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LQPSE-F PDP11 DIAG
CZLQPB0

AH-S329B-MC
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IDENTIFICATION

PRODUCT CODE: AC-S327B-MC
PRODUCT NAME: CZLOP80 LOPSE-F PDP-11 DIAG
PRODUCT DATE: JANUARY 1981
MAINTAINER: DIAGNOSTIC ENGINEERING
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1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

THIS DIAGNOSTIC PROGRAM WILL BE USED PRIMARILY BY FIELD SERVICE PERSONNEL TO EXERCISE THE LQPSE-F LETTER QUALITY PRINTER WITH A SERIAL INTERFACE TO A PDP-11 CPU.

THIS PROGRAM WILL GENERATE SEVERAL PAGES OF PRINT ON THE LQPSE-F PRINTER, LABELLING (WHEN ABLE) EACH TEST PRINT PATTERN WITH THE TEST TITLE. THIS WILL AID THE USER IN THE DIAGNOSIS OF PRINTER FAILURES.

THE DIAGNOSTIC PROGRAM WILL HELP IDENTIFY FUNCTIONAL PROBLEMS WITH THE PRINTER CONNECTED TO A PDP-11 BY ANY OF FIVE SERIAL INTERFACE DEVICES.

THIS DIAGNOSTIC HAS BEEN WRITTEN FOR USE WITH THE DIAGNOSTIC RUNTIME SERVICES SOFTWARE (SUPERVISOR). THESE SERVICES PROVIDE THE INTERFACE TO THE OPERATOR AND TO THE SOFTWARE ENVIRONMENT. THIS PROGRAM CAN BE USED WITH XXDP+, ACT, APT, SLIDE AND PAPER TAPE. FOR A COMPLETE DESCRIPTION OF THE RUNTIME SERVICES, REFER TO THE XXDP+ USER'S MANUAL. THERE IS A BRIEF DESCRIPTION OF THE RUNTIME SERVICES IN SECTION 2 OF THIS DOCUMENT.

1.2 SYSTEM REQUIREMENTS

THE MINIMUM HARDWARE CONFIGURATION FOR RUNNING THIS DIAGNOSTIC IS GIVEN HERE:

- 1) A PDP-11 CPU WITH AT LEAST 16K WORDS OF MEMORY.
- 2) A CONSOLE TERMINAL.
- 3) LQPSE-F PRINTER.
- 4) ONE OF THE FOLLOWING INTERFACES:
 - A) DZ11.
 - B) DL11-W.
 - C) DLV11-J.
 - D) DLV11-F.
 - E) MXV11.

1.3 RELATED DOCUMENTS AND STANDARDS

- 1) XXDP+ USERS MANUAL - CHQUS.
- 2) PDP-11 DIAGNOSTIC SUPERVISOR PROGRAMMERS GUIDE:
HOW TO WRITE TO THE SUPERVISOR.
- 3) DIAGNOSTIC ENGINEERING STANDARDS AND CONVENTIONS,
PROGRAMMING PRACTICES.

1.4 DIAGNOSTIC HIERARCHY PREREQUISITES

THE MINIMUM HARDWARE CONFIGURATION DETAILED IN SECTION 1.2
WITH THE EXCEPTION OF THE PRINTER IS ASSUMED TO BE FULLY
OPERATIONAL BEFORE THIS DIAGNOSTIC IS RUN.

1.5 ASSUMPTIONS

2.0 OPERATING INSTRUCTIONS

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

2.1 COMMANDS

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

COMMAND	EFFECT
START	START THE DIAGNOSTIC FROM AN INITIAL STATE
RESTART	START THE DIAGNOSTIC WITHOUT INITIALIZING
CONTINUE	CONTINUE AT TEST THAT WAS INTERRUPTED (AFTER ^C)
PROCEED	CONTINUE FROM AN ERROR HALT
EXIT	RETURN TO XXDP+ MONITOR (XXDP+ OPERATION ONLY.)
ADD	ACTIVATE A UNIT FOR TESTING (ALL UNITS ARE CONSIDERED TO BE ACTIVE AT START TIME)
DROP	DEACTIVATE A UNIT
PRINT	PRINT STATISTICAL INFORMATION (IF IMPLEMENTED BY THE DIAGNOSTIC - SECTION 4.0)
DISPLAY	TYPE A LIST OF ALL DEVICE INFORMATION
FLAGS	TYPE THE STATE OF ALL FLAGS (SEE SECTION 2.3)
ZFLAGS	CLEAR ALL FLAGS (SEE SECTION 2.3)

A COMMAND CAN BE RECOGNIZED BY THE FIRST THREE CHARACTERS. SO

YOU MAY, FOR EXAMPLE, TYPE 'STA' INSTEAD OF 'START'.

2.2 SWITCHES

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

SWITCH	EFFECT
/TESTS:LIST	EXECUTE ONLY THOSE TESTS SPECIFIED IN THE LIST. LIST IS A STRING OF TEST NUMBERS, FOR EXAMPLE - /TESTS:1:5:7-10. THIS LIST WILL CAUSE TESTS 1,5,7,8,9,10 TO BE RUN. ALL OTHER TESTS WILL NOT BE RUN.
/PASS:DDDD	EXECUTE DDDDD PASSES (DDDD = 1 TO 64000)
/FLAGS:FLGS	SET SPECIFIED FLAGS. FLAGS ARE DESCRIBED IN SECTION 2.3.
/EOP:DDDD	REPORT END OF PASS MESSAGE AFTER EVERY DDDDD PASSES ONLY. (DDDD = 1 TO 64000)
/UNITS:LIST	TEST/ADD/DROP ONLY THOSE UNITS SPECIFIED IN THE LIST. LIST EXAMPLE - /UNITS:0:5:10-12 USE UNITS 0,5,10,11,12 (UNIT NUMBERS = 0-63)

EXAMPLE OF SWITCH USAGE:

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

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

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

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

2.3 FLAGS

FLAGS ARE USED TO SET UP CERTAIN OPERATIONAL PARAMETERS SUCH AS LOOPING ON ERROR. ALL FLAGS ARE CLEARED AT STARTUP AND REMAIN

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

FLAG	EFFECT
----	-----
HOL	HALT ON ERROR - CONTROL IS RETURNED TO RUNTIME SERVICES COMMAND MODE
LOE	LOOP ON ERROR (NOT SUPPORTED IN THIS DIAGNOSTIC)
IER*	INHIBIT ALL ERROR REPORTS
IBP*	INHIBIT ALL ERROR REPORTS EXCEPT FIRST LEVEL (FIRST LEVEL CONTAINS ERROR TYPE, NUMBER, PC, TEST AND UNIT)
IXR*	INHIBIT EXTENDED ERROR REPORTS (THOSE CALLED BY PRINTX MACRO'S)
PRJ	DIRECT MESSAGES TO LINE PRINTER
PNT	PRINT TEST NUMBER AS TEST EXECUTES
BOE	'BELL' ON ERROR
UAM	UNATTENDED MODE (NO MANUAL INTERVENTION)
ISR	INHIBIT STATISTICAL REPORTS (DOES NOT APPLY TO DIAGNOSTICS WHICH DO NOT SUPPORT STATISTICAL REPORTING)
IDR	INHIBIT PROGRAM DROPPING OF UNITS
ADR	EXECUTE AUTODROP CODE
LOT	LOOP ON TEST
EVL	EXECUTE EVALUATION (ON DIAGNOSTICS WHICH HAVE EVALUATION SUPPORT)

*ERROR MESSAGES ARE DESCRIBED IN SECTION 3.1

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

/FLAGS:IER:BOE

2.4 HARDWARE QUESTIONS

WHEN A DIAGNOSTIC IS STARTED, THE RUNTIME SERVICES WILL PROMPT THE USER FOR HARDWARE INFORMATION BY TYPING 'CHANGE HW (L) ?' YOU MUST ANSWER 'Y' AFTER A START COMMAND UNLESS THE HARDWARE INFORMATION HAS BEEN 'PRELOADED' USING THE SETUP UTILITY (SEE CHAPTER 6 OF THE XXDP+ USER'S MANUAL). WHEN YOU ANSWER THIS QUESTION WITH A 'Y', THE RUNTIME SERVICES WILL ASK FOR THE NUMBER OF UNITS (IN DECIMAL). YOU WILL THEN BE ASKED THE FOLLOWING QUESTIONS FOR EACH UNIT.

Q1: 'CHOOSE PAGE WIDTH FOR THE PRINTER

CHOOSE ONE: 1)80 CHARACTERS PER PRINTER LINE
 2)132 CHARACTERS PER PRINTER LINE
 (1,2) >>

Q2: 'IF ALL DEFAULT VALUES FOR INTERFACE DESIRED, ENTER ^Z.
 IF DEFAULT DESIRED FOR A SINGLE INTERFACE CHARACTERISTIC
 DEPRESS <RETURN>.

'ENTER CONTROL STATUS REGISTER (CSR) ADDRESS.>>

Q3: 'PRINTER CONNECTED TO A SINGLE LINE INTERFACE?

Q3-A: 'ENTER INTERFACE CHANNEL NUMBER FOR THE PRINTER.
 (ASKED ONLY IF Q3 WAS ANSWERED BY A 'N')

2.5 SOFTWARE QUESTIONS

AFTER YOU HAVE ANSWERED THE HARDWARE QUESTIONS OR AFTER A RESTART
 OR CONTINUE COMMAND, THE RUNTIME SERVICES WILL ASK FOR SOFTWARE
 PARAMETERS. THESE PARAMETERS WILL GOVERN SOME DIAGNOSTIC SPECIFIC
 OPERATION MODES. YOU WILL BE PROMPTED BY 'CHANGE SW (L) ?'
 IF YOU WISH TO CHANGE ANY PARAMETERS, ANSWER BY TYPING
 'Y'. THE SOFTWARE QUESTIONS AND THE DEFAULT VALUES ARE DESCRIBED
 IN THE NEXT PARAGRAPH(S).

NONE

2.6 EXTENDED P-TABLE DIALOGUE

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

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

UNITS (D) ? 8<CR>

UNIT 1

CSR ADDRESS (0) ? 160000<CR>

SUB-DEVICE # (0) ? 0<CR>

Q-FACTOR (0) 0 ? 1<CR>

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

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

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

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

UNIT 6
 CSR ADDRESS (0) ? 160000<CR>
 SUB-DEVICE # (0) ? 5<CR>
 Q-FACTOR (0) 0 ? <CR>

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

UNIT 8
 CSR ADDRESS (0) 160000<CR>
 SUB-DEVICE # (0) ? 7<CR>
 Q-FACTOR (0) 1 ? <CR>

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

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

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

UNITS (0) ? 8<CR>

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

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

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Q-FACTOR (0) 0 ? 0<CR>

UNIT 7

CSR ADDRESS (0) ? 160000<CR>

SUB-DEVICE # (0) ? 6,7<CR>

Q-FACTOR (0) 0 ? 1<CR>

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

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

UNITS (0) ? 8<CR>

UNIT 1

CSR ADDRESS (0) ? 160000<CR>

SUB-DEVICE # (0) ? 0-7<CR>

Q-FACTOR (0) 0 ? 0,1,0,,,,,1,1<CR>

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

2.7 QUICK START-UP PROCEDURE (XXDP+)

TO START-UP THIS PROGRAM:

1. BOOT XXDP+
2. GIVE THE DATE AND ANSWER THE LSI AND 50HZ (IF THERE IS A CLOCK) QUESTIONS
3. TYPE 'R NAME', WHERE NAME IS THE NAME OF THE BIN OR BIC FILE FOR THIS PROGRAM
4. TYPE "START"
5. ANSWER THE "CHANGE HW" QUESTION WITH 'Y'
6. ANSWER ALL THE HARDWARE QUESTIONS
7. ANSWER THE "CHANGE SW" QUESTION WITH 'N' (NOT ASKED)

WHEN YOU FOLLOW THIS PROCEDURE YOU WILL BE USING ONLY THE

DEFAULTS FOR FLAGS AND SOFTWARE PARAMETERS. THESE DEFAULTS ARE DESCRIBED IN SECTIONS 2.3 AND 2.5.

3.0 ERROR INFORMATION

3.1 TYPES OF ERROR MESSAGES

THERE ARE THREE LEVELS OF ERROR MESSAGES THAT MAY BE ISSUED BY A DIAGNOSTIC: GENERAL, BASIC AND EXTENDED. GENERAL ERROR MESSAGES ARE ALWAYS PRINTED UNLESS THE 'IER' FLAG IS SET (SECTION 2.3). THE GENERAL ERROR MESSAGE IS OF THE FORM:

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

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

BASIC ERROR MESSAGES ARE MESSAGES THAT CONTAIN SOME ADDITIONAL INFORMATION ABOUT THE ERROR. THESE ARE ALWAYS PRINTED UNLESS THE 'IER' OR 'IBR' FLAGS ARE SET (SECTION 2.3). THESE MESSAGES ARE PRINTED AFTER THE ASSOCIATED GENERAL MESSAGE.

EXTENDED ERROR MESSAGES CONTAIN SUPPLEMENTARY ERROR INFORMATION SUCH AS REGISTER CONTENTS OR GOOD/BAD DATA. THESE ARE ALWAYS PRINTED UNLESS THE 'IER', 'IBR' OR 'IXR' FLAGS ARE SET (SECTION 2.3). THESE MESSAGES ARE PRINTED AFTER THE ASSOCIATED GENERAL ERROR MESSAGE AND ANY ASSOCIATED BASIC ERROR MESSAGES.

3.2 SPECIFIC ERROR MESSAGES

'I/O FAILURE DETECTED AT PRINTER.'
PROBLEM WITH THE SELF TEST SEQUENCE. CHECK PRINTER ROM.

'PRINTER BUFFER FULL.'
A 'CAN' CHARACTER HAS BEEN RECEIVED, AND THE PRINTER HAS DETECTED THAT ITS BUFFER LIMIT HAS BEEN REACHED.

'PROM/RAM FAILURE DETECTED BY PRINTER.'
VALID ONLY AFTER THE SELF TEST. CHECK THE PRINTER MEMORY.

'PRINTER ERROR: N OUT OF RANGE IN ESCAPE SEQUENCE.'
AN UNDEFINED OR OUT OF RANGE ARGUMENT HAS BEEN SENT TO THE PRINTER WITHIN AN ESCAPE SEQUENCE.(PRINTER COMMAND)

'PAUSE SWITCH PRESSED.'
THE PRINTER FRONT PANEL PAUSE SWITCH HAS BEEN PRESSED.

'RIBBON OUT ON PRINTER.'
THE PRINTER RIBBON MUST BE IN PLACE.

'UNDEFINED CHARACTER OR ESCAPE SEQUENCE RECEIVED.'

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AN ILLEGAL SEQUENCE OR CHARACTER HAS BEEN RECEIVED.
CHECK THE ADDRESS OF THE LAST TRANSMISSION WHICH
IS GIVEN BY THE DIAGNOSTIC.

"SHEET FEEDER ERROR."

THE SHEET FEEDER HAS FAILED TO OPERATE PROPERLY. THIS
ERROR CONDITION MAY BE CLEARED BY SENDING AN 'ESC 6' TO
THE PRINTER.

"SOFTWARE ERROR"

THIS MESSAGE SHOULD NOT PRINT UNLESS THE SOFTWARE HAS
BEEN CORRUPTED.

"UNEXPECTED CHARACTER RECEIVED FROM PRINTER."

AN XON, XOFF, ANSWER-BACK RESPONSE OR STATUS RESPONSE
WAS EXPECTED, OR NO TRANSMISSION WAS EXPECTED FROM THE
PRINTER. SOMETHING WAS NONE THE LESS RECEIVED.

"EXPECTED CHARACTER NOT RECEIVED FROM THE PRINTER."

AN XON, XOFF, CAN, EOI, OR ESC WAS EXPECTED BUT NOT
RECEIVED.

"INCORRECT CSR ADDRESS GIVEN. TRY AGAIN."

THE USER HAS ENTERED AN INCORRECT CSR ADDRESS OR THE
DEFAULT ADDRESSES DID NOT WORK WHEN TRYED. THE USER
MUST NOW EXPLICITLY ENTER THE CORRECT CSR ADDRESS.

"INCORRECT CSR ADDRESS OR CHANNEL GIVEN. TRY AGAIN."

EITHER THE ADDRESS OR THE CHANNEL IS INCORRECT.

"FAILED TO TRANSMIT TO PRINTER."

THE TRANSMIT READY CONDITION COULD NOT BE OBTAINED.
CHECK THAT THE INTERFACE CABLE IS PROPERLY ATTACHED.

"WAITING FOR A CHARACTER FROM THE PRINTER."

THIS IS NOT AN ERROR MESSAGE. IF THE CHARACTER IS NOT
RECEIVED EVENTUALLY, AN ERROR WILL OCCUR. THIS IS AN
INDICATOR TO THE USER THAT THE PROGRAM IS IN A WAITING
STATE AND NOT SIMPLY 'LOST'. WHEN THIS MESSAGE IS SEEN,
WAIT FOR NO MORE THAN FIVE MINUTES BEFORE TAKING ACTION.

"FAILED TO FIND PRINTER AT DEFAULT ADDRESSES. RESTART PROGRAM."

THIS INDICATES THAT THE DEFAULT SEQUENCE WHICH
THE PROGRAM WAS INSTRUCTED TO EXERCISE FAILED
TO FIND A PRINTER AT THE ASSUMED DEFAULT
ADDRESSES. THE USER MUST NOW RESTART THE
PROGRAM, EXPLICITLY SPECIFYING THE CSR ADDRESS
AND THE D211 CHANNEL (IF APPLICABLE) AND THE
INTERFACE TYPE.

4.0 PERFORMANCE AND PROGRESS REPORTS

AT THE END OF EACH PASS, THE PASS COUNT IS GIVEN ALONG WITH THE

TOTAL NUMBER OF ERRORS REPORTED SINCE THE DIAGNOSTIC WAS STARTED.
THE 'EOP' SWITCH CAN BE USED TO CONTROL HOW OFTEN THE END
OF PASS MESSAGE IS PRINTED. SECTION 2.2 DESCRIBES SWITCHES.

NONE

5.0 DEVICE INFORMATION TABLES

P-TABLE ENTRIES:

CSRADD - CSR ADDRESS. IF FOUND TO BE ZERO, THIS INDICATES
THAT THE DEFAULT CSR ADDRESSES ARE TO BE TRIED AS
THE CSR ADDRESS. THE CSR ADDRESS IS THE ADDRESS OF
THE RECEIVER CONTROL STATUS REGISTER IN THE SINGLE
LINE INTERFACES AND THE RECEIVER AND TRANSMITTER
CSR FOR THE DZ11 INTERFACE.

IOOPTN - I/O OPTION. A LOGICAL VALUE. IF EQUAL TO 'Y' THEN
A DZ11 INTERFACE IS ASSUMED. IF EQUAL TO 'N' THEN
A SINGLE LINE INTERFACE IS ASSUMED.

PTRCHN - PRINTER CHANNEL. THIS NUMBER (0-7) IS THE CHANNEL
NUMBER ON A DZ11 INTERFACE WHICH IS CONNECTED TO THE
PRINTER.

LINCHS - PRINTER LINE SIZE CHOICE.
THIS NUMBER (1-2) CORRESPONDS TO
THE NUMBER OF CHARACTERS PER HORIZONTAL LINE DESIRED
ON THE PRINTER. THIS SHOULD BE CHOSEN BY THE USER
BASED ON THE WIDTH OF THE FORMS USED ON THE PRINTER.

6.0 TEST SUMMARIES

EACH TEST WILL PRINT THE CURRENT TEST TITLE ON THE PRINTER AS PART OF
THE TEST SEQUENCE. THIS WILL AID THE USER IN THE DIAGNOSIS PROCESS
BY INFORMING THE USER OF THE PURPOSE OF THE CURRENT TEST. THIS IS
THOUGHT TO BE PARTICULARLY USEFUL WHEN THE USER IS RUNNING TESTS OUT OF
THE NUMERIC TEST SEQUENCE BECAUSE THE USUAL OVERALL TEST PRINT PATTERN
WILL BE DIFFERENT.

IN ALL TESTS, BEFORE AND AFTER EACH TRANSMISSION TO THE PRINTER, THE
RECEIVER BUFFER IS CHECKED. IF THE BUFFER CONTAINS A CHARACTER THEN
THE PROGRAM CHECKS TO SEE IF IT IS AN EOT, OR A CAN CHARACTER. IF THE
CHARACTER IS ONE OF THESE TWO THEN AN ERROR CONDITION EXISTS AND AN

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ERROR HANDLING ROUTINE IS CALLED.

TEST 1 - SELF TEST

A SELF TEST IS INITIATED BY SENDING THE SEQUENCE 'ESC N C' TO THE PRINTER. IT IS ASSUMED THAT NO CAN OR EOT SIGNALS WILL BE GENERATED IN THE PROCESS. A TIME DELAY WILL BE GENERATED TO WAIT FOR THE SELF TEST COMPLETION. THE PRINTER STATUS IS THEN EXAMINED. THE ARGUMENT N MAY BE ANY VALUE WITH NO EFFECT TO THE TEST.

SELF TEST COMPLETION WILL BE CONFIRMED BY THE SOFTWARE BY THE RECEPTION FROM THE PRINTER OF AN 'XON' CHARACTER AND AN ACCEPTABLE PRINTER STATUS WORD.

TEST 2 - UNDERLINE / NO UNDERLINE MODE TEST

A LINE OF CHARACTERS WILL BE PRINTED, ALTERNATING UNDERLINED AND THEN NON-UNDERLINED CHARACTERS. THE MODE IS GENERATED BY THE 'ESC N G' SEQUENCE WHERE N=0 MEANS THAT UNDERLINE IS INHIBITED AND WHERE N=1 MEANS THAT UNDERLINE IS EMPLOYED.

TEST 3 - HAMMER HIT COUNT TEST

FOUR LINES OF TEXT WILL BE PRINTED, EACH LINE OF TEXT BEING PRINTED WITH A DIFFERENT HIT COUNT. THE RESULTING PRINT PATTERN WILL BE FOUR LINES, ONE BLANK LINE (HIT COUNT 0), AND THREE LINES OF INCREASING DARKNESS (INCREASING HIT COUNT). THE 'ESC N D' SEQUENCE IS USED WITH N EQUAL TO 0, 1, 2, AND N<0. THE N<0 SEQUENCE WILL RESULT IN A HIT COUNT OF ZERO, N=0 IS A HIT COUNT OF ONE, N=1 IS A HIT COUNT OF TWO AND N=2 IS A HIT COUNT OF THREE.

TEST 4 - CARRIAGE POSITIONING TEST

IN THIS TEST, TWO CHARACTERS ARE PRINTED SEPARATED BY A SPACE OF ADJUSTABLE WIDTH. BOTH FORWARD AND REVERSE CARRIAGE MOTIONS ARE EXERCISED. THE RANGE OF THE SPACE SIZE IS DICTATED BY THE CURRENT PAGE WIDTH. THE SPACE SIZE IS ADJUSTED BY SENDING THE 'ESC N ;' SEQUENCE TO THE PRINTER. THE VALUE N IS PROPORTIONAL TO THE SPACE SIZE AND MAY BE POSITIVE (RIGHT MOVEMENT) OR NEGATIVE (LEFT MOVEMENT).

TEST 5 - PAPER POSITIONING TEST (VERTICAL)

THE VERTICAL SPACING IS ADJUSTED IN THIS TEST BY SENDING THE SEQUENCE 'ESC N 9' WHERE N IS PROPORTIONAL TO THE VERTICAL SPACE SIZE. IN THIS TEST A LINE OF CHARACTERS WILL BE PRINTED AND A CARRIAGE RETURN - LINE FEED TRANSMITTED. THE VERTICAL SPACE SIZE WILL THEN BE ADJUSTED AND THE SEQUENCE WILL BE REPEATED. THIS SEQUENCE WILL BE PERFORMED OVER A REASONABLE RANGE OF VERTICAL SPACE SIZES.

TEST 6 - PRINT ONE LINE OF EACH CHARACTER

689
690
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744
745

ONE LINE OF EACH PRINTABLE CHARACTER WILL BE PRINTED TO
CONFIRM THAT ALL POSITIONS ON THE PRINT WHEEL WILL ACTUALLY
PRINT.

TEST 7 - PRINT A SWIRL PATTERN

THE COMPLETE CHARACTER SET IS PRINTED ONE LINE AT A TIME
IN A 'SWIRL PATTERN'.

TEST 8 - WORST CASE RAPID MOTION TEST

THIS TEST WILL PUT THE PRINT WHEEL THROUGH A MECHANICALLY STRESSFUL
SITUATION BY REPEATEDLY PRINTING THE SEQUENCE 'ACA:ACA:AC..'

TEST 9 - PRINT RANDOM CHARACTERS

THIS TEST WILL PRINT A RANDOM SEQUENCE OF CHARACTERS ON THE
PRINTER.

TEST 10 - PRINT OPERATOR SELECTED CHARACTERS

THIS TEST WILL PRINT CHARACTER SEQUENCES DEFINED BY THE
USER. THE TEST IS ENDED BY ENTERING ^RETURN>.

TEST 11 - LIFT / DROP RIBBON BY OPERATOR CONTROL
(OPTIONAL - SPECIAL TEST)

THIS TEST WILL HAVE TWO MODES SELECTABLE ON THE TEST MENU:
AUTOMATIC MODE AND MANUAL MODE. IN THE AUTOMATIC MODE THE
RIBBON WILL RAISE AND DROP AT A RATE OF ABOUT ONCE PER SECOND.
THIS SEQUENCE WILL CONTINUE UNTIL THE OPERATOR STOPS IT BY
ACTION TAKEN AT THE OPERATORS CONSOLE. IN MANUAL MODE THE
OPERATOR WILL RAISE AND DROP THE RIBBON AT WILL BY PRESSING
CONSOLE KEYS AS SPECIFIED ON THE CONSOLE SCREEN.

TEST 12 - BIDIRECTIONAL FORMS TRACTOR (OPTIONAL - SPECIAL TEST)

A VARIABLE SIZE MATRIX OF CHARACTERS WILL BE PRINTED IN A
RANDOM ORDER, FORCING RANDOM MOVEMENT OF THE CARRIAGE IN ALL
FOUR DIRECTIONS.

TEST 13 - CUT SHEET FEEDER EXERCISER (OPTIONAL - SPECIAL TEST)

IN THIS TEST THE PAGE SIZE IS SET TO ELEVEN INCHES. A SHEET
IS FED FROM THE FRONT TRAY, A LINE IS PRINTED AT THE TOP OF
THE PAGE AND A LINE IS PRINTED AT THE BOTTOM OF THE PAGE.
THE PROCESS IS THEN REPEATED WITH THE REAR TRAY FEEDING WHICH
SHOULD AUTOMATICALLY EJECT THE PAGE IN THE PRINTER FROM THE
FRONT TRAY.

8

PROGRAM HEADER

```

1
2 000000      .ENABL  ABS
3              .ENABL  AMA
4
5              .=2000
6              .MCALL  SVC
7 002000      SVC
8 002000      BGNMOD      ; INITIALIZE SUPERVISOR MACROS
9
10             000001    SVCINS= 1      ; LIST INSTRUCTIONS, SHIFTED RIGHT
11             000001    SVCTST= 1     ; LIST TEST TAGS, SHIFTED RIGHT
12             000001    SVCSUB= 1     ; LIST SUBTEST TAGS, SHIFTED RIGHT
13             000001    SVCGBL= 1    ; LIST GLOBAL TAGS, SHIFTED RIGHT
14             000001    SVCTAG= 1    ; LIST OTHER TAGS, SHIFTED RIGHT
15
16
17
18
19
20
21 002000      POINTER ERRIBL
22
23
24 002000      HEADER  CZLQP,B,0,240.,0,PRI07
002000
002000      103
002001      132
002002      114
002003      121
002004      120
002005      000
002006      000
002007      000
002010
002010      102
002011
002011      060
002012
002012      000000
002014
002014      000360
002016
002016      025024
002020
002020      000000
002022
002022      002160
002024
002024      000000
002026
002026      026042
002030
002030      000000
002032
002032      000000
002034
002034      000000

L$NAME::
      .ASCII  /C/
      .ASCII  /Z/
      .ASCII  /L/
      .ASCII  /Q/
      .ASCII  /P/
      .BYTE   0
      .BYTE   0
      .BYTE   0
L$REV::
      .ASCII  /B/
L$DEPO::
      .ASCII  /O/
L$UNIT::
      .WORD   0
L$TIML::
      .WORD   240.
L$HPCP::
      .WORD   L$HARD
L$SPCP::
      .WORD   0
L$HPTP::
      .WORD   L$HW
L$SPTP::
      .WORD   0
L$LADP::
      .WORD   L$LAST
L$STA::
      .WORD   0
L$CO::
      .WORD   0
L$DTYP::
      .WORD   0

```

PROGRAM HEADER

002036	
002036	000000
002040	
002040	002124
002042	
002042	000340
002044	
002044	000000
002046	
002046	000000
002050	
002050	003
002051	003
002052	
002052	000000
002054	000000
002056	
002056	000000
002060	
002060	010102
002062	
002062	000000
002064	
002064	000000
002066	
002066	000000
002070	
002070	000000
002072	
002072	000000
002074	
002074	000000
002076	
002076	010150
002100	
002100	104035
002102	
002102	010072
002104	
002104	015634
002106	
002106	017570
002110	
002110	017566
002112	
002112	015626
002114	
002114	000000
002116	
002116	000000
002120	
002120	000000

25
26

.SBITL DISPATCH TABLE

LSAPT::	.WORD	0
LSDTP::	.WORD	LSDISPATCH
LSPRIO::	.WORD	PRI07
LSENVI::	.WORD	0
LSEXP1::	.WORD	0
LSMREV::	.BYTE	CSREVISION
	.BYTE	CSREDIT
LSEF::	.WORD	0
	.WORD	0
LSSPC::	.WORD	0
LSDEVP::	.WORD	LSDVTYP
LSREPP::	.WORD	0
LSEXP4::	.WORD	0
LSEXP5::	.WORD	0
LSAUT::	.WORD	0
LSDUT::	.WORD	0
LSLUN::	.WORD	0
LSDESP::	.WORD	LSDESC
LSLOAD::	EMT	ESLOAD
LSETP::	.WORD	LSERRTBL
LSICP::	.WORD	LSINIT
LSCCP::	.WORD	LSCLEAN
LSACP::	.WORD	LSAUTO
LSPRT::	.WORD	LSPROT
LSTEST::	.WORD	0
LSDLV::	.WORD	0
LSHIME::	.WORD	0

DISPATCH TABLE

1
2
3
4
5

002122
002122 000015
002124
002124 017632
002126 017766
002130 020224
002132 020510
002134 021042
002136 021264
002140 021446
002142 021646
002144 022012
002146 022174
002150 022634
002152 023060
002154 023766

DISPATCH 13

.WORD 13
L\$DISPATCH::
.WORD T1
.WORD T2
.WORD T3
.WORD T4
.WORD T5
.WORD T6
.WORD T7
.WORD T8
.WORD T9
.WORD T10
.WORD T11
.WORD T12
.WORD T13

6
7

.SBTTL DEFAULT HARDWARE P-TABLE

DEFAULT HARDWARE P-TABLE

1
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```

: **
: THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
: THE TEST-DEVICE PARAMETERS. THE STRUCTURE OF THIS TABLE
: IS IDENTICAL TO THE STRUCTURE OF THE HARDWARE P-TABLES,
: AND IS USED AS A "TEMPLATE" FOR BUILDING THE P-TABLES.
: --

```

BGNHW DFPTBL

.WORD L10000-L\$HW/2

L\$HW::
DFPTBL::

002156
002156 000004
002160
002160

```

: .WORD 0 ;CSR ADDRESS. IF = 0 THEN AUTO-SETUP MODE IS ASSUMED.
: .WORD 1 ;1-'Y' I/O OPTION IS SINGLE LINE (NON-DZ11) INTERFACE
: .WORD 0 ;PRINTER CHANNEL DEFAULT IS CHANNEL 0.
: .WORD 1 ;LINE SIZE CHOICE. 1-80 CHARACTERS/LINE

```

002160 000000
002162 000001
002164 000000
002166 000001

ENDHW

L10000:

002170
002170

```

: TITLE GLOBAL AREAS
: SBITL GLOBAL EQUATES SECTION

```

GLOBAL EQUATES SECTION

1
2 002170

EQUALS

: BIT DEFINITIONS

100000	B1T15== 100000
040000	B1T14== 40000
020000	B1T13== 20000
010000	B1T12== 10000
004000	B1T11== 4000
002000	B1T10== 2000
001000	B1T09== 1000
000400	B1T08== 400
000200	B1T07== 200
000100	B1T06== 100
000040	B1T05== 40
000020	B1T04== 20
000010	B1T03== 10
000004	B1T02== 4
000002	B1T01== 2
000001	B1T00== 1
:	
001000	B1T9== B1T09
000400	B1T8== B1T08
000200	B1T7== B1T07
000100	B1T6== B1T06
000040	B1T5== B1T05
000020	B1T4== B1T04
000010	B1T3== B1T03
000004	B1T2== B1T02
000002	B1T1== B1T01
000001	B1T0== B1T00

: EVENT FLAG DEFINITIONS
 : EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION

000040	EF.START== 32.	: START COMMAND WAS ISSUED
000037	EF.RESTART== 31.	: RESTART COMMAND WAS ISSUED
000036	EF.CONTINUE== 30.	: CONTINUE COMMAND WAS ISSUED
000035	EF.NEW== 29.	: A NEW PASS HAS BEEN STARTED
000034	EF.PWR== 28.	: A POWER-FAIL/POWER-UP OCCURRED

: PRIORITY LEVEL DEFINITIONS

000340	PRI07== 340
000300	PRI06== 300
000240	PRI05== 240
000200	PRI04== 200
000140	PRI03== 140
000100	PRI02== 100
000040	PRI01== 40
000000	PRI00== 0

: OPERATOR FLAG BITS

000004	OP.L-- 4
--------	----------

GLOBAL EQUATES SECTION

000010
000020
000040
000100
000200
000400
001000
002000
004000
010000
020000
040000
100000

LOT== 10
ADR== 20
IDU== 40
ISR== 100
UAM== 200
BOE== 400
PNT== 1000
PRJ== 2000
IXE== 4000
IBE== 10000
IER== 20000
LOE== 40000
HOE== 100000

:
: DECIMAL VALUES

ZERO -32.
ONE -33.
TWO -34.
THREE -35.
FOUR -36.
FIVE -37.
SIX -38.
SEVEN -39.
EIGHT -40.
NINE -41.
HEXA -42.
HEXB -43.
HEXC -44.
HEXD -45.
HEXE -46.
HEXF -47.

; MNEMONICS FOR ESCAPE SEQUENCE ARGUMENTS.

NUM1 =1
NUM2 =2
NUM3 =3
NUM4 =4
NUM5 =5
NUM6 =6
NUM7 =7
NUM8 =8.
NUM9 =9.
NUM10 =10.
NUM11 =11.
NUM12 =12.
NUM13 =13.
NUM14 =14.
NUM15 =15.

020000
010000

ECNRB BIT13
UCRB -BIT12

3
4
5
6
7
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9
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16
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GLOBAL EQUATES SECTION

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002000

MXLF =2000 ;MAXIMUM LINEFEED SIZE. DECIMAL 2048x1/48 INCHES

.SBTTL GLOBAL DATA SECTION

GLOBAL DATA SECTION

```

1
2
3      : **
4      : THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
5      : IN MORE THAN ONE TEST.
6      : --
7 002170 001200      SKP14: .WORD 640.      ;SKIP 14 INCHES MINUS 3 LINES ARGUMENT.
8 002172 001031      SKPA4: .WORD 537.      ;SKIP A4 SPACING MINUS 3 LINES ARGUMENT.
9 002174 000760      SKP11: .WORD 496.      ;SKIP 11 INCHES MINUS 3 LINES ARGUMENT.
10 002176 000000      CRNTSK: .WORD          ;TEMPORARY SAFE LOCATION FOR CURRENT SKIP SIZE.
11
12
13 002200 000000      CSRADD: .WORD          ;ADDRESS OF CSR REGISTER
14
15
16 002202 000000      LOGUNIT: .WORD          ;LOGICAL UNIT NUMBER
17 002204 000000      PLOC: .WORD          ;ADDRESS OF HARDWARE P-TABLE
18
19
20 002206 000000      GREASE: .WORD 0      ;WHEN = -1, A GREASED EXIT IS PROVIDED FROM THE
21                                     ;CURRENT ROUTINE.
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      :

```

ESCAPE SEQUENCE TRANSMISSION TABLE

THE FOLLOWING ASSIGNMENTS MAKE UP A TABLE IN THE FOLLOWING FORMAT:
 THE LABEL IS USED TO REFERENCE THE DESIRED TABLE ENTRY. THE FIRST
 BYTE IN EACH TABLE ENTRY IS AN ESCAPE CHARACTER. SOME OF THE TABLE
 ENTRIES HAVE ONLY ONE ADDITIONAL BYTE. THESE ENTRIES CORRESPOND TO
 PRINTER TASKS WHICH REQUIRE NO VARIABLE PARAMETERS. THOSE TABLE
 ENTRIES WITH MORE THAN TWO BYTES CORRESPOND TO PRINTER TASKS WHICH
 REQUIRE SOME PARAMETER. THE PARAMETERS IN EACH ENTRY MAY BE FROM
 ONE TO THREE BYTES AND MUST BE MNEMONIC VALUES (SUCH AS THOSE ASSIGNED
 BY THE CONVRT ROUTINE). TO USE A TABLE ENTRY IN CONJUNCTION WITH THE
 XMIT ROUTINE, THE TABLE ENTRY LABEL IS PLACED IN R1 AND THE NUMBER OF
 BYTES TO BE TRANSMITTED IS PLACED IN R2.

