

PDM70

DIAGNOSTIC
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1.0 ABSTRACT

THIS IS A DESCRIPTION ON LOADING, USING AND INTERPRETING THE PDM70 DIAGNOSTIC PROGRAM. THE PROGRAM IS COMPRISED OF TWENTY-THREE KEYBOARD SELECTABLE TESTS WHICH TEST AND AID IN CHECKOUT OF THE PDM70 SYSTEM. THE PROGRAM IS STRUCTURED TO GIVE THE USER THE OPTION OF TESTING ANY OF THE MODULES COMPRISING THE PDM70 ON AN INDIVIDUAL OR SYSTEM TEST BASIS.

THE DIAGNOSTIC PROGRAM RESIDES IN A PDP-11 AND IS INTERFACED VIA A DL11 (ASYNCHRONOUS SERIAL LINE) TO THE PDM70. THE PDP-11 IS USED AS A COMBINATION CONTROL, SOURCE AND DESTINATION MODULE.

EACH MODULE TEST PROGRAM IS INDIVIDUALLY OUTLINED IN THIS WRITE-UP. THE SCOPE LOOPING TECHNIQUE AND MODULE ADDRESSING SCHEME IS IN GENERAL THE SAME FOR ALL MODULES WITH ANY UNIQUE CHARACTERISTICS POINTED OUT IN THE MODULE OUTLINE.

THE CONSOLE TELEPRINTER IS USED TO SELECT THE TEST PROGRAMS AND TO CONTROL THE DIAGNOSTIC. THE DIAGNOSTIC RUNS IN THREE MODES: MONITOR, WAIT AND RUN.

THE 'MONITOR MODE' IS ENTERED WHEN THE PROGRAM IS LOADED OR AT ANY TIME A NEW TEST IS TO BE SELECTED. HERE THE PROGRAM WAITS, DECODES AND THEN EXECUTES THE SELECTED TEST TYPED IN FROM THE KEYBOARD.

WHEN THE 'WAIT MODE' IS ENTERED THE PROGRAM HAS TO WAIT FOR ANY PARAMETERS (SUCH AS A MODULE ADDRESS) TO BE INPUTTED. A SIGNAL TO BE SCOPED OR TO STOP PROGRAM EXECUTION IF AN ERROR IS DETECTED.

THE 'RUN MODE' IS WHEN THE PROGRAM IS ACTUALLY EXECUTING A TEST PROGRAM.

THE TELEPRINTER KEYBOARD IS ALWAYS ACTIVE AND WILL RESPOND TO ANY KEYBOARD INPUT. ALL USERS RESPONSES ENTERED MUST END WITH A 'CR' (CARRIAGE RETURN) AND MAY NOT CONTAIN SPACES OR NULL CHARACTERS. 'RUBOUT' MAY BE USED TO ERASE ANY PREVIOUSLY ENTERED CHARACTERS. IF RUBOUT IS TYPED, THE ERASED CHARACTER WILL BE ECHOED BACK.

2.0 REQUIREMENTS (EQUIPMENT)

1. PDM70 MOTHER BOARD.
2. CLOCK MODULE (M7379-SET TO CORRESPOND TO THE DL11 FREQ.)
3. POWER SUPPLY
4. PDP-11 W/DL11 & 9K OF MEMORY
5. CONSOLE TELEPRINTER
6. PDM70 INTERFACE MODULE

A. THIS CAN EITHER BE A DL11 OR A SERIAL I/O MODULE (M7385)

3.0 LOADING PROCEDURE

1. USE STANDARD PROCEDURE FOR LOADING BINARY TAPES.

4.0 STARTING PROCEDURE

1. THE PROGRAM IS SELF STARTING WITH A RESTART ADDRESS OF "200".

5.0 TELEPRINTER CONTROL SWITCHES

1. RETURN TO MONITOR (↑C)*

TYPING A '↑C' AT ANY TIME WILL ENABLE THE PROGRAM TO RETURN TO THE KEYBOARD MONITOR AND WAIT FOR A NEW TEST TO BE ENTERED.

2. CONTINUE (C)

IF A '↑C' HAS BEEN TYPED, RETURNING CONTROL TO THE KEYBOARD MONITOR, AND THE USER WISHES TO RESTART THE LAST TEST HE WAS RUNNING, HE CAN SIMPLY TYPE 'C' CARRIAGE RETURN AND CONTINUE WITHOUT HAVING TO RE-TYPE THE TEST NAME.

3. RESTART (↑R)*

TYPING A '↑R' WILL ENABLE THE CURRENT TEST TO BE RESTARTED. IF A '↑R' IS TYPED WHILE IN MONITOR MODE, THE ENTIRE TEST PROTOCOL IS RETYPED.

4. MODULE ADDRESS UPDATING (↑A)*

TYPING A '↑A' WHILE RUNNING ANY OF THE MODULE PROGRAMS WILL ENABLE A NEW MODULE ADDRESS TO BE ENTERED.

5. EXIT WAIT MODE (CR)

TYPING 'CR' WILL ENABLE THE PROGRAM TO CONTINUE FROM THE WAIT MODE.

* ALL CONTROL CHARACTERS ARE OBTAINED BY TYPING THE 'CTRL AND THE

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CHARACTER DESIGNATED' KEYS SIMULTANEOUSLY.

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6. SUPPRESS PRINTING (↑0)

TYPING A '↑0' TELLS THE COMPUTER TO SUPPRESS THE REST OF THE TELEPRINTER OUTPUT. FOR INSTANCE, IF THE COMPUTER WAS TYPING OUT A MESSAGE AND THE USER KNEW WHAT THE MESSAGE WAS GOING TO BE, HE COULD TYPE A '↑0' AND ENABLE THE PROGRAM TO CONTINUE WITHOUT WAITING FOR THE ENTIRE MESSAGE TO BE PRINTED.

6.0 CONSOLE SWITCH SETTINGS

SWITCH	FUNCTION
SW15=0	ENTER THE 'WAIT MODE' AND WAIT FOR 'CR' ON ERROR DETECTION
SW15=1	CONTINUE ON ERROR
SW14=0	CONTINUE ON TO NEXT SUBTEST
SW14=1	LOOP ON CURRENT SUBTEST
SW13=0	ENABLE PRINTOUTS
SW13=1	INHIBIT PRINTOUTS
SW12=0	NORMAL DL11 TRANSMISSION
SW12=1	ENTER THE 'WAIT MODE' AND WAIT FOR A 'CR' TO TRANSMIT EACH CHARACTER. AS EACH CHARACTER IS TRANSMITTED IT IS ALSO PRINTED.
SW11=0	NORMAL DL11 TRANSMISSION
SW11=1	TRANSMIT THE CURRENT CHARACTER UNTIL SW11 IS RESET TO '0'.
SW10=0	RUN THE ENTIRE MODULE TEST PROGRAM
SW10=1	INHIBIT THE MANUAL INTERVENTION TESTS IN THE MODULE TEST PROGRAM
SW09=0	NORMAL DL11 TRANSMISSION
SW09=1	INHIBIT TRANSMITTER DELAY (SCOPE LOOPING AID)

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NOTE: THE FUNCTIONS OF THE LOWER BITS (0-8) VARY IN USAGE AND
ARE OUTLINED IN THE APPLICABLE TEST DESCRIPTIONS. IN

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GENERAL THOUGH, DATA SWITCHES '0-3' ARE USED IN THE EXERCISER TESTS TO ENABLE THE USER TO SELECT ANY PARTICULAR MODULE MODE. IN THESE CASES, THE PROGRAM ADDS A CODE OF '60' TO THE NUMBER READ FROM THE SWITCHES TO REPRESENT AN ASCII NUMBER.

7.0 SERIAL I/O INPUT OPTION

AS MENTIONED IN THE ABSTRACT, THE PDM70 MODULES CAN BE TESTED IN TWO MODES: PER MODULE BASES OR SYSTEM TEST. IF THE MODULE IS TESTED INDIVIDUALLY A DF11 IS PLUGGED DIRECTLY INTO THE CONTROL SLOT OF THE PDM70 MOTHER BOARD. THIS ENABLES THE PDP-11 TO ACT AS A COMBINATION CONTROL, SOURCE AND DESTINATION MODULE. IN THIS CASE, THE SYSTEM CLOCK MUST BE SET TO CORRESPOND TO THE CLOCK FREQUENCY OF THE DL11.

WHEN THE MODULE IS TESTED IN A SYSTEM ENVIRONMENT, THE BASIC SYSTEM CONFIGURATION CONSISTS OF A : CONTROL, CLOCK, 'KGM' (KNOWN GOOD SERIAL INPUT/OUTPUT MODULE) AND A 'MUT' (MODULE UNDER TEST). THE 'KGM' SHOULD BE VERIFIED AS SUCH BY TESTING IT WITH THE M7385I TEST (REFER TO SECTION 12.13). THE 'KGM' CAN BE INSERTED IN ANY MODULE SLOT AND THEN CABLED TO THE DL11 OUTPUT OF THE PDP-11. THIS MODULE IS TO BE SET UP WITH THE "D" JUMPER OUT AND THE "L" JUMPER IN SO THAT IT IS INITIALIZED ON POWER UP. THE SYSTEM CLOCK MUST BE SET EITHER EQUAL TO OR GREATER THAN, THE INPUT DEVICES (E.G. DL11) BAUD RATE. PROGRAMS ARE THEN SENT FROM THE PDP-11 STORED IN THE CONTROL MODULE.

NOT OBVIOUS TO THE USER IS THE EXTRA ADDRESSING WHICH IS 'PADDED' IN WHEN THE SERIAL I/O MODULE IS USED. THIS PADDING SERVES TWO FUNCTIONS. FIRST, IT FACILITATES LOADING A LEGAL PROGRAM INTO THE CONTROL MODULE 'FIFO' (FIRST-IN, FIRST-OUT BUFFER). THIS MEANS STARTING EACH PROGRAM WITH AN 'STX' AND ENDING IT WITH AN 'ETX'. PADDING ISN'T NECESSARY WHEN THE MODULE IS TESTED ON A MODULE BASIS. ALSO, EXTRA ADDRESSING MUST BE ADDED TO ADDRESS THE 'KGM'. THE PROGRAM HAS TO BE CERTAIN THAT THE 'KGM' NEVER LOSES CONTROL OF A PROGRAM SINCE THIS IS THE ONLY INTERFACE TO THE PDP-11. BY SETTING DATA SWITCH 12, THE USER CAN SINGLE STEP ANY MODULE TEST PROGRAM AND EXAMINE WHAT THIS PADDED PROGRAM LOOKS LIKE.

WHEN THE PROGRAM IS STARTED, IT ASKS IF A SERIAL I/O IS BEING USED. IF IT IS, TYPE 'YES' OR 'Y' CARRIAGE RETURN. IF IT'S NOT, TYPE 'NO', 'N' OR SIMPLY 'CR'. THIS PARAMETER CAN BE CHANGED AT ANY TIME BY TYPING A 'IR' WHILE IN THE MONITOR MODE.

IF THE 'KGM' I/O IS BEING USED, THE PROGRAM WILL THEN ASK FOR THE ADDRESS OF THIS MODULE. THIS CAN BE ANY ADDRESS EXCEPT '17' WHICH FIT THE GUIDE LINES DESCRIBED IN SECTION 9.0 (MODULE ADDRESSING).

8.0 DL11 ADDRESS SETUP PROCEDURE

AFTER SETTING UP THE SERIAL I/O OPTION, THE PROGRAM PRINTS "DL11
ADRS. VEC.?" THIS ENABLES THE USER TO SELECT HIS OWN DL11
DEVICE AND VECTOR ADDRESSES. BY SIMPLY TYPING 'CR', THE DEFAULT
RCSR ADDRESS OF '175610' AND VECTOR ADDRESS OF '300' ARE USED.
IF THESE ADDRESSES ARE TO BE MODIFIED, TYPE THE RCSR ADDRESS AND
THE VECTOR ADDRESS SEPERATED BY A COMMA.

THE USER SHOULD NOTE THAT BOTH THE DL11 AND THE SERIAL I/O MODULE
ARE NORMALLY SETUP FOR 7 BIT EVEN PARITY.

9.0 MODULE ADDRESSING

WHEN A MODULE PROGRAM IS SELECTED, THE PROGRAM REQUESTS THE
MODULE ADDRESS BEFORE THE TEST IS RUN. THIS ADDRESS CAN BE ANY
NUMBER FROM '0-17'*. THE ONLY RESTRICTION IS THAT IF THE SERIAL
INPUT OPTION IS BEING USED, THESE TWO MODULE ADDRESSES MUST NOT
CONFLICT. IF THEY DO, A NEW MODULE ADDRESS WILL BE REQUESTED.
TYPING A '1A' AT ANY POINT WHILE A MODULE PROGRAM IS RUNNING WILL
CAUSE THE PROGRAM TO REQUEST A NEW MODULE ADDRESS.

10.0 MODULE ERRORS

WHEN A MODULE ERROR IS DETECTED, THE FAILING SUBTEST NUMBER, M.A.
(MEMORY ADDRESS) WHERE ERROR OCCURRED AND A DESCRIPTIVE MESSAGE
OF THE FAILURE ARE TYPED OUT. THE PROGRAM THEN ENTERS THE 'WAIT
MODE' UNTIL A 'CR' IS TYPED ENABLING THE PROGRAM TO CONTINUE.

WHEN AN ERROR IS DETECTED, THE 'M.A.' SHOULD BE USED TO LOCATE
THE FAILING SUBTEST IN THE LISTING. HERE THE USER WILL FIND A
WRITTEN DISCRPTION OF WHAT THE SUBTEST WAS ATTEMPTING TO DO.
THE TEST CAN THEN BE ANALYZED AND THEN LOOPED IF NECESSARY UNTIL
THE FAILURE IS FIXED.

WHEN A MODULE IS FAILING THE FIRST SUBTEST, IT IS A GOOD IDEA TO
RE-CHECK THE MODULE TO MAKE SURE THAT IT WAS SET UP CORRECTLY
WITH THE CORRECT SWITCH & JUMPER SETTINGS. THE IDEAL SITUATION,
IF POSSIBLE, WOULD BE TO FIRST TEST A KNOWN GOOD MODULE.

11.0 SCOPE LOOPING

* THE MODULE ADDRESS IS INTERPRETTED AS AN OCTAL VALUE.

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EACH MODULE ADDRESS TEST PROGRAM IS COMPRISED OF ANY NUMBER OF INDIVIDUAL SUBTESTS. WHEN A MODULE PROGRAM IS RUN THESE SUBTESTS ARE RUN AS A WHOLE, OTHERWISE, WHEN ONE SUBTEST FINISHES THE NEXT SUBTEST IS EXECUTED.

THERE ARE TWO WAYS OF RUNNING ANY SELECTED SUBTEST; THE USER MAY RUN THE 'SUBX' ROUTINE (REFER TO SECTION 13.1) OR RUN THROUGH THE ENTIRE MODULE PROGRAM UNTIL THE SELECTED SUBTEST IS REACHED. IF THE LATTER METHOD IS USED, LOAD THE NUMBER OF THE SUBTEST TO BE LOOPE IN THE CONSOLE SWITCH REGISTER AND START THE MODULE PROGRAM. THE PROGRAM WILL TYPE 'SCOPE BREAK AT XXX' WHEN THE SUBTEST IS REACHED. NOW SET CONSOLE SWITCH '14' TO LOOP ON THE CURRENT SUBTEST AND THEN TYPE 'CR'. THE PROGRAM WILL THEN RUN THE SELECTED SUBTEST UNTIL SWITCH '14' IS RESET TO '0' ENABLING THE PROGRAM TO CONTINUE.

12.0 MODULE TEST PROGRAMS

THE FOLLOWING IS A LIST AND DESCRIPTION OF ALL THE MODULE PROGRAMS. IT SHOULD BE NOTED THAT IN THE PROGRAM TEST PROTOCOL EACH MODULE PROGRAM ENDS WITH A LETTER. THIS LETTER INDICATES THE TYPE OF TEST; A = ADDRESSING, C = CALIBRATION*, E = EXERCISER, G = GAIN*, I = INTERFACE, R = REPEATIBILITY*.

THE MODULE ADDRESS TEST SHOULD BE RUN AND PROVED FULLY OPERATIONAL BEFORE RUNNING ANY OF THE OTHER TESTS. THIS TEST VERIFIES THAT THE MODULE CAN BE ADDRESSED AND THAT IT WORKS 'FUNCTIONALLY' IN ALL ITS INTENDED DATA MODES.

THE USER SHOULD REFER TO THE ENGINEERING SPECIFICATIONS TO VERIFY THAT THE SWITCHES AND JUMPERS ARE SET UP CORRECTLY BEFORE RUNNING ANY TESTS.

12.1. M7380A, CONTROL MODULE TEST

THIS PROGRAM TAKES THE CONTROL MODULE THRU THE INITIALIZATION, ADDRESS AND DATA MODES RESPECTIVELY. INITIALLY, TWO PROGRAMS ARE STORED IN THE CONTROL MODULE 'FIFO'. THE SECOND PROGRAM IS HEADED WITH A 'DC4' SO IT WILL NOT BE RECIRCULATED. WITH THE FIRST PROGRAM IN THE DATA MODE, A '500' WORD RANDOM DATA BUFFER IS CIRCULATED THRU THE CONTROL MODULE. AFTER VERIFYING THE DATA, AN 'EOT' IS ISSUED. THIS ENABLES THE SECOND PROGRAM TO BE CALLED OUT. THE DATA MODE IS AGAIN CHECKED AND ANOTHER 'EOT' IS ISSUED ENABLING THE FIRST PROGRAM IS BE RE-CALLED. ONCE VERIFIED, ANOTHER 'EOT' IS ISSUED. A CHECK IS THEN MADE THAT THE SECOND PROGRAM, HEADED WITH A 'DC4', NO LONGER EXISTS. THE 'FIFO' IS THEN REPROGRAMMED.

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* APPLY TO THE A/D MODULE ONLY.

THIS PROGRAM CONSISTS OF '64' CHARACTERS ENABLING THE CONTROL 'FIFO' TO BE COMPLETELY FILLED. THE PROGRAM CONSISTS OF ONE SOURCE AND ONE DESTINATION ADDRESS. THE REMAINING 55 LOCATIONS ARE FILLED WITH RANDOM LITERAL CHARACTERS. THE PROGRAM IS THEN CALLED OUT AND VERIFIED.

THE LAST TEST CHECKS THE DELAY TIMES OF THE 'SYN' CHARACTER. THIS TEST REQUIRES A '110 BAUD' CONSOLE DEVICE SUCH AS A 'TTY' IN ORDER TO RUN. THE CRYSTAL CLOCK IN THE TTY IS USED TO TIME THE 'SYN' DELAYS. IF THE CONSOLE DEVICE IS NOT AVAILABLE, THIS TEST WILL NOT PASS. ALL THE DELAYS, 1-9, ARE TESTED IN ORDER. THE TESTS MAKES TWO CHECKS AT EACH DELAY. FIRST, THAT THE DELAY ISN'T TOO SHORT AND SECOND, THAT THE DELAY ISN'T TOO LONG.

THIS COMPLETES THE CONTROL MODULE TESTS. HOWEVER, IF DATA SW10 IS SET THE PROGRAM WILL ALSO TEST THE M7387 HARDWARE READIN MODULE (1). OTHERWISE, THE MESSAGE 'TEST COMPLETE' IS PRINTED AND THE PROGRAM WILL CONTINUE TO CYCLE THRU THE CONTROL TEST UNTIL STOPPED.

1. M7387, HARDWARE READ-IN MODULE

AS MENTIONED ABOVE, THIS TEST IS RUN IN CONJUNCTION WITH THE M7380A TEST. THE TEST REQUIRES THE USER TO INSERT THE M7387 MODULE WITH A DIAGNOSTIC 'PROM' PROGRAM INTO SLOT 'P5' OF THE MOTHER BOARD.

AFTER THE MODULE HAS BEEN INSERTED, THE PDM70 SHOULD BE POWERED UP. THIS WILL ENABLE THE PROM PROGRAM TO BE READ OUT, STORED IN THE CONTROL MODULES FIFO, AND THEN EXECUTED.

THE PROM PROGRAM IS SETUP TO ADDRESS THE SERIAL I/O DESTINATION MODULE AND THEN SEND LITERAL DATA. AFTER VERIFYING THE DATA, THE MESSAGE "PROM OK" IS TYPED. IF THIS MESSAGE IS NOT TYPED IMMEDIATELY AFTER POWER UP, NO DATA WAS EVER RECEIVED, THUS INDICATING AN ERROR CONDITION.

12.2. M7381A, BCD INPUT MODULE ADDRESS TEST

THIS TEST ADDRESSES THE 'BCD' MODULE IN ALL FOUR(4) DATA MODES VERIFYING INTERNAL AND EXTERNAL DEVICE FLAG OPERATION. IT IS SUGGESTED THAT THE M7381E TEST SHOULD BE RUN IF ANY DATA ERRORS ARE REPORTED. HERE THE USER CAN READILY IDENTIFY THE DATA ERROR BY THE TYPEOUT. THE CUSTOMER SWITCHES (WHICH SELECT HOW MANY DIGITS ARE READ) ARE TESTED BY THE PROGRAM REQUESTING UNIQUE SWITCH SETTINGS. SETTING DATA 'SW10' WILL INHIBIT THE MANUAL INTERVENTION TESTS. THIS MODULE HAS TO BE TESTED WITH THE 'L' JUMPER OUT.

12.3. M7381E, BCD INPUT MODULE EXERCISER TEST

THIS PROGRAM CONTINUOUSLY LOOPS ADDRESSING THE BCD MODULE AND PRINTING THE RECEIVED DATA. DATA SWITCHES '0 & 1' ARE USED TO SELECT ANY ONE OF THE FOUR (4) 'BCD' DATA MODES. THE SWITCH SETTINGS MAY BE SET AND RESET ANY TIME. DATA SW13 CAN ALSO BE SET TO INHIBIT THE DATA PRINTOUT.

12.4. M7382A, BCD OUTPUT MODULE ADDRESSING TEST

THIS TEST IS COMPRISED OF A SERIES OF SUBTESTS WHICH OUTPUT KNOWN DATA TO THE 'BCD' OUTPUT MODULE. ONCE THE DATA IS TRANSMITTED, THE USER IS NOTIFIED OF THE TRANSMITTED PATTERN. THE PROGRAM THEN ENTERS THE 'WAIT' MODE ENABLING THE USER TO VERIFY THE DATA.

THE LAST SUBTEST REQUESTS FOR THE USER TO SCOPE FOR THE SIGNAL 'OUTPUT DONE H & L'. THE PROGRAM WILL INDEFINITELY HANG IN THIS SUBTEST UNTIL EITHER '↑R' IS TYPED TO RESTART THE M7382A TEST OR '↑C' IS TYPED TO RETURN TO THE MONITOR.

12.5. BCD I/O TEST

THIS IS AN EXERCISE TEST UTILIZING BOTH THE BCD 'INPUT & OUTPUT' MODULES. AN INCREMENTING BCD COUNT IS SENT TO THE OUTPUT MODULE AND WRAPPED AROUND VIA A SPECIAL CABLE TO THE INPUT MODULE. THE INPUT MODULE IS THEN ADDRESSED, ENABLING THE DATA TO BE READ. THE RECEIVED DATA IS VERIFIED AGAINST THE TRANSMITTED DATA. THIS TEST VERIFIES THAT ALL DATA LINES ARE GOOD AND THAT NO TWO LINES ARE SHORTED TOGETHER.

THE INPUT MODULE CAN BE SET UP TO USE EITHER INTERNAL OR EXTERNAL SYNC. IF EXTERNAL SYNC IS SELECTED, THE SYNC SIGNAL IS SUPPLIED FROM THE BCD OUTPUT MODULE VIA THE CABLE.

12.6. M7383A, A/D MODULE ADDRESS TEST

THIS TEST ADDRESSES THE A/D MODULE AND VERIFIES THE CORRECT DATA FORMAT IS RECEIVED FROM THE MODULE. THE EXTERNAL SYNC FUNCTION IS ALSO TESTED. IT SHOULD BE NOTED THAT THIS TEST MAKES NO ATTEMPT TO VERIFY WHETHER OR NOT THE A/D IS CONVERTING THE CORRECT VALUES.

12.7. M7383C, A/D CALIBRATION ROUTINE

THIS TEST RUNS IN A CONTINUOUS LOOP ADDRESSING THE A/D MODULE AND

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PRINTING THE CONVERSION VALUE. AFTER ACCEPTING THE MODULE
ADDRESS, THE PROGRAM TYPES "REMOTE DST.". THIS IS AN OPTION

WHICH ENABLES THE USER TO SEND THE CONVERSION DATA TO A USER SELECTED DESTINATION, SUCH AS THE DISPLAY. IF THIS OPTION IS DESIRED, TYPE 'YES' OR 'Y' & 'CR'. A REQUEST WILL THEN MADE FOR THE ADDRESS OF THIS DESTINATION. DATA SWITCHES '0-3' ARE USED TO SELECT THE A/D CHANNEL TO BE CONVERTED. SETTING DATA SW13 WILL INHIBIT THE CONVERSION DATA PRINTOUT. ALL DATA SWITCHES MAY BE SET OR RESET AT ANY TIME.

CHANNEL SELECTION IS AS FOLLOWS:

DATA SW'S '0-1' SELECT 'INT. SYNC' ON CH.'S 0,1,2 OR 3
DATA SW'S '2' & '0-1' SELECT 'EXT SYNC' ON CH.'S 0,1,2 OR 3
DATA SW '3' SELECTS 'INT SYNC' CONVERSION ON ALL '4' CH.'S
DATA SW'S '233' SELECT 'EXT. SYNC' CONVERSION ON ALL '4' CH.'S

12.9. M7383G, A/D GAIN ACCURACY TEST

THIS TEST IS USED TO TEST THE GAIN ACCURACY OF THE A/D. FIVE SPECIFIC VOLTAGES AT A GAIN OF "1" ARE REQUESTED BY THE PROGRAM. WHEN THE VOLTAGE AND GAIN HAVE BEEN SUPPLIED, TYPE 'CR'. A SERIES OF ONE HUNDRED CONVERSIONS ARE THEN TAKEN AND AVERAGED. THIS AVERAGE IS THEN TESTED TO BE WITHIN '+ OR -' ONE COUNT FROM THE TRUE VOLTAGE VALUE FOR THAT SPECIFIED SETTING. IF IT IS NOT, THE LOW, AVERAGE AND HIGH VALUES OBTAINED ON THAT PARTICULAR GROUP OF CONVERSIONS ARE TYPED OUT. THE PROGRAM WILL THEN TAKE ANOTHER SERIES OF CONVERSIONS AND WILL CONTINUE DOING SO, UNTIL THE CORRECT VALUE IS RECEIVED. AT THAT POINT THE PROGRAM WILL REQUEST A NEW SETTING. DATA SWITCH '13' CAN BE SET TO INHIBIT THE ERROR DATA PRINTOUT.

12.9. M7383R, A/D REPEATIBILITY TEST

THIS TEST TAKES A SERIES OF ONE HUNDRED CONVERSIONS ON A USER SELECTED CHANNEL. THE CONVERSIONS ARE AVERAGED AND THEN DISPLAYED IN A GRAPH FORMAT SHOWING THE REPEATIBILITY CHARACTERISTICS OF THE A/D. AFTER ACCEPTING THE MODULE ADDRESS, THE PROGRAM TYPES "REMOTE DST.". THIS IS A OPTION WHICH ENABLES THE USER TO SEND THE COMPUTED A/D GRAPH TO A USER SELECTED DESTINATION. IF THIS OPTION IS DESIRED, TYPE 'YES' OR 'Y' & 'CR'. A REQUEST WILL THEN BE MADE FOR THE ADDRESS OF THE DESTINATION. WHEN STARTED, THE TEST REQUESTS A CHANNEL AND V.S.F (VERTICAL SCALE FACTOR). THE V.S.F. IS THE NUMBER OF CONVERSIONS OF THE HUNDRED, TO BE AVERAGED TOGETHER TO REPRESENT ONE POINT ON THE GRAPH. THE V.S.F. CAN BE ANY NUMBER EVENLY DIVIDED INTO ONE HUNDRED. EACH POINT (REPRESENTED AS AN ASTRICK) IS PLOTTED IN ITS RELATIONSHIP TO THE OVERALL AVERAGE OF THE HUNDRED CONVERSIONS. THE FOLLOWING IS AN EXAMPLE OF WHAT A GRAPH PRINTOUT MIGHT LOOK LIKE USING A V.S.F. OF 10: 10 POINTS, EACH REPRESENTING THE AVERAGE OF '10' CONVERSIONS.

EXAMPLE:

VSF? 10
CH.? 1

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+++++ (SCALE=1MV/DIV)
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THE THREE NUMBERS AT THE BOTTOM OF THE SCALE (RIGHT TO LEFT) REPRESENT: THE LOWEST VALUE, THE OVERALL AVERAGE AND THE HIGHEST VALUE READ OF THE ONE HUNDRED CONVERSIONS. SINCE THE GRAPH ONLY SHOWS COUNTS '+ & -' 9 COUNTS FROM THE AVERAGE, AN OVERRANGE 'HI & LO' PRINTOUT WOULD RESULT IF ANY COUNTS FALL OUT OF THE 9 COUNT RANGE.

12.10. M7384A, D/A ADDRESSING TEST

THIS TEST STARTS BY ADDRESSING THE DIA MODULE USING MODES '8 & 9'. THE USER IS THEN REQUESTED TO SCOPE THE SIGNALS PROG 'L & H'. FIVE SPECIFIC VOLTAGE ARE THEN TRANSMITTED FROM THE D/A ON EACH CHANNEL. AFTER EACH VOLTAGE IS TRANSMITTED, A MESSAGE IS TYPED TELLING THE USER THE VOLTAGE AND CHANNEL. THE LAST SUBTEST CHECKS THE RECOVERY OF THE D/A. THIS IS DONE BY CONTINUOUSLY ADDRESSING THE DAC IN MODE 3 (BOTH CHANNELS). THE PROGRAM THEN ALTERNATLY OUTPUTS '0' VOLTS AND '9.5' VOLTS. THIS ENABLES A SQUARE WAVE OUTPUT FROM THE D/A. THE USER IS REQUESTED TO SCOPE BOTH CHANNEL OUTPUTS AND CHECK FOR A 5 U SECOND. RISE TIME.

THE PROGRAM WILL INDEFINITELY HANG IN THIS SUBTEST UNTIL RESTARTED OR EXITED.

12.11. M7384E, D/A EXERCISER TEST

THIS TEST ENABLES ANY USER SELECTED VALUE TO BE TRANSMITTED FROM THE D/A. WHEN SELECTED, THE TEST REQUESTS FOR TWO, THREE DIGIT VALUES (SEPARATED VIA COMMA'S) TO BE TYPED IN. THE FIRST VALUE IS THE ONLY ONE TRANSMITTED WHEN RUNNING ONE CHANNEL. IF BOTH CHANNELS ARE SELECTED, THE FIRST VALUE WILL BE TRANSMITTED ON

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CHANNEL '0' (X DAC) AND THE SECOND VALUE WILL BE TRANSMITTED ON
CHANNEL '1' (Y DAC). THE CHANNELS ARE SELECTED BY DATA SWITCHES

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'0 & 1' AND CAN BE SET AND RESET AT ANYTIME. SETTING DATA SWITCH '0' WILL SELECT CHANNEL 'C'. SETTING DATA SWITCH '1' WILL SELECT CHANNEL 1 AND SETTING BOTH '0 & 1' WILL SELECT BOTH CHANNELS.

TYPING A '1R' WILL ENABLE FOR A NEW SET OF DAC VALUES TO BE ACCEPTED.

12.12. M7385A, SERIAL I/O ADDRESS TEST

THIS TEST CHECKS BOTH THE SOURCE AND DESTINATION PARTS OF THE SERIAL I/O. BY USING A SPECIAL WRAPPING CABLE, THE DESTINATION OUTPUTS TO THE SOURCE INPUT.

BEFORE TESTING, ALL 'ACTIVE' RECEIVER JUMPERS MUST BE INSERTED AND THE 'D' & 'L' 'MR' JUMPERS MUST BE OUT.

THIS TEST CHECKS ONLY THE 'EIA' OUTPUT OF THE MODULE. REFER TO THE M7385T TEST (12.14) FOR TESTING THE "TTY" OUTPUT LOGIC.

IT SHOULD BE NOTED THAT WHEN THIS TEST IS RUN USING THE SERIAL I/O INPUT OPTION, THAT ONLY SUBTESTS "1, 5 & 10" ARE EXECUTED. THIS MEANS THE TESTING ISN'T TESTED AS IT IS WHEN USING THE DF11 INTERFACE.

IT SHOULD ALSO BE NOTED THAT WHEN THE SERIAL INPUT OPTION IS USED, SUBTEST 5 RETURNS ONE HUNDRED AND TWENTY EIGHT CHARACTERS (128) TO THE DL11 RECEIVER INSTEAD OF "64". THE FIRST "64" CHARACTERS OF THE BUFFER ARE RETURNED DIRECTLY FROM THE DESTINATION OF THE SERIAL INPUT MODULE. THE SECOND "64" CHARACTERS ARE THE CHARACTERS THAT WERE ACTUALLY BUFFERED IN THE "FIFO" OF THE MODULE UNDER TEST.

12.13. M7385I, SERIAL I/O INTERFACE MODULE TEST

THIS TEST IS INTENDED TO VERIFY THAT THE SERIAL I/O MODULE USED AS THE PDP-11 INTERFACE IS FUNCTIONING CORRECTLY. THIS IS DONE BY REMOVING THE M7380 CONTROL MODULE (THUS ELIMINATING ONE UNKNOWN) AND JUMPERING THE 'T & R' BUSES (F101 TO F102) TOGETHER. THE MODULE MUST HAVE THE 'D' JUMPER OUT AND THE 'L' JUMPER IN SO THAT IT IS INITIALIZED ON POWER UP. A PROGRAM IS THEN SENT TO ADDRESS THE DESTINATION PORTION OF THE MODULE. WHEN THIS TEST HAS BEEN RUN SUCCESSFULLY, THE CONTROL MODULE CAN BE RE-INSERTED AND VERIFIED BY RUNNING THE M7380A TEST (12.1).D

12.14. M7385T, SERIAL I/O TTL TEST

THIS TEST VERIFIES THAT THE TTL I/O SECTION OF THE SERIAL I/O

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MODULE IS FUNCTIONING CORRECTLY. IT REQUIRES THAT A TELEPRINTER
BE CABLED TO THE MATIN LOCK OF THE SERIAL I/O. THIS COULD BE THE

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CONSOLE PRINTER ONCE THE TEST IS SELECTED. IF THE CONSOLE PRINTER IS USED, THE PROGRAM SHOULD BE HALTED BEFORE DISCONNECTING THE PRINTER AND THEN RE-STARTED AT THE 'TTLIST' ADDRESS. ALL CHARACTERS THEN TRANSMITTED WILL BE RECEIVED BY THE SERIAL SOURCE AND WRAPPED AROUND (BY THE CONTROL MODULE OR COMPUTER IF THE DF11 IS USED) TO THE DESTINATION. HERE THE CHARACTER WILL BE TRANSMITTED BACK TO THE TELEPRINTER AND PRINTED. EFFECTIVELY AS FOR AS THE USER IS CONCERNED, THIS TEST ACTS LIKE A KEYBOARD ECHO TEST.

12.15. M7386A, KEYBOARD/DISPLAY MODULE ADDRESS TEST

IN ORDER TO RUN THIS TEST, THE "W1" JUMPER MUST BE OUT. THE FIRST SUBTEST ADDRESSES THE KEYBOARD AND CHECKS FOR THE FORCED RETURN OF THE "EOT".

THE SECOND SUBTEST RUNS IN A CONTINUOUS LOOP ADDRESSING BOTH THE KEYBOARD & DISPLAY. WHEN THE USER STRIKES "KEY REQUEST", THE KEYBOARD BECOMES BUS MASTER. ALL DATA THEN TRANSMITTED FROM THE KEYBOARD IS SENT TO THE DISPLAY (IF AVAILABLE). THIS DATA IS ALSO RECEIVED BY THE PDP-11 AND PRINTED.

IF "EOT" IS STRUCK, THE KEYBOARD RELEASES THE BUS AND THE PROGRAM IS AGAIN LOOPED UNTIL THE NEXT "KEY REQUEST".

IF "STX" IS STRUCK AND THE SERIAL INPUT OPTION IS BEING USED, THE MESSAGE "RE-INITIALIZE THE PDM70" IS PRINTED. THE PROGRAM THEN ENTERS THE "WAIT MODE" AND UPON RECEIVING A "CR", WILL BEGIN RE-CYCLING THE SUBTEST.

IF "ETX" IS STRUCK, THIS SUBTEST IS EXITED, AND THE NEXT SUBTEST IS ENTERED. UPON ENTERING THE NEXT SUBTEST, THE MESSAGE "ENTERING THE DISPLAY TEST, RE-INITIALIZE THE PDM70" IS PRINTED. THE PROGRAM THEN ENTERS THE "WAIT MODE" AND WAITS FOR "CR". UPON RECEIPT OF THE "CR" THE SUBTEST STARTS DISPLAYING THE ENTIRE CHARACTER SET, ON CHARACTER AT A TIME ACROSS THE ENTIRE SCREEN. AFTER EACH CHARACTER IS DISPLAYED, A SOFTWARE DELAY IS EXECUTED. THIS DELAY ENABLES THE USER TO VIEW THE LINE BEFORE THE NEXT CHARACTER LINE IS DISPLAYED. AFTER THE ENTIRE CHARACTER SET HAS BEEN DISPLAYED, THE TEST ENTIRE TEST PROGRAM IS RESTARTED.

12.16. M7387A, PROM HARDWARE READ-IN MODULE

THIS PROGRAM MAY BE SELECTED AS A SEPERATE MODULE TEST. ALTHOUGH IT IS RUN AS PART OF THE M7380 CONTROL MODULE TEST. REFER TO PART 1 OF SECTION 12.1 FOR A COMPLETE TEST DESCRIPTION.

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* REFERENCE THE LISTING FOR THE ADDRESS OF THIS 'TAG'.

12.17. M7388A, CHARACTER I/O MODULE ADDRESS (IN-HOUSE) TEST

THIS TEST REQUIRES A SPECIAL WRAP-AROUND MODULE (AVAILABLE ONLY IN HOUSE) TO RUN THIS TEST. FOR FIELD TESTING THIS MODULE REFER TO THE M7388F (SECTION 12.18).

THE TEST USES THE SAME TEST PROGRAM AS THE SERIAL I/O MODULE (REFER TO SECTION 12.12). TO RUN THIS TEST, JUMPERS 'SO & SI' MUST BE IN AND THE 'D' & 'L' JUMPERS MUST BE OUT.

12.18 M7388F, CHARACTER I/O MODULE ADDRESS (FIELD) TEST.

THIS PROGRAM IS DESIGNED TO COMMUNICATE WITH THE FIELD SERVICE TESTER. THE FIRST SUBTEST ADDRESS THE MODULE IN MODE '0' AND CHECKS FOR THE FORCED 'EOT'. THE NEXT SUBTEST ADDRESS THE MODULE IN MODE '1' AND CHECKS THAT NO 'EOT' IS RETURNED. A REQUEST IS THEN MADE FOR THE USER TO INPUT DATA (VIA THE TESTER) TO THE MODULE. AS EACH CHARACTER IS RECEIVED, IT IS ECHOED TO PRINTER. THE PROGRAM WILL HANG IN THIS SUBTEST UNTIL 'EOT' IS RECEIVED, ENABLING IT TO ENTER THE NEXT SUBTEST. THE NEXT SUBTEST IS A 'FIFO' STORAGE TEST. IT REQUESTS FOR THE USER TO INPUT DATA (UP TO 63 CHARACTERS) AND AN 'EOT'. AFTER ALL THE DATA HAS BEEN TRANSMITTED, TYPE 'CR'. THE MODULE (SOURCE) IS THEN ADDRESSED IN MODE '0' ENABLING THE 'FIFO' DATA TO BE READ AND PRINTED.

THE NEXT SUBTEST LOADS "16", "4" CHARACTER DATA PATTERNS (A TOTAL OF 64 CHAR.'S) INTO THE DESTINATION 'FIFO'. THE USER IS THEN REQUESTED TO STROKE OUT THESE "64" CHARACTERS AND VERIFY THEM. THE "4" CHARACTERS PATTERN IS: ALL 1'S, ALLO'S, ALTERNATE "1'S & 0'S" AND REVERSED ALTERNATE "1'S & 0'S".

THE LAST SUBTEST ADDRESSES THE MODULE USING ALL THE WRONG MODULE ADDRESSES AND CHECKS THAT THE SOURCE ISN'T ENABLED. THIS SUBTEST IS NOT EXECUTED WHEN USING THE SERIAL INPUT OPTION.

12.19 M7377A, REMOTE SERIAL I/O TEST

THIS PROGRAM TESTS THE M7377 MODULE USING THE PDP-11 VIA THE DL-11 AS THE DESTINATION INPUT AND SOURCE OUTPUT.

THE FIRST SUBTEST ADDRESSES THE SOURCE PORTION OF THE MODULE AND CHECKS FOR FORCED RETURN OF EOT.

THE SECOND SUBTEST TRANSMITS A RANDOM BUFFER AND CHECKS THAT IT IS RETURNED CORRECTLY.

IN THE NEXT SUBTEST A 2ND RANDOM BUFFER IS TRANSMITTED AND THE VARIABLE TERMINATOR OPTION IS CHECKED.

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NEXT, THE SOURCE IS THEN ADDRESSED USING THE WRONG MODULE
ADDRESSES AND CHECKED TO MAKE SURE IT DOESN'T BECOME ENABLED.

ETX AND STX ARE THEN USED TO VERIFY THAT ETX WILL CLEAR THE SOURCE AND STX WILL CLEAR THE DESTINATION.

A MANUAL INTERVENTION SUBTEST THEN REQUESTS THAT THE OPERATOR RESET THE MODULE ADDRESS TO '17'. DATA IS TRANSMITTED AND THE RECEIVED DATA IS VERIFIED.

THE LAST SUBTEST CHECKS THE TIMEOUT AND REMOTE TIMEOUT ABILITY OF THE MODULE. A NON-EXISTENT SOURCE IS ADDRESSED AND THE MODULE IS CHECKED TO SEE IF IT TIME-OUT CORRECTLY.

12.20 M7378A, FOUNDATION MODULE TEST

THIS TEST SETS THE SERIAL I/O UP AS A SOURCE AND THE FOUNDATION MODULE AS A DESTINATION. A RANDOM BUFFER IS TRANSMITTED TO THE FOUNDATION MODULE VIA THE SERIAL I/O. THEN THE FOUNDATION MODULE IS ADDRESSED AS THE SOURCE AND THE SERIAL I/O IS ADDRESSED AS THE DESTINATION. THE DATA SHOULD BE RETURNED VIA THE "WRAP-AROUND" CABLE FROM THE FOUNDATION MODULE TO THE SERIAL I/O.

IT SHOULD BE NOTED THAT THE PDM-70 MUST BE LOADED WITH THE FOLLOWING PROGRAM TO RUN THIS TEST:

STX, DC1, 8, SOH, 1, DC3, ETX

THE NEXT SUBTESTS VERIFY THAT ADDRESS '17' WILL RETURN DATA CORRECTLY, THAT THE WRONG ADDRESSES WILL NOT RETURN DATA, AND THAT THE CUSTOMER DEFINED MODE FLIP FLOP WORKS CORRECTLY.

13.0 USER AID ROUTINES

13.1. SUBX

THIS ROUTINE ENABLES THE USER TO RUN ANY SELECTED MODULE ADDRESS SUBTEST WITHOUT RUNNING THE ENTIRE PROGRAM. WHEN 'SUBX' IS SELECTED IT ASKS FOR THE 'MEMORY ADDRESS' OF THE SUBTEST TO BE EXECUTED. THIS IS TO BE THE ADDRESS OF THE 'SCOPE' ARGUMENT BEGINNING THAT SUBTEST. IF A 'SUBX' ADDRESS HAD PREVIOUSLY BEEN SET UP, THE USER CAN SIMPLY TYPE 'CR' AND THE PREVIOUSLY SELECTED TEST WILL BE RE-ENTERED.

13.2. RECBUF

THIS ROUTINE ENABLES THE USER TO EXAMINE THE CONTENTS OF THE DL11'S RECEIVER BUFFER. WHEN SELECTED, THIS ROUTINE PRINTS THE

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CONTENTS OF THE BUFFER IN THE ORDER IT WAS RECEIVED. IF THE
BUFFER IS EMPTY, A MESSAGE IS TYPED TO THAT EFFECT.

IT SHOULD BE NOTED THAT ALL DATA RECEIVED FROM THE PDM70 IS STORED IN THIS BUFFER.

13.3. TRNBUF

THIS ROUTINE ENABLES THE USER TO EXAMINE THE DATA TRANSMITTED VIA THE DL11 TO THE PDM70. THE 'RECBUF' & 'TRNBUF' ROUTINES ARE ESPECIALLY USEFUL IN TRACKING DOWN A DATA FAILURE. BY COMPARING THE TWO BUFFERS, THE USER CAN SEE EXACTLY WHERE THE FAILURE OCCURRED AND PICK OUT ANY DESIRED DATA PATTERNS.

13.4. SEND

THIS ROUTINE ENABLES THE USER TO SEND HIS OWN PROGRAM TO THE PDM70. WHEN 'SEND' IS SELECTED AN ASTERISK IS PRINTED TO INDICATE THAT THE ROUTINE IS READY TO ACCEPT INPUT. AS EACH CHARACTER IS RECEIVED IT IS ECHOED BACK TO THE TELEPRINTER AND TRANSMITTED TO THE PDM70.

THIS ROUTINE IS RUN WITH THE DL11 RECEIVER ENABLED. THIS MEANS THAT THE USER CAN USE THE 'RECBUF' ROUTINE TO EXAMINE FOR ANY DATA RETURNED BY HIS PROGRAM.

13.5. RUN

THIS ROUTINE IS USED IN CONJUNCTION WITH THE SEND ROUTINE. WHEN 'RUN' IS SELECTED, IT WILL RE-TRANSMIT THE USER'S 'SEND' PROGRAM. IF THE SERIAL INPUT OPTION IS BEING USED, THE 'SEND' PROGRAM IS TRANSMITTED AND THEN THE PROGRAM ENTERS THE 'WAIT' MODE. IF THE SERIAL INPUT OPTION IS NOT BEING USED, THE SEND PROGRAM IS CONTINUOUSLY TRANSMITTED. IN THIS CASE, THE CONSOLE SWITCHES CAN BE USED TO INCORPORATE A DELAY TIME BEFORE THE PROGRAM IS RE-TRANSMITTED. NO PROGRAM DELAY IS ISSUED WITH ALL DATA SWITCHES DOWN. ALL DATA SWITCHES UP (EXCEPT 11 & 12)* REPRESENT A MAXIMUM PROGRAM DELAY. THE USERS SEND PROGRAM CAN BE EXAMINED AT ANYTIME BY USING THE 'TRNBUF' ROUTINE.

'CONTROL C' WHICH IS NORMALLY USED TO RETURN TO THE MONITOR IS ECHOED AND TRANSMITTED AS AN 'ETX'. SO IN THE SEND ROUTINE, 'CONTROL E' IS USED TO ESCAPE AND RETURN TO THE MONITOR.

* REFER TO CONSOLE SWITCH SETTINGS (SECTION 6.) FOR SPECIFIC SWITCH

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FUNCTIONS.

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.TITLE PDM70 DIAGNOSTIC TEST
.ENABLE ABS
.ENABLE AMA

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:MAINDC-11-DZPMA-A-D
:COPYRIGHT JANUARY 7, 1974
:REVISED: SEPTEMBER 20, 1974
:DIGITAL EQUIPMENT CORP. MAYNARD MASS. 01754
:PROGRAMMER: EARL L. BOUSE
: MIKE MITCHELL

```

:SWITCH REGISTER DEFINITIONS AND FUNCTIONS:

100000	SW15=100000	: =1. CONTINUE ON ERROR
040000	SW14=40000	: =1. LOOP ON CURRENT TEST
020000	SW13=20000	: =1. SUPPRESS ERROR TYPEOUT
010000	SW12=10000	: =1. SINGLE STEP DL11 OUTPUT DATA.
004000	SW11=4000	: =1. TRANSMIT SAME CHARACTER.
002000	SW10=2000	: =1. INHIBIT MANUAL INTERVENTION
001000	SW09=1000	: =1. INHIBIT TRANSMITTER DELAY
000400	SW08=400	
000200	SW07=200	
000100	SW06=100	
000040	SW05=40	
000020	SW04=20	
000010	SW03=10	
000004	SW02=4	

:REGISTER DEFINITIONS

000000	R0=%0
000001	R1=%1
000002	R2=%2
000003	R3=%3
000004	R4=%4
000005	R5=%5
000006	SP=%6
000007	PC=%7

:INSTRUCTIONS DEFINITIONS

005746	PUSH.P=5746
005726	POP1SP=5726
024646	PUSH2SP=24646
022626	POP2SP=22626
000240	POP=240
000002	X=
000002	Y=2

.S3TTL ***** NOTES *****

:NOTES:

:PDM-70 MUST BE CLEARED BEFORE RUNNING ANY TEST.

:ON POWERUP, THE FIFO IS GENERALLY CLEARED (UNLESS "N" MODULE IS PRESENT).
 :IF, DURING THE COURSE OF RUNNING THIS DIAGNOSTIC, IT BECOMES
 :NECESSARY TO RESTART A SUBTEST (FOR EXAMPLE, AFTER ENCOUNTERING AN ERROR),
 :THE PDM70 FIFO SHOULD BE CLEARED OUT TO INSURE THAT GARBAGE WILL
 :NOT ACCIDENTLY BE LEFT IN THE FIFO WHICH WOULD SUBSEQUENTLY
 :GIVE AN ERRONOUS DATA ERROR.

:MODULE SETUP:

 :MODULE UNDER TEST *M7379(CLOCK) * M7379 (CLOCK) *

 : *M973 (CABLE) * M598 (COUPLER) *

:SYSTEM TEST SETUP (USING SERIAL I/O)

 :MODULE UNDER TEST * M7379 (CLOCK) * M7379 *

 : *M7380 (CONTROL MODULE) *

 : SERIAL I/O CABLE *

:NOTE: JUMPER "L" SHOULD BE IN TO ALLOW POWER UP TO ACCESS THE CONTROL MODULE.

