                          DEC     %1              ;DONE?
001046  001375                          BNE     LOGIN           ;LOOP BACK

                                ;ACTIVATE TELETYPES AND CLEAR TEST SETS
001050  012767  001130  176726          MOV     #NOSTAT,4       ;SKIP SET UP ON TIME OUT
001056  012767  000340  176722          MOV     #340,6          ;PRIORITY=7
001064  005000                          CLR     %0
001066  052770  000100  032400  LOOP:   BIS     #100,@TKS0(0)   ;SET TK INT ENB
001074  004767  005706                  JSR     7,CLRCS         ;CLEAR TEST SET
001100  012760  100700  030000          MOV     #100700,STAT0(0) ;ACTIVE,TEST 1, TEST MODE
001106  012760  020000  030002          MOV     #020000,ASTAT(0) ;SEQ 1
001114  052760  000020  030004          BIS     #20,FLAGS(0)    ;SET "STARTUP" FLAG
001122  052760  100000  030200          BIS     #100000,CSBUF(0) ;SET WAIT FLAG
001130  062700  000010          NOSTAT: ADD     #10,%0          ;NEXT
001134  020067  177342                  CMP     %0,NUMBER       ;POLLED ALL STATIONS?
001140  001352                          BNE     LOOP            ;NOT DONE POLLING
001142  012767  000006  176634          MOV     #6,4            ;GO TO 6 ON TIME OUT
001150  005067  176632          RESTAR: CLR     6               ;HALT ON TIME OUT
001154  012767  000140  176614          MOV     #140,PS         ;PRIORITY=3
001162  012706  001000                  MOV     #1000,%6        ;RESET STACK POINTER

                                ;*****************************************************************
                                ;*****************************************************************
                                ;MONITOR
                                ;*****************************************************************
                                ;*****************************************************************

001166  005000          START:  CLR     %0              ;CLEAR STATION COUNTER
001170  005760  030000  SCAN:   TST     STAT0(0)        ;TEST STATION STATUS
001174  100406                  BMI     ACTIVE          ;ACTIVE STATION
001176  062700  000010  NEXT:   ADD     #10,%0          ;INC TO NEXT STATION
001202  020067  177274          CMP     %0,NUMBER       ;POLLED ALL STATIONS?
001206  001370                  BNE     SCAN            ;NOT DONE POLLING
001210  000766                  BR      START           ;RESTART AFTER LAST STATION
```

```
                                        ;*****************************************************************************
                                        ;*****************************************************************************
001212  105770  032200          ACTIVE: TSTB    @CSO(0)             ;TEST SET CONTROL STATUS
001216  100425                          BMI     ATTEN               ;ATTN BIT SET
001220  032760  100004  030200          BIT     #100004,CSBUF(0)    ;WAIT FLAG OR READ?
001226  001763                          BEQ     NEXT                ;NO
001230  100572                          BMI     WAIT
001232  016002  030600          READ:   MOV     RTIME(0),%2         ;GET READ START TIME
001236  166702  016164                  SUB     TIME,%2             ;COMPARE TO PRESENT TIME
001242  003402                          BLE     REDOVR              ;TIME OVERFLOWED?
001244  166702  177230                  SUB     CYCLE,%2            ;YES, COMPENSATE
001250  062702  000006          REDOVR: ADD     #RETIME,%2          ;READING TIME
001254  100350                          BPL     NEXT                ;NOT DONE
001256  052760  000200  030200          BIS     #200,CSBUF(0)       ;SET ATTEN TO STOP READING
001264  016070  030200  032200          MOV     CSBUF(0),@CSO(0)    ;DO IT
001272  032770  170000  032200  ATTEN:  BIT     #170000,@CSO(0)     ;TEST FOR ERRORS
001300  001045                          BNE     ERROR
001302  116001  030001          OPDONE: MOVB    STATO+1(0),%1       ;GET TEST #
001306  042701  177700                  BIC     #177700,%1          ;MASK
001312  006301                          ASL     %1                  ;*2
001314  105060  030606                  CLRB    READ3(0)            ;CLR READ ERROR REPEAT COUNTER
001320  116003  030006                  MOVB    PHASE(0),%3         ;PHASE?
001324  100003                          BPL     TESTS
001326  004767  005536                  JSR     7,TEDONE
001332  000721                          BR      NEXT
                                        ;*****************************************************************************
                                        ;*****************************************************************************
001334  004771  001342          TESTS:  JSR     7,@TEST(1)          ;GO TEST
001340  000716                          BR      NEXT

001342  001632          TEST:   TEST0
001344  001634                  TEST1
001346  002464                  TEST2
001350  002552                  TEST3
001352  002622                  TEST4
001354  002664                  TEST5
001356  002736                  TEST6
001360  003026                  TEST7
001362  003234                  TEST10
001364  003356                  TEST11
001366  003500                  TEST12
001370  003610                  TEST13
001372  003770                  TEST14
001374  004202                  TEST15
001376  004366                  TEST16
001400  004522                  TEST17
001402  004766                  TEST20
001404  005264                  TEST21
001406  005606                  TEST22
001410  006040                  TEST23
001412  006422                  TEST24
```

```
 908
 909                                    ;*****************************************************************************
 910
 911  001414  032760  000001  030004  ERROR:  BIT     #1,FLAGS(0)       ;"IGNORE ERRORS" FLAG UP?
 912  001422  001327                    BNE     OPDONE            ;YES
 913  001424  032760  007400  030400            BIT     #7400,PSTAT(0)    ;LAST MESSAGE DONE?
 914  001432  001032                    BNE     ERBUSY            ;NO
 915  001434  005260  030604            INC     ERCONT(0)         ;COUNT NUMBER OF ERRORS
 916  001440  001432                    BEQ     ERCOVE            ;OVERFLOW?
 917  001442  032760  177700  030604            BIT     #177700,ERCONT(0) ;WAISTING PAPER?
 918  001450  001003                    BNE     ERROR1            ;YES, STOP ERROR MESSAGE
 919  001452  005760  030004            TST     FLAGS(0)          ;SUPRESS ERROR TYPE-OUT FLAG UP?
 920  001456  100012                    BPL     ERMES             ;NO
 921  001460  032760  000002  030004  ERROR1: BIT     #2,FLAGS(0)       ;BELL FLAG?
 922  001466  001403                    BEQ     NOBELL
 923  001470  112760  000241  030401            MOVB    #241,PSTAT+1(0) ;MESS 12, LINE 1 - RING BELL
 924  001476  004767  000044            NOBELL: JSR     7,ERREAD
 925  001502  000635                    BR      NEXT
 926
 927  001504  042760  100000  030000  ERMES:  BIC     #100000,STAT0(0) ;DEACTIVATE
 928  001512  112760  000007  030401            MOVB    #007,PSTAT+1(0) ;MESSAGE 0, LINE 7
 929  001520  004767  006636            ERBUSY: JSR     7,CRACT
 930  001524  000624                    BR      NEXT
 931
 932  001526  032760  007400  030400  ERCOVE: BIT     #7400,PSTAT(0)
 933  001534  001371                    BNE     ERBUSY
 934  001536  112760  000142  030401            MOVB    #142,PSTAT+1(0) ;MESS 6, LINE 2 - ERROR COUNT OVERFLOW
 935  001544  000765                    BR      ERBUSY
 936
 937                                    ;*****************************************************************************
 938                                    ;SUBROUTINE TO REPEAT READS UP TO 3 TIMES WHEN ERRORS OCCUR.
 939                                    ;*****************************************************************************
 940
 941  001546  032760  000004  030200  EREAD:  BIT     #4,CSBUF(0)       ;READ?
 942  001554  001411                    BEQ     EREAD1            ;NO
 943  001556  005770  032200            TST     @CSO(0)           ;DATA ERROR?
 944  001562  100006                    BPL     EREAD1            ;NO
 945  001564  105260  030606            INCB    READ3(0)          ;COUNT REPEATS
 946  001570  126027  030606  000003            CMPB    READ3(0),#3       ;DONE 3 REPEATS?
 947  001576  103402                    BLO     EREAD2            ;NO
 948  001600  000167  005202    EREAD1: JMP     CLRCS             ;CLR TESTER AND RTS
 949
 950  001604  012770  000200  032200  EREAD2: MOV     #200,@CSO(0)      ;CLEAR THE ERROR BITS
 951  001612  000167  005136            JMP     TRANS1            ;TRANSFER BUFFS TO TESTER AND RTS
 952
 953                                    ;*****************************************************************************
 954  001616  026760  015604  030600  WAIT:   CMP     TIME,RTIME(0)
 955  001624  001226                    BNE     OPDONE
 956  001626  000167  177344            JMP     NEXT
 957
 958                                    ;*****************************************************************************
 959  001632  000000            TESTO:  HALT
```

```
                                ;*****************************************************************
                                ;TEST1-MAKE SURE THE TESTER WORKS AND THE DISK "FUNCTIONS."
                                ;       FIRST, DO A CLEAR AND MAKE SURE ATTEN BIT SETS.
                                ;       THEN, WRITE THE DISK WITH ZEROES (TO REDUCE CHANGE OF PARITY ER)
                                ;       THEN, WRITE A RANDOM SECTOR WITH A RANDOM PATTERN.
                                ;       THEN, READ THAT SECTOR WITH A DIFFERENT RANDOM PATTERN,
                                ;       THUS GENERATING AN ERROR. CHECK FOR THE CORRECT ERROR.
                                ;       DO THE SAME FOR A TRACK.
                                ;*****************************************************************

001634  006303                  TEST1:  ASL     %3
001636  000173  001642                  JMP     @T1(3)          ;JMP TO RIGHT PHASE OF TEST
001642  001666                  T1:     T1Z
001644  001732                          T1A
001646  002026                          T1B
001650  002054                          T1C
001652  002110                          T1D
001654  002130                          T1E
001656  002144                          T1F
001660  002200                          T1G
001662  002232                          T1H
001664  002252                          T1I

001666  005260  030006          T1Z:    INC     PHASE(0)
001672  005070  032204                  CLR     @DA0(0)
001676  005070  032202                  CLR     @DB0(0)
001702  004767  005100                  JSR     7,CLRCS
001706  052760  100000  030200          BIS     #100000,CSBUF(0) ;SET "WAIT" FLAG
001714  012760  000074  030406          MOV     #74,WAITER(0)   ;SET UP WAIT COUNTER
001722  016760  015500  030600  T1Z1:   MOV     TIME,RTIME(0)   ;SET UP WAIT TIMER
001730  000207                          RTS     7

001732  105770  032200          T1A:    TSTB    @CSO(0)         ;ATTEN BIT SET?
001736  100416                          BMI     T1A2            ;YES
001740  005360  030406                  DEC     WAITER(0)       ;WAITED 1 SEC?
001744  001366                          BNE     T1Z1            ;NO
001746  005260  030604          T1A1:   INC     ERCONT(0)       ;COUNT THE ERRORS
001752  042760  100000  030000          BIC     #100000,STAT0(0);DEACTIVATE
001760  112760  000010  030401          MOVB    #010,PSTAT+1(0) ;MESSO,LINE10
001766  004767  006370                  JSR     7,CRACT
001772  000207                          RTS     7

001774  032770  177577  032200  T1A2:   BIT     #177577,@CSO(0) ;STATUS BUFFER CLEAR?
002002  001361                          BNE     T1A1            ;FAILED TO CLEAR
002004  005770  032204                  TST     @DA0(0)
002010  001356                          BNE     T1A1
002012  105260  030006                  INCB    PHASE(0)
002016  005060  030204                  CLR     DBBUF(0)
002022  000167  004710                  JMP     WTRK

002026  004767  005132          T1B:    JSR     7,NEXTAD
002032  102402                          BVS     T1B1
002034  000167  004676                  JMP     WTRK

002040  105260  030006          T1B1:   INCB    PHASE(0)
```

```
1016  002044  004767  000256                  JSR     7,T1PX          ;GET RANDOM ADDR. AND RANDOM PAT.
1017  002050  000167  004642                  JMP     WSCT            ;WRITE A SECTOR
1018
1019  002054  105260  030006          T1C:    INCB    PHASE(0)
1020  002060  016060  030204  030206          MOV     DBBUF(0),OLDATA(0)
1021  002066  004767  006150                  JSR     7,RANDOM
1022  002072  010160  030204                  MOV     %1,DBBUF(0)
1023  002076  052760  000001  030004          BIS     #1,FLAGS(0)     ;SET "IGNORE ERRORS" FLAG
1024  002104  000167  004616                  JMP     RSCT            ;READ THE SECTOR
1025
1026  002110  105260  030006          T1D:    INCB    PHASE(0)
1027  002114  004767  000232                  JSR     7,T1PY          ;CHECK FOR ERRORS
1028  002120  005060  030204                  CLR     DBBUF(0)        ;CLEAR THAT SECTOR AGAIN
1029  002124  000167  004566                  JMP     WSCT
1030
1031  002130  105260  030006          T1E:    INCB    PHASE(0)
1032  002134  004767  000166                  JSR     7,T1PX          ;GET NEW RAN. ADDR. AND RAN. PAT.
1033  002140  000167  004572                  JMP     WTRK            ;WRITE A TRACK
1034
1035  002144  105260  030006          T1F:    INCB    PHASE(0)
1036  002150  016060  030204  030206          MOV     DBBUF(0),OLDATA(0)
1037  002156  004767  006060                  JSR     7,RANDOM
1038  002162  010160  030204                  MOV     %1,DBBUF(0)
1039  002166  052760  000001  030004          BIS     #1,FLAGS(0)     ;SET "IGNORE ERRORS" FLAG
1040  002174  000167  004546                  JMP     RTRK
1041
1042  002200  105260  030006          T1G:    INCB    PHASE(0)
1043  002204  004767  000142                  JSR     7,T1PY          ;CHECK FOR ERRORS
1044  002210  004767  006026                  JSR     7,RANDOM
1045  002214  010160  030204                  MOV     %1,DBBUF(0)
1046  002220  052760  000001  030004          BIS     #1,FLAGS(0)     ;SET "IGNORE ERRORS" FLAG
1047  002226  000167  004474                  JMP     RSCT
1048
1049  002232  105260  030006          T1H:    INCB    PHASE(0)
1050  002236  004767  000110                  JSR     7,T1PY          ;CHECK FOR ERRORS
1051  002242  005060  030204                  CLR     DBBUF(0)
1052  002246  000167  004464                  JMP     WTRK
1053
1054  002252  105060  030006          T1I:    CLRB    PHASE(0)
1055  002256  005060  030200                  CLR     CSBUF(0)
1056  002262  005070  032200                  CLR     @CSO(0)
1057  002266  005070  032202                  CLR     @DBO(0)
1058  002272  005070  032204                  CLR     @DAO(0)
1059  002276  032760  000020  030004          BIT     #20,FLAGS(0)    ;"START UP" FLAG SET?
1060  002304  001544                          BEQ     TDONE           ;NO
1061  002306  005060  030000                  CLR     STATO(0)
1062  002312  005060  030002                  CLR     ASTAT(0)
1063  002316  005060  030004                  CLR     FLAGS(0)
1064  002322  000167  004600                  JMP     TOUT1
```

```
1065
1066                                    ;*************************************************************************
1067  002326  004767  005710          T1PX:   JSR     7,RANDOM
1068  002332  016760  005130  030204          MOV     LONUM,DBBUF(0)
1069  002340  042701  174000                  BIC     #174000,%1
1070  002344  010160  030202                  MOV     %1,DABUF(0)
1071  002350  000207                          RTS     7
1072                                    ;*************************************************************************
1073  002352  042760  000001  030004  T1PY:   BIC     #1,FLAGS(0)     ;CLR "IGNORE ERRORS" FLAG
1074  002360  032770  070000  032200          BIT     #070000,@CSO(0) ;OTHER THAN DATA ERROR?
1075  002366  001033                          BNE     T1PYC           ;YES, TESTER ERROR
1076  002370  005770  032200                  TST     @CSO(0)         ;DATA ERROR?
1077  002374  100030                          BPL     T1PYC           ;NO, TESTER ERROR
1078  002376  026070  030206  032202          CMP     OLDATA(0),@DBO(0);TESTER READ PROPER ERROR DATA?
1079  002404  001024                          BNE     T1PYC           ;NO, TESTER OR DISK ERROR
1080  002406  017001  032204                  MOV     @DAO(0),%1
1081  002412  032760  000010  030200          BIT     #10,CSBUF(0)
1082  002420  001006                          BNE     T1PYB
1083  002422  042701  174000                  BIC     #174000,%1
1084  002426  026001  030202                  CMP     DABUF(0),%1
1085  002432  001011                          BNE     T1PYC
1086  002434  000207                  T1PYA:  RTS     7
1087
1088  002436  042701  174077          T1PYB:  BIC     #174077,%1
1089  002442  016002  030202                  MOV     DABUF(0),%2
1090  002446  042702  174077                  BIC     #174077,%2
1091  002452  020102                          CMP     %1,%2
1092  002454  001767                          BEQ     T1PYA
1093  002456  005726                  T1PYC:  TST     (6)+            ;INCREMENT STACK POINTER
1094  002460  000167  177262                  JMP     T1A1
```

```
1095
1096                                    ;*************************************************************************
1097                                    ;TEST2 - READ SECTOR (ALL ZEROES)
1098                                    ;*************************************************************************
1099
1100  002464  003012                    TEST2:  BGT     T2A
1101  002466  005260  030006            T2Z:    INC     PHASE(0)
1102  002472  032760  040000  030000            BIT     #40000,STAT0(0) ;ALL TESTS?
1103  002500  001002                            BNE     T2Z1
1104  002502  004767  004674                    JSR     7,PATIN
1105  002506  000167  004214            T2Z1:   JMP     RSCT
1106
1107  002512  004767  004446            T2A:    JSR     7,NEXTAD
1108  002516  102402                            BVS     T2A1
1109  002520  000167  004202                    JMP     RSCT
1110
1111  002524  005060  030006            T2A1:   CLR     PHASE(0)        ;PHASE = 0
1112  002530  032760  000100  030000            BIT     #100,STAT0(0)   ;ACCEPT MODE?
1113  002536  001027                            BNE     TDONE           ;NO, SEE IF DONE
1114  002540  052760  003400  030000            BIS     #3400,STAT0(0)  ;TEST 7
1115  002546  000167  000272                    JMP     T7Z
1116
1117
1118                                    ;*************************************************************************
1119                                    ;TEST3 - READ TRACK (ALL ZEROES)
1120                                    ;*************************************************************************
1121
1122  002552  003012                    TEST3:  BGT     T3A
1123  002554  005260  030006            T3Z:    INC     PHASE(0)
1124  002560  032760  040000  030000            BIT     #40000,STAT0(0) ;ALL TESTS?
1125  002566  001002                            BNE     T3Z1            ;YES
1126  002570  004767  004606                    JSR     7,PATIN
1127  002574  000167  004146            T3Z1:   JMP     RTRK
1128
1129  002600  004767  004360            T3A:    JSR     7,NEXTAD
1130  002604  102402                            BVS     T3A1
1131  002606  000167  004134                    JMP     RTRK
1132
1133  002612  005060  030006            T3A1:   CLR     PHASE(0)
1134  002616  000167  004200            TDONE:  JMP     TESDON
1135
1136                                    ;*************************************************************************
1137                                    ;TEST4 - WRITE SECTOR
1138                                    ;*************************************************************************
1139
1140  002622  003006                    TEST4:  BGT     T4A
1141  002624  005260  030006            T4Z:    INC     PHASE(0)
1142  002630  004767  004546                    JSR     7,PATIN
1143  002634  000167  004056            T4Z1:   JMP     WSCT
1144
1145  002640  004767  004320            T4A:    JSR     7,NEXTAD
1146  002644  102373                            BVC     T4Z1
1147  002646  004767  004620                    JSR     7,NEXPAT
1148  002652  102370                            BVC     T4Z1
1149  002654  005060  030006                    CLR     PHASE(0)
1150  002660  000167  004136                    JMP     TESDON
```

```
1151
1152                                    ;*****************************************************************************
1153                                    ;TEST5 - WRITE TRACK
1154                                    ;*****************************************************************************
1155
1156  002664  003006                    TEST5:  BGT     T5A
1157  002666  005260  030006            T5Z:    INC     PHASE(0)
1158  002672  004767  004504                    JSR     7,PATIN
1159  002676  000167  004034                    JMP     WTRK
1160
1161  002702  004767  004256            T5A:    JSR     7,NEXTAD
1162  002706  102402                            BVS     T5A1
1163  002710  000167  004022                    JMP     WTRK
1164
1165  002714  004767  004552            T5A1:   JSR     7,NEXPAT
1166  002720  102402                            BVS     T5A2
1167  002722  000167  004010                    JMP     WTRK
1168
1169  002726  005060  030006            T5A2:   CLR     PHASE(0)
1170  002732  000167  004064                    JMP     TESDON
1171
1172                                    ;*****************************************************************************
1173                                    ;TEST6 - WRITE AND READ SECTOR
1174                                    ;*****************************************************************************
1175
1176  002736  001403                    TEST6:  BEQ     T6Z
1177  002740  005303                            DEC     %3
1178  002742  001407                            BEQ     T6A
1179  002744  000412                            BR      T6B
1180
1181  002746  005260  030006            T6Z:    INC     PHASE(0)
1182  002752  004767  004424                    JSR     7,PATIN
1183  002756  000167  003734            T6A1:   JMP     WSCT
1184
1185  002762  005260  030006            T6A:    INC     PHASE(0)
1186  002766  000167  003734            T6B1:   JMP     RSCT
1187
1188  002772  004767  004166            T6B:    JSR     7,NEXTAD
1189  002776  102003                            BVC     T6B2
1190  003000  004767  004466                    JSR     7,NEXPAT
1191  003004  102404                            BVS     T6B3
1192  003006  005360  030006            T6B2:   DEC     PHASE(0)
1193  003012  000167  003700                    JMP     WSCT
1194
1195  003016  005060  030006            T6B3:   CLR     PHASE(0)
1196  003022  000167  003774                    JMP     TESDON
```

```
1197
1198                                    ;*************************************************************************
1199                                    ;TEST7 - WRITE AND READ TRACK
1200                                    ;*************************************************************************
1201
1202  003026  006303                    TEST7:  ASL     %3
1203  003030  000173  003034                    JMP     @T7(3)          ;JMP TO RIGHT PHASE OF TEST
1204  003034  003044                    T7:     T7Z
1205  003036  003060                            T7A
1206  003040  003070                            T7B
1207  003042  003130                            T7C
1208
1209  003044  005260  030006            T7Z:    INC     PHASE(0)
1210  003050  004767  004326                    JSR     7,PATIN
1211  003054  000167  003656            T7A1:   JMP     WTRK
1212
1213  003060  005260  030006            T7A:    INC     PHASE(0)
1214  003064  000167  003656            T7B1:   JMP     RTRK
1215
1216  003070  004767  004070            T7B:    JSR     7,NEXTAD
1217  003074  102003                            BVC     T7B2
1218  003076  004767  004370                    JSR     7,NEXPAT
1219  003102  102404                            BVS     T7B3
1220  003104  005360  030006            T7B2:   DEC     PHASE(0)
1221  003110  000167  003622                    JMP     WTRK
1222
1223  003114  005060  030006            T7B3:   CLR     PHASE(0)        ;PHASE=0
1224  003120  032760  000100  030000            BIT     #100,STAT0(0)   ;TEST MODE?
1225  003126  001233                            BNE     TDONE           ;YES, CONTINUE TO NEXT TEST
1226  003130  032770  000100  032404    T7C:    BIT     #100,@TPS0(0)   ;TP "BUSY"?
1227  003136  001412                            BEQ     T7C1            ;NO
1228  003140  032760  007400  030400            BIT     #7400,PSTAT(0)  ;MESSAGE BUFFER EMPTY?
1229  003146  001410                            BEQ     T7C2            ;YES
1230  003150  112760  000003  030006            MOVB    #3,PHASE(0)     ;PHASE=3, WAIT FOR TP TO FINISH
1231  003156  005060  030200                    CLR     CSBUF(0)                ;CLR CS BUFFER
1232  003162  000207                            RTS     7
1233
1234  003164  004767  005172            T7C1:   JSR     7,CRACT         ;ACTIVATE TP
1235  003170  112760  000122  030401    T7C2:   MOVB    #122,PSTAT+1(0) ;MESS 5,LINE 2
1236  003176  012760  150603  030000            MOV     #150603,STAT0(0) ;TEST 21, ACCEPT MODE, PATTERN 3
1237  003204  004767  005032                    JSR     7,RANDOM        ;GET A RANDOM NUMBER
1238  003210  042701  174077                    BIC     #174077,%1      ;RANDOM TRACK ADDR
1239  003214  010160  030202                    MOV     %1,DABUF(0)     ;INTO ADDR BUFF
1240  003220  052701  030000                    BIS     #030000,%1      ;SEQ 1, SINGLE TRACK
1241  003224  010160  030002                    MOV     %1,ASTAT(0)     ;INTO ADDR STATUS
1242  003230  000167  002056                    JMP     T21Z
```

```
1243
1244                                    ;*************************************************************************
1245                                    ;TEST 10 - CLEAR, READ, WRITE, READ SECTOR
1246                                    ;*************************************************************************
1247
1248  003234  006303                    TEST10: ASL     :3
1249  003236  000173  003242                    JMP     @T10(3)         ;JMP TO RIGHT PHASE OF TEST
1250  003242  003254                    T10:    T10Z
1251  003244  003274                            T10A
1252  003246  003304                            T10B
1253  003250  003322                            T10C
1254  003252  003332                            T10D
1255
1256  003254  004767  004122            T10Z:   JSR     7,PATIN
1257  003260  005260  030006            T10Z1:  INC     PHASE(0)
1258  003264  005060  030204                    CLR     DBBUF(0)
1259  003270  000167  003422                    JMP     WSCT
1260
1261  003274  005260  030006            T10A:   INC     PHASE(0)
1262  003300  000167  003422                    JMP     RSCT
1263
1264  003304  005260  030006            T10B:   INC     PHASE(0)
1265  003310  016060  030208  030204            MOV     OLDATA(0),DBBUF(0) ;RESTOR THE DATA BUFFER
1266  003316  000167  003374                    JMP     WSCT
1267
1268  003322  005260  030006            T10C:   INC     PHASE(0)
1269  003326  000167  003374                    JMP     RSCT
1270
1271  003332  005060  030006            T10D:   CLR     PHASE(0)
1272  003336  004767  003622                    JSR     7,NEXTAD
1273  003342  102346                            BVC     T10Z1
1274  003344  004767  004122                    JSR     7,NEXPAT
1275  003350  102343                            BVC     T10Z1
1276  003352  000167  003444                    JMP     TESDON
```

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1277
1278                                    ;*****************************************************************************
1279                                    ;TEST 11 - CLEAR, READ, WRITE, READ TRACK
1280                                    ;*****************************************************************************
1281
1282  003356  006303                    TEST11: ASL     %3
1283  003360  000173  003364                    JMP     @T11(3)         ;JMP TO RIGHT PHASE OF TEST
1284  003364  003376                    T11:    T11Z
1285  003366  003416                            T11A
1286  003370  003426                            T11B
1287  003372  003444                            T11C
1288  003374  003454                            T11D
1289
1290  003376  004767  004000            T11Z:   JSR     7,PATIN
1291  003402  005260  030006            T11Z1:  INC     PHASE(0)
1292  003406  005060  030204                    CLR     DBBUF(0)
1293  003412  000167  003320                    JMP     WTRK
1294
1295  003416  005260  030006            T11A:   INC     PHASE(0)
1296  003422  000167  003320                    JMP     RTRK
1297
1298  003426  005260  030006            T11B:   INC     PHASE(0)
1299  003432  016060  030206  030204            MOV     OLDATA(0),DBBUF(0) ;RESTOR THE DATA BUFFER
1300  003440  000167  003272                    JMP     WTRK
1301
1302  003444  005260  030006            T11C:   INC     PHASE(0)
1303  003450  000167  003272                    JMP     RTRK
1304
1305  003454  005060  030006            T11D:   CLR     PHASE(0)
1306  003460  004767  003500                    JSR     7,NEXTAD
1307  003464  102346                            BVC     T11Z1
1308  003466  004767  004000                    JSR     7,NEXPAT
1309  003472  102343                            BVC     T11Z1
1310  003474  000167  003322                    JMP     TESDON
```

```
1311
1312                                    ;*************************************************************************
1313                                    ;TEST 12 - WRITE ONE SECTOR, CHANGE TRACKS AND WRITE THAT SECTOR,
1314                                    ;          THEN GO BACK AND READ THOSE SECTORS WRITTEN.
1315                                    ;*************************************************************************
1316
1317  003500  006303                   TEST12: ASL     %3
1318  003502  000173  003506                   JMP     @T12(3)         ;JMP TO RIGHT PHASE OF TEST
1319  003506  003514                   T12:    T12Z
1320  003510  003530                           T12A
1321  003512  003552                           T12B
1322
1323  003514  004767  003662           T12Z:   JSR     7,PATIN         ;START PAT
1324  003520  105260  030006           T12Z1:  INCB    PHASE(0)        ;PHASE = 1
1325  003524  000167  003166                   JMP     WSCT
1326
1327  003530  004767  004210           T12A:   JSR     7,CHATAK        ;CHANGE TRACKS
1328  003534  001402                           BEQ     T12A2
1329  003536  000167  003154                   JMP     WSCT
1330
1331  003542  105260  030006           T12A2:  INCB    PHASE(0)        ;PHASE = 2
1332  003546  000167  003154                   JMP     RSCT            ;READ
1333
1334  003552  004767  004166           T12B:   JSR     7,CHATAK        ;CHANGE TRACKS
1335  003556  001402                           BEQ     T12B1
1336  003560  000167  003142                   JMP     RSCT
1337
1338  003564  105060  030006           T12B1:  CLRB    PHASE(0)        ;PHASE = 0
1339  003570  004767  003370                   JSR     7,NEXTAD
1340  003574  102351                           BVC     T12Z1
1341  003576  004767  003670                   JSR     7,NEXPAT
1342  003602  102346                           BVC     T12Z1
1343  003604  000167  003212                   JMP     TESDON
```

```
1344
1345                                    ;*************************************************************************
1346                                    ;TEST 13 - CLEAR TRACK, WRITE ONE SECTOR, CHANGE TRACKS AND REPEAT
1347                                    ;          THEN READ ALL SECTORS
1348                                    ;*************************************************************************
1349
1350   003610  006303                  TEST13: ASL     %3
1351   003612  000173  003616                  JMP     @T13(3)         ;JMP TO RIGHT PHASE OF TEST
1352   003616  003626                  T13:    T13Z
1353   003620  003646                          T13A
1354   003622  003664                          T13B
1355   003624  003706                          T13C
1356
1357   003626  004767  003550          T13Z:   JSR     7,PATIN
1358   003632  105260  030006          T13Z1:  INCB    PHASE(0)        ;PHASE = 1
1359   003636  005060  030204          T13Z2:  CLR     DBBUF(0)
1360   003642  000167  003070                  JMP     WTRK
1361
1362   003646  005260  030006          T13A:   INC     PHASE(0)        ;PHASE = 2
1363   003652  016060  030206  030204          MOV     OLDATA(0),DBBUF(0)
1364   003660  000167  003032                  JMP     WSCT
1365
1366   003664  004767  004054          T13B:   JSR     7,CHATAK
1367   003670  001403                          BEQ     T13B1
1368   003672  105360  030006                  DECB    PHASE(0)
1369   003676  000757                          BR      T13Z2
1370
1371   003700  105260  030006          T13B1:  INCB    PHASE(0)        ;PHASE = 3
1372   003704  000407                          BR      T13C1
1373
1374   003706  004767  004064          T13C:   JSR     7,CHASEC        ;CHANGE SECTORS
1375   003712  001404                          BEQ     T13C1           ;Z=1, SAME SECTOR
1376   003714  005060  030204                  CLR     DBBUF(0)
1377   003720  000167  003002                  JMP     RSCT
1378
1379   003724  004767  004014          T13C1:  JSR     7,CHATAK        ;CHANGE TRACKS
1380   003730  001405                          BEQ     T13C2           ;Z=1, DONE
1381   003732  016060  030206  030204          MOV     OLDATA(0),DBBUF(0) ;RESTORE DATA BUFF
1382   003740  000167  002762                  JMP     RSCT
1383
1384   003744  005060  030006          T13C2:  CLR     PHASE(0)
1385   003750  004767  003210                  JSR     7,NEXTAD
1386   003754  102326                          BVC     T13Z1
1387   003756  004767  003510                  JSR     7,NEXPAT
1388   003762  102325                          BVC     T13Z2
1389   003764  000167  003032                  JMP     TESDON
```

