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LQPSE-F PDP11 DIAG
CZLQPA0

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CZLQPAO LQPSE-F PDP11 DIAG

MACRO V03.01 7-NOV-80 10:06:10 PAGE 1
.REM 8IDENTIFICATION

PRODUCT CODE: AC-S327A-MC

PRODUCT NAME: CZLQPAO LQPSE-F PDP-11 DIAG

PRODUCT DATE: 7-NOV-80

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 'DDDDD'.

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:DDDDD	EXECUTE DDDDD PASSES (DDDDD = 1 TO 64000)
/FLAGS:FLGS	SET SPECIFIED FLAGS. FLAGS ARE DESCRIBED IN SECTION 2.3.
/EOP:DDDDD	REPORT END OF PASS MESSAGE AFTER EVERY DDDDD PASSES ONLY. (DDDDD = 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
HOE	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
IBR*	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)
PRI	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 (O) ? 160000<CR>

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

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

UNIT 2

CSR ADDRESS (O) ? 160000<CR>

SUB-DEVICE # (O) ? 1<CR>

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

UNIT 3

CSR ADDRESS (O) ? 160000<CR>

SUB-DEVICE # (O) ? 2<CR>

Q-FACTOR (O) 0 ? <CR>

UNIT 4

CSR ADDRESS (O) ? 160000<CR>

SUB-DEVICE # (O) ? 3<CR>

Q-FACTOR (O) 0 ? <CR>

UNIT 5

CSR ADDRESS (O) ? 160000<CR>

SUB-DEVICE # (O) ? 4<CR>

Q-FACTOR (O) 0 ? <CR>

UNIT 6

CSR ADDRESS (O) ? 160000<CR>

SUB-DEVICE # (O) ? 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>

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 (D) ? 8<CR>

UNIT 1

CSR ADDRESS (D) ? 160000<CR>

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

Q-FACTOR (D) 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

400 INFORMATION ABOUT THE ERROR. THESE ARE ALWAYS PRINTED UNLESS
401 THE "IER" OR "IBR" FLAGS ARE SET (SECTION 2.3). THESE MESSAGES
402 ARE PRINTED AFTER THE ASSOCIATED GENERAL MESSAGE.
403
404 EXTENDED ERROR MESSAGES CONTAIN SUPPLEMENTARY ERROR INFORMATION
405 SUCH AS REGISTER CONTENTS OR GOOD/BAD DATA. THESE ARE ALWAYS
406 PRINTED UNLESS THE "IER", "IBR" OR "IXR" FLAGS ARE SET (SECTION 2.3).
407 THESE MESSAGES ARE PRINTED AFTER THE ASSOCIATED GENERAL ERROR
408 MESSAGE AND ANY ASSOCIATED BASIC ERROR MESSAGES.
409
410 3.2 SPECIFIC ERROR MESSAGES
411
412 "I/O FAILURE DETECTED AT PRINTER."
413 PROBLEM WITH THE SELF TEST SEQUENCE. CHECK PRINTER ROM.
414
415
416 "PRINTER BUFFER FULL."
417 A "CAN" CHARACTER HAS BEEN RECEIVED, AND THE PRINTER
418 HAS DETECTED THAT ITS BUFFER LIMIT HAS BEEN REACHED.
419
420 "PROM/RAM FAILURE DETECTED BY PRINTER."
421 VALID ONLY AFTER THE SELF TEST. CHECK THE PRINTER MEMORY.
422
423 "PRINTER ERROR: N OUT OF RANGE IN ESCAPE SEQUENCE."
424 AN UNDEFINED OR OUT OF RANGE ARGUMENT HAS BEEN SENT TO
425 THE PRINTER WITHIN AN ESCAPE SEQUENCE.(PRINTER COMMAND)
426
427 "PAUSE SWITCH PRESSED."
428 THE PRINTER FRONT PANEL PAUSE SWITCH HAS BEEN PRESSED.
429
430 "RIBBON OUT ON PRINTER."
431 THE PRINTER RIBBON MUST BE IN PLACE.
432
433 "UNDEFINED CHARACTER OR ESCAPE SEQUENCE RECEIVED."
434 AN ILLEGAL SEQUENCE OR CHARACTER HAS BEEN RECEIVED.
435 CHECK THE ADDRESS OF THE LAST TRANSMISSION WHICH
436 IS GIVEN BY THE DIAGNOSTIC.
437
438 "SHEET FEEDER ERROR."
439 THE SHEET FEEDER HAS FAILED TO OPERATE PROPERLY. THIS
440 ERROR CONDITION MAY BE CLEARED BY SENDING AN "ESC 6" TO
441 THE PRINTER.
442
443 "SOFTWARE ERROR"
444 THIS MESSAGE SHOULD NOT PRINT UNLESS THE SOFTWARE HAS
445 BEEN CORRUPTED.
446
447
448 "UNEXPECTED CHARACTER RECEIVED FROM PRINTER."
449 AN XON, XOFF, ANSWER-BACK RESPONSE OR STATUS RESPONSE
450 WAS EXPECTED, OR NO TRANSMISSION WAS EXPECTED FROM THE
451 PRINTER. SOMETHING WAS NONE THE LESS RECEIVED.
452
453 "EXPECTED CHARACTER NOT RECEIVED FROM THE PRINTER."
454 AN XON, XOFF, CAN, EOT, OR ESC WAS EXPECTED BUT NOT
455 RECEIVED.
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"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 DZ11 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

514 PRINTER.

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

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523 6.0 TEST SUMMARIES

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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 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.

571 TEST 3 - HAMMER HIT COUNT TEST
572
573 FOUR LINES OF TEXT WILL BE PRINTED, EACH LINE OF TEXT BEING
574 PRINTED WITH A DIFFERENT HIT COUNT. THE RESULTING PRINT
575 PATTERN WILL BE FOUR LINES, ONE BLANK LINE (HIT COUNT 0),
576 AND THREE LINES OF INCREASING DARKNESS (INCREASING HIT COUNT).
577 THE 'ESC N D' SEQUENCE IS USED WITH N EQUAL TO 0, 1, 2, AND
578 N<0. THE N<0 SEQUENCE WILL RESULT IN A HIT COUNT OF ZERO,
579 N=0 IS A HIT COUNT OF ONE, N=1 IS A HIT COUNT OF TWO AND N=2
580 IS A HIT COUNT OF THREE.
581
582 TEST 4 - CARRIAGE POSITIONING TEST
583
584 IN THIS TEST, TWO CHARACTERS ARE PRINTED SEPARATED BY A
585 SPACE OF ADJUSTABLE WIDTH. BOTH FORWARD AND REVERSE
586 CARRIAGE MOTIONS ARE EXERCISED. THE RANGE OF THE SPACE
587 SIZE IS DICTATED BY THE CURRENT PAGE WIDTH. THE SPACE
588 SIZE IS ADJUSTED BY SENDING THE 'ESC N ;' SEQUENCE TO THE
589 PRINTER. THE VALUE N IS PROPORTIONAL TO THE SPACE SIZE
590 AND MAY BE POSITIVE (RIGHT MOVEMENT) OR NEGATIVE (LEFT
591 MOVEMENT).
592
593 TEST 5 - PAPER POSITIONING TEST (VERTICAL)
594
595 THE VERTICAL SPACING IS ADJUSTED IN THIS TEST BY SENDING
596 THE SEQUENCE 'ESC N 9' WHERE N IS PROPORTIONAL TO THE VERTICAL
597 SPACE SIZE. IN THIS TEST A LINE OF CHARACTERS WILL BE PRINTED
598 AND A CARRIAGE RETURN - LINE FEED TRANSMITTED. THE VERTICAL
599 SPACE SIZE WILL THEN BE ADJUSTED AND THE SEQUENCE WILL BE
600 REPEATED. THIS SEQUENCE WILL BE PERFORMED OVER A REASONABLE
601 RANGE OF VERTICAL SPACE SIZES.
602
603 TEST 6 - PRINT ONE LINE OF EACH CHARACTER
604
605 ONE LINE OF EACH PRINTABLE CHARACTER WILL BE PRINTED TO
606 CONFIRM THAT ALL POSITIONS ON THE PRINT WHEEL WILL ACTUALLY
607 PRINT.
608
609 TEST 7 - PRINT A SWIRL PATTERN
610
611 THE COMPLETE CHARACTER SET IS PRINTED ONE LINE AT A TIME
612 IN A 'SWIRL PATTERN'.
613
614 TEST 8 - WORST CASE RAPID MOTION TEST
615
616 THIS TEST WILL PUT THE PRINT WHEEL THROUGH A MECHANICALLY STRESSFUL
617 SITUATION BY REPEATEDLY PRINTING THE SEQUENCE 'ACA:ACA:AC..'
618
619 TEST 9 - PRINT RANDOM CHARACTERS
620
621 THIS TEST WILL PRINT A RANDOM SEQUENCE OF CHARACTERS ON THE
622 PRINTER.
623
624 TEST 10 - PRINT OPERATOR SELECTED CHARACTERS
625
626 THIS TEST WILL PRINT CHARACTER SEQUENCES DEFINED BY THE
627 USER. THE TEST IS ENDED BY ENTERING Q<RETURN>.

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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.

CZLQPAO LQPSE-F PDP11 DIAG
PROGRAM HEADER

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```

1
2 000000      .ENABL  ABS
3              .ENABL  AMA
4
5              002000      .=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,A,0,240.,0,PRI07
    002000
    002000      103
    002001      132
    002002      114
    002003      121
    002004      120
    002005      000
    002006      000
    002007      000
    002010
    002010      101
    002011
    002011      060
    002012
    002012      000000
    002014
    002014      000360
    002016
    002016      024406
    002020
    002020      000000
    002022
    002022      002160
    002024
    002024      000000
    002026
    002026      025234
    002030
    002030      000000
    002032
    002032      000000
    002034
    002034      000000

LSNAME::
      .ASCII  /C/
      .ASCII  /Z/
      .ASCII  /L/
      .ASCII  /Q/
      .ASCII  /P/
      .BYTE   0
      .BYTE   0
      .BYTE   0
LSREV::
      .ASCII  /A/
LSDEPO::
      .ASCII  /O/
LSUNIT::
      .WORD   0
LSTIML::
      .WORD   240.
LSHPCP::
      .WORD   LSHARD
L$SPCP::
      .WORD   0
LSHPTP::
      .WORD   LSHW
L$SPTP::
      .WORD   0
L$LADP::
      .WORD   L$LAST
L$STA::
      .WORD   0
L$CO::
      .WORD   0
L$DTYP::
      .WORD   0

```

CZLQPAO LQPSE-F PDP11 DIAG
PROGRAM HEADER

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G
G

```

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 015522
002106
002106 017456
002110
002110 017454
002112
002112 015514
002114
002114 000000
002116
002116 000000
002120
002120 000000

```

25
26

.SBTTL DISPATCH TABLE

```

LSAPT::
        .WORD 0
LSDTP::
        .WORD LSDISPATCH
LSPRIO::
        .WORD PRI07
LSENV1::
        .WORD 0
LSEXP1::
        .WORD 0
LSMREV::
        .BYTE CSREVISION
        .BYTE CSEDIT
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 LSERRTBI
LSICP::
        .WORD LSINIT
LSCCP::
        .WORD LSCLEAN
LSACP::
        .WORD LSAUTO
LSPRT::
        .WORD LSPROT
LSTEST::
        .WORD 0
LSDLY::
        .WORD 0
LSHIME::
        .WORD 0

```

CZLQPA0 LQPSE-F PDP11 DIAG
DISPATCH TABLE

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1
2
3
4
5

DISPATCH 13

002122 000015
002122 017470
002124 017606
002126 020026
002130 020274
002132 020610
002134 021014
002136 021160
002140 021342
002142 021470
002144 021634
002146 022050
002150 022462
002152 023360
002154

.WORD 13
LSDISPATCH::
.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

CZLQPA0 LQPSE-F PDP11 DIAG
DEFAULT HARDWARE P-TABLE

MACRO V03.01 7-NOV-80 10:06:10 PAGE 7

```

1
2
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4
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6
7
8
9 002156      BGNHW  DFPTBL
   002156      .WORD  L10000-LSHW/2
   002160
   002160      LSHW::
                        DFPTBL::
10
11 002160      000000      .WORD  0      ;CSR ADDRESS. IF = 0 THEN AUTO-SETUP MODE IS ASSUMED.
12 002162      000001      .WORD  1      ;1='Y'. I/O OPTION IS SINGLE LINE (NON-DZ11) INTERFACE
13 002164      000000      .WORD  0      ;PRINTER CHANNEL DEFAULT IS CHANNEL 0.
14 002166      000001      .WORD  1      ;LINE SIZE CHOICE. 1=80 CHARACTERS/LINE
15
16
17 002170      ENDPHW
   002170
                        L10000:
18
19
20 .TITLE GLOBAL AREAS
   .SBTTL GLOBAL EQUATES SECTION

```


GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 8
GLOBAL EQUATES SECTION

1
2 002170

EQUALS

;
; BIT DEFINITIONS
;

100000	BIT15== 100000
040000	BIT14== 40000
020000	BIT13== 20000
010000	BIT12== 10000
004000	BIT11== 4000
002000	BIT10== 2000
001000	BIT09== 1000
000400	BIT08== 400
000200	BIT07== 200
000100	BIT06== 100
000040	BIT05== 40
000020	BIT04== 20
000010	BIT03== 10
000004	BIT02== 4
000002	BIT01== 2
000001	BIT00== 1

001000	BIT9== BIT09
000400	BIT8== BIT08
000200	BIT7== BIT07
000100	BIT6== BIT06
000040	BIT5== BIT05
000020	BIT4== BIT04
000010	BIT3== BIT03
000004	BIT2== BIT02
000002	BIT1== BIT01
000001	BIT0== BIT00

;
; 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	EVL== 4
--------	---------

GLOBAL AREAS MACRO V03.01 7-JCV-80 10:06:10 PAGE 8-1
GLOBAL EQUATES SECTION

000010	LOT==	10
000020	ADR==	20
000040	IDU==	40
000100	ISR==	:00
000200	JAM==	200
000400	BOE==	400
001000	PNT==	1000
002000	PR1==	2000
004000	IXE==	4000
010000	IBE==	10000
020000	IER==	20000
040000	LOE==	40000
100000	HOE==	100000

:
: DECIMAL VALUES

ZERO	=32.	: MNEMONICS FOR ESCAPE SEQUENCE ARGUMENTS.
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.	

000001	NUM1	=1
000002	NUM2	=2
000003	NUM3	=3
000004	NUM4	=4
000005	NUM5	=5
000006	NUM6	=6
000007	NUM7	=7
000010	NUM8	=8.
000011	NUM9	=9.
000012	NUM10	=10.
000013	NUM11	=11.
000014	NUM12	=12.
000015	NUM13	=13.
000016	NUM14	=14.
000017	NUM15	=15.

020000	ECNRB	=BIT13
010000	UCRB	=BIT12

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GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 8-2
GLOBAL EQUATES SECTION

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002000

MXLF =2000 ;MAXIMUM LINEFEED SIZE. DECIMAL 2048X1/48 INCHES

.SBTTL GLOBAL DATA SECTION



GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 9
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 012 033 076 040 DUMMYS: .ASCII <012><033>/>/<033>/< 9/ ;DUMMY SEQUENCE FOR PRINTER INTERFACE
    002217 033 050
    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 HRZTLS: .ASCII <033>/ ;/      ;5 BYTES. ACCUMULATE HORIZONTAL SPACES.
    002236 040 073
    002240 033 041 075 RIBPOS: .ASCII <033>/!=./    ;3 BYTES. SET RIBBON POSITON- DOWN.
    002243 056

```

Line	Address	Length	Code	Command	Description
53					; 8 ONE EXTRA CHARACTER FOR TEST 11.
54	002244	033	040	STCHSZ: .ASCII <033>/ 'A/	;5 BYTES. SET CHARACTER SIZE. 10 CHR/IN
	002247	047	101		
55	002251	033	040	STLNSZ: .ASCII <033>/ (B/	;4 BYTES. SET LINE SIZE. 6 LINES/INCH
	002254	102			
56	002255	033	103	SLFTST: .ASCII <033>/C/	;2 BYTES. DO A SELF TEST. SEND STATUS
57					AND SEND XON.
58	002257	033	040	STHTCT: .ASCII <033>/ D/	;3 BYTES. SET HIT COUNT TO 1 HIT/CHAR.
59	002262	033	040	STSPSZ: .ASCII <033>/ 'F/	;4 BYTES. SET SPACE SIZE. 10 SPACES/IN
	002265	106			
60	002266	033	040	STULMD: .ASCII <033>/ G/	;3 BYTES. SET UNDERLINE MODE TO NO-UND.
61	002271	033	040	STPGSZ: .ASCII <033>/ H/	;5 BYTES. SET PAGE SIZE.
	002274	040	110		
62	002276	033	040	SLTPFF: .ASCII <033>/ !J/	;5 BYTES. SELECT TRAY AND PERFORM FF.
	002301	041	112		
63					; SELECT FRONT TRAY AND EJECT.
64					
65	002303	033	056	SETHTO: .ASCII <033>/...D/	;SET HIT COUNT TO 0 HITS. 5 BYTES.
	002306	056	104		
66	002310	033	040	SETCHO: .ASCII <033>/ A/	;SET SPACE SIZE TO ZERO.
67					
68	002313	015		CR: .ASCII <015>	;1 BYTE FOR RETURN ONLY. 2 FOR <CRLF>.
69	002314	012		LF: .ASCII <012>	;1 BYTE FOR LINEFEED ONLY.
70					
71					
72	002315	033	040	STATUS: .ASCII <033>/ O/	;STAUS SEQUENCE TEMPLATE.
	002320	040	060		
73					
74					
75	002322	042	043	PSZA4: .ASCII /'#!/	;PATTERN: TWO THREE ONE IN HEX
76	002325	042	041	PSZ11: .ASCII /'! /	;PATTERN: 11 INCHES PAGE SIZE TWO ONE
77					ZERO IN HEX
78	002330	042	052	PSZ14: .ASCII /'* /	;PATTERN: 14 INCHES PAGE SIZE
79					
80					
81					
82					
83					
84					
85					
86					
87					
88	002333	045	116	045 TITLE1: .ASCIIZ /%N%ATEST 1 - SELF TEST/<015><012>	;TITLE FOR TEST 1.
	002336	116	045	101	
	002341	124	105	123	
	002344	124	040	061	
	002347	040	055	040	
	002352	123	105	114	
	002355	106	040	124	
	002360	105	123	124	
	002363	015	012	000	
89	002366	045	116	045 TITLE2: .ASCIIZ /%N%ATEST 2 - UNDERLINE/<057>/NO-UNDERLINE MODE TEST/<015><012>	
	002371	101	124	105	
	002374	123	124	040	
	002377	062	040	055	
	002402	040	125	116	
	002405	104	105	122	

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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					
91	002446	045	116	045	TITLE3: .ASCIIZ /%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					
93	002513	045	116	045	TITLE4: .ASCIIZ /%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					
95	002564	045	116	045	TITLE5: .ASCIIZ /%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					:TITLE FOR TEST 5.
97	002645	045	116	045	TITLE6: .ASCIZ /%N%ATEST 6 - PRINT ONE LINE OF EACH CHARACTER/<015><012>
	002650	101	124	105	
	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					:TITLE FOR TEST 6.
99	002725	045	116	045	TITLE7: .ASCIZ /%N%ATEST 7 - PRINT A SWIRL PATTERN/<015><012>
	002730	101	124	105	
	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					:TITLE FOR TEST 7.
101	002772	045	116	045	TITLE8: .ASCIZ /%N%ATEST 8 - WORST CASE RAPID MOTION TEST/<015><012>
	002775	101	124	105	
	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					:TITLE FOR TEST 8.
103	003046	045	116	045	TITLE9: .ASCIZ /%N%ATEST 9 - PRINT RANDOM CHARACTERS/<015><012>
	003051	101	124	105	
	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 AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 9-4
GLOBAL DATA SECTION

	003101	110	101	122	
	003104	101	103	124	
	003107	105	122	123	
	003112	015	012	000	
104					
105	003115	045	116	045	TITLEA: .ASCIZ /%N%ATEST 10 - PRINT OPERATOR SELECTED CHARACTERS/<015><012>
	003120	101	124	105	
	003123	123	124	040	
	003126	061	060	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					
107	003200	105	116	124	PRMPTA: .ASCIZ /ENTER STRING. Q TO EXIT TEST. ;TITLE FOR TEST 10.
	003203	105	122	040	END WITH <RETURN>./<015><012>
	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	122	
	003252	105	124	125	
	003255	122	116	076	
	003260	056	015	012	
	003263	000			
108					
109	003264	045	116	045	TITLEB: .ASCIZ /%N%ATEST 11 - LIFT/<57>/DROP RIBBON BY OPERATOR CONTROL/<015><012>
	003267	101	124	105	
	003272	123	124	040	
	003275	061	061	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 AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 9-5
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 AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 9-6
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	TITLEC: .ASCIIZ /%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: .ASCIIZ /%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	

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GLOBAL DATA SECTION

	004042	122	012	015	
	004045	000			
124					
125	004046	123	120	105	PRMPTD: .ASCII /SPECIAL TEST: CUT PAGE SHEET FEEDER MUST BE INSTALLED./<12><15>
	004051	103	111	101	
	004054	114	040	124	
	004057	105	123	124	
	004062	072	040	103	
	004065	125	24	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		.ASCII <12><15>
127	004140	127	110	101	.ASCII /WHAT IS THE PAGE LENGTH? ENTER A, B, OR C./<012><015>
	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	.ASCII /DEFAULT SIZE IS 11 INCHES./<012><015>
	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		.ASCII <012><015>
130	004253	101	040	040	.ASCII /A -11 INCHES/<012><015>
	004256	055	061	061	
	004261	040	111	116	
	004264	103	110	105	
	004267	123	012	015	
131	004272	102	040	040	.ASCII /B -14 INCHES/<012><015>
	004275	055	061	061	
	004300	040	111	116	

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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	

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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 AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 9-10
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	045	000	
144					
145					
146					
147					
148	005246	000000			
149	005250	000000			
150	005252	000000			
151	005254	176500			
152	005256	176010			

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

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GLOBAL DATA SECTION

153	005260	000000			DFAIL:	.WORD	C
154							
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

;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.)

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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: .BYTE	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

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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	DIRECTN: .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'

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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 /-----/<15> ;PRINTED IN TEST 5 BETWEEN LINEFEEDS
	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:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ/
	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 /!'#\$%&'()*+,-./<57>/0123456789/
	006716	044	045	046	

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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	.ASCII /:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_<140>/abcdefghijklmnopqrstuv/
	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	.ASCII /wxyz/
	007044	172			
348	007045	173	174	175	.BYTE 173,174,175,176
	007050	176			
349	007051	041	042	043	.ASCII /!'#\$%&'()*+,-./<57>/0123456789:;<=>?@ABCDEF GHIJKLMNOPQRSTU/
	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	.ASCII /VWXYZ[\]^_<140>/abcdefghijklmnopqrstuvwxy/
	007141	131	132	133	
	007144	134	135	136	
	007147	137	140	141	
	007152	142	143	144	
	007155	145	146	147	
	007160	150	151	152	

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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		

.DSABL LC

351
352
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FBTM: .ASCII /THIS MESSAGE SHOULD BE PRINTED AT THE BOTTOM OF THE PAGE./<15>

007203	124	110	111
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		

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VARIABLE ASSIGNMENTS

360
361
362
363
364

.EVEN

: THE FOLLOWING LABELS ARE USED WITH THE INTERFACE OPTION WHICH THE
: LQPSSE IS CONNECTED TO.

365
366
367
368
369
370
371
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375

RCSR:	.WORD	; ADDRESS OF THE RECEIVER CSR REGISTER
XCSR:	.WORD	; ADDRESS OF THE TRANSMITTER CSR REGISTER
RBUF:	.WORD	; ADDRESS OF THE RECEIVER BUFFER
XBUF:	.WORD	; ADDRESS OF THE TRANSMITTER BUFFER
LPR:	.WORD	; ADDRESS OF THE LINE PARAMETER REGISTER (DZ11)
TCR:	.WORD	; ADDRESS OF THE TRANSMITTER CONTROL REGISTER (DZ11)
TDR:	.WORD	; ADDRESS OF THE TRANSMITTER DATA REGISTER (DZ11)
PGMCTR:	.WORD	; ADDRESS + 4 WHERE THE LAST TRANSMISSION CALL OCCURRED.

376
377
378
379
380
381
382

ERMSG:	.WORD	EDFM0	; TABLE OF ERROR MESSAGE ADDRESSES USED IN
	.WORD	EDFM1	
	.WORD	EDFM2	
	.WORD	EDFM3	
	.WORD	EDFM4	
	.WORD	EDFM5	; THE ERRORS ROUTINE.
	.WORD	EDFM6	

007276	000000
007300	000000
007302	000000
007304	000000
007306	000000
007310	000000
007312	000000
007314	000000
007316	010361
007320	010422
007322	010475
007324	010543
007326	010622
007330	010650
007332	010677

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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	011444	.WORD	EDFMC	
389	007350	011520	.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	BFRD: .WORD		;
402	010034	000000	BFRD: .WORD		;
403					;
404	010036	000000	SPCSIZ: .WORD		;THE NUMBER OF HORIZONTAL INCREMENTS PER SPACE.
405					
406	010040	000000	IINN: .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 DZ11 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					

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GLOBAL DATA SECTION

440 010070 000000

INUPB: .WORD

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

441

442

443

444

445 010072

ERRTBL

LSERRTBL::

010072

010072 000000

ERRTYP:: .WORD 0

010074 000000

EPRNBR:: .WORD 0

010076 000000

ERPMSG:: .WORD 0

010100 000000

ERRBLK:: .WORD 0

446

447

.SBTTL GLOBAL TEXT SECTION

GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 10
GLOBAL TEXT SECTION

GL
GL

```

1
2
3      :++
4      : THE GLOBAL TEXT SECTION CONTAINS FORMAT STATEMENTS,
5      : MESSAGES, AND ASCII INFORMATION THAT ARE USED IN
6      : MORE THAN ONE TEST.
7      :--
8
9      :
10     : NAMES OF DEVICES SUPPORTED BY PROGRAM
11     :
12     :      DEVTYP  <LOPSE-F SERIAL LETTER QUALITY PRINTER>
13     :
14     :      LSDVTYP::
15     :          .ASCIZ  /LOPSE-F SERIAL LETT
16
17     010102      114      121      120
18     010102      123      105      055
19     010105      106      040      123
20     010110      105      122      111
21     010113      101      114      040
22     010116      114      105      124
23     010121      124      105      122
24     010124      040      121      125
25     010127      101      114      111
26     010132      124      131      040
27     010135      120      122      111
28     010140      116      124      105
29     010143      122
30
31     :
32     : TEST DESCRIPTION
33     :
34     :      DESCRIPT      <DIAGNOSTIC FOR LQPSE-F SERIAL PRINTER ON FDP-11>
35     :
36     :      LSDESC::
37     :          .ASCIZ  /DIAGNOSTIC FOR LQPS
38
39     / 010150      104      111      101
40     010150      107      116      117
41     010153      123      124      111
42     010156      103      040      106
43     010161      117      122      040
44     010164      114      121      120
45     010167      123      105      055
46     010172      106      040      123
47     010175      105      122      111
48     010200      101      114      040
49     010203      120      122      111
50     010206      116      124      105
51     010211      122      040      117
52     010214      116      040      120
53     010217      104      120      055
54     010222      061      061      000
55
56     :
57     : THIS PROGRAM WILL PERFORM UP TO THIRTEEN SEQUENTIAL TESTS ON THE
58     : LQPSE-F SERIAL INTERFACE PRINTER.  THE TESTS WILL CHECK BOTH THE
59     : LOCAL PRINTER SOFTWARE AND THE PRINTER HARDWARE BY SENDING VARIOUS
60     : CHARACTER SEQUENCES TO THE PRINTER WHICH WILL CHALLENGE THE PRINTER
61     : SPECIFIED CAPABILITIES.  A PRINT PATTERN WILL BE GENERATED ON THE
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63     :
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GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 10-1
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      :
37      : ERROR STATEMENT TABLES
38
39      : THESE TABLES ARE USED BY THE ERRDF, PRINTB, AND PRINTX MACROS
40      : IN THE PROCESS OF PRINTING ERROR MESSAGES TO THE USER AT THE CONSOLE.
41      :
42      : .....
43
44      : GENERAL FORMATS FOR OUTPUT OF PC AT TIME OF CALL AND ADDRESS OF
45      : LATEST TRANSMISSION.
46
47      :
48      :
49      :
50
51
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53

```

010230	045	116	045	PRTBMO: .ASCIZ /%N%AERROR DETECTED AFTER CALL AT PC: %06/
010233	101	105	122	
010236	122	117	122	
010241	040	040	104	
010244	105	124	105	
010247	103	124	105	
010252	104	040	101	
010255	106	124	105	
010260	122	040	103	
010263	101	114	114	
010266	040	101	124	
010271	040	120	103	
010274	072	040	045	
010277	117	066	000	

010302	045	116	045	PRTXMO: .ASCIZ /%N%ALAST TRANSMISSION STARTED AT LOCATION: %06/
010305	101	114	101	
010310	123	124	040	
010313	124	122	101	
010316	116	123	115	
010321	111	123	123	
010324	111	117	116	
010327	040	123	124	
010332	101	122	124	
010335	105	104	040	
010340	101	124	040	
010343	114	117	103	
010346	101	124	111	
010351	117	116	072	
010354	040	045	117	
010357	066	000		

GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 10-2
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 PRTBM0,PGMCTR -PRINT BASIC ERROR MESSAGE
61      : PRINTX PRTXM0,TRXADD,ERWORD -PRINT EXTENDED ERROR MESSAGE
62      :
63      : .....
64      :
65      : ERWORD BIT-1 BUFFER FULL
66      :
67

```

```

67 010422 104 105 126 FDFM1: .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 PRTBM0,PGMCTR -PRINT BASIC ERROR MESSAGE
72      : PRINTX PRTXM0,TRXADD,ERWORD -PRINT EXTENDED ERROR MESSAGE
73      :
74      : .....
75      :
76      : ERWORD BIT-2 PROM/RAM FAILURE
77      :
78

```

```

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 AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 10-3
GLOBAL TEXT SECTION

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

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:
: USE OF THESE STRINGS WILL BE AS FOLLOWS...
: ERRDF #NUM8,EDFM2 -DEVICE FATAL ERROR CALL
: PRINTB PRTBMO,PGMCTR -PRINT BASIC ERROR MESSAGE
: PRINTX PRTXMO,TRXADD,ERWORD -PRINT EXTENDED ERROR MESSAGE
:

```

```

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

```

```

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

```

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 #NUM9,EDFM3 -DEVICE FATAL ERROR CALL
: PRINTB PRTBMO,PGMCTR -PRINT BASIC ERROR MESSAGE
: PRINTX PRTXMO,TRXADD,ERWORD -PRINT EXTENDED ERROR MESSAGE
:

```

```

: .....
: ERWORD BIT-4 PAUSE SWITCH
:

```

```

EDFM4: .ASCIIZ /PAUSE SWITCH PRESSED./

```

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		

```

:
: PRTBMO AND PRTXMO 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 PRTBMO,PGMCTR -PRINT BASIC ERROR MESSAGE
: PRINTX PRTXMO,TRXADD,ERWORD -PRINT EXTENDED ERROR MESSAGE
:

