LQP LQPSE-F PDP11 DIAG AH-S329A-MC FEB 1981
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                                IDENTIFICATION
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                PRODUCT CODE:  AC-S327A-MC

                PRODUCT NAME:  CZLQPA0 LQPSE-F PDP-11 DIAG

                PPODUCT DATE:  7-NOV-80

                MAINTAINER:  DIAGNOSTIC ENGINEERING

                AUTHOR:  GRANT F. SANDY



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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 (0) ?  160000<CR>
        SUB-DEVICE # (0) ?  0<CR>
        Q-FACTOR (0) 0 ?  1<CR>

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

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

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

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

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

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

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

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

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

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

                                        UNIT 7
                                        CSR ADDRESS (O) ?  160000<CR>
                                        SUB-DEVICE # (O) ?  6,7<CR>
                                        Q-FACTOR (O) 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.
```

```
343                             THE WHOLE PROCESS COULD HAVE BEEN ACCOMPLISHED IN ONE PASS AS
344                             SHOWN BELOW.
345
346                                     # UNITS (D) ?  8<CR>
347
348                                     UNIT 1
349                                     CSR ADDRESS (O) ?  160000<CR>
350                                     SUB-DEVICE # (O) ?  0-7<CR>
351                                     Q-FACTOR (O) 0 ?  0,1,0,,,,1,1<CR>
352
353                             AS YOU CAN SEE FROM THIS EXAMPLE, NULL REPLIES (COMMAS ENCLOSING
354                             A NULL FIELD) TELL THE RUNTIME SERVICES TO REPEAT THE LAST REPLY.
355
356                             2.7 QUICK START-UP PROCEDURE  (XXDP+)
357
358                             TO START-UP THIS PROGRAM:
359
360                                     1. BOOT XXDP+
361
362                                     2. GIVE THE DATE AND ANSWER THE LSI AND 50HZ (IF THERE
363                                        IS A CLOCK) QUESTIONS
364
365                                     3. TYPE "R NAME", WHERE NAME IS THE NAME OF THE BIN OR BIC
366                                        FILE FOR THIS PROGRAM
367
368                                     4. TYPE "START"
369
370                                     5. ANSWER THE "CHANGE HW" QUESTION WITH "Y"
371
372                                     6. ANSWER ALL THE HARDWARE QUESTIONS
373
374                                     7. ANSWER THE "CHANGE SW" QUESTION WITH "N" (NOT ASKED)
375
376                             WHEN YOU FOLLOW THIS PROCEDURE YOU WILL BE USING ONLY THE
377                             DEFAULTS FOR FLAGS AND SOFTWARE PARAMETERS.  THESE DEFAULTS
378                             ARE DESCRIBED IN SECTIONS 2.3 AND 2.5.
379
380                             3.0 ERROR INFORMATION
381
382                             3.1 TYPES OF ERROR MESSAGES
383
384                             THERE ARE THREE LEVELS OF ERROR MESSAGES THAT MAY BE ISSUED BY
385                             A DIAGNOSTIC: GENERAL, BASIC AND EXTENDED.  GENERAL ERROR MESSAGES
386                             ARE ALWAYS PRINTED UNLESS THE "IER" FLAG IS SET (SECTION 2.3).
387                             THE GENERAL ERROR MESSAGE IS OF THE FORM:
388
389                                     NAME  TYPE  NUMBER  ON UNIT NUMBER  TST NUMBER PC:XXXXXX
390                                     ERROR MESSAGE
391
392                             ,WHERE: NAME = DIAGNOSTIC NAME
393                                     TYPE = ERROR TYPE (SYS FATAL, DEV FATAL, HARD OR SOFT)
394                                     NUMBER = ERROR NUMBER
395                                     UNIT NUMBER = 0 - N (N IS LAST UNIT IN PTABLE)
396                                     TST NUMBER = TEST AND SUBTEST WHERE ERROR OCCURRED
397                                     PC:XXXXXX = ADDRESS OF ERROR MESSAGE CALL
398
399                             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 SEQUFNCE 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.
456
```

```
                        "INCORRECT CSR ADDRESS GIVEN.  TRY AGAIN."
                                THE USER HAS ENTERRED 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, EXPLICILTY 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
```

PRINTER.

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

6.0 TEST SUMMARIES

EACH TEST WILL PRINT THE CURRENT TEST TITLE ON THE PRINTER AS PART OF THE TEST SEQUENCE. THIS WILL AID THE USER IN THE DIAGNOSIS PROCESS BY INFORMING THE USER OF THE PURPOSE OF THE CURRENT TEST. THIS IS THOUGHT TO BE PARTICULARY 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 ERROP 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 INHIBITTED 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 ENTERRING Q<RETURN>.
```

```
628
629                     TEST 11 -       LIFT / DROP RIBBON BY OPERATOR CONTROL
630                                     (OPTIONAL - SPECIAL TEST)
631
632                                     THIS TEST WILL HAVE TWO MODES SELECTABLE ON THE TEST MENU:
633                                     AUTOMATIC MODE AND MANUAL MODE.  IN THE AUTOMATIC MODE THE
634                                     RIBBON WILL RAISE AND DROP AT A RATE OF ABOUT ONCE PER SECOND.
635                                     THIS SEQUENCE WILL CONTINUE UNTIL THE OPERATOR STOPS IT BY
636                                     ACTION TAKEN AT THE OPERATORS CONSOLE.  IN MANUAL MODE THE
637                                     OPERATOR WILL RAISE AND DROP THE RIBBON AT WILL BY PRESSING
638                                     CONSOLE KEYS AS SPECIFIED ON THE CONSOLE SCREEN.
639
640                     TEST 12 -       BIDIRECTIONAL FORMS TRACTOR (OPTIONAL - SPECIAL TEST)
641
642                                     A VARIABLE SIZE MATRIX OF CHARACTERS WILL BE PRINTED IN A
643                                     RANDOM ORDER, FORCING RANDOM MOVEMENT OF THE CARRIAGE IN ALL
644                                     FOUR DIRECTIONS.
645
646                     TEST 13 -       CUT SHEET FEEDER EXERCISER (OPTIONAL - SPECIAL TEST)
647
648                                     IN THIS TEST THE PAGE SIZE IS SET TO ELEVEN INCHES, A SHEET
649                                     IS FED FROM THE FRONT TRAY, A LINE IS PRINTED AT THE TOP OF
650                                     THE PAGE AND A LINE IS PRINTED AT THE BOTTOM OF THE PAGE.
651                                     THE PROCESS IS THEN REPEATED WITH THE REAR TRAY FEEDING WHICH
652                                     SHOULD AUTOMATICALLY EJECT THE PAGE IN THE PRINTER FROM THE
653                                     FRONT TRAY.
654
655
656
657
658
659
660
661
662
663                     &
```

```
                                .ENABL  ABS
                                .ENABL  AMA

                        .=2000
                                .MCALL  SVC
                                SVC                             ; INITIALIZE SUPERVISOR MACROS
                                BGNMOD

                SVCINS= 1       ; LIST INSTRUCTIONS, SHIFTED RIGHT
                SVCTST= 1       ; LIST TEST TAGS, SHIFTED RIGHT
                SVCSUB= 1       ; LIST SUBTEST TAGS, SHIFTED RIGHT
                SVCGBL= 1       ; LIST GLOBAL TAGS, SHIFTED RIGHT
                SVCTAG= 1       ; LIST OTHER TAGS, SHIFTED RIGHT


                                POINTER ERRTBL


                                HEADER  CZLQP,A,0,240.,0,PRI07
                                                                L$NAME::
002000  103                                                             .ASCII /C/
002001  132                                                             .ASCII /Z/
002002  114                                                             .ASCII /L/
002003  121                                                             .ASCII /Q/
002004  120                                                             .ASCII /P/
002005  000                                                             .BYTE   0
002006  000                                                             .BYTE   0
002007  000                                                             .BYTE   0
002010                                                          L$REV::
002010  101                                                             .ASCII  /A/
002011                                                          L$DEPO::
002011  060                                                             .ASCII  /0/
002012                                                          L$UNIT::
002012  000000                                                          .WORD   0
002014                                                          L$TIML::
002014  000360                                                          .WORD   240.
002016                                                          L$HPCP::
002016  024406                                                          .WORD   L$HARD
002020                                                          L$SPCP::
002020  000000                                                          .WORD   0
002022                                                          L$HPTP::
002022  002160                                                          .WORD   L$HW
002024                                                          L$SPTP::
002024  000000                                                          .WORD   0
002026                                                          L$LADP::
002026  025234                                                          .WORD   L$LAST
002030                                                          L$STA::
002030  000000                                                          .WORD   0
002032                                                          L$CO::
002032  000000                                                          .WORD   0
002034                                                          L$DTYP::
002034  000000                                                          .WORD   0
```

```
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
```

```
L$APT::
        .WORD   0
L$DTP::
        .WORD   L$DISPATCH
L$PRIO::
        .WORD   PRI07
L$ENVI::
        .WORD   0
L$EXP1::
        .WORD   0
L$MREV::
        .BYTE   C$REVISION
        .BYTE   C$EDIT
L$EF::
        .WORD   0
        .WORD   0
L$SPC::
        .WORD   0
L$DEVP::
        .WORD   L$DVTYP
L$REPP::
        .WORD   0
L$EXP4::
        .WORD   0
L$EXP5::
        .WORD   0
L$AUT::
        .WORD   0
L$DUT::
        .WORD   0
L$LUN::
        .WORD   0
L$DESP::
        .WORD   L$DESC
L$LOAD::
        EMT     E$LOAD
L$ETP::
        .WORD   L$ERRTBL
L$ICP::
        .WORD   L$INIT
L$CCP::
        .WORD   L$CLEAN
L$ACP::
        .WORD   L$AUTO
L$PRT::
        .WORD   L$PROT
L$TEST::
        .WORD   0
L$DLY::
        .WORD   0
L$HIME::
        .WORD   0
```

```
25
26                      .SBTTL  DISPATCH TABLE
```

```
      1
      2
      3
      4
      5 002122                     DISPATCH 13
        002122  000015                                   .WORD   13
        002124                                   L$DISPATCH::
        002124  017470                                   .WORD   T1
        002126  017606                                   .WOPD   T2
        002130  020026                                   .WORD   T3
        002132  020274                                   .WORD   T4
        002134  020610                                   .WORD   T5
        002136  021014                                   .WORD   T6
        002140  021160                                   .WORD   T7
        002142  021342                                   .WORD   T8
        002144  021470                                   .WORD   T9
        002146  021634                                   .WORD   T10
        002150  022050                                   .WORD   T11
        002152  022462                                   .WORD   T12
        002154  023360                                   .WORD   T13
      6
      7                   .SBTTL  DEFAULT HARDWARE P-TABLE
```

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

002156                                  BGNHW   DFPTBL
002156  000004                                                                 .WORD   L10000-L$HW/2
002160                                                                      L$HW::
002160                                                                      DFPTBL::

002160  000000                          .WORD   0       ;CSR ADDRESS.  IF = 0 THEN AUTO-SETUP MODE IS ASSUMED.
002162  000001                          .WORD   1       ;1="Y". I/O OPTION IS SINGLE LINE (NON-DZ11) INTERFACE
002164  000000                          .WORD   0       ;PRINTER CHANNEL DEFAULT IS CHANNEL 0.
002166  000001                          .WORD   1       ;LINE SIZE CHOICE.  1=80 CHARACTERS/LINE


002170                                  ENDHW
002170                                                                      L10000:

                                .TITLE GLOBAL AREAS
                                .SBTTL GLOBAL EQUATES SECTION
```

```
      1
      2 002170                          EQUALS
                                        ;
                                        ; BIT DIFINITIONS
                                        ;
                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
```

```
                000010                  LOT==       10
                000020                  ADR==       20
                000040                  IDU==       40
                000100                  ISR==      100
                000200                  UAM==      200
                000400                  BOE==      400
                001000                  PNT==     1000
                002000                  PRI==     2000
                004000                  IXE==     4000
                010000                  IBE==    10000
                020000                  IER==    20000
                040000                  LOE==    40000
                100000                  HOE==   100000
     3
     4
     5                                  ;       DECIMAL VALUES
     6                                  ;
     7          000040                          ZERO    =32.    ;MNEMONICS FOR ESCAPE SEQUENCE ARGUMENTS.
     8          000041                          ONE     =33.
     9          000042                          TWO     =34.
    10          000043                          THREE   =35.
    11          000044                          FOUR    =36.
    12          000045                          FIVE    =37.
    13          000046                          SIX     =38.
    14          000047                          SEVEN   =39.
    15          000050                          EIGHT   =40.
    16          000051                          NINE    =41.
    17          000052                          HEXA    =42.
    18          000053                          HEXB    =43.
    19          000054                          HEXC    =44.
    20          000055                          HEXD    =45.
    21          000056                          HEXE    =46.
    22          000057                          HEXF    =47.
    23
    24          000001                          NUM1    =1
    25          000002                          NUM2    =2
    26          000003                          NUM3    =3
    27          000004                          NUM4    =4
    28          000005                          NUM5    =5
    29          000006                          NUM6    =6
    30          000007                          NUM7    =7
    31          000010                          NUM8    =8.
    32          000011                          NUM9    =9.
    33          000012                          NUM10   =10.
    34          000013                          NUM11   =11.
    35          000014                          NUM12   =12.
    36          000015                          NUM13   =13.
    37          000016                          NUM14   =14.
    38          000017                          NUM15   =15.
    39
    40
    41
    42          020000                          ECNRB   =BIT13
    43          010000                          UCRB    =BIT12
    44
    45
    46
```

```
                                                                                
                                                                                
                                                                                
                                                                                
                                                                                
002000                          MXLF    =2000   ;MAXIMUM LINEFEED SIZE.  DECIMAL 2048X1/48 INCHES
                                                                                
                                                                                
                                                                                
                                                                                
                                                                                
                                                                                
                                                                                
                                .SBTTL  GLOBAL DATA SECTION
```

```
                                ;++
                                ; THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
                                ; IN MORE THAN ONE TEST.
                                ;--

002170  001200                  SKP14:  .WORD   640.            ;SKIP 14 INCHES MINUS 3 LINES ARGUMENT.
002172  001031                  SKPA4:  .WORD   537.            ;SKIP A4 SPACING MINUS 3 LINES ARGUMENT.
002174  000760                  SKP11:  .WORD   496.            ;SKIP 11 INCHES MINUS 3 LINES ARGUMENT.
002176  000000                  CRNTSK: .WORD                   ;TEMPORARY SAFE LOCATION FOR CURRENT SKIP SIZE.


002200  000000                  CSRADD:         .WORD           ;ADDRESS OF CSR REGISTER


002202  000000                  LOGUNIT:        .WORD           ;LOGICAL UNIT NUMBER
002204  000000                  PLOC:           .WORD           ;ADDRESS OF HARDWARE P-TABLE

                                ;
002206  000000                  GREASE: .WORD   0       ;WHEN = -1, A GREASED EXIT IS PROVIDED FROM THE
                                                        ;CURRENT ROUTINE.


                                ;
                                ;
                                ;               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.
                                ;


002210  033     060             STSRES: .ASCII  <033>/0/                ;2 BYTES. EVOKE STATUS RESPONSE.
002212  033     065             HZTLSP: .ASCII  <033>/5/                ;2 BYTES. PERFORM HORIZONTAL SPACING

002214  012     033     076     DUMMYS: .ASCII  <012><033>/>/<033>/(  9/ ;DUMMY SEQUENCE FOR PRINTER INTERFACE
002217  033     050     040
002222  040     071
                                                                        ;RESET SEQUENCE
002224  033     066             RESET:  .ASCII  <033>/6/                ;2 BYTES. RESET INTERFACE, SHEET FEEDER
                                                                        ;       PRINTER, RECEIVE STATUS
                                                                        ;       RESPONSE AND "XON" CHARACTER.
002226  033     040     040     VRTCLS: .ASCII  <033>/   9/             ;5 BYTES. ACCUMULATE VERTICAL SPACES.
002231  040     071
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
```

```
                                                                     ;        & ONE EXTRA CHARACTER FOR TEST 11.
002244   033   040   040  STCHSZ: .ASCII  <033>/  'A/            ;5 BYTES. SET CHARACTER SIZE. 10 CHR/IN
002247   047   101
002251   033   040   050  STLNSZ: .ASCII  <033>/ (B/             ;4 BYTES. SET LINE SIZE. 6 LINES/INCH
002254   102
002255   033   103        SLFTST: .ASCII  <033>/C/               ;2 BYTES. DO A SELF TEST. SEND STATUS
                                                                 ;AND SEND XON.
002257   033   040   104  STHTCT: .ASCII  <033>/ D/              ;3 BYTES. SET HIT COUNT TO 1 HIT/CHAR.
002262   033   040   047  STSPSZ: .ASCII  <033>/ 'F/             ;4 BYTES. SET SPACE SIZE.  10 SPACES/IN
002265   106
002266   033   040   107  STULMD: .ASCII  <033>/ G/              ;3 BYTES. SET UNDERLINE MODE TO NO-UND.
002271   033   040   040  STPGSZ: .ASCII  <033>/   H/            ;5 BYTES. SET PAGE SIZE.
002274   040   110
002276   033   040   040  SLTPFF: .ASCII  <033>/  !J/            ;5 BYTES. SELECT TRAY AND PERFORM FF.
002301   041   112
                                                                 ;       SELECT FRONT TRAY AND EJECT.

002303   033   056   056  SETHT0: .ASCII  <033>/...D/            ;SET HIT COUNT TO 0 HITS. 5 BYTES.
002306   056   104
002310   033   040   101  SETCH0: .ASCII  <033>/ A/              ;SET SPACE SIZE TO ZERO.

002313   015              CR:     .ASCII  <015>                  ;1 BYTE FOR RETURN ONLY. 2 FOR <CRLF>.
002314   012              LF:     .ASCII  <012>                  ;1 BYTE FOR LINEFEED ONLY.


002315   033   040   040  STATUS: .ASCII  <033>/   0/            ;STAUS SEQUENCE TEMPLATE.
002320   040   060


002322   042   043   041  PSZA4:  .ASCII  /"#!/                  ;PATTERN: TWO THREE ONE IN HEX
002325   042   041   040  PSZ11:  .ASCII  /"! /                  ;PATTERN: 11 INCHES PAGE SIZE TWO ONE
                                                                 ;                         ZERO IN HEX
002330   042   052   040  PSZ14:  .ASCII  /"* /                  ;PATTERN: 14 INCHES PAGE SIZE
                                                                 ;




                          ;
                          ;
                          ;
                          ;       ASCII STRING MESSAGES, TEST TITLES
                          ;
002333   045   116   045  TITLE1: .ASCIZ  /%N%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
002366   045   116   045  TITLE2: .ASCIZ  /%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
```

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

```
 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 DATA SECTION

```
        003101      110      101      122
        003104      101      103      124
        003107      105      122      123
        003112      015      012      000                                                    ;TITLE FOR TEST 9.
    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                                                                                    ;TITLE FOR TEST 10.
    107 003200      105      116      124  PRMPTA: .ASCIZ  /ENTER STRING. Q TO EXIT TEST.  END WITH <RETURN>./<015><012>
        003203      105      122      040
        003206      123      124      122
        003211      111      116      107
        003214      056      040      121
        003217      040      124      117
        003222      040      105      130
        003225      111      124      040
        003230      124      105      123
        003233      124      056      040
        003236      040      105      116
        003241      104      040      127
        003244      111      124      110
        003247      040      074      122
        003252      105      124      125
        003255      122      116      076
        003260      056      015      012
        003263      000
    108                                                                                    ;PROMPT FOR TEST 10.
    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
```

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                003341      116     124     122
                003344      117     114     015
                003347      012     000
    1;0                                                                 ;TITLE FOR TEST 11.
    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         .ASCIZ  /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
```

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         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: .ASCIZ  /%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: .ASCIZ  /%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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     004042   122   012   015
     004045   000
 124                                                                      ;TITLE FOR TEST 13.
 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   124   040
     004070   120   101   107
     004073   105   040   123
     004076   110   105   105
     004101   124   040   106
     004104   105   105   104
     004107   105   122   040
     004112   115   125   123
     004115   124   040   102
     004120   105   040   111
     004123   116   123   124
     004126   101   114   114
     004131   105   104   056
     004134   012   015
 126 004136   012   015                   .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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        004303      103      110      105
        004306      123      012      015
    132 004311      103      040      040          .ASCIZ  /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          .ASCIZ  /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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        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          .ASCIZ  /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
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                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: .ASCIZ  /%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                                         .EVEN
    147
    148         005246  000000              MSGADD: .WORD                       ;HOLDS ADDRESS OF A MESSAGE
    149         005250  000000              TRXADD: .WORD
    150         005252  000000              BAUDRT: .WORD
    151         005254  176500              DLDFLT: .WORD   176500              ;DEFAULT CSR ADDRESS - SINGLE LINE
    152         005256  176010              DZDFLT: .WORD   176010              ;DEFAULT CSR ADDRESS - MULTILINE.
```

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    153 005260  000000                    DFAIL:  .WORD   C
    154
    155 005262  000000  000000  000101    BASET:  .WORD   0,0,101          ;TABLE ENTRY - 3 WORDS, INCLUDES THE
    156 005270  000000  000036  000102            .WORD   0,30.,102        ;ROW #, THE COLUMN #, THE ASCII
    157 005276  000000  000074  000103            .WORD   0,60.,103        ;VALUE AND THE ACCESS INDICATOR.
    158 005304  000000  000132  000104            .WORD   0,90.,104        ;THE ROW NUMBER AND THE COLUMN NUMBER
    159 005312  000000  000170  000105            .WORD   0,120.,105       ;ARE WORDS AND THE ASCII VALUE AND
    160 005320  000000  000226  000106            .WORD   0,150.,106       ;ACCESS INDICATOR ARE BYTES.  THE
    161 005326  000000  000264  000107            .WORD   0,180.,107       ;FORMAT IS AS FOLLOWS:
    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       ;       ROW # - VRTCLS - LO BYTE    0
    165 005356  000014  000000  000102            .WORD   12.,0,102        ;---------------------------------
    166 005364  000014  000036  000103            .WORD   12.,30.,103      ;       ROW # - VRTCLS - HI BYTE    1
    167 005372  000014  000074  000104            .WORD   12.,60.,104      ;---------------------------------
    168 005400  000014  000132  000105            .WORD   12.,90.,105      ;    COLUMN # - HRZTLS - LO BYTE   2
    169 005406  000014  000170  000106            .WORD   12.,120.,106     ;---------------------------------
    170 005414  000014  000226  000107            .WORD   12.,150.,107     ;    COLUMN # - HRZTLS - HI BYTE   3
    171 005422  000014  000264  000110            .WORD   12.,180.,110     ;---------------------------------
    172 005430  000014  000322  000111            .WORD   12.,210.,111     ; UNIQUENESS INDICATOR - 1=UNIQUE  4
    173 005436  000014  000360  000112            .WORD   12.,240.,112     ;---------------------------------
    174 005444  000014  000416  000113            .WORD   12.,270.,113     ;       ASCII BYTE FOR PRINTING     5
    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      ;(THE NUMBER TO THE RIGHT IN THE ABOVE
    179 005502  000030  000170  000107            .WORD   24.,120.,107     ; FIGURE IS THE BYTE OFFSET FROM THE
    180 005510  000030  000226  000110            .WORD   24.,150.,110     ; TABLE ENTRY ADDRESS.)
    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     ;
```

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

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

```
                        TMPLT2: .WORD   177417  ;BITS 4 - 7 USED IN CONVRT TO DECODE PRINTER XMISSIONS
                        TMPLT3: .WORD   177760  ;BITS 0 - 3

                        TCRENA: .WORD           ;WILL CONTAIN TCR ARGUMENT - CHANNEL SELECT
                        JUNKPL: .WORD           ;WILL CONTAIN NOTHING IF DZ CHOSEN. WILL
                                                ;CONTAIN JUNK IF DL CHOSEN.  SEE SENCHR ROUTINE

                        LPRINI: .WORD   017070  ;LPR INITIALIZE REGISTER.
                                                ;THE FOLLOWING STATUS IS ASSUMED:
                                                ;       1)RX-ON
                                                ;       2)9600 BAUD
                                                ;       3)NO PARITY
                                                ;       4)2 UNIT STOP CODE
                                                ;       5)8 BIT CHARACTER LENGTH
                                                ;
                        TCRTBL: .WORD   1       ;TABLE OF BIT POSITIONS USED TO SET UP THE
                                .WORD   2       ;TCR REGISTER FOR THE APPROPRIATE CHANNEL.
                                .WORD   4
                                .WORD   8.
                                .WORD   16.
                                .WORD   32.
                                .WORD   64.
                                .WORD   128.

                        BAUTBL: .WORD   1280.   ;TABLE OF MASKS TO USE IN SETTING THE BAUD
                                .WORD   1408.   ;RATE  FOR THE PRINTER IN THE LPR REGISTER.
                                .WORD   1536.
                                .WORD   2560.
                                .WORD   3072.
                                .WORD   3584.

