VS60

INSTRUCTION TEST PART 3

MD-11-DZVSC-B

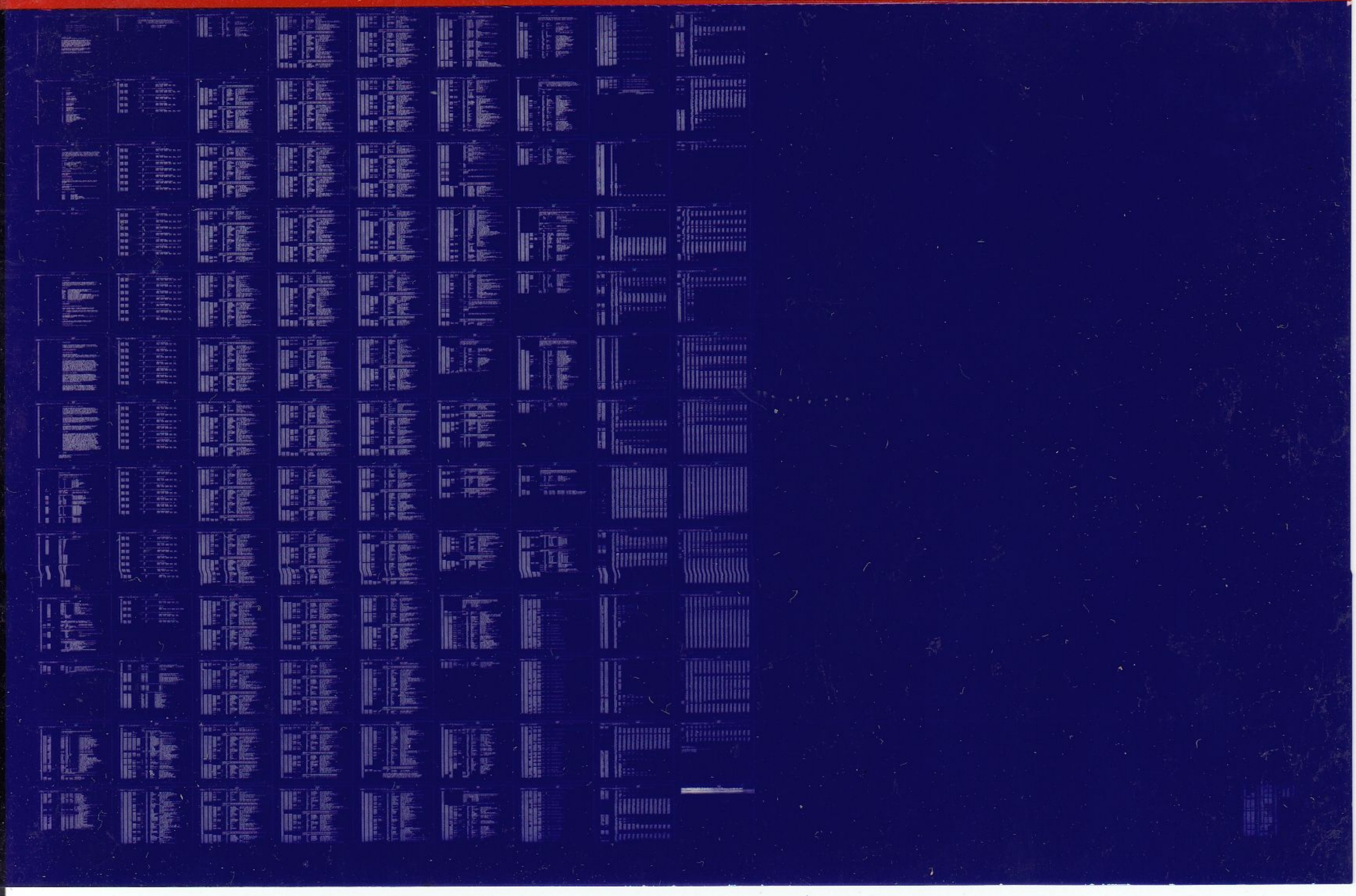
EP-DZVSC-B-DL-A

FICHE 1 OF 1

NOV 1976

digital

MADE IN USA



.REM %

IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZVSC-B-D

PRODUCT NAME: VS-60 INSTRUCTION TEST PART III

DATE: AUG. 21, 1976

MAINTAINER: DIAGNOSTIC ENGINEERING

0.0 TABLE OF CONTENTS

1.0 ABSTRACT

THIS PROGRAM IS ONE OF A SERIES USED TO TEST STRICTLY LOGIC FUNCTIONS OF THE VS60 DISPLAY PROCESSOR. IT IS THE PRIMARY TEST OF THE INTERNAL EIGHT LEVEL STACK AND FOUR LEVEL SILO. THERE ARE ADDITIONAL TESTS WHICH CHECK THE DELTA LENGTH AND TANGENT LOGIC ALONG WITH A MEMORY TEST CONCERNED WITH OPERATING THE VS60 ABOVE 28K OF MEMORY IF AVAILABLE.

2.0 REQUIREMENTS

2.1 EQUIPMENT

A. PDP-11 COMPUTER WITH AT LEAST 8K OF MEMORY
B. I/O TERMINAL (I.E. ASR33 TTY)
C. VS60 DISPLAY PROCESSOR
D. KT11 FOR MEMORY TEST ONLY

2.2 STORAGE

THIS PROGRAM OCCUPIES LOWER 8K OF MEMORY.

3.0 LOADING PROCEDURE

NORMAL PROCEDURE FOR LOADING A BINARY PROGRAM INTO MEMORY SHOULD BE FOLLOWED.

4.0 STARTING PROCEDURE

4.1 STARTING ADDRESS 200

LOADING ADDRESS 200 AND STARTING WILL IDENTIFY THE TEST, INDICATE THE MEMORY SIZE IN THE SYSTEM, INITIALIZE THE SYSTEM, AND BEGIN TESTING.

4.2 RESTART ADDRES 204

LOADING ADDRESS 204 AND STARTING WILL INITIALIZE THE SYSTEM AND BEGIN TESTING.

5.0 SWITCH REGISTER SETTINGS

SWITCH	FUNCTION
SW15=1	HALT ON ERROR
SW14=1	LOOP ON TEST
SW13=1	INHIBIT ERROR TYPEOUTS
SW12=1	HALT AT END OF DIAGNOSTIC
SW11=1	INHIBIT ITERATIONS - NORMALLY 2000(8) AFTER 1ST PASS
SW10=1	BELL ON ERROR

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   141                                  SW09=1          LOOP ON ERROR
   142                                  SW08=1          LOOP ON TEST IN SWR<7:0>
```

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                                6.0     ERROR REPORTING
                                        --------------

                                6.1     ERROR COMMENT

                                        ALL ERRORS ARE ACCOMPANIED WITH AN ENGLISH LANGUAGE DESCRIPTIVE
                                        COMMENT AS TO THE TYPE OF FAILURE.  FURTHER QUALIFICATION
                                        OF THE ERROR CAN BE OBTAINED IF NEEDED FROM THE COMMENT AT THE
                                        ERROR  PC OR FROM THE ERROR TABLE ($ERRTB:) TOWARD THE FRONT
                                        OF THE LISTING.

                                6.2     ERROR DATA

                                       *PC          LISTING ADDRESS WHERE THE ERROR WAS DETECTED
                                       *TSTNUM      TEST NUMBER WHERE THE ERROR OCCURRED
                                       *BUSADRS     DISPLAY BUS ADDRESS WHERE THE RESULTANT DATA WAS EXPECTED
                                       *EXPCT       DATA THAT WAS EXPECTED
                                       *RCVD        DATA THAT WAS RECEIVED
                                        STK SEL     INDICATES STACK LEVEL WHERE FAILURE OCCURED
                                        GDPC        INDICATES LOW ORDER 16 BIT ADDRESS EXPECTED (MEM TST ONLY)
                                        GDPC-HI     INDICATES HIGH ORDER 2 BIT ADDRESS EXPECTED (MEM TST ONLY)
                                        BDPC        RECEIVED LOW ORDER 16 BIT ADDRESS (MEM TST ONLY)
                                        BDPC-HI     RECEIVED HIGH ORDER 2 BIT ADDRESS (MEM TST ONLY)
                                        VECTOR      INDICATES VECTOR VALUE FROM WHICH DELTA LENGTH
                                                    AND TANGENT ARE CALCULATED

                                       *NOTE:  THESE ARE TYPICALLY TYPED.

                        7.0     MISCELLANEOUS
                                --------------

                        7.1     VS60 BUS/VECTOR ADDRESS MODIFICATION

                                MODIFY LOCATION '$VECT1' IF BASE VECTOR ADDRESS IS NOT 320.
                                MODIFY LOCATION '$BASE' IF BASE BUS ADDRESS IS NOT 172000.

                                NOTE:  A RESTART IS REQUIRED AFTER THE ABOVE ADDRESS MODIFICATION.
                                       THE ABOVE LOCATIONS ARE LOCATED IN THE 'APT MAILBOX-ETABLE'.

                        7.2     XXDP/APT NOTES

                                THIS DIAGNOSTIC IS CHAINABLE UNDER XXDP.
                                THIS DIAGNOSTIC INCLUDES THE 'APT SOFTWARE HOOKS' HOWEVER, THEY
                                HAVE NOT BEEN TESTED.

                        7.3     POWER FAIL

                                A POWER FAILURE WILL CAUSE A RESTART MESSAGE ON POWER UP AT
                                WHICH TIME THE PROGRAM IS RESTARTED AT THE BEGINNING.

                        7.4     SINGLE VS60 TESTING

                                THIS DIAGNOSTIC DOES NOT TEST MULTIPLE VS60'S.
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8.0 EXECUTION TIME

EXECUTION TIME RANGES FROM ABOUT 3 SECONDS WITH NO ITERATIONS TO ABOUT 2 MINUTES WITH ITERATIONS ENABLED. EXECUTION TIME WILL INCREASE AS MEMORY IS INCREASED ABOVE 8K. AN 'END PASS' MESSAGE IS TYPED EACH PASS THRU THE DIAGNOSTIC.

9.0 PROGRAM TEST DESCRIPTIONS

9.1 STACK POINTER TESTS

STACK POINTER TESTS INCLUDE:
DECREMENT (JSR), INCREMENT (POP), STACK OVERFLOW (GREATER THAN 8 JSR'S WITHOUT A POP), STACK UNDERFLOW (GREATER THAN 8 POP'S WITHOUT A JSR), STACK OVERFLOW INTERRUPT AND STACK UNDERFLOW INTERRUPT.

9.2 STACK TESTS - JSR (PUSH)

THE STACK CONSISTS OF 8 LEVELS OF 64 BITS. EACH WRITEABLE BIT IS FORCED TO EACH STATE STARTING FROM THE 'TOP OF STACK' POSITION THRU 8 LEVELS TO THE BOTTOM OF THE STACK. FOR EXAMPLE THE TYPICAL FORMAT MIGHT BE AS FOLLOWS: 'TOP OF STACK' IS SET; AN INSTRUCTION IS SET UP AND EXECUTED WHICH SETS UP THE CONDITION UNDER TEST - FOR EXAMPLE LOAD THE VECTOR SCALE TO SOME VALUE; THEN A JSR (PUSH) INSTRUCTION IS EXECUTED - THIS WILL PUSH OR WRITE ON THE STACK THE VECTOR SCALE AT THE BITS ASSIGNED; THEN THE STACK POINTER IS SET (REG 32) TO POINT AT THE STACK LEVEL AND WORD WHERE THE VECTOR SCALE WAS STORED AND CAN BE READ FROM (REG 26); THEN IT IS CHECKED AGAINST WHAT SHOULD HAVE BEEN STORED AND IF OK THE TEST IS REPEATED AT THE NEXT STACK LEVEL.

9.3 STACK TESTS - POP (RESTORE)

THESE STACK TESTS INCLUDE EXACTLY THE SAME PROCEDURE AS 9.2 BUT INSTEAD OF THE CONDITION UNDER TEST BEING VERIFIED ON THE STACK, IT IS RESTORED VIA A POP INSTRUCTION AND VERIFIED FROM THE BUS. NOTE THAT BEFORE THE POP IS PERFORMED THE COMPLEMENT OF WHAT WAS WRITTEN ON THE STACK IS SENT TO THE FLOP/S (CONDITION) UNDER TEST. THERE ARE SEVERAL CONDITIONS (I.E. STOP INTERRUPT ENABLE, L.P. HIT DISABLE, ETC.) THAT CANNOT BE VERIFIED FROM THE BUS, IN THIS CASE AN ADDITIONAL JSR IS EXECUTED AND THE CONDITION IS CHECKED ON THE STACK.

9.4 STACK TESTS ON DPC BETWEEN 8K & 28K

THESE TWO DPC STACK TESTS ARE IDENTICAL TO THE BASIC JSR & POP DPC TESTS EXCEPT THAT THEY ARE PERFORMED AT THE HIGHEST MEMORY BOUNDRY BELOW 28K. THE INTENTION IS TO STACK PREVIOUSLY UNUSED HIGH ORDER DPC BITS. AT THE START OF THE PROGRAM A SIZER PROGRAM IS USED TO DETERMINE HIGHEST AVAILABLE MEMORY TO 28K FOR THESE TESTS. ON 8K SYSTEMS THESE TESTS ARE ABORTED.

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                                9.5     UPPER MEMORY ADDRESS TEST - ABOVE 28K

                                        THIS TEST REQUIRES THAT THE KT11 BE PRESENT OR THE TEST WILL
                                        BE ABORTED.  THIS TEST WAS INTENDED TO EXERCISE DPC BITS 16 & 17
                                        AT 4K MEMORY INTERVALS ABOVE 28K.  THE TEST SEQUENCE FROM EACH 4K
                                        BLOCK IS A JSR, POP & LOAD STATUS B INSTRUCTION.  THE GRAPH
                                        PLOT INCREMENT PORTION OF THE LOAD STATUS B INSTRUCTION CONTAINS
                                        A PAGE ADDRESS EQUAL TO ACTUAL 4K MEMORY ADDRESS ABOVE 28K BEING
                                        ADDRESSED.  REFER TO TEST FOR DETAILED EXPLAINATION.

                                9.6     DELTA LENGTH TESTS

                                        WITH MAINTENANCE MODE SWITCH 3 SET WHEN EXECUTING A LONG VECTOR
                                        INSTRUCTION THE X POSITION REGISTER WILL CONTAIN THE DELTA LENGTH.
                                        THE DELTA LENGTH IS THE AMOUNT OF CHANGE FROM THE POINT OF ORIGIN TO
                                        THE EDGE OF THE SCREEN NOT TO EXCEED 1777.  THESE TESTS WILL VERIFY
                                        THAT THE CORRECT DELTA LENGTH FROM THE POINT OF ORIGIN CAN BE
                                        CALCULATED WITH DIFFERENT VALUES OF X OR Y.

                                9.7     TANGENT TESTS

                                        WITH MAINTENANCE MODE SWITCH 3 SET WHEN EXECUTING A LONG VECTOR
                                        INSTRUCTION THE Y POSITION REGISTER WILL CONTAIN THE TANGENT.
                                        THE TANGENT IS THE OPPOSITE DIVIDED BY THE ADJACENT.
                                        THESE TESTS WILL VERIFY THE TANGENT VALUE FOR DIFFERENT
                                        VALUES OF X OR Y AT A VECTOR SCALE OF UNITY.

                                9.8     SILO TESTS

                                        THE SILO TESTS DETERMINE THAT EACH LEVEL OF THE SILO CAN RESTORE
                                        THE SAVED STATUS WHEN A LIGHT PEN FLAG INTERRUPT IS FORCED (USING
                                        MAINTENTANCE MODE 3).  THE ACTUAL TEST SEQUENCE MIGHT LOOK LIKE THIS;
                                        SET UP THE STATUS TO SOME UNIQUE VALUE, DO A GRAPHIC DISPLAY
                                        INSTRUCTION (THIS FORCES STATUS TO 1ST LEVEL OF SILO), THEN
                                        COMPLEMENT STATUS, THEN CAUSE A LIGHT PEN FLAG INTERRUPT (THIS
                                        WILL RESTORE THE STATUS FROM THE 1ST LEVEL OF THE SILO), THEN
                                        THE PROGRAM WILL VERIFY THAT THE STATUS WAS RESTORED PROPERLY.
                                        SINCE THE SILO ADDRESS POINTER IS ALWAYS RESET ON DISPLAY STARTS,
                                        THEN THE ABOVE SEQUENCE MUST BE REPEATED UP TO FOUR TIMES (FOUR
                                        LEVELS IN SILO) FOR ALL LEVELS TO BE TESTED.  THE ONLY DIFFERENCE
                                        WILL BE THAT THE LIGHT PEN INTERRUPT WILL BE FORCED AFTER THE 2ND,
                                        3RD, OR 4TH GRAPHIC INSTRUCTION DEPENDING ON THE SILO LEVEL
                                        UNDER TEST (EACH GRAPHIC INSTRUCTION LOADS THE SILO AND BUMPS
                                        THE SILO ADDRESS POINTER).  AN ADDITIONAL STEP IS TAKEN IN SILO TEST #2
                                        IN THE CASE WHERE THE SILO RESTORED STATUS CANNOT BE READ DIRECTLY
                                        FROM THE BUS (L.P. HIT DISABLE, STOP INTR ENA, ECT.).  TO VERIFY THESE
                                        RESTORED CONDITIONS, A JSR IS PREFORMED WHICH SAVES THIS INFORMATION
                                        ON THE STACK WHERE IT IS ACCESSIBLE FROM THE BUS.

                                10.0    LISTING
                                        -------
                                        %
                                .TITLE  MAINDEC-11-DZVSC-B  VS60 INSTRUCTION TEST PART III
                                ;*COPYRIGHT (C) 1976
                                ;*DIGITAL EQUIPMENT CORP.
                                ;*MAYNARD, MASS. 01754
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                        ;*
                        ;*PROGRAM BY R. MOORE
                        ;*
                        ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                        ;*PACKAGE (MAINDEC-11-DZQAC-CO),MAR 21, 1976.
                        ;*
                        .SBTTL  OPERATIONAL SWITCH SETTINGS
                        ;*
                        ;*      SWITCH                  USE
                        ;*      ------          --------------------
                        ;*        15            HALT ON ERROR
                        ;*        14            LOOP ON TEST
                        ;*        13            INHIBIT ERROR TYPEOUTS
                        ;*        12            HALT AT END OF DIAGNOSTIC
                        ;*        11            INHIBIT ITERATIONS
                        ;*        10            BELL ON ERROR
                        ;*         9            LOOP ON ERROR
                        ;*         8            LOOP ON TEST IN SWR<7:0>
                        .SBTTL  BASIC DEFINITIONS

                        ;*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
001100                  STACK=  1100
                        .EQUIV  EMT,ERROR       ;;BASIC DEFINITION OF ERROR CALL
                        .EQUIV  IOT,SCOPE       ;;BASIC DEFINITION OF SCOPE CALL

                        ;*MISCELLANEOUS DEFINITIONS
000011                  HT=     11              ;;CODE FOR HORIZONTAL TAB
000012                  LF=     12              ;;CODE FOR LINE FEED
000015                  CR=     15              ;;CODE FOR CARRIAGE RETURN
000200                  CRLF=   200             ;;CODE FOR CARRIAGE RETURN-LINE FEED
177776                  PS=     177776          ;;PROCESSOR STATUS WORD
                        .EQUIV  PS,PSW
177774                  STKLMT= 177774          ;;STACK LIMIT REGISTER
177772                  PIRQ=   177772          ;;PROGRAM INTERRUPT REQUEST REGISTER
177570                  DSWR=   177570          ;;HARDWARE SWITCH REGISTER
177570                  DDISP=  177570          ;;HARDWARE DISPLAY REGISTER

                        ;*GENERAL PURPOSE REGISTER DEFINITIONS
000000                  R0=     %0              ;;GENERAL REGISTER
000001                  R1=     %1              ;;GENERAL REGISTER
000002                  R2=     %2              ;;GENERAL REGISTER
000003                  R3=     %3              ;;GENERAL REGISTER
000004                  R4=     %4              ;;GENERAL REGISTER
000005                  R5=     %5              ;;GENERAL REGISTER
000006                  R6=     %6              ;;GENERAL REGISTER
000007                  R7=     %7              ;;GENERAL REGISTER
                        .EQUIV  R6,SP           ;;STACK POINTER
                        .EQUIV  R7,PC           ;;PROGRAM COUNTER

                        ;*PRIORITY LEVEL DEFINITIONS
000000                  PR0=    0               ;;PRIORITY LEVEL 0
000040                  PR1=    40              ;;PRIORITY LEVEL 1
000100                  PR2=    100             ;;PRIORITY LEVEL 2
000140                  PR3=    140             ;;PRIORITY LEVEL 3
000200                  PR4=    200             ;;PRIORITY LEVEL 4
000240                  PR5=    240             ;;PRIORITY LEVEL 5
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                        000300          PR6=    300             ;;PRIORITY LEVEL 6
                        000340          PR7=    340             ;;PRIORITY LEVEL 7

                                        ;*"SWITCH REGISTER" SWITCH DEFINITIONS
                        100000          SW15=   100000
                        040000          SW14=   40000
                        020000          SW13=   20000
                        010000          SW12=   10000
                        004000          SW11=   4000
                        002000          SW10=   2000
                        001000          SW09=   1000
                        000400          SW08=   400
                        000200          SW07=   200
                        000100          SW06=   100
                        000040          SW05=   40
                        000020          SW04=   20
                        000010          SW03=   10
                        000004          SW02=   4
                        000002          SW01=   2
                        000001          SW00=   1
                                        .EQUIV  SW09,SW9
                                        .EQUIV  SW08,SW8
                                        .EQUIV  SW07,SW7
                                        .EQUIV  SW06,SW6
                                        .EQUIV  SW05,SW5
                                        .EQUIV  SW04,SW4
                                        .EQUIV  SW03,SW3
                                        .EQUIV  SW02,SW2
                                        .EQUIV  SW01,SW1
                                        .EQUIV  SW00,SW0

                                        ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
                        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
                                        .EQUIV  BIT09,BIT9
                                        .EQUIV  BIT08,BIT8
                                        .EQUIV  BIT07,BIT7
                                        .EQUIV  BIT06,BIT6
                                        .EQUIV  BIT05,BIT5
                                        .EQUIV  BIT04,BIT4
                                        .EQUIV  BIT03,BIT3
                                        .EQUIV  BIT02,BIT2
```

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                                .EQUIV  BIT01,BIT1
                                .EQUIV  BIT00,BIT0

                                ;*BASIC "CPU" TRAP VECTOR ADDRESSES
            000004              ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
            000010              RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
            000014              TBITVEC=14              ;;"T" BIT
            000014              TRTVEC= 14              ;;TRACE TRAP
            000014              BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
            000020              ICTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
            000024              PWRVEC= 24              ;;POWER FAIL
            000030              EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
            000034              TRAPVEC=34              ;;"TRAP" TRAP
            000060              TKVEC=  60              ;;TTY KEYBOARD VECTOR
            000064              TPVEC=  64              ;;TTY PRINTER VECTOR
            000240              PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR
            172000                      ABASE=172000
            000320                      AVECT1=320
            000004                      APRIOR=4
                                .SBTTL  TRAP CATCHER

            000000                      .=0
                                ;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ".+2,HALT"
                                ;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
                                ;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
            000174                      .=174
000174  000000                  DISPREG: .WORD  0               ;;SOFTWARE DISPLAY REGISTER
000176  000000                  SWREG:   .WORD  0               ;;SOFTWARE SWITCH REGISTER
                                .SBTTL  STARTING ADDRESS(ES)
000200  000137  002304                  JMP     @#START ;;JUMP TO STARTING ADDRESS OF PROGRAM
                                .SBTTL  ACT11 HOOKS

                                ;;*****************************************************************
                                ;HOOKS REQUIRED BY ACT11
            000204                      $SVPC=.                 ;SAVE PC
            000046                      .=46
000046  024372                          $ENDAD                  ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
            000052                      .=52
000052  000000                          .WORD   0               ;;2)SET LOC.52 TO ZERO
            000204                      .=$SVPC                 ;; RESTORE PC
            001000                      .=1000

                                .SBTTL  APT PARAMETER BLOCK

                                ;;*****************************************************************
                                ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
                                ;;*****************************************************************
            001000                      .$X=.   ;;SAVE CURRENT LOCATION
            000024                      .=24    ;;SET POWER FAIL TO POINT TO START OF PROGRAM
000024  000200                      200     ;;FOR APT START UP
            000044                      .=44    ;;POINT TO APT INDIRECT ADDRESS PNTR.
000044  001000                      $APTHDR ;;POINT TO APT HEADER BLOCK
            001000                      .=.$X   ;;RESET LOCATION COUNTER
                                ;;*****************************************************************
                                ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
                                ;INTERFACE SPEC.
```

```
                                                ;
001000                                  $APTHD:
001000  000000                          $HIBTS: .WORD   0       ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
001002  001202                          $MBADR: .WORD   $MAIL   ;;ADDRESS OF APT MAILBOX (BITS 0-15)
001004  000012                          $TSTM:  .WORD   10.     ;;RUN TIM OF LONGEST TEST
001006  000036                          $PASTM: .WORD   30.     ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
001010  000000                          $UNITM: .WORD   0       ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
001012  000031                                  .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
                                                ;RESTART ADDRESS 204
000204                                          .=204
000204  000137  003244                          JMP     @#RSTART        ;RESTART ADRS
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```
                                .SBTTL  COMMON TAGS

                                ;;*****************************************************************
                                ;*THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS
                                ;*USED IN THE PROGRAM.

                        001100          .=1100
001100                  $CMTAG:                         ;;START OF COMMON TAGS
001100  000000                  .WORD   0
001102  000                     $TSTNM: .BYTE   0       ;;CONTAINS THE TEST NUMBER
001103  000                     $ERFLG: .BYTE   0       ;;CONTAINS ERROR FLAG
001104  000000                  $ICNT:  .WORD   0       ;;CONTAINS SUBTEST ITERATION COUNT
001106  000000                  $LPADR: .WORD   0       ;;CONTAINS SCOPE LOOP ADDRESS
001110  000000                  $LPERR: .WORD   0       ;;CONTAINS SCOPE RETURN FOR ERRORS
001112  000000                  $ERTTL: .WORD   0       ;;CONTAINS TOTAL ERRORS DETECTED
001114  000                     $ITEMB: .BYTE   0       ;;CONTAINS ITEM CONTROL BYTE
001115  001                     $ERMAX: .BYTE   1       ;;CONTAINS MAX. ERRORS PER TEST
001116  000000                  $ERRPC: .WORD   0       ;;CONTAINS PC OF LAST ERROR INSTRUCTION
001120  000000                  $GDADR: .WORD   0       ;;CONTAINS ADDRESS OF 'GOOD' DATA
001122  000000                  $BDADR: .WORD   0       ;;CONTAINS ADDRESS OF 'BAD' DATA
001124  000000                  $GDDAT: .WORD   0       ;;CONTAINS 'GOOD' DATA
001126  000000                  $BDDAT: .WORD   0       ;;CONTAINS 'BAD' DATA
001130  000000                          .WORD   0       ;;RESERVED--NOT TO BE USED
001132  000000                          .WORD   0
001134  000                     $AUTOB: .BYTE   0       ;;AUTOMATIC MODE INDICATOR
001135  000                     $INTAG: .BYTE   0       ;;INTERRUPT MODE INDICATOR
001136  000000                          .WORD   0
001140  177570                  $WR:    .WORD   DSWR    ;;ADDRESS OF SWITCH REGISTER
001142  177570                  DISPLAY: .WORD  DDISP   ;;ADDRESS OF DISPLAY REGISTER
001144  177560                  $TKS:   177560          ;;TTY KBD STATUS
001146  177562                  $TKB:   177562          ;;TTY KBD BUFFER
001150  177564                  $TPS:   177564          ;;TTY PRINTER STATUS REG. ADDRESS
001152  177566                  $TPB:   177566          ;;TTY PRINTER BUFFER REG. ADDRESS
001154  000                     $NULL:  .BYTE   0       ;;CONTAINS NULL CHARACTER FOR FILLS
001155  002                     $FILLS: .BYTE   2       ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
001156  012                     $FILLC: .BYTE   12      ;;INSERT FILL CHARS. AFTER A "LINE FEED"
001157  000                     $TPFLG: .BYTE   0       ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
001160  000000                  $REGAD: .WORD   0       ;;CONTAINS THE ADDRESS FROM
                                                        ;;WHICH  ($REGO) WAS OBTAINED
001162  000000                  $REGO:  .WORD   0       ;;CONTAINS (($REGAD)+0)
001164  000000                  $TMP0.  .WORD   0       ;;USER DEFINED
001166  000000                  $TIMES: 0               ;;MAX. NUMBER OF ITERATIONS
001170  000000                  $ESCAPE:0               ;;ESCAPE ON ERROR ADDRESS
001172  177607  000377           $BELL:  .ASCIZ  <207><377><377> ;;CODE FOR BELL
001176  077                     $QUES:  .ASCII  /?/     ;;QUESTION MARK
001177  015                     $CRLF:  .ASCII  <15>    ;;CARRIAGE RETURN
001200  000012                  $LF:    .ASCIZ  <12>    ;;LINE FEED
                                ;;*****************************************************************
                                .SBTTL  APT MAILBOX-ETABLE

                                ;;*****************************************************************
                                .EVEN
001202                          $MAIL:                  ;;APT MAILBOX
001202  000000                  $MSGTY: .WORD   AMSGTY   ;;MESSAGE TYPE CODE
001204  000000                  $FATAL: .WORD   AFATAL   ;;FATAL ERROR NUMBER
001206  000000                  $TESTN: .WORD   ATESTN   ;;TEST NUMBER
```