```

GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 10-4
GLOBAL TEXT SECTION

```

110 .....
111
112 ERWORD BIT-5 RIBBON OUT
113
114 010650 122 111 102 EDFM5: .ASCIZ /RIBBON OUT ON PRINTER./
    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
116
117 USE OF THESE STRINGS WILL BE AS FOLLOWS...
118 ERRDF #NUM3,EDFM5 -DEVICE FATAL ERROR CALL
119 PRINTB PRTBM0,PGMCTR -PRINT BASIC ERROR MESSAGE
120 PRINTX PRTXMO,TRXADD,ERWORD -PRINT EXTENDED ERROR MESSAGE
121 .....
122
123 ERWORD BIT-6 UNDEFINED CHARACTER OR ESC SEQUENCE RECEIVED.
124
125 010677 125 116 104 EDFM6: .ASCIZ /UNDEFINED CHARACTER OR ESC SEQUENCE RECEIVED./
    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
127 USE OF THESE STRINGS WILL BE AS FOLLOWS...
128 ERRDF #NUM4,EDFM6 -DEVICE FATAL ERROR CALL
129 PRINTB PRTBM0,PGMCTR -PRINT BASIC ERROR MESSAGE
130 PRINTX PRTXMO,TRXADD,ERWORD -PRINT EXTENDED ERROR MESSAGE
131 .....
132
133 ERWORD BIT-7 SHEET FEEDER ERPOR
134
135
136 010755 104 105 126 EDFM7: .ASCIZ /DEVICE FATAL ERROR. SHEET FEEDER ERROR./
    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 AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 10-5

GLOBAL TEXT SECTION

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

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```

:
: USE OF THESE STRINGS WILL BE AS FOLLOWS...
: ERRDF #NUM5,EDFM/ -DEVICE FATAL ERROR CALL
: PRINTB PRTBMO,PGMCTR -PRINT BASIC ERROR MESSAGE
: PRINTX PRTXMO,TRXADD,ERWORD -PRINT EXTENDED ERROR MESSAGE
:
: .....
:

```

146	011026	127	101	122
	011031	116	111	116
	011034	107	072	040
	011037	040	123	117
	011042	106	124	127
	011045	101	122	105
	011050	040	105	122
	011053	122	117	122
	011056	056	040	040
	011061	124	110	111
	011064	123	040	115
	011067	105	123	123
	011072	101	107	105
	011075	040	123	110
	011100	117	125	114
	011103	104	040	116
	011106	117	124	040
	011111	120	122	111
	011114	116	124	

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

147	011116	125	116	114
	011121	105	123	123
	011124	040	105	122
	011127	122	117	122
	011132	040	127	117
	011135	122	104	040
	011140	050	105	122
	011143	127	117	122
	011146	104	051	040
	011151	110	101	123
	011154	040	102	105
	011157	105	116	040
	011162	103	117	122
	011165	122	125	120
	011170	124	105	104

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

148	011173	056	000	
	011175	105	122	122
	011200	117	122	040
	011203	104	105	124
	011206	105	103	124
	011211	105	104	040
	011214	102	131	040
	011217	120	122	111
	011222	116	124	105

EDFM9: .ASCIIZ /ERROR DETECTED BY PRINTER./

GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 10-6
GLOBAL TEXT SECTION

	011225	122	056	000	
149	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	.ASCIZ /CORRUPTED./
	011321	122	125	120	
	011324	124	105	104	
	011327	056	000		
151	011331	127	101	122	FDFMB: .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	.ASCIZ /CORRUPTED./
	011422	122	125	120	
	011425	124	105	104	
	011430	056	000		
153					
154	011432	045	101	127	WAITMX: .ASCIZ /XAWAITING/ ;WHEN GETCHR WAIT STARTS GETTING LONG...
	011435	101	111	124	
	011440	111	116	107	
	011443	000			
155					
156					
157					
158					
159					
160	011444	125	116	105	EDFMC: .ASCIZ /UNEXPECTED CHARACTER RECEIVED FROM PRINTER./
	011447	130	120	105	

GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 10-7
GLOBAL TEXT SECTION

011452	103	124	105
011455	104	040	103
011460	110	101	122
011463	101	103	124
011466	105	122	040
011471	122	105	103
011474	105	111	126
011477	105	104	040
011502	106	122	117
011505	115	040	120
011510	122	111	116
011513	124	105	122
011516	056	000	

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171	011520	105	130
	011523	105	103
	011526	105	104
	011531	103	110
	011534	122	101
	011537	124	105
	011542	040	116
	011545	124	040
	011550	105	103
	011553	111	126
	011556	104	040
	011561	122	117
	011564	040	124
	011567	105	040
	011572	122	111
	011575	124	105
	011600	056	000

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

FDMD: .ASCII /EXPECTED CHARACTER NOT RECEIVED FROM THE PRINTER./

172			
173			
174			
175			
176			
177			
178			
179	011602	045	116
	011605	101	106
	011610	111	114
	011613	104	040
	011616	117	040
	011621	111	116
	011624	040	120
	011627	111	116
	011632	105	122
	011635	101	124

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 /%X%AF AILED TO FIND PRINTER AT DEFAULT ADDRESSES./

GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 10-8
GLOBAL TEXT SECTION

	011640	104	105	106		
	011643	101	125	114		
	011646	124	040	101		
	011651	104	104	122		
	011654	105	123	123		
	011657	105	123	056		
180	011662	040	122	105	.ASCII / RESTART PROGRAM.	/ <12> <15>
	011665	123	124	101		
	011670	122	124	040		
	011673	120	122	117		
	011676	107	122	101		
	011701	115	056	040		
	011704	040	040	040		
	011707	040	040	040		
	011712	040	040	040		
	011715	040	040	040		
	011720	040	040	040		
	011723	040	040	040		
	011726	040	040	012		
	011731	015				
181	011732	045	116	045	.ASCII /%N%ATHE CSR ADDRESS QUESTION MUST BE EXPLICITLY SPECIFIED./	
	011735	101	124	110		
	011740	105	040	103		
	011743	123	122	040		
	011746	101	104	104		
	011751	122	105	123		
	011754	123	040	121		
	011757	125	105	123		
	011762	124	111	117		
	011765	116	040	115		
	011770	125	123	124		
	011773	040	102	105		
	011776	040	105	130		
	012001	120	114	111		
	012004	103	111	124		
	012007	114	131	040		
	012012	123	120	105		
	012015	103	111	106		
	012020	111	105	104		
	012023	056				
182	012024	045	116	045	.ASCIIZ /%N%N%N%N%A.	%/
	012027	116	045	116		
	012032	045	116	045		
	012035	101	056	040		
	012040	040	040	040		
	012043	040	040	040		
	012046	040	040	040		
	012051	040	040	040		
	012054	040	040	040		
	012057	040	040	040		
	012062	040	040	040		
	012065	040	040	040		
	012070	040	040	040		
	012073	040	040	040		
	012076	040	040	040		
	012101	040	040	040		
	012104	040	040	040		

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GLOBAL TEXT SECTION

	012107	040	040	040
	012112	040	040	040
	012115	040	040	040
	012120	045	000	
183				
184				
185	012122	045	116	045
	012125	101	111	116
	012130	103	117	122
	012133	122	105	103
	012136	124	040	103
	012141	123	122	040
	012144	101	104	104
	012147	122	105	123
	012152	123	040	107
	012155	111	126	105
	012160	116	056	040
	012163	040	124	122
	012166	131	040	101
	012171	107	101	111
	012174	116	056	056
	012177	040	040	040
	012202	040	040	040
	012205	040	040	040
	012210	040	040	040
	012213	040	040	040
	012216	045	000	
186	012220	045	116	045
	012223	101	111	116
	012226	103	117	122
	012231	122	105	103
	012234	124	040	103
	012237	123	122	040
	012242	101	104	104
	012245	122	105	123
	012250	123	040	117
	012253	122	040	103
	012256	110	101	116
	012261	116	105	114
	012264	040	107	111
	012267	126	105	116
	012272	056	040	040
	012275	124	122	131
	012300	040	101	107
	012303	101	111	116
	012306	056	056	056
	012311	040	040	040
	012314	045	000	
187	012316	045	116	045
	012321	101	106	101
	012324	111	114	105
	012327	104	040	124
	012332	117	040	124
	012335	122	101	116
	012340	123	115	111
	012343	124	040	124
	012346	117	040	120

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 AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 10-10
GLOBAL TEXT SECTION

	012351	122	111	116	
	012354	124	105	122	
	012357	056	040	040	
	012362	040	040	040	
	012365	040	040	040	
	012370	040	040	040	
	012373	040	040	040	
	012376	040	040	040	
	012401	040	040	040	
	012404	040	040	040	
	012407	040	040	040	
	012412	045	000		
188	012414	045	116	045	WFC: .ASCIZ /%N%AWAITING FOR A CHARACTER FROM THE PRINTER. %/
	012417	101	127	101	
	012422	111	124	111	
	012425	116	107	040	
	012430	106	117	122	
	012433	040	101	040	
	012436	103	110	101	
	012441	122	101	103	
	012444	124	105	122	
	012447	040	106	122	
	012452	117	115	040	
	012455	124	110	105	
	012460	040	120	122	
	012463	111	116	124	
	012466	105	122	056	
	012471	040	040	040	
	012474	040	040	040	
	012477	040	040	040	
	012502	040	040	040	
	012505	040	040	040	
	012510	045	000		
189	012512	045	116	045	TIMOM: .ASCIZ /%N%ATIME-OUT: CHECK TO SEE IF PRINTER CONNECTED PROPERLY. %/
	012515	101	124	111	
	012520	115	105	055	
	012523	117	125	124	
	012526	072	040	103	
	012531	110	105	103	
	012534	113	040	124	
	012537	117	040	123	
	012542	105	105	040	
	012545	111	106	040	
	012550	120	122	111	
	012553	116	124	105	
	012556	122	040	103	
	012561	117	116	116	
	012564	105	103	124	
	012567	105	104	040	
	012572	120	122	117	
	012575	120	105	122	
	012600	114	131	056	
	012603	040	040	040	
	012606	045	000		

190
191
192

GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 10-11
GLOBAL ERROR REPORT SECTION

193

.SBTTL GLOBAL ERROR REPORT SECTION

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GLOBAL ERROR REPORT SECTION

```

1
2
3
4
5
6
7
8
9 012610
10
11
12 012610
    012610 000167
    012612 000000
13
14
15
16 012614
    012614
    012614 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      C$MSG

      .SBTTL     GLOBAL SUBROUTINES SECTION

```

GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 12
GLOBAL SUBROUTINES SECTION

1
2
3
4

;;
; THE GLOBAL SUBROUTINES SECTION CONTAINS THE SUBROUTINES
; THAT ARE USED IN MORE THAN ONE TEST.

GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 13
GLOBAL SUBROUTINES SECTION

G
G

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 AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 13-1
GLOBAL SUBROUTINES SECTION

```

58 012616 011637 007314      XMIT:  MOV    (SP),PGMCTR      ;SAVE THE CALLING PC + 4
59 012622 010146              MOV    R1,-(SP)
60 012624 010246              MOV    R2,-(SP)
61 012626 010346              MOV    R3,-(SP)      ;SAVE ALL GUARANTEED
62 012630 010446              MOV    R4,-(SP)      ;   REGISTERS.
63 012632 010546              MOV    R5,-(SP)      ;
64
65 012634 010137 005250      MOV    R1,TRXADD      ;SAVE THE TRANSMISSION ADDRESS
66
67 012640 012705 007352      MOV    #BFRA,R5      ;BOTTOM OF SOFTWARE STACK
68 012644 062705 000226      ADD     #150.,R5      ;TOP OF SOFTWARE STACK
69 012650 010537 010026      MOV    R5,TOPSTK      ;TOP OF STACK ADDRESS
70 012654 005237 010026      INC     TOPSTK      ;PLUS 1 FOR COUNTING PURPOSES.
71
72 012660 005703              TST     R3            ;IF ZERO THEN NO BIDIRECTIONAL PRINTING
73 012662 001021              BNE     BIDIRP      ;IF SET THEN GOTO BIDIRECTIONAL PRNTG CODE
74
75      :
76      :
77      :
78      :
79
80 012664 010103              MOV    R1,R3      ;ADDRESS OF THE FIRST CHARACTER IN THE STRING
81 012666 060203              ADD     R2,R3      ;ADDRESS OF THE LAST CHARACTER IN THE STRING
82      :
83 012670 112102      XSTR:  MOVB    (R1)+,R2      ;GET THE CHARACTER INTO R2 AND POINT TO NEXT
84      :
85 012672 005037 002206      CLR     GREASE      ;ASSUME NO PREVIOUS ERRORS.
86 012676 004737 013366      JSR     PC,SENCHR      ;SEND THE CHARACTER IN R2 TO THE PRINTER.
87
88 012702 022737 177777 002206  CMP     #-1,GREASE      ;TIME-OUT ERROR. ECCR STATUS.
89 012710 001002              BNE     LCHYET      ;EXPRESS EXIT FOR ECCR ERROR REPORT.
90 012712 000137 013352      JMP     EXITX
91
92 012716 020103      LCHYET: CMP     R1,R3      ;HAS THE LAST CHARACTER BEEN PRINTED YET?
93 012720 100763      BMI     XSTR      ;LOOP THROUGH THE LIST UNTIL DONE.
94 012722 000137 013352      JMP     EXITX      ;AND WHEN DONE WITH STRING, EXIT TEST...
95
96      :
97      :
98 012726 010103      BIDIRP: MOV    R1,R3      ;ADDRESS OF THE STRING TO BE PRINTED
99 012730 060203      ADD     R2,R3      ;ADDRESS OF LAST CHARACTER TO BE PRINTED.
100      :
101      :
102 012732 023737 006502 010042  LNELOO: CMP     CRNTPR,LINSIZ      ;CRNTPR -CURRENT POINTER- IS INITIALIZED TO
103      :
104      :
105      :
106 012740 100567      BMI     SENDR2      ;ZERO BY THE INITCD ROUTINE. CRNTPR KEEPS
107      :
108 012742 113702 002314      MOVB    LF,R2      ;TRACK OF HTE NUMBER OF CHARACTERS PRINTED
109 012746 004737 013366      JSR     PC,SENCHR      ;SINCE THE LAST LINE FEED.
110      :
111 012752 005037 006502      CLR     CRNTPR      ;IF CRNTPR LESS THAN LINSIZ THEN THERE ARE
112 012756 005737 006504      TST     DIRCTN      ;MORE CHARACTERS TO PRINT ON THIS LINE.
113 012762 001100      BNE     FWRLO      ;LINE IS FINISHED. SEND LINE FEED AND REVERSE
114      :
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GLOBAL SUBROUTINES SECTION

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115
116
117 012764 012737 000001 006504      MOV    #1,DIRCTN      ; IF FORWARD (1) THEN CHANGE TO REVERSE PRINT.
118
119 012772 113702 002244      MOVB   STCHSZ,R2      ; 'ESC' CHAR
120 012776 004737 013366      JSR    PC,SENCHR      ; TO RESET CHARACTER SIZE TO NEGATIVE 10 CHAR
121
122 013002 022737 177777 002206      CMP    #-1,GREASE     ; HAS A TIME-OUT OCCURRED? EXPRESS EXIT
123 013010 001560              BEQ     EXITX              ; FROM THIS ROUTINE MAY BE REQUIRED.
124
125 013012 112702 000057      MOVB   #HEXF,R2      ; PER INCH. THIS ENABLES REVERSE <---
126 013016 004737 013366      JSR    PC,SENCHR      ; CARRIAGE MOTION WHILE PRINTING. <--
127
128 013022 022737 177777 002206      CMP    #-1,GREASE     ; HAS A TIME-OUT OCCURRED? EXPRESS EXIT
129 013030 001550              BEQ     EXITX              ; FROM THIS ROUTINE MAY BE REQUIRED.
130
131 013032 004737 013366      JSR    PC,SENCHR      ; HEXF,HEXF,FOUR= -12 = -10 CHAR/INCH
132
133 013036 022737 177777 002206      CMP    #-1,GREASE     ; HAS A TIME-OUT OCCURRED? EXPRESS EXIT
134 013044 001542              BEQ     EXITX              ; FROM THIS ROUTINE MAY BE REQUIRED.
135
136 013046 112702 000044      MOVB   #FOUR,R2      ;
137 013052 004737 013366      JSR    PC,SENCHR      ;
138
139 013056 022737 177777 002206      CMP    #-1,GREASE     ; HAS A TIME-OUT OCCURRED? EXPRESS EXIT
140 013064 001532              BEQ     EXITX              ; FROM THIS ROUTINE MAY BE REQUIRED.
141
142 013066 012700 000004      MOV     #4,R0
143 013072 116002 002244      MOVB   STCHSZ(R0),R2  ; SEQUENCE: ESC 1111 1111 0100 A
144 013076 004737 013366      JSR    PC,SENCHR      ; SENT TO THE PRINTER.
145
146 013102 022737 177777 002206      CMP    #-1,GREASE     ; HAS A TIME-OUT OCCURRED? EXPRESS EXIT
147 013110 001520              BEQ     EXITX              ; FROM THIS ROUTINE MAY BE REQUIRED.
148
149
150
151
152 013112 113702 006521      MOVB   ESCAPE,R2      ; NOW MOVE THE CARRIAGE ONE SPACE TO THE
153 013116 004737 013366      JSR    PC,SENCHR      ; LEFT TO EVEN UP THE MARGIN.
154
155 013122 112702 000057      MOVB   #HEXF,R2      ; SEND ESCAPE CHAR TO PRINTER
156 013126 004737 013366      JSR    PC,SENCHR      ;
157
158 013132 112702 000057      MOVB   #HEXF,R2      ; NOW TRANSMIT -12 IN THREE HEX VALUES
159 013136 004737 013366      JSR    PC,SENCHR      ; IN THREE CHARACTERS
160
161 013142 112702 000044      MOVB   #FOUR,R2      ;
162 013146 004737 013366      JSR    PC,SENCHR      ;
163
164 013152 112702 000073      MOVB   #73,R2         ; SEMI-COLON TO COMPLETE THE SEQUENCE WHERE
165 013156 004737 013366      JSR    PC,SENCHR      ; ESC HEXF,HEXF,FOUR (SEMI-COLON) CAUSES
166
167
168
169
170 013162 000456              BR      SENDR2              ; THE ONE-TENTH INCH SPACE TO THE LEFT.
171

```

; THE MARGIN SHOULD NOW BE EVEN.

; NOW SEND THE CHARACTER TO THE PRINTER.

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GLOBAL SUBROUTINES SECTION

```

172
173
174
175 013164 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 013170 113702 002244      MOVB     STCHSZ,R2      ;RESTORE CARRIAGE MOTION TO FORWARD.
181 013174 004737 013366      JSR      PC,SENCHR      ;
182                                     ;
183 013200 022737 177777 002206  CMP     #-1,GREASE      ;HAS A TIME-OUT OCCURRED?  EXPRESS EXIT
184 013206 001461              BEQ     EXITX          ;FROM THIS ROUTINE MAY BE REQUIRED.
185                                     ;
186 013210 112702 000040      MOVB     #ZERO,R2      ;
187 013214 004737 013366      JSR      PC,SENCHR      ;
188                                     ;
189 013220 022737 177777 002206  CMP     #-1,GREASE      ;HAS A TIME-OUT OCCURRED?  EXPRESS EXIT
190 013226 001451              BEQ     EXITX          ;FROM THIS ROUTINE MAY BE REQUIRED.
191                                     ;
192 013230 004737 013366      JSR      PC,SENCHR      ;SEQUENCE SENT: ESC 0000 0000 1100 A
193                                     ;
194 013234 022737 177777 002206  CMP     #-1,GREASE      ;HAS A TIME-OUT OCCURRED?  EXPRESS EXIT
195 013242 001443              BEQ     EXITX          ;FROM THIS ROUTINE MAY BE REQUIRED.
196                                     ;
197 013244 112702 000054      MOVB     #HEXC,R2      ;ZERO,ZERO,HEXC = 12 = 10 CHARACTERS/INCH
198 013250 004737 013366      JSR      PC,SENCHR      ;
199                                     ;
200 013254 022737 177777 002206  CMP     #-1,GREASE      ;HAS A TIME-OUT OCCURRED?  EXPRESS EXIT
201 013262 001433              BEQ     EXITX          ;FROM THIS ROUTINE MAY BE REQUIRED.
202                                     ;
203 013264 012700 000004      MOV      #4,R0
204 013270 116002 002244      MOVB     STCHSZ(R0),R2    ;
205 013274 004737 013366      JSR      PC,SENCHR      ;FORWARD CARRIAGE RESTORED.
206                                     ;
207 013300 022737 177777 002206  CMP     #-1,GREASE      ;HAS A TIME-OUT OCCURRED?  EXPRESS EXIT
208 013306 001421              BEQ     EXITX          ;FROM THIS ROUTINE MAY BE REQUIRED.
209                                     ;
210 013310 113702 006541      MOVB     SPACE,R2      ;NOW TRANSMIT A SPACE TO EVEN UP THE MARGIN.
211 013314 004737 013366      JSR      PC,SENCHR      ;
212                                     ;
213 013320 112102              SENDR2: MOVB     (R1)+,R2    ;GET THE CHARACTER FOR TRANSMISSION.
214 013322 004737 013366      JSR      PC,SENCHR      ;SEND THE CHARACTER TO THE PRINTER.
215 013326 022737 177777 002206  CMP     #-1,GREASE      ;
216 013334 001406              BEQ     EXITX          ;EXPRESS EXIT IF ANY PROBLEMS.
217                                     ;
218 013336 005237 006502      INC      CRNTPR      ;CURRENT IN-LINE POINTER UPDATED.
219 013342 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 013344 001402              BEQ     EXITX          ;IF NOT YET THERE, REPEAT TRANSMIT PROCESS.
223 013346 000137 012732      JMP      LNELOG
224                                     ;
225 013352 012605      EXITX:  MOV      (SP)+,R5      ;RESTORE
226 013354 012604          MOV      (SP)+,R4      ;
227 013356 012603          MOV      (SP)+,R3      ;
228 013360 012602          MOV      (SP)+,R2      ;

```

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GLOBAL SUBROUTINES SECTION

229	013362	012601	MOV	(SP)+,R1
230				
231	013364	000207	RTS	PC
232				
233				
234				
235				
236		:		
237		:		
238		:		
239		:		
240				

GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 14
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	013366	010246		SENCHR: MOV	R2,-(SP)	;SAVE	
40	013370	010346		MOV	R3,-(SP)		
41	013372	010446		MOV	R4,-(SP)	; REGISTERS	
42	013374	010546		MOV	R5,-(SP)		
43							
44	013376	013777	006442 173702	SENCH2: MOV	LPRINI,@LPR	;IF DZ THEN SET FARMS, IF DL THEN NO EFFECT.	
45	013404	013777	006436 173676	MOV	TCRENA,@TCR	;IF DZ THEN SET CHANNEL. IF DL, NO EFFECT.	
46	013412	005005		CLR	R5		
47	013414	005003		RESINN: CLR	R3	;COUNTER	
48	013416	005203		SENCLP: INC	R3	;COUNTER	
49	013420	020327	007000	CMP	R3,#7000	;INNER LOOP CHECK	
50	013424	100420		BMI	CNTNU	;KEEP LOOPING UNTIL WE REACH 77000	
51	013426	005205		INC	R5	;OUTER LOOP COUNTER	
52							
53	013430	020527	000106	CMP	R5,#70.	;PRINT A WAITING TO SEND MESSAGE.	
54	013434	001010		BNE	COIE	;CONTINUE WITH LOOP IF NOT 70 YET.	
55	013436			PRINTX	WTSTPM	;WAITING TO SEND TO PRINTER MESSAGE.	
	013436	013746	005154			MOV	WTSTPM,-(SP)
	013442	012746	000001			MOV	#1,-(SP)

GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 14-1
GLOBAL SUBROUTINES SECTION

	013446	010600							MOV	SP,R0
	013450	104415							TRAP	C\$PNTX
	013452	062706	000004						ADD	#4,SP
56										
57	013456	020527	000144	COIE:	CMP	R5,#100.				
58	013462	100045			BPL	EXETS				
59	013464	000753			BR	RESINN				
60										
61	013466	032777	000200	173602	CNTNU:	BIT	#BIT7,@RCSR			
62	013474	001007			BNE	ALPHA				
63										
64	013476	033777	010044	173574	BETA:	BIT	TRDYBT,@XCSR			
65	013504	001744			BEQ	SENCLP				
66										
67										
68										
69	013506	110277	173572		MOVB	R2,@XBUF				
70	013512	000445			BR	EXITS				
71										
72										
73	013514	017704	173562	ALPHA:	MOV	@RBUF,R4				
74										
75	013520	120437	006520		CMPB	R4,XON				
76	013524	001764			BEQ	BETA				
77										
78	013526	120437	006517		CMPB	R4,XOFF				
79	013532	001007			BNE	CHKCAN				
80										
81	013534	004737	013640		JSR	PC,WAITXN				
82										
83	013540	022737	177777	002206	CMP	#-1,GREASE				
84	013546	001427			BEQ	EXITS				
85										
86	013550	000712			BR	SENCH2				
87										
88	013552	120437	006516	CHKCAN:	CMPB	R4,CAN				
89	013556	001416			BEQ	SETER				
90										
91	013560	120437	006515		CMPB	R4,EOT				
92	013564	001413			BEQ	SETER				
93										
94	013566	052737	010000	006500	BIS	#BIT12,ERWORD				
95										
96										
97	013574	000740			BR	BETA				
98										
99	013576	012737	000001	006512	EXETS:	MOV	#1,FLTRDY			
100	013604	012737	177777	002206	MOV	#-1,GREASE				
101	013612	000405			BR	EXITS				
102										
103	013614	052737	100000	006500	SETER:	BIS	#BIT15,ERWORD			
104	013622	004737	014774		JSR	PC,STSERR				
105										
106	013626	012605			EXITS:	MOV	(SP)+,R5			
107	013630	012604			MOV	(SP)+,R4				
108	013632	012603			MOV	(SP)+,R3				
109	013634	012602			MOV	(SP)+,R2				

;ALLOW 100 LOOPS BEFORE TIME OUT.
;FAILURE TO FIND TRDY.
;RESET INNER LOOP

;IS RECEIVER READY? SHOULD BE SET IF IT IS.
;IF SET, ALPHA TAKES CARE OF BUFFER READ.

;RCVR NOT RDY. SEE IF THE TRANSMITTER IS READY
;IF ZERO, NOT READY, LOOP AND CHECK AGAIN.

;PUT CHARACTER INTO TRANSMITTER BUFFER.
;AND EXIT

;READ THE RECEIVER BUFFER.

;IS IT = 'XON'?
;IF IT IS THEN ALL IS OK, CONTINUE.

;IS IT = 'XOFF'?
;IF NOT 'XOFF' THEN MAYBE IT IS A 'CAN'

;IF IT WAS AN XOFF THEN WE MUST WAIT FOR
;AN XON AND THEN SEND CHARACTER.
;HAS A TIME-OUT OCCURRED? EXPRESS EXIT
;FROM THIS ROUTINE MAY BE REQUIRED.

;XON FOUND ON TIME. LOOK FOR TRANSMIT READY.

;CHARACTER = 'CAN' ?
;IF IT IS THEN SET APPROPRIATE FLAG (ERWORD)

;CHARACTER = 'EOT' ?
;IF IT IS THEN SET APPROPRIATE FLAG (ERWORD)

;NONE OF THE USUAL CHARACTERS FOUND
;ASYNCHRONOUSLY. UNEXPECTED CHARACTER
;RECEIVED INDICATED IN ERWORD.
;TRY AGAIN TO SEND CHARACTER

;INDICATE FAILED TO FIND TRANSMIT READY.
;ENABLE GREASED EXITS FROM TESTS.
;FAIL TO FIND TRDY

;CAN OR EOT TYPE ERROR
;SET UP ERWORD.

;RESTORE

; REGISTERS

GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 14-2
GLOBAL SUBROUTINES SECTION

110			
111	013636	000207	RTS PC
112			
113			
114			
115		:	
116		:	
117		:	
118		:	

GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 15
GLOBAL SUBROUTINES SECTION

FUNCTIONAL DESCRIPTION

GLOBAL PROCEDURE WAITXN:

THIS PROCEDURE WAITS FOR THE 'XON' CHARACTER TO BE SENT BY THE
PRINTER. IF THE CHARACTER IS NOT SENT WITHIN A REASONABLE AMOUNT
OF TIME, THEN A TIME - OUT WARNING IS GIVEN.

INPUTS

NO INPUTS FROM CALLING ROUTINE.

OUTPUTS

IF A TIME-OUT OCCURS DUE TO TOO LONG A WAIT FOR THE XON CHARACTER
TO BE RECEIVED, THE ERROR FLAG-WORD IS CHANGED.

SUBORDINATE ROUTINES

DELAYS - THIS ROUTINE WILL CAUSE A 100 USEC DELAY
WITH R5 SET TO 1.

FUNCTIONAL SIDE EFFECTS

R1 AND R2 ARE PRESERVED. NO SIDE EFFECTS.

39	013640	010146		WAITXN: MOV	R1,-(SP)	;SAVE USED REGISTERS
40	013642	010446			MOV R4,-(SP)	;
42	013644	005037	006510	OUTSDL: CLR	OUTSDC	;OUTSIDE LOOP COUNTER. 1 MINUTE WAIT
43	013650	005001			CLR R1	;INSIDE LOOP COUNTER.
45	013652	012705	004000	LOOPXN: MOV	#4000,R5	;ARGUMENT FOR THE DELAY
46	013656	004737	015224		PC,DELAYS	;ABOUT 1 MSEC
48	013662	032777	000200 173406	BIT	#BIT7,@RCSR	;RECEIVER READY? =0 IF NOT READY.
49	013670	001415		BEQ	LOOPCK	;NOT READY? THEN CHECK AGAIN
50	013672	004737	014012	JSR	PC,GETCHR	;GET THE BYTE
51	013676	120437	006520	CMPB	R4,XON	;IS IT = 'XON' ?
52	013702	001440		BEQ	EXITON	;IF = XON OK... EXIT ROUTINE WITH NO ERROR
54	013704	012737	177777 002206	MOV	#-1,GREASE	;UNEXPECTED CHARACTER RECEIVED. ENABLE
55	013712	052737	010000 006500	BIS	#BIT12,ERWORD	;GREASED' EXIT FROM CALLING ROUTINE.
56	013720	000137	014004	JMP	EXITON	;EXIT ROUTINE.

GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 15-1
GLOBAL SUBROUTINES SECTION

```

58 013724 005201          LOOPCK: INC      R1          ;UPDATE LOOP COUNTER
59 013726 020127 077000    CMP      R1,#077000      ;LOOPED ENOUGH TIMES YET? 5 SEC CHECK
60 013732 100751          BMI      LOOPXN          ;CONTINUE TO LOOP UNTIL 5000 EXCEEDED.
61
62 013734 005237 006510    INC      OUTSDC          ;OUTSIDE LOOP COUNT
63 013740 023727 006510 000015 CMP      OUTSDC,#15      ;13 LOOPS YET?
64 013746 100740          BMI      OUTSDL          ;NO? THEN START UP AGAIN
65
66 013750 052737 010000 006500 BIS      #BIT12,ERWORD      ;NOT XON.... ERROR UCRB
67 013756 052737 100000 006500 BIS      #BIT15,ERWORD      ;AN ERROR IS DETECTED AND INDICATED
68
69 013764          PRINTX  #TIMOM          ;PRINT TIMEOUT MESSAGE
    013764 012746 012512          MOV      #TIMOM,-(SP)
    013770 012746 000001          MOV      #1,-(SP)
    013774 010600          MOV      SP,R0
    013776 104415          TRAP      C$PNTX
    014000 062706 000004          ADD      #4,SP
70
71 014004 012604          EXITON: MOV      (SP)+,R4      ;RESTORE THE REGISTERS
72 014006 012601          MOV      (SP)+,R1
73
74 014010 000207          RTS      PC
75
76
77

```

GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 16
GLOBAL SUBROUTINES SECTION

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.

```

34 014012 010146      GETCHR: MOV    R1,-(SP)      ;SAVE REGISTERS
35 014014 010246      MOV    R2,-(SP)      ;
36 014016 010546      MOV    R5,-(SP)      ;
37
38 014020 005037 006506      OUTRLP: CLR    OUTCTR      ;OUTER LOOP COUNTER.
39 014024 005001          CLR    R1          ;TIMING INNER LOOP COUNTER.
40
41 014026 032777 000200 173242 LOOPG: BIT    #BIT07,@RCSR      ;RCSR-7 SET? RECEIVER READY? RDONE?
42 014034 001041          BNE    SENDR      ;IF YES.....GET THE CHARACTER OUT OF THE BUFFER
43                                ;AND INTO R4.
44 014036 012705 000001          MOV    #1,R5      ;SHORT DELAY... 100 USEC
45 014042 004737 015224          JSR    PC,DELAYS      ;WAIT AROUND FOR A WHILE
46
47 014046 005201          INC    R1          ;LOOP COUNTER UPDATE.
48
49 014050 020127 002400      NOPRTM: CMP    R1,#2400      ;LOOPED LONG ENOUGH TO SET TIME-OUT INDICATOR?
50 014054 100764          BMI    LOOPG      ;LOOP UNTIL 24400 OR RECEIVER IS SET.
51
52 014056 005237 006506          INC    OUTCTR      ;UPDATE OUTSIDE COUNTER.
53
54 014062 023727 006506 000024      CMP    OUTCTR,#20.      ;HAVE WE BEEN WAITING LONG?
55 014070 001010          BNE    CONTLO      ;SKIP PRINT. ONCE PER LONG WAIT ONLY.
56 014072          PRINTX  #WFC      ;PRINT WAITING FOR A CHARACTER FROM PRINTER.
                                MOV    #WFC,-(SP)
014072 012746 012414

```


GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 16-1
GLOBAL SUBROUTINES SECTION

```

014076 012746 000001                                MOV    #1,-(SP)
014102 010600                                MOV    SP,R0
C14104 104415                                TRAP   C$PNTX
014106 062706 000004                                ADD    #4,SP

57
58 014112 023727 006506 000132  CONTLO:  CMP    OUTCTR,#90.    ;40 LOOPS MAXIMUM PERMITTED.
59 014120 100741                                BMI    OUTRLP        ;NOT DONE YET?  CONTINUE OUTER LOOP.
60
61 014122 052737 020000 006500                BIS    #BIT13,ERWORD  ;ECNRB ERROR
62 014130 052737 100000 006500                BIS    #BIT15,ERWORD  ;ERROR INDICATOR
63
64 014136 000413                                BR     EXITE          ;GIVE UP WITH THIS RECEPTION
65                                ;          AN ERROR WILL BE INDICATED.
66
67 014140 017704 173136                SENDR:  MOV    @RBUF,R4    ;PUT CHARACTER RECEIVED INTO R4
68
69 014144 120437 006516                CMPB   R4,CAN        ;IS THE CHARACTER A 'CAN' FROM THE PRINTER?
70 014150 001403                BEQ     ERSETT       ;THEN SET BIT15 IN ERWORD AND EXIT.
71
72 014152 120437 006515                CMPB   R4,EOT        ;IS THE CHARACTER AN 'EOT' FROM THE PRINTER?
73 014156 001003                BNE     EXITE          ;IF NOT THEN EXIT WITH CHARACTER.
74
75 014160 052737 100000 006500  ERSETT:  BIS    #BIT15,ERWORD  ;WE HAVE AN ERROR CONDITION.  EITHER FATAL
76                                ;          OR NON-FATAL.  (CAN OR EOT)
77
78 014166 012605                EXITE:  MOV    (SP)+,R5
79 014170 012602                MOV    (SP)+,R2    ;RESTORE REGISTERS
80 014172 012601                MOV    (SP)+,R1
81
82 014174 000207                RTS     PC
83
84

```

GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 17
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	014176	010246		CONVRT: MOV	R2,-(SP)	;SAVE REGISTERS
40	014200	010346			MOV R3,-(SP)	;
41						
42	014202	010102		MOV	R1,R2	;GET COPY OF NUMBER TO BE CONVERTED.
43	014204	043702	006430	BIC	TMPLT1,R2	;MASK IN BITS 8 - 11.
44	014210	000302		SWAB	R2	;RIGHT JUSTIFY MASKED BITS
45						
46	014212	052702	000040	BIS	#BITS5,R2	;CONVERT TO THE ASCII VALUE
47	014216	110237	010046	MOVB	R2,MNEB1	;STORE RESULT IN GLOBAL VARIABLE
48						
49	014222	010102		MOV	R1,R2	;COPY OF ORIGINAL NUMBER
50	014224	043702	006432	BIC	TMPLT2,R2	;MASK BITS 4 - 7.
51	014230	006202		ASR	R2	; RIGHT JUSTIFY
52	014232	006202		ASR	R2	;
53	014234	006202		ASR	R2	;
54	014236	006202		ASR	R2	;
55						0 - 3.
56	014240	052702	000040	BIS	#BITS5,R2	;CONVERT TO THE ASCII VALUE
57	014244	110237	010047	MOVB	R2,MNEB2	;STORE RESULT IN GLOBAL VARIABLE

GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 17-1
GLOBAL SUBROUTINES SECTION

```
58
59 014250 010102      MOV    R1,R2      ;GET ORIGINAL NUMBER
60 014252 043702 006434 BIC    TMPLT3,R2    ;MASK OUT LEFT 12 BITS.
61 014256 052702 000040 BIS    #BIT5,R2    ;SET BIT 5.  CONVERT TO ASCII VALUE
62 014262 110237 010050 MOVB   R2,MNEB3    ;MOVE TO GLOBAL VARIABLE
63
64 014266 012603      MOV    (SP)+,R3    ;RESTORE REGISTERS
65 014270 012602      MOV    (SP)+,R2    ;
66
67 014272 000207      RTS    PC
68
69
70
71
72
73      :
74      :
75      :
76
77
78
```

GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 18
GLOBAL SUBROUTINES SECTION

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 ERROR . 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 014274 005037 007314      INITCD: CLR      PGMCTR      ;DOES NOT YET POINT TO PC OF ERROR
51 014300 010146              MOV      R1,-(SP)      ;SAVE REGISTERS
52 014302 010246              MOV      R2,-(SP)      ;
53 014304 010346              MOV      R3,-(SP)      ;
54 014306 010446              MOV      R4,-(SP)      ;
55
56 014310 032777 000200 172760  EMPTIB: BIT      #BIT7, @RCSR      ;IS THERE A CHARACTER IN THE RBUF?
57 014316 001403              BEQ       RESETC          ;IF NO CHARACTER IN RBUF, THEN CONTINUE...

```

GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 18-1
GLOBAL SUBROUTINES SECTION

```

58
59 014320 005777 172756          TST    @RBUF          ;EMPTY RBUF. IGNORE BUFFER CONTENTS.
60 014324 000771                  BR      EMPTIB          ;CHECK FOR RDONE AGAIN AND EMPTY BUFFER
61
62 014326 012701 002214          RESETC: MOV    #DUMMYS,R1      ;FIX INTERFACE TO ACCEPT PRINTER RESET.
63 014332 012702 000010          MOV    #8.,R2              ;
64 014336 005003                  CLR    R3                ;
65 014340 004737 012616          JSR    PC,XMIT            ;SEND DUMMY SEQUENCE
66
67 014344 005037 006500          CLR    ERWORD            ;ASSUME THAT NO ERRORS HAVE YET OCCURED.
68
69 014350 012701 002224          MOV    #RESET,R1          ;TRANSMIT PRINTER RESET SEQUENCE (ADDRESS)
70 014354 012702 000002          MOV    #2,R2              ;2 ARGUMENT LIST
71 014360 005003                  CLR    R3                ;NO BIDIRECTIONAL PRINTING NECESSARY
72 014362 004737 012616          JSR    PC,XMIT            ;SEND SEQUENCE TO PRINTER
73
74 014366 004737 014012          JSR    PC,GETCHR          ;READ 'ESC' CHR FROM RBUF
75 014372 120437 006521          CMPB   R4,ESCAPE          ;CHECK FOR CORRECT CHARACTER
76 014376 001033                  BNE     INIERR            ;INDICATE ERROR IF NOT CORRECT. THEN CONTINUE
77
78 014400 004737 014012          JSR    PC,GETCHR          ;READ STATUS CHR. SHOULD BE SPACE CHARACTER.
79 014404 120427 000040          CMPB   R4,#ZERO          ;SHOULD BE NO ERRORS - RIGHT FOUR BITS = 0000
80 014410 001026                  BNE     INIERR            ;IF RIGHT FOUR BITS NONZERO, INDICATE ERROR.
81
82 014412 004737 014012          JSR    PC,GETCHR          ;READ 2ND STATUS NIBBLE.
83 014416 120427 000040          CMPB   R4,#ZERO          ;RIGHT FOUR BITS SHOULD BE 0000
84 014422 001021                  BNE     INIERR            ;IF NONZERO, INDICATE ERROR AND CONTINUE
85
86 014424 004737 014012          JSR    PC,GETCHR          ;READ 3RD STATUS NIBBLE.
87 014430 042704 000001          BIC    #BIT0,R4          ;CLEAR THE SHEET FEEDER PRESENT BIT IF SET.
88 014434 120427 000040          CMPB   R4,#ZERO          ;IS STATUS NIBBLE = 0000 ?
89 014440 001012                  BNE     INIERR            ;IF NOT, INDICATE ERROR AND CONTINUE
90
91 014442 004737 014012          JSR    PC,GETCHR          ;READ (HOPEFULLY) 'O' FROM RBUF
92 014446 120437 006532          CMPB   R4,SCO          ;CONFIRM THE CHARACTER IS A 'O'.
93 014452 001005                  BNE     INIERR            ;IF NOT = 'O', THEN INDICATE ERROR, CONTINUE
94
95 014454 004737 014012          JSR    PC,GETCHR          ;A CHARACTER IS EXPECTED FROM THE PRINTER
96 014460 120437 006520          CMPB   R4,XON          ;'XON' IS THE EXPECTED CHARACTER
97 014464 001413                  BEQ     SETUP1           ;IF YES, THEN SET UP THE PRINTER PARAMETERS
98
99 014466 052737 010000 006500  INIERR: BIS    #BIT12,ERWORD    ;IF NO, THEN INDICATE ERRORS: UCRB
100 014474 052737 020000 006500    BIS    #BIT13,ERWORD    ;
101 014502 052737 100000 006500    BIS    #BIT15,ERWORD    ; THEN INDICATE ERRORS: ECNRB
102 014510 004737 014774          JSR    PC,STSERR          ; THEN INDICATE ERRORS: ERROR FOUND BIT
103                                     ;CHECK FOR MORE ERRORS
104
104 014514 012700 000001          SETUP1: MOV    #1,R0
105 014520 112760 000040 002240    MOVB   #ZERO,RIBPOS(R0) ;RIBBON POSITION DOWN
106 014526 012701 002240          MOV    #RIBPOS,R1      ;ADDRESS OF ARGUMENT LIST
107 014532 012702 000003          MOV    #3,R2              ;3CHARACTERS IN ARGUMENT LIST
108 014536 005003                  CLR    R3                ;NC PRINTING
109 014540 004737 012616          JSR    PC,XMIT            ;SEND TO PRINTER
110
111 014544 012700 000001          MOV    #1,R0
112 014550 112760 000040 002257    MOVB   #ZERO,STHTCT(R0) ;SET HIT COUNT TO 1 HIT PER CHARACTER
113 014556 012701 002257          MOV    #STHTCT,R1      ;ADDRESS OF ARGUMENT LIST
114 014562 012702 000003          MOV    #3,R2              ;THREE ARGUMENTS IN THE

```

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GLOBAL SUBROUTINES SECTION

```

115 014566 005003          CLR      R3          ;NO PRINTING
116 014570 004737 012616   JSR      PC,XMIT    ;SEND TO PRINTER
117
118 014574 112760 000040 002266   MOVB     #ZERO,STULMD(R0) ;SET UNDERLINE MODE
119 014602 012701 002266       MOV      #STULMD,R1    ;ADDRESS OF ARG LIST
120 014606 012702 000003       MOV      #3,R2        ;THREE ARGUMENTS
121 014612 005003          CLR      R3          ;NO PRINTING
122 014614 004737 012616   JSR      PC,XMIT    ;SEND TO PRINTER
123
124 014620 012701 002313       MOV      #CR,R1        ;ADDRESS OF CRLF TO BE PRINTED
125 014624 012702 000002       MOV      #2,R2        ;2 CHARACTERS TO BE PRINTED
126 014630 005003          CLR      R3          ;NO BIDIRECTIONAL PRINTING
127 014632 004737 012616   JSR      PC,XMIT    ;SEND TO PRINTER
128
129 014636 012701 002314       MOV      #LF,R1        ;ADDRESS OF LINEFEED
130 014642 012702 000001       MOV      #1,R2        ;PRINT THE SINGLE CHARACTER
131 014646 005003          CLR      R3          ;WITHOUT BIDIRECTIONAL PRINTING
132 014650 004737 012616   JSR      PC,XMIT    ;SEND TO PRINTER
133 014654 004737 012616   JSR      PC,XMIT    ;AGAIN...
134 014660 004737 012616   JSR      PC,XMIT    ;AND AGAIN...
135
136 014664 005037 006502       CLR      CRNTPR        ;CLEAR CURRENT COUNT WHICH IS USED IN
137                                     ;BIDIRECTIONAL PRINTING TO KEEP TRACK OF
138                                     ;THE NUMBER OF CHARACTERS PRINTED CURRENTLY
139                                     ;IN THE CURRENT DIRECTION.
140 014670 005037 006504       CLR      DIRCTN        ;INDICATOR THAT PRINTER IS PRINTING IN THE
141                                     ;FORWARD DIRECTION. (0=FORWARD, 1=REVERSE)
142                                     ;THIS IS TRUE AT THIS POINT BECAUSE THIS
143                                     ;ROUTINE RE-INITIALIZES THE PRINTER.
144
145 014674 012705 007000       MOV      #7000,R5        ;SET UP FOR A DELAY (ARG FOR DELAYS ROUTINE)
146 014700 012704 007000       MOV      #7000,R4        ;LOOP COUNTER
147 014704 004737 015224   LODELY: JSR      PC,DELAYS    ;CAUSE A SHORT DELAY
148 014710 005304          DEC      R4              ;LOOP COUNTER ADJUSTMENT
149 014712 100374          BPL      LODELY          ;REPEAT UNTIL SUFFICIENT DELAY CAUSED.
150
151 014714 012604          MOV      (SP)+,R4          ;RESTORE
152 014716 012603          MOV      (SP)+,R3          ;
153 014720 012602          MOV      (SP)+,R2          ;   REGISTERS
154 014722 012601          MOV      (SP)+,R1          ;
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156
157 014724 000207          RTS      PC
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GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 19
GLOBAL SUBROUTINES SECTION

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

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38 014726 000240
39
40 014730 012701 000001
41
42
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44
45 014734 063701 006424
46 014740 063701 006426
47
48 014744 006101
49 014746 006101
50
51 014750 060137 006424
52 014754 010137 006426
53
54
55 014760 042701 177600
56
57 014764 022701 000143

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GLOBAL SUBROUTINES SECTION

58 014770 100757

BMI TRYAGN

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

59

60 014772 000207

RTS PC

61

62

63

64

65

66

67

68

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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 014774 113702 002210 STSERR: MOVB STSRES,R2 ;SEND 'ESC 0' TO THE PRINTER.
44 015000 004737 013366 JSR PC,SENCHR ;
45 015004 012700 000001 MOV #1,R0 ;
46 015010 116002 002210 MOVB STSRES(R0),R2 ;
47 015014 004737 013366 JSR PC,SENCHR ;REQUEST STATUS FROM PRINTER.
48
49 015020 010446 STATS: MOV R4,-(SP) ;PUSH REGISTERS
50 015022 010346 MOV R3,-(SP) ;
51
52 015024 004737 014012 JSR PC,GETCHR ;GET A CHARACTER FROM THE PRINTER.
53 015030 120437 002315 CMPB R4,STATUS ;THE CHARACTER IN R4 SHOULD BE AN ESC CHARACTER
54 015034 001057 BNE PALPHA ;EXPECTED CHAR NOT RECVD, UNEXPECTED CHAR RCVD.
55
56 015036 004737 014012 JSR PC,GETCHR ;GET N3 FROM PRINTER. FATAL ERRORS INDICATED.
57 015042 043704 006434 BIC TMLT3,R4 ;CLEAR LEFT 12 BITS.

```

GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 20-1
GLOBAL SUBROUTINES SECTION

```

58 015046 000304          SWAB R4          ;PUT BITS IN PROPER POSITION FOR ERWORD
59 015050 050437 006500  BIS R4,ERWORD  ;SET THE ERROR BITS APPROPRIATE IN ERWORD.
60
61 015054 004737 014012  JSR PC,GETCHR  ;GET N2 FROM PRINTER. NON-FATAL ERRORS FRM PRTR
62 015060 043704 006434  BIC TMPLT3,R4 ;CLEAR THE LEFT 12 BITS. (NOT WANTED)
63 015064 006304          ASL R4          ;SHIFT
64 015066 006304          ASL R4          ;LEFT
65 015070 006304          ASL R4          ;FOUR
66 015072 006304          ASL R4          ;POSITIONS.
67 015074 050437 006500  BIS R4,ERWORD  ;AND SET THE APPROPRIATE BITS IN ERWORD.
68
69 015100 004737 014012  JSR PC,GETCHR  ;GET ANOOTHER CHARACTER. N1. PRINTER CONDITION
70 015104 043704 006434  BIC TMPLT3,R4 ;CLEAR THE 12 LEFT UNWANTED BITS.
71 015110 042704 000001  BIC #BIT0,R4 ;SHEET FEEDER PRESENT NOT A GENERAL ERROR.
72 015114 042704 000004  BIC #BIT2,R4 ;NOT USED BY PRINTER
73 015120 042704 000010  BIC #BIT3,R4 ;NOT USED BY PRINTER
74 015124 050437 006500  BIS R4,ERWORD  ;SET APPROPRIATE BITS IN ERWORD.
75
76 015130 042737 046400 006500 BIC #46400,ERWORD ;CLEAR BITS 14,11,10,8 (UNUSED BITS IN ERWORD)
77
78 015136 005737 006500  TST ERWORD      ;IS THE ERWORD = 0 ?
79 015142 001403          BEQ CRCLX      ;IF IT IS CONTINUE...
80 015144 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 015152 004737 014012          CRCLX: JSR PC,GETCHR ;HOPE TO GET A 'O'
84 015156 123704 006532          CMPB SC0,R4 ;IS IT THE EXPECTED 'O' ?
85 015162 001415          BEQ EXITSR      ;IF EQUAL TO EXPECTED CHAR ('O'), THEN DONE.
86
87 015164 052737 020000 006500 BIS #ECNRB,ERWORD ;SET ECNRB ('O' NOT FOUND.)
88 015172 000403          BR SET15        ;SET ERROR INDICATOR AND EXIT.
89
90 015174 052737 020000 006500 PALPHA: BIS #ECNRB,ERWORD ;EXPECTED CHARACTER NOT RECEIVED INDICATOR
91
92 015202 052737 100000 006500 SET15: BIS #BIT15,ERWORD ;INDICATE THAT AN ERROR HAS OCCURRED.
93 015210 012737 177777 002206 MOV #-1,GREASE ;ENABLE A 'GREASED' EXIT FROM THE CALLING
94                                     ;ROUTINES.
95 015216 012603          EXITSR: MOV (SP)+,R3 ;RESTORE REGISTERS.
96 015220 012604          MOV (SP)+,R4 ;
97
98 015222 000207          RTS PC
99
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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

```

39
40 015224 012737 000025 010054 DELAYS: MOV    #21., DELCNT    ;2.91USEC. - INNER LOOP INITIALIZATION
41
42 015232 005337 010054          INLOOP: DEC    DELCNT        ;2.385USEC. -
43                                     ;                -TOTAL 4.77USEC. PER LOOP
44 015236 100375                  BPL     INLOOP              ;2.385USEC. -
45                                     ;                0.103MSEC TO HERE
46 015240 005305                  DEC     R5                  ;STARTS WITH # OF .1 MSEC INCREMENTS.
47 015242 100370                  BPL     DELAYS              ;IF R1 WERE 10,000 THEN TIME DELAY IS 1 SECOND.
48
49 015244 000207                  RTS     PC
50
51
52
53
54
55

```

GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 22
GLOBAL SUBROUTINES SECTION

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GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 23
GLOBAL SUBROUTINES SECTION

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1
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43 015246 010346
44 015250 010446
45
46 015252 032737 100000 006500
47 015260 001473
48
49 015262 162737 000004 007314
50
51 015270 005003
52 015272 032737 000001 006500
53 015300 001435
54
55
56 015302 012737 000001 010072
57 015310 016337 007316 010076

:
: *****
: ***** ERROR DECODE AND PRINT SUBROUTINE *****
: *****
: =====
: FUNCTIONAL DESCRIPTION
:
: THIS PROCEDURE ACCEPTS ERWORD (THE ERROR FLAG-WORD) AS A PARAMETER, AND
: DECODES THE ERRORS WHICH HAVE OCCURRED. THE ROUTINE WILL PRINT THE
: ERROR MESSAGES ON THE CONSOLE TERMINAL. REGISTERS ARE PRESERVED. THE
: GLOBAL VARIABLES ERRTP, ERNBR, ERRMSG AND ERBLK ARE USED AS IF THEY
: WERE LOCAL VARIABLES. IT IS ASSUMED THAT THESE VARIABLES ARE NOT USED
: ELSEWHERE IN THE MODULE. (THE FOUR GLOBAL VARIABLES WERE ASSIGNED BY
: THE DIAGNOSTIC SUPERVISOR MACRO CALL ERRBL.)
: .....
: INPUTS
:
: ERWORD - REFLECTS THE ERROR STATUS OF THE PRINTER.
: PGMCTR - PROGRAM COUNTER AT TIME OF CALL WHEN THE ERROR OCCURRED
:
: OUTPUTS
:
: ERWORD - CLEARED AFTER EXECUTION OF ROUTINE
:
: IMPLICIT OUTPUTS
:
: THE ERROR TABLE IS CHANGED (ERRTBL). ERROR MESSAGES ARE PRINTED.
: TO THE CONSOLE TERMINAL.
:
: SUBORDINATE ROUTINES
:
: SUPERVISOR MACROS PRINTB,PRINTX,ERROR
:
: CALLING SEQUENCE
:
: JSR PC,ERRORS
:
: ERRORS: MOV R3,-(SP) ;PUSH REGISTERS
: MOV R4,-(SP) ;
:
: BIT #BIT15,ERWORD ;IS ERROR FOUND BIT SET?
: BEQ EXTMCR ;IF NOT SET, THEN EXIT THE SUBROUTINE.
:
: SUB #4,PGMCTR ;ACCOUNT FOR AUTOINC OF PC WHEN PUSHED BY JSR
:
: CLR R3 ;LOOP COUNTER AND TABLE POINTER.
: NXTBIT: BIT #BIT0,ERWORD ;IS THE RIGHT-MOST BIT SET?
: BEQ NXTERM ;IF NOT SET, THEN CHECK THE NEXT BIT.
:
: ;
: MOV #1,ERRTP ;ERRDF CALL = ERRTP:1
: MOV ERMSGB(R3),ERRMSG ;USING THE ERRTBL SET UP BY THE
: ;SUPERVISOR DEVICE FATAL MACRO CALL

```

GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 23-1
GLOBAL SUBROUTINES SECTION

```

58 015316 010337 010074      MOV      R3,ERRNBR      ;ERROR NUMBER BEING CHECKED.
59 015322      ERROR      ;MACRO CALL - WITH ABOVE PARMS
    015322 104460      TRAP      C$ERROR
60
61 015324      PRINTB #PRTBMO,PGMCTR      ;PRINT BASIC ERROR MESSAGE AND PC
    015324 013746 007314      MOV      PGMCTR,-(SP)
    015330 012746 010230      MOV      #PRTBMO,-(SP)
    015334 012746 000002      MOV      #2,-(SP)
    015340 010600      MOV      SP,R0
    015342 104414      TRAP      C$PNTB
    015344 062706 000006      ADD      #6,SP
62 015350      PRINTX #PRTXMO,TRXADD      ;PRINT EXTENDED ERROR MESSAGE AND
    015350 013746 005250      MOV      TRXADD,-(SP)
    015354 012746 010302      MOV      #PRTXMO,-(SP)
    015360 012746 000002      MOV      #2,-(SP)
    015364 010600      MOV      SP,R0
    015366 104415      TRAP      C$PNTX
    015370 062706 000006      ADD      #6,SP
63
64
65
66 015374 062703 000002      NXTERM: ADD      #2,R3      ;POINT TO NEXT TABLE ENTRY.
67 015400 006237 006500      ASR      ERWORD      ;GET NEXT BIT INTO POSITION.
68
69 015404 022703 000034      CMP      #28.,R3      ;DONE WITH ALL THIS WHEN R3 IS 28 AND 13
70
71 015410 001330      BNE      NXTBIT      ;BITS HAVE BEEN CHECKED.
72 015412 005037 006500      CLR      ERWORD      ;REPEAT UNTIL 13 LOOPS COMPLETE.
73
74 015416 022737 000001 006512      CMP      #1,FLTRDY      ;WAS THERE A FAILURE TO FIND TRANSMIT-READY?
75 015424 001010      BNE      DCUPA      ;IF NOT, DO CLEANUP
76 015426      PRINTB #FXRDYM      ;PRINT TO CONSOLE: FAILED TO TRANSMIT TO PRNTR
    015426 012746 012316      MOV      #FXRDYM,-(SP)
    015432 012746 000001      MOV      #1,-(SP)
    015436 010600      MOV      SP,R0
    015440 104414      TRAP      C$PNTB
    015442 062706 000004      ADD      #4,SP
77
78 015446      DCUPA: DOCLN      TRAP      C$DCLN
    015446 104444
79
80 015450 022737 000001 006512      EXTMCR: CMP      #1,FLTRDY
81 015456 001010      BNE      DDCUPA
82 015460      PRINTB #FXRDYM      MOV      #FXRDYM,-(SP)
    015460 012746 012316      MOV      #1,-(SP)
    015464 012746 000001      MOV      SP,R0
    015470 010600      TRAP      C$PNTB
    015472 104414      ADD      #4,SP
    015474 062706 000004
83
84 015500 012604      DDCUPA: MOV      (SP)+,R4      ;RESTORE REGISTERS
85 015502 012603      MOV      (SP)+,R3      ;
86
87 015504 000207      RTS      PC
88
89
90

```

GLOBAL AREAS MACRO V03.01 7-NOV-80 10:06:10 PAGE 23-2
GLOBAL SUBROUTINES SECTION

91
92
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:
:
:#####
:
:

.TITLE MISCELLANEOUS SECTIONS
.SBTTL REPORT CODING SECTION

MISCELLANEOUS SECTIONS MACRO V03.01 7-NOV-80 10:06:10 PAGE 24
REPORT CODING SECTION

```

1
2
3
4      :++ THE REPORT CODING SECTION CONTAINS THE
5      : 'PRINTS' CALLS THAT GENERATE STATISTICAL REPORTS.
6      :--
7
8 015506      BGNRPT
9 015506
10
11
12
13
14 015506      EXII   RPT
15 015506      .WORD   JSJMP
    015510 000167      .WORD   L10002-2-.
    015510 000000
11
12
13
14 015512      .EVEN
15 015512      ENDRPT
    015512 104425
15      .SBTTL  PROTECTION TABLE

LSRPT::
L10002: TRAP   CSRPT

```


MISCELLANEOUS SECTIONS MACRO V03.01 7-NOV-80 10:06:10 PAGE 25
PROTECTION TABLE

```
1
2
3
4
5
6
7 015514          BGNPROT
  015514          L$PROT::
8
9 015514 177777   -1          :OFFSET INTO P-TABLE FOR CSR ADDRESS
10 015516 177777  -1          :OFFSET INTO P-TABLE FOR MASSBUS ADDRESS
11 015520 177777  -1          :OFFSET INTO P-TABLE FOR DRIVE NUMBER
12
13 015522          ENDPROT
14
15 .SBTTL INITIALIZE SECTION
```

MISCELLANEOUS SECTIONS MACRO V03.01 7-NOV-80 10:06:10 PAGE 26
INITIALIZE SECTION

```

1
2
3
4
5
6
7 015522      BGNINIT
  015522
8
9
10
11
12
13
14
15
16
17
18
19 015522      INITLZ: READEF #EF.CONTINUE
  015522      012700 000036
  015526      104447
20 015530      BCOMPLETE      JENDIN
  015530      103425
21
22 015532      READEF #EF.NEW
  015532      012700 000035
  015536      104447
23 015540      BNCOMPLETE      NEXTU
  015540      103003
24
25
26 015542      012737 177777 002202
27 015550      005237 002202
28 015554      023737 002202 002012
29 015562      001407
30 015564      013700 002202
  015570      104442
  015572      010037 002204
31 015576      BNCOMPLETE      NEXTU
  015576      103364
32 015600      000403
33 015602      ABORT: BR      STRTUP
  015602      104444
34 015604      000137 016566
  015604
35
36 015610      STRTUP: SETVEC #4,#UBTRAP,#PRI07
  015610      012746 000340
  015614      012746 016572
  015620      012746 000004
  015624      012746 000003
  015630      104437
  015632      062706 000010
37
38
39 015636      005037 006500
  015636

```

THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
 AT THE BEGINNING OF EACH PASS.

BGNINIT

LSINIT::

INITIALIZE ROUTINE.

THIS CODE WILL ACT ON THE HARDWARE P-TABLE CONTENTS TO SET UP THE
 SERIAL INTERFACE THAT THE PRINTER IS CONNECTED TO.

INITLZ: READEF #EF.CONTINUE

MOV #EF.CONTINUE,RO
 TRAP CSREFG

BCS JENDIN

READEF #EF.NEW

MOV #EF.NEW,RO
 TRAP CSREFG

BNCOMPLETE NEXTU

BCC NEXTU

NEXTU:

MOV #-1,LOGUNIT
 INC LOGUNIT
 CMP LOGUNIT,LSUNIT
 BEQ ABORT
 GPHARD LOGUNIT,PLCC

MOV LOGUNIT,RO
 TRAP CSGPHRD
 MOV RO,PLCC

BNCOMPLETE NEXTU

BCC NEXTU

BR STRTUP

ABORT: DOCLN

TRAP CSDCLN

JENDIN: JMP ENDIN

STRTUP: SETVEC #4,#UBTRAP,#PRI07

;SET UP TRAP VECTOR FOR ILLEGAL ADDRESS

MOV #PRI07,-(SP)
 MOV #UBTRAP,-(SP)
 MOV #4,-(SP)
 MOV #3,-(SP)
 TRAP CSSVEC
 ADD #10,SP

;TRAP... UNIBUS ERROR.

CLR ERWORD

;ASSUME NO ERRORS

MISCELLANEOUS SECTIONS MACRO V03.01 7-NOV-80 10:06:10 PAGE 26-1
INITIALIZE SECTION