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1390
1391                                    ;*****************************************************************************
1392                                    ;TEST14 - WRITE ONE SECTOR, COMPLEMENT THE PATTERN WORD,
1393                                    ;         WRITE ALL OTHER SECTORS, THE READ ALL SECTORS
1394                                    ;*****************************************************************************
1395
1396  003770  006303                    TEST14: ASL     %3
1397  003772  000173  003776                    JMP     @T14(3)         ;JMP TO RIGHT PHASE OF TEST
1398  003776  004010                    T14:    T14Z
1399  004000  004024                            T14A
1400  004002  004046                            T14B
1401  004004  004102                            T14C
1402  004006  004124                            T14D
1403
1404  004010  004767  003366            T14Z:   JSR     7,PATIN
1405  004014  105260  030006            T14Z1:  INCB    PHASE(0)
1406  004020  000167  002672                    JMP     WSCT            ;WRITE ONE SECTOR
1407
1408  004024  004767  003746            T14A:   JSR     7,CHASEC        ;CHANGE SECTOR
1409  004030  001404                            BEQ     T14A1           ;ALL SECTORS THAT TRACK DONE?
1410  004032  004767  004000                    JSR     7,COMPAT        ;COMPLEMENT THE PATERN WORD
1411  004036  000167  002654                    JMP     WSCT            ;WRITE ALL OTHER SECTORS
1412
1413  004042  105260  030006            T14A1:  INCB    PHASE(0)
1414  004046  004767  003672            T14B:   JSR     7,CHATAK
1415  004052  001404                            BEQ     T14B2
1416  004054  004767  003756                    JSR     7,COMPAT
1417  004060  000167  002652                    JMP     WTRK
1418
1419  004064  105260  030006            T14B2:  INCB    PHASE(0)
1420  004070  016060  030206  030204            MOV     OLDATA(0),DBBUF(0) ;RESTOPE DATA BUFF
1421  004076  000167  002624                    JMP     RSCT
1422
1423  004102  004767  003670            T14C:   JSR     7,CHASEC
1424  004106  001404                            BEQ     T14C1
1425  004110  004767  003722                    JSR     7,COMPAT
1426  004114  000167  002606                    JMP     RSCT
1427
1428  004120  105260  030006            T14C1:  INCB    PHASE(0)
1429  004124  004767  003614            T14D:   JSR     7,CHATAK
1430  004130  001404                            BEQ     T14D1
1431  004132  004767  003700                    JSR     7,COMPAT
1432  004136  000167  002604                    JMP     RTRK
1433
1434  004142  005060  030006            T14D1:  CLR     PHASE(0)        ;PHASE=0
1435  004146  016060  030206  030204            MOV     OLDATA(0),DBBUF(0) ;RESTORE DATA BUFFER
1436  004154  042760  000010  030200            BIC     #10,CSBUF(0)    ;CLR TRACK BIT TO GET NEXT SECTOR
1437  004162  004767  002776                    JSR     7,NEXTAD
1438  004166  102312                            BVC     T14Z1
1439  004170  004767  003276                    JSR     7,NEXPAT
1440  004174  102307                            BVC     T14Z1
1441  004176  000167  002620                    JMP     TESDON
```

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1442
1443                                    ;*************************************************************************
1444                                    ;TEST 15 - WRITE ONE SECTOR, COMPLEMENT THE PATTERN WORD,
1445                                    ;          WRITE THE REST OF THE TRACK, THEN READ THAT TRACK
1446                                    ;*************************************************************************
1447  004202  006303                   TEST15: ASL     %3
1448  004204  000173  004210                   JMP     @T15(3)         ;JMP TO RIGHT PHASE OF TEST
1449  004210  004216                   T15:    T15Z
1450  004212  004232                           T15A
1451  004214  004266                           T15B
1452
1453  004216  004767  003160           T15Z:   JSR     7,PATIN
1454  004222  105260  030006           T15Z1:  INCB    PHASE(0)        ;PHASE = 1
1455  004226  000167  002464                   JMP     WSCT            ;WRITE ONE SECTOR
1456
1457  004232  004767  003540           T15A:   JSR     7,CHASEC        ;CHANGE SECTORS
1458  004236  001404                           BEQ     T15A1           ;Z=1 MEANS DONE TRACK
1459  004240  004767  003572                   JSR     7,COMPAT        ;COMPLEMENT THE PATTERN WORD
1460  004244  000167  002446                   JMP     WSCT            ;WRITE ALL OTHER SECTORS
1461  004250  105260  030006           T15A1:  INCB    PHASE(0)        ;PHASE = 2
1462  004254  016060  030206  030204           MOV     OLDATA(0),DBBUF(0) ;RESTORE DAT BUFF
1463  004262  000167  002440                   JMP     RSCT            ;READ THE ORIGINAL SECTOR
1464
1465  004266  004767  003504           T15B:   JSR     7,CHASEC        ;CHANGE SECTORS
1466  004272  0C1404                           BEQ     T15B1           ;Z=1 MEANS DONE TRACK
1467  004274  004767  003536                   JSR     7,COMPAT        ;COMPLEMENT THE PATTERN WORD
1468  004300  000167  002422                   JMP     RSCT            ;READ THE OTHER SECTORS
1469
1470  004304  005060  030006           T15B1:  CLR     PHASE(0)        ;PHASE = 0
1471  004310  016060  030206  030204           MOV     OLDATA(0),DBBUF(0) ;RESTORE DATA BUFFER
1472  004316  004767  002642                   JSR     7,NEXTAD        ;NEW ADDRESS
1473  004322  102337                           BVC     T15Z1           ;V=0, NOT DONE
1474  004324  004767  003142                   JSR     7,NEXPAT        ;GET NEXT PATTERN
1475  004330  102334                           BVC     T15Z1
1476  004332  032760  000100  030000           BIT     #100,STAT0(0)   ;ACCEPT MODE?
1477  004340  001402                           BEQ     T15B2           ;YES
1478  004342  000167  002454                   JMP     TESDON
1479
1480  004346  105260  030001           T15B2:  INCB    STAT0+1(0)      ;NEXT TEST (16)
1481  004352  012760  020000  030002           MOV     #020000,ASTAT(0) ;SEQUENCE 1
1482  004360  005060  030202                   CLR     DABUF(0)        ;CLR ADDR BUFF
1483  004364  000406                           BR      T16Z            ;TEST16 NEXT
```