```

1038          :LOAD TRAP ADDRESSES 'J-1000' WITH THE 'JOT' TRAP
1039          000000          .=0
1040          .REPT          200
1041          .+2
1042          4
1043          .ENDR
1044          .=20
1045          000020          020220          ERTRAP          ;ERROR TRAP REPORTER ROUTINE.
1046          000022          000340          340
1047          000024          022454          PWRFAL          ;POWER FAIL HANDLER
1048          000026          000340          340
1049          .=30
1050          000030          001200          EMTSRV          ;EMT TRAP, EMT DISPATCH SERVICE
1051          000032          000340          340
1052          .=60
1053          000060          014522          XTYYIN          ;TELEPRINTER KEYBOARD ROUTINE
1054          000062          000340          340
1055          .=200
1056          000200          000137          CO1375          JMP          MONITR          ;PROGRAM KEYBOARD MONITOR ROUTINE.

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.SB*TL EMT TRAP EQUIVALENCE TABLE

1060	104000	PRCNTR=EMT	;SUBROUTINE TO PRINT CONTROL CHARACTER IN R1
1061	104001	SCOPE=EMT+1	;LOGIC TEST SCOPE SUBROUTINE
1062	104002	SAVREG=EMT+2	;SUBROUTINE TO SAVE 'R0-R5' ON STACK
1063	104003	GETREG=EMT+3	;SUBROUTINE TO GET 'R0-R5' FROM STACK
1064	104004	DELAY=EMT+4	;SUBROUTINE TO WAIT FOR DL11 RECV.
1065	104005	RECVRO=EMT+5	;SUBROUTINE TO SET UP THE DL11 O'S RECEIVER.
1066	104006	LDCHRO=EMT+6	;SUBROUTINE TO TRANSMIT A SINGLE CHAR. VIA DL 'O'
1067	104007	LDPGMO=EMT+7	;SUBROUTINE TO TRANSMIT THE DATA IN CALL+2 VIA DL 'O'
1068	104010	TYPEIT=EMT+10	;SUBROUTINE TO PRINT CHARACTER IN 'R1'
1069	104011	RANDOM=EMT+11	;SUBROUTINE TO CREATE A RANDOM DATA BUFFER.
1070	104012	PRINT=EMT+12	;SUBROUTINE TO PRINT ASCII MESSAGES.
1071	104013	TTYIN=EMT+13	;SUBROUTINE TO INPUT VIA KEYBOARD
1072	104014	PRTOCT=EMT+14	;SUBROUTINE TO PRINT A 6 DIGIT OCTAL NO.
1073	104015	ASEMBL=EMT+15	;SUBROUTINE TO ASSEMBLE CHARACTERS INTO OCTAL VALUE
1074	104016	SPACE=EMT+16	;SUBROUTINE TO PRINT SPACES
1075	104017	TSTTKS=EMT+17	;SUBROUTINE TO TEST FOR KEYBOARD FLAGS
1076	104020	DELAYL=EMT+20	;SUBROUTINE TO SETUP A LONG DISPLAY DELAY
1077	104021	NULL=EMT+21	;SUBROUTINE TO TRANSMIT A NULL PRINTER CHAR.
1078	104022	MODERR=EMT+22	;SUBROUTINE TO REPORT MODULE ERRORS.
1079	104023	NULL1=EMT+23	;SUBROUTINE TO TRANSMIT 12 NULL CHAR.'S.
1080	104024	DESTIN=EMT+24	;SUBROUTINE TO SETUP DESTINATION MODULE.
1081	104025	SOURCE=EMT+25	;SUBROUTINE TO SETUP A SOURCE MODULE
1082	104026	ADDRES=EMT+26	;SUBROUTINE TO REQUEST & SAVE MODULE ADDRESS
1083	104027	ADCNVT=EMT+27	;SUBROUTINE TO TAKE & STORE A/D CONVERSIONS
1084	104030	BCDBIN=EMT+30	;SUBROUTINE TO CONVERT 'BCD' TO BINARY
1085	104031	AVERAG=EMT+31	;SUBROUTINE TO AVERAGE 'N' NUMBERS
1086	104032	CHANEL=EMT+32	;SUBROUTINE TO REQUEST & STORE A/D CHANNEL
1087	104033	BINDEC=EMT+33	;SUBROUTINE TO CONVERT BINARY TO DEC.
1088	104034	WAITGN=EMT+34	;SUBROUTINE TO TEST GAIN ACCURACY
1089	104035	SETUP=EMT+35	;SUBROUTINE TO SETUP THE 'R' RESTART ADDR.
1090	104036	NODLAY=EMT+36	;SUBROUTINE TO INHIBIT TRANSMITTER DELAY
1091	104037	PATRBF=EMT+37	;SUBROUTINE TO PRINT CONTENTS OF RECVR BUFFER

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1092 :*****
1093 :SBTTL EMT DISPATCH SERVICE ROUTINE
1094 :ARGUMENT OF EMT IS EXTRACTED AND USED AS OFFSET TO OBTAIN POINTER
1095 :TO THE SELECTED SUBROUTINE.
1096 :*****
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1098      001200      011646      000002      EMTSRV:  .=1200      (SP),-(SP)      ;GET PC FOR TO RETURN
1099      001202      162716      000000      SUB      #2,(SP)      ;PC OF EMT
1100      001206      017616      000000      MOV      2(SP),(SP)      ;GET EMT
1101      001212      005716      TST      (SP)      ;IS EMT VALID?
1102      001214      001001      BNE      EMTOK
1103      001216      000000      HALT
1104      001220      006316      EMTOK:  ASL      (SP)      ;INVALID EMT
1105      001222      042716      177001      BIC      #177001,(SP)      ;MULTIPLY EMT ARG BY '2'
1106      001226      062716      001240      ADD      #EMTTAB,(SP)      ;CLEAR UNWANTED BITS
1107      001232      017616      000000      MOV      2(SP),(SP)      ;POINTER TO SUBROUTINE ADDRESS
1108      001236      000136      JMP      2(SP)+      ;SUBROUTINE ADDRESS
1109      ;GO TO SUBROUTINE
1110      ;EMT DISPATCH TABLE
1111
1112      001240      021152      EMTTAB:  XPRCNT      ;SUBROUTINE TO PRINT CONTROL CHAR. IN R1.
1113      001242      020416      XSCOPE      ;MODULE TEST SCOPE LOOP ROUTINE
1114      001244      022554      XSAVRG      ;SUBROUTINE TO SAVE 'R1-R5' ON STACK
1115      001246      022630      XGETRG      ;SUBROUTINE TO RETRIEVE 'R1-R5' FROM STACK
1116      001250      021666      XDLAYL      ;SUBROUTINE TO WAIT FOR DATA FROM DL11 RECEIVER
1117      001252      015716      XRECRO      ;SUBROUTINE TO SET UP DL 0'S RECEIVER.
1118      001254      017070      XLDCHR      ;SUBROUTINE TO TRANSMIT A SINGLE CHAR
1119      001256      017106      XLDADD      ;SUBROUTINE TO TRANSMIT DATA FROM ADDRESS IN CALL+2.
1120      001260      021114      XTYPIT      ;SUBROUTINE TO PRINT CHARACTER IN 'R1'
1121      001262      020552      XRANGN      ;SUBROUTINE TO CREATE A RANDOM DATA BUFFER.
1122      001264      021410      XPRINT      ;SUBROUTINE TO PRINT ASCII MESSAGES.
1123      001266      014522      XTTYIN      ;SUBROUTINE TO INPUT VIA KEYBOARD.
1124      001270      021550      XOCTPR      ;SUBROUTINE TO PRINT A '6' DIGIT OCTAL NO.
1125      001272      022704      XASEMB      ;SUBROUTINE TO ASSEMBLE A ONE WORD NO.
1126      001274      021010      XSPACE      ;SUBROUTINE TO TYPE SPACES
1127      001276      021040      TKSFLG      ;SUBROUTINE TO TEST FOR KEYBOARD FLAG.
1128      001300      021666      XDLAYL      ;SUBROUTINE TO SET UP A LONG DELAY.
1129      001302      021330      XNULL      ;SUBROUTINE TO ISSUE NULL CHARACTERS AFTER R1.
1130      001304      020320      XERMES      ;SUBROUTINE TO REPORT MODULE ERRORS
1131      001306      021340      XNULL1      ;SUBROUTINE TO TRANSPORT '12' NULL CHAR.'S
1132      001310      016752      XDSTIN      ;SUBROUTINE TO SET UP A DESTINATION MODULE
1133      001312      016732      XSOURCE      ;SUBROUTINE TO SET UP A SOURCE MODULE
1134      001314      020154      XADRES      ;SUBROUTINE TO REQUEST & SAVE MODULE ADDRESS
1135      001316      006566      XADCNT      ;SUBROUTINE TO TAKE & STORE A/D CONVERSIONS
1136      001320      022162      XBCDBIN      ;SUBROUTINE TO CONVERT 'BCD' TO BINARY
1137      001322      015470      XAVRAGE      ;SUBROUTINE TO AVERAGE 'N' NUMBERS
1138      001324      020272      XCHANEL      ;SUBROUTINE TO REQUEST & STORE A/D CHANNEL.
1139      001326      022326      XBINDEC      ;SUBROUTINE TO CONVERT BINARY TO DECIMALS.
1140      001330      006372      XWATGN      ;SUBROUTINE TO TEST GAIN ACCURACY.
1141      001332      021052      XSETUP      ;SUBROUTINE TO SETUP THE '1R' RESTART ADDR.
1142      001334      021320      XNODLY      ;SUBROUTINE TO INHIBIT TRANSMITTED DELAY
1143      001336      022006      XPRTB      ;SUBROUTINE TO PRINT CONTENTS OF RECV. BUFFER

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1147	001342	177560
1148	001344	177562
1149	001346	177564
1150	001350	177566
1151	001352	177570
1152	001354	177571

PSW: 177776
TKS: 177560
TKB: 177562
TPS: 177564
TPB: 177566
SWR: 177570
SWRO: 177571

```
; ADDRESS OF PROCESSOR STATUS REG.  
; ADDRESS OF KEYBOARD STATUS REG.  
; " " " BUFFER "  
; " " PRINTER STATUS REG.  
; " " PRINTER BUFFER REG.  
; " " SWITCH REG.  
; " " HIGH BYTE
```

:DL11 REGISTER ADDRESSES

1155		
1156	001356	175610
1157	001360	175612
1158	001362	175614
1159	001364	175616
1160	001366	000300
1161	001370	000302
1162		
1163	001372	000304
1164	001374	000306

```
RCSR0: 175610
RBUF0: 175612
XCSR0: 175614
XBUF0: 175616
RINT0: 300
RLVLO: 302
```

```

;ADDRESS OF UNIT 0'S DL11 REC. CSR
;ADDRESS OF UNIT 0'S DL11 REC. BUFFER
;ADDRESS OF UNIT 0'S TRANS. CSR
;ADDRESS OF UNIT 0'S DL11 TRANS. BUFFER
;ADDRESS OF UNIT 0'S REC. VECTOR

```

XINTO: 304
XLVLG: 306

```

:ADDRESS OF UNIT 0'S DL11 TRANS. VECTOR
:ADDRESS OF UNIT 1'S DL11 TRANS. VECTOR

```

.SBTTL DEFINITIONS OF THE 'PDM-70' CONTROL CHARACTERS.

1168	0000021
1169	0000022
1170	0000023
1171	0000024
1172	0000003
1173	0000002
1174	0000026
1175	0000001
1176	0000017
1177	0000004
1178	0000005

DC1=021
DC2=022
DC3=023
DC4=024
ETX=003
STX=002
SYN=026
SOH=001
SI=017
EOT=004
ENQ=005

```

;ENABLE SOURCE
;ENABLE DESTINATION
;GO
;DO NOT RECIRCULATE
;END OF TEXT
;START OF TEXT
;SYNCHRONIZE (DELAY)
;START OF HEADER
;SHIFT IN.
;END OF TRANSMISSION
;ENQUIRY.

```

```
;*****  
.SBTTL KEYBOARD MONITOR  
;*****
```

1183	001376	012777	000340
1184	001404	012706	001000
1185	001410	104021	
1186	001412	000005	
1187	001414	104021	
1188	001416	005037	031612
1189	001422	005037	031570
1190	001426	005037	031616
1191	001432	005737	031566
1192	001436	001110	
1193	001440	005237	031566
1194	001444	104012	
1195	001446	023017	

```

MONITR:  MOV      #340, @PSW
          MOV      #1000, SP
          NULL
          RESET
          NULL
          CLR      DLYSWH
          CLR      PRTSWH
          CLR      SENDSW
          TST      MTRSWH
          BNE      MONTRS
          INC      MTRSWH
          PRINT
          TITLE

```

```
;SET PROC. PRIO. TO '7'  
;SET UP STACK  
  
;CLR SOFTWARE SW.  
;CLR SOFTWARE SW.  
;CLR SOFTWARE SW.  
;PROGRAM BEEN INITIALIZED?  
;YES  
;NO  
  
;PRINT PROGRAM HEADER
```

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 DZPMAB.P11 KEYBOARD MONITOR

```

1197 001450 005777 177676 MONTR0: TST      QSWR      ;ARE ANY SW'S SET?
1198 001454 001404          BEQ      .+12      ;NO, CONTINUE
1199 001456 104012          PRINT          ;YES, REQUEST THEM CLR'D
1200 001460 026311          MESS9
1201 001462 104013          TTYIN
1202 001464 000771          BR      MONTR0      ;WAIT
                                           ;RE-CHECK SEE IF I WAS CHEATED.
1203
1204 ;*****
1205 ;MONITOR RESTART ADDRESS STARTS HERE
1206 ;*****
1207
1208 001456 005037 031600 MONTR1: CLR      SIOSWH
1209 001472 104012          PRINT
1210 001474 023466          MES0
1211 001476 104013          TTYIN
1212 001500 122737 000131 015116 CMPB      #131,INSUF
1213 001506 001031          BNE      MONTR1A
1214 001510 104026          ADDRESS
1215 001512 110037 002164          MOVB      RO,IADRS0
1216 001516 110037 002170          MOVB      RO,IADRS1
1217 001522 110037 002174          MOVB      RO,IADRS2
1218 001526 110037 002200          MOVB      RO,IADRS3
1219 001532 110037 003062          MOVB      RO,IADRS4
1220 001536 110037 003066          MOVB      RO,IADRS5
1221 001542 110037 003074          MOVB      RO,IADRS6
1222 001546 110037 017327          MOVB      RO,IADRS7
1223 001552 110037 017423          MOVB      RO,IADRS8
1224 001556 110037 016770          MOVB      RO,IADRS9
1225 001562 110037 011045          MOVB      RO,IADR10
1226 001566 005237 031600          INC      SIOSWH
1227 001572 104012          MONTR1A: PRINT
1228 001574 026546          MES63
1229 001576 104015          ASEMBL
1230 001600 005700          TST      RO
1231 001602 001416          BEQ      MONTR3
1232 001604 012702 001356          MOV      #RCSR0,R2
1233 001610 012703 0000C4          MONTR2: MOV      #4,R3
1234 001614 010022          MOV      RO,(R2)+
1235 001616 062700 000002          ADD      #2,RO
1236 001622 005303          DEC      R3
1237 001624 001373          BNE      .-10
1238 001626 022702 001376          CMP      #XLVL0+2,R2
1239 001632 001402          BEQ      MONTR3
1240 001634 010400          MOV      R4,RO
1241 001636 000764          BR      MONTR2
1242 001640 012777 016526 177520 MONTR3: MOV      #RECVER,QRINTO
1243
1244 001646 012777 000200 177514          MOV      #200,QRLVL0
1245 001654 104012          MONTR4: PRINT
1246 001656 023106          HEADER
1247 001660 012737 001466 031572 MONTR5: MOV      #MONTR1,RVECTR
1248 001666 104012          PRINT
1249 001670 031354          DOT

```

;PRINT DOT TO INDICATE READY

```

1250
1251
1252
1253
1254 001672 005037 015116
1255 001676 104013
1256 001700 022737 000103 015116
1257 001706 001005
1258 001710 005737 031672
1259 001714 001451
1260 001716 000177 027750
1261 001722 012701 023166
1262 001726 005004
1263 001730 012702 015116
1264 001734 122711 000045
1265 001740 001403
1266 001742 122711 000040
1267 001746 001002
1268 001750 105721
1269 001752 000766
1270 001754 122122
1271 001756 001020
1272 001760 122711 000054
1273 001764 001373
1274 001766 006304
1275 001770 005726
1276 001772 016437 002046 031672
1277 002000 016437 002046 031574
1278 002006 062737 000004 031574
1279 002014 000174 002046
1280 002020 005204
1281 002022 122711 000100
1282 002026 001404
1283 002030 122721 000054
1284 002034 001735
1285 002036 000771
1286
1287 002040 104012
1288 002042 031350
1289 002044 000712
1290

```

```

*****
THIS SUBROUTINE DECODES THE USER'S INPUT AND EXECUTES THE SELECTED TEST
*****
DECODE: CLR      INBUF
        TTYIN
        CMP      #103, INBUF
        BNE      DECOD1
        TST      RESTART
        BEQ      NMATCH
        JMP      @RESTART
DECOD1: MOV      #TSTLST, R1
        CLR      R4
RECYCL: MOV      #INBUF, R2
        CMPB     #45, (R1)
        BEQ      .+10
        CMPB     #40, (R1)
        BNE      .+6
        TSTB     (R1)+
        BR       RECYCL
MATCH:  CMPB     (R1)+, (R2)+
        BNE      FLUSH
        CMPB     #54, (R1)
        BNE      MATCH
        ASL      R4
        POP1SP
        MOV      TSTABL(R4), RESTART
        MOV      TSTABL(R4), AVECTR
        ADD      #4, AVECTR
        JMP      @TSTABL(R4)
FLUSH:  INC      R4
        CMPB     #100, (R1)
        BEQ      NMATCH
        CMPB     #54, (R1)+
        BEQ      RECYCL
        BR       FLUSH+2
NMATCH: PRINT    QMARK
        BR       DECODE

```

```

;CALL KEYBOARD ROUTINE
;WAS 'C' TYPED TO CONTINUE LAST TEST?
;NO, DECODE INPUT
;YES, HAS A RESTART ADDR. BEEN SET UP?
;NO, ILLEGAL ENTRY.
;YES, RESTART LAST TEST
;SET UP MESSAGE ADDR. POINTER
;OFFSET REG.
;SET UP TTY BUFFER POINTER
;CHAR. = TO 'SPACE'
;NO
;YES, SKIP CHAR.
;COMPARE BUFFERS
;NOT EQUAL, SET UP NEXT WORD
;NO, COMPARE NEXT CHAR.
;SET UP OFFSET
;SET UP A RESTART ADDRESS
;SET UP TO RE-ADDRESS MODULE
;EXECUTE SELECTED TEST.
;INCREMENT OFFSET CNTR.
;TEST FOR 'a'
;YES, END OF MESSAGE.
;CHAR = COMMA?
;YES, COMPARE NEXT WORD.
;NO, KEEP GOING.
;ILLEGAL ENTRY, TYPE ''
;GET NEW INPUT.

```

```

1291
1292
1293
1294
1295 002046 002130
1296 002050 003374
1297 002052 004232
1298 002054 004324
1299 002056 004520
1300 002060 004726
1301 002062 005316
1302 002064 005412
1303 002066 006254
1304 002070 006762
1305 002072 007676
1306 002074 010016
1307 002076 011026
1308 002100 011236
1309 002102 011352
1310 002104 003212
1311 002106 011702
1312 002110 011714
1313 002112 012222
1314 002114 013476
1315 002116 020716
1316 002120 021764
1317 002122 021772
1318 002124 022024
1319 002126 022120

;*****
;TABLE FOR TESTS SELECTABLE VIA KEYBOARD
;*****

TSTABL: M7380A      ;CONTROL MODULE TEST
              M7381A ;BCD INPUT MODULE ADDRESS TEST
              M7381E ;BCD INPUT MODULE EXERCISER TEST
              M7382A ;BCD OUTPUT MODULE ADDRESSING TEST
              BCDIO  ;BCD INPUT/OUTPUT EXERCISER TEST
              M7383A ;A/D MODULE ADDRESS TEST
              M7383C ;A/D MODULE CALIBRATION TEST
              M7383R ;A/D REPEATIBILITY TEST
              M7383G ;A/D GAIN ACCURACY TEST
              M7384A ;D/A MODULE ADDRESS TEST
              M7384E ;D/A OUTPUT MODULE EXERCISER TEST
              M7385A ;SERIAL INPUT/OUTPUT MODULE ADDRESS TEST
              M7385I ;SERIAL I/O INTERFACE TEST
              M7385T ;SERIAL INPUT/OUTPUT TTL TEST
              M7386A ;KEYBOARD/DISPLAY MODULE ADDRESS TEST
              M7387A ;HARDWARE READ-IN MODULE TEST
              M7388A ;CHARACTER I/O (IN-HOUSE) MODULE ADDRESS TEST
              M7388F ;CHARACTER I/O (FIELD) MODULE ADDRESS TEST
              M7377A ;REMOTE SERIAL MODULE TEST
              M7378A ;FOUNDATION MODULE TEST
              SUBX   ;SUBTEST SELECTOR ROUTINE
              RECBUF ;ROUTINE TO PRINT CONTENTS OF DL RECV BUFFER
              TRNBUF ;ROUTINE TO PRINT CONTENTS OF DL TRNS BUFFER
              SEND   ;ROUTINE TO TRANSMIT CHAR.'S FROM TTY
              RUN    ;ROUTINE TO LOAD & RUN THE SEND PROGRAM

```

K03

PDM70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 36
 DZPMAB.F11 KEYBOARD MONITOR

```

1320
1321
1322
1323
1324
1325
1326
1327 002130 104012
1328 002132 023533
1329 002134 000240
1330 002136 005037 031670
1331 002142 104035
1332 002144 005037 031612
1333
1334
1335
1336
1337
1338
1339 002150 000240
1340 002152 000240
1341 002154 104007
1342 002156 002162
1343 002160 000412
1344 002162 002
1345 002163 021
1346 002164 075
1347 002165 001
1348 002166 061
1349 002167 022
1350 002170 075
1351 002171 023
1352 002172 024
1353 002173 021
1354 002174 075
1355 002175 001
1356 002176 061
1357 002177 022
1358 002200 075
1359 002201 061
1360 002202 063
1361 002203 023
1362 002204 003
1363 002206
1364
1365 002206 005737 031600
1366 002212 001020
1367 002214 012701 002163
1368 002220 005737 031670
1369 002224 001401
1370 002226 005301
1371 002230 005237 031670

;*****
;SBTTL M7380 CONTROL MODULE TEST.
;THIS TEST COMPLETELY EXERCISES THE PDM-70 'CONTROL MODULE' USING THE
;PDP-11 AS THE MASTER 'SOURCE/DESTINATION' MODULE. THE TEST TAKES THE
;MODULE THRU THE INITIALIZATION, PROGRAM, ADDRESS AND DATA MODES RESPECTIVELY.
;*****

M7380A: PRINT
MES1
NOP
CLR LOPSWH
SETUP
CLR DLYSWH
;TEXT 'CONTROL MODULE TEST'
;SET UP TEST PARAMETERS.
;ENABLE TRANSMITTER DELAYS

;*****
;LOAD '2' PROGRAMS INTO THE CONTROLS 'FIFO' AND CHECK THAT
;THE CONTROL MODULE ENTERS THE ADDRESS MODE.
;*****

NOP
NOP
LDPGMO
PRGM1-1
BR TAGB
;LOAD THE FOLLOWING PROGRAM.
PRGM1: .BYTE STX
IADRS0: .BYTE DC1
        .BYTE 75
        .BYTE SOH
        .BYTE 61
        .BYTE DC2
IADRS1: .BYTE 75
        .BYTE DC3
        .BYTE DC4
PRGM2: .BYTE DC1
        .BYTE 75
        .BYTE SOH
        .BYTE 61
        .BYTE DC2
IADRS2: .BYTE 75
        .BYTE SOH
        .BYTE 61
        .BYTE DC2
        .BYTE 75
        .BYTE 61
        .BYTE DC3
IADRS3: .BYTE 61
        .BYTE 63
        .BYTE DC3
END2: .BYTE ETX
        .EVEN

TAGB: TST SIOSWH
      BNE TAGOB1
      MOV #PRGM1,R1
      TST LOPSWH
      BEQ .+4
      DEC R1
      INC LOPSWH
;SERIAL I/O INPUT?
;YES, JUST LOOK FOR DATA
;NO, VERIFY 1ST PROGRAM
;LOOPING FROM LAST TEST?
;NO, DON'T LOOK FOR 'STX'
;YES, SET UP TO LOOK FOR 'STX'

```

```

1372 002234 122221      CMP1:  CMPB    (R2)+,(R1)+    ;COMPARE RECV'D/TRANSMITTED DATA
1373 002236 001403      BEQ      .+10          ;
1374 002240 104022      MODERR          ;RECV'D/TRANS ADDRESS DATA DIFFERENT
1375 002242 030137      ERR2
1376 002244 000412      BR        CT2          ;EXIT ON ERROR.
1377 002246 122701 002172 CMPB    #PRGM2,R1      ;CHK'D ALL DATA?
1378 002252 001370      BNE      CMP1          ;NO
1379
1380      ;AT THIS POINT THE MODULE SHOULD BE IN THE 'DATA MODE'
1381      ;THIS NEXT SUBTEST SENDS THE CHAR. 'A' AND CHECKS
1382      ;THAT IT IS RETURNED AS DATA.
1383
1384 002254 104006      TAGOB1: LDCHRO
1385 002256 000101      'A'
1386 002260 122722 000101 CMPB    #'A',(R2)+    ;SEND CHAR. 'A'
1387 002264 001402      E'      CT2          ;WAS 'A' RETURNED?
1388 002266 104022      MODERR          ;YES
1389 002270 031033      ERR19          ;MODULE DIDN'T ENTER DATA MODE
1390
1391      ;*****
1392      ;THE CONTROL MODULE SHOULD NOW BE IN THE 'DATA MODE'. THE FOLLOWING
1393      ;SUBTEST CREATES A RANDOM '500' WORD DATA BUFFER AND TRANSFERS IT TO THE
1394      ;CONTROL MODULE. THIS DATA IS VERIFIED WHEN IT IS RECEIVED BACK FROM THE
1395      ;CONTROL MODULE.
1396      ;*****
1397
1398 002272 104001 000002 CT2:    SCOPE,2          ;TEST 2
1399 002276 104011      RANDOM          ;CREATE A RANDOM DATA BUFFER
1400 002300 104007      LDPGMO          ;TRANSMIT DATA FROM FOLLOWING ADDRESS.
1401 002302 017450      TRNBFO
1402 002304 012701 017450 MOV     #TRNBFO,R1
1403 002310 122221      CMP2:  CMPB    (R2)+,(R1)+    ;REVC'D & TRANS DATA EQUAL?
1404 002312 001403      BEQ      .+10          ;YES
1405 002314 104022      MODERR          ;RECV'D DATA DOESN'T EQUAL TRANS DATA
1406 002316 030174      ERR3
1407 002320 000411      BR        CT3
1408 002322 005737 016006 TST     PARITY          ;PARITY ERROR FLAG SET?
1409 002326 001403      BEQ      CT3A          ;NO, DATA GOOD
1410 002330 104022      MODERR          ;YES, PARITY ERROR ON LAST TRANSFER
1411 002332 030345      ERR7
1412 002334 000403      BR        .+10
1413 002336 022701 020152 CT3A:  CMP     #TRNEND,R1    ;CHK'D WHOLE BUFFER?
1414      BNE      CMP2          ;CORRECTED 7/1/74.
1415 002342 001362

```

```

1416
1417
1418
1419
1420
1421
1422
1423 002344 104001 000003
1424 002350 104006
1425 002352 000004
1426 002354 012701 002172
1427 002360 122722 000004
1428 002364 001403
1429 002366 104022
1430 002370 030251
1431 002372 000422
1432 002374 005737 031600
1433 002400 001010
1434 002402 122221
1435 002404 001403
1436 002406 104022
1437 002410 030212
1438 002412 000412
1439 002414 122701 002204
1440 002420 001370
1441
1442
1443
1444
1445 002422 104006
1446 002424 000101
1447 002426 122722 000101
1448 002432 001402
1449 002434 104022
1450 002436 030767

;*****
;THIS SUBTEST ISSUES AN 'EOT' CHARACTER AND CHECKS THAT THE CONTROL
;MODULE RE-ENTERS THE ADDRESS MODE AND THAT THE SECOND PROGRAM LOADED IN
;THE 1ST SUBTEST GETS READ OUT.
;*****

CT3:  SCOPE 3 ;TEST 3
      LDCHRO
      EOT ;TRANSMIT THE 'EOT' CHAR.
      MOV #PRGM2,R1
      CMPB #EOT,(R2)+ ;CHK THAT 'EOT' WAS RETURNED
      BEQ .+10
      MODERR
      ERR5 ;EOT CHAR WASN'T RETURNED
      BR CT4 ;EXIT ON ERROR
      TST SIOSWH ;SERIAL I/O INPUT?
      BNE TAGOA ;YES, JUST VERIFY DATA
      CMP3: CMPB (R2)+,(R1)+ ;COMPARE DATA OF THE SECOND PROGRAM
      BEQ .+10
      MODERR ;ADDRESS ERROR IN 2ND PROGRAM
      ERR4
      BR CT4
      CMPB #END2,R1 ;DONE
      BNE CMP3 ;NO

;SEND A CHAR. TO VERIFY THE 2ND PROGRAM IS
;IN THE DATA MODE
TAGOA: LDCHRO
      'A
      CMPB #'A,(R2)+ ;WAS THE 'A' RECV'D?
      BEQ CT4 ;YES
      MODERR ;2ND PROGRAM DIDN'T ENTER DATA MODE
      ERR18

```

N03

PDM70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 39
DZPMAB.P11 M7380 CONTROL MODULE TEST.

```

1451
1452
1453
1454
1455
1456
1457 002440 104001 000C04
1458 002444 104006
1459 002446 000004
1460 002450 105722
1461 002452 005737 031600
1462 002456 001012
1463 002460 012701 002163
1464 002464 122122
1465 002466 001403
1466 002470 104022
1467 002472 030302
1468 002474 001012
1469 002476 022701 002172
1470 002502 001370
1471
1472
1473
1474 002504 104006
1475 002506 000101
1476 002510 122722 000101
1477 002514 001402
1478 002516 104022
1479 002520 030302

;*****
;ISSUE ANOTHER 'EOT' TO TEST THAT THE ADDRESS MODE OF THE 1ST PROGRAM IS
;RECIRCULATED BACK OUT OF THE 'FIFO'.
;*****

CT4:  SCOPE 4 ;TEST 4
      LDCHRO
      EOT ;'EOT' SHOULD RE-ADDRESS 1ST PROGRAM
      TSTB (R2)+ ;ADD '1' TO BUFFER POINTER
      TST SIOSWH ;SERIAL I/O INPUT?
      BNE TAGOC ;YES, JUST CHECK DATA
      MOV #PRGM1,R1
      CMPB (R1)+,(R2)+
      BEQ .+10
      MODERR ;1ST PROGRAM DIDN'T RECIRCULATE
      ERG6
      SNE CT5
      CMP #PRGM2,R1
      BNE CMP4

;SEND A CHAR. TO VERIFY THAT THE 1ST PROGRAM ENTERED THE DATA MODE

TAGOC: LDCHRO
      'A
      CMPB #'A',(R2)+ ;WAS CHAR RETURNED?
      BEQ CT5 ;YES
      MODERR ;1ST PROGRAM DIDN'T RE-ENTER DATA MODE
      ERG6

```

B04

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 DCPMAB.P11 M7390 CONTROL MODULE TEST.

```

1480
1481
1482
1483
1484
1485
1486
1487
1488 002522 1040C1 000005
1489 002526 104006
1490 002530 000004
1491 002532 122722 000004
1492 002536 001403
1493 002540 104022
1494 002542 030251
1495 002544 000424
1496 002546 005737 031600
1497 002552 001012
1498 002554 012701 002163
1499 002560 122122
1500 002562 001403
1501 002564 104022
1502 002566 030302
1503 002570 000412
1504 002572 122701 002172
1505 002576 001370
1506 002600 104006
1507 002602 000101
1508 002604 122722 000101
1509 002610 001403
1510 002612 104022
1511 002614 030302

```

```

*****
:THIS SUBTEST ISSUES ANOTHER 'EOT' CHARACTER. THIS SHOULD ENABLE THE
:ADDRESS OF THE 1ST PROGRAM TO BE OUTPUT SINCE THE SECOND PROGRAM
:CONTAINED A 'DC4' AND SHOULD HAVE BEEN FLUSHED.
*****
CT5:  SCOPE 5 ;TEST 5
      LDCHRO
      EOT ;'EOT' SHOULD ENABLE ADDRESS MODE
      CMPB #EOT,(R2)+ ;CHECK THAT 'EOT' WAS RETURNED
      BEQ .+10
      MODERR ;'EOT' CHAR. WASN'T RETURNED
      ERR5
      BR CT6 ;EXIT ON ERROR
      TST SIOSWH ;SERIAL I/O INPUT?
      BNE TAGOD ;YES.
      MOV #PRGM1,R1
      CMPB (R1)+,(R2)+ ;CHECK RECV'D ADDR. AGAINST PROGRAM 1.
      BEQ .+10 ;PROGRAM DIDN'T RECIRCULATE PROPERLY
      MODERR
      ERR6
      BR CT6
      CMPB #PRGM2,R1
      BNE CMP5
TAGOD: LDCHRO
      A
      CMPB #A,(R2)+
      BEQ .+6
      MODERR
      ERR5

```

C04

PDMTC DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 41
 DZPMAB.P11 M7380 CONTROL MODULE TEST.

```

1511          : **' *****
1512          : TH. TEST CHECKS THAT ALL '64' LOCATIONS OF THE CONTROLS 'FIFO' CAN
1513          : BE ... SED. THIS IS DONE BY LOADING ONE '64' CHARACTER PROGRAM IN
1514          : THE 'FIFO'. IN THIS PROGRAM, '56' CHARACTERS ARE RANDOM LITERAL
1515          : CHARACTERS ENTERED UNDER AN 'SI' COMMAND.
1516          : *****
1517
1518 002616 104031 000006 CT6: SCOPE,6 ;TEST 6
1519 002622 104011 RANDOM ;CREATE A RANDOM DATA BUFFER
1520 002624 012700 017450 MOV #TRNBFO,R0 ;SET UP TO LOAD AN ADDRESS ON THE DATA
1521 002630 112720 000002 MOVB #STX,(R0)+ ;ENTER ADDRESS MODE
1522 002634 112720 000021 MOVB #DC1,(R0)+ ;ALERT SOURCE IF SERIAL I/O IS OUT THERE.
1523 002640 113720 002164 MOVB IADR50,(R0)+ ;ADDRESS INPUTTED VIA USER
1524 002644 112720 000001 MOVB #SOH,(R0)+ ;MODE '1': WAIT FOR DATA
1525 002650 112720 000061 MOVB #61,(R0)+
1526 002654 112720 000022 MOVB #DC2,(R0)+ ;ALERT DESTINATION FOR SERIAL I/O
1527 002660 113720 002164 MOVB IADR50,(R0)+ ;ADDRESS INPUTTED VIA USER
1528 002664 112720 000017 MOVB #SI,(R0)+ ;SEND '55' LITERAL CHARACTERS
1529 002670 112737 000023 017547 MOVB #DC3,TRNBFO+77 ;LOAD THE '64' CHAR.
1530 002676 112737 000003 017550 MOVB #ETA,TRNBFO+100 ;TERMINATE THE PROGRAM
1531
1532 002704 104007 LDPGMO ;SEND THE PROGRAM
1533 002706 017450 TRNBFO
1534 002710 104004 DELAY
1535 002712 105722 TSTB (R2)+ ;WAIT FOR DATA TO RETURN
1536 002714 001003 BNE .+10 ;WAS ANY DATA RETURNED?
1537 002716 104022 MODERR ;YES
1538 002720 030137 ERR2 ;CONTROL MODULE DIDN'T RETURN ANY DATA
1539 002722 000417 BR CT7 ;EXIT ON ERROR
1540 002724 012701 017450 MOV #TRNBFO,R1 ;SET UP TO VERIFY DATA
1541 002730 005737 03160C TST SIOSWH ;USING SERIAL I/O?
1542 002734 001402 BEQ .+6 ;NO, VERIFY ADDRESS AS WELL AS DATA
1543 002736 062701 000010 ADD #10,R1 ;YES, MOVE POINTER TO VERIFY DATA ONLY
1544 002742 122122 CMPB (R1)+,(R2)+
1545 002744 001403 BEQ .+10
1546 002746 104022 MODERR ;DATA ERROR
1547 002750 030174 ERR3
1548 002752 000403 BR CT7 ;EXIT ON ERROR
1549 002754 022701 017547 CMP #TRNBFO+77, ;DONE?
1550 002760 001370 BNE CMP6 ;NO

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1557
1558 002762 104001 000007 CT7: SCOPE,7 ;TEST 7
1559 002766 104006 LDCHRO
1560 002770 000002 STX ;ISSUE 'STX' TO RE-ENTER PROGRAM MODE
1561 002772 122722 000002 CMPB #STX,(R2)+
1562 002776 001402 BEQ .+6
1563 003000 104022 MODERR ;THE 'STX' CHARACTER WASN'T RETURNED
1564 003002 030106 ERRI
1565
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1573
1574 003004 104001 000010 CT10: SCOPE,10 ;TEST 10
1575 003010 104036 NOCLAY ;INHIBIT TRANSMITTER DELAY
1576 003012 012701 000001 MOV #1,R1 ;SET UP DELAY TIMES (1-9).
1577 003016 012702 000002 MOV #2,R2 ;SHORT TIME DELAY COUNT.
1578 003022 012703 000001 MOV #61,R3 ;START DELAY WITH '1'.
1579
1580 003026 104005 TAGD: RECVR0 ;ENABLE THE DL11 RECVR
1581 003030 005077 176304 CLR 2PSW ;ENABLE RECVR INTERRUPTS
1582 003034 005004 CLR R4 ;CONTAINS THE ACTUAL DELAYS COUNTED
1583 003036 110337 003071 MOVB R3,SYNTIM ;SET UP DELAY TIME FOR THIS LOOP
1584 003042 110337 030434 MOVB R3,ERR9+16 ;PRINT DELAY TIME ON ERROR
1585 003046 110337 C30471 MOVB R3,ERR10+16
1586 003052 104007 LDPGMO ;LOAD THE FOLLOWING PROGRAM
1587 003054 003060 .+4
1588 003056 000411 BR TAGF ;GO HERE WHEN LOADED
1589 003060 002 .BYTE STX
1590 003061 021 .BYTE DC1
1591 003062 075 IADR54: .BYTE 75 ;MODIFIED BY USER
1592 003063 001 .BYTE SOH ;MODE '0' AUTO 'EOT'
1593 003064 060 .BYTE 60
1594 003065 022 .BYTE DC2
1595 003066 075 IADR55: .BYTE 75 ;MODIFIED BY USER
1596 003067 017 .BYTE SI ;ENABLE DESTINATION
1597 003070 026 .BYTE SYN
1598 003071 061 SYNTIM: .BYTE 61 ;LOCPION MODIFIED ON EACH PASS.
1599 003072 023 .BYTE DC3
1600 003073 021 .BYTE DC1
1601 003074 075 IADR56: .BYTE 75 ;MODIFIED BY USER
1602 003075 001 .BYTE SOH
1603 003076 061 .BYTE 61
1604 003077 023 .BYTE DC3
1605 003100 003 .BYTE ETX
1606 003102 .EVEN

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1607									
1608	003102	104023		TAGF:	NULL1			:1 SEC. TTY DELAY.	
1609	003104	005204			INC	R4		:INCREMENT DELAY COUNTER	
1610	003106	020401			CMP	R4,R1		:WAITED LONG ENOUGH?	
1611	003110	001410			BEG	TAGC		:YES, 'EOT' SHOULD BE BACK.	
1612	003112	020402			CMP	R4,R2		:CHECK FOR FAST RETURN?	
1613	003114	002372			BGE	TAGF		:NO, EXECUTE NEXT DELAY	
1614	003116	005737	016012		TST	RECEOT		:BACK?	
1615	003122	001767			BEG	TAGF		:NO, STILL OK	
1616	003124	104022			MODERR			: 'SYN' DELAY TOO SHORT	
1617	003126	030416			ERR9			: ** CHECK 'W2' JUMPER IN?	
1618	003130	000416			BR	TAGI+2		:EXIT ON ERROR	
1619									
1620	003132	104023		TAGG:	NULL1			:GIVE IT AN EXTRA SEC.	
1621	003134	005737	016012		TST	RECEOT		:SHOULD BE BACK HERE.	
1622	003140	001003			BNE	TAGH		:HOORAY IT IS.	
1623	003142	104022			MODERR			: 'S 'N' DELAY TOO LONG	
1624	003144	030453			ERR10			: ** CHECK 'W2' JUMPER ...	
1625	003146	000407			BR	TAGI+2			
1626									
1627	003150	005201		TAGH:	INC	R1			
1628	003152	022701	000012		CMP	#12,R1		:TEST ALL TI ?	
1629	003156	001403			BEG	TAGI+c		:YES, EXIT	
1630	003160	005202			INC	R2		:NO, SET UP TO TEST NEXT TIME	
1631	003162	005203			INC	R3		:SET UP NEW 'SYN' COUNT	
1632								:ENABLE NEXT PROGRAM	
1633	003164	000720		TAGI:	BR	TAGD		:LOAD THE NEW TIME DELAY F	720M
1634	003166	012777	000340	176144	MOV	#340,QPSW			
1635	003174	032777	002000	176150	BIT	#SW10,QSWR		:IS 'SW10' SET	
1636	003202	001464			BEG	CT12		:NO, INHIBIT TESTING M7387	

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1647 003204 104001 000011 CT11: SCOPE,11 ;TEST 11
1648 003210 000401 BR .+4
1649 003212 104035 M7387A: SETUP ;ENTERED HERE IS M7387A IS TYPED
1650 003214 104012 PRINT
1651 003216 026571 MES64 ;TEXT 'INSERT M7387 MODULE'.
1652 003220 104005 RECVRO ;ENABLE DL11
1653 003222 005077 176112 CLR APSW ;ENABLE INTERRUPTS
1654 003226 005712 TST (R2)
1655 003230 001776 BEQ .-2 ;NO WAIT
1656 003232 104004 DELAY ;WAIT FOR DATA
1657 003234 012777 000340 176076 MOV #340,APSW ;INHIBIT FURTHER INTERRUPTS
1658 003242 012701 003304 MOV #PROMS,R1
1659 003246 122122 CMP11: CMPB (R1)+,(R2)+ ;DATA OK?
1660 003250 001403 BEQ .+10 ;YES
1661 003252 104022 MODERR ;PROM DATA ERROR
1662 003254 030174 ERR3
1663 003256 000436 BR CT12 ;EXIT ON ERROR
1664
1665 003260 022701 003353 CMP #PROMD,R ;CHECKED ALL DATA?
1666 003264 001370 BNE CMP11 ;NO
1667 003266 104012 PRINT ;YES
1668 003270 026657 MES65 ;TEXT 'PROM OK'
1669 003272 104013 TTYIN ;WAIT FOR 'CR' TO CONTINUE.
1670 003274 012737 000001 031670 MOV #1,LOPSWH
1671 003302 000424 BR CT12
1672
1673 ;FOLLOWING IS THE DATA WHICH SHOULD BE READ FROM PROM
1674
1675 003304 015 PROMS: .BYTE 15
1676 003305 012 .BYTE 12
1677 003306 115 .BYTE 'M
1678 003307 067 .BYTE 67
1679 003310 063 .BYTE 63
1680 003311 070 .BYTE 70
1681 003312 067 .BYTE 67
1682 003313 040 .BYTE 40
1683 003314 120 .BYTE 'P
1684 003315 122 .BYTE 'R
1685 003316 117 .BYTE 'O
1686 003317 115 .BYTE 'M
1687 003320 040 .BYTE 40
1688 003321 122 .BYTE 'R
1689 003322 105 .BYTE 'E
1690 003323 101 .BYTE 'A
1691 003324 104 .BYTE 'D
1692 003325 055 .BYTE 55

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PCMT0 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 45
DZPMAB.P11 M7387 READ-IN MODULE TEST

1693	003326	111	.BYTE	'I
1694	003327	116	.BYTE	'N
1695	003330	040	.BYTE	40
1696	003331	124	.BYTE	'T
1697	003232	105	.BYTE	'E
1698	003333	123	.BYTE	'S
1699	003334	124	.BYTE	'T
1700	003335	015	.BYTE	15
1701	003336	012	.BYTE	12
1702	003337	060	.BYTE	60
1703	003340	061	.BYTE	61
1704	003341	062	.BYTE	62
1705	003342	063	.BYTE	63
1706	003343	064	.BYTE	64
1707	003344	065	.BYTE	65
1708	003345	066	.BYTE	66
1709	003346	067	.BYTE	67
1710	003347	070	.BYTE	70
1711	003350	071	.BYTE	71
1712	003351	015	.BYTE	15
1713	003352	012	.BYTE	12
1714	003353	000	PROMD: .BYTE	0
1715				
1716			.EVEN	
1717				
1718				
1719				
1720			:*****	
1721			:TEST COMPLETE	
1722			:*****	
1723	003354	104001	CT. 3: SCOPE, 12	;TEST 12
1724	003360	104012	PRINT	
1725	003362	023727	MES7	:TEXT 'TEST COMPLETE'
1726	003364	005237	INC	:SET SW. TO LOOP PROGRAM
1727	003370	000137	JMP	:RESTART PROGRAM
		031670		
		002142		
			LOPSWH	
			M7380A+12	

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PDM70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 46
 DZPMAB.P11 M7397 READ-IN MODULE TEST

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1728                                     ;*****
1729                                     ;SETTL M7381 BCD INPUT MODULE ADDRESS TEST
1730                                     ;*****
1731
1732 003274 104012 M7381A: PRINT
1733 003376 024724 MES29
1734 003400 104026 ADDRESS ;GET MODULE ADDRESS
1735 003402 104012 BCDT0: PRINT ;TEST 'SET SW'S ALL ON
1736 003404 024774 MES31
1737 003406 025015 MES31A
1738 003410 104013 TTYIN ;WAIT FOR SET UP
1739 003412 104035 SETUP ;SETUP TEST PARAMETERS
1740
1741                                     ;*****
1742                                     ;THIS SUBTEST ADDRESSES THE MODULE IN MODE '0' AND CHECKS THAT THE
1743                                     ;MODULE ADDRESS, MODE AND CORRECT NUMBER OF DIGITS ARE RETURNED.
1744                                     ;*****
1745
1746 003414 000240 BCDT1: NOP
1747 003416 000240 NOP
1748 003420 112737 000060 017017 MOVB #60,SOH1 ;SET UP MODE '0'
1749 003426 004737 017006 JSR PC,#ADRSRC ;ADDRESS THE MODULE
1750 003432 005737 016012 TST RECEOT ;WAS 'EOT' RETURNED?
1751 003436 001003 BNE .+10 ;YES, VERIFY DATA
1752 003440 104022 MODERR ;NO, MODULE DIDN'T ENTER DATA MODE.
1753 003442 030507 ERR11
1754 003444 000432 BR BCDT2
1755 003446 123722 031602 CMPB MODADR,(R2)+ ;RECEIVE CORRECT ADDRESS?
1756 003452 001403 BEQ .+10 ;YES
1757 003454 104022 MODERR ;RECEIVED WRONG MODULE ADDRESS
1758 003456 030174 ERR3
1759 003460 000424 BR BCDT2
1760 003462 122722 000060 CMPB #60,(R2)+ ;RECEIVE CORRECT MODE"
1761 003466 001403 BEQ .+10 ;YES
1762 003470 104022 MODERR ;MODULE WAS ADDRESSED IN MODE '0'
1763 003472 030174 ERR3
1764 003474 000416 BR BCDT2
1765 003476 122722 000077 CMP2A: CMPB #77,(R2)+ ;SHOULD READ ALL 1'S WITH INPUTS OPEN
1766 003502 001403 BEQ .+10
1767 003504 104022 MODERR ;DATA ERROR, SHOULD READ ALL 1'S
1768 003506 030174 ERR3 ;WITH THE INPUTS OPEN.
1769 003510 000410 BR BCDT2
1770 003512 022702 016034 CMP #RECBFO+12,R2 ;DONE?
1771 003516 001367 BNE CMP2A ;NO
1772 003520 122722 000004 CMPB #EOT,(R2)+ ;WERE CORRECT NUMBER OF CHAR.'S RECEIVED?
1773 003524 001402 BEQ .+6 ;YES
1774 003526 104022 MODERR ;DIDN'T RECEIVE ALL DATA CHAR.'S
1775 003530 030174 ERR3

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1781
1782 003532 104001
1783 003534 000002
1784 003536 112737 000061 017017
1785 003544 004737 017006
1786 003550 122722 000004
1787 003554 001402
1788 003556 104022
1789 003560 030251
1790
1791
1792
1793
1794
1795
1796 003562 104001
1797 003564 000003
1798 003566 112737 000062 017017
1799 003574 004737 017006
1800 003600 122737 000004 016032
1801 003606 001402
1802 003610 104022
1803 003612 030174
1804
1805
1806
1807
1808
1809 003614 104001
1810 003616 000004
1811 003620 112737 000063 017017
1812 003626 004737 017006
1813 003632 122722 000004
1814 003636 001402
1815 003640 104022
1816 003642 030174
1817

;*****
;THIS SUBTEST ADDRESSES THE MODULE FOR MODE '1' (EXT. SYNC) AND CHECKS
;THAT ONLY AN 'EOT' AND ONLY AN 'EOT' IS RECEIVED BACK.
;*****
BCDT2: SCOPE
2
MOV B #61,SOH1 ;SET UP MODE '1' 'EXT SYNC'
JSR PC,ADR SRC ;ADDRESS THE MODULE
CMP B #EOT,(R2)+ ;WAS 'EOT' RETURNED?
BEQ .+6 ;YES
MODERR ;'EXT SYNC' DIDN'T RETURN AN 'EOT'
ERR5

;*****
;THIS SUBTEST ADDRESSES THE MODULE IN MODE '2' AND CHECKS THAT ONLY
;DATA IS RECIEVED FROM THE MODULE.
;*****
BCDT3: SCOPE
3
MOV B #62,SOH1 ;SET UP MODE '2'
JSR PC,ADR SRC ;ADDRESS THE MODULE
CMP B #EOT,RECBFO+10 ;IS 'EOT' IN CORRECT PLACE
BEQ .+6 ;YES
MODERR ;ONLY DATA SHOULD BE TRANSMITTED IN MODE '2'
ERR3

;*****
;THIS SUBTEST ADDRESSES THE MODULE FOR MODE '3' (EXT. SYNC) AND CHECKS
;THAT ONLY AN 'EOT' AND ONLY 'EOT' IS RECEIVED BACK.
;*****
BCDT4: SCOPE
4
MOV B #63,SOH1 ;SET UP MODE '3'
JSR PC,ADR SRC ;ADDRESS MODULE
CMP B #EOT,(R2)+ ;WAS 'EOT' RETURNED?
BEQ .+6 ;YES
MODERR ;EXTERNAL &SYNC' DIDN'T RETURN AN 'EOT'
ERR3

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J04

PDM70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 48
 DZPMAB.P11 M7391 BCD INPUT MODULE ADDRESS TEST

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1818 :*****
1819 :THIS SUBTEST ADDRESSES THE MODULE USING ALL THE WRONG
1820 :MODULE ADDRESSES AND TESTS THAT THE MODULE ISN'T ENABLED.
1821 :*****
1822
1823
1824 003644 104001 BCDT5: SCOPE
1825 003646 000005 5
1826 003650 004737 005066 JSR PC, @#ADRSIT ;SUBROUTINE TO ADDRESS MODULE
1827
1828
1829 :*****
1830 :THIS SUBTEST REQUESTS THAT THE CUSTOMER SWITCHES BE RE-SET TO ALL ON
1831 :AND THE INPUTS GROUNDED. THE PROGRAM THEN CHECKS THAT ALL 0'S
1832 :ARE READ FROM THE MODULE.
1833 :NOTE: IF DATA SW10 IS NOT SET, THE FOLOWING SUBTESTS ARE SKIPPED.
1834 :*****
1835
1836 003654 104001 BCDT6: SCOPE
1837 003656 000006 6
1838 003660 032777 002000 175464 BIT #SW10, @JSR ;SW SET?
1839 003666 001515 BEQ BCDT11 ;NO, SKIP MANUAL TESTS.
1840 003670 104012 PRINT
1841 003672 024774 MES31
1842 003674 025125 MES31D
1843 003676 104013 TTYIN ;WAIT FOR 'CR'
1844 003700 012737 003700 020550 MOV #., RETURN ;RE-SET SCOPE LOOP POINTER
1845 003706 104005 RECVRO
1846 003710 112737 000062 017017 MOVB #62, SOH1 ;SET UP MODE '2'
1847 003716 004737 017006 JSR PC, @#ADRSRC ;ADDRESS THE MODULE
1848 003722 122722 000060 CMP2B: CMPB #60, (R2)+
1849 003726 001403 BEQ .+10
1850 003730 104022 MODERR ;DATA SHOULD TO ALL 0'S WITH
1851 003732 030174 ERR3 ;THE INPUTS GROUNDED
1852 003734 000403 BR BCDT7 ;EXIT ON ERROR
1853 003736 022702 016032 CMP #RECBFO+10, R2 ;DONE?
1854 003742 001367 BNE CMP2B ;NO
1855
1856
1857 :*****
1858 :THIS SUBTEST REQUESTS THAT THE CUSTOMER SWITCHES BE SET TO ALL OFF AND
1859 :CHECKS THAT ONLY THE ADDRESS, MODE AND 'EOT' ARE RETURNED.
1860 :NOTE: IF DATA SW10 IS SET THE FOLLOWING TESTS ARE SKIPPED.
1861 :*****
1862
1863 003744 104001 BCDT7: SCOPE
1864 003746 000007 7
1865 003750 104012 PRINT
1866 003752 024007 MES10 ;TEXT 'RESET MODULE TO ADDR. '17'..
1867 003754 104012 PRINT
1868 003756 024774 MES31 ;SET CUST. SW.'S TO '0'
1869 003760 025154 MES31E
1870 003762 104013 TTYIN ;WAIT FOR 'CR'
1871 003764 112737 000077 031602 MOVB #77, MODADR ;SET UP NEW MODULE ADDRESS.
1872 003772 112737 000077 017015 MOVB #77, SRCADR
1873 004000 012737 004000 020550 MOV #., RETURN ;RE-SET SCOPE LOOP POINTER

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PDM70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 49
 DZPMAB.P11 M7381 BCD INPUT MODULE ADDRESS TEST

1874	004006	104005		RECVRO		;ENABLE THE DL11 RECVR.
1875	004010	112737	000060 017017	MOVB	#60,SOH1	;SET UP MODE '0'
1876	004016	004737	017006	JSR	PC,3*ADRSRC	;ADDRESS THE MCDULE
1877	004022	005712		TST	(R2)	;WAS ANY DATA RETURNED?
1878	004024	001003		BNE	+.10	;YES
1879	004026	104022		MODERR		;DIDN'T ENTER DATA MODE
1880	004030	030507		ERR11		
1881	004032	000406		BR	BCDT10	;EXIT ON ERROR
1882	004034	122737	000004 016024	CMPB	#EOT,RECBFO+2	;EOT SHOULD BE 3RD CHAR. BACK
1883	004042	001402		BEQ	+.6	;OK, IT IS
1884	004044	104022		MODERR		;DATA WASN'T INHIBITED
1885	004046	030174		ERR3		

 :THIS SUBTEST REQUESTS THAT THE CUSTOMER SWITCHES BE SET TO ALTERNATE
 :ON & OFF AND CHECKS THAT ONE '4' CHARACTERS ARE RETURNED.
 :*****

1892	004050	104001		BCDT10: SCOPE		
1893	004052	000010		IO		
1894	004054	104012		PRINT		
1895	004056	024774		MES31		
1896	004060	025074		MES31C		
1897	004062	104013		TTYIN		;WAIT FOR 'CR'
1898	004064	012737	004064 020550	MOV	#,RETURN	;RE-SET THE SCOPE LOOP POINTER
1899	004072	104005		RECVRO		
1900	004074	112737	000062 017017	MOVB	#62,SOH1	;SET UP MODE '2'
1901	004102	004737	017006	JSR	PC,3*ADRSRC	;ADDRESS THE MODULE
1902	004106	022737	000004 016026	CMP	#EOT,RECBFO+4	;WHERE ONLY '4' CHAR.'S RETURNED
1903	004114	001402		BEQ	+.6	;YES
1904	004116	104022		MODERR		;ONLY '4' CHAR.'S SHOULD BE RETURNED
1905	004120	030174		ERR3		

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PDM70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 50
DZPMAB.P11 M7381 BCD INPUT MODULE ADDRESS TEST

1906						*****
1907						THIS SUBTEST TESTS THE DEVICE FLAG IN MODE '1'. A REQUEST IS MADE
1908						FOR AN EXTERNAL SIGNAL TO BE SUPPLIED. THE 'BCD' INPUT MODULE
1909						IS THEN ADDRESSED AND CHECKS THAT DATA WAS RETURNED.
1910						*****
1911						
1912	004122	104001				BCDT11: SCOPE
1913	004124	000011				11
1914	004126	104012				PRINT
1915	004130	026345				MES60
1916	004132	104013				TTYIN
1917	004134	112737	000061	017017		MOV8 #61,SOH1
1918	004142	004737	017006			JSR PC,ADR SRC
1919	004146	105737	016023			TST8 RECBFO+1
1920	004152	001002				BNE BCDT12
1921	004154	104022				MODERR
1922	004156	031101				ERR20
1923						
1924						
1925						*****
1926						THIS SUBTEST TEST THE DEVICE FLAG IN MODE '3'. A REQUEST IS MADE
1927						FOR AN EXTERNAL SIGNAL TO BE SUPPLIED. THE 'BCD' INPUT MODULE IS
1928						THEN ADDRESSED AND CHECKED THAT DATA WAS RETURNED.
1929						*****
1930						
1931	004160	104001				BCDT12: SCOPE
1932	004162	000012				12
1933	004164	104012				PRINT
1934	004166	026345				MES60
1935	004170	104013				TTYIN
1936	004172	112737	000063	017017		MOV8 #63,SOH1
1937	004200	004737	017006			JSR PC,ADR SRC
1938	004204	105737	016023			TST8 RECBFO+1
1939	004210	001002				BNE BCDT13
1940	004212	104022				MODERR
1941	004214	031101				ERR20

;TEXT 'SUPPLY AN EXTERNAL SYNC.'
;WAIT FOR 'CR'
;SELECT MODE '1' ;WAIT FOR DEVICE FLAG.
;ADDRESS THE MODULE
;WAS ANY DATA RETURNED?
;YES, CHECK FORMAT
;NO DATA RETURNED WITH EXT. SYNC.

;TEXT 'SUPPLY AN EXTERNAL SYNC.'
;WAIT FOR 'CR'
;SELECT MODE 3 WAIT FOR DEVICE FLAG
;ADDRESS THE MODULE
;WAS ANY DATA RETURNED?
;YES, VERIFY FORMAT
;NO DATA RETURNED WITH EXT. SYNC.

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PDM70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 51
 DZPMAB.P11 M7381 BCD INPUT MODULE ADDRESS TEST

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1942 :*****
1943 :TEST COMPLETE
1944 :*****
1945
1946 004216 104001 BCDT13: SCOPE
1947 004220 000013 13
1948 004222 104012 PRINT
1949 004224 023727 MES7 ;TEST COMPLETE
1950 004226 000137 903402 JMP BCDT0
1951
1952 :*****
1953 :SBTTL M7381 BCD INPUT EXERCISER TEST
1954 :THIS TEST REQUESTS THE MODULE ADDRESS AND THEN CONTINUOUSLY
1955 :ADDRESSES THE MODULE USING DATA SWITCHES '0 & 1' TO SELECT THE MODE.
1956 :THE RECEIVED DATA IS THEN PRINTED ON THE TELETYPE.
1957 :*****
1958
1959 004232 104012 M7381E: PRINT
1960 004234 025165 MES32
1961 004236 104026 ADDRESS ;GET MODULE ADDRESS
1962 004240 104035 SETUP ;SETUP THE 'R' ADDRESS
1963 004242 004737 021374 JSR PC,TTYENB ;ENABLE INTERRUPTS
1964
1965 004246 104012 M381E1: PRINT
1966 004250 031500 CRLF
1967 004252 117700 175074 M381E2: MOV8 @SWR,RO ;GET MODE FROM SW.'S
1968 004256 142700 000374 BICB #374,RO ;CLR UN-WANTED BITS
1969 004262 110037 017017 MOV8 RO,SOH1 ;SET UP THE MODE
1970 004266 152737 000060 017017 BISB #60,SOH1
1971 004274 104005 RECVRO ;ENABLE THE DL11 RECVR.
1972 004276 004737 017006 JSR PC,@ADRSRC ;ADDRESS THE MODULE
1973 004302 105737 016012 TSTB RECEO1 ;HAS 'EOT' RETURNED?
1974 004306 001775 BEQ -4 ;NO, WAIT IT OUT
1975 004310 032777 020000 175034 BIT #SW13,@SWR ;INHIBIT PRINTOUT?
1976 004316 001355 BNE M381E2 ;YES
1977 004320 104037 PRTRBF ;PRINT RECVR. DATA
1978 004322 000753 BR M381E2