```

40 015642 005037 010056          CLR      NDATA          ;ASSUME NO UNIBUS ERRORS
41 015646 005037 006512          CLR      FLTRDY         ;ASSUME NO FAILURE TO FIND TRANSMIT RDY
42 015652 005037 002206          CLR      GREASE          ;ASSUME NO PREVIOUS ERRORS
43
44 015656 017701 164322          MOV      @PLOC,R1        ;GET CSR ADDRESS
45 015662 001137                BNE      SETUPC          ;IF NOT ZERO, THEN SET UP INTERFACE ADDRESSES
46
47                                ;CSR, LPR, TCR, RBUF
48 015664 005037 010056          CALLDF: CLR      NDATA          ;ASSUME NO UNIBUS ADDRESSING ERRORS YET.
49 015670 004737 017032          JSR      PC,DFault        ;DO THE DEFAULT LOGIC & THEN THE LINE SIZE CODE
50 015674 000137 016456          JMP      LINCOD          ;DO LINE SIZE LOGIC
51
52 015700 005037 010056          CALLDL: CLR      NDATA          ;ASSUME NO UNIBUS ADDRESSING ERRORS YET.
53 015704 004737 016602          JSR      PC,DLSET        ;SET UP FOR A DL
54 015710 005037 006500          CLR      ERWORD          ;ASSUME NO ERRORS
55 015714 023727 010056 000001  CMP      NDATA,#1        ;NO DEVICE AT THAT ADDRESS?
56 015722 001011                BNE      EMPTI2          ;NO PROBLEM WITH UNIBUS
57 015724                PRINTF  #FAILDL          ;FAILED TO FIND DEVICE MESSAGE
                                MOV      #FAILDL,-(SP)
                                MOV      #1,-(SP)
                                MOV      SP,R0
                                TRAP     C$PNTF
                                ADD      #4,SP
015724 012746 012122
015730 012746 000001
015734 010600
015736 104417
015740 062706 000004
58 015744                DOCLN          ;EXIT TEST SEQUENCE
015744 104444                TRAP     C$DCLN
59
60 015746 012700 000144          EMPTI2: MOV      #100.,R0        ;ASSUME NO MORE THAN 100 CHARACTERS IN BUFFER.
61 015752 005300          EMPTL2: DEC      R0              ;COUNT DOWN ONE FOR EACH CHARACTER
62 015754 002407                BLT      NONDTA          ;STOP TRYING TO EMPTY THE BUFFER. ASSUME HOPELESS.
63
64 015756 032777 000200 171312  BIT      #BIT7,JRCSH        ;IS THERE A CHARACTER IN THE RBUF?
65 015764 001403                BEQ      NONDTA          ;IF NO CHARACTER IN RBUF, THEN CONTINUE...
66
67 015766 005777 171310          TST      @RBUF          ;EMPTY RBUF. IGNORE BUFFER CONTENTS.
68 015772 000767                BR       EMPTL2          ;CHECK FOR RDONE AGAIN AND EMPTY BUFFER
69
70
71 015774 005037 006500          NONDTA: CLR      ERWORD          ;ASSUME NO ERRORS
72 016000 005037 010056          CLR      NDATA          ;ASSUME NO UNIBUS ERRORS
73 016004 005037 006512          CLR      FLTRDY         ;ASSUME NO FAILURE TO FIND TRANSMIT RDY
74 016010 005037 002206          CLR      GREASE          ;ASSUME NO PREVIOUS ERRORS.
75
76 016014 012701 002210          MOV      #STSRES,R1        ;ADDRESS OF REQUEST STATUS SEQUENCE
77 016020 012702 000002          MOV      #2,R2
78 016024 005003                CLR      R3
79 016026 004737 012616          JSR      PC,XMIT          ;SEND ANSWER BACK SEQUENCE TO PRINTER.
80 016032 042737 100000 006500  BIC      #BIT15,ERWORD        ;EOT MAY HAVE OCCURED. IGNORE IT.
81 016040 023727 006512 000001  CMP      FLTRDY,#1        ;FAIL TO FIND TRDY?
82 016046 001404                BEQ      PFM1            ;PRINT FAILURE MESSAGE
83
84 016050 023727 010056 000001  CMP      NDATA,#1        ;ANY UNIBUS ERRORS?
85 016056 001011                BNE      NONDT2          ;IF SO, PRINT FAILURE MESSAGE.
86
87 016060                PFM1:  PRINTF  #FAILDL          ;PRINT FAILURE MESSAGE
                                MOV      #FAILDL,-(SP)
                                MOV      #1,-(SP)
                                MOV      SP,R0
016060 012746 012122
016064 012746 000001
016070 010600

```

MISCELLANEOUS SECTIONS MACRO v03.01 7-NOV-80 10:06:10 PAGE 24-2
INITIALIZE SECTION

88	016072	104417				TRAP	C\$PNTF
	016074	062706	000004			ADD	#4,SP
	016100			DOCLN	;EXIT TEST SEQUENCE		
	016100	104444				TRAP	C\$DCLN
89	016102	004737	014012	NONDT2:	JSR PC,GETCHR		
90	016106	120437	006521		CMPB R4,ESCAPE		
91	016112	001411			BEQ NONDT3		
92	016114				PRINTF #FAILDL		
93	016114	012746	012122			MOV	#FAILDL,-(SP)
	016120	012746	000001			MOV	#1,-(SP)
	016124	010600				MOV	SP,R0
	016126	104417				TRAP	C\$PNTF
	016130	062706	000004			ADD	#4,SP
94	016134			DOCLN	;EXIT TEST SEQUENCE		
	016134	104444				TRAP	C\$DCLN
95	016136	004737	014012	NONDT3:	JSR PC,GETCHR		
96	016142	004737	014012		JSR PC,GETCHR		
97	016146	004737	014012		JSR PC,GETCHR		
98	016152	004737	014012		JSR PC,GETCHR		
99							
100							
101							
102	016156	000137	016456		JMP LINCOD		
103							
104	016162	012700	000002	SETUPC:	MOV #2,R0		
105	016166	063700	002204		ADD PLOC,R0		
106	016172	011001			MOV (R0),R1		
107	016174	100633			BMI CALLDF		
108							
109	016176	001240			BNE CALLDL		
110							
111	016200	005037	010056		CLR NDATA		
112	016204	004737	016672		JSR PC,DZSET		
113							
114							
115	016210	005037	006500		CLR ERWORD		
116	016214	023727	010056	000001	CMP NDATA,#1		
117	016222	001011			BNE EMPTI3		
118	016224				PRINTF #FAILDZ		
	016224	012746	012220			MOV	#FAILDZ,-(SP)
	016230	012746	000001			MOV	#1,-(SP)
	016234	010600				MOV	SP,R0
	016236	104417				TRAP	C\$PNTF
	016240	062706	000004			ADD	#4,SP
119	016244			DOCLN	;EXIT TEST SEQUENCE		
	016244	104444				TRAP	C\$DCLN
120							
121	016246	012700	000144	EMPTI3:	MOV #100.,R0		
122	016252	005300		EMPTI3:	DEC R0		
123	016254	002407			BLT NONDZA		
124							
125	016256	032777	000200	171012	BIT #BIT7,@RCSR		
126	016264	001403			BEQ NONDZA		
127							
128	016266	005777	171010		TST @RBUF		
129	016272	000767			BR EMPTI3		

MISCELLANEOUS SECTIONS MACRO V03.01 7-NOV-80 10:06:10 PAGE 26-3
INITIALIZE SECTION

```

130
131
132
133 016274 005037 006500      NONDZA: CLR      ERWORD      ;ASSUME NO ERRORS
134 016300 005037 010056      CLR      NDATA      ;ASSUME NO UNIBUS ERRORS
135 016304 005037 006512      CLR      FLTRDY     ;ASSUME NO FAILURE TO FIND TRANSMIT RDY
136 016310 005037 002206      CLR      GREASE     ;ASSUME NO PREVIOUS ERRORS.
137
138 016314 012701 002210      MOV      #STSRES,R1 ;SEND REQUEST STATUS SEQUENCE.
139 016320 012702 000002      MOV      #2,R2      ;
140 016324 005003              CLR      R3          ;
141 016326 004737 012616      JSR      PC,XMIT      ;SEND REQUEST STATUS SEQUENCE TO PRINTER.
142 016332 042737 100000 006500 BIC      #BIT15,ERWORD ;IGNORE POSSIBLE EOT CONDITION.
143 016340 023727 006512 000001 CMP      FLTRDY,#1    ;FAILURE TO FIND TRDY?
144 016346 001404              BEQ      PRTM2        ;PRINT FAILURE MESSAGE
145
146 016350 023727 010056 000001 CMP      NDATA,#1    ;ANY UNIBUS ERRORS?
147 016356 001011              BNE      NONDZ2       ;IF SO, PRINT FAILURE MESSAGE.
148
149 016360              PRTM2: PRINTF  #FAILDZ      ;PRINT FAILURE MESSAGE
      016360 012746 012220              MOV      #FAILDZ,-(SP)
      016364 012746 000001              MOV      #1,-(SP)
      016370 010600              MOV      SP,R0
      016372 104417              TRAP     C$PNTF
      016374 062706 000004              ADD      #4,SP
150 016400              DOCLN              ;EXIT TESTING SEQUENCE
      016400 104444              TRAP     C$DCLN
151
152 016402 004737 014012      NONDZ2: JSR      PC,GETCHR ;CHECK FOR A RESPONSE CHARACTER
153 016406 120437 006521      CMPB     R4,ESCAPE ;WAS THE CHARACTER AN ESCAPE CHARACTER?
154 016412 001411              BEQ      NONDZ3       ;GET THE REST IF ESC FOUND.
155 016414              PRINTF  #FAILDZ      ;PRINT FAILURE MESSAGE FOR DL SETUP.
      016414 012746 012220              MOV      #FAILDZ,-(SP)
      016420 012746 000001              MOV      #1,-(SP)
      016424 010600              MOV      SP,R0
      016426 104417              TRAP     C$PNTF
      016430 062706 000004              ADD      #4,SP
156 016434              DOCLN              ;EXIT TESTING SEQUENCE
      016434 104444              TRAP     C$DCLN
157
158 016436 004737 014012      NONDZ3: JSR      PC,GETCHR ;GET THE 2ND CHARACTER IN RESPONSE.
159 016442 004737 014012      JSR      PC,GETCHR ;
160 016446 004737 014012      JSR      PC,GETCHR ;
161 016452 004737 014012      JSR      PC,GETCHR ;
      ;          3RD
      ;          4TH
      ;          5TH AND FINAL RESPONSE CHARACTER.
162
163
164
165
166
167 016456 012700 000006      LINCOD: MOV      #6,R0
168 016462 063700 002204      ADD      PLOC,R0 ;RESPONSE FROM PTABLE. ?CHARACTERS PER LINE?
169 016466 011005              MOV      (R0),R5 ;GET THE LINE CHARACTER DENSITY. 1=80CHAR/LINE
170 016470 022705 000001      CMP      #1,R5 ;IF NOT = 1 THEN 132 CHARACTERS PER LINE.
171 016474 001404              BEQ      EIGHTY     ;IF EQ 1 THEN 80 CHAR/LINE
172 016476 012737 000204 010042 MOV      #132.,LINSIZ ;NOT EQ 1... THEN 132 CHAR/LINE
173 016504 000403              BR       INFIN
174 016506 012737 000120 010042 EIGHTY: MOV     #80.,LINSIZ ;LINE SIZE IS EIGHTY CHARS/LINE

```

MISCELLANEOUS SECTIONS MACRO V03.01 7-NOV-80 10:06:10 PAGE 24-4
INITIALIZE SECTION

```

175 016514 013701 010042      INFN:  MOV    LINSIZ,R1      ;GET THE LINE SIZE. NUMBER OF CHARACTERS/LINE
176 016520 006301              ASL     R1              ;X 2
177 016522 006301              ASL     R1              ;X 4
178 016524 010137 010040      MOV     R1,LINN          ;SAVE LINSIZ X 4
179 016530 006301              ASL     R1              ;X 8
180 016532 060137 010040      ADD     R1,LINN          ;LINSIZ X (4+8) = LINSIZ X 12 => LINN
181
182 016536 005037 006500      CLR     ERWORD          ;ASSUME NO ERRORS - YET.
183 016542 012700 000004      CLRVEC  #4              ;RESET VECTOR TO ORIGINAL STATUS
                                MOV     #4,R0
                                TRAP    C$CVEC
184
185
186 016550 032777 000200 170520 EMPTYR: BIT    #BIT7,@RCSR      ;EMPTY RECEIVER BUFFER...
187 016556 001403              BEQ     ENDIN              ;IS THERE A CHARACTER IN THE RBUF?
188
189 016560 005777 170516      TST     @RBUF              ;IF NO CHARACTER IN RBUF, THEN EXIT.
190 016564 000771              BR      EMPTYR            ;EMPTY RBUF. IGNORE BUFFER CONTENTS.
191
192
193 016566 104432              ENDIN:  EXIT    INIT          ;CHECK FOR RDONE AGAIN AND EMPTY BUFFER
                                TRAP    C$EXIT
                                .WORD   L10004-.
                                016570 000662

```

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::

225 016572
016572
226

MISCELLANEOUS SECTIONS MACRO V03.01 7-NOV-80 10:06:10 PAGE 26-5
INITIALIZE SECTION

227 016572 012737 000001 010056 UBTRAP: MOV #1,NDATA ;NO DEVICE AT THAT ADDRESS INDICATED.
228
229 016600 ENDSRV
016600 L10005:
016600 000002 RTI

230
231
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243
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271
272
273 016602 017701 163376
274 016606 010137 007276
275
276 016612 062701 000002
277 016616 010137 007302
278 016622 062701 000002
279 016626 010137 007300
280 016632 062701 000002
281 016636 010137 007304

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 IF 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

DLSET: MOV @PLOC,R1 ;SET UP CSR ADDRESS & BUFFER ADDRESSES.
MOV R1,RCSR ;ADDRESS OF RECEIVER CSR REGISTER.

ADD #2,R1
MOV R1,RBUF ;ADDRESS OF RECEIVER BUFFER REGISTER

ADD #2,R1
MOV R1,XCSR ;ADDRESS OF THE TRANSMITTER CSR REGISTER.

ADD #2,R1
MOV R1,XBUF ;ADDRESS OF THE TRANSMITTER BUFFER REGISTER.

MISCELLANEOUS SECTIONS MACRO V03.01 7-NOV-80 10:06:10 PAGE 26-6
INITIALIZE SECTION

```

282
283 016642 005037 010052          CLR      MLTLIN          ;INDICATE THAT THIS IS A SINGLE LINE INTERFACE.
284 016646 012737 000200 010044    MOV      #BIT7,TRDYBT      ;PLACEMENT OF XMIT READY BIT FOR SINGLE LINE
285                                ;INTERFACES.
286 016654 012737 006440 007306    MOV      #JUNKPL,LPR        ;WHEN LPR IS STUFFED, CONTENTS GO TO JUNKPL
287 016662 012737 006440 007310    MOV      #JUNKPL,TCR        ;WHEN SENCHR STUFFS TCR, CONTENTS GO TO JUNKPL
288
289 016670 000207          RTS      PC
290
291
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```

FUNCTIONAL DESCRIPTION

LOCAL PROCEDURE DZSET:

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.

INPUTS

CSRADD - ADDRESS ASSUMED AS THE CSR REGISTER.

OUTPUTS

NONE

SUBORDINATE ROUTINES

NONE

FUNCTIONAL SIDE EFFECTS

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

CALLING SEQUENCE

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

```

330 016672 017701 163306    DZSET: MOV      @PLOC,R1          ;GET THE CSR ADDRESS TO SET UP INTERFACE REG'S
331 016676 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 016702 010137 007300    MOV      R1,XCSR          ;AND POINT TO THE NEXT REGISTER ADDRESS
335
336 016706 062701 000002    ADD      #2,R1
337 016712 010137 007302    MOV      R1,RBUF          ;ADDRESS OF THE RECEIVER BUFFER
338 016716 010137 007306    MOV      R1,LPR          ;ADDRESS OF THE LINE PARAMETER REGISTER

```


MISCELLANEOUS SECTIONS MACRO V03.01 7-NOV-80 10:06:10 PAGE 26-7
INITIALIZE SECTION

```

339
340 016722 062701 000002      ADD    #2,R1
341 016726 010137 007310      MOV    R1,TCR          ;ADDRESS OF THE TRANSMIT CONTROL REGISTER
342
343 016732 062701 000002      ADD    #2,R1
344 016736 010137 007312      MOV    R1,TDR          ;ADDRESS OF THE TRANSMIT DATA REGISTER
345
346 016742 013737 007312 007304  MOV    TDR,XBUF          ;WHEN REFERENCING THE XBUF, YOU WILL WANT
347                                     ;THE TDR - TRANSMIT DATA REGISTER.
348
349 016750 012777 000040 170320  MOV    #BITS,@RCSR        ;CLEARS INTERRUPT ENABLE BITS AND
350                                     ;SETS MASTER SCAN ENABLE.
351 016756 012737 100000 010044  MOV    #BIT15,TRDYBT      ;DEFINE TRANSMIT READY BIT FOR DZ11 CSR.
352
353 016764 012700 000004      MOV    #4,R0
354 016770 063700 002204      ADD    PLOC,R0          ;PTABLE ENTRY. ?DZ CHANNEL NUMBER?
355 016774 011002              MOV    (R0),R2        ;CHANNEL TO BE SET INTO TCR REGISTER
356 016776 006302              ASL    R2              ;CHANGE THE RANGE FROM 0-7 TO 0-14
357                                     ;TO BE USED AS A TABLE OFFSET.
358 017000 016237 006444 006436  MOV    TCRTBL(R2),TCRENA      ;GET MASK FROM TABLE, PLACE IN TCR REG.
359                                     ;TO DETERMINE THE CHANNEL CHOSEN
360 017006 012700 000004      MOV    #4,R0          ;PTABLE ENTRY #3
361 017012 063700 002204      ADD    PLOC,R0          ;PTABLE ENTRY ADDRESS FOR CHANNEL #.
362 017016 051037 006442      BIS    (R0),LPRINI      ;NEW LPR STATUS WITH CH # INCLUDED.
363 017022 013777 006442 170256  MOV    LPRINI,@LPR        ;SET UP LPR ON DZ INTERFACE
364
365 017030 000207              RTS    PC
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395

```

FUNCTIONAL DESCRIPTION

LOCAL PROCEDURE DEFAULT:

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

MISCELLANEOUS SECTIONS MACRO V03.01 7-NOV-80 10:06:10 PAGE 26-8
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,DFAULT
410      :
411      :
412      :
413      :
414      :
415 017032 013777 005254 163144 DFAULT: MOV      DLDFLT,@PLOC      ;ASSUME A SINGLE LINE INTERFACE
416      :
417 017040 004737 016602      :      JSR      PC,DLSET      ;SET UP THE REGISTER ADDRESSES
418      :
419 017044 023727 010056 000001      :      CMP      NDATA,#1      ;WAS THERE AN ILLEGAL ADDRESSING ERROR?
420 017052 001462      :      BEQ      DZDCOD      ;IF SO, DL SETUP FAILED. TRY DZ SETUP.
421      :
422 017054 005037 006500      :      CLR      ERWORD      ;ASSUME THAT NO ERRORS HAVE BEEN FOUND - YET.
423      :
424 017060 012700 000144      :      EMPTI4: MOV      #100.,R0      ;ASSUME NO MORE THAN 100 CHARACTERS IN BUFFER.
425 017064 005300      :      EMP4:  DEC      R0      ;COUNT DOWN ONE FOR EACH CHARACTER
426 017066 002407      :      BLT      ABSND      ;STOP TRYING TO EMPTY THE BUFFER. ASSUME HOPELESS.
427      :
428 017070 032777 000200 170200      :      BIT      #BIT7,@RCSR      ;IS THERE A CHARACTER IN THE RBUF?
429 017076 001403      :      BEQ      ABSND      ;IF NO CHARACTER IN RBUF, THEN CONTINUE...
430      :
431 017100 005777 170176      :      TST      @RBUF      ;EMPTY RBUF. IGNORE BUFFER CONTENTS.
432 017104 000767      :      BR      EMP4      ;CHECK FOR RDONE AGAIN AND EMPTY BUFFER
433      :
434 017106 005037 006500      :      ABSND: CLR      ERWORD      ;ASSUME NO ERRORS
435 017112 005037 010056      :      CLR      NDATA      ;ASSUME NO UNIBUS ERRORS
436 017116 005037 006512      :      CLR      FLTRDY      ;ASSUME NO FAILURE TO FIND TRANSMIT RDY
437 017122 005037 002206      :      CLR      GREASE      ;ASSUME NO PREVIOUS ERRORS.
438      :
439 017126 012701 002210      :      MOV      #STSRES,R1      ;SEND REQUEST STATUS SEQUENCE.
440 017132 012702 000002      :      MOV      #2,R2      :
441 017136 005003      :      CLR      R3      :
442 017140 004737 012616      :      JSR      PC,XMIT      ;SEND ANSWER-BACK SEQUENCE TO PRINTER.
443 017144 042737 100000 006500      :      BIC      #BIT15,ERWORD      ;IGNORE POSSIBLE EOT INDICATION.
444      :
445 017152 023727 010056 000001      :      CMP      NDATA,#1      ;IF SET THEN TRY MULTILINE ADDRESS
446 017160 001417      :      BEQ      DZDCOD      ;IF NOT SET, DO THE DZ CHECK
447      :
448 017162 005004      :      CLR      R4      ;BR4 SHOULD GET ESCAPE CHAR IF DL PRESENT.
449 017164 004737 014012      :      JSR      PC,GETCHR      ;THE DELAY SHOULD BE LONG ENOUGH TO PERMIT
450      :      :      ;THE PRINTER TO RESPOND.
451      :      :      ;NOW GET THE FIVE RESPONSE CHARACTERS
452 017170 120437 006521      :      CMPB      R4,ESCAPE      ;IS IT AN ESCAPE CHARACTER?

```


MISCELLANEOUS SECTIONS MACRO V03.01 7-NOV-80 10:06:10 PAGE 26-9
INITIALIZE SECTION

```

453 017174 001011      BNE      DZDCOD      ;NO? THEN TRY DZ ADDRESS DEFAULT.
454 017176 004737 014012 JSR      PC,GETCHR      ;
455 017202 004737 014012 JSR      PC,GETCHR      ;
456 017206 004737 014012 JSR      PC,GETCHR      ;
457 017212 004737 014012 JSR      PC,GETCHR      ;THE FINAL CHARACTER SHOULD BE A 'C'
458 017216 000514      BR       DZDCOD      ;YES? THEN SUCCESSFULLY COMPLETED.
459
460 017220 005037 006500      DZDCOD: CLR      ERWORD      ;ASSUME NO ERRORS
461 017224 005037 010056      CLR      NDATA      ;ASSUME NO UNIBUS ERRORS
462 017230 005037 006512      CLR      FLTRDY      ;ASSUME NO FAILURE TO FIND TRANSMIT RDY
463 017234 005037 002206      CLR      GREASE      ;ASSUME NO PREVIOUS ERRORS.
464
465 017240 013777 005256 162736 MOV      DZDFLT,@PLOC      ;ASSUME A DZ INTERFACE AT ADDRESS 776010
466 017246 004737 016672      JSR      PC,DZSET      ;SET UP REGISTERS FOR A DZ11 INTERFACE
467
468 017252 023727 010056 000001 CMP      NDATA,#1      ;HAS AN ILLEGAL ADDRESS ERROR OCCURRED?
469 017260 001462      BEQ      FAILDF      ;IF SO, BOTH DL AND DZ DEAFUALTS HAVE FAILED.
470
471
472 017262 005003      CLR      R3      ;DISABLE BIDIRECTIONAL PRINTING LOGIC
473 017264 005037 006500      CLR      ERWORD      ;ASSUME NO ERRORS HAVE YET OCCURRED.
474
475 017270 012700 000144      EMPT15: MOV      #100.,R0      ;ASSUME NO MORE THAN 100 CHARACTERS IN BUFFER.
476 017274 005300      FMP5:  DEC      R0      ;COUNT DOWN ONE FOR EACH CHARACTER
477 017276 002407      BLT      ABS5      ;STOP TRYING TO EMPTY THE BUFFER. ASSUME HOPELESS.
478
479 017300 032777 000200 167770 BIT      #BIT7,@RCSR      ;IS THERE A CHARACTER IN THE RBUF?
480 017306 001403      BEQ      ABS5      ;IF NO CHARACTER IN RBUF, THEN CONTINUE...
481
482 017310 005777 167766      TST      @RBUF      ;EMPTY RBUF. IGNORE BUFFER CONTENTS.
483 017314 000767      BR       EMP5      ;CHECK FOR RDONE AGAIN AND EMPTY BUFFER
484
485 017316 005037 006500      ABS5:  CLR      ERWORD      ;ASSUME NO ERRORS
486 017322 005037 010056      CLR      NDATA      ;ASSUME NO UNIBUS ERRORS
487 017326 005037 006512      CLR      FLTRDY      ;ASSUME NO FAILURE TO FIND TRANSMIT RDY
488 017332 005037 002206      CLR      GREASE      ;ASSUME NO PREVIOUS ERRORS.
489
490 017336 012701 002210      MOV      #STSRES,R1      ;SEND REQ STATUS SEQUENCE.
491 017342 012702 000002      MOV      #2,R2      ;
492 017346 005003      CLR      R3      ;
493 017350 004737 012616      JSR      PC,XMIT      ;SEND REQ STATUS SEQUENCE TO PRINTER.
494 017354 042737 100000 006500 BIC      #BIT15,ERWORD      ;IGNORE POSSIBLE EOT INDICATION.
495
496 017362 023727 010056 000001 CMP      NDATA,#1      ;CHECK FOR OCCURANCE OF TRAP...
497 017370 001416      BEQ      FAILDF      ;IF SET THEN PRINT AN ERROR AND START OVER
498
499 017372 004737 014012      JSR      PC,GETCHR      ;DELAY SHOULD GIVE PRINTEWR ENOUGH TIME TO
500
501
502
503 017376 120437 006521      CMPB     R4,ESCAPE      ;GET THE FIVE CHARACTER RESPONSE TO THE QUERY
504 017402 001011      BNE      FAILDF      ;EXPECTING ESCAPE CHARACTER IF DZ PRESENT.
505 017404 004737 014012      JSR      PC,GETCHR      ;DEFAULT ADDRESSES DIDN'T WORK OUT.
506 017410 004737 014012      JSR      PC,GETCHR      ;
507 017414 004737 014012      JSR      PC,GETCHR      ;
508 017420 004737 014012      JSR      PC,GETCHR      ;LAST CHARACTER A 'C'(LOWER CASE)
509 017424 000411      BR       DZDCOD      ;FOUND THE ADDRESS. EXIT.

```

MISCELLANEOUS SECTIONS MACRO V03.01 7-NOV-80 10:06:10 PAGE 26-10
INITIALIZE SECTION

```

510
511 017426          FAILDF: PRINTF #FAILM          ;PRINT FAILURE MESSAGE AT CONSOLE
    017426 012746 011602          MOV #FAILM,-(SP)
    017432 012746 000001          MOV #1,-(SP)
    017436 010600          MOV SP,R0
    017440 104417          TRAP C$PRINTF
    017442 062706 000004          ADD #4,SP
512 017446          DOCLN          ;EXIT TESTING SEQUENCE
    017446 104444          TRAP C$DOCLN
513
514 017450 000207          DONEDF: RTS      PC
515
516
517
518          .EVEN
519
520
521
522
523 017452          ENDINIT
    017452          L10004:
    017452 104411          TRAP C$INIT
524
525          .SBTTL AUTODROP SECTION
526
527 017454          BGNAUTO
    017454          L$AUTO::
528
529 017454          ENDAUTO
    017454          L10006:
    017454 104461          TRAP C$AUTO
530
531
532
533
534
535
536          .SBTTL CLEANUP CODING SECTION

```

MISCELLANEOUS SECTIONS MACRO V03.01 7-NOV-80 10:06:10 PAGE 27
 CLEANUP CODING SECTION

```

1
2
3      ;++
4      ; THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
5      ; AFTER THE HARDWARE TESTS HAVE BEEN PERFORMED.
6      ;--
7 017456      BGNCLN
8 017456
9 017456 004737 014274      JSR      PC,INITCD      ;RESET THE PRINTER
10
11 017462      EXIT      CLN
12
13
14
15
16 017466      ENDCLN
17 017466
18 017466 104412
19
20
21
22      .TITLE  HARDWARE TESTS
23      .SBTTL  TEST 1: PRINTER SELF TEST
  
```

LSCLEAN::

TRAP C\$EXIT
 .WORD L10007-

L10007: TRAP C\$CLEAN

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 28
TEST 1: PRINTER SELF TEST

```

1
2
3
4
5 017470          BGNTST
   017470
6
7
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9
10
11
12
13
14
15
16
17
18
19 017470 004737 014274  TEST1: JSR    PC,INITCD    ;INITIALIZE FOR THIS TEST
20 017474          PRINTB  #TITLE1    ;CONSOLE TEST TITLE
   017474 012746 002333          MOV    #TITLE1,-(SP)
   017500 012746 000001          MOV    #1,-(SP)
   017504 010600          MOV    SP,R0
   017506 104414          TRAP   C$PNTB
   017510 062706 000004          ADD    #4,SP
21 017514 012701 002255          MOV    #SLFTST,R1    ;ADDRESS OF SELT TEST ARGUMENT SEQUENCE
22 017520 012702 000002          MOV    #2,R2        ;2 CHARACTERS IN SEQUENCE
23 017524 005003          CLR     R3                ;DISABLE BIDIRECTIONAL PRINTING
24 017526 004737 012616          JSR    PC,XMIT      ;SEND THE ARGUMENT LIST
25
26 017532 023727 002206 177777    CMP     GREASE,#-1    ;WAS THERE A 'GREASED' EXIT FROM XMIT?
27 017540 001402          BEQ     PRNTIT            ;IF SO, PREPARE TO PRINT TO CONSOLE
28                                     ; THE ERRORS FOUND DURING XMIT ATTEMPT.
29 017542 004737 015020          JSR    PC,STATS    ;RECEIVE STATUS AND FIT TO ERWORD.
30 017546 004737 015246          PRNTIT: JSR    PC,ERRORS ;DECODE ERROR WORD & PRINT ERROR MESSAGES
31
32 017552 004737 014012          CHKN6: JSR    PC,GETCHR ;GET ANOTHER (SIXTH) CHARACTER
33 017556 123704 006520          CMPB   XON,R4        ;IS IT AN 'XON'?
34 017562 001406          BEQ     STSCAL            ;IF OK, (XON FOUND) THEN CHECK STATUS
35 017564 052737 020000 006500    BIS     #BIT13,ERWORD ;SET ECNRB
36 017572 052737 100000 006500    BIS     #BIT15,ERWORD ;INDICATE ERROR
37
38 017600 004737 015246          STSCAL: JSR    PC,ERRORS ;CHECK FOR ERRORS
39
40
41 017604          ENDTST
   017604
   017604 104401          L10010: TRAP   C$SETST
42
43
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45
46
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48
49

```

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 28-1
TEST 1: PRINTER SELF TEST

50
51
52

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

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 29
TEST 2: UNDERLINE / NO-UNDERLINE MODE TEST

```

1
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3
4 017606          BGNTST
   017606
5
6
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8
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11
12
13
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16
17
18 017606 004737 014274  TEST2: JSR    PC,INITCD      :INITIALIZE TEST
19 017612                                :CONSOLE PRINT TITLE
   017612 012746 002366                                MOV    #TITLE2,-(SP)
   017616 012746 000001                                MOV    #1,-(SP)
   017622 010600                                MOV    SP,R0
   017624 104414                                TRAP   C$PNTB
   017626 062706 000004                                ADD    #4,SP
20
21 017632 052737 040000 006500      BIS    #BIT14,ERWORD  :INHIBIT ERROR HANG-UPS
22 017640 012701 002366              MOV    #TITLE2,R1      :ADDRESS OF STRING TO PRINT (TITLE)
23 017644 062701 000004              ADD    #4,R1          :SKIP FIRST FOUR CHARACTERS
24 017650 012702 000053              MOV    #43,R2         :43 CHARACTERS TO PRINT IN STRING
25 017654 005003                    CLR    R3              :DISABLE BIDIRECTIONAL
26 017656 004737 012616              JSR    PC,XMIT        :SEND THE ARGUMENT SEQUENCE
27 017662 042737 040000 006500      BIC    #BIT14,ERWORD  :RE-ENABLE ERROR HANG-UPS
28
29 017670 012704 177777              MOV    #-1,R4         :CHARACTER COUNT
30 017674 012701 006531      PLOOP: MOV    #SCA,R1          :ADDRESS OF ASCII 'A'
31 017700 012702 000001              MOV    #1,R2         :ONE CHARACTER
32 017704 005003                    CLR    R3              :NO BIDIRECTIONAL PRINTING
33 017706 004737 012616              JSR    PC,XMIT        :SEND 'A' TO PRINTER FOR PRINTING.
34 017712 004737 015246              JSR    PC,ERRORS      :CHECK FOR ERRORS
35
36 017716 012700 000001              MOV    #1,R0
37 017722 126027 002266 000041      CMPB   STULMD(R0),#ONE  :IS THE UNDERLINE MODE SET?
38 017730 001004                    BNE     SETONE          :NO, THEN CHANGE TO UNDERLINE MODE
39 017732 112760 000040 002266      MOVB   #ZERO,STULMD(R0) :YES, THEN CHANGE TO NON-UNDERLINE MODE
40 017740 000405                    BR      NEWMOD          :TRANSMIT MODE CHANGE AT NEWMOD
41 017742 012700 000001      SETONE: MOV    #1,R0
42 017746 112760 000041 002266      MOVB   #ONE,STULMD(R0) :CHANGE TO UNDERLINE MODE
43
44 017754 012701 002266      NEWMOD: MOV    #STULMD,R1      :ADDRESS OF ARGUMENT STRING
45 017760 012702 000003              MOV    #3,R2          :WHICH IS THREE CHARACTERS LOONG
46 017764 004737 012616              JSR    PC,XMIT        :SEND THE SEQUENCE
47 017770 004737 015246              JSR    PC,ERRORS      :CHECK FOR ERRORS
48
49 017774 005204                    INC     R4              :UPDATE COUNT OF CHARACTERS.
50 017776 020437 010042              CMP     R4,LINSIZ     :PRINTED A LINE YET?
51 020002 001334                    BNE     PLOOP          :DO LOOP UNTIL DONE

```


HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 29-1
 TEST 2: UNDERLINE / NO-UNDERLINE MODE TEST

```

52
53 020004 012701 002313      MOV    #CR,R1      ;ADDRESS OF <CRLF>
54 020010 012702 000002      MOV    #2,R2       ;BOTH CHARACTERS
55 020014 004737 012616      JSR     PC,XMIT      ;PRINT (ACCUMULATE) <CR><LF>
56 020020 004737 015246      JSR     PC,ERRORS    ;CHECK FOR ERRORS.
57
58 020024      ENDTST
   020024
   020024 104401      L10011:  TRAP    C$ETST
59
60
61      :
62      :
63
64
65
66
67
68
69      .SBTTI  TEST 3: HAMMER HIT COUNT TEST
  
```

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020026
020026

BGNTST

१३ ::

.....

TEST #3

HAMMER HIT COUNT TEST

FOUR LINES ARE TRANSMITTED TO THE PRINTER. THE HIT COUNT RANGES FROM 0 TO 3 HITS PER CHARACTER TRANSMITTED. ONE BLANK LINE AND THREE NON-BLANK LINES OF INCREASING DARKNESS SHOULD BE EVIDENT ON THE PRINT PATTERN.