```

42 002210 033 060      STSRES: .ASCII <033>/0/      ;2 BYTES. EVOKE STATUS RESPONSE.
43 002212 033 065      HZTLSP: .ASCII <033>/5/      ;2 BYTES. PERFORM HORIZONTAL SPACING
44
45 002214 012 033 076  DUMMYS: .ASCII <012><033>/>/<033>/(( 9/ ;DUMMY SEQUENCE FOR PRINTER INTERFACE
    002217 033 050 040
    002222 040 071
46
47 002224 033 066      RESET: .ASCII <033>/6/      ;RESET SEQUENCE
48                                     ;2 BYTES. RESET INTERFACE, SHEET FEEDER
49                                     ;PRINTER. RECEIVE STATUS
50                                     ;RESPONSE AND 'XON' CHARACTER.
51 002226 033 040 040  VRTCLS: .ASCII <033>/ 9/      ;5 BYTES. ACCUMULATE VERTICAL SPACES.
    002231 040 071
52 002233 033 040 040  HRZTILS: .ASCII <033>/ ;/      ;5 BYTES. ACCUMULATE HORIZONTAL SPACES.
    002236 040 073
    002240 033 041 075  RIBPCS: .ASCII <033>/!-./      ;3 BYTES. SET RIBBON POSITION- DOWN.
    002243 056

```


GLOBAL DATA SECTION

	002410	114	111	116	
	002413	105	057	116	
	002416	117	055	125	
	002421	116	104	105	
	002424	122	114	111	
	002427	116	105	040	
	002432	115	117	104	
	002435	105	040	124	
	002440	105	123	124	
	002443	015	012	000	
90					:TITLE FOR TEST 2.
91	002446	045	116	045	TITLE3: .ASCIZ /%N%ATEST 3 - HAMMER HIT COUNT TEST/<015><012>
	002451	101	124	105	
	002454	123	124	040	
	002457	063	040	055	
	002462	040	110	101	
	002465	115	115	105	
	002470	122	040	110	
	002473	111	124	040	
	002476	103	117	125	
	002501	116	124	040	
	002504	124	105	123	
	002507	124	015	012	
	002512	000			
92					:TITLE FOR TEST 3.
93	002513	045	116	045	TITLE4: .ASCIZ /%N%ATEST 4 - CARRIAGE POSITIONING TEST/<015><012>
	002516	101	124	105	
	002521	123	124	040	
	002524	064	040	055	
	002527	040	103	101	
	002532	122	122	111	
	002535	101	107	105	
	002540	040	120	117	
	002543	123	111	124	
	002546	111	117	116	
	002551	111	116	107	
	002554	040	124	105	
	002557	123	124	015	
	002562	012	000		
94					:TITLE FOR TEST 4.
95	002564	045	116	045	TITLE5: .ASCIZ /%N%ATEST 5 - PAPER POSITIONING (VERTICAL) TEST/<015><012>
	002567	101	124	105	
	002572	123	124	040	
	002575	065	040	055	
	002600	040	120	101	
	002603	120	105	122	
	002606	040	120	117	
	002611	123	111	124	
	002614	111	117	116	
	002617	111	116	107	
	002622	040	050	126	
	002625	105	122	124	
	002630	111	103	101	
	002633	114	051	040	
	002636	124	105	123	
	002641	124	015	012	
	002644	000			

GLOBAL DATA SECTION

```

96
97 002645      045      116      045      ;TITLE FOR TEST 5.
    002650      101      124      105      TITLE6: .ASCIIZ /%N%ATEST 6 - PRINT ONE LINE OF EACH CHARACTER/<015><012>
    002653      123      124      040
    002656      066      040      055
    002661      040      120      122
    002664      111      116      124
    002667      040      117      116
    002672      105      040      114
    002675      111      116      105
    002700      040      117      106
    002703      040      105      101
    002706      103      110      040
    002711      103      110      101
    002714      122      101      103
    002717      124      105      122
    002722      015      012      000

98
99 002725      045      116      045      ;TITLE FOR TEST 6.
    002730      101      124      105      TITLE7: .ASCIIZ /%N%ATEST 7 - PRINT A SWIRL PATTERN/<015><012>
    002733      123      124      040
    002736      067      040      055
    002741      040      120      122
    002744      111      116      124
    002747      040      101      040
    002752      123      127      111
    002755      122      114      040
    002760      120      101      124
    002763      124      105      122
    002766      116      015      012
    002771      000

100
101 002772      045      116      045      ;TITLE FOR TEST 7.
    002775      101      124      105      TITLE8: .ASCIIZ /%N%ATEST 8 - WORST CASE RAPID MOTION TEST/<015><012>
    003000      123      124      040
    003003      070      040      055
    003006      040      127      117
    003011      122      123      124
    003014      040      103      101
    003017      123      105      040
    003022      122      101      120
    003025      111      104      040
    003030      115      117      124
    003033      111      117      116
    003036      040      124      105
    003041      123      124      015
    003044      012      000

102
103 003046      045      116      045      ;TITLE FOR TEST 8.
    003051      101      124      105      TITLE9: .ASCIIZ /%N%ATEST 9 - PRINT RANDOM CHARACTERS/<015><012>
    003054      123      124      040
    003057      071      040      055
    003062      040      120      122
    003065      111      116      124
    003070      040      122      101
    003073      116      104      117
    003076      115      040      103

```

GLOBAL DATA SECTION

	003101	110	101	122	
	003104	101	103	124	
	003107	105	122	123	
	003112	015	012	000	
104					:TITLE FOR TEST 9.
105	003115	045	116	045	TITLEA: .ASCIZ /%N%ATEST 11 - PRINT OPERATOR SELECTED CHARACTERS/<015><012>
	003120	101	124	105	
	003123	123	124	040	
	003126	061	061	040	
	003131	055	040	120	
	003134	122	111	116	
	003137	124	040	117	
	003142	120	105	122	
	003145	101	124	117	
	003150	122	040	123	
	003153	105	114	105	
	003156	103	124	105	
	003161	104	040	103	
	003164	110	101	122	
	003167	101	103	124	
	003172	105	122	123	
	003175	015	012	000	
106					:TITLE FOR TEST 11.
107	003200	105	116	124	PROMPTA: .ASCIZ /ENTER STRING. Q TO EXIT TEST. END WITH <RETURN>./<015><012>
	003203	105	122	040	
	003206	123	124	122	
	003211	111	116	107	
	003214	056	040	121	
	003217	040	124	117	
	003222	040	105	130	
	003225	111	124	040	
	003230	124	105	123	
	003233	124	056	040	
	003236	040	105	116	
	003241	104	040	127	
	003244	111	124	110	
	003247	040	074	22	
	003252	105	124	25	
	003255	122	116	116	
	003260	056	015	112	
	003263	000			
108					:PROMPT FOR TEST 11.
109	003264	045	116	045	TITLEB: .ASCIZ /%N%ATEST 10 - LIFT/<57>/DROP RIBBON BY OPERATOR CONTROL/<015><012>
	003267	101	124	105	
	003272	123	124	040	
	003275	061	060	040	
	003300	055	040	114	
	003303	111	106	124	
	003306	057	104	122	
	003311	117	120	040	
	003314	122	111	102	
	003317	102	117	116	
	003322	040	102	131	
	003325	040	117	120	
	003330	105	122	101	
	003333	124	117	122	
	003336	040	103	117	

GLOBAL DATA SECTION

	003341	116	124	122	
	003344	117	114	015	
	003347	012	000		
110					
111	003351	103	110	117	OPTN1: .ASCII /CHOOSE ONE: A OR B/<015><012>
	003354	117	123	105	
	003357	040	117	116	
	003362	105	072	040	
	003365	101	040	117	
	003370	122	040	102	
	003373	015	012		
112	003375	101	040	055	.ASCII /A - AUTOMATIC MODE/<015><012>
	003400	040	101	125	
	003403	124	117	115	
	003406	101	124	111	
	003411	103	040	115	
	003414	117	104	105	
	003417	015	012		
113	003421	102	040	055	.ASCII /B - MANUAL MODE/<015><012>
	003424	040	115	101	
	003427	116	125	101	
	003432	114	040	115	
	003435	117	104	105	
	003440	015	012		
114	003442	105	116	104	.ASCIIZ /END WITH <RETURN>/<012><015>
	003445	040	127	111	
	003450	124	110	040	
	003453	074	122	105	
	003456	124	125	122	
	003461	116	076	012	
	003464	015	000		
115	003466	115	101	116	PRMPTC: .ASCII /MANUAL MODE: EACH TIME THE <RETURN> KEY IS HIT, THE RIBBON/
	003471	125	101	114	
	003474	040	115	117	
	003477	104	105	072	
	003502	040	105	101	
	003505	103	110	040	
	003510	124	111	115	
	003513	105	040	124	
	003516	110	105	040	
	003521	074	122	105	
	003524	124	125	122	
	003527	116	076	040	
	003532	113	105	131	
	003535	040	111	123	
	003540	040	110	111	
	003543	124	054	040	
	003546	124	110	105	
	003551	040	122	111	
	003554	102	102	117	
	003557	116			
116	003560	012	015		.ASCII <012><015>
117	003562	127	111	114	.ASCII /WILL RAISE FOR A MOMENT. TO EXIT TEST, ENTER /
	003565	114	040	122	
	003570	101	111	123	
	003573	105	040	106	
	003576	117	122	040	

GLOBAL DATA SECTION

	003601	101	040	115	
	003604	117	115	105	
	003607	116	124	056	
	003612	040	124	117	
	003615	040	105	130	
	003620	111	124	040	
	003623	124	105	123	
	003626	124	054	040	
	003631	105	116	124	
	003634	105	122	040	
118	003637	012	015		.ASCII <012><015>
119	003641	101	040	042	.ASCII /A 'Q' FOLLOWED BY PRESSING THE <RETURN> KEY./<012><015>
	003644	121	042	040	
	003647	106	117	114	
	003652	114	117	127	
	003655	105	104	040	
	003660	102	131	040	
	003663	120	122	105	
	003666	123	123	111	
	003671	116	107	040	
	003674	124	110	105	
	003677	040	074	122	
	003702	105	124	125	
	003705	122	116	076	
	003710	040	113	105	
	003713	131	056	012	
	003716	015			
120					:PROMPTS FOR TEST 11
121	003717	045	116	045	TITLED: .ASCII /%N%ATEST 12 - BIDIRECTIONAL FORMS TRACTOR/<012><015>
	003722	101	124	105	
	003725	123	124	040	
	003730	061	062	040	
	003733	055	040	102	
	003736	111	104	111	
	003741	122	105	103	
	003744	124	111	117	
	003747	116	101	114	
	003752	040	106	117	
	003755	122	115	123	
	003760	040	124	122	
	003763	101	103	124	
	003766	117	122	012	
	003771	015	000		
122					:TITLE FOR TEST 12.
123	003773	045	116	045	TITLED: .ASCII /%N%ATEST 13 - CUT SHEET FEEDER EXERCISOR/<012><015>
	003776	101	124	105	
	004001	123	124	040	
	004004	061	063	040	
	004007	055	040	103	
	004012	125	124	040	
	004015	123	110	105	
	004020	105	124	040	
	004023	106	105	105	
	004026	104	105	122	
	004031	040	105	130	
	004034	105	122	103	
	004037	111	123	117	

GLOBAL DATA SECTION

	004042	122	012	015	
	004045	000			
124	004046	123	120	105	
125	004051	103	111	101	
	004054	114	040	124	
	004057	105	123	124	
	004062	072	040	103	
	004065	125	124	040	
	004070	120	101	107	
	004073	105	040	123	
	004076	110	105	105	
	004101	124	040	106	
	004104	105	105	104	
	004107	105	122	040	
	004112	115	125	123	
	004115	124	040	102	
	004120	105	040	111	
	004123	116	123	124	
	004126	101	114	114	
	004131	105	104	056	
	004134	012	015		
126	004136	012	015		
127	004140	127	110	101	
	004143	124	040	111	
	004146	123	040	124	
	004151	110	105	040	
	004154	120	101	107	
	004157	105	040	114	
	004162	105	116	107	
	004165	124	110	077	
	004170	040	040	105	
	004173	116	124	105	
	004176	122	040	101	
	004201	054	040	102	
	004204	054	040	117	
	004207	122	040	103	
	004212	056	012	015	
128	004215	104	105	106	
	004220	101	125	114	
	004223	124	040	123	
	004226	111	132	105	
	004231	040	111	123	
	004234	040	061	061	
	004237	040	111	116	
	004242	103	110	105	
	004245	123	056	012	
	004250	015			
129	004251	012	015		
130	004253	101	040	040	
	004256	055	061	061	
	004261	040	111	116	
	004264	103	110	105	
	004267	123	012	015	
131	004272	102	040	040	
	004275	055	061	064	
	004300	040	111	116	

PRMPTD: .ASCII /SPECIAL TEST: CUT PAGE SHEET FEEDER MUST BE INSTALLED./<12><15>

.ASCII <12><15>

.ASCII /WHAT IS THE PAGE LENGTH? ENTER A, B, OR C./<012><015>

.ASCII /DEFAULT SIZE IS 11 INCHES./<012><015>

.ASCII <012><015>

.ASCII /A -11 INCHES./<012><015>

.ASCII /B -14 INCHES./<012><015>

GLOBAL DATA SECTION

	004303	103	110	105	
	004306	123	012	015	
132	004311	103	040	040	.ASCIIZ /C -A4 (EUROPEAN STANDARD)/<012><015>
	004314	055	101	064	
	004317	040	050	105	
	004322	125	122	117	
	004325	120	105	101	
	004330	116	040	123	
	004333	124	101	116	
	004336	104	101	122	
	004341	104	051	012	
	004344	015	000		
133	004346	123	120	105	T11PMT: .ASCII /SPECIAL TEST:/<12><15>
	004351	103	111	101	
	004354	114	040	124	
	004357	105	123	124	
	004362	072	012	015	
134	004365	124	110	111	.ASCII /THIS TEST IS FOR PRINTERS WITH THE BIDIRECTIONAL FORMS /
	004370	123	040	124	
	004373	105	123	124	
	004376	040	111	123	
	004401	040	106	117	
	004404	122	040	120	
	004407	122	111	116	
	004412	124	105	122	
	004415	123	040	127	
	004420	111	124	110	
	004423	040	124	110	
	004426	105	040	102	
	004431	111	104	111	
	004434	122	105	103	
	004437	124	111	117	
	004442	116	101	114	
	004445	040	106	117	
	004450	122	115	123	
	004453	040			
135	004454	124	122	101	.ASCII /TRACTOR ONLY./<12><15>
	004457	103	124	117	
	004462	122	040	117	
	004465	116	114	131	
	004470	056	012	015	
136	004473	105	116	124	.ASCIIZ /ENTER <RETURN> TO CONTINUE.../
	004476	105	122	040	
	004501	074	122	105	
	004504	124	125	122	
	004507	116	076	040	
	004512	124	117	040	
	004515	103	117	116	
	004520	124	111	116	
	004523	125	105	056	
	004526	056	056	000	
137	004531	105	116	124	NPRMPT: .ASCII /ENTER "<RETURN>" TO LIFT THE RIBBON FOR A MOMENT./<12><15>
	004534	105	122	040	
	004537	042	074	122	
	004542	105	124	125	
	004545	122	116	076	
	004550	042	040	124	

GLOBAL DATA SECTION

	004553	117	040	114	
	004556	111	106	124	
	004561	040	124	110	
	004564	105	040	122	
	004567	111	102	102	
	004572	117	116	040	
	004575	106	117	122	
	004600	040	101	040	
	004603	115	117	115	
	004606	105	116	124	
	004611	056	012	015	
138	004614	105	116	124	.ASCIIZ /ENTER 'Q<RETURN>' TO EXIT TEST./
	004617	105	122	040	
	004622	042	121	074	
	004625	122	105	124	
	004630	125	122	116	
	004633	076	042	040	
	004636	124	117	040	
	004641	105	130	111	
	004644	124	040	124	
	004647	105	123	124	
	004652	056	000		
139	004654	124	110	111	FTYTPM: .ASCII /THIS SHOULD BE PRINTED AT THE TOP OF THE PAGE./<12><15>
	004657	123	040	123	
	004662	110	117	125	
	004665	114	104	040	
	004670	102	105	040	
	004673	120	122	111	
	004676	116	124	105	
	004701	104	040	101	
	004704	124	040	124	
	004707	110	105	040	
	004712	124	117	120	
	004715	040	117	106	
	004720	040	124	110	
	004723	105	040	120	
	004726	101	107	105	
	004731	056	012	015	
140	004734	124	110	105	.ASCII /THE PAGE SHOULD HAVE COME FROM THE FRONT TRAY./<12><15>
	004737	040	120	101	
	004742	107	105	040	
	004745	123	110	117	
	004750	125	114	104	
	004753	040	110	101	
	004756	126	105	040	
	004761	103	117	115	
	004764	105	040	106	
	004767	122	117	115	
	004772	040	124	110	
	004775	105	040	106	
	005000	122	117	116	
	005003	124	040	124	
	005006	122	101	131	
	005011	056	012	015	
141	005014	124	110	111	RTYTPM: .ASCII /THIS SHOULD BE PRINTED AT THE TOP OF THE PAGE./<12><15>
	005017	123	040	123	
	005022	110	117	125	

GLOBAL DATA SECTION

	005025	114	104	040	
	005030	102	105	040	
	005033	120	122	111	
	005036	116	124	105	
	005041	104	040	101	
	005044	124	040	124	
	005047	110	105	040	
	005052	124	117	120	
	005055	040	117	106	
	005060	040	124	110	
	005063	105	040	120	
	005066	101	107	105	
	005071	056	012	015	
142	005074	124	110	105	.ASCII /THE PAGE SHOULD HAVE COME FROM THE REAR TRAY. /<12><15>
	005077	040	120	101	
	005102	107	105	040	
	005105	123	110	117	
	005110	125	114	104	
	005113	040	110	101	
	005116	126	105	040	
	005121	103	117	115	
	005124	105	040	106	
	005127	122	117	115	
	005132	040	124	110	
	005135	105	040	122	
	005140	105	101	122	
	005143	040	124	122	
	005146	101	131	056	
	005151	040	012	015	
143	005154	045	116	045	WTSTPM: .ASCIIZ /%N%AWAITING TO SEND DATA TO PRINTER. PRINTER NOT READY./
	005157	101	127	101	
	005162	111	124	111	
	005165	116	107	040	
	005170	124	117	040	
	005173	123	105	116	
	005176	104	040	104	
	005201	101	124	101	
	005204	040	124	117	
	005207	040	120	122	
	005212	111	116	124	
	005215	105	122	056	
	005220	040	120	122	
	005223	111	116	124	
	005226	105	122	040	
	005231	116	117	124	
	005234	040	122	105	
	005237	101	104	131	
	005242	056	000		
144					
145					
146					
147					
148	005244	000000			
149	005246	000000			
150	005250	000000			
151	005252	176500			
152	005254	176010			

		.EVEN	
	MSGADD:	.WORD	;HOLDS ADDRESS OF A MESSAGE
	TRXADD:	.WORD	
	BAUDRT:	.WORD	
	D1DFLT:	.WORD 176500	;DEFAULT CSR ADDRESS - SINGLE LINE
	D2DFLT:	.WORD 176010	;DEFAULT CSR ADDRESS - MULTILINE.

GLOBAL DATA SECTION

153	005256	000000			DFAIL:	.WORD	0
154	005260	000000			FLAGS:	.WORD	
155	005262	000000	000000	000101	BASET:	.WORD	0,0,101
156	005270	000000	000036	000102		.WORD	0,30,102
157	005276	000000	000074	000103		.WORD	0,60,103
158	005304	000000	000132	000104		.WORD	0,90,104
159	005312	000000	000170	000105		.WORD	0,120,105
160	005320	000000	000226	000106		.WORD	0,150,106
161	005326	000000	000264	000107		.WORD	0,180,107
162	005334	000000	000322	000110		.WORD	0,210,110
163	005342	000000	000360	000111		.WORD	0,240,111
164	005350	000000	000416	000112		.WORD	0,270,112
165	005356	000014	000000	000102		.WORD	12,0,102
166	005364	000014	000036	000103		.WORD	12,30,103
167	005372	000014	000074	000104		.WORD	12,60,104
168	005400	000014	000132	000105		.WORD	12,90,105
169	005406	000014	000170	000106		.WORD	12,120,106
170	005414	000014	000226	000107		.WORD	12,150,107
171	005422	000014	000264	000110		.WORD	12,180,110
172	005430	000014	000322	000111		.WORD	12,210,111
173	005436	000014	000360	000112		.WORD	12,240,112
174	005444	000014	000416	000113		.WORD	12,270,113
175	005452	000030	000000	000103		.WORD	24,0,103
176	005460	000030	000036	000104		.WORD	24,30,104
177	005466	000030	000074	000105		.WORD	24,60,105
178	005474	000030	000132	000106		.WORD	24,90,106
179	005502	000030	000170	000107		.WORD	24,120,107
180	005510	000030	000226	000110		.WORD	24,150,110
181	005516	000030	000264	000111		.WORD	24,180,111
182	005524	000030	000322	000112		.WORD	24,210,112
183	005532	000030	000360	000113		.WORD	24,240,113
184	005540	000030	000416	000114		.WORD	24,270,114
185	005546	000044	000000	000104		.WORD	36,0,104
186	005554	000044	000036	000105		.WORD	36,30,105
187	005562	000044	000074	000106		.WORD	36,60,106
188	005570	000044	000132	000107		.WORD	36,90,107
189	005576	000044	000170	000110		.WORD	36,120,110
190	005604	000044	000226	000111		.WORD	36,150,111
191	005612	000044	000264	000112		.WORD	36,180,112
192	005620	000044	000322	000113		.WORD	36,210,113
193	005626	000044	000360	000114		.WORD	36,240,114
194	005634	000044	000416	000115		.WORD	36,270,115
195	005642	000060	000000	000105		.WORD	48,0,105
196	005650	000060	000036	000106		.WORD	48,30,106
197	005656	000060	000074	000107		.WORD	48,60,107
198	005664	000060	000132	000110		.WORD	48,90,110
199	005672	000060	000170	000111		.WORD	48,120,111
200	005700	000060	000226	000112		.WORD	48,150,112
201	005706	000060	000264	000113		.WORD	48,180,113
202	005714	000060	000322	000114		.WORD	48,210,114
203	005722	000060	000360	000115		.WORD	48,240,115
204	005730	000060	000416	000116		.WORD	48,270,116
205	005736	000074	000000	000106		.WORD	60,0,106
206	005744	000074	000036	000107		.WORD	60,30,107
207	005752	000074	000074	000110		.WORD	60,60,110
208	005760	000074	000132	000111		.WORD	60,90,111
209	005766	000074	000170	000112		.WORD	60,120,112

START TIME SUPERVISOR FLAGS
 TABLE ENTRY - 3 WORDS, INCLUDES THE
 ROW #, THE COLUMN #, THE ASCII
 VALUE AND THE ACCESS INDICATOR.
 THE ROW NUMBER AND THE COLUMN NUMBER
 ARE WORDS AND THE ASCII VALUE AND
 ACCESS INDICATOR ARE BYTES. THE
 FORMAT IS AS FOLLOWS:

-----	ROW # - VRTCLS - LO BYTE	0
-----	ROW # - VRTCLS - HI BYTE	1
-----	COLUMN # - HRZTLS - LO BYTE	2
-----	COLUMN # - HRZTLS - HI BYTE	3
-----	UNIQUENESS INDICATOR - 1-UNIQUE	4
-----	ASCII BYTE FOR PRINTING	5

(THE NUMBER TO THE RIGHT IN THE ABOVE
 FIGURE IS THE BYTE OFFSET FROM THE
 TABLE ENTRY ADDRESS.)

GLOBAL DATA SECTION

210	005774	000074	000226	000113	.WORD	60.,150.,113
211	006002	000074	000264	000114	.WORD	60.,180.,114
212	006010	000074	000322	000115	.WORD	60.,210.,115
213	006016	000074	000360	000116	.WORD	60.,240.,116
214	006024	000074	000416	000117	.WORD	60.,270.,117
215	006032	000110	000000	000107	.WORD	72.,0.,107
216	006040	000110	000036	000110	.WORD	72.,30.,110
217	006046	000110	000074	000111	.WORD	72.,60.,111
218	006054	000110	000132	000112	.WORD	72.,90.,112
219	006062	000110	000170	000113	.WORD	72.,120.,113
220	006070	000110	000226	000114	.WORD	72.,150.,114
221	006076	000110	000264	000115	.WORD	72.,180.,115
222	006104	000110	000322	000116	.WORD	72.,210.,116
223	006112	000110	000360	000117	.WORD	72.,240.,117
224	006120	000110	000416	000120	.WORD	72.,270.,120
225	006126	000124	000000	000110	.WORD	84.,0.,110
226	006134	000124	000036	000111	.WORD	84.,30.,111
227	006142	000124	000074	000112	.WORD	84.,60.,112
228	006150	000124	000132	000113	.WORD	84.,90.,113
229	006156	000124	000170	000114	.WORD	84.,120.,114
230	006164	000124	000226	000115	.WORD	84.,150.,115
231	006172	000124	000264	000116	.WORD	84.,180.,116
232	006200	000124	000322	000117	.WORD	84.,210.,117
233	006206	000124	000360	000120	.WORD	84.,240.,120
234	006214	000124	000416	000121	.WORD	84.,270.,121
235	006222	000140	000000	000111	.WORD	96.,0.,111
236	006230	000140	000036	000112	.WORD	96.,30.,112
237	006236	000140	000074	000113	.WORD	96.,60.,113
238	006244	000140	000132	000114	.WORD	96.,90.,114
239	006252	000140	000170	000115	.WORD	96.,120.,115
240	006260	000140	000226	000116	.WORD	96.,150.,116
241	006266	000140	000264	000117	.WORD	96.,180.,117
242	006274	000140	000322	000120	.WORD	96.,210.,120
243	006302	000140	000360	000121	.WORD	96.,240.,121
244	006310	000140	000416	000122	.WORD	96.,270.,122
245	006316	000154	000000	000112	.WORD	108.,0.,112
246	006324	000154	000036	000113	.WORD	108.,30.,113
247	006332	000154	000074	000114	.WORD	108.,60.,114
248	006340	000154	000132	000115	.WORD	108.,90.,115
249	006346	000154	000170	000116	.WORD	108.,120.,116
250	006354	000154	000226	000117	.WORD	108.,150.,117
251	006362	000154	000264	000120	.WORD	108.,180.,120
252	006370	000154	000322	000121	.WORD	108.,210.,121
253	006376	000154	000360	000122	.WORD	108.,240.,122
254	006404	000154	000416	000123	.WORD	108.,270.,123

DO NOT SEPARATE THE ABOVE TABLE
FROM THE FOLLOWING 3 LINES.....

255						
256						
257						
258	006412	040	040	041	FRONT: .BYTE	ZERO,ZERO,ONE ;ARGUMENTS FOR SELECT FRONT TRAY. TEST #13.
259	006415	040	040	042	REAR: .BYTE	ZERO,ZERO,TWO ;ARGUMENTS FOR SELECT REAR TRAY. TEST #13.
260	006420	057	057	057	NULL: .BY E	HEXF,HEXF,HEXF ;ARGUMENTS FOR SELECT NULL TRAY. TEST #13.
261					.EVEN	

262	006424	002416		SEED1: .WORD	1294.	;SEED FOR RANDOM NUMBER GENERATOR
263	006426	013020		SEED2: .WORD	5648.	;SEED FOR RANDOM NUMBER GENERATOR

264						
265						
266	006430	170377		TMPLT1: .WORD	170377	;TEMPLATES ;BITS 8 - 11 USED IN DECODING PRINTER TRANSMISSIONS

GLOBAL DATA SECTION

267	006432	177417	TMPLT2: .WORD	177417	:BITS 4 - 7 USED IN CONVRT TO DECODE PRINTER XMISSIONS
268	006434	177760	TMPLT3: .WORD	177760	:BITS 0 - 3
269					
270					
271	006436	000000	TCRENA: .WORD		:WILL CONTAIN TCR ARGUMENT - CHANNEL SELECT
272	006440	000000	JUNKPL: .WORD		:WILL CONTAIN NOTHING IF DZ CHOSEN. WILL
273					:CONTAIN JUNK IF DL CHOSEN. SEE SENCHR ROUTINE
274					
275	006442	017070	LPRINI: .WORD	017070	:LPR INITIALIZE REGISTER.
276					:THE FOLLOWING STATUS IS ASSUMED:
277					: 1)RX-ON
278					: 2)9600 BAUD
279					: 3)NO PARITY
280					: 4)2 UNIT STOP CODE
281					: 5)8 BIT CHARACTER LENGTH
282					
283	006444	000001	TCRTBL: .WORD	1	:TABLE OF BIT POSITIONS USED TO SET UP THE
284	006446	000002	.WORD	2	:TCR REGISTER FOR THE APPROPRIATE CHANNEL.
285	006450	000004	.WORD	4	
286	006452	000010	.WORD	8.	
287	006454	000020	.WORD	16.	
288	006456	000040	.WORD	32.	
289	006460	000100	.WORD	64.	
290	006462	000200	.WORD	128.	
291					
292					
293	006464	002400	BAUTBL: .WORD	1280.	:TABLE OF MASKS TO USE IN SETTING THE BAUD
294	006466	002600	.WORD	1408.	:RATE FOR THE PRINTER IN THE LPR REGISTER.
295	006470	003000	.WORD	1536.	
296	006472	005000	.WORD	2560.	
297	006474	006000	.WORD	3072.	
298	006476	007000	.WORD	3584.	
299					
300					
301					
302	006500	000000	ERWORD: .WORD	0	:CONTAINS VARIOUS ERROR FLAGS
303	006502	000000	CRNTPR: .WORD	0	:CONTAINS THE COUNT OF CHARACTERS ALREADY PRINTED
304					:ON THE CURRENT LINE IN THE BIDIRECTIONAL PRINTING
305					:CODE. (XMIT)
306	006504	000000	DIRCTN: .WORD	0	:CURRENT PRINTING DIRECTION. 0-FORWARD, 1=REVERSE
307					
308	006506	000000	OUTCTR: .WORD		:COUNTERS USED IN WAITXN
309	006510	000000	OUTSDC: .WORD		: AND GETCHR TO WAIT OUT THE PRINTER OPERATIONS.
310	006512	000000	FLTRDY: .WORD		:INDICATES FAILURE TO FIND TRANSMIT READY CONDITION.
311					
312					
313					
314					
315	006514	000	BR2: .BYTE		:TEMPORARY STORAGE FOR A BYTE VALUE. TEST #13
316	006515	004	EOT: .BYTE	004	:ASCII 'EOT'
317	006516	030	CAN: .BYTE	030	:ASCII 'CAN'
318	006517	023	XOFF: .BYTE	023	:ASCII 'XOFF'
319	006520	021	XON: .BYTE	021	:OCTAL 021 = ASCII 'XON'
320	006521	033	ESCAPE: .BYTE	033	:OCTAL 033 = ASCII 'ESC'
321			.EVEN		
322	006522	000000	SNGCHR: .WORD		:STORAGE FOR A SINGLE CHARACTER
323	006524	032	CTLZ: .BYTE	032	:OCTAL 032 = ASCII '^Z'

GLOBAL DATA SECTION

324	006525	121			SCQ:	.ASCII	/Q/	:	SINGLE CHARACTER	'Q'
325	006526	103			SCC:	.ASCII	/C/	:	SINGLE CHARACTER	'C'
326	006527	102			SCB:	.ASCII	/B/	:	SINGLE CHARACTER	'B'
327	006530	130			SCX:	.ASCII	/X/	:	SINGLE CHARACTER	'X'
328	006531	101			SCA:	.ASCII	/A/	:	SINGLE CHARACTER	'A'
329	006532	060			SCO:	.ASCII	/O/	:	SINGLE CHARACTER	'O'
330	006533	061			SCI:	.ASCII	/I/	:	SINGLE CHARACTER	'I'
331	006534	056			PERIOD:	.ASCII	/./	:	SINGLE CHARACTER	'.'
332	006535	101	103	101	ACAS:	.ASCII	/ACA:/	:	WORST CASE SEQUENCE FOR TEST #8	
	006540	072								
333										
334	006541	040			SPACE:	.ASCII	/ /	:	SINGLE SPACE	
335	006542	137	137	137	DASHES:	.ASCII	/-----/	:	PRINTED IN TEST 5 BETWEEN LINEFEEDS	<15>
	006545	137	137	137						
	006550	137	137	137						
	006553	137	015							
336										
337										
338										
339					:				THE REPEATING PATTERN OF ASCII PRINTABLE CHARACTERS.	
340										
341					.ENABL LC					
342	006555	041	042	043	CHRLST:	.ASCII	/.'#\$%&'()*+,-./	:	<57>/0123456789:;<=>?@ABCDEFGHIJKLMN	OPQRSTUVWXYZ/
	006560	044	045	046						
	006563	047	050	051						
	006566	052	053	054						
	006571	055	056	057						
	006574	060	061	062						
	006577	063	064	065						
	006602	066	067	070						
	006605	071	072	073						
	006610	074	075	076						
	006613	077	100	101						
	006616	102	103	104						
	006621	105	106	107						
	006624	110	111	112						
	006627	113	114	115						
	006632	116	117	120						
	006635	121	122	123						
	006640	124	125	126						
	006643	127	130	131						
	006646	132								
343	006647	133	134	135					.ASCII	/[\]^_<140>/abcdefghijklmnopqrstuvwxyz/
	006652	136	137	140						
	006655	141	142	143						
	006660	144	145	146						
	006663	147	150	151						
	006666	152	153	154						
	006671	155	156	157						
	006674	160	161	162						
	006677	163	164	165						
	006702	166	167	170						
	006705	171	172							
344	006707	173	174	175					.BYTE	173,174,175,176
	006712	176								
345	006713	041	042	043					.ASCII	/!'#\$%&'()*+,-./
	006716	044	045	046					<57>/0123456789/	

GLOBAL DATA SECTION

	006721	047	050	051
	006724	052	053	054
	006727	055	056	057
	006732	060	061	062
	006735	063	064	065
	006740	066	067	070
	006743	071		
346	006744	072	073	074
	006747	075	076	077
	006752	100	101	102
	006755	103	104	105
	006760	106	107	110
	006763	111	112	113
	006766	114	115	116
	006771	117	120	121
	006774	122	123	124
	006777	125	126	127
	007002	130	131	132
	007005	133	134	135
	007010	136	137	140
	007013	141	142	143
	007016	144	145	146
	007021	147	150	151
	007024	152	153	154
	007027	155	156	157
	007032	160	161	162
	007035	163	164	165
	007040	166		
347	007041	167	170	171
	007044	172		
348	007045	173	174	175
	007050	176		
349	007051	041	042	043
	007054	044	045	046
	007057	047	050	051
	007062	052	053	054
	007065	055	056	057
	007070	060	061	062
	007073	063	064	065
	007076	066	067	070
	007101	071	072	073
	007104	074	075	076
	007107	077	100	101
	007112	102	103	105
	007115	104	106	107
	007120	110	111	112
	007123	113	114	115
	007126	116	117	120
	007131	121	122	123
	007134	124	125	
350	007136	126	127	130
	007141	131	132	133
	007144	134	135	136
	007147	137	140	141
	007152	142	143	144
	007155	145	146	147
	007160	150	151	152

.ASCII /:;<=>?@ABCDEFGHIJKLMNopRSTUvwXYZ[\]^_<140>/abcdefghijklmnopqrstuv/

.ASCII /wxyz/

.BYTE 173,174,175,176

.ASCII /.'#\$%&'()*+,-./<57>/0123456789:;<=>?@ABCDEFGHIJKLMNopRSTU/

.ASCII /VWXYZ[\]^_<140>/abcdefghijklmnopqrstuvwxyz/

GLOBAL DATA SECTION

	007163	153	154	155	
	007166	156	157	160	
	007171	161	162	163	
	007174	164	165	166	
	007177	167	170	171	
	007202	172			
351					.DSABL LC
352					
353					
354	007203	124	110	111	FBTM: .ASCII /THIS MESSAGE SHOULD BE PRINTED AT THE BOTTOM OF THE PAGE./<15>
	007206	123	040	115	
	007211	105	123	123	
	007214	101	107	105	
	007217	040	123	110	
	007222	117	125	114	
	007225	104	040	102	
	007230	105	040	120	
	007233	122	111	116	
	007236	124	105	104	
	007241	040	101	124	
	007244	040	124	110	
	007247	105	040	102	
	007252	117	124	124	
	007255	117	115	040	
	007260	117	106	040	
	007263	124	110	105	
	007266	040	120	101	
	007271	107	105	056	
	007274	015			
355					
356					
357					
358					
359					
360					
361					
362					
363					
364					
365	007276	000000			RCSR: .WORD ;ADDRESS OF THE RECEIVER CSR REGISTER
366	007300	000000			XCSR: .WORD ;ADDRESS OF THE TRANSMITTER CSR REGISTER
367	007302	000000			RBUF: .WORD ;ADDRESS OF THE RECEIVER BUFFER
368	007304	000000			XBUF: .WORD ;ADDRESS OF THE TRANSMITTER BUFFER
369	007306	000000			LPR: .WORD ;ADDRESS OF THE LINE PARAMETER REGISTER (DZ11)
370	007310	000000			TCR: .WORD ;ADDRESS OF THE TRANSMITTER CONTROL REGISTER (DZ11)
371	007312	000000			TDR: .WORD ;ADDRESS OF THE TRANSMITTER DATA REGISTER (DZ11)
372	007314	000000			PGMCTR: .WORD ;ADDRESS + 4 WHERE THE LAST TRANSMISSION CALL OCCURRED.
373					
374					
375					
376	007316	010361			ERMSGB: .WORD EDFM0 ;TABLE OF ERROR MESSAGE ADDRESSES USED IN
377	007320	010422			.WORD EDFM1
378	007322	010475			.WORD EDFM2
379	007324	010543			.WORD EDFM3
380	007326	010622			.WORD EDFM4
381	007330	010650			.WORD EDFM5 ;THE ERRORS ROUTINE.
382	007332	010677			.WORD EDFM6

GLOBAL DATA SECTION

383	007334	010755	.WORD	EDFM7	
384	007336	011026	.WORD	EDFM8	
385	007340	011175	.WORD	EDFM9	
386	007342	011230	.WORD	EDFMA	
387	007344	011331	.WORD	EDFMB	
388	007346	011464	.WORD	EDFMC	
389	007350	011540	.WORD	EDFMD	
390					
391					
392					
393					
394					
395					
396	007352		BFRA: .BLKB	300.	;BUFFER FOR INPUT FROM USER AND ALSO USED AS A
397					;SOFTWARE STACK.
398	010026	000000	TOPSTK: .WORD		;USED TO POINT TO THE TOP OF THE SOFTWARE STACK
399					;WHEN NEEDED. #BFRA + 150.
400	010030	000000	BFRB: .WORD		;DEFAULT AREAS FOR GMANID QUESTIONS. MAY BE CLEARED.
401	010032	000000	BFRC: .WORD		;
402	010034	000000	BFRD: .WORD		;
403					
404	010036	000000	SPCSIZ: .WORD		;THE NUMBER OF HORIZONTAL INCREMENTS PER SPACE.
405					
406	010040	000000	LINN: .WORD		;THE NUMBER OF HORIZONTAL INCREMENTS PER LINE.
407					
408	010042	000000	LINSIZ: .WORD		;THE NUMBER OF CHARACTERS PER LINE ON PRINTER.
409					
410	010044	000000	TRDYBT: .WORD		;TRANSMIT READY BIT POSITION. VALUE IS SET DYNAMICALLY
411					;IN THE INITIALIZATION CODE SO THAT BOTH SINGLE LINE
412					;INTERFACES AND D211 INTERFACES MAY BE USED.
413					
414					
415					;USED IN PROCEDURE CONVRT:
416	010046	000	MNEB1: .BYTE		;USED TO PASS A MNEMONIC VALUE FROM THE CONVERSION
417	010047	000	MNEB2: .BYTE		;ROUTINE. A SINGLE WORD VALUE ACCEPTED, THREE BYTES
418	010050	000	MNEB3: .BYTE		;RETURNED TO CALLER: MNEB1, MNEB2, MNEB3.
419					
420				.EVEN	
421					
422	010052	000000	MLTLIN: .WORD		;INDICATOR: MULTILINE INTERFACE?-1 SINGLE LINE?-0
423					
424					
425	010054	000000	DELCNT: .WORD		;COUNTER OF SMALL TIME INCREMENTS USED IN DELAY ROUTINE
426					
427	010056	000000	NDA: .WORD	0	;NO DEVICE AT THAT ADDRESS INDICATOR. UNIBUS FAILURE
428					;TO FIND A DEVICE AT THE REFERENCED ADDRESS CAUSES A
429					;TRAP TO OCCUR WHICH IN TURN WILL SET THE NDA WORD
430					;TO ONE.
431	010060	000	HITARG: .BYTE		;TEMPORARY STORAGE OF THE HIT COUNT ARGUMENT USED IN
432					;SET HIT COUNT TEST.
433				.EVEN	
434	010062	000000	LINCNT: .WORD		;A LINE COUNTER USED IN TEST #5. PAPER POSITIONING TEST
435					
436	010064	000000	CHRCNT: .WORD		;A CHARACTER COUNTER USED IN TEST #6. WHERE ONE LINE OF
437					;EACH CHARACTER IS PRINTED.
438	010066	000000	CCOUNT: .WORD		;A COUNT OF CYCLES. USED IN TEST #11- LIFT/DROP RIBBON
439					

GLOBAL DATA SECTION

440 010070 000000

441

442

443

444

445 010072

010072

010072 000000

010074 000000

010076 000000

010100 000000

446

447

INUPB: .WORD

:AN INDICATOR OF WHETHER THE PRINTER RIBBON IS IN THE
:UP OR DOWN POSITION. TEST #11, LOCAL PROC. MANLD:

ERRTBL

L\$ERRTBL::

ERRTYP:: .WORD 0

ERRNBR:: .WORD 0

ERRMSG:: .WORD 0

ERRBLK:: .WORD 0

.SBTTL GLOBAL TEXT SECTION

GLOBAL TEXT SECTION

```

25      : PRINTER WHICH WILL BE USED IN THE DIAGNOSTIC PROCESS BY THE FIELD
26      : SERVICE TECHNICIAN.
27
28      .EVEN
29
30      :
31      : FORMAT STATEMENTS USED IN PRINT CALLS
32      :
33
34      : .....
35
36      : ERROR STATEMENT TABLES
37
38      : THESE TABLES ARE USED BY THE ERRDF, PRINTB, AND PRINTX MACROS
39      : IN THE PROCESS OF PRINTING ERROR MESSAGES TO THE USER AT THE CONSOLE.
40      : .....
41
42      : GENERAL FORMATS FOR OUTPUT OF PC AT TIME OF CALL AND ADDRESS OF
43      : LATEST TRANSMISSION.
44
45      :
46
47      010230      045      116      045 PRIBMO: .ASCIZ /%N%AERROR DETECTED AFTER CALL AT PC: %06/
48      010233      101      105      122
49      010236      122      117      122
50      010241      040      040      104
51      010244      105      124      105
52      010247      103      124      105
53      010252      104      040      101
54      010255      106      124      105
55      010260      122      040      103
56      010263      101      114      114
57      010266      040      101      124
58      010271      040      120      103
59      010274      072      040      045
60      010277      117      066      000
61
62      :
63      : PRTXMO: .ASCIZ /%N%ALAST TRANSMISSION STARTED AT LOCATION: %06/
64
65      010302      045      116      045
66      010305      101      114      101
67      010310      123      124      040
68      010313      124      122      101
69      010316      116      123      115
70      010321      111      123      123
71      010324      111      117      116
72      010327      040      123      124
73      010332      101      122      124
74      010335      105      104      040
75      010340      101      124      040
76      010343      114      117      103
77      010346      101      124      111
78      010351      117      116      072
79      010354      040      045      117
80      010357      066      000
81
82      : .....
83
84      :
85
86
87
88
89
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GLOBAL TEXT SECTION

```

54      :      ERWORD BIT-0      I/O FAILURE
55      :
56 010361 111 055 117  EDFM0: .ASCIZ /I-O FAILURE DETECTED AT PRINTER./
    010364 040 106 101
    010367 111 114 125
    010372 122 105 040
    010375 104 105 124
    010400 105 103 124
    010403 105 104 040
    010406 101 124 040
    010411 120 122 111
    010414 116 124 105
    010417 122 056 000

57      :
58      :      USE OF THESE STRINGS WILL BE AS FOLLOWS...
59      :      ERRDF  #NUM0,EDFM8      -DEVICE FATAL ERROR CALL
60      :      PRINTB  PRIBM0,PGMCTR    -PRINT BASIC ERROR MESSAGE
61      :      PRINTX  PRIXM0,TRXADD,ERWORD -PRINT EXTENDED ERROR MESSAGE
62      :
63      : .....
64      :
65      :      ERWORD BIT-1      BUFFER FULL
66      :
67 010422 104 105 126  EDFM1: .ASCIZ /DEVICE FATAL ERROR. PRINTER BUFFER FULL. /
    010425 111 103 105
    010430 040 106 101
    010433 124 101 114
    010436 040 105 122
    010441 122 117 122
    010444 056 040 040
    010447 120 122 111
    010452 116 124 105
    010455 122 040 102
    010460 125 106 106
    010463 105 122 040
    010466 106 125 114
    010471 114 056 040
    010474 000

68      :
69      :      USE OF THESE STRINGS WILL BE AS FOLLOWS...
70      :      ERRDF  #NUM7,EDFM1      -DEVICE FATAL ERROR CALL
71      :      PRINTB  PRIBM0,PGMCTR    -PRINT BASIC ERROR MESSAGE
72      :      PRINTX  PRIXM0,TRXADD,ERWORD -PRINT EXTENDED ERROR MESSAGE
73      :
74      : .....
75      :
76      :      ERWORD BIT-2      PROM/RAM FAILURE
77      :
78 010475 120 122 117  EDFM2: .ASCIZ /PROM/<57>/RAM FAILURE DETECTED BY PRINTER./
    010500 115 057 122
    010503 101 115 040
    010506 106 101 111
    010511 114 125 122
    010514 105 040 104
    010517 105 124 105
    010522 103 124 105
    010525 104 040 102

```

GLOBAL TEXT SECTION

	010530	131	040	120
	010533	122	111	116
	010536	124	105	122
	010541	056	000	

79
80
81
82
83
84
85
86
87
88
89

010543	120	122	111
010546	116	124	105
010551	122	040	105
010554	122	122	117
010557	122	072	040
010562	116	040	117
010565	125	124	040
010570	117	106	040
010573	122	101	116
010576	107	105	040
010601	111	116	040
010604	105	123	103
010607	040	123	105
010612	121	125	105
010615	116	103	105
010620	056	000	

USE OF THESE STRINGS WILL BE AS FOLLOWS...

ERRDF	#NUM8,EDFM2	-DEVICE FATAL ERROR CALL
PRINTB	PRTBM0,PGMCTR	-PRINT BASIC ERROR MESSAGE
PRINTX	PRTXM0,TRXADD,ERWORD	-PRINT EXTENDED ERROR MESSAGE

ERWORD BIT-3 PRINTER ERROR - N OUT OF RANGE IN ESC SEQUENCE

EDFM3: .ASCIIZ /PRINTER ERROR: N OUT OF RANGE IN ESC SEQUENCE./

90
91
92
93
94
95
96
97
98
99

010622	120	101	125
010625	123	105	040
010630	123	127	111
010633	124	103	110
010636	040	120	122
010641	105	123	123
010644	105	104	056
010647	000		

USE OF THESE STRINGS WILL BE AS FOLLOWS...