                        ;
                        ;
                        ERWORD: .WORD   0       ;CONTAINS VARIOUS ERROR FLAGS
                        CRNTPR: .WORD   0       ;CONTAINS THE COUNT OF CHARACTERS ALREADY PRINTED
                                                ;ON THE CURRENT LINE IN THE BIDIRECTIONAL PRINTING
                                                ;CODE.  (XMIT)
                        DIRCTN: .WORD   0       ;CURRENT PRINTING DIRECTION. 0=FORWARD, 1=REVERSE

                        OUTCTR: .WORD           ;COUNTERS USED IN WAITXN
                        OUTSDC: .WORD           ;       AND GETCHR TO WAIT OUT THE PRINTER OPERATIONS.
                        FLTRDY: .WORD           ;INDICATES FAILURE TO FIND TRANSMIT READY CONDITION.


                        ;       SPECIAL CHARACTER DEFINITIONS

                        BR2:    .BYTE           ;TEMPORARY STORAGE FOR A BYTE VALUE. TEST #13
                        EOT:    .BYTE   004     ;ASCII "EOT"
                        CAN:    .BYTE   030     ;ASCII "CAN"
                        XOFF:   .BYTE   023     ;ASCII "XOFF"
                        XON:    .BYTE   021     ;OCTAL 021 = ASCII "XON"
                        ESCAPE: .BYTE   033     ;OCTAL 033 = ASCII "ESC"
                        .EVEN
                        SNGCHR: .WORD           ;STORAGE FOR A SINGLE CHARACTER
                        CTLZ:   .BYTE   032     ;OCTAL 032 = ASCII "^Z"
```

GLOBAL DATA SECTION

```
    324 006525      121                     SCQ:    .ASCII  /Q/     ;SINGLE CHARACTER "Q"
    325 006526      103                     SCC:    .ASCII  /C/     ;SINGLE CHARACTER "C"
    326 006527      102                     SCB:    .ASCII  /B/     ;SINGLE CHARACTER "B"
    327 006530      130                     SCX:    .ASCII  /X/     ;SINGLE CHARACTER "X"
    328 006531      101                     SCA:    .ASCII  /A/     ;SINGLE CHARACTER "A"
    329 006532      060                     SC0:    .ASCII  /0/     ;SINGLE CHARACTER "0"
    330 006533      061                     SC1:    .ASCII  /1/     ;SINGLE CHARACTER "1"
    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
```

```
        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:;<=>?@ABCEDFGHIJKLMNOPQRSTU/
        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>/abcdefghijklmnopqrstuvwxyz/
        007141      131     132     133
        007144      134     135     136
        007147      137     140     141
        007152      142     143     144
        007155      145     146     147
        007160      150     151     152
```

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

```
                                        .WORD   EDFM7
                                        .WORD   EDFM8
                                        .WORD   EDFM9
                                        .WORD   EDFMA
                                        .WORD   EDFMB
                                        .WORD   EDFMC
                                        .WORD   EDFMD


;--

BFRA:   .BLKB   300.    ;BUFFER FOR INPUT FROM USER AND ALSO USED AS A
                        ;SOFTWARE STACK.
TOPSTK: .WORD           ;USED TO POINT TO THE TOP OF THE SOFTWARE STACK
                        ;WHEN NEEDED.  #BFRA + 150.
BFRB:   .WORD           ;DEFAULT AREAS FOR GMANID QUESTIONS. MAY BE CLEARED.
BFRC:   .WORD           ;       ''
BFRD:   .WORD           ;       ''

SPCSIZ: .WORD           ;THE NUMBER OF HORIZONTAL INCREMENTS PER SPACE.

LINN:   .WORD           ;THE NUMBER OF HORIZONTAL INCREMENTS PER LINE.

LINSIZ: .WORD           ;THE NUMBER OF CHARACTERS PER LINE ON PRINTER.

TRDYBT: .WORD           ;TRANSMIT READY BIT POSITION. VALUE IS SET DYNAMICALLY
                        ;IN THE INITIALIZATION CODE SO THAT BOTH SINGLE LINE
                        ;INTERFACES AND DZ11 INTERFACES MAY BE USED.
                            .


                        ;USED IN PROCEDURE CONVRT:
MNEB1:  .BYTE           ;USED TO PASS A MNEMONIC VALUE FROM THE CONVERSION
MNEB2:  .BYTE           ;ROUTINE.  A SINGLE WORD VALUE ACCEPTED, THREE BYTES
MNEB3:  .BYTE           ;RETURNED TO CALLER: MNEB1, MNEB2, MNEB3.

        .EVEN


MLTLIN: .WORD           ;INDICATOR:  MULTILINE INTERFACE?-1  SINGLE LINE?-0


DELCNT: .WORD           ;COUNTER OF SMALL TIME INCREMENTS USED IN DELAY ROUTINE

NDATA:  .WORD   0       ;NO DEVICE AT THAT ADDRESS INDICATOR.  UNIBUS FAILURE
                        ;TO FIND A DEVICE AT THE REFERENCED ADDRESS CAUSES A
                        ;TRAP TO OCCUR WHICH IN TURN WILL SET THE NDATA WORD
                        ;TO ONE.
HITARG: .BYTE           ;TEMPORARY STORAGE OF THE HIT COUNT ARGUMENT USED IN
                        ;SET HIT COUNT TEST.
        .EVEN
LINCNT: .WORD           ;A LINE COUNTER USED IN TEST #5. PAPER POSITIONING TEST

CHRCNT: .WORD           ;A CHARACTER COUNTER USED IN TEST #6, WHERE ONE LINE OF
                        ;EACH CHARACTER IS PRINTED.
CCOUNT: .WORD           ;A COUNT OF CYCLES, USED IN TEST #11- LIFT/DROP RIBBON
```

```
    440 010070  000000                INUPB:  .WORD           ;AN INDICATOR OF WHETHER THE PRINTER RIBBON IS IN THE
    441                                                       ;UP OR DOWN POSITION.  TEST #11, LOCAL PROC. MANLD:
    442
    443
    444
    445 010072                        ERRTBL
        010072                                                                  L$ERRTBL::
        010072  000000                ERRTYP::        .WORD   0
        010074  000000                EPRNBR::        .WORD   0
        010076  000000                ERRMSG::        .WORD   0
        010100  000000                ERRBLK::        .WORD   0
    446
    447                               .SBTTL  GLOBAL TEXT SECTION
```

```
                                ;++
                                ; THE GLOBAL TEXT SECTION CONTAINS FORMAT STATEMENTS,
                                ; MESSAGES, AND ASCII INFORMATION THAT ARE USED IN
                                ; MORE THAN ONE TEST.
                                ;--
                                ;
                                ; NAMES OF DEVICES SUPPORTED BY PROGRAM
                                ;
010102                                  DEVTYP  <LQPSE-F SERIAL LETTER QUALITY PRINTER>
010102                                                                          L$DVTYP::
010102  114     121     120                                                             .ASCIZ  /LQPSE-F SERIAL LETT
010105  123     105     055
010110  106     040     123
010113  105     122     111
010116  101     114     040
010121  114     105     124
010124  124     105     122
010127  040     121     125
010132  101     114     111
010135  124     131     040
010140  120     122     111
010143  116     124     105
010146  122     000
                                                                                .EVEN
                                ;
                                ; TEST DESCRIPTION
                                ;
                                ;
010150                                  DESCRIPT        <DIAGNOSTIC FOR LQPSE-F SERIAL PRINTER ON PDP-11>
010150                                                                          L$DESC::
010150  104     111     101                                                             .ASCIZ  /DIAGNOSTIC FOR LQPS
010153  107     116     117
010156  123     124     111
010161  103     040     106
010164  117     122     040
010167  114     121     120
010172  123     105     055
010175  106     040     123
010200  105     122     111
010203  101     114     040
010206  120     122     111
010211  116     124     105
010214  122     040     117
010217  116     040     120
010222  104     120     055
010225  061     061     000
                                                                                .EVEN


                                ;       THIS PROGRAM WILL PERFORM UP TO THIRTEEN SEQUENTIAL TESTS ON THE
                                ;       LQPSE-F SERIAL INTERFACE PRINTER.  THE TESTS WILL CHECK BOTH THE
                                ;       LOCAL PRINTER SOFTWARE AND THE PRINTER HARDWARE BY SENDING VARIOUS
                                ;       CHARACTER SEQUENCES TO THE PRINTER WHICH WILL CHALLENGE THE PRINTER
                                ;       SPECIFIED CAPABILITIES.  A PRINT PATTERN WILL BE GENERATED ON THE
```

```
                                ;       PRINTER WHICH WILL BE USED IN THE DIAGNOSTIC PROCESS BY THE FIELD
                                ;       SERVICE TECHNICIAN.
                                
                                        .EVEN
                                
                                ;
                                ; FORMAT STATEMENTS USED IN PRINT CALLS
                                ;
                                
                                ;*****************************************************************************
                                ;
                                ;       ERROR STATEMENT TABLES
                                ;
                                ;       THESE TABLES ARE USED BY THE ERRDF, PRINTB, AND PRINTX MACROS
                                ;       IN THE PROCESS OF PRINTING ERROR MESSAGES TO THE USER AT THE CONSOLE.
                                ;
                                ;.............................................................................
                                ;
                                ;       GENERAL FORMATS FOR OUTPUT OF PC AT TIME OF CALL AND ADDRESS OF
                                ;       LATEST TRANSMISSION.
                                ;
010230  045  116  045  PRTBM0: .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  PRTXM0: .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
                                ;
                                ;.............................................................................
                                ;
```

```
                                        ;       ERWORD BIT-0    I/O FAILURE
                                        ;
 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
                                        ;
                                        ;       USE OF THESE STRINGS WILL BE AS FOLLOWS...
                                        ;       ERRDF   #NUM0,EDFM8             -DEVICE FATAL ERROR CALL
                                        ;       PRINTB  PRTBM0,PGMCTR           -PRINT BASIC ERROR MESSAGE
                                        ;       PRINTX  PRTXM0,TRXADD,ERWORD    -PRINT EXTENDED ERROR MESSAGE
                                        ;
                                        ;.....................................................................
                                        ;
                                        ;       ERWORD BIT-1    BUFFER FULL
                                        ;
 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
                                        ;
                                        ;       USE OF THESE STRINGS WILL BE AS FOLLOWS...
                                        ;       ERRDF   #NUM7,EDFM1             -DEVICE FATAL ERROR CALL
                                        ;       PRINTB  PRTBM0,PGMCTR           -PRINT BASIC ERROR MESSAGE
                                        ;       PRINTX  PRTXM0,TRXADD,ERWORD    -PRINT EXTENDED ERROR MESSAGE
                                        ;
                                        ;.....................................................................
                                        ;
                                        ;       ERWORD BIT-2    PROM/RAM FAILURE
                                        ;
 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
```

```
         010530      131      040      120
         010533      122      111      116
         010536      124      105      122
         010541      056      000
     79
     80                                    ;       USE OF THESE STRINGS WILL BE AS FOLLOWS...
     81                                    ;       ERRDF   #NUM8,EDFM2             -DEVICE FATAL ERROR CALL
     82                                    ;       PRINTB  PRTBM0,PGMCTR           -PRINT BASIC ERROR MESSAGE
     83                                    ;       PRINTX  PRTXM0,TRXADD,ERWORD    -PRINT EXTENDED ERROR MESSAGE
     84                                    ;
     85                                    ;.....................................................................
     86                                    ;
     87                                    ;       ERWORD BIT-3 PRINTER ERROR - N OUT OF RANGE IN ESC SEQUENCE
     88                                    ;
     89 010543      120      122      111  EDFM3:  .ASCIZ  /PRINTER ERROR: N OUT OF RANGE IN ESC SEQUENCE./
         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
     90                                    ;
     91                                    ;       USE OF THESE STRINGS WILL BE AS FOLLOWS...
     92                                    ;       ERRDF   #NUM9,EDFM3             -DEVICE FATAL ERROR CALL
     93                                    ;       PRINTB  PRTBM0,PGMCTR           -PRINT BASIC ERROR MESSAGE
     94                                    ;       PRINTX  PRTXM0,TRXADD,ERWORD    -PRINT EXTENDED ERROR MESSAGE
     95                                    ;
     96                                    ;.....................................................................
     97                                    ;
     98                                    ;       ERWORD BIT-4    PAUSE SWITCH
     99                                    ;
    100 010622      120      101      125  EDFM4:  .ASCIZ  /PAUSE SWITCH PRESSED./
         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
    101                                    ;
    102                                    ;PRTBM0 AND PRTXM0 ARE USED IN THIS ERROR RESPONSE ALSO.  USE OF THESE STRINGS
    103                                    ;WILL BE AS FOLLOWS...
    104                                    ;
    105                                    ;       USE OF THESE STRINGS WILL BE AS FOLLOWS...
    106                                    ;       ERRDF   #NUM2,EDFM4             -DEVICE FATAL ERROR CALL
    107                                    ;       PRINTB  PRTBM0,PGMCTR           -PRINT BASIC ERROR MESSAGE
    108                                    ;       PRINTX  PRTXM0,TRXADD,ERWORD    -PRINT EXTENDED ERROR MESSAGE
    109                                    ;
```

```
                                ;.....................................................................
                                ;
                                ;       ERWORD BIT-5    RIBBON OUT
                                ;
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
                                ;
                                ;       USE OF THESE STRINGS WILL BE AS FOLLOWS...
                                ;       ERRDF   #NUM3,EDFM5             -DEVICE FATAL ERROR CALL
                                ;       PRINTB  PRTBM0,PGMCTR           -PRINT BASIC ERROR MESSAGE
                                ;       PRINTX  PRTXM0,TRXADD,ERWORD    -PRINT EXTENDED ERROR MESSAGE
                                ;
                                ;.....................................................................
                                ;
                                ;       ERWORD BIT-6    UNDEFINED CHARACTER OR ESC SEQUENCE RECEIVED.
                                ;
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
                                ;
                                ;       USE OF THESE STRINGS WILL BE AS FOLLOWS...
                                ;       ERRDF   #NUM4,EDFM6             -DEVICE FATAL ERROR CALL
                                ;       PRINTB  PRTBM0,PGMCTR           -PRINT BASIC ERROR MESSAGE
                                ;       PRINTX  PRTXM0,TRXADD,ERWORD    -PRINT EXTENDED ERROR MESSAGE
                                ;
                                ;.....................................................................
                                ;
                                ;       ERWORD BIT-7    SHEET FEEDER ERPOR
                                ;
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
```

```
                011010  106     105     105
                011013  104     105     122
                011016  040     105     122
                011021  122     117     122
                011024  056     000
    137                                     ;
    138                                     ;       USE OF THESE STRINGS WILL BE AS FOLLOWS...
    139                                     ;       ERRDF   #NUM5,EDFM/             -DEVICE FATAL ERROR CALL
    140                                     ;       PRINTB  PRTBM0,PGMCTR           -PRINT BASIC ERROR MESSAGE
    141                                     ;       PRINTX  PRTXM0,TRXADD,ERWORD    -PRINT EXTENDED ERROR MESSAGE
    142                                     ;
    143                                     ;.....................................................................
    144                                     ;
    145                                     ;
    146 011026  127     101     122     EDFM8:  .ASCII  /WARNING:  SOFTWARE ERROR.  THIS MESSAGE SHOULD NOT PRINT/
        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
    147 011116  125     116     114             .ASCIZ  /UNLESS ERROR WORD (ERWORD) HAS BEEN CORRUPTED./
        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
        011173  056     000
    148 011175  105     122     122     EDFM9:  .ASCIZ  /ERROR DETECTED BY PRINTER./
        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
```

```
     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  /%AWAITING/     ;WHEN GETCHR WAIT STARTS GETTING LONG...
     011435     101     111     124
     011440     111     116     107
     011443     000
155
156                                  ;.....................................................................
157                                  ;
158                                  ;       ERWORD BIT-12   UNEXPECTED CHARACTER RECEIVED
159                                  ;
160  011444     125     116     105  EDFMC:  .ASCIZ  /UNEXPECTED CHARACTER RECEIVED FROM PRINTER./
     011447     130     120     105
```

```
        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
    161
    162                                  ;       USE OF THESE STRINGS WILL BE AS FOLLOWS...
    163                                  ;       ERRDF   #NUM10,EDFMC            -DEVICE FATAL ERROR CALL
    164                                  ;       PRINTB  PRTBM0,PGMCTR           -PRINT BASIC ERROR MESSAGE
    165                                  ;       PRINTX  PRTXM0,TRXADD,ERWORD    -PRINT EXTENDED ERROR MESSAGE
    166                                  ;
    167                                  ;.....................................................................
    168                                  ;
    169                                  ;       ERWORD BIT-13   EXPECTED CHARACTER NOT RECEIVED FROM PRINTER
    170                                  ;
    171 011520      105      130      120 FDFMD:  .ASCIZ  /EXPECTED CHARACTER NOT RECEIVED FROM THE PRINTER./
        011523      105      103      124
        011526      105      104      040
        011531      103      110      101
        011534      122      101      103
        011537      124      105      122
        011542      040      116      117
        011545      124      040      122
        011550      105      103      105
        011553      111      126      105
        011556      104      040      106
        011561      122      117      115
        011564      040      124      110
        011567      105      040      120
        011572      122      111      116
        011575      124      105      122
        011600      056      000
    172                                  ;
    173                                  ;       USE OF THESE STRINGS WILL BE AS FOLLOWS...
    174                                  ;       ERRDF   #NUM11,EDFMD            -DEVICE FATAL ERROR CALL
    175                                  ;       PRINTB  PRTBM0,PGMCTR           -PRINT BASIC ERROR MESSAGE
    176                                  ;       PRINTX  PRTXM0,TRXADD,ERWORD    -PRINT EXTENDED ERROR MESSAGE
    177                                  ;
    178                                  ;.....................................................................
    179 011602      045      116      045 FAILM:  .ASCII  /%N%AFAILED TO FIND PRINTER AT DEFAULT ADDRESSES./
        011605      101      106      101
        011610      111      114      105
        011613      104      040      124
        011616      117      040      106
        011621      111      116      104
        011624      040      120      122
        011627      111      116      124
        011632      105      122      040
        011635      101      124      040
```

```
                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         .ASCIZ  /%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
```

```
        012107     040      040      040
        012112     040      040      040
        012115     040      040      040
        012120     045      000
    183
    184                                  ;                        ERROR MESSAGE FORMAT FOR FAILURE IN DEFAULT PROCEDURE.
    185 012122     045      116      045  FAILDL: .ASCIZ  /%N%AINCORRECT CSR ADDRESS GIVEN.  TRY AGAIN..             %/
        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  FAILDZ: .ASCIZ  /%N%AINCORRECT CSR ADDRESS OR CHANNEL GIVEN.  TRY AGAIN...   %/
        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  FXRDYM: .ASCIZ  /%N%AFAILED TO TRANSMIT TO PRINTER.                       %/
        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
```

```
        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
```

```
    193                                 .SBTTL  GLOBAL ERROR REPORT SECTION
```

```
                        ;++
                        ; 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
012610                          BGNMSG


012610                          EXIT    MSG
012610  000167                                                          .WORD   J$JMP
012612  000000                                                          .WORD   L10001-2$.


012614                          ENDMSG
012614                                                          L10001:
012614  104423                                                          TRAP    C$MSG
                        .SBTTL  GLOBAL SUBROUTINES SECTION
```

GLOBAL SUBROUTINES SECTION

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

```
;-------------------------------------------------------------------------------
;----                                                                      ----
;----                          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 IA 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
;
;
```

```
012616  011637  007314          XMIT:   MOV     (SP),PGMCTR     ;SAVE THE CALLING PC + 4
012622  010146                          MOV     R1,-(SP)
012624  010246                          MOV     R2,-(SP)
012626  010346                          MOV     R3,-(SP)        ;SAVE ALL GUARANTEED
012630  010446                          MOV     R4,-(SP)        ;       REGISTERS.
012632  010546                          MOV     R5,-(SP)        ;

012634  010137  005250                  MOV     R1,TRXADD       ;SAVE THE TRANSMISSION ADDRESS

012640  012705  007352                  MOV     #BFRA,R5        ;BOTTOM OF SOFTWARE STACK
012644  062705  000226                  ADD     #150.,R5        ;TOP OF SOFTWARE STACK
012650  010537  010026                  MOV     R5,TOPSTK       ;TOP OF STACK ADDRESS
012654  005237  010026                  INC     TOPSTK          ;PLUS 1 FOR COUNTING PURPOSES.

012660  005703                          TST     R3              ;IF ZERO THEN NO BIDIRECTIONAL PRINTING
012662  001021                          BNE     BIDIRP          ;IF SET THEN GOTO BIDIRECTIONAL PRNTG CODE

                                ;
                                ;                                NO BIDIRECTIONAL PRINTING.  ALL CARRIAGE
                                ;                                CONTROL MUST BE EXPLICITLY SENT BY
                                ;                                THE CALLING ROUTINE.

012664  010103                          MOV     R1,R3           ;ADDRESS OF THE FIRST CHARACTER IN THE STRING
012666  060203                          ADD     R2,R3           ;ADDRESS OF THE LAST CHARACTER IN THE STRING
                                                                ;                          PLUS ONE.
012670  112102                  XSTR:   MOVB    (R1)+,R2        ;GET THE CHARACTER INTO R2 AND POINT TO NEXT
                                                                ;       CHARACTER IN STRING.
012672  005037  002206                  CLR     GREASE          ;ASSUME NO PREVIOUS ERRORS.
012676  004737  013366                  JSR     PC,SENCHR       ;SEND THE CHARACTER IN R2 TO THE PRINTER.

012702  022737  177777  002206          CMP     #-1,GREASE      ;TIME-OUT ERROR. ECNR STATUS.
012710  001002                          BNE     LCHYET          ;EXPRESS EXIT FOR ECNR ERROR REPORT.
012712  000137  013352                  JMP     EXITX

012716  020103                  LCHYET: CMP     R1,R3           ;HAS THE LAST CHARACTER BEEN PRINTED YET?
012720  100763                          BMI     XSTR            ;LOOP THROUGH THE LIST UNTIL DONE.
012722  000137  013352                  JMP     EXITX           ;AND WHEN DONE WITH STRING, EXIT TEST...
                                ;
                                ;                                BIDIRECTIONAL PRINTING CODE FOLLOWS....
                                ;
012726  010103                  BIDIRP: MOV     R1,R3           ;ADDRESS OF THE STRING TO BE PRINTED
012730  060203                          ADD     R2,R3           ;ADDRESS OF LAST CHARACTER TO BE PRINTED.
                                                                ;       PLUS 1 FOR COUNTING PURPOSES.

012732  023737  006502  010042  LNELOO: CMP     CRNTPR,LINSIZ   ;CRNTPR -CURRENT POINTER- IS INITIALIZED TO
                                                                ; ZERO BY THE INITCD ROUTINE.  CRNTPR KEEPS
                                                                ; TRACK OF HTE NUMBER OF CHARACTERS PRINTED
                                                                ; SINCE THE LAST LINE FEED.
012740  100567                          BMI     SENDR2          ;IF CRNTPR LESS THAN LINSIZ THEN THERE ARE
                                                                ; MORE CHARACTERS TO PRINT ON THIS LINE.
012742  113702  002314                  MOVB    LF,R2           ;LINE IS FINISHED.  SEND LINE FEED AND REVERSE
012746  004737  013366                  JSR     PC,SENCHR       ; THE PRINT DIRECTION.

012752  005037  006502                  CLR     CRNTPR          ;RESET THE CHARACTER COUNT FOR THIS LINE.
012756  005737  006504                  TST     DIRCTN          ;WHAT IS THE CURRENT PRINT DIRECTION? 0=FORWARD
012762  001100                          BNE     FWRDO           ;IF REVERSE (1) THEN CHANGE TO FORWORD PRINT.
```

```
012764  012737  000001  006504          MOV     #1,DIRCTN          ;IF FORWARD (1) THEN CHANGE TO REVERSE PRINT.
                                                                   ;
012772  113702  002244                  MOVB    STCHSZ,R2          ;"ESC" CHAR
012776  004737  013366                  JSR     PC,SENCHR          ;TO RESET CHARACTER SIZE TO NEGATIVE 10 CHAR
                                                                   ;
013002  022737  177777  002206          CMP     #-1,GREASE         ;HAS A TIME-OUT OCCURRED?  EXPRESS EXIT
013010  001560                          BEQ     EXITX              ;FROM THIS ROUTINE MAY BE REQUIRED.
                                                                   ;
013012  112702  000057                  MOVB    #HEXF,R2           ;       PER INCH. THIS ENABLES REVERSE <---.
013016  004737  013366                  JSR     PC,SENCHR          ;       CARRIAGE MOTION WHILE PRINTING. <--

013022  022737  177777  002206          CMP     #-1,GREASE         ;HAS A TIME-OUT OCCURRED?  EXPRESS EXIT
013030  001550                          BEQ     EXITX              ;FROM THIS ROUTINE MAY BE REQUIRED.

013032  004737  013366                  JSR     PC,SENCHR          ;HEXF,HEXF,FOUR= -12 = -10 CHAR/INCH

013036  022737  177777  002206          CMP     #-1,GREASE         ;HAS A TIME-OUT OCCURRED?  EXPRESS EXIT
013044  001542                          BEQ     EXITX              ;FROM THIS ROUTINE MAY BE REQUIRED.