```
TEST3: JSR    PC,INITCD      ;INITIALIZE TEST
        PRINTB #TITLE3      ;CONSOLE PRINT TEST TITLE
```

```
MOV    #TITLE3,-(SP)
MOV    #1,-(SP)
MOV    SP,R0
TRAP   C$PNTB
ADD    #4,SP
```

```

BIS      #BIT14,ERWORD      ;DISABLE ERROR HANGUPS
MOV      #TITLE3,R1         ;TITLE ADDRESS
ADD      #4,R1               ;SKIPPING THE FIRST FOUR TWO CHARACTERS.
MOV      #32.,R2             ;32 CHARACTERS LONG
CLR      R3                  ;NO BIDIRECTIONAL PRINTING
JSR      PC,XMIT             ;PRINT TEST TITLE
BIC      #BIT14,ERWORD      ;RE-ENABLE ERROR HANG-UPS

```

```

MOV      SC1,SNGCHR      ; THE CHARACTER '1' TO BE PRINTED
MOV      #ZERO,HITARG    ;HIT COUNT ARGUMENT
LINLOO:  MOV      #1,R0
MOV      HITARG,STHTCT(R0) ;INSERT IN ARGUMENT TEMPLATE
INC      HITARG           ;NEW ARGUMENT FOR HITARG
MOV      #STHTCT,R1      ;ADDRESS OF ARGUMENT LIST
MOV      #3,R2           ;3 CHARACTER ARGUMENT LIST
CLR      R3              ;DISABLE BIDIRECTIONAL PRINTING FOR NOW.
JSR      PC,XMIT         ;SEND THE LIST - ADJUST HIT COUNT
JSR      PC,ERRORS       ;CHECK FOR ERRORS.

```

```

CLR      R4                ;COUNT OF CHARACTERS
CHRLOO:  MOV    #SNGCHR,R1 ;ADDRESS OF CHAR TO BE PRINTED
        MOV    #1,R2      ;SINGLE CHARACTER

```


Line	Address	Hex	Disassembly	Comments
52	020176	012703	MOV #1,R3	;ENABLE BIDIRECTIONAL PRINTING.
53	020202	004737	JSR PC,XMIT	;SEND THE CHARACTER
54	020206	004737	JSR PC,ERRORS	;CHECK FOR ERRORS.
55				
56	020212	005204	INC R4	;UPDATE NUMBER OF CHARACTERS PRINTED THUS FAR.
57	020214	020437	CMP R4,LINSIZ	;SENT A LINES WORTH YET?
58	020220	001362	BNE CHRLOO	;NO, CONTINUE SENDING.
59				
60	020222	005237	INC SNGCHR	;INCREASE ASCII PATTERN TO NEXT CHARACTER
61	020226	123727	CMPB HITARG,#THREE	;PRINTED THE HIT COUNT = 3 LINE YET?
62	020234	001333	BNE LINLOO	;REPEAT PRINTING LINES UNTIL HIT COUNT = 3
63				
64	020236	012700	MOV #1,R0	
65	020242	112760	MOVB #ZERO,STHTCT(R0)	;REVERT BACK TO HIT COUNT OF 1
66	020250	012701	MOV #STHTCT,R1	
67	020254	012702	MOV #3,R2	
68	020260	005003	CLR R3	;DISABLE BIDIRECTIONAL PRINTING
69	020262	004737	JSR PC,XMIT	;SEND PRINTER ARGUMENT LIST FOR HIT COUNT=1
70	020266	004737	JSR PC,ERRORS	;CHECK FOR ERRORS
71				
72	020272		ENDTST	
	020272			
	020272	104401		L10012: TRAP C\$ETST
73				
74				
75				
76				
77				
78				
79				
80				
81				

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 31
TEST 4: CARRIAGE POSITIONING TEST

```

1
2
3
4 020274      BGNTST
   020274
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25 020274 004737 014274      TEST4: JSR    PC,INITCD      ;INITIALIZE TEST
26 020300      PRINTB  #TITLE4      ;CONSOLE PRINT THE TEST TITLE
   020300 012746 002513      MOV     #TITLE4,-(SP)
   020304 012746 000001      MOV     #1,-(SP)
   020310 010600      MOV     SP,R0
   020312 104414      TRAP    C$PNTB
   020314 062706 000004      ADD     #4,SP
27
28 020320 052737 040000 006500      BIS     #BIT14,ERWORD      ;INHIBIT ERROR HANG-UPS
29 020326 012701 002513      MOV     #TITLE4,R1      ;ADDRESS OF TITLE #4 TO BE PRINTED
30 020332 062701 000004      ADD     #4,R1      ;SKIP FIRST FOUR CHARACTERS
31 020336 012702 000044      MOV     #36.,R2      ;36 CHARACTERS IN THE TITLE
32 020342 005003      CLR     R3      ;DISABLE BIDIRECTIONAL PRINTING
33 020344 004737 012616      JSR     PC,XMIT      ;TRANSMIT THE STRING TO THE PRINTER
34 020350 042737 040000 006500      BIC     #BIT14,ERWORD      ;RE-ENABLE ERROR HANG-UPS
35
36 020356 012701 006530      MOV     #SCX,R1      ;ADDRESS OF THE SINGLE CHARACTER 'X'.
37 020362 012702 000001      MOV     #1,R2      ;SINGLE CHARACTER TO BE PRINTED
38 020366 004737 012616      JSR     PC,XMIT      ;PRINT THE CHARACTER 'A'.
39 020372 004737 015246      JSR     PC,ERRORS      ;CHECK FOR ERRORS.
40
41 020376 012701 002313      MOV     #CR,R1      ;ADDRESS OF CARRIAGE RETURN ASCII
42 020402 012702 000002      MOV     #2,R2      ;TWO CHARACTERS INCLUDE <CR> & <LF>.
43 020406 004737 012616      JSR     PC,XMIT      ;SEND <CR><LF> TO PRINTER
44 020412 004737 015246      JSR     PC,ERRORS      ;CHECK FOR ERRORS
45
46 020416 012737 000001 010036      MOV     #1,SPCSIZ      ;INITIALIZE THE SPACE SIZE TO ITS SMALLEST
47
48 020424 013701 010036      L1LOOP: MOV     SPCSIZ,R1      ;R1 HAS SPACE SIZE FOR THE CONVERSION ROUTINE
49 020430 162701 000014      SUB     #12.,R1      ;TAKE AWAY THE 12 HORIZONTAL INCREMENTS
50                                ; PRODUCED BY THE PRINT OF THE CHARACTER.
51 020434 004737 014176      JSR     PC,CONVRT      ;CONVERT R1 TO THREE ASCII MNEMONICS (BYTES)

```

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.

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 31-1

TEST 4: CARRIAGE POSITIONING TEST

```

52 020440 012700 000001      MOV      #1,R0
53 020444 113760 010046 002233  MOVB    MNEB1,HRZTLS(R0)      ;FIRST BYTE FROM CONVERT ROUTINE
54 020452 005200              INC      R0
55 020454 113760 010047 002233  MOVB    MNEB2,HRZTLS(R0)      ;SECOND BYTE
56 020462 005200              INC      R0
57 020464 113760 010050 002233  MOVB    MNEB3,HRZTLS(R0)      ;THIRD BYTE
58
59 020472 012701 006530      MOV      #SCX,R1      ;ADDRESS OF THE CHARACTER 'X'.
60 020476 012702 000001      MOV      #1,R2      ;LENGTH OF STRING TO BE SENT = 1.
61 020502 004737 012616      JSR      PC,XMIT      ;SEND 'X' TO THE PRINTER
62 020506 004737 015246      JSR      PC,ERRORS     ;CHECK FOR ERRORS
63
64
65 020512 012701 002233      MOV      #HRZTLS,R1    ;ADDRESS OF TAB SEQUENCE JUST COMPUTED.
66 020516 012702 000005      MOV      #5,R2      ;THERE ARE 5 CHARACTERS IN THE SEQUENCE
67 020522 004737 012616      JSR      PC,XMIT      ;SEND THE LIST TO THE PRINTER
68 020526 004737 015246      JSR      PC,ERRORS     ;CHECK FOR ERRORS
69
70 020532 012701 006530      MOV      #SCX,R1      ;ADDRESS OF 'X'
71 020536 012702 000001      MOV      #1,R2      ;SINGLE CHARACTER
72 020542 004737 012616      JSR      PC,XMIT      ;PRINT 'X'
73 020546 004737 015246      JSR      PC,ERRORS     ;CHECK FOR ERRORS
74
75 020552 012701 002313      MOV      #CR,R1      ;ADDRESS OF <CR><LF>
76 020556 012702 000002      MOV      #2,R2      ;TWO CHARACTERS TO BE SENT TO PRINTER
77 020562 004737 012616      JSR      PC,XMIT      ;PRINT THE <CR><LF>
78 020566 004737 015246      JSR      PC,ERRORS     ;CHECK FOR ERRORS
79
80 020572 006337 010036      ASL      SPCSIZ      ;DOUBLE THE SPACE SIZE
81 020576 023737 010036 010040  CMP      SPCSIZ,LINN      ;IS THE SPACE SIZE LARGER THAN THE MAXIMUM?
82 020604 100707              BMI      L1LOOP      ;IF NOT THAN PRINTING MORE IS OK.
83
84 020606              ENDTST
85
86
87
88
89
90
91
92
93
94
95
96
97

```

L10013: TRAP C\$ETST

.SBTTL TEST 5: PAPER POSITIONING TEST

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 32
TEST 5: PAPER POSITIONING TEST

1
2
3 020610
4 020610

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.

29
30 020610 004737 014274
31 020614
020614 012746 002564
020620 012746 000001
020624 010600
020626 104414
020630 062706 000004

TEST5: JSR PC,INITCD ;INITIALIZATION CODE
PRINTB #TITLE5 ;CONSOLE PRINT OF THE TEST TITLE.

MOV #TITLE5,-(SP)
MOV #1,-(SP)
MOV SP,R0
TRAP C\$PNTB
ADD #4,SP

32
33 020634 052737 040000 006500
34 020642 012701 002564
35 020646 062701 000004
36 020652 012702 000054
37 020656 005003
38 020660 004737 012616
39 020664 042737 040000 006500

BIS #BIT14,ERWORD ;DISABLE ERROR HANG-UPS
MOV #TITLE5,R1 ;ADDRESS OF THE TITLE TO BE PRINTED
ADD #4,R1 ;SKIP FIRST FOUR CHARACTERS.
MOV #44.,R2 ;43 CHARACTERS IN THE TITLE
CLR R3 ;DISABLE BIDIRECTIONAL PRINTING
JSR PC,XMIT ;SEND THE TITLE SEQUENCE TO THE PRINTER.
BIC #BIT14,ERWORD ;RE-ENABLE THE ERROR HANG-UPS.

40
41 020672 012737 000001 010062

MOV #1,LINCNT ;LINEFEED SIZE IN 1/48 INCH INCREMENTS.

42
43 020700 013701 010062
44 020704 004737 014176
45 020710 012700 000001
46 020714 113760 010046 002226
47 020722 005200
48 020724 113760 010047 002226
49 020732 005200
50 020734 113760 010050 002226
51

AGN: MOV LINCNT,R1 ;A NUMBER FOR CONVERSION TO ASCII MNEMONICS
JSR PC,CONVRT ;CONVERT NUMBER IN R1 TO THREE MNEMONIC BYTES
MOV #1,R0
MOVB MNEB1,VRTCLS(R0) ;TRANSFER MNEMONICS INTO ARGUMENT
INC R0
MOVB MNEB2,VRTCLS(R0) ; LIST SLOTS IN THE
INC R0
MOVB MNEB3,VRTCLS(R0) ; ESCAPE SEQUENCE.

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 32-1
 TEST 5: PAPER POSITIONING TEST

52	020742	012701	002226		MOV	#VRTCLS,R1	;ADDRESS OF VERTICAL SPACING ARGUMENTS
53	020746	012702	000005		MOV	#5,R2	;THERE ARE 5 CHARACTERS : ESC N N N 9
54	020752	004737	012616		JSR	PC,XMIT	;SEND TO PRINTER.
55							
56	020756	012701	006542		MOV	#DASHES,R1	;ADDRESS OF THE DASHES
57	020762	012702	000013		MOV	#11.,R2	;TEN DASHES & LF
58	020766	004737	012616		JSR	PC,XMIT	;SEND TO PRINTER
59	020772	004737	015246		JSR	PC,ERRORS	;CHECK FOR ERRORS
60							
61	020776	006337	010062		ASL	LINCNT	;DOUBLE LINEFEED SIZE
62	021002	023727	010062	002000	CMP	LINCNT,#MXLF	;TOO LARGE A LINEFEED YET?
63	021010	100733			BMI	AGN	;IF NOT REPEAT PRINT SEQUENCE. ELSE- EXIT TEST.
64							
65	021012				ENDTST		
	021012						
	021012	104401					L10014: TRAP CSETST
66							
67							
68							
69							
70							
71							
72							
73							
74							

.SBTTL TEST 6: PRINT ONE LINE OF EACH CHARACTER

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 33
 TEST 6: PRINT ONE LINE OF EACH CHARACTER

```

1
2
3
4 021014          BGNTST                      T6::
   021014
5
6
7
8
9
10 .....
11
12      TEST #6
13
14      PRINT ONE LINE OF EACH CHARACTER
15
16      IN THIS TEST ONE LINE OF EACH CHARACTER WILL BE PRINTED FOR THE
17      ENTIRE PRESET PAGE WIDTH.  PRINTER DETECTED ERRORS WILL BE DETECTED
18      CLASSIFIED.
19
20 .....
21
22
23
24
25 021014 004737 014274      TEST6: JSR      PC,INITCD      ;INITIALIZATION FOR TEST
26 021020                                PRINTB  #TITLE6      ;CONSOLE PRINT OF THE TEST TITLE.
   021020 012746 002645                                MOV      #TITLE6,-(SP)
   021024 012746 000001                                MOV      #1,-(SP)
   021030 010600                                MOV      SP,R0
   021032 104414                                TRAP     C$PNTB
   021034 062706 000004                                ADD      #4,SP
27
28 021040 052737 040000 006500      BIS      #BIT14,ERWORD      ;DISABLE ERROR HANG-UPS
29 021046 012701 002645      MOV      #TITLE6,R1      ;ADDRESS OF THE TITLE
30 021052 062701 000004      ADD      #4,R1      ;SKIP FIRST FOUR CHARACTERS
31 021056 012702 000053      MOV      #43,R2      ;43 CHARACTERS IN THE TITLE
32 021062 005003      CLR      R3      ;DISABLE BIDIRECTIONAL PRINTING FOR THE MOMENT
33 021064 004737 012616      JSR      PC,XMIT      ;PRINT THE TITLE
34 021070 042737 040000 006500      BIC      #BIT14,ERWORD      ;ENABLE DESIRED ERROR HANG-UPS.
35
36 021076 012703 177777      MOV      #-1,R3      ;ENABLE BIDIRECTIONAL PRINTING
37 021102 005004      CLR      R4      ;NO LINES YET PRINTED
38 021104 005037 010064      LINLO6: CLR      CHRCNT      ;NO CHARACTERS YET PRINTED
39
40 021110 010401      CHRLO6: MOV      R4,R1      ;GET OFFSET
41 021112 062701 006555      ADD      #CHRLST,R1      ;POINT TO DESIRED CHARACTER IN CHAR LIST.
42 021116 012702 000001      MOV      #1,R2      ;JUST THE ONE CHARACTER TO PRINT
43 021122 004737 012616      JSR      PC,XMIT      ;SEND THE CHARACTER
44 021126 004737 015246      JSR      PC,ERRORS      ;CHECK FOR ERRORS
45
46 021132 005237 010064      INC      CHRCNT      ;KEEP TRACK OF THE CHARACTERS PRINTED
47 021136 023737 010064 010042      CMP      CHRCNT,LINSIZ      ;HAS A FULL LINE BEEN PRINTED YET?
48 021144 100761      BMI      CHRLO6      ;IF NOT THEN PRINT UNTIL TRUE.
49
50 021146 005204      INC      R4      ;KEEP TRACK OF THE LINES PRINTED
51 021150 020427 000136      CMP      R4,#94      ;96 LINES PRINTED? (ALL CHARACTERS?)

```


HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 33-1
TEST 6: PRINT ONE LINE OF EACH CHARACTER

52 021154 100753

BMI LINL06

;IF NOT YET, MORE LINES TO PRINT.

53

54 021156

ENDTST

021156

L10015:

TRAP

CSETST

021156 104401

55

56

57

58

59

60

61

62

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.....

.SBTTL TEST 7: PRINT A SWIRL PATTERN

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 34
TEST 7: PRINT A SWIRL PATTERN

```

1
2
3
4 021160      BGNTST
   021160
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21 021160 004737 014274      TEST7: JSR PC,INITCD      ;INITIALIZE THE TEST
22 021164      PRINTB #TITLE7      ;CONSOLE PRINT THE TITLE
   021164 012746 002725      MOV #TITLE7,-(SP)
   021170 012746 000001      MOV #1,-(SP)
   021174 010600      MOV SP,R0
   021176 104414      TRAP C$PNTB
   021200 062706 000004      ADD #4,SP
23
24 021204 052737 040000 006500      BIS #BIT14,ERWORD      ;INHIBIT ERROR HANG-UPS
25 021212 012701 002725      MOV #TITLE7,P1      ;ADDRESS OF THE TITLE TO BE PRINTED
26 021216 062701 000004      ADD #4,R1      ;SKIP 1ST 4 CHARACTERS.
27 021222 012702 000040      MOV #32.,R2      ;32 CHARACTERS INVOLVED
28 021226 005003      CLR R3      ;DISABLE BIDIRECTIONAL PRINTING FOR NOW.
29 021230 004737 012616      JSR PC,XMIT      ;SEND TO PRINTER
30 021234 042737 040000 006500      BIC #BIT14,ERWORD      ;ENABLE ERROR HANG-UPS
31
32 021242 012703 177777      MOV #-1,R3      ;ENABLE BIDIRECTIONAL PRINTING
33 021246 005004      CLR R4      ;NO LINES ARE PRINTED YET
34
35 021250 010401      NXTLIN: MOV R4,R1      ;OFFSET
36 021252 062701 006555      ADD #CHRLST,R1      ;ADDRESS OF CHARACTER TO BE PRINTED.
37 021256 013702 010042      MOV LINSIZ,R2      ;LENGTH OF LINE. PRINT A LINES WORTH
38 021262 004737 012616      JSR PC,XMIT      ;TRANSMIT THE LINE TO THE PRINTER
39 021266 004737 015246      JSR PC,ERRORS      ;CHECK FOR ERRORS
40
41 021272 010105      MOV R1,R5      ;ADDRESS OF LAST CHARACTER FOR PRINTING....
42 021274 005205      INC R5      ;POINT ONE FURTHER FOR SWIRL EFFECT.
43 021276 013701 010042      MOV LINSIZ,R1
44 021302 060501      ADD R5,R1      ;POINT TO THE FIRST CHARACTER TO BE PRINTED+1.
45
46 021304 005301      REVRSP: DEC R1      ;POINT TO THE NEXT CHARACTER TO BE PRINTED.
47 021306 012702 000001      MOV #1,R2      ;TELL XMIT THAT A SINGLE CHARACTER PRINTED.
48 021312 004737 012616      JSR PC,XMIT      ;SEND THE CHARACTER. (REVERSE PRINT)
49 021316 004737 015246      JSR PC,ERRORS      ;CHECK FOR ERRORS.
50
51 021322 020501      CMP R5,R1      ;PRINTED ENOUGH CHARACTERS YET IN REVERSE?

```

.....

TEST #7

PRINT A SWIRL PATTERN

IN THIS TEST, A SWIRL PATTERN IS PRINTED BY SENDING THE SEQUENCE OF CHARACTERS IN THE CHARACTER LIST AND INCREMENTING THE STARTING POINT IN THAT LIST SO THAT THE SEQUENCE STARTS AT A DIFFERENT CHARACTER EVERY LINE.

.....

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 34-1
 TEST 7: PRINT A SWIRL PATTERN

```

52 021324 100767          BMI      REVRSP          ;PRINT NEXT REVERSE CHAR.
53
54
55          ;
56          DONE WITH REVERSE PRINT.
57 021326 062704 000002    ADD      #2,R4          ;KEEP TRACK OF THE NUMBER OF LINES PRINTED
58 021332 020427 000024    CMP      R4,#20.        ;TEN LINES PRINTED YET?
59 021336 100744          BMI      NXTLIN         ;IF DONE, EXIT TEST
60
61 021340          ENDTST
62
63
64
65
66
67
68
69          :
70          :
71          :
72
73
74          .SBTTL TEST 8: WORST CASE RAPID MOTION TEST
  
```

L10016: TRAP C\$ETST

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 35
TEST 8: WORST CASE RAPID MOTION TEST

```

1
2
3
4
5 021342          BGNTST
   021342
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24 021342 004737 014274    TEST8: JSR    PC,INITCD    ;INITIALIZE TEST
25 021346          PRINTB  #TITLE8    ;CONSOLE PRINT TEST TITLE
   021346 012746 002772          MOV    #TITLE8,-(SP)
   021352 012746 000001          MOV    #1,-(SP)
   021356 010600          MOV    SP,R0
   021360 104414          TRAP   C$PNTB
   021362 062706 000004          ADD    #4,SP
26
27 021366 052737 040000 006500    BIS    #BIT14,ERWORD    ;DISABLE ERROR HANG-UPS
28 021374 012701 002772          MOV    #TITLE8,R1    ;ADDRESS OF TITLE
29 021400 062701 000004          ADD    #4,R1    ;SKIP FIRST 4 CHARACTERS
30 021404 012702 000047          MOV    #39.,R2    ;39 CHARACTERS
31 021410 005003          CLR    R3    ;NO BIDIRECTIONAL PRINTING FOR NOW
32 021412 004737 012616          JSR    PC,XMIT    ;SEND TO PRINTER
33 021416 042737 040000 006500    BIC    #BIT14,ERWORD    ;ENABLE ERROR HANG-UPS
34
35 021424 012703 177777          MOV    #-1,R3    ;ENABLE BIDIRECTIONAL PRINTING
36 021430 005004          CLR    R4    ;COUNT OF 'ACA:' BLOCKS
37 021432 013705 010042          MOV    LINSIZ,R5    ;# OF CHARACTERS PER LINE
38 021436 006205          ASR    R5    ;LINSIZ/2 : 1 BLOCK = 4 CHARACTERS...
39
40
41 021440 012701 006535          MOV    #ACAS,R1    ;ADDRESS OF SEQUENCE
42 021444 012702 000004          MOV    #4,R2    ;OF 4 CHARACTERS...
43 021450 004737 012616          JSR    PC,XMIT    ;SEND TO PRINTER
44 021454 004737 015246          JSR    PC,ERRORS    ;CHECK FOR ERRORS.
45
46 021460 005204          INC    R4
47 021462 020405          CMP    R4,R5    ;ENOUGH BLOCKS PRINTED??
48 021464 100765          BMI    LOOP8    ;IF NO, LOOP TO PRINT NEXT BLOCK...
49
50 021466          ENDTST
   021466

```

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:'.

L10017:

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 35-1
TEST 8: WORST CASE RAPID MOTION TEST

021466 104401

TRAP C\$ETST

51
52
53
54
55
56
57
58
59
60
61

..
..
..
..

.SBTTL TEST 9: PRINT RANDOM CHARACTERS

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 36-1
TEST 9: PRINT RANDOM CHARACTERS

52 021630 100757

BMI PLG0P9

;NO,LOOP UNTIL DONE

53

54 021632

ENDTST

021632

L10020:

TRAP

CSETST

021632 104401

55

56

57

58

59

60

61

62

63

.....

.SBTTL TEST 10:

PRINT OPERATOR SELECTED CHARACTERS

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 37
TEST 10: PRINT OPERATOR SELECTED CHARACTERS

```

1
2 021634          BGNTST                      T10::
3 021634
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21 021634 004737 014274          TESTA: JSR    PC,INITCD      ;TEST INITIALIZE
22 021640          PRINTB  #TITLEA      ;CONSOLE PRINT TITLE
    021640 012746 003115          MOV     #TITLEA,-(SP)
    021644 012746 000001          MOV     #1,-(SP)
    021650 010600          MOV     SP,R0
    021652 104414          TRAP    C$PNTB
    021654 062706 000004          ADD     #4,SP
23
24 021660 052737 040000 006500    BIS     #BIT14,ERWORD    ;DISABLE ERROR HANG-UPS
25 021666 012701 003115          MOV     #TITLEA,R1      ;ADDRESS OF TITLE
26 021672 062701 000004          ADD     #4,R1           ;SKIP 4 CHARACTERS
27 021676 012702 000056          MOV     #46.,R2          ;46 CHARACTERS IN THE TITLE
28 021702 005003          CLR     R3                     ;DISABLE BIDIRECTIONAL PRINTING
29 021704 004737 012616          JSR     PC,XMIT          ;SEND TO PRINTER
30 021710 042737 040000 006500    BIC     #BIT14,ERWORD    ;ENABLE ERROR HANG-UPS
31
32 021716          LOOPA:  GMANID  PRMPTA,BFRA,A,0,1,72,NO
    021716 104443          TRAP    C$GMAN
    021720 000406          BR      10000$
    021722 007352          .WORD   BFRA
    021724 000142          .WORD   T$CODE
    021726 003200          .WORD   PRMPTA
    021730 000000          .WORD   0
    021732 000001          .WORD   T$LOLIM
    021734 000072          .WORD   T$HILIM
    021736
                                10000$:
                                ;PROMPT AT CONSOLE AND INPUT STRING.
33
34
35 021736 005004          CLR     R4                     ;R4 IS OFFSET IN INPUT STRING
36
37 021740 105764 007352          NXTA:  TSTB    BFRA(R4)      ;IS THE BYTE A ZERO?  GMANID IS EXPECTED TO
38                                     ; SEND A ZERO AS THE LAST BYTE. THIS WILL
39                                     ; INDICATE THE END OF THE INPUT STRING.
40 021744 001011          BNE     TFCZ          ;NOT ZERO. CHECK FOR CTL-Z
41
42 021746 012701 002313          MOV     #CR,R1      ;ADDRESS OF CARRIAGE RETURN - LINEFEED

```


HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 37-1
TEST 10: PRINT OPERATOR SELECTED CHARACTERS

```

43 021752 012702 000002      MOV    #2,R2      ;TWO BYTES TO SEND
44 021756 004737 012616      JSR     PC,XMIT    ;SEND THE STRING
45 021762 004737 015246      JSR     PC,ERRORS  ;CHECK FOR ERRORS.
46
47 021766 000753      BR      LOGPA      ;BACK TO PROMPT...
48
49
50 021770 126437 007352 006525 TFCZ:  CMPB   BFRA(R4),SCQ    ;IS IT A 'Q' ?
51 021776 001006      BNE     NOTQ      ;IF IT IS, CHECK FOR <RETURN>
52
53 022000 005204      INC     R4          ;CHECK NEXT BYTE FOR ZERO.
54 022002 126427 007352 000000      CMPB   BFRA(R4),#0    ;IS THE BYTE A ZERO?
55 022010 001415      BEQ     EXITA     ;IF IT IS THEN EXIT TEST
56 022012 005304      DEC     R4          ;IF NOT ZERO THEN NOT RETURN
57                                     ;AND NOT YET THE END.
58 022014      NOTQ:
59 022014 012701 007352      MOV     #BFRA,R1    ;PRINT THE CHARACTER...
60 022020 060401      ADD     R4,R1      ;      AS R4 POINTS THROUGH THE LIST.
61 022022 012702 000001      MOV     #1,R2    ;ONE CHARACTER TO PRINT.
62 022026 005003      CLR     R3        ;NOT BIDIR. PRINTING.
63 022030 004737 012616      JSR     PC,XMIT    ;SEND TO PRINTER.
64 022034 004737 015246      JSR     PC,ERRORS  ;CHECK FOR ERRORS.
65
66 022040 005204      INC     R4          ;POINT TO NEXT CHARACTER
67 022042 000736      BR      NXTA     ;REPEAT TILL END OF STRING FOUND.
68 022044 000240      EXITA:  NOP
69
70 022046      ENDTST
   022046
   022046 104401
71
72
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78
79 .SBTTL  TEST 11:      LIFT / DROP RIBBON BY OPERATOR CONTROL

```

L10021: TRAP C\$ETST

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 38
TEST 11: LIFT / DROP RIBBON BY OPERATOR CONTROL

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4 022050
022050

BGNTST

T11::

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TEST #11
LIFT / DROP RIBBON BY OPERATOR CONTROL

THIS TEST WILL EITHER ENABLE THE USER TO MANUALLY LIFT AND
DROP THE PRINTER RIBBON OR IT WILL LIFT AND DROP THE PRINTER
RIBBON AUTOMATICALLY. THE USER LIFTS AND DROPS THE RIBBON
BY PUSHING THE RETURN KEY AFTER SELECTING THE MANUAL MODE. IF
THE AUTOMATIC MODE IS SELECTED BY THE USER, THEN THE RIBBON LIFTS
AND DROPS TEN TIMES AT A RATE OF ABOUT ONCE PER SECOND.
.....