ERRDF	#NUM9,EDFM3	-DEVICE FATAL ERROR CALL
PRINTB	PRTBM0,PGMCTR	-PRINT BASIC ERROR MESSAGE
PRINTX	PRTXM0,TRXADD,ERWORD	-PRINT EXTENDED ERROR MESSAGE

ERWORD BIT-4 PAUSE SWITCH

EDFM4: .ASCIIZ /PAUSE SWITCH PRESSED./

101
102
103
104
105
106
107
108
109

PRTBM0 AND PRTXM0 ARE USED IN THIS ERROR RESPONSE ALSO. USE OF THESE STRINGS WILL BE AS FOLLOWS...

USE OF THESE STRINGS WILL BE AS FOLLOWS...

ERRDF	#NUM2,EDFM4	-DEVICE FATAL ERROR CALL
PRINTB	PRTBM0,PGMCTR	-PRINT BASIC ERROR MESSAGE
PRINTX	PRTXM0,TRXADD,ERWORD	-PRINT EXTENDED ERROR MESSAGE

GLOBAL TEXT SECTION

110					
111					ERWORD BIT-5 RIBBON OUT
112					
113					EDFM5: .ASCIZ /RIBBON OUT ON PRINTER./
114	010650	122	111	102	
	010653	102	117	116	
	010656	040	117	125	
	010661	124	040	117	
	010664	116	040	120	
	010667	122	111	116	
	010672	124	105	122	
	010675	056	000		
115					USE OF THESE STRINGS WILL BE AS FOLLOWS...
116					ERRDF #NUM3,EDFM5 -DEVICE FATAL ERROR CALL
117					PRINTB PRTBM0,PGMCTR -PRINT BASIC ERROR MESSAGE
118					PRINTX PRTXM0,TRXADD,ERWORD -PRINT EXTENDED ERROR MESSAGE
119					
120					ERWORD BIT-6 UNDEFINED CHARACTER OR ESC SEQUENCE RECEIVED.
121					
122					EDFM6: .ASCIZ /UNDEFINED CHARACTER OR ESC SEQUENCE RECEIVED./
123					
124					
125	010677	125	116	104	
	010702	105	106	111	
	010705	116	105	104	
	010710	040	103	110	
	010713	101	122	101	
	010716	103	124	105	
	010721	122	040	117	
	010724	122	040	105	
	010727	123	103	040	
	010732	123	105	121	
	010735	125	105	116	
	010740	103	105	040	
	010743	122	105	103	
	010746	105	111	126	
	010751	105	104	056	
	010754	000			
126					USE OF THESE STRINGS WILL BE AS FOLLOWS...
127					ERRDF #NUM4,EDFM6 -DEVICE FATAL ERROR CALL
128					PRINTB PRTBM0,PGMCTR -PRINT BASIC ERROR MESSAGE
129					PRINTX PRTXM0,TRXADD,ERWORD -PRINT EXTENDED ERROR MESSAGE
130					
131					ERWORD BIT-7 SHEET FEEDER ERROR
132					
133					EDFM7: .ASCIZ /DEVICE FATAL ERROR. SHEET FEEDER ERROR./
134					
135					
136	010755	104	105	126	
	010760	111	103	105	
	010763	040	106	101	
	010766	124	101	114	
	010771	040	105	122	
	010774	122	117	122	
	010777	056	040	040	
	011002	123	110	105	
	011005	105	124	040	

GLOBAL TEXT SECTION

011010	106	105	105
011013	104	105	122
011016	040	105	122
011021	122	117	122
011024	056	000	

USE OF THESE STRINGS WILL BE AS FOLLOWS...

ERRDF	#NUM5,EDFM7	-DEVICE FATAL ERROR CALL
PRINTB	PRTBM0,PGMCTR	-PRINT BASIC ERROR MESSAGE
PRINTX	PRTXMO,TRXADD,ERWORD	-PRINT EXTENDED ERROR MESSAGE

137			
138			
139			
140			
141			
142			
143			
144			
145			
146	011026	127	101
	011031	116	111
	011034	107	072
	011037	040	123
	011042	106	124
	011045	101	122
	011050	040	105
	011053	122	117
	011056	056	040
	011061	124	110
	011064	123	040
	011067	105	123
	011072	101	107
	011075	040	123
	011100	117	125
	011103	104	040
	011106	117	124
	011111	120	122
	011114	116	124
147	011116	125	116
	011121	105	123
	011124	040	105
	011127	122	117
	011132	040	127
	011135	122	104
	011140	050	105
	011143	127	117
	011146	104	051
	011151	110	101
	011154	040	102
	011157	105	116
	011162	103	117
	011165	122	125
	011170	124	105
	011173	056	000
148	011175	105	122
	011200	117	122
	011203	104	105
	011206	105	103
	011211	105	104
	011214	102	131
	011217	120	122
	011222	116	124

EDFM8: .ASCII /WARNING: SOFTWARE ERROR. THIS MESSAGE SHOULD NOT PRINT/

.ASCIIZ /UNLESS ERROR WORD (ERWORD) HAS BEEN CORRUPTED./

EDFM9: .ASCIIZ /ERROR DETECTED BY PRINTER./

GLOBAL TEXT SECTION

149	011225	122	056	000	
	011230	127	101	122	EDFMA: .ASCII /WARNING: SOFTWARE ERROR. ERROR WORD (ERWORD) HAS BEEN/
	011233	116	111	116	
	011236	107	072	040	
	011241	123	117	106	
	011244	124	127	101	
	011247	122	105	040	
	011252	105	122	122	
	011255	117	122	056	
	011260	040	040	105	
	011263	122	122	117	
	011266	122	040	127	
	011271	117	122	104	
	011274	040	050	105	
	011277	122	127	117	
	011302	122	104	051	
	011305	040	110	101	
	011310	123	040	102	
	011313	105	105	116	
150	011316	103	117	122	.ASCIIZ /CORRUPTED./
	011321	122	125	120	
	011324	124	105	104	
	011327	056	000		
151	011331	127	101	122	EDFMB: .ASCII /WARNING: SOFTWARE ERROR. ERROR WORD (ERWORD) HAS BEEN/
	011334	116	111	116	
	011337	107	072	040	
	011342	123	117	106	
	011345	124	127	101	
	011350	122	105	040	
	011353	105	122	122	
	011356	117	122	056	
	011361	040	040	105	
	011364	122	122	117	
	011367	122	040	127	
	011372	117	122	104	
	011375	040	050	105	
	011400	122	127	117	
	011403	122	104	051	
	011406	040	110	101	
	011411	123	040	102	
	011414	105	105	116	
152	011417	103	117	122	.ASCIIZ /CORRUPTED./
	011422	122	125	120	
	011425	124	105	104	
	011430	056	000		
153					
154	011432	045	101	127	WAITMX: .ASCIIZ /%AWAITING: NOT AN ERROR./ ;WHEN GETCHR WAIT STARTS GETTING LONG...
	011435	101	111	124	
	011440	111	116	107	
	011443	072	040	040	
	011446	116	117	124	
	011451	040	101	116	
	011454	040	105	122	
	011457	122	117	122	
	011462	056	000		
155					
156					

GLOBAL TEXT SECTION

```

157
158
159
160 011464      125      116      105
    011467      130      120      105
    011472      103      124      105
    011475      104      040      103
    011500      110      101      122
    011503      101      103      124
    011506      105      122      040
    011511      122      105      103
    011514      105      111      126
    011517      105      104      040
    011522      106      122      117
    011525      115      040      120
    011530      122      111      116
    011533      124      105      122
    011536      056      000

161
162
163
164
165
166
167
168
169
170
171 011540      105      130      120
    011543      105      103      124
    011546      105      104      040
    011551      103      110      101
    011554      122      101      103
    011557      124      105      122
    011562      040      116      117
    011565      124      040      122
    011570      105      103      105
    011573      111      126      105
    011576      104      040      106
    011601      122      117      115
    011604      040      124      110
    011607      105      040      120
    011612      122      111      116
    011615      124      105      122
    011620      056      000

172
173
174
175
176
177
178
179 011622      045      116      045
    011625      101      106      101
    011630      111      114      105
    011633      104      040      124
    011636      117      040      106

    ERWORD BIT-12  UNEXPECTED CHARACTER RECEIVED
EDFMC: .ASCIZ /UNEXPECTED CHARACTER RECEIVED FROM PRINTER./

    USE OF THESE STRINGS WILL BE AS FOLLOWS...
ERRDF  #NUM10,EDFMC      -DEVICE FATAL ERROR CALL
PRINTB PRTBMO,PGMCTR     -PRINT BASIC ERROR MESSAGE
PRINTX PRTXMO,TRXADD,ERWORD -PRINT EXTENDED ERROR MESSAGE

    ERWORD BIT-13  EXPECTED CHARACTER NOT RECEIVED FROM PRINTER
EDFMD: .ASCIZ /EXPECTED CHARACTER NOT RECEIVED FROM THE PRINTER./

    USE OF THESE STRINGS WILL BE AS FOLLOWS...
ERRDF  #NUM11,EDFMD      -DEVICE FATAL ERROR CALL
PRINTB PRTBMO,PGMCTR     -PRINT BASIC ERROR MESSAGE
PRINTX PRTXMO,TRXADD,ERWORD -PRINT EXTENDED ERROR MESSAGE

    FAILM: .ASCII /%N%AFALLED TO FIND PRINTER AT DEFAULT ADDRESSES./

```

GLOBAL TEXT SECTION

	011641	111	116	104	
	011644	040	120	122	
	011647	111	116	124	
	011652	105	122	040	
	011655	101	124	040	
	011660	104	105	106	
	011663	101	125	114	
	011666	124	040	101	
	011671	104	104	122	
	011674	105	123	123	
	011677	105	123	056	
180	011702	040	122	105	.ASCII / RESTART PROGRAM. /<12><15>
	011705	123	124	101	
	011710	122	124	040	
	011713	120	122	117	
	011716	107	122	101	
	011721	115	056	040	
	011724	040	040	040	
	011727	040	040	040	
	011732	040	040	040	
	011735	040	040	040	
	011740	040	040	040	
	011743	040	040	040	
	011746	040	040	012	
	011751	015			
181	011752	045	116	045	.ASCII /%N%ATHE CSR ADDRESS QUESTION MUST BE EXPLICITLY SPECIFIED./
	011755	101	124	110	
	011760	105	040	103	
	011763	123	122	040	
	011766	101	104	104	
	011771	122	105	123	
	011774	123	040	121	
	011777	125	105	123	
	012002	124	111	117	
	012005	116	040	115	
	012010	125	123	124	
	012013	040	102	105	
	012016	040	105	130	
	012021	120	114	111	
	012024	103	111	124	
	012027	114	131	040	
	012032	123	120	105	
	012035	103	111	106	
	012040	111	105	104	
	012043	056			
182	012044	045	116	045	.ASCIIZ /%N%N%N%N%A. /
	012047	116	045	116	
	012052	045	116	045	
	012055	101	056	040	
	012060	040	040	040	
	012063	040	040	040	
	012066	040	040	040	
	012071	040	040	040	
	012074	040	040	040	
	012077	040	040	040	
	012102	040	040	040	
	012105	040	040	040	

GLOBAL TEXT SECTION

	012110	040	040	040
	012113	040	040	040
	012116	040	040	040
	012121	040	040	040
	012124	040	040	040
	012127	040	040	040
	012132	040	040	040
	012135	040	040	040
	012140	000		
183				
184				
185	012141	045	116	045
	012144	101	111	116
	012147	103	117	122
	012152	122	105	103
	012155	124	040	103
	012160	123	122	040
	012163	101	104	104
	012166	122	105	123
	012171	123	040	107
	012174	111	126	105
	012177	116	056	040
	012202	040	124	122
	012205	131	040	101
	012210	107	101	111
	012213	116	056	056
	012216	040	040	040
	012221	040	040	040
	012224	040	040	040
	012227	040	040	040
	012232	040	040	040
	012235	000		
186	012236	045	116	045
	012241	101	111	116
	012244	103	117	122
	012247	122	105	103
	012252	124	040	103
	012255	123	122	040
	012260	101	104	104
	012263	122	105	123
	012266	123	040	117
	012271	122	040	103
	012274	110	101	116
	012277	116	105	114
	012302	040	107	111
	012305	126	105	116
	012310	056	040	040
	012313	124	122	131
	012316	040	101	107
	012321	101	111	116
	012324	056	056	056
	012327	040	040	040
	012332	000		
187	012333	045	116	045
	012336	101	106	101
	012341	111	114	105
	012344	104	040	124

ERROR MESSAGE FORMAT FOR FAILURE IN DEFAULT PROCEDURE.
 FAILDL: .ASCIZ /%N%AINCORRECT CSR ADDRESS GIVEN. TRY AGAIN.. /
 FAILDZ: .ASCIZ /%N%AINCORRECT CSR ADDRESS OR CHANNEL GIVEN. TRY AGAIN... /
 FXRDYM: .ASCIZ /%N%AF AILED TO TRANSMIT TO PRINTER. /

GLOBAL TEXT SECTION

	012347	117	040	124	
	012352	122	101	116	
	012355	123	115	111	
	012360	124	040	124	
	012363	117	040	120	
	012366	122	111	116	
	012371	124	105	122	
	012374	056	040	040	
	012377	040	040	040	
	012402	040	040	040	
	012405	040	040	040	
	012410	040	040	040	
	012413	040	040	040	
	012416	040	040	040	
	012421	040	040	040	
	012424	040	040	040	
	012427	000			
188	012430	045	116	045	WFC: .ASCIZ /%N%AWAITING FOR A CHARACTER FROM THE PRINTER. - NOT AN ERROR./
	012433	101	127	101	
	012436	111	124	111	
	012441	116	107	040	
	012444	106	117	122	
	012447	040	101	040	
	012452	103	110	101	
	012455	122	101	103	
	012460	124	105	122	
	012463	040	106	122	
	012466	117	115	040	
	012471	124	110	105	
	012474	040	120	127	
	012477	111	116	124	
	012502	105	122	056	
	012505	040	055	040	
	012510	116	117	124	
	012513	040	101	116	
	012516	040	105	122	
	012521	122	117	122	
	012524	056	000		
189	012526	045	116	045	TIMOM: .ASCIZ /%N%ATIME-OUT: CHECK TO SEE IF PRINTER CONNECTED PROPERLY. /
	012531	101	124	111	
	012534	115	105	055	
	012537	117	125	124	
	012542	072	040	103	
	012545	110	105	103	
	012550	113	040	124	
	012553	117	040	123	
	012556	105	105	040	
	012561	111	106	040	
	012564	120	122	111	
	012567	116	124	105	
	012572	122	040	103	
	012575	117	116	116	
	012600	105	103	124	
	012603	105	104	040	
	012606	120	122	117	
	012611	120	105	122	
	012614	114	131	056	

N 4

SEQ 52

GLOBAL TEXT SECTION

190 012617 040 040 040
191 012622 000
192
193

.SBTTL GLOBAL ERROR REPORT SECTION

GLOBAL ERROR REPORT SECTION

```

1
2
3
4
5
6
7
8
9 012624
10
11
12 012624
    012624 000167
    012626 000000
13
14
15
16 012630
    012630
    012630 104423
17

```

** THE GLOBAL ERROR REPORT SECTION CONTAINS MESSAGE PRINTING AREAS
 USED BY MORE THAN TEST TO OUTPUT ADDITIONAL ERROR INFORMATION. PRINTB
 (BASIC) AND PRINTX (EXTENDED) CALLS ARE USED TO CALL PRINT SERVICES.
 **

```

.EVEN      BGNMSG

          EXIT      MSG

                                .WORD      JSJMP
                                .WORD      L10001-2-.

          ENDMSG

                                L10001:
                                TRAP      CSMSG

.SBTTL     GLOBAL SUBROUTINES SECTION

```

GLOBAL SUBROUTINES SECTION

1
2
3
41
:++
: THE GLOBAL SUBROUTINES SECTION CONTAINS THE SUBROUTINES
: THAT ARE USED IN MORE THAN ONE TEST.

GLOBAL SUBROUTINES SECTION

GLOBAL PROCEDURES

FUNCTIONAL DESCRIPTION:

GLOBAL PROCEDURE XMIT:

THIS PROCEDURE WILL TRANSMIT CHARACTER SEQUENCES TO THE PRINTER. THE SEQUENCE WILL BE TRANSMITTED IN ONE OF TWO MODES: WITH BIDIRECTIONAL PRINTING ENABLED AND WITH BIDIRECTIONAL PRINTING DISABLED. THERE ARE THREE ARGUMENTS SENT TO THIS ROUTINE IN REGISTERS R1, R2, AND R3. R1 IS EXPECTED TO CONTAIN THE ADDRESS OF THE FIRST BYTE (ASCII) TO BE SENT TO THE PRINTER CONTROLLER. R2 IS EXPECTED TO CONTAIN THE NUMBER OF BYTES TO BE TRANSMITTED TO THE PRINTER FROM THE CONTIGUOUS ARRAY WHOSE ADDRESS IS IN R1. R3, IF SET TO -1, ENABLES BIDIRECTIONAL PRINTING SOFTWARE TO CONTROL THE TRANSMISSION PROCESS. IF R3 IS EQUAL TO ZERO, THEN NO BIDIRECTIONAL PRINTING IS PERMITTED AND ALL CARRIAGE CONTROL CHARACTERS MUST BE EXPLICITLY SENT BY THE CALLING ROUTINE.

INPUTS

R1 - ADDRESS OF STRING TO PRINT
 R2 - NUMBER OF BYTES IN STRING TO BE PRINTED.
 R3 - IF SET, BIDIRECTIONAL PRINTING IS TO BE ENABLED.

OUTPUTS

THE STRING IS PRINTED ON THE PRINTER.
 GREASE - IF SET TO -1, AN ERROR HAS OCCURRED. SET FOR FAST EXIT

SUBROUTINES USED

SENCHR - THIS ROUTINE WILL SEND THE CHARACTER TO THE PRINTER BUFFER (IF THERE IS ROOM IN THE BUFFER AND NO CHARACTERS ARE CURRENTLY BEING RECEIVED).

SIDE EFFECTS

THE CONTENTS OF R1 AND R2 ARE NOT PRESERVED. R3, R4, AND R5 ARE PRESERVED. IF A TRANSMISSION ERROR OCCURS, THIS ROUTINE WILL CAUSE A GREASED EXIT TO OCCUR FROM THE CURRENT TEST.

CALLING SEQUENCE

PUT THE STRING ADDRESS INTO R1, THE NUMBER OF CHARACTERS TO BE PRINTED INTO R2 AND SET R3 TO ENABLE OR DISABLE THE BIDIRECTIONAL PRINTING. SET R3 TO 0 FOR NO BIDIRECTIONAL PRINTING. SET R3 TO -1 FOR BIDIRECTIONAL PRINTING ENABLE. THE CALL IS THEN...
 JSR PC,XMIT

GLOBAL SUBROUTINES SECTION

```

58 012632 011637 007314      XMIT:  MOV    (SP),PGMCTR      ;SAVE THE CALLING PC + 4
59 012636 010146              MOV    R1,-(SP)
60 012640 010246              MOV    R2,-(SP)
61 012642 010346              MOV    R3,-(SP)      ;SAVE ALL GUARANTEED
62 012644 010446              MOV    R4,-(SP)      ;   REGISTERS.
63 012646 010546              MOV    R5,-(SP)      ;
64                               ;
65 012650 010137 005246              MOV    R1,TRXADD      ;SAVE THE TRANSMISSION ADDRESS
66                               ;
67 012654 012705 007352              MOV    #B'RA,R5      ;BOTTOM OF SOFTWARE STACK
68 012660 062705 000226              ADD    #150.,R5      ;TOP OF SOFTWARE STACK
69 012664 010537 010026              MOV    R5,TOPSTK      ;TOP OF STACK ADDRESS
70 012670 005237 010026              INC     TOPSTK      ;PLUS 1 FOR COUNTING PURPOSES.
71                               ;
72 012674 005703              TST     R3                ;IF ZERO THEN NO BIDIRECTIONAL PRINTING
73 012676 001021              BNE     BIDIRP            ;IF SET THEN GOTO BIDIRECTIONAL PRNTG CODE
74                               ;
75                               ;
76                               ;
77                               ;
78                               ;
79                               ;
80 012700 010103              MOV    R1,R3                ;ADDRESS OF THE FIRST CHARACTER IN THE STRING
81 012702 060203              ADD    R2,R3                ;ADDRESS OF THE LAST CHARACTER IN THE STRING
82                               ;                          PLUS ONE.
83 012704 112102      XSTR:  MOVB    (R1)+,R2            ;GET THE CHARACTER INTO R2 AND POINT TO NEXT
84                               ;                          CHARACTER IN STRING.
85 012706 005037 002206              CLR     GREASE      ;ASSUME NO PREVIOUS ERRORS.
86 012712 004737 013402              JSR     PC,SENCHR      ;SEND THE CHARACTER IN R2 TO THE PRINTER.
87                               ;
88 012716 022737 177777 002206              CMP    #-1,GREASE      ;TIME-OUT ERROR. ECNR STATUS.
89 012724 001002              BNE     LCHYET            ;EXPRESS EXIT FOR ECNR ERROR REPORT.
90 012726 000137 013366              JMP     EXITX
91                               ;
92 012732 020103      LCHYET: CMP    R1,R3                ;HAS THE LAST CHARACTER BEEN PRINTED YET?
93 012734 100763              BMI     XSTR                ;LOOP THROUGH THE LIST UNTIL DONE.
94 012736 000137 013366              JMP     EXITX      ;AND WHEN DONE WITH STRING, EXIT TEST...
95                               ;
96                               ;
97                               ;
98 012742 010103      BIDIRP: MOV    R1,R3                ;ADDRESS OF THE STRING TO BE PRINTED
99 012744 060203              ADD    R2,R3                ;ADDRESS OF LAST CHARACTER TO BE PRINTED.
100                               ;                          PLUS 1 FOR COUNTING PURPOSES.
101                               ;
102 012746 023737 006502 010042  LNCLOO: CMP    CRNTPR,LINSIZ ;CRNTPR -CURRENT POINTER- IS INITIALIZED TO
103                               ;                          ZERO BY THE INITCD ROUTINE. CRNTPR KEEPS
104                               ;                          TRACK OF THE NUMBER OF CHARACTERS PRINTED
105                               ;                          SINCE THE LAST LINE FEED.
106 012754 100567              BMI     SENDR2            ;IF CRNTPR LESS THAN LINSIZ THEN THERE ARE
107                               ;                          MORE CHARACTERS TO PRINT ON THIS LINE.
108 012756 113702 002314              MOVB   LF,R2                ;LINE IS FINISHED. SEND LINE FEED AND REVERSE
109 012762 004737 013402              JSR     PC,SENCHR      ; THE PRINT DIRECTION.
110                               ;
111 012766 005037 006502              CLR     CRNTPR      ;RESET THE CHARACTER COUNT FOR THIS LINE.
112 012772 005737 006504              TST     DIRCN      ;WHAT IS THE CURRENT PRINT DIRECTION? 0=FORWARD
113 012776 001100              BNE     FWRDO      ;IF REVERSE (1) THEN CHANGE TO FORWARD PRINT.
114

```

GLOBAL SUBROUTINES SECTION

```

115
116
117 013000 012737 000001 006504      MOV    #1,DIRCTN      ;IF FORWARD (1) THEN CHANGE TO REVERSE PRINT.
118
119 013006 113702 002244      MOVB   STCHSZ,R2      ;'ESC' CHAR
120 013012 004737 013402      JSR    PC,SENCHR      ;TO RESET CHARACTER SIZE TO NEGATIVE 10 CHAR
121
122 013016 022737 177777 002206      CMP    #-1,GREASE     ;HAS A TIME-OUT OCCURRED? EXPRESS EXIT
123 013024 001560              BEQ     EXITX      ;FROM THIS ROUTINE MAY BE REQUIRED.
124
125 013026 112702 000057      MOVB   #HEXF,R2      ;
126 013032 004737 013402      JSR    PC,SENCHR      ;      PER INCH. THIS ENABLES REVERSE <---
127
128 013036 022737 177777 002206      CMP    #-1,GREASE     ;HAS A TIME-OUT OCCURRED? EXPRESS EXIT
129 013044 001550              BEQ     EXITX      ;FROM THIS ROUTINE MAY BE REQUIRED.
130
131 013046 004737 013402      JSR    PC,SENCHR      ;HEXF,HEXF,FOUR= -12 = -10 CHAR/INCH
132
133 013052 022737 177777 002206      CMP    #-1,GREASE     ;HAS A TIME-OUT OCCURRED? EXPRESS EXIT
134 013060 001542              BEQ     EXITX      ;FROM THIS ROUTINE MAY BE REQUIRED.
135
136 013062 112702 000044      MOVB   #FOUR,R2      ;
137 013066 004737 013402      JSR    PC,SENCHR      ;
138
139 013072 022737 177777 002206      CMP    #-1,GREASE     ;HAS A TIME-OUT OCCURRED? EXPRESS EXIT
140 013100 001532              BEQ     EXITX      ;FROM THIS ROUTINE MAY BE REQUIRED.
141
142 013102 012700 000004      MOV    #4,R0
143 013106 116002 002244      MOVB   STCHSZ(R0),R2  ; SEQUENCE: ESC 1111 1111 0100 A
144 013112 004737 013402      JSR    PC,SENCHR      ; SENT TO THE PRINTER.
145
146 013116 022737 177777 002206      CMP    #-1,GREASE     ;HAS A TIME-OUT OCCURRED? EXPRESS EXIT
147 013124 001520              BEQ     EXITX      ;FROM THIS ROUTINE MAY BE REQUIRED.
148
149
150
151
152 013126 113702 006521      MOVB   ESCAPE,R2      ;NOW MOVE THE CARRIAGE ONE SPACE TO THE
153 013132 004737 013402      JSR    PC,SENCHR      ;LEFT TO EVEN UP THE MARGIN.
154
155 013136 112702 000057      MOVB   #HEXF,R2      ;
156 013142 004737 013402      JSR    PC,SENCHR      ;NOW TRANSMIT -12 IN THREE HEX VALUES
157
158 013146 112702 000057      MOVB   #HEXF,R2      ;
159 013152 004737 013402      JSR    PC,SENCHR      ;      IN THREE CHARACTERS
160
161 013156 112702 000044      MOVB   #FOUR,R2      ;
162 013162 004737 013402      JSR    PC,SENCHR      ;
163
164 013166 112702 000073      MOVB   #73,R2        ;SEMI-COLON TO COMPLETE THE SEQUENCE WHERE
165 013172 004737 013402      JSR    PC,SENCHR      ; ESC HEXF,HEXF,FOUR (SEMI-COLON) CAUSES
166
167
168
169
170 013176 000456              BR     SENDR2      ;THE MARGIN SHOULD NOW BE EVEN.
171

```

;NOW SEND THE CHARACTER TO THE PRINTER.

GLOBAL SUBROUTINES SECTION

```

172
173
174
175 013200 005037 006504      FWRDO: CLR      DIRCTN      ;INDICATE THAT THE DIRECTION IS FORWARD PRINT.
176                                     ;
177                                     ;RESTORE CHARACTER SIZE TO A POSITIVE 10 CHAR
178                                     ;PER INCH.  AT LEAST TWO MORE LINES TO GO....
179                                     ;
180 013204 113702 002244      MOVB      STCHSZ,R2      ;RESTORE CARRIAGE MOTION TO FORWARD.
181 013210 004737 013402      JSR        PC,SENCHR      ;
182
183 013214 022737 177777 002206  CMP      #-1,GREASE      ;HAS A TIME-OUT OCCURRED?  EXPRESS EXIT
184 013222 001461              BEQ      EXITX          ;FROM THIS ROUTINE MAY BE REQUIRED.
185
186 013224 112702 000040      MOVB      #ZERO,R2      ;
187 013230 004737 013402      JSR        PC,SENCHR      ;
188
189 013234 022737 177777 002206  CMP      #-1,GREASE      ;HAS A TIME-OUT OCCURRED?  EXPRESS EXIT
190 013242 001451              BEQ      EXITX          ;FROM THIS ROUTINE MAY BE REQUIRED.
191
192 013244 004737 013402      JSR        PC,SENCHR      ;SEQUENCE SENT: ESC 0000 0000 1100 A
193
194 013250 022737 177777 002206  CMP      #-1,GREASE      ;HAS A TIME-OUT OCCURRED?  EXPRESS EXIT
195 013256 001443              BEQ      EXITX          ;FROM THIS ROUTINE MAY BE REQUIRED.
196
197 013260 112702 000054      MOVB      #HEXC,R2      ;ZERO,ZERO,HEXC - 12  10 CHARACTERS/INCH
198 013264 004737 013402      JSR        PC,SENCHR      ;
199
200 013270 022737 177777 002206  CMP      #-1,GREASE      ;HAS A TIME-OUT OCCURRED?  EXPRESS EXIT
201 013276 001433              BEQ      EXITX          ;FROM THIS ROUTINE MAY BE REQUIRED.
202
203 013300 012700 000004      MOV        #4,R0
204 013304 116002 002244      MOVB      STCHSZ(R0),R2  ;
205 013310 004737 013402      JSR        PC,SENCHR      ;FORWARD CARRIAGE RESTORED.
206
207 013314 022737 177777 002206  CMP      #-1,GREASE      ;HAS A TIME-OUT OCCURRED?  EXPRESS EXIT
208 013322 001421              BEQ      EXITX          ;FROM THIS ROUTINE MAY BE REQUIRED.
209
210 013324 113702 006541      MOVB      SPACE,R2      ;NOW TRANSMIT A SPACE TO EVEN UP THE MARGIN.
211 013330 004737 013402      JSR        PC,SENCHR      ;
212
213 013334 112102              SENDR2: MOVB      (R1)+,R2  ;GET THE CHARACTER FOR TRANSMISSION.
214 013336 004737 013402      JSR        PC,SENCHR      ;SEND THE CHARACTER TO THE PRINTER.
215 013342 022737 177777 002206  CMP      #-1,GREASE      ;
216 013350 001406              BEQ      EXITX          ;EXPRESS EXIT IF ANY PROBLEMS.
217
218 013352 005237 006502      INC        CRNTPR      ;CURRENT IN-LINE POINTER UPDATED.
219 013356 020103              CMP        R1,R3        ;IS THE ADDRESS OF THE NEXT CHARACTER TO BE
220                                     ;PRINTED EQUAL TO THE ADDRESS OF THE LAST
221                                     ;CHARACTER (PLUS 1) TO BE TRANSMITTED?
222 013360 001402              BEQ      EXITX          ;IF NOT YET THERE, REPEAT TRANSMIT PROCESS.
223 013362 000137 012746      JMP        LNELOO
224
225 013366 012605      EXITX:  MOV        (SP)+,R5      ;RESTORE
226 013370 012604      MOV        (SP)+,R4      ;
227 013372 012603      MOV        (SP)+,R3      ;
228 013374 012602      MOV        (SP)+,R2      ;

```

GLOBAL SUBROUTINES SECTION

229	013376	012601	MOV	(SP)+,R1
230				
231	013400	000207	RTS	PC
232				
233				
234				
235				
236				
237				
238				
239				
240				

GLOBAL SUBROUTINES SECTION

FUNCTIONAL DESCRIPTION

GLOBAL PROCEDURE SENCHR:

THIS ROUTINE TAKES THE ASCII BYTE IN REGISTER R2 AND SENDS IT TO THE PRINTER - WHEN POSSIBLE.

INPUTS

R2 - THE LOW BYTE IN R2 IS THE CHARACTER TO BE PRINTED.

OUTPUTS

THE CHARACTER IS SENT TO THE PRINTER.

SUBORDINATE ROUTINES USED

WAITXN - WAITS FOR THE XON CHARACTER TO BE SENT FROM THE PRINTER. IF THE XON IS NOT RECEIVED, A TIME-OUT ERROR MAY OCCUR AND A GREASED EXIT IS ENABLED.

STSERR - ADJUSTS THE ERROR FLAG-WORD. THE PRINTER IS QUERIED ABOUT THE PRINTER STATUS.

FUNCTIONAL SIDE EFFECTS

THE REGISTERS R2 AND R3 ARE PRESERVED. WITH THE SETTING OF AN ERROR STATE, THE GREASED EXIT MAY BE INITIATED.

39	013402	010246			SENCHR: MOV	R2,-(SP)	:SAVE
40	013404	010346			MOV	R3,-(SP)	
41	013406	010446			MOV	R4,-(SP)	: REGISTERS
42	013410	010546			MOV	R5,-(SP)	
43							
44	013412	013777	006442	173666	SENCH2: MOV	LPRINI,@LPR	:IF DZ THEN SET PARMS. IF DL THEN NO EFFECT.
45	013420	013777	006436	173662	MOV	TCRENA,@TCR	:IF DZ THEN SET CHANNEL. IF DL, NO EFFECT.
46	013426	005005			CLR	R5	
47	013430	005003			RESINN: CLR	R3	:COUNTER
48	013432				BREAK		:ENABLE ^C FROM CONSOLE DURING LOOP
	013432	104422					TRAP CSBRK
49	013434	005203			SENCLP: INC	R3	:COUNTER
50	013436	020327	007000		CMP	R3,#7000	:INNER LOOP CHECK
51	013442	100420			BMI	CNTNU	:KEEP LOOPING UNTIL WE REACH 77000
52	013444	005205			INC	R5	:OUTER LOOP COUNTER
53							
54	013446	020527	000106		CMP	R5,#70.	:PRINT A WAITING TO SEND MESSAGE.
55	013452	001010			BNE	COLE	:CONTINUE WITH LOOP IF NOT 70 YET.
56	013454				PRINTX	WTSTPM	:WAITING TO SEND TO PRINTER MESSAGE.

GLOBAL SUBROUTINES SECTION

	013454	013746	005154				MOV	WTSTPM,-(SP)
	013460	012746	000001				MOV	#1,-(SP)
	013464	010600					MOV	SP,R0
	013466	104415					TRAP	C\$PNTX
	013470	062706	000004				ADD	#4,SP
57								
58	013474	020527	000144	COIE:	CMP	R5,#100.		;ALLOW 100 LOOPS BEFORE TIME OUT.
59	013500	100045			BPL	EXETS		;FAILURE TO FIND TRDY.
60	013502	000752			BR	RESINN		;RESET INNER LOOP
61								
62	013504	032777	000200	173564	CNTNU:	BIT	#BIT7,@RCSR	;IS RECEIVER READY? SHOULD BE SET IF IT IS.
63	013512	001007			BNE	ALPHA		;IF SET, ALPHA TAKES CARE OF BUFFER READ.
64								
65	013514	033777	010044	173556	BETA:	BIT	TRDYBT,@XCSR	;RCVR NOT RDY. SEE IF THE TRANSMITTER IS READY
66	013522	001744			BEQ	SENCLP		;IF ZERO, NOT READY, LOOP AND CHECK AGAIN.
67								
68								
69								
70	013524	110277	173554		MOVB	R2,@XBUF		;PUT CHARACTER INTO TRANSMITTER BUFFER.
71	013530	000445			BR	EXITS		;AND EXIT
72								
73								
74	013532	017704	173544	ALPHA:	MOV	@RBUF,R4		;READ THE RECEIVER BUFFER.
75								
76	013536	120437	006520		CMPB	R4,XON		;IS IT - 'XON'?
77	013542	001764			BEQ	BETA		;IF IT IS THEN ALL IS OK, CONTINUE.
78								
79	013544	120437	006517		CMPB	R4,XOFF		;IS IT - 'XOFF'?
80	013550	001007			BNE	CHKCAN		;IF NOT 'XOFF' THEN MAYBE IT IS A 'CAN'
81								
82	013552	004737	013656		JSR	PC,WAITXN		;IF IT WAS AN XOFF THEN WE MUST WAIT FOR
83								AN XON AND THEN SEND CHARACTER.
84	013556	022737	177777	002206	CMP	#-1,GREASE		;HAS A TIME-OUT OCCURRED? EXPRESS EXIT
85	013564	001427			BEQ	EXITS		;FROM THIS ROUTINE MAY BE REQUIRED.
86								
87	013566	000711			BR	SENCH2		;XON FOUND ON TIME. LOOK FOR TRANSMIT READY.
88								
89	013570	120437	006516	CHKCAN:	CMPB	R4,CAN		;CHARACTER = 'CAN' ?
90	013574	001416			BEQ	SETER		;IF IT IS THEN SET APPROPRIATE FLAG (ERWORD)
91								
92	013576	120437	006515		CMPB	R4,EOT		;CHARACTER = 'EOT' ?
93	013602	001413			BEQ	SETER		;IF IT IS THEN SET APPROPRIATE FLAG (ERWORD)
94								
95	013604	052737	010000	006500	BIS	#BIT12,ERWORD		;NONE OF THE USUAL CHARACTERS FOUND
96								ASYNCHRONOUSLY. UNEXPECTED CHARACTER
97								RECEIVED INDICATED IN ERWORD.
98	013612	000740			BR	BETA		;TRY AGAIN TO SEND CHARACTER
99								
100	013614	012737	000001	006512	EXETS:	MOV	#1,FLTRDY	;INDICATE FAILED TO FIND TRANSMIT READY.
101	013622	012737	177777	002206	MOV	#-1,GREASE		;ENABLE GREASED EXITS FROM TESTS.
102	013630	000405			BR	EXITS		;FAIL TO FIND TRDY
103								
104	013632	052737	100000	006500	SETER:	BIS	#BIT15,ERWORD	;CAN OR EOT TYPE ERROR
105	013640	004737	015106		JSR	PC,SISERR		;SET UP ERWORD.
106								
107	013644	012605			EXITS:	MOV	(SP)+,R5	
108	013646	012604			MOV	(SP)+,R4		;RESTORE

K 5

SEQ 62

GLOBAL SUBROUTINES SECTION

109 013650 012603
110 013652 012602
111
112 013654 000207
113
114
115
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119

MOV (SP)+,R3
MOV (SP)+,R2 ; REGISTERS
RTS PC

⋮

GLOBAL SUBROUTINES SECTION

```

56 013732 004737 013402      JSR      PC,SENCHR      ;ESCAPE SENT
57 013736 113702 006532      MOV      SC0,R2      ;AND
58 013742 004737 013402      JSR      PC,SENCHR      ;'0' SENT
59
60 013746 004737 014126      JSR      PC,GETCHR      ;GET ESCAPE FROM PRINTER.
61 013752 120437 006521      CMP      R4,ESCAPE      ;CHECK FOR VALID CHARACTER (ESCAPE ONLY)
62 013756 001020              BNE      ELSEX      ;IF NO ESCAPE THEN OTHER ERROR.
63 013760 004737 014126      JSR      PC,GETCHR      ;GET N3
64 013764 004737 014126      JSR      PC,GETCHR      ;GET N2
65 013770 010400              MOV      R4,R0      ;SAVE N2 (CONTAINS PAUSE STATUS)
66 013772 004737 014126      JSR      PC,GETCHR      ;GET N1
67 013776 004737 014126      JSR      PC,GETCHR      ;GET '0'
68 014002 120437 006532      CMP      R4,SC0      ;CONFIRM THAT THE LAST BYTE WAS A '0'
69 014006 001004              BNE      ELSEX      ;IF NOT PROPER, INDICATE AN ERROR.
70 014010 032700 000001      BIT      #BIT0,R0      ;WAS THE PAUSE SWITCH SET?
71 014014 001343              BNE      SENDX      ;REPEAT PROCESS IF BIT IS SET.
72 014016 000410              BR       LOOPCK      ;SWITCH NO LONGER PRESSED. LOOK FOR XON.
73
74 014020 012737 177777 002206 ELSEX: MOV      #-1,GREASE      ;UNEXPECTED CHARACTER RECEIVED. ENABLE
75 014026 052737 010000 006500      BIS      #BIT12,ERWORD      ;'GREASED' EXIT FROM CALLING ROUTINE.
76 014034 000137 014120              JMP      EXITON      ;EXIT ROUTINE.
77
78 014040 005201              LOOPCK: INC      R1      ;UPDATE LOOP COUNTER
79 014042 020127 077000      CMP      R1,#077000      ;LOOPED ENOUGH TIMES YET? 5 SEC CHECK
80 014046 100712              BMI      LOOPXN      ;CONTINUE TO LOOP UNTIL 5000 EXCEEDED.
81
82 014050 005237 006510              INC      OUTSDC      ;OUTSIDE LOOP COUNT
83 014054 023727 006510 000015      CMP      OUTSDC,#15      ;13 LOOPS YET?
84 014062 100701              BMI      OUTSDL      ;NO? THEN START UP AGAIN
85
86 014064 052737 010000 006500      BIS      #BIT12,ERWORD      ;NOT XON.... ERROR UCRB
87 014072 052737 100000 006500      BIS      #BIT15,ERWORD      ;AN ERROR IS DETECTED AND INDICATED
88
89 014100              PRINTX  #TIMOM      ;PRINT TIMEOUT MESSAGE
      MOV      #TIMOM,-(SP)
      MOV      #1,-(SP)
      MOV      SP,R0
      TRAP     C$PNTX
      ADD      #4,SP
90
91 014120 012604              EXITON: MOV      (SP)+,R4      ;RESTORE THE REGISTERS
92 014122 012601              MOV      (SP)+,R1
93
94 014124 000207              RTS      PC
95
96
97

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GLOBAL SUBROUTINES SECTION

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34 014126 010146
35 014130 010246
36 014132 010546
37
38 014134 005037 006506
39 014140 005001
40
41 014142 032777 000200 173126
42 014150 001042
43
44 014152 012705 000001
45 014156 004737 015336
46
47 014162
   014162 104422
48
49 014164 005201
50
51 014166 020127 002400
52 014172 100763
53
54 014174 005237 006506
55 014200 023727 006506 000024
56 014206 001010

:-----:
:FUNCTIONAL DESCRIPTION:
:
:GLOBAL PROCEDURE GETCHR:
:
:THIS PROCEDURE WILL GET A CHARACTER AND WILL INDICATE A TIME-OUT:
:ERROR IF IT FAILS TO RECEIVE A CHARACTER WITHIN A REASONABLE TIME.:
:-----:
:INPUTS:
:
:NONE
:
:OUTPUTS:
:
:THE RECEIVER BUFFER IS READ AND PLACED IN R4.
:
:SUBORDINATE ROUTINES:
:
:DELAYS - GET A 100 USEC DELAY
:
:FUNCTIONAL SIDE EFFECTS:
:
:THE ERROR FLAG-WORD MAY CHANGE IF AN ERROR IS FOUND.
:
GETCHR: MOV R1,-(SP) ;SAVE REGISTERS
        MOV R2,-(SP) ;
        MOV R5,-(SP) ;
:
OUTRLP: CLR OUTCTR ;OUTER LOOP COUNTER.
        CLR R1 ;TIMING INNER LOOP COUNTER.
:
LOOPG: BIT #BIT07,@RCSR ;RCSR-7 SET? RECEIVER READY? RDONE?
        BNE SENDR ;IF YES.....GET THE CHARACTER OUT OF THE BUFFER
:AND INTO R4.
        MOV #1,R5 ;SHORT DELAY... 100 USEC
        JSR PC,DELAYS ;WAIT AROUND FOR A WHILE
:
        BREAK ;ENABLE INTERRUPT FROM ^C ON CONSOLE.
:TRAP (SBRK
:
        INC R1 ;LOOP COUNTER UPDATE.
:
NOPRTM: CMP R1,#2400 ;LOOPED LONG ENOUGH TO SET TIME-OUT INDICATOR?
        BMI LOOPG ;LOOP UNTIL 24400 OR RECEIVER IS SET.
:
        INC OUTCTR ;UPDATE OUTSIDE COUNTER.
        CMP OUTCTR,#20. ;HAVE WE BEEN WAITING LONG?
        BNE CONTLO ;SKIP PRINT. ONCE PER LONG WAIT ONLY.