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1484
1485                                    ;*************************************************************************
1486                                    ;TEST 16 - WRITE A TRACK, COMPLEMENT THE PATTERN WORD,
1487                                    ;          WRITE ALL OTHER TRACKS, THEN READ THE DISK.
1488                                    ;*************************************************************************
1489
1490  004366  006303                   TEST16: ASL     %3
1491  004370  000173  004374                   JMP     @T16(3)         ;JMP TO RIGHT PHASE OF TEST
1492  004374  004402                   T16:    T16Z
1493  004376  004416                           T16A
1494  004400  004452                           T16B
1495
1496  004402  004767  002774           T16Z:   JSR     7,PATIN
1497  004406  105260  030006           T16Z1:  INCB    PHASE(0)        ;PHASE = 1
1498  004412  000167  002320                   JMP     WTRK            ;WRITE ONE TRACK
1499
1500  004416  004767  003322           T16A:   JSR     7,CHATAK        ;CHANGE TRACKS
1501  004422  001404                           BEQ     T16A1           ;Z=1 MEANS DONE
1502  004424  004767  003406                   JSR     7,COMPAT        ;COMPLEMENT THE PATTERN WORD
1503  004430  000167  002302                   JMP     WTRK            ;WRITE ALL OTHER TRACKS
1504
1505  004434  105260  030006           T16A1:  INCB    PHASE(0)        ;PHASE = 2
1506  004440  016060  030206  030204           MOV     OLDATA(0),DBBUF(0) ;RESTORE DATA BUFF
1507  004446  000167  002274                   JMP     RTRK
1508
1509  004452  004767  003266           T16B:   JSR     7,CHATAK        ;CHANGE TRACKS
1510  004456  001404                           BEQ     T16B1           ;Z=1 MEANS DONE
1511  004460  004767  003352                   JSR     7,COMPAT        ;COMPLEMENT PAT WORD
1512  004464  000167  002256                   JMP     RTRK            ;READ THE OTHER TRACKS
1513
1514  004470  005060  030006           T16B1:  CLR     PHASE(0)        ;PHASE = 0
1515  004474  016060  030206  030204           MOV     OLDATA(0),DBBUF(0) ;RESTORE DATA BUFFER
1516  004502  004767  002456                   JSR     7,NEXTAD        ;NEW ADDRESS
1517  004506  102337                           BVC     T16Z1           ;V=0, NOT DONE
1518  004510  004767  002756                   JSR     7,NEXPAT        ;NEW PATTERN WORD.
1519  004514  102334                           BVC     T16Z1           ;V=0, NOT DONE
1520  004516  000167  002300                   JMP     TESDON          ;TEST DONE
```

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1521
1522                                    ;*************************************************************************
1523                                    ;TEST17 - WRITE A TRACK, COMPLEMENT THE PATTERN WORD,
1524                                    ;       WRITE THE TWO ADJACENT TRACKS, THEN READ ALL 3 TRACKS
1525                                    ;*************************************************************************
1526
1527  004522  006303                   TEST17: ASL     %3
1528  004524  000173  004530                   JMP     @T17(3)         ;JMP TO RIGHT PHASE OF TEST
1529  004530  004546                   T17:    T17Z
1530  004532  004562                           T17A
1531  004534  004602                           T17B
1532  004536  004622                           T17C
1533  004540  004654                           T17D
1534  004542  004674                           T17E
1535  004544  004714                           T17F
1536
1537  004546  004767  002630           T17Z:   JSR     7,PATIN
1538  004552  105260  030006           T17Z1:  INCB    PHASE(0)
1539  004556  000167  002154                   JMP     WTRK
1540
1541  004562  005260  030006           T17A:   INC     PHASE(0)        ;PHASE=2
1542  004566  004767  003260                   JSR     7,ADJAC1        ;GET ADJACENT TRACK ADDR
1543  004572  004767  003240                   JSR     7,COMPAT
1544  004576  000167  002134                   JMP     WTRK
1545
1546  004602  005260  030006           T17B:   INC     PHASE(0)        ;PHASE=3
1547  004606  004767  003302                   JSR     7,ADJAC2        ;GET OTHER ADJACENT TRACK ADDR
1548  004612  004767  003220                   JSR     7,COMPAT
1549  004616  000167  002114                   JMP     WTRK
1550
1551  004622  105260  030006           T17C:   INCB    PHASE(0)        ;PHASE=4
1552  004626  016060  030002  030202           MOV     ASTAT(0),DABUF(0) ;RESTORE ADDR BUFF
1553  004634  042760  174000  030202           BIC     #174000,DABUF(0) ;MASK
1554  004642  016060  030206  030204           MOV     OLDATA(0),DBBUF(0) ;RESTORE DATA BUFF
1555  004650  000167  002072                   JMP     RTRK
1556
1557  004654  105260  030006           T17D:   INCB    PHASE(0)        ;PHASE=5
1558  004660  004767  003166                   JSR     7,ADJAC1        ;GET ADJACENT TRACK ADDR
1559  004664  004767  003146                   JSR     7,COMPAT
1560  004670  000167  002052                   JMP     RTRK
1561
1562  004674  105260  030006           T17E:   INCB    PHASE(0)        ;PHASE=6
1563  004700  004767  003210                   JSR     7,ADJAC2        ;GET OTHER ADJACENT TRACK ADDR
1564  004704  004767  003126                   JSR     7,COMPAT
1565  004710  000167  002032                   JMP     RTRK
1566
1567  004714  005060  030006           T17F:   CLR     PHASE(0)
1568  004720  016060  030206  030204           MOV     OLDATA(0),DBBUF(0) ;RESTORE DATA BUFFER
1569  004726  004767  002232                   JSR     7,NEXTAD
1570  004732  102307                           BVC     T17Z1
1571  004734  004767  002532                   JSR     7,NEXPAT
1572  004740  102304                           BVC     T17Z1
1573  004742  032760  000100  030000           BIT     #100,STATO(0)   ;ACCEPT MODE?
1574  004750  001402                           BEQ     T17F1           ;YES
1575  004752  000167  002044                   JMP     TESDON
1576
```

```
 1577  004756  012760  150212  030000  T17F1:  MOV     #150212,STATO(0) ;TEST 20 RANDOM PATTERN
 1578  004764  000411                  BR      T20Z                     ;TEST20 NEXT
```

```
1579
1580                                    ;*************************************************************************
1581                                    ;TEST20-WRITE A TRACK, THEN READ IT FOR 5 MINUTES
1582                                    ;       OR UNTIL INTERUPTED BY "↑A"
1583                                    ;*************************************************************************
1584
1585  004766  006303                    TEST20: ASL     %3
1586  004770  000173  004774                    JMP     @T20(3)         ;JMP TO RIGHT PHASE OF TEST
1587  004774  005010                    T20:    T20Z
1588  004776  005032                            T20A
1589  005000  005064                            T20B
1590  005002  005130                            T20C
1591  005004  005144                            T20D
1592  005006  005174                            T20E
1593
1594  005010  004767  002366            T20Z:   JSR     7,PATIN
1595  005014  012760  000200  030402            MOV     #200,PRANK(0)   ;4 TIMES THROUGH ALL TRACKS
1596  005022  005260  030006            T20Z1:  INC     PHASE(0)
1597  005026  000167  001704                    JMP     WTRK
1598
1599  005032  005260  030006            T20A:   INC     PHASE(0)
1600  005036  005060  030406                    CLR     WAITER(0)       ;MAKE SURE HIGH BYTE IS CLR
1601  005042  116760  012362  030406            MOVB    MINUTE,WAITER(0) ;START TIME FOR 5 MIN. READ
1602  005050  004767  001672            T20A1:  JSR     7,RTRK          ;START READING
1603  005054  052760  100000  030200            BIS     #100000,CSBUF(0) ;SET WAIT FLAG
1604  005062  000207                            RTS     7
1605
1606  005064  105770  032200            T20B:   TSTB    @CSO(0)         ;ATTEN BIT?
1607  005070  100005                            BPL     T20B1           ;NO, CHECK TIME
1608  005072  032760  000100  030000            BIT     #100,STATO(0)   ;ACCEPT MODE?
1609  005100  001363                            BNE     T20A1           ;NO, START READING AGAIN
1610  005102  000420                            BR      T20D
1611
1612  005104  116701  012320            T20B1:  MOVB    MINUTE,%1       ;GET PRESENT TIME
1613  005110  166001  030406                    SUB     WAITER(0),%1    ;LESS READ START TIME
1614  005114  100002                            BPL     T20B2           ;NEXT HOUR?
1615  005116  062701  000074                    ADD     #74,%1          ;COMPENSATE FOR HR CHANGE
1616  005122  162701  000005            T20B2:  SUB     #5,%1           ;5 MINUTES UP?
1617  005126  100405                            BMI     T20C1           ;NO, RTS
1618  005130  105260  030006            T20C:   INCB    PHASE(0)
1619  005134  042760  100000  030200            BIC     #100000,CSBUF(0) ;CLR WAIT FLAG
1620  005142  000207                    T20C1:  RTS     7
1621
1622  005144  005060  030006            T20D:   CLR     PHASE(0)
1623  005150  004767  002010                    JSR     7,NEXTAD
1624  005154  102404                            BVS     T20D1
1625  005156  032760  000100  030000            BIT     #100,STATO(0)
1626  005164  001316                            BNE     T20Z1
1627  005166  004767  002300            T20D1:  JSR     7,NEXPAT
1628  005172  102313                            BVC     T20Z1
1629  005174  032760  000100  030000  T20E:     BIT     #100,STATO(0)   ;ACCEPT MODE?
1630  005202  001402                            BEQ     T20E1           ;YES
1631  005204  000167  001612                    JMP     TESDON
1632
1633  005210  004767  001572            T20E1:  JSR     7,CLRCS
1634  005214  032760  007400  030400            BIT     #7400,PSTAT(0)
```

```
1635  005222  001404                          BEQ     T20E2
1636  005224  112760  000005  030006          MOVB    #5,PHASE(0)
1637  005232  000207                          RTS     7
1638
1639  005234  112760  000226  030401  T20E2:  MOVB    #226,PSTAT+1(0) ;MESS 11, LINE 6 - ACCEPT COMPLETED
1640  005242  004767  003114                  JSR     7,CRACT
1641  005246  005060  030000                  CLR     STAT0(0)
1642  005252  005060  030002                  CLR     ASTAT(0)
1643  005256  005060  030006                  CLR     PHASE(0)
1644  005262  000207                          RTS     7
```

```
1645
1646                                    ;*************************************************************************
1647                                    ;TEST21 - DC POWER FAIL ON A WRITE TRACK
1648                                    ;*************************************************************************
1649
1650  005264  006303                    TEST21: ASL     %3
1651  005266  000173  005272                    JMP     @T21(3)         ;JMP TO RIGHT PHASE OF TEST
1652  005272  005312                    T21:    T21Z
1653  005274  005326                            T21A
1654  005276  005362                            T21B
1655  005300  005406                            T21C
1656  005302  005466                            T21D
1657  005304  005510                            T21E
1658  005306  005532                            T21F
1659  005310  005556                            T21G
1660
1661  005312  004767  002064            T21Z:   JSR     7,PATIN
1662  005316  105260  030006            T21Z1:  INCB    PHASE(0)
1663  005322  000167  001410                    JMP     WTRK
1664
1665  005326  004767  002412            T21A:   JSR     7,CHATAK        ;NEW TRACK
1666  005332  001402                            BEQ     T21A1
1667  005334  000167  001376                    JMP     WTRK            ;WRITE TRACK
1668
1669  005340  016760  012062  030600    T21A1:  MOV     TIME,RTIME(0)   ;SAVE TIME FOR POWER FAIL
1670  005346  004767  001364                    JSR     7,WTRK          ;WRITE TRACK
1671  005352  052760  100000  030200            BIS     #100000,CSBUF(0) ;SET WAIT FLAG
1672  005360  000437                            BR      T21C2
1673
1674  005362  052760  000001  030004    T21B:   BIS     #1,FLAGS(0)     ;SET "IGNORE ERRORS" FLAG
1675  005370  012770  000412  032200            MOV     #412,@CSO(0)    ;TURN DC POWER OFF (KEEP ON WRITING)
1676  005376  016760  012024  030406            MOV     TIME,WAITER(0)  ;SAVE TIME
1677  005404  000425                            BR      T21C2
1678
1679  005406  004767  002560            T21C:   JSR     7,W20S          ;WAIT 20 SEC. (POWER OFF)
1680  005412  100404                            BMI     T21C1           ;DONE
1681  005414  016760  012006  030600            MOV     TIME,RTIME(0)
1682  005422  000207                            RTS     7
1683
1684  005424  017001  032204            T21C1:  MOV     @DA0(0),%1      ;GET DISK ADDR
1685  005430  042701  177700                    BIC     #177700,%1      ;MASK SECTOR ADDR
1686  005434  042760  000077  030202            BIC     #77,DABUF(0)
1687  005442  050160  030202                    BIS     %1,DABUF(0)
1688  005446  004767  001334                    JSR     7,CLRCS         ;TURN POWER BACK ON AND CLEAR
1689  005452  016760  011750  030406            MOV     TIME,WAITER(0)
1690  005460  005260  030006            T21C2:  INC     PHASE(0)
1691  005464  000207                            RTS     7
1692
1693  005466  004767  002454            T21D:   JSR     7,W2S           ;WAIT 2 SEC. (POWER ON)
1694  005472  100402                            BMI     T21D1           ;20 SEC. UP
1695  005474  000167  001306                    JMP     CLRCS           ;DO ANOTHER CLEAR...TO BE SURE!
1696
1697  005500  105260  030006            T21D1:  INCB    PHASE(0)        ;PHASE=E
1698  005504  000167  001216                    JMP     RSCT            ;READ PROBABLE BAD SECTOR
1699
1700  005510  032770  170000  032200    T21E:   BIT     #170000,@CSO(0) ;ERROR?
```

```
1701  005516  001405                          BEQ     T21F            ;NO
1702  005520  105260  030006                  INCB    PHASE(0)
1703  005524  042760  000001  030004          BIC     #1,FLAGS(0)     ;NO LONGER IGNORE ERRORS
1704  005532  004767  002240          T21F:   JSR     7,CHASEC
1705  005536  001402                          BEQ     T21F1
1706  005540  000167  001162                  JMP     RSCT
1707
1708  005544  042760  000001  030004  T21F1:  BIC     #1,FLAGS(0)     ;MAKE SURE "IGNORE ERRORS" FLAG IS CLR
1709  005552  005260  030006                  INC     PHASE(0)
1710  005556  004767  002162          T21G:   JSR     7,CHATAK
1711  005562  001402                          BEQ     T21G1           ;Z=1, DONE
1712  005564  000167  001156                  JMP     RTRK            ;READ TRACK
1713
1714  005570  005060  030006          T21G1:  CLR     PHASE(0)
1715  005574  004767  001672                  JSR     7,NEXPAT
1716  005600  102246                          BVC     T21Z1           ;V=1 MEANS DONE
1717  005602  000167  001214                  JMP     TESDON
```

```
1718
1719                                ;*****************************************************************************
1720                                ;TEST 22 - DC POWER FAIL ON A READ TRACK
1721                                ;*****************************************************************************
1722
1723  005606  006303                TEST22: ASL     %3
1724  005610  000173  005614               JMP     @T22(3)         ;JMP TO RIGHT PHASE OF TEST
1725  005614  005632                T22:    T22Z
1726  005616  005646                        T22A
1727  005620  005660                        T22B
1728  005622  005702                        T22C
1729  005624  005726                        T22D
1730  005626  005754                        T22E
1731  005630  006010                        T22F
1732
1733  005632  004767  001544        T22Z:   JSR     7,PATIN
1734  005636  105260  030006        T22Z1:  INCB    PHASE(0)
1735  005642  000167  001070                JMP     WTRK
1736
1737  005646  004767  002072        T22A:   JSR     7,CHATAK
1738  005652  001452                        BEQ     T22E3
1739  005654  000167  001056                JMP     WTRK
1740
1741  005660  004767  002060        T22B:   JSR     7,CHATAK
1742  005664  001054                        BNE     T22F1
1743  005666  004767  001054                JSR     7,RTRK
1744  005672  052760  100000  030200        BIS     #100000,CSBUF(0) ;SET WAIT FLAG
1745  005700  000422                        BR      T22D1
1746
1747  005702  052760  000001  030004 T22C:  BIS     #1,FLAGS(0)     ;SET "IGNORE ERRORS" FLAG
1748  005710  012770  000414  032200        MOV     #414,@CSO(0)    ;DC POWER OFF (KEEP ON READING)
1749  005716  016760  011504  030406        MOV     TIME,WAITER(0)  ;SAVE TIME
1750  005724  000410                        BR      T22D1
1751  005726  004767  002240        T22D:   JSR     7,W20S          ;WAIT 20 SEC. (POWER OFF)
1752  005732  100013                        BPL     T22E1
1753  005734  004767  001046                JSR     7,CLRCS         ;TURN POWER BACK ON AND CLEAR
1754  005740  016760  011462  030406        MOV     TIME,WAITER(0)  ;SAVE TIME
1755  005746  005260  030006        T22D1:  INC     PHASE(0)
1756  005752  000207                        RTS     7
1757
1758  005754  004767  002166        T22E:   JSR     7,W2S           ;WAIT 2 SEC. (POWER ON)
1759  005760  100404                        BMI     T22E2
1760  005762  016760  011440  030600 T22E1: MOV     TIME,RTIME(0)
1761  005770  000207                        RTS     7
1762
1763  005772  042760  000001  030004 T22E2: BIC     #1,FLAGS(0)     ;CLEAR "IGNORE ERRORS" FLAG
1764  006000  105260  030006        T22E3:  INCB    PHASE(0)
1765  006004  000167  000736                JMP     RTRK
1766
1767  006010  004767  001730        T22F:   JSR     7,CHATAK
1768  006014  001402                        BEQ     T22F2
1769  006016  000167  000724        T22F1:  JMP     RTRK
1770
1771  006022  005060  030006        T22F2:  CLR     PHASE(0)
1772  006026  004767  001440                JSR     7,NEXPAT
1773  006032  102301                        BVC     T22Z1
```

```
1774  006034  000167  000762                    JMP     TESDON
1775
```

```
                                        ;*****************************************************************************
                                        ;TEST23 - AC POWER FAIL ON A WRITE TRACK
                                        ;*****************************************************************************

006040  006303                TEST23: ASL     %3
006042  000173  006046                JMP     @T23(3)         ;JMP TO RIGHT PHASE OF TEST
006046  006076                T23:    T23Z
006050  006112                        T23A
006052  006146                        T23B
006054  006164                        T23C
006056  006234                        T23D
006060  006264                        T23E
006062  006234                        T23F
006064  006264                        T23G
006066  006302                        T23H
006070  005324                        T23I
006072  006346                        T23J
006074  006372                        T23K

006076  004767  001300        T23Z:   JSR     7,PATIN
006102  105260  030006        T23Z1:  INCB    PHASE(0)
006106  000167  000624                JMP     WTRK

006112  004767  001626        T23A:   JSR     7,CHATAK        ;NEW TRACK
006116  001402                        BEQ     T23A1
006120  000167  000612                JMP     WTRK            ;WRITE TRACK

006124  016760  011276  030600 T23A1: MOV     TIME,RTIME(0)   ;SAVE TIME FOR POWER FAIL
006132  004767  000600                JSR     7,WTRK          ;WRITE TRACK
006136  052760  100000  030200        BIS     #100000,CSBUF(0) ;SET WAIT FLAG
006144  000430                        BR      T23C3

006146  052760  000001  030004 T23B:  BIS     #1,FLAGS(0)     ;SET "IGNORE ERRORS" FLAG
006154  012770  001012  032200        MOV     #1012,@CSO(0)   ;TURN AC POWER OFF (KEEP ON WRITING)
006162  000416                        BR      T23C2

006164  004767  002026        T23C:   JSR     7,W60S          ;WAIT 60 SEC. (POWER OFF)
006170  100040                        BPL     T23E1
006172  017001  032204                MOV     @DA0(0),%1
006176  042701  177700                BIC     #177700,%1      ;MASK SECTOR ADDR
006202  042760  000077  030202        BIC     #77,DABUF(0)
006210  050160  030202                BIS     %1,DABUF(0)
006214  004767  000566        T23C1:  JSR     7,CLRCS         ;TURN POWER BACK ON AND CLEAR
006220  016760  011202  030406 T23C2: MOV     TIME,WAITER(0)
006226  005260  030006        T23C3:  INC     PHASE(0)
006232  000207                        RTS     7

006234  004767  001732        T23D:   JSR     7,W20S          ;WAIT 20 SEC. (POWER ON)
006240  100402                        BMI     T23D1           ;20 SEC. UP, DO ANOTHER POWER DOWN
006242  000167  000540                JMP     CLRCS           ;DO ANOTHER CLEAR...TO BE SURE!

006246  052760  100000  030200 T23D1: BIS     #100000,CSBUF(0) ;SET WAIT FLAG
006254  012770  001014  032200        MOV     #1014,@CSO(0)   ;TURN POWER OFF (WITH A READ)
006262  000756                        BR      T23C2
```

```
1832  006264  004767  001726          T23E:   JSR     7,W60S          ;WAIT 60 SEC. (POWER OFF)
1833  006270  100751                  T23E1:  BMI     T23C1           ;DONE
1834  006272  016760  011130  030600          MOV     TIME,RTIME(0)
1835  006300  000207                          RTS     7
1836
1837          006234          T23F = T23D                             ;ANOTHER POWER DOWN
1838
1839          006264          T23G = T23E                             ;ANOTHER POWER UP
1840
1841  006302  004767  001664          T23H:   JSR     7,W20S          ;WAIT 20 SEC. (POWER ON)
1842  006306  100402                  T23H1:  BMI     T23H1           ;20 SEC. UP
1843  006310  000167  000472                  JMP     CLRCS           ;DO ANOTHER CLEAR...TO BE SURE!
1844
1845  006314  105260  030006          T23H1:  INCB    PHASE(0)        ;PHASE=I
1846  006320  000167  000402                  JMP     RSCT            ;READ PROBABLE BAD SECTOR
1847
1848  006324  032760  170000  032200  T23I:   BIT     #170000,@CSD(0) ;ERROR?
1849  006332  001405                  T23I1:  BEQ     T23J            ;NO
1850  006334  105260  030006                  INCB    PHASE(0)
1851  006340  042760  000001  030004          BIC     #1,FLAGS(0)     ;NO LONGER IGNORE ERRORS
1852  006346  004767  001424          T23J:   JSR     7,CHASEC
1853  006352  001402                          BEQ     T23J1
1854  006354  000167  000346                  JMP     RSCT
1855
1856  006360  042760  000001  030004  T23J1:  BIC     #1,FLAGS(0)     ;MAKE SURE "IGNORE ERRORS" FLAG IS CLR
1857  006366  005260  030006                  INC     PHASE(0)
1858  006372  004767  001346          T23K:   JSR     7,CHATAK
1859  006376  001402                          BEQ     T23K1           ;Z=1, DONE
1860  006400  000167  000342                  JMP     RTRK            ;READ TRACK
1861
1862  006404  005060  030006          T23K1:  CLR     PHASE(0)
1863  006410  004767  001056                  JSR     7,NEXPAT
1864  006414  102232                          BVC     T23Z1           ;V=1 MEANS DONE
1865  006416  000167  000400                  JMP     TESDON
```

```
1866
1867                                    ;*****************************************************************************
1868                                    ;TEST 24 - AC POWER FAIL ON A READ TRACK
1869                                    ;*****************************************************************************
1870
1871  006422  006303                    TEST24: ASL     %3
1872  006424  000173  006430                    JMP     @T24(3)         ;JMP TO RIGHT PHASE OF TEST
1873  006430  006456                    T24:    T24Z
1874  006432  006472                            T24A
1875  006434  006504                            T24B
1876  006436  006526                            T24C
1877  006440  006560                            T24D
1878  006442  006606                            T24E
1879  006444  006560                            T24F
1880  006446  006606                            T24G
1891  006450  006560                            T24H
1882  006452  006624                            T24I
1883  006454  006650                            T24J
1884
1885  006456  004767  000720            T24Z:   JSR     7,PATIN
1886  006462  105260  030006            T24Z1:  INCB    PHASE(0)
1887  006466  000167  000244                    JMP     WTRK
1888
1889  006472  004767  001246            T24A:   JSR     7,CHATAK
1890  006476  001460                            BEQ     T24I1
1891  006500  000167  000232                    JMP     WTRK
1892
1893  006504  004767  001234            T24B:   JSR     7,CHATAK
1894  006510  001055                            BNE     T24I2
1895  006512  004767  000230                    JSR     7,RTRK
1896  006516  052760  100000  030200            BIS     #100000,CSBUF(0)
1897  006524  000425                            BR      T24D1
1898
1899  006526  052760  100000  030200    T24C:   BIS     #100000,CSBUF(0) ;SET WAIT FLAG
1900  006534  052760  000001  030004            BIS     #1,FLAGS(0)     ;SET "IGNORE ERRORS" FLAG
1901  006542  012770  001014  032200            MOV     #1014,@CSO(0)   ;TURN AC POWER OFF (KEEP ON READING)
1902  006550  016760  010652  030406            MOV     TIME,WAITER(0)  ;20 SEC
1903  006556  000410                            BR      T24D1
1904
1905  006560  004767  001432            T24D:   JSR     7,W60S          ;WAIT 60 SEC. (POWER OFF)
1906  006564  100013                            BPL     T24E1
1907  006566  004767  000214                    JSR     7,CLRCS         ;TURN POWER BACK ON AND CLEAR
1908  006572  016760  010630  030406            MOV     TIME,WAITER(0)  ;20 SEC
1909  006600  005260  030006            T24D1:  INC     PHASE(0)
1910  006604  000207                            RTS     7
1911
1912  006606  004767  001360            T24E:   JSR     7,W20S          ;WAIT 20 SEC. (POWER ON)
1913  006612  100745                            BMI     T24C
1914  006614  016760  010606  030600    T24E1:  MOV     TIME,RTIME(0)
1915  006622  000207                            RTS     7
1916
1917          006560                    T24F = T24D                     ;WAIT 20 THEN POWER ON AGAIN
1918
1919          006606                    T24G = T24E                     ;WAIT 20 THEN POWER OFF AGAIN
1920
1921          006560                    T24H = T24D                     ;WAIT 20 THEN POWER ON AGAIN
```

```
1922
1923  006624  004767  001342          T24I:   JSR     7,W20S          ;WAIT 20 SEC. (POWER ON)
1924  006630  100371                  BPL     T24E1           ;NOT DONE
1925  006632  042760  000001  030004          BIC     #1,FLAGS(0)     ;CLEAR "IGNORE ERRORS" FLAG
1926  006640  005260  030006          T24I1:  INC     PHASE(0)
1927  006644  000167  000076          T24I2:  JMP     RTRK
1928
1929  006650  004767  001070          T24J:   JSR     7,CHATAK        ;GET NEXT TRACK
1930  006654  001402                  BEQ     T24J1           ;Z=1, DONE
1931  006656  000167  000064                  JMP     RTRK
1932
1933  006662  005060  030006          T24J1:  CLR     PHASE(0)
1934  006666  004767  000600                  JSR     7,NEXPAT
1935  006672  102273                  BVC     T24Z1
1936  006674  032760  000100  030000          BIT     #100,STATO(0)   ;ACCEPT MODE?
1937  006702  001072                  BNE     TEDONE          ;NO, DONE TESTS
1938  006704  012760  146605  030000          MOV     #146605,STATO(0) ;TEST 15, ACCEPT MODE,PATTERN 5
1939  006712  000167  175300                  JMP     T15Z            ;TEST 15 NEXT
```

```
1940
1941                                    ;*************************************************************************
1942                                    ;TRANSFER THE DATA TO THE TESTER AND EXICUTE
1943                                    ;*************************************************************************
1944  006716  012760  000002  030200  WSCT:   MOV     #2,CSBUF(0)     ;OP CODE TO BUFFER
1945  006724  000416                   RSCT:   BR      TRANS
1946
1947  006726  012760  000004  030200  RSCT:   MOV     #4,CSBUF(0)     ;OP CODE TO BUFFER
1948  006734  000407                   WTRK:   BR      TRANS1
1949
1950  006736  012760  000012  030200  WTRK:   MOV     #12,CSBUF(0)    ;OP CODE TO BUFFER
1951  006744  000406                   RTRK:   BR      TRANS
1952
1953  006746  012760  000014  030200  RTRK:   MOV     #14,CSBUF(0)    ;OP CODE TO BUFFER
1954  006754  016760  010446  030600  TRANS1: MOV     TIME,RTIME(0)   ;READ START TIME
1955  006762  016070  030202  032204  TRANS:  MOV     DABUF(0),@DA0(0)
1956  006770  016070  030204  032202          MOV     DBBUF(0),@DB0(0)
1957  006776  016070  030200  032200          MOV     CSBUF(0),@CS0(0)
1958  007004  000207                          RTS     7
1959
1960  007006  005070  032200          CLRCS:  CLR     @CS0(0)         ;CLEAR THE STATION
1961  007012  042760  177767  030200          BIC     #177767,CSBUF(0) ;CLR ALL BUT TRK BIT OF CS BUFF
1962  007020  000207                          RTS     7
1963
1964                                    ;*************************************************************************
1965                                    ;TEST DONE ROUTINE
1966                                    ;*************************************************************************
1967  007022  032760  000040  030004  TESDON: BIT     #40,FLAGS(0)    ;"LOOP ON TEST" FLAG?
1968  007030  001011                          BNE     TLOOP           ;YES
1969  007032  032760  040000  030000          BIT     #40000,STAT0(0) ;ALL TESTS?
1970  007040  001413                          BEQ     TEDONE          ;NO
1971  007042  105260  030001                  INCB    STAT0+1(0)      ;NEXT TEST
1972  007046  105060  030006          TESRET: CLRB    PHASE(0)        ;MAKE SURE PHASE=0
1973  007052  000207                          RTS     7               ;RETURN TO MONITOR
1974
1975  007054  005260  032206          TLOOP:  INC     LOOPC(0)        ;INCREMENT THE LOOP COUNTER
1976  007060  032760  002000  030004          BIT     #2000,FLAGS(0)
1977  007066  001367                          BNE     TESRET
1978  007070  032760  007400  030400  TEDONE: BIT     #7400,PSTAT(0)  ;MESS DONE?
1979  007076  001404                          BEQ     TOUT
1980  007100  112760  177777  030006          MOVB    #-1,PHASE(0)
1981  007106  000207                          RTS     7               ;RETURN TO MONITOR
1982
1983  007110  032760  000040  030004  TOUT:   BIT     #40,FLAGS(0)    ;"LOOP ON TEST"
1984  007116  001014                          BNE     TYLOOP
1985  007120  012760  000010  030004          MOV     #10,FLAGS(0)    ;SET "MESSAGE 4" FLAG (CLR ALL OTHERS)
1986  007126  112760  000062  030401  TOUT1:  MOVB    #062,PSTAT+1(0) ;MESS 3, LINE 2
1987  007134  004767  001222                  JSR     7,CRACT
1988  007140  042760  100200  030000          BIC     #100200,STAT0(0) ;DEACTIVATE TEST SET
1989  007146  000737                          BR      TESRET
1990  007150  112760  000321  030401  TYLOOP: MOVB    #321,PSTAT+1(0)
1991  007156  004767  001200                  JSR     7,CRACT
1992  007162  000731                          BR      TESRET
```

```
1993
1994                                    ;*****************************************************************************
1995                                    ;SUBROUTINE TO SELECT ANOTHER ADDRESS
1996                                    ;*****************************************************************************
1997
1998  007164  016001  030002           NEXTAD: MOV     ASTAT(0),%1
1999  007170  042760  003777  030002           BIC     #3777,ASTAT(0)  ;CLR ADDR FROM ASTAT
2000  007176  032701  040000                   BIT     #40000,%1       ;RANDOM SEQUENCE?
2001  007202  001046                           BNE     NADRAN          ;YES
2002  007204  032760  000010  030200           BIT     #10,CSBUF(0)    ;TRACK OP CODE?
2003  007212  001010                           BNE     NADTOP          ;YES
2004  007214  032701  014000                   BIT     #14000,%1       ;SINGLE TRACK OR SECTOR?
2005  007220  001016                           BNE     NADSIN          ;YES
2006  007222  005201                           INC     %1
2007  007224  032701  003777                   BIT     #3777,%1
2008  007230  001040                           BNE     NADMOR
2009  007232  000422                           BR      NASEQ
2010
2011  007234  032701  010000           NADTOP: BIT     #10000,%1       ;SINGLE TRACK?
2012  007240  001017                           BNE     NASEQ           ;YES
2013  007242  062701  000100                   ADD     #100,%1         ;NEXT TRACK
2014  007246  032701  003700                   BIT     #3700,%1
2015  007252  001027                           BNE     NADMOR
2016  007254  000411                           BR      NASEQ
2017
2018  007256  032701  004000           NADSIN: BIT     #4000,%1        ;SINGLE SECTOR?
2019  007262  001364                           BNE     NADTOP          ;YES
2020  007264  005201                           INC     %1              ;NEXT SECTOR
2021  007266  032701  000077                   BIT     #77,%1          ;DONE?
2022  007272  001017                           BNE     NADMOR          ;NO
2023  007274  162701  000100                   SUB     #100,%1
2024  007300  005701                   NASEQ:  TST     %1              ;BOTH SEQ?
2025  007302  100027                           BPL     NADONE          ;NO
2026  007304  012760  010000  030404           MOV     #10000,SRANK(0) ;RANDOM NUMBER COUNT
2027  007312  052760  040000  030002           BIS     #40000,ASTAT(0) ;SET RANDOM SEQ BIT
2028  007320  005360  030404           NADRAN: DEC     SRANK(0)        ;COUNT DONE?
2029  007324  001411                           BEQ     NADBOS          ;YES
2030  007326  004767  000710                   JSR     7,RANDOM        ;GET ADDR
2031  007332  042701  174000           NADMOR: BIC     #174000,%1      ;MASK
2032  007336  010160  030202                   MOV     %1,DABUF(0)
2033  007342  050160  030002                   BIS     %1,ASTAT(0)             ;LOAD
2034  007346  000207                           RTS     7
2035
2036  007350  005701                   NADBOS: TST     %1              ;ALL SEQ?
2037  007352  100003                           BPL     NADONE          ;NO
2038  007354  042760  040000  030002           BIC     #40000,ASTAT(0) ;YES, CLR RAN SEQ BIT
2039  007362  042701  174000           NADONE: BIC     #174000,%1      ;MASK ADDR
2040  007366  010160  030202                   MOV     %1,DABUF(0)     ;SAVE ADDR
2041  007372  050160  030002                   BIS     %1,ASTAT(0)     ;SAVE ADDR
2042  007376  000262                           SEV                     ;V=1 MEANS DONE
2043  007400  000207                           RTS     7
```

```
2044
2045                                    ;*************************************************************************
2046                                    ;SUBROUTINE TO INITIALIZE PATTERNS
2047                                    ;*************************************************************************
2048
2049  007402  016001  030000           PATIN:  MOV     STAT0(0),%1
2050  007406  042701  177760                   BIC     #177760,%1
2051  007412  001410                           BEQ     PAT0
2052  007414  006301                           ASL     %1
2053  007416  016160  007442  030204   PATUR:  MOV     PATTER-2(1),DBBUF(0)
2054  007424  012760  001000  030402           MOV     #1000,PRANK(0)
2055  007432  000514                           BR      PARET
2056
2057  007434  032760  000020  030000   PAT0:   BIT     #20,STAT0(0)    ;PATX?
2058  007442  001110                           BNE     PARET           ;YES
2059
2060  007444  000000                   PATTER: 000000                  ;PAT1
2061  007446  177777                           177777                  ;PAT2
2062  007450  125252                           125252                  ;PAT3
2063  007452  052525                           052525                  ;PAT4
2064  007454  107070                           107070                  ;PAT5-OCTAL CHECKERBOARD
2065  007456  000001                           000001                  ;PAT6-FLOATING ONE
2066  007460  177776                           177776                  ;PAT7-FLOATING ZERO
2067  007462  000000                           000000                  ;PAT10-ONES'S TRANSFER
2068  007464  177777                           177777                  ;PAT11-ZERO'S TRANSFER
2069  007466  123456                   LONUM:  123456                  ;PAT12-RANDOM NUMBERS
2070  007470  176543                   HINUM:  176543
2071
2072                                    ;*************************************************************************
2073                                    ;SUBROUTINE TO GET NEXT PATTERN WORD
2074                                    ;*************************************************************************
2075
2076  007472  016001  030000           NEXPAT: MOV     STAT0(0),%1     ;GET STATUS
2077  007476  042701  177760                   BIC     #177760,%1      ;MASK PATTERN #
2078  007502  006301                           ASL     %1              ;*2
2079  007504  000171  007510                   JMP     @PATER(1)
2080
2081  007510  007732                   PATER:  PADONE                  ;PAT20=ONLY ONE PATTERN
2082  007512  007570                           PANEX                   ;PAT1 = SINGLE PATTERN
2083  007514  007570                           PANEX                   ;PAT2 = SINGLE PATTERN
2084  007516  007570                           PANEX                   ;PAT3 = SINGLE PATTERN
2085  007520  007570                           PANEX                   ;PAT4 = SINGLE PATTERN
2086  007522  007536                           PAT5                    ;OCTAL CHECKERBOARD
2087  007524  007562                           PAT6                    ;
2088  007526  007616                           PAT7
2089  007530  007634                           PAT10
2090  007532  007652                           PAT11
2091  007534  007674                           PAT12
```

```
2092
2093  007536  022760  016161  030204  PAT5:   CMP     #016161,DBBUF(0)        ;LAST WORD?
2094  007544  001411                          BEQ     PANEX           ;YES
2095  007546  003002                          BGT     PAT5A
2096  007550  006260  030204                  ASR     DBBUF(0)
2097  007554  005160  030204          PAT5A:  COM     DBBUF(0)
2098  007560  000441                          BR      PARET
2099
2100  007562  005760  030204          PAT6:   TST     DBBUF(0)
2101  007566  100034                          BPL     PAT6A
2102  007570  032760  000040  030000  PANEX:  BIT     #40,STAT0(0)    ;ALL PAT?
2103  007576  001455                          BEQ     PADONE          ;NO
2104  007600  020127  000022                  CMP     %1,#22          ;LAST PAT?
2105  007604  001443                          BEQ     PADON
2106  007606  005260  030000                  INC     STAT0(0)
2107  007612  005721                          TST     (1)+            ;ADD 2 TO R1
2108  007614  000700                          BR      PATUR
2109
2110  007616  005760  030204          PAT7:   TST     DBBUF(0)
2111  007622  100362                          BPL     PANEX
2112  007624  000261                          SEC
2113  007626  006160  030204                  ROL     DBBUF(0)
2114  007632  000414                          BR      PARET
2115
2116  007634  005760  030204          PAT10:  TST     DBBUF(0)
2117  007640  100753                          BMI     PANEX
2118  007642  000261                          SEC
2119  007644  006160  030204                  ROL     DBBUF(0)
2120  007650  000405                          BR      PARET
2121
2122  007652  005760  030204          PAT11:  TST     DBBUF(0)
2123  007656  100344                          BPL     PANEX
2124  007660  006360  030204          PAT6A:  ASL     DBBUF(0)
2125  007664  016060  030204  030206  PARET:  MOV     DBBUF(0),OLDATA(0) ;V=0, NOT DONE
2126  007672  000207                          RTS     7
2127
2128  007674  005360  030402          PAT12:  DEC     PRANK(0)
2129  007700  001733                          BEQ     PANEX
2130  007702  004767  000334                  JSR     7,RANDOM
2131  007706  010160  030204                  MOV     %1,DBBUF(0)
2132  007712  000764                          BR      PARET
2133
2134  007714  042760  000037  030000  PADON:  BIC     #37,STAT0(0)
2135  007722  005260  030000                  INC     STAT0(0)
2136  007726  004767  177450                  JSR     7,PATIN
2137  007732  016060  030204  030206  PADONE: MOV     DBBUF(0),OLDATA(0)
2138  007740  000262                          SEV                     ;V=1 MEANS DONE
2139  007742  000207                          RTS     7
```

```
2140
2141                                    ;*************************************************************************
2142                                    ;SUBROUTINE TO CHANGE TRACKS WITHOUT CHANGING ASTAT
2143                                    ;*************************************************************************
2144
2145  007744  062760  000100  030202  CHATAK: ADD     #100,DABUF(0)
2146  007752  042760  174000  030202          BIC     #174000,DABUF(0)
2147  007760  016002  030002                  MOV     ASTAT(0),%2
2148  007764  042702  174000                  BIC     #174000,%2
2149  007770  020260  030202                  CMP     %2,DABUF(0)     ;Z=1 MEANS DONE
2150  007774  000207                          RTS     7
2151
2152                                    ;*************************************************************************
2153                                    ;SUBROUTINE TO CHANGE SECTORS WITHOUT CHANGING ASTAT
2154                                    ;       ALSO CHECKS FOR SAME SECTOR (Z=1)
2155                                    ;*************************************************************************
2156
2157  007776  005260  030202          CHASEC: INC     DABUF(0)
2158  010002  016002  030202                  MOV     DABUF(0),%2
2159  010006  042702  177700                  BIC     #177700,%2
2160  010012  001003                          BNE     CHASE1
2161  010014  162760  000100  030202          SUB     #100,DABUF(0)
2162  010022  016001  030002          CHASE1: MOV     ASTAT(0),%1
2163  010026  042701  177700                  BIC     #177700,%1
2164  010032  020201                          CMP     %2,%1
2165  010034  000207                          RTS     7               ;V=0, Z=0
2166
```

```
2167
2168                                    ;*************************************************************************
2169                                    ;SUBROUTINE TO LOAD COMPLEMENT PATTERN IN DATA BUFFER
2170                                    ;*************************************************************************
2171
2172  010036  016060  030206  030204   COMPAT: MOV     OLDATA(0),DBBUF(0)
2173  010044  005160  030204                   COM     DBBUF(0)
2174  010050  000207                           RTS     7
2175
2176                                    ;*************************************************************************
2177                                    ;SUBROUTINES TO GET ADJACENT TRACK ADDRESSES FOR TEST17.
2178                                    ;       THIS IS NECESSARY BECAUSE THE TRACKS ARE PHYSICALLY STAGGERED.
2179                                    ;       THE ORDER, FROM INSIDE TO OUTSIDE IS:
2180                                    ;       30,20,31,21,32,22,33,23,34,24,35,25,36,26,37,27,
2181                                    ;       00,10,01,11,02,12,03,13,04,14,05,15,06,16,07,17.
2182
2183                                    ;*************************************************************************
2184
2185  010052  016001  030202           ADJAC1: MOV     DABUF(0),%1     ;GET THE ORIGINAL TRACK ADDR
2186  010056  032701  001000                   BIT     #1000,%1        ;7<TRK<20,27<TRK?
2187  010062  001407                           BEQ     ADJ1B           ;NO
2188  010064  032701  002000                   BIT     #2000,%1        ;TRK>17?
2189  010070  001402                           BEQ     ADJ1A           ;NO
2190  010072  162701  000200                   SUB     #200,%1         ;COMPENSATE
2191  010076  162701  001700           ADJ1A:  SUB     #1700,%1        ;COMPENSATE
2192  010102  062701  001000           ADJ1B:  ADD     #1000,%1        ;NEW ADDR
2193  010106  010160  030202                   MOV     %1,DABUF(0)     ;LOAD ADDR BUFFER
2194  010112  000207                           RTS     7
2195
2196  010114  016001  030202           ADJAC2: MOV     DABUF(0),%1     ;GET THE FIRST ADJACENT TRACK ADDR
2197  010120  032760  002000  030002           BIT     #2000,ASTAT(0)  ;WAS ORIGINAL TRK>17?
2198  010126  001402                           BEQ     ADJ2A           ;NO
2199  010130  062701  000200                   ADD     #200,%1         ;COMPENSATE
2200  010134  162701  000100           ADJ2A:  SUB     #100,%1         ;NEW ADDR
2201  010140  010160  030202                   MOV     %1,DABUF(0)     ;LOAD ADDR BUFFER
2202  010144  000207                           RTS     7
2203
2204                                    ;*************************************************************************
2205                                    ;SUBROUTINE TO SEE IF 2 SECONDS HAVE PASSED
2206                                    ;*************************************************************************
2207
2208  010146  016002  030406           W2S:    MOV     WAITER(0),%2    ;GET WAIT START TIME
2209  010152  166702  007250                   SUB     TIME,%2         ;SUBTRACT PRESENT TIME
2210  010156  003402                           BLE     W2S1            ;BRANCH IF NO OVERFLOW
2211  010160  166702  170314                   SUB     CYCLE,%2        ;SUBTRACT A MINUTE
2212  010164  066702  011634           W2S1:   ADD     CYCL02,%2       ;ADD 2 SECONDS
2213  010170  000207                           RTS     7
2214
2215                                    ;*************************************************************************
2216                                    ;SUBROUTINE TO SEE IF 20 SEC. HAVE PASSED.
2217                                    ;*************************************************************************
2218
2219  010172  016002  030406           W20S:   MOV     WAITER(0),%2
2220  010176  166702  007224                   SUB     TIME,%2
2221  010202  003402                           BLE     W20S1
2222  010204  166702  170270                   SUB     CYCLE,%2
```

```
2223  010210  066702  011606          W20S1:  ADD     CYCL20,%2
2224  010214  000207                  RTS     7               ;PLUS=NOT DONE, MINUS=DONE
2225
2226                                  ;*************************************************************************
2227                                  ;SUBROUTINE TO SEE IF 60 SECONDS HAVE PASSED
2228                                  ;*************************************************************************
2229
2230  010216  016002  030406          W60S:   MOV     WAITER(0),%2    ;GET WAIT START TIME
2231  010222  166702  007200                  SUB     TIME,%2         ;SUBTRACT PRESENT TIME
2232  010226  003402                  BLE     W60S1           ;BRANCH IF NO OVERFLOW
2233  010230  166702  17[illegible]4          SUB     CYCLE,%2        ;SUBTRACT A MINUTE
2234  010234  066702  01 [illegible]3  W60S1:  ADD     CYCL60,%2       ;ADD 60 SECONDS
2235  010240  000207                  RTS     7
```

```
2236
2237                            ;*************************************************************************
2238                            ;RANDOM NUMBER SUBROUTINE - R1 CONTAINS HINUM
2239                            ;*************************************************************************
2240
2241  010242  010046           RANDOM: MOV     %0,-(6)         ;SAVE R0
2242  010244  010246                   MOV     %2,-(6)         ;SAVE R2
2243  010246  010346                   MOV     %3,-(6)         ;SAVE R3
2244  010250  016700  177212           MOV     LONUM,%0        ;SET R0 WITH LOW
2245  010254  016701  177210           MOV     HINUM,%1        ;SET R1 WITH HIGH
2246  010260  012703  177771           MOV     #-7,%3          ;SET SHIFT COUNT
2247  010264  005002                   CLR     %2
2248  010266  006300           SHIFT:  ASL     %0              ;SHIFT R0 LEFT AND
2249  010270  006101                   ROL     %1              ;ROTATE CARRY INTO R1 AND
2250  010272  006102                   ROL     %2              ;ROTATE CARRY INTO R2.
2251  010274  005203                   INC     %3              ;CHECK FOR DONE
2252  010276  001373                   BNE     SHIFT           ;CONTINUE SHIFT LOOP
2253  010300  066702  177162           ADD     LONUM,%2        ;ADD NUMBER TO MAKE X 129
2254  010304  005501                   ADC     %1              ;PROPOGATE CARRY
2255  010306  066701  177156           ADD     HINUM,%1        ;ADD NUMBER TO MAKE X 129
2256  010312  005502                   ADC     %2              ;PROPOGATE CARRY
2257  010314  062700  001057           ADD     #1057,%0        ;ADD LOW CONSTANT
2258  010320  005501                   ADC     %1              ;PROPOGATE CARRY
2259  010322  005502                   ADC     %2              ;PROPOGATE CARRY
2260  010324  062701  047401           ADD     #47401,%1       ;ADD HIGH CONSTANT
2261  010330  005502                   ADC     %2              ;PROPOGATE CARRY
2262  010332  062702  000006           ADD     #5,%2           ;ADD HIGHEST CONSTANT
2263  010336  060200                   ADD     %2,%0           ;REPRIME R0 WITH HIGHEST DIGIT
2264  010340  005501                   ADC     %1              ;PROPOGATE CARRY
2265  010342  010067  177120           MOV     %0,LONUM        ;SAVE R0
2266  010346  010167  177116           MOV     %1,HINUM        ;SAVE R1
2267  010352  012603                   MOV     (6)+,%3         ;RESTORE R3
2268  010354  012602                   MOV     (6)+,%2         ;RESTORE R2
2269  010356  012600                   MOV     (6)+,%0         ;RESTORE R0
2270  010360  000207                   RTS     7               ;RETURN
2271
2272                            ;*************************************************************************
2273                            ;SUBROUTINE TO MAKE SURE THE TELEPRINTER IS ACTIVE
2274                            ;*************************************************************************
2275
2276  010362  032770  000100  032404  CRACT:  BIT     #100,@TPS0(0)   ;TELEPRINTER BUSY?
2277  010370  001007                   BNE     CRACT2          ;YES
2278  010372  105060  030400           CLRB    PSTAT(0)        ;CLEAR POINTER
2279  010376  012770  000100  032404  CRACT1: MOV     #100,@TPS0(0)   ;INT ENB (MAKE BUSY)
2280  010404  005070  032406           CLR     @TPB0(0)        ;TYPE A NULL
2281  010410  000207                   CRACT2: RTS     7
```

```
                                        ;*****************************************************************************
                                        ;KEYBOARD INTERRUPT ROUTINE
                                        ;*****************************************************************************

010412  010046                  KIN:    MOV     %0,-(6)         ;SAVE REGISTERS
010414  010146                          MOV     %1,-(6)
010416  010246                          MOV     %2,-(6)
010420  010346                          MOV     %3,-(6)
010422  010446                          MOV     %4,-(6)
010424  005000                          CLR     %0
010426  012767  000002  167352  KLOOP:  MOV     #2,6            ;RTI ON NONEXISTANT TTY
010434  105770  032400                  TSTB    @TKS0(0)        ;TK DONE FLAG?
010440  100415                          BMI     TKSERV          ;SERVICE TTY
010442  062700  000010          KRETUR: ADD     #10,%0          ;INC TO NEXT STATION
010446  020067  170030                  CMP     %0,NUMBER       ;POLLED ALL STATIONS?
010452  001365                          BNE     KLOOP           ;NOT DONE POLLING
010454  005067  167326                  CLR     6               ;HALT ON TIME OUT
010460  012604                          MOV     (6)+,%4         ;RESTORE REGISTERS
010462  012603                          MOV     (6)+,%3
010464  012602                          MOV     (6)+,%2
010466  012601                          MOV     (6)+,%1
010470  012600                          MOV     (6)+,%0
010472  000002                          RTI

                                        ;*****************************************************************************
                                        ;KEYBOARD SERVICE ROUTINE
                                        ;*****************************************************************************

010474  005067  167306          TKSERV: CLR     6               ;HALT ON TIME OUT
010500  010003                          MOV     %0,%3
010502  006303                          ASL     %3
010504  006303                          ASL     %3
010506  062703  031200                  ADD     #PBUF,%3        ;R3=PBUF ADDR.
010512  017001  032402                  MOV     @TKB0(0),%1     ;GET ASCII
010516  042701  177600                  BIC     #177600,%1      ;MASK PARITY
010522  020127  000024                  CMP     %1,#024
010526  003030                          BGT     TK0
010530  006301                          ASL     %1              ;R1*2 FOR IMDIRECT INDEXED ADDRESSING
010532  000171  010536                  JMP     @TKCONT(1)
010536  010670          TKCONT: ILLEG
010540  010770                  CONTA
010542  011054                  CONTB
010544  011132                  CONTC
010546  011264                  CONTD
010550  011304                  CONTE
010552  010670                  ILLEG
010554  010670                  ILLEG
010556  010670                  ILLEG
010560  012210                  SPACE           ;TAB=011
010562  010670                  ILLEG
010564  010670                  ILLEG
010566  011320                  CONTL
010570  013404                  ENDIN           ;CR=015
010572  010670                  ILLEG
010574  010670                  ILLEG
```

```
2338  010576  010670                          ILLEG
2339  010600  010670                          ILLEG
2340  010602  011402                          CONTR
2341  010604  011460                          CONTS
2342  010606  011476                          CONTT
2343
2344  010610  105760  030000        TK0:    TSTB    STAT0(0)        ;RUN MODE?
2345  010614  100425                          BMI     ILLEG           ;YES, GO TYPE "?"
2346  010616  020127  000132                  CMP     %1,#132         ;>"Z"?
2347  010622  003022                          BGT     ILLEG
2348  010624  020127  000100                  CMP     %1,#100         ;ALPHA?
2349  010630  003402                          BLE     TK1
2350  010632  000167  000720                  JMP     ALPHA
2351
2352  010636  020127  000072        TK1:    CMP     %1,#072         ;>"9"?
2353  010642  002012                          BGE     ILLEG
2354  010644  020127  000060                  CMP     %1,#060         ;NUMERIC?
2355  010650  002402                          BLT     TK2
2356  010652  000167  001216                  JMP     NUMB
2357
2358  010656  020127  000040        TK2:    CMP     %1,#040         ;SPACE?
2359  010662  001002                          BNE     ILLEG
2360  010664  000167  001320                  JMP     SPACE
2361
2362                                ;*************************************************************************
2363                                ;ILLEGAL CHARACTER HANDLER
2364                                ;*************************************************************************
2365
2366  010670  005060  031000        ILLEG:  CLR     KSTAT(0)        ;CLEAR INPUT BUFFER
2367  010674  032770  000100  032404          BIT     #100,@TPS0(0)
2368  010702  001014                          BNE     ILBUSY
2369  010704  012713  106612                  MOV     #CRLF,(3)       ;CRLF INTO PBUF
2370  010710  005060  030400                  CLR     PSTAT(0)
2371  010714  052770  000100  032404          BIS     #100,@TPS0(0)   ;MAKE BUSY
2372  010722  112770  000077  032406          MOVB    #'?,@TPB0(0)    ;TYPE "?"
2373  010730  000167  177506                  JMP     KRETUR
2374
2375  010734  004767  002766        ILBUSY: JSR     7,BUSY
2376  010740  112715  000077                  MOVB    #'?,(5)
2377  010744  004767  002756        ILCRLF: JSR     7,BUSY
2378  010750  112715  000215                  MOVB    #CR,(5)
2379  010754  004767  002746                  JSR     7,BUSY
2380  010760  112715  000212                  MOVB    #LF,(5)
2381  010764  000167  177452                  JMP     KRETUR
2382
```

```
2383
2384                                    ;*************************************************************************
2385                                    ;"CONTROL A" (↑A) HANDLER
2386                                    ;       ↑A RAISES THE ATTEN BIT TO STOP READING IN TEST 22 ONLY
2387                                    ;*************************************************************************
2388
2389  010770  105760  030000          CONTA:  TSTB    STATO(0)        ;RUN MODE?
2390  010774  100335                          BPL     ILLEG           ;NO
2391  010776  116001  030001                  MOVB    STATO+1(0),%1   ;GET TEST #
2392  011002  042701  177700                  BIC     #177700,%1
2393  011006  020127  000020                  CMP     %1,#20          ;TEST 20?
2394  011012  001326                          BNE     ILLEG           ;NO
2395  011014  012770  000214  032200          MOV     #214,@CSO(0)    ;ATTEN BIT UP, STOP READING
2396  011022  105260  030006                  INCB    PHASE(0)        ;NEXT PHASE
2397  011026  004767  002622                  JSR     7,ECHO          ;MAKE SURE TP IS "BUSY"
2398  011032  004767  002670                  JSR     7,BUSY
2399  011036  112715  000136                  MOVB    #'↑,(5)
2400  011042  004767  002660                  JSR     7,BUSY
2401  011046  112715  000101                  MOVB    #'A,(5)
2402  011052  000734                          BR      ILCRLF
2403
2404                                    ;*************************************************************************
2405                                    ;"CONTROL B" (↑B) HANDLER
2406                                    ;       RINGS THE BELL ON ERRORS IF NO ERROR MESSAGF.
2407                                    ;       SECOND TIME STOPS THE BELL.
2408                                    ;*************************************************************************
2409
2410  011054  032760  000002  030004  CONTB:  BIT     #2,FLAGS(0)
2411  011062  001404                          BEQ     CONTBA
2412  011064  042760  000002  030004          BIC     #2,FLAGS(0)
2413  011072  000403                          BR      CONTBB
2414
2415  011074  052760  000002  030004  CONTBA: BIS     #2,FLAGS(0)
2416  011102  004767  002546          CONTBB: JSR     7,ECHO
2417  011106  004767  002614                  JSR     7,BUSY
2418  011112  112715  000136                  MOVB    #'↑,(5)
2419  011116  004767  002604                  JSR     7,BUSY
2420  011122  112715  000102                  MOVB    #'B,(5)
2421  011126  000167  177310                  JMP     KRETUR
2422
2423                                    ;*************************************************************************
2424                                    ;"CONTROL C" (↑C) HANDLER
2425                                    ;       IF STATION IS ACITVE, CLEARS ONLY ACTIVE AND MODE BITS
2426                                    ;       IF NOT ACTIVE, CLEARS ALL BUFFERS
2427                                    ;*************************************************************************
2428
2429  011132  004767  175650          CONTC:  JSR     7,CLRCS         ;CLR CS BUFFER
2430  011136  105760  030000                  TSTB    STATO(0)        ;RUN MODE?
2431  011142  100426                          BMI     CONTCC          ;YES
2432  011144  012702  000005                  MOV     #5,%2           ;THERE ARE FIVE FOUR WORD BUFFER AREAS!
2433  011150  012701  030000                  MOV     #STATO,%1       ;FIRST BUFFER AREA ADDR
2434  011154  060001                          ADD     %0,%1           ;ADD STATION "#"
2435  011156  005021          CONTCA: CLR     (1)+            ;CLR ALL BUFFERS
2436  011160  005021                  CLR     (1)+
2437  011162  005021                  CLR     (1)+
2438  011164  005011                  CLR     (1)
```

```
2439  011166  062701  000172                  ADD     #172,%1         ;NEXT BUFFER AREA ADDR
2440  011172  005302                          DEC     %2
2441  011174  001370                          BNE     CONTCA
2442  011176  060001                          ADD     %0,%1
2443  011200  060001                          ADD     %0,%1
2444  011202  060001                          ADD     %0,%1
2445  011204  012702  000020                  MOV     #20,%2          ;THERE ARE 20 WORDS IN THE PBUFF
2446  011210  005021                  CONTCB: CLR     (1)+
2447  011212  005302                          DEC     %2
2448  011214  001375                          BNE     CONTCB
2449  011216  000410                          BR      CONTCD
2450
2451  011220  042760  100200  030000  CONTCC: BIC     #100200,STATO(0) ;CLEAR ACTIVE BIT AND RUN BIT
2452  011226  052760  000100  030004          BIS     #100,FLAGS(0)   ;SET "CONTINUE" FLAG
2453  011234  005060  030400                  CLR     PSTAT(0)        ;RESET PBUF STATUS
2454  011240  012723  041536          CONTCD: MOV     #"↑C,(3)+       ;ASCII FOR "↑C"
2455  011244  012723  106612                  MOV     #CRLF,(3)+      ;ASCII FOR CRLF
2456  011250  005013                          CLR     (3)             ;END OF MESS MARK
2457  011252  032770  000100  032404          BIT     #100,@TPS0(0)   ;TP "BUSY"?
2458  011260  001532                          BEQ     EXCONA          ;NO
2459  011262  000533                          BR      KRET1
2460
2461                                  ;*************************************************************************
2462                                  ;"CONTROL D" (↑D) HANDLER
2463                                  ;*************************************************************************
2464
2465  011264  062760  100000  030004  CONTD:  ADD     #100000,FLAGS(0) ;SET "DON'T TYPE ERROR MESSAGE" FLAG
2466  011272  005060  030400                  CLR     PSTAT(0)        ;CLR PRINTER BUFF
2467  011276  012723  042136                  MOV     #"↑D,(3)+       ;ASCII FOR"↑D"
2468  011302  000502                          BR      EXCONT
2469
2470                                  ;*************************************************************************
2471                                  ;"CONTROL E" (↑E) HANDLER
2472                                  ;       ↑E CAUSES TYPE OUT OF NUMBER OF ERRORS SO FAR
2473                                  ;*************************************************************************
2474
2475  011304  012760  030400  030400  CONTE:  MOV     #30400,PSTAT(0) ;MESS 3, LINE 1
2476  011312  012723  042536                  MOV     #"↑E,(3)+       ;ASCII FOR "↑E"
2477  011316  000474                          BR      EXCONT
2478
2479                                  ;*************************************************************************
2480                                  ;"CONTROL L" (↑L) HANDLER
2481                                  ;       ↑L CAUSES A TEST TO LOOP ON ITSELF UNTIL RELEASED BY ANOTHER ↑L.
2482                                  ;*************************************************************************
2483
2484  011320  032760  000040  030004  CONTL:  BIT     #40,FLAGS(0)
2485  011326  001404                          BEQ     CONTLA
2486  011330  042760  000040  030004          BIC     #40,FLAGS(0)
2487  011336  000405                          BR      CONTLB
2488
2489  011340  005060  032206          CONTLA: CLR     LOOPC(0)        ;CLR LOOP COUNTER
2490  011344  052760  000040  030004          BIS     #40,FLAGS(0)    ;SET LOOP FLAG
2491  011352  004767  002276          CONTLB: JSR     7,ECHO
2492  011356  004767  002344                  JSR     7,BUSY
2493  011362  112715  000136                  MOVB    #'↑,(5)
2494  011366  004767  002334                  JSR     7,BUSY
```

```
2495  011372  112715  000114                  MOVB    #'L,(5)
2496  011376  000167  177040                  JMP     KRETUR
2497
2498                                  ;*****************************************************************
2499                                  ;"CONTROL R" (↑R) HANDLER
2500                                  ;       ↑R CAUSES COUNT TYPE OUT TO BE SUPRESSED ON LOOPING.
2501                                  ;       SECOND ↑R RESUMES TYPE OUT
2502                                  ;*****************************************************************
2503
2504  011402  032760  002000  030004  CONTR:  BIT     #2000,FLAGS(0)
2505  011410  001404                          BEQ     CONTRA
2506  011412  042760  002000  030004          BIC     #2000,FLAGS(0)
2507  011420  000403                          BR      CONTRB
2508
2509  011422  052760  002000  030004  CONTRA: BIS     #2000,FLAGS(0)  ;SET THE "LOOP ON TEST" FLAG
2510  011430  004767  002220          CONTRB: JSR     7,ECHO
2511  011434  004767  002266                  JSR     7,BUSY
2512  011440  112715  000136                  MOVB    #'↑,(5)
2513  011444  004767  002256                  JSR     7,BUSY
2514  011450  112715  000122                  MOVB    #'R,(5)
2515  011454  000167  176762                  JMP     KRETUR
2516
2517                                  ;*****************************************************************
2518                                  ;"CONTROL S" (↑S) HANDLER
2519                                  ;*****************************************************************
2520
2521  011460  012760  012000  030400  CONTS:  MOV     #12000,PSTAT(0) ;MESS 1, LINE4
2522  011466  012723  051536                  MOV     #"↑S,(3)+       ;ASCII FOR "↑S"
2523  011472  005023                          CLR     (3)+            ;END OF MESS MARK
2524  011474  000405                          BR      EXCONT          ;GO CHECK FOR BUSY TP
2525
2526                                  ;*****************************************************************
2527                                  ;"CONTROL T" (↑T) HANDLER
2528                                  ;       ↑T CAUSES THE PRESENT DATE AND TIME TO BE TYPED
2529                                  ;*****************************************************************
2530
2531  011476  012760  050400  030400  CONTT:  MOV     #50400,PSTAT(0) ;MESS 5, LINE 1
2532  011504  012723  052136                  MOV     #"↑T,(3)+       ;ASCII FOR "↑T"
2533  011510  012723  106612          EXCONT: MOV     #CRLF,(3)+      ;ASCII FOR CRLF
2534  011514  005013                          CLR     (3)             ;END OF MESS MARK
2535  011516  032770  000100  032404          BIT     #100,@TPS0(0)   ;TP "BUSY"?
2536  011524  001410                          BEQ     EXCONA          ;NO
2537  011526  032770  170000  032200          BIT     #170000,@CS0(0) ;ANY ERRORS?
2538  011534  001406                          BEQ     KRET1           ;NO
2539  011536  052760  100000  030000          BIS     #100000,STAT0(0) ;SET ACTIVE BIT
2540  011544  000402                          BR      KRET1
2541
2542  011546  004767  176610          EXCONA: JSR     7,CRACT         ;ACTIVATE TTY
2543  011552  000167  176664          KRET1:  JMP     KRETUR
```

```
2544
2545                                    ;*************************************************************************
2546                                    ;ALPHA CHARACTER HANDLER
2547                                    ;*************************************************************************
2548
2549  011556  032760  000100  030000  ALPHA:  BIT     #100,STAT0(0)   ;TEST MODE?
2550  011564  001106                    BNE     XNUM            ;YES, GO CHECK FOR "X" OR "C"
2551  011566  005760  031000            TST     KSTAT(0)
2552  011572  001452                    BEQ     NEWCOM
2553  011574  126027  031001  000002    CMPB    KSTAT+1(0),#2
2554  011602  003144                    BGT     ILLO
2555  011604  001426                    BEQ     KTEST
2556  011606  126027  031000  000005    CMPB    KSTAT(0),#5
2557  011614  003137                    BGT     ILLO
2558  011616  001416                    BEQ     AT
2559  011620  126027  031000  000003    CMPB    KSTAT(0),#3
2560  011626  003007                    BGT     AP
2561  011630  001403                    BEQ     AE
2562  011632  020127  000103            CMP     %1,#103         ;ASCII "C"?
2563  011636  000424                    BR      AOK
2564
2565  011640  020127  000105  AE:       CMP     %1,#105         ;ASCII "E"?
2566  011644  000421                    BR      AOK
2567
2568  011646  020127  000120  AP:       CMP     %1,#120         ;P?
2569  011652  000416                    BR      AOK
2570
2571  011654  020127  000124  AT:       CMP     %1,#124         ;T?
2572  011660  000413                    BR      AOK
2573
2574  011662  126027  031000  000003  KTEST:  CMPB    KSTAT(0),#3
2575  011670  003111                    BGT     ILLO
2576  011672  001770                    BEQ     AT
2577  011674  126027  031000  000001    CMPB    KSTAT(0),#1
2578  011702  001756                    BEQ     AE
2579  011704  020127  000123            CMP     %1,#123         ;ASCII "S"?
2580  011710  001101            AOK:    BNE     ILLO
2581  011712  005260  031000            INC     KSTAT(0)
2582  011716  000462                    BR      NBACK
2583
2584  011720  020127  000124  NEWCOM:  CMP     %1,#124
2585  011724  001416                    BEQ     NTEST
2586  011726  020127  000101            CMP     %1,#101
2587  011732  001417                    BEQ     NACCEP
2588  011734  020127  000103            CMP     %1,#103
2589  011740  001065                    BNE     ILLO
2590  011742  032760  000100  030004    BIT     #100,FLAGS(0)   ;"CONTINUE" FLAG?
2591  011750  001461                    BEQ     ILLO            ;NO, ILLEGAL CHARACTER
2592  011752  012760  001401  031000    MOV     #1401,KSTAT(0)
2593  011760  000441                    BR      NBACK
2594
2595  011762  012760  001001  031000  NTEST:  MOV     #1001,KSTAT(0)
2596  011770  000435                    BR      NBACK
2597
2598  011772  012760  000401  031000  NACCEP: MOV     #401,KSTAT(0)
2599  012000  000431                    BR      NBACK
```

```
2600
2601  012002  105760  031000          XNUM:   TSTB    KSTAT(0)          ;POINTER AT 0?
2602  012006  001042                          BNE     ILLO              ;NO
2603  012010  020127  000103                  CMP     %1,#103           ;C?
2604  012014  001013                          BNE     XNUMX
2605  012016  032760  000100  030004          BIT     #100,FLAGS(0)     ;"CONTINUE" FLAG SET?
2606  012024  001433                          BEQ     ILLO              ;NO, CAN'T CONTINUE!
2607  012026  042760  000100  030004          BIC     #100,FLAGS(0)     ;CLR "CONTINUE" FLAG
2608  012034  112760  000006  031001          MOVB    #06,KSTAT+1(0)    ;ARG 06 = "OK"
2609  012042  000410                          BR      NBACK
2610
2611  012044  020127  000130          XNUMX:  CMP     %1,#130           ;X?
2612  012050  001021                          BNE     ILLO
2613  012052  017060  032402  031002          MOV     @TKB0(0),KBUF(0)
2614  012060  005260  031000                  INC     KSTAT(0)
2615  012064  004767  001564          NBACK:  JSR     7,ECHO
2616  012070  000167  176346                  JMP     KRETUR
2617
2618                                  ;*****************************************************************************
2619                                  ;NUMERIC HANDLER
2620                                  ;*****************************************************************************
2621
2622  012074  032760  000100  030000  NUMB:   BIT     #100,STAT0(0)     ;TEST MODE?
2623  012102  001006                          BNE     TESNUM            ;YES
2624  012104  032760  001400  030004          BIT     #1400,FLAGS(0)    ;SERIAL NUMBER FLAGS?
2625  012112  001364                          BNE     NBACK             ;YES, ECHO IT
2626  012114  000167  176550          ILLO:   JMP     ILLEG             ;NO, ILLEGAL CHARACTER
2627
2628  012120  020127  000070          TESNUM: CMP     %1,#070           ;>"7"?
2629  012124  002373                          BGE     ILLO              ;NOT AN OCTAL NUMBER
2630  012126  126027  031000  000002          CMPB    KSTAT(0),#2
2631  012134  002013                          BGE     WORIN
2632  012136  116005  031000          NUMBIN: MOVB    KSTAT(0),%5
2633  012142  060005                          ADD     %0,%5
2634  012144  110165  031002                  MOVB    %1,KBUF(5)
2635  012150  142765  000260  031002          BICB    #260,KBUF(5)
2636  012156  005260  031000                  INC     KSTAT(0)
2637  012162  000740                          BR      NBACK
2638
2639  012164  126027  031001  000005  WORIN:  CMPB    KSTAT+1(0),#5
2640  012172  001350                          BNE     ILLO
2641  012174  126027  031000  000006          CMPB    KSTAT(0),#6
2642  012202  002344                          BGE     ILLO
2643  012204  000167  177726                  JMP     NUMBIN
2644
```

```
2645
2646                                    ;*************************************************************************
2647                                    ;"SPACE" HANDLER
2648                                    ;*************************************************************************
2649
2650  012210  132760  000300  030000  SPACE:  BITB    #300,STAT0(0)    ;TEST MODE?
2651  012216  003736                    BLE     ILLO             ;NO, ILLEGAL MODE
2652  012220  116001  031002            MOVB    KBUF(0),%1       ;FIRST CHAR
2653  012224  116002  031001            MOVB    KSTAT+1(0),%2    ;WHICH ARG?
2654  012230  006302                    ASL     %2
2655  012232  000172  012236            JMP     @SPACE1(2)       ;JMP TO INPUTING ROUTINES
2656  012236  012254            SPACE1: TSTIN
2657  012240  012400                    INPAT
2658  012242  012540                    SEQIN
2659  012244  012770                    TRKIN
2660  012246  013104                    SCTIN
2661  012250  013212                    WRDIN
2662  012252  010670                    ILLEG
2663
2664  012254  005060  030006    TSTIN:  CLR     PHASE(0)
2665  012260  005060  032206            CLR     LOOPC(0)         ;CLR LOOP COUNTER
2666  012264  042760  000004  030004    BIC     #4,FLAGS(0)      ;CLR "TEST 2 OR 3" FLAG
2667  012272  126027  031000  000001    CMPB    KSTAT(0),#1      ;IN POINTER
2668  012300  003006                    BGT     HITST            ;2 DIGITS
2669  012302  001416                    BEQ     LOTST            ;1 DIGIT
2670  012304  112760  000101  030001  ALLTST: MOVB    #101,STAT0+1(0) ;ALL TESTS + TEST 1
2671  012312  000167  000766            JMP     TAB
2672
2673  012316  006301            HITST:  ASL     %1
2674  012320  006301                    ASL     %1
2675  012322  006301                    ASL     %1
2676  012324  105060  031002            CLRB    KBUF(0)
2677  012330  000360  031002            SWAB    KBUF(0)
2678  012334  066001  031002            ADD     KBUF(0),%1
2679  012340  020127  000024    LOTST:  CMP     %1,#24           ;>LAST TEST?
2680  012344  003263                    BGT     ILLO             ;NO
2681  012346  110160  030001            MOVB    %1,STAT0+1(0)
2682  012352  001754                    BEQ     ALLTST
2683  012354  005301                    DEC     %1
2684  012356  001406                    BEQ     LOT2
2685  012360  162701  000002            SUB     #2,%1
2686  012364  003003                    BGT     LOT2
2687  012366  052760  000004  030004    BIS     #4,FLAGS(0)      ;"TEST 2 OR 3" FLAG
2688  012374  000167  000704    LOT2:   JMP     TAB
2689
2690  012400  042760  000077  030000  INPAT:  BIC     #77,STAT0(0)     ;CLR PATTERN STATUS
2691  012406  120127  000330            CMPB    %1,#330          ;PATTERN X?
2692  012412  001445                    BEQ     XPAT             ;YES
2693  012414  126027  031000  000001    CMPB    KSTAT(0),#1      ;INPUT POINTER
2694  012422  003006                    BGT     HIPAT            ;2 DIGITS
2695  012424  001416                    BEQ     LOPAT            ;1 DIGIT
2696  012426  052760  000041  030000  ALLPAT: BIS     #41,STAT0(0)     ;ALL PATTERNS
2697  012434  000167  000644            JMP     TAB
2698
2699  012440  006301            HIPAT:  ASL     %1
2700  012442  006301                    ASL     %1
```