```

29 022050 004737 014274
30 022054
022054 012746 003264
022060 012746 000001
022064 010600
022066 104414
022070 062706 000004

TESTB: JSR PC,INITCD ;TEST INITIALIZE
PRINTB #TITL B ;CONSOLE PRINT TITLE

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

31
32 022074 052737 040000 006500
33 022102 012701 003264
34 022106 062701 000004
35 022112 012702 000060
36 022116 005003
37 022120 004737 012616
38 022124 042737 040000 006500
39
40 022132 012701 002303
41 022136 012702 000005
42 022142 005003
43 022144 004737 012616
44
45 022150 012701 002310
46 022154 012702 000003
47 022160 005003
48 022162 004737 012616
49
50
51 022166

BIS #BIT14, ERWORD ;DISABLE ERROR HANG-UPS
MOV #TITL B, R1 ;ADDRESS OF TEST TITLE
ADD #4, R1 ;SKIP 4 CHARACTERS
MOV #48, R2 ;48 CHARACTERS TO BE PRINTED.
CLR R3 ;NO BIDIRECTIONAL PRINTING
JSR PC, XMIT ;SEND THE TEST TITLE
BIC #BIT14, ERWORD ;ENABLE ERROR HANG-UPS

MOV #SETHT0, R1 ;SET HIT COUNT TO ZERO
MOV #5, R2 ;FIVE CHARACTER STRING SENT TO PRINTER
CLR R3 ;NO BIDIRECTIONAL LOGIC REQUIRED.
JSR PC, XMIT ;SEND TO PRINTER.

MOV #SETCH0, R1 ;SET CHARACTER SIZE TO ZERO.
MOV #3, R2 ;ARGUMENT LIST IS 3 CHARACTERS LONG.
CLR R3 ;NO BIDSIRECTIONAL LOGIC REQUIRED.
JSR PC, XMIT ;SEND TO PRINTER.

GMANID OPTN1,BFRB,A,0,1,72,YES

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 38-1
TEST 11: LIFT / DROP RIBBON BY OPERATOR CONTROL

022166 104443
022170 000406
022172 010030
022174 000152
022176 003351
022200 000000
022202 000001
022204 000072
022206

TRAP CSGMAN
BR 10000\$
.WORD BFRB
.WORD T\$CODE
.WORD OPTN1
.WORD 0
.WORD T\$LOLIM
.WORD T\$HILIM

10000\$:

;ASK USER TO CHOOSE AUTO OR MANUAL MODE.

;IF CHARACTER IS 'A' THEN AUTO MODE CHOSEN
;SO CALL LOCAL ROUTINE TO HANDLE AUTO MODE

;OTHERWISE, MANUAL IS CHOSEN.....
;DO MANUAL LIFT / DROP.
;EXIT TEST WHEN DONE

;DO AUTOMATIC MODE LIFT / DROP.

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022206 123737 010030 006531
022214 001403

CMPB BFRB,SCA
BEQ AUTCAL

022216 004737 022352
022222 000402

JSR PC,MANLD
BR EXIT

022224 004737 022232

AUTCAL: JSR PC,AUTOLD

022230
022230
022230 104401

EXIT: ENDTST

L10022:

TRAP C\$ETST

.....

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 39
 TEST 11: LIFT / DROP RIBBON BY OPERATOR CONTROL

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31 022232 005037 010066
32 022236 012700 000001
33 022242 112760 000040 002240
34 022250 012701 002240
35 022254 012702 000004
36 022260 004737 012616
37 022264 004737 015246
38
39 022270 012705 001750
40 022274 004737 015224
41
42 022300 012700 000001
43 022304 112760 000041 002240
44 022312 012701 002240
45 022316 012702 000004
46 022322 005003
47 022324 004737 012616
48 022330 004737 015246
49
50 022334 005237 010066
51 022340 023727 010066 000024
52 022346 100733
53
54 022350 000207
55
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```

FUNCTIONAL DESCRIPTION

TEST #11

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 ;

INR 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

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 39-1
TEST 11: LIFT / DROP RIBBON BY OPERATOR CONTROL

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HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 40
TEST 11: LIFT / DROP RIBBON BY OPERATOR CONTROL

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```

FUNCTIONAL DESCRIPTION

TEST #11

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

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

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.

022352 012746 003466 MOV #PRMPTC,-(SP)

022356 012746 000001 MOV #1,-(SP)

022362 010600 MOV SP,R0

022364 104414 TRAP C\$PNTB

022366 062706 000004 ADD #4,SP

022372 104443 TRAP C\$CMAN

022374 000406 BR 10000\$

022376 010032 .WORD BFRC

022400 000152 .WORD T\$CODE

022402 004531 .WORD NPRMPT

022404 000000 .WORD 0

022406 000001 .WORD T\$LOLIM

022410 000072 .WORD T\$HILIM

022412

022412 123737 010032 006525 CMPB BFRC,SCQ

022420 001417 BEG EXIT11

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 40-1
 TEST 11: LIFT / DROP RIBBON BY OPERATOR CONTROL

```

44
45 022422 012700 000001      MOV      #1,R0
46 022426 112760 000040 002240  MOVB    #ZERO,RIBPOS(R0)      ;ARGUMENT FOR LIFT RIBBON
47 022434 012701 002240      MOV      #RIBPOS,R1      ;ADDRESS OF ARGUMENT LIST
48 022440 012702 000004      MOV      #4,R2      ;4 ARGUMENT CHARACTERS IS LIST
49 022444 005003      CLR      R3      ;DON'T BOTHER WITH BIDIRECTIONAL PRINTING CODE
50 022446 004737 012616      JSR      PC,XMIT      ;SEND ARGUMENT LIST TO PRINTER
51 022452 004737 015246      JSR      PC,ERRORS      ;CHECK FOR ERRORS.
52
53 022456 000735      BR      MANLD      ;REPEAT UNTIL A 'Q' IS FOUND IN THE BUFFER
54
55 022460 000207      EXIT11: RTS      PC
56
57
58
59
60      :
61      :
62      :
63      .SBTTL  TEST 12:      BIDIRECTIONAL FORMS TRACTOR TEST

```

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 41
TEST 12: BIDIRECTIONAL FORMS TRACTOR TEST

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4 022462          BGNTST                                T12::
   022462
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21
22 022462 004737 014274      TESTC: JSR    PC,INITCD      ;TEST INITIALIZE
23 022466          PRINTB  #TITLEC      ;CONSOLE PRINT TITLE OF TEST
   022466 012746 003717      MOV     #TITLEC,-(SP)
   022472 012746 000001      MOV     #1,-(SP)
   022476 010600          MOV     SP,R0
   022500 104414          TRAP    C$PNTB
   022502 062706 000004      ADD     #4,SP
24
25 022506 052737 040000 006500  BIS     #BIT14,ERWORD    ;TEMPORARILY SUSPEND ERROR HANG-UPS
26 022514 012701 003717          MOV     #TITLEC,R1      ;ADDRFSS OF TITLE TO PRINT
27 022520 062701 000004      ADD     #4,R1              ;SKIP 4 CHARACTERS
28 022524 012702 000047      MOV     #39.,R2
29 022530 005003          CLR     R3
30 022532 004737 012616      JSR     PC,'IT              ;PRINT TITLE
31 022536 042737 040000 006500  BIC     #BIT14,ERWORD    ;REINSTATE ERROR HANG-UPS
32
33 022544          GMANID T11PMT,BFRD,A,0,1,72,YES
   022544 104443          TRAP    C$GMAN
   022546 000406          BR      10001$
   022550 010034          .WORD   BFRD
   022552 000152          .WORD   T$CODE
   022554 004346          .WORD   T11PMT
   022556 000000          .WORD   0
   022560 000001          .WORD   T$LOLIM
   022562 000072          .WORD   T$HILIM
   022564
                                     10001$:
34
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40
41 022564 012700 005262      MOV     #BASET,R0      ;GET THE BASE ADDRESS OF THE VECTOR TABLE
42 022570 062700 000005      CLEAR: ADD    #5,R0      ;POINT TO THE UNIQUENESS INDICATOR.

```


HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 41-1
TEST 12: BIDIRECTIONAL FORMS TRACTOR TEST

43	022574	105010		CLRB	@RO		;CLEAR THE UNIQUENESS INDICATOR.
44	022576	005200		INC	RO		;POINT TO THE NEXT TABLE ENTRY.
45	022600	020027	006412	CMP	RO,#FRONT		;IS IT POINTING BEYOND THE TABLE?
46	022604	100771		BMI	CLEAR		;REPEAT LOOP UNTIL ALL UNIQUENESS INDICATORS
47							; ARE CLEARED.
48							
49							
50							;VECTOR TABLE READY TO USE.
51							
52							
53	022606	005037	010066	CLR	CCOUNT		;COUNT CHARACTERS PRINTED
54	022612	004737	014726	PLOOPC: JSR	PC,RANDOM		;GET A RANDOM NUMBER (0 - 99) INTO R1
55	022616	010104		MOV	R1,R4		;PUT INTO R4 FOR THE PRARCH ROUTINE.
56							
57	022620	004737	022736	JSR	PC,PRARCH		;PRINT THE CHARACTER IN ITS
58							;CORRESPONDING POSITION.
59							
60	022624	005237	010066	INC	CCOUNT		;KEEP TRACK OF THE COUNT OF CHARACTERS.
61	022630	023727	010066	CMP	CCOUNT,#100.		;DONE WHEN 100 HAVE BEE PRINTED.
62	022636	100765	000144	BMI	PLOOPC		;REPEAT UNTIL DONE.
63							
64	022640	012701	002313	MOV	#CR,R1		;PRINT A CARRIAGE RETURN AND SOME LINE FEEDS.
65	022644	012702	000002	MOV	#2,R2		
66	022650	005003		CLR	R3		
67	022652	004737	012616	JSR	PC,XMIT		; <CR><LF>
68							
69	022656	012701	002314	MOV	#LF,R1		;SEVERAL LINE FEEDS...
70	022662	012702	000001	MOV	#1,R2		
71	022666	005003		CLR	R3		
72	022670	004737	012616	JSR	PC,XMIT		
73	022674	004737	012616	JSR	PC,XMIT		
74	022700	004737	012616	JSR	PC,XMIT		
75	022704	004737	012616	JSR	PC,XMIT		
76	022710	004737	012616	JSR	PC,XMIT		
77	022714	004737	012616	JSR	PC,XMIT		
78	022720	004737	012616	JSR	PC,XMIT		
79	022724	004737	012616	JSR	PC,XMIT		
80	022730	004737	012616	JSR	PC,XMIT		
81							
82	022734			ENDTST			
	022734						
	022734	104401					
83							
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L10023: TRAP CSETST

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 41-2
TEST 12: BIDIRECTIONAL FORMS TRACTOR TEST

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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    #BASET,R4     ;ADDRESS OF TABLE ENTRY DESIRED

        ADD    #5,R4         ;TABLE OFFSET.
        TSTB   @R4           ;CHECK UNIQUE NUMBER INDICATOR....
        BEQ    NOT1          ;IF NOT UNIQUE THEN CONTROL TOO NOT1

        JSR    PC,RANDOM     ;RANDOM NUMBER IN R4
        MOV    R1,R4         ;GET THE RANDOM NUMBER IN THE RIGHT PLACE.
        BR     GTNUM         ;LAST ONE DIDN'T WORK... TRY THIS ONE.

```


HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 41-3
TEST 12: BIDIRECTIONAL FORMS TRACTOR TEST

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155
156 023000 112714 000001      NOT1:  MOV  #1,R4      ;SET UNIQUE INDICATOR
157 023004 162704 000005      SUB    #5,R4      ;
158                                     ;AT THIS POINT R4 CONTAINS A TABLE ENTRY
159                                     ;ADDRESS WHICH HAS NOT BEEN REFERENCED DURING
160                                     ;THIS PASS.
161
162
163 023010 012401              MOV    (R4)+,R1      ;GET THE VERTICAL COMPONENT OF THE VECTOR
164 023012 004737 014176      JSR    PC,CONVRT      ;CONVERT R1 TO MNEMONICS
165 023016 012700 000001      MOV    #1,R0
166 023022 113760 010046 002226  MOVB  MNEB1,VRTCLS(R0)      ;LOAD THE ARGUMENT LIST
167 023030 005200              INC    R0
168 023032 113760 010047 002226  MOVB  MNEB2,VRTCLS(R0)      ;
169 023040 005200              INC    R0
170 023042 113760 010050 002226  MOVB  MNEB3,VRTCLS(R0)      ;
171
172 023050 012401              MOV    (R4)+,R1      ;GET HORIZONTAL COMPONENT OF THE VECTOR
173 023052 004737 014176      JSR    PC,CONVRT      ;CONVERT R1 TO MNEMONICS
174 023056 012700 000001      MOV    #1,R0
175 023062 113760 010046 002233  MOVB  MNEB1,HRZTLS(R0)      ;LOAD THE ARGUMENT LIST
176 023070 005200              INC    R0
177 023072 113760 010047 002233  MOVB  MNEB2,HRZTLS(R0)      ;
178 023100 005200              INC    R0
179 023102 113760 010050 002233  MOVB  MNEB3,HRZTLS(R0)      ;
180
181 023110 012701 002226      MOV    #VRTCLS,R1      ;NOW, ACCUMULATE VERTICAL SPACING
182 023114 012702 000005      MOV    #5,R2      ;
183 023120 005003              CLR    R3
184 023122 004737 012616      JSR    PC,XMIT      ;SEND TO PRINTER
185 023126 004737 015246      JSR    PC,ERRORS      ;CHECK FOR ERRORS.
186
187 023132 012701 002233      MOV    #HRZTLS,R1      ;NOW, ACCUMULATE HORIZONTAL SPACING
188 023136 012702 000005      MOV    #5,R2      ;
189 023142 005003              CLR    R3      ;DISABLE BIDIRECTIONAL PRINT
190 023144 004737 012616      JSR    PC,XMIT      ;SEND TO PRINTER
191 023150 004737 015246      JSR    PC,ERRORS      ;CHECK FOR ERRORS.
192
193 023154 010401              MOV    R4,R1      ;GET ADDRESS OF THE CHARACTER
194 023156 012702 000001      MOV    #1,R2      ;SINGLE CHARACTER
195 023162 005003              CLR    R3      ;DISABLE BIDIRECTIONAL PRINT LOGIC.
196 023164 004737 012616      JSR    PC,XMIT      ;SEND TO PRINTER
197 023170 004737 015246      JSR    PC,ERRORS      ;CHECK FOR ERRORS.
198
199 023174 014401              MOV    -(R4),R1      ;COLUMN NUMBER IN R1
200 023176 005401              NEG    R1      ;NEGATIVE NUMBER FOR LEFT SPACING
201 023200 162701 000014      SUB    #12.,R1      ;AND ONE EXTRA SPACE ACCOUNTS FOR THE
202                                     ;CHARACTER WHICH WAS PRINTED (12 INCREMENTS)
203
204 023204 004737 014176      JSR    PC,CONVRT      ;CONVERT TO MNEMONIC
205 023210 012700 000001      MOV    #1,R0
206 023214 113760 010046 002233  MOVB  MNEB1,HRZTLS(R0)      ;PUT IN ARGUMENT LIST
207 023222 005200              INC    R0
208 023224 113760 010047 002233  MOVB  MNEB2,HRZTLS(R0)      ;
209 023232 005200              INC    R0
210 023234 113760 010050 002233  MOVB  MNEB3,HRZTLS(R0)      ;
211

```

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 41-4
TEST 12: BIDIRECTIONAL FORMS TRACTOR TEST

```

212 023242 012701 002233      MOV      #HRZTILS,R1      ;ADDRESS OF ARGUMENT LIST
213 023246 012702 000005      MOV      #5,R2          ;5 ARGUMENTS
214 023252 005003              CLR      R3              ;DISABLE BIDIRECTIONAL LOGIC.
215 023254 004737 012616      JSR      PC,XMIT          ;SEND TO PRINTER
216 023260 004737 015246      JSR      PC,ERRORS        ;CHECK FOR ERRORS.
217
218 023264 014401              MOV      -(R4),R1        ;GET THE COLUMN NUMBER
219 023266 005401              NEG      R1              ;REVERSE THE CARRIAGE MOVEMENT
220 023270 004737 014176      JSR      PC,CONVRT        ;CONVERT TO MNEMONICS
221 023274 012700 000001      MOV      #1,R0
222 023300 113760 010046 002226  MOVB     MNEB1,VRTCLS(R0) ;FILL ARGUMENT LIST
223 023306 005200              INC      R0
224 023310 113760 010047 002226  MOVB     MNEB2,VRTCLS(R0) ,
225 023316 005200              INC      R0
226 023320 113760 010050 002226  MOVB     MNEB3,VRTCLS(R0) ;
227
228 023326 012701 002226      MOV      #VRTCLS,R1      ;ADDRESS OF ARGUMENT LIST
229 023332 012702 000005      MOV      #5,R2          ; TO ACCUMULATE VERTICAL SPACING
230 023336 005003              CLR      R3              ;DISABLE BIDIR. LOGIC
231 023340 004737 012616      JSR      PC,XMIT          ;SEND TO PRINTER
232 023344 004737 015246      JSR      PC,ERRORS        ;CHECK FOR ERRORS.
233
234 023350 012602              MOV      (SP)+,R2        ;RESTORE REGISTERS
235 023352 012603              MOV      (SP)+,R3
236 023354 012604              MOV      (SP)+,R4
237
238
239 023356 000707              RTS      PC
240
241
242
243
244
245
246
247
248
249

```

.SBTTL TEST 13: CUT SHEET FEEDER EXERCISOR

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 42
TEST 13: CUT SHEET FEEDER EXERCISOR

```

1
2
3
4 023360          BGNTST                                T13::
   023360
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20 023360 004737 014274  TESTD: JSR    PC,INITCD      ;INITIALIZE TEST
21 023364          PRINTB  #TITLED      ;CONSOLE PRINT TITLE
   023364 012746 003773
   023370 012746 000001
   023374 010600
   023376 104414
   023400 062706 000004
22 023404 005003          CLR    R3          ;DISABLE BIDIRECTIONAL PRINTING
23
24 023406          GMANID  PRMPTD,BR2,A,0,1,72,YES
   023406 104443
   023410 000406
   023412 006514
   023414 000152
   023416 004046
   023420 000000
   023422 000001
   023424 000072
   023426
                                     MOV    #TITLED,-(SP)
                                     MOV    #1,-(SP)
                                     MOV    SP,R0
                                     TRAP   C$PNTB
                                     ADD    #4,SP
                                     TRAP   C$GMAN
                                     BR     10000$
                                     .WORD  BR2
                                     .WORD  T$CODE
                                     .WORD  PRMPTD
                                     .WORD  0
                                     .WORD  T$LOLIM
                                     .WORD  T$HILIM
                                     10000$:
25
26
27
28
29
30 023426 123737 006514 006527  CMPB   BR2,SCB      ;WAS THE CHOICE = 'B' ?
31 023434 001020          BNE     CHKC      ;IF NOT THEN CHECK IF IT IS = 'C'...
32
33 023436 012704 000001          MOV    #1,R4          ;OFFSET FOR PSZ14 & STPGSZ
34 023442 113764 002330 002271  MOVB   PSZ14,STPGSZ(R4) ;THEN = 'B'... 14 INCH PAGE.  SET UP ARG LIST
35 023450 012705 000001          MOV    #1,R5
36 023454 116564 002330 002271  MOVB   PSZ14(R5),STPGSZ(R4) ;
37 023462 005204          INC    R4
38 023464 005205          INC    R5
39 023466 116564 002330 002271  MOVB   PSZ14(R5),STPGSZ(R4) ;
40 023474 000447          BR      TRNSMT      ;SEND THE ARGUMENT SEQUENCE
41
42 023476 123737 006514 006526  CHKC:  CMPB   BR2,SCC      ;IS THE CHARACTER A 'C' ?

```

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 42-1
TEST 13: CUT SHEET FEEDER EXERCISOR

```

43 023504 001022          BNE      MAKE11          ;IF NOT THEN ASSUME IT WAS AN 'A'.
44
45 023506 010146          MOV      R1,-(SP)          ;SAVE R1 TEMPORARILY
46 023510 012701 000002    MOV      #2,R1          ;OFFSET
47 023514 012700 000001    MOV      #1,R0          ;OFFSET
48 023520 113760 002322 002271  MOVB   PSZA4,STPGSZ(R0) ;THEN = 'C'. SET UP ARG LIST
49 023526 116061 002322 002271  MOVB   PSZA4(R0),STPGSZ(R1) ;
50 023534 012700 000003    MOV      #3,R0          ;OFFSET ADJUSTMENT
51 023540 116160 002322 002271  MOVB   PSZA4(R1),STPGSZ(R0) ;
52 023546 012601          MOV      (SP)+,R1        ;RESTORE R1
53 023550 000421          BR       TRNSMT
54
55 023552 010146          MAKE11: MOV     R1,-(SP)      ;SAVE R1 TEMPORARILY
56 023554 012701 000002    MOV      #2,R1          ;OFFSET
57 023560 012700 000001    MOV      #1,R0          ;OFFSET
58 023564 113760 002325 002271  MOVB   PSZ11,STPGSZ(R0) ;THEN = 'A'. SET UP ARG LIST
59 023572 116061 002325 002271  MOVB   PSZ11(R0),STPGSZ(R1) ;        FOR 11 INCH PAGE.
60 023600 012700 000003    MOV      #3,R0          ;OFFSET ADJUSTMENT
61 023604 116160 002325 002271  MOVB   PSZ11(R1),STPGSZ(R0) ;
62 023612 012601          MOV      (SP)+,R1        ;RESTORE R1
63
64 023614 012701 002271    TRNSMT: MOV     #STPGSZ,R1    ;ADDRESS OF ARGUMENT LIST
65 023620 012702 000005    MOV      #5,R2          ;
66 023624 005003          CLR       R3              ;
67 023626 004737 012616    JSR      PC,XMIT          ;SEND TO PRINTER... SET PAGE SIZE
68 023632 004737 015246    JSR      PC,ERRORS        ;CHECK FOR ERRORS.
69
70 023636 012700 000001    SELECT: MOV     #1,R0
71 023642 012701 000002    MOV      #2,R1          ;TRANSFER OFFSET FOR
72 023646 113760 006412 002276  MOVB   FRONT,SLTPFF(R0) ;SELECT TRAY-PERFORM FORMFEED
73 023654 116061 006412 002276  MOVB   FRONT(R0),SLTPFF(R1) ;ARGUMENT LIST
74 023662 012700 000003    MOV      #3,R0          ;OFFSET ADJUSTMENT
75 023666 116160 006412 002276  MOVB   FRONT(R1),SLTPFF(R0) ;
76
77 023674 012701 002276    MOV      #SLTPFF,R1      ;ADDRESS OF ARGUMENT LIST
78 023700 012702 000005    MOV      #5,R2          ;
79 023704 005003          CLR       R3              ;
80 023706 004737 012616    JSR      PC,XMIT          ;SELECT TRAY AND PERFORM FORMFEED.
81 023712 004737 015246    JSR      PC,ERRORS        ;CHECK FOR ERRORS.
82
83 023716 012701 004654    MOV      #FTYTPM,R1      ;FRONT TRAY TOP OF PAGE MESSAGE
84 023722 012702 000140    MOV      #96.,R2      ;96 CHARACTERS LONG
85 023726 005003          CLR       R3              ;
86 023730 004737 012616    JSR      PC,XMIT          ;SEND TO PRINTER
87 023734 004737 015246    JSR      PC,ERRORS        ;CHECK FOR ERRORS.
88
89 023740 123737 006514 006527  CMPB   BR2,SCB      ;IS THE BYTE A 'B'
90 023746 001003          BNE      CHC2              ;IF NOT THEN CHECK FOR A 'C'
91
92 023750 013701 002170    MOV      SKP14,R1      ;SKIP 14 INCHES MINUS 3 LINES VERTICALLY
93 023754 000411          BR       DOSPCS          ;PERFORM TASK
94
95 023756 123737 006514 006526  CHC2: CMPB   BR2,SCC      ;IS THE CHARACTER A 'C'?
96 023764 001003          BNE      ASSMA          ;MUST BE 11 INCH IF NOT B OR C.
97
98 023766 013701 002172    MOV      SKPA4,R1      ;MUST BE A4 SIZE. SKIP A4 - 3 LINES VERTICALLY
99 023772 000402          BR       DOSPCS          ;PERFORM TASK

```

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 42-2
TEST 13: CUT SHEET FEEDER EXERCISOR

100					
101	023774	013701	002174	ASSMA: MOV	SKP11,R1 ;11 INCH PAGE. SKIP 11 INCHES - 3 LINES
102					
103	024000	010137	002176	DOSPCS: MOV	R1,CRNTSK ;SAVE CURRENT SKIP SIZE.
104	024004	004737	014176	JSR	PC,CONVRT ;CONVERT TO MNEMONICS
105	024010	012700	000001	MOV	#1,R0
106	024014	113760	010046	MOVB	MNEB1,VRTCLS(R0) ;MNEMONICS FOR ARG LIST
107	024022	005200		INC	R0
108	024024	113760	010047	MOVB	MNEB2,VRTCLS(R0) ;
109	024032	005200		INC	R0
110	024034	113760	010050	MOVB	MNEB3,VRTCLS(R0) ;
111					
112	024042	012701	002226	MOV	#VRTCLS,R1 ;ADDRESS OF ARGUMENT LIST FOR VERTICAL SPACING
113	024046	012702	000005	MOV	#5,R2 ;
114	024052	005003		CLR	R3
115	024054	004737	012616	JSR	PC,XMIT ;SEND TO PRINTER
116	024060	004737	015246	JSR	PC,ERRORS ;CHECK FOR ERRORS.
117					
118	024064	012701	007203	MOV	#FBTM,R1 ;PRINT BOTTOM OF PAGE MESSAGE
119	024070	012702	000072	MOV	#58.,R2 ;58 CHARACTERS
120	024074	005003		CLR	R3
121	024076	004737	012616	JSR	PC,XMIT ;SEND TO PRINTER
122	024102	004737	015246	JSR	PC,ERRORS ;CHECK FOR ERRORS.
123					
124	024106	012700	000001	MOV	#1,R0
125	024112	010146		MOV	R1,-(SP)
126	024114	012701	000002	MOV	#2,R1 ;TEMPORARILY SAVE R1
127	024120	113760	006415	MOVB	REAR,SLTPFF(R0) ;SELECT REAR TRAY
128	024126	116061	006415	MOVB	REAR(R0),SLTPFF(R1) ; AND PERFORM
129	024134	012700	000003	MOV	#3,R0
130	024140	116160	006415	MOVB	REAR(R1),SLTPFF(R0) ; FORMFEED.
131	024146	012601		MOV	(SP)+,R1 ;RESTORE R1
132					
133	024150	012701	002276	MOV	#SLTPFF,R1 ;ADDRESS OF ARGUMENT LIST
134	024154	012702	000005	MOV	#5,R2 ;
135	024160	005003		CLR	R3
136	024162	004737	012616	JSR	PC,XMIT ;SEND TO PRINTER
137	024166	004737	015246	JSR	PC,ERRORS ;CHECK FOR ERRORS.
138					
139	024172	012701	005014	MOV	#RTYTPM,R1 ;REAR TRAY TOP OF PAGE MESSAGE
140	024176	012702	000140	MOV	#96.,R2 ;96 CHARACTERS LONG
141	024202	005003		CLR	R3
142	024204	004737	012616	JSR	PC,XMIT ;SEND TO PRINTER
143	024210	004737	015246	JSR	PC,ERRORS ;CHECK FOR ERRORS.
144					
145	024214	013701	002176	MOV	CRNTSK,R1 ;GET CURRENT SKIP SIZE.
146	024220	004737	014176	JSR	PC,CONVRT ;CONVERT TO MNEMONICS
147	024224	012700	000001	MOV	#1,R0
148	024230	113760	010046	MOVB	MNEB1,VRTCLS(R0) ;MNEMONICS FOR ARG LIST
149	024236	005200		INC	R0
150	024240	113760	010047	MOVB	MNEB2,VRTCLS(R0) ;
151	024246	005200		INC	R0
152	024250	113760	010050	MOVB	MNEB3,VRTCLS(R0) ;
153					
154	024256	012701	002226	MOV	#VRTCLS,R1 ;ADDRESS OF ARGUMENT LIST FOR VERTICAL SPACING
155	024262	012702	000005	MOV	#5,R2 ;
156	024266	005003		CLR	R3

HARDWARE TESTS MACRO V03.01 7-NOV-80 10:06:10 PAGE 42-3
 TEST 13: CUT SHEET FEEDER EXERCISOR

```

157 024270 004737 012616      JSR    PC,XMIT      ;SEND TO PRINTER
158 024274 004737 015246      JSR    PC,ERRORS    ;CHECK FOR ERRORS.
159
160
161 024300 012701 007203      MOV    #FBTM,R1      ;MESSAGE FOR BOTTOM OF PAGE
162 024304 012702 000072      MOV    #58.,R2      ;
163 024310 005003              CLR    R3
164 024312 004737 012616      JSR    PC,XMIT      ;SEND TO PRINTER
165 024316 004737 015246      JSR    PC,ERRORS    ;CHECK FOR ERRORS.
166
167 024322 012700 000001      MOV    #1,R0
168 024326 012701 000002      MOV    #2,R1      ;OFFSET IN ARG LIST
169 024332 113760 006420 002276  MOVB   NULL,SLTPFF(R0) ;EJECT
170 024340 116061 006420 002276  MOVB   NULL(R0),SLTPFF(R1) ; PAGE
171 024346 012700 000003      MOV    #3,R0
172 024352 116160 006420 002276  MOVB   NULL(R1),SLTPFF(R0) ; PRESENTLY
173 024360 012701 002276      MOV    #SLTPFF,R1 ; IN THE PRINTER
174 024364 012702 000005      MOV    #5,R2      ;
175 024370 005003              CLR    R3
176 024372 004737 012616      JSR    PC,XMIT      ;SEND TO PRINTER
177 024376 004737 015246      JSR    PC,ERRORS    ;CHECK FOR ERRORS.
178
179 024402      ENDTST
    024402
    024402 104401
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197      .EVEN
198
199
200      .TITLE  PARAMETER CODING
201      .SBTTL  HARDWARE PARAMETER CODING SECTION

```

L10024: TRAP C\$ETST

PARAMETER CODING MACRO V03.01 7-NOV-80 10:06:10 PAGE 43
HARDWARE PARAMETER CODING SECTION