```
  540  001210  000000                $PASS:  .WORD   APASS   ;;PASS COUNT
  541  001212  000000                $DEVCT: .WORD   ADEVCT  ;;DEVICE COUNT
  542  001214  000000                $UNIT:  .WORD   AUNIT   ;;I/O UNIT NUMBER
  543  001216  000000                $MSGAD: .WORD   AMSGAD  ;;MESSAGE ADDRESS
  544  001220  000000                $MSGLG: .WORD   AMSGLG  ;;MESSAGE LENGTH
  545  001222                         $ETABLE:                ;;APT ENVIRONMENT TABLE
  546  001222     000                 $ENV:   .BYTE   AENV    ;;ENVIRONMENT BYTE
  547  001223     000                 $ENVM:  .BYTE   AENVM   ;;ENVIRONMENT MODE BITS
  548  001224  000000                $SWREG: .WORD   ASWREG  ;;APT SWITCH REGISTER
  549  001226  000000                $USWR:  .WORD   AUSWR   ;;USER SWITCHES
  550  001230  000000                $CPUOP: .WORD   ACPUOP  ;;CPU TYPE,OPTIONS
  551                                 ;*                      BITS 15-11=CPU TYPE
  552                                 ;*                              11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
  553                                 ;*                              11/70=06,PDQ=07,Q=10
  554                                 ;*                      BIT 10=REAL TIME CLOCK
  555                                 ;*                      BIT  9=FLOATING POINT PROCESSOR
  556                                 ;*                      BIT  8=MEMORY MANAGEMENT
  557  001232     000                 $MAMS1: .BYTE   AMAMS1  ;;HIGH ADDRESS,M.S. BYTE
  558  001233     000                 $MTYP1: .BYTE   AMTYP1  ;;MEM. TYPE,BLK#1
  559                                 ;*                      MEM.TYPE BYTE   --  (HIGH BYTE)
  560                                 ;*                              900 NSEC CORE=001
  561                                 ;*                              300 NSEC BIPOLAR=002
  562                                 ;*                              500 NSEC MOS=003
  563  001234  000000                $MADR1: .WORD   AMADR1  ;;HIGH ADDRESS,BLK#1
  564                                 ;*                        MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF "TYPE" ABOVE
  565  001236     000                 $MAMS2: .BYTE   AMAMS2  ;;HIGH ADDRESS,M.S. BYTE
  566  001237     000                 $MTYP2: .BYTE   AMTYP2  ;;MEM.TYPE,BLK#2
  567  001240  000000                $MADR2: .WORD   AMADR2  ;;MEM.LAST ADDRESS,BLK#2
  568  001242     000                 $MAMS3: .BYTE   AMAMS3  ;;HIGH ADDRESS,M.S.BYTE
  569  001243     000                 $MTYP3: .BYTE   AMTYP3  ;;MEM.TYPE,BLK#3
  570  001244  000000                $MADR3: .WORD   AMADR3  ;;MEM.LAST ADDRESS,BLK#3
  571  001246     000                 $MAMS4: .BYTE   AMAMS4  ;;HIGH ADDRESS,M.S.BYTE
  572  001247     000                 $MTYP4: .BYTE   AMTYP4  ;;MEM.TYPE,BLK#4
  573  001250  000000                $MADR4: .WORD   AMADR4  ;;MEM.LAST ADDRESS,BLK#4
  574  001252  000320                $VECT1: .WORD   AVECT1  ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
  575  001254  000000                $VECT2: .WORD   AVECT2  ;;INTERRUPT VECTOR#2BUS PRIORITY#2
  576  001256  172000                $BASE:  .WORD   ABASE   ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
  577  001260  000000                $DEVM:  .WORD   ADEVM   ;;DEVICE MAP
  578  001262  000000                $CDW1:  .WORD   ACDW1   ;;CONTROLLER DESCRIPTION WORD#1
  579  001264                         $ETEND:
  580                                 .MEXIT
```

```
                                .SBTTL  ERROR POINTER TABLE

                                ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
                                ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
                                ;*LOCATION $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
                                ;*NOTE1:        IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
                                ;*NOTE2:        EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:

                                ;*      EM              ;;POINTS TO THE ERROR MESSAGE
                                ;*      DH              ;;POINTS TO THE DATA HEADER
                                ;*      DT              ;;POINTS TO THE DATA
                                ;*      DF              ;;POINTS TO THE DATA FORMAT


  001264                        $ERRTB:
```

```
                                        ;ERROR 1 - MAINT MODE 3 & L.P. FLAG FAILED TO CAUSE AN INTERRUPT

001264  027522                                EM1                     ;L.P. FLAG INTR FAILURE
001266  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
001270  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
001272  000000                                0                       ;ALL ARE OCTAL

                                        ;ERROR 2 - SILO FAILED TO RESTORE AT BUSADRS & LEVEL INDICATED

001274  027551                                EM2                     ;SILO FAILURE AT LEVEL INDICATED
001276  032200                                DH5                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD    LEVEL
001300  032272                                DT2                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT  $TMP0
001302  000000                                0

                                        ;ERROR 3 - STACK POINTER FAILED TO DECREMENT PROPERLY ON JSR INSTR

001304  027611                                EM3                     ;STK PTR DECREMENT ERROR
001306  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
001310  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
001312  000000                                0

                                        ;ERROR 4 - STACK OVERFLOW BIT FAILED TO SET OR RESET

001314  027630                                EM4                     ;STACK OVERFLOW ERROR
001316  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
001320  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
001322  000000                                0

                                        ;ERROR 5 - JSR RELATIVE INSTR FAILED TO PUSH DPC ONTO STACK

001324  027652                                EM5                     ;DPC STACKING ERROR
001326  031776                                DH2                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD    STK SEL
001330  032272                                DT2                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT  $TMP0
001332  000000                                0
```

```
                                        ;ERROR 6 - DPU NAME REG FAILED ON STACKING

001334  027670                                EM6                     ;DPU NAME STACKING ERROR
001336  031776                                DH2                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD    STK SEL
001340  032272                                DT2                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT  $TMPO
001342  000000                                0

                                        ;ERROR 7 - MODE BITS FAILED ON STACKING

001344  027713                                EM7                     ;MODE STACKING ER
001346  031776                                DH2                     ;ERRPC  TST JM  BUSADR  EXPCT   RCVD    STK SEL
001350  032272                                DT2                     ;$ERRPC TSTNJM  $BDADR  $GDDAT  $BDDAT  $TMPO
001352  000000                                0

                                        ;ERROR 10 - VECTOR SCALE BITS FAILED ON STACKING

001354  027732                                EM10                    ;VECTOR SCALE STACKING ERROR
001356  031776                                DH2                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD    STK SEL
001360  032272                                DT2                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT  $TMPO
001362  000000                                0

                                        ;ERROR 11 - CHARACTER SCALE FAILED ON STACKING

001364  027761                                EM11                    ;CHARACTER SCALE STACKING ERROR
001366  031776                                DH2                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD    STK SEL
001370  032272                                DT2                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT  $TMPO
001372  000000                                0

                                        ;ERROR 12 - CHARACTER ROTATE FAILED ON STACKING

001374  030013                                EM12                    ;CHARACTER ROTATE STACKING ERROR
001376  031776                                DH2                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD    STK SEL
001400  032272                                DT2                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT  $TMPO
001402  000000                                0

                                        ;ERROR 13 - INTENSITY LEVEL FAILED ON STACKING

001404  030046                                EM13                    ;INTENSITY LEVEL STACKING ERROR
001406  031776                                DH2                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD    STK SEL
001410  032272                                DT2                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT  $TMPO
001412  000000                                0

                                        ;ERROR 14 - COLOR LEVEL FAILED ON STACKING

001414  030100                                EM14                    ;COLOR LEVEL STACKING-ER
001416  031776                                DH2                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD    STK SEL
001420  032272                                DT2                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT  $TMPO
001422  000000                                0
```

```
                                ;ERROR 15 - ITALICS FAILED ON STACKING
                                
001424  030126                          EM15                    ;ITALICS STACKING ER
001426  031776                          DH2                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD    STK SEL
001430  032272                          DT2                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT  $TMPO
001432  000000                          0
                                
                                ;ERROR 16 - MENU FAILED ON STACKING
                                
001434  030150                          EM16                    ;MENU STACKING ER
001436  031776                          DH2                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD    STK SEL
001440  032272                          DT2                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT  $TMPO
001442  000000                          0
                                
                                ;ERROR 17 - BLINK ENA FAILED ON STACKING
                                
001444  030167                          EM17                    ;BLINK ENA STACKING-ER
001446  031776                          DH2                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD    STK SEL
001450  032272                          DT2                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT  $TMPO
001452  000000                          0
                                
                                ;ERROR 20 - STOP INT ENA FAILED ON STACKING
                                
001454  030213                          EM20                    ;STOP INT ENA STACKING ER
001456  031776                          DH2                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD    STK SEL
001460  032272                          DT2                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT  $TMPO
001462  000000                          0
                                
                                ;ERROR 21 - L.P. HIT FAILED ON STACKING
                                
001464  030242                          EM21                    ;LP HIT STACKING ER
001466  031776                          DH2                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD    STK SEL
001470  032272                          DT2                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT  $TMPO
001472  000000                          0
                                
                                ;ERROR 22 - LOAD STATUS A OR B' INSTR FAILED WHEN ENA=0 (VERIFIED ON STACK)
                                
001474  030273                          EM22                    ;LD STATUS STKING ER
001476  031776                          DH2                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD    STK SEL
001500  032272                          DT2                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT  $TMPO
001502  000000                          0
                                
                                ;ERROR 23 - EDGE INT ENA FAILED ON STACKING
                                
001504  030323                          EM23                    ;EDGE INT ENA STACKING ER
001506  031776                          DH2                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD    STK SEL
001510  032272                          DT2                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT  $TMPO
001512  000000                          0
```

```
                                        ;ERROR 24 - CHARACTER STRING ESCAPE FAILED ON STACKING

001514  030352                                EM24                    ;CHAR STRING ESCAPE STACKING ER
001516  031776                                DH2                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD    STK SEL
001520  032272                                DT2                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT  $TMPD
001522  000000                                0

                                        ;ERROR 25 - DEPTH QUEING OR DEPTH QUE CONTROL FAILED ON STACKING

001524  030407                                EM25                    ;DEPTH QUE STACKING ER
001526  031776                                DH2                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD    STK SEL
001530  032272                                DT2                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT  $TMPD
001532  000000                                0

                                        ;ERROR 26 - LINE TYPE FAILED ON STACKING

001534  030433                                EM26                    ;LINE TYPE STACKING ER
001536  031776                                DH2                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD    STK SEL
001540  032272                                DT2                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT  $TMPD
001542  000000                                0

                                        ;ERROR 27 - INTENSITY ENABLED FAILED ON STACKING

001544  030457                                EM27                    ;INTENSITY ENA STKING ER
001546  031776                                DH2                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD    STK SEL
001550  032272                                DT2                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT  $TMPD
001552  000000                                0

                                        ;ERROR 30 - L.P. INTR ENABLED FAILED ON STACKING

001554  030507                                EM30                    ;L.P. INTR ENA STKING ER
001556  031776                                DH2                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD    STK SEL
001560  032272                                DT2                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT  $TMPD
001562  000000                                0

                                        ;ERROR 31 - L.P. SWITCH INTR ENABLED FAILED ON STACKING

001564  030537                                EM31                    ;L.P. SW INTR ENA STKING ER
001566  031776                                DH2                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD    STK SEL
001570  032272                                DT2                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT  $TMPD
001572  000000                                0


                                        ;ERROR 32 - SHIFT OUT FAILED ON STACKING

001574  030572                                EM32                    ;SHIFT OUT STKING ER
001576  031776                                DH2                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD    STK SEL
001600  032272                                DT2                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT  $TMPD
001602  000000                                0
```

```
                                        ;ERROR 33 - POP INSTR FAILED TO INCREMENT THE STACK POINTER

001604  030616                                EM33                    ;STK PTR INCREMENT ER
001606  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
001610  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
001612  000000                                0

                                        ;ERROR 34 - STACK UNDERFLOW FAILED TO SET OR RESET

001614  030635                                EM34                    ;STACK UNDERFLOW ER
001616  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
001620  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
001622  000000                                0

                                        ;ERROR 35 - DPC FAILED TO RESTORE ON POP INSTR

001624  030656                                EM35                    ;DPC POP ER
001626  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
001630  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
001632  000000                                0

                                        ;ERROR 36 - NAME BITS FAILED TO RESTORE ON POP INSTR

001634  030671                                EM36                    ;NAME POP ER
001636  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
001640  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
001642  000000                                0

                                        ;ERROR 37 - VECTOR SCALE FAILED TO RESTORE ON POP INSTR

001644  030705                                EM37                    ;VECTOR SCALE POP ER
001646  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
001650  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
001652  000000                                0

                                        ;ERROR 40 - CHAR SCALE FAILED TO RESTORE ON POP INSTR

001654  030731                                EM40                    ;CHAR SCALE POP ER
001656  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
001660  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
001662  000000                                0

                                        ;ERROR 41 - CHAR ROTATE FAILED TO RESTORE ON POP INSTR

001664  030753                                EM41                    ;CHAR ROTATE POP ER
001666  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
001670  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
001672  000000                                0
```

```
                                        ;ERROR 42 - COLOR LEVEL FAILED TO RESTORE ON POP INSTR

001674  030776                                EM42                    ;COLOR LEVEL POP ER
001676  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
001700  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
001702  000000                                0

                                        ;ERROR 43 - ITALICS FAILED TO RESTORE ON POP INSTR

001704  031021                                EM43                    ;ITALICS POP ER
001706  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
001710  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
001712  000000                                0

                                        ;ERROR 44 - MENU FAILED TO RESTORE ON POP INSTR

001714  031040                                EM44                    ;MENU POP ER
001716  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
001720  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
001722  000000                                0

                                        ;ERROR 45 - INTENSITY ENABLED FAILED TO RESTORE ON POP INSTR

001724  031054                                EM45                    ;INTENSITY ENA POP ER
001726  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
001730  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
001732  000000                                0

                                        ;ERROR 46 - L.P. INTR ENABLED FAILED TO RESTORE ON POP INSTR

001734  031101                                EM46                    ;L.P. INTR ENA POP ER
001736  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
001740  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
001742  000000                                0

                                        ;ERROR 47 - L.P. SWITCH INTR ENABLED FAILED TO RESTORE ON POP INSTR

001744  031126                                EM47                    ;L.P. SW INTR ENA POP ER
001746  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
001750  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
001752  000000                                0

                                        ;ERROR 50 - LINE TYPE FAILED TO RESTORE ON POP INSTR

001754  031156                                EM50                    ;LINE TYPE POP ER
001756  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
001760  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
001762  000000                                0
```

```
                                        ;ERROR 51 - INTENSITY LEVEL FAILED TO RESTORE ON POP INSTR

001764  031177                                EM51                    ;INTENSITY LEVEL POP ER
001766  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
001770  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
001772  000000                                0

                                        ;ERROR 52 - BLINK FAILED TO RESTORE ON POP INSTR

001774  031226                                EM52                    ;BLINK POP ER
001776  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
002000  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
002002  000000                                0

                                        ;ERROR 53 - MODE FAILED TO RESTORE ON POP INSTR

002004  031243                                EM53                    ;MODE POP ER
002006  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
002010  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
002012  000000                                0

                                        ;ERROR 54 - STOP INTR ENABLED FAILED TO RESTORE ON POP INSTR

002014  031257                                EM54                    ;STOP INTR ENA POP ER
002016  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
002020  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
002022  000000                                0

                                        ;ERROR 55 - DEPTH QUEING OR DEPTH QUE CONTROL FAILED TO RESTORE ON POP INSTR

002024  031304                                EM55                    ;DEPTH QUE POP ER
002026  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
002030  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
002032  000000                                0

                                        ;ERROR 56 - EDGE INTR ENABLED FAILED TO RESTORE ON POP INSTR

002034  031325                                EM56                    ;EDGE INTR ENA POP ER
002036  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
002040  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
002042  000000                                0

                                        ;ERROR 57 - CHAR STRING ESCAPE FAILED TO RESTORE ON POP INSTR

002044  031352                                EM57                    ;CHAR STRING ESC POP ER
002046  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
002050  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
002052  000000                                0
```

```
                                        ;ERROR 60 - L.P. HIT DISABLE FAILED TO RESTORE ON POP INSTR

002054  031401                                EM60                    ;L.P. HIT DISABLE POP ER
002056  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
002060  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
002062  000000                                0

                                        ;ERROR 61 - SHIFT OUT FAILED TO RESTORED ON POP INSTR

002064  031431                                EM61                    ;SHIFT OUT ER
002066  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
002070  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
002072  000000                                0

                                        ;ERROR 62 - TERMINATE CHARACTER FAILED TO POP THE STACK

002074  031452                                EM62                    ;TERMINATE CHAR POP ER
002076  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
002100  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
002102  000000                                0

                                        ;ERROR 63 - STACK OVERFLOW FAILED ON INTERRUPT

002104  031500                                EM63                    ;STK OVFLO INT ER
002106  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
002110  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
002112  000000                                0

                                        ;ERROR 64 - STACK UNDERFLOW FAILED ON INTERRUPT

002114  031521                                EM64                    ;STK UNFLO INT ER
002116  031731                                DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
002120  032256                                DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
002122  000000                                0

                                        ;ERROR 65 - INCORRECT DELTA LENGTH FOR X OR Y VECTOR INDICATED

002124  031542                                EM65                    ;DELTA LENGTH ER
002126  032133                                DH4                     ;ERRPC  TSTNUM  VECTOR  EXPCT   RCVD
032130  032326                                DT4                     ;$ERRPC TSTNUM  $TMPO   $GDDAT  $BDDAT
002132  000000                                0

                                        ;ERROR 66 - TANGENT ERROR FOR X OR Y VECTOR INDICATED

002134  031562                                EM66                    ;TANGENT ER
002136  032133                                DH4                     ;ERRPC  TSTNUM  VECTOR  EXPCT   RCVD
002140  032326                                DT4                     ;$ERRPC TSTNUM  $TMPO   $GDDAT  $BDDAT
002142  000000                                0
```

```
                                        ;ERROR 67 - DPC HIGH ORDER BIT 16 & 17 FAILED TO SET OR RESET

002144  031575                                 EM67                    ;DPC 16-17 ER
002146  031731                                 DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
002150  032256                                 DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
002152  000000                                 0

                                        ;ERROR 70 - VS60 ADDRESS FAILURE ABOVE 28K

002154  031612                                 EM70                    ;ADRS ER
002156  032056                                 DH3                     ;ERRPC  TSTNUM  GD-1716 GD-DPC  BD-1716 BD-DPC
002160  032310                                 DT3                     ;$ERRPC TSTNUM  G1716   $GDDAT  B1716   $BDDAT
002162  000000                                 0

                                        ;ERROR 71 - STOP FLAG FAILED TO SET WHEN VS60 OPERATING AT FULL SPEED

002164  031640                                 EM71                    ;STOP FLAG FAILED TO SET
002166  031731                                 DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
002170  032256                                 DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
002172  000000                                 0

                                        ;ERROR 72 - START FAILED TO CLR STACK BITS & SET 'TOP OF STACK'

002174  031670                                 EM72                    ;START FAILED TO SET 'TOP OF STK'
002176  031731                                 DH1                     ;ERRPC  TSTNUM  BUSADR  EXPCT   RCVD
002200  032256                                 DT1                     ;$ERRPC TSTNUM  $BDADR  $GDDAT  $BDDAT
002202  000000                                 0
```

```
                                        ;MORE PROGRAM DEFINITIONS

            000000          OPEN=   0                       ;LOCATION WILL LATER BE REWRITTEN
            010000          MAINT1= 10000                   ;SINGLE STEP MAINTENANCE BIT - NO NPR ALLOWED
            020000          MAINT2= 20000                   ;SINGLE CYCLE MAINTENANCE BIT - ONE NPR ALLOWED

            000250          KTERRV= 250                     ;KT TRAP ADRS
            177572          KTSR0=  177572                  ;KT STATUS REG

                                        ;MORE PROGRAM TAGS

002204      000000          TSTNUM: OPEN                    ;CONTAINS TEST NO OF TEST WITH ERROR
002206      000000          DLYCNT: OPEN                    ;COUNTER USED BY DELAY ROUTINE
002210      000000          LDRSV1: OPEN                    ;LOCATION SAVES DATA OF LOC USED IN MEM TEST
002212      000000          LDRSV2: OPEN                    ;DITTO
002214      000000          MEMMAX: OPEN                    ;CONTAINS STARTING ADRS OF HIGHEST 4K
002216      000000          CENAB:  OPEN                    ;NON ZERO ENABLES THE DPC MEM TEST
002220      000000          KTENAB: OPEN                    ;NON ZERO ENABLES THE ABOVE 28K DPC MEM TEST
002222      000000          KTMAX:  OPEN                    ;CONTAINS LAST 4K PAGE ADRS AVAILABLE ABOVE 28K
002224      000000          G1716:  OPEN                    ;CONTAINS EXPECTED ADRS BITS 17 & 16
002226      000000          B1716:  OPEN                    ;CONTAINS ACTUAL ADRS BITS 17 & 16

                                        ;KT11 PAGE ADDRESS REGS & PAGE DESCRIPTOR REGS ADDRESSES

002230      172340          KIPAR0: 172340                  ;PAR 0
002232      172300          KIPDR0: 172300                  ;PDR 0
002234      172344          KIPAR2: 172344                  ;PAR 2
002236      172304          KIPDR2: 172304                  ;PDR 2
002240      172356          KIPAR7: 172356                  ;PAR 7
002242      172316          KIPDR7: 172316                  ;PDR 7

                                        ;VS60 REGISTER ADDRESS POINTERS

002244      000000          DPC:    OPEN                    ;DISPLAY PROCESSOR PC
002246      000000          SREG0:  OPEN                    ;STATUS REG 1
002250      000000          XPOS:   OPEN                    ;X POSITION & GRAPHPLOT INC REG
002252      000000          YPOS:   OPEN                    ;Y POSITION & CHAR REG
002254      000000          RLO:    OPEN                    ;RELOCATE REG
002256      000000          SREG1:  OPEN                    ;STATUS REG 2
002260      000000          XDOFF:  OPEN                    ;X DYNAMIC OFFSET REG
002262      000000          YDOFF:  OPEN                    ;Y DYNAMIC OFFSET REG
002264      000000          ANAME:  OPEN                    ;ASSOCIATE NAME REG
002266      000000          CONS:   OPEN                    ;CONSOLE INDICATORS & COLOR LEVEL
002270      000000          DNAME:  OPEN                    ;DPU NAME REG
002272      000000          STKVAL: OPEN                    ;STACK READ REG
002274      000000          TERMCH: OPEN                    ;TERMINATE CHAR REG
002276      000000          STKPT:  OPEN                    ;MAINTENANCE & STK PTR
002300      000000          ZPOS:   OPEN                    ;Z POSOITION REG
002302      000000          ZDOFF:  OPEN                    ;Z DYNAMIC OFFSET REG
```

```
                                        ;SOFTWARE INITIALIZATION ROUTINE

                                        START:
002304                                  .SBTTL  INITIALIZE THE COMMON TAGS
                                        ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
002304  012706  001100                          MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
002310  005026                                  CLR     (R6)+           ;;CLEAR MEMORY LOCATION
002312  022706  001140                          CMP     #SWR,R6 ;;DONE?
002316  001374                                  BNE     .-6             ;;LOOP BACK IF NO
002320  012706  001100                          MOV     #STACK,SP       ;;SETUP THE STACK POINTER
                                        ;;INITIALIZE A FEW VECTORS
002324  012737  025072  000020                  MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
002332  012737  000340  000022                  MOV     #340,@#IOTVEC+2 ;;LEVEL 7
002340  012737  025616  000030                  MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
002346  012737  000340  000032                  MOV     #340,@#EMTVEC+2 ;;LEVEL 7
002354  012737  027110  000034                  MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
002362  012737  000340  000036                  MOV     #340,@#TRAPVEC+2;LEVEL 7
002370  012737  027144  000024                  MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
002376  012737  000340  000026                  MOV     #340,@#PWRVEC+2 ;;LEVEL 7
002404  013737  024340  024332                  MOV     $ENDCT,$EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
002412  005037  001166                          CLR     $TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
002416  005037  001170                          CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
002422  112737  000001  001115                  MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
002430  012737  002430  001106                  MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
002436  012737  002436  001110                  MOV     #.,$LPERR       ;;SETUP THE ERROR LOOP ADDRESS
                                        ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
                                        ;;EQUAL TO A "-1"  SETUP FOR A SOFTWARE SWITCH REGISTER.
002444  013746  000004                          MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
002450  012737  002504  000004                  MOV     #64$,@#ERRVEC   ;;SET UP ERROR VECTOR
002456  012737  177570  001140                  MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
002464  012737  177570  001142                  MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
002472  022777  177777  176440                  CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
002500  001012                                  BNE     66$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
                                                                        ;;AND  THE HARDWARE SWR IS NOT = -1
002502  000403                                  BR      65$             ;;BRANCH IF NO TIMEOUT
002504  012716  002512                  64$:    MOV     #65$,(SP)       ;;SET UP FOR TRAP RETURN
002510  000002                                  RTI
002512  012737  000176  001140          65$:    MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
002520  012737  000174  001142                  MOV     #DISPREG,DISPLAY
002526  012637  000004                  66$:    MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR

002532  005037  001210                          CLR     $PASS           ;;CLEAR PASS COUNT
002536  132737  000200  001223                  BITB    #APTSIZE,$ENVM  ;;TEST USER SIZE UNDER APT
002544  001403                                  BEQ     67$             ;;YES,USE NON-APT SWITCH
002546  012737  001224  001140                  MOV     #$SWREG,SWR     ;;NO,USE APT SWITCH REGISTER
002554                                  67$:
002554  005737  000042                          TST     @#42            ;TEST IF RUNNING CHAIN MODE UNDER XXDP
002560  001002                                  BNE     START1          ;BR IF SO
002562  104400  027363                          TYPE    ,MSG1           ;GO IDENTIFY TEST
002566  013700  001256                  START1: MOV     $BASE,R0        ;GET 1ST VS60 BUS ADRS
002572  012701  002244                          MOV     #DPC,R1         ;INITIALIZE VS60 REG POINTER
002576  010011                          SETPTR: MOV     R0,(R1)         ;SET UP THIS ADRS POINTER
002600  062700  000002                          ADD     #2,R0           ;ADVANCE TO NEXT REG ADRS
002604  062701  000002                          ADD     #2,R1           ;MOVE POINTER TO NEXT REG ADRS
002610  020127  002304                          CMP     R1,#DPC+40      ;HAVE WE DONE ALL REG POINTERS?
002614  001370                                  BNE     SETPTR          ;BR IF NOT
```

```
1100  002616  005037  002216          CSIZR:  CLR     CENAB           ;TURN OFF DPC MEM TEST
1101  002622  005037  002220                  CLR     KTENAB          ;TURN OFF KT UPPER MEM TEST
1102  002626  012737  002666  000004          MOV     #2$,@#ERRVEC    ;SET UP MEM TIMEOUT SERVICE ADRS
1103  002634  012700  040000                  MOV     #40000,R0       ;START MEM SIZER GREATER THAN 8K
1104  002640  010001                  1$:     MOV     R0,R1           ;DO ACTUAL TESTING IN R1
1105  002642  005721                          TST     (R1)+           ;CHECK EVEN ADRS
1106  002644  005711                          TST     (R1)            ;CHECK ODD ADRS
1107  002646  062700  020000                  ADD     #20000,R0       ;BUMP IT BY 4K
1108  002652  022700  160000                  CMP     #160000,R0      ;ARE WE TO I/O PAGE?
1109  002656  001370                          BNE     1$              ;BR IF NOT
1110  002660  005237  002220                  INC     KTENAB          ;'KTENAB' NON-ZERO MEANS KT11 SIZER REQ
1111  002664  000401                          BR      3$              ;GO SAVE 28K MEM LIMIT
1112  002666  022626                  2$:     CMP     (R6)+,(R6)+     ;FIX STACK SINCE NO RTI ON MEM TIMEOUT
1113  002670  012737  000006  000004  3$:     MOV     #ERRVEC+2,@#ERRVEC      ;RESTORE LOC 4 & 6
1114  002676  162700  020000                  SUB     #20000,R0       ;BACK UP TO LAST 4K MEM BLK
1115  002702  010037  002214                  MOV     R0,MEMMAX       ;SAVE HIGHEST NON-KT MEM ADRS
1116  002706  020027  020000                  CMP     R0,#20000       ;IS THERE MORE THAN 8K?
1117  002712  101002                          BHI     4$              ;BR IF SO
1118  002714  000137  003202                  JMP     TYPCOR          ;GO TYPE CORE AMT - NOTHING OVER 8K
1119  002720  005237  002216          4$:     INC     CENAB           ;NON-ZERO REQ DPC MEM TEST
1120  002724  005737  002220                  TST     KTENAB          ;DO WE NEED TO DO KT MEM SIZER?
1121  002730  001002                          BNE     KTSIZR          ;BR IF SO
1122  002732  000137  003202                  JMP     TYPCOR          ;GO TYPE CORE AMT - LESS THAN 28K
1123  002736  012737  024610  000250  KTSIZR: MOV     #KTSER,@#KTERRV ;GET UP KT11 TRAP SERVICE ADRS
1124  002744  012737  003022  000004          MOV     #2$,@#ERRVEC            ;RETURN TO 2$ ON KT TIMOUT
1125  002752  005737  177572                  TST     @#KTSR0         ;LOOK FOR STATUS REG
1126  002756  005077. 177246          1$:     CLR     @KIPAR0         ;SET UP FOR TRAPS TO PAGE 0
1127  002762  012777  077406  177242          MOV     #77406,@KIPDR0  ;4K PAGE LENGTH, EXPAND UP, R/W ACCESS
1128  002770  012777  001600  177236          MOV     #1600,@KIPAR2   ;START AT 28K
1129  002776  012777  077406  177232          MOV     #77406,@KIPDR2  ;4K PAGE LENGTH, EXPAND UP, R/W ACCESS
1130  003004  012777  007600  177226          MOV     #7600,@KIPAR7   ;SET UP I/O 4K PAGE ADRS
1131  003012  012777  077406  177222          MOV     #77406,@KIPDR7  ;4K PAGE LENGTH, EXPAND UP, R/W ACCESS
1132  003020  000410                          BR      3$              ;SKIP OVER TIMEOUT STUFF
1133  003022  022626                  2$:     CMP     (R6)+,(R6)+     ;FIX STACK SINCE NO RTI
1134  003024  005037  002220                  CLR     KTENAB          ;THERE IS NO KT11
1135  003030  012737  000006  000004          MOV     #ERRVEC+2,@#ERRVEC      ;RESTORE 4 & 6
1136  003036  000137  003202                  JMP     TYPCOR          ;GO TYPE CORE AMT - KT NOT THERE
1137  003042  012737  003114  000004  3$:     MOV     #5$,@#ERRVEC    ;SET UP NON-EXISTENT MEM TIMEOUT ADRS
1138  003050  012700  040000          4$:     MOV     #40000,R0       ;START WITH ADRS 0 AT PAGE ADRS IN KIPAR2
1139  003054  052737  001400  177572          BIS     #1400,@#KTSR0   ;ENAB KT (MAINT)
1140  003062  005720                          TST     (R0)+           ;IS THIS BLK THERE?
1141  003064  005720                          TST     (R0)+           ;CK INTERLEAVING ALSO
1142  003066  042737  001400  177572          BIC     #1400,@#KTSR0   ;DISABLE KT
1143  003074  062777  000200  177132          ADD     #200,@KIPAR2    ;ADVANCE TO NEXT 4K BLK
1144  003102  027777  177126  177130          CMP     @KIPAR2,@KIPAR7 ;ARE WE OUT TO 128K?
1145  003110  001357                          BNE     4$              ;BR IF NOT
1146  003112  000403                          BR      6$              ;GO SET UP KTMAX
1147  003114  005037  177572          5$:     CLR     @#KTSR0         ;DISABLE KT
1148  003120  022626                          CMP     (R6)+,(R6)+     ;FIX STACK SINCE NO RTI
1149  003122  012737  000006  000004  6$:     MOV     #ERRVEC+2,@#ERRVEC      ;RESTORE ERRVEC
1150  003130  162777  000200  177076          SUB     #200,@KIPAR2    ;BACK UP TO LAST AVAILABLE BLK
1151  003136  017737  177072  002222          MOV     @KIPAR2,KTMAX   ;SAVE IT
1152  003144  023727  002222  001600          CMP     KTMAX,#1600     ;ARE WE OVER 28K?
1153  003152  103004                          BHIS    7$              ;BR IF SO
1154  003154  005037  002220                  CLR     KTENAB          ;DON'T USE KT
1155  003160  000137  003202                  JMP     TYPCOR          ;KT THERE BUT NOTHING OVER 28K?
```