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2701  012444  006301                          ASL     %1
2702  012446  105060  031002                  CLRB    KBUF(0)
2703  012452  000360  031002                  SWAB    KBUF(0)
2704  012456  066001  031002                  ADD     KBUF(0),%1
2705  012462  020127  000012          LOPAT:  CMP     %1,#12
2706  012466  101212                          BHI     ILLO
2707  012470  032760  000004  030004          BIT     #4,FLAGS(0)     ;"TEST 2 OR 3" FLAG?
2708  012476  001405                          BEQ     LOPAT1          ;NO
2709  012500  005301                          DEC     %1
2710  012502  032701  000014                  BIT     #14,%1          ;PAT 1,2,3,OR 4?
2711  012506  001007                          BNE     XPAT            ;NO
2712  012510  005201                          INC     %1
2713  012512  005701          LOPAT1: TST     %1
2714  012514  001744                          BEQ     ALLPAT
2715  012516  060160  030000                  ADD     %1,STATO(0)
2716  012522  000167  000556                  JMP     TAB
2717
2718  012526  052760  000020  030000  XPAT:   BIS     #20,STATO(0)    ;SPECIAL PATTERN
2719  012534  000167  000544                  JMP     TAB
2720
2721  012540  042760  174000  030002  SEQIN:  BIC     #174000,ASTAT(0) ;CLR SEQUENCE STATUS
2722  012546  012760  010000  030404          MOV     #10000,SRANK(0) ;SET UP RANDOM SEQ COUNTER
2723  012554  120127  000330                  CMPB    %1,#330         ;SEQUENCE X?
2724  012560  001413                          BEQ     XSEQ            ;YES
2725  012562  126027  031000  000001          CMPB    KSTAT(0),#1     ;INPUT POINTER
2726  012570  003014                          BGT     HISEQ
2727  012572  001417                          BEQ     LOSEQ
2728  012574  012760  120000  030002  ALSEQ:  MOV     #120000,ASTAT(0) ;ALL SEQ AND SEQ 1 BITS
2729  012602  005060  030202                  CLR     DABUF(0)
2730  012606  000437                          BR      SEQTAB
2731
2732  012610  052760  034000  030002  XSEQ:   BIS     #34000,ASTAT(0) ;SET SEQ=1, SING TRK + SCT
2733  012616  000167  000462                  JMP     TAB
2734
2735  012622  105701                  HISEQ:  TSTB    %1
2736  012624  001113                          BNE     ILL1
2737  012626  116001  031003                  MOVB    KBUF+1(0),%1
2738  012632  020127  000002          LOSEQ:  CMP     %1,#2
2739  012636  003106                          BGT     ILL1
2740  012640  001410                          BEQ     SEQ2
2741  012642  005701                          TST     %1
2742  012644  001753                          BEQ     ALSEQ
2743  012646  012760  020000  030002          MOV     #20000,ASTAT(0)
2744  012654  005060  030202                  CLR     DABUF(0)
2745  012660  000412                          BR      SEQTAB
2746
2747  012662  004767  175354          SEQ2:   JSR     7,RANDOM
2748  012666  042701  174000                  BIC     #174000,%1      ;MASK ALL BUT ADDR
2749  012672  010160  030202                  MOV     %1,DABUF(0)
2750  012676  052701  040000                  BIS     #40000,%1       ;SET RAN SEQ BIT
2751  012702  010160  030002                  MOV     %1,ASTAT(0)
2752  012706  062760  001400  031000  SEQTAB: ADD     #1400,KSTAT(0)
2753  012714  032760  000020  030000          BIT     #20,STATO(0)
2754  012722  001570                          BEQ     TAB
2755  012724  126027  031000  000001          CMPB    KSTAT(0),#1
2756  012732  003005                          BGT     XWRDB
```

```
 2757  012734  001402                          BEQ     XWRDA
 2758  012736  004767  000712                  JSR     7,ECHO
 2759  012742  004767  000706          XWRDA:  JSR     7,ECHO
 2760  012746  004767  000702          XWRDB:  JSR     7,ECHO
 2761  012752  112760  000041  030401          MOVB    #41,PSTAT+1(0)  ;MESSAGE 2 - LINE 1
 2762  012760  105060  031000                  CLRB    KSTAT(0)
 2763  012764  000167  175452                  JMP     KRETUR
 2764  012770  120127  000330          TRKIN:  CMPB    %1,#330         ;ALL TRKS?
 2765  012774  001405                          BEQ     ALLTRK
 2766  012776  126027  031000  000001          CMPB    KSTAT(0),#1     ;INPUT POINTER
 2767  013004  003007                          BGT     HITRK
 2768  013006  001417                          BEQ     LOTRK
 2769  013010  012760  024000  030002  ALLTRK: MOV     #24000,ASTAT(0)
 2770  013016  005060  030202                  CLR     DABUF(0)
 2771  013022  000530                          BR      TAB
 2772
 2773  013024  006301                  HITRK:  ASL     %1
 2774  013026  006301                          ASL     %1
```

```
2775  013030  006301                          ASL     %1
2776  013032  105060  031002                  CLRB    KBUF(0)
2777  013036  000360  031002                  SWAB    KBUF(0)
2778  013042  066001  031002                  ADD     KBUF(0),%1
2779  013046  020127  000040          LOTRK:  CMP     %1,#40          ;OUT OF RANGE?
2780  013052  002402                          BLT     LOK1            ;NO
2781  013054  000167  175610          ILL1:   JMP     ILLEG
2782  013060  000301                  LOK1:   SWAB    %1
2783  013062  006201                          ASR     %1
2784  013064  006201                          ASR     %1
2785  013066  010160  030202                  MOV     %1,DABUF(0)
2786  013072  052701  034000                  BIS     #34000,%1
2787  013076  010160  030002                  MOV     %1,ASTAT(0)
2788  013102  000500                          BR      TAB
2789
2790
2791  013104  120127  000330          SCTIN:  CMPB    %1,#330         ;ALL SECTORS?
2792  013110  001405                          BEQ     ALLSCT
2793  013112  126027  031000  000001          CMPB    KSTAT(0),#1
2794  013120  003005                          BGT     HISCT
2795  013122  001415                          BEQ     LOSCT
2796  013124  042760  004077  030002  ALLSCT: BIC     #4077,ASTAT(0)
2797  013132  000420                          BR      SCTTAB
2798
2799  013134  006301                  HISCT:  ASL     %1
2800  013136  006301                          ASL     %1
2801  013140  006301                          ASL     %1
2802  013142  105060  031002                  CLRB    KBUF(0)
2803  013146  000360  031002                  SWAB    KBUF(0)
2804  013152  066001  031002                  ADD     KBUF(0),%1
2805  013156  020127  000077          LOSCT:  CMP     %1,#77
2806  013162  101334                          BHI     ILL1
2807  013164  050160  030002                  BIS     %1,ASTAT(0)
2808  013170  050160  030202                  BIS     %1,DABUF(0)
2809  013174  032760  000020  030000  SCTTAB: BIT     #20,STAT0(0)
2810  013202  001040                          BNE     TAB
2811  013204  105260  031001                  INCB    KSTAT+1(0)
2812  013210  000435                          BR      TAB
2813  013212  012704  031002          WRDIN:  MOV     #KBUF,%4
2814  013216  060004                          ADD     %0,%4
2815  013220  121427  000055                  CMPB    (4),#055
2816  013224  001012                          BNE     NOTNEG
2817  013226  005001                          CLR     %1
2818  013230  105360  031000                  DECB    KSTAT(0)
2819  013234  001417                          BEQ     POS
2820  013236  005204                          INC     %4
2821  013240  006301                  WLOOP:  ASL     %1
2822  013242  006301                          ASL     %1
2823  013244  006301                          ASL     %1
2824  013246  111402                          MOVB    (4),%2
2825  013250  060201                          ADD     %2,%1
2826  013252  005204                  NOTNEG: INC     %4
2827  013254  105360  031000                  DECB    KSTAT(0)
2828  013260  003367                          BGT     WLOOP
2829  013262  122760  000055  031002          CMPB    #055,KBUF(0)
2830  013270  001001                          BNE     POS
```

```
 2831  013272  005401                          NEG     %1
 2832  013274  010160  030204          POS:    MOV     %1,DBBUF(0)
 2833  013300  010160  030206                  MOV     %1,OLDATA(0)
 2834  013304  004767  000344          TAB:    JSR     7,ECHO
 2835  013310  116001  031000                  MOVB    KSTAT(0),%1
 2836  013314  162701  000005                  SUB     #5,%1
 2837  013320  100004                  TABLOP: BPL     OKOUT
 2838  013322  004767  000366                  JSR     7,SPACES
 2839  013326  005201                          INC     %1
 2840  013330  000773                          BR      TABLOP
 2841
 2842  013332  062760  000400  031000  OKOUT:  ADD     #400,KSTAT(0)
 2843  013340  105060  031000                  CLRB    KSTAT(0)
 2844  013344  126027  031001  000006          CMPB    KSTAT+1(0),#6
 2845  013352  001012                          BNE     KRET2
 2846  013354  005060  030604                  CLR     ERCONT(0)
 2847  013360  004767  000342                  JSR     7,BUSY
 2848  013364  112715  000317                  MOVB    #317,(5)
 2849  013370  004767  000332                  JSR     7,BUSY
 2850  013374  112715  000313                  MOVB    #313,(5)
 2851  013400  000167  175036          KRET2:  JMP     KRETUR
```