```

GLOBAL SUBROUTINES SECTION

```

57 014210          PRINTX  #WFC          ;PRINT WAITING FOR A CHARACTER FROM PRINTER.
    014210 012746 012430          MOV      #WFC,-(SP)
    014214 012746 000001          MOV      #1,-(SP)
    014220 010600          MOV      SP,R0
    014222 104'          TRAP      C$PNTX
    014224 062          ADD      #4,SP

58
59 014230 023727 06 000132 CONTLO: CMP      OUTCTR,#90.          ;40 LOOPS MAXIMUM PERMITTED.
60 014236 100740          EMI      OUTRLP          ;NOT DONE YET? CONTINUE OUTER LOOP.
61
62 014240 052737 020000 006500      BIS      #BIT13,ERWORD          ;ECNRB ERROR
63 014246 052737 100000 006500      BIS      #BIT15,ERWORD          ;ERROR INDICATOR
64
65 014254 000413          BR       EXITE          ;GIVE UP WITH THIS RECEPTION
66                                     ; AN ERROR WILL BE INDICATED.
67
68 014256 017704 173020          SENDR: MOV      @RBUF,R4          ;PUT CHARACTER RECEIVED INTO R4
69
70 014262 120437 006516          CMPB     R4,CAN          ;IS THE CHARACTER A 'CAN' FROM THE PRINTER?
71 014266 001403          BEQ      ERSETT          ;THEN SET BIT15 IN ERWORD AND EXIT.
72
73 014270 120437 006515          CMPB     R4,EOT          ;IS THE CHARACTER AN 'EOT' FROM THE PRINTER?
74 014274 001003          BNE      EXITE          ;IF NOT THEN EXIT WITH CHARACTER.
75
76 014276 052737 100000 006500 ERSETT: BIS      #BIT15,ERWORD          ;WE HAVE AN ERROR CONDITION. EITHER FATAL
77                                     ; OR NON-FATAL. (CAN OR EOT)
78
79 014304 012605          EXITE:  MOV      (SP)+,R5
80 014306 012602          MOV      (SP)+,R2          ;RESTORE REGISTERS
81 014310 012601          MOV      (SP)+,R1
82
83 014312 000207          RTS      PC
84
85

```

GLOBAL SUBROUTINES SECTION

FUNCTIONAL DESCRIPTION

GLOBAL PROCEDURE CONVRT:

THIS PROCEDURE CONVERTS A NUMBER CONTAINED IN REGISTER R1 INTO THREE ASCII BYTES WHICH ARE MNEMONIC ARGUMENTS ACCEPTABLE TO THE LQP CONTROLLER. THE THREE BYTES ARE CONTAINED IN THE LOCATIONS: MNEB1 (MOST SIGNIFICANT BYTE), MNEB2, AND MNEB3 (LEAST SIGNIFICANT BYTE).

INPUTS

R1 - CONTAINS THE NUMBER TO BE CONVERTED INTO MNEMONIC FORM

OUTPUTS

MNEB1 - HIGH ORDER BYTE MNEMONIC FROM VALUE IN R1.
 MNEB2 - MIDDLE BYTE MNEMONIC FROM VALUE IN R1.
 MNEB3 - LOW ORDER BYTE MNEMONIC FROM VALUE IN R1.

SUBORDINATE ROUTINES

NONE

FUNCTIONAL SIDE EFFECTS

REGISTERS ARE PRESERVED.

```

39 014314 010246
40 014316 010346
41
42 014320 010102
43 014322 043702 006430
44 014326 000302
45
46 014330 052702 000040
47 014334 110237 010046
48
49 014340 010102
50 014342 043702 006432
51 014346 006202
52 014350 006202
53 014352 006202
54 014354 006202
55
56 014356 052702 000040
57 014362 110237 010047

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CONVRT: MOV    R2,-(SP)      ;SAVE REGISTERS
        MOV    R3,-(SP)      ;
        MOV    R1,R2         ;GET COPY OF NUMBER TO BE CONVERTED.
        BIC    TMPLT1,R2     ;MASK IN BITS 8 - 11.
        SWAB   R2            ;RIGHT JUSTIFY MASKED BITS
        BIS    #BIT5,R2      ;CONVERT TO THE ASCII VALUE
        MOVB   R2,MNEB1      ;STORE RESULT IN GLOBAL VARIABLE
        MOV    R1,R2         ;COPY OF ORIGINAL NUMBER
        BIC    TMPLT2,R2     ;MASK BITS 4 - 7.
        ASR    R2            ;RIGHT JUSTIFY
        ASR    R2            ;BITS 4 - 7
        ASR    R2            ;INTO BIT POSITIONS
        ASR    R2            ;0 - 3.
        BIS    #BIT5,R2      ;CONVERT TO THE ASCII VALUE
        MOVB   R2,MNEB2      ;STORE RESULT IN GLOBAL VARIABLE

```

GLOBAL SUBROUTINES SECTION

```
58
59 014366 010102      MOV    R1,R2      ;GET ORIGINAL NUMBER
60 014370 043702 006434 BIC    TMPLT3,R2      ;MASK OUT LEFT 12 BITS.
61 014374 052702 000040 BIS    #BIT5,R2      ;SET BIT 5. CONVERT TO ASCII VALUE
62 014400 110237 010050 MOVB   R2,MNEB3      ;MOVE TO GLOBAL VARIABLE
63
64 014404 012603      MOV    (SP)+,R3      ;RESTORE REGISTERS
65 014406 012602      MOV    (SP)+,R2      ;
66
67 014410 000207      RTS    PC
68
69
70
71
72
73      :
74      :
75      :
76
77
78
```

GLOBAL SUBROUTINES SECTION

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FUNCTIONAL DESCRIPTION

GLOBAL PROCEDURE INITCD

THIS ROUTINE IS USED TO INITIALIZE EACH TEST. THIS PROCEDURE WILL GUARANTEE THAT THE PRINTER BEING TESTED WILL BE IN A TESTABLE CONDITION (IF THE INITCD ROUTINE SUCCEEDS IN PERFORMING IN ITS ENTIRETY). THIS CODE WILL SET UP THE INTERFACE DEVICE USED TO COMMUNICATE WITH THE PRINTER. THE ROUTINE WILL RESET THE PRINTER TO ITS DEFAULT START-UP CONDITION, IT WILL SET THE RIBBON TO ITS DOWN POSITION, IT WILL SET THE HIT COUNT TO ONE HIT PER CHARACTER PRINTED, AND IT WILL SET THE UNDERLINE MODE OPTION TO 'NO-UNDERLINE'. FINALLY, THIS ROUTINE WILL SEND A CARRIAGE RETURN AND FOUR LINEFEEDS TO THE PRINTER TO AID IN THE READABILITY OF THE PRINT PATTERN.

INPUTS

NONE

OUTPUTS

NONE

SUBORDINATE ROUTINES

XMIT - SEND SEQUENCES TO THE PRINTER
STATS - CHECK FOR ERRORS. ENTRYPOINT IN STSERR.
GETCHR - GET A CHARACTER FROM THE PRINTER
STSERR - ADJUST THE STATUS WORD VIA PRINTER QUERY

FUNCTIONAL SIDE EFFECTS

- 1) PRINTER STATUS IS DETERMINED.
- 2) RIBBON POSITION IS SET DOWN.
- 3) HIT COUNT IS SET TO 1.
- 4) NO-UNDERLINE MODE IS SET.
- 5) PRINT CARRIAGE RETURN AND FOUR LINEFEEDS.

50 014412 005037 007314
51 014416 010146
52 014420 010246
53 014422 010346
54 014424 010446
55
56 014426 012701 002214
57 014432 012702 000010

INITCD: CLR PGMCTR ; DOES NOT YET POINT TO PC OF ERROR
MOV R1,-(SP) ; SAVE REGISTERS
MOV R2,-(SP)
MOV R3,-(SP)
MOV R4,-(SP)
RESETC: MOV #DUMMYS,R1 ; FIX INTERFACE TO ACCEPT PRINTER RESFT.
MOV #8.,R2 ;

58	014436	005003		CLR	R3	:
59	014440	004737	C12632	JSR	PC,XMIT	:SEND DUMMY SEQUENCE
60						
61	014444	005037	006500	CLR	ERWORD	:ASSUME THAT NO ERRORS HAVE YET OCCURED.
62						
63	014450	012701	002224	MOV	#RESET,R1	:TRANSMIT PRINTER RESET SEQUENCE (ADDRESS)
64	014454	012702	000002	MOV	#2,R2	:2 ARGUMENT LIST
65	014460	005003		CLR	R3	:NO BIDIRECTIONAL PRINTING NECESSARY
66	014462	004737	012632	JSR	PC,XMIT	:SEND SEQUENCE TO PRINTER
67						
68	014466	012700	000020	MOV	#16.,R0	:SIXTEEN TRIES ARE GIVEN TO FIND THE ESC CHAR
69	014472	005300		DEC	R0	:COUNT DOWN OF LOOPS TO FIND ESCAPE
70	014474	005700		TST	R0	:MAX TRIES USED TO FIND ESCAPE?
71	014476	001440		BEQ	INIERR	:IF SO AN ERROR MUST BE REPORTED.
72						
73	014500	004737	014126	JSR	PC,GETCHR	:READ 'ESC' CHR FROM RBUF
74	014504	120437	006521	CMPB	R4,ESCAPE	:CHECK FOR CORRECT CHARACTER
75	014510	001370		BNE	LOUEF	:IF NO ESCAPE FOUND THEN TRY AGAIN
76						
77	014512	004737	014126	JSR	PC,GETCHR	:READ STATUS CHR. SHOULD BE SPACE CHARACTER.
78	014516	120427	000040	CMPB	R4,#ZERO	:SHOULD BE NO ERRORS - RIGHT FOUR BITS = 0000
79	014522	001026		BNE	INIERR	:IF RIGHT FOUR BITS NONZERO, INDICATE ERROR.
80						
81	014524	004737	014126	JSR	PC,GETCHR	:READ 2ND STATUS NIBBLE.
82	014530	120427	000040	CMPB	R4,#ZERO	:RIGHT FOUR BITS SHOU D BE 0000
83	014534	001021		BNE	INIERR	:IF NONZERO, INDICATE ERROR AND CONTINUE
84						
85	014536	004737	014126	JSR	PC,GETCHR	:READ 3RD STATUS NIBBLE.
86	014542	042704	000001	BIC	#BIT0,R4	:CLEAR THE SHEET FEEDER PRESENT BIT IF SET.
87	014546	120427	000040	CMPB	R4,#ZERO	:IS STATUS NIBBLE = 0000 ?
88	014552	001012		BNE	INIERR	:IF NOT, INDICATE ERROR AND CONTINUE
89						
90	014554	004737	014126	JSR	PC,GETCHR	:READ (HOPEFULLY) 'O' FROM RBUF
91	014560	120437	006532	CMPB	R4,SCO	:CONFIRM THE CHARACTER IS A 'O'.
92	014564	001005		BNE	INIERR	:IF NOT = 'O', THEN INDICATE ERROR, CONTINUE
93						
94	014566	004737	014126	JSR	PC,GETCHR	:A CHARACTER IS EXPECTED FROM THE PRINTER
95	014572	120437	006520	CMPB	R4,XON	:XON IS THE EXPECTED CHARACTER
96	014576	001413		BEQ	SETUPI	:IF YES, THEN SET UP THE PRINTER PARAMETERS
97						
98	014600	052737	010000	006500	INIERR:	BIS #BIT12,ERWORD :IF NO, THEN INDICATE ERRORS: UCRB
99	014606	052737	020000	006500	BIS #BIT13,ERWORD :	THEN INDICATE ERRORS: ECRNB
100	014614	052737	100000	006500	BIS #BIT15,ERWORD :	THEN INDICATE ERRORS: ERROR FOUND BIT
101	014622	004737	015106	JSR	PC,STSERR	:CHECK FOR MORE ERRORS
102						
103	014626	012700	000001	002240	SETUPI:	MOV #1,R0
104	014632	112760	000040	MOVB	#ZERO,RIBPOS(R0)	:RIBBON POSITION DOWN
105	014640	012701	002240	MOV	#RIBPOS,R1	:ADDRESS OF ARGUMENT LIST
106	014644	012702	000003	MOV	#3,R2	:3CHARACTERS IN ARGUMENT LIST
107	014650	005003		CLR	R3	:NO PRINTING
108	014652	004737	012632	JSR	PC,XMIT	:SEND TO PRINTER
109						
110	014656	012700	000001	002257	MOV	#1,R0
111	014662	112760	000040	MOVB	#ZERO,STHTCT(R0)	:SET HIT COUNT TO 1 HIT PER CHARACTER
112	014670	012701	002257	MOV	#STHTCT,R1	:ADDRESS OF ARGUMENT LIST
113	014674	012702	000003	MOV	#3,R2	:THREE ARGUMENTS IN THE
114	014700	005003		CLR	R3	:NO PRINTING

GLOBAL SUBROUTINES SECTION

```

115 014702 004737 012632      JSR      PC,XMIT      ;SEND TO PRINTER
116
117 014706 112760 000040 002266  MOVB     #ZERO,STULMD(R0) ;SET UNDERLINE MODE
118 014714 012701 002266      MOV      #STULMD,R1      ;ADDRESS OF ARG LIST
119 014720 012702 000003      MOV      #3,R2        ;THREE ARGUMENTS
120 014724 005003      CLR      R3          ;NO PRINTING
121 014726 004737 012632      JSR      PC,XMIT      ;SEND TO PRINTER
122
123 014732 012701 002313      MOV      #CR,R1        ;ADDRESS OF CRLF TO BE PRINTED
124 014736 012702 000002      MOV      #2,R2        ;2 CHARACTERS TO BE PRINTED
125 014742 005003      CLR      R3          ;NO BIDIRECTIONAL PRINTING
126 014744 004737 012632      JSR      PC,XMIT      ;SEND TO PRINTER
127
128 014750 012701 002314      MOV      #LF,R1        ;ADDRESS OF LINEFEED
129 014754 012702 000001      MOV      #1,R2        ;PRINT THE SINGLE CHARACTER
130 014760 005003      CLR      R3          ;WITHOUT BIDIRECTIONAL PRINTING
131 014762 004737 012632      JSR      PC,XMIT      ;SEND TO PRINTER
132 014766 004737 012632      JSR      PC,XMIT      ;AGAIN...
133 014772 004737 012632      JSR      PC,XMIT      ;AND AGAIN...
134
135 014776 005037 006502      CLR      CRNTPR      ;CLEAR CURRENT COUNT WHICH IS USED IN
136                                     ;BIDIRECTIONAL PRINTING TO KEEP TRACK OF
137                                     ;THE NUMBER OF CHARACTERS PRINTED CURRENTLY
138                                     ;IN THE CURRENT DIRECTION.
139 015002 005037 006504      CLR      DIRCTN      ;INDICATOR THAT PRINTER IS PRINTING IN THE
140                                     ;FORWARD DIRECTION. (0=FORWARD, 1=REVERSE)
141                                     ;THIS IS TRUE AT THIS POINT BECAUSE THIS
142                                     ;ROUTINE RE-INITIALIZES THE PRINTER.
143
144 015006 012705 007000      MOV      #7000,R5      ;SET UP FOR A DELAY (ARG FOR DELAYS ROUTINE)
145 015012 012704 007000      MOV      #7000,R4      ;LOOP COUNTER
146 015016 004737 015336  LODELY: JSR      PC,DELAYS    ;CAUSE A SHORT DELAY
147 015022 005304      DEC      R4          ;LOOP COUNTER ADJUSTMENT
148 015024 100374      BPL      LODELY      ;REPEAT UNTIL SUFFICIENT DELAY CAUSED.
149
150 015026 012604      MOV      (SP)+,R4      ;RESTORE
151 015030 012603      MOV      (SP)+,R3      ;
152 015032 012602      MOV      (SP)+,R2      ;   REGISTERS
153 015034 012601      MOV      (SP)+,R1      ;
154
155
156 015036 000207      RTS      PC
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GLOBAL SUBROUTINES SECTION

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FUNCTIONAL DESCRIPTION

GLOBAL PROCEDURE RANDOM

RANDOM NUMBER GENERATOR. THE RANDOM NUMBER: RANGE 0 - 99
WILL BE HELD IN REGISTER: R1. THE ALGORITHM FOR THIS RANDOM
NUMBER GENERATOR WAS SUPPLIED BY THE LQP DIAGNOSTIC ON THE
PDP-8 WRITTEN BY BILLY CRAFT.

INPUTS

SEED1 - NOT EXPLICITLY PASSED BY SOFTWARE. FIRST SEED
SEED2 - SAME AS SEED1. USED FOR RANDOM NUMBER GENERATION.

OUTPUTS

R1 - WILL CONTAIN THE RANDOM NUMBER (0-99)

SUBORDINATE ROUTINES

NONE

FUNCTIONAL SIDE EFFECTS

SEED1 AND SEED2 WILL BOTH BE CHANGED SO THAT THE NEXT RANDOM NUMBER
WILL BE DIFFERENT FROM THE ONE JUST COMPUTED.

CALLING SEQUENCE

NO EXPLICIT PARAMETERS ARE PASSED.
JSR PC,RANDOM

RANDOM: NOP

;RANDOM NUMBER GENERATOR

TRYAGN: MOV #1,R1

;RANDOM NUMBER IS GENERATED FROM
;TWO SEEDS: SEED1 AND SEED2. IF DESIRED,
;THESE SEEDS MAY BE CHANGED USING A DYNAMIC
;DEBUGGER OR RE-ASSEMBLY OF THE PROGRAM WITH
;NEW SEED VALUES. (NOT RECOMMENDED)
;GET THE SEED1 VALUE (SLIGHTLY ALTERED)
;ADD THE SECOND SEED VALUE

ADD SEED1,R1
ADD SEED2,R1

ROL R1
ROL R1

;ROTATE CONTENTS SO THAT VALUE IS LOST
;ROTATE AGAIN. VALUE IS CHANGED AGAIN

ADD R1,SEED1
MOV R1,SEED2

;NOW A NEW SEED VALUE
;AND A NEW SECOND SEED VALUE
;BOTH FAIRLY UNRELATED TO THE ORIGINAL SEEDS

BIC #177600,R1

;MASK OUT THE LEFT NINE BITS
;THE NUMBER NOW HAS A POSSIBLE RANGE OF 0-127
;IS THE NUMBER 0-99 ?

CMP #99.,R1

GLOBAL SUBROUTINES SECTION

58 015102 100757

59

60 015104 000207

61

62

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64

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66

67

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BMI TRYAGN

;NO? WELL TRY AGAIN. RANGE MUST BE 0-99.

RTS PC

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:
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:

GLOBAL SUBROUTINES SECTION

FUNCTIONAL DESCRIPTION

GLOBAL PROCEDURE STSERR:

THIS ROUTINE DOES TWO THINGS: IT REQUESTS STATUS FROM THE PRINTER AND SETS UP THE ERROR FLAG - WORD (ERWORD). THE ENTRY POINT -STATS- MAY BE USED TO SKIP THE REQUEST STATUS CODE.

INPUTS

ERWORD - SOME BITS MAY ALREADY BE SET, INDICATING ERRORS ALREADY

OUTPUTS

ERWORD - THIS GLOBAL SYMBOL WILL INDICATE ALL COMPUTABLE ERRORS.

SUBORDINATE ROUTINES

SENCHR - USED TO TRANSMIT CHARACTERS TO THE PRINTER.
GETCHR - USED TO RECEIVE CHARACTERS FROM THE PRINTER.

FUNCTIONAL SIDE EFFECTS

THE GLOBAL SYMBOL ERWORD WILL REFLECT THE STATUS OF THE PRINTER.
REGISTERS ARE PRESERVED.

CALLING SEQUENCE

NO EXPLICIT PARAMETERS ARE PASSED TO THE ROUTINE.
JSR PC,STSERR - NORMAL ENTRY
STATUS REQUESTED FROM PRINTER
JSR PC,STATS - 2ND ENTRY POINT. THE STATUS
IS CHECKED AS IS.

43	015106	113702	002210	STSERR: MOV B	STRES,R2	;SEND 'ESC 0' TO THE PRINTER.
44	015112	004737	013402	JSR	PC,SENCHR	;
45	015116	012700	000001	MOV	#1,R0	;
46	015122	116002	002210	MOV B	STRES(R0),R2	;
47	015126	004737	013402	JSR	PC,SENCHR	;REQUEST STATUS FROM PRINTER.
48						
49	015132	010446		STATS: MOV	R4,-(SP)	;PUSH REGISTERS
50	015134	010346		MOV	R3,-(SP)	;
51						
52	015136	004737	014126	JSR	PC,GETCHR	;GET A CHARACTER FROM THE PRINTER.
53	015142	120437	002315	CMPI	R4,STATUS	;THE CHARACTER IN R4 SHOULD BE AN ESC CHARACTER
54	015146	001057		BNE	PALPHA	;EXPECTED CHAR NOT RCVD, UNEXPECTED CHAR RCVD.
55						
56	015150	004737	014126	JSR	PC,GETCHR	;GET N3 FROM PRINTER. FATAL ERRORS INDICATED.
57	015154	043704	006434	BIC	IMPLT3,R4	;CLEAR LEFT 12 BITS.

GLOBAL SUBROUTINES SECTION

58	015160	000304		SWAB	R4	;PUT BITS IN PROPER POSITION FOR ERWORD
59	015162	050437	006500	BIS	R4,ERWORD	;SET THE ERROR BITS APPROPRIATE IN ERWORD.
60						
61	015166	004737	014126	JSR	PC,GETCHR	;GET N2 FROM PRINTER. NON-FATAL ERRORS FRM PRTR
62	015172	043704	006434	BIC	TMPLT3,R4	;CLEAR THE LEFT 12 BITS. (NOT WANTED)
63	015176	006304		ASL	R4	;SHIFT
64	015200	006304		ASL	R4	LEFT
65	015202	006304		ASL	R4	FOUR
66	015204	006304		ASL	R4	POSITIONS.
67	015206	050437	006500	BIS	R4,ERWORD	;AND SET THE APPROPRIATE BITS IN ERWORD.
68						
69	015212	004737	014126	JSR	PC,GETCHR	;GET ANOOTHER CHARACTER. N1. PRINTER CONDITION
70	015216	043704	006434	BIC	TMPLT3,R4	;CLEAR THE 12 LEFT UNWANTED BITS.
71	015222	042704	000001	BIC	#BIT0,R4	;SHEET FEEDER PRESENT NOT A GENERAL ERROR.
72	015226	042704	000004	BIC	#BIT2,R4	;NOT USED BY PRINTER
73	015232	042704	000010	BIC	#BIT3,R4	;NOT USED BY PRINTER
74	015236	050437	006500	BIS	R4,ERWORD	;SET APPROPRIATE BITS IN ERWORD.
75						
76	015242	042737	046400 006500	BIC	#46400,ERWORD	;CLEAR BITS 14,11,10,8 (UNUSED BITS IN ERWORD)
77						
78	015250	005737	006500	TST	ERWORD	;IS THE ERWORD = 0 ?
79	015254	001403		BEQ	CRCLX	;IF IT IS CONTINUE...
80	015256	053737	100000 006500	BIS	BIT15,ERWORD	;IF IT ISN'T... INDICATE AN ERROR (GENERAL)
81						; BY SETTING BIT 15 IN THE ERROR WORD.
82						
83	015264	004737	014126	CRCLX: JSR	PC,GETCHR	;HOPE TO GET A 'O'
84	015270	123704	006532	CMPB	SC0,R4	;IS IT THE EXPECTED 'O' ?
85	015274	001415		BEQ	EXITSR	;IF EQUAL TO EXPECTED CHAR ('O'), THEN DONE.
86						
87	015276	052737	020000 006500	BIS	#ECNRB,ERWORD	;SET ECNRB ('O' NOT FOUND.)
88	015304	000403		BR	SET15	;SET ERROR INDICATOR AND EXIT.
89						
90	015306	052737	020000 006500	PALPHA: BIS	#ECNRB,ERWORD	;EXPECTED CHARACTER NOT RECEIVED INDICATOR
91						
92	015314	052737	100000 006500	SET15: BIS	#BIT15,ERWORD	;INDICATE THAT AN ERROR HAS OCCURRED.
93	015322	012737	177777 002206	MOV	#-1,GREASE	;ENABLE A 'GREASED' EXIT FROM THE CALLING
94						;ROUTINES.
95	015330	012603		EXITSR: MOV	(SP)+,R3	;RESTORE REGISTERS.
96	015332	012604		MOV	(SP)+,R4	
97						
98	015334	000207		RTS	PC	
99						
100						
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102						
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105						
106						

GLOBAL SUBROUTINES SECTION

FUNCTIONAL DESCRIPTION

GLOBAL PROCEDURE DELAYS

THIS PROCEDURE ACCEPTS A NUMBER IN REGISTER R5 AND CAUSES A DELAY OF 100 MICROSECONDS X R5. THE VALUE AFTER CALLING OF THIS ROUTINE IN R5 WILL BE ZERO.

INPUTS

R5 - CONTAINS THE NUMBER OF 100 USEC INCREMENTS DESIRED.

OUTPUTS

NONE

SUBORDINATE ROUTINES

NONE

FUNCTIONAL SIDE EFFECTS

THE DELAY IS AT LEAST 0.103MSEC X R5

CALLING SEQUENCE

NO PARAMETERS.
JSR PC, DELAYS

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015336	012737	000025	010054	DELAYS: MOV	#21., DELCNT	:2.91USEC. - INNER LOOP INITIALIZATION
015344	005337	010054		INLOOP: DEC	DELCNT	:2.385USEC. -
015350	100375			BPL	INLOOP	:2.385USEC. -
015352	005305			DEC	R5	0.103MSEC TO HERE
015354	100370			BPL	DELAYS	:STARTS WITH # OF .1 MSEC INCREMENTS.
015356	000207			RTS	PC	:IF R1 WERE 10,000 THEN TIME DELAY IS 1 SECOND.

GLOBAL SUBROUTINES SECTION

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GLOBAL SUBROUTINES SECTION

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1
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3 *****
4 ***** ERROR DECODE AND PRINT SUBROUTINE *****
5
6 -----
7
8 FUNCTIONAL DESCRIPTION
9
10 THIS PROCEDURE ACCEPTS ERWORD (THE ERROR FLAG-WORD) AS A PARAMETER, AND
11 DECODES THE ERRORS WHICH HAVE OCCURRED. THE ROUTINE WILL PRINT THE
12 ERROR MESSAGES ON THE CONSOLE TERMINAL. REGISTERS ARE PRESERVED. THE
13 GLOBAL VARIABLES ERRTP, ERRNR, ERRMSG AND ERRBK ARE USED AS IF THEY
14 WERE LOCAL VARIABLES. IT IS ASSUMED THAT THESE VARIABLES ARE NOT USED
15 ELSEWHERE IN THE MODULE. (THE FOUR GLOBAL VARIABLES WERE ASSIGNED BY
16 THE DIAGNOSTIC SUPERVISOR MACRO CALL ERRTBL.)
17
18 .....
19
20 INPUTS
21
22 ERWORD - REFLECTS THE ERROR STATUS OF THE PRINTER.
23 PGMCTR - PROGRAM COUNTER AT TIME OF CALL WHEN THE ERROR OCCURRED
24
25 OUTPUTS
26
27 ERWORD - CLEARED AFTER EXECUTION OF ROUTINE
28
29 IMPLICIT OUTPUTS
30
31 THE ERROR TABLE IS CHANGED (ERRTBL). ERROR MESSAGES ARE PRINTED.
32 TO THE CONSOLE TERMINAL.
33
34 SUBORDINATE ROUTINES
35
36 SUPERVISOR MACROS PRINTB,PRINTX,ERROR
37
38 CALLING SEQUENCE
39
40 JSR PC,ERRORS
41
42
43 ERRORS: MOV R3,-(SP) ;PUSH REGISTERS
44 MOV R4,-(SP) ;
45
46 015360 010346 BIT #BIT15,ERWORD ;IS ERROR FOUND BIT SET?
47 015362 010446 BEQ EXTMCR ;IF NOT SET, THEN EXIT THE SUBROUTINE.
48
49 015374 162737 000004 007314 SUB #4,PGMCTR ;ACCOUNT FOR AUTOINC OF PC WHEN PUSHED BY JSR
50
51 015402 005003 NXTBIT: CLR R3 ;LOOP COUNTER AND TABLE POINTER.
52 015404 032737 000001 006500 BIT #BIT0,ERWORD ;IS THE RIGHT-MOST BIT SET?
53 015412 001435 BEQ NXTERM ;IF NOT SET, THEN CHECK THE NEXT BIT.
54
55
56 015414 012737 000001 010072 ;MOV #1,ERRTP ;ERRDF CALL = ERRTP:1
57 015422 016337 007316 010076 ;MOV ERMSG(R3),ERRMSG ;USING THE ERPTBL SET UP BY THE
;SUPERVISOR DEVICE FATAL MACRO CALL

```

GLOBAL SUBROUTINES SECTION

```

58 015430 010337 010074      MOV      R3,ERRNBR      ;ERROR NUMBER BEING CHECKED.
59 015434      ERROR      ;MACRO CALL - WITH ABOVE PARMS
                                TRAP      C$ERROR
60
61 015436      PRINTB      #PRTBMO,PGMCTR      ;PRINT BASIC ERROR MESSAGE AND PC
                                MOV      PGMCTR,-(SP)
                                MOV      #PRTBMO,-(SP)
                                MOV      #2,-(SP)
                                MOV      SP,R0
                                TRAP      C$PNTB
                                ADD      #6,SP
62 015462      PRINTX      #PRTXMO,TRXADD      ;PRINT EXTENDED ERROR MESSAGE AND
                                MOV      TRXADD,-(SP)
                                MOV      #PRTXMO,-(SP)
                                MOV      #2,-(SP)
                                MOV      SP,R0
                                TRAP      C$PNTX
                                ADD      #6,SP
63                                ;ADDRESS OF TRANSMITTED STRING AND
64                                ;THE ERROR FLAG-WORD.
65
66 015506 062703 000002      NXTERM: ADD      #2,R3      ;POINT TO NEXT TABLE ENTRY.
67 015512 006237 006500      ASR      ERWORD      ;GET NEXT BIT INTO POSITION.
68
69 015516 022703 000034      CMP      #28.,R3      ;DONE WITH ALL THIS WHEN R3 IS 28 AND 13
70                                ;BITS HAVE BEEN CHECKED.
71 015522 001330      BNE      NXTBIT      ;REPEAT UNTIL 13 LOOPS COMPLETE.
72 015524 005037 006500      CLR      ERWORD      ;SINCE WE ARE DONE, CLEAR THE ERROR FLAG-WORD.
73
74 015530 022737 000001 006512      CMP      #1,FLTRDY      ;WAS THERE A FAILURE TO FIND TRANSMIT-READY?
75 015536 001010      BNE      DCUPA      ;IF NOT, DO CLEANUP
76 015540      PRINTB      #FXRDYM      ;PRINT TO CONSOLE: FAILED TO TRANSMIT TO PRNTR
                                MOV      #FXRDYM,-(SP)
                                MOV      #1,-(SP)
                                MOV      SP,R0
                                TRAP      C$PNTB
                                ADD      #4,SP
77
78 015560      DCUPA: DOCLN      TRAP      C$DCLN
79 015560 104444
80 015562 022737 000001 006512      EXTMCR: CMP      #1,FLTRDY
81 015570 001010      BNE      DDCUPA
82 015572      PRINTB      #FXRDYM      MOV      #FXRDYM,-(SP)
                                MOV      #1,-(SP)
                                MOV      SP,R0
                                TRAP      C$PNTB
                                ADD      #4,SP
83
84 015612 012604      DDCUPA: MOV      (SP)+,R4      ;RESTORE REGISTERS
85 015614 012603      MOV      (SP)+,R3      ;
86
87 015616 000207      RTS      PC
88
89
90

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GLOBAL SUBROUTINES SECTION

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.TITLE MISCELLANEOUS SECTIONS
.SBTTL REPORT CODING SECTION

REPORT CODING SECTION

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015620
015620
015620 000167
015622 000000
015624
015624
015624 104425

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:++
: THE REPORT CODING SECTION CONTAINS THE
: 'PRINTS' CALLS THAT GENERATE STATISTICAL REPORTS.
:--

```

BGNRPT

L\$RPT::

EXIT RPT

.WORD JSJMP
.WORD L10002-2-

.EVEN

ENDRPT

L10002: TRAP C\$RPT

.SBTTL PROTECTION TABLE

PROTECTION TABLE

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: THIS TABLE IS USED BY THE RUNTIME SERVICES
: TO PROTECT THE LOAD MEDIA.
:--

BGNPROT

L\$PROT::

015626
015626
015626 77777
015630 177777
015632 177777
015634

-1
-1
-1

: OFFSET INTO P-TABLE FOR CSR ADDRESS
: OFFSET INTO P-TABLE FOR MASSBUS ADDRESS
: OFFSET INTO P-TABLE FOR DRIVE NUMBER

ENDPROT

.SBTTL INITIALIZE SECTION

INITIALIZE SECTION

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7 015634      BGNINIT
  015634
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18
19 015634      INITLZ: READEF #EF.CONTINUE
  015634 012700 000036
  015640 104447
20 015642      BCOMPLETE      JENDIN
  015642 103425
21
22 015644      READEF #EF.NEW
  015644 012700 000035
  015650 104447
23 015652      BNCOMPLETE      NEXTU
  015652 103003
24
25
26 015654 012737 177777 002202
27 015662 005237 002202
28 015666 023737 002202 002012
29 015674 001407
30 015676      NEXTU: MOV #1,LOGUNIT
  015676 013700 002202      INC LOGUNIT
  015702 104442      CMP LOGUNIT,L$UNIT
  015704 010037 002204      BEQ ABORT
  015710      GPHARD LOGUNIT,PLOC
  015710 103364      MOV LOGUNIT,RO
  015712 000403      TRAP C$GPHRD
  015714 104444      MOV RO,PLOC
  015716 000137 016700      BCC NEXTU
  015722      BR STARTUP
  015726 012746 000340
  015732 012746 016704
  015736 012746 000004
  015742 104437
  015744 062706 000010
37
38
39 015750 005037 006500      ABORT: DOCLN
  015750 005037 006500      JENDIN: JMP ENDIN
  015750 005037 006500      STARTUP: SETVEC #4,#UBTRAP,#PRI07
  015750 005037 006500      ;SET UP TRAP VECTOR FOR ILLEGAL ADDRESS
  015750 005037 006500      MOV #PRI07,-(SP)
  015750 005037 006500      MOV #UBTRAP,-(SP)
  015750 005037 006500      MOV #4,-(SP)
  015750 005037 006500      MOV #3,-(SP)
  015750 005037 006500      TRAP C$SVEC
  015750 005037 006500      ADD #10,SP
  015750 005037 006500      ;TRAP... UNIBUS ERROR.
  015750 005037 006500      ;ASSUME NO ERRORS
  015750 005037 006500      CLR ERWORD

```

INITIALIZE SECTION

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40 015754 005037 010056          CLR      NDATA          ;ASSUME NO UNIBUS ERRORS
41 015760 005037 006512          CLR      FLTRDY        ;ASSUME NO FAILURE TO FIND TRANSMIT RDY
42 015764 005037 002206          CLR      GREASE          ;ASSUME NO PREVIOUS ERRORS
43
44 015770 017701 164210          MOV      @PLOC,R1      ;GET CSR ADDRESS
45 015774 001137                BNE      SETUPC        ;IF NOT ZERO, THEN SET UP INTERFACE ADDRESSES
46
47                                ;CSR, LPR, TCR, RBUF
48 015776 005037 010056          CALLDF: CLR      NDATA          ;ASSUME NO UNIBUS ADDRESSING ERRORS YET.
49 016002 004737 017144          JSR      PC,DFUALT      ;DO THE DEFAULT LOGIC & THEN THE LINE SIZE CODE
50 016006 000137 016570          JMP      LINCOD        ;DO LINE SIZE LOGIC
51
52 016012 005037 010056          CALLDL: CLR      NDATA          ;ASSUME NO UNIBUS ADDRESSING ERRORS YET.
53 016016 004737 016714          JSR      PC,DLSET      ;SET UP FOR A DL
54 016022 005037 006500          CLR      ERWORD        ;ASSUME NO ERRORS
55 016026 023727 010056 000001  CMP      NDATA,#1      ;NO DEVICE AT THAT ADDRESS?
56 016034 001011                BNE      EMPTI2        ;NO PROBLEM WITH UNIBUS
57 016036                PRINTF  #FAILDL        ;FAILED TO FIND DEVICE MESSAGE
    016036 012746 012141          MOV      #FAILDL,-(SP)
    016042 012746 000001          MOV      #1,-(SP)
    016046 010600                MOV      SP,R0
    016050 104417                TRAP     C$PNTF
    016052 062706 000004          ADD      #4,SP
58 016056                DOCLN                ;EXIT TEST SEQUENCE
    016056 104444                TRAP     C$DCLN
59
60 016060 012700 000144          EMPTI2: MOV      #100.,R0      ;ASSUME NO MORE THAN 100 CHARACTERS IN BUFFER.
61 016064 005300          EMPTL2: DEC      R0              ;COUNT DOWN ONE FOR EACH CHARACTER
62 016066 002407                BLT      NONDTA          ;STOP TRYING TO EMPTY THE BUFFER. ASSUME HOPELESS.
63
64 016070 032777 000200 171200  BIT      #BIT7,@RCSR      ;IS THERE A CHARACTER IN THE RBUF?
65 016076 001403                BEQ      NONDTA          ;IF NO CHARACTER IN RBUF, THEN CONTINUE...
66
67 016100 005777 171176          TST      @RBUF          ;EMPTY RBUF. IGNORE R IFFER CONTENTS.
68 016104 000767                BR      EMPTL2          ;CHECK FOR RDONE AGAIN AND EMPTY BUFFER
69
70
71 016106 005037 006500          NONDTA: CLR      ERWORD        ;ASSUME NO ERRORS
72 016112 005037 010056          CLR      NDATA          ;ASSUME NO UNIBUS ERRORS
73 016116 005037 006512          CLR      FLTRDY        ;ASSUME NO FAILURE TO FIND TRANSMIT RDY
74 016122 005037 002206          CLR      GREASE          ;ASSUME NO PREVIOUS ERRORS.
75
76 016126 012701 002210          MOV      #STSRES,R1      ;ADDRESS OF REQUEST STATUS SEQUENCE
77 016132 012702 000002          MOV      #2,R2
78 016136 005003                CLR      R3
79 016140 004737 012632          JSR      PC,XMIT      ;SEND ANSWER BACK SEQUENCE TO PRINTER.
80 016144 042737 100000 006500  BIC      #BIT15,ERWORD      ;EOT MAY HAVE OCCURED. IGNORE IT.
81 016152 023727 006512 000001  CMP      FLTRDY,#1      ;FAIL TO FIND TRDY?
82 016160 001404                BEQ      PFM1          ;PRINT FAILURE MESSAGE
83
84 016162 023727 010056 000001  CMP      NDATA,#1      ;ANY UNIBUS ERRORS?
85 016170 001011                BNE      NONDT2        ;IF SO, PRINT FAILURE MESSAGE.
86
87 016172                PFM1: PRINTF  #FAILDL        ;PRINT FAILURE MESSAGE
    016172 012746 012141          MOV      #FAILDL,-(SP)
    016176 012746 000001          MOV      #1,-(SP)
    016202 010600                MOV      SP,R0

```

INITIALIZE SECTION

016204	104417				TRAP	C\$PNTF
016206	062706	000004			ADD	#4,SP
88 016212			DOCLN			
016212	104444				TRAP	C\$DCLN
89						
90 016214	004737	014126	NONDT2:	JSR	PC,GETCHR	;CHECK FOR A RESPONSE CHARACTER
91 016220	120437	006521		CMPB	R4,ESCAPE	;WAS THE CHARACTER AN ESCAPE CHARACTER?
92 016224	001411			BEQ	NONDT3	;GET THE REST IF ESC FOUND.
93 016226				PRINTF	#FAILDL	;PRINT FAILURE MESSAGE FOR DL SETUP.
016226	012746	012141			MOV	#FAILDL,-(SP)
016232	012746	000001			MOV	#1,-(SP)
016236	010600				MOV	SP,R0
016240	104417				TRAP	C\$PNTF
016242	062706	000004			ADD	#4,SP
94 016246			DOCLN			
016246	104444				TRAP	C\$DCLN
95						
96 016250	004737	014126	NONDT3:	JSR	PC,GETCHR	;GET THE 2ND CHARACTER IN RESPONSE.
97 016254	004737	014126		JSR	PC,GETCHR	: 3RD
98 016260	004737	014126		JSR	PC,GETCHR	: 4TH
99 016264	004737	014126		JSR	PC,GETCHR	: 5TH AND FINAL RESPONSE CHARACTER.
100						
101						
102 016270	000137	016570		JMP	LINCOD	;AND THEN DO THE LINE SIZE LOGIC.
103						
104 016274	012700	000002	SETUPC:	MOV	#2,R0	;RESPONSE FROM PTABLE. ?DZ (Y,N)?
105 016300	063700	002204		ADD	PLOC,R0	;IF = 0 THEN MULTILINE. IF 1 THEN SINGLE LINE
106 016304	011001			MOV	(R0),R1	;INTERFACE.
107 016306	100633			BMI	CALLDF	
108						
109 016310	001240			BNE	CALLDL	;IF = 1 THEN SINGLE LINE.
110						
111 016312	005037	010056		CLR	NDA	;ASSUME NO ADDRESSING (UNIBUS) ERRORS YET.
112 016316	004737	017004		JSR	PC,DZSET	;IF = 0 THEN MULTILINE.
113						
114						
115 016322	005037	006500		CLR	ERWORD	;ASSUME NO ERRORS
116 016326	023727	010056	000001	CMP	NDA,#1	;NO DEVICE AT THAT ADDRESS?
117 016334	001011			BNE	EMPTY3	;NO PROBLEM WITH UNIBUS
118 016336				PRINTF	#FAILDZ	;FAILED TO FIND DEVICE MESSAGE
016336	012746	012236			MOV	#FAILDZ,-(SP)
016342	012746	000001			MOV	#1,-(SP)
016346	010600				MOV	SP,R0
016350	104417				TRAP	C\$PNTF
016352	062706	000004			ADD	#4,SP
119 016356			DOCLN			
016356	104444				TRAP	C\$DCLN
120						
121 016360	012700	000144	EMPTY3:	MOV	#100.,R0	;ASSUME NO MORE THAN 100 CHARACTERS IN BUFFER.
122 016364	005300		EMPTY3:	DEC	R0	;COUNT DOWN ONE FOR EACH CHARACTER
123 016366	002407			BLT	NONDZA	;STOP TRYING TO EMPTY THE BUFFER. ASSUME HOPELESS.
124						
125 016370	032777	000200	170700	BIT	#BIT7,@RCSR	;IS THERE A CHARACTER IN THE RBUF?
126 016376	001403			BEQ	NONDZA	;IF NO CHARACTER IN RBUF, THEN CONTINUE...
127						
128 016400	005777	170676		TST	@RBUF	;EMPTY RBUF. IGNORE BUFFER CONTENTS.
129 016404	000767			BR	EMPTY3	;CHECK FOR RDONE AGAIN AND EMPTY BUFFER

INITIALIZE SECTION

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130
131
132
133 016406 005037 006500      NONDZA: CLR      ERWORD      ;ASSUME NO ERRORS
134 016412 005037 010056      CLR      NDATA      ;ASSUME NO UNIBUS ERRORS
135 016416 005037 006512      CLR      FLTRDY     ;ASSUME NO FAILURE TO FIND TRANSMIT RDY
136 016422 005037 002206      CLR      GREASE     ;ASSUME NO PREVIOUS ERRORS.
137
138 016426 012701 002210      MOV      #STSRES,R1    ;SEND REQUEST STATUS SSEQUENCE.
139 016432 012702 000002      MOV      #2,R2      ;
140 016436 005003              CLR      R3          ;
141 016440 004737 012632      JSR      PC,XMIT      ;SEND REQUEST STATUS SEQUENCE TO PRINTER.
142 016444 042737 100000 006500 BIC      #BIT15,ERWORD ;IGNORE POSSIBLE EOT CONDITION.
143 016452 023727 006512 000001 CMP      FLTRDY,#1  ;FAILURE TO FIND TRDY?
144 016460 001404              BEQ      PRTM2        ;PRINT FAILURE MESSAGE
145
146 016462 023727 010056 000001 CMP      NDATA,#1  ;ANY UNIBUS ERRORS?
147 016470 001011              BNE      NONDZ2      ;IF SO, PRINT FAILURE MESSAGE.
148
149 016472              PRTM2: PRINTF  #FAILDZ      ;PRINT FAILURE MESSAGE
150 016472 012746 012236              MOV      #FAILDZ,-(SP)
151 016476 012746 000001              MOV      #1,-(SP)
152 016502 010600              MOV      SP,R0
153 016504 104417              TRAP     ($PNTF
154 016506 062706 000004              ADD      #4,SP
155 016512              DOCLN          ;EXIT TESTING SEQUENCE
156 016512 104444              TRAP     ($DCLN
157
158 016514 004737 014126      NONDZ2: JSR      PC,GETCHR  ;CHECK FOR A RESPONSE CHARACTER
159 016520 120437 006521      CMPB     R4,ESCAPE ;WAS THE CHARACTER AN ESCAPE CHARACTER?
160 016524 001411              BEQ      NONDZ3      ;GET THE RST IF ESC FOUND.
161 016526              PRINTF  #FAILDZ      ;PRINT FAILURE MESSAGE FOR DL SETUP.
162 016526 012746 012236              MOV      #FAILDZ,-(SP)
163 016532 012746 000001              MOV      #1,-(SP)
164 016536 010600              MOV      SP,R0
165 016540 104417              TRAP     ($PNTF
166 016542 062706 000004              ADD      #4,SP
167 016546              DOCLN          ;EXIT TESTING SEQUENCE
168 016546 104444              TRAP     ($DCLN
169
170 016550 004737 014126      NONDZ3: JSR      PC,GETCHR  ;GET THE 2ND CHARACTER IN RESPONSE.
171 016554 004737 014126      JSR      PC,GETCHR  ;
172 016560 004737 014126      JSR      PC,GETCHR  ;
173 016564 004737 014126      JSR      PC,GETCHR  ;
174 016564 004737 014126      JSR      PC,GETCHR  ;
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INITIALIZE SECTION

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175 016626 013701 010042      INF IN:  MOV    LINSIZ,R1      ;GET THE LINE SIZE. NUMBER OF CHARACTERS/LINE
176 016632 006301              ASL     R1              ;X 2
177 016634 006301              ASL     R1              ;X 4
178 016636 010137 010040      MOV     R1,LINN          ;SAVE LINSIZ X 4
179 016642 006301              ASL     R1              ;X 8
180 016644 060137 010040      ADD     R1,LINN          ;LINSIZ X (4+8) = LINSIZ X 12 => LINN
181
182 016650 005037 006500      CLR     ERWORD          ;ASSUME NO ERRORS - YET.
183 016654 012700 000004      CLRVEC  #4              ;RESET VECTOR TO ORIGINAL STATUS
                                MOV     #4,R0
                                TRAP    C$CVEC
184
185
186 016662 032777 000200 170406  EMPTYR: BIT    #BIT7,@RCSR      ;EMPTY RECEIVER BUFFER...
187 016670 001403              BEQ     ENDIN              ;IS THERE A CHARACTER IN THE RBUF?
188
189 016672 005777 170404      TST     @RBUF            ;EMPTY RBUF. IGNORE BUFFER CONTENTS.
190 016676 000771              BR      EMPTYR            ;CHECK FOR RDONE AGAIN AND EMPTY BUFFER
191
192
193 016700 010432              ENDIN:  EXIT    INIT
                                TRAP    C$EXIT
                                .WORD   L10004-.
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225 016704 010432
    016704
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FUNCTIONAL DESCRIPTION

TRAP HANDLER FOR UNIBUS FAILURE TO FIND A DEVICE AT THE REFERENCED ADDRESS. ALL THAT IS NECESSARY IS TO INDICATE THAT THE TRAP ROUTINE HAS BEEN ACCESSED (THAT A DEVICE WAS UNSUCCESSFULLY ADDRESSED) AND RETURN FOR ANOTHER TRY.