```
1156  003164  013700  002222          7$:     MOV     kTMAX,R0        ;GET MAX PAGE ADRS VALUE
1157  003170  006300                          ASL     R0              ;JUSTIFY RIGHT FOR TYPE
1158  003172  000300                          SWAB    R0              ;
1159  003174  006300                          ASL     R0              ;
1160  003176  006300                          ASL     R0              ;
1161  003200  000406                          BR      TYPMEM          ;GO TYPE IT
1162  003202  013700  002214          TYPCOR: MOV     MEMMAX,R0       ;GET TOP 4K BLK NO BELOW 28K
1163  003206  000300                          SWAB    R0              ;SET IT UP FOR TYPE
1164  003210  006200                          ASR     R0              ;ADJUST FOR TYPE
1165  003212  006200                          ASR     R0              ;
1166  003214  006200                          ASR     R0              ;
1167  003216  062700  000004          TYPMEM: ADD     #4,R0           ;POINT TO LAST ADRS
1168  003222  005737  000042                  TST     @#42            ;TEST IF RUNNING CHAIN MODE UNDER XXDP
1169  003226  001006                          BNE     RSTART          ;BR IF SO
1170  003230  104400  027476                  TYPE    ,MSG3           ;GO TYPE 'MEMORY SIZE='
1171  003234  010046                          MOV     R0,-(SP)        ;SAVE IT ON STK FOR DECIMAL TYPE
1172  003236  104404                          TYPDS                   ;GO TYPE IT
1173  003240  104400  027516                  TYPE    ,MSG4           ;TYPE 'K'
1174  003244  000005          RSTART: RESET                           ;INITIALIZE THE VS60
1175  003246  012706  001100                  MOV     #STACK,SP       ;SET UP STACK POINTER
1176  003252  012737  000340  177776          MOV     #340,PSW        ;SET UP PSW TO HIGHEST LEVEL
1177  003260  105037  001102                  CLRB    $TSTNM          ;CLR TEST NO. ON RESTARTS
```

```
1178                                                    .SBTTL
1179                                                    .SBTTL  THESE TESTS USE MAINT. SW 2
1180                                                    .SBTTL
1181
1182                                            ;;**************************************************************
1183                                            ;*TEST 1        TEST THAT THE JSR REL INSTR WILL DECREMENT THE STACK POINTER
1184                                            ;;**************************************************************
1185  003264  000004                           TST1:   SCOPE
1186  003266  012737  000001  001206                   MOV     #1,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
1187  003274  012737  003330  001110                   MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
1188  003302  013737  002276  001122                   MOV     STKPT,$BDADR    ;SET UP RF; 32 ADRS
1189  003310  012700  020040                          MOV     #20040,R0       ;SET TOP OF STACK & MAINT SW2 IN R0
1190  003314  012737  000034  001124                   MOV     #34,$GDDAT      ;WILL EXPECT PTR TO BE 34 INITIALLY
1191  003322  012737  163000  032342                   MOV     #163000,BUFFER  ;SET UP JSR INSTR
1192  003330  010077  176742                  1$:     MOV     R0,@STKPT       ;SET UP STACK PTR
1193  003334  012777  032342  176702                   MOV     #BUFFER,@PC     ;START
1194  003342  004537  024426                          JSR     R5,DELAY        ;STALL FOR STACKING
1195  003346  000001                                   BITO                    ;COUNT TO 1
1196  003350  017737  176722  001126                   MOV     @STKPT,$BDDAT   ;READ STACK POINTER
1197  003356  042737  177703  001126                   BIC     #177703,$BDDAT  ;ONLY WANT STACK POINTER - TOP OF STK SB 0
1198  003364  023737  001124  001126                   CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
1199  003372  001401                                   BEQ     2$              ;BR IF OK
1200  003374  104003                                   ERROR   3               ;JSR REL INSTR FAILED TO DECREMENT STACK PTR
1201  003376  162700  000004                  2$:     SUB     #4,R0           ;SET UP NEXT STK PTR VALUE IN R0
1202  003402  162737  000004  001124                   SUB     #4,$GDDAT       ;ADVANCE TO NEXT EXPECTED PTR VALUE
1203  003410  001347                                   BNE     1$              ;BR IF THIS VALUE NOT TESTED YET
1204
1205                                            ;;**************************************************************
1206                                            ;*TEST 2        TEST THAT THE STACK OVERFLOW BIT CAN SET
1207                                            ;;**************************************************************
1208  003412  000004                           TST2:   SCOPE
1209  003414  012737  000002  001206                   MOV     #2,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
1210  003422  012737  000340  177776                   MOV     #340,PSW        ;SET PRIORITY TO HIGHEST LEVEL
1211  003430  013737  002256  001122                   MOV     $REG1,$BDADR    ;SET UP REG 12 ADRS
1212  003436  012777  020040  176632                   MOV     #20040,@STKPT   ;RESET THE STACK PTR
1213  003444  005037  001124                          CLR     $GDDAT          ;EXPECT NO OVERFLOW FOR 8 JSR'S
1214  003450  012700  000011                          MOV     #11,R0          ;SET UP COUNT FOR 9 JSR'S
1215  003454  012737  163000  032342                   MOV     #163000,BUFFER  ;SET UP JSR INSTR
1216  003462  012777  032342  176554  1$:     MOV     #BUFFER,@PC     ;START
1217  003470  004537  024426                          JSR     R5,DELAY        ;STALL FOR STACKING
1218  003474  000001                                   BITO                    ;COUNT TO 1
1219  003476  005300                                   DEC     R0              ;COUNT STACKING OPERATION
1220  003500  001410                                   BEQ     2$              ;BR IF THIS IS OVERFLOW
1221  003502  032777  020000  176546                   BIT     #20000,@SREG1   ;SEE THAT OVERFLOW IS NOT SET
1222  003510  001764                                   BEQ     1$              ;BR IF OVERFLOW NOT SET
1223  003512  012737  020000  001126                   MOV     #20000,$BDDAT   ;INDICATE STACK OVERFLOW
1224  003520  104004                                   ERROR   4               ;STACK OVERFLOW SET PREMATURELY
1225  003522  032777  020000  176526  2$:     BIT     #20000,@SREG1   ;IS STACK OVERFLOW SET?
1226  003530  001006                                   BNE     TST3            ;;ADVANCE TO NEXT TEST IF OK
1227  003532  012737  020000  001124                   MOV     #20000,$GDDAT   ;EXPECTED STACK OVERFLOW
1228  003540  005037  001126                          CLR     $BDDAT          ;INDICATE IT WAS NOT SET
1229  003544  104004                                   ERROR   4               ;STACK OVERFLOW FAILED TO SET
1230
1231                                            ;;**************************************************************
1232                                            ;*TEST 3        TEST THAT START WILL SET 'TOP OF STACK'
1233                                            ;;**************************************************************
```

```
1234  003546  000004                        TST3:   SCOPE
1235  003550  012737  000003  001206                MOV     #3,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
1236  003556  013737  002276  001122                MOV     STKPT,$BDADR    ;SET UP REG 32 ADRS
1237  003564  012737  000040  001124                MOV     #40,$GDDAT      ;EXPECT TOP OF STACK
1238  003572  012777  010037  176476                MOV     #10037,@STKPT   ;SET ALL STACK BITS & MAINT 1
1239  003600  005077  176440                      CLR     @DPC            ;START - NO NPR
1240  003604  017737  176466  001126                MOV     @STKPT,$BDDAT   ;READ STK PTR REG
1241  003612  042737  177701  001126                BIC     #177701,$BDDAT  ;SAVE ONLY STK PTR BITS
1242  003620  023737  001124  001126                CMP     $GDDAT,$BDDAT   ;DID START SET 'TOP OF STACK'?
1243  003626  001401                                BEQ     TST4            ;;NEXT TEST IF SO
1244  003630  104072                                ERROR   72              ;START FAILED TO SET 'TOP OF STACK'
1245
1246                                        ;;**************************************************************
1247                                        ;*TEST 4         TEST THAT THE JSR RELATIVE INSTR WILL PUSH DPC ONTO STACK
1248                                        ;;**************************************************************
1249  003632  000004                        TST4:   SCOPE
1250  003634  012737  000004  001206                MOV     #4,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
1251  003642  013737  002272  001122                MOV     STKVAL,$BDADR   ;SET UP REG 26 ADRS
1252  003650  012737  163000  032342                MOV     #163000,BUFFER  ;SET UP JSR RELATIVE INSTR
1253  003656  012700  000034                       MOV     #34,R0          ;SET UP STK SEL AFTER JSR IN R0
1254  003662  012701  020040                       MOV     #20040,R1       ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
1255  003666  012737  032344  001124                MOV     #BUFFER+2,$GDDAT        ;EXPECT ADRS BUFFER+2 ON STACK
1256  003674  012737  003702  001110                MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
1257  003702  010177  176370              1$:       MOV     R1,@STKPT       ;SET STK PTR BEFORE JSR
1258  003706  012777  032342  176330                MOV     #BUFFER,@DPC    ;START
1259  003714  004537  024426                       JSR     R5,DELAY        ;STALL FOR STACKING
1260  003720  000001                                BITO                    ;COUNT TO 1
1261  003722  010077  176350                       MOV     R0,@STKPT       ;SELECT STK WORD & BYTE
1262  003726  017737  176340  001126                MOV     @STKVAL,$BDDAT  ;READ STACK BYTE
1263  003734  042737  000001  001126                BIC     #BITO,$BDDAT    ;DON'T WANT LSB
1264  003742  023737  001124  001126                CMP     $GDDAT,$BDDAT   ;DID THE DPC GET STORED OK?
1265  003750  001403                                BEQ     2$              ;BR IF OK
1266  003752  010037  001164                       MOV     R0,$TMP0        ;SET UP STK LEVEL FOR ER TYPE
1267  003756  104005                                ERROR   5               ;DPC FAILED TO STACK AT LEVEL INDICATED
1268  003760  162701  000004              2$:       SUB     #4,R1           ;ADVANCE TO NEXT STK LEVEL
1269  003764  162700  000004                       SUB     #4,R0           ;ALL STACK LOCATIONS TESTED?
1270  003770  100344                                BPL     1$              ;BR IF NOT
1271
1272                                        ;;**************************************************************
1273                                        ;*TEST 5         TEST THAT THE JSR ABS INSTR WILL PUSH DPC ONTO STACK
1274                                        ;;**************************************************************
1275  003772  000004                        TST5:   SCOPE
1276  003774  012737  000005  001206                MOV     #5,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
1277  004002  013737  002272  001122                MOV     STKVAL,$BDADR   ;SET UP REG 26 ADRS
1278  004010  012737  162000  032342                MOV     #162000,BUFFER  ;SET UP JSR ABS INSTR
1279  004016  012737  032346  001124                MOV     #BUFFER+4,$GDDAT        ;EXPCT ADRS BUFFER+4 ON STACK
1280  004024  012701  020040                       MOV     #20040,R1       ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
1281  004030  012700  000034                       MOV     #34,R0          ;SET UP STACK SEL AFTER JSR IN R0
1282  004034  012737  004042  001110                MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
1283  004042  010177  176230              1$:       MOV     R1,@STKPT       ;SET UP STACK PTR BEFORE JSR
1284  004046  012777  032342  176170                MOV     #BUFFER,@DPC    ;START
1285  004054  004537  024426                       JSR     R5,DELAY        ;STALL FOR STACKING
1286  004060  000001                                BITO                    ;COUNT TO 1
1287  004062  005277  176156                       INC     @DPC            ;ADVANCE TO ABS ADRS
1288  004066  004537  024426                       JSR     R5,DELAY        ;STALL FOR STACKING
1289  004072  000001                                BITO                    ;COUNT TO 1
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1290  004074  010077  176176                  MOV     R0,@STKPT       ;SELECT STK WORD & BYTE
1291  004100  017737  176166  001126          MOV     @STKVAL,$BDDAT  ;READ STACK BYTE
1292  004106  042737  000001  001126          BIC     #BIT0,$BDDAT    ;DON'T WANT LSB
1293  004114  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;DID DPC GET STORED OK?
1294  004122  001403                          BEQ     2$              ;BR IF OK
1295  004124  010037  001164                  MOV     R0,$TMP0        ;SET UP STK LEVEL FOR ER TYPE
1296  004130  104005                          ERROR   5               ;DPC FAILED TO STACK AT LEVEL INDICATED
1297  004132  162701  000004          2$:     SUB     #4,R1           ;ADVANCE TO NEXT STK LEVEL
1298  004136  162700  000004                  SUB     #4,R0           ;ALL STACK LOCATIONS TESTED?
1299  004142  100337                          BPL     1$              ;BR IF NOT
1300
1301
1302                                  ;;*****************************************************************
1303                                  ;*TEST 6         TEST THAT THE JSR RELATIVE INSTR WILL PUSH DPC NAME REG ONTO STACK
1304                                  ;;*****************************************************************
1305  004144  000004                  TST6:   SCOPE
1306  004146  012737  000004  001166          MOV     #4,$TIMES       ;;DO 4 ITERATIONS
1307  004154  012737  000006  001206          MOV     #6,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
1308  004162  012737  153777  032342          MOV     #153777,BUFFER  ;SET UP NAME INSTR WITH 3777
1309  004170  012737  163000  032344          MOV     #163000,BUFFER+2        ;SET UP JSR INSTR
1310  004176  012737  077760  001124          MOV     #77760,$GDDAT   ;EXPECT 7776 INITIALLY
1311  004204  012737  004222  001110          MOV     #2$,$LPERR      ;SET SCOPE LOOP ADRS
1312  004212  012701  020040          1$:     MOV     #20040,R1       ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
1313  004216  012700  000035                  MOV     #35,R0          ;SET STACK SELECTION AFTER JSR IN R0
1314  004222  010177  176050          2$:     MOV     R1,@STKPT       ;SET STK PTR BEFORE JSR
1315  004226  012777  032342  176010          MOV     #BUFFER,@DPC    ;START
1316  004234  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG ADRS 26
1317  004242  005277  175776                  INC     @DPC            ;DO NEXT INSTR
1318  004246  004537  024426                  JSR     R5,DELAY        ;ALLOW TIME FOR STACKING
1319  004252  000001                          BIT0                    ;COUNT TO 1
1320  004254  010077  176016                  MOV     R0,@STKPT       ;SELECT STK WORD & BYTE
1321  004260  017737  176006  001126          MOV     @STKVAL,$BDDAT  ;READ STACK BYTE
1322  004266  042737  100017  001126          BIC     #100017,$BDDAT  ;ONLY WANT NAME BITS
1323  004274  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;DID THE NAME BITS GET STORED OK?
1324  004302  001403                          BEQ     3$              ;BR IF OK
1325  004304  010037  001164                  MOV     R0,$TMP0        ;SET UP STK LEVEL FOR ER TYPE
1326  004310  104006                          ERROR   6               ;DPC NAME FAILED TO STACK AT LEVEL INDICATED
1327  004312  162701  000004          3$:     SUB     #4,R1           ;ADVANCE TO NEXT STK LEVEL
1328  004316  162700  000004                  SUB     #4,R0           ;ALL STACK LOCATIONS TESTED?
1329  004322  100337                          BPL     2$              ;BR IF NOT
1330  004324  162737  000020  001124          SUB     #20,$GDDAT      ;ADVANCE TO NEXT PATTERN
1331  004332  100403                          BMI     TST7            ;;ADVANCE TO NEXT TEST IF ALL PATTERNS TESTED
1332  004334  005337  032342                  DEC     BUFFER          ;SET UP NAME INSTR WITH NEXT PATTERN
1333  004340  000724                          BR      1$              ;GO TRY NEXT PATTERN
1334
1335
1336                                  ;;*****************************************************************
1337                                  ;*TEST 7         TEST THAT THE MODE BITS GET PUSHED ON THE STACK
1338                                  ;;*****************************************************************
1338  004342  000004                  TST7:   SCOPE
1339  004344  012737  000010  001166          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
1340  004352  012737  000007  001206          MOV     #7,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
1341  004360  005037  001124                  CLR     $GDDAT          ;INITIALLY EXPECT ZERO FOR MODE
1342  004364  005002                          CLR     R2              ;SET INSTR TO CHAR MODE INITIALLY
1343  004366  012737  163000  032344          MOV     #163000,BUFFER+2        ;SET UP JSR INSTR
1344  004374  012737  004412  001110          MOV     #2$,$LPERR      ;SET UP LOOP ADRS
1345  004402  012701  020040          1$:     MOV     #20040,R1       ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
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1346  004406  012700  000035                  MOV     #35,R0          ;SET UP STK LEVEL AFTER JSR IN R0
1347  004412  010177  175660          2$:     MOV     R1,@STKPT       ;SET STK PTR BEFORE JSR
1348  004416  012737  100000  032342          MOV     #100000,BUFFER  ;SET UP INSTR
1349  004424  050237  032342                  BIS     R2,BUFFER       ;ADD IN CURRENT INSTR MODE
1350  004430  012777  032342  175606          MOV     #BUFFER,@DPC    ;START
1351  004436  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG ADRS 26
1352  004444  005277  175574                  INC     @DPC            ;RESUME
1353  004450  004537  024426                  JSR     R5,DELAY        ;STALL FOR STACKING
1354  004454  000001                          BITO                    ;COUNT TO 1
1355  004456  010077  175614                  MOV     R0,@STKPT       ;SELECT STACK WORD & BYTE
1356  004462  017737  175604  001126          MOV     @STKVAL,$BDDAT  ;READ MODE BITS
1357  004470  042737  177760  001126          BIC     #177760,$BDDAT  ;DON'T WANT NAME BITS
1358  004476  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;ARE THE MODE BITS CORRECT?
1359  004504  001403                          BEQ     3$              ;BR IF OK
1360  004506  010037  001164                  MOV     R0,$TMP0        ;SET UP STK LEVEL BEFORE ER TYPE
1361  004512  104007                          ERROR   7               ;MODE FAILED TM STACK AT LEVEL INDICATED
1362  004514  162701  000004          3$:     SUB     #4,R1           ;ADVANCE TO NEXT STK LEVEL
1363  004520  162700  000004                  SUB     #4,R0           ;HAS THIS INSTR MODE BEEN WRITTEN THRU STACK?
1364  004524  100332                          BPL     2$              ;BR IF NOT
1365  004526  022702  044000                  CMP     #44000,R2       ;IS THIS THE ABS VECTOR INSTR?
1366  004532  001405                          BEQ     TST10           ;;ADVANCE TO NEXT TEST IF SPARE HAS BEEN TESTED
1367  004534  062702  004000                  ADD     #4000,R2        ;ADVANCE TO NEXT INSTR MODE
1368  004540  005237  001124                  INC     $GDDAT          ;ADVANCE TO NEXT MODE EXPECTED
1369  004544  000716                          BR      1$              ;TRY NEXT INSTR
1370
1371                                  ;;**************************************************************
1372                                  ;*TEST 10       TEST THAT THE VECTOR SCALE BITS GET PUSHED ON THE STACK
1373                                  ;;**************************************************************
1374  004546  000004                  TST10:  SCOPE
1375  004550  012737  000010  001166          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
1376  004556  012737  000010  001206          MOV     #10,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
1377  004564  012737  074000  001124          MOV     #74000,$GDDAT   ;EXPECT ALL ONES INITIALLY
1378  004572  012737  154037  032342          MOV     #154037,BUFFER  ;SET UP LOAD STATUS C INSTR
1379  004600  012737  163000  032344          MOV     #163000,BUFFER+2        ;SET UP JSR INSTR
1380  004606  012737  004624  001110          MOV     #2$,$LPERR      ;SET UP SCOPE LOOP ADRS
1381  004614  012701  020040          1$:     MOV     #20040,R1       ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
1382  004620  012700  000036                  MOV     #36,R0          ;SET UP STK LEVEL AFTER JSR IN R0
1383  004624  010177  175446          2$:     MOV     R1,@STKPT       ;SET STK PTR BEFORE JSR
1384  004630  012777  032342  175406          MOV     #BUFFER,@DPC    ;START
1385  004636  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG ADRS 26
1386  004644  005277  175374                  INC     @DPC            ;ADVANCE TO JSR INSTR
1387  004650  004537  024426                  JSR     R5,DELAY        ;STALL FOR STACKING
1388  004654  000001                          BITO                    ;COUNT TO 1
1389  004656  010077  175414                  MOV     R0,@STKPT       ;SELECT STACK WORD & BYTE
1390  004662  017737  175404  001126          MOV     @STKVAL,$BDDAT  ;READ VECTOR SCALE FROM STACK
1391  004670  042737  103777  001126          BIC     #103777,$BDDAT  ;ONLY WANT VECTOR SCALE BITS
1392  004676  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;ARE THEY CORRECT?
1393  004704  001403                          BEQ     3$              ;BR IF OK
1394  004705  010037  001164                  MOV     R0,$TMP0        ;SET UP STK LEVEL FOR ER TYPE
1395  004712  104010                          ERROR   10              ;VECTOR SCALE FAILED TO STACK AT LEVEL INDICATED
1396  004714  162701  000004          3$:     SUB     #4,R1           ;ADVANCE TO NEXT STK LEVEL
1397  004720  162700  000004                  SUB     #4,R0           ;ALL STACK LOCATIONS TESTED?
1398  004724  100337                          BPL     2$              ;BR IF NOT
1399  004726  162737  004000  001124          SUB     #4000,$GDDAT    ;ADVANCE TO NEXT VECTOR SCALE PATTERN
1400  004734  100403                          BMI     TST11           ;;ADVANCE TO NEXT TEST IF ALL PATTERNS TESTED
1401  004736  005337  032342                  DEC     BUFFER          ;UPDATE INSTRUCTION
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1402  004742  000724                          BR      1$              ;TRY NEXT VECTOR SCALE VALUE
1403
1404                                  ;;*****************************************************************
1405                                  ;*TEST 11       TEST THAT THE CHARACTER SCALE BITS GET PUSHED ON THE STACK
1406                                  ;;*****************************************************************
1407  004744  000004                  TST11:  SCOPE
1408  004746  012737  000010  001166          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
1409  004754  012737  000011  001206          MOV     #11,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
1410  004762  012737  003000  001124          MOV     #3000,$GDDAT    ;EXPECT ALL ONES INITIALLY
1411  004770  012737  154340  032342          MOV     #154340,BUFFER  ;SET UP LOAD STATUS C INSTR
1412  004776  012737  163000  032344          MOV     #163000,BUFFER+2        ;SET UP JSR INSTR
1413  005004  012737  005022  001110          MOV     #2$,$LPERR      ;SET UP LOOP ADRS
1414  005012  012701  020040          1$:     MOV     #20040,R1       ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
1415  005016  012700  000036                  MOV     #36,R0          ;SET UP STK LEVEL AFTER JSR IN R0
1416  005022  010177  175250          2$:     MOV     R1,@STKPT       ;SET STK PTR BEFORE JSR
1417  005026  012777  032342  175210          MOV     #BUFFER,@DPC    ;START
1418  005034  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG ADRS 26
1419  005042  005277  175176                  INC     @DPC            ;ADVANCE TO JSR INSTR
1420  005046  004537  024426                  JSR     R5,DELAY        ;STALL FOR STACKING
1421  005052  000001                          BITO                    ;COUNT TO 1
1422  005054  010077  175216                  MOV     R0,@STKPT       ;SELECT STACK WORD & BYTE
1423  005060  017737  175206  001126          MOV     @STKVAL,$BDDAT  ;READ CHARACTER SCALE
1424  005066  042737  174777  001126          BIC     #174777,$BDDAT  ;ONLY WANT CHAR SCALE
1425  005074  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;ARE THEY CORRECT?
1426  005102  001403                          BEQ     3$              ;BR IF OK
1427  005104  010037  001164                  MOV     R0,$TMP0        ;SET UP STK LEVEL FOR ER TYPE
1428  005110  104011                          ERROR   11              ;CHARACTER SCALE FAILED TO STACK AT LEVEL INDICATED
1429  005112  162701  000004          3$:     SUB     #4,R1           ;ADVANCE TO NEXT STK LEVEL
1430  005116  162700  000004                  SUB     #4,R0           ;ALL STACK LOCATIONS TESTED?
1431  005122  100337                          BPL     2$              ;BR IF NOT
1432  005124  162737  001000  001124          SUB     #1000,$GDDAT    ;ADVANCE CHARACTER SCALE PATTERN
1433  005132  100404                          BMI     TST12           ;;ADVANCE TO NEXT TEST IF ALL PATTERNS TESTED
1434  005134  162737  000040  032342          SUB     #40,BUFFER      ;UPDATE INSTRUCTION
1435  005142  000723                          BR      1$              ;TRY NEXT CHARACTER SCALE VALUE
1436
1437                                  ;;*****************************************************************
1438                                  ;*TEST 12       TEST THAT THE CHARACTER ROTATE BIT GETS PUSHED ON THE STACK
1439                                  ;;*****************************************************************
1440  005144  000004                  TST12:  SCOPE
1441  005146  012737  000012  001206          MOV     #12,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
1442  005154  012737  000200  001124          MOV     #200,$GDDAT     ;EXPECT IT TO BE SET INITIALLY
1443  005162  012737  155400  032342          MOV     #155400,BUFFER  ;SET UP LOAD STATUS C INSTR
1444  005170  012737  163000  032344          MOV     #163000,BUFFER+2        ;SET UP JSR INSTR
1445  005176  012737  005214  001110          MOV     #2$,$LPERR      ;SET UP LOOP ADRS
1446  005204  012701  020040          1$:     MOV     #20040,R1       ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
1447  005210  012700  000036                  MOV     #36,R0          ;SET UP STK LEVEL AFTER JSR IN R0
1448  005214  010177  175056          2$:     MOV     R1,@STKPT       ;SET STK PTR BEFORE JSR
1449  005220  012777  032342  175016          MOV     #BUFFER,@DPC    ;START
1450  005226  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG ADRS 26
1451  005234  005277  175004                  INC     @DPC            ;ADVANCE TO JSR INSTR
1452  005240  004537  024426                  JSR     R5,DELAY        ;STALL FOR STACKING
1453  005244  000001                          BITO                    ;COUNT TO 1
1454  005246  010077  175024                  MOV     R0,@STKPT       ;SELECT STACK WORD & BYTE
1455  005252  017737  175014  001126          MOV     @STKVAL,$BDDAT  ;READ CHARACTER ROTATE BIT
1456  005260  042737  177577  001126          BIC     #177577,$BDDAT  ;ONLY WANT CHARACTER ROTATE BIT
1457  005266  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
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1458  005274  001403                          BEQ     3$              ;BR IF OK
1459  005276  010037  001164                  MOV     R0,$TMP0        ;SET UP STK LEVEL FOR ER TYPE
1460  005302  104012                          ERROR   12              ;CHARACTER ROTATE FEILED TO STACK AT LEVEL INDICATED
1461  005304  162701  000004          3$:     SUB     #4,R1           ;ADVANCE TO NEXT STK LEVEL
1462  005310  162700  000004                  SUB     #4,R0           ;ALL STACK LOCATIONS TESTED?
1463  005314  100337                          BPL     2$              ;BR IF NOT
1464  005316  162737  000400  032342          SUB     #400,BUFFER     ;UPDATE INSTR
1465  005324  162737  000200  001124          SUB     #200,$GDDAT     ;EXPECT ZERO NEXT
1466  005332  100324                          BPL     1$              ;BR IF RESET STATE NOT TESTED
1467
1468                                  ;;**************************************************************
1469                                  ;*TEST 13        TEST THAT THE INTENSITY LEVEL BITS GET PUSHED ON THE STACK
1470                                  ;;**************************************************************
1471  005334  000004                  TST13:  SCOPE
1472  005336  012737  000010  001166          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
1473  005344  012737  000013  001206          MOV     #13,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
1474  005352  012737  000160  001124          MOV     #160,$GDDAT     ;EXPECT ALL BITS INITIALLY
1475  005360  012737  103600  032342          MOV     #103600,BUFFER  ;SET UP ALL INTENSITY LEVEL BITS INITIALLY
1476  005366  012737  163000  032344          MOV     #163000,BUFFER+2        ;SET UP JSR INSTR
1477  005374  012737  005412  001110          MOV     #2$,$LPERR      ;SET UP LOOP ADRS
1478  005402  012701  020040          1$:     MOV     #20040,R1       ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
1479  005406  012700  000036                  MOV     #36,R0          ;SET UP STK LEVEL AFTER JSR IN R0
1480  005412  010177  174660          2$:     MOV     R1,@STKPT       ;SET STK PTR BEFORE JSR
1481  005416  012777  032342  174620          MOV     #BUFFER,@DPC    ;START
1482  005424  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG ADRS26
1483  005432  012777  032344  174604          MOV     #BUFFER+2,@DPC  ;START
1484  005440  004537  024426                  JSR     R5,DELAY        ;STALL FOR STACKING
1485  005444  000001                          BIT0                    ;COUNT TO 1
1486  005446  010077  174624                  MOV     R0,@STKPT       ;SELECT STACK WORD & BYTE
1487  005452  017737  174614  001126          MOV     @STKVAL,$BDDAT  ;READ INTENSITY LEVEL
1488  005460  042737  177617  001126          BIC     #177617,$BDDAT  ;ONLY WANT INTENISTY LEVEL BITS
1489  005466  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;ARE THEY CORRECT?
1490  005474  001403                          BEQ     3$              ;BR IF OK
1491  005476  010037  001164                  MOV     R0,$TMP0        ;SET UP STK LEVEL FOR ER TYPE
1492  005502  104013                          ERROR   13              ;INTENSITY LEVEL FAILED TO STACK AT LEVEL INDICATED
1493  005504  162701  000004          3$:     SUB     #4,R1           ;ADVANCE TO NEXT STK LEVEL
1494  005510  162700  000004                  SUB     #4,R0           ;ALL STACK LOCATIONS TESTED?
1495  005514  100336                          BPL     2$              ;BR IF NOT
1496  005516  162737  000200  032342          SUB     #200,BUFFER     ;SET UP NEXT INTENSITY LEVEL
1497  005524  162737  000020  001124          SUB     #20,$GDDAT      ;ADVANCE TO NEXT INTENSITY LEVEL
1498  005532  100323                          BPL     1$              ;BR IF RESET STATE NOT TESTED
1499
1500                                  ;;**************************************************************
1501                                  ;*TEST 14        TEST THAT THE COLOR LEVEL BITS GET PUSHED ON THE STACK
1502                                  ;;**************************************************************
1503  005534  000004                  TST14:  SCOPE
1504  005536  012737  000010  001166          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
1505  005544  012737  000014  001206          MOV     #14,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
1506  005552  012737  000014  001124          MOV     #14,$GDDAT      ;EXPECT ALL BIT INITIALLY
1507  005560  012737  175600  032342          MOV     #175600,BUFFER  ;SET UP ALL COLOR LEVEL BITS INITIALLY
1508  005566  012737  163000  032344          MOV     #163000,BUFFER+2        ;SET UP JSR INSTR
1509  005574  012737  005602  001110          MOV     #1$,$LPERR      ;SET UP LOOP ADRS
1510  005602  012701  020040          1$:     MOV     #20040,R1       ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
1511  005606  012700  000036                  MOV     #36,R0          ;SET UP STK LEVEL AFTER JSR IN R0
1512  005612  010177  174460          2$:     MOV     R1,@STKPT       ;SET STK PTR BEFORE JSR
1513  005616  012777  032342  174420          MOV     #BUFFER,@DPC    ;START
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1514  005624  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG ADRS 26
1515  005632  005277  174406                  INC     @DPC            ;ADVANCE TO JSR INSTR
1516  005636  004537  024426                  JSR     R5,DELAY        ;STALL FOR STACKING
1517  005642  000001                          BITO                    ;COUNT TO 1
1518  005644  010077  174426                  MOV     R0,@STKPT       ;SELECT STACK WORD & BYTE
1519  005650  017737  174416  001126          MOV     @STKVAL,$BDDAT  ;READ COLOR LEVEL FROM STACK
1520  005656  042737  177763  001126          BIC     #177763,$BDDAT  ;SAVE ONLY COLOR LEVEL
1521  005664  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;ARE THEY CORRECT?
1522  005672  001403                          BEQ     3$              ;BR IF SO
1523  005674  010037  001164                  MOV     R0,$TMP0        ;SET UP STK LEVEL FOR ER TYPE
1524  005700  104014                          ERROR   14              ;COLOR LEVEL FAILED TO STACK AT LEVEL INDICATED
1525  005702  162701  000004          3$:     SUB     #4,R1           ;ADVANCE TO NEXT STK LEVEL
1526  005706  162700  000004                  SUB     #4,R0           ;ALL STACK LOCATIONS TESTED?
1527  005712  100337                          BPL     2$              ;BR IF NOT
1528  005714  162737  000200  032342          SUB     #200,BUFFER     ;ADVANCE COLOR LEVEL AT INSTR LOC
1529  005722  162737  000004  001124          SUB     #4,$GDDAT       ;ADVANCE COLOR LEVEL AT EXPECTED LOC
1530  005730  100324                          BPL     1$              ;BR IF RESET STATE NOT TESTED
1531
1532                                  ;;*****************************************************************
1533                                  ;*TEST 15        TEST THAT ITALICS GETS PUSHED ON THE STACK
1534                                  ;;*****************************************************************
1535  005732  000004                  TST15:  SCOPE
1536  005734  012737  000015  001206          MOV     #15,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
1537  005742  012737  100000  001124          MOV     #100000,$GDDAT  ;EXPECT IT TO BE SET INITIALLY
1538  005750  012737  170060  032342          MOV     #170060,BUFFER  ;SET UP ITALICS AT INSTR LOC
1539  005756  012737  163000  032344          MOV     #163000,BUFFER+2        ;SET UP JSR INSTR
1540  005764  012737  006002  001110          MOV     #2$,$LPERR      ;SET UP SCOPE LOOP ADRS
1541  005772  012701  020040          1$:     MOV     #20040,R1       ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
1542  005776  012700  000036                  MOV     #36,R0          ;SET UP STK LEVEL AFTER JSR IN R0
1543  006002  010177  174270          2$:     MOV     R1,@STKPT       ;SET STK PTR BEFORE JSR
1544  006006  012777  032342  174230          MOV     #BUFFER,@DPC    ;START
1545  006014  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG ADRS 26
1546  006022  005277  174216                  INC     @DPC            ;ADVANCE TO JSR INSTR
1547  006026  004537  024426                  JSR     R5,DELAY        ;STALL FOR STACKING
1548  006032  000001                          BITO                    ;COUNT TO 1
1549  006034  010077  174236                  MOV     R0,@STKPT       ;SELECT STACK WORD & BYTE
1550  006040  017737  174226  001126          MOV     @STKVAL,$BDDAT  ;READ ITALICS FROM STACK
1551  006046  042737  077777  001126          BIC     #77777,$BDDAT   ;SAVE AONLY ITALICS BIT
1552  006054  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
1553  006062  001403                          BEQ     3$              ;BR IF SO
1554  006064  010037  001164                  MOV     R0,$TMP0        ;SET UP STK LEVEL FOR ER TYPE
1555  006070  104015                          ERROR   15              ;ITALICS FAILED TO STACK AT LEVEL INDICATED
1556  006072  162701  000004          3$:     SUB     #4,R1           ;ADVANCE TO NEXT STK LEVEL
1557  006076  162700  000004                  SUB     #4,R0           ;ALL STACK LOCATIONS TESTED?
1558  006102  100337                          BPL     2$              ;BR IF NOT
1559  006104  162737  000020  032342          SUB     #20,BUFFER      ;RESET ITALICS BIT AT INSTR LOC
1560  006112  162737  100000  001124          SUB     #100000,$GDDAT  ;RESET ITALICS AT EXPECTED LOCATION
1561  006120  100324                          BPL     1$              ;BR IF RESET STATE NOT TESTED
1562
1563                                  ;;*****************************************************************
1564                                  ;*TEST 16        TEST THAT MENU GETS PUSHED ON THE STACK
1565                                  ;;*****************************************************************
1566  006122  000004                  TST16:  SCOPE
1567  006124  012737  000016  001206          MOV     #16,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
1568  006132  012737  020000  001124          MOV     #20000,$GDDAT   ;EXPECT IT TO BE SET INITIALLY
1569  006140  012737  170003  032342          MOV     #170003,BUFFER  ;SET UP MENU AT INSTR LOC
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1570  006146  012737  163000  032344          MOV     #163000,BUFFER+2         ;SET UP JSR INSTR
1571  006154  012737  006172  001110          MOV     #2$,$LPERR       ;SET UP SCOPE LOOP ADRS
1572  006162  012701  020040          1$:     MOV     #20040,R1        ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
1573  006166  012700  000037                  MOV     #37,R0           ;SET UP STK LEVEL AFTER JSR IN R0
1574  006172  010177  174100          2$:     MOV     R1,@STKPT        ;SET STK PTR BEFORE JSR
1575  006176  012777  032342  174040          MOV     #BUFFER,@DPC     ;START
1576  006204  013737  002272  001122          MOV     STKVAL,$BDADR    ;SET UP REG ADRS 26
1577  006212  005277  174026                  INC     @DPC             ;ADVANCE TO JSR INSTR
1578  006216  004537  024426                  JSR     R5,DELAY         ;STALL FOR STACKING
1579  006222  000001                          BITO                     ;COUNT TO 1
1580  006224  010077  174046                  MOV     R0,@STKPT        ;SELECT STACK WORD & BYTE
1581  006230  017737  174036  001126          MOV     @STKVAL,$BDDAT   ;READ MENU BIT
1582  006236  042737  157777  001126          BIC     #157777,$BDDAT   ;SAVE ONLY MENU BIT
1583  006244  023737  001124  001126          CMP     $GDDAT,$BDDAT    ;IS IT CORRECT?
1584  006252  001403                          BEQ     3$               ;BR IF SO
1585  006254  010037  001164                  MOV     R0,$TMP0         ;SET UP STK LEVEL FOR ER TYPE
1586  006260  104016                          ERROR   16               ;MENU FAILED TO STACK AT LEVEL INDICATED
1587  006262  162701  000004          3$:     SUB     #4,R1            ;ADVANCE TO NEXT STK LEVEL
1588  006266  162700  000004                  SUB     #4,R0            ;ALL STACK LOCATIONS TESTED?
1589  006272  100337                          BPL     2$               ;BR IF NOT
1590  006274  005337  032342                  DEC     BUFFER           ;RESET MENU BIT AT INSTR LOC
1591  006300  162737  020000  001124          SUB     #20000,$GDDAT    ;RESET MENU BIT AT EXPECTED LOC
1592  006306  100325                          BPL     1$               ;BR IF RESET STATE NOT TESTED
1593
1594                                  ;;**************************************************************
1595                                  ;*TEST 17        TEST THAT BLINK ENA GETS PUSHED ON THE STACK
1596                                  ;;**************************************************************
1597  006310  000004          TST17:  SCOPE
1598  006312  012737  000017  001206          MOV     #17,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
1599  006320  012737  100000  001124          MOV     #100000,$GDDAT   ;EXPECT IT TO BE SET INITIALLY
1600  006326  012737  100030  032342          MOV     #100030,BUFFER   ;SET UP BLINK ENA AT INSTR LOC
1601  006334  012737  163000  032344          MOV     #163000,BUFFER+2         ;SET UP JSR INSTR
1602  006342  012737  006360  001110          MOV     #2$,$LPERR       ;SET UP SCOPE LOOP ADRS
1603  006350  012701  020040          1$:     MOV     #20040,R1        ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
1604  006354  012700  000037                  MOV     #37,R0           ;SET UP STK LEVEL AFTER JSR IN R0
1605  006360  010177  173712          2$:     MOV     R1,@STKPT        ;SET STK PTR BEFORE JSR
1606  006364  012777  032342  173652          MOV     #BUFFER,@DPC     ;START
1607  006372  013737  002272  001122          MOV     STKVAL,$BDADR    ;SET UP REG ADRS 26
1608  006400  012777  032344  173636          MOV     #BUFFER+2,@DPC   ;START
1609  006406  004537  024426                  JSR     R5,DELAY         ;STALL FOR STACKING
1610  006412  000001                          BITO                     ;COUNT TO 1
1611  006414  010077  173656                  MOV     R0,@STKPT        ;SELECT STACK WORD & BYTE
1612  006420  017737  173646  001126          MOV     @STKVAL,$BDDAT   ;READ BLINK ENA BIT
1613  006426  042737  077777  001126          BIC     #77777,$BDDAT    ;SAVE ONLY BLINK ENA
1614  006434  023737  001124  001126          CMP     $GDDAT,$BDDAT    ;IS IT CORRECT?
1615  006442  001403                          BEQ     3$               ;BR IF SO
1616  006444  010037  001164                  MOV     R0,$TMP0         ;SET UP STK LEVEL FOR ER TYPE
1617  006450  104017                          ERROR   17               ;BLINK ENA FAILED TO STACK AT LEVEL INDICATED
1618  006452  162701  000004          3$:     SUB     #4,R1            ;ADVANCE TO NEXT STK LEVEL
1619  006456  162700  000004                  SUB     #4,R0            ;ALL STACK LOCATIONS TESTED?
1620  006462  100336                          BPL     2$               ;BR IF NOT
1621  006464  162737  000010  032342          SUB     #10,BUFFER       ;RESET BLINK ENA BIT INSTR LOC
1622  006472  162737  100000  001124          SUB     #100000,$GDDAT   ;RESET BLINK ENA AT EXPECTED LOC
1623  006500  100323                          BPL     1$               ;BR IF RESET STATE NOT TESTED
1624
1625                                  ;;**************************************************************
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                                        ;*TEST 20       TEST THAT STOP INTR ENA GETS PUSHED ON THE STACK
                                        ;;**************************************************************
006502  000004                  TST20:  SCOPE
006504  012737  000020  001206          MOV     #20,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
006512  012737  000001  001124          MOV     #1,$GDDAT       ;EXPECT IT TO BE SET INITIALLY
006520  012737  171400  032342          MOV     #171400,BUFFER  ;SET UP STOP INTR ENA AT INSTR LOC
006526  012737  163000  032344          MOV     #163000,BUFFER+2        ;SET UP JSR INSTR
006534  012737  006552  001110          MOV     #2$,$LPERR      ;SET UP SCOPE LOOP ADRS
006542  012701  020040          1$:     MOV     #20040,R1       ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
006546  012700  000037                  MOV     #37,R0          ;SET UP STK LEVEL AFTER JSR IN R0
006552  010177  173520          2$:     MOV     R1,@STKPT       ;SET STK PTR BEFORE JSR
006556  012777  032342  173460          MOV     #BUFFER,@DPC    ;START
006564  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG ADRS 26
006572  005277  173446                  INC     @DPC            ;ADVANCE TO JSR INSTR
006576  004537  024426                  JSR     R5,DELAY        ;STALL FOR STACKING
006602  000001                          BITO                    ;COUNT TO 1
006604  010077  173466                  MOV     R0,@STKPT       ;SELECT WORD & BYTE
006610  017737  173456  001126          MOV     @STKVAL,$BDDAT  ;READ STOP INTR ENA WORD
006616  042737  177776  001126          BIC     #177776,$BDDAT  ;SAVE ONLY STOP INTR ENA BIT
006624  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
006632  001403                          BEQ     3$              ;BR IF SO
006634  010037  001164                  MOV     R0,$TMP0        ;SET UP STK LEVEL FOR ER TYPE
006640  104020                          ERROR   20              ;STOP INTR ENA FAILED TO STACK AT LEVEL INDICATED
006642  162701  000004          3$:     SUB     #4,R1           ;ADVANCE TO NEXT STK LEVEL
006646  162700  000004                  SUB     #4,R0           ;ALL STACK LOCATIONS TESTED?
006652  100337                          BPL     2$              ;BR IF NOT
006654  162737  000400  032342          SUB     #400,BUFFER     ;RESET STOP INTR ENA AT INSTR LOC
006662  005337  001124                  DEC     $GDDAT          ;RESET STOP INTR ENA AT EXPECTED LOC
006666  100325                          BPL     1$              ;BR IF RESET STATE NOT TESTED