```
2852
2853                                    ;*********.  ***************************************************************
2854                                    ;CARRIAGE RETURN HANDLER
2855                                    ;*********************************************************************
2856
2857  013404  132760  000300  030000  ENDIN:  BITB    #300,STATO(0)    ;WHICH MODE?
2858  013412  100421                          BMI     ILL2             ;RUN MODE IS ILLEGAL
2859  013414  001410                          BEQ     MONDON           ;NOT TEST MODE
2860  013416  126027  031001  000006          CMPB    KSTAT+1(0),#6
2861  013424  001014                          BNE     ILL2
2862  013426  052760  100200  030000  MONACT: BIS     #100200,STATO(0) ;ACTIVATE MONITOR
2863  013434  000457                          BR      ECCR
2864
2865  013436  116001  031001          MONDON: MOVB    KSTAT+1(0),%1    ;GET ARGUMENT
2866  013442  005301                          DEC     %1               ;ARG=1=ACCEPT?
2867  013444  001415                          BEQ     ACMODE           ;YES
2868  013446  005301                          DEC     %1               ;ARG=2=TEST?
2869  013450  001404                          BEQ     ENTEST           ;YES
2870  013452  005301                          DEC     %1               ;ARG=3=CONTINUE?
2871  013454  001764                          BEQ     MONACT           ;YES
2872  013456  000167  175206          ILL2:   JMP     ILLEG            ;NO, ILLEGAL CHARACTER
2873
2874  013462  052760  000100  030000  ENTEST: BIS     #100,STATO(0)
2875  013470  112760  000102  030401          MOVB    #102,PSTAT+1(0) ;MESS4, LINE2
2876  013476  000426                          BR      ECCRO
2877
2878  013500  032760  000400  030004  ACMODE: BIT     #400,FLAGS(0)    ;M SER. NO. FLAG?
2879  013506  001050                          BNE     PSERNO           ;YES
2880  013510  032760  001000  030004          BIT     #1000,FLAGS(0)   ;P SER. NO. FLAG?
2881  013516  001440                          BEQ     MSERNO           ;NO
2882  013520  042760  001000  030004          BIC     #1000,FLAGS(0)   ;CLEAR M SER.NO. FLAG
2883  013526  012760  140641  030000          MOV     #140641,STATO(0) ;ACCEPT STARTING STATUS
2884  013534  005060  030002                  CLR     ASTAT(0)
2885  013540  016760  003664  030602          MOV     MINUTE,STIME(0) ;SAVE STARTING TIME
2886  013546  112760  000162  030401          MOVB    #162,PSTAT+1(0) ;MESS 7,LINE 2 - AUTO ACCEPT START MESS
2887  013554  005060  030604          ECCRO:  CLR     ERCONT(0)
2888  013560  005060  032206                  CLR     LOOPC(0)         ;CLR LOOP COUNTER
2889  013564  105060  030006                  CLRB    PHASE(0)
2890  013570  004767  173212                  JSR     7,CLRCS
2891  013574  004767  000054          ECCR:   JSR     7,ECHO           ;CR
2892  013600  004767  000122                  JSR     7,BUSY
2893  013604  112715  000212                  MOVB    #212,(5)         ;LF
2894  013610  005060  031000                  CLR     KSTAT(0)
2895  013614  000167  174622                  JMP     KRETUR
2896
2897  013620  112760  000261  030401  MSERNO: MOVB    #261,PSTAT+1(0) ;MESS13, LINE1-M SERIAL NUMBER
2898  013626  000403                          BR      PSER1
2899
2900  013630  112760  000301  030401  PSERNO: MOVB    #301,PSTAT+1(0) ;MESS14, LINE1-P SERIAL NUMBER
2901  013636  062760  000400  030004  PSER1:  ADD     #400,FLAGS(0)    ;SET FLAG
2902  013644  004767  000004                  JSR     7,ECHO
2903  013650  000167  174566                  JMP     KRETUR
```

```
2904
2905                                    ;*************************************************************************
2906                                    ;ECHO SUBROUTINE
2907                                    ;*************************************************************************
2908
2909  013654  032770  000100  032404  ECHO:   BIT     #100,@TPS0(0)   ;"BUSY"?
2910  013662  001007                          BNE     ECBUSY
2911  013664  052770  000100  032404          BIS     #100,@TPS0(0)   ;MAKE BUSY
2912  013672  017070  032402  032406          MOV     @TKB0(0),@TPB0(0);ECHO
2913  013700  000207                          RTS     7
2914  013702  004767  000020          ECBUSY: JSR     7,BUSY
2915  013706  117015  032402                  MOVB    @TKB0(0),(5)
2916  013712  000207                          RTS     7
2917
2918                                    ;*************************************************************************
2919                                    ;SUBROUTINE TO PRINT A SPACE
2920                                    ;*************************************************************************
2921
2922  013714  004767  000006          SPACES: JSR     7,BUSY
2923  013720  112715  000240                  MOVB    #240,(5)
2924  013724  000207                          RTS     7
2925
2926                                    ;*************************************************************************
2927                                    ;TELEPRINTER "BUSY" SUBROUTINE
2928                                    ;*************************************************************************
2929
2930  013726  010146                  BUSY:   MOV     %1,-(6)         ;SAVE R1
2931  013730  010246                          MOV     %2,-(6)         ;SAVE R2
2932  013732  116005  030400                  MOVB    PSTAT(0),%5     ;GET POINTER
2933  013736  060305                          ADD     %3,%5           ;SET UP POINTER
2934  013740  010502                          MOV     %5,%2           ;SAVE POINTER IN R2
2935  013742  010301                          MOV     %3,%1           ;GET PBUF ADDR.
2936  013744  062701  000040                  ADD     #40,%1          ;END OF BUFFER IN R1
2937  013750  105725                  BLOOP:  TSTB    (5)+            ;END  OF MESS?
2938  013752  001420                          BEQ     POINT           ;YES
2939  013754  020501                          CMP     %5,%1           ;END OF BUFFER?
2940  013756  001001                          BNE     ENDAR           ;NO
2941  013760  010305                          MOV     %3,%5           ;YES, GO TO BEG OF BUF
2942  013762  020502                  ENDAR:  CMP     %5,%2           ;FULL BUFFER?
2943  013764  001371                          BNE     BLOOP           ;NO
2944  013766  020503                          CMP     %5,%3           ;BEGINNING OF BUFFER?
2945  013770  001001                          BNE     BUFUL1          ;NO
2946  013772  010105                          MOV     %1,%5           ;YES, GO TO END OF BUFFER
2947  013774  105045                  BUFUL1: CLRB    -(5)            ;CLEAR LAST SLOT
2948  013776  020503                          CMP     %5,%3           ;BEGINNING OF BUFFER?
2949  014000  001001                          BNE     BUFUL2          ;NO
2950  014002  010105                          MOV     %1,%5           ;YES, GO TO END OF BUFFER
2951  014004  112745  000207          BUFUL2: MOVB    #BELL,-(5)      ;BELL IN NEXT TO LAST SLOT
2952  014010  005205                          INC     %5              ;R5 POINTS TO LAST SLOT
2953  014012  000412                          BR      BUSIES          ;EXIT
2954
2955  014014  020501                  POINT:  CMP     %5,%1           ;END OF BUFFER?
2956  014016  001404                          BEQ     ENDAR1          ;YES
2957  014020  020502                          CMP     %5,%2           ;FULL BUFFER?
2958  014022  001764                          BEQ     BUFUL1          ;YES
2959  014024  105015                          CLRB    (5)             ;NO, CLR 2ND FREE SLOT
```

```
 2960  014026  000403                          BR      BUSIER
 2961
 2962  014030  020302              ENDAR1:     CMP     %3,%2           ;FULL BUFFER?
 2963  014032  001760                          BEQ     BUFUL1          ;YES
 2964  014034  105013                          CLRB    (3)             ;NO, CLR 2ND FREE SLOT
 2965  014036  005305              BUSIER:     DEC     %5              ;R5 POINTS TO 1ST FREE SLOT
 2966  014040  012602              BUSIES:     MOV     (6)+,%2         ;RESTORE R2
 2967  014042  012601                          MOV     (6)+,%1         ;RESTORE R1
 2968  014044  000207                          RTS     7
```

```
                                        ;*************************************************************************
                                        ;TELEPRINTER INTERUPT ROUTINE
                                        ;*************************************************************************

014046  010046                  PIN:    MOV     %0,-(6)
014050  010146                          MOV     %1,-(6)
014052  010246                          MOV     %2,-(6)
014054  010346                          MOV     %3,-(6)
014056  010446                          MOV     %4,-(6)
014060  005000                          CLR     %0
014062  012767  000002  163716  PLOOP:  MOV     #2,6
014070  022770  000300  032404          CMP     #300,@TPS0(0)
014076  001415                          BEQ     TPSERV
014100  062700  000010          PRETUR: ADD     #10,%0
014104  020067  164372                  CMP     %0,NUMBER       ;POLLED ALL STATIONS?
014110  001364                          BNE     PLOOP           ;NOT DONE POLLING
014112  005067  163670                  CLR     6
014116  012604                          MOV     (6)+,%4
014120  012603                          MOV     (6)+,%3
014122  012602                          MOV     (6)+,%2
014124  012601                          MOV     (6)+,%1
014126  012600                          MOV     (6)+,%0
014130  000002                          RTI

                                        ;*************************************************************************
                                        ;TELEPRINTER SERVICE ROUTINE
                                        ;*************************************************************************

014132  005067  163650          TPSERV: CLR     6
014136  010003                          MOV     %0,%3
014140  006303                          ASL     %3
014142  006303                          ASL     %3
014144  062703  031200                  ADD     #PBUF,%3        ;PBUF ADDR IN R3
014150  010004                          MOV     %0,%4           ;STATION # TO R4
014152  062704  030400                  ADD     #PSTAT,%4       ;PSTAT ADDR IN R4
014156  111401                          MOVB    (4),%1          ;POINTER IN R1
014160  060301                          ADD     %3,%1           ;CHAR. ADDR. IN R1
014162  105711                          TSTB    (1)             ;END OF OUTPUT?
014164  001412                          BEQ     PUFEM           ;YES, GET NEXT MESS
014166  111170  032406                  MOVB    (1),@TPB0(0)    ;NO, PRINT CHAR.
014172  105011                          CLRB    (1)             ;CLR BUFFER
014174  005214                          INC     (4)             ;MOVE POINTER
014176  032714  000340                  BIT     #340,(4)        ;END OF BUFF?
014202  001736                          BEQ     PRETUR          ;NO
014204  142714  000040                  BICB    #40,(4)
014210  001733                          BEQ     PRETUR
014212  105024          PUFEM:  CLRB    (4)+            ;CLR TP POINTER
014214  132714  000017                  BITB    #17,(4)         ;LINE=0?
014220  001460                          BEQ     PRIDON          ;YES, MESSAGE DONE
014222  105314                          DECB    (4)
014224  001567                          BEQ     LINE00
014226  121427  000020                  CMPB    (4),#20
014232  103460                          BLO     MESS0
014234  001563                          BEQ     LINE00          ;MESS1 LINE0 = LINE00
014236  121427  000040                  CMPB    (4),#40
```

```
3025  014242  103471                  BLO     MESS1
3026  014244  001525                  BEQ     L20
3027  014246  121427  000060          CMPB    (4),#60
3028  014252  103472                  BLO     MESS2
3029  014254  001523                  BEQ     L30
3030  014256  121427  000100          CMPB    (4),#100
3031  014262  103550                  BLO     LINE00
3032  014264  001521                  BEQ     L40
3033  014266  121427  000120          CMPB    (4),#120
3034  014272  103506                  BLO     L06             ;MESS4 LINE1 = LINE06
3035  014274  001543                  BEQ     LINE00
3036  014276  121427  000140          CMPB    (4),#140
3037  014302  103514                  BLO     L51
3038  014304  001537                  BEQ     LINE00          ;MESS6 LINE0 = LINE00
3039  014306  121427  000160          CMPB    (4),#160
3040  014312  103512                  BLO     L61
3041  014314  001533                  BEQ     LINE00          ;MESS7 LINE0 = LINE00
3042  014316  121427  000200          CMPB    (4),#200
3043  014322  103510                  BLO     L71
3044  014324  001527                  BEQ     LINE00          ;MESS10 LINE0 = LINE00
3045  014326  121427  000220          CMPB    (4),#220
3046  014332  103506                  BLO     L101
3047  014334  001507                  BEQ     L110
3048  014336  121427  000240          CMPB    (4),#240
3049  014342  103437                  BLO     MESS11
3050  014344  001511                  BEQ     L120
3051  014346  121427  000300          CMPB    (4),#300
3052  014352  103510                  BLO     L130
3053  014354  001511                  BEQ     L140
3054  014356  000167  002206          JMP     LIN150
3055
3056  014362  005070  032404  PRIDON: CLR     @TPS0(0)
3057  014366  005304                  DEC     %4
3058  014370  005014                  CLR     (4)
3059  014372  000642                  BR      PRETUR
3060
3061                          ;*****************************************************************************
3062                          ;MESSAGES
3063                          ;*****************************************************************************
3064
3065  014374  121427  000002  MESS0:  CMPB    (4),#002
3066  014400  103431                  BLO     L01
3067  014402  001432                  BEQ     L02
3068  014404  121427  000004          CMPB    (4),#004
3069  014410  103431                  BLO     L03
3070  014412  001432                  BEQ     L04
3071  014414  121427  000006          CMPB    (4),#006
3072  014420  103431                  BLO     L05
3073  014422  001432                  BEQ     L06
3074  014424  000433                  BR      L07
3075
3076  014426  121427  000022  MESS1:  CMPB    (4),#022
3077  014432  101026                  BHI     L06
3078  014434  001423                  BEQ     L05
3079  014436  000420                  BR      L04
3080
```

```
 3081  014440  000000                  MESS2:  HALT
 3082
 3083  014442  121427  000222          MESS11: CMPB    (4),#222
 3084  014446  103426                          BLO     L30             ;MESS11, LINE1 = LINE30
 3085  014450  001455                          BEQ     LINE00
 3086  014452  121427  000224                  CMPB    (4),#224
 3087  014456  103440                          BLO     L113
 3088  014460  001441                          BEQ     L114
 3089  014462  000430                          BR      L71
 3090
 3091  014464  000167  000324          L01:    JMP     LINE01
 3092  014470  000167  000500          L02:    JMP     LINE02
 3093  014474  000167  000604          L03:    JMP     LINE03
 3094  014500  000167  000636          L04:    JMP     LINE04
 3095  014504  000167  001026          L05:    JMP     LINE05
 3096  014510  000167  001156          L06:    JMP     LINE06
 3097  014514  000167  001212          L07:    JMP     LINE07
 3098  014520  000167  001250          L20:    JMP     LINE20
 3099  014524  000167  001270          L30:    JMP     LINE30
 3100  014530  000167  001354          L40:    JMP     LINE40
 3101  014534  000167  001372          L51:    JMP     LINE51
 3102  014540  000167  001424          L61:    JMP     LINE61
 3103  014544  000167  001460          L71:    JMP     LINE71
 3104  014550  000167  001520          L101:   JMP     LIN101
 3105  014554  000167  001544          L110:   JMP     LIN110
 3106  014560  000167  001606          L113:   JMP     LIN113
 3107  014564  000167  001624          L114:   JMP     LIN114
 3108  014570  000167  001666          L120:   JMP     LIN120
 3109  014574  000167  001674          L130:   JMP     LIN130
 3110  014600  000167  001726          L140:   JMP     LIN140
```

```
3111
3112                                    ;*************************************************************************
3113  014604  116701  002621          LINE00: MOVB    HOUR,%1         ;GET HOUR
3114  014610  004767  002172                  JSR     7,DECIM2
3115  014614  112723  000072                  MOVB    #':,(3)+        ;ASCII FOR ":" IN TP BUFFER
3116  014620  116701  002604                  MOVB    MINUTE,%1
3117  014624  004767  002156                  JSR     7,DECIM2
3118  014630  116701  002576                  MOVB    DATE,%1         ;GET DATE
3119  014634  012702  000240          LOOA:   MOV     #SP,%2
3120  014640  110223                  MOVB    %2,(3)+
3121  014642  110223                  MOVB    %2,(3)+
3122  014644  110223                  MOVB    %2,(3)+
3123  014646  004767  002134                  JSR     7,DECIM2        ;PUT DECIMAL DATE IN PBUF
3124  014652  116701  002555                  MOVB    MONTH,%1        ;GET MONTH
3125  014656  006301                  ASL     %1              ;*2
3126  014660  006301                  ASL     %1              ;*2
3127  014662  016123  014730                  MOV     LOOTAB(1),(3)+  ;MONTH INTO PBUF
3128  014666  016123  014732                  MOV     LOOTAB+2(1),(3)+
3129  014672  112723  000055                  MOVB    #'-,(3)+        ;ASCII FOR "-" IN TP BUFFER
3130  014676  116701  002532                  MOVB    YEAR,%1         ;GET YEAR
3131  014702  004767  002100                  JSR     7,DECIM2        ;PUT DECIMAL YEAR IN PBUF
3132  014706  112723  000215                  MOVB    #CR,(3)+
3133  014712  112723  000212                  MOVB    #LF,(3)+        ;ASCII FOR A LINE FEED
3134  014716  105013                  CLRB    (3)             ;END OF MESS MARK
3135  014720  005070  032406                  CLR     @TPB0(0)        ;TYPE A NULL TO ACTIVATE TP
3136  014724  000167  177150                  JMP     PRETUR
3137  014730  030055  030060          LOOTAB: .ASCII  /-000/
3138  014734  045055  047101  043055          .ASCII  /-JAN-FEB-MAR-APR-MAY-JUN-JUL-AUG-SEP-OCT-NOV-DEC/
3139  014742  041105  046455  051101
3140  014750  040455  051120  046455
3141  014756  054501  045055  047125
3142  014764  045055  046125  040455
3143  014772  043525  051455  050105
3144  015000  047455  052103  047055
3145  015006  053117  042055  041505
3146
3147  015014  012704  015146          LINE01: MOV     #LO1B,%4
3148  015020  017001  032204                  MOV     @DA0(0),%1      ;GET TESTER TRACK ADDR.
3149  015024  042701  174077                  BIC     #174077,%1
3150  015030  006301                  ASL     %1
3151  015032  006301                  ASL     %1
3152  015034  000301                  SWAB    %1
3153  015036  004767  001704                  JSR     7,OCTAL2
3154  015042  012704  015154                  MOV     #LO1C,%4
3155  015046  017001  032204                  MOV     @DA0(0),%1      ;GET TESTER SECTOR ADDR.
3156  015052  004767  001670                  JSR     7,OCTAL2
3157  015056  012704  015140                  MOV     #LO1A,%4
3158  015062  017001  032204                  MOV     @DA0(0),%1      ;GET TESTER WORD COUNT
3159  015066  042701  003777                  BIC     #3777,%1        ;MASK
3160  015072  006201                  ASR     %1
3161  015074  006201                  ASR     %1
3162  015076  006201                  ASR     %1
3163  015100  000301                  SWAB    %1
3164  015102  004767  001640                  JSR     7,OCTAL2
3165  015106  012704  015162                  MOV     #LO1D,%4
3166  015112  017001  032202                  MOV     @DB0(0),%1      ;GET TESTER DATA BUFFER
```

```
 3167  015116  004767  001474                    JSR     7,OCTAL6
 3168  015122  052760  100000  030000            BIS     #100000,STAT0(0) ;ACTIVATE MONITOR
 3169  015130  004767  164412                    JSR     7,ERREAD         ;REPEAT READ ERRORS
 3170  015134  004567  001674                    JSR     5,PRINT
 3171  015140     000     000            LO1A:   .BYTE   0,0
 3172  015142     240     240     240            .BYTE   SP,SP,SP,SP
 3173  015145     240
 3174  015146     000     000            LO1B:   .BYTE   0,0
 3175  015150     240     240     240            .BYTE   SP,SP,SP,SP
 3176  015153     240
 3177  015154     000     000            LO1C:   .BYTE   0,0
 3178  015156     240     240     240            .BYTE   SP,SP,SP,SP
 3179  015161     240
 3180  015162     000     000     000    LO1D:   .BYTE   0,0,0,0,0,0
 3181  015165     000     000     000
 3182  015170     215     212     000            .BYTE   CR,LF,0
 3183          015174                            .EVEN
 3184
 3185                                    ;*****************************************************************
 3186  015174  017001  032200            LINE02: MOV     @CSR0(0),%1      ;GET ERROR CODE
 3187  015200  042701  007777                    BIC     #7777,%1         ;MASK
 3188  015204  006001                            ROR     %1
 3189  015206  006201                            ASR     %1
 3190  015210  006201                            ASR     %1
 3191  015212  006201                            ASR     %1
 3192  015214  000301                            SWAB    %1
 3193  015216  012704  015266                    MOV     #LO2A,%4
 3194  015222  004767  001520                    JSR     7,OCTAL2
 3195  015226  016001  030200                    MOV     CSBUF(0),%1      ;GET OP CODE
 3196  015232  042701  177760                    BIC     #177760,%1
 3197  015236  012704  015274                    MOV     #LO2B,%4
 3198  015242  004767  001500                    JSR     7,OCTAL2
 3199  015246  004567  001562                    JSR     5,PRINT
 3200  015252  042523  020103  020040            .ASCII  /SEC     DB/
 3201  015260  020040  041104
 3202  015264     215     212                    .BYTE   CR,LF
 3203  015266     000     000            LO2A:   .BYTE   0,0
 3204  015270     240     240     240            .BYTE   SP,SP,SP,SP
 3205  015273     240
 3206  015274     000     000            LO2B:   .BYTE   0,0
 3207  015276     240     240     240            .BYTE   SP,SP,SP,SP,0
 3208  015301     240     000
 3209          015304                            .EVEN
 3210
 3211                                    ;*****************************************************************************
 3212  015304  004567  001524            LINE03: JSR     5,PRINT
 3213  015310  051105  020122  020040            .ASCII  /ERR   OP    WCT   TRK   /
 3214  015316  050117  020040  020040
 3215  015324  041527  020124  020040
 3216  015332  051124  020113  020040
 3217  015340     000                            .BYTE   0
 3218          015342                            .EVEN
 3219                                    ;*****************************************************************************
 3220  015342  032760  014000  030002    LINE04: BIT     #14000,ASTAT(0) ;SEQ X?
 3221  015350  001015                            BNE     LO4X            ;YES
 3222  015352  112767  000260  000123            MOVB    #260,LO4A       ;ASCII "0"
```

```
 3223  015360  112767  000261  000116          MOVB    #261,LO4A+1     ;ASCII "1"
 3224  015366  032760  040000  030002          BIT     #40000,ASTAT(0) ;SEQ 2?
 3225  015374  001411                          BEQ     LO4Y            ;NO
 3226  015376  105267  000102                  INCB    LO4A+1          ;YES, ASCII "2"
 3227  015402  000406                          BR      LO4Y
 3228
 3229  015404  112767  000330  000071  LO4X:   MOVB    #330,LO4A
 3230  015412  112767  000240  000064          MOVB    #240,LO4A+1
 3231  015420  016001  030202          LO4Y:   MOV     DABUF(0),%1     ;GET TRACK ADDR
 3232  015424  042701  174077                  BIC     #174077,%1      ;MASK
 3233  015430  006101                          ROL     %1
 3234  015432  006101                          ROL     %1
 3235  015434  000301                          SWAB    %1
 3236  015436  012704  015511                  MOV     #LO4B,%4
 3237  015442  004767  001300                  JSR     7,OCTAL2
 3238  015446  016001  030202                  MOV     DABUF(0).%1     ;GET BUFFERED SECTOR ADDR
 3239  015452  012704  015517                  MOV     #LO4C,%4
 3240  015456  004767  001264                  JSR     7,OCTAL2
 3241  015462  016001  030204                  MOV     DBBUF(0),%1     ;GET BUFFERED DATA
 3242  015466  012704  015525                  MOV     #LO4D,%4
 3243  015472  004767  001120                  JSR     7,OCTAL6
 3244  015476  004567  001332                  JSR     5,PRINT
 3245  015502      240                         .BYTE   SP
 3246  015503      000      000          LO4A:  .BYTE   0,0
 3247  015505      240      240      240        .BYTE   SP,SP,SP,SP
 3248  015510      240
 3249  015511      000      000          LO4B:  .BYTE   0,0
 3250  015513      240      240      240        .BYTE   SP,SP,SP,SP
 3251  015516      240
 3252  015517      000      000          LO4C:  .BYTE   0,0
 3253  015521      240      240      240        .BYTE   SP,SP,SP,SP
 3254  015524      240
 3255  015525      000      000      000 LO4D:  .BYTE   0,0,0,0,0,0
 3256  015530      000      000      000
 3257  015533      215      212      000        .BYTE   CR,LF,0
 3258                                           .EVEN
 3259
 3260                                   ;*************************************************************************
 3261  015536  116001  030001          LINE05: MOVB    STAT0+1(0),%1   ;GET TEST NO.
 3262  015542  012704  015655                  MOV     #LO5B,%4
 3263  015546  004767  001174                  JSR     7,OCTAL2
 3264  015552  116001  030006                  MOVB    PHASE(0),%1     ;GET PHASE
 3265  015556  001002                          BNE     LO5A            ;NOT PHASE 0
 3266  015560  162701  000040                  SUB     #40,%1          ;FOR SPACE
 3267  015564  062701  000300          LO5A:   ADD     #300,%1         ;LETTER ASCII
 3268  015570  110167  000063                  MOVB    %1,LO5C
 3269  015574  116001  030000                  MOVB    STAT0(0),%1     ;GET PATTERN NO.
 3270  015600  012704  015663                  MOV     #LO5D,%4
 3271  015604  032701  000020                  BIT     #20,%1          ;PAT X?
 3272  015610  001005                          BNE     LO5X            ;YES
 3273  015612  042701  177760                  BIC     #177760,%1
 3274  015616  004767  001124                  JSR     7,OCTAL2
 3275  015622  000404                          BR      LO5Y
 3276
 3277  015624  112724  000240          LO5X:   MOVB    #240,(4)+
 3278  015630  112714  000330                  MOVB    #330,(4)        ;ASCII "X"
```

```
3279  015634  004567  001174          LOSY:   JSR     5,PRINT
3280  015640  042523  020103  020040          .ASCII  /SEC    WORD/
3281  015646  053440  051117     104
3282  015653     215     212                  .BYTE   CR,LF
3283  015655     000     000          LOSB:   .BYTE   0,0
3284  015657     000     240     240  LOSC:   .BYTE   0,SP,SP,SP
3285  015662     240
3286  015663     000     000          LOSD:   .BYTE   0,0
3287  015665     240     240     240          .BYTE   SP,SP,SP,0
3288  015670     000
3289          015672                          .EVEN
3290
3291                                  ;*****************************************************************************
3292  015672  004567  001136          LINE06: JSR     5,PRINT
3293  015676     215     212                  .BYTE   CR,LF
3294  015700  051524  020124  020040          .ASCII  /TST   PAT   SEQ   TRK   /
3295  015706  040520  020124  020040
3296  015714  042523  020121  020040
3297  015722  051124  020113  020040
3298  015730     000                          .BYTE   0
3299          015732                          .EVEN
3300
3301                                  ;*****************************************************************************
3302  015732  004567  001076          LINE07: JSR     5,PRINT
3303  015736     215     212                  .BYTE   CR,LF
3304  015740  047520  051523  041111          .ASCII  /POSSIBLE TESTER MALFUNCTION/
3305  015746  042514  052040  051505
3306  015754  042524  020122  040515
3307  015762  043114  047125  052103
3308  015770  047511     116
```

```
 3309  015773     000                          .BYTE   0
 3310                                          .EVEN
```

```
3311
3312                                        ;*****************************************************************************
3313  015774  004567  001034                LINE20: JSR     5,PRINT
3314  016000  020040  054040  020130                .ASCII  /   XX    XX    /
3315  016006  020040  054040  020130
3316  016014  020040    040
3317  016017    000                                 .BYTE   0
3318                                                .EVEN
3319
3320                                        ;*****************************************************************************
3321  016020  032760  000010  030004        LINE30: BIT     #10,FLAGS(0)    ;"MESSAGE 4" FLAG?
3322  016026  001405                                BEQ     L30A            ;NO
3323  016030  112760  000102  030401                MOVB    #102,PSTAT+1(0) ;MESSAGE 4, LINE 2
3324  016036  005060  030004                        CLR     FLAGS(0)        ;CLR "MESSAGE 4" FLAG
3325  016042  016001  030604        L30A:   MOV     ERCONT(0),%1
3326  016046  012704  016076                MOV     #L30B,%4
3327  016052  004767  000540                JSR     7,OCTAL6
3328  016056  004567  000752                JSR     5,PRINT
3329  016062  051105  047522  051522                .ASCII  /ERRORS:      /
3330  016070  020072  020040  020040
3331  016076    000     000     000       L30B:   .BYTE   0,0,0,0,0,0,CR,LF,0
3332  016101    000     000     000
3333  016104    215     212     000
3334          016110                                .EVEN
3335
3336                                        ;*****************************************************************************
3337  016110  004567  000720                LINE40: JSR     5,PRINT
3338  016114  042523  020103  020040                .ASCII  /SEC    WORD/
3339  016122  053440  051117    104
3340  016127    215     212     000                 .BYTE   CR,LF,0
3341                                                .EVEN
3342
3343                                        ;*****************************************************************************
3344  016132  004567  000676                LINE51: JSR     5,PRINT
3345  016136    215     212                         .BYTE   CR,LF
3346  016140  052521  041511  020113                .ASCII  /QUICK VERIFY COMPLETED/
3347  016146  042526  044522  054506
3348  016154  041440  046517  046120
3349  016162  052105  042105
3350  016166    240     000                         .BYTE   SP,0
3351                                                .EVEN
3352
3353                                        ;*****************************************************************************
3354  016170  004567  000640                LINE61: JSR     5,PRINT
3355  016174    215     212                         .BYTE   CR,LF
3356  016176  051105  047522  020122                .ASCII  /ERROR COUNT OVERFLOW AT/
3357  016204  047503  047125  020124
3358  016212  053117  051105  046106
3359  016220  053517  040440    124
3360  016225    240     000                         .BYTE   SP,0
3361          016230                                .EVEN
3362
3363                                        ;*****************************************************************************
3364  016230  004567  000600                LINE71: JSR     5,PRINT
3365  016234  051522  032066  040440                .ASCII  /RS64 AUTO ACCEPT/
3366  016242  052125  020117  041501
```