```

N04.

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DZPMAB.P11 M7381 BCD INPUT EXERCISER TEST

1979			:*****
1990			:SBTTL M7382 BCD OUTPUT MODULE ADDRESS TEST
1991			:*****
1992			
1983	004324	104012	M7382A: PRINT
1984	004326	025217	MES33
1985	004330	104026	ADDRESS ;GET THE MODULE ADDRESS
1986	004332	104035	SETUP ;SET UP TEST PARAMETERS
1987			
1998			:*****
1989			:THIS TEST ADDRESSED THE BCD OUTPUT MODULE AND TRANSMITS '8' DIGITS
1990			:OF DATA AS '77'. THIS SHOULD CAUSE ALL THE OUTPUT LINES TO BE HIGH
1991			:*****
1992			
1993	004334	000240	OBCDT1: NOP
1994	004336	000240	NOP
1995	004340	004737	JSR PC, @#ADRST ;ADDRESS DESTINATION
1996			
1997	004344	104007	LDPGMO ;TRANSMIT THE FOLLOWING DATA
1998	004346	004352	.+4
1999	004350	000405	BR TAG3A
2000	004352	077	.BYTE 77 ;1ST DIGIT
2001	004353	077	.BYTE 77
2002	004354	077	.BYTE 77
2003	004355	077	.BYTE 77
2004	004356	077	.BYTE 77
2005	004357	077	.BYTE 77
2006	004360	077	.BYTE 77
2007	004361	077	.BYTE 77 ;LAST DIGIT
2008	004362	004	.BYTE EOT
2009		004364	.EVEN
2010			
2011	004364	104012	TAG3A: PRINT ;TEXT 'EXAMINE OUTPUT
2012	004366	025250	MES34
2013	004370	025303	MES35 ;CHECK FOR ALL LOGIC 1'S
2014	004372	104013	TTYIN ;WAIT FOR CHECK

017022

: THIS SUBTEST SHOULD CAUSE ALTERNATE 'HI & LO 'S' TO BE SEEN ON THE OUTPUT
: *****

08COT2: SCOPE

```

JSR      PC,2=ADDRDST      ;ADDRESS DESTINATION
LOPGMO   ;TRANSMIT THE FOLLOWING DATA
+4
BR       TAG3B
.BYTE    65                ;1ST DIGIT
.BYTE    65
.BYTE    65
.BYTE    65
.BYTE    65
.BYTE    65
.BYTE    65
.BYTE    65
.BYTE    65                ;LAST DIGIT
.BYTE    EOT
.EVEN

```

TAG3B: PRINT
MES34
MES40B
TTYIN

:WAIT FOR CHECK

```

:*****
:THIS SUBTEST SHOULD CAUSE ALTERNATE 'HI & LO'S' TO BE SEEN ON THE OUTPUT
:IN REVERSE OF THOSE IN THE PREVIOUS SUBTEST.
:*****

```

CECDT3: SCOPE

```

3      JSR      PC,ADRST          ;ADDRESS DESTINATION
LDPGM0                                ;TRANSMIT THE FOLLOWING DATA
.+4
BR      TAG3C
.BYTE   72
.BYTE   72
.BYTE   72
.BYTE   72
.BYTE   72
.BYTE   72
.BYTE   72
.BYTE   72
.BYTE   EOT
.EVEN

```

TAG30: PRINT
 MES34
 MES37
 MES40B
 ITTYIN

:WAIT FOR CHECK

```

2068      ;*****
2069      ;THIS SUBTEST CONTINUOUSLY ADDRESSES THE MODULE ENABLING THE USER TO SCOPE
2070      ;FOR THE SIGNAL 'OUTPUT DONE 'H 3 L'.
2071      ;*****
2072
2073      004476 104001      OBCDT4: SCOPE
2074      004500 000004      4
2075      004502 104012      PRINT
2076      004504 025334      MES38      ;TEXT SCOPE FOR OUTPUT DONE
2077      004506 004737 017022 TAG3D: JSR      PC,2*ADROST      ;ADDRESS DESTINATION
2078
2079      004512 104006      LDCHRO
2080      004514 000004      EOT
2081      004516 000773      BR      TAG3D      ;CYCLE UNTIL RESTARTED
2082
2083
2084
2085      .SBTTL BCD I/O TEST
2086      ;*****
2087      ;BCD INPUT/OUTPUT EXERCISER TEST
2088      ;THIS TEST USES BOTH THE BCD 'INPUT&OUTPUT' MODULES. AN INCREMENTING
2089      ;'BCD' COUNT IS SENT TO THE OUTPUT MODULE AND WRAPPED AROUND VIA A
2090      ;SPECIAL CABLE TO THE INPUT MODULE. THE DATA RECEIVED FROM THE INPUT MODULE
2091      ;IS THEN VERIFIED AGAINST THE TRANSMITTED DATA. THE INPUT MODULE CAN
2092      ;BE SETUP TO USE EITHER INTERNAL OR EXTERNAL SYNC. IF EXTERNAL SYNC IS
2093      ;SELECTED, THIS SIGNAL IS SUPPLIED FROM THE SIGNAL ON THE BCD OUTPUT
2094      ;MODULE KNOWN AS OUTPUT DATA H.
2095      ;*****
2096
2097      004520 104012      BCDIO: PRINT
2098      004522 025634      MES43      ;TEXT 'BCD I/O TEST'
2099      004524 104026      ADDRESS      ;GET THE MODULE ADDRESS
2100      004526 104012      PRINT
2101      004530 025607      MES42      ;TEXT 'INT OR EXT SYNC.?'
2102      004532 104013      TTYIN      ;WAIT FOR INPUT
2103      004534 122737 000111 015116 CMPB      #111,INBUF      ;'I' FOR INTERNAL?
2104      004542 001404      BEQ      .+12      ;YES, SET UP FOR INT. SYNC.
2105      004544 112737 000061 017017 MOVB      #61,SOH1      ;NO, SET UP FOR EXT. SYNC.
2106      004552 000403      BR      .+10
2107      004554 112737 000060 017017 MOVB      #60,SOH1
2108      004562 104035      SETUP      ;SET UP TEST PARAMETERS

```

```

2109
2110
2111
2112
2113
2114
2115
2116
2117 004564 000240
2118 004566 000240
2119 004570 012700 004624
2120 004574 112720 000060
2121 004600 022700 004634
2122 004604 001373
2123 004606 012701 004624
2124
2125 004612 004737 017022
2126 004616 104007
2127 004620 004624
2128 004622 000405
2129 004624 060
2130 004625 060
2131 004626 060
2132 004627 060
2133 004630 060
2134 004631 060
2135 004632 060
2136 004633 060
2137 004634 004
2138 004636
2139
2140 004636 104005
2141 004640 004737 017006
2142 004644 104004
2143 004646 012702 004624
2144 004652 012703 016024
2145 004656 122223
2146 004660 001403
2147 004662 104022
2148 004664 030174
2149 004666 000414
2150 004670 022702 004634
2151 004674 001370
2152
2153 004676 105211
2154 004700 122711 000100
2155 004704 001342
2156 004706 112721 000060
2157 004708 022701 004634
2158 004710 001367
2159 004720 104012
2160 004722 023727
2161 004724 000717

```

```

:*****~*****
:THIS SUBTEST OUTPUTS A DATA PATTERN OF '60-77' TO EACH 'BCD' OUTPUT,
:ONE AT A TIME. THIS PATTERN IS THEN READ BACK BY THE BCD INPUT
:MODULE AND COMPARED AGAINST THE OUTPUTTED DATA. THIS TEST WILL VERIFY
:THAT EACH OUTPUT LINE CAN BE ADDRESSED AND THAT NO TWO OUTPUTS ARE
:SHORTED TOGETHER.
:*****

```

```

BCDI01: NOP
        NOP
        MOV     #DATA1,R0      SET UP DATA TABLE TO TRANSMIT ALL 0'S.
        MOV     #60,(R0)+
        CMP     #DATA2,R0      ;DONE?
        BNE     .-10           ;NO
        MOV     #DATA1,R1      ;SET UP DATA POINTER

TAG4A:  JSR     PC,2#ADRDST    ;ADDRESS DESTINATION
        LDPGMO
        .+4
        BR      TAG4B         ;GO HERE WHEN DONE

DATA1:  .BYTE   60
        .BYTE   60
        .BYTE   60
        .BYTE   60
        .BYTE   60
        .BYTE   60
        .BYTE   60
        .BYTE   60
        .BYTE   60
        .BYTE   60
        .BYTE   60
        .EVEN

DATA2:  .BYTE   EOT

TAG4B:  RECVRO
        JSR     PC,2#ADRSRC    ;ENABLE THE DL11 RECVR.
        DELAY
        MOV     #DATA1,R2      ;ADDRESS BCD
        MOV     #RECBFO+2,R3   ;GIVE 'EM TIME READ THE DATA.
        TAG4C:  CMPB     (R2)+,(R3)+ ;SET UP TO VERIFY DATA
        BEQ     .+10           ;DATA EQUAL?
        MODERR
        ERR3
        BR      T,34E+2        ;EXIT ON ERROR
        CMP     #DATA2,R2      ;DONE?
        BNE     TAG4C          ;NO, COMPARE NEXT BYTE

TAG4D:  INCB     (R1)           ;UPDATE DATA PATTERN
        CMPB     #100,(R1)     ;DONE ALL CODES FOR THIS OUTPUT?
        BNE     TAG4A          ;NO, TRANSMIT NEXT PATTERN
        MOV     #60,(R1)+      ;YES, RESET IT TO '60'.
        CMP     #DATA2,R1      ;DONE WITH TEST?
        BNE     TAG4D          ;NO, START NEXT OUTPUT TEST

TAG4E:  BNE     TAG4D
        PRINT
        MES7
        BR      BCDI01        ;TEST COMPLETE
                                   ;RESTART TEST

```

```

2162 ;*****
2163 ;SBITL M7383 A/D INPUT MODULE ADDRESS TEST
2164 ;THIS TEST IS USED TO VERIFY THAT THE A/D MODULE CA ADDRESS
2165 ;AND THAT IT WILL RETURN DATA ON COMPLETION OF A CONVERSION.
2166 ;*****
2167
2168 004726 104012
2169 004731 104055
2170 004732 104026
2171 004734 104035
2172
2173
2174
2175
2176
2177
2178 004736 000240
2179 004740 000240
2180 004742 112737 000063 017017
2181 004750 004737 017006
2182
2183
2184 004754 000240
2185 004756 105737 016023
2186 004762 001003
2187 004764 104022
2188 004766 030507
2189 004770 000414
2190 004772 005737 016012
2191 004776 001003
2192 005000 104022
2193 005002 030251
2194 005004 000406
2195 005006 122737 000004 016032
2196 005014 001402
2197 005016 104022
2198 005020 030174
2199
2200
2201
2202
2203
2204 005022 104001
2205 005024 000002
2206 005026 112737 000070 017017
2207 005034 004737 017006
2208
2209 005040 122737 000004 016062
2210 005046 001402
2211 005050 104022
2212 005052 030174

;*****
;ADT1:  NOP
;      NOP
;      MOVB #63,SOH1 ;PROGRAM CH.'3'
;      JSR PC,2*ADRSRC ;ADDRESS MODULE
;
;TAG2A: NOP
;      TSTB RECBFO+1 ;DATA RETURNED?
;      BNE .+10 ;YES
;      MODERR ;MODULE DIDN'T ENTER DATA MODE
;      ERR11
;      BR ADT2 ;EXIT ON ERROR
;      TST RECBOT ;WAS 'EOT' RETURNED?
;      BNE .+10 ;YES
;      MODERR ;MODULE DIDN'T RETURN 'EOT'
;      ERR5
;      BR ADT2 ;EXIT ON ERROR
;      CMPB #EOT,RECBFO+10 ;CORRECT NO. OF CHAR.'S RETURNED?
;      BEQ .+6 ;YES
;      MODERR ;DIDN'T RECV. CORRECT NO. OF CHAR.'S.
;      ERR3
;
;*****
;THIS SUBTEST ADDRESSES THE A/D MODULE USING MODE '8' AND TESTS
;THAT THE CORRECT NUMBER OF CHARACTER ARE RECEIVED BACK.
;*****

ADT2: SCOPE
      2
      MOVB #70,SOH1 ;PROGRAM MODE '8'
      JSR PC,2*ADRSRC ;ADDRESS MODULE
;
TAG2B: CMPB #EOT,RECBFO+40 ;'EOT' SHOULD BE RETURNED HERE
      BEQ .+6 ;OK
      MODERR ;MODULE DIDN'T RETURN '4' CH.'S OF DATA
      ERR3

```

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 DZPMAB.P11 M7393 A D INPUT MODULE ADDRESS TEST

```

2213
2214
2215
2216
2217
2218
2219
2219 005054 104001
2220 005056 000003
2221 005060 004737 005066
2222 005064 000437
2223
2224 005066 005737 031600
2225 005072 0
2226 005074 000060 005123
2227 005102 001416 031602 005123
2228 005110 104005
2229 005112 104025
2230 005114 005122
2231 005116 000403
2232 005120
2233
2234 005122 021
2235 005123 060
2236 005124 001
2237 005125 060
2238 005126 023
2239 005127 000
2240
2241 005130 005712
2242 005132 001405
2243 005134 113737 005123 030634
2244 005142 104022
2245 005144 030572
2246
2247 005146 105237 005123
2248 005152 122737 000100 005123
2249 005160 001350
2250 005162 000207

;*****
;THIS SUBTEST ADDRESSES THE 'A/D' USING THE WRONG MODULE ADDRESSES
;AND TESTS THAT THE MODULE ISN'T ENABLED.
;*****

ADT3: SCOPE
      JSR PC,ADR SIT
      BR ADT4

ADRSIT: TST SIOSWH ;USING THE SERIAL INPUT?
      SNE TAG2H ;YES, INHIBIT RUNNING THIS TEST.
      MOVB #60,ADCHX1 ;SET UP 1ST ADDRESS TO BE TESTED
      CMPB MODADR,ADCHX1 ;EQUAL TO SELECTED ADDR.?
      BEQ TAG2F ;YES, SELECT NEXT. ADDR.
      RECVRO
      SOURCE
      BR TAG2G

ADCHX1: .BYTE DC1 ;ALERT MODULE
        .BYTE 60 ;ADDRESS MODIFIED FROM '60-77'
        .BYTE 50H
        .BYTE 60
        .BYTE DC3
        .BYTE 0 ;ENABLE MODULE

TAG2G: TST (R2) ;WAS ANY DATA RETURNED
      BEQ TAG2F ;NO
      MOVB ADCHX1,ERR13A
      MODERR
      ERR13

TAG2F: INCB ADCHX1 ;UPDATE MODULE ADDRESS
      CMPB #100,ADCHX1 ;DONE?
      BNE TAG2C ;NO
      TAG2H: RTS PC
  
```

G05

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 DZPMAB.P11 M7383 A/D INPUT MODULE ADDRESS TEST

```

2251                                     :*****
2252                                     :THIS SUBTEST CHECKS THAT THE A/D MODULE WILL WORK UNDER EXTERNAL SYNC.
2253                                     :THE MODULE IS ADDRESSED AND THEN A REQUEST IS MADE FOR AN EXTERNAL
2254                                     :SYNC SIGNAL TO BE SUPPLIED.
2255                                     :*****
2256
2257 005164 104001 ADT4: SCOPE
2258 005166 000004 4
2259 005170 032777 002000 174154 BIT #SW10,DSWR ;SW. '10' SET?
2260 005176 001443 BEQ ADT5+4 ;NO. INHIBIT THIS TEST
2261 005200 104012 PRINT
2262 005202 024007 MES10 ;TEXT 'RESET' MODULE ADDR.
2263 005204 104013 TTYIN ;WAIT FOR SETUP
2264 005206 012737 005206 020550 MOV #. RETURN ;RESET SCOPE LOOP POINTER
2265 005214 112737 000077 017015 MOVB #77,SRADR ;SET UP ADDRESS '17'
2266 005222 104005 RECVRO ;ENABLE THE DL11 RECEIVER
2267 005224 112737 000064 017017 MOVB #64,SOH1 ;EXT SYNC; CHANNEL '0'
2268 005232 004737 017006 JSR PC,ADR SRC ;ADDRESS MODULE
2269 005236 005712 TST (R2) ;MAKE SURE NO DATA WAS RETURNED
2270 005240 001403 BEQ .+10
2271 005242 104022 MODERR ;EXT SYNC CONVERSION TOOK PLACE
2272 005244 031143 ERR21 ;WITH NO EXT. SYNC SUPPLIED.
2273 005246 000415 BR ADT5 ;EXIT ON ERROR
2274 005250 104012 PRINT
2275 005252 026345 MES60 ;TEXT 'SUPPLY EXT. SYNC SIGNAL'.
2276 005254 005077 174060 CLR DPSW ;ENABLE DL11 INTERRUPTS
2277 005260 000001 WAIT
2278 005262 012777 000340 174050 MOV #340,DPSW ;SET PROC. PRIOR. D7
2279 005270 104004 DELAY ;WAIT FOR DATA
2280 005272 005712 TST (R2) ;WAS A DATA RETURNED
2281 005274 001002 BNE .+6 ;YES
2282 005276 104022 MODERR ;NO DATA WAS RETURNED WITH
2283 005300 031101 ERR20 ;EXTERNAL SYNC.
2284
2285 :*****
2286 :TEST COMPLETE
2287 :*****
2288
2289 005302 104001 ADT5: SCOPE
2290 005304 000005 5
2291 005306 104012 PRINT
2292 005310 023727 MES7 ;TEXT 'TEST COMPLETE'
2293 005312 000137 004734 JMP ADT0 ;RE-START TEST.

```

```

2294      ;*****
2295      ;SBTTL M7383 A/D CALIBRATION ROUTINE
2296      ;THIS ROUTINE TAKES CONTINUOUS CONVERSION USING DATA SW'S '0-4' IN OCTAL
2297      ;WEIGHT TO SELECT THE CHANNEL TO BE CONVERTED AND THEN PRINTS THE CONVERTED VALUE
2298      ;
2299      ;CHANNEL SELECTION IS AS FOLLOWS:
2300      ;
2301      ;DATA SW'S '0-1' SELECT 'INT. SYNC' ON CH.'S 0,1,2 OR 3
2302      ;DATA SW '2' & '0-1' SELECT 'EXT SYNC' ON CH.'S 0,1,2 OR 3
2303      ;DATA SW '3' ONLY SELECTS 'INT SYNC' CONVERSION ON ALL '4' CH.'S
2304      ;DATA SW'S '2&3' SELECT 'EXT. SYNC' CONVERSION ON ALL '4' CH.'S
2305      ;*****
2306
2307 005316 104012      M7383C: PRINT
2308 005320 024102      MES:2
2309 005322 104026      ADDRESS
2310 005324 004737 021216 JSR      PC,REMOTE
2311 005330 104035      SETUP
2312 005332 012701 000001 MOV      #1,R1
2313 005336 104036      NODLAY
2314 005340 104012      CALBT1: PRINT
2315 005342 031500      CRLF
2316 005344 117703 174002 CALBT2: MOVB   @SWR,R3
2317 005350 142700 000300 BICB    #300,R3
2318 005354 152700 000063 BISB    #50,R3
2319 005360 110337 017017 MOVB    R3,$OH1
2320 005364 104027      ADCNVT
2321 005366 032777 020000 173756 BIT      #SW13,@SWR
2322 005374 001363      BNE     CALBT2
2323 005376 004737 021256 JSR      PC,SETRMT
2324
2325 005402 104037      PTRBFB
2326 005404 004737 021300 JSR      PC,CLRMOTE
2327 005410 000755      BR      CALBT2

```

```

;TEXT 'A/D CALIBRATION ROUTINE'
;GET MODULE ADDRESS
;CHECK FOR REMOTE DESTINATION
;SET UP THE 'R' RESTART ADDRESS
;SET UP FOR '1' CONVERSION
;SET TRANS. DELAY INHIBIT SW.

;GET CHANNEL
;CLR UN-WANTED BITS
;CONVERT TO ASCII
;SET UP TO CONVERT CH.
;CONVERT
;INHIBIT TYPEOUT?
;YES, TAKE NEXT CONVERSION
;CHK FOR AND SET UP REMOTE DST.

;PRINT RECV'D DATA
;CLEAR REMOTE DESTINATION

```

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 DZPMAB.P11 M7383 A/D CALIBRATION ROUTINE

```

2328      ;*****
2329      ;SBTTL M7383 A/D REPEATIBILITY TEST
2330      ;THIS TEST REQUESTS FOR A CHANNEL AND A V.S.F (VERTICAL SCALE FACTOR) TO
2331      ;BE INPUTTED FROM THE TELETYPE.  A SERIES OF '100' CONVERSIONS A THEN TAKEN,
2332      ;AVERAGED AND THEN THE RESULT IS DISPLAYED IN A HISTOGRAM FORMAT ON
2333      ;THE TELETYPE.
2334      ;*****
2335
2336      005412 104012
2337      005414 024265
2338      005416 104026
2339      005420 004737 021216
2340      005424 104035
2341      005426 104036
2342      005430 104012
2343      005432 024315
2344      005434 104013
2345      005436 104030
2346      005440 005737 022316
2347      005444 001771
2348      005446 013737 022316 031642
2349      005454 005037 015700
2350      005460 005037 015704
2351      005464 013737 031642 015676
2352      005472 012737 000144 015702
2353      005500 004737 015604
2354      005504 005737 015714
2355      005510 001347
2356      005512 013737 015710 031650
2357      005520 013737 031642 031652
2358      005526 006337 031652
2359      005532 104032
2360      005534 012701 000144
2361      005540 012702 017450
2362      005544 104027
2363      005546 104031
2364      005550 012700 015706
2365      005554 012703 031750
2366      005560 012704 000003
2367      005564 012023
2368      005566 005304
2369      005570 001375
2370      005572 013700 015710
2371      005576 062700 000011
2372      005602 010037 031644
2373      005606 162700 000022
2374      005612 010037 031646
2375      005616 013704 031650
2376      005622 013701 031642
2377      005626 022701 000001
2378      005632 001412
2379      005634 104031
2380      005636 013723 015710
2381      005642 063702 031652
2382      005646 005304
2383      005650 001371

M7383R: PRINT
          MES15 ;TEXT 'A/D REPEATIBILITY TEST'.
          ADDRESS ;GET THE MODULE ADDRESS
          JSR PC,REMOTE ;CHECK FOR REMOTE DESTINATION
          SETUP ;SET UP RESTART ADDR. POINTER
          NOOLAY ;SET TRANS. DELAY INHIBIT SW.

REPT0A: PRINT
          MES16 ;REQUEST 'VSF'
          TTYIN
          BCDIBIN ;CONVERT INPUT TO BINARY
          TST BCDTAB ;VSF=0?
          BEQ REPT0A ;YES, ILLEGAL ENTRY
          MOV BCDTAB,KSTOR1 ;SAVE INPUT
          CLR HIDIVR
          CLR HIDIVD
          MOV KSTOR1,LODIVR ;SET UP TO DIVIDE 'VSF' TO GET NO. OF AVG.'S
          MOV #100,LODIVD
          JSR FC,DIVIDE
          TST REMAIN ;IS NUMBER LEGAL?
          BNE REPT0A ;NO, REQUEST NEW 'VSF'
          MOV QUOTIENT,KSTOR4 ;YES, SAVE IT
          MOV KSTOR1,KSTOR5
          ASL KSTOR5

REPTD: MOV #100,R1 ;REQUEST CHANNEL.
          MOV #TRANBFO,R2 ;SET UP TO TAKE '100' CONVERSIONS
          ;SET UP TO SAVE CONVERTED VALUE
          ADCNVT
          AVERAGE ;TAKE 100 CONVERSION
          MOV #LOW,R0 ;AVERAGE THEM
          MOV #AVGTAB,R3 ;SET UP TO SAVE VALUES
          MOV #3,R4 ;SAVE AVERAGE HERE
          MOV (R0)+,(R3)+ ;SAVE AVG HIGH & LOW
          DEC R4 ;SAVED ALL VALUES
          BNE .-4 ;NO
          MOV QUOTIENT,R0 ;SET UP AVERAGE
          ADD #9,R0 ;CALCULATE AVERAGE +9 VALUE
          MOV R0,KSTOR2 ;SAVE IT
          SUB #18,R0 ;CALCULATE AVERAGE -9 VALUE
          MOV R0,KSTOR3 ;SAVE IT
          MOV KSTOR4,R4 ;SETUP TO AVERAGE 'VSF'
          MOV KSTOR1,R1 ;SET UP TO TAKE 'X' AVERAGES
          CMP #1,R1 ;VSF =1?
          BEQ REPT3 ;YES, NO AVERAGING NEEDED
          ;DO IT
          MOV QUOTIENT,(R3)+ ;SAVE VALUE
          ADD KSTOR5,R2 ;SET BUFFER POINTER TO PICK UP NEXT GROUP
          DEC R4 ;DONE
          BNE REPT2 ;NO
  
```

2384	00565	2702	031756	MOV	#AVGTAB+6,R2	;SET UP TO CATEGORIZE AVERAGES
2385	00565	J0402		BR	.+6	
2386	00566	012702	017450	REPT3: MOV	#TRNBFO,R2	;FOR VSF OF '1' USE ACTUAL VALUES
2387	005664	012700	031674	MOV	#ORLOW,R0	;SET UP TO CLR COUNT BUFFER
2388	005670	005020		CLR	(R0)+	;CLR BUFFER
2389	005672	022700	031750	CMP	#ORHIGH+2,R0	;DONE?
2390	005676	001374		BNE	.-6	;NO
2391	005700	013700	031650	MOV	KSTOR4,R0	;KSTOR4 CONTAINS VSF
2392	005704	010001		MOV	R0,R1	
2393	005706	021237	031644	REPT4: CMP	(R2),KSTOR2	;IS VALUE > AVG. +9?
2394	005712	003403		BLE	.+10	;NO
2395	005714	005237	031746	INC	ORHIGH	;YES, VALUE OUT OF RANGE
2396	005720	000414		BR	REPT5	
2397	005722	021237	031646	CMP	(R2),KSTOR3	;IS VALUE < AVG. -9?
2398	005726	002003		BGE	.+10	;YES
2399	005730	005237	031674	INC	ORLOW	;NO, OUT OF RANGE
2400	005734	000406		BR	REPT5	
2401	005736	011203		MOV	(R2),R3	;GET VALUE TO WORK ON IT
2402	005740	163703	031646	SUB	KSTOR3,R3	;OBTAIN OFFSET
2403	005744	006303		ASL	R3	
2404	005746	005253	031676	INC	MINUS9(R3)	;INCREMENT CNTR
2405	005752	005722		REPT5: TST	(R2)+	;INCREMENT POINTER
2406	005754	005300		DEC	R0	;DONE?
2407	005756	001353		BNE	REPT4	;NO
2408	005760	004737	021256	JSR	PC,SETRMT	;CHK FOR AND SET UP REMOTE DST.
2409						
2410						
2411						
2412						
2413						
2414						
2415	005764	012702	031676	REPT6: MOV	#MINUS9,R2	;SET UP COUNT TABLE
2416	005770	005003		CLR	R3	
2417	005772	020122		CMP	R1,(R2)+	;SCAN TABLE FOR CURRENT COUNT
2418	005774	001407		BEQ	REPT7	;COUNT FOUND, PRINT IT
2419	005776	005203		INC	R3	
2420	006000	022702	031746	REPT6A: CMP	#ORHIGH,R2	;SCANNED WHOLE TABLE?
2421	006004	001372		BNE	REPT6+6	;NO, CONTINUE
2422	006006	005301		REPT6B: DEC	R1	;YES, CHECKED ALL COUNTS?
2423	006010	001365		BNE	REPT6	;NO, RE-SCAN TABLE
2424	006012	000422		BR	REPT9	;TYPE FINAL DATA
2425						
2426	006014	104012		REPT7: PRINT		
2427	006016	031360		DASH		
2428	006020	010337	021036	REPT8: MOV	R3,SPACE	;ANY SPACES TO BE TYPED?
2429	006024	001401		BEQ	.+4	;NO, PRINT ASTRICK
2430	006026	104016		SPACE		;YES, PRINT SPACE
2431	006030	005342		DEC	-(R2)	;SUBTRACT '1' FROM COUNT
2432	006032	005722		TST	(R2)+	
2433	006034	104012		PRINT		
2434	006036	031346		ASTRIC		
2435	006040	005003		CLR	R3	
2436	006042	022702	031746	REPT8A: CMP	#ORHIGH,R2	;DONE CURRENT SCAN?
2437	006046	001757		BEQ	REPT6B	;YES, EXIT
2438	006050	020122		CMP	R1,(R2)+	;NO, IS THIS COUNT EQUAL?
2439	006052	001762		BEQ	REPT8	;YES, PRINT IT

 ;AT THIS POINT THE AVERAGES HAVE BEEN TAKEN AND CATEGORIZED. THE
 ;NEXT SECTION DISPLAYS THE COUNTS IN A HISTOGRAM FORMAT.
 ;*****

Address	Hex	Dec	Label	Instruction	Comment
2440	006054	005203		INC R3	;NO, INC. SPACE CNTR.
2441	006056	000771		BR REPT8A	
2442	006060	113701	016024	REPT9: MOV B RECBFO+2,R1	;SAVE GAIN SETTING
2443	006064	122701	000114	CMP B #'L,R1	;RUNNING WITH LOW GAIN?
2444	006070	001003		BNE .+10	;NO
2445	006072	012737	031421 006134	MOV #X1MV,REPT10	
2446	006100	122701	000115	CMP B #'M,R1	;RUNNING WITH MEDIUM GAIN?
2447	006104	001003		BNE .+10	;NO
2448	006106	012737	031425 006134	MOV #X100UV,REPT10	
2449	006114	122701	000110	CMP B #'H,R1	;RUNNING WITH HIGH GAIN
2450	006120	001003		BNE .+10	;NO
2451	006122	012737	031433 006134	MOV #X10UV,REPT10	
2452	006130	104012		PRINT SCALE	;PRINT HORIZONTAL SCALE HEADER
2453	006132	031363		REPT10: 0	
2454	006134	000000		XDIV	
2455	006136	031440		JSR PC,REPT13	;PRINT SUMMARY
2456	006140	004737	006216	REPT11: MOV ORLOW,R5	
2457	006144	013705	031674	ADD ORHIGH,R5	;WERE ANY COUNTS OUT OF RANGE?
2458	006150	063705	031746	BEQ REPT12	;NO, RE-CYCLE TEST
2459	006154	001412		PRINT	
2460	006156	104012		XLOW	;TEXT 'OR-LOW
2461	006160	031451		MOV ORLOW,R2	
2462	006162	013702	031674	BINDEC	;PRINT COUNTS LOW
2463	006166	104033		PRINT	
2464	006170	104012		XHIGH	
2465	006172	031462		MOV ORHIGH,R2	
2466	006174	013702	031746	BINDEC	;PRINT COUNTS 'HI'
2467	006200	104033		REPT12: PRINT	
2468	006202	104012		CRLF2	
2469	006204	031502		JSR PC,CLRMOTE	;CLEAR REMOTE DESTINATION
2470	006206	004737	021300	RPT12A: JMP REPT0	
2471	006212	000137	005534		
2472					
2473	006216	012703	000003	REPT13: MOV #3,R3	;SET UP PRINT LO-HI & AVG. VALUES
2474	006222	012701	031750	MOV #AVGTAB,R1	;SET UP BUFFER POINTER
2475	006226	012102		REPT14: MOV (R1)+,R2	;GET VALUE
2476	006230	004737	006730	JSR PC,POSTIT	;CONVERT & PRINT IT
2477	006234	005303		DEC R3	
2478	006236	001001		BNE .+4	
2479	006240	000207		RTS PC	
2480	006242	012737	000002 021036	MOV #2,SPACE	
2481	006250	104016		SPACE	
2482	006252	000765		BR REPT14	
2483					

L05

PDM70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 63
DZPMAB.P11 M7383 A/D REPEATIBILITY TEST

```

2484
2485
2486
2487
2488
2489
2490
2491
2492
2493
2494 006254 104012
2495 006256 024332
2496 006260 104026
2497 006262 104035
2498 006264 005037 031670
2499 006270 104032
2500
2501
2502
2503 006272 104012
2504 006274 024357
2505 006276 104012
2506 006300 024405
2507 006302 104034
2508 006304 000114
2509 006306 007625
2510
2511
2512
2513 006310 104012
2514 006312 024421
2515 006314 104034
2516 006316 000114
2517 006320 000011
2518
2519
2520
2521 006322 104012
2522 006324 024505
2523 006326 024405
2524 006330 104034
2525 006332 000114
2526 006334 004226
2527

```

```

;*****
;SBTTL M7383 A/D GAIN ACCURACY TEST
;THIS TEST REQUESTS OF A SERIES OF VOLTAGES A SPECIFIED GAIN SETTINGS
;TO BE SUPPLIED TO THE 'A/D'. A SERIES OF A HUNDRED CONVERSIONS ARE TAKEN
;AT EACH OF THESE SETTINGS AND AVERAGED OUT. THIS AVERAGE IS THEN TESTED
;TO BE WRITTEN '+ OR -' A COUNT FROM THE TRUE VOLTAGE VALUE FOR THAT
;SPECIFIED SETTING.
;*****

M7383G: PRINT
          MES18                ;TEXT 'A/D GAIN TEST'
          ADDRESS
          SETUP                ;SET UP RESTART ADDR. POINTER
          CLR LOPSWH
          CHANEL               ;REQUEST & STORE CH. TO BE TESTED.

;TEST '+1.990V' AT 'LOW' GAIN

          PRINT
          MES19                ;TEXT 'SUPPLY +1.990V'
          PRINT
          MES20                ;TEXT 'AT LOW GAIN'
          WAITGN
          'L                   ;LOW GAIN
          7625                 ;TRUE VOLTAGE VALUE + OFFSET

;TEST -1.990V AT 'LOW' GAIN

          PRINT
          MES21                ;SWITCH VOLTAGE NEG.
          WAITGN
          'L
          11                   ;TRUE VOLTAGE VALUE + OFFSET

;TEST +.1990V AT LOW GAIN

          PRINT
          MES24                ;TEXT 'SUPPLY' +.1990V'
          MES20                ;TEXT 'SUPPLY +.1990V'
          WAITGN
          'L                   ;GAIN MED.
          4226

```

M05

PDM70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 64
 DZPMAB.P11 M7383 A/D GAIN ACCURACY TEST

```

2528      :TEST '-.1990V AT 'LOW' GAIN
2529
2530      006336 104012      PRINT
2531      006340 024421      MES21      ;TEXT 'SWITCH VOLTAGE NEG.'
2532      006342 104034      WAITGN
2533      006344 000114      'L
2534      006346 003410      3410
2535
2536      :TEXT '0.0V' AT LOW GAIN
2537
2538      006350 104012      PRINT
2539      006352 024553      MES25      ;TEXT 'SUPPLY +0.000V.'
2540      006354 104034      WAITGN
2541      006356 000114      'L
2542      006360 003717      3717
2543      ;*****
2544      ;TEST COMPLETE
2545      ;*****
2546      006362 104012      PRINT
2547      006364 023727      MES7      ;TEST COMPLETE
2548      006366 000735      BR      M7383G+6      ;RE-START TEST
2549      006370 000240      NOP
2550
2551      ;*****
2552      ;SBTTL M7383 A/D GAIN AVERAGING SUBROUTINE
2553      ;THIS SUBROUTINE WAITS FOR 'CR' THEN TAKES AND AVERAGES '100' A/D CONVERSIONS.
2554      ;THIS COMPUTED AVERAGE IS COMPARED AGAINST THE TRUE VOLTAGE VALUE FOR A
2555      ;SPECIFIED SETTING. THE AVERAGE IS PRINTED OUT IF FOUND TO BE MORE THAN '+ OR -'
2556      ;1 COUNT FROM THE AVERAGE
2557      ;*****
2558
2559      006372 017603 000000      XWATGN: MOV      2(SP),R3      ;PICK UP GAIN CODE FROM CALL +2
2560      006376 062716 000002      ADD      #2,(SP)
2561      006402 017604 000000      MOV      2(SP),R4      ;PICK UP TRUE VOLTAGE VALUE
2562      006406 104013      WAITG1: TTYIN      ;WAIT FOR 'CR' TO CONTINUE
2563      006410 012701 000001      MOV      #1,R1
2564      006414 104027      ADCNVT
2565      006416 120337 016024      CMPB      R3,RECBFO+2      ;IS GAIN CODE CORRECT?
2566      006422 001403      BEQ      .+10      ;YES
2567      006424 104012      PRINT      ;NO, TELL HIM ABOUT IT
2568      006426 024604      MES26
2569      006430 000766      BR      WAITG1      ;WAIT FOR SETUP
2570      006432 012701 000144      MOV      #100.,R1      ;SET UP TO TAKE '100' CONVERSIONS

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N05

PDM70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 65
 DZPMAB.P11 M7383 A/D GAIN AVERAGING SUBROUTINE

2571	006436	012702	017450	WAITG2:	MOV	#TRNBFO,R2	;SAVE THEM HERE
2572	006442	104027			ADCVT		;TAKE THE CONVERSIONS
2573	006444	104031			AVERAGE		;AVERAGE THEM
2574	006446	013702	015710		MOV	QUOENT,R2	
2575	006452	020402			CMP	R4,R2	;AVERAGE = TRUE VALUE?
2576	006454	001441			BEQ	GANEXT	;YES, EXIT
2577	006456	005204			INC	R4	
2578	006460	020402			CMP	R4,R2	;AVERAGE = TRUE VALUE +1?
2579	006462	001436			BEQ	GANEXT	;YES, EXIT
2580	006464	162704	000002		SUB	#2,R4	
2581	006470	020402			CMP	R4,R2	;AVERAGE = TRUE VALUE -1?
2582	006472	001432			BEQ	GANEXT	;YES, EXIT
2583	006474	032777	020000	172650	WAITG3:	BIT	#SW13,SWR
2584	006502	001355			BNE	WAITG2	;YES
2585	006504	032777	020000	172640	BIT	#SW13,SWR	;SW SET?
2586	006512	001351			BNE	WAITG2	;YES, INHIBIT ERROR TYPEOUT.
2587	006514	005737	031670		TST	LOPSWH	;NO, HAS ERROR HEADER BEEN TYPED?
2588	006520	001004			BNE	.+12	
2589	006522	005237	031670		INC	LOPSWH	
2590	006526	104012			PRINT		
2591	006530	024625			MES27		
2592	006532	104012			PRINT		
2593	006534	031500			CRLF		
2594	006536	104002			SAVREG		
2595	006540	012703	000003		MOV	#3,R3	
2596	006544	012701	015706		MOV	#LOW,R1	
2597	006550	004737	006226		JSR	PC,REPT14	
2598	006554	104003			GETREG		
2599	006556	000727			BR	WAITG2	
2600							
2601	006560	062716	000002		GANEXT:	ADD	#2,(SP)
2602	006564	000002			RTI		
2603							