                                        ;;**************************************************************
                                        ;*TEST 21       TEST THAT L.P. HIT DISABLE GETS PUSHED ON THE STACK
                                        ;;**************************************************************
006670  000004                  TST21:  SCOPE
006672  012737  000021  001206          MOV     #21,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
006700  012737  000002  001124          MOV     #2,$GDDAT       ;EXPECT IT TO BE SET INITIALLY
006706  012737  170300  032342          MOV     #170300,BUFFER  ;SET UP HIT DISABLE AT INSTR LOC
006714  012737  163000  032344          MOV     #163000,BUFFER+2        ;SET UP JSR INSTR
006722  012737  006740  001110          MOV     #2$,$LPERR      ;SET UP SCOPE LOOP ADRS
006730  012701  020040          1$:     MOV     #20040,R1       ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
006734  012700  000037                  MOV     #37,R0          ;SET UP STK LEVEL AFTER JSR IN R0
006740  010177  173332          2$:     MOV     R1,@STKPT       ;SET STK PTR BEFORE JSR
006744  012777  032342  173272          MOV     #BUFFER,@DPC    ;START
006752  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG ADRS 26
006760  005277  173260                  INC     @DPC            ;ADVANCE TO JSR INSTR
006764  004537  024426                  JSR     R5,DELAY        ;STALL FOR STACKING
006770  000001                          BITO                    ;COUNT TO 1
006772  010077  173300                  MOV     R0,@STKPT       ;SELECT WORD & BYTE
006776  017737  173270  001126          MOV     @STKVAL,$BDDAT  ;READ LP HIT DISABLE WORD
007004  042737  177775  001126          BIC     #177775,$BDDAT  ;SAVE ONLY LP HIT DISABLE BIT
007012  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
007020  001403                          BEQ     3$              ;BR IF SO
007022  010037  001164                  MOV     R0,$TMP0        ;SET UP STK LEVEL FOR ER TYPE
007026  104021                          ERROR   21              ;L.P. HIT DISABLE FAILED TO STACK AT LEVEL INDICATED
007030  162701  000004          3$:     SUB     #4,R1           ;ADVANCE TO NEXT STK LEVEL
007034  162700  000004                  SUB     #4,R0           ;ALL STACK LOCATIONS TESTED?
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1682  007040  100337                          BPL     2$              ;BR IF NOT
1683  007042  162737  000100  032342          SUB     #100,BUFFER     ;RESET LP HIT DISABLE BIT AT INSTR LOC
1684  007050  162737  000002  001124          SUB     #2,$GDDAT       ;RESET LP HIT DISABLE BIT AT EXPECTED LOC
1685  007056  100324                          BPL     1$              ;BR IF RESET STATE NOT TESTED
1686                                  ;;**************************************************************
1687                                  ;*TEST 22       TEST THAT STOP INTR & L.P. HIT ENABLES DON'T CHANGE WHEN CHANGE ENA=0
1688                                  ;;**************************************************************
1689  007060  000004                  TST22:  SCOPE
1690  007062  012737  000022  001206          MOV     #22,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
1691  007070  012737  000003  001124          MOV     #3,$GDDAT       ;EXPECT STOP INTR ENABLED & L.P. HIT FROM STK
1692  007076  012737  171700  032342          MOV     #171700,BUFFER  ;SET UP LOAD STATUS A INSTR
1693  007104  012737  163000  032344          MOV     #163000,BUFFER+2        ;SET UP JSR REL INSTR
1694  007112  012777  020040  173156  1$:     MOV     #20040,@STKPT   ;SET 'TOP OF STACK'
1695  007120  012777  032342  173116          MOV     #BUFFER,@DPC    ;START
1696  007126  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG ADRS 26
1697  007134  005277  173104                  INC     @DPC            ;PICK UP JSR INSTR
1698  007140  004537  024426                  JSR     R5,DELAY        ;STALL FOR STACKING
1699  007144  000001                          BITO                    ;COUNT TO ONE
1700  007146  012777  020037  173122          MOV     #20037,@STKPT   ;SET STACK PTR
1701  007154  017737  173112  001126          MOV     @STKVAL,$BDDAT  ;READ STACK
1702  007162  042737  177774  001126          BIC     #177774,$BDDAT  ;SAVE ONLY STOP INTR & L.P. HIT
1703  007170  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;SHOULD STAY SET ONCE CHANGE ENABLES ARE OFF
1704  007176  001404                          BEQ     2$              ;BR IF CORRECT
1705  007200  012737  000037  001164          MOV     #37,$TMP0       ;SAVE STACK LEVEL FOR TYPE
1706  007206  104022                          ERROR   22              ;LD STATUS A STROBED WHEN CHANGE ENA=0
1707  007210  022737  171700  032342  2$:     CMP     #171700,BUFFER  ;IS THIS THE 2ND PASS?
1708  007216  001004                          BNE     TST23           ;;GO TO NEXT TEST IF TESTED WITH CHANGE ENA=0
1709  007220  042737  001700  032342          BIC     #1700,BUFFER    ;CLR CHANGE ENABLES FOR 2ND PASS THIS TEST
1710  007226  000731                          BR      1$              ;GO REPEAT TEST WITH CHANGE ENABLES OFF
1711
1712
1713                                  ;;**************************************************************
1714                                  ;*TEST 23       TEST THAT EDGE INT ENA GETS PUSHED ON THE STACK
1715                                  ;;**************************************************************
1716  007230  000004                  TST23:  SCOPE
1717  007232  012737  000023  001206          MOV     #23,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
1718  007240  012737  004000  001124          MOV     #4000,$GDDAT    ;EXPECT IT TO BE SET INITIALLY
1719  007246  012737  176060  032342          MOV     #176060,BUFFER  ;SET UP EDGE INT ENA AT INSTR LOC
1720  007254  012737  163000  032344          MOV     #163000,BUFFER+2        ;SET UP JSR INSTR
1721  007262  012737  007300  001110          MOV     #2$,$LPERR      ;SET UP SCOPE LOOP ADRS
1722  007270  012701  020040          1$:     MOV     #20040,R1       ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
1723  007274  012700  000037                  MOV     #37,R0          ;SET UP STK LEVEL AFTER JSR IN R0
1724  007300  010177  172772          2$:     MOV     R1,@STKPT       ;SET STK PTR BEFORE JSR
1725  007304  012777  032342  172732          MOV     #BUFFER,@DPC    ;START
1726  007312  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG ADRS 26
1727  007320  005277  172720                  INC     @DPC            ;ADVANCE TO JSR INSTR
1728  007324  004537  024426                  JSR     R5,DELAY        ;STALL FOR STACKING
1729  007330  000001                          BITO                    ;COUNT TO 1
1730  007332  010077  172740                  MOV     R0,@STKPT       ;SELECT WORD & BYTE
1731  007336  017737  172730  001126          MOV     @STKVAL,$BDDAT  ;READ STACK WORD
1732  007344  042737  173777  001126          BIC     #173777,$BDDAT  ;SAVE ONLY EDGE INT ENA BIT
1733  007352  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
1734  007360  001403                          BEQ     3$              ;BR IF SO
1735  007362  010037  001164                  MOV     R0,$TMP0        ;SET UP STK LEVEL FOR ER TYPE
1736  007366  104023                          ERROR   23              ;EDGE INTR ENA FAILED TO STACK AT LEVEL INDICATED
1737  007370  162701  000004          3$:     SUB     #4,R1           ;ADVANCE TO NEXT STK LEVEL
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1738  007374  162700  000004                        SUB     #4,R0           ;ALL STACK LOCATIONS TESTED?
1739  007400  100337                                BPL     2$              ;BR IF NOT
1740  007402  162737  000020  032342                SUB     #20,BUFFER      ;RESET EDGE INT ENA BIT AT INSTR LOC
1741  007410  162737  004000  001124                SUB     #4000,$GDDAT    ;RESET EDGE INT ENA BIT AT EXPECTED LOC
1742  007416  100324                                BPL     1$              ;BR IF RESET STATE NOT TESTED
1743
1744                                          ;;**************************************************************
1745                                          ;*TEST 24       TEST THAT CHAR STRING ESCAPE BIT GETS PUSHED ON THE STACK
1746                                          ;;**************************************************************
1747  007420  000004                          TST24:  SCOPE
1748  007422  012737  000024  001206                  MOV     #24,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
1749  007430  012737  010000  001124                  MOV     #10000,$GDDAT   ;EXPECT IT TO BE SET INITIALLY
1750  007436  012737  176003  032342                  MOV     #176003,BUFFER  ;SET UP CHAR STRING ESCAPE ENA AT INSTR LOC
1751  007444  012737  163000  032344                  MOV     #163000,BUFFER+2        ;SET UP JSR INSTR
1752  007452  012737  007470  001110                  MOV     #2$,$LPERR      ;SET UP SCOPE LOOP ADRS
1753  007460  012701  020040                  1$:     MOV     #20040,R1       ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
1754  007464  012700  000037                          MOV     #37,R0          ;SET UP STK LEVEL AFTER JSR IN R0
1755  007470  010177  172602                  2$:     MOV     R1,@STKPT       ;SET STK PTR BEFORE JSR
1756  007474  012777  032342  172542                  MOV     #BUFFER,@DPC    ;START
1757  007502  013737  002272  001122                  MOV     STKVAL,$BDADR   ;SET UP REG ADRS 26
1758  007510  005277  172530                          INC     @DPC            ;ADVANCE TO JSR INSTR
1759  007514  004537  024426                          JSR     R5,DELAY        ;STALL FOR STACKING
1760  007520  000001                                  BITO                    ;COUNT TO 1
1761  007522  010077  172550                          MOV     R0,@STKPT       ;SELECT STACK WORD & BYTE
1762  007526  017737  172540  001126                  MOV     @STKVAL,$BDDAT  ;READ STACK WORD
1763  007534  042737  167777  001126                  BIC     #167777,$BDDAT  ;SAVE ONLY CHAR STRING ESCAPE BIT
1764  007542  023737  001124  001126                  CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
1765  007550  001403                                  BEQ     3$              ;BR IF OK
1766  007552  010037  001164                          MOV     R0,$TMP0        ;SET UP STK LEVEL FOR ER TYPE
1767  007556  104024                                  ERROR   24              ;CHAR STRING ESCAPE FAILED TO STACK AT LEVEL INDICATED
1768  007560  162701  000004                  3$:     SUB     #4,R1           ;ADVANCE TO NEXT STK LEVEL
1769  007564  162700  000004                          SUB     #4,R0           ;ALL STACK LOCATIONS TESTED?
1770  007570  100337                                  BPL     2$              ;BR IF NOT
1771  007572  005337  032342                          DEC     BUFFER          ;RESET CHAR STRING ESCAPE AT INSTR LOC
1772  007576  162737  010000  001124                  SUB     #10000,$GDDAT   ;RESET CHAR STRING ESCAPE AT EXPECTED LOC
1773  007604  100325                                  BPL     1$              ;BR IF RESET STATE NOT TESTED
1774
1775                                          ;;**************************************************************
1776                                          ;*TEST 25       TEST THAT DEPTH QUEING BIT GETS PUSHED ON THE STACK
1777                                          ;;**************************************************************
1778  007606  000004                          TST25:  SCOPE
1779  007610  012737  000025  001206                  MOV     #25,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
1780  007616  012737  002000  001124                  MOV     #2000,$GDDAT    ;EXPECT IT TO BE SET INITIALLY
1781  007624  012737  176014  032342                  MOV     #176014,BUFFER  ;SET UP DEPTH QUEING AT INSTR LOC
1782  007632  012737  163000  032344                  MOV     #163000,BUFFER+2        ;SET UP JSR REL INSTR
1783  007640  012737  007656  001110                  MOV     #2$,$LPERR      ;SET UP SCOPE LOOP ADRS
1784  007646  012701  020040                  1$:     MOV     #20040,R1       ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
1785  007652  012700  000037                          MOV     #37,R0          ;SET UP STK LEVEL AFTER JSR IN R0
1786  007656  010177  172414                  2$:     MOV     R1,@STKPT       ;SET STK PTR BEFORE JSR
1787  007662  012777  032342  172354                  MOV     #BUFFER,@DPC    ;START
1788  007670  013737  002272  001122                  MOV     STKVAL,$BDADR   ;SET UP REG ADRS 26
1789  007676  005277  172342                          INC     @DPC            ;ADVANCE TO JSR INSTR
1790  007702  004537  024426                          JSR     R5,DELAY        ;STALL FOR STACKING
1791  007706  000001                                  BITO                    ;COUNT TO 1
1792  007710  010077  172362                          MOV     R0,@STKPT       ;SELECT STACK WORD & BYTE
1793  007714  017737  172352  001126                  MOV     @STKVAL,$BDDAT  ;READ STACK WORD
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1794  007722  042737  175777  001126          BIC     #175777,$BDDAT  ;SAVE ONLY DEPTH QUEING BIT
1795  007730  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
1796  007736  001403                          BEQ     3$              ;BR IF SO
1797  007740  010037  001164                  MOV     R0,$TMP0        ;SET UP STK LEVEL FOR ER TYPE
1798  007744  104025                          ERROR   25              ;DEPTH QUEING FAILED TO STACK AT LEVEL INDICATED
1799  007746  162701  000004          3$:     SUB     #4,R1           ;ADVANCE TO NEXT STK LEVEL
1800  007752  162700  000004                  SUB     #4,R0           ;ALL STACK LOCATIONS TESTED?
1801  007756  100337                          BPL     2$              ;BR IF NOT
1802  007760  162737  000004  032342          SUB     #4,BUFFER       ;RESET DEPTH QUEING BIT AT INSTR LOC
1803  007766  162737  002000  001124          SUB     #2000,$GDDAT    ;RESET DEPTH QUEING BIT AT EXPECTED LOC
1804  007774  100324                          BPL     1$              ;BR IF RESET STATE NOT TESTED
1805
1806                                  ;;*****************************************************************
1807                                  ;*TEST 26       TEST THAT THE DEPTH QUE CONTROL GETS PUSHED ON THE STACK
1808                                  ;;*****************************************************************
1809  007776  000004                  T$T26:  SCOPE
1810  010000  012737  000026  001206          MOV     #26,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
1811  010006  012737  000400  001124          MOV     #400,$GDDAT     ;EXPECT IT TO BE SET INITIALLY
1812  010014  012737  176300  032342          MOV     #176300,BUFFER  ;SET UP DEPTH QUE CONTROL AT INSTR LOC
1813  010022  012737  163000  032344          MOV     #163000,BUFFER+2        ;SET UP JSR REL INSTR
1814  010030  012737  010046  001110          MOV     #2$,$LPERR      ;SET UP SCOPE LOOP ADRS
1815  010036  012701  020040          1$:     MOV     #20040,R1       ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
1816  010042  012700  000037                  MOV     #37,R0          ;SET UP STK LEVEL AFTER JSR IN R0
1817  010046  010177  172224          2$:     MOV     R1,@STKPT       ;SET STK PTR BEFORE JSR
1818  010052  012777  032342  172164          MOV     #BUFFER,@DPC    ;START
1819  010060  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG ADRS 26
1820  010066  005277  172152                  INC     @DPC            ;ADVANCE TO JSR INSTR
1821  010072  004537  024426                  JSR     R5,DELAY        ;STALL FOR STACKING
1822  010076  000001                          BIT0                    ;COUNT TO 1
1823  010100  010077  172172                  MOV     R0,@STKPT       ;SEL STK WORD & BYTE
1824  010104  017737  172162  001126          MOV     @STKVAL,$BDDAT  ;READ STACK WORD
1825  010112  042737  177377  001126          BIC     #177377,$BDDAT  ;SAVE ONLY DEPTH QUE CONTROL
1826  010120  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
1827  010126  001403                          BEQ     3$              ;BR IF SO
1828  010130  010037  001164                  MOV     R0,$TMP0        ;SET UP STK LEVEL FOR ER TYPE
1829  010134  104025                          ERROR   25              ;DEPTH QUE CONTROL FAILED TO STACK
1830  010136  162701  000004          3$:     SUB     #4,R1           ;ADVANCE TO NEXT STK LEVEL
1831  010142  162700  000004                  SUB     #4,R0           ;ALL STACK LOCATIONS TESTED?
1832  010146  100337                          BPL     2$              ;BR IF NOT
1833  010150  162737  000100  032342          SUB     #100,BUFFER     ;RESET DEPTH QUE CONTROL BIT AT INSTR LOC
1834  010156  162737  000400  001124          SUB     #400,$GDDAT     ;RESET DEPTH QUE CONTROL AT EXPECTED LOC
1835  010164  100324                          BPL     1$              ;BR IF RESET STATE NOT TESTED
1836
1837                                  ;;*****************************************************************
1838                                  ;*TEST 27       TEST THAT BITS SET BY LOAD STATUS B' DON'T CHANGE WHEN CHANGE ENA=0
1839                                  ;;*****************************************************************
1840  010166  000004                  T$T27:  SCOPE
1841  010170  012737  000040  001166          MOV     #40,$TIMES      ;;DO 40 ITERATIONS
1842  010176  012737  000027  001206          MOV     #27,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
1843  010204  012737  016400  001124          MOV     #16400,$GDDAT   ;EXPECT ALL LOAD STATUS B' ENABLED BITS FROM STK
1844  010212  012737  176377  032342          MOV     #176377,BUFFER  ;SET UP LOAD STATUS B' INSTR
1845  010220  012737  163000  032344          MOV     #163000,BUFFER+2        ;SET UP JSR REL INSTR
1846  010226  012777  020040  172042  1$:     MOV     #20040,@STKPT   ;SET 'TOP OF STACK'
1847  010234  012777  032342  172002          MOV     #BUFFER,@DPC    ;START
1848  010242  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG ADRS 26
1849  010250  000240                          NOP                     ;ALLOW TIME FOR NPR
```