INPUTS

NONE

OUTPUTS

NDATA - IF THIS ROUTINE IS PERFORMED, NDATA WILL BE SET.

SUBORDINATE ROUTINES

NONE

CALLING SEQUENCE

WHEN A TRAP OCCURS THE ROUTINE IS CALLED.

BGNSRV UBTRAP

;TRAP SERVICE ROUTINE

UBTRAP::

INITIALIZE SECTION

```

227 016704 012737 000001 010056 UBTRAP: MOV    #1,NDATA      ;NO DEVICE AT THAT ADDRESS  INDICATED.
228
229 016712                                ENDSRV
      016712                                L10005:
      016712 000002                                RTI

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FUNCTIONAL DESCRIPTION

LOCAL PROCEDURE DLSET

THIS PROCEDURE WILL TAKE THE CSR ADDRESS GIVEN IN CSRADD AND SET UP
THE ADDRESSES FOR THE RCSR, THE XCSR, AND THE RBUF AND XBUF REGISTERS.

THIS CODE IS FOR SINGLE LINE INTERFACES ONLY.

INPUTS

CSRADD - ADDRESS OF CSR REGISTER.

OUTPUTS

NONE

SUBORDINATE ROUTINES

NONE

FUNCTIONAL SIDE EFFECTS

INTERFACE REGISTERS ARE SET UP IF THE CSR ADDRESS IS VALID.

CALLING SEQUENCE

PLACE ADDRESS OF CSR REGISTER INTO CSR ADD.
JSR PC,DLSET

```

273 016714 017701 163264 DLSET: MOV    @PLOC,R1      ;SET UP CSR ADDRESS & BUFFER ADDRESSES.
274 016720 010137 007276      MOV    R1,RCSR      ;ADDRESS OF RECEIVER CSR REGISTER.
275
276 016724 062701 000002      ADD     #2,R1
277 016730 010137 007302      MOV    R1,RBUF      ;ADDRESS OF RECEIVER BUFFER REGISTER
278 016734 062701 000002      ADD     #2,R1
279 016740 010137 007300      MOV    R1,XCSR      ;ADDRESS OF THE TRANSMITTER CSR REGISTER.
280 016744 062701 000002      ADD     #2,R1
281 016750 010137 007304      MOV    R1,XBUF      ;ADDRESS OF THE TRANSMITTER BUFFER REGISTER.

```

INITIALIZE SECTION

```

282
283 016754 005037 C10052      CLR      MLTLIN      ;INDICATE THAT THIS IS A SINGLE LINE INTERFACE.
284 016760 012737 000200 010044  MOV      #BIT7,TRDYBT ;PLACEMENT OF XMIT READY BIT FOR SINGLE LINE
285                                     ;INTERFACES.
286 016766 012737 006440 007306  MOV      #JUNKPL,LPR  ;WHEN LPR IS STJFFED, CONTENTS GO TO JUNKPL
287 016774 012737 006440 007310  MOV      #JUNKPL,TCR  ;WHEN SENCHR STUFFS TCR, CONTENTS GO TO JUNKPL
288
289 017002 000207      RTS      PC
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FUNCTIONAL DESCRIPTION

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LOCAL PROCEDURE DZSET:

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THIS ROUTINE WILL ACCEPT THE ADDRESS IN THE GLOBAL VARIABLE CSRADD
AND THEN SET UP THE VARIOUS MULTILINE INTERFACE REGISTERS ASSOCIATED
WITH THE DZ11 OPTION: CSR, RBUF, LPR, TCR, MSR (IGNORED), AND TDR.

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INPUTS

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CSRADD - ADDRESS ASSUMED AS THE CSR REGISTER.

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OUTPUTS

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NONE

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SUBORDINATE ROUTINES

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NONE

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FUNCTIONAL SIDE EFFECTS

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THE DZ11 INTERFACE ADDRESSES ARE SET UP IF THE CSR ADDRESS IS VALID.

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CALLING SEQUENCE

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THE CSR ADDRESS MUST BE IN CSRADD. THE CALL:
JSR PC,DZSET

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330 017004 017701 163174      DZSET:  MOV      @PLOC,R1      ;GET THE CSR ADDRESS TO SET UP INTERFACE REG'S
331 017010 010137 007276      MOV      R1,RCSR      ;ADDRESS OF RCSR AND THE XCSR WILL BE THE SAME
332                                     ;IN A DZ11. THE TRDYBT XMIT READY BIT
333                                     ;WILL CHANGE, HOWEVER.
334 017014 010137 007300      MOV      R1,XCSR      ;AND POINT TO THE NEXT REGISTER ADDRESS
335
336 017020 062701 000002      ADD      #2,R1
337 017024 010137 007302      MOV      R1,RBUF      ;ADDRESS OF THE RECEIVER BUFFER
338 017030 010137 007306      MOV      R1,LPR      ;ADDRESS OF THE LINE PARAMETER REGISTER

```

INITIALIZE SECTION

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339
340 017034 062701 000002      ADD    #2,R1
341 017040 010137 007310      MOV    R1,TCR          ;ADDRESS OF THE TRANSMIT CONTROL REGISTER
342
343 017044 062701 000002      ADD    #2,R1
344 017050 010137 007312      MOV    R1,TDR          ;ADDRESS OF THE TRANSMIT DATA REGISTER
345
346 017054 013737 007312 007304  MOV    TDR,XBUF          ;WHEN REFERENCING THE XBUF, YOU WILL WANT
347                                     ;THE TDR - TRANSMIT DATA REGISTER.
348
349 017062 012777 000040 170206  MOV    #BIT5,@RCSR          ;CLEARS INTERRUPT ENABLE BITS AND
350                                     ;SETS MASTER SCAN ENABLE.
351 017070 012737 100000 010044  MOV    #BIT15,TRDYBT        ;DEFINE TRANSMIT READY BIT FOR DZ11 CSR.
352
353 017076 012700 000004          MOV    #4,R0
354 017102 063700 002204          ADD    PLOC,R0          ;PTABLE ENTRY. ?DZ CHANNEL NUMBER?
355 017106 011002                MOV    (R0),R2          ;CHANNEL TO BE SET INTO TCR REGISTER
356 017110 006302                ASL     R2              ;CHANGE THE RANGE FROM 0-7 TO 0-14
357                                     ;TO BE USED AS A TABLE OFFSET.
358 017112 016237 006444 006436  MOV    TCRTBL(R2),TCRENA        ;GET MASK FROM TABLE, PLACE IN TCR REG.
359                                     ;TO DETERMINE THE CHANNEL CHOSEN
360 017120 012700 000004          MOV    #4,R0          ;PTABLE ENTRY #3
361 017124 063700 002204          ADD    PLOC,R0          ;PTABLE ENTRY ADDRESS FOR CHANNEL #.
362 017130 051037 006442          BIS    (R0),LPRINI        ;NEW LPR STATUS WITH CH # INCLUDED.
363 017134 013777 006442 170144  MOV    LPRINI,@LPR          ;SET UP LPR ON DZ INTERFACE
364
365 017142 000207                RTS     PC
366
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 :FUNCTIONAL DESCRIPTION

:LOCAL PROCEDURE DFAULT:

:THIS CODE WILL COMPUTE THE CSR ADDRESS AND SET UP THE INTERFACE
 :REGISTER ADDRESSES. THE CSR ADDRESSES ARE CHECKED BY SENDING THE
 :PRINTER AN 'ANSWER BACK' QUERY AND CHECKING FOR THE APPROPRIATE
 :RESPONSE FROM THE PRINTER.
 :*****

:INPUTS

:NONE

:OUTPUTS

:CSRADD -ADDRESS OF THE CONTROL STATUS REGISTER
 :RBUF -BUFFER ADDRESS
 :XCSR -TRANSMITTER CSR
 :RCSR -RECEIVER CSR
 :XBUF -TRANSMITTER BUFFER ADDRESS

INITIALIZE SECTION

```

396      ; MLTLIN -IS =1 IF THE INTERFACE IS A DZ11.
397
398      ; SUBORDINATE ROUTINES
399
400      ; GETCHR - GET A CHARACTER.
401      ; XMIT - SEND A SEQUENCE OF CHARACTERS TO THE PRINTER.
402
403      ; FUNCTIONAL SIDE EFFECTS
404
405      ; THE INTERFACE REGISTERS SHOULD BE SET UP.
406
407      ; CALLING SEQUENCE
408
409      ; JSR PC,DEFAULT
410
411
412
413
414
415 C17144 013777 0C5252 163032 DEFAULT: MOV DLDFLT,@PLOC ;ASSUME A SINGLE LINE INTERFACE
416
417 017152 004737 016714 JSR PC,DLSET ;SET UP THE REGISTER ADDRESSES
418
419 017156 023727 010056 000001 CMP NDATA,#1 ;WAS THERE AN ILLEGAL ADDRESSING ERROR?
420 017164 001462 BEQ DZDCOD ;IF SO, DL SETUP FAILED. TRY DZ SETUP.
421
422 017166 005037 006500 CLR ERWORD ;ASSUME THAT NO ERRORS HAVE BEEN FOUND - YET.
423
424 017172 012700 000144 EMPT14: MOV #100.,R0 ;ASSUME NO MORE THAN 100 CHARACTERS IN BUFFER.
425 017176 005300 EMP4: DEC R0 ;COUNT DOWN ONE FOR EACH CHARACTER
426 017200 002407 BLT ABSND ;STOP TRYING TO EMPTY THE BUFFER. ASSUME HOPELESS.
427
428 017202 032777 000200 170066 BIT #BIT7,@RCSR ;IS THERE A CHARACTER IN THE RBUF?
429 017210 001403 BEQ ABSND ;IF NO CHARACTER IN RBUF, THEN CONTINUE...
430
431 017212 005777 170064 TST @RBUF ;EMPTY RBUF. IGNORE BUFFER CONTENTS.
432 017216 000767 BR EMP4 ;CHECK FOR RDONE AGAIN AND EMPTY BUFFER
433
434 017220 005037 006500 ABSND: CLR ERWORD ;ASSUME NO ERRORS
435 017224 005037 010056 CLR NDATA ;ASSUME NO UNIBUS ERRORS
436 017230 005037 006512 CLR FLTRDY ;ASSUME NO FAILURE TO FIND TRANSMIT RDY
437 017234 005037 002206 CLR GREASE ;ASSUME NO PREVIOUS ERRORS.
438
439 017240 012701 002210 MOV #STSRES,R1 ;SEND REQUEST STATUS SEQUENCE.
440 017244 012702 000002 MOV #2,R2 ;
441 017250 005003 CLR R3 ;
442 017252 004737 012632 JSR PC,XMIT ;SEND ANSWER-BACK SEQUENCE TO PRINTER.
443 017256 042737 100000 006500 BIC #BIT15,ERWORD ;IGNORE POSSIBLE EOT INDICATION.
444
445 017264 023727 010056 000001 CMP NDATA,#1 ;IF SET THEN TRY MULTILINE ADDRESS
446 017272 001417 BEQ DZDCOD ;IF NOT SET, DO THE DZ CHECK
447
448 017274 005004 CLR R4 ;BR4 SHOULD GET ESCAPE CHAR IF DL PRESENT.
449 017276 004737 014126 JSR PC,GETCHR ;THE DELAY SHOULD BE LONG ENOUGH TO PERMIT
450 ;THE PRINTER TO RESPOND.
451 ;NOW GET THE FIVE RESPONSE CHARACTERS
452 017302 120437 006521 CMPS R4,ESCAPE ;IS IT AN ESCAPE CHARACTER?

```

INITIALIZE SECTION

453	017306	001011		BNE	DZDCOD	;NO? THEN TRY DZ ADDRESS DEFAULT.
454	017310	004737	014126	JSR	PC,GETCHR	;
455	017314	004737	014126	JSR	PC,GETCHR	;
456	017320	004737	014126	JSR	PC,GETCHR	;
457	017324	004737	014126	JSR	PC,GETCHR	;THE FINAL CHARACTER SHOULD BE A 'C'
458	017330	000514		BR	DONEDF	;YES? THEN SUCCESSFULLY COMPLETED.
459						
460	017332	005037	006500	DZDCOD: CLR	ERWORD	;ASSUME NO ERRORS
461	017336	005037	010056	CLR	NDA	;ASSUME NO UNIBUS ERRORS
462	017342	005037	006512	CLR	FLTRDY	;ASSUME NO FAILURE TO FIND TRANSMIT RDY
463	017346	005037	002206	CLR	GREASE	;ASSUME NO PREVIOUS ERRORS.
464						
465	017352	013777	005254 162624	MOV	DZDFLT,@PLOC	;ASSUME A DZ INTERFACE AT ADDRESS 776010
466	017360	004737	017004	JSR	PC,DZSET	;SET UP REGISTERS FOR A DZ11 INTERFACE
467						
468	017364	023727	010056 000001	CMP	NDA,#1	;HAS AN ILLEGAL ADDRESS ERROR OCCURRED?
469	017372	001462		BEQ	FAILDF	;IF SO, BOTH DL AND DZ DEAFUALTS HAVE FAILED.
470						SO LET USER KNOW.
471						
472	017374	005003		CLR	R3	;DISABLE BIDIRECTIONAL PRINTING LOGIC
473	017376	005037	006500	CLR	ERWORD	;ASSUME NO ERRORS HAVE YET OCCURRED.
474						
475	017402	012700	000144	EMPTY5: MOV	#100.,R0	;ASSUME NO MORE THAN 100 CHARACTERS IN BUFFER.
476	017406	005300		EMP5: DEC	R0	;COUNT DOWN ONE FOR EACH CHARACTER
477	017410	002407		BLT	ABS5	;STOP TRYING TO EMPTY THE BUFFER. ASSUME HOPELESS.
478						
479	017412	032777	000200 167656	BIT	#BIT7,@RCSR	;IS THERE A CHARACTER IN THE RBUF?
480	017420	001403		BEQ	ABS5	;IF NO CHARACTER IN RBUF, THEN CONTINUE...
481						
482	017422	005777	167654	TST	@RBUF	;EMPTY RBUF. IGNORE BUFFER CONTENTS.
483	017426	000767		BR	EMP5	;CHECK FOR RDONE AGAIN AND EMPTY BUFFER
484						
485	017430	005037	006500	ABS5: CLR	ERWORD	;ASSUME NO ERRORS
486	017434	005037	010056	CLR	NDA	;ASSUME NO UNIBUS ERRORS
487	017440	005037	006512	CLR	FLTRDY	;ASSUME NO FAILURE TO FIND TRANSMIT RDY
488	017444	005037	002206	CLR	GREASE	;ASSUME NO PREVIOUS ERRORS.
489						
490	017450	012701	002210	MOV	#STSRES,R1	;SEND REQ STATUS SEQUENCE.
491	017454	012702	000002	MOV	#2,R2	;
492	017460	005003		CLR	R3	;
493	017462	004737	012632	JSR	PC,XMIT	;SEND REQ STATUS SEQUENCE TO PRINTER.
494	017466	042737	100000 006500	BIC	#BIT15,ERWORD	;IGNORE POSSIBLE EOT INDICATION.
495						
496	017474	023727	010056 000001	CMP	NDA,#1	;CHECK FOR OCCURANCE OF TRAP...
497	017502	001416		BEQ	FAILDF	;IF SET THEN PRINT AN ERROR AND START OVER
498						
499	017504	004737	014126	JSR	PC,GETCHR	;DELAY SHOULD GIVE PRINTEWR ENOUGH TIME TO
500						RESPOND TO ANSWER-BACK SEQUENCE.
501						
502						
503	017510	120437	006521	CMPS	R4,ESCAPE	;GET THE FIVE CHARACTER RESPONSE TO THE QUERY
504	017514	001011		BNE	FAILDF	;EXPECTING ESCAPE CHARACTER IF DZ PRESENT.
505	017516	004737	014126	JSR	PC,GETCHR	;DEFAULT ADDRESSES DIDN'T WORK OUT.
506	017522	004737	014126	JSR	PC,GETCHR	;
507	017526	004737	014126	JSR	PC,GETCHR	;
508	017532	004737	014126	JSR	PC,GETCHR	;
509	017536	000411		BR	DONEDF	;LAST CHARACTER A 'C'(LOWER CASE)
						;FOUND THE ADDRESS. EXIT.

INITIALIZE SECTION

```

510
511 017540          FAILDF: PRINTF  #FAILM          ;PRINT FAILURE MESSAGE AT CONSOLE
    017540 012746 011622          MOV  #FAILM,-(SP)
    017544 012746 000001          MOV  #1,-(SP)
    017550 010600          MOV  SP,R0
    017552 104417          TRAP  C$PRINTF
    017554 062706 000004          ADD  #4,SP
512 017560          DOCLN          ;EXIT TESTING SEQUENCE
    017560 104444          TRAP  C$DCLN
513
514 017562 000207          DONELF: RTS    PC
515
516
517
518          .EVEN
519
520
521
522
523 C17564          ENDINIT
    017564          L10004:
    017564 104411          TRAP  C$INIT
524
525          .SBTTL  AUTODROP SECTION
526
527 017566          BGNAUTO
    017566          L$AUTO::
528
529 017566          ENDAUTO
    017566          L10006:
    017566 104461          TRAP  C$AUTO
530
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533
534
535
536          .SBTTL  CLEANUP CODING SECTION

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CLEANUP CODING SECTION

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

```

BGNCLN

L\$CLEAN::

```

MOV    #DUMMYS,R1    ;FIX INTERFACE TO ACCEPT PRINTER RESET.
MOV    #8.,R2        :
CLR    R3             :
JSR    PC,XMIT        ;SEND DUMMY SEQUENCE

MOV    #RESET,R1     ;TRANSMIT PRINTER RESET SEQUENCE (ADDRESS)
MOV    #2,R2          ;2 ARGUMENT LIST
CLR    R3             ;NO BIDIRECTIONAL PRINTING NECESSARY
JSR    PC,XMIT        ;SEND SEQUENCE TO PRINTER

```

EXIT CLN

```

TRAP    C$EXIT
.WORD   L10007-.

```

.EVEN

ENDCLN

L10007:

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TRAP    C$CLEAN

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.EVEN

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.TITLE HARDWARE TESTS
.SBTTL TEST 1: PRINTER SELF TEST

```

TEST 1: PRINTER SELF TEST

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5 017632          BGNTST
   017632          T1::
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18
19 017632 004737 014412  TEST1: JSR    PC,INITCD      ;INITIALIZE FOR THIS TEST
20
21 017636          RFLAGS  FLAGS      ;READ THE START TIME SUPERVISOR FLAGS
   017636 104421          TRAP          CSRFLA
   017640 010037 005260          MOV          RO,FLAGS
22 017644 032737 000010 005260  BIT    #LOT,FLAGS      ;WAS LOOP ON TEST ASKED FOR?
23 017652 001010          BNE    T1LOT      ;IF LOT THEN DON'T PRINT TEST TITLE.
24
25 017654          PRINTB  #TITLE1      ;CONSOLE TEST TITLE
   017654 012746 002333          MOV          #TITLE1,(SP)
   017660 012746 000001          MOV          #1,-(SP)
   017664 010600          MOV          SP,RO
   017666 104414          TRAP          ($PNTB
   017670 062706 000004          ADD          #4,SP
26
27 017674 012701 002255  T1LOT: MOV    #SLFTST,R1      ;ADDRESS OF SELF TEST ARGUMENT SEQUENCE
28 017700 012702 000002      MOV    #2,R2      ;2 CHARACTERS IN SEQUENCE
29 017704 005003          CLR    R3      ;DISABLE BIDIRECTIONAL PRINTING
30 017706 004737 012632      JSR    PC,XMIT      ;SEND THE ARGUMENT LIST
31
32 017712 023727 002206 177777      CMP    GREASE,#-1      ;WAS THERE A 'GREASED' EXIT FROM XMIT?
33 017720 001402          BEQ    PRNTIT      ;IF SO, PREPARE TO PRINT TO CONSOLE
34
35 017722 004737 015132          JSR    PC,STATS      ;RECEIVE STATUS AND FIT TO ERWORD.
36 017726 004737 015360  PRNTIT: JSR    PC,ERRORS      ;DECODE ERROR WORD & PRINT ERROR MESSAGES
37
38 017732 004737 014126  CHKN6: JSR    PC,GETCHR      ;GET ANOTHER (SIXTH) CHARACTER
39 017736 123704 006520          CMPB   XON,R4      ;IS IT AN 'XON'?
40 017742 001406          BEQ    STSCAL      ;IF OK, (XON FOUND) THEN CHECK STATUS
41 017744 052737 020000 006500      BIS    #BIT13,ERWORD      ;SET ECNRB
42 017752 052737 100000 006500      BIS    #BIT15,ERWORD      ;INDICATE ERROR
43
44 017760 004737 015360  STSCAL: JSR    PC,ERRORS      ;CHECK FOR ERRORS
45
46
47 017764          ENDTST
   017764
   017764 104401          _10010: TRAP    #SETST

```

TEST 1: PRINTER SELF TEST

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.SBTTL TEST 2: UNDERLINE / NO-UNDERLINE MODE TEST

TEST 2: UNDERLINE / NO-UNDERLINE MODE TEST

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4 017766          BGNTST
5 017766
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17
18 017766 004737 014412  TEST2: JSR    PC,INITCD      ;INITIALIZE TEST
19
20 017772          RFLAGS  FLAGS      ;READ START TIME SUPERVISOR FLAGS
21 017772 104421          TRAP    C$RFLA
22 017774 010037 005260          MOV    RO,FLAGS
23 020000 032737 000010 005260  BIT    #LOT,FLAGS    ;WAS THE LOOP ON TEST FLAG SET?
24 020006 001027          BNE    T2LOT      ;SKIP PRINT OF TEST TITLE IF 'LOT'.
25
26 020010          PRINTB #TITLE2      ;CONSOLE PRINT TITLE
27 020010 012746 002366          MOV    #TITLE2,-(SP)
28 020014 012746 000001          MOV    #1,-(SP)
29 020020 010600          MOV    SP,RO
30 020022 104414          TRAP    C$PNTB
31 020024 062706 000004          ADD    #4,SP
32
33 020030 052737 040000 006500  BIS    #BIT14,ERWORD  ;INHIBIT ERROR HANG-UPS
34 020036 012701 002366          MOV    #TITLE2,R1    ;ADDRESS OF STRING TO PRINT (TITLE)
35 020042 062701 000004          ADD    #4,R1        ;SKIP FIRST FOUR CHARACTERS
36 020046 012702 000053          MOV    #43,R2       ;43 CHARACTERS TO PRINT IN STRING
37 020052 005003          CLR    R3                ;DISABLE BIDIRECTIONAL
38 020054 004737 012632          JSR    PC,XMIT      ;SEND THE ARGUMENT SEQUENCE
39 020060 042737 040000 006500  BIC    #BIT14,ERWORD  ;RE-ENABLE ERROR HANG-UPS
40
41 020066 012704 177777          T2LOT: MOV    #-1,R4    ;CHARACTER COUNT
42 020072 012701 006531          PLOOP: MOV    #SCA,R1    ; ADDRESS OF ASCII 'A'
43 020076 012702 000001          MOV    #1,R2        ;ONE CHARACTER
44 020102 005003          CLR    R3                ;NO BIDIRECTIONAL PRINTING
45 020104 004737 012632          JSR    PC,XMIT      ;SEND 'A' TO PRINTER FOR PRINTING.
46 020110 004737 015360          JSR    PC,ERRORS    ;CHECK FOR ERRORS
47
48 020114 012700 000001          MOV    #1,RO
49 020120 126027 002266 000041  CMPB  STULMD(RO),#ONE ;IS THE UNDERLINE MODE SET?
50 020126 001004          BNE    SETONE            ;NO, THEN CHANGE TO UNDERLINE MODE
51 020130 112760 000040 002266  MOVB  #ZERO,STULMD(RO) ;YES, THEN CHANGE TO NON-UNDERLINE MODE
52 020136 000405          BR     NEWMOD           ;TRANSMIT MODE CHANGE AT NEWMOD
53 020140 012700 000001          SETONE: MOV    #1,RO
54 020144 112760 000041 002266  MOVB  #ONE,STULMD(RO) ;CHANGE TO UNDERLINE MODE
55
56 020152 012701 002266          NEWMOD: MOV    #STULMD,R1    ;ADDRESS OF ARGUMENT STRING

```

TEST 2: UNDERLINE / NO-UNDERLINE MODE TEST

50	020156	012702	000003	MOV	#3,R2	;WHICH IS THREE CHARACTERS LOONG
51	020162	004737	012632	JSR	PC,XMIT	;SEND THE SEQUENCE
52	020166	004737	015360	JSR	PC,ERRORS	;CHECK FOR ERRORS
53						
54	020172	005204		INC	R4	;UPDATE COUNT OF CHARACTERS.
55	020174	020437	010042	CMP	R4,LINSIZ	;PRINTED A LINE YET?
56	020200	001334		BNE	PLOOP	;DO LOOP UNTIL DONE
57						
58	020202	012701	002313	MOV	#CR,R1	;ADDRESS OF <CRLF>
59	020206	012702	000002	MOV	#2,R2	;BOTH CHARACTERS
60	020212	004737	012632	JSR	PC,XMIT	;PRINT (ACCUMULATE) <CR><LF>
61	020216	004737	015360	JSR	PC,ERRORS	;CHECK FOR ERRORS.
62						
63	020222			ENDTST		
	020222					L10011:
	020222	104401				TRAP
						CSETST
64						
65						
66						
67						
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74						

.SBTTL TEST 3: HAMMER HIT COUNT TEST

TEST 3: HAMMER HIT COUNT TEST

50	020366	005003		CLR	R3		;DISABLE BIDIRECTIONAL PRINTING FOR NOW.
51	020370	004737	012632	JSR	PC,XMIT		;SEND THE LIST - ADJUST HIT COUNT
52	020374	004737	015360	JSR	PC,ERRORS		;CHECK FOR ERRORS.
53							
54	020400	005004		CLR	R4		;COUNT OF CHARACTERS
55	020402	012701	006522	CHRL00: MOV	#SNGCHR,R1		;ADDRESS OF CHAR TO BE PRINTED
56	020406	012702	000001	MOV	#1,R2		;SINGLE CHARACTER
57	020412	012703	177777	MOV	#-1,R3		;ENABLE BIDIRECTIONAL PRINTING.
58	020416	004737	012632	JSR	PC,XMIT		;SEND THE CHARACTER
59	020422	004737	015360	JSR	PC,ERRORS		;CHECK FOR ERRORS.
60							
61	020426	005204		INC	R4		;UPDATE NUMBER OF CHARACTERS PRINTED THUS FAR.
62	020430	020437	010042	CMP	R4,LINSIZ		;SENT A LINES WORTH YET?
63	020434	001362		BNE	CHRL00		;NO, CONTINUE SENDING.
64							
65	020436	005237	006522	INC	SNGCHR		;INCREASE ASCII PATTERN TO NEXT CHARACTER
66	020442	123727	010060	CMPB	HITARG,#THREE		;PRINTED THE HIT COUNT = 3 LINE YET?
67	020450	001333	000043	BNE	LINL00		;REPEAT PRINTING LINES UNTIL HIT COUNT - 3
68							
69	020452	012700	000001	MOV	#1,R0		
70	020456	112760	000040	MOVB	#ZERO,STHTCT(R0)		;REVERT BACK TO HIT COUNT OF 1
71	020464	012701	002257	MOV	#STHTCT,R1		
72	020470	012702	000003	MOV	#3,R2		
73	020474	005003		CLR	R3		;DISABLE BIDIRECTIONAL PRINTING
74	020476	004737	012632	JSR	PC,XMIT		;SEND PRINTER ARGUMENT LIST FOR HIT COUNT-1
75	020502	004737	015360	JSR	PC,ERRORS		;CHECK FOR ERRORS
76							
77	020506			ENDTST			
	020506						
	020506	104401					
78							
79							
80							
81							
82							
83							
84							
85							
86							

L10012: TRAP C\$ETST

...
 .SBTTL TEST 4: CARRIAGE POSITIONING TEST

TEST 4: CARRIAGE POSITIONING TEST

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4 020510
020510

BGNTST

T4::

TEST #4

CARRIAGE POSITIONING TEST

IN THIS TEST THE PRINTER CARRIAGE WILL BE EXERCISED BY MOVING
THE CARRIAGE BACK AND FORTH INCREASING AMOUNTS FROM THE MINIMUM
HORIZONTAL INCREMENT OF MOVEMENT TO THE MAXIMUM (PAGE SIZE) HORIZONTAL
INCREMENT OF MOVEMENT. IN THE PROCESS, ANY ERRORS DETECTED BY THE
PRINTER WILL BE IDENTIFIED AND REPORTED.

24									
25	020510	004737	014412	TEST4:	JSR	PC,INITCD	;INITIALIZE TEST		
26									
27	020514				RFLAGS	FLAGS	;READ START TIME SUPERVISOR FLAGS		
	020514	104421					TRAP	C\$RFLA	
	020516	010037	005260				MOV	RO,FLAGS	
28	020522	032737	000010	005260	BIT	#LOT,FLAGS	;WAS THE LOOP ON TEST FLAG SET?		
29	020530	001027			BNE	T4LOT	;SKIP PRINT OF TEST TITLE IF 'LOT'.		
30									
31	020532				PRINTB	#TITLE4	;CONSOLE PRINT THE TEST TITLE		
	020532	012746	002513				MOV	#TITLE4,-(SP)	
	020536	012746	000001				MOV	#1,-(SP)	
	020542	010600					MOV	SP,RO	
	020544	104414					TRAP	C\$PNTB	
	020546	062706	000004				ADD	#4,SP	
32									
33	020552	052737	040000	006500	BIS	#BIT14,ERWORD	;INHIBIT ERROR HANG-UPS		
34	020560	012701	002513		MOV	#TITLE4,R1	;ADDRESS OF TITLE #4 TO BE PRINTED		
35	020564	062701	000004		ADD	#4,R1	;SKIP FIRST FOUR CHARACTERS		
36	020570	012702	000044		MOV	#36,R2	;36 CHARACTERS IN THE TITLE		
37	020574	005003			CLR	R3	;DISABLE BIDIRECTIONAL PRINTING		
38	020576	004737	012632		JSR	PC,XMIT	;TRANSMIT THE STRING TO THE PRINTER		
39	020602	042737	040000	006500	BIC	#BIT14,ERWORD	;RE-ENABLE ERROR HANG-UPS		
40									
41	020610	012701	006530		T4LOT:	MOV	#SCX,R1	;ADDRESS OF THE SINGLE CHARACTER 'X'.	
42	020614	012702	000001		MOV	#1,R2	;SINGLE CHARACTER TO BE PRINTED		
43	020620	004737	012632		JSR	PC,XMIT	;PRINT THE CHARACTER 'A'.		
44	020624	004737	015360		JSR	PC,ERRORS	;CHECK FOR ERRORS.		
45									
46	020630	012701	002313		MOV	#CR,R1	;ADDRESS OF CARRIAGE RETURN ASCII		
47	020634	012702	000002		MOV	#2,R2	;TWO CHARACTERS INCLUDE <CR> & <LF>.		
48	020640	004737	012632		JSR	PC,XMIT	;SEND <CR><LF> TO PRINTER		
49	020644	004737	015360		JSR	PC,ERRORS	;CHECK FOR ERRORS		

TEST 4: CARRIAGE POSITIONING TEST

```

50
51 020650 012737 000001 010036      MOV      #1,SPCSIZ      ;INITIALIZE THE SPACE SIZE TO ITS SMALLEST
52
53 020656 013701 010036      L1LOOP: MOV      SPCSIZ,R1      ;R1 HAS SPACE SIZE FOR THE CONVERSION ROUTINE
54 020662 162701 000014      SUB       #12.,R1      ;TAKE AWAY THE 12 HORIZONTAL INCREMENTS
55                                ; PRODUCED BY THE PRINT OF THE CHARACTER.
56 020666 004737 014314      JSR       PC,CONVRT      ;CONVERT R1 TO THREE ASCII MNEMONICS (BYTES)
57 020672 012700 000001      MOV       #1,R0
58 020676 113760 010046 002233  MOVB     MNEB1,HRZTLS(R0)      ;FIRST BYTE FROM CONVERT ROUTINE
59 020704 005200      INC       R0
60 020706 113760 010047 002233  MOVB     MNEB2,HRZTLS(R0)      ;SECOND BYTE
61 020714 005200      INC       R0
62 020716 113760 010050 002233  MOVB     MNEB3,HRZTLS(R0)      ;THIRD BYTE
63
64 020724 012701 006530      MOV       #SCX,R1      ;ADDRESS OF THE CHARACTER 'X'.
65 020730 012702 000001      MOV       #1,R2      ;LENGTH OF STRING TO BE SENT - 1.
66 020734 004737 012632      JSR       PC,XMIT      ;SEND 'X' TO THE PRINTER
67 020740 004737 015360      JSR       PC,ERRORS      ;CHECK FOR ERRORS
68
69
70 020744 012701 002233      MOV       #HRZTLS,R1      ;ADDRESS OF TAB SEQUENCE JUST COMPUTED.
71 020750 012702 000005      MOV       #5,R2      ;THERE ARE 5 CHARACTERS IN THE SEQUENCE
72 020754 004737 012632      JSR       PC,XMIT      ;SEND THE LIST TO THE PRINTER
73 020760 004737 015360      JSR       PC,ERRORS      ;CHECK FOR ERRORS
74
75 020764 012701 006530      MOV       #SCX,R1      ;ADDRESS OF 'X'
76 020770 012702 000001      MOV       #1,R2      ;SINGLE CHARACTER
77 020774 004737 012632      JSR       PC,XMIT      ;PRINT 'X'
78 021000 004737 015360      JSR       PC,ERRORS      ;CHECK FOR ERRORS
79
80 021004 012701 002313      MOV       #CR,R1      ;ADDRESS OF <CR><LF>
81 021010 012702 000002      MOV       #2,R2      ;TWO CHARACTERS TO BE SENT TO PRINTER
82 021014 004737 012632      JSR       PC,XMIT      ;PRINT THE <CR><LF>
83 021020 004737 015360      JSR       PC,ERRORS      ;CHECK FOR ERRORS
84
85 021024 006337 010036      ASL       SPCSIZ      ;DOUBLE THE SPACE SIZE
86 021030 023737 010036 010040  CMP      SPCSIZ,LINN      ;IS THE SPACE SIZE LARGER THAN THE MAXIMUM?
87 021036 100707      BMI       L1LOOP      ;IF NOT THAN PRINTING MORE IS OK.
88
89 021040      ENDTST
90 021040
91 021040      L10013:
92      TRAP      C$ETST
93      104401
94
95
96
97
98
99
100
101
102

```

.SBTTL TEST 5: PAPER POSITIONING TEST

TEST 5: PAPER POSITIONING TEST

1
2
3 021042
021042

BGNTST

T5::

TEST #5

PAPER POSITIONING TEST

IN THIS TEST THE VERTICAL PAGE MOVEMENT CAPABILITIES OF THE PRINTER ARE EXERCISED. A LINE OF DASHES WILL BE PRINTED BETWEEN EACH VERTICAL CARRIAGE MOVEMENT SO THAT THE PATTERN CAN BE DETECTED BY THE USER. IN EACH LOOP THROUGH THE PRINTING CYCLE OF THIS TEST, THE VERTICAL INCREMENT OF MOVEMENT WILL BE DOUBLED. THE LINES OF DASHES WILL THUS BECOME TWICE AS FAR APART AS EACH PASS THROUGH THE PRINTING CYCLE IS COMPLETED.