```

1
2
3
4
5
6
7
8
9
10
11 024404          BGNHRD
    024404 000022
    024406
                                .WORD L10025-LSHARD/2
                                LSHARD::
12
13 024406          GPRMD   GPD2MS,6,0,3,1,2,YES      ;PRINTER WIDTH QUESTION.
    024406 003032
    024410 025002
    024412 000003
    024414 000001
    024416 000002
                                .WORD   T$CODE
                                .WORD   GPD2MS
                                .WORD   3
                                .WORD   T$LOLIM
                                .WORD   T$HILIM
14 024420          GPRMA   GPAMSG,0,0,160000,177777,YES ;CSR ADDRESS QUESTION.
    024420 000031
    024422 024452
    024424 160000
    024426 177777
                                .WORD   T$CODE
                                .WORD   GPAMSG
                                .WORD   T$LOLIM
                                .WORD   T$HILIM
15 024430          GPRML   GPLMSG,2,1,YES             ;DZ11? QUESTION.
    024430 001130
    024432 024624
    024434 000001
                                .WORD   T$CODE
                                .WORD   GPLMSG
                                .WORD   1
16 024436          XFERT   SNGLP                      ;SKIP CHANNEL QUESTION IF DL11.
    024436 006024
                                .WORD   T$CODE
17 024440          GPRMD   GPDMSG,4,0,7,0,7,YES      ;CHANNEL # QUESTION.
    024440 002032
    024442 024707
    024444 000007
    024446 000000
    024450 000007
                                .WORD   T$CODE
                                .WORD   GPDMSG
                                .WORD   7
                                .WORD   T$LOLIM
                                .WORD   T$HILIM
18 024452          SNGLP:
19 024452          ENDHRD
                                .EVEN
                                L10025:
20
21
22
23 024452          012      015      111
    024455          106      040      104
    024460          105      106      101
    024463          125      114      124
    024466          040      126      101
    024471          114      125      105
    024474          123      040      106
    024477          117      122      040
    024502          111      116      124
    024505          105      122      106
    024510          101      103      105
    024513          040      104      105
    024516          123      111      122
;      MESSAGES FOR THE ABOVE CALLS
GPAMSG: .ASCII <12><15>/IF DEFAULT VALUES FOR INTERFACE DESIRED, ENTER ^Z./<12><15>

```

PARAMETER CODING MACRO V03.01 7-NOV-80 10:06:10 PAGE 43-1
 HARDWARE PARAMETER CODING SECTION

	024521	105	104	054	
	024524	040	105	116	
	024527	124	105	122	
	024532	040	136	132	
	024535	056	012	015	
24	024540	012	015	040	.ASCII <12><15>/ /<12><15>
	024543	012	015		
25	024545	105	116	124	.ASCIIZ /ENTER CONTROL STATUS REGISTER (CSR) ADDRESS.>>/
	024550	105	122	040	
	024553	103	117	116	
	024556	124	122	117	
	024561	114	040	123	
	024564	124	101	124	
	024567	125	123	040	
	024572	122	105	107	
	024575	111	123	124	
	024600	105	122	040	
	024603	050	103	123	
	024606	122	051	040	
	024611	101	104	104	
	024614	122	105	123	
	024617	123	056	076	
	024622	076	000		
26	024624	012	015	120	GPLMSG: .ASCIIZ <12><15>/PRINTER CONNECTED TO A SINGLE LINE INTERFACE? >>/
	024627	122	111	116	
	024632	124	105	122	
	024635	040	103	117	
	024640	116	116	105	
	024643	103	124	105	
	024646	104	040	124	
	024651	117	040	101	
	024654	040	123	111	
	024657	116	107	114	
	024662	105	040	114	
	024665	111	116	105	
	024670	040	111	116	
	024673	124	105	122	
	024676	106	101	103	
	024701	105	077	040	
	024704	076	076	000	
27	024707	012	015	105	GPMSG: .ASCIIZ <12><15>/ENTER INTERFACE CHANNEL NUMBER FOR THE PRINTER. (0-7) >>/
	024712	116	124	105	
	024715	122	040	111	
	024720	116	124	105	
	024723	122	106	101	
	024726	103	105	040	
	024731	103	110	101	
	024734	116	116	105	
	024737	114	040	116	
	024742	125	115	102	
	024745	105	122	040	
	024750	106	117	122	
	024753	040	124	110	
	024756	105	040	120	
	024761	122	111	116	
	024764	124	105	122	
	024767	056	040	050	

PARAMETER CODING MACRO V03.01 7-NOV-80 10:06:10 PAGE 43-2
 HARDWARE PARAMETER CODING SECTION

	024772	060	055	067	
	024775	051	040	076	
	025000	076	000		
28					
29	025002	040	012	015	GPD2MS: .ASCII / /<12><15>
30	025005	103	110	117	.ASCII /CHOOSE PAGE WIDTH FOR PRINTER/<12><15>
	025010	117	123	105	
	025013	040	120	101	
	025016	107	105	040	
	025021	127	111	104	
	025024	124	110	040	
	025027	106	117	122	
	025032	040	120	122	
	025035	111	116	124	
	025040	105	122	012	
	025043	015			
31	025044	103	110	117	.ASCII /CHOOSE ONE: 1) 80 CHARACTERS PER PRINTER LINE/<15><12>
	025047	117	123	105	
	025052	040	117	116	
	025055	105	072	040	
	025060	040	061	051	
	025063	040	070	060	
	025066	040	103	110	
	025071	101	122	101	
	025074	103	124	105	
	025077	122	123	040	
	025102	120	105	122	
	025105	040	120	122	
	025110	111	116	124	
	025113	105	122	040	
	025116	114	111	116	
	025121	105	015	012	
32	025124	011	040	040	.ASCII / 2) 132 CHARACTERS PER PRINTER LINE/<15><12>
	025127	040	040	040	
	025132	040	062	051	
	025135	040	061	063	
	025140	062	040	103	
	025143	110	101	122	
	025146	101	103	124	
	025151	105	122	123	
	025154	040	120	105	
	025157	122	040	120	
	025162	122	111	116	
	025165	124	105	122	
	025170	040	114	111	
	025173	116	105	015	
	025176	012			
33	025177	050	061	054	.ASCIIZ /(1,2) >>/
	025202	062	051	040	
	025205	076	076	000	
34					.EVEN
35					
36	025210				\$PATCH::
37					.BLKW 10 ;(ADJUST SIZE OF PATCH AREA UNTIL)
38					;(LASTAD + 27264 HAS BIT 7 CLEAR)
39					
40					

PARAMETER CODING MACRO V03.01 7-NOV-80 10:06:10 PAGE 43-3
HARDWARE PARAMETER CODING SECTION

41 025230

LASTAD

025230 000000
025232 000000
025234

LSLAST::

.EVEN
.WORD 0
.WORD 0

PARAMETER CODING MACRO V03.01 7-NOV-80 10:06:10 PAGE 44
HARDWARE PARAMETER CODING SECTION

1 025234

2

000001

.END

ENDMOD

PARAMETER CODING
SYMBOL TABLE

MACRO V03.01 7-NOV-80 10:06:10 PAGE 44-1

ABORT	015602	CHRCNT	010064	C\$QIO =	000377	EMPTYR	016550	F\$SRV =	000010
ABSND	017106	CHRL00	020166	C\$RDBU=	000007	EMPTZ3	016252	F\$SUB =	000002
ABSS	017316	CHRL06	021110	C\$REFG=	000047	EMP4	017064	F\$SW =	000014
ACAS	006535	CHRLST	006555	C\$RESE=	000033	EMP5	017274	F\$TEST=	000001
ADR =	000020 G	CLEART	022570	C\$REVI=	000003	ENDIN	016566	GETCHR	014012
AGN	020700	CNTNU	013466	C\$RFLA=	000021	EOT	006515	GPAMSG	024452
ALPHA	013514	COIE	013456	C\$RPT =	000025	ERMSGB	007316	GPDMSG	024707
ASSEMB=	000010	CONTLO	014112	C\$SEFG=	000046	ERRBLK	010100 G	GPDM2S	025002
ASSMA	023774	CONVRT	014176	C\$SPRI=	000041	ERRMSG	010076 G	GPLMSG	024624
AUTCAL	022224	CR	002313	C\$SVEC=	000037	ERRNBR	010074 G	GREASE	002206
AUTOID	022232	CRCLX	015152	C\$TPRI=	000013	ERRORS	015246	GTNUM	022744
AUTOLE	022236	CRNTPR	006502	DASHES	006542	ERRTYP	010072 G	G\$CNT0=	000200
BASET	005262	CRNTSK	002176	DCUPA	015446	ERSETT	014160	G\$DELM=	000372
BAUDRT	005252	CSRADD	002200	DDCUPA	015500	ERWORD	006500	G\$DISP=	000003
BAUTBL	006464	CTLZ	006524	DELAYS	015224	ESCAPE	006521	G\$EXCP=	000400
BETA	013476	C\$AU =	000052	DELCNT	010054	EVL =	000004 G	G\$HILI=	000002
BFRA	007352	C\$AUTO=	000061	DFAIL	005260	EXETS	013576	G\$LOLI=	000001
BFRB	010030	C\$BRK =	000022	DFAULT	017032	EXIT	022230	G\$NO =	000000
BFRB	010030	C\$BSEG=	000004	DFPTBL	002160 G	EXITA	022044	G\$C'rs=	000400
BFRD	010034	C\$BSUB=	000002	DIAGMC=	000000	EXITE	014166	G\$JFSI=	000376
BIDIRP	012726	C\$CEFG=	000045	DIRCTN	006504	EXITON	014004	G\$PRMA=	000001
BIT0 =	000001 G	C\$CLCK=	000062	DLDFLT	005254	EXITS	013626	G\$PRMD=	000002
BIT00 =	000001 G	C\$CLEA=	000012	DLSET	016602	EXITSR	015216	G\$PRML=	000000
BIT01 =	000002 G	C\$CLOS=	000035	DONEDF	017450	EXITX	013352	G\$RADA=	000140
BIT02 =	000004 G	C\$CLP1=	000006	DOSPCS	024000	EXIT11	022460	G\$RADB=	000000
BIT03 =	000010 G	C\$CVEC=	000036	DUMMYS	002214	EXTMCR	015450	G\$RADD=	000040
BIT04 =	000020 G	C\$DCLN=	000044	DZDCOD	017220	E\$END =	002100	G\$RADL=	000120
BIT05 =	000040 G	C\$DODU=	000051	DZDFLT	005256	E\$LOAD=	000035	G\$RADO=	000020
BIT06 =	000100 G	C\$DRPT=	000024	DZSET	016672	FAILDF	017426	G\$XFER=	000004
BIT07 =	000200 G	C\$DU =	000053	ECNRB =	020000	FAILDL	012122	G\$YES =	000010
BIT08 =	000400 G	C\$EDIT=	000003	EDFMA	011230	FAILDZ	012220	HEXA =	000052
BIT09 =	001000 G	C\$ERDF=	000055	EDFMB	011331	FAILM	011602	HEXB =	000053
BIT1 =	000002 G	C\$ERHR=	000056	EDFMC	011444	FRTM	007203	HEXC =	000054
BIT10 =	002000 G	C\$ERRO=	000060	EDFMD	011520	FIVE =	000045	HEXD =	000055
BIT11 =	004000 G	C\$ERSF=	000054	EDFM0	010361	FLTRDY	006512	HEXE =	000056
BIT12 =	010000 G	C\$ERSO=	000057	EDFM1	010422	FOUR =	000044	HEXF =	000057
BIT13 =	020000 G	C\$ESCA=	000010	EDFM2	010475	FRONT	006412	HITARG	010060
BIT14 =	040000 G	C\$SEEG=	000005	EDFM3	010543	FTYTPM	004654	HOE =	100000 G
BIT15 =	100000 G	C\$ESUB=	000003	EDFM4	010622	FWRDO	013164	HRZTLS	002233
BIT2 =	000004 G	C\$ETST=	000001	EDFM5	010650	FXRDYM	012316	HZTLSP	002212
BIT3 =	000010 G	C\$EXIT=	000032	EDFM6	010677	F\$AU =	000015	IBE =	010000 G
BIT4 =	000020 G	C\$GETB=	000026	EDFM7	010755	F\$AUTO=	000020	IDU =	000040 G
BIT5 =	000040 G	C\$GETW=	000027	EDFM8	011026	F\$BGN =	000040	IER =	020000 G
BIT6 =	000100 G	C\$GMAN=	000043	EDFM9	011175	F\$CLEA=	000007	INFIN	016514
BIT7 =	000200 G	C\$GPHR=	000042	EF.CON=	000036 G	F\$DU =	000016	INIERR	014466
BIT8 =	000400 G	C\$GPLO=	000030	EF.NEW=	000035 G	F\$END =	000041	INITCD	014274
BIT9 =	001000 G	C\$GPRI=	000040	EF.PWR=	000034 G	F\$HARD=	000004	INITLZ	015522
BOE =	000400 G	C\$INIT=	000011	EF.RES=	000037 G	F\$HW =	000013	INLOOP	015232
BR2	006514	C\$INLP=	000020	EF.STA=	000040 G	F\$INIT=	000006	INUPB	010070
CALLDF	015664	C\$MANI=	000050	EIGHT =	000050	F\$JMP =	000050	ISR =	000100 G
CALLDL	015700	C\$MEM =	000031	EIGHTY	016506	F\$MOD =	000000	IXE =	004000 G
CAN	006516	C\$MSG =	000023	EMPTYB	014310	F\$MSG =	000011	I\$AU =	000041
CCOUNT	010066	C\$OPEN=	000034	EMPTY2	015746	F\$PROT=	000021	I\$AUTO=	000041
CHC2	023756	C\$PNTB=	000014	EMPTY3	016246	F\$PWR =	000017	I\$CLN =	000041
CHKC	023476	C\$PNTF=	000017	EMPTY4	017060	F\$RPT =	000012	I\$DU =	000041
CHKCAN	013552	C\$PNTS=	000016	EMPTY5	017270	F\$SEG =	000003	I\$HRD =	000041
CHKN6	017552	C\$PNTX=	000015	EMPTL2	015752	F\$SOFT=	000005	I\$INIT=	000041

PARAMETER CODING
SYMBOL TABLE

MACRO V03.01 7-NOV-80 10:06:10 PAGE 44-2

ISMOD = 000041	L\$EXP5 002066 G	MXLF = 002000	PLOOP9 021570	SKP11 002174
ISMSG = 000041	L\$HARD 024406 G	NDATA 010056	PNT = 001000 G	SKP14 002170
ISPROT= 000040	L\$HIME 002120 G	NEWMOD 017754	PRARCH 022736	SLFTST 002255
ISPTAB= 000041	L\$HPCP 002016 G	NEXTU 015550	PRI = 002000 G	SLTPFF 002276
ISPWR = 000041	L\$HPTP 002022 G	NINE = 000051	PRI00 = 000000 G	SNGCHR 006522
ISRPT = 000041	L\$HW 002160 G	NONDTA 015774	PRI01 = 000040 G	SNGLP 024452
ISSEG = 000041	L\$ICP 002104 G	NONDT2 016102	PRI02 = 000100 G	SPACE 006541
ISSETU= 000041	L\$INIT 015522 G	NONDT3 016136	PRI03 = 000140 G	SPCSIZ 010036
ISSRV = 000041	L\$LADP 002026 G	NONDZA 016274	PRI04 = 000200 G	STATS 015020
ISSUB = 000041	L\$LAST 025234 G	NONDZ2 016402	PRI05 = 000240 G	STATUS 002315
ISTST = 000041	L\$LOAD 002100 G	NONDZ3 016436	PRI06 = 000300 G	STCHSZ 002244
JENDIN 015604	L\$LUN 002074 G	NOPRTM 014050	PRI07 = 000340 G	STHTCT 002257
JUNKPL 006440	L\$MREV 002050 G	NOTQ 022014	PRMPTA 003200	STLNSZ 002251
JSJMP = 000167	L\$NAME 002000 G	NOT1 023000	PRMPTC 003466	STPGSZ 002271
LCHYET 012716	L\$PRIO 002042 G	NPRMPT 004531	PRMPTD 004046	STRTUP 015610
LF 002314	L\$PROT 015514 G	NULL 006420	PRNTIT 017546	STSCAL 017600
LINCNT 010062	L\$PRT 002112 G	NUM1 = 000001	PRTBM0 010230	STSERR 014774
LINCOD 016456	L\$REPP 002062 G	NUM10 = 000012	PRTM2 016360	STSPSZ 002262
LINLOO 020124	L\$REV 002010 G	NUM11 = 000013	PRTXM0 010302	STGRES 002210
LINLO6 021104	L\$RPT 015506 G	NUM12 = 000014	PSZA4 002322	STULMD 002266
LINN 010040	L\$SPC 002056 G	NUM13 = 000015	PSZ11 002325	SVCGBL= 000000
LINSIZ 010042	L\$SPCP 002020 G	NUM14 = 000016	PSZ14 002330	SVCINS= 000001
LNELOU 012732	L\$SPTP 002024 G	NUM15 = 000017	RANDOM 014726	SVCSUB= 000001
LODELY 014704	L\$STA 002030 G	NUM2 = 000002	RBUF 007302	SVCTAG= 000001
LOE = 040000 G	L\$TEST 002114 G	NUM3 = 000003	RCSR 007276	SVCTST= 000001
LOGUNI 002202	L\$TIML 002014 G	NUM4 = 000004	REAR 006415	S\$LSYM= 010000
LOOPA 021716	L\$UNIT 002012 G	NUM5 = 000005	RESET 002224	TCR 007310
LOOPCK 013724	L1LOOP 020424	NUM6 = 000006	RESETC 014326	TCRENA 006436
LOOPG 014026	L10000 002170	NUM7 = 000007	RESINN 013414	TCRTBL 006444
LOOPXN 013656	L10001 012614	NUM8 = 000010	REVRSP 021304	TDR 007312
LOOP8 021440	L10002 015512	NUM9 = 000011	RIBPOS 002240	TESTA 021634
LOT = 000010 G	L10004 017452	NXTA 021740	RTYTPM 005014	TESTB 022050
LPR 007306	L10005 016600	NXTBIT 015272	SCA 006531	TESTC 022462
LPRINI 006442	L10006 017454	NXTERM 015374	SCB 006527	TESTD 023360
L\$ACP 002110 G	L10007 017466	NXTLIN 021250	SCC 006526	TEST1 017470
L\$APT 002036 G	L10010 017604	ONE = 000041	SCQ 006525	TEST2 017606
L\$AUT 002070 G	L10011 020024	OPTN1 003351	SCX 006530	TEST3 020026
L\$AUTO 017454 G	L10012 020272	OUTCTR 006506	SCO 006532	TEST4 020274
L\$CCP 002106 G	L10013 020606	OUTRLP 014024	SC1 006533	TEST5 020610
L\$CLEA 017456 G	L10014 021012	OUTSDC 006510	SEED1 006424	TEST6 021014
L\$CO 002032 G	L10015 021156	OUTSDL 013650	SEED2 006426	TEST7 021160
L\$DEPO 002011 G	L10016 021340	OSAPTS= 000000	SELECT 023636	TEST8 021342
L\$DESC 010150 G	L10017 021466	OSAU = 000000	SENCHR 013366	TEST9 021470
L\$DESP 002076 G	L10020 021632	OSBGNR= 000000	SENCH2 013376	TFCZ 021770
L\$DEVP 002060 G	L10021 022046	OSBGNS= 000000	SENCLP 013416	THREE = 000043
L\$DISP 002124 G	L10022 022230	OSDU = 000000	SENDR 014140	TIMOM 012512
L\$DLY 002116 G	L10023 022734	OSERRT= 000001	SENDR2 013320	TITLEA 003115
L\$DTP 002040 G	L10024 024402	OSGNSW= 000000	SETCHO 002310	TITLEB 003264
L\$DTYP 002034 G	L10025 024452	OSPOIN= 000001	SETER 013614	TITLEC 003717
L\$DUT 002072 G	MAKE11 023552	OSSETU= 000000	SETHTO 002303	TITLED 003773
L\$DVTY 010102 G	MANLD 022352	PALPHA 015174	SETONE 017742	TITLE1 002333
L\$EF 002052 G	MANLE 022372	PERIOD 006534	SETUPC 016162	TITLE2 002366
L\$ENVI 002044 G	MLTLIN 010052	PFM1 016060	SETUPI 014514	TITLE3 002446
L\$ERRT 010072 G	MNEB1 010046	PGMCTR 007314	SET15 015202	TITLE4 002513
L\$ETP 002102 G	MNEB2 010047	PLOC 002204	SEVEN = 000047	TITLE5 002564
L\$EXP1 002046 G	MNEB3 010050	PLOOP 017674	SIX = 000046	TITLE6 002645
L\$EXP4 002064 G	MSGADD 005246	PLOOPC 022612	SKPA4 002172	TITLE7 002725

PARAMETER CODING
SYMBOL TABLE

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TITLE8 002772	T\$GMAN= 000000	T\$TEMP= 000000	T11 022050 G	WAITMX 011432
TITLE9 003046	T\$HILI= 000007	T\$TEST= 000015	T11*PMT 004346	WAITXN 013640
TMPLT1 006430	T\$LAST= 000001	T\$TSTM= 177777	T12 022462 G	W+C 012414
TMPLT2 006432	T\$LOLI= 000000	T\$TSTS= 000001	T13 023360 G	WTSTPM 005154
TMPLT3 006434	T\$LSYM= 010000	T\$SAUT= 010006	T2 017606 G	XBUF 007304
TOPSTK 010026	T\$LTNO= 000015	T\$SCLE= 010007	T3 020026 G	XCSR 007300
TRDYBT 010044	T\$NEST= 177777	T\$SHAR= 010025	T4 020274 G	XMIT 012616
TRNSMT 023614	T\$NS0 = 000000	T\$SHW = 010000	T5 020610 G	XOFF 006517
TRXADD 005250	T\$NS1 = 000004	T\$SINI= 010004	T6 021014 G	YON 006520
TRYAGN 014730	T\$NS2 = 000010	T\$MSG= 010001	T7 021160 G	XSTR 012670
TWO = 000042	T\$PTNU= 000000	T\$SPRO= 010003	T8 021342 G	X\$ALWA= 000000
T\$ARGC= 000001	T\$SAVL= 177777	T\$SRPT= 010002	T9 021470 G	X\$FALS= 000040
T\$CODE= 002032	T\$SEGL= 177777	T\$SSRV= 010005	UAM = 000200 G	X\$OFFS= 000400
T\$ERRN= 000000	T\$SUBN= 000000	T\$STES= 010024	UBTRAP 016572 G	X\$TRUE= 000020
T\$EXCP= 000000	T\$TAGL= 177777	T1 017470 G	UCRB = 010000	ZERO = 000040
T\$FLAG= 000040	T\$TAGN= 010026	T10 021634 G	VRTCLS 002226	\$PATCH 025210 G

. ABS. 025234 000
000000 001

ERRORS DETECTED: 0

VIRTUAL MEMORY USED: 20886 WORDS (82 PAGES)
DYNAMIC MEMORY AVAILABLE FOR 69 PAGES
CZLQPA.BIN,CZLQPA.SEQ/C/N:TOC=SVC34R.MLB CZLQPA.P11

[illegible]

[illegible]

[illegible]

F\$JMP	5-7#	11-12	11-12	24-10	24-10	26-193	27-11										
F\$MOD	5-7#	5-8	44-1														
F\$MSG	5-7#	11-9	11-16														
F\$PROT	5-7#	25-7	25-13														
F\$PWR	5-7#																
F\$RPT	5-7#	24-8	24-14														
F\$SEG	5-7#																
F\$SOFT	5-7#																
F\$SRV	5-7#	26-225	26-229														
F\$SUB	5-7#																
F\$SW	5-7#																
F\$TEST	5-7#	28-5	28-41	29-4	29-58	30-8	30-72	31-4	31-64	32-3	32-65	33-4	33-54	34-4			
	34-61	35-5	35-50	36-3	36-54	37-2	37-70	38-4	38-63	41-4	41-82	42-4	42-179				
FAILDF	26-469	26-497	26-504	26-511#													
FAILDL	10-185#	26-57	26-87	26-93													
FAILDZ	10-186#	26-118	26-149	26-155													
FAILM	10-179#	26-511															
FBTM	9-354#	42-118	42-161														
FIVE	8-12#																
FLTRDY	9-310#	14-99*	23-74	23-80	26-41*	26-73*	26-81	26-135*	26-143	26-436*	26-462*	26-487*					
FOUR	8-11#	13-136	13-161														
FRONT	9-258#	41-45	42-72	42-73	42-75												
FTYTPM	9-139#	42-83															
FWRDO	13-113	13-175#															
FXRDYM	10-187#	23-76	23-82														
G\$CNTO	5-7#																
G\$DELM	5-7#																
G\$DISP	5-7#																
G\$EXCP	5-7#																
G\$HILI	5-7#																
G\$LOLI	5-7#																
G\$NO	5-7#	37-32															
G\$OFFS	5-7#	37-32	38-51	40-38	41-33	42-24	43-13	43-14	43-15	43-17							
G\$OF SI	5-7#	37-32	38-51	40-38	41-33	42-24	43-13	43-14	43-15	43-17							
G\$PRMA	5-7#	43-14															
G\$PRMD	5-7#	37-32	38-51	40-38	41-33	42-24	43-13	43-17									
G\$PRML	5-7#	43-15															
G\$RADA	5-7#	37-32	38-51	40-38	41-33	42-24											
G\$RADB	5-7#																
G\$RADD	5-7#																
G\$RADL	5-7#	43-15			</												

HEXD	8-20#													
HEXE	8-21#													
HEXF	8-22#	9-260	9-260	9-260	13-125	13-155	13-158							
HITARG	9-431#	30-39*	30-41	30-42*	30-61									
HOE	8-2#													
HRZTLS	9-51#	31-53*	31-55*	31-57*	31-65	41-175*	41-177*	41-179*	41-187	41-206*	41-208*	41-210*	41-212	
HZTLSP	9-43#													
ISAU	5-7#													
ISAUTO	5-7#	26-527#	26-529#											
ISCLN	5-7#	27-7#	27-11	27-16#										
ISDU	5-7#													
ISHRD	43-11#	43-19#												
ISINIT	5-7#	26-7#	26-193	26-523#										
ISMOD	5-7#	5-8	5-8#	44-1	44-1#									
ISMSG	5-7#	11-9#	11-16#											
ISPROT	5-7#	25-7#												
ISPTAB	5-7#													
ISPR	5-7#													
ISRPT	5-7#	24-8#	24-14#											
ISSEG	5-7#	28-5	29-4	30-8	31-4	32-3	33-4	34-4	35-5	36-3	37-2	38-4	41-4	42-4
ISSETU	5-7#													
ISSRV	5-7#	26-225#	26-229#											
ISSUB	5-7#	28-5	29-4	30-8	31-4	32-3	33-4	34-4	35-5	36-3	37-2	38-4	41-4	42-4
ISTST	5-7#	28-5	28-5#	28-41	28-41#	28-41#	29-4	29-4#	29-58	29-58#	29-58#	30-8	30-8#	30-72
	30-72#	30-72#	31-4	31-4#	31-84	31-84#	31-84#	32-3	32-3#	32-65	32-65#	32-65#	33-4	33-4#
	33-54	33-54#	33-54#	34-4	34-4#	34-61	34-61#	34-61#	35-5	35-5#	35-50	35-50#	35-50#	36-3
	36-3#	36-54	36-54#	36-54#	37-2	37-2#	37-70	37-70#	37-70#	38-4	38-4#	38-63	38-63#	38-63#
	41-4	41-4#	41-82	41-82#	41-82#	42-4	42-4#	42-179	42-179#	42-179#				
IBE	8-2#													
IDU	8-2#													
IER	8-2#													
INFIN	26-173	26-175#												
INIERR	18-76	18-80	18-84	18-89	18-93	18-99#								
INITCD	18-50#	27-9	28-19	29-18	30-27	31-25	32-30	33-25	34-21	35-24	36-24	37-21	38-29	41-22
	42-20													
INITLZ	26-19#													
INLOOP	21-42#	21-44												
INUPB	9-440#													
ISR	8-2#													
IXE	8-2#													
JSJMP	5-7#	11-12	24-10											
JENDIN	26-20	26-34#												
JUNKPL	9-272#	26-286	26-287											
LSACP	5-24#													

PARAMETER CODING MACRO V03.01 7-NOV-80 10:06:10 PAGE S-7
 CROSS REFERENCE TABLE (CREF V01-05)

L\$DTYP	5-24#		
L\$DUT	5-24#		
L\$DVTY	5-24	10-11#	
L\$EF	5-24#		
L\$ENVI	5-24#		
L\$ERRT	5-24	9-445#	
L\$EIP	5-24#		
L\$EXP1	5-24#		
L\$EXP4	5-24#		
L\$EXP5	5-24#		
L\$HARD	5-24	43-11	43-11#
L\$HIME	5-24#		
L\$HPCP	5-24#		
L\$HPTP	5-24#		
L\$HW	5-24	7-9	7-9#
L\$ICP	5-24#		
L\$INIT	5-24	26-7#	
L\$LADP	5-24#		
L\$LAST	5-24	43-41#	
L\$LOAD	5-24#		
L\$LUN	5-24#		
L\$MREV	5-24#		
L\$NAME	5-24#		
L\$PRIO	5-24#		
L\$PROT	5-24	25-7#	
L\$PRT	5-24#		
L\$REPP	5-24#		
L\$REV	5-24#		
L\$RPT	24-8#		
L\$SPC	5-24#		
L\$SPCP	5-24#		
L\$SPTP	5-24#		
L\$STA	5-24#		
L\$TEST	5-24#		
L\$TIML	5-24#		
L\$UNIT	5-24#	26-28	
L10000	7-9	7-17#	
L10001	11-12	11-16#	
L10002	24-10	24-14#	
L10004	26-193	26-523#	
L10005	26-229#		
L10006	26-529#		
L10007	27-11	27-16#	
L10010	28-41#		
L10011	29-58#		
L10012	30-72#		
L10013	31-84#		
L10014	32-65#		
L10015	33-54#		
L10016	34-61#		
L10017	35-50#		
L10020	36-54#		
L10021	37-70#		
L10022	38-63#		
L10023	41-82#		
L10024	42-179#		
L10025	43-11	43-19#	

[illegible]

PARAMETER CODING

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CROSS REFERENCE TABLE (CREF V01-05)

[illegible]

RESETC	18-57	18-62#													
RESINN	14-47#	14-59													
REVRSP	34-46#	34-52													
RIBPOS	9-52#	18-105*	18-106	39-33*	39-34	39-43*	39-44	40-46*	40-47						
RTYTPM	9-141#	42-139													
S\$LSYM	5-7#	7-17#	11-16#	24-14#	26-229#	26-523#	26-529#	27-16#	28-41#	29-58#	30-72#	31-84#	32-65#	33-54#	
	34-61#	35-50#	36-54#	37-32	37-32	37-32	37-32#	37-70#	38-51	38-51	38-51	38-51#	38-63#	40-38	
	40-38	40-38	40-38#	41-33	41-33	41-33	41-33#	41-82#	42-24	42-24	42-24	42-24#	42-179#	43-19#	
SCO	9-329#	18-92	20-84												
SC1	9-330#	30-38													
SCA	9-328#	29-30	38-54												
SCB	9-326#	42-30	42-89												
SCC	9-325#	42-42	42-95												
SCQ	9-324#	37-50	40-42												
SCX	9-327#	31-36	31-59	31-70											
SEED1	9-262#	19-45	19-51*												
SEED2	9-263#	19-46	19-52*												
SELECT	42-70#														