```
 1850  010252  005277  171766                    INC     @DPC            ;PICK UP JSR INSTR
 1851  010256  004537  024426                    JSR     R5,DELAY        ;STALL FOR STACKING
 1852  010262  000001                            BITO                    ;COUNT TO 1
 1853  010264  012777  020037  172004            MOV     #20037,@STKPT   ;SET STK PTR
 1854  010272  017737  171774  001126            MOV     @STKVAL,$BDDAT  ;READ STACK
 1855  010300  042737  161377  001126            BIC     #161377,$BDDAT  ;SAVE ONLY DEPTH QUE, EDGE FLG & CHAR STRING
 1856  010306  023737  001124  001126            CMP     $GDDAT,$BDDAT   ;THEY SHOULD STAY SET ONCE CHANGE ENABLES ARE OFF
 1857  010314  001404                            BEQ     2$              ;BR IF SO
 1858  010316  012737  000037  001164            MOV     #37,$TMPO       ;SAVE STACK LEVEL FOR TYPE
 1859  010324  104022                            ERROR   22              ;LD STATUS B' STROBED WHEN CHANGE ENA=0
 1860  010326  105737  032342          2$:       TSTB    BUFFER          ;IS THIS THE SECOND PASS THIS TEST?
 1861  010332  100004                            BPL     3$              ;GO TO NEXT TEST IF TESTED WITH CHANGE ENA=0
 1862  010334  042737  000377  032342            BIC     #377,BUFFER     ;CLR OUT CHANGE ENABLES FOR 2ND PASS THIS TEST
 1863  010342  000731                            BR      1$              ;GO REPEAT TEST WITH ENA=0
 1864  010344  000005                    3$:     RESET                   ;CLR ENABLES BEFORE ADVANCING
 1865
 1866                                    ;;*****************************************************************
 1867                                    ;*TEST 30       TEST THAT THE LINE TYPE BITS GETS PUSHED ON THE STACK
 1868                                    ;;*****************************************************************
 1869  010346  000004                    ↑ST30:  SCOPE
 1870  010350  012737  000030  001206            MOV     #30,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
 1871  010356  012737  000003  001124            MOV     #3,$GDDAT       ;EXPECT BOTH BITS INITIALLY
 1872  010364  012737  100007  032342            MOV     #100007,BUFFER  ;SET UP BOTH LINE TYP BITS AT INSTR LOC
 1873  010372  012737  163000  032344            MOV     #163000,BUFFER+2        ;SET UP JSR INSTR
 1874  010400  012737  010416  001110            MOV     #2$,$LPERR      ;SET UP SCOPE LOOP ADRS
 1875  010406  012701  020040          1$:       MOV     #20040,R1       ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
 1876  010412  012700  000036                    MOV     #36,R0          ;SET UP STK LEVEL AFTER JSR IN R0
 1877  010416  010177  171654          2$:       MOV     R1,@STKPT       ;SET STK PTR BEFORE JSR
 1878  010422  012777  032342  171614            MOV     #BUFFER,@DPC    ;START
 1879  010430  013737  002272  001122            MOV     STKVAL,$BDADR   ;SET UP REG ADRS 26
 1880  010436  012777  032344  171600            MOV     #BUFFER+2,@DPC  ;START
 1881  010444  004537  024426                    JSR     R5,DELAY        ;STALL FOR STACKING
 1882  010450  000001                            BITO                    ;COUNT TO 1
 1883  010452  010077  171620                    MOV     R0,@STKPT       ;SELECT STACK WORD & BYTE
 1884  010456  017737  171610  001126            MOV     @STKVAL,$BDDAT  ;READ STACK
 1885  010464  042737  177774  001126            BIC     #177774,$BDDAT  ;SAVE LINE TYPE ONLY
 1886  010472  023737  001124  001126            CMP     $GDDAT,$BDDAT   ;ARE THEY CORRECT?
 1887  010500  001403                            BEQ     3$              ;BR IF SO
 1888  010502  010037  001164                    MOV     R0,$TMPO        ;SET UP STK LEVEL FOR ER TYPE
 1889  010506  104026                            ERROR   26              ;LINE TYPE FAILED TO STACK AT LEVEL INDICATED
 1890  010510  162701  000004          3$:       SUB     #4,R1           ;ADVANCE TO NEXT STK LEVEL
 1891  010514  162700  000004                    SUB     #4,R0           ;ALL STACK LOCATIONS TESTED?
 1892  010520  100336                            BPL     2$              ;BR IF NOT
 1893  010522  005337  032342                    DEC     BUFFER          ;ADVANCE LINE TYPE AT INSTR LOC
 1894  010526  005337  001124                    DEC     $GDDAT          ;ADVANCE LINE TYPE AT EXPECTED LOC
 1895  010532  100325                            BPL     1$              ;BR IF RESET STATE NOT TESTED
 1896
 1897                                    ;;*****************************************************************
 1898                                    ;*TEST 31       TEST THAT INTENSITY ENABLED (CONSOLE 0) GETS PUSHED ON THE STACK
 1899                                    ;;*****************************************************************
 1900  010534  000004                    ↑ST31:  SCOPE
 1901  010536  012737  000031  001206            MOV     #31,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
 1902  010544  012737  000004  001124            MOV     #4,$GDDAT       ;EXPECT IT TO BE SET INITIALLY
 1903  010552  012737  164300  032342            MOV     #164300,BUFFER  ;SET UP INT EN AT INSTR LOC
 1904  010560  012737  163000  032344            MOV     #163000,BUFFER+2        ;SET UP JSR REL INSTR
 1905  010566  012737  010604  001110            MOV     #2$,$LPERR      ;SET UP SCOPE LOOP ADRS
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1906  010574  012701  020040          1$:   MOV   #20040,R1        ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
1907  010600  012700  000037                MOV   #37,R0           ;SET UP STK LEVEL AFTER JSR IN R0
1908  010604  010177  171466          2$:   MOV   R1,@STKPT        ;SET STK PTR BEFORE JSR
1909  010610  012777  032342  171426        MOV   #BUFFER,@DPC     ;START
1910  010616  013737  002272  001122        MOV   STKVAL,$BDADR    ;SET UP REG ADRS 26
1911  010624  005277  171414               INC   @DPC             ;ADVANCE TO JSR INSTR
1912  010630  004537  024426               JSR   R5,DELAY         ;STALL FOR STACKING
1913  010634  000001                       BITO                   ;COUNT TO 1
1914  010636  010077  171434               MOV   R0,@STKPT        ;SELECT STK WORD & BYTE
1915  010642  017737  171424  001126        MOV   @STKVAL,$BDDAT   ;READ STK BYTE
1916  010650  042737  177773  001126        BIC   #177773,$BDDAT   ;SAVE ONLY INTENSITY ENABLED BIT
1917  010656  023737  001124  001126        CMP   $GDDAT,$BDDAT    ;IS IT CORRECT?
1918  010664  001403                       BEQ   3$               ;BR IF OK
1919  010666  010037  001164               MOV   R0,$TMP0         ;SET UP STK LEVEL FOR ER TYPE
1920  010672  104027                       ERROR 27               ;INTENSITY ENABLE FAILED TO STACK AT LEVEL INDICATED
1921  010674  162701  000004          3$:   SUB   #4,R1            ;ADVANCE TO NEXT STK LEVEL
1922  010700  162700  000004               SUB   #4,R0            ;ALL STACK LOCATIONS TESTED?
1923  010704  100337                       BPL   2$               ;BR IF NOT
1924  010706  162737  000100  032342        SUB   #100,BUFFER      ;SET UP RESET STATE AT INSTR LOC
1925  010714  162737  000004  001124        SUB   #4,$GDDAT        ;SET UP RESET STATE AT EXPECTED LOC
1926  010722  100324                       BPL   1$               ;BR IF RESET STATE NOT TESTED
1927
1928                                  ;;*****************************************************************
1929                                  ;*TEST 32       TEST THAT INTENSITY ENABLED (CONSOLE 1) GETS PUSHED ON THE STACK
1930                                  ;;*****************************************************************
1931  010724  000004                 T$T32:  SCOPE
1932  010726  012737  000032  001206        MOV   #32,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
1933  010734  013737  002272  001122        MOV   STKVAL,$BDADR    ;SET UP REG 26 ADRS
1934  010742  012737  000020  001124        MOV   #20,$GDDAT       ;EXPECT IT TO BE SET INITIALLY
1935  010750  012737  164700  032342        MOV   #164700,BUFFER   ;SET UP INT EN AT INSTR LOC
1936  010756  012737  163000  032344        MOV   #163000,BUFFER+2         ;SET UP JSR REL INSTR
1937  010764  012737  011002  001110        MOV   #2$,$LPERR       ;SET UP SCOPE LOOP ADRS
1938  010772  012701  020040          1$:   MOV   #20040,R1        ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
1939  010776  012700  000037                MOV   #37,R0           ;SET UP STK LEVEL AFTER JSR IN R0
1940  011002  010177  171270          2$:   MOV   R1,@STKPT        ;SET STK PTR BEFORE JSR
1941  011006  012777  032342  171230        MOV   #BUFFER,@DPC     ;START
1942  011014  013737  002272  001122        MOV   STKVAL,$BDADR    ;SET UP REG ADRS 26
1943  011022  005277  171216               INC   @DPC             ;ADVANCE TO JSR INSTR
1944  011026  004537  024426               JSR   R5,DELAY         ;STALL FOR STACKING
1945  011032  000001                       BITO                   ;COUNT TO 1
1946  011034  010077  171236               MOV   R0,@STKPT        ;SEL STK WORD & BYTE
1947  011040  017737  171226  001126        MOV   @STKVAL,$BDDAT   ;READ STK BYTE
1948  011046  042737  177757  001126        BIC   #177757,$BDDAT   ;SAVE ONLY INTENSITY ENABLED BIT
1949  011054  023737  001124  001126        CMP   $GDDAT,$BDDAT    ;IS IT CORRECT?
1950  011062  001403                       BEQ   3$               ;BR IF OK
1951  011064  010037  001164               MOV   R0,$TMP0         ;SET UP STK LEVEL FOR ER TYPE
1952  011070  104027                       ERROR 27               ;INTENSITY ENABLE FAILED TO STACK AT LEVEL INDICATED
1953  011072  162701  000004          3$:   SUB   #4,R1            ;ADVANCE TO NEXT STK LEVEL
1954  011076  162700  000004               SUB   #4,R0            ;ALL STACK LOCATIONS TESTED?
1955  011102  100337                       BPL   2$               ;BR IF NOT
1956  011104  162737  000100  032342        SUB   #100,BUFFER      ;SET UP RESET STATE AT INSTR LOC
1957  011112  162737  000020  001124        SUB   #20,$GDDAT       ;SET UP RESET STATE AT EXPECTED LOC
1958  011120  100324                       BPL   1$               ;BR IF RESET STATE NOT TESTED
1959
1960                                  ;;*****************************************************************
1961                                  ;*TEST 33       TEST THAT L.P. INTR ENABLED (CONSOLE 0) GETS PUSHED ON THE STACK
```

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                                         ;;*************************************************************
011122  000004                           TST33:  SCOPE
011124  012737  000033  001206                   MOV     #33,$TESTN         ;;SET TEST NUMBER IN APT MAIL BOX
011132  012737  000010  001124                   MOV     #10,$GDDAT         ;EXPECT IT TO BE SET INITIALLY
011140  012737  164060  032342                   MOV     #164060,BUFFER     ;SET UP L.P. INTR EN AT INSTR LOC
011146  012737  163000  032344                   MOV     #163000,BUFFER+2          ;SET UP JSR INSTR
011154  012737  011172  001110                   MOV     #2$,$LPERR         ;SET UP SCOPE LOOP ADRS
011162  012701  020040                   1$:     MOV     #20040,R1          ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
011166  012700  000037                           MOV     #37,R0             ;SET UP STK LEVEL AFTER JSR IN R0
011172  010177  171100                   2$:     MOV     R1,@STKPT          ;SET STK PTR BEFORE JSR
011176  012777  032342  171040                   MOV     #BUFFER,@DPC       ;START
011204  013737  002272  001122                   MOV     STKVAL,$BDADR      ;SET UP REG ADRS 26
011212  005277  171026                           INC     @DPC               ;ADVANCE TO JSR INSTR
011216  004537  024426                           JSR     R5,DELAY           ;STALL FOR STACKING
011222  000001                                   BIT0                       ;COUNT TO 1
011224  010077  171046                           MOV     R0,@STKPT          ;SEL STK WORD & BYTE
011230  017737  171036  001126                   MOV     @STKVAL,$BDDAT     ;READ STK BYTE
011236  042737  177767  001126                   BIC     #177767,$BDDAT     ;SAVE ONLY L.P. INTR ENABLED BIT
011244  023737  001124  001126                   CMP     $GDDAT,$BDDAT      ;IS IT CORRECT?
011252  001403                                   BEQ     3$                 ;BR IF SO
011254  010037  001164                           MOV     R0,$TMP0           ;SET UP STK LEVEL FOR ER TYPE
011260  104030                                   ERROR   30                 ;L.P. INTR ENABLE FAILED TO STACK AT LEVEL INDICATED
011262  162701  000004                   3$:     SUB     #4,R1              ;ADVANCE TO NEXT STK LEVEL
011266  162700  000004                           SUB     #4,R0              ;ALL STACK LOCATIONS TESTED?
011272  100337                                   BPL     2$                 ;BR IF NOT
011274  162737  000020  032342                   SUB     #20,BUFFER         ;SET UP RESET STATE AT INSTR LOC
011302  162737  000010  001124                   SUB     #10,$GDDAT         ;SET UP RESET STATE AT EXPECTED LOC
011310  100324                                   BPL     1$                 ;BR IF RESET STATE NOT TESTED

                                         ;;*************************************************************
                                         ;*TEST 34        TEST THAT L.P. INTR ENABLED (CONSOLE 1) GETS PUSHED ON THE STACK
                                         ;;*************************************************************
011312  000004                           TST34:  SCOPE
011314  012737  000034  001206                   MOV     #34,$TESTN         ;;SET TEST NUMBER IN APT MAIL BOX
011322  012737  000040  001124                   MOV     #40,$GDDAT         ;EXPECT IT TO BE SET INITIALLY
011330  012737  164460  032342                   MOV     #164460,BUFFER     ;SET UP L.P. INTR EN AT INSTR LOC
011336  012737  163000  032344                   MOV     #163000,BUFFER+2          ;SET UP JSR REL INSTR
011344  012737  011362  001110                   MOV     #2$,$LPERR         ;SET UP SCOPE LOOP ADRS
011352  012701  020040                   1$:     MOV     #20040,R1          ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
011356  012700  000037                           MOV     #37,R0             ;SET UP STK LEVEL AFTER JSR IN R0
011362  010177  170710                   2$:     MOV     R1,@STKPT          ;SET STK PTR BEFORE JSR
011366  012777  032342  170650                   MOV     #BUFFER,@DPC       ;START
011374  013737  002272  001122                   MOV     STKVAL,$BDADR      ;SET UP REG ADRS 26
011402  005277  170636                           INC     @DPC               ;ADVANCE TO JSR INSTR
011406  004537  024426                           JSR     R5,DELAY           ;STALL FOR STACKING
011412  000001                                   BIT0                       ;COUNT TO 1
011414  010077  170656                           MOV     R0,@STKPT          ;SEL STK WORD & BYTE
011420  017737  170646  001126                   MOV     @STKVAL,$BDDAT     ;READ STK BYTE
011426  042737  177737  001126                   BIC     #177737,$BDDAT     ;SAVE ONLY L.P. INTR ENABLED BIT
011434  023737  001124  001126                   CMP     $GDDAT,$BDDAT      ;IS IT CORRECT?
011442  001403                                   BEQ     3$                 ;BR IF SO
011444  010037  001164                           MOV     R0,$TMP0           ;SET UP STK LEVEL FOR ER TYPE
011450  104030                                   ERROR   30                 ;L.P. INTR ENABLE FAILED TO STACK AT LEVEL INDICATED
011452  162701  000004                   3$:     SUB     #4,R1              ;ADVANCE TO NEXT STK LEVEL
011456  162700  000004                           SUB     #4,R0              ;ALL STACK LOCATIONS TESTED?
011462  100337                                   BPL     2$                 ;BR IF NOT
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2018  011464  162737  000020  032342          SUB     #20,BUFFER      ;SET UP RESET STATE AT INSTR LOC
2019  011472  162737  000040  001124          SUB     #40,$GDDAT      ;SET UP RESET STATE AT EXPECTED LOC
2020  011500  100324                          BPL     1$              ;BR IF RESET STATE NOT TESTED
2021
2022                                  ;;*****************************************************************
2023                                  ;*TEST 35       TEST THAT L.P. SWITCH INTR ENABLED (CONSOLE 0) GETS PUSHED ON THE STACK
2024                                  ;;*****************************************************************
2025  011502  000004                  TST35:  SCOPE
2026  011504  012737  000035  001206          MOV     #35,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2027  011512  012737  000100  001124          MOV     #100,$GDDAT     ;EXPECT IT TO BE SET INITIALLY
2028  011520  012737  164014  032342          MOV     #164014,BUFFER  ;SET UP L.P. SW INTR EN AT INSTR LOC
2029  011526  012737  163000  032344          MOV     #163000,BUFFER+2        ;SET UP JSR REL INSTR
2030  011534  012737  011552  001110          MOV     #2$,$LPERR      ;SET UP SCOPE LOOP ADRS
2031  011542  012701  020040          1$:     MOV     #20040,R1       ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
2032  011546  012700  000037                  MOV     #37,R0          ;SET UP STK LEVEL AFTER JSR IN R0
2033  011552  010177  170520          2$:     MOV     R1,@STKPT       ;SET STK PTR BEFOE JSR
2034  011556  012777  032342  170460          MOV     #BUFFER,@DPC    ;START
2035  011564  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG ADRS 26
2036  011572  005277  170446                  INC     @DPC            ;ADVANCE TO JSR INSTR
2037  011576  004537  024426                  JSR     R5,DELAY        ;STALL FOR STACKING
2038  011602  000001                          BITO                    ;COUNT TO 1
2039  011604  010077  170466                  MOV     R0,@STKPT       ;SEL STK WORD & BYTE
2040  011610  017737  170456  001126          MOV     @STKVAL,$BDDAT  ;READ STK BYTE
2041  011616  042737  177677  001126          BIC     #177677,$BDDAT  ;SAVE ONLY L.P. SW INTR ENABLED BIT
2042  011624  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
2043  011632  001403                          BEQ     3$              ;BR IF OK
2044  011634  010037  001164                  MOV     R0,$TMP0        ;SET UP STK LEVEL FOR ER TYPE
2045  011640  104031                          ERROR   31              ;L.P. SW INTR ENABLE FAILED TO STACK AT LEVEL INDICATED
2046  011642  162701  000004          3$:     SUB     #4,R1           ;ADVANCE TO NEXT STK LEVEL
2047  011646  162700  000004                  SUB     #4,R0           ;ALL STACK LOCATIONS TESTED?
2048  011652  100337                          BPL     2$              ;BR IF NOT
2049  011654  162737  000004  032342          SUB     #4,BUFFER       ;SET UP RESET STATE AT INSTR. LOC.
2050  011662  162737  000100  001124          SUB     #100,$GDDAT     ;SET UP RESET STATE AT EXPECTED LOC
2051  011670  100324                          BPL     1$              ;BR IF RESET STATE NOT TESTED
2052
2053                                  ;;*****************************************************************
2054                                  ;*TEST 36       TEST THAT L.P. SWITCH INTR ENABLED (CONSOLE 1) GETS PUSHED ON THE STACK
2055                                  ;;*****************************************************************
2056  011672  000004                  TST36:  SCOPE
2057  011674  012737  000036  001206          MOV     #36,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2058  011702  012737  000200  001124          MOV     #200,$GDDAT     ;EXPECT IT TO BE SET INITIALLY
2059  011710  012737  164414  032342          MOV     #164414,BUFFER  ;SET UP L.P. SW INSTR EN AT INSTR LOC
2060  011716  012737  163000  032344          MOV     #163000,BUFFER+2        ;SET UP JSR REL INSTR
2061  011724  012737  011742  001110          MOV     #2$,$LPERR      ;SET UP SCOPE LOOP ADRS
2062  011732  012701  020040          1$:     MOV     #20040,R1       ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
2063  011736  012700  000037                  MOV     #37,R0          ;SET UP STK LEVEL AFTER JSR IN R0
2064  011742  010177  170330          2$:     MOV     R1,@STKPT       ;SET STK PTR BEFORE JSR
2065  011746  012777  032342  170270          MOV     #BUFFER,@DPC    ;START
2066  011754  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG ADRS 26
2067  011762  005277  170256                  INC     @DPC            ;ADVANCE TO JSR INSTR
2068  011766  004537  024426                  JSR     R5,DELAY        ;STALL FOR STACKING
2069  011772  000001                          BITO                    ;COUNT TO 1
2070  011774  010077  170276                  MOV     R0,@STKPT       ;SEL STK WORD & BYTE
2071  012000  017737  170266  001126          MOV     @STKVAL,$BDDAT  ;READ STK BYTE
2072  012006  042737  177577  001126          BIC     #177577,$BDDAT  ;SAVE ONLY L.P. SW INTR ENABLED BIT
2073  012014  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
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2074  012022  001403                          BEQ     3$              ;BR IF OK
2075  012024  010037  001164                  MOV     R0,$TMP0        ;SET UP STK LEVEL FOR ER TYPE
2076  012030  104031                          ERROR   31              ;L.P. SW INTR ENABLE FAILED TO STACK AT LEVEL INDICATED
2077  012032  162701  000004          3$:     SUB     #4,R1           ;ADVANCE TO NEXT STK LEVEL
2078  012036  162700  000004                  SUB     #4,R0           ;ALL STACK LOCATIONS TESTED?
2079  012042  100337                          BPL     2$              ;BR IF NOT
2080  012044  162737  000004  032342          SUB     #4,BUFFER       ;SET UP RESET STATE AT INSTR LOC
2081  012052  162737  000200  001124          SUB     #200,$GDDAT     ;SET UP RESET STATE AT EXPECTED LOC
2082  012060  100324                          BPL     1$              ;BR IF RESET STATE NOT TESTED
2083
2084                                  ;;*****************************************************************
2085                                  ;*TEST 37        TEST THAT THE SHIFT OUT BIT GETS PUSHED ON THE STACK
2086                                  ;;*****************************************************************
2087  012062  000004                  TST37:  SCOPE
2088  012064  012737  000037  001206          MOV     #37,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2089  012072  012737  040000  001124          MOV     #40000,$GDDAT   ;EXPECT IT TO BE SET INITIALLY
2090  012100  012737  100000  032342          MOV     #100000,BUFFER  ;SET UP CHAR INSTR
2091  012106  012737  007000  032344          MOV     #7000,BUFFER+2  ;SET CHAR TO SHIFT OUT
2092  012114  012737  163000  032346          MOV     #163000,BUFFER+4        ;SET UP JSR REL INSTR
2093  012122  012737  012140  001110          MOV     #2$,$LPERR      ;SET UP SCOPE LOOP ADRS
2094  012130  012701  020040          1$:     MOV     #20040,R1       ;SET TOP OF STACK & MAINT SW2 INITIALLY IN R1
2095  012134  012700  000037                  MOV     #37,R0          ;SET UP STK LEVEL AFTER JSR IN R0
2096  012140  010177  170132          2$:     MOV     R1,@STKPT       ;SET STK PTR BEFORE JSR
2097  012144  012777  032342  170072          MOV     #BUFFER,@DPC    ;START
2098  012152  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG ADRS 26
2099  012160  005277  170060                  INC     @DPC            ;RESUME
2100  012164  004537  024426                  JSR     R5,DELAY        ;STALL FOR CHAR DISPLAY
2101  012170  000010                          BIT3                    ;COUNT TO 10
2102  012172  005277  170046                  INC     @DPC            ;RESUME
2103  012176  004537  024426                  JSR     R5,DELAY        ;STALL FOR STKING
2104  012202  000001                          BIT0                    ;COUNT TO 1
2105  012204  010077  170066                  MOV     R0,@STKPT       ;SEL STK WD & BYTE
2106  012210  017737  170056  001126          MOV     @STKVAL,$BDDAT  ;READ STK
2107  012216  042737  137777  001126          BIC     #137777,$BDDAT  ;SAVE SHIFT OUT BIT ONLY
2108  012224  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
2109  012232  001403                          BEQ     3$              ;BR IF SO
2110  012234  010037  001164                  MOV     R0,$TMP0        ;SET UP STK LEVEL FOR ER TYPE
2111  012240  104032                          ERROR   32              ;SHIFT OUT FAILED TO STACK AT LEVEL INDICATED
2112  012242  162701  000004          3$:     SUB     #4,R1           ;ADVANCE TO NEXT STK LEVEL
2113  012246  162700  000004                  SUB     #4,R0           ;ALL STACK LOCATIONS TESTED?
2114  012252  100332                          BPL     2$              ;BR IF MORE STK LOC TO TEST
2115  012254  012737  000017  032344          MOV     #17,BUFFER+2    ;PROVIDE CHAR THAT WON'T SET SHIFT OUT
2116  012262  162737  040000  001124          SUB     #40000,$GDDAT   ;EXPECT ZERO STATE NEXT
2117  012270  100317                          BPL     1$              ;BR IF RESET STATE NOT TESTED
2118
2119                                  ;;*****************************************************************
2120                                  ;*TEST 40        TEST THAT THE 'POP' INSTR WILL INCREMENT THE STACK POINTER
2121                                  ;;*****************************************************************
2122  012272  000004                  TST40:  SCOPE
2123  012274  012737  000040  001206          MOV     #40,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2124  012302  012777  020000  167766          MOV     #20000,@STKPT   ;SET STACK POINTER TO ZERO
2125  012310  012737  000004  001124          MOV     #4,$GDDAT       ;EXPECT STK PTR TO BE 1 INITIALLY
2126  012316  012737  165000  032342          MOV     #165000,BUFFER  ;SET UP POP INSTR
2127  012324  012777  032342  167712  1$:     MOV     #BUFFER,@DPC    ;START
2128  012332  013737  002276  001122          MOV     STKPT,$BDADR    ;SET UP REG ADRS 32
2129  012340  017737  167732  001126          MOV     @STKPT,$BDDAT   ;READ STACK SELECTION
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2130  012346  042737  177740  001126          BIC     #177740,$BDDAT  ;SAVE ONLY STK SEL BITS
2131  012354  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;ARE THEY CORRECT?
2132  012362  001401                          BEQ     2$              ;BR IF SO
2133  012364  104033                          ERROR   33              ;POP INSTR FAILED TO INCREMENT STACK PTR
2134  012366  062737  000004  001124  2$:     ADD     #4,$GDDAT       ;ADVANCE EXPECTED STACK POINTER VALUE
2135  012374  022737  000040  001124          CMP     #40,$GDDAT      ;HAVE DONE ALL STK LOCS?
2136  012402  001350                          BNE     1$              ;BR IF NOT
2137
2138                                  ;;**********************************************************************
2139                                  ;*TEST 41        TEST THAT STACK UNDERFLOW WILL SET
2140                                  ;;**********************************************************************
2141  012404  000004                  TST41:  SCOPE
2142  012406  012737  000040  001166          MOV     #40,$TIMES      ;;DO 40 ITERATIONS
2143  012414  012737  000041  001206          MOV     #41,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2144  012422  012777  020000  167646          MOV     #20000,@STKPT   ;SET STACK TO ZERO
2145  012430  005037  001124                  CLR     $GDDAT          ;EXPECT NO UNDERFLOW FOR 8 POPS
2146  012434  012700  000011                  MOV     #11,R0          ;SET UP POP COUNT
2147  012440  012737  165000  032342          MOV     #165000,BUFFER  ;SET UP POP INSTR
2148  012446  012777  032342  167570  1$:     MOV     #BUFFER,@DPC    ;START
2149  012454  013737  002256  001122          MOV     SREG1,$BDADR    ;SET UP REG ADRS 12
2150  012462  005300                          DEC     R0              ;COUNT POP OPERATION
2151  012464  001410                          BEQ     2$              ;BR IF UNDERFLOW EXPECTED
2152  012466  032777  010000  167562          BIT     #10000,@SREG1   ;SEE THAT UNDERFLOW  NOT SET
2153  012474  001764                          BEQ     1$              ;BR IF OK
2154  012476  012737  010000  001126          MOV     #10000,$BDDAT   ;INDICATE STACK UNDERFLOW
2155  012504  104034                          ERROR   34              ;STACK UNDERFLOW SET PREMATURELY
2156  012506  032777  010000  167542  2$:     BIT     #10000,@SREG1   ;SEE THAT UNDERFLOW IS SET
2157  012514  001006                          BNE     3$              ;BR IF SO
2158  012516  012737  010000  001124          MOV     #10000,$GDDAT   ;EXPECTED STACK UNDERFLOW
2159  012524  005037  001126                  CLR     $BDDAT          ;INDICATE IT WAS NOT THERE
2160  012530  104034                          ERROR   34              ;STACK UNDERFLOW FAILED TO SET
2161  012532  000005                  3$:     RESET                   ;RESET STACK UNDERFLOW INT REQ BEFORE ADVANCING
2162
2163                                  ;;**********************************************************************
2164                                  ;*TEST 42        TEST THAT THE POP INSTR CAN RESTORE THE DPC
2165                                  ;;**********************************************************************
2166  012534  000004                  TST42:  SCOPE
2167  012536  012737  000042  001206          MOV     #42,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2168  012544  013737  002244  001122          MOV     DPC,$BDADR      ;SET UP REG 00 ADRS
2169  012552  012737  032344  001124          MOV     #BUFFER+2,$GDDAT        ;EXPECT BUFFER+2 ADRS AFTER POP
2170  012560  012777  020040  167510          MOV     #20040,@STKPT   ;SET TOP OF STACK
2171  012566  012737  163000  032342          MOV     #163000,BUFFER  ;SET UP JSR REL INSTR
2172  012574  012737  166000  032352          MOV     #166000,BUFFER+10       ;SET UP POP INSTR
2173  012602  012777  032342  167434          MOV     #BUFFER,@DPC    ;START
2174  012610  004537  024426                  JSR     R5,DELAY        ;STALL FOR STACKING
2175  012614  000001                          BITO                    ;COUNT TO 1
2176  012616  012777  032352  167420          MOV     #BUFFER+10,@DPC ;START
2177  012624  004537  024426                  JSR     R5,DELAY        ;STALL FOR UNSTACKING
2178  012630  000001                          BITO                    ;COUNT TO 1
2179  012632  017737  167406  001126          MOV     @DPC,$BDDAT     ;READ DPC
2180  012640  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;DID THE DPC GET RESTORED OK