```

*****
:SBTTL A D CONVERSION ROUTINE
:THIS ROUTINE TAKES AN A D CONVERSION AND ENABLES
:DL O'S RECVR TO ACCEPT & STORE THE CONVERTED VALUE
*****

006556 104002          XADCT: SAVREG          ;SAVE REG.'S
006570 012705 017453   MOV      #TRNBFO,R5      ;SAVE CONVERTED VALUES HERE
006574 005077 172540   CLR      #PSW           ;ENABLE RECEIVER INTERRUPTS
006600 104005          ADCT0: RECVRO          ;ENABLE THE DL11 RECVR
006602 004737 017006   JSR      PC,2#ADRSRC      ;ADDRESS MODULE

006606 005737 016012   ADCT1: TST      RECEOT      ;WAS 'EOT' RETURNED?
006612 001775          BEQ      #-4              ;NO, WAIT FOR CONVERT
006614 012703 016025   MOV      #RECBFO+3,R3      ;SET UP ADDRESS TO PICK UP SIGN
006620 012704 016026   MOV      #RECBFO+4,R4      ;SET UP ADDRESS TO PICK UP DATA
006624 005000          CLR      R0
006626 012437 015116   ADCT2: MOV      (R4)+,INBUF    ;SET UP NO. TO BE CONVERTED
006632 011437 015120   MOV      (R4),INBUF+2
006636 012737 000004 031662   MOV      #4,CHRCNT
006644 104030          BCDBIN
006646 013715 022316   MOV      BCDTAB,(R5)      ;CONVERT VALUE TO BINARY
006652 122713 000053   CMPB      #53,(R3)        ;SAVE IT
006656 001401          BEQ      #+4              ;VALUE POS.?
006660 005415          NEG      (R5)              ;YES, LEAVE AS IS
006662 063725 031576   ADD      OFFSET,R5)+      ;NO
006666 132737 000010 017017   BITB      #10,SC      ;ADD OFFSET
006674 001411          BEQ      ADCT3            ;CONVERTING ALL '4' CH.'S?
006676 005200          INC      R0              ;NO, EXIT
006700 022700 000004   CMP      #4,R0            ;SAVED ALL VALUES?
006704 001405          BEQ      ADCT3            ;YES, EXIT
006706 062703 000010   ADD      #10,R3            ;NO, PICK UP NEXT ADDRESSES
006712 062704 000006   ADD      #6,R4
006716 000743          BR      ADCT2
006720 005301          ADCT3: DEC      R1
006722 003326          BGT      ADCT0            ;TAKE NEXT CONVERSION
006724 104003          GETREG
006726 000002          RTI                      ;NO, EXIT

*****
:SUBROUTINE TO CONVERT THE VALUE IN 'R2' BACK TO A 'TRUE' A D VALUE
:AND PRINT IT IN DECIMAL AS EITHER '+ OR-'.
*****

006730 104002          POSTIT: SAVREG
006732 012701 000053   MOV      #53,R1          ;SET UP TO PRINT '+'
006736 163702 031576   SUB      OFFSET,R2        ;SUBTRACT OFFSET TO OBTAIN REAL VALUE.
006742 100003          BPL      #+10              ;VALUE POS.?
006744 005402          NEG      R2              ;NO, COMPLIMENT IT
006746 012701 000055   MOV      #55,R1          ;NO, SET UP TO PRINT '-'
006752 104010          TYPEIT
006754 104033          BINDEC
006756 104003          GETREG
006760 000207          RTS      PC              ;TYPE VALUE

```

```

2658 :*****
2659 :SBTTL M7384 D/A ADDRESSING TEST
2660 :*****
2661
2662 006762 104012 M7384A: PRINT
2663 006764 025706 MES45 :TEXT 'D/A ADDRESSING TEST'
2664 006766 104026 ADDRESS :GET THE MODULE ADDRESS
2665 006770 104035 SETUP :SETUP TEST PARAMETERS
2666
2667 :*****
2668 :THIS SUBTEST ADDRESSES THE D/A MODULE SENDS A CODE OF '70' (MODE 9)
2669 :THIS SHOULD ENABLE THE SIGNAL 'PROG L' TO BE LOW UNTIL THE 2ND CHAR.
2670 :IS SENT TO THE MODULE.
2671 :*****
2672
2673 006772 000240 DAT1: NOP
2674 006774 000240 NOP
2675 006776 004737 JSR PC,2*ADDRST :ADDRESS THE MODULE
2676 007002 104006 LDCHRO
2677 007004 000070 :SEND THE CHAR. '8'
2678 007006 104012 PRINT
2679 007010 025733 MES46 :TEXT 'SCOPE FOR 'PROG L' HI'
2680 007012 104013 TTYIN :WAIT FOR 'CR' TO CONTINUE
2681 007014 104006 LDCHRO
2682 007016 000004 EOT
2683 007020 104012 PRINT
2684 007022 025776 MES47 :SCOPE FOR 'PROG L' HI & FLOP L LO'
2685 007024 104013 TTYIN
2686
2687 :*****
2688 :THIS SUBTEST ADDRESSES THE MODULE AND SENDS MODE '9' TO SET
2689 :THE 'FLOP' FLOP. THEN THE MODULE IS RE-ADDRESSED AND SENDS MODE '9'
2690 :TO CLR THE 'FLOP' FLOP.
2691 :*****
2692
2693 007026 104001 DAT2: SCOPE
2694 007030 000002 2
2695 007032 004737 JSR PC,ADDRST :ADDRESS MODULE
2696 007036 104007 LOPGMO
2697 007040 007044 .+4
2698 007042 000401 BR .+4
2699 007044 071 .BYTE 71 :SEND CHAR. '9'
2700 007045 004 .BYTE EOT
2701
2702 007046 104012 PRINT
2703 007050 026043 MES48 :SCOPE FOR 'FLOP L' HI'
2704 007052 104013 TTYIN
2705
2706 007054 004737 JSR PC,2*ADDRST :RE-ADDRESS MODULE
2707 007060 104007 LOPGMO
2708 007062 007066 .+4
2709 007064 000401 BR .+4
2710 007066 070 .BYTE 70 :SEND CHAR. '9'
2711 007067 004 .BYTE EOT
2712
2713 007070 104012 PRINT

```

;SCOPE FOR 'FLOP L' L0

2714 007072 026072
2715 007074 104013MES49
TTYIN:*****
:THIS SUBTEST OUTPUTS 0.00 VOLTS TO CH. '0'.
:*****

2720 007076 104001

DATST3: SCOPE

2721 007100 000003

3

2722 007102 012737

030061

007666

MOV

#30061.DAT3

;CH. '0' 0 VOLTS

2723 007110 012737

030060

007670

MOV

#30060.DAT4

2724 007116 37

007636

JSR

PC,DAOUT

;SEND DATA

2725 007122 3

PRINT

2726 007124 05

MESS0

2727 007126 05

MESS2

2728 007130 10401

TTYIN

:*****
:THIS SUBTEST OUTPUTS 1.11 VOLTS TO CH. '0'.
:*****

2731 007132 104001

DATST4: SCOPE

2732 007134 000004

4

2733 007136 012737

030461

007666

MOV

#30461.DAT3

2734 007144 012737

030461

007670

MOV

#30461.DAT4

2735 007152 004737

007636

JSR

PC,DAOUT

2736 007156 104012

PRINT

2737 007160 026121

MESS0

2738 007162 026213

MESS3

2739 007164 104013

TTYIN

:*****
:THIS SUBTEST OUTPUTS 2.22 VOLTS TO CH. '0'.
:*****

2744 007166 104001

DATST5: SCOPE

2745 007170 000005

5

2746 007172 012737

031061

007666

MOV

#31061.DAT3

2747 007200 012737

031062

007670

MOV

#31062.DAT4

2748 007206 004737

007636

JSR

PC,DAOUT

2749 007212 104012

PRINT

2750 007214 026121

MESS0

2751 007216 026221

MESS4

2752 007220 104013

TTYIN

E06

PDMTC DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 69
DEPMAB.P11 M7384 D A ADDRESSING TEST

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2758
2759
2760
2761
2762
2763 007222 104001
2764 007224 000006
2765 007226 012737 032061 007666
2766 007234 012737 032064 007670
2767 007242 004737 007636
2768 007246 104012
2769 007250 026121
2770 007252 026227
2771 007254 104013
2772
2773
2774
2775
2776
2777 007256 104001
2778 007260 000007
2779 007262 012737 034061 007666
2780 007270 012737 034070 007670
2781 007276 004737 007636
2782 007302 104012
2783 007304 026121
2784 007306 026235
2785 007310 104013
2786
2787
2788
2789
2790
2791 007312 104001
2792 007314 000010
2793 007316 012737 030062 007666
2794 007324 012737 030060 007670
2795 007332 004737 007636
2796 007336 104012
2797 007340 026153
2798 007342 026205
2799 007344 104013

:*****
:THIS SUBTEST OUTPUTS 4.44 VOLTS TO CH. '0'.
:*****

DATST6: SCOPE
6
MOV #32061,DATA3
MOV #32064,DATA4
JSR PC,DAOUT
PRINT
MESS0
MESS5
TTYIN

:*****
:THIS SUBTEST OUTPUTS 8.88 VOLTS TO CH. '0'.
:*****

DATS7: SCOPE
7
MOV #34061,DATA3
MOV #34070,DATA4
JSR PC,DAOUT
PRINT
MESS0
MESS6
TTYIN

:*****
:THIS SUBTEST OUTPUTS 0.00 VOLTS TO CH. '!'
:*****

DATS10: SCOPE
10
MOV #30062,DATA3
MOV #30060,DATA4
JSR PC,DAOUT
PRINT
MESS1
MESS2
TTYIN
```

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2800
2801
2802
2803
2804
2805 007346 104001
2806 007350 000011
2807 007352 012737 030462 007666
2808 007360 012737 030461 007670
2809 007366 004737 007636
2810 007372 104012
2811 007374 026153
2812 007376 026213
2813 007400 104013
2814
2815
2816
2817
2818
2819 007402 104001
2820 007404 000012
2821 007406 012737 031062 007666
2822 007414 012737 031062 007670
2823 007422 004737 007636
2824 007426 104012
2825 007430 026153
2826 007432 026221
2827 007434 104013
2828
2829
2830
2831
2832 007436 104001
2833 007440 000013
2834 007442 012737 032062 007666
2835 007450 012737 032064 007670
2836 007456 004737 007636
2837 007462 104012
2838 007464 026153
2839 007466 026227
2840 007470 104013
2841
2842
2843
2844
2845 007472 104001
2846 007474 000014
2847 007476 012737 034062 007666
2848 0075 012737 034070 007670
2849 0075 004737 007636
2850 007516 104012
2851 007520 026153
2852 007522 026235
2853 007524 104013

;*****
;THIS SUBTEST OUTPUTS 1.11 VOLTS TO CH '1'.
;*****

DATS11: SCOPE
11
MOV #30462,DATA3
MOV #30461,DATA4
JSR PC,DAOUT
PRINT
MESS1
MESS3
TTYIN

;*****
;THIS SUBTEST OUTPUTS 2.22 VOLTS TO CH. '1'.
;*****

DATS12: SCOPE
12
MOV #31062,DATA3
MOV #31062,DATA4
JSR PC,DAOUT
PRINT
MESS1
MESS4
TTYIN

;*****
;THIS SUBTEST OUTPUTS 4.44 VOLTS TO CH. '1'.
;*****

DATS13: SCOPE
13
MOV #32062,DATA3
MOV #32064,DATA4
JSR PC,DAOUT
PRINT
MESS1
MESS5
TTYIN

;*****
;THIS SUBTEST OUTPUTS 8.88 VOLTS TO CH. '1'.
;*****

DATS14: SCOPE
14
MOV #34062,DATA3
MOV #34070,DATA4
JSR PC,DAOUT
PRINT
MESS1
MESS6
TTYIN

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G06

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 DZPMAB.P11 M7394 D-A ADDRESSING TEST

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2862 007526 104001
2863 007530 000015
2864 007532 005037 031612
2865 007536 104012
2866 007540 026376
2867 007542 012737 030063 007666
2868 007550 012737 030060 007670
2869 007556 012737 032471 007672
2870 007564 012737 002060 007674
2871 007572 004737 007636
2872
2873 007576 012737 034463 007666
2874 007604 012737 030065 007670
2875 007612 012737 030060 007672
2876 007620 012737 002060 007674
2877 007626 004737 007636
2878 007632 000743
2879 007634 000000
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2881
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2885
2886
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2888
2889 007636 122737 000063 007666
2890 007644 001403
2891 007646 112737 000004 007672
2892 007654 004737 017022
2893
2894 007660 104007
2895 007662 007666
2896 007664 000207
2897
2898 007666 000000
2899 007670 000000
2900 007672 000000
2901 007674 000000

;*****
;THIS SUBTEST OUTPUTS 0.00 VOLTS TO CH. '0' & 9.5 VOLTS TO CH. '1' AND
;THEN THIS SUBTEST RUNS IN A CONTINUOUS LOOP UNTIL EITHER
;'R' IS TYPED TO RESTART THE TEST OR 'IC' IS TYPED TO
;RETURN TO THE MONITOR.
;*****

DH: S15: SCOPE
IS
CLR DLYSWH ;ENABLE TRANSMITTER DELAY
PRINT
MES61
DAT15A: MOV #30063, DATA3 ;MODE '3' CH. '0'
MOV #30060, DATA4
MOV #32471, DATA5 ;CH. '1'
MOV #2060, DATA6 ;SEND 'EOT' WITH 'LSB'
JSR PC, DAOUT
MOV #34463, DATA3 ;MODE '3' CH. '0'
MOV #30065, DATA4
MOV #30060, DATA5 ;CH. '1'
MOV #2060, DATA6 ;SEND 'EOT' WITH 'LSB'
JSR PC, DAOUT
BR DAT15A
HALT

;*****
;M7394 ADDRESS TEST COMPLETE
;*****

;*****
;ROUTINE TO OUTPUT A PRE-LOAD DATA VALUE TO THE D/A CONVERTER.
;*****

DAOUT: CMPB #63, DATA3 ;OUTPUTTING BOTH CH.'S'
BEQ .+10 ;YES
MOVB #EOT, DATA5 ;NO, TERMINATE AFTER '3' CHAR.'S'
JSR PC, ADDRST ;ADDRESS THE MODULE

LDPGMO ;TRANSMIT THE DATA
.+4
RTS PC

DATA3: 0 ;LOW BYTE=MODE, HI BYTE=MSB
DATA4: 0 ;HI BYTE=LSB
DATA5: 0 ;LO BYTE='EOT' OR 'MSB' OF CH. '2'
DATA6: 0

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2917 007676 104012
2918 007700 026243
2919 007702 104026
2920 007704 104035
2921 007706 104012
2922 007710 026267
2923 007712 104013
2924 007714 022737 000007 031662
2925 007722 001371
2926 007724 012701 015116
2927 007730 012702 007667
2928 007734 112122
2929 007736 112122
2930 007740 112122
2931 007742 122721 000054
2932 007746 001357
2933 007750 111103
2934 007752 112122
2935 007754 112122
2936 007756 112122
2937 007760 112722 000004
2938
2939 007764 012701 007666
2940 007770 117711 171356
2941 007774 142711 000310
2942 010000 152711 000060
2943 010004 110337 007672
2944 010010 004737 007636
2945 010014 000763

;*****
;SBTTL M7384 D/A EXERCISER TEST
;THIS TEST ENABLES ANY VALUE THE USER TYPES IN ON THE TELEPRINTER TO BE
;OUTPUTTED FROM THE D/A. WHEN SELECTED, THE TEST REQUESTS FOR TWO THREE DIGIT VALUES
;(SEPARATED VIA COMMA'S) TO BE TYPED IN. THE FIRST VALUE IS THE ONLY ONE
;OUTPUTTED WHEN RUNNING ONLY ONE CHANNEL. IF BOTH CHANNELS ARE SELECTED
;THE FIRST VALUE WILL BE OUTPUTTED ON CHANNEL '0' (X DAC) AND THE
;SECOND VALUE WILL BE OUTPUTTED ON CHANNEL '1' (Y DAC). THE CHANNELS
;ARE SELECTED BY DATA SWITCHES '0 & 1' AND MAY BE SET AND RESET
;AT ANYTIME. SETTING DATA SWITCH '0' WILL SELECT CHANNEL '0'. SETTING
;DATA SWITCH '1' WILL SELECT CHANNEL 1 AND SETTING BOTH '0 & 1' WILL
;ENABLE BOTH CHANNELS.
;*****

M7384E: PRINT
          MES57
          ADDRESS
          SETUP
TAG4F:   PRINT
          MES58
          TTYIN
          CMP      #7,CHRCNT
          BNE      TAG4F
          MOV      #INBUF,R1
          MOV      #DATA3+1,R2
          MOVB     '1)+(R2)+
          MOVB     ')+(R2)+
          MOVB     R1)+(R2)+
          CMPB     #54,(R1)+
          BNE      TAG4F
          MOVB     (R1),R3
          MOVB     (R1)+(R2)+
          MOVB     (R1)+(R2)+
          MOVB     (R1)+(R2)+
          MOVB     #EOT,(R2)+
          ;TERMINATE WITH 'EOT'

TAG4G:   MOV      #DATA3,R1
          MOVB     JSWR,(R1)
          BICB     #310,(R1)
          BISB     #60,(R1)
          MOVB     R3,DATAS
          JSR      PC,@#DAOUT
          BR       TAG4G
          ;SET UP SAVE SWITCHES
          ;CLR UNWANTED BITS
          ;MAKE NO. BCD
          ;RESTORE 'MSB' OF CH. 2 EACH TIME
          ;SEND THE DATA

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2946
2947 .SBTTL M7385 (SERIAL) & M7388 (CHAR.) I/O ADDRESS TEST
2948 ;*****
2949 ;THIS TEST EXERCISES THE 'M7385' MODULE USING THE PDP-11 VIA THE DL11
2950 ;AS THE DESTINATION INPUT AND THE SOURCE OUTPUT
2951 ;*****
2952
2953 010016 104012 M7385A: PRINT
2954 010020 023620 MES3 ;TEXT 'M7385 MODULE TEST'.
2955 010022 104026 ADDRESS ;GET MODULE ADDRESS
2956 010024 110037 010515 M385A1: MOVB R0,STADR7
2957 010030 110037 010521 MOVB R0,STADR8
2958 010034 110037 010601 MOVB R0,STADR9
2959 010040 110037 010605 MOVB R0,STAD10
2960 010044 005037 031670 CLR LOPSWH
2961 010050 104035 SETUP ;SET UP TEST PARAMETERS.
2962
2963 ;*****
2964 ;THIS SUBTEST ADDRESSES THE 'SOURCE' PORTION OF THE MODULE USING
2965 ;MODE '0' AND TESTS FOR THE FORCED RETURN OF THE 'EOT'.
2966 ;*****
2967
2968 010052 000240 ST7385: NOP
2969 010054 000240 NOP
2970 010056 112737 C00060 017017 MOVB #60,SOH1 ;SET UP MODE '0'
2971 010064 004737 J17006 JSR PC,ADRSRC ;ADDRESS THE MODULE
2972
2973 010070 022712 000004 CMP #EOT,(R2) ;WAS IT RETURNED?
2974 010074 001402 BEQ .+6 ;YES
2975 010076 104022 MODERR ;'EOT' WASN'T FORCED OUT BY SOURCE
2976 010100 030251 ERRS
2977 010102 005737 031600 TST SIOSWH ;SERIAL INPUT
2978 010106 001106 BNE SD5 ;YES, GO TO TEST '5'.
2979
2980 ;*****
2981 ;THIS SUBTEST ADDRESSES THE SOURCE IN MODE '1' AND CHECKS THAT THE
2982 ;'EOT' ISN'T FORCED.
2983 ;*****
2984
2985 010110 104001 000002 SD2: SCOPE,2
2986 010114 112737 000061 017017 MOVB #61,SOH1 ;SET UP MODE '1'
2987 010122 004737 017006 JSR PC,ADRSRC ;ADDRESS MODULE
2988
2989 010126 005712 TST (R2) ;WAS ANY DATA RETURNED?
2990 010130 001402 BEQ SD3 ;NO-OK
2991 010132 104022 MODERR ;ILLEGAL DATA TRANSFER VIA SOURCE
2992 010134 030372 ERRS
2993

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PDM70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 74
 DZPMAB.P11 M7385 (SERIAL) & M7388 (CHAR.) I/O ADDRESS TEST

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2994                                     ;*****
2995                                     ;AT THIS POINT THE SOURCE MODULE IS ADDRESSED WAITING FOR DATA.
2996                                     ;THIS SUBTEST ADDRESSES THE DESTINATION MODULE AND TRANSFERS DATA
2997                                     ;TO THE SOURCE AND CHECKS THAT IT IS RETURNED.
2998                                     ;*****
2999                                     ;*****
3000 010136 104001 000003 SD3: SCOPE,3
3001 010142 004737 017022 JSR PC,ADRST ;ADDRESS DESTINATION
3002 010146 005712 TST (R2) ;HAS ANY DATA RETURNED?
3003 010150 001403 BEQ .+10 ;NO, OK
3004 010152 104022 MODERR ;NO DATA HAS YET BEEN TRANSFERED
3005 010154 030372 ERR8
3006 010156 000436 BR TAG1D+2 ;EXIT ON ERROR
3007
3008 010160 104011 RANDOM ;CREATE A RANDOM DATA BUFFER
3009 010162 012737 010162 020550 MOV #.,RETURN ;RE-SET SCOPE LOOP ADDR.
3010 010170 104005 RECVRO ;ENABLE DL 0'S RECVR
3011 010172 104007 LDPGMO ;TRANSFER '500' WORDS TO SOURCE VIA DEST.
3012 010174 017450 TRNBFO
3013 010176 005737 016022 TST RECBFO ;WAS ANY DATA RECV'D?
3014 010202 001003 BNE .+10 ;YES, VERIFY IT
3015 010204 104022 MODERR ;NO DATA WAS RECV'D BACK FROM SOURCE
3016 010206 030507 ERR11
3017 010210 000421 BR TAG1D+2 ;EXIT ON ERROR
3018 010212 005737 016006 TST PARITY ;WAS PARITY ERROR DETECTED?
3019 010216 001402 BEQ .+6 ;NO, VERIFY DATA
3020 010220 104022 MODERR ;DATA PARITY ERROR
3021 010222 030345 ERR7
3022 010224 012701 016022 MOV #RECBFO,R1 ;SET UP TO COMPARE RECV'D DATA
3023 010230 012702 017450 MOV #TRNBFO,R2 ;AGAINST TRANSMITTED DATA
3024 010234 022122 CMP1A: CMP (R1)+,(R2)+ ;DATA MATCH?
3025 010236 001403 BEQ .+10 ;YES, CONTINUE
3026 010240 104022 MODERR ;RECEIVED DATA DOESN'T MATCH TRANSMITTED DATA
3027 010242 030174 ERR3
3028 010244 000403 BR TAG1D+2
3029 010246 022702 020152 CMP #TRNEND,R2 ;DONE?
3030 010252 00137C TAG1D: BNE CMP1A ;NO

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PDM70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 75
 DZPMAB.P11 M7385 (SERIAL) & M7388 (CHAR.) I/O ADDRESS TEST

```

3031 ;*****
3032 ;AT THIS POINT DATA HAS BEEN TRANSFERED TO THE DESTINATION AND
3033 ;RECEIVED BACK FROM THE SOURCE. THIS SUBTEST TRANSFERS AN 'EOT' FOLLOWED
3034 ;BY DATA TO VERIFY THAT THE 'EOT' CLEARS THE SOURCE & DESTINATION.
3035 ;*****
3036
3037 010254 104001 000004 SD4: SCOPE,4
3038 010260 104006 LDCHAR0 ;TRANSMIT 'EOT'
3039 010262 000004 EOT
3040 010264 104007 LDPGMC ;FOLLOW 'EOT' WITH SOME DATA
3041
3042 010266 010272 .+4
3043 010270 000402 SR TAGIE
3044
3045 010272 101 .BYTE 'A ;SEND A COUPLE OF DATA CHAR.'S
3046 010273 102 .BYTE 'B
3047 010274 000 .BYTE 0 ;TERMINATE
3048 010276 .EVEN
3049
3050 010276 005737 016012 TAGIE: TST RECEOT ;WAS 'EOT' RECV'D?
3051 010302 001003 BNE .+10 ;YES
3052 010304 104022 MODERR ;'EOT' WASN'T RETURNED
3053 010306 030251 ERRS
3054 010310 000405 BR TAGIF+2 ;EXIT ON ERROR
3055
3056 010312 022712 000004 CMP #EOT,(R2) ;WAS 'EOT' ONLY CHAR. RETURNED?
3057 010316 001402 BEQ .+6 ;YES
3058 010320 104022 MODERR ;ILLEGAL DATA TRANSFER
3059 010322 030372 TAGIF: ERRB
  
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18 18

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3073
3074 010324 104001 000005 SD5: SCOPE,5
3075 010330 005077 171004 CLR APSW ;ENABLE INTERRUPTS
3076 010334 104011 RANDOM ;CREATE A RANDOM DATA BUFFER
3077 010336 112737 000004 017547 MOVB #EOT,TRNBFO+77 ;TERMINATE BUFFER AFTER '64' BYTES
3078 010344 005037 017550 CLR TRNBFO+100 ;TERMINATE BUFFER
3079 010350 004737 017022 JSR PC,ADRST ;ADDRESS DESTINATION MODULE
3080
3081 010354 104007 TAG1H: LDPGMO ;TRANSMIT DATA
3082 010356 017450 TRNBFO
3083
3084 010360 112737 000060 017017 TAG1L: MOVB #60,SOH1 ;SET UP FOR MODE '0'
3085 010366 004737 017006 JSR PC,ADRSRC ;ADDRESS SOURCE
3086 010372 005737 016012 TST RECEOT ;RECEIVED ALL DATA BACK?
3087 010376 001775 BEQ .-4 ;NO, WAIT FOR 'EOT'
3088
3089 010400 012701 017450 CMP1C: MOV #TRNBFO,R1 ;TO TRANSMITTED DATA
3090 010404 122122 CMP1B: CMPB (R1)+,(R2)+ ;DATA MATCH?
3091 010406 001403 BEQ .+10 ;YES
3092 010410 104022 MODERR ;REC'D DATA NOT EQUAL TO TRANS. DATA
3093 010412 030174 ERR3
3094 010414 000420 BR SD6 ;EXIT ON ERROR
3095 010416 020127 017550 CMP R1,#TRNBFO+100 ;DONE?
3096 010422 001370 BNE CMP1B ;NO
3097 010424 005737 031600 TST SIOSWH ;USING THE SERIAL I/O INPUT?
3098 010430 001412 BEQ SD6 ;NO, CHECK ONLY '64' CHAR.'S
3099 010432 105737 017551 TSTB TRNBFO+101 ;YES, HAVE WE CHK'D '128' CHAR.'S?
3100 010436 001101 BNE SD10 ;YES, EXIT
3101 010440 105237 017551 INCB TRNBFO+101 ;NO, CHK NEXT '64' CHAR.'S FROM 'FIFO'
3102 010444 022737 000002 016012 CMP #2,RECEOT ;RECEIVED ALL DATA FROM FIFO?
3103 010452 001374 BNE .-6 ;NO, WAIT FOR 'EOT'
3104 010454 000751 BR CMP1C ;DO IT.

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M06

PDM70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 77
 DZPMAB.P11 M7395 (SERIAL) & M7388 (CHAR.) I/O ADDRESS TEST

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3105
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3110
3111 010456 104001 000006
3112 010462 012777 000340 170650
3113 010470 005737 031600
3114 010474 001062
3115 010476 004737 005066
3116
3117
3118
3119
3120
3121
3122 010502 104001 000007
3123 010506 104007
3124 010510 010514
3125 010512 000404
3126 010514 021
3127 010515 061
3128 010516 001
3129 010517 061
3130 010520 022
3131 010521 061
3132 010522 023
3133 010523 003
3134
3135 010524 104006
3136 010526 000102
3137
3138 010530 122722 000003
3139 010534 001403
3140 010536 104022
3141 010540 030725
3142 010542 000435
3143
3144 010544 105722
3145 010546 001403
3146 010550 104022
3147 010552 030637
3148 010554 000430

;*****
;THIS SUBTEST ADDRESSES THE 'SOURCE' USING THE WRONG MODULE ADDRESSES
;AND TESTS THAT THE SOURCE ISN'T ENABLED.
;*****
SD6:  SCOPE,6
      MOV     #340, @PSW      ;INHIBIT INTERRUPTS
      TST     SIOSWH         ;USING SERIAL INPUT OPTION?
      BNE     SD10           ;YES, SKIP THE NEXT TEST.
      JSR     PC, @ADRSIT

;*****
;THIS SUBTEST CHECKS THAT 'ETX' WILL CLEAR THE SOURCE AND THAT 'STX'
;WILL CLEAR THE DESTINATION
;*****
SD7:  SCOPE,7
      LDPGM0                ;ADDRESS MODULE
      .+4
      BR      TAG1K
      .BYTE   DC1            ;ALERT SOURCE
STADR7: .BYTE   61
      .BYTE   SOH
      .BYTE   61            ;MODE '1'
      .BYTE   DC2            ;ALERT DESTINATION
STADR8: .BYTE   61
      .BYTE   DC3            ;ENABLE MODULE
      .BYTE   ETX            ;CLR SOURCE

TAG1K: LDCHRD                ;SEND A DATA CHAR.
      'B

      CMPB    #ETX, (R2)+    ;WAS 'ETX' RETURNED?
      BEQ     .+10           ;YES
      MODERR  ERR16          ;'ETX' WASN'T RETURNED
      BR      TAG1W          ;EXIT ON ERROR

      TSTB    (R2)+          ;WAS ANY OTHER DATA RECV'D?
      BEQ     .+10           ;NO-OK
      MODERR  ERR14          ;ETX DIDN'T CLR SOURCE
      BR      TAG1W          ;EXIT ON ERROR

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PDM70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 78
 DZPMAB.P11 M7385 (SERIAL) & M7388 (CHAR.) I/O ADDRESS TEST

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3149                                     ;NOW CLR DESTINATION
3150
3151 010556 104007                      LDPGMO
3152 010560 010564                      .+4
3153 010562 000402                      BR      TAG1S
3154 010564      002                      .BYTE   STX      ;CLR DESTINATION
3155 010565      101                      .BYTE   'A      ;SEND SOME DATA
3156 010566      130                      .BYTE   'X
3157 010567      000                      .BYTE   0      ;TERMINATE
3158
3159                                     ;NOW RE-ADDRESS SOURCE & DESTINATION AND EXAMINE DATA
3160
3161 010570 104005                      TAG1S:  RECVRO
3162 010572 104007                      LDPGMO      ;RE-ADDRESS SOURCE
3163 010574 010600                      .+4
3164 010576 000404                      BR      TAG1T
3165
3166 010600      021                      .BYTE   DC1      ;ALERT SOURCE
3167 010601      061                      STADR9:  .BYTE   61
3168 010602      001                      .BYTE   SOH
3169 010603      061                      .BYTE   61      ;MODE '1'
3170 010604      022                      .BYTE   DC2      ;ALERT DESTINATION
3171 010605      061                      STAD10:  .BYTE   61
3172 010606      023                      .BYTE   DC3      ;ENABLE MODULE
3173 010607      000                      .BYTE   0
3174
3175 010610 005737 016014              TAG1T:  TST      RECSTX      ;WAS 'STX' RETURNED?
3176 010614 001003                    BNE      .+10      ;YES
3177 010616 104022                    MODERR
3178 010620 030106                    ERR1      ;'STX' WASN'T RECV'D FROM DEST.
3179 010622 000405                    BR      TAG1W      ;EXIT ON ERROR
3180
3181 010624 105737 016024              TSTB      RECBFO+2      ;WAS 'STX' THE ONLY DATA RECV'D
3182 010630 001402                    BEQ      .+6      ;YES
3183 010632 104022                    MODERR
3184 010634 030541                    ERR12      ;'STX' DIDN'T CLR DEST.
3185
3186                                     ;SEND AN 'EOT' TO CLR MODULE
3187
3188 010636 104006                      TAG1W:  LDCHRO
3189 010640 000004                      EOT      ;CLR MODULE

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B07

PORTC DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 79
 21PMAB.P11 M7385 (SERIAL) & M7388 (CHAR.) I/O ADDRESS TEST

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3190          :*****
3191          :THIS 'JSTEST REQUEST' THE OPERATOR TO RE-SET THE MODULE ADDRESS TO '17'.
3192          :AND INSERT THE STRAP TO INHIBIT THE 'EOT' FROM BEING TRANSMITTED.
3193          :IF DATA 'SWIO' IS NOT SET THIS MANUAL INTERVENTION TEST IS SKIPPED.
3194          :*****
3195
3196          010642 104001 000010          SD10:  SCOPE,10
3197          010646 032777 002000 170476          BIT          #SWIO,JSWR          :SWIO SET?
3198          010654 001456          BEQ          TAG1P          :NO, TYPE TEST COMPLETE
3199          010656 104012          PRINT
3200          010660 024151          MES14
3201          010652 024007          MES10          :TEXT 'RE-SET MODULE ADDRESS TO '17'.
3202          010664 104013          TTYIN          :WAIT FOR 'CR' TO CONTINUE
3203
3204          010666 012737 010666 020550          TAG10:  MOV          #, RETURN          :RE-SET SCOPE LOOP ADDRESS POINTER
3205          010674 112737 000077 031632          MOV      #77,MODADR          :SET UP FOR ADDR. '17'
3206          010702 112737 000077 017015          MOV      #77,SRCADR
3207          010710 112737 000077 017065          MOV      #77,DSTADR
3208          010716 104065          RECVRO          :ENABLE DL O'S RECVR.
3209          010720 004737 017022          JSR          PC,ADRDSI          :ADDRESS DEST. MODULE
3210
3211          010724 104007          TAG1R:  LDPGMO          :SEND SOME DATA
3212          010726 010732          .+4
3213          010730 000402          BR          TAG1U
3214          010732 101          .BYTE          'A          :SEND DATA
3215          010733 102          .BYTE          'E
3216          010734 004          .BYTE          EOT          :TERMINATE
3217          010736 104005          .EVEN
3218          010740 112737 000060 017017          TAG1U:  RECVRO          :CLR & RESET BUFFER
3219          010746 004737 017006          MOV      #60,SOHI          :SET UP FOR MODE '0'
3220          :JSR          PC,,RSRC          :ADDRESS THE SOURCE
3221
3222          010752 022712 041101          TAG1Z:  CMP          #41101,(R2)          :WAS THE 'A & B' RETURNED?
3223          010756 001403          BEQ          .+10          :YES
3224          010760 104023          MODERR          :MODULE WASN'T ADDRESS W/ '17'
3225          010762 030507          ERR11
3226          010764 000405          BR          SD11          :EXIT ON ERROR
3227          010766 005737 0160'2          TST          RECEOT          :WAS 'EOT' STRAPPED OUT?
3228          010770 001402          BEQ          .+6          :YES
3229          010774 104022          MODERR          :'EOT' WASN'T STRAPPED OUT
3230          010776 030671          ERR15
3231
3232          :*****
3233          :TEST COMPLETE
3234          :*****
3235
3236          011030 104001 000011          SD11:  SCOPE,11
3237          011034 104012          PRINT
3238          011036 024220          MES14A          :TEXT 'REMOVE STAP'
3239          011010 104026          ADDRESS          :SET UP NEW MODULE ADDRESS
3240          011012 104012          TAG1P:  PRINT
3241          011014 023727          MES7          :TEXT 'TEST COMPLETE'
3242          011016 113700 031502          MOV      MODADR,RO
3243          011022 000137 010024          JMP          M385A1          :RESTART TEST

```

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PDM70 DIAGNOS IC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 90
 DZP. 28.P11 M7385 (SERIAL) & M7389 (CHAR.) I/O ADDRESS TEST

```

3244
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3250
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3253 011026 104012
3254 011030 026714
3255 011032 104035
3256
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3262 011034 104011
3263 011036 104007
3264 011040 011044
3265 011042 000402
3266 011044 022
3267 011045 060
3268 011046 017
3269 011047 000
3270
3271
3272 011050 005712
3273 011052 001403
3274 011054 104022
3275 011056 030372
3276 011060 000434
3277
3278 011062 104011
3279 011064 012737 01 4 020550
3280 011072 104005
3281 011074 104007
3282 011076 017450
3283 011100 005712
3284 011102 001003
3285 011104 104022
3286 011106 030507
3287 011110 000420
3288 011112 005737 016006
3289 011116 001403
3290 011120 104022
3291 011122 030345
3292 011124 000412
3293 011126 012701 017450

```

```

:*****
:SBTTL M7385 SERIAL I/O INTERFACE TEST
:THIS TEST IS USED TO TEST THAT THE SERIAL I/O INTERFACE MODULE IS FUNCTIONING
:CORRECTLY. TO RUN THIS TEST THE 'L' JUMPER MUST BE INSERTED ON THE M7385
:SO AS TO BE INITIALIZED ON POWER UP. REMOVE THE CONTROL MODULE AND
:TIE THE 'T&R' BUSES TOGETHER.
:*****

M7385I: PRINT          :TEXT 'M7385 SERIAL INTERFACE TEST
        MES66
        SETUP

:*****
:THIS TEST SIMPLY ADDRESSES THE DESTINATION PORTION OF THE MODULE WHICH
:WILL ENABLE A CLOSED LOOP FOR DATA BEING SENT TO THE SOURCE.
:*****

TEST1:  RANDOM          :CREATE A RANDOM DATA BUFFER.
        LDPGMO          :ADDRESS DESTINATION
        .+4
        BR              TST1A
        .BYTE           DC2
IADR10: .BYTE           60      :ALERT THE DESTINATION
        .BYTE           SI      :MODIFIED BY USER
        .BYTE           0       :ENABLE DESTINATION
        .EVEN           :TERMINATE

TST1A:  TST             (R2)    :HAS ANY DATA RETURNED?
        BEQ             .+10    :NO, OK
        MODERR          :NO DATA HAS YET BEEN TRANSFERED
        ERR8
        BR              TEST2   :EXIT ON ERROR

RANDOM
MOV     #.RETURN
RECVRO
LDPGMO
TRNBFO

TST     (R2)              :WAS ANY DATA RECV'D?
BNE     .+10             :YES, VERIFY IT
MODERR  :NO DATA WAS RECV'D BACK FROM SOURCE
ERR11
BR       TEST2           :EXIT ON ERROR
TST     PARITY           :WAS PARITY ERROR DETECTED?
BEQ     .+10             :NO, VERIFY DATA
MODERR  :DATA PARITY ERROR
ERR7
BR       TEST2
MOV     #TRNBFO,R1      :AGAINST TRANSMITTED DATA

```

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PCMTIC DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 81
DZPMAB.P11 M7385 SERIAL I 3 INTERFACE TEST

3294	011132	022122		CMPT1A: CMP	(R1)+,(R2)+	:DATA MATCH?
3295	011134	001403		BEQ	.+10	:YES, CONTINUE
3296	011136	104022		MODERR		:RECEIVED DATA DOESN'T MATCH TRANSMITTED DATA
3297	011140	030174		ERR3		
3298	011142	000403		BR	TEST2	
3299	011144	022701	020152	CMP	#TRNEND,R1	:DONE?
3300	011150	001370		SNE	CMPT1A	:NO
3301				:*****		
3302				:AT THIS POINT DATA HAS BEEN TRANSFERED TO THE DESTINATION AND		
3303				:RECEIVED BACK FROM THE SOURCE. THIS SUBTEST TRANSFERS AN 'EOT' FOLLOWED		
3304				:BY DATA TO VERIFY THAT THE 'EOT' CLEARS THE SOURCE & DESTINATION.		
3305				:*****		
3306						
3307						
3308	011152	104001		TEST2: SCOPE		
3309	011154	000002		2		
3310	011156	104006		LDCHRO		:TRANSMIT 'EOT'
3311	011160	000004		EOT		
3312	011162	104007		LDPGMO		:FOLLOW 'EOT' WITH SOME DATA
3313	011164	011170		.+4		
3314	011166	000402		BR	TST2A	
3315						
3316	011170	101		.BYTE	.2	:SEND A COUPLE OF DATA CHAR.'S
3317	011171	102		.BYTE	.8	
3318	011172	000		.BYTE	0	:TERMINATE
3319		011174		.EVEN		
3320						
3321	011174	005737	016012	TST2A: TST	RECEOT	:WAS 'EOT' RECV'D?
3322	011200	001003		BNE	.+10	:YES
3323	011202	104022		MODERR		: 'EOT' WASN'T RETURNED
3324	011204	030251		ERR5		
3325	011206	000405		BR	TST2B+2	:EXIT ON ERROR
3326						
3327	011210	022712	000004	CMP	#EOT,(R2)	:WAS 'EOT' ONLY C' RETURNED?
3328	011214	001402		BEQ	.+6	:YES
3329	011216	104022		MODERR		:ILLEGAL DATA TRANSFER
3330	011220	030372		TST2B: ERR8		
3331				:*****		
3332				:TEST COMPLETE		
3333				:*****		
3334						
3335						
3336	011222	104001		TEST3: SCOPE		
3337	011224	000003		3		
3338	011226	104012		PRINT		
3339	011230	023727		MES7		:TEXT 'TEST COMPLETE
3340	011232	000137	001376	JMP	MONITR	:RETURN TO MONITOR