013046  112702  000044                  MOVB    #FOUR,R2           ;
013052  004737  013366                  JSR     PC,SENCHR          ;

013056  022737  177777  002206          CMP     #-1,GREASE         ;HAS A TIME-OUT OCCURRED?  EXPRESS EXIT
013064  001532                          BEQ     EXITX              ;FROM THIS ROUTINE MAY BE REQUIRED.

013066  012700  000004                  MOV     #4,R0
013072  116002  002244                  MOVB    STCHSZ(R0),R2      ; SEQUENCE: ESC 1111 1111 0100 A
013076  004737  013366                  JSR     PC,SENCHR          ; SENT TO THE PRINTER.

013102  022737  177777  002206          CMP     #-1,GREASE         ;HAS A TIME-OUT OCCURRED?  EXPRESS EXIT
013110  001520                          BEQ     EXITX              ;FROM THIS ROUTINE MAY BE REQUIRED.

                                                                   ;NOW MOVE THE CARRIAGE ONE SPACE TO THE
                                                                   ;LEFT TO EVEN UP THE MARGIN.
                                                                   ;
013112  113702  006521                  MOVB    ESCAPE,R2          ;SEND ESCAPE CHAR TO PRINTER
013116  004737  013366                  JSR     PC,SENCHR          ;

013122  112702  000057                  MOVB    #HEXF,R2           ;NOW TRANSMIT -12 IN THREE HEX VALUES
013126  004737  013366                  JSR     PC,SENCHR          ;                  IN THREE CHARACTERS

013132  112702  000057                  MOVB    #HEXF,R2           ;
013136  004737  013366                  JSR     PC,SENCHR          ;

013142  112702  000044                  MOVB    #FOUR,R2           ;
013146  004737  013366                  JSR     PC,SENCHR          ;

013152  112702  000073                  MOVB    #73,R2             ;SEMI-COLON TO COMPLETE THE SEQUENCE WHERE
013156  004737  013366                  JSR     PC,SENCHR          ; ESC HEXF,HEXF,FOUR (SEMI-COLON) CAUSES
                                                                   ; THE ONE-TENTH INCH SPACE TO THE LEFT.

                                                                   ;THE MARGIN SHOULD NOW BE EVEN.

013162  000456                          BR      SENDR2             ;NOW SEND THE CHARACTER TO THE PRINTER.
```

```



013164  005037  006504          FWRDO:  CLR     DIRCTN          ;INDICATE THAT THE DIRECTION IS FORWARD PRINT.
                                                                ;
                                                                ;RESTORE CHARACTER SIZE TO A POSITIVE 10 CHAR
                                                                ;PER INCH.  AT LEAST TWO MORE LINES TO GO....
                                                                ;
013170  113702  002244                  MOVB    STCHSZ,R2       ;RESTORE CARRIAGE MOTION TO FORWARD.
013174  004737  013366                  JSR     PC,SENCHR       ;

013200  022737  177777  002206          CMP     #-1,GREASE      ;HAS A TIME-OUT OCCURRED?  EXPRESS EXIT
013206  001461                          BEQ     EXITX           ;FROM THIS ROUTINE MAY BE REQUIRED.

013210  112702  000040                  MOVB    #ZERO,R2        ;
013214  004737  013366                  JSR     PC,SENCHR       ;

013220  022737  177777  002206          CMP     #-1,GREASE      ;HAS A TIME-OUT OCCURRED?  EXPRESS EXIT
013226  001451                          BEQ     EXITX           ;FROM THIS ROUTINE MAY BE REQUIRED.

013230  004737  013366                  JSR     PC,SENCHR       ;SEQUENCE SENT: ESC 0000 0000 1100 A

013234  022737  177777  002206          CMP     #-1,GREASE      ;HAS A TIME-OUT OCCURRED?  EXPRESS EXIT
013242  001443                          BEQ     EXITX           ;FROM THIS ROUTINE MAY BE REQUIRED.

013244  112702  000054                  MOVB    #HEXC,R2        ;ZERO,ZERO,HEXC = 12 = 10 CHARACTERS/INCH
013250  004737  013366                  JSR     PC,SENCHR       ;

013254  022737  177777  002206          CMP     #-1,GREASE      ;HAS A TIME-OUT OCCURRED?  EXPRESS EXIT
013262  001433                          BEQ     EXITX           ;FROM THIS ROUTINE MAY BE REQUIRED.

013264  012700  000004                  MOV     #4,R0
013270  116002  002244                  MOVB    STCHSZ(R0),R2   ;
013274  004737  013366                  JSR     PC,SENCHR       ;FORWARD CARRIAGE RESTORED.

013300  022737  177777  002206          CMP     #-1,GREASE      ;HAS A TIME-OUT OCCURRED?  EXPRESS EXIT
013306  001421                          BEQ     EXITX           ;FROM THIS ROUTINE MAY BE REQUIRED.

013310  113702  006541                  MOVB    SPACE,R2        ;NOW TRANSMIT A SPACE TO EVEN UP THE MARGIN.
013314  004737  013366                  JSR     PC,SENCHR       ;

013320  112102                  SENDR2: MOVB    (R1)+,R2        ;GET THE CHARACTER FOR TRANSMISSION.
013322  004737  013366                  JSR     PC,SENCHR       ;SEND THE CHARACTER TO THE PRINTER.
013326  022737  177777  002206          CMP     #-1,GREASE      ;
013334  001406                          BEQ     EXITX           ;EXPRESS EXIT IF ANY PROBLEMS.

013336  005237  006502                  INC     CRNTPR          ;CURRENT IN-LINE POINTER UPDATED.
013342  020103                          CMP     R1,R3           ;IS THE ADDRESS OF THE NEXT CHARACTER TO BE
                                                                ;PRINTED EQUAL TO THE ADDRESS OF THE LAST
                                                                ;CHARACTER (PLUS 1) TO BE TRANSMITTED?
013344  001402                          BEQ     EXITX           ;IF NOT YET THERE, REPEAT TRANSMIT PROCESS.
013346  000137  012732                  JMP     LNELOO

013352  012605                  EXITX:  MOV     (SP)+,R5        ;RESTORE
013354  012604                          MOV     (SP)+,R4        ;       REGISTERS
013356  012603                          MOV     (SP)+,R3        ;
013360  012602                          MOV     (SP)+,R2
```

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

```
;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.
;

013366  010246                  SENCHR: MOV     R2,-(SP)        ;SAVE
013370  010346                          MOV     R3,-(SP)
013372  010446                          MOV     R4,-(SP)        ;       REGISTERS
013374  010546                          MOV     R5,-(SP)

013376  013777  006442  173702  SENCH2: MOV     LPRINI,@LPR     ;IF DZ THEN SET PARMS, IF DL THEN NO EFFECT.
013404  013777  006436  173676          MOV     TCRENA,@TCR     ;IF DZ THEN SET CHANNEL. IF DL, NO EFFECT.
013412  005005                          CLR     R5
013414  005003                  RESINN: CLR     R3              ;COUNTER
013416  005203                  SENCLP: INC     R3              ;COUNTER
013420  020327  007000                  CMP     R3,#7000        ;INNER LOOP CHECK
013424  100420                          BMI     CNTNU           ;KEEP LOOPING UNTIL WE REACH 77000
013426  005205                          INC     R5              ;OUTER LOOP COUNTER

013430  020527  000106                  CMP     R5,#70.         ;PRINT A WAITING TO SEND MESSAGE.
013434  001010                          BNE     COIE            ;CONTINUE WITH LOOP IF NOT 70 YET.
013436                                  PRINTX  WTSTPM          ;WAITING TO SEND TO PRINTER MESSAGE.
013436  013746  005154                                                  MOV     WTSTPM,-(SP)
013442  012746  000001                                                  MOV     #1,-(SP)
```

```
 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.        ;ALLOW 100 LOOPS BEFORE TIME OUT.
    58 013462  100045                  BPL     EXETS                   ;FAILURE TO FIND TRDY.
    59 013464  000753                  BR      RESINN                  ;RESET INNER LOOP
    60
    61 013466  032777  000200  173602  CNTNU:  BIT     #BIT7,@RCSR     ;IS RECEIVER READY? SHOULD BE SET IF IT IS.
    62 013474  001007                  BNE     ALPHA                   ;IF SET, ALPHA TAKES CARE OF BUFFER READ.
    63
    64 013476  033777  010044  173574  BETA:   BIT     TRDYBT,@XCSR    ;RCVR NOT RDY.  SEE IF THE TRANSMITTER IS READY
    65 013504  001744                  BEQ     SENCLP                  ;IF ZERO, NOT READY, LOOP AND CHECK AGAIN.
    66
    67
    68
    69 013506  110277  173572                  MOVB    R2,@XBUF        ;PUT CHARACTER INTO TRANSMITTER BUFFER.
    70 013512  000445                  BR      EXITS                   ;AND EXIT
    71
    72
    73 013514  017704  173562          ALPHA:  MOV     @RBUF,R4        ;READ THE RECEIVER BUFFER.
    74
    75 013520  120437  006520                  CMPB    R4,XON          ;IS IT = ''XON''?
    76 013524  001764                  BEQ     BETA                    ;IF IT IS THEN ALL IS OK, CONTINUE.
    77
    78 013526  120437  006517                  CMPB    R4,XOFF         ;IS IT = ''XOFF''?
    79 013532  001007                  BNE     CHKCAN                  ;IF NOT ''XOFF'' THEN MAYBE IT IS A ''CAN''
    80
    81 013534  004737  013640                  JSR     PC,WAITXN       ;IF IT WAS AN XOFF THEN WE MUST WAIT FOR
    82                                                                 ;       AN XON AND THEN SEND CHARACTER.
    83 013540  022737  177777  002206          CMP     #-1,GREASE      ;HAS A TIME-OUT OCCURRED?  EXPRESS EXIT
    84 013546  001427                  BEQ     EXITS                   ;FROM THIS ROUTINE MAY BE REQUIRED.
    85
    86 013550  000712                  BR      SENCH2                  ;XON FOUND ON TIME.  LOOK FOR TRANSMIT READY.
    87
    88 013552  120437  006516          CHKCAN: CMPB    R4,CAN          ;CHARACTER = ''CAN'' ?
    89 013556  001416                  BEQ     SETER                   ;IF IT IS THEN SET APPROPRIATE FLAG (ERWORD)
    90
    91 013560  120437  006515                  CMPB    R4,EOT          ;CHARACTER = ''EOT'' ?
    92 013564  001413                  BEQ     SETER                   ;IF IT IS THEN SET APPROPRIATE FLAG (ERWORD)
    93
    94 013566  052737  010000  006500          BIS     #BIT12,ERWORD   ;NONE OF THE USUAL CHARACTERS FOUND
    95                                                                 ;       ASYNCHRONOUSLY.  UNEXPECTED CHARACTER
    96                                                                 ;       RECEIVED INDICATED IN ERWORD.
    97 013574  000740                  BR      BETA                    ;TRY AGAIN TO SEND CHARACTER
    98
    99 013576  012737  000001  006512  EXETS:  MOV     #1,FLTRDY       ;INDICATE FAILED TO FIND TRANSMIT READY.
   100 013604  012737  177777  002206          MOV     #-1,GREASE      ;ENABLE GREASED EXITS FROM TESTS.
   101 013612  000405                  BR      EXITS                   ;FAIL TO FIND TRDY
   102
   103 013614  052737  100000  006500  SETER:  BIS     #BIT15,ERWORD   ;CAN OR EOT TYPE ERROR
   104 013622  004737  014774                  JSR     PC,STSERR       ;SET UP ERWORD.
   105
   106 013626  012605                  EXITS:  MOV     (SP)+,R5
   107 013630  012604                  MOV     (SP)+,R4                ;RESTORE
   108 013632  012603                  MOV     (SP)+,R3
   109 013634  012602                  MOV     (SP)+,R2                ;       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
```

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

```




                                             ;
                                             ;-----------------------------------------------------------------------
                                             ;FUNCTIONAL DESCRIPTION
                                             ;
                                             ;        GLOBAL PROCEDURE GETCHR
                                             ;
                                             ;        THIS PROCEDURE WILL GET A CHARACTER AND WILL INDICATE A TIME-OUT
                                             ;        ERROR IF IT FAILS TOO 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.
                                             ;
                                             ;
 014012  010146                              GETCHR: MOV     R1,-(SP)         ;SAVE REGISTERS
 014014  010246                                      MOV     R2,-(SP)         ;
 014016  010546                                      MOV     R5,-(SP)

 014020  005037  006506                              CLR     OUTCTR           ;OUTER LOOP COUNTER.
 014024  005001                              OUTRLP: CLR     R1               ;TIMING INNER LOOP COUNTER.

 014026  032777  000200  173242              LOOPG:  BIT     #BIT07,@RCSR     ;RCSR-7 SET? RECEIVER READY? RDONE?
 014034  001041                                      BNE     SENDR            ;IF YES.....GET THE CHARACTER OUT OF THE BUFFER
                                                                              ;AND INTO R4.
 014036  012705  000001                              MOV     #1,R5            ;SHORT DELAY... 100 USEC
 014042  004737  015224                              JSR     PC,DELAYS        ;WAIT AROUND FOR A WHILE

 014046  005201                                      INC     R1               ;LOOP COUNTER UPDATE.

 014050  020127  002400                      NOPRTM: CMP     R1,#2400         ;LOOPED LONG ENOUGH TO SET TIME-OUT INDICATOR?
 014054  100764                                      BMI     LOOPG            ;LOOP UNTIL 24400 OR RECEIVER IS SET.

 014056  005237  006506                              INC     OUTCTR           ;UPDATE OUTSIDE COUNTER.

 014062  023727  006506  000024                      CMP     OUTCTR,#20.      ;HAVE WE BEEN WAITING LONG?
 014070  001010                                      BNE     CONTLO           ;SKIP PRINT. ONCE PER LONG WAIT ONLY.
 014072                                              PRINTX  #WFC             ;PRINT WAITING FOR A CHARACTER FROM PRINTER.
 014072  012746  012414                                                                                      MOV     #WFC,-(SP)
```

```
                014076  012746  000001                                          MOV     #1,-(SP)
                014102  010600                                                  MOV     SP,R0
                014104  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
```

;

```
                                        ;-------------------------------------------------------------------
                                        ;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.
                                        ;
                                        ;


014176  010246                          CONVRT: MOV     R2,-(SP)        ;SAVE REGISTERS
014200  010346                                  MOV     R3,-(SP)        ;

014202  010102                                  MOV     R1,R2           ;GET COPY OF NUMBER TO BE CONVERTED.
014204  043702  006430                          BIC     TMPLT1,R2       ;MASK IN BITS 8 - 11.
014210  000302                                  SWAB    R2              ;RIGHT JUSTIFY MASKED BITS

014212  052702  000040                          BIS     #BIT5,R2                ;CONVERT TO THE ASCII VALUE
014216  110237  010046                          MOVB    R2,MNEB1        ;STORE RESULT IN GLOBAL VARIABLE

014222  010102                                  MOV     R1,R2           ;COPY OF ORIGINAL NUMBER
014224  043702  006432                          BIC     TMPLT2,R2       ;MASK BITS 4 - 7.
014230  006202                                  ASR     R2              ; RIGHT JUSTIFY
014232  006202                                  ASR     R2              ;       BITS 4 - 7
014234  006202                                  ASR     R2              ;       INTO BIT POSITIONS
014236  006202                                  ASR     R2              ;       0 - 3.

014240  052702  000040                          BIS     #BIT5,R2                ;CONVERT TO THE ASCII VALUE
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
```

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

```

014320  005777  172756                    TST     @RBUF             ;EMPTY RBUF.  IGNORE BUFFER CONTENTS.
014324  000771                            BR      EMPTIB            ;CHECK FOR RDONE AGAIN AND EMPTY BUFFER

014326  012701  002214          RESETC:   MOV     #DUMMYS,R1        ;FIX INTERFACE TO ACCEPT PRINTER RESET.
014332  012702  000010                    MOV     #8.,R2            ;
014336  005003                            CLR     R3                ;
014340  004737  012616                    JSR     PC,XMIT           ;SEND DUMMY SEQUENCE

014344  005037  006500                    CLR     ERWORD            ;ASSUME THAT NO ERRORS HAVE YET OCCURED.

014350  012701  002224                    MOV     #RESET,R1         ;TRANSMIT PRINTER RESET SEQUENCE (ADDRESS)
014354  012702  000002                    MOV     #2,R2             ;2 ARGUMENT LIST
014360  005003                            CLR     R3                ;NO BIDIRECTIONAL PRINTING NECESSARY
014362  004737  012616                    JSR     PC,XMIT           ;SEND SEQUENCE TO PRINTER

014366  004737  014012                    JSR     PC,GETCHR         ;READ   "ESC"   CHR FROM RBUF
014372  120437  006521                    CMPB    R4,ESCAPE         ;CHECK FOR CORRECT CHARACTER
014376  001033                            BNE     INIERR            ;INDICATE ERROR IF NOT CORRECT. THEN CONTINUE

014400  004737  014012                    JSR     PC,GETCHR         ;READ STATUS CHR. SHOULD BE SPACE CHARACTER.
014404  120427  000040                    CMPB    R4,#ZERO                  ;SHOULD BE NO ERRORS - RIGHT FOUR BITS = 0000
014410  001026                            BNE     INIERR            ;IF RIGHT FOUR BITS NONZERO, INDICATE ERROR.

014412  004737  014012                    JSR     PC,GETCHR         ;READ 2ND STATUS NIBBLE.
014416  120427  000040                    CMPB    R4,#ZERO          ;RIGHT FOUR BITS SHOULD BE 0000
014422  001021                            BNE     INIERR            ;IF NONZERO, INDICATE ERROR AND CONTINUE

014424  004737  014012                    JSR     PC,GETCHR         ;READ 3RD STATUS NIBBLE.
014430  042704  000001                    BIC     #BIT0,R4          ;CLEAR THE SHEET FEEDER PRESENT BIT IF SET.
014434  120427  000040                    CMPB    R4,#ZERO          ;IS STATUS NIBBLE = 0000 ?
014440  001012                            BNE     INIERR            ;IF NOT, INDICATE ERROR AND CONTINUE

014442  004737  014012                    JSR     PC,GETCHR         ;READ (HOPEFULLY) "0" FROM RBUF
014446  120437  006532                    CMPB    R4,SC0            ;CONFIRM THE CHARACTER IS A "0".
014452  001005                            BNE     INIERR            ;IF NOT = "0", THEN INDICATE ERROR, CONTINUE

014454  004737  014012                    JSR     PC,GETCHR         ;A CHARACTER IS EXPECTED FROM THE PRINTER
014460  120437  006520                    CMPB    R4,XON            ;"XON" IS THE EXPECTED CHARACTER
014464  001413                            BEQ     SETUPI            ;IF YES, THEN SET UP THE PRINTER PARAMETERS

014466  052737  010000  006500  INIERR:   BIS     #BIT12,ERWORD     ;IF NO, THEN INDICATE ERRORS: UCRB
014474  052737  020000  006500            BIS     #BIT13,ERWORD     ;       THEN INDICATE ERRORS: ECNRB
014502  052737  100000  006500            BIS     #BIT15,ERWORD     ;       THEN INDICATE ERRORS: ERROR FOUND BIT
014510  004737  014774                    JSR     PC,STSERR         ;CHECK FOR MORE ERRORS

014514  012700  000001          SETUPI:   MOV     #1,R0
014520  112760  000040  002240            MOVB    #ZERO,RIBPOS(R0)  ;RIBBON POSITION DOWN
014526  012701  002240                    MOV     #RIBPOS,R1         ;ADDRESS OF ARGUMENT LIST
014532  012702  000003                    MOV     #3,R2              ;3CHARACTERS IN ARGUMENT LIST
014536  005003                            CLR     R3                 ;NO PRINTING
014540  004737  012616                    JSR     PC,XMIT            ;SEND TO PRINTER

014544  012700  000001                    MOV     #1,R0
014550  112760  000040  002257            MOVB    #ZERO,STHTCT(R0)  ;SET HIT COUNT TO 1 HIT PER CHARACTER
014556  012701  002257                    MOV     #STHTCT,R1         ;ADDRESS OF ARGUMENT LIST
014562  012702  000003                    MOV     #3,R2              ;THREE ARGUMENTS IN THE
```

```
                014566  005003                          CLR     R3              ;NO PRINTING
                014570  004737  012616                  JSR     PC,XMIT         ;SEND TO PRINTER

                014574  112760  000040  002266          MOVB    #ZERO,STULMD(R0) ;SET UNDERLINE MODE
                014602  012701  002266                  MOV     #STULMD,R1      ;ADDRESS OF ARG LIST
                014606  012702  000003                  MOV     #3,R2           ;THREE ARGUMENTS
                014612  005003                          CLR     R3              ;NO PRINTING
                014614  004737  012616                  JSR     PC,XMIT         ;SEND TO PRINTER

                014620  012701  002313                  MOV     #CR,R1          ;ADDRESS OF CRLF TO BE PRINTED
                014624  012702  000002                  MOV     #2,R2           ;2 CHARACTERS TO BE PRINTED
                014630  005003                          CLR     R3              ;NO BIDIRECTIONAL PRINTING
                014632  004737  012616                  JSR     PC,XMIT         ;SEND TO PRINTER

                014636  012701  002314                  MOV     #LF,R1          ;ADDRESS OF LINEFEED
                014642  012702  000001                  MOV     #1,R2           ;PRINT THE SINGLE CHARACTER
                014646  005003                          CLR     R3              ;WITHOUT BIDIRECTIONAL PRINTING
                014650  004737  012616                  JSR     PC,XMIT         ;SEND TO PRINTER
                014654  004737  012616                  JSR     PC,XMIT         ;AGAIN...
                014660  004737  012616                  JSR     PC,XMIT         ;AND AGAIN...

                014664  005037  006502                  CLR     CRNTPR          ;CLEAR CURRENT COUNT WHICH IS USED IN
                                                                                ;BIDIRECTIONAL PRINTING TO KEEP TRACK OF
                                                                                ;THE NUMBER OF CHARACTERS PRINTED CURRENTLY
                                                                                ;IN THE CURRENT DIRECTION.
                014670  005037  006504                  CLR     DIRCTN          ;INDICATOR THAT PRINTER IS PRINTING IN THE
                                                                                ;FORWARD DIRECTION. (0=FORWARD, 1=REVERSE)
                                                                                ;THIS IS TRUE AT THIS POINT BECAUSE THIS
                                                                                ;ROUTINE RE-INITIALIZES THE PRINTER.

                014674  012705  007000                  MOV     #7000,R5        ;SET UP FOR A DELAY (ARG FOR DELAYS ROUTINE)
                014700  012704  007000                  MOV     #7000,R4        ;LOOP COUNTER
                014704  004737  015224          LODELY: JSR     PC,DELAYS       ;CAUSE A SHORT DELAY
                014710  005304                          DEC     R4              ;LOOP COUNTER ADJUSTMENT
                014712  100374                          BPL     LODELY          ;REPEAT UNTIL SUFFICIENT DELAY CAUSED.

                014714  012604                          MOV     (SP)+,R4        ;RESTORE
                014716  012603                          MOV     (SP)+,R3        ;       REGISTERS
                014720  012602                          MOV     (SP)+,R2        ;
                014722  012601                          MOV     (SP)+,R1        ;

                014724  000207                          RTS     PC

                                                ;
                                                ;
                                                ;
```

```
                        ;*****************************************************************
                        ;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
                        ;
                        ;
014726  000240          ;RANDOM: NOP                    ;RANDOM NUMBER GENERATOR
                        ;
014730  012701  000001  ;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 RECCOMENDED)
014734  063701  006424  ;       ADD     SEED1,R1        ;GET THE SEED1 VALUE (SLIGHTLY ALTERRED)
014740  063701  006426  ;       ADD     SEED2,R1        ;ADD THE SECOND SEED VALUE
                        ;
014744  006101          ;       ROL     R1              ;ROTATE CONTENTS SO THAT VALUE IS LOST
014746  006101          ;       ROL     R1              ;ROTATE AGAIN.  VALUE IS CHANGED AGAIN
                        ;
014750  060137  006424  ;       ADD     R1,SEED1        ;NOW A NEW SEED VALUE
014754  010137  006426  ;       MOV     R1,SEED2        ;AND A NEW SECOND SEED VALUE
                        ;                               ;BOTH FAIRLY UNRELATED TO THE ORIGINAL SEEDS
                        ;
014760  042701  177600  ;       BIC     #177600,R1      ;MASK OUT THE LEFT NINE BITS
                        ;                               ;THE NUMBER NOW HAS A POSSIBLE RANGE OF 0-127
014764  022701  000143  ;       CMP     #99.,R1         ;IS THE NUMBER 0-99 ?
```

```
GLOBAL AREAS    MACRO V03.01 7-NOV-80 10:06:10 PAGE 19-1
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
```

```
                        ;
                        ;
                        ;-------------------------------------------------------------------------------
                        ;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.
                        ;
                        ;
                        ;
                        ;
                        ;
014774  113702  002210  STSERR: MOVB    STSRES,R2       ;SEND "ESC 0" TO THE PRINTER.
015000  004737  013366          JSR     PC,SENCHR       ;
015004  012700  000001          MOV     #1,R0
015010  116002  002210          MOVB    STSRES(R0),R2   ;
015014  004737  013366          JSR     PC,SENCHR       ;REQUEST STATUS FROM PRINTER.
                        ;
015020  010446          STATS:  MOV     R4,-(SP)        ;PUSH REGISTERS
015022  010346          MOV     R3,-(SP)        ;
                        ;
015024  004737  014012          JSR     PC,GETCHR       ;GET A CHARACTER FROM THE PRINTER.
015030  120437  002315          CMPB    R4,STATUS       ;THE CHARACTER IN R4 SHOULD BE AN ESC CHARACTER
015034  001057                  BNE     PALPHA          ;EXPECTED CHAR NOT RECVD, UNEXPECTED CHAR RCVD.
                        ;
015036  004737  014012          JSR     PC,GETCHR       ;GET N3 FROM PRINTER. FATAL ERRORS INDICATED.
015042  043704  006434          BIC     TMPLT3,R4       ;CLEAR LEFT 12 BITS.
```

```
                                                SWAB    R4              ;PUT BITS IN PROPER POSITION FOR ERWORD
                                                BIS     R4,ERWORD       ;SET THE ERROR BITS APPROPRIATE IN ERWORD.