2181  012646  001401                          BEQ     TST43           ;;ADVANCE TO NEXT TEST IF OK
2182  012650  104035                          ERROR   35              ;POP INSTR FAILED TO RESTORE DPC FROM STACK
2183
2184                                  ;;**********************************************************************
2185                                  ;*TEST 43        TEST THAT THE NAME BITS WILL GET RESTORED
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2186                                    ;;*****************************************************************
2187  012652  000004                    TST43:  SCOPE
2188  012654  012737  000004  001166            MOV     #4,$TIMES       ;;DO 4 ITERATIONS
2189  012662  012737  000043  001206            MOV     #43,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2190  012670  012737  012720  001110            MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
2191  012676  013737  002270  001122            MOV     DNAME,$BDADR    ;SET UP REG 24 ADRS
2192  012704  012737  003777  001124            MOV     #3777,$GDDAT    ;START NAME REG WITH MAXIMUM VALUE
2193  012712  004437  024442                    JSR     R4,POPSET       ;SET UP JSR, POP & NAME INSTRUCTIONS
2194  012716  150000                            150000                  ;NAME INSTR
2195  012720  012737  150000  032342  1$:       MOV     #150000,BUFFER  ;SET UP NAME INSTR
2196  012726  053737  001124  032342            BIS     $GDDAT,BUFFER   ;SET NAME WORD
2197  012734  004737  024472                    JSR     PC,DO           ;GO CYCLE THRU INSTRUCTIONS
2198  012740  017737  167324  001126            MOV     @DNAME,$BDDAT   ;READ NAME REG
2199  012746  042737  174000  001126            BIC     #174000,$BDDAT  ;SAVE ONLY NAME BITS
2200  012754  023737  001124  001126            CMP     $GDDAT,$BDDAT   ;DID THEY GET RESTORED?
2201  012762  001401                            BEQ     2$              ;BR IF SO
2202  012764  104036                            ERROR   36              ;NAME FAILED TO RESTORE
2203  012766  005337  001124          2$:       DEC     $GDDAT          ;ADVANCE PATTERN
2204  012772  100405                            BMI     TST44           ;;ADVANCE TO NEXT TEST IF ALL VALUES TESTED
2205  012774  001351                            BNE     1$              ;BR IF NAME BITS NOT EQ TO ZERO
2206  012776  052737  003777  032346            BIS     #3777,BUFFER+4  ;SET NAME REG TO ALL ONES WHEN RESTORING ZERO
2207  013004  000745                            BR      1$              ;GO RESTORE ALL ZEROS
2208
2209                                    ;;*****************************************************************
2210                                    ;*TEST 44        TEST THAT THE VECTOR SCALE WILL GET RESTORED
2211                                    ;;*****************************************************************
2212  013006  000004                    TST44:  SCOPE
2213  013010  012737  000100  001166            MOV     #100,$TIMES     ;;DO 100 ITERATIONS
2214  013016  012737  000044  001206            MOV     #44,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2215  013024  012737  013054  001110            MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
2216  013032  013737  002256  001122            MOV     SREG1,$BDADR    ;SET UP REG 12 ADRS
2217  013040  012737  000017  001124            MOV     #17,$GDDAT      ;START VECTOR SCALE AT MAXIMUM VALUE
2218  013046  004437  024442                    JSR     R4,POPSET       ;SET UP JSR,POP & LOAD STATUS C INSTRS
2219  013052  154020                            154020                  ;LOAD STATUS C INSTR
2220  013054  012737  154020  032342  1$:       MOV     #154020,BUFFER  ;SET UP LOAD STATUS C INSTR
2221  013062  053737  001124  032342            BIS     $GDDAT,BUFFER   ;SET VECTOR SCALE
2222  013070  004737  024472                    JSR     PC,DO           ;GO CYCLE THRU INSTRUCTIONS
2223  013074  017737  167156  001126            MOV     @SREG1,$BDDAT   ;READ VECTOR SCALE REG
2224  013102  042737  177760  001126            BIC     #177760,$BDDAT  ;SAVE ONLY THE VECTOR SCALE BITS
2225  013110  023737  001124  001126            CMP     $GDDAT,$BDDAT   ;DID THEY GET RESTORED?
2226  013116  001401                            BEQ     2$              ;BR IF SO
2227  013120  104037                            ERROR   37              ;VECTOR SCALE FAILED TO RESTORE
2228  013122  005337  001124          2$:       DEC     $GDDAT          ;ADVANCE PATTERN
2229  013126  100405                            BMI     TST45           ;;ADVANCE TO NEXT TEST IF ALL VALUES TESTED
2230  013130  001351                            BNE     1$              ;BR IF VECTOR SCALE NOT EQ TO ZERO
2231  013132  052737  000017  032346            BIS     #17,BUFFER+4    ;SET VECTOR SCALE TO ALL ONES WHEN RESTORING ZEROS
2232  013140  000745                            BR      1$              ;GO RESTORE ALL ZEROS
2233
2234                                    ;;*****************************************************************
2235                                    ;*TEST 45        TEST THAT THE CHAR SCALE WILL GET RESTORED
2236                                    ;;*****************************************************************
2237  013142  000004                    TST45:  SCOPE
2238  013144  012737  000045  001206            MOV     #45,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2239  013152  012737  013206  001110            MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
2240  013160  013737  002256  001122            MOV     SREG1,$BDADR    ;SET UP REG 12 ADRS
2241  013166  012737  001400  001124            MOV     #1400,$GDDAT    ;EXPECT CHAR SCALE AT MAXIMUM VALUE
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2242  013174  012700  000140                    MOV     #140,R0         ;START CHAR SCALE AT MAXIMUM VALUE
2243  013200  004437  024442                    JSR     R4,POPSET       ;SET UP JSR,POP & LOAD STATUS C INSTR
2244  013204  154200                            154200                  ;LOAD STATUS C INSTR
2245  013206  012737  154200  032342  1$:       MOV     #154200,BUFFER  ;SET UP LOAD STATUS C INSTR
2246  013214  050037  032342                    BIS     R0,BUFFER       ;SET CHAR SCALE
2247  013220  004737  024472                    JSR     PC,DO           ;GO CYCLE THRU INSTRUCTIONS
2248  013224  017737  167026  001126            MOV     @SREG1,$BDDAT   ;READ CHAR SCALE REG
2249  013232  042737  176377  001126            BIC     #176377,$BDDAT  ;SAVE ONLY THE CHAR SCALE BITS
2250  013240  023737  001124  001126            CMP     $GDDAT,$BDDAT   ;DID THE CHAR SCALE GET RESTORED OK?
2251  013246  001401                            BEQ     2$              ;BR IF SO
2252  013250  104040                            ERROR   40              ;CHARACTER SCALE FAILED TO RESTORE
2253  013252  162737  000400  001124  2$:       SUB     #400,$GDDAT     ;ADVANCE CHAR SCALE VALUE
2254  013260  162700  000040                    SUB     #40,R0          ;SET UP R0 WITH NEXT VALUE
2255  013264  100405                            BMI     TST46           ;;ADVANCE TO NEXT TEST IF ALL VALUES TESTED
2256  013266  001347                            BNE     1$              ;GO TRY NEXT VALUE IF CHAR SCALE NOT EQ ZERO
2257  013270  052737  000140  032346            BIS     #140,BUFFER+4   ;SET CHAR SCALE TO ALL ONES WHEN RETORING ZEROS
2258  013276  000743                            BR      1$              ;GO RESTORE ALL ZEROS
2259
2260                                      ;;**************************************************************
2261                                      ;*TEST 46        TEST THAT THE CHAR ROTATE BIT GETS RESTORED
2262                                      ;;**************************************************************
2263  013300  000004                      TST46:  SCOPE
2264  013302  012737  000046  001206              MOV     #46,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2265  013310  012737  013346  001110              MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
2266  013316  013737  002256  001122              MOV     SREG1,$BDADR    ;SET UP REG 12 ADRS
2267  013324  012737  002000  001124              MOV     #2000,$GDDAT    ;EXPECT CHAR ROTATE TO BE SET INITIALLY
2268  013332  004437  024442                    JSR     R4,POPSET       ;SET UP JSR,POP & LOAD STATUS C INSTR
2269  013336  155000                            155000                  ;LOAD STATUS C INSTR
2270  013340  012737  155400  032342            MOV     #155400,BUFFER  ;SET UP LOAD STATUS C INSTR
2271  013346  004737  024472              1$:   JSR     PC,DO           ;GO CYCLE THRU INSTRUCTIONS
2272  013352  017737  166700  001126            MOV     @SREG1,$BDDAT   ;READ CHAR ROTATE REG
2273  013360  042737  175777  001126            BIC     #175777,$BDDAT  ;SAVE ONLY CHAR ROTATE BIT
2274  013366  023737  001124  001126            CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
2275  013374  001401                            BEQ     2$              ;BR IF SO
2276  013376  104041                            ERROR   41              ;CHARACTER ROTATE FAILED TO RESTORE
2277  013400  162737  002000  001124  2$:       SUB     #2000,$GDDAT    ;CLR CHAR ROTATE
2278  013406  100407                            BMI     TST47           ;;ADVANCE TO NEXT TEST IF BOTH STATES TESTED
2279  013410  042737  000400  032342            BIC     #400,BUFFER     ;SET UP FOR RESET STATE
2280  013416  052737  000400  032346            BIS     #400,BUFFER+4   ;SET CHAR ROTATE BIT
2281  013424  000750                            BR      1$              ;GO TRY RESET STATE
2282
2283                                      ;;**************************************************************
2284                                      ;*TEST 47        TEST THAT THE COLOR LEVEL WILL GET RESTORED
2285                                      ;;**************************************************************
2286  013426  000004                      TST47:  SCOPE
2287  013430  012737  000047  001206              MOV     #47,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2288  013436  012737  013472  001110              MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
2289  013444  013737  002266  001122              MOV     CONS,$BDADR     ;SET UP REG 22 ADRS
2290  013452  012737  000014  001124              MOV     #14,$GDDAT      ;EXPECT MAX VALUE INITIALLY
2291  013460  012700  000600                    MOV     #600,R0         ;SET UP COLOR LEVEL FOR INSTR USE
2292  013464  004437  024442                    JSR     R4,POPSET       ;SET UP JSR,POP & LOAD STATUS B INSTR
2293  013470  175000                            175000                  ;LOAD STATUS B INSTR
2294  013472  012737  175000  032342  1$:       MOV     #175000,BUFFER  ;SET UP LOAD STATUS B INSTR
2295  013500  050037  032342                    BIS     R0,BUFFER       ;SET UP COLOR LEVEL
2296  013504  004737  024472                    JSR     PC,DO           ;GO CYCLE THRU INSTRUCTIONS
2297  013510  017737  166552  001126            MOV     @CONS,$BDDAT    ;READ COLOR LEVEL REG
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2298  013516  042737  177763  001126          BIC     #177763,$BDDAT  ;SAVE COLOR LEVEL ONLY
2299  013524  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
2300  013532  001401                          BEQ     2$              ;BR IF SO
2301  013534  104042                          ERROR   42              ;COLOR LEVEL FAILED TO RESTORE
2302  013536  162737  000004  001124  2$:     SUB     #4,$GDDAT       ;ADVANCE TO NEXT VALUE
2303  013544  162700  000200                  SUB     #200,R0         ;SET UP R4 WITH NEXT VALUE
2304  013550  100405                          BMI     TST50           ;;ADVANCE TO NEXT TEST IF ALL COLOR LEVELS TESTED
2305  013552  001347                          BNE     1$              ;GO TEST NEXT COLOR LEVEL IF NOT ZERO
2306  013554  052737  000600  032346          BIS     #600,BUFFER+4   ;SET COLOR LEVEL TO ALL ONES WHEN RESTORING ZEROS
2307  013562  000743                          BR      1$              ;GO RESTORE ALL ZEROS
2308
2309                                  ;;*****************************************************************
2310                                  ;*TEST 50       TEST THAT THE ITALICS BIT GETS RETORED
2311                                  ;;*****************************************************************
2312  013564  000004                  TST50:  SCOPE
2313  013566  012737  000050  001206          MOV     #50,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2314  013574  012737  013624  001110          MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
2315  013602  013737  002246  001122          MOV     $REG0,$BDADR    ;SET UP REG 02 ADRS
2316  013610  012737  000020  001124          MOV     #20,$GDDAT      ;EXPECT ITALICS INITIALLY
2317  013616  004437  024442                  JSR     R4,POPSET       ;SET UP JSR,POP & LOAD STATUS A
2318  013622  170040                          170040                  ;LOAD STATUS A INSTR
2319  013624  012737  170040  032342  1$:     MOV     #170040,BUFFER  ;SET UP LOAD STATUS A INSTR
2320  013632  053737  001124  032342          BIS     $GDDAT,BUFFER   ;SET UP ITALICS
2321  013640  004737  024472                  JSR     PC,DO           ;GO CYCLE THRU INSTRUCTIONS
2322  013644  017737  166376  001126          MOV     @$REG0,$BDDAT   ;READ ITALICS REG
2323  013652  042737  177757  001126          BIC     #177757,$BDDAT  ;SAVE ONLY ITALICS
2324  013660  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
2325  013666  001401                          BEQ     2$              ;BR IF SO
2326  013670  104043                          ERROR   43              ;ITALICS FAILED TO RESTORE
2327  013672  162737  000020  001124  2$:     SUB     #20,$GDDAT      ;GO TO RESET STATE
2328  013700  100404                          BMI     TST51           ;;ADVANCE TO NEXT TEST IF BOTH STATES TESTED
2329  013702  052737  000020  032346          BIS     #20,BUFFER+4    ;SET ITALICS BIT TO ONE WHEN RESTORING ZERO
2330  013710  000745                          BR      1$              ;GO RESTORE RESET STATE
2331
2332                                  ;;*****************************************************************
2333                                  ;*TEST 51       TEST THAT THE MENU BIT GETS RESTORED
2334                                  ;;*****************************************************************
2335  013712  000004                  TST51:  SCOPE
2336  013714  012737  000051  001206          MOV     #51,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2337  013722  012737  013760  001110          MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
2338  013730  013737  002256  001122          MOV     $REG1,$BDADR    ;SET UP REG 12 ADRS
2339  013736  012737  000100  001124          MOV     #100,$GDDAT     ;EXPECT MENU INITIALLY
2340  013744  004437  024442                  JSR     R4,POPSET       ;SET UP JSR,POP & LOAD STATUS A INSTR
2341  013750  170002                          170002                  ;LOAD STATUS A INSTR
2342  013752  012737  170003  032342          MOV     #170003,BUFFER  ;SET UP LOAD STATUS A INSTR
2343  013760  004737  024472          1$:     JSR     PC,DO           ;GO CYCLE THRU INSTRUCTIONS
2344  013764  017737  166266  001126          MOV     @$REG1,$BDDAT   ;READ MENU REG
2345  013772  042737  177677  001126          BIC     #177677,$BDDAT  ;SAVE ONLY THE MENU BIT
2346  014000  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
2347  014006  001401                          BEQ     2$              ;BR IF SO
2348  014010  104044                          ERROR   44              ;MENU FAILED TO RESTORE
2349  014012  162737  000100  001124  2$:     SUB     #100,$GDDAT     ;RESET MENU BIT
2350  014020  100407                          BMI     TST52           ;;ADVANCE TO NEXT TEST IF BOTH STATES TESTED
2351  014022  042737  000001  032342          BIC     #1,BUFFER       ;RESET MENU FOR INSTR USE
2352  014030  052737  000001  032346          BIS     #1,BUFFER+4     ;SET MENU WHEN RESTORING ZERO
2353  014036  000750                          BR      1$              ;GO RESTORE ZERO
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2354
2355                                    ;;*****************************************************************
2356                                    ;*TEST 52       TEST THAT THE INTENSITY ENA GETS RESTORED ON CONSOLE 0
2357                                    ;;*****************************************************************
2358  014040  000004                    TST52:  SCOPE
2359  014042  012737  000052  001206            MOV     #52,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2360  014050  012737  014106  001110            MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
2361  014056  013737  002266  001122            MOV     CONS,$BDADR     ;SET UP REG 22 ADRS
2362  014064  012737  100000  001124            MOV     #100000,$GDDAT  ;EXPECT INTENSITY ENABLED TO BE SET INITIALLY
2363  014072  004437  024442                    JSR     R4,POPSET       ;SET UP JSR, POP & NOP INSTRS
2364  014076  164200                            164200                  ;NOP INSTR
2365  014100  012737  164300  032342            MOV     #164300,BUFFER  ;SET UP NOP INSTR
2366  014106  004737  024472            1$:     JSR     PC,DO           ;GO CYCLE THRU INSTRS
2367  014112  017737  166150  001126            MOV     @CONS,$BDDAT    ;READ REG 22
2368  014120  042737  077777  001126            BIC     #77777,$BDDAT   ;SAVE ONLY INTENSITY ENA BIT
2369  014126  023737  001124  001126            CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
2370  014134  001401                            BEQ     2$              ;BR IF SO
2371  014136  104045                            ERROR   45              ;INTENSITY ENA FAILED TO RESTORE
2372  014140  162737  100000  001124  2$:      SUB     #100000,$GDDAT  ;CLR INTENSITY ENA BIT AT EXPECTED LOC
2373  014146  100407                            BMI     TST53           ;;ADVANCE TO NEXT STATE IF BOTH STATES TESTED
2374  014150  042737  000100  032342            BIC     #100,BUFFER     ;SET UP FOR RESET STATE
2375  014156  052737  000100  032346            BIS     #100,BUFFER+4   ;SET INTENSITY ENA AT INSTR LOC
2376  014164  000750                            BR      1$              ;GO TRY RESET STATE
2377
2378                                    ;;*****************************************************************
2379                                    ;*TEST 53       TEST THAT THE INTENSITY ENA GETS RESTORED ON CONSOLE 1
2380                                    ;;*****************************************************************
2381  014166  000004                    TST53:  SCOPE
2382  014170  012737  000053  001206            MOV     #53,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2383  014176  012737  014234  001110            MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
2384  014204  013737  002266  001122            MOV     CONS,$BDADR     ;SET UP REG 22 ADRS
2385  014212  012737  001000  001124            MOV     #1000,$GDDAT    ;EXPECT INTENSITY ENABLED TO BE SET INITIALLY
2386  014220  004437  024442                    JSR     R4,POPSET       ;SET UP JSR, POP & NOP INSTRS
2387  014224  164600                            164600                  ;NOP INSTR
2388  014226  012737  164700  032342            MOV     #164700,BUFFER  ;SET UP NOP INSTR
2389  014234  004737  024472            1$:     JSR     PC,DO           ;GO CYCLE THRU INSTRS
2390  014240  017737  166022  001126            MOV     @CONS,$BDDAT    ;READ REG 22
2391  014246  042737  176777  001126            BIC     #176777,$BDDAT  ;SAVE ONLY INTENSITY ENA BIT
2392  014254  023737  001124  001126            CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
2393  014262  001401                            BEQ     2$              ;BR IS SO
2394  014264  104045                            ERROR   45              ;INTENSITY ENA FAILED TO RESTORE
2395  014266  162737  001000  001124  2$:      SUB     #1000,$GDDAT    ;CLR INTENSITY ENA BIT AT EXPECTED LOC
2396  014274  100407                            BMI     TST54           ;;ADVANCE TO NEXT TEST IF BOTH STATES TESTED
2397  014276  042737  000100  032342            BIC     #100,BUFFER     ;SET UP FOR RESET STATE
2398  014304  052737  000100  032346            BIS     #100,BUFFER+4   ;SET INTENSITY ENA AT INSTR LOC
2399  014312  000750                            BR      1$              ;GO TRY RESET STATE
2400
2401                                    ;;*****************************************************************
2402                                    ;*TEST 54       TEST THAT L.P. INTR ENA GETS RESTORED ON CONSOLE 0
2403                                    ;;*****************************************************************
2404  014314  000004                    TST54:  SCOPE
2405  014316  012737  000054  001206            MOV     #54,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2406  014324  012737  014362  001110            MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
2407  014332  013737  002266  001122            MOV     CONS,$BDADR     ;SET UP REG 22 ADRS
2408  014340  012737  004000  001124            MOV     #4000,$GDDAT    ;EXPECT L.P. INTR ENA TO BE SET INITIALLY
2409  014346  012737  164060  032342            MOV     #164060,BUFFER  ;SET UP NOP INSTR
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2410  014354  004437  024442                    JSR     R4,POPSET       ;SET UP JSR, POP & NOP INSTRS
2411  014360  164040                            164040                  ;NOP INSTR
2412  014362  004737  024472            1$:     JSR     PC,DO           ;GO CYCLE THRU INSTRS
2413  014366  017737  165674  001126            MOV     @CONS,$BDDAT    ;READ REG 22
2414  014374  042737  173777  001126            BIC     #173777,$BDDAT  ;SAVE ONLY L.P. INTR ENA
2415  014402  023737  001124  001126            CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
2416  014410  001401                            BEQ     2$              ;BR IF SO
2417  014412  104046                            ERROR   46              ;L.P. INTR ENA FAILED TO RESTORE
2418  014414  162737  004000  001124  2$:      SUB     #4000,$GDDAT    ;SET UP FOR RESET STATE
2419  014422  100407                            BMI     TST55           ;;ADVANCE TO NEXT TEST IF BOTH STATES TESTED
2420  014424  042737  000020  032342            BIC     #20,BUFFER      ;SET UP FOR RESET STATE
2421  014432  052737  000020  032346            BIS     #20,BUFFER+4    ;SET IT BEFORE POP
2422  014440  000750                            BR      1$              ;GO TRY RESET STATE
2423
2424                                    ;;*****************************************************************
2425                                    ;*TEST 55       TEST THAT L.P. INTR ENA GETS RESTORED ON CONSOLE 1
2426                                    ;;*****************************************************************
2427  014442  000004                    TST55:  SCOPE
2428  014444  012737  000055  001206            MOV     #55,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2429  014452  012737  014510  001110            MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
2430  014460  013737  002266  001122            MOV     CONS,$BDADR     ;SET UP REG 22 ADRS
2431  014466  012737  000040  001124            MOV     #40,$GDDAT      ;EXPECT L.P. INTR ENABLED TO BE SET INITIALLY
2432  014474  012737  164460  032342            MOV     #164460,BUFFER  ;SET UP NOP INSTR
2433  014502  004437  024442                    JSR     R4,POPSET       ;SET UP JSR, POP & NOP INSTRS
2434  014506  164440                            164440                  ;NOP INSTR
2435  014510  004737  024472            1$:     JSR     PC,DO           ;GO CYCLE THRU INSTRS
2436  014514  017737  165546  001126            MOV     @CONS,$BDDAT    ;READ REG 22
2437  014522  042737  177737  001126            BIC     #177737,$BDDAT  ;SAVE ONLY L.P. INTR ENA
2438  014530  023737  001124  001126            CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
2439  014536  001401                            BEQ     2$              ;BR IF SO
2440  014540  104046                            ERROR   46              ;L.P. INTR ENA FAILED TO RESTORE
2441  014542  162737  000040  001124  2$:      SUB     #40,$GDDAT      ;SET UP FOR RESET STATE
2442  014550  100407                            BMI     TST56           ;;ADVANCE TO NEXT TEST IF BOTH STATES TESTED
2443  014552  042737  000020  032342            BIC     #20,BUFFER      ;SET UP FOR RESET STATE
2444  014560  052737  000020  032346            BIS     #20,BUFFER+4    ;SET IF BEFORE POP
2445  014566  000750                            BR      1$              ;GO TRY RESET STATE
2446
2447                                    ;;*****************************************************************
2448                                    ;*TEST 56       TEST THAT L.P. SW INTR ENA GETS RESTORED ON CONSOLE 0
2449                                    ;;*****************************************************************
2450  014570  000004                    TST56:  SCOPE
2451  014572  012737  000056  001206            MOV     #56,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2452  014600  012737  014636  001110            MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
2453  014606  013737  002266  001122            MOV     CONS,$BDADR     ;SET UP REG 22 ADRS
2454  014614  012737  002000  001124            MOV     #2000,$GDDAT    ;EXPECT L.P. SW INTR ENA TO BE SET INITIALLY
2455  014622  012737  164014  032342            MOV     #164014,BUFFER  ;SET UP NOP INSTR
2456  014630  004437  024442                    JSR     R4,POPSET       ;SET UP JSR, POP & NOP INSTRS
2457  014634  164010                            164010                  ;NOP INSTR
2458  014636  004737  024472            1$:     JSR     PC,DO           ;GO CYCLE THRU INSTRUCTIONS
2459  014642  017737  165420  001126            MOV     @CONS,$BDDAT    ;READ REG 22
2460  014650  042737  175777  001126            BIC     #175777,$BDDAT  ;SAVE ONLY L.P. SW INTR ENA
2461  014656  023737  001124  001126            CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
2462  014664  001401                            BEQ     2$              ;BR IF NOT
2463  014666  104047                            ERROR   47              ;L.P. SW INTR ENA FAILED TO RESTORE
2464  014670  162737  002000  001124  2$:      SUB     #2000,$GDDAT    ;SET UP FOR RESET STATE
2465  014676  100407                            BMI     TST57           ;;ADVANCE TO NEXT TEST IF BOTH STATES TESTED
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 2466  014700  042737  000004  032342          BIC     #4,BUFFER       ;SET UP FOR RESET STATE
 2467  014706  052737  000004  032346          BIS     #4,BUFFER+4     ;SET IT BEFORE POP
 2468  014714  000750                          BR      1$              ;GO TRY RESET STATE
 2469
 2470                                  ;;*****************************************************************
 2471                                  ;*TEST 57       TEST THAT L.P. SW INTR ENA GETS RESTORED ON CONSOLE 1
 2472                                  ;;*****************************************************************
 2473  014716  000004                  TST57:  SCOPE
 2474  014720  012737  000057  001206          MOV     #57,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
 2475  014726  012737  014764  001110          MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
 2476  014734  013737  002266  001122          MOV     CONS,$BDADR     ;SET UP REG 22 ADRS
 2477  014742  012737  000020  001124          MOV     #20,$GDDAT      ;EXPECT L.P. SW INTR ENA TO BE SET INITIALLY
 2478  014750  012737  164414  032342          MOV     #164414,BUFFER  ;SET UP NOP INSTR
 2479  014756  004437  024442                  JSR     R4,POPSET       ;SET UP JSR, POP & NOP INSTRS
 2480  014762  164410                          164410                  ;NOP INSTR
 2481  014764  004737  024472          1$:     JSR     PC,DO           ;GO CYCLE THRU INSTRS
 2482  014770  017737  165272  001126          MOV     @CONS,$BDDAT    ;READ REG 22
 2483  014776  042737  177757  001126          BIC     #177757,$BDDAT  ;SAVE ONLY L.P. SW INTR ENA
 2484  015004  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
 2485  015012  001401                          BEQ     2$              ;BR IF NOT
 2486  015014  104047                          ERROR   47              ;L.P. SW INTR ENA FAILED TO RESTORE
 2487  015016  162737  000020  001124  2$:     SUB     #20,$GDDAT      ;SET UP FOR RESET STATE
 2488  015024  100407                          BMI     TST60           ;;ADVANCE TO NEXT TEST IF BOTH STATES TESTED
 2489  015026  042737  000004  032342          BIC     #4,BUFFER       ;SET UP RESET STATE
 2490  015034  052737  000004  032346          BIS     #4,BUFFER+4     ;SET IT BEFORE POPS
 2491  015042  000750                          BR      1$              ;GO TRY RESET STATE
 2492
 2493                                  ;;*****************************************************************
 2494                                  ;*TEST 60       TEST THAT THE LINE TYPE WILL GET RESTORED
 2495                                  ;;*****************************************************************
 2496  015044  000004                  TST60:  SCOPE
 2497  015046  012737  000060  001206          MOV     #60,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
 2498  015054  012737  015104  001110          MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
 2499  015062  013737  002246  001122          MOV     SREG0,$BDADR    ;SET UP REG 02 ADRS
 2500  015070  012737  000003  001124          MOV     #3,$GDDAT       ;EXPECT MAX VALUE INITIALLY
 2501  015076  004437  024442                  JSR     R4,POPSET       ;SET UP JSR, POP & CHAR INSTRS
 2502  015102  100004                          100004                  ;CHAR INSTR
 2503  015104  012737  100004  032342  1$:     MOV     #100004,BUFFER  ;SET UP CHAR INSTR
 2504  015112  053737  001124  032342          BIS     $GDDAT,BUFFER   ;SET UP LINE TYPE
 2505  015120  004737  024472                  JSR     PC,DO           ;GO CYCLE THRU INSTRS
 2506  015124  017737  165116  001126          MOV     @SREG0,$BDDAT   ;READ LINE TYPE
 2507  015132  042737  077774  001126          BIC     #77774,$BDDAT   ;SAVE ONLY LINE TYPE
 2508  015140  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
 2509  015146  001401                          BEQ     2$              ;BR IF SO
 2510  015150  104050                          ERROR   50              ;LINE TYPE FAILED TO RESTORE
 2511  015152  005337  001124          2$:     DEC     $GDDAT          ;ADVANCE TO NEXT VALUE