```
 3367  016250  042503  052120
 3368  016254     215     212                    .BYTE   CR,LF
 3369  016256  052123  051101  042524            .ASCII  /STARTED:/
 3370  016264  035104
 3371  016266     240     240     240            .BYTE   SP,SP,SP,SP,0
 3372  016271     240     000
 3373          016274                             .EVEN
 3374
 3375                                  ;*************************************************************************
 3376  016274  004567  000534          LIN101: JSR     5,PRINT
 3377  016300     215     212                    .BYTE   CR,LF
 3378  016302  047520  042527  020122            .ASCII  /POWER FAILED AT/
 3379  016310  040506  046111  042105
 3380  016316  040440     124
 3381  016321     240     000                    .BYTE   SP,0
 3382          016324                             .EVEN
 3383
 3384                                  ;*************************************************************************
 3385  016324  010001          LIN110: MOV     %0,%1
 3386  016326  006201                  ASR     %1
 3387  016330  006201                  ASR     %1
 3388  016332  006201                  ASR     %1
 3389  016334  012704  016364          MOV     #L110A,%4
 3390  016340  004767  000402          JSR     7,OCTAL2
 3391  016344  004567  000464          JSR     5,PRINT
 3392  016350  052123  052101  047511          .ASCII  /STATION #:  /
 3393  016356  020116  035043  020040
 3394  016364     000     000     215  L110A:  .BYTE   0,0,CR,LF,0
 3395  016367     212     000
 3396          016372                             .EVEN
 3397
 3398                                  ;*************************************************************************
 3399  016372  004567  000436          LIN113: JSR     5,PRINT
 3400  016376  047503  050115  042514            .ASCII  /COMPLETED:/
 3401  016404  042524  035104
 3402  016410     240     240     000            .BYTE   SP,SP,0
 3403          016414                             .EVEN
 3404
 3405                                  ;*************************************************************************
 3406  016414  116001  030603          LIN114: MOVB    STIME+1(0),%1
 3407  016420  004767  000362                  JSR     7,DECIM2
 3408  016424  112723  000072                  MOVB    #':,(3)+        ;ASCII FOR ":" IN TP BUFFER
 3409  016430  116001  030602                  MOVB    STIME(0),%1
 3410  016434  004767  000346                  JSR     7,DECIM2
 3411  016440  116701  000766                  MOVB    DATE,%1         ;GET PRESENT DATE
 3412  016444  126760  000761  030603          CMPB    HOUR,STIME+1(0) ;NEXT DAY?
 3413  016452  002001                  BGE     L114A
 3414  016454  005301                  DEC     %1
 3415  016456  000167  176152          L114A:  JMP     L00A
 3416
 3417                                  ;*************************************************************************
 3418  016462  112770  000007  032406  LIN120: MOVB    #007,@TPB0(0)
 3419  016470  000167  175404                  JMP     PRETUR
 3420
 3421                                  ;*************************************************************************
 3422  016474  004567  000334          LIN130: JSR     5,PRINT
```

```
 3423  016500    215    212                    .BYTE   CR,LF
 3424  016502  051522 032066 020115            .ASCII  /RS64M SERIAL NUMBER:  /
 3425  016510  042523 044522 046101
 3426  016516  047040 046525 042502
 3427  016524  035122 020040
 3428  016530    000                          .BYTE   0
 3429          016532                         .EVEN
 3430
 3431                                 ;*****************************************************************************
 3432  016532  004567 000276          LIN140: JSR     5,PRINT
 3433  016536    215    212                    .BYTE   CR,LF
 3434  016540  051522 032066 020120            .ASCII  /RS64P SERIAL NUMBER:  /
 3435  016546  042523 044522 046101
 3436  016554  047040 046525 042502
 3437  016562  035122 020040
 3438  016566    000                          .BYTE   0
 3439          016570                         .EVEN
 3440
 3441                                 ;*****************************************************************************
 3442  016570  016001 032206          LIN150: MOV     LOOPC(0),%1
 3443  016574  012704 016610                  MOV     #L150A,%4
 3444  016600  004767 000142                  JSR     7,OCTAL2
 3445  016604  004567 000224                  JSR     5,PRINT
 3446  016610    000    000    215  L150A:   .BYTE   0,0,CR,LF,0
 3447  016613    212    000
 3448          016616                         .EVEN
```

```
3449
3450                                    ;*****************************************************************
3451                                    ;SUBROUTINE TO CONVERT OCTAL NUMBER TO ASCII
3452                                    ;*****************************************************************
3453
3454  016616  112714  000260      OCTAL6: MOVB    #260,(4)
3455  016622  010102                      MOV     %1,%2
3456  016624  100001                      BPL     OC6A
3457  016626  105214                      INCB    (4)
3458  016630  042702  170370      OC6A:   BIC     #170370,%2
3459  016634  052702  060260              BIS     #060260,%2
3460  016640  110264  000005              MOVB    %2,5(4)
3461  016644  105002                      CLRB    %2
3462  016646  000302                      SWAB    %2
3463  016650  000261                      SEC
3464  016652  106002                      RORB    %2
3465  016654  110264  000002              MOVB    %2,2(4)
3466  016660  010102                      MOV     %1,%2
3467  016662  006202                      ASR     %2
3468  016664  006202                      ASR     %2
3469  016666  006202                      ASR     %2
3470  016670  042702  170370              BIC     #170370,%2
3471  016674  052702  060260              BIS     #060260,%2
3472  016700  110264  000004              MOVB    %2,4(4)
3473  016704  105002                      CLRB    %2
3474  016706  000302                      SWAB    %2
3475  016710  000261                      SEC
3476  016712  106002                      RORB    %2
3477  016714  110264  000001              MOVB    %2,1(4)
3478  016720  010102                      MOV     %1,%2
3479  016722  006102                      ROL     %2
3480  016724  006102                      ROL     %2
3481  016726  000302                      SWAB    %2
3482  016730  042702  000370              BIC     #370,%2
3483  016734  052702  000260              BIS     #260,%2
3484  016740  110264  000003              MOVB    %2,3(4)
3485  016744  000207                      RTS     7
3486
3487                                    ;*****************************************************************
3488                                    ;SUBROUTINE TO CONVERT 2 BIT OCTAL NUMBER TO ASCII
3489                                    ;*****************************************************************
3490
3491  016746  042701  177700      OCTAL2: BIC     #177700,%1
3492  016752  010102                      MOV     %1,%2
3493  016754  042702  000370              BIC     #370,%2
3494  016760  052702  000260              BIS     #260,%2
3495  016764  110264  000001              MOVB    %2,1(4)
3496  016770  006201                      ASR     %1
3497  016772  006201                      ASR     %1
3498  016774  006201                      ASR     %1
3499  016776  052701  000260              BIS     #260,%1
3500  017002  110114                      MOVB    %1,(4)
3501  017004  000207                      RTS     7
```

```
3502
3503                                    ;*************************************************************************
3504                                    ;SUBROUTINE TO CHANGE TWO OCTAL DIGITS TO DECIMAL AND
3505                                    ; STORE IN PBUF
3506                                    ;*************************************************************************
3507  017006  112713  000257      DECIM2: MOVB    #257,(3)        ;ASCII "0"-1
3508  017012  105213                DEC2A:  INCB    (3)             ;FIRST DIGIT
3509  017014  162701  000012              SUB     #12,%1          ;IS 1ST DIG THERE YET?
3510  017020  002374                      BGE     DEC2A           ;NO
3511  017022  005203                      INC     %3
3512  017024  062701  000272              ADD     #272,%1         ;ASCII FOR SECOND DIGIT
3513  017030  110123                      MOVB    %1,(3)+         ;PUT IT IN PBUF
3514  017032  000207                      RTS     7               ;RETURN
3515                                    ;*************************************************************************
3516                                    ;SUBROUTINE TO PUT MESSAGE IN PBUF FOR TYPING
3517                                    ;*************************************************************************
3518
3519  017034  112570  032406      PRINT:  MOVB    (5)+,@TPB0(0)   ;TYPE FIRST CHAR
3520  017040  112523                PRINTA: MOVB    (5)+,(3)+
3521  017042  001376                      BNE     PRINTA
3522  017044  005726                      TST     (6)+            ;ADD 2 TO R6
3523  017046  000167  175026              JMP     PRETUR
```

```
3524
3525                                    ;*************************************************************************
3526                                    ;LINE FREQUENCY CLOCK INTERUPT ROUTINE
3527                                    ;*************************************************************************
3528
3529  017052  042777  000200  000356  CLOCK:  BIC     #200,@LKS
3530  017060  005267  000342                  INC     TIME
3531  017064  001401                           BEQ     TIMIN
3532  017066  000002                           RTI
3533
3534  017070  010046                  TIMIN:   MOV     %0,-(6)
3535  017072  010146                           MOV     %1,-(6)
3536  017074  010246                           MOV     %2,-(6)
3537  017076  166767  161376  000322           SUB     CYCLE,TIME
3538  017104  126727  000320  000073           CMPB    MINUTE,#73      ;HOUR UP?
3539  017112  001403                           BEQ     TIMOUR
3540  017114  105267  000310                   INCB    MINUTE
3541  017120  000474                           BR      TIMOUT
3542
3543  017122  105067  000302          TIMOUR:  CLRB    MINUTE
3544  017126  126727  000277  000027           CMPB    HOUR,#27        ;MIDNIGHT?
3545  017134  001403                           BEQ     TIMDAY          ;YES, NEW DAY.
3546  017136  105267  000267                   INCB    HOUR
3547  017142  000463                           BR      TIMOUT
3548
3549  017144  105067  000261          TIMDAY:  CLRB    HOUR            ;CLEAR HOURS
3550  017150  126727  000256  000034           CMPB    DATE,#34        ;DAY=28TH?
3551  017156  001411                           BEQ     FEB             ;YES, CHECK FOR FEB.
3552  017160  003003                           BGT     TIMDAT          ;DAY>28TH.
3553  017162  105267  000244          TIDA:    INCB    DATE            ;NEXT DAY
3554  017166  000451                           BR      TIMOUT
3555
3556  017170  126727  000236  000036  TIMDAT:  CMPB    DATE,#36        ;WHAT DAY?
3557  017176  101027                           BHI     TIMONT          ;31ST
3558  017200  001415                           BEQ     SNAJ            ;30TH
3559  017202  126727  000225  000002  FEB:     CMPB    MONTH,#2        ;FEBRUARY?
3560  017210  001364                           BNE     TIDA            ;NO
3561  017212  132767  000003  000214           BITB    #3,YEAR         ;LEAP YEAR?
3562  017220  001016                           BNE     TIMONT          ;NO, END OF MONTH
3563  017222  126727  000204  000034           CMPB    DATE,#34        ;DAY=28TH?
3564  017230  001754                           BEQ     TIDA            ;YES, GO TO 29TH.
3565  017232  000411                           BR      TIMONT          ;29TH, END OF MONTH
3566
3567  017234  116701  000173          SNAJ:    MOVB    MONTH,%1        ;GET MONTH IN R1
3568  017240  032701  000010                   BIT     #10,%1          ;FIRST SEVEN MONTHS?
3569  017244  001401                           BEQ     AJ              ;YES-MONTH # EVEN IF APR OR JUN
3570  017246  005101                           COM     %1              ;NO-MONTH # ODD IF SEP OR NOV
3571  017250  032701  000001          AJ:      BIT     #1,%1           ;IF EVEN THEN 30 DAY MONTH
3572  017254  001342                           BNE     TIDA            ;31 DAY MONTH
3573  017256  112767  000001  000146  TIMONT:  MOVB    #1,DATE         ;1ST, 0HR, 0MIN
3574  017264  105267  000143                   INCB    MONTH           ;NEXT MONTH
3575  017270  126727  000137  000014           CMPB    MONTH,#14       ;DECEMBER?
3576  017276  101405                           BLOS    TIMOUT
3577  017300  112767  000001  000125           MOVB    #1,MONTH        ;JANUARY
3578  017306  105267  000122                   INCB    YEAR            ;NEXT YEAR
3579                                    ;*************************************************************************
```

```
3580                                    ;ROUTINE TO SEE IF IT IS TIME TO TYPE ANOTHER TIME MESSAGE.
3581                                    ;       DATE,TIME AND NUMBER OF ERRORS (MESSAGE 6) ARE TYPED OUT
3582                                    ;       EVERY HALF HOUR ON STATIONS RUNNING AUTO ACCEPT.
3583                                    ;*****************************************************************************
3584  017312  005000                    TIMOUT: CLR     %0                      ;SET R0 UP FOR POLLING
3585  017314  105760  030000            TILOOP: TSTB    STAT0(0)                ;ACTIVE STATION?
3586  017320  100031                            BPL     TIMOT2                  ;NO
3587  017322  032760  000100  030000            BIT     #100,STAT0(0)           ;ACCEPT MODE?
3588  017330  001025                            BNE     TIMOT2                  ;NO
3589  017332  116001  030602                    MOVB    STIME(0),%1             ;GET STARTING TIME (MIN ONLY)
3590  017336  116702  000066                    MOVB    MINUTE,%2               ;GET PRESENT TIME
3591  017342  160102                            SUB     %1,%2                   ;SAME?
3592  017344  001406                            BEQ     TIMTYP                  ;YES!
3593  017346  100002                            BPL     TIMOT1                  ;R2>R1
3594  017350  062702  000074                    ADD     #74,%2                  ;ADD 60 MIN TO R2
3595  017354  162702  000036            TIMOT1: SUB     #36,%2                  ;HALF HOUR?
3596  017360  001011                            BNE     TIMOT2                  ;NO, DON'T TYPE
3597  017362  032770  000100  032404    TIMTYP: BIT     #100,@TPS0(0)           ;TP BUSY?
3598  017370  001005                            BNE     TIMOT2                  ;YES,FORGET THE MESSAGE!
3599  017372  112760  000062  030401            MOVB    #062,PSTAT+1(0)         ;MESS 3, LINE 2 - # ERRORS AND TIME
3600  017400  004767  170756                    JSR     7,CRACT                 ;ACTIVATE TP
3601  017404  062700  000010            TIMOT2: ADD     #10,%0                  ;NEXT STATION
3602  017410  020067  161066                    CMP     %0,NUMBER               ;DONE POLLING?
3603  017414  001337                            BNE     TILOOP                  ;NO
3604  017416  012602                            MOV     (6)+,%2
3605  017420  012601                            MOV     (6)+,%1
3606  017422  012600                            MOV     (6)+,%0
3607  017424  000002                            RTI
3608
3609  017426  174370                    TIME:   -3410                           ;HALF A MINUTE
3610  017430     000                    MINUTE: .BYTE   0
3611  017431     000                    HOUR:   .BYTE   0
3612  017432     000                    DATE:   .BYTE   0
3613  017433     000                    MONTH:  .BYTE   0
3614  017434     000                    YEAR:   .BYTE   0
3615           017436                            .EVEN
3616
3617  017436  177546                    LKS:    177546
```

```
3618
3619                                    ;*****************************************************************************
3620                                    ;ROUTINE TO INPUT THE DATE AND TIME
3621                                    ;*****************************************************************************
3622
3623  017440  012700  021522   DATIN:  MOV     #MESS24,%0
3624  017444  004767  001540           JSR     7,TYPE
3625  017450  004767  001506   KEYA:   JSR     7,KEIN
3626  017454  010102                   MOV     %1,%2
3627  017456  020227  000260           CMP     %2,#260
3628  017462  103441                   BLO     TRYAGN
3629  017464  020227  000270           CMP     %2,#270
3630  017470  103036                   BHIS    TRYAGN
3631  017472  042702  000260           BIC     #260,%2
3632  017476  006302                   ASL     %2
3633  017500  006302                   ASL     %2
3634  017502  006302                   ASL     %2
3635  017504  010267  160772           MOV     %2,NUMBER
3636  017510  004767  001446   KEYB:   JSR     7,KEIN
3637  017514  020127  000215           CMP     %1,#215         ;CR?
3638  017520  001427                   BEQ     KEYC
3639  017522  020127  000260           CMP     %1,#260
3640  017526  103417                   BLO     TRYAGN
3641  017530  020127  000270           CMP     %1,#270
3642  017534  103014                   BHIS    TRYAGN
3643  017536  042701  000260           BIC     #260,%1
3644  017542  060201                   ADD     %2,%1
3645  017544  006301                   ASL     %1
3646  017546  006301                   ASL     %1
3647  017550  006301                   ASL     %1
3648  017552  020127  000200           CMP     %1,#200         ;LIMIT OF 20 OCTAL STATIONS
3649  017556  101003                   BHI     TRYAGN
3650  017560  010167  160716           MOV     %1,NUMBER
3651  017564  001005                   BNE     KEYC
3652  017566  012700  021362   TRYAGN: MOV     #MESS22,%0
3653  017572  004767  001412           JSR     7,TYPE
3654  017576  000724                   BR      KEYA
3655
3656  017600  020127  000215   KEYC:   CMP     %1,#215         ;CR?
3657  017604  001370                   BNE     TRYAGN
3658  017606  012700  021226           MOV     #MESS20,%0
3659  017612  004767  001372           JSR     7,TYPE
3660  017616  005067  177606   KEYD:   CLR     MINUTE          ;CLR MINUTE AND HOUR BYTES
3661  017622  005067  177604           CLR     DATE            ;CLR DATE AND MONTH BYTES
3662  017626  105067  177602           CLRB    YEAR            ;CLR YEAR BYTE
3663  017632  004767  001324   KEY1:   JSR     7,KEIN
3664  017636  010102                   MOV     %1,%2
3665  017640  020227  000260           CMP     %2,#260
3666  017644  103477                   BLO     TRYAG
3667  017646  020227  000272           CMP     %2,#272
3668  017652  103074                   BHIS    TRYAG
3669  017654  042702  000260           BIC     #260,%2
3670  017660  001471                   BEQ     TRYAG
3671  017662  110267  177544           MOVB    %2,DATE
3672  017666  004767  001270   KEY2:   JSR     7,KEIN
3673  017672  020127  000255           CMP     %1,#255         ;"-"?
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```
 3674  017676  001430                          BEQ     KEY4            ;YES, ONE DIGIT DATE
 3675  017700  020127  000260                  CMP     %1,#260
 3676  017704  103457                          BLO     TRYAG
 3677  017706  020127  000272                  CMP     %1,#272
 3678  017712  103054                          BHIS    TRYAG
 3679  017714  042701  000260                  BIC     #260,%1
 3680  017720  006302                          ASL     %2
 3681  017722  060201                          ADD     %2,%1
 3682  017724  006302                          ASL     %2
 3683  017726  006302                          ASL     %2
 3684  017730  060201                          ADD     %2,%1
 3685  017732  001444                          BEQ     TRYAG
 3686  017734  032701  177740                  BIT     #177740,%1
 3687  017740  001041                          BNE     TRYAG
 3688  017742  110167  177464                  MOVB    %1,DATE
 3689  017746  004767  001210          KEY3:   JSR     7,KEIN
 3690  017752  020127  000255                  CMP     %1,#255
 3691  017756  001032                          BNE     TRYAG
 3692
 3693  017760  004767  001176          KEY4:   JSR     7,KEIN
 3694  017764  020127  000301                  CMP     %1,#301         ;A?
 3695  017770  001457                          BEQ     K5A
 3696  017772  020127  000304                  CMP     %1,#304         ;D?
 3697  017776  001507                          BEQ     K5D
 3698  020000  020127  000306                  CMP     %1,#306         ;F?
 3699  020004  001435                          BEQ     K5F
 3700  020006  020127  000312                  CMP     %1,#312         ;J?
 3701  020012  001421                          BEQ     K5J
 3702  020014  020127  000315                  CMP     %1,#315         ;M?
 3703  020020  001435                          BEQ     K5M
 3704  020022  020127  000316                  CMP     %1,#316         ;N?
 3705  020026  001465                          BEQ     K5N
 3706  020030  020127  000317                  CMP     %1,#317         ;O?
 3707  020034  001454                          BEQ     K5O
 3708  020036  020127  000323                  CMP     %1,#323         ;S?
 3709  020042  001443                          BEQ     K5S
 3710  020044  012700  021362          TRYAG:  MOV     #MESS22,%0
 3711  020050  004767  001134                  JSR     7,TYPE
 3712  020054  000660                          BR      KEYO
 3713  020056  004767  001100          K5J:    JSR     7,KEIN
 3714  020062  020127  000301                  CMP     %1,#301         ;JA?
 3715  020066  001461                          BEQ     K6JAN
 3716  020070  020127  000325                  CMP     %1,#325         ;JU?
 3717  020074  001531                          BEQ     K6JU
 3718  020076  000762                          BR      TRYAG
 3719  020100  004767  001056          K5F:    JSR     7,KEIN
 3720  020104  020127  000305                  CMP     %1,#305         ;FE?
 3721  020110  001461                          BEQ     K6FEB
 3722  020112  000754                          BR      TRYAG
 3723  020114  004767  001042          K5M:    JSR     7,KEIN
 3724  020120  020127  000301                  CMP     %1,#301         ;MA?
 3725  020124  001464                          BEQ     K6MA
 3726  020126  000746                          BR      TRYAG
 3727  020130  004767  001026          K5A:    JSR     7,KEIN
 3728  020134  020127  000320                  CMP     %1,#320         ;AP?
 3729  020140  001472                          BEQ     K6APR
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3730  020142  020127  000325                  CMP     %1,#325         ;AU?
3731  020146  001524                          BEQ     K6AUG
3732  020150  000735                          BR      TRYAG
3733  020152  004767  001004          K5S:    JSR     7,KEIN
3734  020156  020127  000305                  CMP     %1,#305         ;SE?
3735  020162  001527                          BEQ     K6SEP
3736  020164  000727                          BR      TRYAG
3737  020166  004767  000770          K5O:    JSR     7,KEIN
3738  020172  020127  000303                  CMP     %1,#303         ;OC?
3739  020176  001532                          BEQ     K6OCT
3740  020200  000721                          BR      TRYAG
3741  020202  004767  000754          K5N:    JSR     7,KEIN
3742  020206  020127  000317                  CMP     %1,#317         ;NO?
3743  020212  001535                          BEQ     K6NOV
3744  020214  000713                          BR      TRYAG
3745  020216  004767  000740          K5D:    JSR     7,KEIN
3746  020222  020127  000305                  CMP     %1,#305         ;DE?
3747  020226  001542                          BEQ     K6DEC
3748  020230  000705                          BR      TRYAG
3749  020232  004767  000724          K6JAN:  JSR     7,KEIN
3750  020236  020127  000316                  CMP     %1,#316         ;N?
3751  020242  001300                          BNE     TRYAG
3752  020244  112767  000001  177161          MOVB    #1,MONTH        ;JANUARY
3753  020252  000540                          BR      KEY7
3754
3755  020254  004767  000702          K6FEB:  JSR     7,KEIN
3756  020260  020127  000302                  CMP     %1,#302         ;B?
3757  020264  001267                          BNE     TRYAG
3758  020266  112767  000002  177137          MOVB    #2,MONTH        ;FEBRUARY
3759  020274  000527                          BR      KEY7
3760
3761  020276  004767  000660          K6MA:   JSR     7,KEIN
3762  020302  020127  000331                  CMP     %1,#331         ;Y?
3763  020306  001420                          BEQ     K6MAY
3764  020310  020127  000322                  CMP     %1,#322         ;R?
3765  020314  001253                          BNE     TRYAG
3766  020316  112767  000003  177107          MOVB    #3,MONTH        ;MARCH
3767  020324  000513                          BR      KEY7
3768
3769  020326  004767  000630          K6APR:  JSR     7,KEIN
3770  020332  020127  000322                  CMP     %1,#322         ;R?
3771  020336  001242                          BNE     TRYAG
3772  020340  112767  000004  177065          MOVB    #4,MONTH        ;APRIL
3773  020346  000502                          BR      KEY7
3774
3775  020350  112767  000005  177055  K6MAY:  MOVB    #5,MONTH        ;MAY
3776  020356  000476                          BR      KEY7
3777
3778  020360  004767  000576          K6JU:   JSR     7,KEIN
3779  020364  020127  000314                  CMP     %1,#314         ;L?
3780  020370  001407                          BEQ     K6JUL
3781  020372  020127  000316                  CMP     %1,#316         ;N?
3782  020376  001222                          BNE     TRYAG
3783  020400  112767  000006  177025          MOVB    #6,MONTH        ;JUNE
3784  020406  000462                          BR      KEY7
3785
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3786  020410  112767  000007  177015  K6JUL:  MOVB    #7,MONTH        ;JULY
3787  020416  000456                  BR      KEY7
3788
3789  020420  004767  000536          K6AUG:  JSR     7,KEIN
3790  020424  020127  000307                  CMP     %1,#307         ;G?
3791  020430  001205                  BNE     TRYAG
3792  020432  112767  000010  176773          MOVB    #10,MONTH       ;AUGUST
3793  020440  000445                  BR      KEY7
3794
3795  020442  004767  000514          K6SEP:  JSR     7,KEIN
3796  020446  020127  000320                  CMP     %1,#320         ;P?
3797  020452  001026                  BNE     TRYAGA
3798  020454  112767  000011  176751          MOVB    #11,MONTH       ;SEPTEMBER
3799  020462  000434                  BR      KEY7
3800
3801  020464  004767  000472          K6OCT:  JSR     7,KEIN
3802  020470  020127  000324                  CMP     %1,#324         ;T?
3803  020474  001015                  BNE     TRYAGA
3804  020476  112767  000012  176727          MOVB    #12,MONTH       ;OCTOBER
3805  020504  000423                  BR      KEY7
3806
3807  020506  004767  000450          K6NOV:  JSR     7,KEIN
3808  020512  020127  000326                  CMP     %1,#326         ;V?
3809  020516  001004                  BNE     TRYAGA
3810  020520  112767  000013  176705          MOVB    #13,MONTH       ;NOVEMBER
3811  020526  000412                  BR      KEY7
3812
3813  020530  000167  177310          TRYAGA: JMP     TRYAG
3314
3815  020534  004767  000422          K6DEC:  JSR     7,KEIN
3816  020540  020127  000303                  CMP     %1,#303         ;C?
3817  020544  001371                  BNE     TRYAGA
3818  020546  112767  000014  176657          MOVB    #14,MONTH       ;DECEMBER
3819  020554  004767  000402          KEY7:   JSR     7,KEIN
3820  020560  020127  000255                  CMP     %1,#255         ;-?
3821  020564  001361                  BNE     TRYAGA
3822
3823  020566  004767  000370          KEY8:   JSR     7,KEIN
3824  020572  020127  000260                  CMP     %1,#260
3825  020576  103754                  BLO     TRYAGA
3826  020600  020127  000272                  CMP     %1,#272
3827  020604  103351                  BHIS    TRYAGA
3828  020606  042701  000260                  BIC     #260,%1
3829  020612  006301                  ASL     %1
3830  020614  010102                  MOV     %1,%2
3831  020616  006301                  ASL     %1
3832  020620  006301                  ASL     %1
3833  020622  060102                  ADD     %1,%2
3834
3835  020624  004767  000332          KEY9:   JSR     7,KEIN
3836  020630  020127  000260                  CMP     %1,#260
3837  020634  103735                  BLO     TRYAGA
3838  020636  020127  000272                  CMP     %1,#272
3839  020642  103332                  BHIS    TRYAGA
3840  020644  042701  000260                  BIC     #260,%1
3841  020650  060102                  ADD     %1,%2
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3842  020652  110267  176556                  MOVB    %2,YEAR
3843
3844  020656  004767  000300          KEY10:  JSR     7,KEIN
3845  020662  020127  000215                  CMP     %1,#215         ;CR?
3846  020666  001320                          BNE     TRYAGA
3847  020670  012700  021402                  MOV     #MESS23,%0
3848  020674  004767  000310                  JSR     7,TYPE
3849
3850  020700  004767  000256          KEY11:  JSR     7,KEIN
3851  020704  010102                          MOV     %1,%2
3852  020706  020227  000260                  CMP     %2,#260
3853  020712  103516                          BLO     TRYAN
3854  020714  020227  000272                  CMP     %2,#272
3855  020720  103113                          BHIS    TRYAN
3856  020722  042702  000260                  BIC     #260,%2
3857
3858  020726  004767  000230          KEY12:  JSR     7,KEIN
3859  020732  020127  000272                  CMP     %1,#272
3860  020736  001420                          BEQ     KEY13A
3861  020740  101103                          BHI     TRYAN
3862  020742  020127  000260                  CMP     %1,#260
3863  020746  103500                          BLO     TRYAN
3864  020750  042701  000260                  BIC     #260,%1
3865  020754  006302                          ASL     %2
3866  020756  060201                          ADD     %2,%1
3867  020760  006302                          ASL     %2
3868  020762  006302                          ASL     %2
3869  020764  060102                          ADD     %1,%2
3870
3871  020766  004767  000170          KEY13:  JSR     7,KEIN
3872  020772  020127  000272                  CMP     %1,#272         ;:?
3873  020776  001064                          BNE     TRYAN
3874
3875  021000  020227  000027          KEY13A: CMP     %2,#27
3876  021004  003061                          BGT     TRYAN
3877  021006  110267  176417                  MOVB    %2,HOUR
3878  021012  004767  000144          KEY14:  JSR     7,KEIN
3879  021016  010102                          MOV     %1,%2
3880  021020  020227  000260                  CMP     %2,#260
3881  021024  103451                          BLO     TRYAN
3882  021026  020227  000272                  CMP     %2,#272
3883  021032  103046                          BHIS    TRYAN
3884  021034  042702  000260                  BIC     #260,%2
3885
3886  021040  004767  000116          KEY15:  JSR     7,KEIN
3887  021044  020127  000215                  CMP     %1,#215         ;CR?
3888  021050  001422                          BEQ     KEY16A
3889  021052  020127  000260                  CMP     %1,#260
3890  021056  103434                          BLO     TRYAN
3891  021060  020127  000272                  CMP     %1,#272
3892  021064  103031                          BHIS    TRYAN
3893  021066  042701  000260                  BIC     #260,%1
3894  021072  006302                          ASL     %2
3895  021074  060201                          ADD     %2,%1
3896  021076  006302                          ASL     %2
3897  021100  006302                          ASL     %2
```