                                                JSR     PC,GETCHR       ;GET N2 FROM PRINTER. NON-FATAL ERRORS FRM PRTR
                                                BIC     TMPLT3,R4       ;CLEAR THE LEFT 12 BITS. (NOT WANTED)
                                                ASL     R4              ;SHIFT
                                                ASL     R4              ;       LEFT
                                                ASL     R4              ;                FOUR
                                                ASL     R4              ;                             POSITIONS.
                                                BIS     R4,ERWORD       ;AND SET THE APPROPRIATE BITS IN ERWORD.

                                                JSR     PC,GETCHR       ;GET ANOOTHER CHARACTER. N1. PRINTER CONDITION
                                                BIC     TMPLT3,R4       ;CLEAR THE 12 LEFT UNWANTED BITS.
                                                BIC     #BIT0,R4        ;SHEET FEEDER PRESENT NOT A GENERAL ERROR.
                                                BIC     #BIT2,R4        ;NOT USED BY PRINTER
                                                BIC     #BIT3,R4        ;NOT USED BY PRINTER
                                                BIS     R4,ERWORD       ;SET APPROPRIATE BITS IN ERWORD.

                                                BIC     #46400,ERWORD   ;CLEAR BITS 14,11,10,8 (UNUSED BITS IN ERWORD)

                                                TST     ERWORD          ;IS THE ERWORD = 0 ?
                                                BEQ     CRCLX           ;IF IT IS CONTINUE...
                                                BIS     BIT15,ERWORD    ;IF IT ISN'T... INDICATE AN ERROR (GENERAL)
                                                                        ;       BY SETTING BIT 15 IN THE ERROR WORD.

                                        CRCLX:  JSR     PC,GETCHR       ;HOPE TO GET A "0"
                                                CMPB    SC0,R4          ;IS IT THE EXPECTED "0" ?
                                                BEQ     EXITSR          ;IF EQUAL TO EXPECTED CHAR ("0"), THEN DONE.

                                                BIS     #ECNRB,ERWORD   ;SET ECNRB ("0" NOT FOUND.)
                                                BR      SET15           ;SET ERROR INDICATOR AND EXIT.

                                        PALPHA: BIS     #ECNRB,ERWORD   ;EXPECTED CHARACTER NOT RECEIVED INDICATOR

                                        SET15:  BIS     #BIT15,ERWORD   ;INDICATE THAT AN ERROR HAS OCCURRED.
                                                MOV     #-1,GREASE      ;ENABLE A "GREASED" EXIT FROM THE CALLING
                                                                        ;ROUTINES.
                                        EXITSR: MOV     (SP)+,R3        ;RESTORE REGISTERS.
                                                MOV     (SP)+,R4        ;

                                                RTS     PC
```

```
                        ;
                        ;.....................................................................
                        ;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
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
015224  012737  000025  010054  DELAYS: MOV     #21.,DELCNT     ;2.91USEC. - INNER LOOP INITIALIZATION
                        ;
015232  005337  010054          INLOOP: DEC     DELCNT          ;2.385USEC. -
                        ;                                               -TOTAL 4.77USEC. PER LOOP
015236  100375                  BPL     INLOOP          ;2.385USEC. -
                        ;                                                       0.103MSEC TO HERE
015240  005305                  DEC     R5              ;STARTS WITH # OF .1 MSEC INCREMENTS.
015242  100370                  BPL     DELAYS          ;IF R1 WERE 10,000 THEN TIME DELAY IS 1 SECOND.
                        ;
015244  000207                  RTS     PC
                        ;
                        ;
                        ;
                        ;
                        ;
```

```
      1
      2
      3                                ;
      4                                ;.....................................................................
```

```
                        ;##################################################################################
                        ;
                        ;******************** 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 ERRTYP, ERRNBR, ERRMSG AND ERRBLK 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 ERRTBL.)
                        ;................................................................................
                        ;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
                        ;
                        ;
                        ;
015246  010346                  ERRORS: MOV     R3,-(SP)        ;PUSH REGISTERS
015250  010446                          MOV     R4,-(SP)        ;
                        ;
015252  032737  100000  006500          BIT     #BIT15,ERWORD   ;IS ERROR FOUND BIT SET?
015260  001473                          BEQ     EXTMCR          ;IF NOT SET, THEN EXIT THE SUBROUTINE.
                        ;
015262  162737  000004  007314          SUB     #4,PGMCTR       ;ACCOUNT FOR AUTOINC OF PC WHEN PUSHED BY JSR
                        ;
015270  005003                          CLR     R3              ;LOOP COUNTER AND TABLE POINTER.
015272  032737  000001  006500  NXTBIT: BIT     #BIT0,ERWORD    ;IS THE RIGHT-MOST BIT SET?
015300  001435                          BEQ     NXTERM          ;IF NOT SET, THEN CHECK THE NEXT BIT.
                        ;
                        ;                                        ERRDF CALL = ERRTYP:1
015302  012737  000001  010072          MOV     #1,ERRTYP               ;USING THE ERRTBL SET UP BY THE
015310  016337  007316  010076          MOV     ERMSGB(R3),ERRMSG       ;SUPERVISOR DEVICE FATAL MACRO CALL
```

```
                                        MOV     R3,ERRNBR               ;ERROR NUMBER BEING CHECKED.
                                        ERROR                           ;MACRO CALL - WITH ABOVE PARMS
015322  104460                                                                    TRAP    C$ERROR

                                        PRINTB  #PRTBM0,PGMCTR          ;PRINT BASIC ERROR MESSAGE AND PC
015324  013746  007314                                                            MOV     PGMCTR,-(SP)
015330  012746  010230                                                            MOV     #PRTBM0,-(SP)
015334  012746  000002                                                            MOV     #2,-(SP)
015340  010600                                                                    MOV     SP,R0
015342  104414                                                                    TRAP    C$PNTB
015344  062706  000006                                                            ADD     #6,SP
                                        PRINTX  #PRTXM0,TRXADD          ;PRINT EXTENDED ERROR MESSAGE AND
015350  013746  005250                                                            MOV     TRXADD,-(SP)
015354  012746  010302                                                            MOV     #PRTXM0,-(SP)
015360  012746  000002                                                            MOV     #2,-(SP)
015364  010600                                                                    MOV     SP,R0
015366  104415                                                                    TRAP    C$PNTX
015370  062706  000006                                                            ADD     #6,SP
                                                                        ;ADDRESS OF TRANSMITTED STRING AND
                                                                        ;THE ERROR FLAG-WORG.

015374  062703  000002        NXTERM: ADD     #2,R3           ;POINT TO NEXT TABLE ENTRY.
015400  006237  006500                ASR     ERWORD          ;GET NEXT BIT INTO POSITION.

015404  022703  000034                CMP     #28.,R3         ;DONE WITH ALL THIS WHEN R3 IS 28 AND 13
                                                                ;       BITS HAVE BEEN CHECKED.
015410  001330                        BNE     NXTBIT          ;REPEAT UNTIL 13 LOOPS COMPLETE.
015412  005037  006500                CLR     ERWORD          ;SINCE WE ARE DONE, CLEAR THE ERROR FLAG-WORD.

015416  022737  000001  006512        CMP     #1,FLTRDY       ;WAS THERE A FAILURE TO FIND TRANSMIT-READY?
015424  001010                        BNE     DCUPA           ;IF NOT, DO CLEANUP
                                        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

015446                          DCUPA:  DOCLN
015446  104444                                                                    TRAP    C$DCLN

015450  022737  000001  006512  EXTMCR: CMP     #1,FLTRDY
015456  001010                        BNE     DDCUPA
                                        PRINTB  #FXRDYM
015460  012746  012316                                                            MOV     #FXRDYM,-(SP)
015464  012746  000001                                                            MOV     #1,-(SP)
015470  010600                                                                    MOV     SP,R0
015472  104414                                                                    TRAP    C$PNTB
015474  062706  000004                                                            ADD     #4,SP

015500  012604                DDCUPA: MOV     (SP)+,R4        ;RESTORE REGISTERS
015502  012603                        MOV     (SP)+,R3        ;

015504  000207                        RTS     PC


                                ;
```

```
                                ;
                                ;
                                ;###############################################################################
                                ;
                                
                                
                                
                                
                                
                                
                                .TITLE MISCELLANEOUS SECTIONS
                                .SBTTL  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
        015506                                                                  L$RPT::
      9
     10 015506                                  EXIT    RPT
        015506  000167                                                                  .WORD   J$JMP
        015510  000000                                                                  .WORD   L10002-2-.
     11
     12                                         .EVEN
     13
     14 015512                                  ENDRPT
        015512                                                                  L10002:
        015512  104425                                                                  TRAP    C$RPT
     15                                 .SBTTL  PROTECTION TABLE
```

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

      1
      2                                 ;++
      3                                 ; THIS TABLE IS USED BY THE RUNTIME SERVICES
      4                                 ; TO PROTECT THE LOAD MEDIA.
      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
```

```
                        ;++
                        ; THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
                        ; AT THE BEGINNING OF EACH PASS.
                        ;--

015522                          BGNINIT
015522                                                                  L$INIT::


                        ;*****************************************************************************

                        ;       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
015522  012700  000036                                                  MOV     #EF.CONTINUE,R0
015526  104447                                                         TRAP    C$REFG
015530                          BCOMPLETE       JENDIN
015530  103425                                                         BCS     JENDIN

015532                          READEF  #EF.NEW
015532  012700  000035                                                  MOV     #EF.NEW,R0
015536  104447                                                         TRAP    C$REFG
015540                          BNCOMPLETE      NEXTU
015540  103003                                                         BCC     NEXTU


015542  012737  177777  002202        MOV     #-1,LOGUNIT
015550  005237  002202        NEXTU:  INC     LOGUNIT
015554  023737  002202  002012        CMP     LOGUNIT,L$UNIT
015562  001407                        BEQ     ABORT
015564                                GPHARD  LOGUNIT,PLOC
015564  013700  002202                                                  MOV     LOGUNIT,R0
015570  104442                                                         TRAP    C$GPHRD
015572  010037  002204                                                  MOV     R0,PLOC
015576                                BNCOMPLETE      NEXTU
015576  103364                                                         BCC     NEXTU
015600  000403                        BR      STRTUP
015602                        ABORT:  DOCLN
015602  104444                                                         TRAP    C$DCLN
015604  000137  016566        JENDIN: JMP     ENDIN

015610                        STRTUP: SETVEC  #4,#UBTRAP,#PRI07       ;SET UP TRAP VECTOR FOR ILLEGAL ADDRESS
015610  012746  000340                                                  MOV     #PRI07,-(SP)
015614  012746  016572                                                  MOV     #UBTRAP,-(SP)
015620  012746  000004                                                  MOV     #4,-(SP)
015624  012746  000003                                                  MOV     #3,-(SP)
015630  104437                                                         TRAP    C$SVEC
015632  062706  000010                                                  ADD     #10,SP
                                                                        ;TRAP... UNIBUS ERROR.

015636  005037  006500                CLR     ERWORD                  ;ASSUME NO ERRORS
```

```
     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, RBUFF
     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
        015724  012746  012122                                                         MOV     #FAILDL,-(SP)
        015730  012746  000001                                                         MOV     #1,-(SP)
        015734  010600                                                                 MOV     SP,R0
        015736  104417                                                                 TRAP    C$PNTF
        015740  062706  000004                                                         ADD     #4,SP
     58 015744                                 DOCLN                   ;EXIT TEST SEQUENCE
        015744  104444                                                                 TRAP    C$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,@RCSR     ;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     NONDT?          ;IF SO, PRINT FAILURE MESSAGE.
     86
     87 016060                          PFM1:   PRINTF  #FAILDL         ;PRINT FAILURE MESSAGE
        016060  012746  012122                                                         MOV     #FAILDL,-(SP)
        016064  012746  000001                                                         MOV     #1,-(SP)
        016070  010600                                                                 MOV     SP,R0
```

```
                016072  104417                                                                  TRAP    C$PNTF
                016074  062706  000004                                                          ADD     #4,SP
         88     016100                          DOCLN                   ;EXIT TEST SEQUENCE
                016100  104444                                                                  TRAP    C$DCLN
         89
         90     016102  004737  014012  NONDT2: JSR     PC,GETCHR       ;CHECK FOR A RESPONSE CHARACTER
         91     016106  120437  006521          CMPB    R4,ESCAPE       ;WAS THE CHARACTER AN ESCAPE CHARACTER?
         92     016112  001411                  BEQ     NONDT3          ;GET THE REST IF ESC FOUND.
         93     016114                          PRINTF  #FAILDL         ;PRINT FAILURE MESSAGE FOR DL SETUP.
                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
         96     016136  004737  014012  NONDT3: JSR     PC,GETCHR       ;GET THE 2ND CHARACTER IN RESPONSE.
         97     016142  004737  014012          JSR     PC,GETCHR       ;       3RD
         98     016146  004737  014012          JSR     PC,GETCHR       ;       4TH
         99     016152  004737  014012          JSR     PC,GETCHR       ;       5TH AND FINAL RESPONSE CHARACTER.
        100
        101
        102     016156  000137  016456          JMP     LINCOD          ;AND THEN DO THE LINE SIZE LOGIC.
        103
        104     016162  012700  000002  SETUPC: MOV     #2,R0
        105     016166  063700  002204          ADD     PLOC,R0         ;RESPONSE FROM PTABLE.  ?DZ (Y,N)?
        106     016172  011001                  MOV     (R0),R1         ;IF = 0 THEN MULTILINE. IF 1 THEN SINGLE LINE
        107     016174  100633                  BMI     CALLDF          ;INTERFACE.
        108
        109     016176  001240                  BNE     CALLDL          ;IF = 1 THEN SINGLE LINE.
        110
        111     016200  005037  010056          CLR     NDATA           ;ASSUME NO ADDRESSING (UNIBUS) ERRORS YET.
        112     016204  004737  016672          JSR     PC,DZSET        ;IF = 0 THEN MULTILINE.
        113
        114
        115     016210  005037  006500          CLR     ERWORD          ;ASSUME NO ERRORS
        116     016214  023727  010056  000001  CMP     NDATA,#1        ;NO DEVICE AT THAT ADDRESS?
        117     016222  001011                  BNE     EMPTI3          ;NO PROBLEM WITH UNIBUS
        118     016224                          PRINTF  #FAILDZ         ;FAILED TO FIND DEVICE MESSAGE
                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        ;ASSUME NO MORE THAN 100 CHARACTERS IN BUFFER.
        122     016252  005300          EMPTZ3: DEC     R0              ;COUNT DOWN ONE FOR EACH CHARACTER
        123     016254  002407                  BLT     NONDZA          ;STOP TRYING TO EMPTY THE BUFFER. ASSUME HOPELESS.
        124
        125     016256  032777  000200  171012  BIT     #BIT7,@RCSR     ;IS THERE A CHARACTER IN THE RBUF?
        126     016264  001403                  BEQ     NONDZA          ;IF NO CHARACTER IN RBUF, THEN CONTINUE...
        127
        128     016266  005777  171010          TST     @RBUF           ;EMPTY RBUF.  IGNORE BUFFER CONTENTS.
        129     016272  000767                  BR      EMPTZ3          ;CHECK FOR RDONE AGAIN AND EMPTY BUFFER
```

```
016274  005037  006500          NONDZA: CLR     ERWORD                  ;ASSUME NO ERRORS
016300  005037  010056                  CLR     NDATA                   ;ASSUME NO UNIBUS ERRORS
016304  005037  006512                  CLR     FLTRDY                  ;ASSUME NO FAILURE TO FIND TRANSMIT RDY
016310  005037  002206                  CLR     GREASE                  ;ASSUME NO PREVIOUS ERRORS.

016314  012701  002210                  MOV     #STSRES,R1      ;SEND REQUEST STATUS SEQUENCE.
016320  012702  000002                  MOV     #2,R2           ;
016324  005003                          CLR     R3              ;
016326  004737  012616                  JSR     PC,XMIT         ;SEND REQUEST STATUS SEQUENCE TO PRINTER.
016332  042737  100000  006500          BIC     #BIT15,ERWORD   ;IGNORE POSSIBLE EOT CONDITION.
016340  023727  006512  000001          CMP     FLTRDY,#1       ;FAILURE TO FIND TRDY?
016346  001404                          BEQ     PRTM2           ;PRINT FAILURE MESSAGE

016350  023727  010056  000001          CMP     NDATA,#1        ;ANY UNIBUS ERRORS?
016356  001011                          BNE     NONDZ2          ;IF SO, PRINT FAILURE MESSAGE.

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$PNTF
016374  062706  000004                                                          ADD     #4,SP
016400                                  DOCLN                   ;EXIT TESTING SEQUENCE
016400  104444                                                                  TRAP    C$DCLN

016402  004737  014012          NONDZ2: JSR     PC,GETCHR       ;CHECK FOR A RESPONSE CHARACTER
016406  120437  006521                  CMPB    R4,ESCAPE       ;WAS THE CHARACTER AN ESCAPE CHARACTER?
016412  001411                          BEQ     NONDZ3          ;GET THE REST IF ESC FOUND.
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$PNTF
016430  062706  000004                                                          ADD     #4,SP
016434                                  DOCLN                   ;EXIT TESTING SEQUENCE
016434  104444                                                                  TRAP    C$DCLN

016436  004737  014012          NONDZ3: JSR     PC,GETCHR       ;GET THE 2ND CHARACTER IN RESPONSE.
016442  004737  014012                  JSR     PC,GETCHR       ;       3RD
016446  004737  014012                  JSR     PC,GETCHR       ;       4TH
016452  004737  014012                  JSR     PC,GETCHR       ;       5TH AND FINAL RESPONSE CHARACTER.





016456  012700  000006          LINCOD: MOV     #6,R0
016462  063700  002204                  ADD     PLOC,R0         ;RESPONSE FROM PTABLE.  ?CHARACTERS PER LINE?
016466  011005                          MOV     (R0),R5         ;GET THE LINE CHARACTER DENSITY. 1=80CHAR/LINE
016470  022705  000001                  CMP     #1,R5           ;IF NOT = 1 THEN 132 CHARACTERS PER LINE.
016474  001404                          BEQ     EIGHTY          ;IF EQ 1 THEN 80 CHAR/LINE
016476  012737  000204  010042          MOV     #132.,LINSIZ    ;NOT EQ 1... THEN 132 CHAR/LINE
016504  000403                          BR      INFIN
016506  012737  000120  010042  EIGHTY: MOV     #80.,LINSIZ     ;LINE SIZE IS EIGHTY CHARS/LINE
```

```
                                INFIN:  MOV     LINSIZ,R1       ;GET THE LINE SIZE. NUMBER OF CHARACTERS/LINE
                                        ASL     R1              ;X 2
                                        ASL     R1              ;X 4
                                        MOV     R1,LINN         ;SAVE LINSIZ X 4
                                        ASL     R1              ;X 8
                                        ADD     R1,LINN         ;LINSIZ X (4+8) = LINSIZ X 12 => LINN

                                        CLR     ERWORD          ;ASSUME NO ERRORS - YET.
                                        CLRVEC  #4              ;RESET VECTOR TO ORIGINAL STATUS
016542  012700  000004                                                          MOV     #4,R0
016546  104436                                                                  TRAP    C$CVEC

                                EMPTYR: BIT     #BIT7,@RCSR     ;EMPTY RECEIVER BUFFER...
                                        BEQ     ENDIN           ;IS THERE A CHARACTER IN THE RBUF?
                                                                ;IF NO CHARACTER IN RBUF, THEN EXIT.
                                        TST     @RBUF           ;EMPTY RBUF.  IGNORE BUFFER CONTENTS.
                                        BR      EMPTYR          ;CHECK FOR RDONE AGAIN AND EMPTY BUFFER
                                                                ;IF NEEDED.

016566                          ENDIN:  EXIT    INIT
016566  104432                                                                  TRAP    C$EXIT
016570  000662                                                                  .WORD   L10004-.

                        ;
                        ;.....................................................................
                        ;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.
                        ;
                        ;
016572                          BGNSRV  UBTRAP          ;TRAP SERVICE ROUTINE
016572                                                                  UBTRAP::
```

```
    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                                 ;
    232                                 ;
    233
    234                                 ;
    235                                 ;
    236                                 ;*****************************************************************************
    237                                 ;FUNCTIONAL DESCRIPTION                                                      *
    238                                 ;                                                                            *
    239                                 ;       LOCAL PROCEDURE DLSET                                                *
    240                                 ;                                                                            *
    241                                 ;       THIS PROCEDURE WILL TAKE THE CSR ADDRESS GIVEN IN CSRADD AND SET UP  *
    242                                 ;       THE ADDRESSES FOR THE RCSR, THE XCSR, AND THE RBUF AND XBUF REGISTERS.*
    243                                 ;                                                                            *
    244                                 ;       THIS CODE IF FOR SINGLE LINE INTERFACES ONLY.                        *
    245                                 ;                                                                            *
    246                                 ;*****************************************************************************
    247                                 ;
    248                                 ;
    249                                 ;
    250                                 ;INPUTS
    251                                 ;
    252                                 ;       CSRADD  -       ADDRESS OF CSR REGISTER.
    253                                 ;
    254                                 ;OUTPUTS
    255                                 ;
    256                                 ;       NONE
    257                                 ;
    258                                 ;SUBORDINATE ROUTINES
    259                                 ;
    260                                 ;       NONE
    261                                 ;
    262                                 ;FUNCTIONAL SIDE EFFECTS
    263                                 ;
    264                                 ;       INTERFACE REGISTERS ARE SET UP IF THE CSR ADDRESS IS VALID.
    265                                 ;
    266                                 ;CALLING SEQUENCE
    267                                 ;
    268                                 ;       PLACE ADDRESS OF CSR REGISTER INTO CSR ADD.
    269                                 ;               JSR     PC,DLSET
    270                                 ;
    271                                 ;
    272
    273 016602  017701  163376  DLSET:  MOV     @PLOC,R1        ;SET UP CSR ADDRESS & BUFFER ADDRESSES.
    274 016606  010137  007276          MOV     R1,RCSR         ;ADDRESS OF RECEIVER CSR REGISTER.
    275
    276 016612  062701  000002          ADD     #2,R1
    277 016616  010137  007302          MOV     R1,RBUF         ;ADDRESS OF RECEIVER BUFFER REGISTER
    278 016622  062701  000002          ADD     #2,R1
    279 016626  010137  007300          MOV     R1,XCSR         ;ADDRESS OF THE TRANSMITTER CSR REGISTER.
    280 016632  062701  000002          ADD     #2,R1
    281 016636  010137  007304          MOV     R1,XBUF         ,ADDRESS OF THE TRANSMITTER BUFFER REGISTER.
```

```
                                                CLR     MLTLIN          ;INDICATE THAT THIS IS A SINGLE LINE INTERFACE.
                                                MOV     #BIT7,TRDYBT    ;PLACEMENT OF XMIT READY BIT FOR SINGLE LINE
                                                                        ;INTERFACES.
                                                MOV     #JUNKPL,LPR     ;WHEN LPR IS STUFFED, CONTENTS GO TO JUNKPL
                                                MOV     #JUNKPL,TCR     ;WHEN SENCHR STUFFS TCR, CONTENTS GO TO JUNKPL

                                                RTS     PC


                                        ;*******************************************************************************
                                        ;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
                                        ;
                                        ;
                                        ;

                                        DZSET:  MOV     @PLOC,R1        ;GET THE CSR ADDRESS TO SET UP INTERFACE REG'S
                                                MOV     R1,RCSR         ;ADDRESS OF RCSR AND THE XCSR WILL BE THE SAME
                                                                        ;       IN A DZ11. THE TRDYBT XMIT READY BIT
                                                                        ;       WILL CHANGE, HOWEVER.
                                                MOV     R1,XCSR         ;AND POINT TO THE NEXT REGISTER ADDRESS

                                                ADD     #2,R1
                                                MOV     R1,RBUF         ;ADDRESS OF THE RECEIVER BUFFER
                                                MOV     R1,LPR          ;ADDRESS OF THE LINE PARAMETER REGISTER
```

```
016722 062701 000002                ADD     #2,R1
016726 010137 007310                MOV     R1,TCR          ;ADDRESS OF THE TRANSMIT CONTROL REGISTER

016732 062701 000002                ADD     #2,R1
016736 010137 007312                MOV     R1,TDR          ;ADDRESS OF THE TRANSMIT DATA REGISTER

016742 013737 007312 007304         MOV     TDR,XBUF        ;WHEN REFERENCING THE XBUF, YOU WILL WANT
                                                            ;THE TDR - TRANSMIT DATA REGISTER.

016750 012777 000040 170320         MOV     #BIT5,@RCSR     ;CLEARS INTERUPT ENABLE BITS AND
                                                            ;SETS MASTER SCAN ENABLE.
016756 012737 100000 010044         MOV     #BIT15,TRDYBT   ;DEFINE TRANSMIT READY BIT FOR DZ11 CSR.

016764 012700 000004                MOV     #4,R0
016770 063700 002204                ADD     PLOC,R0         ;PTABLE ENTRY.  ?DZ CHANNEL NUMBER?
016774 011002                       MOV     (R0),R2         ;CHANNEL TO BE SET INTO TCR REGISTER
016776 006302                       ASL     R2              ;CHANGE THE RANGE FROM 0-7 TO 0-14
                                                            ;TO BE USED AS A TABLE OFFSET.
017000 016237 006444 006436         MOV     TCRTBL(R2),TCRENA       ;GET MASK FROM TABLE, PLACE IN TCR REG.
                                                                    ;TO DETERMINE THE CHANNEL CHOSEN
017006 012700 000004                MOV     #4,R0           ;PTABLE ENTRY #3
017012 063700 002204                ADD     PLOC,R0         ;PTABLE ENTRY ADDRESS FOR CHANNEL #.
017016 051037 006442                BIS     (R0),LPRINI     ;NEW LPR STATUS WITH CH # INCLUDED.
017022 013777 006442 170256         MOV     LPRINI,@LPR     ;SET UP LPR ON DZ INTERFACE

017030 000207                       RTS     PC






                            ;
                            ;*****************************************************************
                            ;FUNCTIONAL DESCRIPTION
                            ;
                            ;       LOCAL PROCEDURE DFAULT:
                            ;
                            ;       THIS CODE WILL COMPUTE THE CSR ADDRESS AND SET UP THE INTERFACE
                            ;       REGISTER ADDRESSES.  THE CSR ADDRESSES ARE CHECKED BY SENDING THE
                            ;       PRINTER AN ''ANSWER BACK'' QUERY AND CHECKING FOR THE APPROPRIATE
                            ;       RESPONSE FROM THE PRINTER.
                            ;
                            ;*****************************************************************
                            ;
                            ;INPUTS
                            ;
                            ;       NONE
                            ;
                            ;OUTPUTS
                            ;
                            ;       CSRADD  -ADDRESS OF THE CONTROL STATUS REGISTER
                            ;       RBUF    -BUFFER ADDRESS
                            ;       XCSR    -TRANSMITTER CSR
                            ;       RCSR    -RECEIVER CSR
                            ;       XBUF    -TRANSMITTER BUFFER ADDRESS
```

```
                                ;       MLTLIN  -IS =1 IF THE INTERFACE IS A DZ11.
                                ;
                                ;SUBORDINATE ROUTINES
                                ;
                                ;       GETCHR  -       GET A CHARACTER.
                                ;       XMIT    -       SEND A SEQUENCE OF CHARACTERS TO THE PRINTER.
                                ;
                                ;FUNCTIONAL SIDE EFFECTS
                                ;
                                ;       THE INTERFACE REGISTERS SHOULD BE SET UP.
                                ;
                                ;CALLING SEQUENCE
                                ;
                                ;       JSR     PC,DFAULT
                                ;
                                ;
                                ;

017032  013777  005254  163144  DFAULT: MOV     DLDFLT,@PLOC    ;ASSUME A SINGLE LINE INTERFACE

017040  004737  016602                  JSR     PC,DLSET        ;SET UP THE REGISTER ADDRESSES

017044  023727  010056  000001          CMP     NDATA,#1        ;WAS THERE AN ILLEGAL ADDRESSING ERROR?
017052  001462                          BEQ     DZDCOD          ;IF SO, DL SETUP FAILED.  TRY DZ SETUP.

017054  005037  006500                  CLR     ERWORD          ;ASSUME THAT NO ERRORS HAVE BEEN FOUND - YET.

017060  012700  000144          EMPTI4: MOV     #100.,R0        ;ASSUME NO MORE THAN 100 CHARACTERS IN BUFFER.
017064  005300                  EMP4:   DEC     R0              ;COUNT DOWN ONE FOR EACH CHARACTER
017066  002407                          BLT     ABSND           ;STOP TRYING TO EMPTY THE BUFFER. ASSUME HOPELESS.

017070  032777  000200  170200          BIT     #BIT7,@RCSR     ;IS THERE A CHARACTER IN THE RBUF?
017076  001403                          BEQ     ABSND           ;IF NO CHARACTER IN RBUF, THEN CONTINUE...

017100  005777  170176                  TST     @RBUF           ;EMPTY RBUF.  IGNORE BUFFER CONTENTS.
017104  000767                          BR      EMP4            ;CHECK FOR RDONE AGAIN AND EMPTY BUFFER

017106  005037  006500          ABSND:  CLR     ERWORD                  ;ASSUME NO ERRORS
017112  005037  010056                  CLR     NDATA                   ;ASSUME NO UNIBUS ERRORS
017116  005037  006512                  CLR     FLTRDY                  ;ASSUME NO FAILURE TO FIND TRANSMIT RDY
017122  005037  002206                  CLR     GREASE                  ;ASSUME NO PREVIOUS ERRORS.

017126  012701  002210                  MOV     #STSRES,R1      ;SEND REQUEST STATUS SEQUENCE.
017132  012702  000002                  MOV     #2,R2           ;
017136  005003                          CLR     R3              ;
017140  004737  012616                  JSR     PC,XMIT         ;SEND ANSWER-BACK SEQUENCE TO PRINTER.
017144  042737  100000  006500          BIC     #BIT15,ERWORD   ;IGNORE POSSIBLE EOT INDICATION.

017152  023727  010056  000001          CMP     NDATA,#1        ;IF SET THEN TRY MULTILINE ADDRESS
017160  001417                          BEQ     DZDCOD          ;IF NOT SET, DO THE DZ CHECK

017162  005004                          CLR     R4              ;BR4 SHOULD GET ESCAPE CHAR IF DL PRESENT.
017164  004737  014012                  JSR     PC,GETCHR       ;THE DELAY SHOULD BE LONG ENOUGH TO PERMIT
                                                                ;THE PRINTER TO RESPOND.
                                                                ;NOW GET THE FIVE RESPONSE CHARACTERS
017170  120437  006521                  CMPB    R4,ESCAPE       ;IS IT AN ESCAPE CHARACTER?
```

```
                                        BNE     DZDCOD          ;NO? THEN TRY DZ ADDRESS DEFAULT.
                                        JSR     PC,GETCHR       ;
                                        JSR     PC,GETCHR       ;
                                        JSR     PC,GETCHR       ;
                                        JSR     PC,GETCHR       ;THE FINAL CHARACTER SHOULD BE A "C"
                                        BR      DONEDF          ;YES? THEN SUCCESSFULLY COMPLETED.

                                DZDCOD: CLR     ERWORD                  ;ASSUME NO ERRORS
                                        CLR     NDATA                   ;ASSUME NO UNIBUS ERRORS
                                        CLR     FLTRDY                  ;ASSUME NO FAILURE TO FIND TRANSMIT RDY
                                        CLR     GREASE                  ;ASSUME NO PREVIOUS ERRORS.

                                        MOV     DZDFLT,@PLOC    ;ASSUME A DZ INTERFACE AT ADDRESS 776010
                                        JSR     PC,DZSET        ;SET UP REGISTERS FOR A DZ11 INTERFACE

                                        CMP     NDATA,#1        ;HAS AN ILLEGAL ADDRESS ERROR OCCURRED?
                                        BEQ     FAILDF          ;IF SO, BOTH DL AND DZ DEAFUALTS HAVE FAILED.
                                                                ;       SO LET USER KNOW.

                                        CLR     R3              ;DISABLE BIDIRECTIONAL PRINTING LOGIC
                                        CLR     ERWORD          ;ASSUME NO ERRORS HAVE YET OCCURRED.

                                EMPTI5: MOV     #100.,R0        ;ASSUME NO MORE THAN 100 CHARACTERS IN BUFFER.
                                EMP5:   DEC     R0              ;COUNT DOWN ONE FOR EACH CHARACTER
                                        BLT     ABS5            ;STOP TRYING TO EMPTY THE BUFFER. ASSUME HOPELESS.

                                        BIT     #BIT7,@RCSR     ;IS THERE A CHARACTER IN THE RBUF?
                                        BEQ     ABS5            ;IF NO CHARACTER IN RBUF, THEN CONTINUE...

                                        TST     @RBUF           ;EMPTY RBUF.  IGNORE BUFFER CONTENTS.
                                        BR      EMP5            ;CHECK FOR RDONE AGAIN AND EMPTY BUFFER

                                ABS5:   CLR     ERWORD                  ;ASSUME NO ERRORS
                                        CLR     NDATA                   ;ASSUME NO UNIBUS ERRORS
                                        CLR     FLTRDY                  ;ASSUME NO FAILURE TO FIND TRANSMIT RDY
                                        CLR     GREASE                  ;ASSUME NO PREVIOUS ERRORS.

                                        MOV     #STSRES,R1      ;SEND REQ STATUS SEQUENCE.
                                        MOV     #2,R2           ;
                                        CLR     R3              ;
                                        JSR     PC,XMIT         ;SEND REQ STATUS SEQUENCE TO PRINTER.
                                        BIC     #BIT15,ERWORD   ;IGNORE POSSIBLE EOT INDICATION.

                                        CMP     NDATA,#1        ;CHECK FOR OCCURRANCE OF TRAP...
                                        BEQ     FAILDF          ;IF SET THEN  PRINT AN ERROR AND START OVER

                                        JSR     PC,GETCHR       ;DELAY SHOULD GIVE PRINTEWR ENOUGH TIME TO
                                                                ;RESPOND TO ANSWER-BACK SEQUENCE.


                                                                ;GET THE FIVE CHARACTER RESPONSE TO THE QUERY
                                        CMPB    R4,ESCAPE       ;EXPECTING ESCAPE CHARACTER IF DZ PRESENT.
                                        BNE     FAILDF          ;DEFAULT ADDRESSES DIDN'T WORK OUT.
                                        JSR     PC,GETCHR       ;
                                        JSR     PC,GETCHR       ;
                                        JSR     PC,GETCHR       ;
                                        JSR     PC,GETCHR       ;LAST CHARACTER A "C"(LOWER CASE)
                                        BR      DONEDF          ;FOUND THE ADDRESS. EXIT.
```

```
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$PNTF
    017442  062706  000004                                                    ADD     #4,SP
512 017446                                  DOCLN                   ;EXIT TESTING SEQUNCE
    017446  104444                                                            TRAP    C$DCLN
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
```