 2512  015156  100405                          BMI     TST61           ;;ADVANCE TO NEXT TEST IF ALL VALUES TESTED
 2513  015160  001351                          BNE     1$              ;TRY NEXT LINE TYPE IF NOT ZERO
 2514  015162  052737  000003  032346          BIS     #3,BUFFER+4     ;SET LINE TYPE TO 3 WHEN RESTORING ZEROS
 2515  015170  000745                          BR      1$              ;GO RESTORE ALL ZEROS
 2516
 2517                                  ;;*****************************************************************
 2518                                  ;*TEST 61       TEST THAT THE INTENSITY LEVEL WILL GET RESTORED
 2519                                  ;;*****************************************************************
 2520  015172  000004                  TST61:  SCOPE
 2521  015174  012737  000061  001206          MOV     #61,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
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2522  015202  012737  015236  001110          MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
2523  015210  013737  002246  001122          MOV     SREG0,$BDADR    ;SET UP REG 02 ADRS
2524  015216  012737  003400  001124          MOV     #3400,$GDDAT    ;EXPECT MAX VALUE INITIALLY
2525  015224  012700  001600                  MOV     #1600,R0        ;SET UP INTENSITY LEVEL FOR INSTR USE
2526  015230  004437  024442                  JSR     R4,POPSET       ;SET UP JSR, POP & CHAR INSTRS
2527  015234  102000                          102000                  ;CHAR INSTR
2528  015236  012737  102000  032342  1$:     MOV     #102000,BUFFER  ;SET UP CHAR INSTR
2529  015244  050037  032342                  BIS     R0,BUFFER       ;SET UP INTENSITY LEVEL
2530  015250  004737  024472                  JSR     PC,DO           ;GO CYCLE THRU INSTR
2531  015254  017737  164766  001126          MOV     @SREG0,$BDDAT   ;READ INTENSITY LEVEL
2532  015262  042737  174377  001126          BIC     #174377,$BDDAT  ;SAVE ONLY INTENSITY LEVEL
2533  015270  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
2534  015276  001401                          BEQ     2$              ;BR IF SO
2535  015300  104051                          ERROR   51              ;INTENSITY LEVEL FAILED TO RESTORE
2536  015302  162700  000200          2$:     SUB     #200,R0         ;SET UP R0 WITH NEXT VALUE
2537  015306  162737  000400  001124          SUB     #400,$GDDAT     ;ADVANCE TO NEXT VALUE
2538  015314  100405                          BMI     TST62           ;;ADVANCE TO NEXT TEST IF ALL VALUES TESTED
2539  015316  001347                          BNE     1$              ;BR IF NEXT INTENSITY LEVEL NOT ZERO
2540  015320  052737  001600  032346          BIS     #1600,BUFFER+4  ;SET INTENSITY LEVEL TO ALL ONES WHEN RESTORING ZEROS
2541  015326  000743                          BR      1$              ;GO RESTORE ALL ZEROS
2542
2543                                  ;;*****************************************************************
2544                                  ;*TEST 62        TEST THAT BLINK WILL GET RESTORED
2545                                  ;;*****************************************************************
2546  015330  000004                  TST62:  SCOPE
2547  015332  012737  000062  001206          MOV     #62,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2548  015340  012737  015376  001110          MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
2549  015346  013737  002246  001122          MOV     SREG0,$BDADR    ;SET UP REG 02 ADRS
2550  015354  012737  000010  001124          MOV     #10,$GDDAT      ;EXPECT BLINK INITIALLY
2551  015362  012737  100030  032342          MOV     #100030,BUFFER  ;SET UP CHAR INSTR
2552  015370  004437  024442                  JSR     R4,POPSET       ;SET UP JSR, POP & CHAR INSTRS
2553  015374  100020                          100020                  ;CHAR INSTR
2554  015376  004737  024472          1$:     JSR     PC,DO           ;GO CYCLE THRU INSTRS
2555  015402  017737  164640  001126          MOV     @SREG0,$BDDAT   ;READ REG 02
2556  015410  042737  177767  001126          BIC     #177767,$BDDAT  ;SAVE ONLY THE BLINK BIT
2557  015416  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
2558  015424  001401                          BEQ     2$              ;BR IF SO
2559  015426  104052                          ERROR   52              ;BLINK FAILED TO RESTORE
2560  015430  162737  000010  032342  2$:     SUB     #10,BUFFER      ;SET UP RESET STATE
2561  015436  162737  000010  001124          SUB     #10,$GDDAT      ;GO TO RESET STATE
2562  015444  100404                          BMI     TST63           ;;ADVANCE TO NEXT TEST IF BOTH STATES TESTED
2563  015446  052737  000010  032346          BIS     #10,BUFFER+4    ;SET BLINK WHEN RESTORING ZERO
2564  015454  000750                          BR      1$              ;GO TRY RESET STATE
2565
2566                                  ;;*****************************************************************
2567                                  ;*TEST 63        TEST THAT THE MODE WILL GET RESTORED
2568                                  ;;*****************************************************************
2569  015456  000004                  TST63:  SCOPE
2570  015460  012737  000100  001166          MOV     #100,$TIMES     ;;DO 100 ITERATIONS
2571  015466  012737  000063  001206          MOV     #63,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2572  015474  012737  015524  001110          MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
2573  015502  013737  002246  001122          MOV     SREG0,$BDADR    ;SET UP REG 02 ADRS
2574  015510  012737  044000  001124          MOV     #44000,$GDDAT   ;EXPECT 22BIS VEC MODE INITIALLY
2575  015516  004437  024442                  JSR     R4,POPSET       ;SET UP JSR, POP & MODE INSTR
2576  015522  100000                          100000                  ;CHAR INSTR
2577  015524  052737  100000  032346  1$:     BIS     #100000,BUFFER+4        ;RESTORE 'INSTR' BIT AT LOC BUFFER+4
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 2578  015532  012737  100000  032342          MOV     #100000,BUFFER  ;SET UP CHAR INSTR
 2579  015540  053737  001124  032342          BIS     $GDDAT,BUFFER   ;SET UP CURRENT DISPLAY INSTR
 2580  015546  004737  024472                  JSR     PC,DO           ;GO CYCLE THRU INSTRS
 2581  015552  042737  100000  032346          BIC     #100000,BUFFER+4        ;USE LOC BUFFER+4 NOW AS DISPLAY DATA
 2582  015560  005277  164460                  INC     @DPC            ;PICK UP DATA FOR DISPLAY INSTR ISSUED
 2583  015564  000240                          NOP                     ; BEFORE JSR - THIS WILL LD MODE BITS
 2584  015566  017737  164454  001126          MOV     @SREG0,$BDDAT   ;READ REG 02
 2585  015574  042737  103777  001126          BIC     #103777,$BDDAT  ;SAVE ONLY MODE BITS
 2586  015602  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
 2587  015610  001401                          BEQ     2$              ;BR IF OK
 2588  015612  104053                          ERROR   53              ;MODE FAILED TO RESTORE
 2589  015614  162737  004000  001124  2$:     SUB     #4000,$GDDAT    ;GO TO NEXT DISPLAY MODE
 2590  015622  100340                          BPL     1$              ;BR IF MORE MODES TO TEST
 2591
 2592                                  ;;*****************************************************************
 2593                                  ;*TEST 64       TEST THAT STOP INTR ENABLED GETS RESTORED-CK IT ON STK
 2594                                  ;;*****************************************************************
 2595  015624  000004                  TST64:  SCOPE
 2596  015626  012737  000064  001206          MOV     #64,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
 2597  015634  012737  015672  001110          MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
 2598  015642  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG 26 ADRS
 2599  015650  012737  000001  001124          MOV     #1,$GDDAT       ;EXPECT IT TO BE SET INITIALLY
 2600  015656  012737  171400  032342          MOV     #171400,BUFFER  ;SET UP LOAD STATUS A INSTR
 2601  015664  004437  024442                  JSR     R4,POPSET       ;SET UP JSR, POP & LOAD STATUS A INSTR
 2602  015670  171000                          171000                  ;LOAD STATUS A INSTR
 2603  015672  004737  024472          1$:     JSR     PC,DO           ;GO CYCLE THRU INSTRS
 2604  015676  012777  032344  164340          MOV     #BUFFER+2,@DPC  ;DO A JSR
 2605  015704  004537  024426                  JSR     R5,DELAY        ;STALL FOR STACKING
 2606  015710  000001                          BIT0                    ;COUNT TO 1
 2607  015712  012777  020037  164356          MOV     #20037,@STKPT   ;SET UP STK SEL
 2608  015720  017737  164346  001126          MOV     @STKVAL,$BDDAT  ;READ STOP INTR ENA BYTE FROM STACK
 2609  015726  042737  177776  001126          BIC     #177776,$BDDAT  ;SAVE ONLY STOP INTR ENABLED BIT
 2610  015734  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;WAS IT RESTORED ON THE POP INSTR?
 2611  015742  001401                          BEQ     2$              ;BR IF SO
 2612  015744  104054                          ERROR   54              ;STOP INTR ENABLE FAILED TO RESTORE
 2613  015746  005337  001124          2$:     DEC     $GDDAT          ;SET UP FOR RESET STATE
 2614  015752  100407                          BMI     TST65           ;;ADVANCE TO NEXT TEST IF BOTH STATES TESTED
 2615  015754  042737  000400  032342          BIC     #400,BUFFER     ;SET UP FOR STKING RESET STATE
 2616  015762  052737  000400  032346          BIS     #400,BUFFER+4   ;SET BIT BEFORE POP INSTR
 2617  015770  000740                          BR      1$              ;GO TRY RESET STATE
 2618
 2619                                  ;;*****************************************************************
 2620                                  ;*TEST 65       TEST THAT DEPTH QUEING BIT GETS RESTORED-CK IT ON STK
 2621                                  ;;*****************************************************************
 2622  015772  000004                  TST65:  SCOPE
 2623  015774  012737  000065  001206          MOV     #65,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
 2624  016002  012737  016040  001110          MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
 2625  016010  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG 26 ADRS
 2626  016016  012737  002000  001124          MOV     #2000,$GDDAT    ;EXPECT IT TO BE SET INITIALLY
 2627  016024  012737  176014  032342          MOV     #176014,BUFFER  ;SET UP LOAD STATUS B' INSTR
 2628  016032  004437  024442                  JSR     R4,POPSET       ;SET UP JSR, POP & LOAD STATUS B' INSTRS
 2629  016036  176010                          176010                  ;LOAD STATUS B' INSTR
 2630  016040  004737  024472          1$:     JSR     PC,DO           ;GO CYCLE THRU INSTRS
 2631  016044  012777  032344  164172          MOV     #BUFFER+2,@DPC  ;DO A JSR
 2632  016052  004537  024426                  JSR     R5,DELAY        ;STALL FOR STACKING
 2633  016056  000001                          BIT0                    ;COUNT TO 1
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2634  016060  012777  020037  164210          MOV     #20037,@STKPT   ;SET UP STK SEL
2635  016066  017737  164200  001126          MOV     @STKVAL,$BDDAT  ;READ DEPTH QUEING BYTE FROM STK
2636  016074  042737  175777  001126          BIC     #175777,$BDDAT  ;SAVE ONLY DEPTH QUEING BIT
2637  016102  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;WAS IT RESTORED ON THE POP INSTR?
2638  016110  001401                          BEQ     2$              ;BR IF SO
2639  016112  104055                          ERROR   55              ;DEPTH QUE FAILED TO RESTORE
2640  016114  162737  002000  001124  2$:     SUB     #2000,$GDDAT    ;SET UP FOR RESET STATE
2641  016122  100407                          BMI     TST66           ;;ADVANCE TO NEXT TEST IF BOTH STATES TESTED
2642  016124  042737  000004  032342          BIC     #4,BUFFER       ;SET UP FOR STKING RESET STATE
2643  016132  052737  000004  032346          BIS     #4,BUFFER+4     ;SET BIT BEFORE POP INSTR
2644  016140  000737                          BR      1$              ;GO TRY RESET STATE
2645
2646                                  ;;*****************************************************************
2647                                  ;*TEST 66        TEST THAT DEPTH QUE CONTROL BIT GETS RESTROED-CK IT ON STK
2648                                  ;;*****************************************************************
2649  016142  000004                  TST66:  SCOPE
2650  016144  012737  000066  001206          MOV     #66,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2651  016152  012737  016210  001110          MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
2652  016160  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG 26 ADRS
2653  016166  012737  000400  001124          MOV     #400,$GDDAT     ;EXPECT IT TO BE SET INITIALLY
2654  016174  012737  176300  032342          MOV     #176300,BUFFER  ;SET UP LOAD STATUS B' INSTR
2655  016202  004437  024442                  JSR     R4,POPSET       ;SET UP JSR, POP & LOAD STATUS B' INSTRS
2656  016206  176200                          176200                  ;LOAD STATUS B' INSTR
2657  016210  004737  024472          1$:     JSR     PC,DO           ;GO CYCLE THRU INSTRS
2658  016214  012777  032342  164022          MOV     #BUFFER,@DPC    ;DO A JSR REL
2659  016222  004537  024426                  JSR     R5,DELAY        ;STALL FOR STACKING
2660  016226  000001                          BITO                    ;COUNT TO 1
2661  016230  012777  020037  164040          MOV     #20037,@STKPT   ;SET UP STACK SEL
2662  016236  017737  164030  001126          MOV     @STKVAL,$BDDAT  ;READ STACK
2663  016244  042737  177377  001126          BIC     #177377,$BDDAT  ;SAVE ONLY DEPTH QUE CONTROL BIT
2664  016252  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;WAS IT RESTORED ON THE POP INSTR?
2665  016260  001401                          BEQ     2$              ;BR IF SO
2666  016262  104055                          ERROR   55              ;DEPTH QUE CONTROL FAILED TO RESTORE
2667  016264  162737  000400  001124  2$:     SUB     #400,$GDDAT     ;SET UP FOR RESET SATATE
2668  016272  100407                          BMI     TST67           ;;ADVANCE TO NEXT TEST IF BOTH STATES TESTED
2669  016274  042737  000100  032342          BIC     #100,BUFFER     ;SET UP FOR STACKING RESET STATE
2670  016302  052737  000100  032346          BIS     #100,BUFFER+4   ;SET BIT BEFORE POP INSTR
2671  016310  000737                          BR      1$              ;GO TRY RESET STATE
2672
2673                                  ;;*****************************************************************
2674                                  ;*TEST 67        TEST THAT EDGE INTR ENABLED GETS RESTORED-CK IT ON STK
2675                                  ;;*****************************************************************
2676  016312  000004                  TST67:  SCOPE
2677  016314  012737  000067  001206          MOV     #67,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2678  016322  012737  016360  001110          MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
2679  016330  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG 26 ADRS
2680  016336  012737  004000  001124          MOV     #4000,$GDDAT    ;EXPECT IT TO BE SET INITIALLY
2681  016344  012737  176060  032342          MOV     #176060,BUFFER  ;SET UP LOAD STATUS B' INSTR
2682  016352  004437  024442                  JSR     R4,POPSET       ;SET UP JSR, POP & LOAD STATUS B' INSTR
2683  016356  176040                          176040                  ;LOAD STATUS B' INSTR
2684  016360  004737  024472          1$:     JSR     PC,DO           ;GO CYCLE THRU INSTRS
2685  016364  012777  032344  163652          MOV     #BUFFER+2,@DPC  ;DO A JSR
2686  016372  004537  024426                  JSR     R5,DELAY        ;STALL FOR STACKING
2687  016376  000001                          BITO                    ;COUNT TO 1
2688  016400  012777  020037  163670          MOV     #20037,@STKPT   ;SET UP STK SEL
2689  016406  017737  163660  001126          MOV     @STKVAL,$BDDAT  ;READ EDGE INTR ENA BYTE FROM STK
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2690  016414  042737  173777  001126          BIC     #173777,$BDDAT  ;SAVE ONLY EDGD INTR ENA BIT
2691  016422  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;WAS IT RESTORED ON THE POP INSTR?
2692  016430  001401                          BEQ     2$              ;BR IF SO
2693  016432  104056                          ERROR   56              ;EDGE INTR ENABLE FAILED TO RESTOPE
2694  016434  162737  004000  001124  2$:     SUB     #4000,$GDDAT    ;SET UP FOR RESET STATE
2695  016442  100407                          BMI     TST70           ;;ADVANCE TO NEXT TEST IF BOTH STATES TESTED
2696  016444  042737  000020  032342          BIC     #20,BUFFER      ;SET UP FOR STACKING RESET STATE
2697  016452  052737  000020  032346          BIS     #20,BUFFER+4    ;SET BIT BEFORE POP INSTR
2698  016460  000737                          BR      1$              ;GO TRY RESET STATE
2699
2700                                  ;;**********************************************************************
2701                                  ;*TEST 70        TEST THAT CHAR STRING ESCAPE GETS RESTORED-CK IT ON STK
2702                                  ;;**********************************************************************
2703  016462  000004                  TST70:  SCOPE
2704  016464  012737  000070  001206          MOV     #70,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2705  016472  012737  016530  001110          MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
2706  016500  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG 26 ADRS
2707  016506  012737  010000  001124          MOV     #10000,$GDDAT   ;EXPECT IT TO BE SET INITIALLY
2708  016514  012737  176003  032342          MOV     #176003,BUFFER  ;SET UP LOAD STATUS B' INSTR
2709  016522  004437  024442                  JSR     R4,POPSET       ;SET UP JSR, POP & LOAD STATUS B' INSTR
2710  016526  176002                          176002                  ;LOAD STATUS B' INSTR
2711  016530  004737  024472          1$:     JSR     PC,DO           ;GO CYCLE THRU INSTRS
2712  016534  012777  032344  163502          MOV     #BUFFER+2,@DPC  ;DO A JSR
2713  016542  004537  024426                  JSR     R5,DELAY        ;STALL FOR STACKING
2714  016546  000001                          BITO                    ;COUNT TO 1
2715  016550  012777  020037  163520          MOV     #20037,@STKPT   ;SET UP STK SEL
2716  016556  017737  163510  001126          MOV     @STKVAL,$BDDAT  ;READ CHAR STRING ESCAPE BYTE FROM STK
2717  016564  042737  167777  001126          BIC     #167777,$BDDAT  ;SAVE ONLY CHAR STRING ESCAPE BIT
2718  016572  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;WAS IT RESTORED ON THE POP INSTR?
2719  016600  001401                          BEQ     2$              ;BR IF SO
2720  016602  104057                          ERROR   57              ;CHARACTER STRING ESCAPE FAILED TO RESTORE
2721  016604  162737  010000  001124  2$:     SUB     #10000,$GDDAT   ;SET UP FOR RESET STATE
2722  016612  100407                          BMI     TST71           ;;ADVANCE TO NEXT TEST IF BOTH STATES TESTED
2723  016614  042737  000001  032342          BIC     #1,BUFFER       ;SET UP FOR STACKING RESET STATE
2724  016622  052737  000001  032346          BIS     #1,BUFFER+4     ;SET BIT BEFORE POP INSTR
2725  016630  000737                          BR      1$              ;GO TRY RESET STATE
2726
2727                                  ;;**********************************************************************
2728                                  ;*TEST 71        TEST THAT L.P. HIT DISABLE GETS RESTORED-CK IT ON STK
2729                                  ;;**********************************************************************
2730  016632  000004                  TST71:  SCOPE
2731  016634  012737  000071  001206          MOV     #71,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2732  016642  012737  016700  001110          MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
2733  016650  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG 26 ADRS
2734  016656  012737  000002  001124          MOV     #2,$GDDAT       ;EXPECT IT TO BE SET INITIALLY
2735  016664  012737  170300  032342          MOV     #170300,BUFFER  ;SET UP LOAD STATUS A INSTR
2736  016672  004437  024442                  JSR     R4,POPSET       ;SET UP JSR, POP & LOAD STATUS A INSTR
2737  016676  170200                          170200                  ;LOAD STATUS A INSTR
2738  016700  004737  024472          1$:     JSR     PC,DO           ;GO CYCLE THRU INSTRS
2739  016704  012777  032344  163332          MOV     #BUFFER+2,@DPC  ;DO A JSR
2740  016712  004537  024426                  JSR     R5,DELAY        ;STALL FOR STACKING
2741  016716  000001                          BITO                    ;COUNT TO 1
2742  016720  012777  020037  163350          MOV     #20037,@STKPT   ;SET UP STK SEL
2743  016726  017737  163340  001126          MOV     @STKVAL,$BDDAT  ;READ L.P. HIS DISABLE BYTE FROM STK
2744  016734  042737  177775  001126          BIC     #177775,$BDDAT  ;SAVE ONLY L.P. HIS DISABLE BIT
2745  016742  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;WAS IT RESTORED ON THE POP INSTR?
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2746  016750  001401                          BEQ     2$              ;BR IF SO
2747  016752  104060                          ERROR   60              ;L.P. HIT DISABLE FAILED TO RESTORE
2748  016754  162737  000002  001124  2$:     SUB     #2,$GDDAT       ;SET UP FOR RESET STATE
2749  016762  100407                          BMI     TST72           ;;ADVANCE TO NEXT TEST IF BOTH STATES TESTED
2750  016764  042737  000100  032342          BIC     #100,BUFFER     ;SET UP FOR STKING RESET STATE
2751  016772  052737  000100  032346          BIS     #100,BUFFER+4   ;SET BIT BEFORE POP INSTR
2752  017000  000737                          BR      1$              ;GO TRY RESET STATE
2753
2754                                  ;;**********************************************************************
2755                                  ;*TEST 72        TEST THAT SHIFT OUT WILL GET RESTORED - CK IT ON STK
2756                                  ;;**********************************************************************
2757  017002  000004                  TST72:  SCOPE
2758  017004  012737  000072  001206          MOV     #72,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2759  017012  012737  000340  177776          MOV     #340,PSW        ;SET PRIORITY TO HIGEST LEVEL
2760  017020  012737  017102  001110          MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
2761  017026  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG 26 ADRS
2762  017034  012737  040000  001124          MOV     #40000,$GDDAT   ;EXPECT SHIFT OUT INITIALLY
2763  017042  012704  032342                  MOV     #BUFFER,R4      ;SET UP START ADRS IN R4
2764  017046  012724  100000                  MOV     #100000,(R4)+   ;SET UP CHAR INSTR
2765  017052  012724  007000                  MOV     #7000,(R4)+     ;SET UP SHIFT OUT CHAR
2766  017056  012724  163001                  MOV     #163001,(R4)+   ;SET UP JSR REL + 4
2767  017062  012724  163000                  MOV     #163000,(R4)+   ;SET UP JSR REL - THIS WILL FORCE SHIFT OUT BACK ON STK
2768  017066  012724  100000                  MOV     #100000,(R4)+   ;SET UP CHAR INSTR TO COM SHIFT OUT
2769  017072  012724  000017                  MOV     #17,(R4)+       ;SET UP CHAR LOC - SHIFT IN
2770  017076  012714  166000                  MOV     #166000,(R4)    ;SET UP POP & RESTORE INSTR
2771  017102  012777  020040  163166  1$:     MOV     #20040,@STKPT   ;SET TOP OF STK
2772  017110  012777  032342  163126          MOV     #BUFFER,@DPC    ;START
2773  017116  012704  000006                  MOV     #6,R4           ;SET UP NPR CNTR
2774  017122  005277  163116          2$:     INC     @DPC            ;ADVANCE TO NEXT INSTR OR DATA
2775  017126  004537  024426                  JSR     R5,DELAY        ;ALLOW TIME FOR EACH OPERATION TO COMPLETE
2776  017132  000004                          BIT2                    ;COUNT TO 4
2777  017134  005304                          DEC     R4              ;COUNT THIS NPR
2778  017136  001371                          BNE     2$              ;BR IF MORE NPRS
2779  017140  012777  020037  163130          MOV     #20037,@STKPT   ;SET UP STK SEL
2780  017146  017737  163120  001126          MOV     @STKVAL,$BDDAT  ;READ REG 26
2781  017154  042737  137777  001126          BIC     #137777,$BDDAT  ;SAVE ONLY SHIFT OUT
2782  017162  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
2783  017170  001401                          BEQ     3$              ;BR IF SO
2784  017172  104061                          ERROR   61              ;SHIFT OUT FAILED TO RESTORE
2785  017174  012737  000017  032344  3$:     MOV     #17,BUFFER+2    ;SET UP FOR NO SHIFT OUT
2786  017202  012737  000016  032354          MOV     #16,BUFFER+12   ;COMPLEMENT IT
2787  017210  162737  040000  001124          SUB     #40000,$GDDAT   ;SET UP FOR RESET STATE
2788  017216  100331                          BPL     1$              ;BR IF RESET STATE NOT TESTED
2789
2790                                  ;;**********************************************************************
2791                                  ;*TEST 73        TEST THAT CHAR STRING ESCAPE ON TERMINATE CHAR WILL POP THE STACK
2792                                  ;;**********************************************************************
2793  017220  000004                  TST73:  SCOPE
2794  017222  012737  000010  001166          MOV     #10,$TIMES      ;;DO 10 ITERATIONS
2795  017230  012737  000073  001206          MOV     #73,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2796  017236  012737  032346  001124          MOV     #BUFFER+4,$GDDAT        ;EXPECT ADRS BUFFER+4 AFTER TERM CHAR
2797  017244  012737  176003  032342          MOV     #176003,BUFFER  ;SET UP CHAR STRING ESCAPE INSTR
2798  017252  012737  163002  032344          MOV     #163002,BUFFER+2        ;SET UP JSR REL INSTR
2799  017260  012737  100000  032352          MOV     #100000,BUFFER+10       ;SET CHAR INSTR
2800  017266  012700  000377                  MOV     #377,R0         ;START WITH MAX TERM CHAR VALUE
2801  017272  012777  020040  162776  1$:     MOV     #20040,@STKPT   ;SET TOP OF STACK
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 2802  017300  010077  162770                    MOV     R0,@TERMCH      ;SET UP TERM CHAR
 2803  017304  010037  032354                    MOV     R0,BUFFER+12            ;SET UP VALUE FOR INSTR
 2804  017310  012777  032342  162726            MOV     #BUFFER,@DPC    ;START
 2805  017316  012737  017272  001110            MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
 2806  017324  005277  162714                    INC     @DPC            ;ADVANCE TO JSR REL INSTR
 2807  017330  004537  024426                    JSR     R5,DELAY        ;STALL FOR STACKING
 2808  017334  000001                            BIT0                    ;COUNT TO 1
 2809  017336  005277  162702                    INC     @DPC            ;RESUME - SHOULD PICK UP CHAR INSTR
 2810  017342  013737  002244  001122            MOV     DPC,$BDADR      ;SET UP REG ADRS 00
 2811  017350  005277  162670                    INC     @DPC            ;RESUME - PICK UP TERM CHAR
 2812  017354  004537  024426                    JSR     R5,DELAY        ;STALL FOR POP
 2813  017360  000020                            BIT4                    ;COUNT TO 20
 2814  017362  017737  162656  001126            MOV     @DPC,$BDDAT     ;READ DPC
 2815  017370  023737  001124  001126            CMP     $GDDAT,$BDDAT   ;DID IT DO THE POP?
 2816  017376  001401                            BEQ     2$              ;BR IF SO
 2817  017400  104062                            ERROR   62              ;TERMINATE CHARACTER FAILED TO POP STACK
 2818  017402  105300                    2$:     DECB    R0              ;ADVANCE TO NEXT TERMINATE VALUE
 2819  017404  100732                            BMI     1$              ;BR IF MORE TO TEST
 2820
 2821                                    ;;*****************************************************************
 2822                                    ;*TEST 74        TEST THAT CHAR STRING ESCAPE WHEN DISABLED WILL NOT POP THE STACK
 2823                                    ;;*****************************************************************
 2824  017406  000004                    ↑ST74:  SCOPE
 2825  017410  012737  000074  001206            MOV     #74,$TESTN      ;:SET TEST NUMBER IN APT MAIL BOX
 2826  017416  012737  032356  001124            MOV     #BUFFER+14,$GDDAT       ;EXPECT ADRS DPT3 AFTER TERM CHAR
 2827  017424  012737  176002  032342            MOV     #176002,BUFFER  ;SET UP CHAR STRING ESCAPE INSTR-OFF
 2828  017432  012737  100000  032352            MOV     #100000,BUFFER+10       ;SET UP CHAR INSTR
 2829  017440  012737  000177  032354            MOV     #177,BUFFER+12  ;SET UP ASCII TERM CHAR
 2830  017446  012777  000377  162620            MOV     #377,@TERMCH    ;SET UP TERM CHAR
 2831  017454  012777  020040  162614            MOV     #20040,@STKPT   ;SET TOP OF STACK
 2832  017462  012777  032342  162554            MOV     #BUFFER,@DPC    ;START
 2833  017470  012737  163002  032344            MOV     #163002,BUFFER+2        ;SET UP JSR REL
 2834  017476  005277  162542                    INC     @DPC            ;ADVANCE TO JSR INSTR
 2835  017502  004537  024426                    JSR     R5,DELAY        ;STALL FOR STACKING
 2836  017506  000001                            BIT0                    ;COUNT TO 1
 2837  017510  005277  162530                    INC     @DPC            ;ADVANCE TO CHAR INSTR
 2838  017514  013737  002244  001122            MOV     DPC,$BDADR      ;SET UP REG ADRS 00
 2839  017522  005277  162516                    INC     @DPC            ;ADVANCE TO TERM CHAR
 2840  017526  004537  024426                    JSR     R5,DELAY        ;STALL FOR POTENTIAL POP
 2841  017532  000020                            BIT4                    ;COUNT TO 20
 2842  017534  017737  162504  001126            MOV     @DPC,$BDDAT     ;READ THE DPC
 2843  017542  023737  001124  001126            CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
 2844  017550  001401                            BEQ     TST75           ;:GO TO NEXT TEST IF OK
 2845  017552  104062                            ERROR   62              ;TERM CHAR POPPED WHEN CHAR STRING TERM DISABLED