```
 3898  021102  060102                          ADD     %1,%2
 3899
 3900  021104  004767  000052          KEY16:  JSR     7,KEIN
 3901  021110  020127  000215                  CMP     %1,#215
 3902  021114  001015                          BNE     TRYAN
 3903
 3904  021116  020227  000073          KEY16A: CMP     %2,#73
 3905  021122  003012                          BGT     TRYAN
 3906  021124  110267  176300                  MOVB    %2,MINUTE
 3907  021130  012700  021357                  MOV     #MESS21,%0
 3908  021134  004767  000050                  JSR     7,TYPE
 3909  021140  105777  011240          KEY16B: TSTB    @TPS0
 3910  021144  100375                          BPL     KEY16B
 3911  021146  000207                          RTS     7
 3912
 3913  021150  012700  021362          TRYAN:  MOV     #MESS22,%0
 3914  021154  004767  000030                  JSR     7,TYPE
 3915  021160  000647                          BR      KEY11
 3916
 3917  021162  105777  011212          KEIN:   TSTB    @TKS0
 3918  021166  100375                          BPL     KEIN
 3919  021170  017701  011206                  MOV     @TKB0,%1
 3920
 3921  021174  105777  011204          KOUT:   TSTB    @TPS0
 3922  021200  100375                          BPL     KOUT
 3923  021202  010177  011200                  MOV     %1,@TPB0
 3924  021206  000207                          RTS     7
 3925
 3926  021210  105777  011170          TYPE:   TSTB    @TPS0
 3927  021214  100375                          BPL     TYPE
 3928  021216  112077  011164                  MOVB    (0)+,@TPB0
 3929  021222  001372                          BNE     TYPE
 3930  021224  000207                          RTS     7
 3931
 3932  021226     212     212          MESS20: .BYTE   LF,LF
 3933  021230  054524  042520  044440          .ASCII  /TYPE IN DAY-MONTH-YEAR FROM KEYBOARD./
 3934  021236  020116  040504  026531
 3935  021244  047515  052116  026510
 3936  021252  042531  051101  043040
 3937  021260  047522  020115  042513
 3938  021266  041131  040517  042122
 3939  021274     056
 3940  021275     215     212                  .BYTE   CR,LF
 3941  021277     123  050105  051105          .ASCII  /SEPERATE EACH WITH A HYPHEN, SUCH AS, 20-JAN-71./
 3942  021304  052101  020105  040505
 3943  021312  044103  053440  052111
 3944  021320  020110  020101  054510
 3945  021326  044120  047105  020054
 3946  021334  052523  044103  040440
 3947  021342  026123  031040  026460
 3948  021350  040512  026516  030467
 3949  021356     056
 3950  021357     215     212     000  MESS21: .BYTE   CR,LF,0
 3951                                          .EVEN
 3952
 3953  021362     077                  MESS22: .ASCII  /?/
```

```
3954  021363     215     212                      .BYTE   CR,LF
3955  021365     124  054522  040440              .ASCII  /TRY AGAIN!/
3956  021372  040507  047111     041
3957  021377     215     212     000              .BYTE   CR,LF,0
3958                                                .EVEN
3959
3960  021402     212     212          MESS23:     .BYTE   LF,LF
3961  021404  054524  042520  044440              .ASCII  /TYPE IN HOUR:MINUTE FROM KEYBOARD./
3962  021412  020116  047510  051125
3963  021420  046472  047111  052125
3964  021426  020105  051106  046517
3965  021434  045440  054505  047502
3966  021442  051101  027104
3967  021446     215     212                      .BYTE   CR,LF
3968  021450  042523  042520  040522              .ASCII  /SEPERATE WITH A COLON, SUCH AS, 15:35./
3969  021456  042524  053440  052111
3970  021464  020110  020101  047503
3971  021472  047514  026116  051440
3972  021500  041525  020110  051501
3973  021506  020054  032461  031472
3974  021514  027065
3975  021516     215     212     000              .BYTE   CR,LF,0
3976          021522                               .EVEN
3977
3978  021522     215     212          MESS24:     .BYTE   CR,LF
3979  021524  051522  032066  052040              .ASCII  /RS64 TESTER MONITOR AND DISK EXERCISER./
3980  021532  051505  042524  020122
3981  021540  047515  044516  047524
3982  021546  020122  047101  020104
3983  021554  044504  045523  042440
3984  021562  042530  041522  051511
3985  021570  051105     056
3986  021573     215     212                      .BYTE   CR,LF
3987  021575     124  050131  020105              .ASCII  /TYPE THE OCTAL NUMBER OF STATIONS ON THE SYSTEM./
3988  021602  044124  020105  041517
3989  021610  040524  020114  052516
3990  021616  041115  051105  047440
3991  021624  020106  052123  052101
3992  021632  047511  051516  047440
3993  021640  020116  044124  020105
3994  021646  054523  052123  046505
3995  021654     056
3996  021655     215     212                      .BYTE   CR,LF
3997  021657     124  051105  044515              .ASCII  /TERMINATE WITH A CARRIAGE RETURN./
3998  021664  040516  042524  053440
3999  021672  052111  020110  020101
4000  021700  040503  051122  040511
4001  021706  042507  051040  052105
4002  021714  051125  027116
4003  021720     215     212     000              .BYTE   CR,LF,0
4004          021724                               .EVEN
4005
4006                                    ;*****************************************************************************
4007                                    ;SUBROUTINE TO SET UP THE 2 SEC., 20 SEC., AND 60 SEC WAIT ROUTINE
4008                                    ;*****************************************************************************
4009
```

```
 4010  021724  026727  156550  007020  SETCYC: CMP     CYCLE,#7020     ;CHECK FOR 60 CYCLE CONSTANT
 4011  021732  001406                          BEQ     .60CYC          ;BRANCH IF 60 CYCLE
 4012  021734  026727  156540  005670          CMP     CYCLE,#5670     ;CHECK FOR 50 CYCLE CONSTANT
 4013  021742  001414                          BEQ     .50CYC          ;BRANCH IF 50 CYCLE
 4014  021744  000000                          HALT                    ;NEITHER 50 OR 60?
 4015  021746  000766                          BR      SETCYC          ;TRY AGAIN.
 4016
 4017  021750  012767  007016  000042  .60CYC: MOV     #7016,CYCL60
 4018  021756  012767  002260  000036          MOV     #2260,CYCL20
 4019  021764  012767  000170  000032          MOV     #0170,CYCL02
 4020  021772  000207                          RTS     %7
 4021
 4022  021774  012767  005670  000016  .50CYC: MOV     #5670,CYCL60
 4023  022002  012767  001750  000012          MOV     #1750,CYCL20
 4024  022010  012767  000144  000006          MOV     #0144,CYCL02
 4025  022016  000207                          RTS     %7
 4026
 4027  022020  000000                  CYCL60: 0
 4028  022022  000000                  CYCL20: 0
 4029  022024  000000                  CYCL02: 0
```

```
                                        ;*****************************************************************
                                        ;POWER FAILURE INTERUPT ROUTINE.
                                        ;       ALL STATIONS GET CLEARED AFTER 30 SECONDS, AND THE MONITOR
                                        ;       PICKS UP WHERE IT LEFT OFF.
                                        ;       A POWER FAIL MESSAGE IS TYPED ON ALL STATIONS RUNNING TESTS.
                                        ;*****************************************************************

022026  012767  022036  155770  POWER:  MOV     #POWON,24
022034  000000                          HALT

022036  012767  022026  155760  POWON:  MOV     #POWER,24
022044  012706  001000                  MOV     #1000,%6
022050  000005                          RESET                   ;CLEAR OUT ALL DEVICES
022052  012777  000100  175356          MOV     #100,@LKS
022060  012702  000140                  MOV     #140,%2         ;30 SEC. WAIT LOOP
022064  005001                          CLR     %1
022066  005301                  W30S:   DEC     %1
022070  001376                          BNE     W30S
022072  005302                          DEC     %2
022074  001374                          BNE     W30S
                                ;POLL STATIONS; TYPE MESSAGE AND CLEAR ACTIVE STATIONS.

022076  012767  000002  155702          MOV     #2,6            ;RTI ON TIME OUT
022104  005000                          CLR     %0
022106  012770  000100  032400  LOOPOW: MOV     #100,@TKS0(0)   ;INTERUPT ENABLE
022114  004767  166256                  JSR     7,CRACT1        ;INITIALIZE TELEPRINTER
022120  105760  030000                  TSTB    STAT0(0)        ;STATION IN RUN MODE?
022124  100015                          BPL     NOTACT
022126  052760  100000  030000          BIS     #100000,STAT0(0) ;MAKE SURE IT IS ACTIVE
022134  012760  101000  030400          MOV     #101000,PSTAT(0) ;MESS10, LINE 2
022142  004767  166214                  JSR     7,CRACT
022146  012770  000200  032200          MOV     #200,@CSS0(0)   ;CLEAR ANY ERRORS
022154  004767  164602                  JSR     7,TRANS         ;REDO LAST OPERATION
022160  062700  000010          NOTACT: ADD     #10,%0
022164  020067  156312                  CMP     %0,NUMBER
022170  001346                          BNE     LOOPOW
022172  000167  156752                  JMP     RESTAR
```

```
4068
4069            030000                  STAT0   = 30000
4070            030002                  ASTAT   = STAT0+2
4071            030004                  FLAGS   = STAT0+4
4072            030006                  PHASE   = STAT0+6
4073            030200                  CSBUF   = STAT0+200
4074            030202                  DABUF   = STAT0+202
4075            030204                  DBBUF   = STAT0+204
4076            030206                  OLDATA  = STAT0+206
4077            030400                  PSTAT   = STAT0+400
4078            030402                  PRANK   = STAT0+402
4079            030404                  SRANK   = STAT0+404
4080            030406                  WAITER  = STAT0+406
4081            030600                  RTIME   = STAT0+600
4082            030602                  STIME   = STAT0+602
4083            030604                  ERCONT  = STAT0+604
4084            030606                  READ3   = STAT0+606
4085            031000                  KSTAT   = STAT0+1000
4086            031002                  kBUF    = STAT0+1002
4087            031200                  PBUF    = STAT0+1200
4088            032200                  .       = STAT0+2200
4089
4090    032200  170100                  CS0:    170100
4091    032202  170102                  DB0:    170102
4092    032204  170104                  DA0:    170104
4093    032206  000000                  LOOPC:  0
4094    032210  170110                  CS1:    170110
4095    032212  170112                  DB1:    170112
4096    032214  170114                  DA1:    170114
4097    032216  000000                          0
4098    032220  170120                  CS2:    170120
4099    032222  170122                  DB2:    170122
4100    032224  170124                  DA2:    170124
4101    032226  000000                          0
4102    032230  170130                  CS3:    170130
4103    032232  170132                  DB3:    170132
4104    032234  170134                  DA3:    170134
4105    032236  000000                          0
4106    032240  170140                  CS4:    170140
4107    032242  170142                  DB4:    170142
4108    032244  170144                  DA4:    170144
4109    032246  000000                          0
4110    032250  170150                  CS5:    170150
4111    032252  170152                  DB5:    170152
4112    032254  170154                  DA5:    170154
4113    032256  000000                          0
4114    032260  170160                  CS6:    170160
4115    032262  170162                  DB6:    170162
4116    032264  170164                  DA6:    170164
4117    032266  000000                          0
4118    032270  170170                  CS7:    170170
4119    032272  170172                  DB7:    170172
4120    032274  170174                  DA7:    170174
4121    032276  000000                          0
4122    032300  170200                  CS10:   170200
4123    032302  170202                  DB10:   170202
```

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 4124  032304  170204                DA10:   170204
 4125  032306  000000                        0
 4126  032310  170210                CS11:   170210
 4127  032312  170212                DB11:   170212
 4128  032314  170214                DA11:   170214
 4129  032316  000000                        0
 4130  032320  170220                CS12:   170220
 4131  032322  170222                DB12:   170222
 4132  032324  170224                DA12:   170224
 4133  032326  000000                        0
 4134  032330  170230                CS13:   170230
 4135  032332  170232                DB13:   170232
 4136  032334  170234                DA13:   170234
 4137  032336  000000                        0
 4138  032340  170240                CS14:   170240
 4139  032342  170242                DB14:   170242
 4140  032344  170244                DA14:   170244
 4141  032346  000000                        0
 4142  032350  170250                CS15:   170250
 4143  032352  170252                DB15:   170252
 4144  032354  170254                DA15:   170254
 4145  032356  000000                        0
 4146  032360  170260                CS16:   170260
 4147  032362  170262                DB16:   170262
 4148  032364  170264                DA16:   170264
 4149  032366  000000                        0
 4150  032370  170270                CS17:   170270
 4151  032372  170272                DB17:   170272
 4152  032374  170274                DA17:   170274
 4153  032376  000000                        0
```

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4154
4155  032400  177560          TKS0:   177560
4156  032402  177562          TKB0:   177562
4157  032404  177564          TPS0:   177564
4158  032406  177566          TPB0:   177566
4159  032410  176500          TKS1:   176500
4160  032412  176502          TKB1:   176502
4161  032414  176504          TPS1:   176504
4162  032416  176506          TPB1:   176506
4163  032420  176510          TKS2:   176510
4164  032422  176512          TKB2:   176512
4165  032424  176514          TPS2:   176514
4166  032426  176516          TPB2:   176516
4167  032430  176520          TKS3:   176520
4168  032432  176522          TKB3:   176522
4169  032434  176524          TPS3:   176524
4170  032436  176526          TPB3:   176526
4171  032440  176530          TKS4:   176530
4172  032442  176532          TKB4:   176532
4173  032444  176534          TPS4:   176534
4174  032446  176536          TPB4:   176536
4175  032450  176540          TKS5:   176540
4176  032452  176542          TKB5:   176542
4177  032454  176544          TPS5:   176544
4178  032456  176546          TPB5:   176546
4179  032460  176550          TKS6:   176550
4180  032462  176552          TKB6:   176552
4181  032464  176554          TPS6:   176554
4182  032466  176556          TPB6:   176556
4183  032470  176560          TKS7:   176560
4184  032472  176562          TKB7:   176562
4185  032474  176564          TPS7:   176564
4186  032476  176566          TPB7:   176566
4187  032500  176570          TKS10:  176570
4188  032502  176572          TKB10:  176572
4189  032504  176574          TPS10:  176574
4190  032506  176576          TPB10:  176576
4191  032510  176600          TKS11:  176600
4192  032512  176602          TKB11:  176602
4193  032514  176604          TPS11:  176604
4194  032516  176606          TPB11:  176606
4195  032520  176610          TKS12:  176610
4196  032522  176612          TKB12:  176612
4197  032524  176614          TPS12:  176614
4198  032526  176616          TPB12:  176616
4199  032530  176620          TKS13:  176620
4200  032532  176622          TKB13:  176622
4201  032534  176624          TPS13:  176624
4202  032536  176626          TPB13:  176626
4203  032540  176630          TKS14:  176630
4204  032542  176632          TKB14:  176632
4205  032544  176634          TPS14:  176634
4206  032546  176636          TPB14:  176636
4207  032550  176640          TKS15:  176640
4208  032552  176642          TKB15:  176642
4209  032554  176644          TPS15:  176644
```

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4210  032556  176646                  TPB15:  176646
4211  032560  176650                  TkS16:  176650
4212  032562  176652                  TKB16:  176652
4213  032564  176654                  TPS16:  176654
4214  032566  176656                  TPB16:  176656
4215  032570  176660                  TKS17:  176660
4216  032572  176662                  TKB17:  176662
4217  032574  176664                  TPS17:  176664
4218  032576  176666                  TPB17:  176666
4219
4220  032600  000200                  END:    .END    LOAD
```

```
ACMODE  013500          2867    2878*
ACTIVE  001212           850     858*
ADJAC1  010052          1542    1558    2185*
ADJAC2  010114          1547    1563    2196*
ADJ1A   010076          2189    2191*
ADJ1B   010102          2187    2192*
ADJ2A   010134          2198    2200*
AE      011640          2561    2565*   2578
AJ      017250          3569    3571*
ALLPAT  012426          2696*   2714
ALLSCT  013124          2792    2796*
ALLTRK  013010          2765    2769*
ALLTST  012304          2670*   2682
ALPHA   011556          2350    2549*
ALSEQ   012574          2728*   2742
AOK     011710          2563    2566    2569    2572    2580*
AP      011646          2560    2568*
ASTAT = 030002           931*   1062*   1241*   1481*   1552    1642*   1998    1999*   2027*   2033*   2038*   2041*   2147
                        2162    2197    2721*   2728*   2732*   2743*   2751*   2769*   2787*   2795*   2807*   2884*   3220
                        3224    4070*
AT      011654          2558    2571*   2576
ATTEN   001272           859     871*
BEGIN   001000           800     812*
BELL  = 000207           780*   2951
BLOOP   013750          2937*   2943
BUFUL1  013774          2945    2947*   2958    2963
BUFUL2  014004          2949    2951*
BUSIER  014036          2960    2965*
BUSIES  014040          2953    2966*
BUSY    013726          2375    2377    2379    2398    2400    2417    2419    2492    2494    2511    2513    2847    2849
                        2892    2914    2922    2930*
CHASEC  007776          1374    1408    1423    1457    1465    1704    1852    2157*
CHASE1  010022          2160    2162*
CHATAK  007744          1327    1334    1366    1379    1414    1429    1500    1509    1665    1710    1737    1741    1767
                        1800    1858    1889    1893    1929    2145*
CLOCK   017052           797    3529*
CLRCS   007006           829     948     987    1633    1688    1695    1753    1819    1826    1843    1907    1960*   2429
                        2890
COMPAT  010036          1410    1416    1425    1431    1459    1467    1502    1511    1543    1548    1559    1564    2172*
CONTA   010770          2323    2389*
CONTB   011054          2324    2410*
CONTBA  011074          2411    2415*
CONTBB  011102          2413    2416*
CONTC   011132          2325    2429*
CONTCA  011156          2435*   2441
CONTCB  011210          2446*   2448
CONTCC  011220          2431    2451*
CONTCD  011240          2449    2454*
CONTD   011264          2326    2465*
CONTE   011304          2327    2475*
CONTL   011320          2334    2484*
CONTLA  011340          2485    2489*
CONTLB  011352          2487    2491*
CONTR   011402          2340    2504*
CONTRA  011422          2505    2509*
CONTRB  011430          2507    2510*
```

```
CONTS   011460          2341    2521#
CONTT   011476          2342    2531#
CR    = 000215           778#   2378    3132    3182    3202    3257    3282    3293    3303    3331    3340    3345    3355
                        3368    3377    3394    3423    3433    3446    3940    3950    3954    3957    3967    3975    3978
                        3986    3996    4003
CRACT   010362           929    1000    1234    1640    1987    1991    2276#   2542    3600    4051
CRACT1  010376          2279#   4056
CRACT2  010410          2277    2281#
CRLF  = 106612           781#   2369    2455    2533
CSBUF = 030200           833*    860     869*    870     941     988*    1055*   1081    1231*   1436*   1603*   1619*   1671*
                        1744*   1806*   1828*   1896*   1899*   1944*   1947*   1950*   1953*   1957    1961*   2002    3195
                        4073#
CSO     032200           858     870*    871     943     950*    993     1003    1056*   1074    1076    1606    1675*   1700
                        1748*   1810*   1829*   1848    1901*   1957*   1960*   2395*   2537    3186    4062*   4090#
CS1     032210          4094#
CS10    032300          4122#
CS11    032310          4126#
CS12    032320          4130#
CS13    032330          4134#
CS14    032340          4138#
CS15    032350          4142#
CS16    032360          4146#
CS17    032370          4150#
CS2     032220          4098#
CS3     032230          4102#
CS4     032240          4106#
CS5     032250          4110#
CS6     032260          4114#
CS7     032270          4118#
CYCLE   000500           804#    866    2211    2222    2233    3537    4010    4012
CYCL02  022024          2212    4019*   4024*   4029#
CYCL20  022022          2223    4018*   4023*   4028#
CYCL60  022020          2234    4017*   4022*   4027#
DABUF = 030202          1070*   1084    1089    1239*   1482*   1552*   1553*   1686*   1687*   1817*   1818*   1955    2032*
                        2040*   2145*   2146*   2149    2157*   2158    2161*   2185    2193*   2196    2201*   2729*   2744*
                        2749*   2770*   2785*   2808*   3231    3238    4074#
DATE    017432          3118    3411    3550    3553*   3556    3563    3573*   3612#   3661*   3671*   3688*
DATIN   017440           815    3623#
DA0     032204           985*   1005    1058*   1080    1684    1815    1955*   3148    3155    3158    4092#
DA1     032214          4096#
DA10    032304          4124#
DA11    032314          4128#
DA12    032324          4132#
DA13    032334          4136#
DA14    032344          4140#
DA15    032354          4144#
DA16    032364          4148#
DA17    032374          4152#
DA2     032224          4100#
DA3     032234          4104#
DA4     032244          4108#
DA5     032254          4112#
DA6     032264          4116#
DA7     032274          4120#
DBBUF = 030204          1008*   1020    1022*   1028*   1036    1038*   1045*   1051*   1068*   1258*   1265*   1292*   1299*
                        1359*   1363*   1376*   1381*   1420*   1435*   1462*   1471*   1506*   1515*   1554*   1568*   1956
```

```
                    2053*  2093   2096*  2097*  2100   2110   2113*  2116   2119*  2122   2124*  2125   2131*
                    2137   2172*  2173*  2832*  3241   4075#
D80      032202      986*  1057*  1078   1956*  3166   4091#
D81      032212     4095#
D810     032302     4123#
D811     032312     4127#
D812     032322     4131#
D813     032332     4135#
D814     032342     4139#
D815     032352     4143#
D816     032362     4147#
D817     032372     4151#
D82      032222     4099#
D83      032232     4103#
D84      032242     4107#
D85      032252     4111#
D86      032262     4115#
D87      032272     4119#
DECIM2   017006     3114   3117   3123   3131   3407   3410   3507#
DEC2A    017012     3508#  3510
ECBUSY   013702     2910   2914#
ECCR     013574     2863   2891#
ECCRO    013554     2876   2887#
ECHO     013654     2397   2416   2491   2510   2615   2758   2759   2760   2834   2891   2902   2909#
END      032600     4220#
ENDAR    013762     2940   2942#
ENDAR1   014030     2955   2962#
ENDIN    013404     2335   2857#
ENTEST   013462     2869   2874#
ERBUSY   001520      914    929#   933    935
ERCONT=  030604      915*   917    997*   2846*  2887*  3325   4083#
ERCOVE   001526      916    932#
EREAD1   001600      942    944    948#
EREAD2   001604      947    950#
ERMES    001504      920    927#
ERREAD   001546      924    941#   3169
ERROR    001414      872    911#
ERROR1   001460      918    921#
EXCONA   011546     2458   2536   2542#
EXCONT   011510     2468   2477   2524   2533#
FEB      017202     3551   3559#
FLAGS =  030004      832*   911    919    921    1023*  1039*  1046*  1059   1063*  1073*  1674*  1703*  1708*
                    1747*  1763*  1809*  1851*  1856*  1900*  1925*  1967   1976   1983   1985*  2410   2412*
                    2415*  2452*  2465*  2484   2486*  2490*  2504   2506*  2509*  2590   2605   2607*  2624
                    2666*  2687*  2707   2878   2880   2882*  2901*  3321   3324*  4071#
HINUM    007470     2070#  2245   2255   2266*
HIPAT    012440     2694   2699#
HISCT    013134     2794   2799#
HISEQ    012622     2726   2735#
HITRK    013024     2767   2773#
HITST    012316     2668   2673#
HOUR     017431     3113   3412   3544   3546*  3549*  3611#  3877*
ILBUSY   010734     2368   2375#
ILCRLF   010744     2377#  2402
ILLEG    010670     2322   2328   2329   2330   2332   2333   2336   2337   2338   2339   2345   2347   2353
                    2359   2366#  2390   2394   2626   2662   2781   2872
```

```
ILLO    012114          2554    2557    2575    2580    2589    2591    2602    2606    2612    2626*   2629    2640    2642
                        2651    2680    2706
ILL1    013054          2736    2739    2781*   2806
ILL2    013456          2858    2861    2872*
INPAT   012400          2657    2690*
KBUF  = 031002          2613*   2634*   2635*   2652    2676*   2677*   2678    2702*   2703*   2704    2737    2776*   2777*
                        2778    2802*   2803*   2804    2813    2829    4086*
KEIN    021162          3625    3636    3663    3672    3689    3693    3713    3719    3723    3727    3733    3737    3741
                        3745    3749    3755    3761    3769    3778    3789    3795    3801    3807    3815    3819    3823
                        3835    3844    3850    3858    3871    3878    3886    3900    3917*   3918
KEYA    017450          3625*   3654
KEYB    017510          3636*
KEYC    017600          3638    3651    3656*
KEYD    017616          3660*   3712
KEY1    017632          3663*
KEY10   020656          3844*
KEY11   020700          3850*   3915
KEY12   020726          3858*
KEY13   020766          3871*
KEY13A  021000          3860    3875*
KEY14   021012          3878*
KEY15   021040          3886*
KEY16   021104          3900*
KEY16A  021116          3888    3904*
KEY16B  021140          3909*   3910
KEY2    017666          3672*
KEY3    017746          3689*
KEY4    017760          3674    3693*
KEY7    020554          3753    3759    3767    3773    3776    3784    3787    3793    3799    3805    3811    3819*
KEY8    020566          3823*
KEY9    020624          3835*
KIN     010412           792    2287*
KLOOP   010426          2293*   2298
KOUT    021174          3921*   3922
KRETUR  010442          2296*   2373    2381    2421    2496    2515    2543    2616    2763    2851    2895    2903
KRET1   011552          2459    2538    2540    2543*
KRET2   013400          2845    2851*
KSTAT = 031000          2366*   2551    2553    2556    2559    2574    2577    2581*   2592*   2595*   2598*   2601    2608*
                        2614*   2630    2632    2636*   2639    2641    2653    2667    2693    2725    2752*   2755    2762*
                        2766    2793    2811*   2818*   2827*   2835    2842*   2843*   2844    2860    2865    2894*   4085*
KTEST   011662          2555    2574*
K5A     020130          3695    3727*
K5D     020216          3697    3745*
K5F     020100          3699    3719*
K5J     020056          3701    3713*
K5M     020114          3703    3723*
K5N     020202          3705    3741*
K5O     020166          3707    3737*
K5S     020152          3709    3733*
K6APR   020326          3729    3769*
K6AUG   020420          3731    3789*
K6DEC   020534          3747    3815*
K6FEB   020254          3721    3755*
K6JAN   020232          3715    3749*
K6JU    020360          3717    3778*
K6JUL   020410          3780    3786*
```

```
K6MA    020276          3725    3761#
K6MAY   020350          3763    3775#
K6NOV   020506          3743    3807#
K6OCT   020464          3739    3801#
K6SEP   020442          3735    3795#
LF    = 000212           779#   2380    3133    3182    3202    3257    3282    3293    3303    3331    3340    3345    3355
                        3368    3377    3394    3423    3433    3446    3932    3940    3950    3954    3957    3960    3967
                        3975    3978    3986    3996    4003
LINE00  014604          3020    3023    3031    3035    3038    3041    3044    3085    3113#
LINE01  015014          3091    3147#
LINE02  015174          3092    3186#
LINE03  015304          3093    3212#
LINE04  015342          3094    3220#
LINE05  015536          3095    3261#
LINE06  015672          3096    3292#
LINE07  015732          3097    3302#
LINE20  015774          3098    3313#
LINE30  016020          3099    3321#
LINE40  016110          3100    3337#
LINE51  016132          3101    3344#
LINE61  016170          3102    3354#
LINE71  016230          3103    3364#
LIN101  016274          3104    3376#
LIN110  016324          3105    3385#
LIN113  016372          3106    3399#
LIN114  016414          3107    3406#
LIN120  016462          3108    3418#
LIN130  016474          3109    3422#
LIN140  016532          3110    3432#
LIN150  016570          3054    3442#
LKS     017436           817*   3529*   3617#   4044*
LOAD    000200           800#   4220
LOGIN   001042           820#    922
LOK1    013060          2780    2782#
LONUM   007466          1068    2069#   2244    2253    2265*
LOOP    001066           828#    836
LOOPC   032206          1975*   2489*   2665*   2888*   3442    4093#
LOOPOW  022106          4055#   4066
LOPAT   012462          2695    2705#
LOPAT1  012512          2708    2713#
LOSCT   013156          2795    2805#
LOSEQ   012632          2727    2738#
LOTRK   013046          2768    2779#
LOTST   012340          2669    2679#
LOT2    012374          2684    2686    2688#
LOOA    014634          3119#   3415
LOOTAB  014730          3127    3128    3137#
LO1     014464          3066    3091#
LO1A    015140          3157    3171#
LO1B    015146          3147    3174#
LO1C    015154          3154    3177#
LO1D    015162          3165    3180#
LO2     014470          3067    3092#
LO2A    015266          3193    3203#
LO2B    015274          3197    3206#
LO3     014474          3069    3093#
```

```
L04     014500          3070    3079    3094#
L04A    015503          3222*   3223*   3226*   3229*   3230*   3246#
L04B    015511          3236    3249#
L04C    015517          3239    3252#
L04D    015525          3242    3255#
L04X    015404          3221    3229#
L04Y    015420          3225    3227    3231#
L05     014504          3072    3078    3095#
L05A    015564          3265    3267#
L05B    015655          3262    3283#
L05C    015657          3268*   3284#
L05D    015663          3270    3286#
L05X    015624          3272    3277#
L05Y    015634          3275    3279#
L06     014510          3034    3073    3077    3096#
L07     014514          3074    3097#
L101    014550          3046    3104#
L110    014554          3047    3105#
L110A   016364          3389    3394#
L113    014560          3087    3106#
L114    014564          3088    3107#
L114A   016456          3413    3415#
L120    014570          3050    3108#
L130    014574          3052    3109#
L140    014600          3053    3110#
L150A   016610          3443    3446#
L20     014520          3026    3098#
L30     014524          3029    3084    3099#
L30A    016042          3322    3325#
L30B    016076          3326    3331#
L40     014530          3032    3100#
L51     014534          3037    3101#
L61     014540          3040    3102#
L71     014544          3043    3089    3103#
MESS0   014374          3022    3065#
MESS1   014426          3025    3076#
MESS11  014442          3049    3083#
MESS2   014440          3028    3081#
MESS20  021226          3658    3932#
MESS21  021357          3907    3950#
MESS22  021362          3652    3710    3913    3953#
MESS23  021402          3847    3960#
MESS24  021522          3623    3978#
MINUTE  017430          1601    1612    2885    3116    3538    3540*   3543*   3590    3610#   3660*   3906*
MONACT  013426          2862#   2871
MONDON  013436          2859    2865#
MONTH   017433          3124    3559    3567    3574*   3575    3577*   3613#   3752*   3758*   3766*   3772*   3775*   3783*
                        3786*   3792*   3798*   3804*   3810*   3818*
MSERNO  013620          2881    2897#
NACCEP  011772          2587    2598#
NADBOS  007350          2029    2036#
NADMOR  007332          2008    2015    2022    2031#
NADONE  007362          2025    2037    2039#
NADRAN  007320          2001    2028#
NADSIN  007256          2005    2018#
NADTOP  007234          2003    2011#   2019
```

```
NASEQ   007300          2009    2012    2016    2024#
NBACK   012064          2582    2593    2596    2599    2609    2615#   2625    2637
NEWCOM  011720          2552    2584#
NEXPAT  007472          1147    1165    1190    1218    1274    1308    1341    1387    1439    1474    1518    1571    1627
                        1715    1772    1863    1934    2076#
NEXT    001176           851#    861     868     880     885     925     930     956
NEXTAD  007164          1011    1107    1129    1145    1161    1188    1216    1272    1306    1339    1385    1437    1472
                        1516    1569    1623    1998#
NOBELL  001476           922     924#
NOSTAT  001130           825     834#
NOTACT  022160          4058    4064#
NOTNEG  013252          2816    2826#
NTEST   011762          2585    2595#
NUMB    012074          2356    2622#
NUMBER  000502           807#    835     852    2297    2984    3602    3635*   3650*   4065
NUMBIN  012136          2632#   2643
OCTAL2  016746          3153    3156    3164    3194    3198    3237    3240    3263    3274    3390    3444    3491#
OCTAL6  016616          3167    3243    3327    3454#
OC6A    016630          3456    3458#
OKOUT   013332          2837    2842#
OLDATA= 030206          1020*   1036*   1078    1265    1299    1363    1381    1420    1435    1462    1471    1506    1515
                        1554    1568    2125*   2137*   2172    2833*   4076#
OPDONE  001302           873#    912     955
PADON   007714          2105    2134#
PADONE  007732          2081    2103    2137#
PANEX   007570          2082    2083    2084    2085    2094    2102#   2111    2117    2123    2129
PARET   007664          2055    2058    2098    2114    2120    2125#   2132
PATER   007510          2079    2081#
PATIN   007402          1104    1126    1142    1158    1182    1210    1256    1290    1323    1357    1404    1453    1496
                        1537    1594    1661    1733    1796    1885    2049#   2136
PATTER  007444          2053    2060#
PATUR   007416          2053#   2108
PAT0    007434          2051    2057#
PAT10   007634          2089    2116#
PAT11   007652          2090    2122#
PAT12   007674          2091    2128#
PAT5    007536          2086    2093#
PAT5A   007554          2095    2097#
PAT6    007562          2087    2100#
PAT6A   007660          2101    2124#
PAT7    007616          2088    2110#
PBUF  = 031200          2315    3002    4087#
PHASE = 030006           877     984*   1007*   1015*   1019*   1026*   1031*   1035*   1042*   1049*   1054*   1101*   1111*
                        1123*   1133*   1141*   1149*   1157*   1169*   1181*   1185*   1192*   1195*   1209*   1213*   1220*
                        1223*   1230*   1257*   1261*   1264*   1268*   1271*   1291*   1295*   1298*   1302*   1305*   1324*
                        1331*   1338*   1358*   1362*   1368*   1371*   1384*   1405*   1413*   1419*   1428*   1434*   1454*
                        1461*   1470*   1497*   1505*   1514*   1538*   1541*   1546*   1551*   1557*   1562*   1567*   1596*
                        1599*   1618*   1622*   1636*   1643*   1662*   1690*   1697*   1702*   1709*   1714*   1734*   1755*
                        1764*   1771*   1797*   1821*   1845*   1850*   1857*   1862*   1886*   1909*   1926*   1933*   1972*
                        1980*   2396*   2664*   2889*   3264    4072#
PIN     014046           794    2974#
PLOOP   014062          2980#   2985
POINT   014014          2938    2955#
POS     013274          2819    2830    2832#
POWER   022026           789    4038#   4041
POWON   022036          4038    4041#
```

```
PRANK = 030402          1595*  2054*  2128*  4078#
PRETUR  014100          2983#  3013   3015   3059   3136   3419   3523
PRIDON  014362          3018   3056#
PRINT   017034          3170   3199   3212   3244   3279   3292   3302   3313   3328   3337   3344   3354   3364
                        3376   3391   3399   3422   3432   3445   3519#
PRINTA  017040          3520#  3521
PS    = 177776           775#   814*   839*
PSERNO  013630          2879   2900#
PSER1   013636          2898   2901#
PSTAT = 030400           913    923*   928*   932    934*   999*   1228   1235*  1634   1639*  1978   1986*  1990*
                        2278*  2370*  2453*  2466*  2475*  2521*  2531*  2761*  2875*  2886*  2897*  2900*  2932
                        3004   3323*  3599*  4060*  4077#
PUFEM   014212          3008   3016#
RANDOM  010242          1021   1037   1044   1067   1237   2030   2130   2241#  2747
READ    001232           863#
READ3 = 030606           876*   945*   946   4084#
REDOVR  001250           865    867#
RESTAR  001150           838#  4067
RETIME= 000006           776#   867
RSCT    006726          1024   1047   1105   1109   1186   1262   1269   1332   1336   1377   1382   1421   1426
                        1463   1468   1698   1706   1846   1854   1947#
RTIME = 030600           863    954    990*  1669*  1681*  1760*  1804*  1834*  1914*  1954*  4081#
RTRK    006746          1040   1127   1131   1214   1296   1303   1432   1507   1512   1555   1560   1565   1602
                        1712   1743   1765   1769   1860   1895   1927   1931   1953#
SCAN    001170           849#   853
SCTIN   013104          2660   2791#
SCTTAB  013174          2797   2809#
SEQIN   012540          2658   2721#
SEQTAB  012706          2730   2745   2752#
SEQ2    012662          2740   2747#
SETCYC  021724           816   4010#  4015
SHIFT   010266          2248#  2252
SNAJ    017234          3558   3567#
SP    = 000240           777#  3119   3172   3175   3178   3204   3207   3245   3247   3250   3253   3284   3287
                        3350   3360   3371   3381   3402
SPACE   012210          2331   2360   2650#
SPACES  013714          2838   2922#
SPACE1  012236          2655   2656#
SRANK = 030404          2026*  2028*  2722*  4079#
START   001166           848#   854
STATO = 030000           818    830*   849    873    927*   998*   1061*  1102   1112   1114*  1124   1224   1236*
                        1476   1480*  1573   1577*  1608   1625   1629   1641*  1936   1938*  1969   1971*  1988*
                        2049   2057   2076   2102   2106*  2134*  2135*  2344   2389   2391   2430   2433   2451*
                        2539*  2549   2622   2650   2670*  2681*  2690*  2696*  2715*  2718*  2753   2809   2857
                        2862*  2874*  2883*  3168*  3261   3269   3585   3587   4057   4059*  4069#  4070   4071
                        4072   4073   4074   4075   4076   4077   4078   4079   4080   4081   4082   4083   4084
                        4085   4086   4087   4088
STIME = 030602          2885*  3406   3409   3412   3589   4082#
TAB     013304          2671   2688   2697   2716   2719   2733   2754   2771   2788   2810   2812   2834#
TABLOP  013320          2837#  2840
TDONE   002616          1060   1113   1134#  1225
TEDONE  007070           879   1937   1970   1978#
TESDON  007022          1134   1150   1170   1196   1276   1310   1343   1389   1441   1478   1520   1575   1631
                        1717   1774   1865   1967#
TESNUM  012120          2623   2628#
TESRET  007046          1972#  1977   1989   1992
```

```
TEST    001342          984     887#
TESTS   001334          878     884#
TESTO   001632          987     959#
TEST1   001634          988     971#
TEST10  003234          895    1248#
TEST11  003356          896    1282#
TEST12  003500          897    1317#
TEST13  003610          898    1350#
TEST14  003770          899    1396#
TEST15  004202          900    1447#
TEST16  004366          901    1490#
TEST17  004532          902    1527#
TEST2   002464          889    1100#
TEST20  004766          903    1595#
TEST21  005264          904    1650#
TEST22  005606          905    1723#
TEST23  006040          906    1791#
TEST24  006422          907    1871#
TEST3   002552          890    1122#
TEST4   002622          891    1140#
TEST5   002664          892    1156#
TEST6   002736          893    1176#
TEST7   003026          894    1202#
TIDA    017162         3553#   3560    3564    3572
TILOOP  017314         3585#   3603
TIMDAT  017170         3552    3556#
TIMDAY  017144         3545    3549#
TIME    017426          864     954     990    1669    1675    1681    1689    1749    1754    1760    1904    1920    193
                       1902    1908    1914    1954    2209    2220    2231    3530*   3537*   3609#
TIMIN   017070         3531    3534#
TIMONT  017256         3557    3562    3565    3573#
TIMOT1  017354         3593    3595#
TIMOT2  017404         3586    3588    3596    3598    3601#
TIMOUR  017122         3539    3543#
TIMOUT  017312         3541    3547    3554    3576    3584#
TIMTYP  017362         3592    3597#
TKB0    032402         2316    2613    2912    2915    3919    4156#
TKB1    032412         4160#
TKB10   032502         4188#
TKB11   032512         4192#
TKB12   032522         4196#
TKB13   032532         4200#
TKB14   032542         4204#
TKB15   032552         4208#
TKB16   032562         4212#
TKB17   032572         4216#
TKB2    032422         4164#
TKB3    032432         4168#
TKB4    032442         4172#
TKB5    032452         4176#
TKB6    032462         4180#
TKB7    032472         4184#
TKCONT  010536         2321    2322#
TKSERV  010474         2295    2311#
TKS0    032400          828*   2294    3917    4055*   4155#
TKS1    032410         4159#
```