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

017456                                  BGNCLN
017456                                                                          L$CLEAN::
017456  004737  014274                  JSR     PC,INITCD       ;RESET THE PRINTER
017462                                  EXIT    CLN
017462  104432                                                                  TRAP    C$EXIT
017464  0000^2                                                                  .WORD   L10007-.

                                        .EVEN

017466                                  ENDCLN
017466                                                                          L10007:
017466  104412                                                                  TRAP    C$CLEAN


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

```
017470                                  BGNTST
017470                                                                                      T1::

                                ;!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
                                ;
                                ;       TEST #1
                                ;
                                ;       THIS TEST WILL INITIATE THE PRINTER SELF-TEST.  AFTER THE SELF-TEST
                                ;       IS COMPLETE, THE PRINTER SENDS THE PRINTER STATUS AND AN XON CHARACTER
                                ;       IF EVERYTHING HAS OPERATED PROPERLY.  THE PRINTER STATUS IS THEN
                                ;       EXAMINED AND APPROPPIATE  ERROR REPORTING IS INITIATED.
                                ;
                                ;.............................................................................

017470  004737  014274          TEST1:  JSR     PC,INITCD       ;INITIALIZE FOR THIS TEST
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
017514  012701  002255                  MOV     #SLFTST,R1      ;ADDRESS OF SELT TEST ARGUMENT SEQUENCE
017520  012702  000002                  MOV     #2,R2           ;2 CHARACTERS IN SEQUENCE
017524  005003                          CLR     R3              ;DISABLE BIDIRECTIONAL PRINTING
017526  004737  012616                  JSR     PC,XMIT         ;SEND THE ARGUMENT LIST

017532  023727  002206  177777          CMP     GREASE,#-1      ;WAS THERE A "GREASED" EXIT FROM XMIT?
017540  001402                          BEQ     PRNTIT          ;IF SO, PREPARE TO PRINT TO CONSOLE
                                                                ;       THE ERRORS FOUND DURING XMIT ATTEMPT.
017542  004737  015020                  JSR     PC,STATS        ;RECEIVE STATUS AND FIT TO ERWORD.
017546  004737  015246          PRNTIT: JSR     PC,ERRORS       ;DECODE ERROR WORD & PRINT ERROR MESSAGES

017552  004737  014012          CHKN6:  JSR     PC,GETCHR       ;GET ANOTHER (SIXTH) CHARACTER
017556  123704  006520                  CMPB    XON,R4          ;IS IT AN "XON"?
017562  001406                          BEQ     STSCAL          ;IF OK, (XON FOUND) THEN CHECK STATUS
017564  052737  020000  006500          BIS     #BIT13,ERWORD   ;SET ECNRB
017572  052737  100000  006500          BIS     #BIT15,ERWORD   ;INDICATE ERROR

017600  004737  015246          STSCAL: JSR     PC,ERRORS       ;CHECK FOR ERRORS


017604                                  ENDTST
017604                                                                                  L10010:
017604  104401                                                                                  TRAP    C$ETST
```

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

```
017606                          BGNTST
017606                                                                  T2::

                                ;!..!!..!!!!!!.!!!!!.!!!!!!!!..!!!!.!!!!.!!!..!!!!!!!!!!.!!!.!!!!!!!!!!!!!
                                ;
                                ;       TEST #2
                                ;
                                ;       UNDERLINE / NO-UNDERLINE MODE
                                ;
                                ;
                                ;       PRINT A SINGLE LINE OF ALTERNATING UNDERLINED AND NON-UNDERLINED
                                ;       "A"S, CHECKING FOR ERRORS FROM THE PRINTER ALONG THE WAY.
                                ;.....................................................................

017606  004737  014274          TEST2:  JSR     PC,INITCD       ;INITIALIZE TEST
017612                                  PRINTB  #TITLE2         ;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

017632  052737  040000  006500          BIS     #BIT14,ERWORD   ;INHIBIT ERROR HANG-UPS
017640  012701  002366                  MOV     #TITLE2,R1      ;ADDRESS OF STRING TO PRINT (TITLE)
017644  062701  000004                  ADD     #4,R1           ;SKIP FIRST FOUR CHARACTERS
017650  012702  000053                  MOV     #43.,R2         ;43 CHARACTERS TO PRINT IN STRING
017654  005003                          CLR     R3              ;DISABLE BIDIRECTIONAL
017656  004737  012616                  JSR     PC,XMIT         ;SEND THE ARGUMENT SEQUENCE
017662  042737  040000  006500          BIC     #BIT14,ERWORD   ;RE-ENABLE ERROR HANG-UPS

017670  012704  177777                  MOV     #-1,R4          ;CHARACTER COUNT
017674  012701  006531          PLOOP:  MOV     #SCA,R1         ; ADDRESS OF ASCII "A"
017700  012702  000001                  MOV     #1,R2           ;ONE CHARACTER
017704  005003                          CLR     R3              ;NO BIDIRECTIONAL PRINTING
017706  004737  012616                  JSR     PC,XMIT         ;SEND "A" TO PRINTER FOR PRINTING.
017712  004737  015246                  JSR     PC,ERRORS       ;CHECK FOR ERRORS

017716  012700  000001                  MOV     #1,R0
017722  126027  002266  000041          CMPB    STULMD(R0),#ONE ;IS THE UNDERLINE MODE SET?
017730  001004                          BNE     SETONE          ;NO, THEN CHANGE TO UNDERLINE MODE
017732  112760  000040  002266          MOVB    #ZERO,STULMD(R0) ;YES, THEN CHANGE TO NON-UNDERLINE MODE
017740  000405                          BR      NEWMOD          ;TRANSMIT MODE CHANGE AT NEWMOD
017742  012700  000001          SETONE: MOV     #1,R0
017746  112760  000041  002266          MOVB    #ONE,STULMD(R0) ;CHANGE TO UNDERLINE MODE

017754  012701  002266          NEWMOD: MOV     #STULMD,R1      ;ADDRESS OF ARGUMENT STRING
017760  012702  000003                  MOV     #3,R2           ;WHICH IS THREE CHARACTERS LOONG
017764  004737  012616                  JSR     PC,XMIT         ;SEND THE SEQUENCE
017770  004737  015246                  JSR     PC,ERRORS       ;CHECK FOR ERRORS

017774  005204                          INC     R4              ;UPDATE COUNT OF CHARACTERS.
017776  020437  010042                  CMP     R4,LINSIZ       ;PRINTED A LINE YET?
020002  001334                          BNE     PLOOP           ;DO LOOP UNTIL DONE
```

```
      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                                                                  L10011:
         020024  104401                                                                 TRAP    C$ETST
      59
      60
      61                                 ;
      62                                 ;
      63
      64
      65
      66
      67
      68
      69                                 .SBTTL  TEST 3: HAMMER HIT COUNT TEST
```

```
  020026                                  BGNTST
  020026                                                                                T3::

                                          ;!!!!!.....!!..!!. !! .'! ... ..    .  . ...   ..  .     !... ...!.!.. !!'.
                                          ;
                                          ;
                                          ;      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.
                                          ;
                                          ;.....................................................................

  020026  004737  014274                  TEST3:  JSR     PC,INITCD        ;INITIALIZE TEST
  020032                                          PRINTB  #TITLE3          ;CONSOLE PRINT TEST TITLE
  020032  012746  002446                                                                         MOV     #TITLE3,-(SP)
  020036  012746  000001                                                                         MOV     #1,-(SP)
  020042  010600                                                                                 MOV     SP,R0
  020044  104414                                                                                 TRAP    C$PNTB
  020046  062706  000004                                                                         ADD     #4,SP

  020052  052737  040000  006500                  BIS     #BIT14,ERWORD    ;DISABLE ERROR HANGUPS
  020060  012701  002446                          MOV     #TITLE3,R1       ;TITLE ADDRESS
  020064  062701  000004                          ADD     #4,R1            ;SKIPPING THE FIRST FOUR TWO CHARACTERS.
  020070  012702  000040                          MOV     #32.,R2          ;32 CHARACTERS LONG
  020074  005003                                  CLR     R3               ;NO BIDIRECTIONAL PRINTING
  020076  004737  012616                          JSR     PC,XMIT          ;PRINT TEST TITLE
  020102  042737  040000  006500                  BIC     #BIT14,ERWORD    ;RE-ENABLE ERROR HANG-UPS

  020110  113737  006533  006522                  MOVB    SC1,SNGCHR       ; THE CHARACTER "1" TO BE PRINTED
  020116  112737  000040  010060                  MOVB    #ZERO,HITARG     ;HIT COUNT ARGUMENT
  020124  012700  000001                  LINLOO: MOV     #1,R0
  020130  113760  010060  002257                  MOVB    HITARG,STHTCT(R0) ;INSERT IN ARGUMENT TEMPLATE
  020136  005237  010060                          INC     HITARG           ;NEW ARGUMENT FOR HITARG
  020142  012701  002257                          MOV     #STHTCT,R1       ;ADDRESS OF ARGUMENT LIST
  020146  012702  000003                          MOV     #3,R2            ;3 CHARACTER ARGUMENT LIST
  020152  005003                                  CLR     R3               ;DISABLE BIDIRECTIONAL PRINTING FOR NOW.
  020154  004737  012616                          JSR     PC,XMIT          ;SEND THE LIST - ADJUST HIT COUNT
  020160  004737  015246                          JSR     PC,ERRORS        ;CHECK FOR ERRORS.

  020164  005004                                  CLR     R4               ;COUNT OF CHARACTERS
  020166  012701  006522                  CHRLOO: MOV     #SNGCHR,R1       ;ADDRESS OF CHAR TO BE PRINTED
  020172  012702  000001                          MOV     #1,R2            ;SINGLE CHARACTER
```

```
HARDWARE TESTS  MACRO V03.01 7-NOV-80 10:06:10 PAGE 30-1
TEST 3: HAMMER HIT COUNT TEST

     52 020176  012703  177777                MOV     #-1,R3          ;ENABLE BIDIRECTIONAL PRINTING.
     53 020202  004737  012616                JSR     PC,XMIT         ;SEND THE CHARACTER
     54 020206  004737  015246                JSR     PC,ERRORS       ;CHECK FOR ERRORS.
     55
     56 020212  005204                        INC     R4              ;UPDATE NUMBER OF CHARACTERS PRINTED THUS FAR.
     57 020214  020437  010042                CMP     R4,LINSIZ       ;SENT A LINES WORTH YET?
     58 020220  001362                        BNE     CHRLOO          ;NO, CONTINUE SENDING.
     59
     60 020222  005237  006522                INC     SNGCHR          ;INCREASE ASCII PATTERNTO NEXT CHARACTER
     61 020226  123727  010060  000043        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  000001                MOV     #1,R0
     65 020242  112760  000040  002257        MOVB    #ZERO,STHTCT(R0)        ;REVERT BACK TO HIT COUNT OF 1
     66 020250  012701  002257                MOV     #STHTCT,R1
     67 020254  012702  000003                MOV     #3,R2
     68 020260  005003                        CLR     R3              ;DISABLE BIDIRECTIONAL PRINTING
     69 020262  004737  012616                JSR     PC,XMIT         ;SEND PRINTER ARGUMENT LIST FOR HIT COUNT=1
     70 020266  004737  015246                JSR     PC,ERRORS       ;CHECK FOR ERRORS
     71
     72 020272                                ENDTST
        020272                                                                  L10012:
        020272  104401                                                                 TRAP    C$ETST
     73
     74
     75
     76
     77                                       ;
     78                                       ;
     79                                       ;
     80
     81                                       .SBTTL  TEST 4: CARRIAGE POSITIONING TEST
```

```
020274                             BGNTST
020274                                                                                    T4::


                                   ;.........................................................................
                                   ;
                                   ;        TEST #4
                                   ;
                                   ;        CARRIAGE POSITIONING TEST
                                   ;
                                   ;        IN THIS TEST THE PRINTER CARRIAGE WILL BE EXERCISED BY MOVING
                                   ;        THE CARRIAGE BACK AND FORTH INCREASING AMOUNTS FROM THE MINIMUM
                                   ;        HORIZONTAL INCREMENT OF MOVEMENT TO THE MAXIMUM (PAGE SIZE) HORIZONTAL
                                   ;        INCREMENT OF MOVEMENT.  IN THE PROCESS, ANY ERRORS DETECTED BY THE
                                   ;        PRINTER WILL BE IDENTIFIED AND REPORTED.
                                   ;
                                   ;.........................................................................





020274  004737  014274             TEST4:  JSR     PC,INITCD       ;INITIALIZE TEST
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

020320  052737  040000  006500             BIS     #BIT14,ERWORD   ;INHIBIT ERROR HANG-UPS
020326  012701  002513                     MOV     #TITLE4,R1      ;ADDRESS OF TITLE #4 TO BE PRINTED
020332  062701  000004                     ADD     #4,R1           ;SKIP FIRST FOUR CHARACTERS
020336  012702  000044                     MOV     #36.,R2         ;36 CHARACTERS IN THE TITLE
020342  005003                             CLR     R3              ;DISABLE BIDIRECTIONAL PRINTING
020344  004737  012616                     JSR     PC,XMIT         ;TRANSMIT THE STRING TO THE PRINTER
020350  042737  040000  006500             BIC     #BIT14,ERWORD   ;RE-ENABLE ERROR HANG-UPS

020356  012701  006530                     MOV     #SCX,R1         ;ADDRESS OF THE SINGLE CHARACTER ''X''.
020362  012702  000001                     MOV     #1,R2           ;SINGLE CHARACTER TO BE PRINTED
020366  004737  012616                     JSR     PC,XMIT         ;PRINT THE CHARACTER ''A''.
020372  004737  015246                     JSR     PC,ERRORS       ;CHECK FOR ERRORS.

020376  012701  002313                     MOV     #CR,R1          ;ADDRESS OF CARRIAGE RETURN ASCII
020402  012702  000002                     MOV     #2,R2           ;TWO CHARACTERS INCLUDE <CR> & <LF>.
020406  004737  012616                     JSR     PC,XMIT         ;SEND <CR><LF> TO PRINTER
020412  004737  015246                     JSR     PC,ERRORS       ;CHECK FOR ERRORS

020416  012737  000001  010036             MOV     #1,SPCSIZ       ;INITIALIZE THE SPACE SIZE TO ITS SMALLEST

020424  013701  010036             L1LOOP: MOV     SPCSIZ,R1       ;R1 HAS SPACE SIZE FOR THE CONVERSION ROUTINE
020430  162701  000014                     SUB     #12.,R1         ;TAKE AWAY THE 12 HORIZONTAL INCREMENTS
                                                                   ; PRODUCED BY THE PRINT OF THE CHARACTER.
020434  004737  014176                     JSR     PC,CONVRT       ;CONVERT R1 TO THREE ASCII MNEMONICS (BYTES)
```

```
     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
        020606                                                                  L10013:
        020606  104401                                                                  TRAP    C$ETST
     85
     86
     87
     88
     89                                  ;
     90                                  ;
     91                                  ;
     92                                  ;
     93
     94
     95
     96
     97                                  .SBTTL  TEST 5: PAPER POSITIONING TEST
```

```


020610                                  BGNTST
020610                                                                                  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.
                                        ;
                                        ;.................................................................................





020610  004737  014274                  TEST5:  JSR     PC,INITCD        ;INITIALIZATION CODE
020614                                          PRINTB  #TITLE5          ;CONSOLE PRINT OF THE TEST TITLE.
020614  012746  002564                                                                                          MOV     #TITLE5,-(SP)
020620  012746  000001                                                                                          MOV     #1,-(SP)
020624  010600                                                                                                  MOV     SP,R0
020626  104414                                                                                                  TRAP    C$PNTB
020630  062706  000004                                                                                          ADD     #4,SP

020634  052737  040000  006500                  BIS     #BIT14,ERWORD    ;DISABLE ERROR HANG-UPS
020642  012701  002564                          MOV     #TITLE5,R1       ;ADDRESS OF THE TITLE TO BE PRINTED
020646  062701  000004                          ADD     #4,R1            ;SKIP FIRST FOUR CHARACTERS.
020652  012702  000054                          MOV     #44.,R2          ;43 CHARACTERS IN THE TITLE
020656  005003                                  CLR     R3               ;DISABLE BIDIRECTIONAL PRINTING
020660  004737  012616                          JSR     PC,XMIT          ;SEND THE TITLE SEQUENCE TO THE PRINTER.
020664  042737  040000  006500                  BIC     #BIT14,ERWORD    ;RE-ENABLE THE ERROR HANG-UPS.

020672  012737  000001  010062                  MOV     #1,LINCNT        ;LINEFEED SIZE IN 1/48 INCH INCREMENTS.

020700  013701  010062                  AGN:    MOV     LINCNT,R1        ;A NUMBER FOR CONVERSION TO ASCII MNEMONICS
020704  004737  014176                          JSR     PC,CONVRT        ;CONVERT NUMBER IN R1 TO THREE MNEMONIC BYTES
020710  012700  000001                          MOV     #1,R0
020714  113760  010046  002226                  MOVB    MNEB1,VRTCLS(R0)  ;TRANSFER MNEMONICS INTO ARGUMENT
020722  005200                                  INC     R0
020724  113760  010047  002226                  MOVB    MNEB2,VRTCLS(R0)  ;     LIST SLOTS IN THE
020732  005200                                  INC     R0
020734  113760  010050  002226                  MOVB    MNEB3,VRTCLS(R0)  ;     ESCAPE SEQUENCE.