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 DZPMAB.P11 M7385 SERIAL I/O INTERFACE TEST

```

3341          ;*****
3342          ;SBTTL M7385 TTL I/O TEST
3343          ;*****
3344
3345 011236 104012 M7385T: PRINT
3346 011240 026530      MES62
3347 011242 104026      ADDRESS      ;TEXT 'TTL I/O TEST'
3348 011244 110037 011305      MOV8      RO,TTLAD1      ;GET THE MODULE ADDRESS
3349 011250 110037 011311      MOV8      RO,TTLAD2      ;SET UP MODULE ADDRESS
3350 011254 104035      SETUP
3351
3352          ;*****
3353          ;THIS TEST VERIFIES THAT THE TTL I/O SECTION OF THE SERIAL I/O MODULE
3354          ;IS FUNCTIONING CORRECTLY. IT REQUIRES FOR A TELEPRINTER TO BE CABLED TO
3355          ;THE MATON LOCK OF THE SERIAL I/O (THIS COULD BE THE CONSOLE PRINTER ONCE
3356          ;THE TEST IS SELECTED). ALL CHARACTERS THEN INPUTTED WILL BE RECEIVED BY
3357          ;THE SERIAL SOURCE AND WRAPPED AROUND (BY THE CONTROL MODULE OR
3358          ;COMPUTER IF DF11 IS USED) TO THE DESTINATION. HERE THE CHARACTER WILL BE
3359          ;TRANSMITTED BACK TO THE TELEPRINTER AND PRINTED. EFFECTIVELY, AS FAR AS
3360          ;THE USER IS CONCERNED, THIS TEST ACTS LIKE A KEYBOARD ECHO TEST.
3361          ;*****
3362
3363 011277 012777 000340 170054 TTLTST: MOV      #340,APSWM
3364 011267 104005      RECVRO      ;ENABLE DL11 RECVR.
3365 011266 005077 170046      CLR      APSWM
3366 011272 005237 031614      INC      DSTSWH
3367 011276 104025      SOURCE
3368 011300 011304      .+4
3369 011302 000404      BR      TAG7A      ;ADDRESS THE MODULE
3370 011304      021      .BYTE      DC1
3371 011305      061      TTLAD1: .BYTE      61      ;ADDRESS MODIFIED BY USER
3372 011306      001      .BYTE      SOH      ;MODE 1, WAIT FOR DATA
3373 011307      061      .BYTE      61
3374 011310      022      .BYTE      DC2      ;ALERT DEST.
3375 011311      061      TTLAD2: .BYTE      61      ;ADDRESS MODIFIED BY USER
3376 011312      023      .BYTE      DC3
3377 011313      000      .BYTE      0
3378      .EVEN
3379
3380 011314 005037 031614      TAG7A: CLR      DSTSWH
3381 011320 105712      TSTB      (R2)      ;DATA READY?
3382 011322 001776      BEQ      -2      ;NO
3383 011324 005737 031600      TST      $T7SWH      ;USING SERIAL I/O
3384 011330 001004      BNE      B+2      ;YES, TEST ONLY FOR EOT
3385 011332 111237 011340      MOV8      (R2),TAG7B      ;NO, SET UP TO TRANSMIT CHAR.
3386 011336 104006      LDCHRO
3387 011340 000000      TAG7B: 0
3388 011342 122722 000004      CMPB      #EOT,(R2)+      ;CHAR. = 'EOT'?
3389 011346 001743      BEQ      TTLTST      ;YES, RE-ADDRESS MODULE
3390 011350 000761      BR      TAG7A      ;NO, WAIT FOR NEXT CHAR.
3391
3392

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 DZPMAB.P11 M7385 TTL I O TEST

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 3397
 3398 011352 104012
 3399 011354 025417
 3400 011356 104026
 3401 011360 110037 011455
 3402 011364 110037 011457
 3403 011370 104035
 3404 011372 005037 031612
 3405
 3406
 3407
 3408
 3409
 3410
 3411 011376 000240
 3412 011400 000240
 3413 011402 004737 017006
 3414 011406 022712 000004
 3415 011412 001402
 3416 011414 104022
 3417 011416 030251
 3418
 3419
 3420
 3421
 3422
 3423
 3424
 3425 011420 104001
 3426 011422 000002
 3427 011424 104036
 3428 011426 012777 000340 167704
 3429 011434 005077 167700
 3430 011440 104005
 3431 011442 005237 031614
 3432 011446 104025
 3433 011450 011454
 3434 011452 000403
 3435 011454 021
 3436 011455 060
 3437 011456 022
 3438 011457 060
 3439 011460 023
 3440 011461 000
 3441
 3442
 3443 011462 005037 031614
 3444 011466 105712
 3445 011470 001776
 3446 011472 005737 031600
 3447 011476 001004
 3448 011500 111237 011506

 SBTTL M7386 KEYBOARD/DISPLAY MODULE ADDRESS TEST

M7386A: PRINT
 MES39
 ADDRESS ;GET THE MODULE ADDRESS
 MOVB R0,KEYAD1 ;SET IT UP
 MOVB R0,KEYAD2 ;SET UP TEST PARAMETERS
 KEYTO: SETUP
 CLR DLYSWH ;ENABLE TRANSMITTER DELAY

 THIS SUBTEST ADDRESSES THE KEYBOARD MODULE AND CHECKS FOR THE
 AUTOMATIC RETURN OF AN 'EOT'.

KEYT1: NOP
 NOP
 JSR PC,ADRSRC ;ADDRESS THE MODULE
 CMP #EOT,(R2) ;WAS 'EOT' RETURNED?
 BEQ KEYT2 ;YES
 MODERR ;MODULE DIDN'T RETURN "EOT"
 ERR5

 THIS SUBTEST ADDRESSES BOTH THE KEYBOARD & THE DISPLAY. THE DATA
 FROM THE KEYBOARD IS DISPLAYED AND ALSO PRINTED OUT ON THE TELETYPE.
 THE TELETYPE OUTPUT CAN BE ELIMINATED BY SETTING DATA SW13.

KEYT2: SCOPE
 2
 NODLAY
 MOV #340,APSW ;INHIBIT TRANSMITTER DELAY
 CLR APSW ;SET PROC. PRIO 27.
 RECVRO ;ENABLE DL11 RECEIVER
 INC DSTSWH
 SOURCE ;ADDRESS THE MODULE
 +4
 BR TAG6A
 KEYAD1: .BYTE DC1 ;ALERT SOURCE
 .BYTE 60
 KEYAD2: .BYTE DC2 ;ALERT DESTINATION
 .BYTE 60
 .BYTE DC3 ;ENABLE MODULE.
 .BYTE 0
 .EVEN

TAG6A: CLR DSTSWH
 TSTB (R2) ;DATA READY?
 BEQ -2 ;NO, WAIT
 TST SIOSWH ;USING THE CONTROL MODULE?
 BNE TAG6B+2 ;YES
 MOVB (R2),TAG6B ;NO,SET UP TO SEND CHAR TO DISPLAY

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PDM70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 84
 DZPMAB.P11 M7386 KEYBOARD DISPLAY MODULE ADDRESS TEST

3449	011504	104006			LDCHRO		
3450	011506	000000			TAG6B: 0		
3451	011510	122712	000004		CMPB #EOT, (R2)		;REC. 'EOT'?
3452	011514	001744			BEQ KEYT2+6		;YES, RE-ADDRESS MODULE
3453	011516	111201			MOVB (R2), R1		;GET DATA
3454	011520	032777	020000	167624	BIT #SW13, 0SWR		;INHIBIT PRINTOUT?
3455	011526	001002			BNE TAG6C		;YES
3456	011530	004737	015222		JSR PC, PDMSET		;NO, TYPE IT
3457	011534	122712	000003		TAG6C: CMPB #ETX, (R2)		;REC. AN 'ETX'?
3458	011540	001412			BEQ KEYT3		;YES, RUN DISPLAY TEST
3459	011542	122722	000002		CMPB #STX, (R2)+		;REC. AN 'STX'?
3460	011546	001345			BNE TAG6A		;NO, RE-ADDRESS MODULE
3461	011550	005737	031600		TST SIOSWH		;YES, USING SERIAL INPUT?
3462	011554	001742			BEQ TAG6A		;NO, 'STX' IS LEGAL
3463	011556	104012			PRINT		
3464	011560	027164			MES73A		;TEXT 'RE-INITIALIZE PDM70.'
3465	011562	104013			TTYIN		;WAIT FOR SETUP
3466	011564	000720			BR KEYT2+6		;RESTART TEST

 ;THIS SUBTEST IS ENTERED L-ON RECEIPT OF AN 'ETX' FROM THE KEYBOARD
 ;IN THE PREVIOUS SUBTEST. THIS TEST THEN ADDRESSES THE DISPLAY
 ;AND DISPLAYS THE ENTIRE DISPLAY CHARACTER SET ONE CHARACTER
 ;AT A TIME. EACH CHARACTER IS DISPLAYED ACROSS THE ENTIRE SCREEN
 ;FOR APPROXIMATELY ONE SECOND.

3476	011566	104001			KEYT3: SCOPE		
3477	011570	000003			3		
3478	011572	104012			PRINT		
3479	011574	027131			MES73		;TEXT "DISPLAY TEST"
3480	011576	104013			TTYIN		;WAIT FOR 'CR'
3481	011600	104036			NODLAY		;INHIBIT TRANSMITTER DELAY
3482	011602	012737	011602	020550	MOV #., RETURN		;RESET SCOPE LOOP POINTER
3483	011610	012737	000040	011636	MOV #40, TAG6D+2		;START OFF WITH DISPLAYING SPACES.
3484	011616	104005			TAG6E: RECVRO		;ENABLE DL11 RECVR.
3485	011620	004737	017022		JSR PC, ADDRST		;ADDRESS THE DESTINATION
3486	011624	012702	000040		MOV #32., R2		;DISPLAY '32' CHAR./LINE
3487	011630	104006			LDCHRO		
3488	011632	000212			212		;SEND 'LF' TO CLEAR SCREEN
3489	011634	104006			TAG6D: LDCHRO		
3490	011636	000040			40		;MODIFIED TO CHAR. BEING DISPLAYED.
3491	011640	005302			DEC R2		;DISPLAYED 32 CHAR.'S'
3492	011642	001374			BNE TAG6D		;NO, LOAD NEXT CHAR.
3493	011644	104006			LDCHRO		;YES
3494	011646	000004			EOT		;CLEAR DESTINATION
3495	011650	104004			DELAY		;DELAY SO USER CAN VIEW SCREEN
3496	011652	104004			DELAY		
3497	011654	005237	011636		INC TAG6D+2		;SETUP NEXT CHAR.
3498	011660	022737	000140	011636	CMP #140, TAG6D+2		;DISPLAYED ALL CHAR.'S.'
3499	011666	001353			BNE TAG6E		;NO.

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PDM70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 85
 DZPMAB.P11 M7386 KEYBOARD DISPLAY MODULE ADDRESS TEST

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3500
3501 ;*****
3502 ;TEST COMPLETE
3503 ;*****
3504
3505 011670 104001 KEYT4: SCOPE
3506 011672 000004      4
3507 011674 104012      PRINT
3508 011676 023727      MES7      ;TEXT "TEST COMPLETE"
3509 011700 000633      BR      KEYTO
3510
3511 ;*****
3512 ;SBTTL M7388 CHARACTER I/O MODULE ADDRESS (IN-HOUSE) TEST
3513 ;THIS TEST USES THE SAME TEST AS THE SERIAL I/O THE
3514 ;TEST HEADER IS TYPED HERE AND THEN THE PROGRAM GOES TO THE
3515 ;SERIAL I/O TESTS TO EXERCISE THE MODULE
3516 ;THIS IS DESIGNATED AS AN IN-HOUSE TEST SINCE A SPECIAL
3517 ;WRAP-A-ROUND MODULE IS REQUIRED TO RUN THE TEST.
3518 ;*****
3519
3520 011702 104012 M7388A: PRINT
3521 011704 025652      MES44      ;TEXT 'CHAR. I/O ADDRESS TEST'
3522 011706 027014      MES69      ;TEXT "(IN-HOUSE)"
3523 011710 000137 010022      JMP      @M7385A+4
3524
3525 ;*****
3526 ;SBTTL M7388F CHARACTER I/O MODULE ADDRESS (FIELD) TEST
3527 ;THIS TEST REQUIRES FOR THE FIELD SERVICE TESTER BE CONNECTED TO THE
3528 ;INPUT /OUTPUT OF THE CHARACTER I/O MODULE. THE PROGRAM THEN SENDS
3529 ;SPECIFIC DATA AND THEN REQUESTS THE USER TO VERIFY (WITH HIS TESTER) THIS
3530 ;DATA. THE PROGRAM ALSO REQUESTS THE USER TO INPUT DATA WHICH WILL
3531 ;IN TURN BE PRINTER ON THE CONSOLE DEVICE.
3532 ;*****
3533
3534 011714 104012 M7388F: PRINT
3535 011716 025652      MES44      ;TEXT 'CHARACTER I/O ADDRESS TEST'
3536 011720 027030      MES70      ;TEXT '(FIELD)'
3537 011722 104026      ADDRESS    ;GET THE MODULE ADDRESS
3538 011724 104035      SETUP      ;SET UP TEST PARAMETERS
3539
3540 ;*****
3541 ;THIS SUBTEST ADDRESSES THE SOURCE IN MODE '0' AND CHECKS FOR A
3542 ;FORCED 'EOT'.
3543 ;*****
3544
3545 011726 000240 CHART1: NOP
3546 011730 000240      NOP
3547 011732 112737 000060 017017      MOVB      #60,SOH1      ;SET UP MODE '0'
3548 011740 004737 017006      JSR      PC,ADRSRC    ;ADDRESS THE SOURCE
3549 011744 022712 000004      CMP      #EOT,(R2)    ;WAS 'EOT' RETURNED?
3550 011750 001402      BEQ      CHART2      ;YES
3551 011752 104022      MODERR    ;'EOT' WASN'T FORCED BY SOURCE
3552 011754 030251      ERR5

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PCD70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 86
 DZPMAB.P11 M7389F CHARACTER I/O MODULE ADDRESS (FIELD) TEST

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3560
3561 011756 104001
3562 011760 000002
3563 011762 112737 000061 017017
3564 011770 004737 017006
3565 011774 005712
3566 011776 001403
3567 012000 104022
3568 012002 030372
3569 012004 000405
3570 012006 004737 021374
3571 012012 104012
3572 012014 027211
3573 012016 027041
3574 012020 105712
3575 012022 001776
3576 012024 111201
3577 012026 004737 015222
3578 012032 122722 000004
3579 012036 001370
3580
3581
3582
3583
3584
3585
3586
3587
3588 012040 104001
3589 012042 000003
3590 012044 104012
3591 012046 027225
3592 012050 027041
3593 012052 005237 031616
3594 012056 004737 021374
3595 012062 000001
3596 012064 000776
3597 012066 005037 031616
3598 012072 112737 000060 017017
3599 012100 004737 017006
3600 012104 104037

;*****
;THIS SUBTEST ADDRESSES THE SOURCE IN MODE '1' AND CHECKS THAT THE
;'EOT' ISN'T FORCED. IT THEN REQUESTS THE USER TO INPUT DATA TO THE MODULE.
;THE INPUTTED DATA WILL BE ECHOED TO THE PRINTER UNTIL AND 'EOT' IS RECEIVED.
;THIS WILL ENABLE THE PROGRAM TO CONTINUE ON TO THE NEXT SUBTEST.
;*****

CHART2: SCOPE
2
MOV# #61,SOH1 ;SET UP FOR MODE '1'
JSR PC,ADRSRC ;ADDRESS THE SOURCE
TST (R2) ;WAS ANY DATA RETURNED?
BEQ .+10 ;NO-OK
MODERR ;ILLEGAL DATA TRANSFER
ERR#
BR TAG8A ;PRINT THE RECEIVED DATA
JSR PC,TTYENB ;ENABLE INTERRUPTS
PRINT
MES74 ;TEXT "ECHO TEST"
MES71 ;TEXT" INPUT DATA, TERMINATE TEST W/EOT"
TAG8A: TSTB (R2) ;WAIT FOR DATA
BEQ .-2
MOV# (R2),R1
JSR PC,PDMSET ;PRINT IT
CMPB #EOT,(R2)+ ;WAS 'EOT' RECEIVED?
BNE TAG8A

;*****
;THIS IS A 'FIFO' STORAGE TEST. IT REQUESTS THE USER TO INPUT DATA (UP TO 63)
;CHARACTERS) AND AN 'EOT'. AFTER THE USER HAS INPUTTED ALL HIS DATA, TYPE 'CR'.
;THE TEST THEN ADDRESSES THE MODULE IN MODE '0' AND THEN PRINTS THE RECEIVED
;DATA WHICH WAS STORED IN THE SOURCE 'FIFO'.
;*****

CHART3: SCOPE
3
PRINT
MES75 ;TEXT "STORAGE TEST"
MES71 ;TEXT" INPUT DATA & TERMINATE W/EOT"
INC SENDSW ;SET UP TO RETURN ON TTY INTERRUPT
JSR PC,TTYENB ;ENABLE INTERRUPTS
WAIT ;WAIT FOR RECV. INTERRUPTS
BR .-2 ;TTY INTERRUPTS RETURN .+2
CLR SENDSW
MOV# #60,SOH1 ;SET UP FOR MODE '0'
JSR PC,ADRSRC ;ADDRESS THE MODULE
PRTRBF ;PRINT CONTENTS OF THE RECV. BUFFER

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PCMT0 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 87
 DZPMAB.P11 M7389F CHARACTER I/O MODULE ADDRESS (FIELD) TEST

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3601
3602
3603
3604
3605
3606
3607
3608
3609
3610 012106 104001
3611 012110 000004
3612 012112 012701 000016
3613 012116 012702 017450
3614 012122 112722 000377
3615 012126 112722 000200
3616 012132 112722 000125
3617 012136 112722 000252
3618 012142 005301
3619 012144 001366
3620 012146 012712 000004
3621 012152 012737 012152 020550
3622 012160 004737 017022
3623 012164 104007
3624 012166 017450
3625 012170 104012
3626 012172 027104
3627 012174 104013
3628
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3634 012176 104001
3635 012200 000005
3636 012202 004737 005066
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3641
3642 012206 104001
3643 012210 000006
3644 012212 104012
3645 012214 023727
3646 012216 000137 011724
3647
3648

```

```

*****
;THIS SUBTEST LOAD '16', '4' CHARACTER DATA PATTERNS (TOTAL OF 64 CHAR.'S)
;INTO THE DESTINATION 'FIFO'. THE USER IS THEN REQUESTED TO STROBE OUT
;THESE '64' CHARACTERS AND VIEW THEM.
;THE '4' CHARACTER PATTERN IS: ALL 1'S, ALL 0'S, ALTERNATE "1&0'S", AND
;REVERSED ALTERNATE "1&0'S".
*****
CHART4: SCOPE
4
MOV #16, R1 ;SET UP THE CHARACTER PATTERN
MOV #TF4BFO, R2 ;SAVE IT IN TRANSMITTER BUFFER
TAG88A: MOVB #377, (R2)+ ;ALL 1'S
MOVB #200, (R2)+ ;ALL 0'S
MOVB #125, (R2)+ ;ALTERNATE "1&0'S"
MOVB #252, (R2)+ ;REVERSED ALTERNATE "1&0'S"
DEC R1 ;LOAD '16' PATTERN'S?
BNE TAG88A ;NO
MOV #EOT, (R2) ;TERMINATE W/EOT
MOV #, RETURN ;RESET SCOPE LOOP POINTER
JSR PC, ADDRST ;ADDRESS DESTINATION
LDPGMO ;TRANSMIT THE '64' CHARACTERS
TRNBFO
PRINT
MES72 ;TEXT "EXAMINE '64' CHARACTERS
TTYIN ;WAIT FOR 'CR'

*****
;THIS SUBTEST ADDRESSES THE 'SOURCE' USING ALL THE WRONG MODULE
;ADDRESSES AND CHECKS THAT THE SOURCE ISN'T ENABLED.
*****
CHART5: SCOPE
5
JSR PC, ADDRST ;DO IT

*****
;TEST COMPLETE
*****
CHART6: SCOPE
6
PRINT
MES7 ;TEXT "TEST COMPLETE"
JMP M7388F+10

.SBTTL M7377A REMOTE SERIAL I/O TEST

```

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3660
3661 0122' 0012
3662 0122' 0417
3663 0122' 0326
3664 0122' 0037 012715
3665 0122' 0037 012737
3666 0122' 0037 012777
3667 012244 110037 013002
3668 012250 110037 013021
3669 012254 110037 013301
3670 012260 110037 013343
3671 012264 110037 013411
3672 012270 110037 013431
3673 012274 104035
3674 012276 005037 031670
3675
3676
3677
3678
3679
3680
3681 012302 104001 000001
3682 012306 112737 000062 017017
3683 012314 004737 017006
3684
3685 012320 104004
3686 012322 022712 000004
3687 012326 001402
3688 012330 104022
3689 012332 030251
3690

;*****
;M7377A REMOTE SERIAL I/O TEST
;*****

;*****
;THIS TEST EXERCISES THE 'M7377' MODULE USING THE PDP-11 VIA THE DL11
;AS THE DESTINATION INPUT AND THE SOURCE OUTPUT
;*****

M7377A: PRINT ;TEXT "M7377A REMOTE SERIAL I/O TEST".
          MES80
          ADDRESS ;GET MODULE ADDRESS OF MODULE UNDER TEST

M7377B: MOV8 R0,STDR7
          MOV8 R0,STDR8
          MOV8 R0,STDR9
          MOV8 R0,STDR10
          MOV8 R0,STDR11
          MOV8 R0,STDR12
          MOV8 R0,STDR13
          MOV8 R0,STDR14
          MOV8 R0,STDR15

M377A1: SETUP
          CLR LOPSWH

;*****
;THIS SUBTEST ADDRESSES THE 'SOURCE' PORTION OF THE MODULE USING
;MODE '2' AND TESTS FOR THE FORCED RETURN OF THE 'EOT'.
;*****

ST7377: SCOPE,1
          MOV8 #62,SOH1 ;SET UP MODE '2'
          JSR PC,ADRSRC ;ADDRESS THE MODULE

          DELAY
          CMP #EOT,(R2) ;WAS IT RETURNED?
          BEQ SD4A ;YES
          MODERR ;'EOT' WASN'T FORCED OUT BY SOURCE
          ERR5

```

```

3691
3692
3693 012334 104001 000002 SD4A: SCOPE,2
3694 ;*****
3695 ;FIFO CHARACTER STORAGE TEST.
3696 ;THIS SUBTEST ADDRESSES THE DESTINATION MODULE THEN TRANSMITS
3697 ;'63' AND AN 'EOT'. THE SOURCE MODULE IS THEN ADDRESSED
3698 ;AND IT SHOULD TRANSMIT THESE CHARACTERS BACK TO THE PDP-11.
3699 ;IT SHOULD BE NOTED THAT WHEN THIS TEST IS RUN USING THE
3700 ;SERIAL INPUT OPTION, ONE HUNDRED AND TWENTY-EIGHT (128)
3701 ;CHARACTERS WILL BE RETURNED TO THE DL11 RECEIVER. THE FIRST
3702 ;'64' CHARACTERS ARE RECEIVED FROM THE SERIAL INPUT
3703 ;DESTINATION, AND THE SECOND '64' CHARACTERS ARE THE CHARACTERS
3704 ;THAT WERE ACTUALLY STORED IN THE FIFO OF THE MODULE UNDER TEST.
3705 ;*****
3706
3707
3708
3709 ;NOTE: THE CONTENTS OF THE RECEIVER BUFFER ARE:
3710 ;LOCATIONS 1-62 (1-75 BASE 8) ARE XMITTED/RCVD CHARACTERS.
3711 ;LOC 63: XMITTED/RCVD EOT (76 BASE 8)
3712 ;LOC 64: (77 BASE 8)
3713 ;LOC 65: TERMINATE IF=1, INITIALLY SET TO 0 (2ND BUFFER SWITCH)
3714
3715
3716
3717
3718 012340 005077 166774 SS: CLR APSW ;ENABLE INTERRUPTS
3719 012344 104011 ;CREATE A RANDOM DATA BUFFER
3720 012346 112737 000004 017547 MOVB #EOT, TRNBFO+77 ;TERMINATE BUFFER AFTER '63' BYTES
3721 012354 005037 017550 CLR TRNBFO+100 ;TERMINATE BUFFER
3722 012360 004737 017022 JSR PC, ADDRST ;ADDRESS DESTINATION MODULE
3723
3724 012364 104007 TG1H: LDPGMO ;TRANSMIT DATA
3725 012366 017450 TRNBFO
3726
3727 012370 112737 000062 017017 TG1L: MOVB #62, SOH1 ;SET UP FOR MODE '2'
3728 012376 104020 DELAYL ;WAIT FOR THE DATA
3729 012400 104020 DELAYL
3730 012402 104020 DELAYL
3731 012404 004737 017006 JSR PC, ADRSRC ;ADDRESS SOURCE
3732 012410 005737 016012 TST RECEOT ;RECEIVED ALL DATA BACK?
3733 012414 001775 BEQ .-4 ;NO, WAIT FOR 'EOT'
3734
3735 ;NOTE: HANGS HERE WAITING FOR EOT
3736
3737
3738 012416 012701 017450 CP1C: MOV #TRNBFO, R1 ;TO TRANSMITTED DATA
3739 012422 122122 CP1B: CMPB (R1)+, (R2)+ ;DATA MATCH?
3740 012424 001403 BEQ .+10 ;YES
3741 012426 104022 MODERR ;REC'D DATA NOT EQUAL TO TRANS. DATA
3742 012430 030174 ERR3
3743 012432 000420 BR SSB ;EXIT ON ERROR
3744 012434 120127 017550 CMPB R1, #TRNBFO+100 ;DONE?
3745 012440 001370 BNE CP1B ;NO
3746 012442 005737 031600 TST SIOSWH ;USING THE SERIAL I/O INPUT?

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3747	012446	001412		BEQ	S5B	:NO, CHECK ONLY '63' CHAR.'S
3748	012450	105737	017551	TSTB	TRNBFO+101	:YES, HAVE WE CHK'D '128' CHAR.'S'
3749	012454	001007		BNE	S5B	:YES, EXIT
3750	012456	105237	017551	INCB	TRNBFO+101	:NO, CHK NEXT '63' CHARACTERS FROM FIFO
3751	012462	022737	000002 016012	CMP	#2, RECEOT	:RECEIVED ALL DATA FROM FIFO?
3752	012470	001374		BNE	.-6	:NO, WAIT FOR 'EOT'
3753	012472	000751		SR	CP1C	:DO IT.
3754						

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3755 012474 005737 031600
3756 012500 001402
3757 012502 000137 013456

55B: TST SIOSWH
BEQ SDSA
JMP TAG1PD

;USING SERIAL I/O? (SYSTEM TEST)?
;YES, SKIP THE FOLLOWING TEST.

 :THIS TEST CHECKS VARIABLE TERMINATORS BY REQUESTING
 :THAT THE MODULE BE CHANGED TO MODE 2 AND CHECKING THAT
 :THE VARIABLE TERMINATOR EVOKES
 :A TRANSFER.

:62 CHARACTERS +DEFINED VARIABLE TERMINATOR ARE XMITTED
 :TO THE MODULE.

:THIS ADDRESSES THE DESTINATION MODULE THEN TRANSMITS
 :62 CHARACTERS FOLLOWED BY THE CUSTOMER SELECTED TERMINATOR.
 :THE SOURCE MODULE IS THEN ADDRESSED
 :AND IT SHOULD TRANSMIT THESE CHARACTERS BACK TO THE PDP-11.
 :IT SHOULD BE NOTED THAT WHEN THIS TEST IS RUN USING THE
 :SERIAL INPUT OPTION, ONE HUNDRED AND TWENTY-EIGHT (128)
 :CHARACTERS WILL BE RETURNED TO THE DL11 RECEIVER. THE FIRST
 :'64' CHARACTERS ARE RECEIVED BACK FROM THE SERIAL INPUT
 :DESTINATION, AND THE SECOND '64' CHARACTERS ARE THE CHARACTERS
 :THAT WERE ACTUALLY STORED IN THE 'FIFO' OF THE MODULE UNDER TEST.
 :*****

:THIS TEST CAN ONLY BE CHECKED IF WE ARE NOT USING THE SERIAL I/O MODULE
 :FROM THE PDP-11 TO THE PDM-70.

:THE REMOTE SERIAL I/O MODULE HAS 4 MODES:

:MODE:	FUNCTION:
:0	CLEAR ALL MODE FUNCTIONS
:1	TIME-OUT MODE
:2	VARIABLE TERMINATOR MODE
:4	REMOTE POWER CLEAR
:7	ENABLE ALL FUNCTIONS

:IMPORTANT: NOTE THAT THIS SUBTEST WILL "HANG" IF EOT IS NOT RETURNED

:NOTE THAT THE REMOTE SERIAL I/O ALWAYS RESPONDS TO 'EOT'
 :IN ALL MODES, BUT ONLY RESPONDS TO VARIABLES IN MODE 2.

012506	104012	
012510	027460	
012512	104013	
012514	104001	000003
012520	112737	000062 017017
012526	005077	166606

SDSA: PRINT
 MESB1
 TTYIN
 SCOPE,3
 MOVB #62,SOH1
 CLR APSW

:TEXT 'SELECT 12 (LF) ON SWITCH V (CR)'.

:WAIT FOR CR.

:USE MODE 2
 :ENABLE INTERRUPTS

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 DZPHAB.P11 M7377A REMOTE SERIAL I/O TEST

```

3814 012532 104011          RANDOM          ;CREATE A RANDOM DATA BUFFER
3815 012534 005037 017546    CLR          TRNBFO+76 ;CLR HIGH BYTE
3816 012540 012737 002012 017546 MOV          #2012,TRNBFO+76 ;VARIABLE TERMINATOR=LINEFEED.
3817          ;EOT AFTER LF GETS STRAPPED OUT.
3818          ;INTO THE LOW BYTE.
3819          ;NOTE THAT AN EOT WILL BE RETURNED AFTER THE LINEFEED...
3820 012546 005037 017550    CLR          TRNBFO+100 ;TERMINATE BUFFER
3821          ;
3822 012552 004737 017022    JSR          PC,ADDRST ;ADDRESS DESTINATION MODULE
3823          ;
3824 012556 104007          TAGIHA: LDPGMO          ;TRANSMIT DATA
3825 012560 017450          TRNBFO
3826          ;
3827 012562 004737 017006    TAGILA: JSR          PC,ADRSRC ;ADDRESS SOURCE
3828 012566 005737 016012    TST          RECEOT ;RECEIVED ALL DATA BACK?
3829 012572 001775          BEQ          -4 ;NO, WAIT FOR 'EOT'
3830          ;
3831          ;NOTE: HANGS HERE WAITING FOR AN EOT....
3832          ;
3833          ;
3834          ;
3835          ;DATA PLUS AN EOT SHOULD BE RETURNED.
3836          ;
3837 012574 012701 017450    CMPICA: MOV          #TRNBFO,R1 ;TO TRANSMITTED DATA
3838 012600 122122          CMPIBA: CMPB          (R1)+,(R2)+ ;DATA MATCH?
3839 012602 001403          BEQ          CMPIDA ;YES
3840 012604 104022          MODERR          ;RECV'D DATA NOT EQUAL TO TRANS. DATA
3841 012606 030174          ERR3
3842 012610 000420          BR          SD6A ;EXIT ON ERROR
3843 012612 020127 017546    CMPIDA: CMP          R1,#TRNBFO+76 ;DONE?
3844          ;
3845          ;NOTE: DON'T TRY TO COMPARE THE 'EOT'....
3846 012616 001370          BNE          CMPIBA ;NO
3847 012620 005737 031600    TST          SIOSWH ;USING THE SERIAL I/O INPUT?
3848 012624 001412          BEQ          SD6A ;NO, CHECK ONLY '64' CHAR.'S
3849 012626 105737 017551    TSTB          TRNBFO+101 ;YES, HAVE WE CHK'D '129' CHAR.'S?
3850 012632 001010          TNE          SD6B ;YES, EXIT
3851 012634 105237 017551    LNCB          TRNBFO+101 ;NO, CHK NEXT '64' CHAR.'S FROM 'FIFO'
3852 012640 022737 000002 016012    CMP          #2,RECEOT ;RECEIVED ALL DATA FROM FIFO?
3853 012646 001374          BNE          -6 ;NO, WAIT FOR 'EOT'
3854 012650 000751          BR          CMPICA ;DO IT.
3855 012652 000240          SD6A: NOP
3856          ;
3857          ;
3858          ;

```

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3859
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3863
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3865 012654 104001 000004
3866 012660 012777 000340 166452
3867 012666 005737 031600
3868 012672 001074
3869 012674 004737 005066
3870
3871
3872
3873
3874
3875 012700 104001 000005
3876 012704 104005
3877 012706 104007
3878 012710 012714
3879 012712 000402
3880 012714 022
3881 012715 067
3882 012716 023
3883 012717 003
3884
3885 012720 104007
3886 012722 012726
3887 012724 000401
3888 012726 102
3889 012727 004
3890
3891 012730 104007
3892 012732 012736
3893 012734 000402
3894 012736 021
3895 012737 067
3896 012740 023
3897 012741 000
3898
3899
3900
3901 012742 122722 000003
3902 012746 001403
3903 012750 104022
3904 012752 030725
3905 012754 000443
3906
3907 012756 105722
3908 012760 001403
3909 012762 104022
3910 012764 030637
3911 012766 000436

```

 : THIS SUBTEST ADDRESSES THE 'SOURCE' USING THE WRONG MODULE ADDRESSES
 : AND TESTS THAT THE SOURCE ISN'T ENABLED.

SD6B: SCOPE,4
 MOV #340,3PSW ;INHIBIT INTERRUPTS
 TST SIOSWH ;USING SERIAL INPUT OPTION?
 BNE SD10A ;YES, SKIP THE NEXT TEST.
 JSR PC,2#ADR

 : THIS SUBTEST CHECKS THAT 'ETX' WILL CLEAR THE SOURCE AND THAT 'STX'
 : WILL CLEAR THE DESTINATION

SD7A: SCOPE,5
 RECVRO
 LDPGMO ;ADDRESS MODULE
 .+4
 BR TG1KA
 .BYTE DC2 ;ALERT DESTIN
 STDR7: .BYTE 67 ;SEND THE ETX TO CLEAR THE SOURCE.
 .BYTE DC3
 .BYTE ETX
 ;SEND THE "B" AS DATA.
 TG1KA: LDPGMO
 .+4
 BR TG1LA
 .BYTE 'B'
 .BYTE EOT
 ;THIS EOT SHOULD CLEAR THE DESTINATION.
 TG1LA: LDR '10
 .+1
 BR TAG1KA
 .BYTE DC1 ;ALERT SOURCE
 STDR8: .BYTE 67 ;ENABLE MODULE TO RECEIVE ANY DATA.
 .BYTE DC3
 .BYTE 0
 .EVEN
 ;ONLY "ETX" SHOULD BE RETURNED.
 TAG1KA: CMPB #ETX,(R2)+
 BEQ .+10 ;WAS 'ETX' RETURNED?
 ;YES
 ;'ETX' WASN'T RETURNED
 MODERR
 ERR16
 BR SD10A ;EXIT ON ERROR
 TSTB (R2)+
 BEQ .+10 ;WAS ANY OTHER DATA RECV'D?
 ;NO-OK
 MODERR
 ERR14
 BR SD10A ;EXIT ON ERROR

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```

3912
3913
3914
3915 012770 104007
3916 012772 012776
3917 012774 000405
3918 012776 021
3919 012777 061
3920 013000 023
3921 013001 022
3922
3923 013002 061
3924 013003 023
3925 013004 002
3926 013005 101
3927 013006 130
3928 013007 000
3929
3930
3931
3932 013010 104005
3933 013012 104007
3934 013014 013020
3935 013016 000402
3936
3937 013020 021
3938 013021 061
3939 013022 023
3940 013023 000
3941
3942
3943 013024 005737 016014
3944 013030 001003
3945 013032 104022
3946 013034 030106
3947 013036 000405
3948
3949
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3951
3952
3953
3954
3955 013040 105737 016024
3956 013044 001402
3957 013046 104022
3958 013050 030541
3959
3960
3961
3962 013052 105737 016026
3963 013056 001402
3964 013060 104022
3965 013062 030541

;REMEMBER TO CLEAR THE 'B' AND 'EOT' THAT ARE IN THE BUFFER.
TAG15A: LDPGMO
        +4
        BR TAG15B
        .BYTE DC1
STDR9:  .BYTE 61
        .BYTE DC3
        .BYTE DC2
        ;SEND THE 'B' & 'EOT' OUT OF FIFO.

STDR10: .BYTE 61
        .BYTE DC3
        .BYTE STX
        .BYTE 'A'
        .BYTE 'X'
        .BYTE 0
        .EVEN
        ;NOW RE-ENABLE THE DESTINATION.

;NOW RE-ADDRESS SOURCE & DESTINATION AND EXAMINE DATA
TAG15B: RECVRO
        LDPGMO
        +4
        BR TAG1TA
        .BYTE DC1
STDR11: .BYTE 61
        .BYTE DC3
        .BYTE 0
        .EVEN
        ;ALERT SOURCE

TAG1TA: TST RECTX
        BNE +10
        MODERR
        ERR1
        BR TAG1WA
        ;WAS 'S' RETURNED?
        ;YES
        ;'STX' WASN'T RECV'D FROM DES.
        ;EXIT ON ERROR

;SKIP OVER EOT HERE AND LOOK FOR AN "X".
;SINCE NO DATA SHOULD HAVE BEEN RETURNED, IT SHOULD BE 0.
;IF NON-ZERO, THEN WE HAVE AN ERROR.

TSTB RECBFO+2
BEQ +6
MODERR
ERR12
;WAS 'STX' THE ONLY DATA RECV'D
;YES
; 'STX' DIDN'T CLR DEST.

;SEND AN 'EOT' TO CLR MODULE

TAG1WA: TSTB RECBFO+4
        BEQ SD10A
        MODERR
        ERR12
        ;LOOK FOR THE "X" HERE...
        ;BRANCH IF NO ERRORS.

```

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 DZPMAB.P11 M7377A REMOTE SERIAL I/O TEST

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3966                                     ;*****
3967                                     ;THIS SUBTEST REQUESTS THE OPERATOR TO RE-SET THE MODULE ADDRESS TO '17'.
3968                                     ;IF DATA 'SWID' IS NOT SET THIS MANUAL INTERVENTION TEST IS SKIPPED.
3969                                     ;*****
3970
3971 013064 104001 000006 SD10A: SCOPE,6
3972 013070 032777 002000 166254 BIT #SWID,JSWR ;SWID SET?
3973 013076 001166 BNE TAG1PC ;YES, TYPE TEST COMPLETE
3974 013100 104012 PRINT
3975 013102 024007 MES10 ;TEXT 'RE-SET MODULE ADDRESS TO '17'.
3976 013104 104013 TTYIN ;WAIT FOR 'CR' TO CONTINUE
3977
3978 013106 012737 013106 020550 TAG10A: MOV #, RETURN ;RE-SET SCOPE LOOP ADDRESS POINTER
3979 013114 112737 000077 031602 MOVB #77,MODADR ;SET UP FOR ADDR. '17'
3980 013122 112737 000077 017015 MOVB #77,SRCADR
3981 013130 112737 000077 017065 MOVB #77,DSTADR
3982 013136 104005 RECVRO ;ENABLE DL 0'S RECVR.
3983 013140 004737 017022 JSR PC,ADRST ;ADDRESS DEST. MODULE
3984
3985 013144 104007 TAG1RA: LDPGMO ;SEND SOME DATA
3986 013146 013152 .+4
3987 013150 000402 BR TAG1UA
3988 013152 101 .BYTE 'A ;SEND DATA
3989 013153 102 .BYTE 'B
3990 013154 004 .BYTE EOT ;TERMINATE
3991 013156 013156 .EVEN
3992 013156 104005 TAG1UA: RECVRO ;CLR & RESET BUFFER
3993
3994 013160 004737 017006 JSR PC,ADRSRC ;FOR THE NEXT TEST.
3995 013164 104004 DELAY ;ADDRESS THE SOURCE
3996 013166 022712 041101 TAG1ZA: CMP #41101,(R2) ;WAS THE 'A & B' RETURNED?
3997 013172 001403 BEQ .+10 ;YES
3998 013174 104022 MODERR ;MODULE WASN'T ENABLED WITH ADDRESS '17'
3999 013176 030507 ERR11
4000 013200 000405 BR SD11A ;EXIT ON ERROR
4001 013202 005737 016012 TST RECEOT ;WAS 'EOT' STRAPPED OUT?
4002 013206 001002 BNE .+6 ;NO.
4003
4004 013210 104022 MODERR ;'EOT' WAS STRAPPED OUT
4005 013212 030671 ERR15
4006 013214 104012 SD11A: PRINT ;TEXT 'RESET MODULE ADDRESS<CR>'
4007 013216 030053 MES88
4008 013220 113737 012715 031602 MOVB STDR7,MODADR ;RE-STUFF THE ORIGINAL ADDRESSES.
4009 013226 113737 012715 017015 MOVB STDR7,SRCADR
4010 013234 113737 012715 017065 MOVB STDR7,DSTADR
4011
4012
4013
4014                                     ;*****
4015                                     ; THIS SUBTEST CHECKS MODE 1 FOR TIMEOUT
4016                                     ;*****
4017
4018 013242 104001 000007 SCOPE,7
4019 013246 104035 SETUP
4020
4021 013250 104012 PRINT ;TEXT SET CLOCK 3 ON CLOCK MODULE TO 100 M' L1SEC

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 DZPMAB.P11 M7377A REMOTE SERIAL I/O TEST

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4022 013252 027643 MES84 ;TEXT SET SWITCH 1 OF P TO ON.
4023 013254 027727 MES85
4024 013256 104013 TTYIN
4025 013260 112737 000061 017017 MOVB #61,SOH1 ;SET UP MODE 1
4026 013266 004737 017006 JSR PC,ADRSRC
4027 013272 104007 LDPGMO ;NOW CHECK THE TIME-OUT CLEAR.
4028 013274 013300 .+4
4029 013276 000403 BR TG1PA
4030 013300 022 .BYTE DC2
4031 013301 061 STDR12: .BYTE 61
4032 013302 023 .BYTE DC3
4033 013303 130 .BYTE 'X
4034 013304 101 .BYTE 'A
4035 013305 004 .BYTE EOT
4036
4037
4038 ;ADDRESS SOURCE USING MODE 3
4039
4040
4041
4042 ;ADDRESS NON-EXISTENT SOURCE (240=SPACE).
4043 ;VIA THIS PROGRAM: DC1,240,DC3
4044
4045 013306 112737 000240 017015 TG1PA: MOVB #240,SRCADR ;SET SPACE=ADDRESS TO BE ADDRESSED.
4046 013314 004737 017006 JSR PC,ADRSRC ;ADDRESS THE SOURCE MODULE.
4047 013320 012737 177763 031626 MOV #-15,COUNT
4048 013326 104005 RECVRO
4049
4050 ;WAIT FOR APPROXIMATELY 15 SECONDS...
4051
4052
4053 013330 004737 014276 JSR PC,CNTLOP
4054
4055 013334 104007 LDPGMO
4056 013336 013342 .+4
4057 013340 000402 BR TG1PB
4058 013342 021 .BYTE DC1
4059 013343 061 STDR13: .BYTE 61
4060 013344 023 .BYTE DC3
4061 013345 000 .BYTE 0
4062 013346 105722 TG1PB: TSTB (R2)+ ;SKIP OVER THE EOT.
4063 013350 105722 TSTB (R2)+ ;LOOK AT THE BYTE.
4064
4065 013352 001403 BEQ TG1PC ;OK,NO DATA RETURNED.
4066 013354 104022 MODERR ;CLEAR LEFT GARBAGE IN MODULE FIFO.
4067 013356 031301 ERR24
4068
4069 ;NOW CHECK THE REMOTE CLEAR FUNCTION.
4070
4071 013360 104005 RECVRO
4072 013362 112737 000064 017017 TG1PC: MOVB #64,SOH1 ;LEAVE IN MODE 4.
4073 013370 113737 012715 017015 MOVB STDR7,SRCADR
4074 013376 004737 017006 JSR PC,ADRSRC ;ADDRESS THE SOURCE
4075
4076 ;DON'T DELAY THIS TIME.
4077

```

H08

PDM70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 98
 DZPMAB.P11 M7377A REMOTE SERIAL I/O TEST

```

4078 013402 104007          LDPGMO          ;RETURNS FIRST EOT
4079
4080 013404 013410          .+4
4091 013406 000405          BR          TG1PE
4082 013410 022          .BYTE DC2          ;ALERT DESTINATION.
4083 013411 061          STDR14: .BYTE 61
4084 013412 023          .BYTE DC3
4085 013413 130          .BYTE 'X          ;SEND SOME DATA.
4086 013414 101          .BYTE 'A
4087 013415 005          .BYTE ENQ          ;SEND ENQ TO DESTINATION.
4088                                     ;ENQ SHOULD CLEAR OUT THE DESTINATION.
4089 013416 000          .BYTE 0
4090 013420 013420          .EVEN
4091 013420 104020          DELAYL
4092
4093 013422 104007          TG1PE: LDPGMO
4094 013424 013430          .+4
4095 013426 000402          BR          TG1PF
4096 013430 021          .BYTE DC1
4097 013431 061          STDR15: .BYTE 61          ;ALERT THE SOURCE.
4098 013432 023          .BYTE DC3          ;2ND T RETURNED HERE
4099
4100 013433 000          .BYTE 0
4101                                     .EVEN
4102 013434 005722          TG1PF: TST (R2)+          ;TWO EOT'S ARE EXPECTED BACK.
4103
4104 013436 005722          TST (R2)+          ;SKIP OVER THE EOT'S.
4105 013440 005722          TST (R2)+          ;AND LOOK TO SEE IF ANY DATA WAS RETURNED.
4106                                     ;IF DATA CAME BACK, THEN REMOTE CLEAR
4107                                     ;DIDN'T WORK.
4108
4109 013442 001402          BEQ          TG1PG          ;REMOTE CLEARED WORKED ?
4110 013444 104022          MODERR
4111 013446 031225          ERR23          ;NO, IT DIDN'T
4112                                     ;REMOTE CLEAR LEFT GARBAGE IN FIFO.
4113 013450 104001 000010          TG1PG: SCOPE,8.          ;YES, REMOTE CLEAR WORKED.
4114          ;*****
4115          ;TEST COMPLETE
4116          ;*****
4117
4118 013454 104026          TAG1PC: ADDRESS          ;SET UP NEW MODULE ADDRESS
4119 013456 113700 031602          TAG1PD: MOVB MODADR,R0          ;RESET THE ADDRESS.
4120 013462 104012          PRINT
4121 013464 023727          MES7          ;TEXT 'TEST COMPLETE'
4122 013466 000137 012230          JMP M7377B          ;RESTART TEST
4123          .SBTTL M7378A FOUNDATION MODULE TEST
4124

```

PDM70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 99
 DZPMAB.P11 M7379A FOUNDATION MODULE TEST

```

4125 *****
4126 ;M7378 FOUNDATION MODULE TEST
4127 *****
4128
4129
4130
4131 ;THIS TEST SETS THE SERIAL I/O UP AS A SOURCE AND THE FOUNDATION
4132 ;MODULE AS THE DESTINATION. A RANDOM(PSEUDO) BUFFER
4133 ;IS CREATED AND TRANSMITTED FROM SERIAL I/O TO THE FOUNDATION
4134 ;MODULE. THEN THE FOUNDATION MODULE IS ADDRESSED AS THE SOURCE
4135 ;AND THE SERIAL I/O IS ADDRESSED AS THE DESTINATION. BECAUSE
4136 ;OF THE 'WRAP-AROUND' CABLE, THE DATA IS RETURNED
4137 ;FROM FOUNDATION MODULE TO SERIAL I/O.
4138
4139 ;
4140
4141 ;IF THE SERIAL I/O IS BEING USED, A TOTAL OF 128 CHARACTERS
4142 ;RATHER THAN 64 CHARACTERS WILL BE RETURNED.
4143
4144 ;THE TEST THEN CHECKS TO MAKE SURE THAT ADDRESS 17.
4145 ;WILL ALSO RETURN THE DATA.
4146
4147 013472 000000 FLAB7: .WORD 0 ;THIS LOC IS USED TO RESTORE
4148                                     ;THE CONTENTS OF ADDRESS
4149                                     ;WHEN LOOPING.
4150
4151 013474 000000 FOUNSW: .WORD 0
4152 013476 104012 M7379A: PRINT
4153 013500 027263 MES77
4154                                     ;TEXT "FOUNDATION
4155                                     ;MODULE TEST"
4156 013502 005037 013474 FLO: CLR FOUNSW ;CLEAR OUT OUR SUBTEST SWITCH.
4157 013506 104035 FLOP: SETUP ;GET THE MODULE ADDRESS.
4158 013510 104026 ADDRESS ;PUT ADDRESS INTO RD.
4159
4160 013512 110037 013472 FLOPB: MOV B RD,FLAB7 ;SAVE THE ADDRESS IN FLAB7.
4161 013516 113700 013472 FLAB7,RD
4162                                     ;MODIFY THE FOUNDATION ADDRESS
4163                                     ;IN THE PDM-70 PROGRAMS.
4164 013522 004737 014464 JSR PC,FSTUF
4165 013526 113737 016770 013652 MOV B IADRS9,IADR11 ;SET UP SER I/O ADDR.
4166 013534 113737 016770 013636 MOV B IADRS9,IADR12
4167 013542 113737 016770 013655 MOV B IADRS9,IADR14
4168 013550 113737 016770 013642 MOV B IADRS9,IADR13
4169
4170 ;
4171 *****
4172 ;THIS SUBTEST XMITTS A RANDOM BUFFER TO THE FOUNDATION MODULE.
4173 *****
4174
4175 ;NOTE THAT FOUNSW=0 HERE.
4176
4177 013556 104001 000001 SCOPE,1
4178 013562 113737 013472 013646 MOV B FLAB7,FLAB1 ;MODIFY THE FOUNDATION ADDRESS IN PROG.
4179 013570 005077 165544 CLR APSW ;ENABLE INTERRUPTS
4180 013574 104011 RANDOM ;GENERATE RANDOM BUFFER

```

4181	013576	112737	000004	017547	MOV B	#EOT, TRNBFO+77	; TERMINATE AFTER 64 BYTES.
4182	013604	005037	017550		CLR	TRNBFO+100	; END OF BUFFER.
4183	013610	104005			RECVRO		
4184							
4185	013612	112737	000060	017017	MOV B	#60, SOH1	; MODE X
4186	013620	005737	031600		FOUNDL: TST	SIO5WH	; USING THE SERIAL I/O?
4187	013624	001417			SEQ	FNORM	; NO, SO BRANCH TO NORMAL LOAD.
4188	013626	104007			LDPGMO		; ELSE USE PADDED PROGRAM.
4189	013630	013634			.+4		
4190	013632	000421			BR	FDATA	; XMIT THE DATA NEXT.
4191	013634	002			FPROG: .BYTE	STX	
4192	013635	021			.BYTE	DC1	
4193	013636	075			IADR12: .BYTE	75	; SERIAL I/O SRC.
4194	013637	001			.BYTE	SOH	
4195	013640	061			.BYTE	61	
4196	013641	022			.BYTE	DC2	
4197	013642	075			IADR13: .BYTE	75	
4198	013643	075			FLAB2: .BYTE	75	; FOUNDATION MODULE
4199	013644	023			.BYTE	DC3	
4200	013645	021			.BYTE	DC1	; ADDRESS FOUNDATION AS SRC.
4201	013646	075			FLAB1: .BYTE	75	
4202	013647	001			.BYTE	SOH	
4203	013650	060			.BYTE	60	
4204	013651	022			.BYTE	DC2	
4205							
4206							
4207							; ADDRESS THE SERIAL I/O AS DESTINATION.
4208	013652	075			IADR11: .BYTE	75	
4209	013653	023			.BYTE	DC3	
4210	013654	021			.BYTE	DC1	
4211	013655	075			IADR14: .BYTE	75	
4212	013656	001			.BYTE	SOH	
4213	013657	061			.BYTE	61	
4214	013660	023			.BYTE	DC3	
4215	013661	003			.BYTE	ETX	
4216	013662	000			.BYTE	0	
4217		013664			.EVEN		
4218	013664	104007			FNORM: LDPGMO		
4219	013666	013672			.+4		
4220	013670	000402			BR	FDATA	
4221	013672	022			FLAB3A: .BYTE	DC2	
4222	013673	075			FLAB3: .BYTE	75	; FOUNDATION MODULE.
4223	013674	023			.BYTE	DC3	; AS DESTINATION
4224	013675	000			.BYTE	0	
4225					.EVEN		
4226	013676	104007			FDATA: LDPGMO		
4227	013700	017450			TRNBFO		; XMIT THE DATA.
4228	013702	005737	031600		TST	SIO5WH	
4229	013706	001005			BNE	FTST	; BRANCH IF USING SER I/O.
4230							
4231	013710	104007			LDPGMO		
4232	013712	013716			.+4		
4233	013714	000402			BR	FTST	; FOUNDATION AS SOURCE.
4234	013716	021			FLAB5A: .BYTE	DC1	
4235	013717	071			FLAB5: .BYTE	71	
4236	013720	023			.BYTE	DC3	

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 DZPMAB.P11 M7378A FOUNDATION MODULE TEST