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TKS10   032500          4187#
TKS11   032510          4191#
TKS12   032520          4195#
TKS13   032530          4199#
TKS14   032540          4203#
TKS15   032550          4207#
TKS16   032560          4211#
TKS17   032570          4215#
TKS2    032420          4163#
TKS3    032430          416 #
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TKS7    032470          4183#
TK0     010610          2319    2344#
TK1     010636          2349    2352#
TK2     010656          2355    2358#
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TOUT    007110          1979    1983#
TOUT1   007126          1064    1986#
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TPB1    032416          4162#
TPB10   032506          4190#
TPB11   032516          4194#
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                        3921    3926    4157#
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TPS11   032514          4193#
TPS12   032524          4197#
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TRANS   006762          1945    1951    1955#   4063
TRANS1  006754           951    1948    1954#
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		3736	3740	3744	3748	3751	3757	3765	3771	3782	3791	3813		
TRYAGA	020530	3797	3803	3809	3813#	3817	3821	3825	3827	3837	3839	3846		
TRYAGN	017566	3628	3630	3640	3642	3649	3652#	3657						
TRYAN	021150	3853	3855	3861	3863	3873	3876	3881	3883	3890	3892	3902	3905	3913#
TSTIN	012254	2656	2664#											
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T1	001642	972	973#											
T1A	001732	974	993#											
T1A1	001746	997#	1004	1006	1094									
T1A2	001774	994	1003#											
T1B	002026	975	1011#											
T1B1	002040	1012	1015#											
T1C	002054	976	1019#											
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T1F	002144	979	1035#											
T1G	002200	980	1042#											
T1H	002232	981	1049#											
T1I	002252	982	1054#											
T1PX	002326	1016	1032	1067#										
T1PY	002352	1027	1043	1050	1073#									
T1PYA	002434	1086#	1092											
T1PYB	002436	1082	1088#											
T1PYC	002456	1075	1077	1079	1085	1093#								
T1Z	001666	973	984#											
T1Z1	001722	990#	996											
T10	003242	1249	1250#											
T10A	003274	1251	1261#											
T10B	003304	1252	1264#											
T10C	003322	1253	1268#											
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T10Z	003254	1250	1256#											
T10Z1	003260	1257#	1273	1275										
T11	003364	1283	1284#											
T11A	003416	1285	1295#											
T11B	003426	1286	1298#											
T11C	003444	1287	1302#											
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T12	003506	1318	1319#											
T12A	003530	1320	1327#											
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T12B	003552	1321	1334#											
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T12Z1	003520	1324#	1340	1342										
T13	003616	1351	1352#											
T13A	003646	1353	1362#											
T13B	003664	1354	1366#											
T13B1	003700	1367	1371#											
T13C	003706	1355	1374#											
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T13Z2	003636	1359#	1369	1388
T14	003776	1397	1398#	
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T14B	004046	1400	1414#	
T14B2	004064	1415	1419#	
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T14D	004124	1402	1429#	
T14D1	004142	1430	1434#	
T14Z	004010	1398	1404#	
T14Z1	004014	1405#	1438	1440
T15	004210	1448	1449#	
T15A	004232	1450	1457#	
T15A1	004250	1458	1461#	
T15B	004266	1451	1465#	
T15B1	004304	1466	1470#	
T15B2	004346	1477	1480#	
T15Z	004216	1449	1453#	1939
T15Z1	004222	1454#	1473	1475
T16	004374	1491	1492#	
T16A	004416	1493	1500#	
T16A1	004434	1501	1505#	
T16B	004452	1494	1509#	
T16B1	004470	1510	1514#	
T16Z	004402	1483	1492	1496#
T16Z1	004406	1497#	1517	1519
T17	004530	1528	1529#	
T17A	004562	1530	1541#	
T17B	004602	1531	1546#	
T17C	004622	1532	1551#	
T17D	004654	1533	1557#	
T17E	004674	1534	1562#	
T17F	004714	1535	1567#	
T17F1	004756	1574	1577#	
T17Z	004546	1529	1537#	
T17Z1	004552	1538#	1570	1572
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T2A1	002524	1108	1111#	
T2Z	002466	1101#		
T2Z1	002506	1103	1105#	
T20	004774	1586	1587#	
T20A	005032	1588	1599#	
T20A1	005050	1602#	1609	
T20B	005064	1589	1606#	
T20B1	005104	1607	1612#	
T20B2	005122	1614	1616#	
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T20C1	005142	1617	1620#	
T20D	005144	1591	1610	1622#
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T20Z1	005022	1596#	1626	1628
T21	005272	1651	1652#	
T21A	005326	1653	1665#	
T21A1	005340	1666	1669#	
T21B	005362	1654	1674#	
T21C	005406	1655	1679#	
T21C1	005424	1680	1684#	
T21C2	005460	1672	1677	1690#
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T21E	005510	1657	1700#	
T21F	005532	1658	1701	1704#
T21F1	005544	1705	1708#	
T21G	005556	1659	1710#	
T21G1	005570	1711	1714#	
T21Z	005312	1242	1652	1661#
T21Z1	005316	1662#	1716	
T22	005614	1724	1725#	
T22A	005646	1726	1737#	
T22B	005660	1727	1741#	
T22C	005702	1728	1747#	
T22D	005726	1729	1751#	
T22D1	005746	1745	1750	1755#
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T22E1	005762	1752	1760#	
T22E2	005772	1759	1763#	
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T22F	006010	1731	1767#	
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T22F2	006022	1768	1771#	
T22Z	005632	1725	1733#	
T22Z1	005636	1734#	1773	
T23	006046	1782	1783#	
T23A	006112	1784	1800#	
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T23B	006146	1785	1809#	
T23C	006164	1786	1813#	
T23C1	006214	1819#	1833	
T23C2	006220	1811	1820#	1830
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T23D	006234	1787	1824#	1837
T23D1	006246	1825	1828#	
T23E	006264	1788	1832#	1839
T23E1	006272	1814	1834#	
T23F =	006234	1789	1837#	
T23G =	006264	1790	1839#	
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T23H1	006314	1842	1845#	
T23I	006324	1792	1848#	
T23J	006346	1793	1849	1852#
T23J1	006360	1853	1856#	
T23K	006372	1794	1858#	
T23K1	006404	1859	1862#	
T23Z	006076	1783	1796#	

DZRSAA.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

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T23Z1   006102          1797*   1864
T24     006430          1872    1873*
T24A    006472          1874    1889*
T24B    006504          1875    1893*
T24C    006526          1876    1899*   1913
T24D    006560          1877    1905*   1917    1921
T24D1   006600          1897    1903    1909*
T24E    006606          1878    1912*   1919
T24E1   006614          1906    1914*   1924
T24F  = 006560          1879    1917*
T24G  = 006606          1880    1919*
T24H  = 006560          1881    1921*
T24I    006624          1882    1923*
T24I1   006640          1890    1926*
T24I2   006644          1894    1927*
T24J    006650          1883    1929*
T24J1   006662          1930    1933*
T24Z    006456          1873    1885*
T24Z1   006462          1886*   1935
T3A     002600          1122    1129*
T3A1    002612          1130    1133*
T3Z     002554          1123*
T3Z1    002574          1125    1127*
T4A     002640          1140    1145*
T4Z     002624          1141*
T4Z1    002634          1143*   1146    1148
T5A     002702          1156    1161*
T5A1    002714          1162    1165*
T5A2    002726          1166    1169*
T5Z     002666          1157*
T6A     002762          1178    1185*
T6A1    002756          1183*
T6B     002772          1179    1188*
T6B1    002766          1186*
T6B2    003006          1189    1192*
T6B3    003016          1191    1195*
T6Z     002746          1176    1181*
T7      003034          1203    1204*
T7A     003060          1205    1213*
T7A1    003054          1211*
T7B     003070          1206    1216*
T7B1    003064          1214*
T7B2    003104          1217    1220*
T7B3    003114          1219    1223*
T7C     003130          1207    1226*
T7C1    003164          1227    1234*
T7C2    003170          1229    1235*
T7Z     003044          1115    1204    1209*
WAIT    001616           862     954*
WAITER= 030406           989*    995*   1600*   1601*   1613    1676*   1689*   1749*   1754*   1820*   1902*   1909*   2208
                        2219    2230    4080*
WLOOP   013240          2821*   2828
WORIN   012164          2631    2639*
WRDIN   013212          2661    2813*
WSCT    006716          1017    1029    1143    1183    1193    1259    1266    1325    1329    1364    1406    1411    1455
                        1460    1944*
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                        1805    1887    1891    1950#
W2S     010146          1693    1758    2208#
W2S1    010164          2210    2212#
W2OS    010172          1679    1751    1824    1841    1912    1923    2219#
W2OS1   010210          2221    2223#
W3OS    022066          4047#   4048    4050
W6OS    010216          1813    1832    1905    2230#
W6OS1   010234          2232    2234#
XNUM    012002          2550    2601#
XNUMX   012044          2604    2611#
XPAT    012526          2692    2711    2718#
XSEQ    012610          2724    2732#
XWRDA   012742          2757    2759#
XWRDB   012746          2756    2760#
YEAR    017434          3130    3561    3578#   3614#   3662#   3842#
.     = 032600           783#    788#    791#    796#    799#    803#    811#   3183#   3209#   3218#   3289#   3299#   3334#
                        3361#   3373#   3382#   3396#   3403#   3429#   3439#   3448#   3615#   3976#   4004#   4088#
.50CYC  021774          4013    4022#
.60CYC  021750          4011    4017#
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DZRSAA.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

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        2262  2263  2296  2315  2434  2439  2442  2443  2444  2465  2633  2678  2704  2715  2752
        2778  2804  2814  2825  2842  2901  2933  2936  2983  3002  3004  3006  3267  3512  3594
        3601  3644  3681  3684  3833  3841  3866  3869  3895  3898  4064
ASL      875   971  1202  1248  1282  1317  1350  1396  1447  1490  1527  1595  1650  1723  1781
        1871  2052  2078  2124  2248  2313  2314  2320  2654  2673  2674  2675  2699  2700  2701
        2773  2774  2775  2799  2800  2801  2821  2822  2823  3000  3001  3125  3126  3150  3151
        3632  3633  3634  3645  3646  3647  3680  3682  3683  3829  3831  3832  3865  3867  3868
        3894  3896  3897
ASR     2096  2783  2784  3160  3161  3162  3189  3190  3191  3386  3387  3388  3467  3468  3469
        3496  3497  3498
BEQ      861   916   922   942  1060  1092  1176  1178  1227  1229  1328  1335  1367  1375  1380
        1409  1415  1424  1430  1458  1466  1477  1501  1510  1574  1630  1635  1666  1701  1705
        1711  1738  1768  1801  1849  1853  1859  1890  1930  1970  1979  2029  2051  2094  2103
        2105  2129  2187  2189  2198  2411  2458  2485  2505  2536  2538  2552  2555  2558  2561
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        2740  2742  2754  2757  2765  2768  2792  2795  2819  2859  2867  2869  2871  2881  2938
        2956  2958  2963  2982  3008  3013  3015  3018  3020  3023  3026  3029  3032  3035  3038
        3041  3044  3047  3050  3053  3067  3070  3073  3078  3085  3088  3225  3322  3531  3539
        3545  3551  3558  3564  3569  3592  3638  3670  3674  3685  3695  3697  3699  3701  3703
        3705  3707  3709  3715  3717  3721  3725  3729  3731  3735  3739  3743  3747  3763  3780
        3860  3888  4011  4013
BGE     2353  2629  2631  2642  3413  3510
BGT     1100  1122  1140  1156  2095  2319  2347  2554  2557  2560  2575  2668  2680  2686  2694
        2726  2739  2756  2767  2794  2828  3552  3876  3905
BHI     2706  2806  3077  3557  3649  3861
BHIS    3630  3642  3668  3678  3827  3839  3855  3883  3892
BIC      874   927   998  1069  1073  1083  1088  1090  1238  1436  1553  1619  1685  1686  1703
        1708  1763  1816  1817  1851  1856  1925  1961  1988  1999  2031  2038  2039  2050  2077
        2134  2146  2148  2159  2163  2317  2392  2412  2451  2486  2506  2607  2666  2690  2721
        2748  2796  2882  3149  3159  3187  3196  3232  3273  3458  3470  3482  3491  3493  3529
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BICB    2635  3014
BIS      828   832   833   869   988  1023  1039  1046  1114  1240  1603  1671  1674  1687  1744
        1747  1806  1809  1818  1828  1896  1899  1900  2027  2033  2041  2371  2415  2452  2490
        2509  2539  2687  2696  2718  2732  2750  2786  2807  2808  2862  2874  2911  3168  3459
        3471  3483  3494  3499  4059
BIT      860   871   911   913   917   921   932   941  1003  1059  1074  1081  1102  1112  1124
        1224  1226  1228  1476  1573  1608  1625  1629  1634  1700  1848  1936  1967  1969  1976
        1978  1983  2000  2002  2004  2007  2011  2014  2018  2021  2057  2102  2186  2188  2197
        2276  2367  2410  2457  2484  2504  2535  2537  2549  2590  2605  2622  2624  2707  2710
        2753  2809  2878  2880  2909  3012  3220  3224  3271  3321  3568  3571  3597  3597  3686
BITB    2650  2857  3017  3561
BLE      865  2210  2221  2232  2349  2651
BLO      947  3022  3025  3028  3031  3034  3037  3040  3043  3046  3049  3052  3066  3069  3072
        3084  3087  3628  3640  3666  3676  3825  3837  3853  3863  3881  3890
BLOS    3576
BLT     2355  2780
BMI      850   859   862   994  1617  1680  1694  1759  1825  1833  1842  1913  2117  2295  2345
        2431  2858
BNE      822   836   853   872   912   914   918   933   955   996  1004  1006  1075  1079  1082
        1085  1103  1113  1125  1225  1609  1626  1742  1894  1937  1968  1977  1984  2001  2003
        2005  2008  2012  2015  2019  2022  2058  2160  2252  2277  2298  2359  2368  2394  2441
        2448  2550  2580  2589  2602  2604  2612  2623  2625  2640  2711  2736  2810  2816  2830
        2845  2861  2879  2910  2940  2943  2945  2949  2985  3221  3265  3272  3521  3560  3562
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        3572  3588  3596  3598  3603  3651  3657  3687  3691  3751  3757  3765  3771  3782  3791
        3797  3803  3809  3817  3821  3846  3873  3902  3929  4048  4050  4066
BPL      868   878   920   944  1077  1607  1614  1752  1814  1906  1924  2025  2037  2101  2111
        2123  2390  2837  3456  3586  3593  3910  3918  3922  3927  4058
BR       854   880   885   925   930   935  1179  1369  1372  1483  1578  1610  1672  1677  1745
        1750  1807  1811  1830  1897  1903  1945  1948  1951  1989  1992  2009  2016  2055  2098
        2108  2114  2120  2132  2402  2413  2449  2459  2468  2477  2487  2507  2524  2540  2563
        2566  2569  2572  2582  2593  2596  2599  2609  2637  2730  2745  2771  2788  2797  2812
        2840  2863  2876  2898  2953  2960  3059  3074  3079  3089  3227  3275  3541  3547  3554
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        3776  3784  3787  3793  3799  3805  3811  3915  4015
BVC     1146  1148  1189  1217  1273  1275  1307  1309  1340  1342  1386  1388  1438  1440  1473
        1475  1517  1519  1570  1572  1628  1716  1773  1864  1935
BVS     1012  1108  1130  1162  1166  1191  1219  1624
CLR      820   827   838   848   985   986  1008  1028  1051  1055  1056  1057  1058  1061  1062
        1063  1111  1133  1149  1169  1195  1223  1231  1258  1271  1292  1305  1359  1376  1384
        1434  1470  1482  1514  1567  1600  1622  1641  1642  1643  1714  1771  1862  1933  1960
        2247  2280  2292  2299  2311  2366  2370  2435  2436  2437  2438  2446  2453  2456  2466
        2489  2523  2534  2664  2665  2729  2744  2770  2817  2846  2884  2887  2888  2894  2979
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CLRB     876  1054  1338  1972  2278  2676  2702  2762  2776  2802  2843  2889  2947  2959  2964
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        3836  3838  3845  3852  3854  3859  3862  3872  3875  3880  3882  3887  3889  3891  3901
        3904  4010  4012  4065
CMPB     946  2553  2556  2559  2574  2577  2630  2639  2641  2667  2691  2693  2723  2725  2755
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COM     2097  2173  3570
DEC      821   995  1177  1192  1220  2028  2128  2440  2447  2683  2709  2866  2868  2870  2965
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DECB    1368  2818  2827  3019
HALT     788   801   959  3081  4014  4039
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        2952  3011  3511  3530
INCB     945  1007  1015  1019  1026  1031  1035  1042  1049  1324  1331  1358  1371  1405  1413
        1419  1428  1454  1461  1480  1497  1505  1538  1551  1557  1562  1618  1662  1697  1702
        1734  1764  1797  1825  1850  1886  1971  2396  2811  3226  3457  3508  3540  3546  3553
        3574  3578
JMP      800   948   951   956   972  1009  1013  1017  1024  1029  1033  1040  1047  1052  1064
        1094  1105  1109  1115  1127  1131  1134  1143  1150  1159  1163  1167  1170  1183  1196
        1193  1196  1203  1211  1214  1221  1242  1249  1259  1262  1266  1269  1276  1283  1293
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	3107	3108	3109	3110	3136	3415	3419	3523	3813	4067					
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	1043	1044	1050	1067	1104	1107	1126	1129	1142	1145	1147	1158	1161	1165	1182
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	2849	2890	2891	2892	2902	2914	2922	3114	3117	3123	3131	3153	3156	3164	3167
	3169	3170	3194	3198	3199	3212	3237	3240	3243	3244	3263	3274	3279	3292	3302
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MOV	812	814	817	818	819	825	826	830	831	837	839	840	863	870	950
	989	990	1020	1022	1036	1038	1045	1068	1070	1080	1089	1236	1239	1241	1265
	1299	1363	1381	1420	1435	1462	1471	1481	1506	1515	1552	1554	1568	1577	1595
	1669	1675	1676	1681	1684	1689	1748	1749	1754	1760	1804	1810	1815	1820	1829
	1834	1901	1902	1908	1914	1938	1944	1947	1950	1953	1954	1955	1956	1957	1985
	1998	2026	2032	2040	2049	2053	2054	2076	2125	2131	2137	2147	2158	2162	2172
	2185	2193	2196	2201	2208	2219	2230	2241	2242	2243	2244	2245	2246	2265	2266
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	2312	2316	2369	2395	2432	2433	2445	2454	2455	2467	2475	2476	2521	2522	2531
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	4042	4044	4045	4053	4055	4060	4062								
MOVB	873	877	923	928	934	999	1230	1235	1601	1612	1636	1639	1980	1986	1990
	2372	2376	2378	2380	2391	2399	2401	2418	2420	2493	2495	2512	2514	2608	2632
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NEG	2831														
RESET	813	4043													
ROL	2113	2119	2249	2250	3233	3234	3479	3480							
ROR	3188														
RORB	3464	3476													
RTI	2305	2992	3532	3607											
RTS	991	1001	1071	1086	1232	1604	1620	1637	1644	1682	1691	1756	1761	1822	1835
	1910	1915	1958	1962	1973	1981	2034	2043	2126	2139	2150	2165	2174	2194	2202
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	4020	4025													

DZRSAA.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

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SEC      2112  2118  3463  3475
SEV      2042  2138
SUB       864   866  1613  1616  2023  2161  2190  2191  2200  2209  2211  2220  2222  2231  2233
         2685  2836  3266  3509  3537  3591  3595
SWAB     2677  2703  2777  2782  2803  3152  3163  3192  3235  3462  3474  3481
TST       849   919   943  1005  1076  1093  2024  2036  2100  2107  2110  2116  2122  2551  2713
         2741  3522
TSTB      858   993  1606  2294  2344  2389  2430  2601  2735  2937  3007  3585  3909  3917  3921
         3926  4057
.ASCII   3137  3138  3200  3213  3280  3294  3304  3314  3329  3338  3346  3356  3365  3369  3378
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.BYTE    3171  3172  3174  3175  3177  3178  3180  3182  3202  3203  3204  3206  3207  3217  3245
         3246  3247  3249  3250  3252  3253  3255  3257  3282  3283  3284  3286  3287  3293  3298
         3303  3309  3317  3331  3340  3345  3350  3355  3360  3368  3371  3377  3381  3394  3402
         3423  3428  3433  3438  3446  3610  3611  3612  3613  3614  3932  3940  3950  3954  3957
         3960  3967  3975  3978  3986  3996  4003
.ENABL    769
.END     4220
.EVEN    3183  3209  3218  3258  3289  3299  3310  3318  3334  3341  3351  3361  3373  3382  3396
         3403  3429  3439  3448  3615  3951  3958  3976  4004
.REM        1
.REPT     784
.TITLE    768
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ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

*DZRSAA,DZRSAA.SEQ/SOL/CRF/DS:ERFZ/EN:ABS=DSKM:DZRSAA.P11
RUN-TIME: 11 24 6 SECONDS
RUN-TIME RATIO: 76/42=1.7
CORE USED: 14K (28 PAGES)

M09

Spooler runtime 15 Seconds, 64 KCS, 398 disk reads, 4 disk writes, 115 pages