30	021042	004737	014412	TEST5:	JSR	PC,INITCD	;INITIALIZATION CODE	
31								
32	021046				RFLAGS	FLAGS	;READ START TIME SUPERVISOR FLAGS	
	021046	104421					TRAP	C\$RFLA
	021050	010037	005260				MOV	RO,FLAGS
33	021054	032737	000010	005260	BIT	#LOT,FLAGS	;WAS THE LOOP ON TEST FLAG SET?	
34	021062	001027			BNE	T5LOT	;SKIP PRINT OF TEST TITLE IF 'LOT'.	
35								
36	021064				PRINTB	#TITLE5	;CONSOLE PRINT OF THE TEST TITLE.	
	021064	012746	002564				MOV	#TITLE5,-(SP)
	021070	012746	000001				MOV	#1,-(SP)
	021074	010600					MOV	SP,RO
	021076	104414					TRAP	C\$PNTB
	021100	062706	000004				ADD	#4,SP
37								
38	021104	052737	040000	006500	BIS	#BIT14,ERWORD	;DISABLE ERROR HANG-UPS	
39	021112	012701	002564		MOV	#TITLE5,R1	;ADDRESS OF THE TITLE TO BE PRINTED	
40	021116	062701	000004		ADD	#4,R1	;SKIP FIRST FOUR CHARACTERS.	
41	021122	012702	000054		MOV	#44.,R2	;43 CHARACTERS IN THE TITLE	
42	021126	005003			CLR	R3	;DISABLE BIDIRECTIONAL PRINTING	
43	021130	004737	012632		JSR	PC,XMIT	;SEND THE TITLE SEQUENCE TO THE PRINTER.	
44	021134	042737	040000	006500	BIC	#BIT14,ERWORD	;RE-ENABLE THE ERROR HANG-UPS.	
45								
46	021142	012737	000001	010062	T5LOT:	MOV	#1,LINCNT	;LINEFEED SIZE IN 1/48 INCH INCREMENTS.
47								
48	021150	013701	010062		AGN:	MOV	LINCNT,R1	;A NUMBER FOR CONVERSION TO ASCII MNEMONICS
49	021154	004737	014314			JSR	PC,CONVRT	;CONVERT NUMBER IN R1 TO THREE MNEMONIC BYTES

TEST 5: PAPER POSITIONING TEST

50	021160	012700	000001		MOV	#1,R0	
51	021164	113760	010046	002226	MOVB	MNEB1,VRTCLS(R0)	;TRANSFER MNEMONICS INTO ARGUMENT
52	021172	005200			INC	R0	
53	021174	113760	010047	002226	MOVB	MNEB2,VRTCLS(R0)	; LIST SLOTS IN THE
54	021202	005200			INC	R0	
55	021204	113760	010050	002226	MOVB	MNEB3,VRTCLS(R0)	; ESCAPE SEQUENCE.
56							
57	021212	012701	002226		MOV	#VRTCLS,R1	;ADDRESS OF VERTICAL SPACING ARGUMENTS
58	021216	012702	000005		MOV	#5,R2	;THERE ARE 5 CHARACTERS : ESC N N N 9
59	021222	004737	012632		JSR	PC,XMIT	;SEND TO PRINTER.
60							
61	021226	012701	006542		MOV	#DASHES,R1	;ADDRESS OF THE DASHES
62	021232	012702	000013		MOV	#11,R2	;TEN DASHES & LF
63	021236	004737	012632		JSR	PC,XMIT	;SEND TO PRINTER
64	021242	004737	015360		JSR	PC,ERRORS	;CHECK FOR ERRORS
65							
66	021246	006337	010062		ASL	LINCNT	;DOUBLE LINEFEED SIZE
67	021252	023727	010062	002000	CMP	LINCNT,#MXLF	;TOO LARGE A LINEFEED YET?
68	021260	100733			BMI	AGN	;IF NOT REPEAT PRINT SEQUENCE. ELSE- EXIT TEST.
69							
70	021262				ENDTST		
	021262						
	021262	104401					
71							
72							
73							
74							
75							
76							
77							
78							
79							

L10014: TRAP C\$ETST

.SBTTL TEST 6: PRINT ONE LINE OF EACH CHARACTER

TEST 6: PRINT ONE LINE OF EACH CHARACTER

1
2
3
4 021264
021264

BGNIST

T6::

TEST #6

PRINT ONE LINE OF EACH CHARACTER

IN THIS TEST ONE LINE OF EACH CHARACTER WILL BE PRINTED FOR THE
ENTIRE PRESET PAGE WIDTH. PRINTER DETECTED ERRORS WILL BE DETECTED
CLASSIFIED.

25	021264	004737	014412	TEST6:	JSR	PC,INITCD	:INITIALIZATION FOR TEST	
26					RFLAGS	FLAGS	:READ START TIME SUPERVISOR FLAGS	
27	021270							TRAP
	021270	104421						MOV
	021272	010037	005260					CSRFLA
28	021276	032737	000010	005260	BIT	#LOT,FLAGS	:WAS THE LOOP ON TEST FLAG SET?	
29	021304	001027			BNE	T6LOT	:SKIP PRINT OF TEST TITLE IF 'LOT'.	
30								
31	021306				PRINTB	#TITLE6	:CONSOLE PRINT OF THE TEST TITLE.	
	021306	012746	002645					MOV
	021312	012746	000001					MOV
	021316	010600						MOV
	021320	104414						TRAP
	021322	062706	000004					ADD
32								#4,SP
33	021326	052737	040000	006500	BIS	#BIT14,ERWORD	:DISABLE ERROR HANG-UPS	
34	021334	012701	002645		MOV	#TITLE6,R1	:ADDRESS OF THE TITLE	
35	021340	062701	000004		ADD	#4,R1	:SKIP FIRST FOUR CHARACTERS	
36	021344	012702	000053		MOV	#43,R2	:43 CHARACTERS IN THE TITLE	
37	021350	005003			CLR	R3	:DISABLE BIDIRECTIONAL PRINTING FOR THE MOMENT	
38	021352	004737	012632		JSR	PC,XMIT	:PRINT THE TITLE	
39	021356	042737	040000	006500	BIC	#BIT14,ERWORD	:ENABLE DESIRED ERROR HANG-UPS.	
40								
41	021364	012703	177777		T6LOT:	MOV	#-1,R3	:ENABLE BIDIRECTIONAL PRINTING
42	021370	005004				CLR	R4	:NO LINES YET PRINTED
43	021372	005037	010064		LINLO6:	CLR	CHRCNT	:NO CHARACTERS YET PRINTED
44								
45	021376	010401			CHRL06:	MOV	R4,R1	:GET OFFSET
46	021400	062701	006555			ADD	#CHRLST,R1	:POINT TO DESIRED CHARACTER IN CHAR LIST.
47	021404	012702	000001			MOV	#1,R2	:JUST THE ONE CHARACTER TO PRINT
48	021410	004737	012632			JSR	PC,XMIT	:SEND THE CHARACTER
49	021414	004737	015360			JSR	PC,ERRORS	:CHECK FOR ERRORS

TEST 6: PRINT ONE LINE OF EACH CHARACTER

```

50
51 021420 005237 C10064      INC  CHRCNT      ;KEEP TRACK OF THE CHARACTERS PRINTED
52 021424 023737 010064 010042  CMP  CHRCNT,LINSIZ ;HAS A FULL LINE BEEN PRINTED YET?
53 021432 100761      BMI  CHRL06      ;IF NOT THEN PRINT UNTIL TRUE.
54
55 021434 005204      INC  R4          ;KEEP TRACK OF THE LINES PRINTED
56 021436 020427 000136  CMP  R4,#94.      ;96 LINES PRINTED? (ALL CHARACTERS?)
57 021442 100753      BMI  LINL06      ;IF NOT YET, MORE LINES TO PRINT.
58
59 021444      ENDTST
   021444
   021444 104401      L10015:      TRAP  C$ETST
60
61
62
63
64
65
66
67
68
69      :
70      :
71      :
72      :
73
74      .SBTTL  TEST 7: PRINT A SWIRL PATTERN

```

TEST 7: PRINT A SWIRL PATTERN

```

1
2
3
4 021446      BGN1ST
5 021446
6
7
8
9
10
11
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13
14
15
16
17
18
19
20
21 021446 004737 014412      TEST7: JSR      PC,INITCD      ;INITIALIZE THE TEST
22
23 021452      RFLAGS  FLAGS      ;READ START TIME SUPERVISOR FLAGS
24 021452 104421      TRAP      C$RFLA
25 021454 010037 005260      MOV      RO,FLAGS
26 021460 032737 000010 005260      BIT      #LOT,FLAGS      ;WAS THE LOOP ON TEST FLAG SET?
27 021466 001027      BNE      17LOT      ;SKIP PRINT OF TEST TITLE IF 'LOT'.
28
29 021470      PRINTB  #TITLE7      ;CONSOLL PRINT THE TITLE
30 021470 012746 002725      MOV      #TITLE7,-(SP)
31 021474 012746 000001      MOV      #1,-(SP)
32 021500 010600      MOV      SP,RO
33 021502 104414      TRAP      C$PNTB
34 021504 062706 000004      ADD      #4,SP
35
36 021510 052737 040000 006500      BIS      #BIT14,ERWORD      ;INHIBIT ERROR HANG-UPS
37 021516 012701 002725      MOV      #TITLE7,R1      ;ADDRESS OF THE TITLE TO BE PRINTED
38 021522 062701 000004      ADD      #4,R1      ;SKIP 1ST 4 CHARACTERS.
39 021526 012702 000040      MOV      #32.,R2      ;32 CHARACTERS INVOLVED
40 021532 005003      CLR      R3      ;DISABLE BIDIRECTIONAL PRINTING FOR NOW.
41 021534 004737 012632      JSR      PC,XMIT      ;SEND TO PRINTER
42 021540 042737 040000 006500      BIC      #BIT14,ERWORD      ;ENABLE ERROR HANG-UPS
43
44 021546 012703 177777      T7LOT: MOV      #-1,R3      ;ENABLE BIDIRECTIONAL PRINTING
45 021552 005004      CLR      R4      ;NO LINES ARE PRINTED YET
46
47 021554 010401      NXTLIN: MOV      R4,R1      ;OFFSET
48 021556 062701 006555      ADD      #CHRLST,R1      ;ADDRESS OF CHARACTER TO BE PRINTED.
49 021562 013702 010042      MOV      LINSIZ,R2      ;LENGTH OF LINE. PRINT A LINES WORTH
50 021566 004737 012632      JSR      PC,XMIT      ;TRANSMIT THE LINE TO THE PRINTER
51 021572 004737 015360      JSR      PC,ERRORS      ;CHECK FOR ERRORS
52
53 021576 010105      MOV      R1,R5      ;ADDRESS OF LAST CHARACTER FOR PRINTING....
54 021600 005205      INC      R5      ;POINT ONE FURTHER FOR SWIRL EFFECT.
55 021602 013701 010042      MOV      LINSIZ,R1
56 021606 060501      ADD      R5,R1      ;POINT TO THE FIRST CHARACTER TO BE PRINTED+1.

```

TEST 7: PRINT A SWIRL PATTERN

```

50
51 021610 005301          REVRSP: DEC    R1          ;POINT TO THE NEXT CHARACTER TO BE PRINTED.
52 021612 012702 000001    MOV    #1,R2          ;TELL XMIT THAT A SINGLE CHARACTER PRINTED.
53 021616 004737 012632    JSR    PC,XMIT         ;SEND THE CHARACTER. (REVERSE PRINT)
54 021622 004737 015360    JSR    PC,ERRORS       ;CHECK FOR ERRORS.
55
56 021626 020501          .    CMP    R5,R1        ;PRINTED ENOUGH CHARACTERS YET IN REVERSE?
57 021630 100767          .    BMI    REVRSP       ;PRINT NEXT REVERSE CHAR.
58
59
60 ;
61
62 021632 062704 000002    ADD    #2,R4          ;KEEP TRACK OF THE NUMBER OF LINES PRINTED
63 021636 020427 000036    CMP    R4,#30.         ;FIFTEEN LINES PRINTED YET THIS PASS?
64 021642 100744          .    BMI    NX1LIN       ;IF DONE, EXIT TEST
65
66 021644          .    ENDTST
67
68
69
70
71
72
73
74
75
76
77
78
79 .SBTTL  TEST 8: WORST CASE RAPID MOTION TEST

```

L10016: TRAP C\$ETST

TEST 8: WORST CASE RAPID MOTION TEST

```

1
2
3
4
5 021646      BGNTST      T8::
   021646
6
7
8
9
10 .....
11      TEST #8
12      WORST CASE RAPID MOTION TEST
13      THIS TEST WILL PUT THE PRINT WHEEL THROUGH A MECHANICALLY STRESSFUL
14      SITUATION BY REPEATEDLY PRINTING THE SEQUENCE 'ACA:'.
15      .....
16
17
18
19
20
21
22
23
24 021646 004737 014412      TEST8: JSR      PC,INITCD      ;INITIALIZE TEST
25
26 021652      RFLAGS      FLAGS      ;READ START TIME SUPERVISOR FLAGS
   021652 104421      TRAP      CSRFLA
   021654 010037 005260      MOV      RO,FLAGS
27 021660 032737 000010 005260      BIT      #LOT,FLAGS      ;WAS THE LOOP ON TEST FLAG SET?
28 021666 001027      BNE      T8LOT      ;SKIP PRINT OF TEST TITLE IF 'LOT'.
29
30      PRINTB      #TITLE8      ;CONSOLE PRINT TEST TITLE
   021670      MOV      #TITLE8,-(SP)
   021670 012746 002772      MOV      #1,-(SP)
   021674 012746 000001      MOV      SP,RO
   021700 010600      TRAP      CSPNTB
   021702 104414      ADD      #4,SP
   021704 062706 000004
31
32 021710 052737 040000 006500      BIS      #BIT14,ERWORD      ;DISABLE ERROR HANG-UPS
33 021716 012701 002772      MOV      #TITLE8,R1      ;ADDRESS OF TITLE
34 021722 062701 000004      ADD      #4,R1      ;SKIP FIRST 4 CHARACTERS
35 021726 012702 000047      MOV      #39.,R2      ;39 CHARACTERS
36 021732 005003      CLR      R3      ;NO BIDIRECTIONAL PRINTING FOR NOW
37 021734 004737 012632      JSR      PC,XMIT      ;SEND TO PRINTER
38 021740 042737 040000 006500      BIC      #BIT14,ERWORD      ;ENABLE ERROR HANG-UPS
39
40 021746 012703 177777      T8LOT: MOV      #-1,R3      ;ENABLE BIDIRECTIONAL PRINTING
41 021752 005004      CLR      R4      ;COUNT OF 'ACA:' BLOCKS
42 021754 013705 010042      MOV      LINSIZ,R5      ;# OF CHARACTERS PER LINE
43 021760 006205      ASR      R5      ;LINSIZ/2 : 1 BLOCK - 4 CHARACTERS...
44      ; PRINT 2 LINES AT NEW LINE SIZE
45
46 021762 012701 006535      LOOP8: MOV      #ACAS,R1      ;ADDRESS OF SEQUENCE
47 021766 012702 000004      MOV      #4,R2      ;OF 4 CHARACTERS...
48 021772 004737 012632      JSR      PC,XMIT      ;SEND TO PRINTER
49 021776 004737 015360      JSR      PL,ERRORS      ;CHECK FOR ERRORS.

```

TEST 8: WORST CASE RAPID MOTION TEST

```
50
51 022002 005204      INC      R4
52 022004 020405      CMP      R4,R5      ;ENOUGH BLOCKS PRINTED??
53 022006 100765      BMI      LOOP8      ;IF NO, LOOP TO PRINT NEXT BLOCK...
54
55 022010              ENDTST
                    L10017:
                    TRAP      C$ETST
56
57
58
59
60      :
61      :
62      :
63      :
64
65
66      .SBTTL TEST 9: PRINT RANDOM CHARACTERS
```

TEST 9: PRINT RANDOM CHARACTERS

```

1
2
3 022012      BGNTST      T9::
4 022012
5
6
7
8 .....!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
9
10 TEST #9
11 PRINT RANDOM CHARACTERS
12 THIS TEST WILL PRINT A RANDOM SEQUENCE OF CHARACTERS ON THE
13 PRINTER.
14 .....
15
16
17
18
19
20
21
22
23
24 022012 004737 014412      TEST9: JSR      PC,INITCD      ;INITIALIZE TEST
25
26 022016      RFLAGS      FLAGS      ;READ START TIME SUPERVISOR FLAGS
27 022016 104421      TRAP      CSRFLA
28 022020 010037 005260      MOV      RO,FLAGS
29 022024 032737 000010 005260      BIT      #LOT,FLAGS      ;WAS THE LOOP ON TEST FLAG SET?
30 022032 001027      BNE      T9LOT      ;SKIP PRINT OF TEST TITLE IF 'LOT'.
31
32 022034      PRINTB      #TITLE9      ;CONSOLE PRINT TITLE
33 022034 012746 003046      MOV      #TITLE9,-(SP)
34 022040 012746 000001      MOV      #1,-(SP)
35 022044 010600      MOV      SP,RO
36 022046 104414      TRAP      $PNTB
37 022050 062706 000004      ADD      #4,SP
38
39 022054 052737 040000 006500      BIS      #BIT14,ERWORD      ;DISABLE ERROR HANG-UPS
40 022062 012701 003046      MOV      #TITLE9,R1      ;ADDRESS OF TITLE
41 022066 062701 000004      ADD      #4,R1      ;SKIP 1ST 4 CHARACTERS
42 022072 012702 000042      MOV      #34,,R2      ;34 CHARACTERS IN THE TITLE
43 022076 005003      CLR      R3      ;DISABLE BIDIRECTIONAL PRINTING
44 022100 004737 012632      JSR      PC,XMIT      ;SEND TO PRINTER
45 022104 042737 040000 006500      BIC      #BIT14,ERWORD      ;ENABLE ERROR HANG-UPS
46
47 022112 013705 010042      T9LOT: MOV      LINSIZ,R5      ;GET THE LINE SIZE
48 022116 006305      ASL      R5      ;LINE SIZE * 2
49 022120 006305      ASL      R5      ;LINE SIZE * 4
50 022122 006305      ASL      R5      ;LINE SIZE * 8
51      ; TO PRINT 8 LINES WORTH
52      ;NO CHARACTERS PRINTED YET
53 022124 005037 010064      CLR      CHRCNT
54
55 022130 004737 015040      PLOOP9: JSR      PC,RANDOM      ;RANDOM NUMBER (0 - 99) INTO R1
56
57 022134 062701 006555      ADD      #CHRLST,R1      ;ADDRESS FOR THIS PRINT

```

TEST 9: PRINT RANDOM CHARACTERS

50	022140	012702	000001	MOV	#1,R2	:SINGLE CHARACTER
51	022144	012703	177777	MOV	#-1,R3	:BIDIRECTIONAL PRINTING.
52	022150	004737	012632	JSR	PC,XMIT	:SEND TO PRINTER
53	022154	004737	015360	JSR	PC,ERRORS	:CHECK FOR ERRORS.
54						
55	022160	005237	010064	INC	CHRCNT	:KEEP TRACK OF THE NUMBER OF CHARACTERS
56	022164	023705	010064	CMP	CHRCNT,R5	:EIGHT LINES YET?
57	022170	100757		BMI	PLOOP9	:NO,LOOP UNTIL DONE
58						
59	022172			ENDTST		
	022172					
	022172	104401				L10020: TRAP C\$ETST
60						
61						
62						
63						
64						
65						
66						
67						
68						
69						
70						
71						
72						

.SBTTL TEST 10: LIFT / DROP RIBBON BY OPERATOR CONTROL

TEST 10: LIFT / DROP RIBBON BY OPERATOR CONTROL

```

1
2
3 022174          BGNTST                      T10::
  022174
4
5
6
7
8 .....!!!!!!
9
10 TEST #10
11 LIFT / DROP RIBBON BY OPERATOR CONTROL
12
13 THIS TEST WILL EITHER ENABLE THE USER TO MANUALLY LIFT AND
14 DROP THE PRINTER RIBBON OR IT WILL LIFT AND DROP THE PRINTER
15 RIBBON AUTOMATICALLY. THE USER LIFTS AND DROPS THE RIBBON
16 BY PUSHING THE RETURN KEY AFTER SELECTING THE MANUAL MODE. IF
17 THE AUTOMATIC MODE IS SELECTED BY THE USER, THEN THE RIBBON LIFTS
18 AND DROPS TEN TIMES AT A RATE OF ABOUT ONCE PER SECOND.
19 .....
20
21
22
23
24
25
26
27
28 022174          TESTB: MANUAL                ;MANUAL INTERVENTION PERMITTED?
  022174 104450          BCOMPLETE TBMANB        ;DO TEST IF MANUAL INTERVENTION PERMITTED.
29 022176          ;                               TRAP C$MANI
  022176 103402          BCS TBMANB              ;
30 022200 000137 022402  JMP EXIT                ;SKIP TEST IF UNATTENDED MODE SET.
31
32 022204 004737 014412  TBMANB: JSR PC,INITCD    ;TEST INITIALIZE
33
34 022210          RFLAGS FLAGS                  ;READ START TIME SUPERVISOR FLAGS
  022210 104421          ;                               TRAP C$RFLA
  022212 010037 005260  MOV RO,FLAGS              ;
35 022216 032737 000010 005260  BIT #LOT,FLAGS    ;WAS THE LOOP ON TEST FLAG SET?
36 022224 001027          BNE TBLOT              ;SKIP PRINT OF TEST TITLE IF 'LOT'.
37
38 022226          PRINTB #TITLEB                ;CONSOLE PRINT TITLE
  022226 012746 003264          ;                               MOV #TITLEB,-(SP)
  022232 012746 000001          ;                               MOV #1,-(SP)
  022236 010600          ;                               MOV SP,RO
  022240 104414          ;                               TRAP C$PNTB
  022242 062706 000004          ;                               ADD #4,SP
39
40 022246 052737 040000 006500  BIS #BIT14,ERWORD ;DISABLE ERROR HANG-UPS
41 022254 012701 003264          MOV #TITLEB,R1   ;ADDRESS OF TEST TITLE
42 022260 062701 000004          ADD #4,R1        ;SKIP 4 CHARACTERS
43 022264 012702 000060          MOV #48,R2       ;48 CHARACTERS TO BE PRINTED.
44 022270 005003          CLR R3                 ;NO BIDIRECTIONAL PRINTING
45 022272 004737 012632          JSR PC,XMIT      ;SEND THE TEST TITLE
46 022276 042737 040000 006500  BIC #BIT14,ERWORD ;ENABLE ERROR HANG-UPS
47

```

TEST 10: LIFT / DROP RIBBON BY OPERATOR CONTROL

```

48 022304 012701 002303      TBLOT:  MOV    #SETH0,R1      ;SET HIT COUNT TO ZERO
49 022310 012702 000005      MOV    #5,R2          ;FIVE CHARACTER STRING SENT TO PRINTER
50 022314 005003              CLR    R3              ;NO BIDIRECTIONAL LOGIC REQUIRED.
51 022316 004737 012632      JSR    PC,XMIT          ;SEND TO PRINTER.
52
53 022322 012701 002310      MOV    #SETH0,R1      ;SET CHARACTER SIZE TO ZERO.
54 022326 012702 000003      MOV    #3,R2          ;ARGUMENT LIST IS 3 CHARACTERS LONG.
55 022332 005003              CLR    R3              ;NO BIDIRECTIONAL LOGIC REQUIRED.
56 022334 004737 012632      JSR    PC,XMIT          ;SEND TO PRINTER.
57
58
59 022340              GMANID  OPTN1,BFRB,A,0,1,72,YES
    022340 104443
    022342 000406
    022344 010030
    022346 000152
    022350 003351
    022352 000000
    022354 000001
    022356 000072
    022360
                                TRAP    CS$GMAN
                                BR      10000$
                                .WORD   BFRB
                                .WORD   T$CODE
                                .WORD   OPTN1
                                .WORD   0
                                .WORD   T$LOLIM
                                .WORD   T$HILIM
                                10000$:
60                                ;ASK USER TO CHOOSE AUTO OR MANUAL MODE.
61
62 022360 123737 010030 006531      CMPB   BFRB,SCA      ;IF CHARACTER IS 'A' THEN AUTO MODE CHOSEN
63 022366 001403              BEQ    AUTCAL      ;SO CALL LOCAL ROUTINE TO HANDLE AUTO MODE
64
65                                ;OTHERWISE, MANUAL IS CHOSEN.....
66 022370 004737 022524      JSR    PC,MANLD      ;DO MANUAL LIFT / DROP.
67 022374 000402              BR      EXIT      ;EXIT TEST WHEN DONE
68
69 022376 004737 022404      AUTCAL: JSR    PC,AUTOLD      ;DO AUTOMATIC MODE LIFT / DROP.
70
71 022402              EXIT:  ENDTST
    022402
    022402 104401
                                L10021:
                                TRAP    ($ETST
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TEST 10: LIFT / DROP RIBBON BY OPERATOR CONTROL

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31 022404 005037 010066
32 022410 012700 000001
33 022414 112760 000040 002240
34 022422 012701 002240
35 022426 012702 000004
36 022432 004737 012632
37 022436 004737 015360
38
39 022442 012705 001750
40 022446 004737 015336
41
42 022452 012700 000001
43 022456 112760 000041 002240
44 022464 012701 002240
45 022470 012702 000004
46 022474 005003
47 022476 004737 012632
48 022502 004737 015360
49
50 022506 005237 010066
51 022512 023727 010066 000024
52 022520 100733
53
54 022522 000207
55
56
57

```

.....
 FUNCTIONAL DESCRIPTION

 TEST #10
 LOCAL PROCEDURE AUTOLD
 AUTOMATIC MODE OF RIBBON LIFT AND RIBBON DROP.

 INPUTS
 NONE
 OUTPUTS
 NONE
 FUNCTIONAL SIDE EFFECTS
 THE PRINTER RIBBON WILL LIFT/DROP AUTOMATICALLY.
 CALLING SEQUENCE
 JSR PC,AUTOLD

 AUTOLD: CLR CCOUNT ;COUNT OF CYCLES (LIFT/DROP)
 AUTOLE: MOV #1,R0 ;POINT TO POSITION PARAMETER.
 MOVB #ZERO,RIBPOS(R0) ;RIBBON UP ARGUMENT LIFT/DROP
 MOV #RIBPOS,R1 ;ADDRESS OF ARG LIST CYCLE....
 MOV #4,R2 ;4 ARGUMENTS
 JSR PC,XMIT ;SEND TO PRINTER
 JSR PC,ERRORS ;CHECK FOR ERRORS.

 MOV #1000.,R5 ;DELAY TIME IN R1 FOR DELAY ROUTINE.
 JSR PC,DELAYS ;PERFORM DELAY OF ABOUT 1 SECOND.

 MOV #1,R0 ;POINT TO THE RIBBON POSITION PARAMETER ...
 MOVB #ONE,RIBPOS(R0) ;LOWER THE RIBBON. ...
 MOV #RIBPOS,R1 ;ARGUMENT LIST ADDRESS.
 MOV #4,R2 ;4 CHARACTERS
 CLR R3 ;BIDIRECTIONAL LOGIC DISABLED
 JSR PC,XMIT ;SEND SEQUENCE TO PRINTER.
 JSR PC,ERRORS ;

 INC CCOUNT ;KEEP COUNT OF CYCLES SO FAR...
 CMP CCOUNT,#20. ;LOOP TEN TIMES FOR TEN LIFT / DROP CYCLES.
 BMI AUTOLE ;LOOP UNTIL TEN LOOPS DONE. .

 RTS PC

TEST 10: LIFT / DROP RIBBON BY OPERATOR CONTROL

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TEST 10: LIFT / DROP RIBBON BY OPERATOR CONTROL

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FUNCTIONAL DESCRIPTION

TEST #10

LOCAL PROCEDURE MANLD

MANUAL LIFT / DROP MODE. IF SELECTED, THIS MODE WILL PERMIT THE USER TO EITHER LIFT OR DROP THE RIBBON BY SIMPLY HITTING THE <RETURN> KEY. IF A 'Q' CHARACTER IS ENTERED BEFORE THE <RETURN> KEY IS HIT THEN THE TEST IS STOPPED.

INPUTS

NONE

OUTPUTS

NONE

FUNCTIONAL SIDE EFFECTS

THE RIBBON WILL LIFT/DROP BY OPERATOR CONTROL.

CALLING SEQUENCE

JSR PC,MANLD

MANLD: PRINTB #PRMPTC ;PROMPT INSTRUCTIONS AT CONSOLE

022524
022524 012746 003466
022530 012746 000001
022534 010600
022536 104414
022540 062706 000004

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

MANLE: GMANLD NPRMPT,BFRC,A,0,1,72,YES

022544
022544 104443
022546 000406
022550 010032
022552 000152
022554 004531
022556 000000
022560 000001
022562 000072
022564

TRAP C\$GMAN
BR 10000\$
.WORD BFRC
.WORD T\$CODE
.WORD NPRMPT
.WORD 0
.WORD T\$LOCLIM
.WORD T\$HILIM

39
40
41
42
43

022564 123737 010032 006525
022572 001417

CMPB BFRC,SC0
BEQ EXIT11

10000\$:
;INPUT <RETURN> OR Q <RETURN>
;<RETURN> MEANS TO CHANGE RIBBON POSITION
;Q <RETURN> MEANS TO EXIT TEST.
;IS THE CHARACTER A 'Q' ?
;IF SO - EXIT TEST.

TEST 10:

LIFT / DROP RIBBON BY OPERATOR CONTROL

```

44
45 022574 012700 000001      MOV    #1,R0
46 022600 112760 000040 002240  MOVB  #ZERO,RIBPOS(R0)      ;ARGUMENT FOR LIFT RIBBON
47 022606 012701 002240      MOV    #RIBPOS,R1      ;ADDRESS OF ARGUMENT LIST
48 022612 012702 000004      MOV    #4,R2      ;4 ARGUMENT CHARACTERS IS LIST
49 022616 005003      CLR    R3      ;DON'T BOTHER WITH BIDIRECTIONAL PRINTING CODE
50 022620 004737 012632      JSR    PC,XMIT      ;SEND ARGUMENT LIST TO PRINTER
51 022624 004737 015360      JSR    PC,ERRORS      ;CHECK FOR ERRORS.
52
53 022630 000735      BR     MA'ULD      ;REPEAT UNTIL A '0' IS FOUND IN THE BUFFER
54
55 022632 000207      EXIT11: RTS    PC
56
57      ;
58      ;SBTTL TEST 11:      PRINT OPERATOR SELECTED CHARACTERS

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1			BGNTST		T11::
2	022634				
3	022634				
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20					
21	022634		TESTA: MANUAL	;MANUAL INTERVENTION PERMITTED?	
22	022634	104450	BCOMPLETE TAMAN	;DO TEST IS MANUAL INTERVENTION	TRAP C\$MANI
23	022636	103402	JMP EXITA	;MANUAL NOT OK - DON'T DO THIS TEST.	SET. TAMAN
24	022640	000137			BCS
25	022644	004737	TAMAN: JSR PC,INITCD	;TEST INITIALIZE	
26	022650		PRINTB #TITLEA	;CONSOLE PRINT TITLE	
27	022650	012746			MOV #TITLEA,-(SP)
28	022654	012746			MOV #1,-(SP)
29	022660	010600			MOV SP,R0
30	022662	104414			TRAP C\$PNTB
31	022664	062706			ADD #4,SP
32	022670	052737	BIS #BIT14,ERWORD	;DISABLE ERROR HANG-UPS	
33	022676	012701	MOV #TITLEA,R1	;ADDRESS OF TITLE	
34	022702	062701	ADD #4,R1	;SKIP 4 CHARACTERS	
35	022706	012702	MOV #46.,R2	;46 CHARACTERS IN THE TITLE	
36	022712	005003	CLR R3	;DISABLE BIDIRECTIONAL PRINTING	
37	022714	004737	JSR PC,XMIT	;SEND TO PRINTER	
38	022720	042737	BIC #BIT14,ERWORD	;ENABLE ERROR HANG-UPS	
39	022726		LOOPA: GMANID PRMPTA,BFRA,A,0,1,72,NO		
40	022726	104443			TRAP C\$GMAN
41	022730	000406			BR 10001\$
42	022732	007352			.WORD BFRA
43	022734	000142			.WORD T\$CODE
44	022736	003200			.WORD PRMPTA
45	022740	000000			.WORD 0
46	022742	000001			.WORD T\$LOLIM
47	022744	000072			.WORD T\$HILIM
48	022746				
49					10001\$: ;PROMPT AT CONSOLE AND INPUT STRING.
50	022746	005004	CLR R4	;R4 IS OFFSET IN INPUT STRING	

TEST 11: PRINT OPERATOR SELECTED CHARACTERS

```

41
42 022750 105764 007352      NXTA:  TSTB   BFRA(R4)      ;IS THE BYTE A ZERO?  GMANID IS EXPECTED TO
43                                     ; SEND A ZERO AS THE LAST BYTE.  THIS WILL
44                                     ; INDICATE THE END OF THE INPUT STRING.
45 022754 001011              BNE     TFCZ      ;NOT ZERO.  CHECK FOR CTL-Z
46                                     ;
47 022756 012701 002313      MCV     #CR,R1      ;ADDRESS OF CARRIAGE RETURN - LINEFEED
48 022762 012702 000002      MCV     #2,R2      ;TWO BYTES TO SEND
49 022766 004737 012632      JSR     PC,XMIT      ;SEND THE STRING
50 022772 004737 015360      JSR     PC,ERRORS    ;CHECK FOR ERRORS.
51
52 022776 000753              BR      L00PA      ;BACK TO PROMPT...
53
54
55 023000 126437 007352 006525 TFCZ:  CMPSB  BFRA(R4),SC0    ;IS IT A '0'?
56 023006 001006              BNE     NOT0      ;IF IT IS, CHECK FOR <RETURN>
57
58 023010 005204              INC     R4          ;CHECK NEXT BYTE FOR ZERO.
59 023012 126427 007352 000000      CMPSB  BFRA(R4),#0    ;IS THE BYTE A ZERO?
60 023020 001415              BEQ     EXITA      ;IF IT IS THEN EXIT TEST
61 023022 005304              DEC     R4          ;IF NOT ZERO THEN NOT RETURN
62                                     ;AND NOT YET THE END.
63
64 023024              NOT0:  MOV     #BFRA,R1      ;PRINT THE CHARACTER...
65 023024 012701 007352      ADD     R4,R1      ; AS R4 POINTS THROUGH THE LIST.
66 023030 060401              MOV     #1,R2      ;ONE CHARACTER TO PRINT.
67 023032 012702 000001      CLR     R3        ;NOT BIDIR. PRINTING.
68 023036 005003              JSR     PC,XMIT      ;SEND TO PRINTER.
69 023040 004737 012632      JSR     PC,ERRORS    ;CHECK FOR ERRORS.
70 023044 004737 015360
71
72 023050 005204              INC     R4          ;POINT TO NEXT CHARACTER
73 023052 000736              BR      NXTA      ;REPEAT TILL END OF STRING FOUND.
74 023054 000240              EXITA:  NOP
75
76 023056              ENDTST
77
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```

:SBTTL TEST 12:

BIDIRECTIONAL FORMS TRACTOR TEST

L10022: TRAP CSETST

TEST 12: BIDIRECTIONAL FORMS TRACTOR TEST

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4 023060
023060

BGNTS*

T12::

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TEST #12

BIDIRECTIONAL FORMS TRACTOR TEST /OPTIONAL SPECIAL TEST

THIS TEST WILL PRINT A TEN BY TEN ARRAY OF ASCII CHARACTERS
IN A RANDOM ORDER ON THE PRINTER. THE TEST WILL NOT OVERPRINT
ANY LOCATIONS IN THE ARRAY. THIS TEST SHOULD EXERCISE BOTH UP
AND DOWN CARRIAGE MOTION AS WELL AS FORWARD AND BACKWARD CARRIAGE
MOTION.

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22 023060
023060 104450
23 023062
023062 103402
24 023064 000137 023342

TESTC: MANUAL

;MANUAL INTERVENTION PERMITTED?

TRAP C\$MANI
OK.
BCS TCMAN

BCOMPLETE TCMAN

;DO TEST IF MANUAL INTERVENTION

JMP ENDC

;OTHERWISE, EXIT TEST.

25
26 023070 004737 014412
27 023074
023074 012746 003717
023100 012746 000001
023104 010600
023106 104414
023110 062706 000004

TCMAN: JSR PC,INITCD
PRINTB #TITLEC;TEST INITIALIZE
;CONSOLE PRINT TITLE OF TEST

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

28
29 023114 052737 040000 006500
30 023122 012701 003717
31 023126 062701 000004
32 023132 012702 000047
33 023136 005003
34 023140 004737 012632
35 023144 042737 040000 006500

BIS #BIT14, ERWORD
MOV #TITLEC, R1
ADD #4, R1
MOV #39, R2
CLR R3
JSR PC, XMIT
BIC #BIT14, ERWORD

;TEMPORARILY SUSPEND ERROR HANG-UPS
;ADDRESS OF TITLE TO PRINT
;SKIP 4 CHARACTERS
:
;PRINT TITLE
;REINSTATE ERROR HANG-UPS

36
37 023152
023152 104443
023154 000406
023156 010034
023160 000152
023162 004346
023164 000000
023166 000001
023170 000072
023172

G\$MANID T11PMT, BFRD, A, 0, 1, 72, YES

TRAP C\$G\$MAN
BR 100008
.WORD BFRD
.WORD T\$CODE
.WORD T11PMT
.WORD 0
.WORD T\$LOLIM
.WORD T\$HILIM

100008:

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TEST 12: BIDIRECTIONAL FORMS TRACTOR TEST

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023344 010446
023346 010346
023350 010246

023352 006304
023354 010403
023356 006304
023360 060304

023362 062704 005262

.....
FUNCTIONAL DESCRIPTION

TEST #12

LOCAL PROCEDURE PRARCH

THIS SUB-PROCEDURE WILL INPUT THE RANDOM NUMBER, FIND THE CORRESPONDING PLACE IN THE VECTOR TABLE, PRINT THE APPROPRIATE CHARACTER AT THE APPROPRIATE VECTOR AND ACCUMULATE SPACING TO RE-POSITION THE CARRIAGE AT THE (0,0) POSITION IN THE ARRAY.

.....
INPUTS

R4 - RANDOM NUMBER CONTAINED IN R4.
- USED TO GET A RANDOM TABLE ENTRY WHICH IS PRINTED.

OUTPUTS

THE TABLE ENTRY IS MARKED AS IT IS PRINTED.