```

4237 013721 000 .BYTE 0
4238 .EVEN
4239
4240
4241 ;DELAY AND CHECK TO MAKE SURE THAT AN EOT HAS BEEN RETURNED.
4242
4243
4244 013722 104020 FTST: DELAYL
4245 013724 104004 DELAY
4246 013726 005737 016C12 TST RECEOT ;GIVE IT TIME TO RETURN.
4247 013732 001002 BNE FNDIC ;LOOK FOR AN EOT.
4248 013734 104022 MODERR ;YES, EOT WAS RETURNED.
4249 013736 030251 ERR5 ;'EOT' NOT RETURNED.
4250
4251
4252
4253
4254 ;NOW CHECK THE DATA IN THE RECEIVER AND TRANSMITER BUFFERS.
4255 ;LOOK FOR MATCHES.
4256
4257 013740 012701 017450 FND1C: MOV #TRNBFO,R1 ;XMITTED DATA.
4258 013744 122122 FND1B: CMPB (R1)+,(R2)+ ;DATA MATCH?
4259 013746 001403 BEQ FND1D ;YES.
4260 013750 104022 MODERR ;ELSE ERROR
4261 013752 030174 ERR3 ;XMITTED DATA NOT = RECVD DATA.
4262 013754 000420 BR FOUND2 ;NON-FATAL ERROR.
4263
4264
4265 ;NOW CHECK TO SEE IF WE SHOULD LOOK FOR 64 CHARACTERS OR 128
4266 ;CHARACTERS. IF WE ARE USING THE SERIAL I/O WE WILL
4267 ;HAVE 128 CHARACTERS RETURNED (INCLUDING TWO 'EOTS').
4268
4269 ;NOTE THAT THE LOW BYTE OF TRNBFO+100
4270 ;SERVES AS A BUFFER TERMINATOR AND THAT THE
4271 ;HIGH BYTE SERVES AS A SWITCH. IF THE HIGH BYTE IS SET, THEN
4272 ;WE HAVE CHECKED ALL 128 CHARACTERS.
4273
4274
4275
4276 013756 020127 017550 FND1D: CMP R1,#TRNBFO+100 ;DONE?
4277 013762 001370 BNE FND1B ;NOT DONE YET.
4278 013764 005737 031600 TST SIOSWH ;USING THE SERIAL I/O?
4279 013770 001412 BEQ FOUND2 ;NO, CK ONLY 64 CHARS
4280 013772 105737 017551 TSTB TRNBFO+101 ;CHECKED 128 CHARS?
4281 013776 001007 BNE FOUND2 ;YES, EXIT.
4282 014000 105237 017551 INCB TRNBFO+101 ;NO, CK NEXT 64 CHARS FROM FIFO.
4283 014004 022737 000002 016012 CMP #2,RECEOT ;EOT RECVD YET?
4284 014012 001374 BNE -6 ;NO, WAIT FOR IT.
4285 014014 000751 BR FND1C ;GO CHECK THE DATA FROM FIFO.
4286
4287
4288 ;IF THE 'FOUNSW' IS SET, THEN WE ARE EXECUTING
4289 ;THE 'ADDRESS 17' SUBTEST AND WE SHOULD SKIP OVER THE
4290 ;FOLLOWING SECTION. SET MEANS=-1.
4291
4292

```

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PCD70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 102
DZPMAB.P11 M7378A FOUNDATION MODULE TEST

4293	014016	005737	013474	FOUND2: TST	FOUNSW
4294	014022	003035		BGT	FOUND5
4295					
4296	014024	100423		BMI	FOUND3
4297					
4298					
4299					
4300	014026	005737	031600	TST	SIOSWH
4301	014032	001067		BNE	FOUND6
4302	014034	000240		NCP	
4303	014036	000240		NOP	

;LOOK AT THE SOFTWARE SWITCH.
;IF SWITCH=+1, THEN
;WE ARE IN SUBTEST 3.
;SW=-1 MEANS WE HAVE
;JUST FINISHED SUBTEST 2.
;ELSE FALL THROUGH TO SUBTEST 2.
;(SWITCH=0).

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PDM70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 103
DZPMAB.P11 M7378A FOUNDATION MODULE TEST

```

4304 :*****
4305 :THIS SUBTEST USES ADDRESS '17' AND XMIT A RANDOM BUFFER.
4306 :*****
4307
4308 ;NOTE: FOUNSW=-1 HERE.
4309
4310 014040 104001 000002 SCOPE.2 ;****SUBTEST 2
4311
4312 014044 104012 PRINT
4313 014046 024007 MESIO ;TEXT RESET MODULE ADDRESS TO '17'.
4314 014050 104013 TTYIN ;WAIT FOR CR
4315 014052 112700 000077 MOV B #77,RO ;REPLACE THE FOUNDATION ADDRESS WITH 17.
4316 014056 004737 014464 JSR PC,FSTUF
4317 ;SET THE SWITCH SO THAT WE WON'T ENTER THIS AGAIN.
4318
4319 014062 012737 177777 013474 MOV #-1,FOUNSW ;-1 MEANS WE ARE IN THIS TEST.
4320 014070 000137 013620 JMP FOUNDL ;SEND 2 CHARACTERS AND
4321 ;CHECK TO MAKE SURE THAT ADDRESS 17
4322 ;WILL RETURN THEM.
4323
4324

```

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PDM70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 104
 DZPMAB.P11 M7378A FOUNDATION MODULE TEST

```

4325      ;*****
4326      ;THIS SUBTEST USES THE WRONG ADDRESSES AND CHECK TO MAKE
4327      ;SURE THAT THE MODULE IS NOT ENABLED.
4328      ;*****
4329
4330 014074 005737 031600 FOUND3: TST      SIOSWH      ;SKIP THIS SUBTEST IF WE ARE USING SERIAL I/O.
4331 014100 001402      BEQ      FND3A      ;SIO NOT IN USE.
4332 014102 000137 013502      JMP      FLO      ;ELSE LOOP TO BEGINNING OF MODULE TEST.
4333
4334      ;ADDRESS THE MODULE WITH ADDRESSES 0-16.
4335      ;ASSUME PRESENT ADDRESS SELECTED TO BE 17.
4336
4337
4338 014106 104001 000003 FND3A: SCOPE,3      ;****SUBTEST 3
4339 014112 004737 005066      JSR      PC,ADRSIT      ;MULTIPLE
4340      ;ADDRESS TEST.
4341      ;(DESTINATION)
4342
4343

```

```

4344 *****
4345 :
4346 : ROUTINE TO CHECK CUSTOMER DEFINED
4347 : MODE FLIP FLOP (SUB-PROGRAM).
4348 *****
4349 014116 104001 000005 FOUND5: SCOPE.5 :****SUBTEST 5
4350 014122 104012 PRINT
4351 014124 027325 MEST9 :TEXT
4352 :PUT SCOPE PROBE
4353 :ON PIN 78(CR).
4354 014126 027361 MEST9 :USE IE TO EXIT
4355 014130 104013 TTYIN :WAIT FOR CR
4356 :
4357 014132 012737 014212 014210 : MOV #FOUND6,EVECTOR
4358 : OUTPUT THE FOLLOWING PROGRAM.
4359 : THIS PROGRAM WILL LOOP ENDLESSLY
4360 : UNTIL A 'E' IS INPUTTED VIA TTY.
4361 : THE APPROXIMATE SIGN. TO BE SCOPED WILL
4362 : BE 1 MILLISEC @ 9600 BAUD.
4363 :
4364 :SW 14=SET TO SC DP.
4365 :SW 11 =SET TO
4366 :
4367 014140 005737 031600 FNDS: TST SIOSWH :USING THE SERIAL I/O?
4368 014144 001013 BNE FNDSB :YES, SO USE PADDED PROGRAM.
4369 :ELSE, USE THE FOLLOWING:
4370 :
4371 :
4372 :LOAD THIS PROGRAM IF MODULE TEST
4373 FNDSA: LDPGMO :LOAD THE PROGRAM
4374 :+4
4375 BR FNDS0 :GO HERE WHEN DONE
4376 :.BYTE DC2
4377 FLAB6: :.BYTE 77 :FOUNDATION AS DESTIN.
4378 :.BYTE DC3
4379 :.BYTE EOT :SEND THE EOT
4380 :
4381 :
4382 014160 104007 FNDS0: LDPGMO
4383 014162 014166 :+4
4384 014164 000770 BR FNDS4
4385 014166 021 :.BYTE
4386 014167 077 FLAB4: :.BYTE
4387 014170 :.BYTE
4388 014171 :.BYTE
4389 014172 :.BYTE
4390 :.EVEN
4391 :
4392 :USE THIS PROGRAM IF SYSTEM TEST
4393 014174 104007 FNDSB: LDPGMO :LOAD THE FOLLOWING PROGRAM.
4394 : (SERIAL I/O IN USE).
4395 :
4396 :
4397 014176 013634 FPROG
4398 014200 104006 LDCHRC :SEND AN EOT
4399 014202 000004 EOT
4400 014204 000137 014174 JMP FNDSB

```

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PDMO DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 106
DZPYAB.P11 M7378A FOUNDATION MODULE TEST

4400

4401 014210 000000

EVECTOR:

.WORD 0

;ADDRESS TO GET ME OUT OF #FINI LOOPS.

PCMTG DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 107
DZPMAB.P11 M7379A FOUNDATION MODULE TEST

```
4402
4403
4404
4405
4406
4407 014212 104001 000006 FOUND6: SCOPE,6
4408
4409 014216 104012 PRINT
4410 014220 023727 MES7
4411 014222 000137 013502 JMP FLO ;TEXT 'TEST COMPLETE'
4412 ;LOOP THE TEST.
4413
.SBTTL SUBROUTINES
```

EOS

```

4414
4415
4416
4417
4418
4419
4420
4421
4422 014226 104007
4423 014230 014234
4424 014232 000420
4425 014234 101
4426 014235 130
4427 014236 004
4428 014237 000
4429
4430
4431
4432
4433
4434
4435
4436
4437 014240 104007
4438 014242 014246
4439 014244 000413
4440 014246 002
4441 014247 021
4442 014250 060
4443 014251 001
4444 014252 061
4445 014253 022
4446 014254 060
4447 014255 023
4448 014256 021
4449 014257 060
4450 014260 022
4451 014261 060
4452 014262 023
4453 014263 021
4454 014264 060
4455 014265 001
4456 014266 060
4457 014267 000
4458 014270 000
4459 014271 000
4460 014272 000
4461 014274 014274
4462 014274 000207
4463
4464
4465
4466
4467
4468
4469

```

```

*****: *****
SUBROUTINE SENDAX
*****
SUBROUTINE TO LOAD AND SEND THE CHARACTERS
"A" AND "X"
SENDAX: LDPGM0
      +4
      BR      SNDAX1      ;GO HERE WHEN DONE.
BYTEA: .BYTE  'A'
BYTEX: .BYTE  'X'
      .BYTE  EOT
      .BYTE  0
      .EVEN

*****SUBROUTINE SENDPG*****
SUBROUTINE TO SEND A PROGRAM.
(USED FOR DEBUGGING PURPOSES.)
SENDPG: LDPGM0
      +4
      BR      SNDAX1
      .BYTE  STX
      .BYTE  DC1
      .BYTE  60
      .BYTE  SOH
      .BYTE  61
      .BYTE  DC2
      .BYTE  60
      .BYTE  DC3
      .BYTE  DC1
      .BYTE  60
      .BYTE  DC2
      .BYTE  60
      .BYTE  DC3
      .BYTE  DC1
      .BYTE  60
      .BYTE  SOH
      .BYTE  60
      .BYTE  0
      .BYTE  0
      .BYTE  0
      .BYTE  0
      .EVEN
SNDAX1: RTS      PC      ;RETURN

*****SUBROUTINE CNTLOP*****
SUBROUTINE TO PROVIDE AN "X" SECOND WAIT.
ENTERS WITH COUNT EQUAL TO THE COMPLEMENT OF THE NUMBER
OF SECONDS DESIRED TO WAIT.

```

```

4470
4471 014276 104023
4472 014300 000000 01626
4473 014304 001374
4474 014306 000207
4475
4476
4477
4478
4479
4480
4481
4482
4483
4484
4485 014310 112737 000060 017065
4486
4487 014316 113700 017065
4488 014322 004737 014464
4489 014326 005027 016024
4490 014332 123737 031602 017065
4491 014340 001434
4492 014342 005737 031600
4493 014346 001403
4494
4495 014350 104007
4496 014352 013634
4497
4498 014354 000410
4499 014356 104007
4500 014360 013716
4501
4502 014362 104007
4503 014364 014370
4504 014366 000403
4505 014370 021
4506 014371 060
4507 014372 001
4508 014373 060
4509 014374 023
4510 014376
4511
4512 014376 004737 014226
4513 014402 104005
4514 014404 104004
4515
4516
4517
4518
4519
4520
4521
4522 014406 123722 000101
4523 014412 001007
4524 014414 123722 000102
4525 014420 001004

CNTLOP: NULL1 ;DELAY ONE SECOND.
INC COUNT ;UP THE DELAY COUNTER.
BNE CNTLOP ;CONTINUE LOOPING UNTIL COUNTER IS ZERO.
RTS PC ;RETURN WHEN DONE.

;*****
;ROUTINE TO ADDRESS A MODULE USING ALL OF THE WRONG ADDRESSES
;AND CHECK TO MAKE SURE THAT DATA ISN'T RETURNED.
;*****

;THIS ROUTINE IS DESIGNED FOR THE FOUNDATION MODULE
;BUT WILL WORK FOR OTHER MODULES.
MATD: MOVB #60,DSTADR ;SET UP 1ST ADDRESS
;TO BE TESTED.
ADSLOP: MOVB DSTADR,R0
JSR PC,FSTUF ;STUFF MODULE ADDRESS.
CLR #RECBFO+2 ;CLEAR 1ST LOC.
CMPB MODADR,DSTADR ;EQUAL TO SELECTED ADDRESS?
BEQ ADSNXT ;YES, SELECT NEXT ADDR.
TST SIOSWH ;SERIAL I/O IN USE?
BEQ ADSLP1 ;NOPE

LDPGMO
FPROG ;USE PADDED SERIAL PROGRAM.

ADSLP1: BR ADSLP2
LDPGMO
FLAB5A
;ADDRESS THE FOUNDATION MODULE AS A SOURCE (NON-SERIAL I/O).
LDPGMO
+4
BR ADSLP2
FLAB17: .BYTE DC1
.BYTE 60
.BYTE 50H
.BYTE 60
.BYTE DC3
.EVEN

ADSLP2: JSR PC,SENDAX ;SEND 2 CHARS.
RCVRO ;ENABLE DL-11 RCVR.
DELAY

;CHECK THE DATA TO SEE IF IT IS A,B,EOT.
;SINCE OTHER MODULES MAY INDEED BE IN THE SYSTEM, OTHER
;THAN THE FOUNDATION MOD, THEY COULD POSSIBLY XMIT DATA WHEN
;ADDRESSED.

CMPB 'A,(R2)+ ;WAS AN "A" RETURNED?
BNE ADSNXT ;NOPE.
CMPB 'B,(R2)+ ;B?
BNE ADSNXT ;NOT A B.

```

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PDM70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 110
 DZPMAB.P11 SUBROUTINES

```

4526 014422 122722 000004      CMPB  #EOT,(R2)+      ;EOT?
4527 014426 001001      BNE    ADSNXT
4528
4529      ;ONLY THE STRING A,B,EOT CAN MAKE IT TO HERE.
4530
4531 014430 000407      BR      ADSER1
4532
4533      ;THAT STRING SHOULD NOT HAVE
4534      ;BEEN RECEIVED.
4535 014432 105237 017065      ADSNXT: INCB  DSTADR      ;UPDATE MODULE ADDRESS.
4536 014436 122737 000077 017065      CMPB  #77,DSTADR  ;DONE?
4537 014444 001324      BNE    ADSLOP      ;NO.
4538 014446 000207      RTS    PC          ;YES.
4539 014450 113737 017065 030634      ADSER1: MOVB  DSTADR,ERR13A
4540 014456 104022      MODERR
4541 014460 030572      ERR13
4542      ;MODULE ENABLED
4543      ;WITH ILLEGAL
4543 014462 000763      BR      ADSNXT      ;ADDRESS.

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014464	110037	013646
014470	110037	013643
014474	110037	013673
014500	110037	014167
014504	110037	013717
014510	110037	014155
014514	110037	013472
014527	000207	

```

FSTUF:  MOVB  RO,FLAB1
        MOVB  RO,FLAB2
        MOVB  RO,FLAB3
        MOVB  RO,FLAB4
        MOVB  RO,FLAB5
        MOVB  RO,FLAB6
        MOVB  RO,FLAB7
        RTS  PC

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```

;RETURN.

```

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;*****
;ROUTINE TO STUFF THE ADDRESS IN RO INTO THE PADDED SERIAL
;I/O PROGRAM AND UN-PADDED PROGRAM.
;*****

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4567 014522 104002
4568 014524 005037 031604
4569 014530 005037 031662
4570 014534 005037 031664
4571 014540 012704 015116
4572 014544 105777 164572
4573 014550 100375
4574 014552 117701 164566
4575 014556 142701 000200
4576 014562 105701
4577 014564 001757
4578 014566 005737 031616
4579 014572 001407
4580 014574 005737 031570
4581 014600 001066
4582 014602 110114
4583 014604 062716 000002
4584 014610 000462
4585 014612 120127 000060
4586 014616 100426
4587 014620 122701 000132
4588 014624 100423
4589 014626 005737 031570
4590 014632 001051
4591 014634 005737 031664
4592 014640 001404
4593 014642 005037 031664
4594 014646 104012
4595 014650 031474
4596 014652 110124
4597 014654 005237 031662
4598 014660 022737 000102 031662
4599 014666 100510
4600 014670 104010
4601 014672 000724

*****
:KEYBOARD SERVICE ROUTINE.  CHARACTERS ARE ACCEPTED FROM THE KEYBOARD,
:TESTED FOR DIFFERENT FUNCTIONS AND SAVED IN A BUFFER.
*****

XTTYIN: SAVREG          ;SAVE REGISTERS
      CLR REPTSW        ;CLR SOFTWARE SW.
      CLR CHRCNT        ;CHARACTER COUNTER
      CLR RUBSWH        ;RUBOUT SW.
      MOV #INBUF,R4     ;SET UP BUFFER POINTER
INPUTA: TSTB @TKS        ;CHARACTER READY?
      BPL INPUTA        ;NO, WAIT
      MOV @TKB,R1       ;YES, SAVE IT
      BICB #200,R1      ;STRIPE OFF PARITY BIT
      TSTB R1           ;WAS 'HERE IS' TYPED?
      BEQ XTTYIN+2      ;YES, IGNORE IT
      TST SENDSW        ;INTERRUPTED FROM SEND ROUTINE
      BEQ INPUTC        ;NO
      TST PRTSWH        ;INTERRUPT FROM PRINT?
      BNE EXTTY         ;YES, IGNORE IT
      MOV R1,(R4)       ;NO, SAVE CHAR.
      ADD #2,(SP)       ;YES, RETURN CALL +4
      BR EXTTY          ;EXIT
INPUTC: CMPB R1,#60     ;SPECIAL CHARACTER
      BMI SPCHR1        ;YES, TEST IT
      CMPB #132,R1      ;SPECIAL CHARACTER
      BMI SPCHR1        ;YES, TEST IT
      TST PRTSWH        ;INTERRUPTED FROM PRINT ROUTINE?
      BNE EXTTY         ;YES, IGNORE IT
INPUTB: TST RUBSWH      ;RUBOUT SW. SET?
      BEQ .+12          ;NO, NORMAL ECHO.
      CLR RUBSWH        ;YES, CLR IT.
      PRINT '\ ' TO TERMINATE RUBOUT MODE
      SLASH             ;SAVE CHARACTER
      MOV R1,(R4)+
      INC CHRCNT
      CMP #66,CHRCNT    ;BUFFER FULL?
      BMI TYPEQM        ;YES, TYPE '?'
      TYPEIT            ;NO, ECHO CHAR.
      BR INPUTA         ;WAIT FOR NEXT CHAR.

```

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4602
4603 ;SUBROUTINE ENTERED TO TEST FOR SPECIAL CHARACTERS
4604
4605 014674 005737 031570 SPCHR1: TST PRTSWH ;INTERRUPTED FROM PRINT ROUTINE?
4606 014700 001036 BNE CNTRLC ;YES, CHECK FOR '↑C'
4607 014702 122701 000177 CMPB #177,R1 ;CHAR. = RUBOUT?
4608 014706 001016 BNE SPCHR3 ;NO
4609 014710 005737 031662 TST CHRCNT ;YES, IS IT VALID?
4610 014714 001713 BEQ INPUTA ;NO, IGNORE IT
4611 014716 005337 031662 DEC CHRCNT ;YES, DECREMENT COUNTER
4612 014722 005737 031664 TST RUBSWH ;IN 'RUBOUT' MODE?
4613 014726 001002 BNE .+6 ;YES, JUST ECHO BACK CHAR.
4614 014730 104012 PRINT
4615 014732 031474 SLASH ;PRINT '\ ' TO INDICATE RUBOUT
4616 014734 114401 MOVB -(R4),R1 ;GET LAST CHAR.
4617 014736 005237 031664 INC RUBSWH ;SET 'RUBOUT' MODE
4618 014742 000752 BR ECHO
4619 014744 122701 000015 SPCHR3: CMPB #15,R1 ;CHAR. = 'CR' !
4620 014750 001004 BNE SPCHR5 ;NO
4621 014752 104012 PRINT ;YES, PRINT 'CR-LF'
4622 014754 031500 CRLF
4623
4624 014756 104003 EXTTY: GETREG ;RESTORE REGISTERS
4625 014760 000002 RTI ;EXIT
4626 014762 122701 000040 SPCHR5: CMPB #40,R1 ;CHAR. = SPACE?
4627 014766 001740 BEQ ECHO ;YES, ECHO BUT DON'T SAVE IT
4628 014770 122701 000054 CMPB #54,R1 ;CHAR = 'COMMA'
4629 014774 001717 BEQ INPUTB ;YES, SAVE IT
4630 014776 104000 CNTRLC: PRCNTR
4631 015000 122701 000003 CMPB #3,R1 ;CHAR. = '↑C'
4632 015004 001002 BNE CNTRLA ;NO CHECK FOR '↑A'
4633 015006 000137 001376 JMP MONTR ;RETURN TO MONITOR
4634 015012 122701 000001 CNTRLA: CMPB #1,R1 ;CHAR. = '↑A' ?
4635 015016 001004 BNE CNTRLR ;NO, CHECK FOR '↑R'
4636 015020 012706 001000 MOV #1000,SP ;RESET STACK POINTER
4637 015024 000177 014544 JMP @AVECTR ;GO TO THE RESTART ADDRESS
4638 015030 122701 000022 CNTRLR: CMPB #22,R1 ;CHAR. = '↑R'
4639 015034 001006 BNE CNTRLE ;NO, TEST FOR '↑E'
4640 015036 104012 PRINT
4641 015040 031500 CRLF
4642 015042 012706 001000 MOV #1000,SP ;RESET STACK POINTER
4643 015046 000177 014520 JMP @AVECTR ;GO TO RESTART ADDRESS
4644 015052 122701 000005 CNTRLE: CMPB #5,R1 ;CHAR.= '↑E'?
4645 015056 001003 BNE CNTRLO ;NO, TEST FOR '↑O'
4646 015060 104005 RECVRC ;CLEAR OUT THE BUFFER.
4647 015062 000177 177122 JMP @VECTOR ;CONTINUE ON TO NEXT SUBTEST.
4648 015066 005737 031570 CNTRLO: TST PRTSWH ;INTERRUPTED IN FROM PRINT ROUTINE?
4649 015072 001406 BEQ TYPEQM ;NO, ILLEGAL ENTRY
4650 015074 122701 000017 CMPB #17,R1 ;CHAR. = '↑O'?
4651 015100 001326 BNE EXTTY ;NO, IGNORE IT
4652 015102 005137 031620 COM OPRTSW ;YES, SET/RESET PRINT INHIBIT SW.
4653 015106 000723 BR EXTTY ;EXIT
4654 015110 104012 TYPEQM: PRINT
4655 015112 031350 QMARK
4656 015114 000603 BR
4657 015116 000000 INBUF: 0 XTTYIN+2

```

K09

PDM70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 114
DZPMAB.P11 SUBROUTINES

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4659

015222

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4660      ;SUBROUTINE TO CHECK FOR AND PRINT PDP-70 CONTROL CHAR.'S
4661      PDMSET: CMPB    #DC1,R1      ;YES, CHAR = 21?
4662      JSR      PC,PDMPT      ;PRINT PDM CNTRL CHAR.
4663      MESDC1      ;TEXT 'DC1'
4664      CMPB    #DC2,R1      ;CHAR = 22?
4665      JSR      PC,PDMPT      ;PRINT PDM CNTRL CHAR.
4666      MESDC2      ;TEXT 'DC2'
4667      CMPB    #DC3,R1      ;CHAR = 23?
4668      JSR      PC,PDMPT      ;PRINT PDM CNTRL CHAR.
4669      MESDC3      ;TEXT 'DC3'
4670      CMPB    #DC4,R1      ;CHAR = 24?
4671      JSR      PC,PDMPT      ;PRINT PDM CNTRL CHAR.
4672      MESDC4
4673      CMPB    #STX,R1
4674      JSR      PC,PDMPT      ;PRINT PDM CNTRL CHAR.
4675      MESSTX
4676      CMPB    #SYN,R1
4677      JSR      PC,PDMPT      ;PRINT PDM CNTRL CHAR.
4678      MESSYN
4679      CMPB    #SOH,R1
4680      JSR      PC,PDMPT      ;PRINT PDM CNTRL CHAR.
4681      MESSOH
4682      CMPB    #SI,R1
4683      JSR      PC,PDMPT      ;PRINT PDM CNTRL CHAR.
4684      MESSI
4685      CMPB    #EOT,R1
4686      JSR      PC,PDMPT      ;PRINT PDM CNTRL CHAR.
4687      MESEOT
4688      CMPB    #ETX,R1
4689      JSR      PC,PDMPT      ;PRINT PDM CNTRL CHAR.
4690      MESETX
4691      BITB    #140,R1      ;IS CHAR. PRINTABLE?
4692      BEQ     PDMST1      ;NO, PRINT AS CONTROL CHAR.
4693      TYPEIT      ;YES, TYPE IT
4694      TST     SENDSW
4695      BNE     PDMSTO
4696      INC     FORMT1
4697      CMP     FORMT1,#72.
4698      BLT     PDMST2
4699      PDMSTO: PRINT
4700      CRLF
4701      CLR     FORMT1
4702      BR      .+4
4703      PDMST1: PRCNTR      ;PRINT AS CONTROL CHAR.
4704      PDMST2: RTS     PC
4705      PDMPT:  BNE     PEXT2      ;CHAR. MATCH?
4706      MOV     @ (SP),XPDMES      ;YES, GET ADDRESS OF MESSAGE
4707      PRINT
4708      XPDMES: 0
4709      CLR     FORMT1      ;RE-SET 'CR/LF' FORMAT SW.
4710      POP1SP      ;CLEAN UP STACK
4711      RTS     PC      ;EXIT
4712      PEXT2:  ADD     #2,(SP)      ;CHECK NEXT WORD
4713      RTS     PC

```

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4714      ;*****
4715      ; COMPUTE THE RESULT OF 'X' CONVERSIONS AS HIGH, LOW AND AVERAGE
4716      ; THE ROUTINE IS ENTERED WITH THE NUMBER OF CONVERSIONS TO BE TAKEN IN 'R1'
4717      ; AND WITH 'R2' CONTAINING THE ADDRESS OF THE DATA TO BE AVERAGED.
4718      ;*****
4719
4720 015470 104002      XAVRAGE: SAVREG      ; SAVE REGISTERS
4721 015472 005037 015702      CLR      HIDIVD      ; CLR HI-ORDER DIVIDEND
4722 015476 005037 015702      CLR      LODIVD      ; CLR LO-ORDER DIVIDEND
4723 015502 005037 015712      CLR      HIGH      ; HIGH
4724 015506 005037 015706      CLR      LOW      ; & LOW
4725 015512 010137 015676      MOV      R1, LODIVR      ; SET UP DIVISOR FOR DIVIDE
4726 015516 012204      GETDAT: MOV      (R2)+, R4      ; GET VALUE
4727 015520 005737 015712      TST      HIGH
4728 015524 001403      BEQ      .+10
4729 015526 020437 015712      CMP      R4, HIGH      ; IS NEW NO. GREATER THAN OLD NO.?
4730 015532 003402      BLE      TSTLO      ; NO, TEST IF LESS THAN
4731 015534 010437 015712      MOV      R4, HIGH      ; YES, SAVE NEW HIGH
4732 015540 005737 015706      TSTLO: TST      LOW
4733 015544 001403      BEQ      .+10
4734 015546 020437 015706      CMP      R4, LOW      ; NEW NO LESS THAN OLD NO.?
4735 015552 003002      BGT      .+6      ; NO
4736 015554 010437 015706      MOV      R4, LOW      ; YES, SAVE NEW LOW
4737 015560 060437 015702      ADD      R4, LODIVD      ; ADD VALUE TO LOW-ORDER DIVIDEND
4738 015564 005537 015704      ADC      HIDIVD      ; ADD CARRY TO HI-ORDER DIVIDEND
4739 015570 005301      DEC      R1      ; DONE?
4740 015572 001351      BNE      GETDAT      ; NO
4741 015574 004737 015604      AVGDAT: JSR      PC, DIVIDE      ; PREFORM DIVIDE
4742 015600 104003      GETREG      ; YES, RESTORE REG.'S
4743 015602 00C002      RTI      ; EXIT

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4744
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4750 015604 104002
4751 015606 013701 015676
4752 015612 013702 015700
4753 015616 013703 015702
4754 015622 013704 015704
4755 015626 005005
4756 015630 160103
4757 015632 005604
4758 015634 160204
4759 015636 005704
4760 015640 100402
4761 015642 005205
4762 015644 000771
4763 015646 050103
4764 015650 010337 015714
4765 015654 006201
4766 015656 001403
4767 015660 020103
4768 015662 101001
4769 015664 005205
4770 015666 010537 015710
4771 015672 104003
4772 015674 000207
4773 015676 000000
4774 015700 000000
4775 015702 000000
4776 015704 000000
4777 015706 000000
4778 015710 000000
4779 015712 000000
4780 015714 000000
4781

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*****
DOUBLE PERCISION DIVIDE SUBROUTINE
THIS ROUTINE IS ENTERED THIS WITH THE DIVISOR AND DIVIDENT PRE-LOADER
INTO THE ROUTINE.
*****
DIVIDE: SAVREG
MOV LODIVR,R1
MOV HIDIVR,R2
MOV LODIVD,R3
MOV HIDIVD,R4
DIVDIT: CLR R5
SUB R1,R3
SBC R4
SUB R2,R4
TST R4
BMI .+6
INC R5
BR DIVDIT
ADD R1,R3
MOV R3,REMAIN
ASR R1
BEQ .+10
CMP R1,R3
BHI .+4
INC R5
MOV R5,QUOENT
GETREG
RTS PC
LODIVR: 0
HIDIVR: 0
LODIVD: 0
HIDIVD: 0
LOW: 0
QUOENT: 0
HIGH: 0
REMAIN: 0

```

```

;SAVE REG.'S
;GET LOW ORDER DIVISOR
;GET HIGH ORDER DIVISOR
;GET LOW ORDER DIVIDENT
;GET HIGH ORDER DIVIDENT
;USE 'R5' TO STORE QUOTIENT
;SUBTRACT L-O DIVISOR FROM DIVIDENT
;SUB CARRY FROM HI-ORDER DIVIDENT
;SUBTRACT HI-ORDER DIVISOR
;SUBTRACTION SUCCESSFUL?
;NO, EXIT
;YES, INCREMENT QUOTIENT
;PERFORM NEXT SUBTRACTION
;ADD BACK OVERFLOW
;SAVE AS REMAINDER

;IS REMAINED > THAN HALF DIVISOR?
;NO
;YES, ADD '1' TO QUOTIENT
;SAVE QUOTIENT
;RESTORE REGISTER
;EXIT

```

[illegible]

015716	012700	016022
015722	010037	016020
015726	005020	
015730	022700	016062
015734	001374	
015736	005037	016006
015742	005037	016012
015746	005037	016022
015752	005037	016010
015756	005037	016014
015762	005037	016016
015766	005777	163366
015772	052777	000100
016000	012702	016022
016004	000002	
016006	000000	
016010	000000	
016012	000000	
016014	000000	
016016	000000	
016020	016022	
016022	000000	
	016524	
016524	000000	

163356

```

:*****
:DL11 RECEIVER INITIALIZATION ROUTINE.
:THIS ROUTINE SETS UP A RECEIVER BUFFER WHERE DATA IS STORED AS IT COMES
:IN FROM THE DL11 RECEIVER.
:*****

```

```

XRECRQ:  MOV      #RECBFO,R0
          MOV      R0,RECVPT
          CLR      (R0)+          ;CLR 1ST '20' LOCATIONS OF BUFFER
          CMP      #RECBFO+40,R0
          BNE      .-6
          CLR      PARITY
          CLR      RECEOT
          CLR      RECBFO
          CLR      RECDCC3
          CLR      RECSTX
          CLR      RECETX
          TST      @RBUFO
          BIS      #10C,@RCSRD    ;CLR RECVR. FLAGS
          MOV      #RECBFO,R2     ;ENABLE THE INTERRUPT
          RTI                     ;SET UP BUFFER POINTER

```

```

PARITY: 00
RECD03: 00
RECE0T: 00
RECSTX: 00
RECETX: 00
RECVPT: RECBFO
RECBFO: 0
          = .+500
RECE0D: 0

```

4814			
4815			
4816			
4817			
4818			
4819			
4820			
4821	C16526	010146	
4822	016530	010246	
4823	016532	013701	016020
4824	016536	017702	162616
4825	016542	110221	
4826	016544	105011	
4827	016546	012737	023561
4828	016554	020127	016524
4829	016560	003054	
4830	016562	005702	
4831	016564	100013	
4832	016566	012737	C23652
4833	016574	032702	040000
4834	016600	001044	
4835	016602	032702	010000
4836	016606	001402	
4837	016610	005237	016006
4838	016614	122702	000004
4839	016620	001003	
4840	016622	005237	016012
4841	016626	000424	
4842	016630	005737	031600
4843	016634	001021	
4844	016636	122702	000023
4845	016642	001003	
4846	016644	005237	016010
4847	016650	000413	
4848	016652	122702	000002
4849	016656	001003	
4850	016660	005237	016014
4851	016664	000405	
4852	016666	122702	000003
4853	016672	001002	
4854	016674	005237	016016
4855	016700	010137	016020
4856	016704	012602	
4857	016706	012601	
4858	016710	000002	
4859	016712	005077	162440
4860	016716	005037	031616
4861	016722	104012	
4862	016724	023561	
4863	016726	000137	001376

```

;*****
;SBTTL DL11 RECEIVER SUBROUTINE.
;ROUTINE IS ENTERED ON DL11 RECEIVER INTERRUPTS WHERE THE CHARACTER IS
;READ & SAVED IN A BUFFER.
;*****
RECVER:  MOV     R'  -(SP)           ;SAVE REG'S 'R1&R2' ON STACK
        MOV     -(SP)
        MOV     PT,R1             ;SET UP BUFFER POINTER
        MOV     JFO,R2           ;READ & SAVE CHAR.
        MOVB    <+(R1)+         ;SAVE CHAR. IN BUFFER
        CLRB    1)              ;TERMINATE BUFFER W/ NULL CHAR.
        MOV     MES2,ERRMES       ;NO, SET UP 1ST ERROR MESSAGE
        CMP     1,RECEND         ;RECEIVER BUFFER FULL?
        BGT     RECERR           ;YES PRINT BUFFER FULL MESSAGE
        TST     R2               ;WAS RECVR. ERROR DETECTED?
        SPL     RECVR1           ;NO
        MOV     MES4,ERRMES       ;SETUP 2ND ERROR MESSAGE
        BIT     #4000,R2         ;OVERRUN FLAG SET?
        BNE     RECERR           ;YES, PRINT OVERRUN ERROR MESSAGE
        BIT     #1000,R2         ;PARITY BIT SET?
        BEQ     +6               ;NO, OK
        INC     PARITY           ;YES, SET PARITY ERROR FLAG
RECVR1:  CMPB    #EOT,R2         ;CHAR. =EOT?
        BNE     +10              ;NO
        INC     RECEOT
        BR      RECEXT
        TST     SIOSWH           ;USING SERIAL INPUT OPTION?
        BNE     RECEXT           ;YES, EXIT
        CMPB    #DC3,R2         ;CHAR. =DC3?
        BNE     +10              ;NO
        INC     REODC3           ;YES, SET FLAG
        BR      RECEXT
        CMPB    #STX,R2         ;CHAR. = STX?
        BNE     +10              ;NO
        INC     RECSTX           ;YES, SET FLAG.
        BR      RECEXT
        CMPB    #ETX,R2         ;CHAR. = ETX?
        BNE     +6               ;NO
        INC     RECETX           ;YES, SET FLAG
RECEXT:  MOV     R1,RECVRT
        MOV     (SP)+,R2
        MOV     (SP)+,R1
        RTI
RECERR:  CLR     JRCSRC           ;DISABLE FURTHER INTERRUPTS
        CLR     SENDSW
        PRINT
ERRMES:  MES2
        JMP     MONITR           ;MODIFIED DEPENDING ON TYPE OF ERROR
;RETURN TO MONITOR ON RECVR. ERRORS

```

```

4864
4865
4866
4867
4868
4869
4870
4871 016732 005737 031600
4872 016736 001463
4873 016740 104006
4874 016742 000002
4875 016744 005237 031622
4876 016750 000456
4877
4878
4879
4880
4881
4882
4883
4884 016752 005737 031600
4885 016756 001453
4886 016760 000002
4887 016762 000002
4888 016764 000002
4889 016766 000002
4890 016767 000002
4891 016770 000002
4892 016771 000002
4893 016772 000002
4894 016773 000002
4895
4896 016774 005237 031622
4897 017000 000002 031614
4898 017001 000002

```

 IF THE CONTROL MODULE IS BEING USED THIS ROUTINE PADS THE DATA
 BEING TRANSMITTED SO THAT THE DESTINATION PORTION OF THE
 SERIAL I/O MODULE GETS ADDRESSED.

XSOURC: TST SIOSWH ;SERIAL I/O INPUT?
 BEQ XLDADD ;NO, NORMAL LOAD
 LDCHRC ;YES, SEND 'STX' TO ENTER ADDRESS MODE
 STX
 INC TERMSW
 BR XLDADD

 IF THE CONTROL MODULE IS BEING USED THIS ROUTINE PADS THE DATA
 BEING TRANSMITTED SO THAT THE SOURCE PORTION OF THE SERIAL I/O
 MODULE GETS ADDRESSED.

XDSTIN: TST SIOSWH ;SERIAL I/O INPUT?
 BEQ XLDADD ;NO, NORMAL LOAD
 LDPCMO ;ADD, ADD CODE TO ADDRESS SOURCE
 +4
 BR XDSTG1
 .BYTE STX ;CLEAR FIFO
 .BYTE DC1 ;ALERT SOURCE
 IADRS9: .BYTE 75 ;MODIFIED BY USER
 .BYTE 50H ;SET UP MODE 'I'; WAIT
 .BYTE 61
 .BYTE 0

XDSTG1: INC TERMSW
 INC DSTSWH
 BR XLDADD

```

4999
5000
5001
5002
5003
5004
5005 017006 104025
5006 017010 017014
5007 017012 000207
5008 017014 021
5009 017015 060
5010 017016 001
5011 017017 060
5012 017020 023
5013 017021 000
5014
5015
5016
5017
5018
5019
5020 017022 005737 031600
5021 017026 001004
5022 017030 122737 000023 017066
5023 017036 001404
5024 017040 112737 000023 017066
5025 017046 000403
5026 017050 112737 000017 017066
5027 017056 104024
5028 017060 017064
5029 017062 000207
5030 017064 022
5031 017065 060
5032 017066 023
5033 017067 000
5034
5035
5036
5037
5038
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5040 017070 005237 017444
5041 017074 011637 017446
5042 017100 062716 000002
5043 017104 000404
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5050 017106 017637 000000 017446
5051 017114 000771

;*****
;SUBROUTINE TO ADDRESS ANY SOURCE MODULE
;*****

ADLRC: SOURCE ;ADDRESS AS SOURCE
      .+4
      RTS PC
SRCADR: .BYTE DC1 ;ALERT MODULE
        .BYTE 60 ;ADDRESS MODIFIED BY USER
        .BYTE SOH
SOH1: .BYTE 60 ;ADDRESS MODIFIED BY ME
      .BYTE DC3
      .BYTE 0
      .EVEN

;*****
;SUBROUTINE TO ADDRESS ANY DESTINATION MODULE
;*****

ADDRST: TST SIOSWH ;USING SERIAL I/O?
        BNE .+12 ;NO
        CMPB #DC3,DSTADR+1 ;YES, USING 'DC3'?
        BEQ .+1 ;YES, LOAD 'SI'
        MOVB #DC3,DSTADR+1 ;NO, LOAD DC3
        BR .+10
        MOVB #SI,DSTADR+1
        DESTIN ;ADDRESS DESTINATION
        .+4
        RTS PC
DSTADR: .BYTE DC2 ;ALERT MODULE
        .BYTE 60 ;ADDRESS MODIFIED BY USER
        .BYTE DC3
        .BYTE 0
        .EVEN

;*****
;SUBROUTINE TO TRANSMIT A SINGLE CHARACTER VIA THE DL11.
;*****

XLDCHR: INC SNGCHR ;SET SOFTWARE FLAG
        MOV (SP),TRANPT ;SET UP ADDRESS OF CHAR. TO BE TRANSMITTED
XLD1: ADD #2,(SP) ;SET UP STACK TO EXIT
      BR TRNSMT

;*****
;SUBROUTINE TO SETUP AN ADDRESS FROM WHICH DATA IS TO BE TRANSMITTED VIA
;THE DL11.
;*****

XLDADD: MOV 2(SP),TRANPT ;SETUP ADDRESS OF DATA TO BE TRANSFERRED
        BR XLD1

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4963 017116 104002
4964 017120 005077 162214
4965 017124 013701 017446
4966 017130 032777 010000 162214 TRAN0:
4967 017136 001406
4968 017140 005237 031662
4969 017144 000001
4970 017146 005737 031662
4971 017152 001374
4972 017154 032777 004000 162170 TRAN1:
4973 017162 001401
4974 017164 105741
4975 017166 105711
4976 017170 001446
4977 017172 122711 000004
4978 017176 001443
4979 017200 122711 000023
4980 017204 001453
4981 017206 105711
4982 017210 001422
4983 017212 032777 010000 162132
4984 017220 001103
4985 017222 105777 162134
4986 017226 100375
4987 017230 111177 162130
4988 017234 005737 017444
4989 017240 001006
4990 017242 122711 000004
4991 017246 001403
4992 017250 122721 000003
4993 017254 001325
4994 017256 005037 017444
4995 017262 032777 001000 162062
4996 017270 001004
4997 017272 005737 031612
4998 017276 001001
4999 017300 104004
5000 017302 104003
5001 017304 000002

*****
;SBTTL DL11 TRANSMITTER ROUTINE
;THIS ROUTINE IS ENTERED WITH THE ADDRESS OF THE CHARACTER OR CHARACTERS
;TO BE TRANSMITTED IN ADDRESS 'TRANPT'. CHARACTERS ARE TRANSMITTED UNTIL
;EITHER AND 'EOT', 'EXT' OR A NULL CHARACTER IS TRANSMITTED. IF 'SW11'
;IS SET, THE SAME CHARACTER IS TRANSMITTED EVERY TIME. IF 'SW12' IS SET,
;THE PROGRAM WAITS FOR A 'CR' TO BE TYPED BEFORE THE CHARACTER IS TRANS-
;MITTED. AS IT IS TRANSMITTED, IT IS ALSO PRINTED.
*****
TRANSMT: SAVREG
CLR @PSW ;SET PROC. PRIO. TO '0'
MOV TRANPT,R1 ;SET UP TRANSMITTER BUFFER POINTER.
TRAN0: BIT #SW12,@SWR ;SINGLE STEP TRANSFER?
BEQ TRAN1 ;NO
INC CHRCNT ;YES, SET TTY SOFTWARE FLAG
WAIT ;WAIT FOR 'CR'
TST CHRCNT ;WAS THE INTERRUPT FROM TTY?
BNE -6 ;NO, WAIT AGAIN
TRAN1: BIT #SW11,@SWR ;TRANSMIT SAME CHAR.?
BEQ -4 ;NO
TSTB -(R1) ;YES, BACK UP POINTER
TSTB (R1) ;DONE?
BEQ TRAN4 ;YES, EXIT
CMPB #EOT,(R1)
BEQ TRAN4
CMPB #DC3,(R1)
BEQ TRAN5
TRAN3: TSTB (R1) ;TERMINATOR CHAR.?
BEQ TRNEXT ;YES, EXIT
BIT #SW12,@SWR ;TRANSMITTING SINGLE STEP?
BNE TRAN6 ;YES, PRINT CHAR. TO BE TRANSMITTED
TRAN7: TSTB @XCSR0 ;WAIT FOR READY
BPL -4
MOVB (R1),@XBUFO ;TRANSMIT CHAR.
TST SNGCHR ;SINGLE CHAR. TRANSFER?
BNE TRNEXT ;YES, EXIT
TRAN2: CMPB #EOT,(R1) ;TRANSMITTED LAST CHAR.?
BEQ TRNEXT ;YES, EXIT
CMPB #ETX,(R1)+ ;NO, TRANSMIT NEXT CHAR.
BNE TRAN0
TRANEXT: CLR SNGCHR ;IS DATA 'SW9' SET?
BIT #SW09,@SWR ;YES, INHIBIT DELAY
BNE +12 ;ISSUE DELAY?
TST DLYSWH ;NO, SKIP IT
BNE +4 ;DELAY BEFORE EXITING
DELAY GETREG ;RESTORE REG.'S
RTI ;EXIT