```

```
     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                                                                  L10014:
        021012  104401                                                                  TRAP    C$ETST
     66
     67
     68
     69
     70                                 ;
     71                                 ;
     72                                 ;
     73
     74                                 .SBTTL TEST 6:  PRINT ONE LINE OF EACH CHARACTER
```

```
  021014                                BGNTST
  021014                                                                          T6::





                                        ;!!.!!!.!!!..!!.!!!..!!.!!!.!!.!!!!...!.!!!!!.!!!!!!.!!!!!!!!!!!!!!!!!!!!.!!!.!!!
                                        ;
                                        ;       TEST #6
                                        ;
                                        ;       PRINT ONE LINE OF EACH CHARACTER
                                        ;
                                        ;       IN THIS TEST ONE LINE OF EACH CHARACTER WILL BE PRINTED FOR THE
                                        ;       ENTIRE PRESET PAGE WIDTH.  PRINTER DETECTED ERRORS WILL BE DETECTED
                                        ;       CLASSIFIED.
                                        ;
                                        ;.....................................................................................




  021014  004737  014274                TEST6:  JSR     PC,INITCD       ;INITIALIZATION FOR TEST
  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

  021040  052737  040000  006500                BIS     #BIT14,ERWORD   ;DISABLE ERROR HANG-UPS
  021046  012701  002645                        MOV     #TITLE6,R1      ;ADDRESS OF THE TITLE
  021052  062701  000004                        ADD     #4,R1           ;SKIP FIRST FOUR CHARACTERS
  021056  012702  000053                        MOV     #43.,R2         ;43 CHARACTERS IN THE TITLE
  021062  005003                                CLR     R3              ;DISABLE BIDIRECTIONAL PRINTING FOR THE MOMENT
  021064  004737  012616                        JSR     PC,XMIT         ;PRINT THE TITLE
  021070  042737  040000  006500                BIC     #BIT14,ERWORD   ;ENABLE DESIRED ERROR HANG-UPS.

  021076  012703  177777                        MOV     #-1,R3          ;ENABLE BIDIRECTIONAL PRINTING
  021102  005004                                CLR     R4              ;NO LINES YET PRINTED
  021104  005037  010064                LINL06: CLR     CHRCNT          ;NO CHARACTERS YET PRINTED

  021110  010401                        CHRL06: MOV     R4,R1           ;GET OFFSET
  021112  062701  006555                        ADD     #CHRLST,R1      ;POINT TO DESIRED CHARACTER IN CHAR LIST.
  021116  012702  000001                        MOV     #1,R2           ;JUST THE ONE CHARACTER TO PRINT
  021122  004737  012616                        JSR     PC,XMIT         ;SEND THE CHARACTER
  021126  004737  015246                        JSR     PC,ERRORS       ;CHECK FOR ERRORS

  021132  005237  010064                        INC     CHRCNT          ;KEEP TRACK OF THE CHARACTERS PRINTED
  021136  023737  010064  010042                CMP     CHRCNT,LINSIZ   ;HAS A FULL LINE BEEN PRINTED YET?
  021144  100761                                BMI     CHRL06          ;IF NOT THEN PRINT UNTIL TRUE.

  021146  005204                                INC     R4              ;KEEP TRACK OF THE LINES PRINTED
  021150  020427  000136                        CMP     R4,#94.         ;96 LINES PRINTED? (ALL CHARACTERS?)
```

```
     52 021154  100753                          BMI     LINL06          ;IF NOT YET, MORE LINES TO PRINT.
     53
     54 021156                                  ENDTST
        021156                                                                      L10015:
        021156  104401                                                                      TRAP    C$ETST
     55
     56
     57
     58
     59
     60
     61
     62
     63
     64                             ;
     65                             ;
     66                             ;
     67                             ;
     68
     69                             .SBTTL  TEST 7: PRINT A SWIRL PATTERN
```

```
021160                          BGNTST
021160                                                                  T7::

                        ;..!!..!.!.............!..... ..!!!.!..!!!.!...!!!..!!!:!!!!!!!!!!.!!!!!!!!!.!!
                        ;
                        ;       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.
                        ;
                        ;.....................................................................

021160  004737  014274          TEST7:  JSR     PC,INITCD       ;INITIALIZE THE TEST
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

021204  052737  040000  006500          BIS     #BIT14,ERWORD   ;INHIBIT ERROR HANG-UPS
021212  012701  002725                  MOV     #TITLE7,R1      ;ADDRESS OF THE TITLE TO BE PRINTED
021216  062701  000004                  ADD     #4,R1           ;SKIP 1ST 4 CHARACTERS.
021222  012702  000040                  MOV     #32.,R2         ;32 CHARACTERS INVOLVED
021226  005003                          CLR     R3              ;DISABLE BIDIRECTIONAL PRINTING FOR NOW.
021230  004737  012616                  JSR     PC,XMIT         ;SEND TO PRINTER
021234  042737  040000  006500          BIC     #BIT14,ERWORD   ;ENABLE ERROR HANG-UPS

021242  012703  177777                  MOV     #-1,R3          ;ENABLE BIDIRECTIONAL PRINTING
021246  005004                          CLR     R4              ;NO LINES ARE PRINTED YET

021250  010401                  NXTLIN: MOV     R4,R1                   ;OFFSET
021252  062701  006555                  ADD     #CHRLST,R1              ;ADDRESS OF CHARACTER TO BE PRINTED.
021256  013702  010042                  MOV     LINSIZ,R2               ;LENGTH OF LINE. PRINT A LINES WORTH
021262  004737  012616                  JSR     PC,XMIT                 ;TRANSMIT THE LINE TO THE PRINTER
021266  004737  015246                  JSR     PC,ERRORS               ;CHECK FOR ERRORS

021272  010105                          MOV     R1,R5           ;ADDRESS OF LAST CHARACTER FOR PRINTING....
021274  005205                          INC     R5              ;       POINT ONE FURTHER FOR SWIRL EFFECT.
021276  013701  010042                  MOV     LINSIZ,R1       ;
021302  060501                          ADD     R5,R1           ;POINT TO THE FIRST CHARACTER TO BE PRINTED+1.

021304  005301                  REVRSP: DEC     R1              ;POINT TO THE NEXT CHARACTER TO BE PRINTED.
021306  012702  000001                  MOV     #1,R2           ;TELL XMIT THAT A SINGLE CHARACTER PRINTED.
021312  004737  012616                  JSR     PC,XMIT         ;SEND THE CHARACTER. (REVERSE PRINT)
021316  004737  015246                  JSR     PC,ERRORS       ;CHECK FOR ERRORS.

021322  020501                          CMP     R5,R1           ;PRINTED ENOUGH CHARACTERS YET IN REVERSE?
```

```
     52 021324  100767                          BMI     REVRSP          ;PRINT NEXT REVERSE CHAR.
     53
     54
     55                                 ;                               DONE WITH REVERSE PRINT.
     56
     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
        021340                                                                      L10016:
        021340  104401                                                                      TRAP    C$ETST
     62
     63
     64
     65
     66
     67
     68
     69                                 ;
     70                                 ;
     71                                 ;
     72
     73
     74                                 .SBTTL  TEST 8: WORST CASE RAPID MOTION TEST
```

```
  021342                              BGNTST
  021342                                                                                    T8::



                                      ;...............................................................................
                                      ;
                                      ;       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:''.
                                      ;
                                      ;...............................................................................





  021342  004737  014274              TEST8:  JSR     PC,INITCD       ;INITIALIZE TEST
  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

  021366  052737  040000  006500              BIS     #BIT14,ERWORD   ;DISABLE ERROR HANG-UPS
  021374  012701  002772                      MOV     #TITLE8,R1      ;ADDRESS OF TITLE
  021400  062701  000004                      ADD     #4,R1           ;SKIP FIRST 4 CHARACTERS
  021404  012702  000047                      MOV     #39.,R2         ;39 CHARACTERS
  021410  005003                              CLR     R3              ;NO BIDIRECTIONAL PRINTING FOR NOW
  021412  004737  012616                      JSR     PC,XMIT         ;SEND TO PRINTER
  021416  042737  040000  006500              BIC     #BIT14,ERWORD   ;ENABLE ERROR HANG-UPS

  021424  012703  177777                      MOV     #-1,R3          ;ENABLE BIDIRECTIONAL PRINTING
  021430  005004                              CLR     R4              ;COUNT OF ''ACA:'' BLOCKS
  021432  013705  010042                      MOV     LINSIZ,R5       ;# OF CHARACTERS PER LINE
  021436  006205                              ASR     R5              ;LINSIZ/2 : 1 BLOCK = 4 CHARACTERS...
                                                                      ;       PRINT 2 LINES AT NEW LINE SIZE

  021440  012701  006535              LOOP8:  MOV     #ACAS,R1        ;ADDRESS OF SEQUENCE
  021444  012702  000004                      MOV     #4,R2           ;OF 4 CHARACTERS...
  021450  004737  012616                      JSR     PC,XMIT         ;SEND TO PRINTER
  021454  004737  015246                      JSR     PC,ERRORS       ;CHECK FOR ERRORS.

  021460  005204                              INC     R4
  021462  020405                              CMP     R4,R5           ;ENOUGH BLOCKS PRINTED??
  021464  100765                              BMI     LOOP8           ;IF NO, LOOP TO PRINT NEXT BLOCK...

  021466                                      ENDTST
  021466                                                                                    L10017:
```

```
        021466  104401                                                          TRAP    C$ETST
    51
    52
    53
    54
    55                                  ;
    56                                  ;
    57                                  ;
    58                                  ;
    59
    60
    61                                  .SBTTL  TEST 9: PRINT RANDOM CHARACTERS
```

```
021470                          BGNTST
021470                                                          T9::

;..... .!!...! .....!!.!.. ...  .......!.!!.!!!!!!!.!!!!!!!!!!!!!.!!!!!!!!!!!
;
;       TEST #9
;
;       PRINT RANDOM CHARACTERS
;
;       THIS TEST WILL PRINT A RANDOM SEQUENCE OF CHARACTERS ON THE
;       PRINTER.
;
;.....................................................................

021470  004737  014274        TEST9:  JSR     PC,INITCD       ;INITIALIZE TEST
021474                          PRINTB  #TITLE9         ;CONSOLE PRINT TITLE
021474  012746  003046                                                  MOV     #TITLE9,-(SP)
021500  012746  000001                                                  MOV     #1,-(SP)
021504  010600                                                          MOV     SP,R0
021506  104414                                                          TRAP    C$PNTB
021510  062706  000004                                                  ADD     #4,SP

021514  052737  040000  006500          BIS     #BIT14,ERWORD   ;DISABLE ERROR HANG-UPS
021522  012701  003046                  MOV     #TITLE9,R1      ;ADDRESS OF TITLE
021526  062701  000004                  ADD     #4,R1           ;SKIP 1ST 4 CHARACTERS
021532  012702  000042                  MOV     #34.,R2         ;34 CHARACTERS IN THE TITLE
021536  005003                          CLR     R3              ;DISABLE BIDIRECTIONAL PRINTING
021540  004737  012616                  JSR     PC,XMIT         ;SEND TO PRINTER
021544  042737  040000  006500          BIC     #BIT14,ERWORD   ;ENABLE ERROR HANG-UPS

021552  013705  010042                  MOV     LINSIZ,R5       ;GET THE LINE SIZE
021556  006305                          ASL     R5              ;LINE SIZE * 2
021560  006305                          ASL     R5              ;LINE SIZE * 4
021562  006305                          ASL     R5              ;LINE SIZE * 8
                                                                ; TO PRINT 8 LINES WORTH
021564  005037  010064                  CLR     CHRCNT          ;NO CHARACTERS PRINTED YET

021570  004737  014726          PLOOP9: JSR     PC,RANDOM       ;RANDOM NUMBER (0 - 99) INTO R1

021574  062701  006555                  ADD     #CHRLST,R1      ;ADDRESS FOR THIS PRINT
021600  012702  000001                  MOV     #1,R2           ;SINGLE CHARACTER
021604  012703  177777                  MOV     #-1,R3          ;BIDIRECTIONAL PRINTING.
021610  004737  012616                  JSR     PC,XMIT         ;SEND TO PRINTER
021614  004737  015246                  JSR     PC,ERRORS       ;CHECK FOR ERRORS.

021620  005237  010064                  INC     CHRCNT          ;KEEP TRACK OF THE NUMBER OF CHARACTERS
021624  023705  010064                  CMP     CHRCNT,R5       ;EIGHT LINES YET?
```

```
      52 021630  100757                          BMI     PLOOP9          ;NO,LOOP UNTIL DONE
      53
      54 021632                                  ENDTST
         021632                                                                  L10020:
         021632  104401                                                                  TRAP    C$ETST
      55
      56
      57
      58
      59
      60                                 ;
      61                                 ;
      62                                 ;
      63                                 .SBTTL  TEST 10:        PRINT OPERATOR SELECTED CHARACTERS
```

```
021634                                  BGNTST
021634                                                                                          T10::



                                        ;.... ......!...!.! !.. ... .! .....! !!!!.!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
                                        ;
                                        ;       TEST #10
                                        ;
                                        ;       PRINT OPERATOR SELECTED CHARACTERS
                                        ;
                                        ;       THIS OPTIONAL TEST WILL PRINT CHARACTER SEQUENCES SELECTED BY THE
                                        ;       OPERATOR ONE LINE AT A TIME.
                                        ;
                                        ;......................................................................




021634  004737  014274                  TESTA:  JSR     PC,INITCD       ;TEST INITIALIZE
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

021660  052737  040000  006500                  BIS     #BIT14,ERWORD   ;DISABLE ERROR HANG-UPS
021666  012701  003115                          MOV     #TITLEA,R1      ;ADDRESS OF TITLE
021672  062701  000004                          ADD     #4,R1           ;SKIP 4 CHARACTERS
021676  012702  000056                          MOV     #46.,R2         ;46 CHARACTERS IN THE TITLE
021702  005003                                  CLR     R3              ;DISABLE BIDIRECTIONAL PRINTING
021704  004737  012616                          JSR     PC,XMIT         ;SEND TO PRINTER
021710  042737  040000  006500                  BIC     #BIT14,ERWORD   ;ENABLE ERROR HANG-UPS

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.

021736  005004                                  CLR     R4              ;R4 IS OFFSET IN INPUT STRING

021740  105764  007352                  NXTA:   TSTB    BFRA(R4)        ;IS THE BYTE A ZERO?  GMANID IS EXPECTED TO
                                                                        ; SEND A ZERO AS THE LAST BYTE.  THIS WILL
                                                                        ; INDICATE THE END OF THE INPUT STRING.
021744  001011                                  BNE     TFCZ            ;NOT ZERO.  CHECK FOR CTL-Z

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      LOOPA           ;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                                                                  L10021:
        022046  104401                                                                 TRAP    C$ETST
     71
     72
     73
     74
     75                                 ;
     76                                 ;
     77                                 ;
     78
     79                                 .SBTTL  TEST 11:        LIFT / DROP RIBBON BY OPERATOR CONTROL
```

```



 022050                         BGNTST
 022050                                                                                 T11::




                                ;!!!!!.!!!!!!!.!!!!.:!.!!!! !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
                                ;
                                ;       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.
                                ;
                                ;
                                ;..............................................................................





 022050 004737  014274          TESTB:  JSR     PC,INITCD       ;TEST INITIALIZE
 022054                                 PRINTB  #TITLEB         ;CONSOLE PRINT TITLE
 022054 012746  003264                                                                  MOV     #TITLEB,-(SP)
 022060 012746  000001                                                                  MOV     #1,-(SP)
 022064 010600                                                                          MOV     SP,R0
 022066 104414                                                                          TRAP    C$PNTB
 022070 062706  000004                                                                  ADD     #4,SP

 022074 052737  040000  006500          BIS     #BIT14,ERWORD   ;DISABLE ERROR HANG-UPS
 022102 012701  003264                  MOV     #TITLEB,R1      ;ADDRESS OF TEST TITLE
 022106 062701  000004                  ADD     #4,R1           ;SKIP 4 CHARACTERS
 022112 012702  000060                  MOV     #48.,R2         ;48 CHARACTERS TO BE PRINTED.
 022116 005003                          CLR     R3              ;NO BIDIRECTIONAL PRINTING
 022120 004737  012616                  JSR     PC,XMIT         ;SEND THE TEST TITLE
 022124 042737  040000  006500          BIC     #BIT14,ERWORD   ;ENABLE ERROR HANG-UPS

 022132 012701  002303                  MOV     #SETHTO,R1      ;SET HIT COUNT TO ZERO
 022136 012702  000005                  MOV     #5,R2           ;FIVE CHARACTER STRING SENT TO PRINTER
 022142 005003                          CLR     R3              ;NO BIDIRECTIONAL LOGIC REQUIRED.
 022144 004737  012616                  JSR     PC,XMIT         ;SEND TO PRINTER.

 022150 012701  002310                  MOV     #SETCHO,R1      ;SET CHARACTER SIZE TO ZERO.
 022154 012702  000003                  MOV     #3,R2           ;ARGUMENT LIST IS 3 CHARACTERS LONG.
 022160 005003                          CLR     R3              ;NO BIDSIRECTIONAL LOGIC REQUIRED.
 022162 004737  012616                  JSR     PC,XMIT         ;SEND TO PRINTER.


 022166                                 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                                                          TRAP    C$GMAN
        022170  000406                                                          BR      10000$
        022172  010030                                                          .WORD   BFRB
        022174  000152                                                          .WORD   T$CODE
        022176  003351                                                          .WORD   OPTN1
        022200  000000                                                          .WORD   0
        022202  000001                                                          .WORD   T$LOLIM
        022204  000072                                                          .WORD   T$HILIM
        022206                                                          10000$:
     52
     53
     54 022206  123737  010030  006531          CMPB    BFRB,$CA        ;IF CHARACTER IS "A" THEN AUTO MODE CHOSEN
     55 022214  001403                          BEQ     AUTCAL          ;SO CALL LOCAL ROUTINE TO HANDLE AUTO MODE
     56
     57                                                                  ;OTHERWISE, MANUAL IS CHOSEN.....
     58 022216  004737  022352                  JSR     PC,MANLD        ;DO MANUAL LIFT / DROP.
     59 022222  000402                          BR      EXIT            ;EXIT TEST WHEN DONE
     60
     61 022224  004737  022232          AUTCAL: JSR     PC,AUTOLD       ;DO AUTOMATIC MODE LIFT / DROP.
     62
     63 022230                          EXIT:   ENDTST
        022230                                                          L10022:
        022230  104401                                                          TRAP    C$ETST
     64
     65
     66
     67
     68
     69                                 ;
     70                                 ;
     71                                 ;
     72                                 ;
     73
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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
                        ;
                        ;
                        ;
                        ;
022232  005037  010066        AUTOLD: CLR     CCOUNT          ;COUNT OF CYCLES (LIFT/DROP)
022236  012700  000001        AUTOLE: MOV     #1,R0                   ;POINT TO POSITION PARAMETER.
022242  112760  000040  002240        MOVB    #ZERO,RIBPOS(R0)        ;RIBBON UP ARGUMENT       LIFT/DROP
022250  012701  002240                MOV     #RIBPOS,R1              ;ADDRESS OF ARG LIST      CYCLE....
022254  012702  000004                MOV     #4,R2                   ;4 ARGUMENTS              .........
022260  004737  012616                JSR     PC,XMIT                 ;SEND TO PRINTER          .........
022264  004737  015246                JSR     PC,ERRORS               ;CHECK FOR ERRORS.        .........
                                                                        ;                         .....
022270  012705  001750                MOV     #1000.,R5       ;DELAY TIME IN R1 FOR  DELAY ROUTINE. .....
022274  004737  015224                JSR     PC,DELAYS       ;PERFORM DELAY OF ABOUT 1 SECOND.     .....
                                                                        ;                           ...
022300  012700  000001                MOV     #1,R0           ;POINT TO THE RIBBON POSITION PARAMETER ...
022304  112760  000041  002240        MOVB    #ONE,RIBPOS(R0) ;LOWER THE RIBBON.                      ...
022312  012701  002240                MOV     #RIBPOS,R1      ;ARGUMENT LIST ADDRESS.                 .....
022316  012702  000004                MOV     #4,R2           ;4 CHARACTERS                           .....
022322  005003                        CLR     R3              ;BIDIRECTIONAL LOGIC DISABLED           .....
022324  004737  012616                JSR     PC,XMIT         ;SEND SEQUENCE TO PRINTER.        .........
022330  004737  015246                JSR     PC,ERRORS       ;                                 .........
                                                                ;                                 .........
022334  005237  010066                INC     CCOUNT          ;KEEP COUNT OF CYCLES SO FAR...   .........
022340  023727  010066  000024        CMP     CCOUNT,#20.     ;LOOP TEN TIMES FOR TEN LIFT / DROP CYCLES.
022346  100733                        BMI     AUTOLE          ;LOOP UNTIL TEN LOOPS DONE.               .

022350  000207                        RTS     PC
```

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

      58
      59                                ;
      60                                ;
      61                                ;
      62
      63
      64
```

```
                        ;.....................................................................
                        ;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 ENTERRED 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
                        ;
                        ;
                        ;
                        ;
                        ;
022352                  MANLD:  PRINTB  #PRMPTC         ;PROMPT INSTRUCTIONS AT CONSOLE
022352  012746  003466                                                  MOV     #PRMPTC,-(SP)
022356  012746  000001                                                  MOV     #1,-(SP)
022362  010600                                                          MOV     SP,R0
022364  104414                                                          TRAP    C$PNTB
022366  062706  000004                                                  ADD     #4,SP
                        ;
022372                  MANLE:  GMANID  NPRMPT,BFRC,A,0,1,72,YES
022372  104443                                                          TRAP    C$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$HILIM
022412                                                          10000$:
                                                        ;INPUT <RETURN> OR Q <RETURN>
                                                        ;<RETURN> MEANS TO CHANGE RIBBON POSITION
                                                        ;Q <RETURN> MEANS TO EXIT TEST.
022412  123737  010032  006525          CMPB    BFRC,SCQ        ;IS THE CHARACTER A "Q" ?
022420  001417                          BEQ     EXIT11          ;IF SO - EXIT TEST.
```

```
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
```

```
                                ;.!!!.!!!!.!!!..!!....!.. !..... .....!!...!!..!!..!!!!!!!!!!!!.!!.!!!!!!
                                ;
                                ;       TEST #12
                                ;
                                ;       BIDIRECTIONAL FORMS TRACTOR TEST
                                ;
                                ;       THIS TEST WILL PRINT A TEN BY TEN ARRAY OF ASCII CHARACTERS
                                ;       IN A RANDOM ORDER ON THE PRINTER.  THE TEST WILL NOT OVERPRINT
                                ;       ANY LOCATIONS IN THE ARRAY.  THIS TEST SHOULD EXERCISE BOTH UP
                                ;       AND DOWN CARRIAGE MOTION AS WELL AS FORWARD AND BACKWARD CARRIAGE
                                ;       MOTION.
                                ;
                                ;.....................................................................