SUBORDINATE ROUTINES

RANDOM - GETS ANOTHER RANDOM NUMBER IF THE ONE SUPPLIED WAS CHOSEN ALREADY DURING THIS PASS.

```
PRARCH: MOV  R4, -(SP)      ;SAVE REGISTERS
        MOV  R3, -(SP)      ;
        MOV  R2, -(SP)      ;      (THAT ARE NOT USED FOR PASSING)

GTNUM:  ASL   R4             ;OFFSET DESIRED * 2
        MOV  R4, R3          ;SAVE 2 * OFFSET FOR LATER
        ASL  R4             ;DESIRED OFFSET * 4
        ADD  R3, R4          ;6 * OFFSET NOW IN R4.
                           ;DESIRED TABLE INDEX NOW IN R4.

        ADD  #BASE1, R4      ;ADDRESS OF TABLE ENTRY DESIRED
```

TEST 12: BIDIRECTIONAL FORMS TRACTOR TEST

```

153
154 023366 062704 000005      ADD    #5,R4      ;TABLE OFFSET.
155 023372 105714             TSTB   #R4        ;CHECK UNIQUE NUMBER INDICATOR....
156 023374 001404             BEQ    NOT1       ;IF NOT UNIQUE THEN CONTROL TOO NOT1
157
158 023376 004737 015040      JSR    PC,RANDOM ;RANDOM NUMBER IN R4
159 023402 010104             MOV    R1,R4     ;GET THE RANDOM NUMBER IN THE RIGHT PLACE.
160 023404 000762             BR     GTNUM     ;LAST ONE DIDN'T WORK... TRY THIS ONE.
161
162 023406 112714 000001      NOT1:  MOVB   #1,R4      ;SET UNIQUE INDICATOR
163 023412 162704 000005      SUB    #5,R4      ;
164                                     ;AT THIS POINT R4 CONTAINS A TABLE ENTRY
165                                     ;ADDRESS WHICH HAS NOT BEEN REFERENCED DURING
166                                     ;THIS PASS.
167
168
169 023416 012401             MOV    (R4)+,R1    ;GET THE VERTICAL COMPONENT OF THE VECTOR
170 023420 004737 014314      JSR    PC,CONVRT  ;CONVERT R1 TO MNEMONICS
171 023424 012700 000001      MOV    #1,R0
172 023430 113760 010046 002226  MOVB   MNEB1,VRTCLS(R0) ;LOAD THE ARGUMENT LIST
173 023436 005200             INC    R0
174 023440 113760 010047 002226  MOVB   MNEB2,VRTCLS(R0) ;
175 023446 005200             INC    R0
176 023450 113760 010050 002226  MOVB   MNEB3,VRTCLS(R0) ;
177
178 023456 012401             MOV    (R4)+,R1    ;GET HORIZONTAL COMPONENT OF THE VECTOR
179 023460 004737 014314      JSR    PC,CONVRT  ;CONVERT R1 TO MNEMONICS
180 023464 012700 000001      MOV    #1,R0
181 023470 113760 010046 002233  MOVB   MNEB1,HRZTLS(R0) ;LOAD THE ARGUMENT LIST
182 023476 005200             INC    R0
183 023500 113760 010047 002233  MOVB   MNEB2,HRZTLS(R0) ;
184 023506 005200             INC    R0
185 023510 113760 010050 002233  MOVB   MNEB3,HRZTLS(R0) ;
186
187 023516 012701 002226      MOV    #VRTCLS,R1  ;NOW, ACCUMULATE VERTICAL SPACING
188 023522 012702 000005      MOV    #5,R2      ;
189 023526 005003             CLR    R3
190 023530 004737 012632      JSR    PC,XMIT   ;SEND TO PRINTER
191 023534 004737 015360      JSR    PC,ERRORS ;CHECK FOR ERRORS.
192
193 023540 012701 002233      MOV    #HRZTLS,R1  ;NOW, ACCUMULATE HORIZONTAL SPACING
194 023544 012702 000005      MOV    #5,R2      ;
195 023550 005003             CLR    R3          ;DISABLE BIDIRECTIONAL PRINT
196 023552 004737 012632      JSR    PC,XMIT   ;SEND TO PRINTER
197 023556 004737 015360      JSR    PC,ERRORS ;CHECK FOR ERRORS.
198
199 023562 010401             MOV    R4,R1      ;GET ADDRESS OF THE CHARACTER
200 023564 012702 000001      MOV    #1,R2      ;SINGLE CHARACTER
201 023570 005003             CLR    R3          ;DISABLE BIDIRECTIONAL PRINT LOGIC.
202 023572 004737 012632      JSR    PC,XMIT   ;SEND TO PRINTER
203 023576 004737 015360      JSR    PC,ERRORS ;CHECK FOR ERRORS.
204
205 023602 014401             MOV    -(R4),R1    ;COLUMN NUMBER IN R1
206 023604 005401             NEG    R1         ;NEGATIVE NUMBER FOR LEFT SPACING
207 023606 162701 000014      SUB    #12,,R1    ;AND ONE EXTRA SPACE ACCOUNTS FOR THE
208                                     ;CHARACTER WHICH WAS PRINTED (12 INCREMENTS)
209

```

TEST 12: BIDIRECTIONAL FORMS TRACTOR TEST

210	023612	004737	014314	JSR	PC,CONVRT	:CONVERT TO MNEMONIC
211	023616	012700	000001	MOV	#1,R0	
212	023622	113760	010046	MOVB	MNEB1,HRZTLS(R0)	:PUT IN ARGUMENT LIST
213	023630	005200		INC	R0	
214	023632	113760	010047	MOVB	MNEB2,HRZTLS(R0)	:
215	023640	005200		INC	R0	
216	023642	113760	010050	MOVB	MNEB3,HRZTLS(R0)	:
217						
218	023650	012701	002233	MOV	#HRZTLS,R1	:ADDRESS OF ARGUMENT LIST
219	023654	012702	000005	MOV	#5,R2	:5 ARGUMENTS
220	023660	005003		CLR	R3	:DISABLE BIDIRECTIONAL LOGIC.
221	023662	004737	012632	JSR	PC,XMIT	:SEND TO PRINTER
222	023666	004737	015360	JSR	PC,ERRORS	:CHECK FOR ERRORS.
223						
224	023672	014401		MOV	-(R4),R1	:GET THE COLUMN NUMBER
225	023674	005401		NEG	R1	:REVERSE THE CARRIAGE MOVEMENT
226	023676	004737	014314	JSR	PC,CONVRT	:CONVERT TO MNEMONICS
227	023702	012700	000001	MOV	#1,R0	
228	023706	113760	010046	MOVB	MNEB1,VRTCLS(R0)	:FILL ARGUMENT LIST
229	023714	005200		INC	R0	
230	023716	113760	010047	MOVB	MNEB2,VRTCLS(R0)	:
231	023724	005200		INC	R0	
232	023726	113760	010050	MOVB	MNEB3,VRTCLS(R0)	:
233						
234	023734	012701	002226	MOV	#VRTCLS,R1	:ADDRESS OF ARGUMENT LIST
235	023740	012702	000005	MOV	#5,R2	:TO ACCUMULATE VERTICAL SPACING
236	023744	005003		CLR	R3	:DISABLE BIDIR. LOGIC
237	023746	004737	012632	JSR	PC,XMIT	:SEND TO PRINTER
238	023752	004737	015360	JSR	PC,ERRORS	:CHECK FOR ERRORS.
239						
240	023756	012602		MOV	(SP)+,R2	:RESTORE REGISTERS
241	023760	012603		MOV	(SP)+,R3	
242	023762	012604		MOV	(SP)+,R4	
243						
244						
245	023764	000207		RTS	PC	
246						
247						
248						
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252						
253						
254						
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: SEPT 13: TEST 13:

CUT SHEET FEEDER EXERCISOR

TEST 13: CUT SHEET FEEDER EXERCISOR

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4 023766          BGNTEST                                T13::
   023766
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20 023766          TESTD:  MANUAL                        ;MANUAL INTERVENTION PERMITTED?
   023766          104450                                TRAP      C$MANI
21 023770          BCOMPLETE TDMAN                      ;DO TEST IF SET.          BCS      TDMAN
   023770          103402
22 023772          000137 025020                        JMP      ENDD      ;SKIP TEST IF NOT SET.
23
24 023776          004737 014412                        TDMAN:  JSR      PC,INITCD      ;INITIALIZE TEST
25 024002          012746 003773                        PRINTB  #TITLED      ;CONSOLE PRINT TITLE
   024006          012746 000001                        MOV      #TITLED,-(SP)
   024012          010600                                MOV      #1,-(SP)
   024014          104414                                MOV      SP,R0
   024016          062706 000004                        TRAP     C$PNTB
   024022          005003                                ADD      #4,SP
26
27
28 024024          CLR      R3                          ;DISABLE BIDIRECTIONAL PRINTING
   024024          104443                                GMANID  PRMPTD,BR2,A,0,1,72,YES
   024026          000406                                TRAP     C$GMAN
   024030          006514                                BR       10000$
   024032          000152                                .WORD   BR2
   024034          004046                                .WORD   T$CODE
   024036          000000                                .WORD   PRMPTD
   024040          000001                                .WORD   0
   024042          000072                                .WORD   T$LOLIM
   024044          000000                                .WORD   T$HILIM
29
30
31
32
33
34 024044          123737 006514 006527                CMPB     BR2,SCB
35 024052          001020                                BNE      CHKC
36
37 024054          012704 000001                        ;PROMPT USER FOR PAGE SIZE USED.
38 024060          113764 002330 002271                ;OPTIONS ARE A) 11 INCH, B) 14 INCH
39 024066          012705 000001                        ;AND C) A4 EUROPEAN STANDARD.
40 024072          116564 002330 002271                ;WAS THE CHOICE = 'B' ?
                                                ;IF NOT THEN CHECK IF IT IS = 'C'...
                                                ;OFFSET FOR PS214 & STPGSZ
                                                ;THEN = 'B'... 14 INCH PAGE.  SET UP ARG LIST
   024072          116564 002330 002271                MOV      #1,R4
   024072          116564 002330 002271                MOV      PS214,STPGSZ(R4)
   024072          116564 002330 002271                MOV      #1,R5
   024072          116564 002330 002271                MOV      PS214(R5),STPGSZ(R4)

```

TEST 13:

CUT SHEET FEEDER EXERCISOR

41	024100	005204			INC	R4	
42	024102	005205			INC	R5	
43	024104	1'6564	002330	002271	MOVB	PSZ14(R5),STPGSZ(R4)	: SEND THE ARGUMENT SEQUENCE
44	024112	000447			BR	TRANSMIT	
45							
46	024114	123737	006514	006526	CMPEB	BR2,SCC	: IS THE CHARACTER A 'C' ?
47	024122	001022			BNE	MAKE11	: IF NOT THEN ASSUME IT WAS AN 'A'.
48							
49	024124	010146			MOV	R1,-(SP)	: SAVE R1 TEMPORARILY
50	024126	012701	000002		MOV	#2,R1	: OFFSET
51	024132	012700	000001		MOV	#1,R0	: OFFSET
52	024136	113760	002322	002271	MOVB	PSZA4,STPGSZ(R0)	: THEN = 'C'. SET UP ARG LIST
53	024144	116061	002322	002271	MOVB	PSZA4(R0),STPGSZ(R1)	:
54	024152	012700	000003		MOV	#3,R0	: OFFSET ADJUSTMENT
55	024156	116160	002322	002271	MOVB	PSZA4(R1),STPGSZ(R0)	:
56	024164	012601			MOV	(SP)+,R1	: RESTORE R1
57	024166	000421			BR	TRANSMIT	
58							
59	024170	010146			MAKE11: MOV	R1,-(SP)	: SAVE R1 TEMPORARILY
60	024172	012701	000002		MOV	#2,R1	: OFFSET
61	024176	012700	000001		MOV	#1,R0	: OFFSET
62	024202	113760	002325	002271	MOVB	PSZ11,STPGSZ(R0)	: THEN = 'A'. SET UP ARG LIST
63	024210	116061	002325	002271	MOVB	PSZ11(R0),STPGSZ(R1)	: FOR 11 INCH PAGE.
64	024216	012700	000003		MOV	#3,R0	: OFFSET ADJUSTMENT
65	024222	116160	002325	002271	MOVB	PSZ11(R1),STPGSZ(R0)	:
66	024230	012601			MOV	(SP)+,R1	: RESTORE R1
67							
68	024232	012701	002271		TRANSMIT: MOV	#STPGSZ,R1	: ADDRESS OF ARGUMENT LIST
69	024236	012702	000005		MOV	#5,R2	:
70	024242	005003			CLR	R3	
71	024244	004737	012632		JSR	PC,XMIT	: SEND TO PRINTER... SET PAGE SIZE
72	024250	004737	015360		JSR	PC,ERRORS	: CHECK FOR ERRORS.
73							
74	024254	012700	000001		SELECT: MOV	#1,R0	
75	024260	012701	000002		MOV	#2,R1	: TRANSFER OFFSET FOR
76	024264	113760	006412	002276	MOVB	FRONT,SLTPFF(R0)	: SELECT TRAY-PERFORM FORMFEED
77	024272	116061	006412	002276	MOVB	FRONT(R0),SLTPFF(R1)	: ARGUMENT LIST
78	024300	012700	000003		MOV	#3,R0	: OFFSET ADJUSTMENT
79	024304	116160	006412	002276	MOVB	FRONT(R1),SLTPFF(R0)	:
80							
81	024312	012701	002276		MOV	#SLTPFF,R1	: ADDRESS OF ARGUMENT LIST
82	024316	012702	000005		MOV	#5,R2	:
83	024322	005003			CLR	R3	
84	024324	004737	012632		JSR	PC,XMIT	: SELECT TRAY AND PERFORM FORMFEED.
85	024330	004737	015360		JSR	PC,ERRORS	: CHECK FOR ERRORS.
86							
87	024334	012701	004654		MOV	#FTYTPM,R1	: FRONT TRAY TOP OF PAGE MESSAGE
88	024340	012702	000140		MOV	#96.,R2	: 96 CHARACTERS LONG
89	024344	005003			CLR	R3	
90	024346	004737	012632		JSR	PC,XMIT	: SEND TO PRINTER
91	024352	004737	015360		JSR	PC,ERRORS	: CHECK FOR ERRORS.
92							
93	024356	123737	006514	006527	CMPEB	BR2,SCB	: IS THE BYTE A 'B'?
94	024364	001003			BNE	CHC2	: IF NOT THEN CHECK FOR A 'C'.
95							
96	024366	013701	002170		MOV	SKP14,R1	: SKIP 14 INCHES MINUS 3 LINES VERTICALLY
97	024372	000411			BR	DOSPCS	: PERFORM TASK

TEST 13: CUT SHEET FEEDER EXERCISOR

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98
99 024374 123737 006514 006526 MC2: CMPB BR2,SCC ;IS THE CHARACTER A 'C'?
100 024402 001003 BNE ASSMA ;MUST BE 11 INCH IF NOT B OR C.
101
102 024404 013701 002172 MOV SKPA4,R1 ;MUST BE A4 SIZE. SKIP A4 - 3 LINES VERTICALLY
103 024410 000402 BR DOSPCS ;PERFORM TASK
104
105 024412 013701 002174 ASSMA: MOV SKP11,R1 ;11 INCH PAGE. SKIP 11 INCHES - 3 LINES
106
107 024416 010137 002176 DOSPCS: MOV R1,CRNTSK ;SAVE CURRENT SKIP SIZE.
108 024422 004737 014314 JSR PC,CONVRT ;CONVERT TO MNEMONICS
109 024426 012700 000001 MOV #1,R0
110 024432 113760 010046 002226 MOVB MNEB1,VRTCLS(R0) ;MNEMONICS FOR ARG LIST
111 024440 005200 INC R0
112 024442 113760 010047 002226 MOVB MNEB2,VRTCLS(R0) ;
113 024450 005200 INC R0
114 024452 113760 010050 002226 MOVB MNEB3,VRTCLS(R0) ;
115
116 024460 012701 002226 MOV #VRTCLS,R1 ;ADDRESS OF ARGUMENT LIST FOR VERTICAL SPACING
117 024464 012702 000005 MOV #5,R2 ;
118 024470 005003 CLR R3
119 024472 004737 012632 JSR PC,XMIT ;SEND TO PRINTER
120 024476 004737 015360 JSR PC,ERRORS ;CHECK FOR ERRORS.
121
122 024502 012701 007203 MOV #FBTM,R1 ;PRINT BOTTOM OF PAGE MESSAGE
123 024506 012702 000072 MOV #58,R2 ;58 CHARACTERS
124 024512 005003 CLR R3
125 024514 004737 012632 JSR PC,XMIT ;SEND TO PRINTER
126 024520 004737 015360 JSR PC,ERRORS ;CHECK FOR ERRORS.
127
128 024524 012700 000001 MOV #1,R0
129 024530 010146 MOV R1,-(SP)
130 024532 012701 000002 MOV #2,R1 ;TEMPORARILY SAVE R1
131 024536 113760 006415 002276 MOVB REAR,SLTPFF(R0) ;SELECT REAR TRAY
132 024544 116061 006415 002276 MOVB REAR(R0),SLTPFF(R1) ; AND PERFORM
133 024552 012700 000003 MOV #3,R0
134 024556 116160 006415 002276 MOVB REAR(R1),SLTPFF(R0) ; FORMFEED.
135 024564 012601 MOV (SP)+,R1 ;RESTORE R1
136
137 024566 012701 002276 MOV #SLTPFF,R1 ;ADDRESS OF ARGUMENT LIST
138 024572 012702 000005 MOV #5,R2 ;
139 024576 005003 CLR R3
140 024600 004737 012632 JSR PC,XMIT ;SEND TO PRINTER
141 024604 004737 015360 JSR PC,ERRORS ;CHECK FOR ERRORS.
142
143 024610 012701 005014 MOV #RTYTPM,R1 ;REAR TRAY TOP OF PAGE MESSAGE
144 024614 012702 000140 MOV #96,R2 ;96 CHARACTERS LONG
145 024620 005003 CLR R3
146 024622 004737 012632 JSR PC,XMIT ;SEND TO PRINTER
147 024626 004737 015360 JSR PC,ERRORS ;CHECK FOR ERRORS.
148
149 024632 013701 002176 MOV CRNTSK,R1 ;GET CURRENT SKIP SIZE.
150 024636 004737 014314 JSR PC,CONVRT ;CONVERT TO MNEMONICS
151 024642 012700 000001 MOV #1,R0
152 024646 113760 010046 002226 MOVB MNEB1,VRTCLS(R0) ;MNEMONICS FOR ARG LIST
153 024654 005200 INC R0
154 024656 113760 010047 002226 MOVB MNEB2,VRTCLS(R0) ;

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TEST 13: CUT SHEET FEEDER EXERCISOR

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155 024664 005200      INC      R0
156 024666 113760 010050 002226      MOVB   MNEB3,VRTCLS(R0) ;
157                                     ;
158 024674 012701 002226      MOV    #VRTCLS,R1      ;ADDRESS OF ARGUMENT LIST FOR VERTICAL SPACING
159 024700 012702 000005      MOV    #5,R2          ;
160 024704 005003      CLR     R3
161 024706 004737 012632      JSR    PC,XMIT          ;SEND TO PRINTER
162 024712 004737 015360      JSR    PC,ERRORS        ;CHECK FOR ERRORS.
163                                     ;
164                                     ;
165 024716 012701 007203      MOV    #F3TM,R1        ;MESSAGE FOR BOTTOM OF PAGE
166 024722 012702 000072      MOV    #58.,R2         ;
167 024726 005003      CLR     R3
168 024730 004737 012632      JSR    PC,XMIT          ;SEND TO PRINTER
169 024734 004737 015360      JSR    PC,ERRORS        ;CHECK FOR ERRORS.
170                                     ;
171 024740 012700 000001      MOV    #1,R0
172 024744 012701 000002      MOV    #2,R1            ;OFFSET IN ARG LIST
173 024750 113760 006420 002276      MOVB   NULL,SLTPFF(R0) ;EJECT
174 024756 116061 006420 002276      MOVB   NULL(R0),SLTPFF(R1) ; PAGE
175 024764 012700 000003      MOV    #3,R0
176 024770 116160 006420 002276      MOVB   NULL(R1),SLTPFF(R0) ; PRESENTLY
177 024776 012701 002276      MOV    #SLTPFF,R1       ; IN THE PRINTER
178 025002 012702 000005      MOV    #5,R2          ;
179 025006 005003      CLR     R3
180 025010 004737 012632      JSR    PC,XMIT          ;SEND TO PRINTER
181 025014 004737 015360      JSR    PC,ERRORS        ;CHECK FOR ERRORS.
182                                     ;
183 025020      ENDD:   ENDTST
184 025020
185 025020      L10024: TRAP   C$ETST
186 104401
187
188
189
190
191
192
193
194
195
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197
198
199
200
201      .EVEN
202
203      .TITLE  PARAMETER CODING
204      .SBTTL  HARDWARE PARAMETER CODING SECTION
205

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HARDWARE PARAMETER CODING SECTION

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1
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10
11 025022          BGNHRD
    025022 000022
    025024                                     .WORD L10025-L$HARD/2
                                           $HARD::
12
13 025024          GPRMD   GPD2MS,6,0,3,1,2,YES      ;PRINTER WIDTH QUESTION.
    025024 003032                                     .WORD   T$CODE
    025026 025420                                     .WORD   GPD2MS
    025030 000003                                     .WORD   3
    025032 000001                                     .WORD   T$LOLIM
    025034 000002                                     .WORD   T$HILIM
14 025036          GPRMA   GPAMSG,0,0,160000,177777,YES ;CSR ADDRESS QUESTION.
    025036 000031                                     .WORD   T$CODE
    025040 025070                                     .WORD   GPAMSG
    025042 160000                                     .WORD   T$LOLIM
    025044 177777                                     .WORD   T$HILIM
15 025046          GPRML   GPLMSG,2,1,YES             ;DZ11? QUESTION.
    025046 J01130                                     .WORD   T$CODE
    025050 025242                                     .WORD   GPLMSG
    025052 000001                                     .WORD   1
16 025054          XFERT   SNGLP                      ;SKIP CHANNEL QUESTION IF DL11.
    025054 006024                                     .WORD   T$CODE
17 025056          GPRMD   GPDMSG,4,0,7,0,7,YES      ;CHANNEL # QUESTION.
    025056 002032                                     .WORD   T$CODE
    025060 025325                                     .WORD   GPDMSG
    025062 000007                                     .WORD   7
    025064 000J00                                     .WORD   T$LOLIM
    025066 000007                                     .WORD   T$HILIM
18 025070          SNGLP:
19 025070          ENDHRD
                                           .EVEN
    025070          L10025:
20
21
22
23 025070          ;      MESSAGES FOR THE ABOVE CALLS
    025073          GPAMSG: .ASCII <12><15>/IF DEFAULT VALUES FOR INTERFACE DESIRED, ENTER ^Z./<12><15>
    025076          012      015      111
    025101          106      040      104
    025104          105      106      101
    025107          123      114      124
    025112          040      126      101
    025115          114      125      105
    025120          123      040      106
    025123          117      122      040
    025126          111      116      124
    025131          105      122      106
    025134          101      103      105
    025137          040      104      105
    025140          123      111      122

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HARDWARE PARAMETER CODING SECTION

	025137	105	104	054	
	025142	040	105	116	
	025145	124	105	122	
	025150	040	136	132	
	025153	056	012	015	
24	025156	012	015	040	.ASCII <12><15>/ /<12><15>
	025161	012	015		
25	025163	105	116	124	.ASCIIZ /ENTER CONTROL STATUS REGISTER (CSR) ADDRESS.>>/
	025166	105	122	040	
	025171	103	117	116	
	025174	124	122	117	
	025177	114	040	123	
	025202	124	101	124	
	025205	125	123	040	
	025210	122	105	107	
	025213	111	123	124	
	025216	105	122	040	
	025221	050	103	123	
	025224	122	051	040	
	025227	101	104	104	
	025232	122	105	123	
	025235	123	056	076	
	025240	076	000		
26	025242	012	015	120	GPLMSG: .ASCIIZ <12><15>/PRINTER CONNECTED TO A SINGLE LINE INTERFACE? >>/
	025245	122	111	116	
	025250	124	105	122	
	025253	040	103	117	
	025256	116	116	105	
	025261	103	124	105	
	025264	104	040	124	
	025267	117	040	101	
	025272	040	123	111	
	025275	116	107	114	
	025300	105	040	114	
	025303	111	116	105	
	025306	040	111	116	
	025311	124	105	122	
	025314	106	101	103	
	025317	105	077	040	
	025322	076	076	000	
27	025325	012	015	105	GPMSG: .ASCIIZ <12><15>/ENTER INTERFACE CHANNEL NUMBER FOR THE PRINTER. (0-7) >>/
	025330	116	124	105	
	025333	122	040	111	
	025336	116	124	105	
	025341	122	106	101	
	025344	103	105	040	
	025347	103	110	101	
	025352	116	116	105	
	025355	114	040	116	
	025360	125	115	102	
	025363	105	122	040	
	025366	106	117	122	
	025371	040	124	110	
	025374	105	040	120	
	025377	122	111	116	
	025402	124	105	122	
	025405	056	040	050	

HARDWARE PARAMETER CODING SECTION

	025410	060	055	067	
	025413	051	040	076	
	025416	076	000		
28					
29	025420	040	012	015	GPD2MS: .ASCII / /<12><15>
30	025423	103	110	117	.ASCII /CHOOSE PAGE WIDTH FOR PRINTER/<12><15>
	025426	117	123	105	
	025431	040	120	101	
	025434	107	105	040	
	025437	127	111	104	
	025442	124	110	040	
	025445	106	117	122	
	025450	040	120	122	
	025453	111	116	124	
	025456	105	122	012	
	025461	015			
31	025462	103	110	117	.ASCII /CHOOSE ONE: 1) 80 CHARACTERS PER PRINTER LINE/<15><12>
	025465	117	123	105	
	025470	040	117	116	
	025473	105	072	040	
	025476	040	061	051	
	025501	040	040	070	
	025504	060	040	103	
	025507	110	101	122	
	025512	101	103	124	
	025515	105	122	123	
	025520	040	120	105	
	025523	122	040	120	
	025526	122	111	116	
	025531	124	105	122	
	025534	040	114	111	
	025537	116	105	015	
	025542	012			
32	025543	040	040	040	.ASCII / 2) 132 CHARACTERS PER PRINTER LINE/<15><12>
	025546	040	040	040	
	025551	040	040	040	
	025554	040	040	040	
	025557	040	062	051	
	025562	040	061	063	
	025565	062	040	103	
	025570	110	101	122	
	025573	101	103	124	
	025576	105	122	123	
	025601	040	120	105	
	025604	122	040	120	
	025607	122	111	116	
	025612	124	105	122	
	025615	040	114	111	
	025620	116	105	015	
	025623	012			
33	025624	050	061	054	.ASCIIZ /(1,2) >>/
	025627	062	051	040	
	025632	076	076	000	
34					.EVEN
35					
36	025636				\$PATCH::
37					.BLKW 100;(ADJUST SIZE OF PATCH AREA UNTIL)

HARDWARE PARAMETER CODING SECTION

38
39
40

41 026036

026036 000000
026040 000000
026042

;

(LASTAD + 27264 HAS BIT 7 CLEAR)

LASTAD

LSLAST::

.EVEN
.WORD 0
.WORD 0

HARDWARE PARAMETER CODING SECTION

1 026042 .
2

000001

.END

ENDMOD

SYMBOL TABLE

ABORT	015714	CHRCNT	010064	C\$QIO =	000377	EMPTYR	016662	F\$RPT =	000012
ABSND	017220	CHRL00	020402	C\$RDBU=	000007	EMPTYZ3	016364	F\$SEG =	000003
ABS5	017430	CHRL06	021376	C\$REFG=	000047	EMP4	017176	F\$SOFT=	000005
ACAS	006535	CHRLST	006555	C\$RESE=	000033	EMP5	017406	F\$SRV =	000010
ADR =	000020 G	CLEAR	023176	C\$REVI=	000003	ENDC	023342	F\$SUB =	000002
AGN	021150	CNTNU	013504	C\$RFLA=	000021	ENDD	025020	F\$SW =	000014
ALPHA	013532	COIE	013474	C\$RPT =	000025	ENDIN	016700	F\$TEST=	000001
ASSEMB=	000010	CONTLO	014230	C\$SEFG=	000046	EOT	006515	GETCHR	014126
ASSMA	024412	CONVRT	014314	C\$SPRI=	000041	ERMSG	007316	GPAMSG	025070
AUTCAL	022376	CR	002313	C\$SEEC=	000037	FRRBLK	010100 G	GPDMG	025325
AUTOLD	022404	CRCLX	015264	C\$TPRI=	000013	ERRMSG	010076 G	GPDM2S	025420
AUTOLE	022410	CRNTPR	006502	DASHES	006542	ERRNBR	010074 G	GPLMSG	025242
BASET	005262	CRNTSK	002176	DCUPA	015560	ERRORS	015360	GREASE	002206
BAUDRT	005250	CSRADD	002200	DDCUPA	015612	ERRTYP	010072 G	GTNUM	023352
BAUTBL	006464	CTLZ	006524	DELAYS	015336	ERSETT	014276	G\$CNT0=	000200
BETA	013514	C\$AU =	000052	DELCNT	010054	ERWORD	006500	G\$DELM=	000372
BFRA	007352	C\$AUTO=	000061	DFAIL	005256	ESCAPE	006521	G\$DISP=	000003
BFRB	010030	C\$BRK =	000022	DFAULT	017144	EVL -	000004 G	G\$EXCP=	000400
BFRB	010032	C\$BSEG=	000004	DFPTBL	002160 G	EXETS	013614	G\$HILI=	000002
BFRD	010034	C\$BSUB=	000002	DIAGMC=	000000	EXIT	022402	G\$LOLI=	000001
BIDIRP	012742	C\$CEFG=	000045	DIRCTN	006504	EXITA	023054	G\$NO =	000000
BIT0 -	000001 G	C\$CLCK=	000062	DLDFLT	005252	EXITE	014304	G\$OFFS=	000400
BIT00 =	000001 G	C\$CLEA=	000012	DLSET	016714	EXITON	014120	G\$OF SI=	000376
BIT01 =	000002 G	C\$CLOS=	000035	DONEDF	017562	EXITS	013644	G\$PRMA=	000001
BIT02 =	000004 G	C\$CLP1=	000006	DOSPCS	024416	EXITSR	015330	G\$PRMD=	000002
BIT03 =	000010 G	C\$CVEC=	000036	DUMMYS	002214	EXITX	013366	G\$PRML=	000000
BIT04 -	000020 G	C\$DCLN=	000044	DZDCOD	017332	EXIT11	022632	G\$RADA=	000140
BIT05 -	000040 G	C\$DODU=	000051	DZDFLT	005254	EXTMCR	015562	G\$RADB=	000000
BIT06 =	000100 G	C\$DRPT=	000024	DZSET	017004	E\$END =	002100	G\$RADD=	000040
BIT07 =	000200 G	C\$DU =	000053	ECNRB -	020000	E\$LOAD=	000035	G\$RADL=	000120
BIT08 -	000400 G	C\$EDIT=	000003	EDFMA	011230	FAILDF	017540	G\$RADO=	000020
BIT09 =	001000 G	C\$ERDF=	000055	EDFMB	011331	FAILDL	012141	G\$XFER=	000004
BIT1 -	000002 G	C\$ERHR=	000056	EDFMC	011464	FAILDZ	012236	G\$YES =	000010
BIT10 -	002000 G	C\$ERRO=	000060	EDFMD	011540	FAILM	011622	HEXA =	000052
BIT11 -	004000 G	C\$ERSF=	000054	EDFM0	010361	FBTM	007203	HEXB =	000053
BIT12 =	010000 G	C\$ERSO=	000057	EDFM1	010422	FIVE -	000045	HEXC =	000054
BIT13 -	020000 G	C\$ESCA=	000010	EDFM2	010475	FLAGS	005260	HEXD =	000055
BIT14 -	040000 G	C\$SEGE=	000005	EDFM3	010543	FLTRDY	006512	HEXE =	000056
BIT15 -	100000 G	C\$ESUB=	000003	EDFM4	010622	FOUR =	000044	HEXF =	000057
BIT2 -	000004 G	C\$ETST=	000001	EDFM5	010650	FRONT	006412	HITARG	010060
BIT3 -	000010 G	C\$EXIT=	000032	EDFM6	010677	FTYTPM	004654	HOE =	100000 G
BIT4 =	000020 G	C\$GETB=	000026	EDFM7	010755	FWRDO	013200	HRZTLS	002233
BIT5 -	000040 G	C\$GETW=	000027	EDFM8	011026	FXRDYM	012333	HZTLSP	002212
BIT6 -	000100 G	C\$GMAN=	000043	EDFM9	011175	F\$AU =	000015	IBE =	010000 G
BIT7 =	000200 G	C\$GPHR=	000042	EF.CON=	000036 G	F\$AUTO=	000020	IDU =	000040 G
BIT8 -	000400 G	C\$GPLO=	000030	EF.NEW=	000035 G	F\$BGN -	000040	IER =	020000 G
BIT9 -	001000 G	C\$GPRI=	000040	EF.PWR=	000034 G	F\$CLEA=	000007	INFIN	016626
BOE =	000400 G	C\$INIT=	000011	EF.RES=	000037 G	F\$DU =	000016	INIERR	014600
BR2	006514	C\$INLP=	000020	EF.STA=	000040 G	F\$END =	000041	INITCD	014412
CALLDF	015776	C\$MANI=	000050	EIGHT =	000050	F\$HARD=	000004	INITLZ	015634
CALLDL	016012	C\$MEM =	000031	EIGHTY	016620	F\$HW =	000013	INLOOP	015344
CAN	006516	C\$MSG =	000023	ELSEX	014020	F\$INIT=	000006	INUPB	010070
CCOUNT	010066	C\$OPEN=	000034	EMPTY2	016060	F\$JMP =	000050	ISR =	000100 G
CHC2	024374	C\$PNTB=	000014	EMPTY3	016360	F\$MOD =	000000	IXE =	004000 G
CHCC	024114	C\$PNTF=	000017	EMPTY4	017172	F\$MSG =	000011	I\$AU =	000041
CHKCAN	013570	C\$PNTS=	000016	EMPTY5	017402	F\$PROT=	000021	I\$AUTO=	000041
CHKNO	017732	C\$PNTX=	000015	EMPTL2	016064	F\$PWR =	000017	I\$LN =	000041

SYMBOL TABLE

ISDU = 000041	L\$ERRT 010072 G	MNEB1 010046	PGMCTR 007314	SETUPI 014626
ISHRD = 000041	L\$ETP 002102 G	MNEB2 010047	PLOC 002204	SET15 015314
ISINIT= 000041	L\$EXP1 002046 G	MNEB3 010050	PLOOP 020072	SEVEN = 000047
ISMOD = 000041	L\$EXP4 002064 G	MSGADD 005244	PLOOPC 023220	SIX = 000046
ISMSG = 000041	L\$EXP5 002066 G	MXLF = 002000	PLOOP9 022130	SKPA4 002172
ISPROT= 000040	L\$HARD 025024 G	NDA 010056	PNT = 001000 G	SKP11 002174
ISPTAB= 000041	L\$HIME 002120 G	NEWMOD 020152	PRARCH 023344	SKP14 002170
ISPR = 000041	L\$HPCP 002016 G	NEXTU 015662	PRI = 002000 G	SLFTST 002255
ISRPT = 000041	L\$HPTP 002022 G	NINE = 000051	PRI00 = 000000 G	SLTPFF 002276
ISSEG = 000041	L\$HW 002160 G	NONDTA 013106	PRI01 = 000040 G	SNGCHR 006522
ISSETU= 000041	L\$ICP 002104 G	NONDT2 016214	PRI02 = 000100 G	SNGLP 025070
ISSRV = 000041	L\$INIT 015634 G	NONDT3 016250	PRI03 = 000140 G	SPACE 006541
ISSUB = 000041	L\$LADP 002026 G	NONDZA 016406	PRI04 = 000200 G	SPCSIZ 010036
ISTST = 000041	L\$LAST 026042 G	NONDZ2 016514	PRI05 = 000240 G	STATS 015132
JENDIN 015716	L\$LOAD 002100 G	NONDZ3 016550	PRI06 = 000300 G	STATUS 002315
JUNKPL 006440	L\$LUN 002074 G	NOPRTM 014166	PRI07 = 000340 G	STCHSZ 002244
J\$JMP = 000167	L\$MREV 002050 G	NOTQ 023024	PRMPTA 003200	STHTCT 002257
LCHYET 012732	L\$NAME 002000 G	NOT1 023406	PRMPTC 003466	STLNSZ 002251
LF 002314	L\$PRIO 002042 G	NPRMPT 004531	PRMPTD 004046	STPGSZ 002271
LINCNT 010062	L\$PROT 015626 G	NULL 006420	PRNTIT 017726	STRUP 015722
LINCOD 016570	L\$PRT 002112 G	NUM1 = 000001	PRTBM0 010230	STSCAL 017760
LINLOO 020340	L\$REPP 002062 G	NUM10 = 000012	PRTM2 016472	STSERR 015106
LINLO6 021372	L\$REV 002010 G	NUM11 = 000013	PRTXM0 010302	STSPSZ 002262
LINN 010040	L\$RPT 015620 G	NUM12 = 000014	PSZA4 002322	STSRES 002210
LINSIZ 010042	L\$SPC 002056 G	NUM13 = 000015	PSZ11 002325	STULMD 002266
LNELOO 012746	L\$SPCP 002020 G	NUM14 = 000016	PSZ14 002330	SVCGBL= 000000
LODELY 015016	L\$SPTP 002024 G	NUM15 = 000017	RANDOM 015040	SVCINS= 000001
LOE = 040000 G	L\$STA 002030 G	NUM2 = 000002	RBUF 007302	SVCSUB= 000001
LOGUNI 002202	L\$TEST 002114 G	NUM3 = 000003	RCSR 007276	SVCTAG= 000001
LOOPA 022726	L\$TML 002014 G	NUM4 = 000004	REAR 006415	SVCTST= 000001
LOOPCK 014040	L\$UNIT 002012 G	NUM5 = 000005	RESET 002224	\$SYMSYM= 010000
LOOPG 014142	L1LOOP 020656	NUM6 = 000006	RESETC 014426	TAMAN 022644
LOOPXN 013674	L10000 002170	NUM7 = 000007	RESINN 013430	TBLOT 022304
LOOP8 021762	L10001 012630	NUM8 = 000010	REVRSP 021610	TBMANB 022204
LOT = 000010 G	L10002 015624	NUM9 = 000011	RIBPOS 002240	TCMAN 023070
LOUEF 014472	L10004 017564	NXTA 022750	RTYTPM 005014	TCR 007310
LPR 007306	L10005 016712	NXTBIT 015404	SCA 006531	TCRENA 006436
LPRINI 006442	L10006 017566	NXTERM 015506	SCB 006527	TCRTBL 006444
L\$ACP 002110 G	L10007 017630	NXTLIN 021554	SCC 006526	TDMAN 023776
L\$APT 002036 G	L10010 017764	ONE = 000041	SCQ 006525	TDR 007312
L\$AUT 002070 G	L10011 020222	OPTN1 003351	SCX 006530	TESTA 022634
L\$AUTO 017566 G	L10012 020506	OUTCTR 006506	SC0 006532	TESTB 022174
L\$CCP 002106 G	L10013 021040	OUTRLP 014140	SC1 006533	TESTC 023060
L\$CLEA 017570 G	L10014 021262	OUTSDC 006510	SEED1 006424	TESTD 023766
L\$CO 002032 G	L10015 021444	OUTSDL 013666	SEED2 006426	TEST1 017632
L\$DEPO 002011 G	L10016 021644	OSAPTS= 000000	SELECT 024254	TEST2 017766
L\$DESC 010150 G	L10017 022010	OSAU = 000000	SENCHR 013402	TEST3 020224
L\$DESP 002076 G	L10020 022172	OSBGNR= 000000	SENCH2 013412	TEST4 020510
L\$DEVP 002060 G	L10021 022402	OSBGRS= 000000	SENCLP 013434	TEST5 021042
L\$DISP 002124 G	L10022 023056	OSDU = 000000	SENDR 014256	TEST6 021264
L\$DLY 002116 G	L10023 023342	OSERRT= 000001	SENDR2 013334	TEST7 021446
L\$DTP 002040 G	L10024 025020	OSGNSW= 000000	SENDX 013724	TEST8 021646
L\$DTYP 002034 G	L10025 025070	OSPOIN= 000001	SETHO 002310	TEST9 022012
L\$DUT 002072 G	MAKE11 024170	OSSETU= 000000	SETER 013632	TFCZ 023000
L\$DVT 010102 G	MANLD 022524	PALPHA 015306	SETHO 002303	THREE = 000043
L\$EF 002052 G	MANIF 022544	PERIOD 006534	SETONE 020140	TIMOM 012526
L\$ENVI 002044 G	MLTLIN 010052	P' M1 016172	SFTUPC 016274	TITLEA 003115

SYMBOL TABLE

TITLEB	003264	TWO =	000042	T\$TAGL=	177777	T11PMT	004346	UBTRAP	016704 G
TITLEC	003717	T\$ARGC=	000001	T\$TAGN=	010026	T12	023060 G	UCRB =	010000
TITLED	003773	T\$MODE=	002032	T\$TEMP=	000000	T13	023766 G	VRTCLS	002226
TITLE1	002333	T\$ERRN=	000000	T\$TEST=	000015	T2	017766 G	WAITMX	011432
TITLE2	002366	T\$EXCP=	000000	T\$TSTM=	177777	T2LOT	020066	WAITXN	013656
TITLE3	002446	T\$FLAG=	000040	T\$TSTS=	000001	T3	020224 G	WFC	012430
TITLE4	002513	T\$GMAN=	000000	T\$SAUT=	010006	T3LOT	020324	WTSTPM	005154
TITLE5	002564	T\$HILI=	000007	T\$SCLE=	010007	T4	020510 G	XBUF	007304
TITLE6	002645	T\$LAST=	000001	T\$SHAR=	010025	T4LOT	020610	XCSR	007300
TITLE7	002725	T\$LOLI=	000000	T\$SHW =	010000	T5	021042 G	XMIT	012632
TITLE8	002772	T\$LSYM=	010000	T\$SINI=	010004	T5LOT	021142	XOFF	006517
TITLE9	003046	T\$LTNO=	000015	T\$SMMSG=	010001	T6	021264 G	XON	006520
TMPLT1	006430	T\$NEST=	177777	T\$SPRO=	010003	T6LOT	021364	XSTR	012704
TMPLT2	006432	T\$NSO =	000000	T\$SRPT=	010002	T7	021446 G	X\$ALWA=	000000
TMPLT3	006434	T\$NS1 =	000004	T\$SSRV=	010005	T7LOT	021546	X\$FALS=	000040
TOPSTK	010026	T\$NS2 =	000010	T\$STES=	010024	T8	021646 G	X\$OFFS=	000400
TRDYBT	010044	T\$PTNU=	000000	T1	017632 G	T8LOT	021746	X\$TRUE=	000020
TRNSMT	024232	T\$SAVL=	177777	T1LOT	017674	T9	022012 G	ZERO	000040
TRXADD	005246	T\$SFGL=	177777	T10	022174 G	T9LOT	022112	\$PATCH	025636 G
TRYAGN	C15042	T\$SUBN=	000000	T11	022634 G	JAM =	000200 G		

. ABS. 026042 000
000000 001

ERRORS DETECTED: 0

VIRTUAL MEMORY USED: 20966 WORDS (82 PAGES)

DYNAMIC MEMORY AVAILABLE FOR 69 PAGES

ZLQPB.BIN,CZLQPB.SEO/C/N:TOC=SV(C34R.MLB,CZLQPB.P11

CROSS REFERENCE TABLE (CREF V01-05)

[illegible]

CROSS REFERENCE TABLE (CREF V01-05)

CSBSUB	2-7#																
CSCEFG	2-7#																
CSCLCK	2-7#																
CSCLEA	2-7#	24-24															
CSCLOS	2-7#																
CSCLP1	2-7#																
CSVEEC	2-7#	23-183															
CSDECLN	2-7#	20-78	23-33	23-58	23--8	23-94	23-119	23-150	23-156	23-512							
CSDODU	2-7#																
CSDRPT	2-7#																
CSDU	2-7#																
CSEDIT	2-7#	2-24															
CSERDF	2-7#																
CSERHR	2-7#																
CSERRO	2-7#	20-59															
CSERSF	2-7#																
CSERSO	2-7#																
CSESCA	2-7#																
CSSEEG	2-7#																
CSesub	2-7#																
CSETST	2-7#	25-47	26-63	27-77	28-89	29-70	30-59	31-66	32-55	33-59	34-71	37-75	38-86	39-183			
CSEXIT	2-7#	23-193	24-19														
CGETB	2-7#																
CGETW	2-7#																
CSGMAN	2-7#	34-59	36-38	37-37	38-37	39-28											
CSGPHR	2-7#	23-30															
CSGPLO	2-7#																
CSGPRI	2-7#																
CSINIT	2-7#	23-523															
CSINLP	2-7#																
CSMANI	2-7#	34-28	37-21	38-22	39-20												
CSMEM	2-7#																
CSMSG	2-7#	8-16															
CSOPEN	2-7#																
CSPTB	2-7#	20-61	20-76	20-82	25-25	26-24	27-33	28-31	29-36	30-31	31-27	32-30	33-30	34-38			
	36-36	37-27	38-27	39-25													
CSPTBF	2-7#	23-57	23-87	23-93	23-118	23-149	23-155	23-511									
CSPTS	2-7#																
CSPTX	2-7#	11-56	12-89	13-57	20-62												
CSQIO	2-7#																
CSRDBU	2-7#																
CSREFG	2-7#	23-19	23-22														
CSRESE	2-7#	2-7#															
CSREVI	2-7#	2-24															
CSRFLA	2-7#	25-21	26-20	27-29	28-27	29-32	30-27	31-23	32-26	33-26	34-34						
CSRPT	2-7#	21-14															
CSSEFG	2-7#																
CSSPRI	2-7#																
CSSEEC	2-7#	23-36															
CSIPRI	2-7#																
CALLDF	23-48#	23-107															
CALLDL	23-52#	23-109															
CAN	6-317#	11-89	13-70														
CCOUNT	6-438#	35-31*	35-50*	35-51	38-57*	38-64*	38-65										
CHC2	39-94	39-99#															
CHKC	39-35	39-46#															
CHKCAN	11-80	11-89#															

CROSS REFERENCE TABLE (CREF V01-05)

F\$HW	2-7#	4-9	4-17											
F\$INIT	2-7#	23-7	23-523											
F\$JMP	2-7#	8-12	8-12	21-10	21-10	23-193	24-19							
F\$MOD	2-7#	2-8	41-1											
F\$MSG	2-7#	8-9	8-16											
F\$PROT	2-7#	22-7	22-13											
F\$PWR	2-7#													
F\$RPT	2-7#	21-8	21-14											
F\$SEG	2-7#													
F\$SOFT	2-7#													
F\$SRV	2-7#	23-225	23-229											
F\$SUB	2-7#													
F\$SW	2-7#													
F\$TEST	2-7#	25-5	25-47	26-4	26-63	27-8	27-77	28-4	28-89	29-3	29-70	30-4	30-59	31-4
	31-66	32-5	32-55	33-3	33-59	34-3	34-71	37-2	37-75	38-4	38-86	39-4	39-183	
FAILDF	23-469	23-497	23-504	23-511#										
FAILDL	7-185#	23-57	23-87	23-93										
FAILDZ	7-186#	23-118	23-149	23-155										
FAILM	7-179#	23-511												
FBTM	6-354#	39-122	39-165											
FIVE	5-12#													
FLAGS	6-154#	25-21*	25-22	26-20*	26-21	27-29*	27-30	28-27*	28-28	29-32*	29-33	30-27*	30-28	31-23*
	31-24	32-26*	32-27	33-26*	33-27	34-34*	34-35							
FLTRDY	6-310#	11-100*	20-74	20-80	23-41*	23-73*	23-81	23-135*	23-143	23-436*	23-462*	23-487*		
FOUR	5-11#	10-136	10-161											
FRONT	6-258#	38-49	39-76	39-77	39-79									
FTYTPM	6-139#	39-87												
FWRDO	10-113	10-175#												
FXRDYM	7-187#	20-76	20-82											
G\$CNT0	2-7#													
G\$DELM	2-7#													
G\$DISP	2-7#													
G\$EXCP	2-7#													
G\$HILI	2-7#													
G\$LOLI	2-7#													
G\$NO	2-7#	37-37												
G\$OFFS	2-7#	34-59	36-38	37-37	38-37	39-28	40-13	40-14	40-15	40-17				
G\$OF SI	2-7#	34-59	36-38	37-37	38-37	39-28	40-13	40-14	40-15	40-17				
G\$PRMA	2-7#	40-14												
G\$PRMD	2-7#	34-59	36-38	37-37	38-37	39-28	40-13	40-17						
G\$PRML	2-7#	40-15												
G\$RADA	2-7#	34-59	36-38	37-37	38-37	39-28								
G\$RADB	2-7#													
G\$RADD	2-7#													
G\$RADL	2-7#	40-15												
G\$RADO	2-7#	40-13	40-14	40-17										
G\$XFER	2-7#	40-16												
G\$YES	2-7#	34-59	36-38	38-37	39-28	40-13	40-14	40-15	40-17					
GETCHR	12-50	12-60	12-63	12-64	12-66	12-67	13-34#	15-73	15-77	15-81	15-85	15-90	15-94	17-52
	17-56	17-61	17-69	17-83	23-90	23-96	23-97	23-98	23-99	23-152	23-158	23-159	23-160	23-161
	23-449	23-454	23-455	23-456	23-457	23-499	23-505	23-506	23-507	23-508	25-38			
GPAMSG	40-14	40-23#												
GPD2MS	40-13	40-29#												
GPDMSG	40-17	40-27#												
GPLMSG	40-15	40-26#												
GREASE	6-20#	10-85*	10-88	10-122	10-128	10-133	10-139	10-146	10-183	10-189	10-194	10-200	10-207	10-215
	11-84	11-101*	12-74*	17-93*	23-42*	23-74*	23-136*	23-437*	23-463*	23-488*	25-32			

CROSS REFERENCE TABLE (CREF V01-05)

L\$DISP	2-24	3-5#	
L\$DLY	2-24#		
L\$DTP	2-24#		
L\$DTYP	2-24#		
L\$DUT	2-24#		
L\$DVTY	2-24	7-11#	
L\$EF	2-24#		
L\$ENVI	2-24#		
L\$ERRT	2-24	6-445#	
L\$ETP	2-24#		
L\$EXP1	2-24#		
L\$EXP4	2-24#		
L\$EXP5	2-24#		
L\$HARD	2-24	40-11	40-1 #
L\$HIME	2-24#		
L\$HPCP	2-24#		
L\$HPTP	2-24#		
L\$HW	2-24	4-9	4-9#
L\$ICP	2-24#		
L\$INIT	2-24	23-7#	
L\$LADP	2-24#		
L\$LAST	2-24	40-41#	
L\$LOAD	2-24#		
L\$LUN	2-24#		
L\$MREV	2-24#		
L\$NAME	2-24#		
L\$PRIO	2-24#		
L\$PROT	2-24	22-7#	
L\$PRT	2-24#		
L\$REPP	2-24#		
L\$REV	2-24#		
L\$RPT	21-8#		
L\$SPC	2-24#		
L\$SPCP	2-24#		
L\$SPTP	2-24#		
L\$STA	2-24#		
L\$TEST	2-24#		
L\$TIML	2-24#		
L\$UNIT	2-24#	23-28	
L10000	4-9	4-17#	
L10001	8-12	8-16#	
L10002	21-10	21-14#	
L10004	23-193	23-523#	
L10005	23-229#		
L10006	23-529#		
L10007	24-19	24-24#	
L10010	25-47#		
L10011	26-63#		
L10012	27-77#		
L10013	28-89#		
L10014	29-70#		
L10015	30-59#		
L10016	31-66#		
L10017	32-55#		
L10020	33-59#		
L10021	34-71#		
L10022	37-75#		

[illegible]

[illegible]

RBUF	6-367#	11-74	13-68	23-67	23-128	23-189	23-277*	23-337*	23-431	23-482				
RCSR	6-365#	11-62	12-48	13-41	23-64	23-125	23-186-	23-274*	23-331*	23-349*	23-428	23-479		
REAR	6-259#	39-131	39-132	39-134										
RESET	6-47#	15-63	24-14											
RESETC	15-56#													
RESINN	11-47#	11-60												
REVRSP	31-51#	31-57												
RIBPOS	6-52#	15-104*	15-105	35-33*	35-34	35-43*	35-44	36-46*	36-47					
R*VTPM	6-141#	39-143												
S&LSYM	2-7#	4-17#	8-16#	21-14#	23-229#	23-523#	23-529#	24-24#	25-47#	26-63#	27-77#	28-89#	29-70#	30-59#
	31-66#	32-55#	33-59#	34-59	34-59	34-59	34-59#	34-71#	36-38	36-38	36-38	36-38#	37-37	37-37
	37-37	37-37#	37-75#	38-37	38-37	38-37	38-37#	38-86#	39-28	39-28	39-28	39-28#	39-183#	40-19#
SCO	6-329#	12-57	12-68	15-91	17-84									
SC1	6-330#	27-43												
SCA	6-328#	26-35	34-62											
SCB	6-326#	39-34	39-93											
SCC	6-325#	39-46	39-99											
SCQ	6-324#	36-42	37-55											
SCX	6-327#	28-41	28-64	28-75										
SEED1	6-262#	16-45	16-51*											
SEED2	6-263#	16-46	16-52*											
SELECT	39-74#													
SENCH2	11-44#	11-87												
SENCHR	10-86	10-109	10-120	10-126	10-131	10-137	10-144	10-153	10-156	10-159	10-162	10-165	10-181	10-187
	10-192	10-198	10-205	10-211	10-214	11-39#	12-56	12-58	17-44	17-47				
SENCLP	11-49#	11-66												
SENDR	13-42	13-68#												
SENDER2	10-106	10-170	10-213#											
SENDX	12-54#	12-71												
SET15	17-88	17-92#												
SETHO	6-66#	34-53												
SETER	11-90	11-93	11-104#											
SEHTO	6-65#	34-48												
SETONE	26-43	26-46#												
SETUPC	23-45	23-104#												
SETUPI	15-96	15-103#												
SEVEN	5-14#													
SIX	5-13#													
SKP11	6-9#	39-105												
SKP14	6-7#	39-96												
SKPA4	6-8#	39-102												
SLFTST	6-56#	25-27												
SLTPFF	6-62#	39-76*	39-77*	39-79*	39-81	39-131*	39-132*	39-134*	39-137	39-173*				

[illegible]

	31-23	31-23	31-23	31-23	31-27	31-27	31-27	31-27	31-27	31-27	31-27	31-27	31-27
	31-27	31-27	31-27	31-27	31-27	31-66	31-66	31-66	32-26	32-26	32-26	32-26	32-26
	32-30	32-30	32-30	32-30	32-30	32-30	32-30	32-30	32-30	32-30	32-30	32-30	32-30
	32-30	32-55	32-55	32-55	33-26	33-26	33-26	33-26	33-26	33-26	33-30	33-30	33-30
	33-30	33-30	33-30	33-30	33-30	33-30	33-30	33-30	33-30	33-30	33-30	33-59	33-59
	34-28	34-28	34-28	34-29	34-29	34-29	34-34	34-34	34-34	34-34	34-34	34-38	34-38
	34-38	34-38	34-38	34-38	34-38	34-38	34-38	34-38	34-38	34-38	34-38	34-38	34-59
	34-59	34-59	34-59	34-59	34-59	34-59	34-59	34-59	34-59	34-59	34-59	34-59	34-59
	34-59	34-59	34-59	34-59	34-59	34-59	34-59	34-59	34-59	34-71	34-71	34-71	36-36
	36-36	36-36	36-36	36-36	36-36	36-36	36-36	36-36	36-36	36-36	36-36	36-36	36-38
	36-38	36-38	36-38	36-38	36-38	36-38	36-38	36-38	36-38	36-38	36-38	36-38	36-38
	36-38	36-38	36-38	36-38	36-38	36-38	36-38	36-38	36-38	37-21	37-21	37-21	37-22
	37-22	37-27	37-27	37-27	37-27	37-27	37-27	37-27	37-27	37-27	37-27	37-27	37-27
	37-27	37-27	37-37	37-37	37-37	37-37	37-37	37-37	37-37	37-37	37-37	37-37	37-37
	37-37	37-37	37-37	37-37	37-37	37-37	37-37	37-37	37-37	37-37	37-37	37-37	37-75
	37-75	38-22	38-22	38-22	38-23	38-23	38-23	38-27	38-27	38-27	38-27	38-27	38-27
	38-27	38-27	38-27	38-27	38-27	38-27	38-27	38-27	38-37	38-37	38-37	38-37	38-37
	38-37	38-37	38-37	38-37	38-37	38-37	38-37	38-37	38-37	38-37	38-37	38-37	38-37
	38-37	38-37	38-37	38-37	38-86	38-86	38-86	39-20	39-20	39-20	39-21	39-21	39-21
	39-25	39-25	39-25	39-25	39-25	39-25	39-25	39-25	39-25	39-25	39-25	39-25	39-25
	39-28	39-28	39-28	39-28	39-28	39-28	39-28	39-28	39-28	39-28	39-28	39-28	39-28
	39-28	39-28	39-28	39-28	39-28	39-28	39-28	39-28	39-28	39-183	39-183	39-183	40-11
	40-11	40-11	40-13	40-13	40-13	40-13	40-13	40-13	40-13	40-13	40-13	40-13	40-13
	40-13	40-13	40-13	40-14	40-14	40-14	40-14	40-14	40-14	40-14	40-14	40-14	40-14
	40-14	40-15	40-15	40-15	40-15	40-15	40-15	40-15	40-15	40-15	40-16	40-16	40-16
	40-17	40-17	40-17	40-17	40-17	40-17	40-17	40-17	40-17	40-17	40-17	40-17	40-17
	40-19	40-19	40-19	40-41	40-41	40-41	40-41	40-41	40-41	40-41	40-41	40-41	40-41
SVCSUB	2-7#	2-12#											
SVCTAG	2-7#	2-14#	4-17	8-16	21-14	23-229	23-523	23-529	24-24	25-47	26-63	27-77	28-89
	30-59	31-66	32-55	33-59	34-59	34-71	36-38	37-37	37-75	38-37	38-86		

CROSS REFERENCE TABLE (REF V01-05)

TSEXCP	34-59 40-17	34-59# 40-17#	36-38	36-38#	37-37	37-37#	38-37	38-37#	39-28	39-28#	40-13	40-13#	40-14	40-14#
T\$FLAG	8-12	8-12#	8-12#	21-10	21-10#	21-10#	23-193	23-193	23-193#	23-193#	24-19	24-19	24-19#	24-19#
T\$GMAN	2-7#	34-59	34-59#	34-59#	36-38	36-38#	36-38#	37-37	37-37#	37-37#	38-37	38-37#	38-37#	39-28
T\$HILI	39-28#	39-28#												
T\$LAST	34-59	34-59#	36-38	36-38#	37-37	37-37#	38-37	38-37#	39-28	39-28#	40-13	40-13#	40-14	40-14#
T\$LOLI	40-17	40-17#												
T\$LSYM	2-7#	40-41#												
T\$LT.J	34-59	34-59#	36-38	36-38#	37-37	37-37#	38-37	38-37#	39-28	39-28#	40-13	40-13#	40-14	40-14#
T\$NEST	40-17	40-17#												
	2-7	2-7#	4-17	8-16	21-14	23-229	23-523	23-529	24-24	25-47	26-63	27-77	28-89	29-70
	30-59	31-66	32-55	33-59	34-71	37-75	38-86	39-183	40-19					
	40-41#													
	2-7#	2-8	2-8	2-8#	4-9	4-9	4-9#	4-17	4-17	4-17	4-17#	8-9	8-9	8-9#
	8-16	8-16	8-16	8-16#	21-8	21-8	21-8#	21-14	21-14	21-14	21-14#	22-7	22-7	22-7#
	22-13	22-13	22-13	22-13#	23-7	23-7	23-7#	23-225	23-225	23-225	23-225#	23-229	23-229	23-229#
	23-523	23-523	23-523	23-523#	23-527	23-527	23-527#	23-529	23-529	23-529	23-529#	24-7	24-7	24-7#
	24-24	24-24	24-24	24-24#	25-5	25-5	25-5#	25-47	25-47	25-47	25-47#	26-4	26-4	26-4#
	26-63	26-63	26-63	26-63#	27-8	27-8	27-8#	27-77	27-77	27-77	27-77#	28-4	28-4	28-4#
	28-89	28-89	28-89	28-89#	29-3	29-3	29-3#	29-70	29-70	29-70	29-70#	30-4	30-4	30-4#
	30-59	30-59	30-59	30-59#	31-4	31-4	31-4#	31-66	31-66	31-66	31-66#	32-5	32-5	32-5#
	32-55	32-55	32-55	32-55#	33-3	33-3	33-3#	33-59	33-59	33-59	33-59#	34-3	34-3	34-3#
	34-71	34-71	34-71	34-71#	37-2	37-2	37-2#	37-75	37-75	37-75	37-75#	38-4	38-4	38-4#
	38-86	38-86	38-86	38-86#	39-4	39-4	39-4#	39-183	39-183	39-183	39-183#	40-11	40-11	40-11#
	40-16	40-19	40-19	40-19#	40-19#	41-1	41-1	41-1	41-1#					
T\$NSO	2-8#	41-1												
T\$NS1	4-9#	4-17	8-9#	8-16	21-8#	21-14	22-7#	22-13	23-7#	23-523	23-527#	23-529	24-7#	24-24
	25-5#	25-47	26-4#	26-63	27-8#	27-77	28-4#	28-89	29-3#	29-70	30-4#	30-59	31-4#	31-66
	32-5#	32-55	33-3#	33-59	34-3#	34-71	37-2#	37-75	38-4#	38-86	39-4#	39-183	40-11#	40-16
	40-19													
T\$NS2	23-225#	23-229												
T\$PTNU	2-7#													
T\$SAVL	2-7#													
T\$SEGL	2-7#													
T\$SUBN	2-7#	25-5#	26-4#	27-8#	28-4#	29-3#	30-4#	31-4#	32-5#	33-3#	34-3#	37-2#	38-4#	39-4#
T\$TAGL	2-7#													
T\$TAGN	2-7#	4-9	4-9	4-9#	8-9	8-9	8-9#	21-8	21-8	21-8#	22-7	22-7	22-7#	23-7
	23-7	23-7#	23-225	23-225	23-225#	23-527	23-527	23-527#	24-7	24-7	24-7#	25-5	25-5	25-5#
	26-4	26-4	26-4#	27-8	27-8	27-8#	28-4	28-4	28-4#	29-3	29-3	29-3#	30-4	30-4
	30-4#	31-4	31-4	31-4#	32-5	32-5	32-5#	33-3	33-3	33-3#	34-3	34-3	34-3#	37-2
	37-2	37-2#	38-4	38-4	38-4#	39-4	39-4	39-4#	40-11	40-11	40-11#			
T\$TEMP	3-5	3-5	3-5	3-5	3-5	3-5	3-5	3-5	3-5	3-5	3-5	3-5	3-5	3-5
	3-5	3-5	3-5	3-5	3-5	3-5	3-5	3-5	3-5	3-5	3-5	3-5	3-5	3-5
	3-5#	3-5#	3-5#	3-5#	3-5#	3-5#	3-5#	3-5#	3-5#	3-5#	3-5#	3-5#	4-17	4-17#
	8-12	8-12#	8-16	8-16#	21-10	21-10#	21-14	21-14#	22-13	22-13#	23-193	23-193#	23-229	23-229#
	23-523	23-523#	23-529	23-529#	24-19	24-19#	24-24	24-24#	25-47	25-47#	26-63	26-63#	27-77	27-77#
	28-89	28-89#	29-70	29-70#	30-59	30-59#	31-66	31-66#	32-55	32-55#	33-59	33-59#	34-59	34-59#
	34-59	34-59#	34-59#	34-59#	34-71	34-71#	36-38	36-38	36-38	36-38#	36-38#	36-38#	37-37	37-37#
	37-37	37-37#	37-37#	37-37#	37-75	37-75#	38-37	38-37	38-37	38-37#	38-37#	38-37#	38-86	38-86#
	39-28	39-28	39-28	39-28#	39-28#	39-28#	39-183	39-183#	40-13	40-13	40-13	40-13#	40-13#	40-13#
	40-14	40-14	40-14	40-14#	40-14#	40-14#	40-15	40-15	40-15	40-15#	40-15#	40-15#	40-17	40-17#
	40-17	40-17#	40-17#	40-17#	40-19	40-19#	41-1	41-1#						
T\$TEST	2-7#	25-5	25-5	25-5#	26-4	26-4	26-4#	27-8	27-8	27-8#	28-4	28-4	28-4#	29-3
	29-3	29-3#	30-4	30-4	30-4#	31-4	31-4	31-4#	32-5	32-5	32-5#	33-3	33-3	33-3#
	34-3	34-3	34-3#	37-2	37-2	37-2#	38-4	38-4	38-4#	39-4	39-4	39-4#	40-41	40-41#
T\$TSM	2-7#	8-16	11-48	11-56	12-47	12-54	12-89	13-47	13-57	20-59	20-61	20-62	20-76	20-78
	20-82	21-14	23-19	23-22	23-30	23-33	23-36	23-57	23-58	23-87	23-88	23-93	23-94	23-11#

TITLE4	6-93#	28-31	28-34															
TITLE5	6-95#	29-36	29-39															
TITLE6	6-97#	30-31	30-34															
TITLE7	6-99#	31-27	31-30															
TITLE8	6-101#	32-30	32-33															
TITLE9	6-103#	33-30	33-33															
TITL EA	6-105#	37-27	37-30															
TITL EB	6-109#	34-38	34-41															
TITL EC	6-121#	38-27	38-30															
TITLED	6-123#	39-25																
TMPLT1	6-266#	14-43																
TMPLT2	6-267#	14-50																
TMPLT3	6-268#	14-60	17-57	17-62	17-70													
TOPSTK	6-398#	10-69*	10-70*															
TRDYBT	6-410#	11-65	23-284*	23-351*														
TRNSMT	39-44	39-57	39-68#															
TRXADD	6-149#	10-65*	20-62															
TRYAGN	16-40#	16-58																
TWO	5-9#	6-259																
UAM	5-2#																	
UBTRAP	23-36	23-225#	23-227#															
UCRB	5-43#																	
VRTCLS	6-50#	29-51*	29-53*	29-55*	29-57	38-172*	38-174*	38-176*	38-187	38-228*	38-230*	38-232*	38-234	39-110*				
	39-112*	39-114*	39-116	39-152*	39-154*	39-156*	39-158											
WAITMX	7-154#																	
WAITXN	11-82	12-39#																
WFC	7-188#	13-57																
WTSTPM	6-143#	11-56																
X\$ALWA	2-7#																	
X\$FALS	2-7#																	
X\$OFFS	2-7#	40-16																
X\$TRUE	2-7#	40-16																
XBUF	6-368#	11-70*	23-281*	23-346*														
XCSR	6-366#	11-65	23-279*	23-334*														
XMIT	10-58#	15-59	15-66	15-108	15-115	15-121	15-126	15-131	15-132	15-133	23-79	23-141	23-442	23-493				
	24-12	24-17	25-30	26-31	26-38	26-51	26-60	27-40	27-51	27-58	27-74	28-38	28-43	28-48				
	28-66	28-72	28-77	28-82	29-43	29-59	29-63	30-38	30-48	31-34	31-43	31-53	32-37	32-48				
	33-37	33-52	34-45	34-51	34-56	35-36	35-47	36-50	37-34	37-								

[illegible]

CROSS REFERENCE TABLE (CREF V01-05)

ENDSUB	1-596#	2-7#												
ENDSW	1-614#	2-7#												
ENDTST	1-624#	2-7#	25-47	26-63	27-77	28-89	29-70	30-59	31-66	32-55	33-59	34-71	37-75	38-86
	39-183													
EQUALS	1-642#	2-7#	5-2											
ERRDF	1-714#	2-7#												
ERRHRD	1-718#	2-7#												
ERROR	1-722#	2-7#	20-59											
ERRSF	1-726#	2-7#												
ERRSOF	1-730#	2-7#												
ERRTBL	1-734#	2-7#	6-445											
ESCAPE	1-744#	2-7#												
EXIT	1-771#	2-7#	8-12	21-10	23-193	24-19								
FEQUAL	1-810#	2-7#												
GETBYT	1-824#	2-7#												
GETPRI	1-834#	2-7#												
GETWOR	1-829#	2-7#												
GMANIA	1-839#	2-7#												
GMANID	1-848#	2-7#	34-59	36-38	37-37	38-37	39-28							
GMANIL	1-859#	2-7#												
GPHARD	1-868#	2-7#	23-30											
GPRMA	1-874#	2-7#	40-14											
GPRMD	1-903#	2-7#	34-59	34-59#	36-38	36-38#	37-37	37-37#	38-37	38-37#	39-28	39-28#	40-13	40-17
GPRML	1-934#	2-7#	40-15											
HEADER	1-954#	2-7#	2-24											
INLOOP	1-962#	2-7#												
IOSETU	1-966#	2-7#												
IOSTAR	1-974#	2-7#												
KT11	1-982#	2-7#												
LASTAD	1-:47#	2-7#	40-41											
MSBYTE	1-D00#	2-7#	2-24	2-24	2-24	2-24#								
MSCHEC	1-E18#	2-7#	8-12	8-12#	21-10	21-10#	23-193	23-193#	24-19	24-19#				
MSCNTO	1-E82#	2-7#	34-59	34-59#	36-38	36-38#	37-37	37-37#	38-37	38-37#	39-28	39-28#	40-13	40-13#
	40-14	40-14#	40-15	40-15#	40-17	40-17#								
MSCOUN	1-D66#	2-7#	11-56	11-56#	12-89	12-89#	13-57	13-57#	20-61	20-61#	20-62	20-62#	20-76	20-76#
	20-82	20-82#	23-57	23-57#	23-87	23-87#	23-93	23-93#	23-118	23-118#	23-149	23-149#	23-155	23-155#
	23-511	23-511#	25-25	25-25#	26-24	26-24#	27-33	27-33#	28-31	28-31#	29-36	29-36#	30-31	30-31#
	31-27	31-27#	32-30	32-30#	33-30	33-30#	34-38	34-38#	36-36	36-36#	37-27	37-27#	38-27	38-27#
	39-25	39-25#												
MSDATA	1-B67#	2-7#	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24
	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24
	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24
	7-11#	7-17	7-17#											7-11
MSDECR	1-D29#	2-7#	4-17	4-17#	8-16	8-16#	21-14	21-14#	22-13	22-13#	23-229	23-229#	23-523	23-523#
	23-529	23-529#	24-24	24-24#	25-47	25-47#	26-63	26-63#	27-77	27-77#	28-89	28-89#	29-70	29-70#
	30-59	30-59#	31-66	31-66#	32-55	32-55#	33-59	33-59#	34-71	34-71#	37-75	37-75#	38-86	38-86#
	39-183	39-183#	40-19	40-19#	41-1	41-1#								
MSDEFA	1-E70#	2-7#	34-59	34-59#	36-38	36-38#	37-37	37-37#	38-37	38-37#	39-28	39-28#	40-13	40-13#
	40-14	40-14#	40-15	40-15#	40-17	40-17#								
MSENDE	1-D74#	2-7#	4-17#	8-16#	21-14#	23-229#	23-523#	23-529#	24-24#	25-47#	26-63#	27-77#	28-89#	29-70#
	30-59#	31-66#	32-55#	33-59#	34-71#	37-75#	38-86#	39-183#	40-19#	41-1#				
MSERRI	1-249#	2-7#												
MSESCA	1-D06#	2-7#												
MSSECS	1-D10#	2-7#												
MSEXCP	1-E01#	2-7#	34-59	34-59	34-59#	36-38	36-38	36-38#	37-37	37-37	37-37#	38-37	38-37	38-37#
	39-28	39-28	39-28#	40-13	40-13	40-13#	40-14	40-14	40-14#	40-17	40-17	40-17#		
MSEXIT	1-D14#	2-7#	8-12#	21-10#	23-193	23-193#	24-19	24-19#						

MSEXSE	1-D22#	2-7#	8-12#	21-10#	23-193#	24-19#								
MSEX TJ	1-D18#	2-7#	8-12#	8-12#	21-10	21-10#	23-193#	24-19#						
MSGEN	1-D38#	2-7#	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24
	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24
	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#
	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#
	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#
	4-17	4-17#	6-445	6-445#	7-11	7-11#	7-17	7-17#	8-9#	8-16	8-16#	21-8	21-8#	21-14
	21-14#	22-7	22-7#	23-7	23-7#	23-225	23-225#	23-229	23-229#	23-523	23-523#	23-527	23-527#	23-529
	23-529#	24-7	24-7#	24-24	24-24#	25-5	25-5#	25-47	25-47#	26-4	26-4#	26-63	26-63#	27-8
	27-8#	27-77	27-77#	28-4	28-4#	28-89	28-89#	29-3	29-3#	29-70	29-70#	30-4	30-4#	30-59
	30-59#	31-4	31-4#	31-66	31-66#	32-5	32-5#	32-55	32-55#	33-3	33-3#	33-59	33-59#	34-3
	34-3#	34-59	34-59#	34-71	34-71#	36-38	36-38#	37-2	37-2#	37-37	37-37#	37-75	37-75#	38-4
	38-4#	38-37	38-37#	38-86	38-86#	39-4	39-4#	39-28	39-28#	39-183	39-183#	40-11	40-11#	40-19
	40-19#	40-41	40-41#											
MSGENB	1-C38#	2-7#	34-59	34-59#	36-38	36-38#	37-37	37-37#	38-37	38-37#	39-28	39-28#		
MSGETS	1-D35#	2-7#	4-17	4-17#	8-16	8-16#	21-14	21-14#	22-13	22-13#	23-229	23-229#	23-523	23-523#
	23-529	23-529#	24-24	24-24#	25-47	25-47#	26-63	26-63#	27-77	27-77#	28-89	28-89#	29-70	29-70#
	30-59	30-59#	31-66	31-66#	32-55	32-55#	33-59	33-59#	34-71	34-71#	37-75	37-75#	38-86	38-86#
	39-183	39-183#	40-16	40-16#	40-19	40-19#	41-1	41-1#						
MSGETT	1-B77#	2-7#	8-12#	21-10#	23-193#	24-19#	40-16	40-16#						
MSGNGB	1-C02#	2-7#	2-8#	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24
	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24
	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24	2-24
	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#
	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#
	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#	2-24#
	6-445	6-445#	7-11	7-11#	7-17	7-17#	8-9	8-9#	21-8	21-8#	22-7	22-7#	23-7	23-7#
	23-225	23-225#	23-527	23-527#	24-7	24-7#	40-11	40-11#	40-41	40-41#				

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	26-24#	26-24#	26-63	26-63#	27-29	27-29	27-29#	27-29#	27-33	27-33	27-33	27-33	27-33	27-33#
	27-33#	27-33#	27-33#	27-77	27-77#	28-27	28-27	28-27#	28-27#	28-31	28-31	28-31	28-31	28-31
	28-31#	28-31#	28-31#	28-31#	28-89	28-89#	29-32	29-32	29-32#	29-32#	29-36	29-36	29-36	29-36
	29-36	29-36#	29-36#	29-36#	29-36#	29-70	29-70#	30-27	30-27	30-27#	30-27#	30-31	30-31	30-31
	30-31	30-31	30-31#	30-31#	30-31#	30-31#	30-59	30-59#	31-23	31-23	31-23#	31-23#	31-27	31-27
	31-27	31-27	31-27	31-27#	31-27#	31-27#	31-66	31-66#	32-26	32-26	32-26#	32-26#	32-30	32-30
	32-30	32-30	32-30	32-30	32-30#	32-30#	32-30#	32-30#	32-55	32-55#	33-26	33-26	33-26#	33-26#
	33-30	33-30	33-30	33-30	33-30	33-30#	33-30#	33-30#	33-30#	33-59	33-59#	34-28	34-28#	34-29
	34-29#	34-34	34-34	34-34#	34-34#	34-38	34-38	34-38	34-38	34-38#	34-38#	34-38#	34-38#	34-38#
	34-59	34-59	34-59	34-59	34-59	34-59	34-59	34-59	34-59#	34-59#	34-59#	34-59#	34-71	34-71#
	36-36	36-36	36-36	36-36	36-36	36-36#	36-36#	36-36#	36-36#	36-38	36-38	36-38	36-38	36-38
	36-38	36-38	36-38	36-38#	36-38#	36-38#	36-38#	37-21	37-21#	37-22	37-22#	37-27	37-27	37-27
	37-27	37-27	37-27#	37-27#	37-27#	37-27#	37-37	37-37	37-37	37-37	37-37	37-37	37-37	37-37
	37-37#	37-37#	37-37#	37-37#	37-75	37-75#	38-22	38-22#	38-23	38-23#	38-27	38-27	38-27	38-27
	38-27	38-27#	38-27#	38-27#	38-27#	38-37	38-37	38-37	38-37	38-37	38-37	38-37	38-37	38-37#
	38-37#	38-37#	38-37#	38-86	38-86#	39-20	39-20#	39-21	39-21#	39-25	39-25	39-25	39-25	39-25
	39-25#	39-25#	39-25#	39-25#	39-28	39-28	39-28	39-28	39-28	39-28	39-28	39-28	39-28#	39-28#
	39-28#	39-28#	39-183	39-183#	40-11	40-11#	40-13	40-13	40-13	40-13	40-13	40-13#	40-14	40-14
	40-14	40-14	40-14#	40-15	40-15	40-15	40-15#	40-16	40-16#	40-17	40-17	40-17	40-17	40-17
	40-17#	40-19	40-19#	40-41	40-41	40-41	40-41#	40-41#	40-41#	40-41#	38-37	38-37#	39-28	39-28#
MSGNLS	1-C13#	2-7#	34-59	34-59#	36-38	36-38#	37-37	37-37#	38-37	38-37#	39-28	39-28#		
MSGNSU	1-B98#	2-7#												
MSGNTA	1-B90#	2-7#	4-17	4-17#	8-16	8-16#	21-14	21-14#	23-229	23-229#	23-523	23-523#	23-529	23-529#
	24-24	24-24#	25-47	25-47#	26-63	26-63#	27-77	27-77#	28-89	28-89#	29-70	29-70#	30-59	30-59#
	31-66	31-66#	32-55	32-55#	33-59	33-59#	34-71	34-71#	37-75	37-75#	38-86	38-86#	39-183	39-183#
	40-19	40-19#												
MSGNTE	1-B94#	2-7#	25-5	25-5#	26-4	26-4#	27-8	27-8#	28-4	28-4#	29-3	29-3#	30-4	30-4#
	31-4	31-4#	32-5	32-5#	33-3	33-3#	34-3	34-3#	37-2	37-2#	38-4	38-4#	39-4	39-4#
MSHAPT	1-A39#	2-7#	2-24	2-24#										
MSHNP	1-B24#	2-7#	2-24	2-24#										
MSINCR	1-D26#	2-7#	2-8	2-8#	4-9	4-9	4-9#	4-9#	8-9	8-9	8-9#	8-9#	8-16#	11-48#
	11-56#	12-47#	12-54#	12-89#	13-47#	13-57#	20-59#	20-61#	20-62#	20-76#	20-78#	20-82#	21-8	21-8
	21-8#	21-8#	21-14#	22-7	22-7	22-7#	22-7#	23-7	23-7	23-7#	23-7#	23-19#	23-22#	23-30#
	23-33#	23-36#	23-57#	23-58#	23-87#	23-88#	23-93#	23-94#	23-118#	23-119#	23-149#	23-150#	23-155#	23-156#
	23-183#	23-193#	23-225	23-225	23-225#	23-225#	23-511#	23-512#	23-523#	23-527	23-527	23-527#	23-527#	23-529#
	24-7	24-7	24-7#	24-7#	24-19#	24-24#	25-5	25-5	25-5	25-5#	25-5#	25-5#	25-21#	25-25#
	25-47#	26-4	26-4	26-4	26-4#	26-4#	26-4#	26-20#	26-24#	26-63#	27-8	27-8	27-8	27-8#
	27-8#	27-8#	27-29#	27-33#	27-77#	28-4	28-4	28-4	28-4#	28-4#	28-4#	28-27#	28-31#	28-89#
	29-3	29-3	29-3	29-3#	29-3#	29-3#	29-32#	29-36#	29-70#	30-4	30-4	30-4	30-4#	30-4#
	30-4#	30-27#	30-31#	30-59#	31-4	31-4	31-4	31-4#	31-4#	31-4#	31-23#	31-27#	31-66#	32-5
	32-5	32-5	32-5#	32-5#	32-5#	32-26#	32-30#	32-55#	33-3	33-3	33-3	33-3#	33-3#	33-3#
	33-26#	33-30#	33-59#	34-3	34-3	34-3	34-3#	34-3#	34-3#	34-28#	34-34#	34-38#	34-59	34-59#
	34-59#	34-71#	36-36#	36-38	36-38#	36-38#	37-2	37-2	37-2	37-2#	37-2#	37-2#	37-21#	37-27#
	37-37	37-37#	37-37#	37-75#	38-4	38-4	38-4	38-4#	38-4#	38-4#	38-22#	38-27#	38-37	38-37#
	38-37#	38-86#	39-4	39-4	39-4	39-4#	39-4#	39-4#	39-20#	39-25#	39-28	39-28#	39-28#	39-183#
	40-11	40-11	40-11#	40-11#										
MSIOSE	1-A00#	2-7#												
MSLDRO	1-C42#	2-7#	23-19	23-19#	23-22	23-22#	23-30	23-30#	23-183	23-183#				
MSMASK	1-a71#	2-7#												
MSMCHI	1-4#	2-7	2-7#	2-7#										
MSMCLO	1-a24#	2-7	2-7#	2-7#										
MSMSK1	1-a77#	2-7#												
MSPOP	1-B81#	2-7#	4-17	4-17#	8-16	8-16#	21-14	21-14#	22-13	22-13#	23-229	23-229#	23-523	23-523#
	23-529	23-529#	24-24	24-24#	25-47	25-47#	26-63	26-63#	27-77	27-77#	28-89	28-89#	29-70	29-70#
	30-59	30-59#	31-66	31-66#	32-55	32-55#	33-59	33-59#	34-71	34-71#	37-75	37-75#	38-86	38-86#
	39-183	39-183#	40-19	40-19#	41-1	41-1#								
MSPRIN	1-a36#	2-7#	11-56	11-56#	12-89	12-89#	13-57	13-57#	20-61	20-61#	20-62	20-62#	20-76	20-76#

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	20-82	20-82#	23-57	23-57#	23-87	23-87#	23-93	23-93#	23-118	23-118#	23-149	23-149#	23-155	23-155#
	23-511	23-511#	25-25	25-25#	26-24	26-24#	27-33	27-33#	28-31	28-31#	29-36	29-36#	30-31	30-31#
	31-27	31-27#	32-30	32-30#	33-30	33-30#	34-38	34-38#	36-36	36-36#	37-27	37-27#	38-27	38-27#
	39-25	39-25#												
M\$PUSH	1-@31#	2-7#	2-8	2-8#	4-9	4-9#	8-9	8-9#	21-8	21-8#	22-7	22-7#	23-7	23-7#
	23-225	23-225#	23-527	23-527#	24-7	24-7#	25-5	25-5#	26-4	26-4#	27-8	27-8#	28-4	28-4#
	29-3	29-3#	30-4	30-4#	31-4	31-4#	32-5	32-5#	33-3	33-3#	34-3	34-3#	37-2	37-2#
	38-4	38-4#	39-4	39-4#	40-11	40-11#								
M\$PUT	1-C72#	2-7#	11-56	11-56#	11-56#	11-56#	12-89	12-89#	13-57	13-57#	13-57#	20-61	20-61	20-61
	20-61#	20-62	20-62	20-62#	20-62#	20-62#	20-76	20-76#	20-82	20-82#	20-82#	23-36	23-36	23-36
	23-36	23-36#	23-57	23-57#	23-57#	23-57#	23-87	23-87#	23-93	23-93#	23-93#	23-118	23-118	23-118#
	23-149	23-149	23-149#	23-155	23-155	23-155#	23-511	23-511#	23-511#	23-511#	25-25	25-25#	26-24	26-24
	26-24#	27-33	27-33#	27-33#	28-31	28-31#	28-31#	29-36	29-36#	29-36#	30-31	30-31#	30-31#	31-27
	31-27	31-27#	32-30	32-30#	32-30#	33-30	33-30#	33-30#	34-38	34-38#	34-38#	36-36	36-36	36-36#
	37-27	37-27#	37-27#	38-27	38-27#	38-27#	39-25	39-25#	39-25#	39-25#				
M\$PUT1	1-C81#	2-7#	11-56	11-56#	11-56#	11-56#	12-89	12-89#	12-89#	12-89#	13-57	13-57#	13-57#	13-57#
	20-61	20-61	20-61	20-61#	20-61#	20-61#	20-62	20-62#	20-62#	20-62#	20-62#	20-62#	20-76	20-76
	20-76#	20-76#	20-82	20-82#	20-82#	20-82#	23-36	23-36#	23-36#	23-36#	23-36#	23-36#	23-36#	23-36#
	23-57	23-57#	23-57#	23-57#	23-87	23-87#	23-87#	23-87#	23-93	23-93#	23-93#	23-93#	23-118	23-118
	23-118#	23-118#	23-149	23-149#	23-149#	23-149#	23-155	23-155#	23-155#	23-155#	23-511	23-511#	23-511#	23-511#
	25-25	25-25#	25-25#	25-25#	26-24	26-24#	26-24#	26-24#	27-33	27-33#	27-33#	27-33#	28-31	28-31#
	28-31#	28-31#	29-36	29-36#	29-36#	29-36#	30-31	30-31#	30-31#	30-31#	31-27	31-27#	31-27#	31-27#
	32-30	32-30#	32-30#	32-30#	33-30	33-30#	33-30#	33-30#	34-38	34-38#	34-38#	34-38#	36-36	36-36
	36-36#	36-36#	37-27	37-27#	37-27#	37-27#	38-27	38-27#	38-27#	38-27#	39-25	39-25#	39-25#	39-25#
M\$RADI	1-D77#	2-7#	34-59	34-59#	36-38	36-38#	37-37	37-37#	38-37	38-37#	39-28	39-28#	40-13	40-13#
	40-14	40-14#	40-15	40-15#	40-17	40-17#								
M\$RBRO	1-C52#	2-7#												
M\$RNRO	1-C62#	2-7#	23-30	23-30#	25-21	25-21#	26-20	26-20#	27-29	27-29#	28-27	28-27#	29-32	29-32#
	30-27	30-27#	31-23	31-23#	32-26	32-26#	33-26	33-26#	34-34	34-34#				
M\$SETS	1-D32#	2-7#	2-8	2-8#	4-9	4-9#	8-9	8-9#	21-8	21-8#	22-7	22-7#	23-7	23-7#
	23-225	23-225#	23-527	23-527#	24-7	24-7#	25-5	25-5#	26-4	26-4#	27-8	27-8#	28-4	28-4#
	29-3	29-3#	30-4	30-4#	31-4	31-4#	32-5	32-5#	33-3	33-3#	34-3	34-3#	37-2	37-2#
	38-4	38-4#	39-4	39-4#	40-11	40-11#								
M\$STAR	1-A33#	2-7#												
M\$SVC	1-C33#	2-7#	8-12#	8-16	8-16#	11-48	11-48#	11-56	11-56#	12-47	12-47#	12-54	12-54#	12-89
	12-89#	13-47	13-47#	13-57	13-57#	20-59	20-59#	20-61	20-61#	20-62	20-62#	20-76	20-76#	20-78
	20-78#	20-82	20-82#	21-10#	21-14	21-14#	23-19	23-19#	23-22	23-22#	23-30	23-30#	23-33	23-33#
	23-36	23-36#	23-57	23-57#	23-58	23-58#	23-87	23-87#	23-88	23-88#	23-93	23-93#	23-94	23-94#
	23-118	23-118#	23-119	23-119#	23-149	23-149#	23-150	23-150#	23-155	23-155#	23-156	23-156#	23-183	23-183#
	23-193	23-193#	23-511	23-511#	23-512	23-512#	23-523	23-523#	23-529	23-529#	24-19	24-19#	24-24	24-24#
	25-21	25-21#	25-25	25-25#	25-47	25-47#	26-20	26-20#	26-24	26-24#	26-63	26-63#	27-29	27-29#
	27-33	27-33#	27-77	27-77#	28-27	28-27#	28-31	28-31#	28-89	28-89#	29-32	29-32#	29-36	29-36#
	29-70	29-70#	30-27	30-27#	30-31	30-31#	30-59	30-59#	31-23	31-23#	31-27	31-27#	31-66	31-66#
	32-26	32-26#	32-30	32-30#	32-55	32-55#	33-26	33-26#	33-30	33-30#	33-59	33-59#	34-28	34-28#
	34-34	34-34#	34-38	34-38#	34-59	34-59#	34-71	34-71#	36-36	36-36#	36-38	36-38#	37-21	37-21#
	37-27	37-27#	37-37	37-37#	37-75	37-75#	38-22	38-22#	38-27	38-27#	38-37	38-37#	38-86	38-86#
	39-20	39-20#	39-25	39-25#	39-28	39-28#	39-183	39-183#						
M\$TLAB	1-C29#	2-7#	8-16#	11-48#	11-56#	12-47#	12-54#	12-89#	13-47#	13-57#	20-59#	20-61#	20-62#	20-76#
	20-78#	20-82#	21-14#	23-19#	23-22#	23-30#	23-33#	23-36#	23-57#	23-58#	23-87#	23-88#	23-93#	23-94#
	23-118#	23-119#	23-149#	23-150#	23-155#	23-156#	23-183#	23-193#	23-511#	23-512#	23-523#	23-529#	24-19#	24-24#
	25-21#	25-25#	25-47#	26-20#	26-24#	26-63#	27-29#	27-33#	27-77#	28-27#	28-31#	28-89#	29-32#	29-36#
	29-70#	30-27#	30-31#	30-59#	31-23#	31-27#	31-66#	32-26#	32-30#	32-55#	33-26#	33-30#	33-59#	34-28#
	34-34#	34-38#	34-59#	34-71#	36-36#	36-38#	37-21#	37-27#	37-37#	37-75#	38-22#	38-27#	38-37#	38-86#
	39-20#	39-25#	39-28#	39-183#										
M\$TSTL	1-C21#	2-7#	8-16	8-16#	11-48	11-48#	11-56	11-56#	12-47	12-47#	12-54	12-54#	12-89	12-89#
	13-47	13-47#	13-57	13-57#	20-59	20-59#	20-61	20-61#	20-62	20-62#	20-76	20-76#	20-78	20-78#
	20-82	20-82#	21-14	21-14#	23-19	23-19#	23-22	23-22#	23-30	23-30#	23-33	23-33#	23-36	23-36#

[illegible]