```

5002	017306	005737	031622	TRAN4:	TST	TERMSW	;ADDRESS SERIAL I/O?
5003	017312	001735			BEQ	TRAN3	;NO
5004	017314	005037	031622		CLR	TERMSW	
5005	017320	104007		TRAN4A:	LDPGMO		;YES, ADD CODE TO ADDRESS SOURCE
5006	017322	017326			.+4		
5007	017324	000754			BR	TRNEXT	
5008	017326	021			.BYTE	DC1	;ALERT SOURCE
5009	017327	075		IADRS7:	.BYTE	75	;MODIFIED BY USER
5010	017330	001			.BYTE	50H	
5011	017331	061			.BYTE	61	
5012	017332	023			.BYTE	DC3	;ENABLE IT
5013	017333	003			.BYTE	ETX	
5014							
5015	017334	005737	031622	TRANS:	TST	TERMSW	;SOURCE INPUT SW. SET?
5016	017340	001722			BEQ	TRAN3	;NO, NORMAL TRANSMIT
5017	017342	005037	031622		CLR	TERMSW	;YES, ADDRESS DESTINATION
5018	017346	005737	031614		TST	DSTSWH	;CURRENTLY ADDR. A DST. MODULE?
5019	017352	001413			BEQ	TRANSC	;NO, SEND 'DC2' TO ALERT DST.
5020	017354	005737	031604		TST	REPTSW	;YES, USING REMOTE DST.?
5021	017360	001404			BEQ	TRANSB	;NO
5022	017362	012737	017424	017416	TRANSA:	MOV	#TRANSB,TRANSE
5023	017370	000407			BR	TRANSB	;YES, DON'T ENABLE MY DST.
5024	017372	012737	017423	017416	TRANSB:	MOV	#IADRSB,TRANSE
5025	017400	000403			BR	TRANSB	;YES, SEND ONLY THE ADDR.
5026	017402	012737	017422	017416	TRANSC:	MOV	#TRANSF,TRANSE
5027	017410	005037	031614		TRANSD:	CLR	;SEND 'DC2'
5028	017414	104007			LDPGMO		
5029	017416	017422			TRANSE:	.+4	
5030	017420	000402			BR	.+6	
5031	017422	022			TRANSF:	.BYTE	DC2
5032	017423	075			IADRSB:	.BYTE	75
5033	017424	023			TRANSB:	.BYTE	DC3
5034	017425	000			.BYTE	0	
5035	017426	000734			BR	TRAN4A	
5036							
5037	017430	104002			TRAN6:	SAVREG	
5038	017432	111101			MOVB	(R1),R1	
5039	017434	004737	015222		JSR	PC,PDMSET	
5040	017440	104003			GETREG		
5041	017442	000667			BR	TRAN7	
5042	017444	000000			SNGCHR:	0	
5043	017446	017450			TRANPT:	TRNBFO	
5044	017450	000000			TRNBFO:	0	
5045		020152			.+500		
5046	020152	000000			TRNEND:	0	

```

5047      ;*****.*****
5048      ;ROUTINE TO REQUEST & SAVE MODULE ADDRESS TO BE USED FOR TESTING
5049      ;*****
5050
5051      020154 104012      XADRES: PRINT
5052      020156 024754      MES30      ;TEXT 'MODULE ADDR.?'
5053      020160 104015      ASEMBL      ;WAIT & DECODE INPUT
5054      020162 152700 000060      BISB      #60,RO      ;CONVERT TO ASCII
5055      020166 005737 031600      TST      SIOSWH      ;SERIAL INPUT?
5056      020172 001403      BEQ      +10      ;NO, ALLOW ANY ADDRESS
5057      020174 123700 002164      CMPB      IADRS0,RO      ;YES, CHECK AGAINST SERIAL I/O
5058      020200 001765      BEQ      XADRES      ;SAME, REQUEST IT AGAIN
5059      020202 110037 031602      MOVB      RO,MODADR
5060      020206 110037 017015      MOVB      RO,SRCADR      ;SET UP SOURCE ADDR.
5061      020212 110037 017065      MOVB      RO,DSTADR      ;SET UP PARAMETERS ADDR.
5062      020216 000002      RTI      ;YES, EXIT
5063
5064      ;*****
5065      ;SUBROUTINE ENTERED ON AN ILLEGAL TRAP. THE ROUTINE REPORTS WHERE IT
5066      ;TRAPPED 'FROM' AND WHERE IT TRAP 'TO'.
5067      ;*****
5068
5069      020220 011637 031624      ERTRAP: MOV      (SP),TOPC      ;SAVE LOCATION WHERE IT TRAPPED 'TO'
5070      020224 022626      POP2SP
5071      020226 011637 031630      MOV      (SP),FROMPC      ;SAVE WHERE IT TRAPPED FROM.
5072      020232 104012      PRINT
5073      020234 023676      MESS      ;TEXT 'ILLEGAL TRAP TO'
5074      020236 162737 000004 031624      SUB      #4,TOPC
5075      020244 104014      PRTCT
5076      020246 031624      TOPC      ;TYPE 'PC' TRAPPED TO
5077      020250 104012      PRINT
5078      020252 023720      MES6      ;TEXT 'FROM'
5079      020254 162737 000002 031630      SUB      #2,FROMPC
5080      020262 104014      PRTCT
5081      020264 031630      FROMPC      ;TYPE WHERE IT TRAPPED FROM
5082      020266 000137 001376      JMP      MONITR      ;RETURN TO MONITOR
5083
5084      ;*****
5085      ;SUBROUTINE TO REQUEST A/D CHANNEL FROM TELETYPE
5086      ;*****
5087
5088      020272 104012      XCHANNEL:PRINT
5089      020274 024324      MES17      ;TEXT 'CH.?'
5090      020276 104013      TTYIN      ;WAIT FOR INPUT
5091      020300 122737 000064 015116      CMPB      #64,INBUF      ;LEGAL CH.
5092      020306 003771      BLE      XCHANNEL      ;NO, REQUEST NEW CH.
5093      020310 113737 015116 017017      MOVB      INBUF,SOH1      ;YES, SETUP CH.
5094      020316 000002      RTI      ;EXIT

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5103 020320 042777 000100 161030 XERMES: BIC #100, @RCSR0 ;CLEAR RECVR. INTERRUPT ENABLES.
5104 020326 011537 031646 MOV (SP), KSTOR3 ;SAVE 'PC'
5105 020332 017537 000000 020376 MOV @ (SP), MESADR ;SAVE MESSAGE ADDRESS
5106 020340 062716 000002 ADD #2, (SP) ;SET UP STACK TO EXIT
5107 020344 032777 020000 161000 BIT #SW13, @SWR ;PRINT ERROR MESSAGE?
5108 020352 001012 BNE ERREXT ;NO, EXIT
5109 020354 104014 PRTCT ;YES
5110 020356 031654 TSTNUM ;PRINT FAILING TEST NO.
5111 020360 104016 SPACE
5112 020362 162737 000002 031646 SUB #2, KSTOR3
5113 020370 104014 PRTCT
5114 020372 031646 KSTOR3 ;PRINT 'MA' WHERE ERROR OCCURRED
5115 020374 104012 PRINT ;PRINT ERROR MESSAGE
5116 020376 000000 MESADR: 0
5117
5118 020400 005777 160746 ERREXT: TST @SWR ;HALT ON ERROR
5119 020404 100403 BMI .+10 ;NO
5120 020406 004737 021374 JSR PC, TTYENB
5121 020412 000001 WAIT ;WAIT FOR 'CR' TO CONTINUE
5122 020414 000002 RTI
5123
5124
5125
5126
5127
5128 020416 104017 XSCOPE: TSTTKS ;CHECK FOR KEYBOARD FLAG
5129 020420 104005 RECVRO ;ENABLE DL11 RECEIVER
5130 020422 032777 040000 160722 BIT #40000, @SWR ;TEST SW-14 FOR SCOPE
5131 020430 001012 BNE SCOPEB ;YES, SCOPE
5132 020432 032777 004000 160712 BIT #4000, @SWR ;NO-TEST SW-11 FOR ITERATION
5133 020440 001013 BNE SCOPEB ;INHIBIT ITERATION
5134 020442 023737 020546 020544 CMP SCOPEF, ICOUNT ;COMPARE CURRENT COUNT TO MAX NUMBER
5135 020450 100007 BPL SCOPEB ;EXIT-DONE
5136 020452 005237 020546 INC SCOPEF ;INCREMENT COUNT
5137 020456 022606 SCOPEB: CMP (6)+, SP ;REPOSITION STACK
5138 020460 012677 160654 MOV (6)+, @PSW ;RESTORE PREVIOUS PROCESSOR STATUS
5139 020464 000177 000060 JMP @RETURN ;REPEAT TEST
5140 020470 005037 020546 SCOPEG: CLR SCOPEF ;CLEAR COUNT
5141 020474 011601 MOV @SP, R1 ;SAVE TEST NO.
5142 020476 011137 031654 MOV (R1), TSTNUM
5143 020502 062716 000002 ADD #2, (SP)
5144 020506 017701 160640 MOV @SWR, R1 ;READ SW'S
5145 020512 042701 177700 BIC #177700, R1 ;CLR UNWANTED BITS
5146 020516 020137 031654 CMP R1, TSTNUM ;HALT ON THIS TEST
5147 020522 001005 BNE .+14 ;NO
5148 020524 104012 PRINT ;YES
5149 020526 024130 MES13 ;TEXT 'BREAK AT SCOPE X'
5150 020530 104014 PRTCT

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5151 020532 031654          TSTNUM
5152 020534 104013          TTYIN
5153 020536 011637 020550  MOV    JSP,RETURN ;WAIT FOR 'CR' TO CONTINUE
5154 020542 000002          RTI    ;SAVE SCOPE RETURN POINTER
5155 020544 000000          ;RETURN INLINE-NEXT TEST
5156 020546 000000          ICOUNT: 0 ;ITERATION COUNT
5157 020550 000000          SCOPEF: 0 ;COUNT LOCATION FOR ITERATION LOOP
5158 020550 000000          RETURN: 0

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5159
5160
5161 ;*****
5162 ;RANDOM NUMBER SUBROUTINE
5163 ;THIS ROUTINE CREATES A RANDOM NUMBER, MASKS IT TO EIGHT BITS AND SAVES
5164 ;IT IN THE TRANSMITTER BUFFER AREA.
5165 ;*****
5166

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5167 020552 012701 017450  XRANGN: MOV    #TRNBFO,R1
5168 020556 063737 020712 020710  ADD    RANB,RANA
5169 020564 063737 020714 020710  ADD    RANC,RANA
5170 020572 006137 020710          ROL    RANA
5171 020576 063737 020710 020712  ADD    RANA,RANB
5172 020604 063737 020714 020712  ADD    RANC,RANB
5173 020612 006137 020712          ROL    RANB
5174 020616 063737 020710 020714  ADD    RANA,RANC
5175 020624 063737 020712 020714  ADD    RANB,RANC
5176 020632 006137 020714          ROL    RANC
5177 020636 013711 020714          MOV    RANC,(R1) ;SAVE NUMBER
5178 020642 042711 100200          BIC    #100200,(R1) ;STRIPE NO. TO 7 BIT ASCII
5179 020646 032711 060000          BIT    #60000,(R1) ;IS BIT 5 OR 6 HIGH BYTE SET
5180 020652 001002          BNE    .+6 ;YES, LEAVE AS IS
5181 020654 052711 040000          BIS    #40000,(R1) ;NO, FORCE BIT 6.
5182 020660 032711 000140          BIT    #140,(R1) ;IS BIT 5 OR 6 OF LOW BYT SET
5183 020664 001002          BNE    .+6 ;YES, LEAVE AS IS
5184 020666 052711 000040          BIS    #40,(R1) ;NO, FORCE BIT '5'
5185 020672 005721          TST    (R1)+
5186 020674 022701 020152          CMP    #TRNEND,R1 ;DONE
5187 020700 001326          BNE    XRANGN+4
5188 020702 005037 020152          CLR    TRNEND ;TERMINATE BUFFER.
5189 020706 000002          RTI
5190 020710 072701          RANA: 072701
5191 020712 126543          RANB: 126543
5192 020714 101234          RANC: 101234
5193

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K10

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 DZPMAB.P11 DL11 TRANSMITTER ROUTINE

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5194 ;*****
5195 ;ROUTINE TO LOOP THRU A SINGLE LOGIC SUBTEST. ENTERED FROM THE 'MONITOR'
5196 ;VIA SELECTING TEST '?'.
5197 ;*****
5198
5199 020716 104012 SUBX: PRINT
5200 020720 023750 MESS
5201 020722 104015 ASEMBL ;TEXT 'TEST ADDR.? '
5202 020724 005700 TST R0 ;YES, GET ADDR. FROM TTY.
5203 020726 001006 BNE SUBX1 ;WAS AN ADDRESS ENTERED?
5204 020730 005737 031642 TST KSTOR1 ;YES, LOAD IT
5205 020734 001016 BNE XLOOP ;NO, WAS ONE PREVIOUSLY SET UP?
5206 020736 104012 PRINT ;YES, RUN OLD ADDRESS
5207 020740 031350 QMARK ;NO, ILLEGAL ENTRY
5208 020742 000766 BR SUBX+2 ;ASK FOR NEW ADDRESS
5209 020744 010037 031642 SUBX1: MOV R0,KSTOR1 ;SAVE ADDRESS
5210 020750 062737 000002 031642 ADD #2,KSTOR1 ;ADD '2' TO POINT TO INSTRUCTION AFTER SCOPE
5211 020756 017737 010660 031654 MOV @KSTOR1,TSTNUM ;LOAD TEST NO.
5212 020764 062737 000002 031642 ADD #2,KSTOR1
5213 020772 005037 020546 XLOOP: CLR SCOPEF ;KEEP COUNT AT ZERO
5214 020776 012737 020772 020550 MOV #XLOOP,RETURN ;LOAD SCOPE LOOP RETURN POINTER
5215 021004 000177 010632 JMP @KSTOR1 ;JUMP TO TEST
5216
5217 ;*****
5218 ;SUBROUTINE TO ISSUE N SPACES
5219 ;N IS ONE PLUS VALUE CONTAINED IN SPACEX
5220 ;SPACEX IS CLEARED WITHIN THE SUBROUTINE, SO THAT A CALL ON
5221 ;SPACE WITHOUT LOADING SPACEX ISSUES ONLY ONE SPACE
5222 ;*****
5223
5224 021010 104002 XSPACE: SAVREG ;SAVE REG'S
5225 021012 112701 000240 MOVB #240,R1
5226 021016 104010 TYPEIT ;OUTPUT A SPACE
5227 021020 005337 021036 DEC SPACEX ;DECREMENT COUNT
5228 021024 003372 BGT XSPACE+2 ;LOOP IF NOT DONE
5229 021026 005037 021036 CLR SPACEX ;RESET COUNT TO ZERO
5230 021032 104003 GETREG ;RESTORE REG'S
5231 021034 000002 RTI ;RETURN
5232 021036 000000 SPACEX: 0
5233
5234 ;*****
5235 ;SUBROUTINE TO TEST FOR THE KEYBOARD FLAG BEING SET
5236 ;*****
5237
5238 021040 105777 160276 TKSFLG: TSTB @TKS ;FLAG SET?
5239 021044 100001 BPL .+4 ;NO, EXIT
5240 021046 104013 TTYIN ;YES, INQUIRE
5241 021050 000002 RTI

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5247 021052 011637 020550
5248 021056 011637 031572
5249 021062 162737 000002 031572
5250 021070 013737 031572 031672
5251 021076 005037 020544
5252 021102 012737 000001 031654
5253 021110 104005
5254 021112 000002
5255
5256
5257
5258
5259
5260 021114 004737 021374
5261 021120 105777 160222
5262 021124 100375
5263 021126 005737 031604
5264 021132 001404
5265 021134 110137 021142
5266 021140 104006
5267 021142 000004
5268 021144 110177 160200
5269 021150 000002
5270
5271
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5275 021152 122701 000012
5276 021156 001413
5277 021160 122701 000015
5278 021164 001410
5279 021166 013746 031570
5280 021172 104012
5281 021174 031476
5282 021176 012637 031570
5283 021202 052701 000100
5284 021206 104010
5285 021210 042701 000100
5286 021214 000002

;*****
;SUBROUTINE TO SETUP PARAMETERS FOR THE MODULE PROGRAM TESTS.
;*****
XSETUP: MOV (SP),RETURN ;SET UP THE 'SCOPE' RETURN ADDRESS.
        MOV (SP),RVECTR
        SUB #2,RVECTR ;SET UP THE RESTART ADDRESS
        MOV RVECTR,RESTR ;AND THE 'C' POINTER
        CLR ICOUNT
        MOV #1,TSTNUM ;SET UP TEST '1'
        RECVRO ;ENABLE DL11 RECEIVER
        RTI

;*****
;SUBROUTINE TO PRINT CHARACTER IN 'R1'
;*****
XTYPIT: JSR PC,TTYENB ;ENABLE INTERRUPTS
        TSTB @TPB ;PRINTER READY
        BPL -4 ;NO
        TST REPTSW ;REMOTE DST.?
        BEQ XTYPE2 ;NO
        MOVB R1,XTYPE1 ;YES. SET UP TO TRANSMIT CHAR.
        LDCHRO
XTYPE1: EOT
XTYPE2: MOVB R1,@TPB ;PRINT CHAR.
        RTI

;*****
;SUBROUTINE TO PRINT THE CONTROL CHARACTER IN 'R1'.
;*****
XPRCNT: CMPB #12,R1 ;CHAR = LF?
        BEQ XPRCT1 ;YES
        CMPB #15,R1 ;CHAR. = 'CR'?
        BEQ XPRCT1
        MOV PRTSWH,-(SP) ;SAVE SW. STATUS
        PRINT
        UPAROW
        MOV (SP)+,PRTSWH
        BIS #100,R1 ;MAKE CHAR. PRINTABLE
XPRCT1: TYPEIT
        BIC #100,R1 ;RESTORE ORIGINAL VALUE
        RTI

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5287
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5291
5292 021216 110005 REMOTE: MOVB RD,R5 ;TEMPORARILY SAVE MODULE ADDRESS
5293 021220 005037 031606 CLR KSTOR0 ;CLR SOFTWARE SW.
5294 021224 104012 PRINT
5295 021226 026747 MES67 ;TEXT "REMOTE DEST.?"
5296 021230 104013 TTYIN ;WAIT FOR INPUT
5297 021232 122737 000131 015116 CMPB #'Y,INBUF ;WAS YES TYPED?
5298 021240 001003 BNE .+10 ;NO
5299 021242 104026 ADDRESS ;YES, REQUEST IT'S ADDRESS
5300 021244 010037 031606 MOV RD,KSTOR0 ;SAVE IT, THIS ALSO SETS SOFTWARE SW.
5301 021250 110537 017015 MOVB R5,SRADR ;SET UP A/D SOURCE ADDR.
5302 021254 000207 RTS PC ;RETURN
5303
5304 021256 013737 031606 031604 SETRMT: MOV KSTOR0,REPTSW ;SET UP THE REMOTE DESTINATION SW.
5305 021264 005737 031604 TST REPTSW ;USING REMOTE DEST.?
5306 021270 001402 BEQ .+6 ;NO, EXIT
5307 021272 004737 017022 JSR PC,ADRST ;YES, ADDRESS IT
5308 021276 000207 RTS PC
5309
5310
5311 021300 005737 031604 CLRMOT: TST REPTSW ;OUTPUTTING TO THE DEMOTE DST.?
5312 021304 001402 BEQ .+6 ;NO, EXIT
5313 021306 104006 LDCHRD ;YES, SEND 'EOT' TO CLR MODULE
5314 021310 000004 EOT
5315 021312 005037 031604 CLR REPTSW
5316 021316 000207 RTS PC ;RETURN
5317
5318 021320 012737 000001 031612 XNODLY: MOV #1,DLYSWH ;SET THE TRANS. DELAY INHIBIT SW.
5319 021326 000002 RTI
5320
5321
5322
5323
5324 021330 012737 000002 021036 XNULL: MOV #2,SPACEX
5325 021336 000405 BR XNULL2
5326 021340 005077 157774 XNULL1: CLR @PSW
5327 021344 012737 000011 021036 MOV #11,SPACEX
5328 021352 105777 157770 XNULL2: TSTB @TPS
5329 021356 100375 BPL .-4
5330 021360 005077 157764 CLR @TPB ;TRANSMIT A NULL CHAR.
5331 021364 005337 021036 DEC SPACEX
5332 021370 001370 BNE XNULL2
5333 021372 000002 RTI

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N10

PDM70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 130
DZPMAB.P11 DL11 TRANSMITTER ROUTINE

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5334
5335 ;*****
5336 ;SUBROUTINE ENABLE KEYBOARD INTERRUPTS.
5337 ;*****
5338
5339 021374 012777 000100 157740 TTYENB: MOV #100, @TKS ;YES, ENABLE TTY INTERRUPTS
5340 021402 005077 157732 CLR @PSW
5341 021406 000207 RTS PC
5342
5343 ;*****
5344 ;MESSAGE PRINT ROUTINE, ENTERED VIA EMT DISPATCH HANDLER.
5345 ;ROUTINE PICKS UP CONTENTS OF THE 'PC' AND USES THIS AS
5346 ;THE ADDRESS OF MESSAGE TO BE TYPED.
5347 ;+ IS NEXT MESSAGE SWITCH
5348 ;% IS CRLF SWITCH
5349 ;@ IS END OF MESSAGE SWITCH
5350 ;*****
5351
5352 021410 104002 XPRINT: SAVREG ;SAVE REGISTERS ON STACK
5353 021412 005037 031620 CLR OPRTSW
5354 021416 005237 031570 INC PRTSWH
5355 021422 004737 021374 JSR PC, TTYENB ;ENABLE TTY INTERRUPTS
5356 021426 017602 000000 TYPER3: MOV @ (SP), R2 ;GET THE MESSAGE ADDRESS FROM STACK
5357 021432 062716 000002 ADD #2, (SP) ;SET UP STACK TO EXIT
5358 021436 112201 TYPERA: MOVB (R2)+, R1 ;GET CHAR.
5359 021440 005701 TST R1 ;=NULL CHAR.?
5360 021442 001414 BEQ PRTEXT ;YES, EXIT
5361 021444 122701 000004 CMPB #4, R1 ;TEST FOR 'EOT'
5362 021450 001003 BNE .+10 ;NOT EOT
5363 021452 104012 PRINT ;YES, PRINT 'EOT'
5364 021454 031554 MESEOT
5365 021456 000406 BR PRTEXT ;EXIT
5366 021460 122701 000137 CMPB #137, R1 ;TEST FOR '+'
5367 021464 001760 BEQ TYPER3 ;YES PICK UP NEXT MESSAGE ADDRESS.
5368 021466 122701 000100 CMPB #100, R1 ;TEST FOR '@'
5369 021472 001006 BNE TYPER1 ;BRANCH IF NO EQUAL
5370 021474 005037 031570 PRTEXT: CLR PRTSWH
5371 021500 005037 031620 CLR OPRTSW
5372 021504 104003 GETREG ;RESTORE REGISTERS FROM STACK.
5373 021506 000002 RTI ;OTHERWISE EXIT
5374 021510 005737 031620 TYPER1: TST OPRTSW ;INHIBIT TYPEOUT?
5375 021514 001350 BNE TYPERA ;YES, SCAN DATA
5376 021516 122701 000045 CMPB #45, R1 ;TEST FOR '%'
5377 021522 001402 BEQ TYPECL ;IF = TYPE 'CR-LF'
5378 021524 104010 TYPER2: TYPEIT ;OUTPUT CHAR.
5379 021526 000743 BR TYPERA
5380 021530 012701 000015 TYPECL: MOV #15, R1 ;TYPE 'CR'
5381 021534 104010 TYPEIT
5382 021536 104010 TYPEIT
5383 021540 012701 000012 MOV #12, R1
5384 021544 104010 TYPEIT ;INCREMENT BUFFER
5385 021546 000733 BR TYPERA

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*****
:SUBROUTINE TO TYPEOUT A '6' DIGIT OCTAL NO. THE 'PC' CONTAINS
:THE ADDRESS OF 'WORD' TO BE TYPED
*****

021550 004737 021374 XOCTPR: JSR PC,TTYENB ;ENABLE TTY INTERRUPTS
021554 104002 SAVREG ;SAVE REGISTERS ON STACK
021556 017601 000000 MOV 2(SP),R1 ;THE ADDRESS OF WORD TO BE TYPED
021562 062716 000002 ADD #2,(SP) ;SET UP STACK TO EXIT
021566 012703 000006 MOV #6,R3
021572 012737 000376 021654 MOV #376,MASK ;MASK FOR FIRST BIT
021600 000401 BR .+4
021602 006111 MOVEIT: ROL (R1)
021604 006111 ROL (R1)
021606 006111 ROL (R1)
021610 111102 MOVB (R1),R2
021612 143702 021654 BICB MASK,R2
021616 052702 000260 BIS #260,R2
021622 132777 000200 157516 BITB #200,TPS
021630 100374 BPL .-6
021632 110277 157512 MOVB R2,TPB ;PRINT CHAR.
021636 012737 000370 021654 MOV #370,MASK ;MASK FOR NEXT '5' DIGITS
021644 005303 DEC R3
021646 001355 BNE MOVEIT
021650 104003 GETREG ;RESTORE REGISTERS FROM STACK.
021652 000002 RTI
021654 000376 MASK: 376

*****
:SUBROUTINE TO SET UP AN APPROXIMATE '1' SECOND DELAY.
*****

021656 012737 161000 031660 XDELAY: MOV #161000,TEMP2 ;SET UP SHORT DELAY
021664 000402 BR .+6
021666 005037 031660 XDLYL: CLR TEMP2 ;SET UP LONG DELAY
021672 004737 021374 JSR PC,TTYENB ;ENABLE TTY INTERRUPTS
021676 012737 177777 031656 MOV #-1,TEMP1
021704 005237 031660 XDLY3: INC TEMP2
021710 001375 BNE XDLY3
021712 005237 031656 INC TEMP1
021716 001372 BNE XDLY3
021720 000002 XDLY2: RTI

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021722	104012	
021724	031500	
021726	005712	
021730	001003	
021732	104012	
021734	023766	
021736	000411	
021740	004737	021374
021744	005037	031510
021750	112201	
021752	004737	015222
021756	105712	
021760	001373	
021762	000207	
021764	012702	016022
021770	000402	
021772	012702	017450
021776	004737	021722
022002	000137	001376
022006	104002	
022010	012702	016022
022014	004737	021726
022020	104003	
022022	000002	

```

*****
:SUBROUTINE TO PRINT THE DATA IN THE DL11 RECEIVER & TRANSMITTER BUFFER.
*****

```

```

PRTBF1: PRINT
        CR LF
PRTBF2: TST      (R2)      ;BUFFER EMPTY?
        BNE      .+10     ;NO, PRINT IT
        PRINT     YES
        MES9      TEXT 'BUFFER EMPTY'
        BR        PRT1B   ;EXIT
        JSR       PC,TTYENB;ENABLE INTR.'S.
        JR        FORMAT1;'CR/LF' FORMAT SW.
PRT1A:  MOV      (R2)+,R1  ;GET CHARACTER
        JSR      PC,PDMSET;PRINT CHAR.
        TST      (R2)     ;DONE?
        BNE      PRT1A
PRT1B:  RTS          PC    ;RETURN

```

```

*****
:SUBROUTINE TO PRINT THE CONTENTS OF THE DL11 RECVR. BUFFER.
*****

```

```

RECBUF: MOV      #RECBF0,R2 ;SET UP BUFFER POINTER
        BR        TRNBUF+4

```

```

*****
:SUBROUTINE TO PRINT THE CONTENTS OF THE DL11 TRANSMITTER BUFFER
*****

```

```

TRNBUF: MOV      #TRNBF0,R2 ;SET UP BUFFER POINTER
        JSR      PC,PRTBF1
        JMP      MON1R      ;RETURN TO MONITOR.

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*****
:SUBROUTINE, ENTERED AS A SUBROUTINE, TO PRINT CONTENTS OF THE DL11
:RECEIVER BUFFER.
*****

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XPRTB: SAVREG      ;SAVE REG.'S
        MOV      #RECBF0,R2 ;SETUP BUFFER POINTER
        JSR      PC,PRTBF2
        GETREG
        RTI        ;RESTORE REG.'S

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5480 022024 104035
5481 022026 104012
5482 022030 031346
5483 022032 104036
5484 022034 005237 031616
5485 022040 104005
5486 022042 012702 017450
5487 022046 004737 021374
5488 022052 000001
5489 022054 000776
5490 022056 113701 015116
5491 022062 122701 000005
5492 022066 001003
5493 022070 104000
5494 022072 000137 001376
5495 022076 110112
5496 022100 112237 022114
5497 022104 105012
5498 022106 004737 015222
5499 022112 104006
5500 022114 000000
5501 022116 000755
5502
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5504
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5510
5511 022120 104012
5512 022122 031346
5513 022124 104036
5514 022126 005077 157206
5515 022132 104005
5516 022134 104007
5517 022136 017450
5518 022140 005737 031600
5519 022144 001375
5520 022146 017701 157200
5521 022152 005101
5522 022154 005201
5523 022156 001762
5524 022160 000775

.SBTTL SEND ROUTINE
:*****
:THIS ROUTINE ACCEPTS CHARACTERS FROM THE TELETYPE AND TRANSMITS THEM
:TO THE DL11. THIS ROUTINE USES 'IE' TO ESCAPE BACK TO THE MONITOR.
:CONTROL C (IC) IS ECHOED AND SENT AS AN 'EXT':
:*****
SEND: SETUP ;SETUP RESTART ADDRESS
PRINT
ASTRIC
NODLAY
INC SENDSW ;INHIBIT TRANSMITTER DELAY
RECVRO ;SET SOFTWARE SW.
MOV #TRNBFO,R2 ;ENABLE DL O'S RECVR
JSR PC,TTYENB ;SET UP BUFFER TO SAVE CHAR.S
;ENABLE TTY INTERRUPTS
SEND1: WAIT ;WAIT FOR KEYBOARD & RECEIVER INTERRUPTS
BR -2 ;KEYBOARD INTERRUPTS RETURN .+2
MOVB INBUF,R1 ;GET CHAR.
CMPB #5,R1 ;CHAR. = 'IE' ?
BNE .+10 ;NO
PRCNTR ;YES, TYPE IT
JMP MONTR ;EXIT
MOVB R1,(R2) ;SAVE CHAR.
MOVB (R2)+,SEND2
CLRB (R2) ;LOAD '0' TO TERMINATE BUFFER
JSR PC,PDMSET ;PRINT CHAR.
LDCHRD ;TRANSMIT CHAR.
SEND2: 0
BR SEND1

.SBTTL RUN ROUTINE
:*****
:THIS ROUTINE IS USED TO LOAD AND RUN TRANSMIT THE USERS SEND
:IN PROGRAM. DATA SW.'S '0-15' CAN BE USED TO SET UP
:A LOOP DELAY. IF THIS SERIAL I/O OPTION INPUT IS BEING USED.
:THE USERS PROGRAM ISN'T LOOPED, IT IS JUST LOADED AND RUN.
:*****
RUN: PRINT
ASTRIC
NODLAY
CLR @PSW ;INHIBIT TRANS. DELAY
RECVRO ;ENABLE RECVR INTERRUPTS
LDPGMO ;ENABLE DL RECVR
TRNBFO ;LOAD THE USERS PROGRAM FROM
;THE TRANSMITTER BUFFER
TST SIOSWH ;SERIAL I/O INPUT?
BNE -4 ;YES, STAY HERE
MOV @SWR,R1 ;LOAD THE SW.'S TO SET DELAY
COM R1
INC R1
BEQ RUN+4
BR -4

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5525
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5532 022162 104002
5533 022164 012704 015116
5534 022170 012703 022316
5535 022174 005037 022320
5536 022200 005005
5537 022202 005001
5538 022204 005002
5539 022206 005737 031662
5540 022212 003426
5541 022214 005337 031662
5542 022220 122714 000054
5543 022224 001421
5544 022226 121427 000060
5545 022232 002425
5546 022234 121427 000071
5547 022240 003022
5548 022242 142714 000360
5549 022246 112405
5550 022250 010102
5551 022252 006301
5552 022254 006301
5553 022256 006301
5554 022260 060201
5555 022262 060201
5556 022264 060501
5557 022266 000747
5558 022270 105724
5559 022272 010123
5560 022274 005737 031662
5561 022300 001337
5562 022302 104003
5563 022304 000002
5564 022306 104012
5565 022310 026765
5566 022312 000137 001376
5567 022316 000000
5568 022320 000000
5569 022322 000000
5570 022324 000000

.SBTTL SUBROUTINES
:*****
:SUBROUTINE WILL CONVERT 'N' BCD WORDS (SEPARATED VIA COMMA'S)
:WHICH WERE STORED IN A TABLE VIA 'TTYIN' TO OCTAL AND STORE THEM.
:*****

XBCDBIN: SAVREG          ;SAVE REG.'S
      MOV      #INBUF,R4  ;SETUP ASCII STORAGE TABLE
      MOV      #BCDTAB,R3 ;TABLE FOR STORAGE OF CONVERTED WORDS
      CLR      BCDTAB+2
BCDBN1: CLR      R5
      CLR      R1          ;REG. TO STORE RUNNING TOTAL
      CLR      R2          ;TEMP. STORAGE FOR 'R1'
BCDBN2: TST      CHRCNT    ;END OF DATA?
      BLE      BCDEND      ;YES, EXIT
      DEC      CHRCNT      ;DECREMENT CHARACTER COUNTER
      CMPB     #54,(R4)    ;IS CHARACTER = TO ','?
      BEQ      BCDEND      ;YES, DECODE NEW WORD
      CMPB     (R4),#60
      BLT      BCDERR      ;TEST FOR LEGAL NO.
      CMPB     (R4),#71
      BGT      BCDERR
      BICB     #360,(R4)   ;STRIPE NO. TO BCD
      MOVB     (R4)+,R5    ;SAVE NO. IN R5
      MOV      R1,R2      ;SAVE CURRENT TOTAL
      ASL      R1          ;NX2
      ASL      R1          ;NX4
      ASL      R1          ;NX8
      ADD      R2,R1       ;NX9
      ADD      R2,R1       ;NX10
      ADD      R5,R1       ;N+NEW NO.
      BR       BCDDBN2
BCDEND: TSTB     (R4)+     ;UPDATE BUFFER
      MOV      R1,(R3)+    ;SAVE CONVERTED VALUE & SETUP TO SAVE NEXT
      TST      CHRCNT      ;FINISHED?
      BNE      BCDDBN1    ;NO, CONVERT NEXT WORD
      GETREG
      RTI                ;YES, EXIT
BCDERR: PRINT    MES68     ;TEXT 'ILLEGAL DECIMAL NO.'
      JMP      MONITR      ;RETURN TO THE MONITOR
BCDTAB: 0            ;OCTAL STORAGE TABLE
        0
        0
        0

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5571                                     :*****
5572                                     :PRINT DECIMAL VALUE IN R2
5573                                     :*****
5574
5575 022326 004737 021374 XBINDEC:JSR PC,TTYENB
5576 022332 104002 SAVREG
5577 022334 012703 177774 MOV #-4,R3
5578 022340 012704 022444 MOV #DECPNT+2,R4
5579 022344 012737 000260 022440 MOV #260,ZERO
5580 022352 012701 177777 TYPT1: MOV #-1,R1
5581 022356 005201 TYPT2: INC R1
5582 022360 161402 SUB (R4),R2
5583 022362 100375 BPL TYPT2
5584 022364 062402 ADD (R4)+,R2
5585 022366 004737 022402 JSR PC,DECOUT
5586 022372 005203 INC R3
5587 022374 001366 BNE TYPT1
5588 022376 104003 GETREG
5589 022400 000002 RTI
5590 022402 005701 DECOUT: TST R1
5591 022404 001006 BNE DEC1
5592 022406 022703 177777 CMP #-1,R3
5593 022412 001403 BEQ DEC1
5594 022414 013701 022440 MOV ZERO,R1
5595 022420 000405 BR DEC2
5596 022422 012737 000260 022440 DEC1: MOV #260,ZERO
5597 022430 052701 000260 BIS #260,R1
5598 022434 104010 DEC2: TYPEIT
5599 022436 000207 RTS PC
5600 022440 000240 ZERO: 240
5601 022442 022444 DECPNT: .+2
5602 022444 001750 1000.
5603 022446 000144 100.
5604 022450 000012 10.
5605 022452 000001 1.
5606

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5607
5608
5609      ;*****
5610      ;POWER FAIL HANDLER
5611      ;*****
5612      022454 010046      PWRFL: MOV      R0,-(SP)
5613      022456 010146      MOV      R1,-(SP)
5614      022460 010246      MOV      R2,-(SP)
5615      022462 010346      MOV      R3,-(SP)
5616      022464 010446      MOV      R4,-(SP)
5617      022466 010546      MOV      R5,-(SP)
5618      022470 013746 000024      MOV      24,-(SP)
5619      022474 010637 031656      MOV      SP,TEMP1
5620      022500 012737 022510 000024      MOV      #PWRUP,2#24
5621      022506 000000      HALT
5622      022510 012777 000340 156622 PWRUP: MOV      #340,2PSW
5623      022516 013706 031656      MOV      TEMP1,SP
5624      022522 012637 000024      MOV      (SP)+,2#24
5625      022526 012605      MOV      (SP)+,R5
5626      022530 012604      MOV      (SP)+,R4
5627      022532 012603      MOV      (SP)+,R3
5628      022534 012602      MOV      (SP)+,R2
5629      022536 012601      MOV      (SP)+,R1
5630      022540 012600      MOV      (SP)+,R0
5631      022542 104021      NULL
5632      022544 104012      PRINT
5633      022546 024652      MES28
5634      022550 000137 001376      JMP      MONITR
5635
5636      ;*****
5637      ;SUBROUTINE TO SAVE 'R1-R5' ON STACK
5638      ;*****
5639
5640      022554 012637 031632      XSAVRG: MOV      (SP)+,SAVEPC
5641      022560 012637 031634      MOV      (SP)+,SAVPSW
5642      022564 012637 031636      MOV      (SP)+,SAV2PC
5643      022570 012637 031640      MOV      (SP)+,SAV2SW
5644      022574 010146      MOV      R1,-(SP)
5645      022576 010246      MOV      R2,-(SP)
5646      022600 010346      MOV      R3,-(SP)
5647      022602 010446      MOV      R4,-(SP)
5648      022604 010546      MOV      R5,-(SP)
5649      022606 013746 031640      MOV      SAV2SW,-(SP)
5650      022612 013746 031636      MOV      SAV2PC,-(SP)
5651      022616 013746 031634      MOV      SAVPSW,-(SP)
5652      022622 013746 031632      MOV      SAVEPC,-(SP)
5653      022626 000002      RTI

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5654                                     ;*****
5655                                     ;SUBROUTINE TO RESTORE 'R1-R5' FROM THE STACK
5656                                     ;*****
5657
5658 022630 012637 031632 XGETRG: MOV      (SP)+,SAVEPC
5659 022634 012637 031634      MOV      (SP)+,SAVPSW
5660 022640 012637 031636      MOV      (SP)+,SAV2PC
5661 022644 012637 031640      MOV      (SP)+,SAV2SW
5662 022650 012605      MOV      (SP)+,R5
5663 022652 012604      MOV      (SP)+,R4
5664 022654 012603      MOV      (SP)+,R3
5665 022656 012602      MOV      (SP)+,R2
5666 022660 012601      MOV      (SP)+,R1
5667 022662 013746 031640      MOV      SAV2SW,-(SP)
5668 022666 013746 031636      MOV      SAV2PC,-(SP)
5669 022672 013746 031634      MOV      SAVPSW,-(SP)
5670 022676 013746 031632      MOV      SAVEPC,-(SP)
5671 022702 000002      RTI
5672                                     ;*****
5673                                     ;SUBROUTINE TO WAIT FOR AND ASSEMBLE CHARACTERS INPUT
5674                                     ;FROM THE KEYBOARD INTO OCTAL NUMBERS.
5675                                     ;*****
5676
5677 022704 104013 XASEMB: TTYIN      ;GET CHAR.'S FROM KEYBOARD
5678 022706 005000      CLR      R0
5679 022710 005737 031662      TST      CHRCNT      ;ANY CHARACTERS ENTERED
5680 022714 001001      BNE      .+4      ;YES
5681 022716 000002      RTI      ;NO, EXIT
5682 022720 012701 015116      MOV      #INBUF,R1      ;SET UP CHAR. BUFFER POINTER
5683 022724 004737 022760      JSR      PC,STRIPN      ;STRIPE NO.
5684 022730 010400      XASEM1: MOV      R4,R0      ;RETURNS HERE IF ONLY '1' NO.
5685 022732 000002      RTI
5686
5687 022734 105721 WORD2: TSTB      (R1)+      ;ADVANCE POINTER PAST COMMA
5688 022736 006204      ASR      R4
5689 022740 006204      ASR      R4
5690 022742 006204      ASR      R4
5691 022744 005337 031662      DEC      CHRCNT      ;DEC. CHAR. CNTR.
5692 022750 001767      BEQ      XASEM1      ;COMMA LAST CHAR.?
5693 022752 010400      MOV      R4,R0      ;NO, SAVE 1ST NO.
5694 022754 062716 000002      ADD      #2,(SP)      ;SET UP STACK TO EXIT
5695 022760 005004      STRIPN: CLR      R4
5696 022762 122711 000054      CMPB      #54,(R1)      ;CHAR. = COMMA?
5697 022766 001762      BEQ      WORD2      ;YES, SAVE 1ST NO.
5698 022770 142711 000370      BICB      #370,(R1)      ;NO, STRIPE NO. TO OCTAL
5699 022774 152104      BISB      (R1)+,R4
5700 022776 005337 031662      DEC      CHRCNT      ;FINISHED?
5701 023002 003001      BGT      .+4      ;NO
5702 023004 000207      RTS      PC      ;YES, EXIT
5703 023006 006304      ASL      R4
5704 023010 006304      ASL      R4
5705 023012 006304      ASL      R4
5706 023014 000762      BR       STRIPN+2

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5707
5708
5709
5710 023016 000
5711 023017 045 050045 046504
5712 023024 030067 042040 040511
5713 023032 047107 051517 044524
5714 023040 020103 042524 052123
5715 023046 030440 033457 033457
5716 023054 027064 046440 044501
5717 023062 042116 041505 030455
5718 023070 026461 055104 046520
5719 023076 026501 026501 041120
5720 023104 040040
5721
5722 023106 052045 050131 020105
5723 023114 047111 052040 042510
5724 023122 043040 046117 047514
5725 023130 044527 043516 052040
5726 023136 020117 052522 020116
5727 023144 044124 020105 042504
5728 023152 044523 042522 020104
5729 023160 042524 052123 022472
5730
5731 023166 033515 034063 040460
5732 023174 020054 033515 034063
5733 023202 040461 020054 033515
5734 023210 034063 042461 020054
5735 023216 033515 034063 040462
5736 023224 020054 041502 044504
5737 023232 026117 046440 031467
5738 023240 031470 026101 046440
5739 023246 031467 031470 026103
5740 023254 046440 031467 031470
5741 023262 026122 046440 031467
5742 023270 031470 026107 040
5743 023275 045 033515 034063
5744 023302 040464 020054 033515
5745 023310 034063 042464 020054
5746 023316 033515 034063 040465
5747 023324 020054 033515 034063
5748 023332 044465 020054 033515
5749 023340 034063 052065 020054
5750 023346 033515 034063 040466
5751 023354 020054 033515 034063
5752 023362 040467 020054 033515
5753 023370 034063 040470 020054
5754 023376 033515 034063 043070
5755 023404 022454 033515 033463
5756 023412 040467 046454 031467
5757 023420 034067 026101 051440
5758 023426 041125 026130 051040
5759 023434 041505 052502 026106
5760 023442 052040 047122 052502
5761 023450 026106 051440 047105
5762 023456 026104 051040 047125

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:*****

.SBTTL MESSAGES

:*****

.BYTE

TITLE: .ASCII ;%%PDM70 DIAGNOSTIC TEST 1/7/74. MAINDEC-11-DZPMA-A-PB a;

HEADER: .ASCII ;%TYPE IN THE FOLLOWING TO RUN THE DESIRED TEST:%;

TSTLST: .ASCII ;M7380A, M7381A, M7381E, M7382A, BCDIO, M7383A, M7383C, M7383R, M7383G,

.ASCII ;%M7384A, M7384E, M7385A, M7385I, M7385T, M7386A, M7387A, M7388A. ;

.ASCII ;M7388F,%M7377A,M7378A, SUBX, RECBUF, TRNBUF, SEND. RUN,3;

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 DZPMAB.P11 MESSAGES

5763	023464	040054			
5764					
5765					
5766					
5767					
5768	023466	052445	044523	043516	MES0: .ASCII ;%USING SERIAL I/O INTERFACE OPTION? a;
5769	023474	051440	051105	040511	
5770	023502	020114	027511	020117	
5771	023510	047111	042524	043122	
5772	023516	041501	020105	050117	
5773	023524	044524	047117	020077	
5774	023532	100			
5775					
5776					
5777	023533	103	047117	051124	MES1: .ASCII ;CONTROL MODULE TEST.%a;
5778	023540	046117	046440	042117	
5779	023546	046125	020105	042524	
5780	023554	052123	022456	100	
5781					
5782					
5783	023561	045	046104	030461	MES2: .ASCII ;%DL11 RECV. BUFFER OVERFLOW.%a;
5784	023566	051040	041505	051126	
5785	023574	020056	052502	043106	
5786	023602	051105	047440	042526	
5787	023610	043122	047514	027127	
5788	023616	040045			
5789					
5790	023620	042523	044522	046101	MES3: .ASCII ;SERIAL I/O ADDRESS TEST.%a;
5791	023626	044440	047457	040440	
5792	023634	042104	042522	051523	
5793	023642	052040	051505	027124	
5794	023650	040045			
5795	023652	046104	030461	047440	MES4: .ASCII ;DL11 OVERRUN ERROR.a;
5796	023660	042526	051122	047125	
5797	023666	042440	051122	051117	
5798	023674	040056			
5799					
5800	023576	044445	046114	043505	MES5: .ASCII ;%ILLEGAL TRAP TO a;
5801	023704	046101	052040	040522	
5802	023712	020120	047524	040040	
5803					
5804	023720	043040	047522	020115	MES6: .ASCII ; FROM a;
5805	023726	100			
5806					
5807	023727	045	042524	052123	MES7: .ASCII ;%TEST COMPLETE.%a;
5808	023734	041440	046517	046120	
5809	023742	052105	027105	040045	
5810					
5811	023750	052045	051505	020124	MES8: .ASCII ;%TEST ADDR.? a;
5812	023756	042101	051104	037456	
5813	023764	040040			
5814					
5815	023766	052502	043106	051105	MES9: .ASCII ;BUFFER IS EMPTY.a;
5816	023774	044440	020123	046505	
5817	024002	052120	027131	100	
5818	024007	045	042522	051455	MES10: .ASCII ;%RE-SET MODULE ADDR. TO '17'(OCTAL). a;

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 DZPMAB.P11 MESSAGES

5819	024014	052105	046440	042117	
5820	024022	046125	020105	042101	
5821	024030	051104	020056	047524	
5822	024036	023440	033461	024047	
5823	024044	041517	040524	024514	
5824	024052	020056	100		
5825	024055	101	042057	040440	MES11: .ASCII ;A/D ADDRESSING TEST.0;
5826	024062	042104	042522	051523	
5827	024070	047111	020107	042524	
5828	024076	052123	040056		
5829	024102	027501	020104	040503	MES12: .ASCII ;A/D CALIBRATION TEST.0;
5830	024110	044514	051102	052101	
5831	024116	047511	020116	042524	
5832	024124	052123	040056		
5833	024130	041045	042522	045501	MES13: .ASCII ;%BREAK AT SCOPE 0;
5834	024136	040440	020124	041523	
5835	024144	050117	020105	100	
5836	024151	045	047111	042523	MES14: .ASCII ;%INSERT D JUMPER TO INHIBIT 'EOT' AND +;
5837	024156	052122	042040	045040	
5838	024164	046525	042520	020122	
5839	024172	047524	044440	044116	
5840	024200	041111	052111	023440	
5841	024206	047505	023524	040440	
5842	024214	042116	057440		
5843	024220	051045	046505	053117	MES14A: .ASCII ;%REMOVE JUMPER, CLR MODULE AND ENTER0;
5844	024226	020105	052512	050115	
5845	024234	051105	020054	046103	
5846	024242	020122	047515	052504	
5847	024250	042514	040440	042116	
5848	024256	042440	052116	051105	
5849	024264	100			
5850	024265	101	042057	051040	MES15: .ASCII ;A/D REPEATIBILITY TEST.0;
5851	024272	050105	040505	044524	
5852	024300	044502	044514	054524	
5853	024306	052040	051505	027124	
5854	024314	100			
5855	024315	045	051526	037506	MES16: .ASCII ;%VSF? 0;
5856	024322	040040			
5857	024324	044103	03745c	040040	MES17: .ASCII ;CH.? 0;
5858					
5859	024332	040507	047111	040440	MES18: .ASCII ;GAIN ACCURACY TEST.%0;
5860	024340	041503	051125	041501	
5861	024346	020131	042524	052123	
5862	024354	022456	100		
5863					
5864	024357	045	052523	050120	MES19: .ASCII ;%SUPPLY +1.990V WITH 0;
5865	024364	054514	025440	027061	
5866	024372	034471	053060	053440	
5867	024400	052111	020110	100	
5868					
5869	024405	107	044501	020116	MES20: .ASCII ;GAIN 'LOW'.0;
5870	024412	046047	053517	027047	
5871	024420	100			
5872					
5873	024421	123	044527	041524	MES21: .ASCII ;SWITCH VOLTAGE NEGATIVE.0;
5874	024426	020110	047526	052114	

5875	024434	043501	020105	042516	
5876	024442	040507	044524	042526	
5877	024450	040056			
5878					
5879	024452	040507	047111	023440	MES22: .ASCII ;GAIN 'MEDIUM'.a;
5880	024460	042515	044504	046525	
5881	024466	027047	100		
5882					
5883	024471	107	044501	020116	MES23: .ASCII ;GAIN 'HIGH'.a;
5884	024476	044047	043511	023510	
5885	024504	100			
5886					
5887	024505	045	052523	050120	MES24: .ASCII ;%SUPPLY +,1990V WITH +;
5888	024512	054514	025440	030456	
5889	024520	034471	053060	053440	
5890	024526	052111	020110	137	
5891					
5892	024533	045	052523	050120	MES24A: .ASCII ;%SUPPLY +0.01990V WITH +;
5893	024540	054514	025440	027060	
5894	024546	030460	034471	053060	
5895	024554	053440	052111	020110	
5896	024562	137			
5897	024563	045	052523	050120	MES25: .ASCII ;%SUPPLY +0.000V.a;
5898	024570	054514	025440	027060	
5899	024576	030060	053060	040056	
5900					
5901	024604	044445	041516	051117	MES26: .ASCII ;%INCORRECT GAIN!.a;
5902	024612	042522	052103	043440	
5903	024620	044501	020516	100	
5904					
5905	024625	045	020040	047514	MES27: .ASCII ;% LOW AVG HIGH.a;
5906	024632	020127	020040	040440	
5907	024640	043526	020040	044040	
5908	024646	043511	040110		
5909	024652	051045	041505	053117	MES28: .ASCII ;%RECOVERED FROM POWER FAILURE - BY GOLLY!.a;
5910	024660	051105	042105	043040	
5911	024666	047522	020115	047520	
5912	024674	042527	020122	040506	
5913	024702	046111	051125	020105	
5914	024710	020055	054502	043440	
5915	024716	046117	054514	040041	
5916					
5917	024724	041502	020104	047111	MES29: .ASCII ;BCD INPUT ADDRESS TEST.a;
5918	024732	052520	020124	042101	
5919	024740	051104	051505	020123	
5920	024746	042524	052123	040056	
5921					
5922	024754	046445	042117	046125	MES30: .ASCII ;%MODULE ADDR.? a;
5923	024762	020105	042101	051104	
5924	024770	037456	040040		
5925	024774	042523	020124	052503	MES31: .ASCII ;SET CUST. SW.'S +;
5926	025002	052123	020056	053523	
5927	025010	023456	020123	137	
5928	025015	101	046114	047440	MES31A: .ASCII ;ALL ON WITH INPUTS HI.a;
5929	025022	020116	044527	044124	
5930	025030	044440	050116	052125	

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5931	025036	020123	044510	040056	
5932	025044	046101	020114	043117	MES31B: .ASCII ;ALL OFF WITH INPUTS HI.;
5933	025052	020106	044527	044124	
5934	025060	044440	050116	052125	
5935	025066	020123	044510	040056	
5936	025074	047524	040440	052114	MES31C: .ASCII ;TO ALTERNATE ON & OFF'S.;
5937	025102	051105	040516	042524	
5938	025110	047440	020116	020046	
5939	025116	043117	023506	027123	
5940	025124	100			
5941	025125	101	046114	047440	MES31D: .ASCII ;ALL ON WITH INPUTS LO.;
5942	025132	020116	044527	044124	
5943	025140	044440	050116	052125	
5944	025146	020123	047514	040056	
5945	025154	046101	020114	043117	MES31E: .ASCII ;ALL OFF.;
5946	025162	027106	100		
5947	025165	102	042103	044440	MES32: .ASCII ;BCD INPUT EXERCISER TEST.;
5948	025172	050116	052125	042440	
5949	025200	042530	041522	051511	
5950	025206	051105	052040	051505	
5951	025214	027124	100		
5952	025217	102	042103	047440	MES33: .ASCII ;BCD OUTPUT ADDRESS TEST.;
5953	025224	052125	052520	020124	
5954	025232	042101	051104	051505	
5955	025240	020123	042524	052123	
5956	025246	040056			
5957	025250	042445	040530	044515	MES34: .ASCII ;%EXAMINE OUTPUT LINES FOR +;
5958	025256	042516	047440	052125	
5959	025264	052520	020124	044514	
5960	025272	042516	020123	047506	
5961	025300	020122	137		
5962	025303	101	046114	046040	MES35: .ASCII ;ALL LOGIC 1'S.;
5963	025310	043517	041511	030440	
5964	025316	051447	040056		
5965	025322	042522	042526	051522	MES37: .ASCII ;REVERSED +;
5966	025330	042105	057440		
5967	025334	051445	047503	042520	MES38: .ASCII ;%SCOPE FOR 'OUTPUT DONE H&L' (TYPE +R TO RESTART).;
5968	025342	043040	051117	023440	
5969	025350	052517	050124	052125	
5970	025356	042040	047117	020105	
5971	025364	023110	023514	024040	
5972	025372	054524	042520	057040	
5973	025400	020122	047524	051040	
5974	025406	051505	040524	052122	
5975	025414	027051	100		
5976	025417	045	042513	041131	MES39: .ASCII ;%KEYBOARD/DISPLAY MODULE ADDRESS TEST.;
5977	025424	040517	042122	042057	
5978	025432	051511	046120	054501	
5979	025440	046440	042117	046125	
5980	025446	020105	042101	051104	
5981	025454	051505	020123	042524	
5982	025462	052123	040056		
5983	025466	023461	020123	047101	MES40: .ASCII ;1'S AND LEAVE THE INPUTS OPEN.;
5984	025474	020104	042514	053101	
5985	025502	020105	044124	020105	
5986	025510	047111	052520	051524	