022462                          BGNTST
022462                                                                          T12::

022462  004737  014274          TESTC:  JSR     PC,INITCD       ;TEST INITIALIZE
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

022506  052737  040000  006500          BIS     #BIT14,ERWORD   ;TEMPORARILY SUSPEND ERROR HANG-UPS
022514  012701  003717                  MOV     #TITLEC,R1      ;ADDRESS OF TITLE TO PRINT
022520  062701  000004                  ADD     #4,R1           ;SKIP 4 CHARACTERS
022524  012702  000047                  MOV     #39.,R2         ;
022530  005003                          CLR     R3              ;
022532  004737  012616                  JSR     PC, 'IT         ;PRINT TITLE
022536  042737  040000  006500          BIC     #BIT14,ERWORD   ;REINSTATE ERROR HANG-UPS

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$HILIM
022564                                                                  10001$:

                                ;
                                ;
                                ;                               CLEAR ALL TABLE UNIQUENESS INDICATORS.
                                ;
022564  012700  005262                  MOV     #BASET,R0       ;GET THE BASE ADDRESS OF THE VECTOR TABLE
022570  062700  000005          CLEART: 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    @R0             ;CLEAR THE UNIQUENESS INDICATOR.
     44 022576  005200                          INC     R0              ;POINT TO THE NEXT TABLE ENTRY.
     45 022600  020027  006412                   CMP     R0,#FRONT       ;IS IT POINTING BEYOND THE TABLE?
     46 022604  100771                          BMI     CLEART          ;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  000144           CMP     CCOUNT,#100.    ;DONE WHEN 100 HAVE BEE PRINTED.
     62 022636  100765                          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
      7 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                                                  L10023:
        022734  104401                                                  TRAP    CSETST
     83
     84
     85
     86
     87
     88
     89
     90
     91
     92
     93
     94
     95
     96
     97
```

```
                        ;.....................................................................
                        ;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.
                        ;
                        ;
                        ;
                        ;
                        ;
022736  010446          PRARCH: MOV     R4,-(SP)        ;SAVE REGISTERS
022740  010346                  MOV     R3,-(SP)        ;
022742  010246                  MOV     R2,-(SP)        ;       (THAT ARE NOT USED FOR PASSING)
                        ;
                        ;
022744  006304          GTNUM:  ASL     R4              ;OFFSET DESIRED * 2
022746  010403                  MOV     R4,R3           ;SAVE 2 * OFFSET FOR LATER
022750  006304                  ASL     R4              ;DESIRED OFFSET * 4
022752  060304                  ADD     R3,R4           ;6 * OFFSET NOW IN R4.
                                                        ;DESIRED TABLE INDEX NOW IN R4.
                        ;
022754  062704  005262          ADD     #BASET,R4       ;ADDRESS OF TABLE ENTRY DESIRED
                        ;
022760  062704  000005          ADD     #5,R4           ;TABLE OFFSET.
022764  105714                  TSTB    @R4             ;CHECK UNIQUE NUMBER INDICATOR....
022766  001404                  BEQ     NOT1            ;IF NOT UNIQUE THEN CONTROL TOO NOT1
                        ;
022770  004737  014726          JSR     PC,RANDOM       ;RANDOM NUMBER IN R4
022774  010104                  MOV     R1,R4           ;GET THE RANDOM NUMBER IN THE RIGHT PLACE.
022776  000762                  BR      GTNUM           ;LAST ONE DIDN'T WORK... TRY THIS ONE.
```

```
023000  112714  000001          NOT1:   MOVB    #1,@R4          ;SET UNIQUE INDICATOR
023004  162704  000005                  SUB     #5,R4           ;
                                                                ;AT THIS POINT R4 CONTAINS A TABLE ENTRY
                                                                ;ADDRESS WHICH HAS NOT BEEN REFERENCED DURING
                                                                ;THIS PASS.
023010  012401                          MOV     (R4)+,R1        ;GET THE VERTICAL COMPONENT OF THE VECTOR
023012  004737  014176                  JSR     PC,CONVRT       ;CONVERT R1 TO MNEMONICS
023016  012700  000001                  MOV     #1,R0
023022  113760  010046  002226          MOVB    MNEB1,VRTCLS(R0)        ;LOAD THE ARGUMENT LIST
023030  005200                          INC     R0
023032  113760  010047  002226          MOVB    MNEB2,VRTCLS(R0)        ;
023040  005200                          INC     R0
023042  113760  010050  002226          MOVB    MNEB3,VRTCLS(R0)        ;
023050  012401                          MOV     (R4)+,R1        ;GET HORIZONTAL COMPONENT OF THE VECTOR
023052  004737  014176                  JSR     PC,CONVRT       ;CONVERT R1 TO MNEMONICS
023056  012700  000001                  MOV     #1,R0
023062  113760  010046  002233          MOVB    MNEB1,HRZTLS(R0)  ;LOAD THE ARGUMENT LIST
023070  005200                          INC     R0
023072  113760  010047  002233          MOVB    MNEB2,HRZTLS(R0)  ;
023100  005200                          INC     R0
023102  113760  010050  002233          MOVB    MNEB3,HRZTLS(R0)  ;
023110  012701  002226                  MOV     #VRTCLS,R1      ;NOW, ACCUMULATE VERTICAL SPACING
023114  012702  000005                  MOV     #5,R2           ;
023120  005003                          CLR     R3
023122  004737  012616                  JSR     PC,XMIT         ;SEND TO PRINTER
023126  004737  015246                  JSR     PC,ERRORS       ;CHECK FOR ERRORS.
023132  012701  002233                  MOV     #HRZTLS,R1      ;NOW, ACCUMULATE HORIZONTAL SPACING
023136  012702  000005                  MOV     #5,R2           ;
023142  005003                          CLR     R3              ;DISABLE BIDIRECTIONAL PRINT
023144  004737  012616                  JSR     PC,XMIT         ;SEND TO PRINTER
023150  004737  015246                  JSR     PC,ERRORS       ;CHECK FOR ERRORS.
023154  010401                          MOV     R4,R1           ;GET ADDRESS OF THE CHARACTER
023156  012702  000001                  MOV     #1,R2           ;SINGLE CHARACTER
023162  005003                          CLR     R3              ;DISABLE BIDIRECTIONAL PRINT LOGIC.
023164  004737  012616                  JSR     PC,XMIT         ;SEND TO PRINTER
023170  004737  015246                  JSR     PC,ERRORS       ;CHECK FOR ERRORS.
023174  014401                          MOV     -(R4),R1        ;COLUMN NUMBER IN R1
023176  005401                          NEG     R1              ;NEGATIVE NUMBER FOR LEFT SPACING
023200  162701  000014                  SUB     #12.,R1         ;AND ONE EXTRA SPACE ACCOUNTS FOR THE
                                                                ;CHARACTER WHICH WAS PRINTED (12 INCREMENTS)
023204  004737  014176                  JSR     PC,CONVRT       ;CONVERT TO MNEMONIC
023210  012700  000001                  MOV     #1,R0
023214  113760  010046  002233          MOVB    MNEB1,HRZTLS(R0)  ;PUT IN ARGUMENT LIST
023222  005200                          INC     R0
023224  113760  010047  002233          MOVB    MNEB2,HRZTLS(R0)  ;
023232  005200                          INC     R0
023234  113760  010050  002233          MOVB    MNEB3,HRZTLS(R0)  ;
```

```
023242  012701  002233                  MOV     #HRZTLS,R1      ;ADDRESS OF ARGUMENT LIST
023246  012702  000005                  MOV     #5,R2           ;5 ARGUMENTS
023252  005003                          CLR     R3              ;DISABLE BIDIRECTIONAL LOGIC.
023254  004737  012616                  JSR     PC,XMIT         ;SEND TO PRINTER
023260  004737  015246                  JSR     PC,ERRORS       ;CHECK FOR ERRORS.

023264  014401                          MOV     -(R4),R1        ;GET THE COLUMN NUMBER
023266  005401                          NEG     R1              ;REVERSE THE CARRIAGE MOVEMENT
023270  004737  014176                  JSR     PC,CONVRT       ;CONVERT TO MNEMONICS
023274  012700  000001                  MOV     #1,R0
023300  113760  010046  002226          MOVB    MNEB1,VRTCLS(R0)  ;FILL ARGUMENT LIST
023306  005200                          INC     R0
023310  113760  010047  002226          MOVB    MNEB2,VRTCLS(R0)  ,
023316  005200                          INC     R0
023320  113760  010050  002226          MOVB    MNEB3,VRTCLS(R0)  ;

023326  012701  002226                  MOV     #VRTCLS,R1      ;ADDRESS OF ARGUMENT LIST
023332  012702  000005                  MOV     #5,R2           ; TO ACCUMULATE VERTICAL SPACING
023336  005003                          CLR     R3              ;DISABLE BIDIR. LOGIC
023340  004737  012616                  JSR     PC,XMIT         ;SEND TO PRINTER
023344  004737  015246                  JSR     PC,ERRORS       ;CHECK FOR ERRORS.

023350  012602                          MOV     (SP)+,R2        ;RESTORE REGISTERS
023352  012603                          MOV     (SP)+,R3
023354  012604                          MOV     (SP)+,R4


023356  000207                          RTS     PC


                        ;
                        ;
                        ;
                        ;

                        .SBTTL  TEST 13:        CUT SHEET FEEDER EXERCISOR
```

```
023360                            BGNTST
023360                                                                              T13::

                                  ;...!!..!!..!!!...!!!!!!!!!..!!..!!..!!!!.!!!...!!.!!!!!!!!!!!!!.!!!!!!!!!!!
                                  ;
                                  ;       TEST #13
                                  ;
                                  ;       CUT SHEET FEEDER EXERCISOR
                                  ;
                                  ;       THIS TEST WILL EXERCISE THE CUT SHEET FEEDER BY TESTING TO SEE THAT
                                  ;       THE FEEDER IS INSTALLED, FEEDING AND EJECTING SHEETS AND PRINTING
                                  ;       TEXT ON THE TOPS AND BOTTOMS OF THE SHEETS IN THE PRINTER.
                                  ;
                                  ;.............................................................................

023360  004737  014274            TESTD:  JSR     PC,INITCD       ;INITIALIZE TEST
023364                                    PRINTB  #TITLED         ;CONSOLE PRINT TITLE
023364  012746  003773                                                                  MOV     #TITLED,-(SP)
023370  012746  000001                                                                  MOV     #1,-(SP)
023374  010600                                                                          MOV     SP,R0
023376  104414                                                                          TRAP    C$PNTB
023400  062706  000004                                                                  ADD     #4,SP
023404  005003                            CLR     R3              ;DISABLE BIDIRECTIONAL PRINTING

023406                                    GMANID  PRMPTD,BR2,A,0,1,72,YES
023406  104443                                                                          TRAP    C$GMAN
023410  000406                                                                          BR      10000$
023412  006514                                                                          .WORD   BR2
023414  000152                                                                          .WORD   T$CODE
023416  004046                                                                          .WORD   PRMPTD
023420  000000                                                                          .WORD   0
023422  000001                                                                          .WORD   T$LOLIM
023424  000072                                                                          .WORD   T$HILIM
023426                                                                          10000$:

                                                          ;PROMPT USER FOR PAGE SIZE USED.
                                                          ;OPTIONS ARE A) 11 INCH, B) 14 INCH
                                                          ;AND C) A4 EUROPEAN STANDARD.

023426  123737  006514  006527            CMPB    BR2,SCB         ;WAS THE CHOICE = "B" ?
023434  001020                            BNE     CHKC            ;IF NOT THEN CHECK IF IT IS = "C"...

023436  012704  000001                    MOV     #1,R4                   ;OFFSET FOR PSZ14 & STPGSZ
023442  113764  002330  002271            MOVB    PSZ14,STPGSZ(R4)        ;THEN = "B"... 14 INCH PAGE.  SET UP ARG LIST
023450  012705  000001                    MOV     #1,R5
023454  116564  002330  002271            MOVB    PSZ14(R5),STPGSZ(R4)    ;
023462  005204                            INC     R4
023464  005205                            INC     R5
023466  116564  002330  002271            MOVB    PSZ14(R5),STPGSZ(R4)    ;
023474  000447                            BR      TRNSMT                  ;SEND THE ARGUMENT SEQUENCE

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
```

```
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  002226          MOVB    MNEB1,VRTCLS(R0)  ;MNEMONICS FOR ARG LIST
107 024022  005200                          INC     R0
108 024024  113760  010047  002226          MOVB    MNEB2,VRTCLS(R0)  ;
109 024032  005200                          INC     R0
110 024034  113760  010050  002226          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  002276          MOVB    REAR,SLTPFF(R0)         ;SELECT REAR TRAY
128 024126  116061  006415  002276          MOVB    REAR(R0),SLTPFF(R1)     ;       AND PERFORM
129 024134  012700  000003                  MOV     #3,R0
130 024140  116160  006415  002276          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  002226          MOVB    MNEB1,VRTCLS(R0)  ;MNEMONICS FOR ARG LIST
149 024236  005200                          INC     R0
150 024240  113760  010047  002226          MOVB    MNEB2,VRTCLS(R0)  ;
151 024246  005200                          INC     R0
152 024250  113760  010050  002226          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
```

```
    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                                                                  L10024:
        024402  104401                                                                 TRAP    C$ETST
    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
```

```
      1
      2                                 ;++
      3                                 ; THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS
      4                                 ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
      5                                 ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
      6                                 ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
      7                                 ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
      8                                 ; WITH THE OPERATOR.
      9                                 ;--
     10
     11 024404                                  BGNHRD
        024404  000022                                                          .WORD L10025-L$HARD/2
        024406                                                          L$HARD::
     12
     13 024406                                  GPRMD   GPD2MS,6,0,3,1,2,YES            ;PRINTER WIDTH QUESTION.
        024406  003032                                                          .WORD   T$CODE
        024410  025002                                                          .WORD   GPD2MS
        024412  000003                                                          .WORD   3
        024414  000001                                                          .WORD   T$LOLIM
        024416  000002                                                          .WORD   T$HILIM
     14 024420                                  GPRMA   GPAMSG,0,0,160000,177777,YES    ;CSR ADDRESS QUESTION.
        024420  000031                                                          .WORD   T$CODE
        024422  024452                                                          .WORD   GPAMSG
        024424  160000                                                          .WORD   T$LOLIM
        024426  177777                                                          .WORD   T$HILIM
     15 024430                                  GPRML   GPLMSG,2,1,YES                  ;DZ11? QUESTION.
        024430  001130                                                          .WORD   T$CODE
        024432  024624                                                          .WORD   GPLMSG
        024434  000001                                                          .WORD   1
     16 024436                                  XFERT   SNGLP                           ;SKIP CHANNEL QUESTION IF DL11.
        024436  006024                                                          .WORD   T$CODE
     17 024440                                  GPRMD   GPDMSG,4,0,7,0,7,YES            ;CHANNEL # QUESTION.
        024440  002032                                                          .WORD   T$CODE
        024442  024707                                                          .WORD   GPDMSG
        024444  000007                                                          .WORD   7
        024446  000000                                                          .WORD   T$LOLIM
        024450  000007                                                          .WORD   T$HILIM
     18 024452                          SNGLP:
     19 024452                                  ENDHRD
                                                                                .EVEN
        024452                                                          L10025:
     20
     21                                 ;       MESSAGES FOR THE ABOVE CALLS
     22
     23 024452      012     015     111 GPAMSG: .ASCII  <12><15>/IF DEFAULT VALUES FOR INTERFACE DESIRED, ENTER ^Z./<12><15>
        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
```

```
        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             .ASCIZ  /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: .ASCIZ  <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  GPDMSG: .ASCIZ  <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
```

```
                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             .ASCIZ  /(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
```

```
41 025230                          LASTAD
                                                         .EVEN
   025230  000000                                        .WORD   0
   025232  000000                                        .WORD   0
   025234                     L$LAST::
```

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

      1 025234                                  ENDMOD
      2          000001                 .END
```

PARAMETER CODING MACRO V03.01 7-NOV-80 10:06:10 PAGE 44-1
SYMBOL TABLE

```
ABORT   015602          CHRCNT  010064          C$QIO = 000377          EMPTYR  016550          F$SRV = 000010
ABSND   017106          CHRLOO  020166          C$RDBU= 000007          EMPTZ3  016252          F$SUB = 000002
ABS5    017316          CHRLO6  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        GPD2MS  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
AUTOLD  022232          CRCLX   015152          C$TPRI= 000013          ERRORS  015246          GTNUM   022744
AUTOLE  022236          CRNTPR  006502          DASHES  006542          ERRTYP  010072 G        G$CNTO= 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$NO  = 000000
BFRC    010032          C$BSEG= 000004          DFPTBL  002160 G        EXITA   022044          G$OPRS= 000400
BFRD    010034          C$BSUB= 000002          DIAGMC= 000000          EXITE   014166          G$OFSI= 000376
BIDIRP  012726          C$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          FBTM    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$ESEG= 000005          EDFM3   010543          FTYTPM  004654          HOE   = 100000 G
BIT15 = 100000 G        C$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          EMPTIB  014310          F$MSG = 000011          I$AU  = 000041
CCOUNT  010066          C$OPEN= 000034          EMPTI2  015746          F$PROT= 000021          I$AUTO= 000041
CHC2    023756          C$PNTB= 000014          EMPTI3  016246          F$PWR = 000017          I$CLN = 000041
CHKC    023476          C$PNTF= 000017          EMPTI4  017060          F$RPT = 000012          I$DU  = 000041
CHKCAN  013552          C$PNTS= 000016          EMPTI5  017270          F$SEG = 000003          I$HRD = 000041
CHKN6   017552          C$PNTX= 000015          EMPTL2  015752          F$SOFT= 000005          I$INIT= 000041
```

```
I$MOD = 000041          L$EXP5  002066 G      MXLF   = 002000        PLOOP9  021570          SKP11   002174
I$MSG = 000041          L$HARD  024406 G      NDATA   010056         PNT    = 001000 G       SKP14   002170
I$PROT= 000040          L$HIME  002120 G      NEWMOD  017754         PRARCH  022736          SLFTST  002255
I$PTAB= 000041          L$HPCP  002016 G      NEXTU   015550         PRI    = 002000 G       SLTPFF  002276
I$PWR = 000041          L$HPTP  002022 G      NINE   = 000051        PRI00  = 000000 G       SNGCHR  006522
I$RPT = 000041          L$HW    002160 G      NONDTA  015774         PRI01  = 000040 G       SNGLP   024452
I$SEG = 000041          L$ICP   002104 G      NONDT2  016102         PRI02  = 000100 G       SPACE   006541
I$SETU= 000041          L$INIT  015522 G      NONDT3  016136         PRI03  = 000140 G       SPCSIZ  010036
I$SRV = 000041          L$LADP  002026 G      NONDZA  016274         PRI04  = 000200 G       STATS   015020
I$SUB = 000041          L$LAST  025234 G      NONDZ2  016402         PRI05  = 000240 G       STATUS  002315
I$TST = 000041          L$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
J$JMP = 000167          L$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$REV   002010 G      NUM11  = 000013        PRTXM0  010302          STSRES  002210
LINL06  021104          L$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
LNELOO  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         SC0     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         O$APTS= 000000         SELECT  023636          TEST8   021342
L$DESC  010150 G        L10017  021466         O$AU   = 000000        SENCHR  013366          TEST9   021470
L$DESP  002076 G        L10020  021632         O$BGNR= 000000         SENCH2  013376          TFCZ    021770
L$DEVP  002060 G        L10021  022046         O$BGNS= 000000         SENCLP  013416          THREE  = 000043
L$DISP  002124 G        L10022  022230         O$DU   = 000000        SENDR   014140          TIMOM   012512
L$DLY   002116 G        L10023  022734         O$ERRT= 000001         SENDR2  013320          TITLEA  003115
L$DTP   002040 G        L10024  024402         O$GNSW= 000000         SETCH0  002310          TITLEB  003264
L$DTYP  002034 G        L10025  024452         O$POIN= 000001         SETER   013614          TITLEC  003717
L$DUT   002072 G        MAKE11  023552         O$SETU= 000000         SETHT0  002303          TITLED  003773
L$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        MACRO V03.01 7-NOV-80 10:06:10 PAGE 44-3
SYMBOL TABLE

TITLE8  002772          T$GMAN= 000000          T$TEMP= 000000          T11     022050 G        WAITMX  011432
TITLE9  003046          T$HILI= 000007          T$TEST= 000015          T11PMT  004346          WAITXN  013640
TMPLT1  006430          T$LAST= 000001          T$TSTM= 177777          T12     022462 G        WRC     012414
TMPLT2  006432          T$LOLI= 000000          T$TSTS= 000001          T13     023360 G        WTSTPM  005154
TMPLT3  006434          T$LSYM= 010000          T$$AUT= 010006          T2      017606 G        XBUF    007304
TOPSTK  010026          T$LTNO= 000015          T$$CLE= 010007          T3      020026 G        XCSR    007300
TRDYBT  010044          T$NEST= 177777          T$$HAR= 010025          T4      020274 G        XMIT    012616
TRNSMT  023614          T$NS0 = 000000          T$$HW = 010000          T5      020610 G        XOFF    006517
TRXADD  005250          T$NS1 = 000004          T$$INI= 010004          T6      021014 G        XON     006520
TRYAGN  014730          T$NS2 = 000010          T$$MSG= 010001          T7      021160 G        XSTR    012670
TWO   = 000042          T$PTNU= 000000          T$$PRO= 010003          T8      021342 G        X$ALWA= 000000
T$ARGC= 000001          T$SAVL= 177777          T$$RPT= 010002          T9      021470 G        X$FALS= 000040
T$CODE= 002032          T$SEGL= 177777          T$$SRV= 010005          UAM   = 000200 G        X$OFFS= 000400
T$ERRN= 000000          T$SUBN= 000000          T$$TES= 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
```

```
C$BSUB   5-7#
C$CEFG   5-7#
C$CLCK   5-7#
C$CLEA   5-7#    27-16
C$CLOS   5-7#
C$CLP1   5-7#
C$CVEC   5-7#    26-183
C$DCLN   5-7#    23-78    26-33    26-58    26-88    26-94    26-119   26-150   26-156   26-512
C$DODU   5-7#
C$DRPT   5-7#
C$DU     5-7#
C$EDIT   5-7#     5-24
C$ERDF   5-7#
C$ERHR   5-7#
C$ERRO   5-7#    23-59
C$ERSF   5-7#
C$ERSO   5-7#
C$ESCA   5-7#
C$ESEG   5-7#
C$ESUB   5-7#
C$ETST   5-7#    28-41    29-58    30-72    31-84    32-65    33-54    34-61    35-50    36-54    37-70    38-63    41-82    42-179
C$EXIT   5-7#    26-193   27-11
C$GETB   5-7#
C$GETW   5-7#
C$GMAN   5-7#    37-32    38-51    40-38    41-33    42-24
C$GPHR   5-7#    26-30
C$GPLO   5-7#
C$GPRI   5-7#
C$INIT   5-7#    26-523
C$INLP   5-7#
C$MANI   5-7#
C$MFM    5-7#
C$MSG    5-7#    11-16
C$OPEN   5-7#
C$PNTB   5-7#    23-61    23-76    23-82    28-20    29-19    30-28    31-26    32-31    33-26    34-22    35-25    36-25    37-22
         38-30   40-36    41-23    42-21
C$PNTF   5-7#    26-57    26-87    26-93    26-118   26-149   26-155   26-511
C$PNTS   5-7#
C$PNTX   5-7#    14-55    15-69    16-56    23-62
C$QIO    5-7#
C$RDBU   5-7#
C$REFG   5-7#    26-19    26-22
C$RESE   5-7#     5-7#
C$REVI   5-7#     5-24
C$RFLA   5-7#
C$RPT    5-7#    24-14
C$SEFG   5-7#
C$SPRI   5-7#
C$SVEC   5-7#    26-36
C$TPRI   5-7#
CALLDF   26-48#  26-107
CALLDL   26-52#  26-109
CAN       9-317# 14-88    16-69
CCOUNT    9-438# 39-31*   39-50*   39-51    41-53*   41-60*   41-61
CHC2     42-30   42-95#
CHKC     42-31   42-42#
CHKCAN   14-79   14-88#
```