SENCH2	14-44#	14-86													
SENCHR	13-86	13-109	13-120	13-126	13-131	13-137	13-144	13-153	13-156	13-159	13-162	13-165	13-181	13-187	
	13-192	13-198	13-205	13-211	13-214	14-39#	20-44	20-47							
SENCLP	14-48#	14-65													
SENDR	16-42	16-67#													
SENDR2	13-106	13-170	13-213#												
SET15	20-88	20-92#													
SETCHO	9-66#	38-45													
SETER	14-89	14-92	14-103#												
SETHTO	9-65#	38-40													
SETONE	29-38	29-41#													
SETUPC	26-45	26-104#													
SETUPI	18-97	18-104#													
SEVEN	8-14#														
SIX	8-13#														
SKP11	9-9#	42-101													
SKP14	9-7#	42-92													
SKPA4	9-8#	42-98													
SLFTST	9-56#	28-21													
SLTPFF	9-62#	42-72*	42-73*	42-75*	42-77	42-127*	42-128*	42-130*	42-133	42-169*	42-170*	42-172*	42-173		
SNGCHR	9-322#	30-38*	30-50	30-60*											
SNGLP	43-16	43-18#													
SPACE	9-334#	13-210													
SPCSIZ	9-404#	31-46*	31-48	31-80*	31-81										

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CROSS REFERENCE TABLE (CREF V01-05)

	38-51	38-51	38-51	38-51	38-51	38-51	38-51	38-51	38-51	38-51	38-51	38-51	38-51	38-51
	38-51	38-63	38-63	38-63	40-36	40-36	40-36	40-36	40-36	40-36	40-36	40-36	40-36	40-36
	40-36	40-36	40-36	40-36	40-36	40-38	40-38	40-38	40-38	40-38	40-38	40-38	40-38	40-38
	40-38	40-38	40-38	40-38	40-38	40-38	40-38	40-38	40-38	40-38	40-38	40-38	40-38	40-38
	40-38	41-23	41-23	41-23	41-23	41-23	41-23	41-23	41-23	41-23	41-23	41-23	41-23	41-23
	41-23	41-23	41-33	41-33	41-33	41-33	41-33	41-33	41-33	41-33	41-33	41-33	41-33	41-33
	41-33	41-33	41-33	41-33	41-33	41-33	41-33	41-33	41-33	41-33	41-33	41-33	41-82	41-82
	41-82	42-21	42-21	42-21	42-21	42-21	42-21	42-21	42-21	42-21	42-21	42-21	42-21	42-21
	42-21	42-21	42-24	42-24	42-24	42-24	42-24	42-24	42-24	42-24	42-24	42-24	42-24	42-24
	42-24	42-24	42-24	42-24	42-24	42-24	42-24	42-24	42-24	42-24	42-24	42-24	42-179	42-179
	42-179	43-11	43-11	43-11	43-13	43-13	43-13	43-13	43-13	43-13	43-13	43-13	43-13	43-13
	43-13	43-13	43-13	43-13	43-13	43-14	43-14	43-14	43-14	43-14	43-14	43-14	43-14	43-14
	43-14	43-14	43-14	43-15	43-15	43-15	43-15	43-15	43-15	43-15	43-15	43-15	43-16	43-16
	43-16	43-17	43-17	43-17	43-17	43-17	43-17	43-17	43-17	43-17	43-17	43-17	43-17	43-17
	43-17	43-17	43-19	43-19	43-19	43-41	43-41	43-41	43-41	43-41	43-41	43-41	43-41	43-41
SVCSUB	5-7#	5-12#												
SVCTAG	5-7#	5-14#	7-17	11-16	24-14	26-229	26-523	26-529	27-16	28-41	29-58	30-72	31-84	32-65
	33-54	34-61	35-50	36-54	37-32	37-70	38-51	38-63	40-38	41-33	41-82	42-24	42-179	43-19
SVCTST	5-7#	5-11#	28-5	29-4	30-8	31-4	32-3	33-4	34-4	35-5	36-3	37-2	38-4	41-4
	42-4													
TSSAUT	26-527#	26-529												
TSSCLE	27-7#	27-11	27-16											
TSSHAR	43-11	43-11#	43-19											
TSSHW	7-9	7-9#	7-17											
TSSINI	26-7#	26-193	26-523											
TSSMSG	11-9#	11-12	11-16											
TSSPRO	25-7#													
TSSRPT	24-8#	24-10	24-14											
TSSSRV	26-225#	26-229												
TSTES	28-5#	28-41	29-4#	29-58	30-8#	30-72	31-4#	31-84	32-3#	32-65	33-4#	33-54	34-4#	34-61
	35-5#	35-50	36-3#	36-54	37-2#	37-70	38-4#	38-63	41-4#	41-82	42-4#	42-179		
TSARGC	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24#	5-24#	5-24#
	5-24#	5-24#	5-24#	14-55	14-55	14-55#	15-69	15-69	15-69#	16-56	16-56	16-56#	23-61	23-61
	23-61	23-61#	23-61#	23-62	23-62	23-62	23-62#	23-62#	23-76	23-76	23-76#	23-82	23-82	23-82#
	26-57	26-57	26-57#	26-87	26-87	26-87#	26-93	26-93	26-93#	26-118	26-118	26-118#	26-149	26-149
	26-149#	26-155	26-155	26-155#	26-511	26-511	26-511#	28-20	28-20	28-20#	29-19	29-19	29-19#	30-78
	30-28	30-28#	31-26	31-26	31-26#	32-31	32-31	32-31#	33-26	33-26	33-26#	34-22	34-22	34-22#
	35-25	35-25	35-25#	36-25	36-25	36-25#	37-22	37-22	37-22#	38-30	38-30	38-30#	40-36	40-36
	40-36#	41-23	41-23	41-23#	42-21	42-21	42-21#							
TS CODE	37-32	37-32	37-32	37-32#	37-32#	37-32#	38-51	38-51	38-51	38-51#	38-51#	38-51#	40-38	40-38
	40-38	40-38#	40-38#	40-38#	41-33	41-33	41-33	41-33#	41-33#	41-33#	42-24	42-24	42-24	42-24#
	42-24#	42-24#	43-13	43-13	43-13	43-13#	43-13#	43-13#	43-14	43-14	43-14	43-14#	43-14#	43-14#
	43-15	43-15	43-15	43-15#	43-15#	43-15#	43-16	43-16	43-16	43-16	43-16	43-16#	43-16#	43-16#
	43-16#	43-17	43-17	43-17	43-17#	43-17#	43-17#							
TSERRN	5-7#													
TSEXCP	37-32	37-32#	38-51	38-51#	40-38	40-38#	41-33	41-33#	42-24	42-24#	43-13	43-13#	43-14	43-14#
	43-17	43-17#												
TSFLAG	11-12	11-12#	11-12#	24-10	24-10#	24-10#	26-193	26-193	26-193#	26-193#	27-11	27-11	27-11#	27-11#
TSGMAN	5-7#	37-32	37-32#	37-32#	38-51	38-51#	38-51#	40-38	40-38#	40-38#	41-33	41-33#	41-33#	42-24
	42-24#	42-24#												
TSWILI	37-32	37-32#	38-51	38-51#	40-38	40-38#	41-33	41-33#	42-24	42-24#	43-13	43-13#	43-14	43-14#
	43-17	43-17#												
TSLAST	5-7#	43-41#												
TSLOLI	37-32	37-32#	38-51	38-51#	40-38	40-38#	41-33	41-33#	42-24	42-24#	43-13	43-13#	43-14	43-14#
	43-17	43-17#												
TSLSYM	5-7	5-7#	7-17	11-16	24-14	26-229	26-523	26-529	27-16	28-41	29-58	30-72	31-84	32-65
	33-54	34-61	35-50	36-54	37-70	38-63	41-82	42-179	43-19					

	TSLTNO	T\$NEST	T\$NSO	T\$NS1	T\$NS2	T\$PTNU	T\$SAVL	T\$SEGL	T\$SUBN	T\$TAGL	T\$TAGN	T\$TEMP	T\$TEST	T\$TSTM	T\$TSTS	T1	T10	T11	T11PMT	T12	T13	T2	T3
	43-41#	5-7#	5-8#	7-9#	7-9#	7-9#	7-17#	7-17#	7-17#	7-17#	11-9#	11-9#	11-9#										
	11-16#	11-16#	11-16#	11-16#	24-8#	24-8#	24-14#	24-14#	24-14#	24-14#	25-7#	25-7#	25-7#										
	25-13#	25-13#	25-13#	25-13#	26-7#	26-7#	26-225#	26-225#	26-225#	26-225#	26-229#	26-229#	26-229#										
	26-523#	26-523#	26-523#	26-523#	26-527#	26-527#	26-529#	26-529#	26-529#	26-529#	27-7#	27-7#	27-7#										
	27-16#	27-16#	27-16#	27-16#	28-5#	28-5#	28-41#	28-41#	28-41#	28-41#	29-4#	29-4#	29-4#										
	29-58#	29-58#	29-58#	29-58#	30-8#	30-8#	30-72#	30-72#	30-72#	30-72#	31-4#	31-4#	31-4#										
	31-84#	31-84#	31-84#	31-84#	32-3#	32-3#	32-65#	32-65#	32-65#	32-65#	33-4#	33-4#	33-4#										
	33-54#	33-54#	33-54#	33-54#	34-4#	34-4#	34-61#	34-61#	34-61#	34-61#	35-5#	35-5#	35-5#										
	35-50#	35-50#	35-50#	35-50#	36-3#	36-3#	36-54#	36-54#	36-54#	36-54#	37-2#	37-2#	37-2#										
	37-70#	37-70#	37-70#	37-70#	38-4#	38-4#	38-63#	38-63#	38-63#	38-63#	41-4#	41-4#	41-4#										
	41-82#	41-82#	41-82#	41-82#	42-4#	42-4#	42-179#	42-179#	42-179#	42-179#	43-11#	43-11#	43-11#										
	43-16#	43-19#	43-19#	43-19#	43-19#	44-1#	44-1#	44-1#	44-1#	44-1#													
	5-8#	44-1#																					
	7-9#	7-17#	11-9#	11-16#	24-8#	24-14#	25-7#	25-13#	26-7#	26-523#	26-527#	26-529#	27-7#	27-16#									
	28-5#	28-41#	29-4#	29-58#	30-8#	30-72#	31-4#	31-84#	32-3#	32-65#	33-4#	33-54#	34-4#	34-61#									
	35-5#	35-50#	36-3#	36-54#	37-2#	37-70#	38-4#	38-63#	41-4#	41-82#	42-4#	42-179#	43-11#	43-16#									
	43-19#																						
	26-225#	26-229#																					
	5-7#																						
	5-7#																						
	5-7#																						
	5-7#	28-5#	29-4#	30-8#	31-4#	32-3#	33-4#	34-4#	35-5#	36-3#	37-2#	38-4#	41-4#	42-4#									
	5-7#																						
	5-7#	7-9#	7-9#	7-9#	11-9#	11-9#	11-9#	24-8#	24-8#	24-8#	25-7												

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CROSS REFERENCE TABLE (CREF V01-05)

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CROSS REFERENCE TABLE (CREF V01-05)

ENDSUB	1-596#	5-7#												
ENDSW	1-614#	5-7#												
ENDTST	1-624#	5-7#	28-41	29-58	30-72	31-84	32-65	33-54	34-61	35-50	36-54	37-70	38-63	41-82
	42-179													
EQUALS	1-642#	5-7#	8-2											
ERRDF	1-714#	5-7#												
ERRHRD	1-718#	5-7#												
ERROR	1-722#	5-7#	23-59											
ERRSF	1-726#	5-7#												
ERRSOF	1-730#	5-7#												
ERRTBL	1-734#	5-7#	9-445											
ESCAPE	1-744#	5-7#												
EXIT	1-771#	5-7#	11-12	24-10	26-193	27-11								
FEQUAL	1-810#	5-7#												
GETBYT	1-824#	5-7#												
GETPRI	1-834#	5-7#												
GETWOR	1-829#	5-7#												
GMANIA	1-839#	5-7#												
GMANID	1-848#	5-7#	37-32	38-51	40-38	41-53	42-24							
GMANIL	1-859#	5-7#												
GPHARD	1-868#	5-7#	26-30											
GPRMA	1-874#	5-7#	43-14											
GPRMD	1-903#	5-7#	37-32	37-32#	38-51	38-51#	40-38	40-38#	41-33	41-33#	42-24	42-24#	43-13	43-17
GPRML	1-934#	5-7#	43-15											
HEADER	1-954#	5-7#	5-24											
INLOOP	1-962#	5-7#												
IOSETU	1-966#	5-7#												
IOSTAR	1-974#	5-7#												
KT11	1-982#	5-7#												
LASTAD	1-;47#	5-7#	43-41											
MSBYIE	1-D00#	5-7#	5-24	5-24	5-24	5-24#								
MSCHEC	1-E18#	5-7#	11-12	11-12#	24-10	24-10#	26-193	26-193#	27-11	27-11#				
MSCNTO	1-E82#	5-7#	37-32	37-32#	38-51	38-51#	40-38	40-38#	41-33	41-33#	42-24	42-24#	43-13	43-13#
	43-14	43-14#	43-15	43-15#	43-17	43-17#								
MSCOUN	1-D66#	5-7#	14-55	14-55#	15-69	15-69#	16-56	16-56#	23-61	23-61#	23-62	23-62#	23-76	23-76#
	23-82	23-82#	26-57	26-57#	26-87	26-87#	26-93	26-93#	26-118	26-118#	26-149	26-149#	26-155	26-155#
	26-511	26-511#	28-20	28-20#	29-19	29-19#	30-28	30-28#	31-26	31-26#	32-31	32-31#	33-26	33-26#
	34-22	34-22#	35-25	35-25#	36-25	36-25#	37-22	37-22#	38-30	38-30#	40-36	40-36#	41-23	41-23#
	42-21	42-21#												
MSDATA	1-867#	5-7#	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24
	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24
	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24#	5-24#	10-11
	10-11#	10-17	10-17#											
MSDECR	1-D29#	5-7#	7-17	7-17#	11-16	11-16#	24-14	24-14#	25-13	25-13#	26-229	26-229#	26-523	26-523#
	26-529	26-529#	27-16	27-16#	28-41	28-41#	29-58	29-58#	30-72	30-72#	31-84	31-84#	32-65	32-65#
	33-54	33-54#	34-61	34-61#	35-50	35-50#	36-54	36-54#	37-70	37-70#	38-63	38-63#	41-82	41-82#
	42-179	42-179#	43-19	43-19#	44-1	44-1#								
MSDEFA	1-E70#	5-7#	37-32	37-32#	38-51	38-51#	40-38	40-38#	41-33	41-33#	42-24	42-24#	43-13	43-13#
	43-14	43-14#	43-15	43-15#	43-17	43-17#								
MSENDE	1-D74#	5-7#	7-17#	11-16#	24-14#	26-229#	26-523#	26-529#	27-16#	28-41#	29-58#	30-72#	31-84#	32-65#
	33-54#	34-61#	35-50#	36-54#	37-70#	38-63#	41-82#	42-179#	43-19#	44-1#				
MSERRI	1-249#	5-7#												
MSESCA	1-D06#	5-7#												
MSESCS	1-D10#	5-7#												
MSEXCP	1-E01#	5-7#	37-32	37-32	37-32#	38-51	38-51	38-51#	40-38	40-38	40-38#	41-33	41-33	41-33#
	42-24	42-24	42-24#	43-13	43-13	43-13#	43-14	43-14	43-14#	43-17	43-17	43-17#		
MSEXIT	1-D14#	5-7#	11-12#	24-10#	26-193	26-193#	27-11	27-11#						

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CROSS REFERENCE TABLE (CREF V01-05)

MSEXSE	1-D22#	5-7#	11-12#	24-10#	26-193#	27-11#								
MSEXTJ	1-D18#	5-7#	11-12	11-12#	24-10	24-10#	26-193#	27-11#						
MSGEN	1-D38#	5-7#	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24
	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24
	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24
	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#
	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#
	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#
	7-17	7-17#	9-445	9-445#	10-11	10-11#	10-17	10-17#	11-9#	11-16	11-16#	24-8	24-8#	24-14
	24-14#	25-7	25-7#	26-7	26-7#	26-225	26-225#	26-229	26-229#	26-523	26-523#	26-527	26-527#	26-529
	26-529#	27-7	27-7#	27-16	27-16#	28-5	28-5#	28-41	28-41#	29-4	29-4#	29-58	29-58#	30-8
	30-8#	30-72	30-72#	31-4	31-4#	31-84	31-84#	32-3	32-3#	32-65	32-65#	33-4	33-4#	33-54
	33-54#	34-4	34-4#	34-61	34-61#	35-5	35-5#	35-50	35-50#	36-3	36-3#	36-54	36-54#	37-2
	37-2#	37-32	37-32#	37-70	37-70#	38-4	38-4#	38-51	38-51#	38-63	38-63#	40-38	40-38#	41-4
	41-4#	41-33	41-33#	41-82	41-82#	42-4	42-4#	42-24	42-24#	42-179	42-179#	43-11	43-11#	43-19
	43-19#	43-41	43-41#											
MSGENB	1-C38#	5-7#	37-32	37-32#	38-51	38-51#	40-38	40-38#	41-33	41-33#	42-24	42-24#		
MSGETS	1-D35#	5-7#	7-17	7-17#	11-16	11-16#	24-14	24-14#	25-13	25-13#	26-229	26-229#	26-523	26-523#
	26-529	26-529#	27-16	27-16#	28-41	28-41#	29-58	29-58#	30-72	30-72#	31-84	31-84#	32-65	32-65#
	33-54	33-54#	34-61	34-61#	35-50	35-50#	36-54	36-54#	37-70	37-70#	38-63	38-63#	41-82	41-82#
	42-179	42-179#	43-16	43-16#	43-19	43-19#	44-1	44-1#						
MSGETT	1-B77#	5-7#	11-12#	24-10#	26-193#	27-11#	43-16	43-16#						
MSGNGB	1-C02#	5-7#	5-8#	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24
	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24
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	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#
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	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#	5-24#
	9-445	9-445#	10-11	10-11#	10-17	10-17#	11-9	11-9#	24-8	24-8#	25-7	25-7#	26-7	26-7#
MSGNIN	26-225	26-225#	26-527	26-527#	27-7	27-7#	43-11	43-11#	43-41	43-41#				
	1-D49#	5-7#	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24
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	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24	5-24
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	6-5#	6-5#	6-5#	6-5#	6-5#	6-5#	6-5#	6-5#	6-5#	6-5#	6-5#	6-5#	6-5#	6-5#
	10-17	10-17	10-17#	10-17#	11-12	11-12	11-12#	11-12#	11-16	11-16#	14-55	14-55	14-55	14-55
	14-55	14-55#	14-55#	14-55#	14-55#	15-69	15-69	15-69	15-69	15-69	15-69#	15-69#	15-69#	15-69#
	16-56	16-56	16-56	16-56	16-56	16-56#	16-56#	16-56#	16-56#	16-56#	23-59	23-59#	23-61	23-61
	23-61	23-61	23-61	23-61#	23-61#	23-61#	23-61#	23-61#	23-62	23-62	23-62	23-62	23-62	23-62
	23-62#	23-62#	23-62#	23-62#	23-62#	23-76	23-76	23-76	23-76	23-76	23-76#	23-76#	23-76#	23-76#
	23-78	23-78#	23-82	23-82	23-82	23-82	23-82	23-82	23-82#	23-82#	23-82#	24-10	24-10	24-10#
	24-10#	24-14	24-14#	26-19	26-19	26-19#	26-19#	26-20	26-20#	26-22	26-22	26-22#	26-22#	26-23
	26-23#	26-30	26-30	26-30	26-30#	26-30#	26-30#	26-31	26-31#	26-33	26-33#	26-36	26-36	26-36
	26-36	26-36	26-36	26-36#	26-36#	26-36#	26-36#	26-36#	26-36#	26-57	26-57	26-57	26-57	26-57
	26-57#	26-57#	26-57#	26-57#	26-58	26-58#	26-58#	26-87	26-87	26-87	26-87	26-87	26-87#	26-87#
	26-87#	26-88	26-88#	26-93	26-93	26-93	26-93	26-93	26-93#	26-93#	26-93#	26-93#	26-94	26-94#
	26-118	26-118	26-118	26-118	26-118	26-118#	26-118#	26-118#	26-118#	26-119	26-119#	26-149	26-149	26-149
	26-149	26-149	26-149#	26-149#	26-149#	26-149#	26-149#	26-150	26-150#	26-155	26-155	26-155	26-155	26-155#
	26-155#	26-155#	26-155#	26-156	26-156#	26-183	26-183	26-183#	26-183#	26-193	26-193	26-193#	26-193#	26-229
	26-229#	26-511	26-511	26-511	26-511	26-511	26-511#	26-511#	26-511#	26-512	26-512#	26-523	26-523#	26-523#
	26-529	26-529#	27-11	27-11	27-11#	27-11#	27-16	27-16#	28-20	28-20	28-20	28-20	28-20#	28-20#
	28-20#	28-20#	28-20#	28-41	28-41#	29-19	29-19	29-19	29-19	29-19	29-19#	29-19#	29-19#	29-19#
	29-58	29-58#	30-28	30-28	30-28	30-28	30-28	30-28	30-28#	30-28#	30-28#	30-72	30-72#	31-26

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CROSS REFERENCE TABLE (CREF V01-05)

	31-26	31-26	31-26	31-26	31-26#	31-26#	31-26#	31-26#	31-84	31-84#	32-31	32-31	32-31	32-31
	32-31	32-31#	32-31#	32-31#	32-31#	32-65	32-65#	33-26	33-26	33-26	33-26	33-26	33-26#	33-26#
	33-26#	33-26#	33-54	33-54#	34-22	34-22	34-22	34-22	34-22	34-22#	34-22#	34-22#	34-22#	34-61
	34-61#	35-25	35-25	35-25	35-25	35-25	35-25#	35-25#	35-25#	35-25#	35-50	35-50#	36-25	36-25
	36-25	36-25	36-25	36-25#	36-25#	36-25#	36-25#	36-54	36-54#	37-22	37-22	37-22	37-22	37-22
	37-22#	37-22#	37-22#	37-22#	37-32	37-32	37-32	37-32	37-32	37-32	37-32	37-32	37-32#	37-32#
	37-32#	37-32#	37-70	37-70#	38-30	38-30	38-30	38-30	38-30	38-30#	38-30#	38-30#	38-30#	38-51
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	40-36	40-36	40-36	40-36	40-36#	40-36#	40-36#	40-36#	40-38	40-38	40-38	40-38	40-38	40-38
	40-38	40-38	40-38#	40-38#	40-38#	40-38#	41-23	41-23	41-23	41-23	41-23	41-23#	41-23#	41-23#
	41-23#	41-33	41-33	41-33	41-33	41-33	41-33	41-33	41-33	41-33#	41-33#	41-33#	41-33#	41-82
	41-82#	42-21	42-21	42-21	42-21	42-21	42-21#	42-21#	42-21#	42-21#	42-24	42-24	42-24	42-24
	42-24	42-24	42-24	42-24	42-24#	42-24#	42-24#	42-24#	42-179	42-179#	43-11	43-11#	43-13	43-13
	43-13	43-13	43-13	43-13#	43-14	43-14	43-14	43-14	43-14#	43-15	43-15	43-15	43-15#	43-16
	43-16#	43-17	43-17	43-17	43-17	43-17	43-17#	43-19	43-19#	43-41	43-41	43-41	43-41#	43-41#
	43-41#													
MSGNLS	1-C13#	5-7#	37-32	37-32#	38-51	38-51#	40-38	40-38#	41-33	41-33#	42-24	42-24#		
MSGNSU	1-B98#	5-7#												
MSGNTA	1-B90#	5-7#	7-17	7-17#	11-16	11-16#	24-14	24-14#	26-229	26-229#	26-523	26-523#	26-529	26-529#
	27-16	27-16#	28-41	28-41#	29-58	29-58#	30-72	30-72#	31-84	31-84#	32-65	32-65#	33-54	33-54#
	34-61	34-61#	35-50	35-50#	36-54	36-54#	37-70	37-70#	38-63	38-63#	41-82	41-82#	42-179	42-179#
	43-19	43-19#												
MSGNTE	1-B94#	5-7#	28-5	28-5#	29-4	29-4#	30-8	30-8#	31-4	31-4#	32-3	32-3#	33-4	33-4#
	34-4	34-4#	35-5	35-5#	36-3	36-3#	37-2	37-2#	38-4	38-4#	41-4	41-4#	42-4	42-4#
MSHAPT	1-A39#	5-7#	5-24	5-24#										
MSHNP	1-B24#	5-7#	5-24	5-24#										
MSINCR	1-D26#	5-7#	5-8	5-8#	7-9	7-9	7-9#	7-9#	11-9	11-9	11-9#	11-9#	11-16#	14-55#
	15-69#	16-56#	23-59#	23-61#	23-62#	23-76#	23-78#	23-82#	24-8	24-8	24-8#	24-8#	24-14#	25-7
	25-7	25-7#	25-7#	26-7	26-7	26-7#	26-7#	26-19#	26-22#	26-30#	26-33#	26-36#	26-57#	26-58#
	26-87#	26-88#	26-93#	26-94#	26-118#	26-119#	26-149#	26-150#	26-155#	26-156#	26-183#	26-193#	26-225	26-225
	26-225#	26-225#	26-511#	26-512#	26-523#	26-527	26-527	26-527#	26-527#	26-529#	27-7	27-7#	27-7#	27-7#
	27-11#	27-16#	28-5	28-5	28-5	28-5#	28-5#	28-5#	28-20#	28-41#	29-4	29-4	29-4	29-4#
	29-4#	29-4#	29-19#	29-58#	30-8	30-8	30-8	30-8#	30-8#	30-8#	30-28#	30-72#	31-4	31-4
	31-4	31-4#	31-4#	31-4#	31-26#	31-84#	32-3	32-3	32-3	32-3#	32-3#	32-3#	32-31#	32-65#
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	34-22#	34-61#	35-5	35-5	35-5	35-5#	35-5#	35-5#	35-25#	35-50#	36-3	36-3	36-3	36-3#
	36-3#	36-3#	36-25#	36-54#	37-2	37-2	37-2	37-2#	37-2#	37-2#	37-22#	37-32	37-32#	37-32#
	37-70#	38-4	38-4	38-4	38-4#	38-4#	38-4#	38-30#	38-51	38-51#	38-51#	38-63#	40-36#	40-38
	40-38#	40-38#	41-4	41-4	41-4	41-4#	41-4#	41-4#	41-23#	41-33	41-33#	41-33#	41-82#	42-4
	42-4	42-4	42-4#	42-4#	42-4#	42-21#	42-24	42-24#	42-24#	42-179#	43-11	43-11	43-11#	43-11#
MSIOSE	1-A00#	5-7#												
MSLDRO	1-C42#	5-7#	26-19	26-19#	26-22	26-22#	26-30	26-30#	26-183	26-183#				
MSMASK	1-071#	5-7#												
MSMCHI	1-4#	5-7	5-7#	5-7#										
MSMCLO	1-024#	5-7	5-7#	5-7#										
MSMSK1	1-077#	5-7#												
MSPOP	1-B81#	5-7#	7-17	7-17#	11-16	11-16#	24-14	24-14#	25-13	25-15#	26-229	26-229#	26-523	26-523#
	26-529	26-529#	27-16	27-16#	28-41	28-41#	29-58	29-58#	30-72	30-72#	31-84	31-84#	32-65	32-65#
	33-54	33-54#	34-61	34-61#	35-50	35-50#	36-54	36-54#	37-70	37-70#	38-63	38-63#	41-82	41-82#
	42-179	42-179#	43-19	43-19#	44-1	44-1#								
MSPRIN	1-036#	5-7#	14-55	14-55#	15-69	15-69#	16-56	16-56#	23-61	23-61#	23-62	23-62#	23-76	23-76#
	23-82	23-82#	26-57	26-57#	26-87	26-87#	26-93	26-93#	26-118	26-118#	26-149	26-149#	26-155	26-155#
	26-511	26-511#	28-20	28-20#	29-19	29-19#	30-28	30-28#	31-26	31-26#	32-31	32-31#	33-26	33-26#
	34-22	34-22#	35-25	35-25#	36-25	36-25#	37-22	37-22#	38-30	38-30#	40-36	40-36#	41-23	41-23#
	42-21	42-21#												
MSPUSH	1-031#	5-7#	5-8	5-8#	7-9	7-9#	11-9	11-9#	24-8	24-8#	25-7	25-7#	26-7	26-7#
	26-225	26-225#	26-527	26-527#	27-7	27-7#	28-5	28-5#	29-4	29-4#	30-8	30-8#	31-4	31-4#

	32-3	32-3#	33-4	33-4#	34-4	34-4#	35-5	35-5#	36-3	36-3#	37-2	37-2#	38-4	38-4#
MSPUT	41-4	41-4#	42-4	42-4#	43-11	43-11#								
	1-C72#	5-7#	14-55	14-55#	14-55#	15-69	15-69#	15-69	16-56	16-56#	16-56#	23-61	23-61	23-61
	23-61#	23-62	23-62	23-62#	23-62#	23-76	23-76#	23-76#	23-82	23-82#	23-82#	26-36	26-36	26-36
	24-36	26-36#	26-57	26-57#	26-57#	26-87	26-87#	26-87#	26-93	26-93#	26-93#	26-118	26-118	26-118#
	26-149	26-149	26-149#	26-155	26-155#	26-155#	26-511	26-511#	26-511#	28-20	28-20#	28-20#	29-19	29-19
	29-19#	30-28	30-28	30-28#	31-26	31-26#	31-26#	32-31	32-31#	32-31#	33-26	33-26#	33-26#	34-22
	34-22	34-22#	35-25	35-25#	35-25#	36-25	36-25#	36-25#	37-22	37-22#	37-22#	38-30	38-30	38-30#
	40-36	40-36	40-36#	41-23	41-23#	41-23#	42-21	42-21#	42-21#					
MSPUT1	1-C81#	5-7#	14-55	14-55#	14-55#	14-55#	15-69	15-69#	15-69#	15-69#	16-56	16-56#	16-56#	16-56#
	23-61	23-61	23-61	23-61#	23-61#	23-61#	23-62	23-62#	23-62#	23-62#	23-62#	23-62#	23-76	23-76
	23-76#	23-76#	23-82	23-82#	23-82#	23-82#	26-36	26-36#	26-36#	26-36#	26-36#	26-36#	26-36#	26-36#
	26-57	26-57	26-57#	26-57#	26-87	26-87#	26-87#	26-87#	26-93	26-93#	26-93#	26-93#	26-118	26-118
	26-118#	26-118#	26-149	26-149#	26-149#	26-149#	26-155	26-155#	26-155#	26-155#	26-511	26-511#	26-511#	26-511#
	28-20	28-20	28-20#	28-20#	29-19	29-19#	29-19#	29-19#	30-28	30-28#	30-28#	30-28#	31-26	31-26
	31-26#	31-26#	32-31	32-31#	32-31#	32-31#	33-26	33-26#	33-26#	33-26#	34-22	34-22#	34-22#	34-22#
	35-25	35-25	35-25#	35-25#	36-25	36-25#	36-25#	36-25#	37-22	37-22#	37-22#	37-22#	38-30	38-30
	38-30#	38-30#	40-36	40-36#	40-36#	40-36#	41-23	41-23#	41-23#	41-23#	42-21	42-21#	42-21#	42-21#
MSRADI	1-D77#	5-7#	37-32	37-32#	38-51	38-51#	40-38	40-38#	41-33	41-33#	42-24	42-24#	43-13	43-13#
	43-14	43-14#	43-15	43-15#	43-17	43-17#								
MSRBRO	1-C52#	5-7#												
MSRNRO	1-C62#	5-7#	26-30	26-30#										
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	26-225	26-225#	26-527	26-527#	27-7	27-7#	28-5	28-5#	29-4	29-4#	30-8	30-8#	31-4	31-4#
	32-3	32-3#	33-4	33-4#	34-4	34-4#	35-5	35-5#	36-3	36-3#	37-2	37-2#	38-4	38-4#
	41-4	41-4#	42-4	42-4#	43-11	43-11#								
MSSTAR	1-A33#	5-7#												
MSVC	1-C33#	5-7#	11-12#	11-16	11-16#	14-55	14-55#	15-69	15-69#	16-56	16-56#	23-59	23-59#	23-61
	23-61#	23-62	23-62#	25-76	23-76#	23-78	23-78#	23						

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CROSS REFERENCE TABLE (CREF V01-05)

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