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5987	025516	047440	042520	027116	
5988	025524	100			
5989	025525	061	051447	040440	MES40A: .ASCII ;1'S AND GND ALL INPUTS.0;
5990	025532	042116	043440	042116	
5991	025540	040440	046114	044440	
5992	025546	050116	052125	027123	
5993	025554	100			
5994	025555	101	052114	051105	MES40B: .ASCII ;ALTERNATE 1'S & 0'S.0;
5995	025562	040516	042524	030440	
5996	025570	051447	023040	030040	
5997	025576	051447	040056		
5998	025602	023460	027123	100	MES41: .ASCII ;0'S.0;
5999	025607	111	052116	020056	MES42: .ASCII ;INT. OR EXT. SYNC.? 0;
6000	025614	051117	042440	052130	
6001	025622	020056	054523	041516	
6002	025630	037456	040040		
6003	025634	041502	020104	027511	MES43: .ASCII ;BCD I/O TEST.0;
6004	025642	020117	042524	052123	
6005	025650	040056			
6006	025652	044103	051101	041501	MES44: .ASCII ;CHARACTER I/O ADDRESS TEST+ ;
6007	025660	042524	020122	027511	
6008	025666	020117	042101	051104	
6009	025674	051505	020123	042524	
6010	025702	052123	020137		
6011	025706	027504	020101	042101	MES45: .ASCII ;D/A ADDRESSING TEST.0;
6012	025714	051104	051505	044523	
6013	025722	043516	052040	051505	
6014	025730	027124	100		
6015	025733	045	041523	050117	MES46: .ASCII ;%SCOPE FOR 'PROG L' & 'FLOP L' LO.0;
6016	025740	020105	047506	020122	
6017	025746	050047	047522	020107	
6018	025754	023514	023040	023440	
6019	025762	046106	050117	046040	
6020	025770	020047	047514	040056	
6021	025776	041523	050117	020105	MES47: .ASCII ;SCOPE FOR 'PROG L' HI & 'FLOP L' LO.0;
6022	026004	047506	020122	050047	
6023	026012	047522	020107	023514	
6024	026020	044040	020111	020046	
6025	026026	043047	047514	020120	
6026	026034	023514	046040	027117	
6027	026042	100			
6028	026043	123	047503	042520	MES48: .ASCII ;SCOPE FOR 'FLOP L' HI.0;
6029	026050	043040	051117	023440	
6030	026056	046106	050117	046040	
6031	026064	020047	044510	040056	
6032	026072	041523	050117	020105	MES49: .ASCII ;SCOPE FOR 'FLOP L' LO.0;
6033	026100	047506	020122	043047	
6034	026106	047514	020120	023514	
6035	026114	046040	027117	100	
6036	026121	103	042510	045503	MES50: .ASCII ;CHECK CH. '0' OUTPUT FOR +;
6037	026126	041440	027110	023440	
6038	026134	023460	047440	052125	
6039	026142	052520	020124	047506	
6040	026150	020122	137		
6041	026153	103	042510	045503	MES51: .ASCII ;CHECK CH. '1' OUTPUT FOR +;
6042	026160	041440	027110	023440	

6043	026166	023461	047440	052125	
6044	026174	052520	020124	047506	
6045	026202	020122	137		
6046	026205	060	030056	053060	MESS2: .ASCII :0.00VQ;
6047	026212	100			
6048	026213	061	030456	053061	MESS3: .ASCII :1.11VQ;
6049	026220	100			
6050	026221	062	031056	053062	MESS4: .ASCII :2.22VQ;
6051	026226	100			
6052	026227	064	032056	053064	MESS5: .ASCII :4.44VQ;
6053	026234	100			
6054	026235	070	034056	053070	MESS6: .ASCII :8.88VQ;
6055	026242	100			
6056	026243	104	040457	042440	MESS7: .ASCII :D/A EXERCISER TEST.Q;
6057	026250	042530	041522	051511	
6058	026256	051105	052040	051505	
6059	026304	027124	100		
6060	026267	104	040457	053040	MESS8: .ASCII :D/A VALUES(X,Y)? Q;
6061	026274	046101	042525	024123	
6062	026302	026130	024531	020077	
6063	026310	100			
6064	026311	045	042523	020124	MESS9: .ASCII :%SET ALL DATA SW.'S TO '0'.Q;
6065	026316	046101	020114	040504	
6066	026324	040524	051440	027127	
6067	026332	051447	052040	020117	
6068	026341	030047	027047	100	
6069	026341	123	050125	046120	MESS10: .ASCII :SUPPLY AN EXTERNAL SYNC.Q;
6070	026352	020131	047101	042440	
6071	026360	052130	051105	040516	
6072	026366	020114	054523	041516	
6073	026374	040056			
6074	026376	041523	050117	020105	MESS11: .ASCII :SCOPE FOR THE SIGNAL 'DATA READY, AND CHECK %;
6075	026404	047506	020122	044124	
6076	026412	020105	044523	047107	
6077	026420	046101	023440	040504	
6078	026426	040524	051040	040505	
6079	026434	054504	020054	047101	
6080	026442	020104	044103	041505	
6081	026450	020113	045		
6082	026453	103	027110	051447	.ASCII :CH.'S '0 & 1' OUTPUTS FOR 5 JSEC RISE TIMES.Q;
6083	026460	023440	020060	020046	
6084	026466	023461	047440	052125	
6085	026474	052520	051524	043040	
6086	026502	051117	032440	052440	
6087	026510	042523	020103	044522	
6088	026516	042523	052040	046511	
6089	026524	051505	040056		
6090	026530	052124	020114	0275	MESS12: .ASCII :TTL I/O TEST.Q;
6091	026536	020117	042524	0523	
6092	026544	040045			
6093	026546	046104	030461	040440	MESS13: .ASCII :DL11 ADRS., VEC.? Q;
6094	026554	051104	027123	020054	
6095	026562	042526	027103	020077	
6096	026570	100			
6097	026571	111	051516	051105	MESS14: .ASCII :INSERT THE M7387 READ-IN MODULE & INITIALIZE SYSTEM.Q;
6098	026576	020124	044124	020105	

6099	026604	033515	034063	020067	
6100	026612	042522	042101	044455	
6101	026620	020116	047515	052504	
6102	026626	042514	023040	044440	
6103	026634	044516	044524	046101	
6104	026642	055111	020105	054523	
6105	026650	052123	046505	022456	
6106	026656	100			
6107	026657	042	051120	046517	MES65: .ASCII ;"FROM OK" REMOVE THE M7397.2;
6108	026664	047440	021113	051040	
6109	026672	046505	053117	020105	
6110	026700	044124	020105	033515	
6111	026706	034063	027067	040045	
6112	026714	042523	044522	046101	MES66: .ASCII ;SERIAL I/O INTERFACE TEST.2;
6113	026722	044440	047457	044440	
6114	026730	052116	051105	040506	
6115	026736	042503	052040	051505	
6116	026744	022524	100		
6117	026747	122	046505	052117	MES67: .ASCII ;REMOTE DST. 2;
6118	026754	020105	051504	027124	
6119	026762	020077	100		
6120					
6121	026765	111	046114	043505	MES68: .ASCII ;ILLEGAL DECIMAL NO. 2;
6122	026772	046101	042040	041505	
6123	027000	047515	046101	047040	
6124	027006	037440	040077		
6125					
6126	027014	044450	026516	047510	MES69: .ASCII ;(IN-HOUSE).2;
6127	027022	051535	024505	040056	
6128					
6129	027030	050	042511	042114	MES70: .ASCII ;(FIELD).2;
6130	027036	027051	100		
6131					
6132	027041	111	050116	052125	MES71: .ASCII ;INPUT DATA. TERMINATE TEST W/EOT.2;
6133	027046	042040	052101	026101	
6134	027054	052040	051105	044515	
6135	027062	040516	042524	052040	
6136	027070	051505	020124	027527	
6137	027076	047505	027124	040045	
6138					
6139	027104	054105	046501	047111	MES72: .ASCII ;EXAMINE 'FIFO' DATA.2;
6140	027112	020105	043047	043111	
6141	027120	023517	042040	052101	
6142	027126	027101	100		
6143	027131	105	052116	051105	MES73: .ASCII ;ENTERING THE DISPLAY TEST. ;
6144	027136	047111	020107	044124	
6145	027144	020105	044504	050123	
6146	027152	040514	020131	042524	
6147	027160	052123	020054		
6148	027164	042522	044455	04516	MES73A: .ASCII ;RE-INITIALIZE PDM70.2;
6149	027172	044524	046101	055111	
6150	027200	020105	042120	033515	
6151	027206	027060	100		
6152	027211	105	044103	020117	MES74: .ASCII ;ECHO TEST. 2;
6153	027216	042524	052123	020054	
6154	027224	137			

6155	027225	123	047524	040522	MES75: .ASCII ;STORAGE TEST .+;
6156	027232	042507	052040	051505	
6157	027240	020124	137		
6158	027243	122	051505	052105	MES76: .ASCII ;RESET ADDRESS %2;
6159	027250	040440	042104	042522	
6160	027256	051523	022440	100	
6161	027263	115	031467	034067	MES77: .ASCII ;M7378A FOUNDATION MODULE TEST. %2;
6162	027270	020101	043040	052517	
6163	027276	042116	052101	047511	
6164	027304	020116	047515	052504	
6165	027312	042514	052040	051505	
6166	027320	027124	022440	100	
6167	027325	120	052125	051440	MES78: .ASCII ;PUT SCOPE PROBE ON PIN 78 .+;
6168	027332	047503	042520	050040	
6169	027340	047522	042502	047440	
6170	027346	020116	044520	020116	
6171	027354	034067	027040	137	
6172	027361	125	042523	057040	MES79: .ASCII ;USE IE TO EXIT FROM SUBTEST. 2;
6173	027366	020105	047524	042440	
6174	027374	044530	020124	051105	
6175	027402	046517	051440	041125	
6176	027410	042524	052123	020056	
6177	027416	100			
6178	027417	115	031467	033467	MES80: .ASCII ;M7377A REMOTE SERIAL I/O TEST. %2;
6179	027424	020101	042522	047515	
6180	027432	042524	051440	051105	
6181	027440	040511	020114	027511	
6182	027446	020117	042524	052123	
6183	027454	020056	040045		
6184	027460	051440	046105	041505	MES81: .ASCII ; SELECT D12 (LINEFEED) SWITCH 'V'(VARIABLE TERMINATOR).<CR>2;
6185	027466	020124	030460	020062	
6186	027474	046050	047111	043105	
6187	027502	042505	024504	051440	
6188	027510	044527	041524	020110	
6189	027516	053047	024047	040526	
6190	027524	044522	041101	042514	
6191	027532	052040	051105	044515	
6192	027540	040516	047524	024522	
6193	027546	036056	051103	040076	
6194	027554	044510	020124	040503	MES82: .ASCII ;HIT CARRIAGE RETURN TO CONTINUE.%2;
6195	027562	051122	040511	042507	
6196	027570	051040	052105	051125	
6197	027576	020116	047524	041440	
6198	027604	047117	044524	052516	
6199	027612	027105	022445	100	
6200	027617	122	051505	052105	MES83: .ASCII ;RESET MODE SWITCH.%2;
6201	027624	046440	042117	020105	
6202	027632	053523	052111	044103	
6203	027640	022456	100		
6204	027643	123	052105	041440	MES84: .ASCII ;SET CLOCK 3 ON CLOCK MODULE TO 100 MILLI SECONDS.%2+;
6205	027650	047514	045503	031440	
6206	027656	047440	020116	046103	
6207	027664	041517	020113	047515	
6208	027672	052504	042514	052040	
6209	027700	020117	030061	027160	
6210	027706	044515	046114	020111	

6211	027714	042523	047503	042116	
6212	027722	027123	022445	137	
6213	027727	045	020045	042523	MES85: .ASCII ;%% SET SWITCH 1 OF SWITCH P TO ON. %2;
6214	027734	020124	053523	052111	
6215	027742	044103	020040	020061	
6216	027750	043117	051440	044527	
6217	027756	041524	020110	020120	
6218	027764	047524	047440	027116	
6219	027772	022440	100		
6220	027775	045	020045	052123	MES86: .ASCII ;%% STRAP OUT EOT<CR>%2;
6221	030002	040522	020120	052517	
6222	030010	020124	047505	036124	
6223	030016	051103	022476	100	
6224	030023	045	051045	046505	MES87: .ASCII ;%%REMOVE EOT JUMPER<CR>%2;
6225	030030	053117	020105	047505	
6226	030036	020124	052512	050115	
6227	030044	051105	041474	037122	
6228	030052	100			
6229	030053	122	051505	052105	MES88: .ASCII ;RESET MODULE ADDRESS <CR>%2;
6230	030060	046440	042117	046125	
6231	030066	020105	042101	051104	
6232	030074	051505	020123	041474	
6233	030102	037122	040045		
6234	030106	023440	052123	023530	ERR1: .ASCII ; 'STX' WASN'T RETURNED.%2;
6235	030114	053440	051501	023516	
6236	030122	020124	042522	052524	
6237	030130	047122	042105	022456	
6238	030136	100			
6239					
6240	030137	040	044504	047104	ERR2: .ASCII ; DIDN'T ENTER ADDRESS MODE.%2;
6241	030144	052047	042440	052116	
6242	030152	051105	040440	042104	
6243	030160	042522	051523	046440	
6244	030166	042117	027105	040045	
6245					
6246	030174	042040	052101	020101	ERR3: .ASCII ; DATA ERROR.%2;
6247	030202	051105	047522	027122	
6248	030210	040045			
6249	030212	040440	042104	042522	ERR4: .ASCII ; ADDRESS ERROR IN 2ND PROGRAM%2;
6250	030220	051523	042440	051122	
6251	030226	051117	044440	020116	
6252	030234	047062	020104	051120	
6253	030242	043517	040522	022515	
6254	030250	100			
6255					
6256	030251	040	042447	052117	ERR5: .ASCII ; 'EOT' WASN'T RETURNED.%2;
6257	030256	020047	040527	047123	
6258	030264	052047	051040	052105	
6259	030272	051125	042516	027104	
6260	030300	040045			
6261					
6262	030302	030440	052123	050040	ERR6: .ASCII ; 1ST PROGRAM WASN'T RECIRCULATED.%2;
6263	030310	047522	051107	046501	
6264	030316	053440	051501	023516	
6265	030324	020124	042522	044503	
6266	030332	041522	046125	052101	

6267	030340	042105	022456	100	
6268					
6269	030345	040	040504	040524	ERR7: .ASCII ; DATA PARITY ERROR.%a;
6270	030352	050040	051101	052111	
6271	030360	020131	051105	047522	
6272	030366	027122	040045		
6273					
6274	030372	044440	046114	043505	ERR8: .ASCII ; ILLEGAL DATA XFER%a;
6275	030400	046101	042040	052101	
6276	030406	020101	043130	051105	
6277	030414	040045			
6278	030416	023440	054523	023516	ERR9: .ASCII ; 'SYN' DELAY 'X' TOO SHORT.%a;
6279	030424	042040	046105	054501	
6280	030432	023440	023530	052040	
6281	030440	047517	051440	047510	
6282	030446	052122	022456	100	
6283					
6284	030453	040	051447	047131	ERR10: .ASCII ; 'SYN' DELAY 'X' TOO LONG.%a;
6285	030460	020047	042504	040514	
6286	030466	020131	054047	020047	
6287	030474	047524	020117	047514	
6288	030502	043516	022456	100	
6289					
6290	030507	040	044504	047104	ERR11: .ASCII ; DIDN'T ENTER DATA MODE.%a;
6291	030514	052047	042440	052116	
6292	030522	051105	042040	052101	
6293	030530	020101	047515	042504	
6294	030536	022456	100		
6295	030541	040	051447	054124	ERR12: .ASCII ; 'STX' DIDN'T CLR DEST.%a;
6296	030546	020047	044504	047104	
6297	030554	052047	041440	051114	
6298	030562	042040	051505	027124	
6299	030570	040045			
6300	030572	040440	046440	042117	ERR13: .ASCII ; A MODULE WAS ENABLED WITH ADDR. ';
6301	030600	046125	020105	040527	
6302	030606	020123	047105	041101	
6303	030614	042514	020104	044527	
6304	030622	044124	040440	042104	
6305	030630	027122	023440		
6306	030634	023440	100		ERR13A: .ASCII ; 'a;
6307	030637	040	052105	020130	ERR14: .ASCII ; ETX DIDN'T CLR SOURCE, %a;
6308	030644	044504	047104	052047	
6309	030652	041440	051114	051440	
6310	030660	052517	041522	026105	
6311	030666	022440	100		
6312	030671	040	047505	020124	ERR15: .ASCII ; EOT WASN'T STRAPPED OUT. %a;
6313	030676	040527	047123	052047	
6314	030704	051440	051124	050101	
6315	030712	042520	020104	052517	
6316	030720	027124	022440	100	
6317	030725	040	052105	020130	ERR16: .ASCII ; ETX WASN'T RETURNED.%a;
6318	030732	040527	047123	052047	
6319	030740	051040	052105	051125	
6320	030746	042516	027104	100	
6321					
6322	030753	040	042523	044522	ERR17: .ASCII ; SERIAL I/O+;

6323	030760	046101	044440	047457	
6324	030766	137			
6325					
6326	030767	040	047062	020104	ERR18: .ASCII ; 2ND PROGRAM DIDN'T ENTER DATA MODE.;
6327	030774	051120	043517	040522	
6328	031002	020115	044504	047104	
6329	031010	052047	042440	052116	
6330	031016	051105	042040	052101	
6331	031024	020101	047515	042504	
6332	031032	100			
6333					
6334	031033	040	047103	051124	ERR19: .ASCII ; CNTRL MODULE DIDN'T ENTER DATA MODE.;
6335	031040	020114	047515	052504	
6336	031046	042514	042040	042111	
6337	031054	023516	020124	047105	
6338	031062	042524	020122	040504	
6339	031070	040524	046440	042117	
6340	031076	027105	100		
6341	031101	040	047516	042040	ERR20: .ASCII ; NO DATA RETURNED WITH EXT. SYNC.;
6342	031106	052101	020101	042522	
6343	031114	052524	047122	042105	
6344	031122	053440	052111	020110	
6345	031130	054105	027124	051440	
6346	031136	047131	027103	100	
6347	031143	045	046111	042514	ERR21: .ASCII ;%ILLEGAL EXTERNAL CONVERSION.;
6348	031150	040507	020114	054105	
6349	031156	042524	047122	046101	
6350	031164	041440	047117	042526	
6351	031172	051522	047511	027116	
6352	031200	100			
6353	031201	040	040504	040524	ERR22: .ASCII ; DATA FORMAT ERROR.;
6354	031206	043040	051117	040515	
6355	031214	020124	051105	047522	
6356	031222	027122	100		
6357	031225	122	046505	052117	ERR23: .ASCII ;REMOTE CLEAR LEFT GARBAGE IN MODULE FIFO%%;
6358	031232	020105	041440	042514	
6359	031240	051101	046040	042105	
6360	031246	020124	040507	041122	
6361	031254	043501	020105	047111	
6362	031262	046440	042117	046125	
6363	031270	020105	044506	047506	
6364	031276	022445	100		
6365	031301	103	042514	051101	ERR24: .ASCII ;CLEAR LEFT GARBAGE IN MODULE FIFO.%%;
6366	031306	046040	043105	020124	
6367	031314	040507	041122	043501	
6368	031322	020105	047111	046440	
6369	031330	042117	046125	020105	
6370	031336	044506	047506	022456	
6371	031344	040045			
6372	031346	040052			ASTRIC: .ASCII ;*;
6373					
6374	031350	022477	040056		GMARK: .ASCII ;?%;
6375					
6376	031354	022445	040056		DOT: .ASCII ;%%;
6377					
6378	031360	026445	100		DASH: .ASCII ;%-;

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6379
6380 031363 045 025440 025453 SCALE: .ASCII ;% ++++++++ ++++++++ (SCALE=+;
6381 031370 025453 025453 025453
6382 031376 025440 025453 025453
6383 031404 025453 025453 024040
6384 031412 041523 046101 036505
6385 031420 137
6386 031421 061 053115 137 XIMV: .ASCII ;1MV+;
6387 031425 061 030060 053125 X100UV: .ASCII ;100UV+;
6388 031432 137
6389 031433 061 052460 057526 X10UV: .ASCII ;10UV+;
6390 031440 042057 053111 022451 XDIV: .ASCII ;/DIV)%% a;
6391 031446 020045 100
6392
6393 031451 045 051117 047514 XLOW: .ASCII ;%ORLOW a;
6394 031456 020127 040040
6395 031462 047445 044122 043511 XHIGH: .ASCII ;%ORHIGH a;
6396 031470 020110 100
6397 031473 100 END: .ASCII ;a;
6398
6399 031474 040134 SLASH: .ASCII ;\a;
6400
6401 031476 040136 UPAROW: .ASCII ;^a;
6402
6403 031500 040045 CRLF: .ASCII ;%a;
6404
6405 031502 022445 100 CRLF2: .ASCII ;%%a;
6406
6407 031505 104 030503 040045 MESDC1: .ASCII ;DC1%a;
6408
6409 031512 041504 022462 100 MESDC2: .ASCII ;DC2%a;
6410
6411 031517 104 031503 040045 MESDC3: .ASCII ;DC3%a;
6412
6413 031524 041504 022464 100 MESDC4: .ASCII ;DC4%a;
6414
6415 031531 123 054124 040045 MESSTX: .ASCII ;STX%a;
6416
6417 031536 054523 022516 100 MESSYN: .ASCII ;SYN%a;
6418
6419 031543 123 044117 040045 MESSOH: .ASCII ;SOH%a;
6420
6421 031550 044523 040045 MESSI: .ASCII ;SI%a;
6422
6423 031554 047505 022524 100 MESEOT: .ASCII ;EOT%a;
6424
6425 031561 105 054124 040045 MESETX: .ASCII ;ETX%a;

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6426		
6427		
6428		
6429		
6430		
6431	031566	000000
6432	031570	000000
6433	031572	001466
6434	031574	001466
6435	031576	003717
6436	031600	000000
6437	031602	000000
6438	031604	000000
6439	031606	000000
6440	031610	000000
6441	031612	000000
6442	031614	000000
6443	031616	000000
6444	031620	000000
6445	031622	000000
6446	031624	000000
6447	031626	000000
6448	031630	000000
6449	031632	000000
6450	031634	000000
6451	031636	000000
6452	031640	000000
6453	031642	000000
6454	031644	000000
6455	031646	000000
6456	031650	000000
6457	031652	000000
6458	031654	000000
6459	031656	000000
6460	031660	000000
6461	031662	000000
6462	031664	000000
6463	031666	000000
6464	031670	000000
6465	031672	000000
6466	031674	000000
6467	031676	000000
6468		031746
6469	031746	000000
6470		
6471	031750	000000
6472		032262
6473		001376

;*****

;SBTTL SOFTWARE 'SWITCH' ADDRESSES

;*****

;EVEN

MTRSWH: 0

PRTSWH: 0

RVECTR: MONTR1

AVECTR: MONTR1

OFFSET: 1999.

SIOSWH: 0

MODADR: 0

REPTSW: 0

KSTOR0: 0

FORMT1: 0

DLYSWH: 0

DSTSWH: 0

SENDSW: 0

OPRTSW: 0

TERMSW: 0

TOPC: 0

COUNT: .WORD 0

FROMPC: 0

SAVEPC: 0

SAVPSW: 0

SAV2PC: 0

SAV2SW: 0

KSTOR1: 0

KSTOR2: 0

KSTOR3: 0

KSTOR4: 0

KSTOR5: 0

TSTNUM: 0

TEMP1: 0

TEMP2: 0

CHRCNT: 0

RUBSWH: 0

PRGSWH: 0

LOPSWH: 0

RESTR1: 0

ORLOW: 0

MINUS9: 0

ORHIGH: 0

AVGTAB: 0

;=.+200.

;END MONITR

;CONTAINS THE 'CNTRL R' RESTART ADDRESS

;CONTAINS THE 'CNTRL A' RESTART ADDRESS

;A/D OFFSET

;SERIAL I/O SWITCH, SET IF SERIAL INPUT USED

;STORAGE OF CURRENT MODULE ADDRESS

;TEMPORARY COUNTER(REMOTE SER I/O).

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524
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[illegible]

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MES86      027775
MES87      030023
MES88      030053
ME59       023766
MINUS9     031676
MODADR     031602
MODERR=    104022

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6220*												
6224*												
4007	6229*											
5438	5815*											
2404*	2415	6467*										
1755	1871*	2227	3205*	3242	3979*	4008*	4119	4490	5059*	6437*		
1078*	1374	1388	1405	1410	1429	1436	1449	1466	1478	1492	1500	1509
1537	1546	1563	1616	1623	1661	1752	1757	1762	1767	1774	1788	1802
1815	1850	1879	1884	1904	1921	1940	2147	2186	2191	2196	2211	2244
2271	2282	2275	2291	3004	3015	3020	3026	3052	3058	3092	3140	3146
3177	3183	3224	3229	3274	3285	3290	3296	3323	3329	3416	3551	3567
3688	3741	3840	3903	3909	3945	3957	3964	3998	4004	4066	4110	4248

MONITOR	001376
MONTRO	001450
MONTRI	001466
MONTR2	001610
MONTR3	001640
MONTR4	001654
MONTR5	001660
MONTIA	001572
MOVEIT	021602
MTRSWH	031566
M377A1	012274
M381E1	004246
M381E2	004252
M385A1	010024
M7377A	012222
M7377B	012230
M7378A	013476
M7380A	002130
M7381A	003374
M7381E	004232
M7382A	004324
M7383A	004726
M7383C	005316
M7383G	006254
M7383R	005412
M7384A	006762
M7384E	007676
M7385A	010016
M7385I	011026
M7385T	011236
M7386A	011352
M7387A	003212
M7388A	011702
M7388F	011714
NMATCH	002040
NODLAY=	104036
NOP =	000240
NULL =	104021
NULL1 =	104023
OBCCDT1	004334
OBCCDT2	004374
OBCCDT3	004434
OBCCDT4	004476

[illegible]

OFFSET	031576	2629	2650	6435*										
OPRTSW	031620	4652*	5353*	5371*	5374	6444*								
ORHIGH	031746	2389	2395*	2420	2436	2458	2466	6469*						
ORLOW	031674	2387	2399*	2457	2462	6466*								
PARITY	016006	1408	3018	3288	4794*	4804*	4837*							
PC	=.000007	986*	1749*	1785*	1799*	1812*	1826*	1847*	1876*	1901*	1918*	1937*	1953*	1972*
		1995*	2022*	2048*	2077*	2125*	2141*	2181*	2207*	2221*	2250*	2268*	2310*	2323*
		2326*	2339*	2353*	2408*	2456*	2470*	2476*	2479*	2597*	2614*	2657*	2675*	2695*
		2706*	2725*	2739*	2753*	2767*	2781*	2795*	2809*	2823*	2836*	2849*	2871*	2877*
		2892*	2896*	2944*	2971*	2987*	3001*	3079*	3085*	3115*	3209*	3220*	3413*	3456*
		3485*	3548*	3564*	3570*	3577*	3594*	3599*	3622*	3636*	3683*	3722*	3731*	3922*
		3827*	3869*	3983*	3994*	4026*	4046*	4053*	4074*	4163*	4316*	4339*	4462*	4474*
		4488*	4512*	4538*	4559*	4662*	4665*	4668*	4671*	4674*	4677*	4680*	4683*	4686*
		4689*	4704*	4711*	4713*	4741*	4772*	4907*	4929*	5039*	5120*	5260*	5302*	5307*
		5308*	5316*	5341*	5355*	5391*	5421*	5440*	5443*	5446*	5460*	5470*	5487*	5499*
		5575*	5585*	5599*	5683*	5702*								
PDMPR	015436	4662	4665	4668	4671	4674	4677	4680	4683	4686	4699	4705*		
PDMSET	015222	3456	3577	4661*	5039	5443	5499							
PDMST0	015420	4695	4699*											
PDMST1	015432	4692	4703*											
PDMST2	015434	4698	4704*											
PEXT2	015462	4705	4712*											
POP1SP=	005726	991*	1275	4710										
POP2SP=	022626	993*	5070											
PJSTIT	006730	2476	2648*											
PRCNTR=	104000	1060*	4630	4703	5493									
PRGM1	002163	1342	1345*	1367	1463	1497								
PRGM2	002172	1352*	1377	1426	1469	1503								
PRGSWH	031666	6463*												
PRINT =	104012	1070*	1195	1199	1209	1227	1245	1248	1287	1327	1650	1667	1724	1732
		1735	1840	1865	1867	1894	1914	1933	1948	1959	1965	1983	2011	2037
		2063	2075	2097	2100	2159	2168	2261	2274	2291	2307	2314	2336	2342
		2426	2433	2452	2460	2464	2468	2494	2503	2505	2513	2521	2530	2538
		2546	2567	2590	2592	2662	2678	2683	2702	2713	2726	2740	2754	2768
		2782	2796	2810	2824	2837	2850	2855	2917	2921	2953	3199	3237	3240
		3253	3338	3345	3398	3463	3478	3507	3520	3534	3571	3590	3625	3644
		3661	3807	3974	4006	4021	4120	4152	4312					

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RVECTR 031572	1247*	4643	5248*	5249*	5250	6433*							
RO =%000000	979*	1215	1216	1217	1218	1219	1220	1221	1222	1223	1224	1225	1230
	1234	1235*	1240*	1520*	1521*	1522*	1523*	1524*	1525*	1526*	1527*	1528*	1967*
	1968*	1969	2119*	2120*	2121	2364*	2367	2370*	2371*	2372	2373*	2374	2387*
	2388*	2389	2391*	2392	2406*	2620*	2632*	2633	2956	2957	2958	2959	3242*
	3349	3349	3401	3402	3634	3665	3666	3667	3668	3659	3670	3671	3672
	4119*	4159	4160*	4315*	4487*	4552	4553	4554	4555	4556	4557	4558	4789*
	4790	4791*	4792	5054*	5057	5059	5060	5061	5202	5209	5292	5300	5612
	5630*	5678*	5684*	5693*									
R1 =%000001	980*	1261*	1264	1266	1268	1270	1272	1281	1283	1367*	1370*	1372	1377
	1402*	1403	1413	1426*	1434	1439	1463*	1464	1469	1497*	1498	1503	1540*
	1543*	1544	1549	1576*	1610	1627*	1628	1658*	1659	1665	2123*	2153*	2154
	2156*	2157	2312*	2360*	2376*	2377	2392*	2417	2422*	2438	2442*	2443	2446
	2449	2474*	2475	2563*	2570*	2596*	2638*	2649*	2653*	2926*	2928	2929	2930
	2931	2933	2934	2935	2936	2939*	2940*	2941*	2942*	3022*	3024	3089*	3090
	3095	3293*	3294	3299	3453*	3576*	3612*	3618*	3738*	3739	3744	3837*	3838
	3843	4257*	4258	4276	4574*	4575*	4576	4582	4585	4587	4596	4607	4616*
	4619	4626	4628	4631	4634	4638	464	4650	4661	4664	4667	4670	4673
	4676	4679	4682	4685	4688	4691	4725	4739*	4751*	4756	4763	4765*	4767
	4821	4823*	4825*	4826*	4828	4855	4857*	4965*	4974	4975	4977	4979	4981
	4987	4990	4992	5038*	5141*	5142	5144*	5145*	5146	5167*	5177*	5178*	5179
	5181*	5182	5184*	5185	5186	5225*	5265	5268	5275	5277	5283*	5285*	5358*
	5359	5361	5366	5368	5376	5380*	5383*	5393*	5398*	5399*	5400*	5401	5442*
	5490*	5491	5495	5520*	5521*	5522*	5537*	5550	5551*	5552*	5553*	5554*	5555*
	5556*	5559	5580*	5581*	5590	5594*	5597*	5613	5629*	5644	5666*	5682*	5687
	5696	5698*	5699										
R2 =%000002	981*	1232*	1234*	1238	1263*	1270	1372	1386	1403	1427	1434	1447	1460
	1464	1476	1490	1498	1507	1535	1544	1561	1577*	1612	1630*	1654	1659
	1755	1760	1765	1770	1772	1786	1813	1848	1853	1877	2143*	2145	2150
	2241	2269	2280	2361*	2381*	2384*	2386*	2393	2397	2401	2405	2415*	2417
	2420	2431*	2432	2436	2438	2462*	2466*	2475*	2571*	2574*	2575	2578	2591
	2650*	2652*	2927*	2928*	2929*	2930*	2934*	2935*	2936*	2937*	2973	2989	3002
	3023*	3024	3029	3056	3090	3138	3144	3222	3272	3283	3294	3327	3381
	3385	3388	3414	3444	3448	3451	3453	3457	3459	3486*	3491*	3549	3555
	3574	3576	3578	3613*	3614*	3615*	3616*	3617*	3620*	3696	3739	3838	3901
	3907	3996	4062	4063	4102	4104	4105	4258	4522	4524	4526	4726	4752*
	4758	4802*	4822	4824*	4825	4830	4833	4835	4838	4844	4848	4852	4856*
	5356*	5358	5401*	5402*	5403*	5406	5435	5442	5444	5452*	5459*	5459*	5486*
	5495*	5496	5497*	5538*	5550*	5554	5555	5582*	5584*	5614	5628*	5645	5665*
R3 =%000003	982*	1233*	1236*	1578*	1583	1584	1585	1631*	2144*	2145	2316*	2317*	2318*
	2319	2365*	2367*	2380*	2401*	2402*	2403*	2404*	2416*	2419*	2428	2435*	2440*
	2473*	2477*	2559*	2565	2595*	2618*	2626	2635*	2933*	2942	4753*	4756*	4763*
	4764	4767	5395*	5408*	5534*	5559*	5577*	5586*	5592	5615	5627*	5646	5664*
R4 =%000004	983*	1240	1262*	1274*	1276	1277	1279	1280*	1582*	1609*	1610	1612	2366*
	2368*	2375*	2382*	2561*	2575	2577*	2578	2580*	2581	2619*	2621	2622	2636*
	4571*	4582*	4596*	4616	4726*	4729	4731	4734	4736	4737	4754*	4757*	4758*
	4759	5533*	5542	5544	5546	5548*	5549	5558	5578*	5582	5584	5616	5626*
	5647	5663*	5684	5688*	5689*	569*	5693	5695*	5699*	5703*	5704*	5705*	
R5 =%000005	984*	2457*	2458*	2611*	2625*	2628*	2629*	4755*	4761*	4769*	4770	5292*	5301
	5536*	5549*	5556	5617	5625*	5648	5662*						
SAVEPC 031632	5640*	5652	5658*	5670	6449*								
SAVPSW 031634	5641*	5651	5659*	5669	6450*								
SAVREG= 104002	1062*	2594	2610	2648	4567	4720	4750	4963	5037	5224	5352	5392	5469
	5532	5576											
SAV2PC 031636	5642*	5650	5660*	5668	6451*								
SAV2SW 031640	5643*	5649	5661*	5667	6452*								

SCALE	031363	2453	6380*										
SCOPE =	104001	1061*	1398	1423	1457	1487	1518	1558	1574	1647	1723	1782	1796
		1824	1836	1863	1892	1912	1931	1946	2020	2046	2073	2204	2219
		2289	2693	2721	2735	2749	2763	2777	2791	2805	2819	2832	2845
		2985	3000	3037	3074	3111	3122	3196	3236	3308	3336	3425	3476
		3561	3588	3610	3634	3642	3681	3693	3810	3865	3875	3971	4018
		4177	4310	4338	4348	4407							4113
SCOPEB	020456	5131	5137*										
SCOPEF	020546	5134	5136*	5140*	5156*	5213*							
SCOPEG	020470	5133	5135	5140*									
SD10	010642	3100	3114	3196*									
SD10A	013064	3868	3905	3911	3963	3971*							
SD11	011000	3226	3236*										
SD11A	013214	4000	4006*										
SD2	010110	2985*											
SD3	010136	2990	3000*										
SD4	010254	3037*											
SD4A	012334	3687	3693*										
SD5	010324	2978	3074*										
SD5A	012506	3756	3807*										
SD6	010456	3094	3098	3111*									
SD6A	012652	3842	3848	3855*									
SD6B	012654	3850	3865*										
SD7	010502	3122*											
SD7A	012700	3875*											
SEND	022024	1318	5480*										
SENDAX	014226	4422*	4512										
SENDPG	014240	4437*											
SENDSW	031616	1191*	3593*	3597*	4578	4694	4860*	5484*	6443*				
SEND1	022052	5488*	5501										
SEND2	022114	5496*	5500*										
SETRMT	021256	2323	2408	5304*									
SETUP =	104035	1089*	1331	1649	1739	1962	1986	2108	2171	2311	2340	2497	2665
		2961	3255	3350	3403	3538	3673	4019	4156	5480			2920
SI =	000017	1176*	1528	1596	3268	4682	4926						
S10SWH	031600	1208*	1226*	1365	1432	1461	1495	1541	2224	2977	3097	3113	3383
		3461	3746	3755	3847	3867	4186	4228	4278	4300	4330	4367	4492
		4871	4884	4920	5055	5518	6436*						4942
SLASH	031474	4595	4615	6399*									
SNDAX1	014274	4424	4439	4462*									
SNGCHR	017444	4940*	4988	4994*	5042*								
SOH =	000001	1175*	1347	1355	1524	1592	1602	2236	3128	3168	3372	4194	4202
		4387	4443	4455	4507	4679	4892	4910	5010				4212
SOH1	017017	1748*	1784*	1798*	1811*	1846*	1875*	1900*	1917*	1936*	1969*	1970*	2105*
		2180*	2206*	2267*	2319*	2630	2970*	2986*	3084*	3219*	3547*	3563*	3598*
		3727*	3811*	4025*	4072*	4185*	4911*	5093*					3682*
SOURCE=	104025	1031*	2230	3367	3432	4905							
SP =	%000006	985*	1099*	1100*	1101*	1102	1105*	1106*	1107*	1108*	1109	1185*	2559
		2561	2601*	4583*	4636*	4642*	4706	4712*	4821*	4822*	4856	4857	4941
		4950	5069	5071	5104	5105	5106*	5137	5141	5143*	5153	5247	5248
		5282	5356	5357*	5393	5394*	5612*	5613*	5614*	5615*	5616*	5617*	5618*
		5623*	5624	5625	5626	5627	5628	5629	5630	5640	5641	5642	5643
		5645*	5646*	5647*	5648*	5649*	5650*	5651*	5652*	5658	5659	5660	5661
		5663	5664	5665	5666	5667*	5668*	5669*	5670*	5694*			5662
SPACE =	104016	1074*	2430	2481	5111								
SPACEX	J21036	2428*	2480*	5227*	5229*	5232*	5324*	5327*	5331*				

[illegible]

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 DZPMAB.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

TAG1D	010252	3006	3017	3028	3030*
TAG1E	010276	3043	3050*		
TAG1F	010322	3054	3059*		
TAG1H	010354	3081*			
TAG1HA	012556	3824*			
TAG1K	010524	3125	3135*		
TAG1KA	012742	3893	3901*		
TAG1L	010360	3084*			
TAG1P	011012	3198	3240*		
TAG1PC	013454	3973	4118*		
TAG1PD	013456	3757	4119*		
TAG1Q	010666	3204*			
TAG1QA	013106	3978*			
TAG1R	010724	3211*			
TAG1RA	013144	3985*			
TAG1S	010570	3153	3161*		
TAG1SA	012770	3915*			
TAG1SB	013010	3917	3932*		
TAG1T	010610	3164	3175*		
TAG1TA	013024	3935	3943*		
TAG1U	010736	3213	3218*		
TAG1UA	013156	3987	3992*		
TAG1W	010636	3142	3148	3179	3188*
TAG1WA	013052	3947	3962*		
TAG1Z	010752	3222*			
TAG1ZA	013166	3996*			
TAG2A	004754	2183*			
TAG2B	005040	2209*			
TAG2C	005102	2227*	2249		
TAG2F	005146	2228	2242	2247*	
TAG2G	005130	2232	2241*		
TAG2H	005162	2225	2250*		
TAG3A	004364	1999	2011*		
TAG3B	004424	2025	2037*		
TAG3C	004464	2052	2063*		
TAG3D	004506	2077*	2081		
TAG4A	004612	2125*	2155		
TAG4B	004636	2128	2140*		
TAG4C	004656	2145*	2151		
TAG4D	004676	2153*	2158		
TAG4E	004716	2149	2158*		
TAG4F	007706	2921*	2925	2932	
TAG4G	007764	2939*	2945		
TAG5A	011462	3434	3443*	3460	3462
TAG5B	011506	3447	3448*	3450*	
TAG5C	011534	3455	3457*		
TAG5D	011634	3483*	3489*	3492	3497* 3498
TAG5E	011616	3484*	3499		
TAG7A	011314	3369	3380*	3390	
TAG7B	011340	3384	3385*	3387*	
TAG8A	012020	3569	3574*	3579	
TAG8BA	012122	3614*	3619		
TEMP1	031656	5422*	5425*	5619*	5623 6459*
TEMP2	031660	5418*	5420*	5423*	6460*
TERMSW	031622	4875*	4896*	5002	5004* 5015 5017* 6445*
TEST1	011034	3262*			

[illegible]

TTYENB	021374	1963	3570	3594	5120	5260	5339#	5355	5391	5421	5440	5487	5575	
TTYIN =	104013	1071#	1201	1211	1255	1669	1739	1843	1870	1897	1916	1935	2014	2040
		2067	2102	2263	2344	2562	2680	2685	2704	2715	2729	2743	2757	2771
		2785	2799	2813	2827	2840	2853	2923	3202	3465	3480	3627	3809	3976
		4024	4314	4355	5090	5152	5240	5296	5677					
TYPECL	021530	5377	5380#											
TYPEIT=	104010	1068#	2654	4600	4693	5226	5284	5378	5381	5382	5384	5598		
TYPEQM	015110	4599	4649	4654#										
TYPERA	021436	5358#	5375	5379	5385									
TYPER1	021510	5369	5374#											
TYPER2	021524	5378#												
TYPER3	021426	5356#	5367											
TYPT1	022352	5580#	5587											
TYPT2	022356	5581#	5583											
UPAROW	031476	5281	6401#											
WAITGN=	104034	1088#	2507	2515	2524	2532	2540							
WAITG1	006406	2562#	2569											
WAITG2	006436	2571#	2584	2586	2599									
WAITG3	006474	2583#												
WORD2	022734	5687#	5697											
X =	000013	995#	1398	1399#	1423	1424#	1457	1458#	1487	1488#	1518	1519#	1558	1559#
		1574	1575#	1647	1648#	1723	1724#							
XADCNT	006566	1135	2610#											
XADRES	020154	1134	5051#	5058										
XASEMB	022704	1125	5677#											
XASEM1	022730	5684#	5692											
XAVRAG	015470	1137	4720#											
XBCDBI	022162	1136	5532#											
XBINDE	022326	1139	5575#											
XBUFO	001364	1159#	4987#											
XCHANE	020272	1138	5088#	5092										
XCSRO	001362	1158#	4985											
XDELAY	021656	5418#												
XDIV	031440	2455	6390#											
XDLAYL	021666	1116	1128	5420#										
XDLAY2	021720	5427#												
XDLAY3	021704	5423#	5424	5426										
XDSTG1	016774	4888	4896#											
XDSTIN	016752	1132	4884#											
XERMES	020320	1130	5103#											
XGETRG	022630	1115	5658#											
XHIGH	031462	2465	6395#											
XINTO	001372	1163#												
XLDAO	017106	1119	4872	4876										

XPRCT1	021206	5276	5278	5284*										
XPRINT	021410	1122	5352*											
XPRTRB	022006	1143	5468*											
XRANGN	020552	1121	5167*	5187										
XRECRO	015716	1117	4789*											
XSAVRG	022554	1114	5640*											
XSCOPE	020416	1113	5128*											
XSETUP	021052	1141	5247*											
XSOURC	016732	1133	4871*											
XSPACE	021010	1126	5224*	5228										
XTTYIN	014522	1053	1123	4567*	4577	4656								
XTYPE1	021142	5265*	5267*											
XTYPE2	021144	5264	5268*											
XTYPIT	021114	1120	5260*											
XWATGN	006372	1140	2559*											
XIMV	031421	2445	6386*											
XIOUV	031433	2451	6389*											
XIOOUV	031425	2448	6387*											
Y =	000002	996*												
ZERO =	022440	5579*	5594	5596*	5600*									
.	= 032262	1039*	1044*	1049*	1052*	1055*	1098*	1198	1237	1265	1267	1363*	1369	1373
		1404	1412	1428	1435	1465	1491	1499	1508	1536	1542	1545	1562	1587
		1606*	1648	1655	1660	1751	1756	1761	1766	1773	1787	1801	1814	1844
		1849	1873	1878	1883	1898	1903	1974	1998	2009*	2024	2035*	2051	2062*
		2104	2106	2122	2127	2130*	2146	2185	2190	2195	2210	2231	2264	2270
		2281	2369	2385	2390	2394	2398	2429	2444	2447	2450	2478	2566	2588
		2617	2627	2651	2697	2698	2708	2709	2890	2895	2974	3003	3009	3014
		3019	3025	3042	3048*	3051	3057	3087	3091	3103	3124	3139	3145	3152
		3163	3176	3182	3204	3212	3217*	3223	3228	3264	3273	3279	3284	3289
		3295	3313	3319*	3322	3328	3368	3382	3433	3445	3482	3566	3575	3596
		3621	3733	3740	3752	3829	3853	3878	3886	3892	3902	3908	3916	3934
		3944	3956	3978	3986	3991*	3997	4002	4028	4056	4080	4090*	4094	4189
		4217*	4219	4232	4284	4374	4383	4390*	4423	4438	4461*	4503	4510*	4592
		4613	4658*	4702	4728	4733	4735	4760	4766	4768	4793	4811*	4836	4839
		4845	4849	4853	4887	4906	4921	4923	4925	4928	4971	4973	4986	4996
		4998	5006	5029	5030	5045*	5056	5119	5147	5180	5183	5239	5262	5298
		5306	5312	5329	5362	5397	5405	5419	5436	5499	5492	5519	5524	5501
		5680	5701	6468*	6472*									

PDM70 DIAGNOSTIC TEST MACY11 27(732) 10-SEP-76 11:56 PAGE 171
 DZPMAB.P11 CROSS REFERENCE TABLE -- MACRO NAMES

CTX	1058*	1398	1423	1457	1487	1518	1558	1574	1647	1723
SIO	1058*									
TA	1058*									
TS	1057*	1398	1423	1457	1487	1518	1558	1574	1647	1723

[illegible]

[illegible]

DDMT0 DIAGNOSTIC TEST MACV11 27(732) 10-SEP-76 11:56 PAGE 176
 DZPMAB.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

	3919	3920	3921	3923	3924	3925	3926	3927	3928	3937	3938	3939	3940	3988	3989
	3990	4030	4031	4032	4033	4034	4035	4058	4059	4060	4061	4082	4083	4084	4085
	4086	4087	4089	4096	4097	4098	4100	4191	4192	4193	4194	4195	4196	4197	4198
	4199	4200	4201	4202	4203	4204	4208	4209	4210	4211	4212	4213	4214	4215	4216
	4221	4222	4223	4224	4234	4235	4236	4237	4376	4377	4378	4379	4385	4386	4387
	4388	4389	4425	4426	4427	4428	4440	4441	4442	4443	4444	4445	4446	4447	4449
	4449	4450	4451	4452	4453	4454	4455	4456	4457	4458	4459	4460	4505	4506	4507
	4508	4509	4889	4890	4891	4892	4893	4894	4908	4909	4910	4911	4912	4913	4930
	4931	4932	4933	5008	5009	5010	5011	5012	5013	5031	5032	5033	5034	5710	
.ENABL	951	952													
.ENC	6473														
.EVEN	1363	1606	1716	2009	2035	2062	2138	3048	3217	3270	3319	3378	3441	3898	3929
	3941	3991	4090	4101	4217	4225	4238	4390	4430	4461	4510	4914	4934	6430	
.LIST	1057	1399	1424	1458	1488	1519	1559	1575	1648	1724					
.MACRO	1057	1058													
.NLIST	1057	1399	1424	1458	1488	1519	1559	1575	1648	1724					
.REM	1														
.REPT	1040														
.SBTTL	997	1058	1093	1144	1166	1181	1321	1639	1729	1953	1980	2095	2163	2295	2329
	2486	2552	2605	2659	2904	2947	3246	3342	3395	3526	3648	4123	4413	4816	4954
	5473	5503	5526	5708	6428										
.TITLE	950														
.WORD	4147	4151	4401	6447											

ERRORS DETECTED: 0
 DEFAULT GLOBALS GENERATED: 0

*DZPMAB.DZPMAB.SEO/SOL/CRF/DS:ERFZ/EN:ABS=DSKM:DZPMAB.P11
 RUN-TIME: 18 40 8 SECONDS
 RUN-TIME RATIO: 109/67=1.6
 CORE USED: 15K (29 PAGES)