PARAMETER CODING MACRO V03.01 7-NOV-80 10:06:10 PAGE S-3
CROSS REFERENCE TABLE (CREF V01-05)

```
CHKN6    28-32#
CHRCNT    9-436#  33-38*   33-46*   33-47    36-40*   36-50*   36-51
CHRL06   33-40#   33-48
CHRLOO   30-50#   30-58
CHRLST    9-342#  33-41    34-36    36-44
CLEART   41-42#   41-46
CNTNU    14-50    14-61#
COIE     14-54    14-57#
CONTLO   16-55    16-58#
CONVRT   17-39#   31-51    32-44    41-164   41-173   41-204   41-220   42-104   42-146
CR        9-68#   18-124   29-53    31-41    31-75    37-42    41-64
CRCLX    20-79    20-83#
CRNTPR    9-303#  13-102   13-111*  13-218*  18-136*
CRNTSK    9-10#   42-103*  42-145
CSRADD    9-13#
CTLZ      9-323#
DASHES    9-335#  32-56
DCUPA    23-75    23-78#
DDCUPA   23-81    23-84#
DELAYS   15-46    16-45    18-147   21-40#   21-47    39-40
DELCNT    9-425#  21-40*   21-42*
DFAIL     9-153#
DFAULT   26-49    26-415#
DFPTBL    7-9#
DIAGMC    5-7      5-7
DIRCTN    9-306#  13-112   13-117*  13-175*  18-140*
DLDFLT    9-151#  26-415
DLSET    26-53    26-273#  26-417
DONEDF   26-458   26-509   26-514#
DOSPCS   42-93    42-99    42-103#
DUMMYS    9-45#   18-62
DZDCOD   26-420   26-446   26-453   26-460#
DZDFLT    9-152#  26-465
DZSET    26-112   26-330#  26-466
E$END     5-7#
E$LOAD    5-7#     5-24
ECNRB     8-42#   20-87    20-90
EDFM0     9-376   10-56#
EDFM1     9-377   10-67#
EDFM2     9-378   10-78#
EDFM3     9-379   10-89#
EDFM4     9-380   10-100#
EDFM5     9-381   10-114#
EDFM6     9-382   10-125#
EDFM7     9-383   10-136#
EDFM8     9-384   10-146#
EDFM9     9-385   10-148#
EDFMA     9-386   10-149#
EDFMB     9-387   10-151#
EDFMC     9-388   10-160#
EDFMD     9-389   10-171#
EF.CON    8-2#    26-19
EF.NEW    8-2#    26-22
EF.PWR    8-2#
EF.RES    8-2#
EF.STA    8-2#
EIGHT     8-15#
```

```
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    31-84   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
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$OFSI    5-7#    37-32   38-51   40-38   41-33   42-24   43-13   43-14   43-15   43-17
G$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
G$RADO    5-7#    43-13   43-14   43-17
G$XFER    5-7#    43-16
G$YES     5-7#    38-51   40-38   41-33   42-24   43-13   43-14   43-15   43-17
GETCHR   15-50    16-34#  18-74   18-78   18-82   18-86   18-91   18-95   20-52   20-56   20-61   20-69   20-83   26-90
         26-96    26-97   26-98   26-99   26-152  26-158  26-159  26-160  26-161  26-449  26-454  26-455  26-456  26-457
         26-499   26-505  26-506  26-507  26-508  28-32
GPAMSG   43-14    43-23#
GPD2MS   43-13    43-29#
GPDMSG   43-17    43-27#
GPLMSG   43-15    43-26#
GREASE    9-20#   13-85*  13-88   13-122  13-128  13-133  13-139  13-146  13-183  13-189  13-194  13-200  13-207  13-215
         14-83    14-100* 15-54*  20-93*  26-42*  26-74*  26-136* 26-437* 26-463* 26-488* 28-26
GTNUM    41-140#  41-154
HEXA      8-17#
HEXB      8-18#
HEXC      8-19#   13-197
```

PARAMETER CODING MACRO V03.01 7-NOV-80 10:06:10 PAGE S-6
CROSS REFERENCE TABLE (CREF V01-05)

```
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#
I$AU      5-7#
I$AUTO    5-7#     26-527#  26-529#
I$CLN     5-7#     27-7#    27-11    27-16#
I$DU      5-7#
I$HRD     43-11#   43-19#
I$INIT    5-7#     26-7#    26-193   26-523#
I$MOD     5-7#      5-8      5-8#    44-1     44-1#
I$MSG     5-7#     11-9#    11-16#
I$PROT    5-7#     25-7#
I$PTAB    5-7#
I$PWR     5-7#
I$RPT     5-7#     24-8#    24-14#
I$SEG     5-7#     28-5     29-4     30-8     31-4     32-3     33-4     34-4     35-5     36-3     37-2     38-4     41-4     42-4
I$SETU    5-7#
I$SRV     5-7#     26-225#  26-229#
I$SUB     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
I$TST     5-7#     28-5     28-5#    28-41    28-41#   28-41#   29-4     29-4#    29-58    29-58#   29-58#   30-8     30-8#    30-72
          30-72#   30-72#   31-4     31-4#    31-84    31-84#   31-84#   32-3     32-3#    32-65    32-65#   32-65#   33-4     33-4#
          33-54    33-54#   33-54#   34-4     34-4#    34-61    34-61#   34-61#   35-5     35-5#    35-50    35-50#   35-50#   36-3
          36-3#    36-54    36-54#   36-54#   37-2     37-2#    37-70    37-70#   37-70#   38-4     38-4#    38-63    38-63#   38-63#
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IDU       8-2#
IER       8-2#
INFIN     26-173   26-175#
INIERR    18-76    18-80    18-84    18-89    18-93    18-99#
INITCD    18-50#   27-9     28-19    29-18    30-27    31-25    32-30    33-25    34-21    35-24    36-24    37-21    38-29    41-22
          42-20
INITLZ    26-19#
INLOOP    21-42#   21-44
INUPB      9-440#
ISR       8-2#
IXE       8-2#
J$JMP     5-7#     11-12    24-10
JENDIN    26-20    26-34#
JUNKPL     9-272#  26-286   26-287
L$ACP     5-24#
L$APT     5-24#
L$AUT     5-24#
L$AUTO    5-24     26-527#
L$CCP     5-24#
L$CLEA    5-24     27-7#
L$CO      5-24#
L$DEPO    5-24#
L$DESC    5-24     10-17#
L$DESP    5-24#
L$DEVP    5-24#
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L$DLY     5-24#
L$DTP     5-24#
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L$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#
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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$SPLP    5-24#
L$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#
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L10022   38-63#
L10023   41-82#
L10024   42-179#
L10025   43-11     43-19#
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LCHYET  13-89   13-92#
LF       9-69#  13-108  18-129  41-69
LINCNT   9-434# 32-41*  32-43   32-61*  32-62
LINCOD  26-50   26-102  26-167#
LINLO6  33-38#  33-52
LINLOO  30-40#  30-62
LINN     9-406# 26-178* 26-180* 31-81
LINSIZ   9-408# 13-102  26-172* 26-174* 26-175  29-50  30-57  33-47  34-37  34-43  35-37  36-35
LNELOO  13-102# 13-223
LODELY  18-147# 18-149
LOE      8-2#
LOGUNI   9-16#  26-26*  26-27*  26-28   26-30
LOOP8   35-41#  35-48
LOOPA   37-32#  37-47
LOOPCK  15-49   15-58#
LOOPG   16-41#  16-50
LOOPXN  15-46#  15-60
LOT      8-2#
LPR      9-369# 14-44*  26-286* 26-338* 26-363*
LPRINI   9-275# 14-44   26-362* 26-363
MAKE11  42-43   42-55#
MANLD   38-58   40-36#  40-53
MANLE   40-38#
MLTLIN   9-422# 26-283*
MNEB1    9-416# 17-47*  31-53   32-46   41-166  41-175  41-206  41-222  42-106  42-148
MNEB2    9-417# 17-57*  31-55   32-48   41-168  41-177  41-208  41-224  42-108  42-150
MNEB3    9-418# 17-62*  31-57   32-50   41-170  41-179  41-210  41-226  42-110  42-152
MSGADD   9-148#
MXLF     8-52#  32-62
NDATA    9-427# 26-40*  26-48*  26-52*  26-55   26-72*  26-84   26-111* 26-116  26-134* 26-146  26-227* 26-419  26-435*
        26-445  26-461*  26-468  26-486*  26-496
NEWMOD  29-40   29-44#
NEXTU   26-23   26-27#  26-31
NINE     8-16#
NONDT2  26-85   26-90#
NONDT3  26-92   26-96#
NONDTA  26-62   26-65   26-71#
NONDZ2  26-147  26-152#
NONDZ3  26-154  26-158#
NONDZA  26-123  26-126  26-133#
NOPRTM  16-49#
NOT1    41-150  41-156#
NOTQ    37-51   37-58#
NPRMPT   9-137# 40-38
NULL     9-260# 42-169  42-170  42-172
NUM1     8-24#
NUM10    8-33#
NUM11    8-34#
NUM12    8-35#
NUM13    8-36#
NUM14    8-37#
NUM15    8-38#
NUM2     8-25#
NUM3     8-26#
NUM4     8-27#
NUM5     8-28#
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NUM7      8-30#
NUM8      8-31#
NUM9      8-32#
NXTA     37-37#   37-67
NXTBIT   23-52#   23-71
NXTERM   23-53    23-66#
NXTLIN   34-35#   34-59
O$APTS    5-7#     5-24
O$AU      5-7#     5-24
O$BGNR    5-7#     5-24
O$BGNS    5-7#     5-24
O$DU      5-7#     5-24
O$ERRT    5-7#     5-21#    5-24
O$GNSW    5-7#     5-24
O$POIN    5-7#     5-21     5-21#    5-24
O$SETU    5-7#     5-24    43-41
ONE       8-8#     9-258   29-37    29-42    39-43
OPTN1     9-111#  38-51
OUTCTR    9-308#  16-38*   16-52*   16-54    16-58
OUTRLP   16-39#   16-59
OUTSDC    9-309#  15-42*   15-62*   15-63
OUTSDL   15-43#   15-64
PALPHA   20-54    20-90#
PERIOD    9-331#
PFM1     26-82    26-87#
PGMCTR    9-372#  13-58*   18-50*   23-49*   23-61
PLOC      9-17#   26-30*   26-44    26-105   26-168   26-273   26-330   26-354   26-361   26-415*  26-465*
PLOOP    29-30#   29-51
PLOOP9   36-42#   36-52
PLOOPC   41-54#   41-62
PNT       8-2#
PRARCH   41-57    41-135#
PRI       8-2#
PRI00     8-2#
PRI01     8-2#
PRI02     8-2#
PRI03     8-2#
PRI04     8-2#
PRI05     8-2#
PRI06     8-2#
PRI07     5-24     8-2#     26-36
PRMPTA    9-107#  37-32
PRMPTC    9-115#  40-36
PRMPTD    9-125#  42-24
PRNTIT   28-27    28-30#
PRTBM0   10-47#   23-61
PRTM2    26-144   26-149#
PRTXM0   10-49#   23-62
PSZ11     9-76#   42-58    42-59    42-61
PSZ14     9-78#   42-34    42-36    42-39
PSZA4     9-75#   42-48    42-49    42-51
RANDOM   19-38#   36-42    41-54    41-152
RBUF      9-367#  14-73    16-67    18-59    26-67    26-128   26-189   26-277*  26-337*  26-431   26-482
RCSR      9-365#  14-61    15-48    16-41    18-56    26-64    26-125   26-186   26-274*  26-331*  26-349*  26-428   26-479
REAR      9-259#  42-127   42-128   42-130
RESET     9-47#   18-69
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                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
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                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
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                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
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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
T$$AUT          26-527#  26-529
T$$CLE          27-7#    27-11   27-16
T$$HAR          43-11    43-11#  43-19
T$$HW            7-9      7-9#    7-17
T$$INI          26-7#    26-193  26-523
T$$MSG          11-9#    11-12   11-16
T$$PRO          25-7#
T$$RPT          24-8#    24-10   24-14
T$$SRV          26-225#  26-229
T$$TES          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
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T$ARGC           5-24     5-24     5-24     5-24     5-24     5-24     5-24     5-24     5-24     5-24     5-24     5-24#    5-24#    5-24#
                 5-24#    5-24#    5-24#   14-55   14-55   14-55#  15-69   15-69   15-69#  16-56   16-56   16-56#  23-61   23-61
                23-61   23-61#  23-61#  23-62   23-62   23-62   23-62#  23-62#  23-76   23-76   23-76#  23-82   23-82   23-82#
                26-57   26-57   26-57#  26-87   26-87   26-87#  26-93   26-93   26-93#  26-118  26-118  26-118#  26-149  26-149
                26-149# 26-155  26-155  26-155# 26-511  26-511  26-511# 28-20   28-20   28-20#  29-19   29-19   29-19#  30-28
                30-28   30-28#  31-26   31-26   31-26#  32-31   32-31   32-31#  33-26   33-26   33-26#  34-22   34-22   34-22#
                35-25   35-25   35-25#  36-25   36-25   36-25#  37-22   37-22   37-22#  38-30   38-30   38-30#  40-36   40-36
                40-36#  41-23   41-23   41-23#  42-21   42-21   42-21#
T$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#
T$ERRN           5-7#
T$EXCP          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#
T$FLAG          11-12   11-12#  11-12#  24-10   24-10#  24-10#  26-193  26-193  26-193#  26-193#  27-11   27-11   27-11#  27-11#
T$GMAN           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#
T$HILI          37-32   37-32#  38-51   38-51#  40-38   40-38#  41-33   41-33#  42-24   42-24#  43-13   43-13#  43-14   43-14#
                43-17   43-17#
T$LAST           5-7#    43-41#
T$LOLI          37-32   37-32#  38-51   38-51#  40-38   40-38#  41-33   41-33#  42-24   42-24#  43-13   43-13#  43-14   43-14#
                43-17   43-17#
T$LSYM           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
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T$_TNO	43-41#													
T$NEST	5-7#	5-8	5-8	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	24-8#	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	26-7#	26-225	26-225	26-225#	26-229	26-229	26-229	26-229#
	26-523	26-523	26-523	26-523#	26-527	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	28-5#	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	30-8#	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	32-3#	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	34-4#	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	36-3#	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	38-4#	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	42-4#	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#					
T$NS0	5-8#	44-1												
T$NS1	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													
T$NS2	26-225#	26-229												
T$PTNU	5-7#													
T$SAVL	5-7#													
T$SEGL	5-7#													
T$SUBN	5-7#	28-5#	29-4#	30-8#	31-4#	32-3#	33-4#	34-4#	35-5#	36-3#	37-2#	38-4#	41-4#	42-4#
T$TAGL	5-7#													
T$TAGN	5-7#	7-9	7-9	7-9#	11-9	11-9	11-9#	24-8	24-8	24-8#	25-7	25-7	25-7#	26-7
	26-7	26-7#	26-225	26-225	26-225#	26-527	26-527	26-527#	27-7	27-7	27-7#	28-5	28-5	28-5#
	29-4	29-4	29-4#	30-8	30-8	30-8#	31-4	31-4	31-4#	32-3	32-3	32-3#	33-4	33-4
	33-4#	34-4	34-4	34-4#	35-5	35-5	35-5#	36-3	36-3	36-3#	37-2	37-2	37-2#	38-4
	38-4	38-4#	41-4	41-4	41-4#	42-4	42-4	42-4#	43-11	43-11	43-11#			
T$TEMP	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
	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#
	6-5#	6-5#	6-5#	6-5#	6-5#	6-5#	6-5#	6-5#	6-5#	6-5#	6-5#	6-5#	7-17	7-17#
	11-12	11-12#	11-16	11-16#	24-10	24-10#	24-14	24-14#	25-13	25-13#	26-193	26-193#	26-229	26-229#
	26-523	26-523#	26-529	26-529#	27-11	27-11#	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#	37-32	37-32
	37-32	37-32#	37-32#	37-32#	37-70	37-70#	38-51	38-51	38-51	38-51#	38-51#	38-51#	38-63	38-63#
	40-38	40-38	40-38	40-38#	40-38#	40-38#	41-33	41-33	41-33	41-33#	41-33#	41-33#	41-82	41-82#
	42-24	42-24	42-24	42-24#	42-24#	42-24#	42-179	42-179#	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#	43-17	43-17
	43-17	43-17#	43-17#	43-17#	43-19	43-19#	44-1	44-1#						
T$TEST	5-7#	28-5	28-5	28-5#	29-4	29-4	29-4#	30-8	30-8	30-8#	31-4	31-4	31-4#	32-3
	32-3	32-3#	33-4	33-4	33-4#	34-4	34-4	34-4#	35-5	35-5	35-5#	36-3	36-3	36-3#
	37-2	37-2	37-2#	38-4	38-4	38-4#	41-4	41-4	41-4#	42-4	42-4	42-4#	43-41	
T$TSTM	5-7#	11-16	14-55	15-69	16-56	23-59	23-61	23-62	23-76	23-78	23-82	24-14	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	26-511	26-512	26-523	26-529	27-11	27-16	28-20	28-41	29-19	29-58	30-28
	30-72	31-26	31-84	32-31	32-65	33-26	33-54	34-22	34-61	35-25	35-50	36-25	36-54	37-22
	37-32	37-70	38-30	38-51	38-63	40-36	40-38	41-23	41-33	41-82	42-21	42-24	42-179	
T$TSTS	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#
T1	6-5	28-5#												
T10	6-5	37-2#												
T11	6-5	38-4#												
T11PMT	9-133#	41-33												
T12	6-5	41-4#												
T13	6-5	42-4#												
T2	6-5	29-4#												
T3	6-5	30-8#												

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T4          6-5       31-4#
T5          6-5       32-3#
T6          6-5       33-4#
T7          6-5       34-4#
T8          6-5       35-5#
T9          6-5       36-3#
TCR         9-370#    14-45*    26-287*   26-34'*
TCRENA      9-271#    14-45     26-358*
TCRTBL      9-283#    26-358
TDR         9-371#    26-344*   26-346
TEST1      28-19#
TEST2      29-18#
TEST3      30-27#
TEST4      31-25#
TEST5      32-30#
TEST6      33-25#
TEST7      34-21#
TEST8      35-24#
TEST9      36-24#
TESTA      37-21#
TESTB      38-29#
TESTC      41-22#
TESTD      42-20#
TFCZ       37-40     37-50#
THREE       8-10#    30-61
TIMOM      10-189#   15-69
TITLE1      9-88#    28-20
TITLE2      9-89#    29-19     29-22
TITLE3      9-91#    30-28     30-31
TITLE4      9-93#    31-26     31-29
TITLE5      9-95#    32-31     32-34
TITLE6      9-97#    33-26     33-29
TITLE7      9-99#    34-22     34-25
TITLE8      9-101#   35-25     35-28
TITLE9      9-103#   36-25     36-28
TITLEA      9-105#   37-22     37-25
TITLEB      9-109#   38-30     38-33
TITLEC      9-121#   41-23     41-26
TITLED      9-123#   42-21
TMPLT1      9-266#   17-43
TMPLT2      9-267#   17-50
TMPLT3      9-268#   17-60     20-57     20-62     20-70
TOPSTK      9-398#   13-69*    13-70*
TRDYBT      9-410#   14-64     26-284*   26-351*
TRNSMT     42-40     42-53     42-64#
TRXADD      9-149#   13-65*    23-62
TRYAGN     19-40#    19-58
TWO         8-9#      9-259
UAM         8-2#
UBTRAP     26-36     26-225#   26-227#
UCRB        8-43#
VRTCLS      9-50#    32-46*    32-48*    32-50*    32-52     41-166*   41-168*   41-170*   41-181    41-222*   41-224*   41-226*   41-228    42-106*
           42-108*   42-110*   42-112    42-148*   42-150*   42-152*   42-154
WAITMX     10-154#
WAITXN     14-81     15-39#
WFC        10-188#   16-56
WTSTPM      9-143#   14-55
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X$ALWA   5-7#
X$FALS   5-7#
X$OFFS   5-7#    43-16
X$TRUE   5-7#    43-16
XBUF     9-368#  14-69*   26-281*  26-346*
XCSR     9-366#  14-64    26-279*  26-334*
XMIT    13-58#   18-65    18-72    18-109   18-116   18-122   18-127   18-132   18-133   18-134   26-79    26-141   26-442   26-493
        28-24    29-26    29-33    29-46    29-55    30-35    30-46    30-53    30-69    31-33    31-38    31-43    31-61    31-67
        31-72    31-77    32-38    32-54    32-58    33-33    33-43    34-29    34-38    34-48    35-32    35-43    36-32    36-47
        37-29    37-44    37-63    38-37    38-43    38-48    39-36    39-47    40-50    41-30    41-67    41-72    41-73    41-74
        41-75    41-76    41-77    41-78    41-79    41-80    41-184   41-190   41-196   41-215   41-231   42-67    42-80    42-86
        42-115   42-121   42-136   42-142   42-157   42-164   42-176
XOFF     9-318#  14-78
XON      9-319#  14-75    15-51    18-96    28-33
XSTR    13-83#   13-93
ZERO     8-7#     9-258    9-258    9-259    9-259    13-186   18-79    18-83    18-88    18-105   18-112   18-118   29-39    30-39
        30-65    39-33    40-46
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BCOMPL	1-15#	5-7#	26-20										
BERROR	1-19#	5-7#											
BGNAU	1-23#	5-7#											
BGNAUT	1-31#	5-7#	26-527										
BGNCLN	1-39#	5-7#	27-7										
BGNDU	1-47#	5-7#											
BGNHRD	1-55#	5-7#	43-11										
BGNHW	1-66#	5-7#	7-9										
BGNINI	1-77#	5-7#	26-7										
BGNMOD	1-85#	5-7#	5-8										
BGNMSG	1-98#	5-7#	11-9										
BGNPRO	1-106#	5-7#	25-7										
BGNPTA	1-114#	5-7#											
BGNRPT	1-144#	5-7#	24-8										
BGNSEG	1-152#	5-7#											
BGNSET	1-161#	5-7#											
BGNSFT	1-182#	5-7#											
BGNSRV	1-193#	5-7#	26-225										
BGNSUB	1-201#	5-7#											
BGNSW	1-225#	5-7#											
BGNTST	1-236#	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													
BNCOMP	1-266#	5-7#	26-23	26-31										
BNERRO	1-270#	5-7#												
BREAK	1-274#	5-7#												
BRESET	1-278#	5-7#												
CKLOOP	1-282#	5-7#												
CLOCK	1-286#	5-7#												
CLOSE	1-292#	5-7#												
CLRVEC	1-296#	5-7#	26-183											
COMMEN	1-301#	5-7#												
DELAY	1-322#	5-7#												
DESCRI	1-317#	5-7#	10-17											
DEVTYP	1-341#	5-7#	10-11											
DISPAT	1-346#	5-7#	6-5											
DISPLA	1-360#	5-7#												
DOCLN	1-376#	5-7#	23-78	26-33	26-58	26-88	26-94	26-119	26-150	26-156	26-512			
DODU	1-380#	5-7#												
DORPT	1-385#	5-7#												
ENDAU	1-389#	5-7#												
ENDAUT	1-401#	5-7#	26-529											
ENDCLN	1-413#	5-7#	27-16											
ENDCOM	1-425#	5-7#												
ENDDU	1-441#	5-7#												
ENDHRD	1-453#	5-7#	43-19											
ENDHW	1-465#	5-7#	7-17											
ENDINI	1-475#	5-7#	26-523											
ENDMOD	1-487#	5-7#	44-1											
ENDMSG	1-500#	5-7#	11-16											
ENDPRO	1-512#	5-7#	25-13											
ENDPTA	1-520#	5-7#												
ENDRPT	1-529#	5-7#	24-14											
ENDSEG	1-541#	5-7#												
ENDSET	1-555#	5-7#												
ENDSFT	1-568#	5-7#												
ENDSRV	1-580#	5-7#	26-229											

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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
MSBYTE   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-B67#  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#
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MSESCS   1-D10#  5-7#
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CROSS REFERENCE TABLE (CREF V01-05)

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	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
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	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
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	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#													
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	43-19	43-19#												
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	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#
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	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
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MSMCLO	1-a24#	5-7	5-7#	5-7#										
MSMSK1	1-a77#	5-7#												
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	42-179	42-179#	43-19	43-19#	44-1	44-1#								
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	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#												
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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#

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                26-36   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
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                43-41
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MANUAL   1-;62#   5-7#
MEMORY   1-;66#   5-7#
OPEN     1-;71#   5-7#
POINTE   1-;76#   5-7#     5-21
PRINTB   1-<39#   5-7#    23-61    23-76    23-82    28-20    29-19    30-28    31-26    32-31    33-26    34-22    35-25    36-25
        37-22    38-30    40-36    41-23    42-21
PRINTF   1-<79#   5-7#    26-57    26-87    26-93    26-118   26-149   26-155   26-511
PRINTS   1-=19#   5-7#
PRINTX   1-=59#   5-7#    14-55    15-69    16-56    23-62
READBU   1-=99#   5-7#
READEF   1->03#   5-7#    26-19    26-22
RFLAGS   1->08#   5-7#
SETPRI   1->13#   5-7#
SETVEC   1->18#   5-7#    26-36
SLASH    1->24#   5-7#
STARS    1->38#   5-7#
SVC      1->52#   5-6#     5-7
XFER     1-@12#   5-7#    11-12#   24-10#   26-193#  27-11#
XFERF    1-@16#   5-7#
XFERT    1-@20#   5-7#    43-16
```