 2846
 2847                                    ;;*****************************************************************
 2848                                    ;*TEST 75        TEST THAT STACK OVERFLOW WILL CAUSE AN INTERRUPT
 2849                                    ;;*****************************************************************
 2850  017554  000004                    ↑ST75:  SCOPE
 2851  017556  012737  000040  001166            MOV     #40,$TIMES      ;;DO 40 ITERATIONS
 2852  017564  012737  000075  001206            MOV     #75,$TESTN      ;:SET TEST NUMBER IN APT MAIL BOX
 2853  017572  013701  001252                    MOV     $VECT1,R1       ;GET BASIC VECTOR ADRS
 2854  017576  012761  017720  000010            MOV     #2$,10(R1)      ;SET UP STK OVFL INT ADRS
 2855  017604  012761  000340  000012            MOV     #340,12(R1)     ;SET UP PSW TO 7 ON INT
 2856  017612  013737  002256  001122            MOV     $REG1,$BDADR    ;SET UP REG 12 ADRS
 2857  017620  012777  020040  162450            MOV     #20040,@STKPT   ;SET TOP OF STK
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2858  017626  012700  000011          MOV   #11,R0          ;WILL COUNT TO OVFL IN R0
2859  017632  012737  020000  001124  MOV   #20000,$GDDAT   ;WILL EXPECT STK OVFL
2860  017640  012737  163000  032342  MOV   #163000,BUFFER  ;SET UP JSR INSTR
2861  017646  012737  000340  177776  1$:   MOV   #340,PSW      ;SET PSW TO 7
2862  017654  012777  032342  162362  MOV   #BUFFER,@DPC   ;START
2863  017662  004537  024426          JSR   R5,DELAY        ;STALL FOR STKING
2864  017666  000001                  BITO                  ;COUNT TO 1
2865  017670  005037  177776          CLR   PSW             ;ALLOW INT TO OCCUR
2866  017674  005300                  DEC   R0              ;COUNT THIS STK OPERATION
2867  017676  001363                  BNE   1$              ;BR IF NOT TO STK OVFL LEVEL
2868  017700  017737  162352  001126  MOV   @SREG1,$BDDAT   ;READ REG 12
2869  017706  042737  157777  001126  BIC   #157777,$BDDAT  ;SAVE ONLY STK OVFL
2870  017714  104063                  ERROR 63              ;STACK OVERFLOW FAILED TO INTERRUPT
2871  017716  000424                  BR    4$              ;GO LOOK FOR LOOP ON TEST SWITCH
2872  017720  022626          2$:     CMP   (R6)+,(R6)+     ;FIX STK SINCE NO RTI
2873  017722  032777  020000  162326  BIT   #20000,@SREG1   ;SEE IF STK OVFL BIT SET
2874  017730  001004                  BNE   3$              ;BR IF SO
2875  017732  005037  001126          CLR   $BDDAT          ;INDICATE OVFLO BIT NOT SET
2876  017736  104063                  ERROR 63              ;STACK OVERFLOW INTERRUPTED BUT NO FLAG
2877  017740  000413                  BR    4$              ;LOOK FOR LOOP ON TEST SW
2878  017742  005037  001124  3$:     CLR   $GDDAT          ;EXPECT ZERO
2879  017746  000005                  RESET                 ;CLR FLAG
2880  017750  032777  020000  162270  BIT   #20000,@SREG0   ;STILL SET?
2881  017756  001404                  BEQ   4$              ;BR IF NOT
2882  017760  012737  020000  001126  MOV   #20000,$BDDAT   ;INDICATE IT IS STILL SET
2883  017766  104063                  ERROR 63              ;RESET FAILED TO CLR STACK OVERFLOW FLAG
2884  017770  004737  024626  4$:     JSR   PC,RSTVEC       ;RESTORE STK OVERFLOW VECTOR HALT
2885
2886                          ;;*****************************************************************
2887                          ;*TEST 76       TEST THAT STACK UNDERFLOW WILL CAUSE AN INTERRUPT
2888                          ;;*****************************************************************
2889  017774  000004          TST76:  SCOPE
2890  017776  012737  000040  001166          MOV   #40,$TIMES      ;;DO 40 ITERATIONS
2891  020004  012737  000076  001206          MOV   #76,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2892  020012  013701  001252                  MOV   $VECT1,R1       ;GET BASIC VECTOR ADRS
2893  020016  012761  020140  000010          MOV   #2$,10(R1)      ;SET UP STK UNDERFLOW INT ADRS
2894  020024  012761  000340  000012          MOV   #340,12(R1)     ;SET UP PSW TO 7 ON INT
2895  020032  013737  002256  001122          MOV   SREG1,$3DADR    ;SET UP REG 12 ADRS
2896  020040  012700  000011                  MOV   #11,R0          ;WILL COUNT TO UNDERFLOW IN R0
2897  020044  012777  020000  162224          MOV   #20000,@STKPT   ;SET STACK PTR TO ZERO
2898  020052  012737  010000  001124          MOV   #10000,$GDDAT   ;WILL EXPECT STK UNDERFLOW
2899  020060  012737  165000  032342          MOV   #165000,BUFFER  ;SET UP POP INSTR
2900  020066  012737  000340  177776  1$:     MOV   #340,PSW        ;SET PSW TO 7
2901  020074  012777  032342  162142          MOV   #BUFFER,@DPC    ;START
2902  020102  004537  024426                  JSR   R5,DELAY        ;STALL FOR POPING
2903  020106  000001                          BITO                  ;COUNT TO 1
2904  020110  005037  177776                  CLR   PSW             ;ALLOW INT TO OCCUR
2905  020114  005300                          DEC   R0              ;COUNT THIS POP OPERATION
2906  020116  001363                          BNE   1$              ;BR IF NOT ST STK UNDERFLO LEVEL
2907  020120  017737  162132  001126          MOV   @SREG1,$BDDAT   ;READ REG 12
2908  020126  043737  167777  001126          BIC   167777,$BDDAT   ;SAVE ONLY STK UNDERFLOW
2909  020134  104064                          ERROR 64              ;STACK UNDERFLOW FAILED TO INTERRUPT
2910  020136  000424                          BR    4$              ;GO LOOK FOR LOOP ON TEST SWITCH
2911  020140  022626          2$:     CMP   (R6)+,(R6)+     ;FIX STACK SINCE NO RTI
2912  020142  032777  010000  162106          BIT   #10000,@SREG1   ;SEE IF STK UNDERFLOW BIT SET
2913  020150  001004                          BNE   3$              ;BR IF SO
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2914  020152  005037  001126              CLR     $BDDAT          ;INDICATE UNDERFLOW BIT NOT SET
2915  020156  104064                      ERROR   64              ;STACK UNDERFLOW INTERRUPTED BUT NO FLAG
2916  020160  000413                      BR      4$              ;GO LOOK FOR LOOP ON TEST SW
2917  020162  005037  001124      3$:     CLR     $GDDAT          ;EXPECT ZERO
2918  020166  000005                      RESET                   ;CLR FLAG
2919  020170  032777  010000  162050      BIT     #10000,@SREG0   ;STILL SET?
2920  020176  001404                      BEQ     4$              ;BR IF NOT
2921  020200  012737  010000  001126      MOV     #10000,$BDDAT   ;INDICATE IT IS STILL SET
2922  020206  104064                      ERROR   64              ;RESET FAILED TO CLR STACK UNDERFLOW FLAG
2923  020210  004737  024626      4$:     JSR     PC,RSTVEC       ;RESTORE STK UNDERFLOW VECTOR WITH HALT
2924
2925                                      ;;*****************************************************************
2926                                      ;*TEST 77        TEST THAT X DELTA LENGTH COMPUTES WITH MAINT SW3 SET
2927                                      ;;*****************************************************************
2928  020214  000004              TST77:  SCOPE
2929  020216  012737  000040  001166      MOV     #40,$TIMES      ;;DO 40 ITERATIONS
2930  020224  012737  000077  001206      MOV     #77,$TESTN      ;;SET TEST NUMBER IN APT MAIL BOX
2931  020232  000005                      RESET                   ;MAKE SURE ALL FLAGS ARE CLEARED
2932  020234  012737  020316  001110      MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
2933  020242  013737  002250  001122      MOV     XPOS,$BDADR     ;SET UP REG ADRS 04
2934  020250  012700  032342              MOV     #BUFFER,R0      ;GET INSTR ADRS POINTER
2935  020254  012720  154024              MOV     #154024,(R0)+   ;SET UP UNITY VECTOR SCALE
2936  020260  012720  114000              MOV     #114000,(R0)+   ;STORE POINT INSTR
2937  020264  005020                      CLR     (R0)+           ;X=0
2938  020266  005020                      CLR     (R0)+           ;Y=0
2939  020270  012720  110000              MOV     #110000,(R0)+   ;STORE LONG VECTOR INSTR
2940  020274  005020                      CLR     (R0)+           ;X TO BE UPDATED
2941  020276  005020                      CLR     (R0)+           ;Y=0
2942  020300  012710  172000              MOV     #172000,(R0)    ;STORE STOP INSTR
2943  020304  012700  000001              MOV     #1,R0           ;R0 CONTAINS X VECTOR LENGTH
2944  020310  012737  000001  001124      MOV     #1,$GDDAT       ;CONTAINS EXPECTED DELTA LENGTH
2945  020316  010037  032354      1$:     MOV     R0,BUFFER+12    ;SET UP NEXT VECTOR LENGTH
2946  020322  004537  025020              JSR     R5,EXECUTE      ;GO START DISPLAY
2947  020326  000007                      7                       ;RESUME COUNT
2948
2949  020330  017737  161714  001126      MOV     @XPOS,$BDDAT    ;DELTA LENGTH READ BACK FROM X POSITION REG
2950  020336  023737  001124  001126      CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
2951  020344  001403                      BEQ     2$              ;BR IF SO
2952  020346  010037  001164              MOV     R0,$TMP0        ;SET UP X VECTOR LENGTH FOR ER TYPE
2953  020352  104065                      ERROR   65              ;X DELTA LENGTH INCORRECT
2954  020354  005237  001124      2$:     INC     $GDDAT          ;BUMP EXPECTED DELTA LENGTH
2955  020360  005200                      INC     R0              ;ADVANCE TO NEXT X VECTOR VALUE
2956  020362  032700  002000              BIT     #2000,R0        ;HAVE WE DONE 10 BITS?
2957  020366  001753                      BEQ     1$              ;BR IF NOT
2958
2959                                      ;;*****************************************************************
2960                                      ;*TEST 100       TEST THAT Y DELTA LENGTH COMPUTES WITH MAINT SW3 SET
2961                                      ;;*****************************************************************
2962  020370  000004              TST100: SCOPE
2963  020372  012737  000040  001166      MOV     #40,$TIMES      ;;DO 40 ITERATIONS
2964  020400  012737  000100  001206      MOV     #100,$TESTN     ;;SET TEST NUMBER IN APT MAIL BOX
2965  020406  012737  020472  001110      MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
2966  020414  013737  002252  001122      MOV     YPOS,$BDADR     ;SET UP REG ADRS 06
2967  020422  012700  032342              MOV     #BUFFER,R0      ;GET INSTR ADRS POINTER
2968  020426  012720  154024              MOV     #154024,(R0)+   ;SET UP UNITY VECTOR SCALE
2969  020432  012720  114000              MOV     #114000,(R0)+   ;STORE POINT INSTR
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 2970  020436  005020                          CLR     (R0)+           ;X=0
 2971  020440  012720  001777                  MOV     #1777,(R0)+     ;Y=1777
 2972  020444  012720  110000                  MOV     #110000,(R0)+   ;STORE LONG VECTOR INSTR
 2973  020450  005020                          CLR     (R0)+           ;X=0
 2974  020452  005020                          CLR     (R0)+           ;Y TO BE UPDATED
 2975  020454  012710  172000                  MOV     #172000,(R0)    ;STORE STOP INSTR
 2976  020460  012700  020001                  MOV     #20001,R0       ;R0 CONTAINS Y VECTOR LENGTH (DRAW TOP TO BOTTOM)
 2977  020464  012737  000001  001124          MOV     #1,$GDDAT       ;CONTAINS EXPECTED Y DELTA LENGTH
 2978  020472  010037  032356          1$:     MOV     R0,BUFFER+14    ;SET UP NEXT VECTOR LENGTH
 2979  020476  004537  025020                  JSR     R5,EXECUTE      ;GO START DISPLAY
 2980  020502  000007                          7                       ;RESUME COUNT
 2981
 2982  020504  017737  161542  001126          MOV     @YPOS,$BDDAT    ;DELTA LENGTH READ BACK FROM Y POSITION REG
 2983  020512  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
 2984  020520  001403                          BEQ     2$              ;BR IF SO
 2985  020522  010037  001164                  MOV     R0,$TMP0        ;SET UP Y VECTOR LENGTH FOR ER TYPE
 2986  020526  104065                          ERROR   65              ;Y DELTA LENGTH INCORRECT
 2987  020530  005237  001124          2$:     INC     $GDDAT          ;BUMP EXPECTED DELTA LENGTH
 2988  020534  005200                          INC     R0              ;ADVANCE TO NEXT Y VECTOR VALUE
 2989  020536  032700  002000                  BIT     #2000,R0        ;HAVE WE DONE 10 BITS?
 2990  020542  001753                          BEQ     1$              ;BR IF NOT
 2991
 2992                                  ;;*****************************************************************
 2993                                  ;*TEST 101       TEST THAT DELTA LENGTH FOLLOWS THE LONGER OF X OR Y WITH MAINT SW3 SET
 2994                                  ;;*****************************************************************
 2995  020544  000004                  TST101: SCOPE
 2996  020546  012737  000040  001166          MOV     #40,$TIMES      ;;DO 40 ITERATIONS
 2997  020554  012737  000101  001206          MOV     #101,$TESTN     ;;SET TEST NUMBER IN APT MAIL BOX
 2998  020562  012737  020642  001110          MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
 2999  020570  013702  002252                  MOV     YPOS,R2         ;R2 CONTAINS REG ADRS OF DELTA (X OR Y POS REG)
 3000  020574  012700  032342                  MOV     #BUFFER,R0      ;GET INSTR ADRS POINTER
 3001  020600  012720  154024                  MOV     #154024,(R0)+   ;SET UP UNITY VECTOR SCALE
 3002  020604  012720  114000                  MOV     #114000,(R0)+   ;STORE POINT INSTR
 3003  020610  005020                          CLR     (R0)+           ;X=0
 3004  020612  005020                          CLR     (R0)+           ;Y=0
 3005  020614  012720  110000                  MOV     #110000,(R0)+   ;STORE LONG VECTOR INSTR
 3006  020620  005020                          CLR     (R0)+           ;X TO BE UPDATED
 3007  020622  005020                          CLR     (R0)+           ;Y TO BE UPDATED
 3008  020624  012710  172000                  MOV     #172000,(R0)    ;STORE STOP INSTR
 3009  020630  012700  001777                  MOV     #1777,R0        ;R0 CONTAINS Y VECTOR LENGTH
 3010  020634  005001                          CLR     R1              ;R1 CONTAINS X VECTOR LENGTH
 3011  020636  010037  001124                  MOV     R0,$GDDAT       ;CONTAINS EXPECTED DELTA LENGTH
 3012  020642  010037  032356          1$:     MOV     R0,BUFFER+14    ;SET UP Y VECTOR LENGTH (1777 TO 0)
 3013  020646  010137  032354                  MOV     R1,BUFFER+12    ;SET UP X VECTOR LENGTH (0 TO 1777)
 3014  020652  004537  025020                  JSR     R5,EXECUTE      ;GO START DISPLAY
 3015  020656  000007                          7                       ;RESUME COUNT
 3016
 3017  020660  010237  001122                  MOV     R2,$BDADR       ;SET UP REG ADRS WHERE DELTA IS
 3018  020664  011237  001126                  MOV     (R2),$BDDAT     ;GREATER OF X OF Y DELTA READ FROM X OR Y POS REG
 3019  020670  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
 3020  020676  001404                          BEQ     2$              ;BR IF SO
 3021  020700  013737  001124  001164          MOV     $GDDAT,$TMP0    ;SET UP LONGEST X OR Y VECTOR LENGTH FOR ER TYPE
 3022  020706  104065                          ERROR   65              ;DELTA LENGTH DOES NOT EQUAL LONGER OF X OR Y
 3023  020710  005300          2$:     DEC     R0              ;DECREASE Y VECTOR VALUE BY 1
 3024  020712  100413                          BMI     TST102          ;;TO NEXT TEST IF 10 BITS OF X & Y HAVE BEEN TESTED
 3025  020714  005201                          INC     R1              ;INCREASE X VECTOR VALUE BY 1
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3026  020716  020001                          CMP     R0,R1           ;LOOK FOR THE LARGEST OF X OR Y
3027  020720  101005                          BHI     3$              ;BR IF Y VECTOR STILL GREATER THAN X
3028  020722  013702  002250                  MOV     XPOS,R2         ;NOW DELTA WILL BE IN XPOS
3029  020726  010137  001124                  MOV     R1,$GDDAT       ;DELTA LENGTH WILL BE THAT OF X VECTOR
3030  020732  000743                          BR      1$              ;TRY NEXT VECTOR COMBINATION
3031  020734  010037  001124          3$:     MOV     R0,$GDDAT       ;DELTA LENGTH WILL BE THAT OF Y VECTOR
3032  020740  000740                          BR      1$              ;TRY NEXT VECTOR COMBINATION
3033
3034                                          ;;*****************************************************************
3035                                          ;*TEST 102      CHECK TANGENT WHEN INCREMENTING Y AT 1777 X WITH MAINT SW3 SET
3036                                          ;;*****************************************************************
3037  020742  000004                  TST102: SCOPE
3038  020744  012737  000040  001166          MOV     #40,$TIMES      ;;DO 40 ITERATIONS
3039  020752  012737  000102  001206          MOV     #102,$TESTN     ;;SET TEST NUMBER IN APT MAIL BOX
3040  020760  012737  021046  001110          MOV     #2$,$LPERR      ;SET UP SCOPE LOOP ADRS
3041  020766  013702  002252                  MOV     YPOS,R2         ;R2 CONTAINS REG ADRS OF TANGENT (X OR Y POS REG)
3042  020772  013701  002262                  MOV     YDOFF,R1        ;R1 CONTAINS REG ADRS OF HI ORDER TANGENT
3043  020776  012700  032342                  MOV     #BUFFER,R0      ;GET INSTR ADRS POINTER
3044  021002  012720  154024                  MOV     #154024,(R0)+   ;SET UP UNITY VECTOR SCALE
3045  021006  012720  114000                  MOV     #114000,(R0)+   ;STORE POINT INSTR
3046  021012  005020                          CLR     (R0)+           ;X=0
3047  021014  005020                          CLR     (R0)+           ;Y=0
3048  021016  012720  110000                  MOV     #110000,(R0)+   ;STORE LONG VECTOR INSTR
3049  021022  012720  001777                  MOV     #1777,(R0)+     ;X=1777
3050  021026  005020                          CLR     (R0)+           ;Y TO BE UPDATED
3051  021030  012710  172000                  MOV     #172000,(R0)    ;STORE STOP INSTR
3052  021034  005000                          CLR     R0              ;R0 CONTAINS INCREMENTING Y VECTOR LENGTH (0-1777)
3053  021036  010037  032356          1$:     MOV     R0,BUFFER+14    ;SET UP Y VECTOR LENGTH (0-1777)
3054  021042  004737  024706                  JSR     PC,CALTAN       ;GO FIGURE OUT WHAT TAN SHOULD BE
3055  021046  004537  025020          2$:     JSR     R5,EXECUTE      ;GO START DISPLAY
3056  021052  000007                          7                       ;RESUME COUNT
3057
3058  021054  010237  001122                  MOV     R2,$BDADR       ;SET UP REG ADRS WHERE TANGENT IS
3059  021060  011237  001126                  MOV     (R2),$BDDAT     ;TANGENT IS READ FROM X OR Y POSITION REG
3060  021064  011105                          MOV     (R1),R5         ;READ HI ORDER TANGENT BITS
3061  021066  004737  024662                  JSR     PC,TANCON       ;GO MAKE UP 12 BIT TANGENT
3062  021072  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
3063  021100  001403                          BEQ     3$              ;BR IF SO
3064  021102  010037  001164                  MOV     R0,$TMP0        ;SET UP Y VECTOR LENGTH FOR ER TYPE
3065  021106  104066                          ERROR   66              ;INCORRECT TANGENT FOR X & Y VALUE INDICATED
3066  021110  005200                  3$:     INC     R0              ;INCREASE X VECTOR VALUE BY 1
3067  021112  022700  001777                  CMP     #1777,R0        ;R0 UP TO 1777 YET?
3068  021116  101347                          BHI     1$              ;BR IF NOT
3069  021120  103405                          BCS     TST103          ;;NEXT TEST IF R0 = 2000
3070  021122  013702  002250                  MOV     XPOS,R2         ;TANGENT WILL NOW BE IN XPOS
3071  021126  013701  002260                  MOV     XDOFF,R1        ;HI ORDER TANGENT BITS NOW IN XDOFF
3072  021132  000741                          BR      1$              ;ONE MORE TIME
3073
3074                                          ;;*****************************************************************
3075                                          ;*TEST 103      CHECK TANGENT WHEN INCREMENTING X AT 1777 Y WITH MAINT SW3 SET
3076                                          ;;*****************************************************************
3077  021134  000004                  TST103: SCOPE
3078  021136  012737  000040  001166          MOV     #40,$TIMES      ;;DO 40 ITERATIONS
3079  021144  012737  000103  001206          MOV     #103,$TESTN     ;;SET TEST NUMBER IN APT MAIL BOX
3080  021152  012737  021240  001110          MOV     #2$,$LPERR      ;SET UP SCOPE LOOP ADRS
3081  021160  013702  002250                  MOV     XPOS,R2         ;R2 CONTAINS REG ADRS OF TANGENT (X OR Y POS REG)
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3082  021164  013701  002260                    MOV     XDOFF,R1          ;R1 CONTAINS REG ADRS OF HI ORDER TANGENT
3083  021170  012700  022342                    MOV     #BUFFER,R0        ;GET INSTR ADRS POINTER
3084  021174  012720  154024                    MOV     #154024,(R0)+     ;SET UP UNITY VECTOR SCALE
3085  021200  012720  114000                    MOV     #114000,(R0)+     ;STORE POINT INSTR
3086  021204  005020                            CLR     (R0)+             ;X=0
3087  021206  005020                            CLR     (R0)+             ;Y=0
3088  021210  012720  110000                    MOV     #110000,(R0)+     ;STORE LONG VECTOR INSTR
3089  021214  005020                            CLR     (R0)+             ;X TO BE UPDATED
3090  021216  012720  001777                    MOV     #1777,(R0)+       ;Y=1777
3091  021222  012710  172000                    MOV     #172000,(R0)      ;STORE STOP INSTR
3092  021226  005000                            CLR     R0                ;R0 CONTAINS INCREMENTING X VECTOR LENGTH (0-1777)
3093  021230  010037  032354          1$:       MOV     R0,BUFFER+12      ;SET UP X VECTOR LENGTH (0-1777)
3094  021234  004737  024706                    JSR     PC,CALTAN         ;GO FIGURE OUT WHAT TAN SHOULD BE
3095  021240  004537  025020          2$:       JSR     R5,EXECUTE        ;GO START DISPLAY
3096  021244  000007                            7                         ;RESUME COUNT
3097
3098  021246  010237  001122                    MOV     R2,$BDADR         ;SET UP REG ADRS WHERE TANGENT IS
3099  021252  011237  001126                    MOV     (R2),$BDDAT       ;TANGENT IS READ FROM X OR Y POSITION REG
3100  021256  011105                            MOV     (R1),R5           ;READ HI ORDER TANGENT BITS
3101  021260  004737  024662                    JSR     PC,TANCON         ;GO MAKE UP 12 BIT TANGENT
3102  021264  023737  001124  001126            CMP     $GDDAT,$BDDAT     ;IS IT CORRECT?
3103  021272  001403                            BEQ     3$                ;BR IF SO
3104  021274  010037  001164                    MOV     R0,$TMP0          ;SET UP X VECTOR LENGTH FOR ER TYPE
3105  021300  104066                            ERROR   66                ;INCORRECT TANGENT FOR X & Y VALUE INDICATED
3106  021302  005200                  3$:       INC     R0                ;INCREASE Y VECTOR VALUE BY 1
3107  021304  022700  002000                    CMP     #2000,R0          ;R0 UP TO 2000 YET?
3108  021310  001347                            BNE     1$                ;BR IF NOT
3109
3110                                            ;;*****************************************************************
3111                                            ;*TEST 104      TEST THAT DPC BITS 16 & 17 WILL SET & RESET
3112                                            ;;*****************************************************************
3113  021312  000004                  TST104: SCOPE
3114  021314  012737  000040  001166            MOV     #40,$TIMES        ;;DO 40 ITERATIONS
3115  021322  012737  000104  001206            MOV     #104,$TESTN       ;;SET TEST NUMBER IN APT MAIL BOX
3116  021330  012737  000060  001124            MOV     #60,$GDDAT        ;EXPECT BOTH BITS INITIALLY
3117  021336  012700  006000                    MOV     #6000,R0          ;PUT RELOCATE VALUE IN R0
3118  021342  012737  021350  001110            MOV     #1$,$LPERR        ;SET UP SCOPE LOOP ADRS
3119  021350  012777  010000  160720  1$:       MOV     #MAINT1,@STKPT    ;SET MAINT SW 1
3120  021356  010077  160672                    MOV     R0,@RLO           ;SET UP RELOCATE VALUE
3121  021362  005077  160656                    CLR     @DPC              ;SET UP DPC ADRS & START DISPLAY
3122  021366  013737  002256  001122            MOV     SREG1,$BDADR      ;SET UP REG ADRS 12
3123  021374  017737  160656  001126            MOV     @SREG1,$BDDAT     ;READ REG 12
3124  021402  042737  177717  001126            BIC     #177717,$BDDAT    ;SAVE ONLY DPC BITS 17 & 16
3125  021410  023737  001124  001126            CMP     $GDDAT,$BDDAT     ;ARE THEY CORRECT?
3126  021416  001401                            BEQ     2$                ;BR IF OK
3127  021420  104067                            ERROR   67                ;RELOCATE VALUE FAILED TO SET UP DPC 16 OR 17
3128  021422  162737  000020  001124  2$:       SUB     #20,$GDDAT        ;SET UP NEXT ADRS VALUE AT EXPECTED LOC
3129  021430  162700  002000                    SUB     #2000,R0          ;SET UP NEXT ADRS VALUE AT R0
3130  021434  100345                            BPL     1$                ;BR IF MORE ADRS TO TEST
3131  021436  005037  001110                    CLR     $LPERR            ;NO RESET SCOPE LOOP
3132  021442  005037  001124                    CLR     $GDDAT            ;EXPECT ZERO
3133  021446  012777  006000  160600            MOV     #6000,@RLO        ;SET BOTH BITS
3134  021454  005077  160564                    CLR     @DPC              ;CLR DPC & START - NO NPR
3135  021460  000005                            RESET                     ;CLR DPC 16 & 17
3136  021462  017737  160570  001126            MOV     @SREG1,$BDDAT     ;READ REG 12
3137  021470  042737  177717  001126            BIC     #177717,$BDDAT    ;SAVE ONLY DPC 16 & 17
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3138  021476  001401                          BEQ     3$              ;BR IF CLEARED
3139  021500  104067                          ERROR   67              ;RESET FAILED TO CLEAR DPC 16 OR 17
3140  021502  005077  160546          3$:     CLR     @RLO            ;CLR RELOCATE REG BEFORE ADVANCING
3141
3142                                          ;;**************************************************************
3143                                          ;*TEST 105       TEST THAT DPC GETS PUSHED ONTO STACK AT HIGHEST BOUNDRY BELOW 28K
3144                                          ;;**************************************************************
3145  021506  000004                  TST105: SCOPE
3146  021510  012737  000105  001206          MOV     #105,$TESTN     ;;SET TEST NUMBER IN APT MAIL BOX
3147  021516  005737  002216                  TST     CENAB           ;DO WE HAVE MORE THAN 8K?
3148  021522  001477                          BEQ     TST106          ;;IF NOT - NEXT TEST
3149  021524  012737  021610  001110  1$:     MOV     #3$,$LPERR      ;SET UP SCOPE LOOP ADRS
3150  021532  013737  002272  001122          MOV     STKVAL,$BDADR   ;SET UP REG 26 ADRS
3151  021540  005002                          CLR     R2              ;CLR ADRS ROTATIONAL VALUE
3152  021542  013700  002214                  MOV     MEMMAX,R0       ;GET LAST 4K MEM BLK
3153  021546  010001                          MOV     R0,R1           ;PUT IT INTO R1
3154  021550  010003                          MOV     R0,R3           ;PUT IT INTO R3 ALSO
3155  021552  062701  020000                  ADD     #20000,R1       ;POINT TO 1ST NON-EXISTENT MEM ADRS IN R1
3156  021556  012704  020040          2$:     MOV     #20040,R4       ;SET UP TOP OF STACK INITIALLY IN R4
3157  021562  012737  000034  001164          MOV     #34,$TMP0       ;SET UP STACK LEVEL WHERE JSR'ED DPC IS STORED
3158  021570  010337  001124                  MOV     R3,$GDDAT       ;SAVE EXPECTED JSR RETURN ADRS OF STK
3159  021574  162703  000002                  SUB     #2,R3           ;REDUCE ADRS BY 2 TO ALLOW FOR JSR REL INSTR
3160  021600  011337  002210                  MOV     (R3),LDRSV1     ;SAVE LOCATION
3161  021604  012713  163400                  MOV     #163400,(R3)    ;LOAD UP JSR REL INSTR
3162  021610  010477  160462          3$:     MOV     R4,@STKPT       ;SET STK PTR
3163  021614  010377  160424                  MOV     R3,@DPC         ;START AT ADRS IN R3
3164  021620  004537  024426                  JSR     R5,DELAY        ;STALL FOR STACKING
3165  021624  000001                          BIT0                    ;COUNT TO ONE
3166  021626  013777  001164  160442          MOV     $TMP0,@STKPT    ;SEL STK LEVEL OF STORED DPC
3167  021634  017737  160432  001126          MOV     @STKVAL,$BDDAT  ;READ STORED JSR RETURN ADRS
3168  021642  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
3169  021650  001401                          BEQ     4$              ;BR IF SO
3170  021652  104005                          ERROR   5               ;JSR REL FAILED TO PUSH ON STK THE RETURN ADRS
3171  021654  162704  000004          4$:     SUB     #4,R4           ;ADVANCE TO NEXT STK LEVEL
3172  021660  162737  000004  001164          SUB     #4,$TMP0        ;HAVE ALL 8 LEVELS BEEN TESTED?
3173  021666  100350                          BPL     3$              ;BR IF NOT
3174  021670  013713  002210                  MOV     LDRSV1,(R3)     ;RESTORE MEM LOC
3175  021674  005702                          TST     R2              ;IS THIS THE 1ST ADRS PASS?
3176  021676  001003                          BNE     5$              ;BR IF NOT
3177  021700  012702  000002                  MOV     #2,R2           ;SET UP ADRS ROTATIONAL FACTOR IN R2
3178  021704  000401                          BR      6$              ;THIS TIME DON'T ROTATE
3179  021706  006302                  5$:     ASL     R2              ;SELECT NEXT ADRS BIT TO LEFT
3180  021710  010003                  6$:     MOV     R0,R3           ;GET HIGHEST ADRS BOUNDRY
3181  021712  060203                          ADD     R2,R3           ;ADD IN NEXT ADRS BIT FOR TEST
3182  021714  103402                          BCS     TST106          ;;TO NEXT TEST IF ADRS GREATER THAN 16 BITS
3183  021716  020103                          CMP     R1,R3           ;IS THERE ROOM FOR THIS ADRS BIT?
3184  021720  103316                          BCC     2$              ;BR IF SO
3185
3186                                          ;;**************************************************************
3187                                          ;*TEST 106       TEST THAT DPC GETS RESTORED FROM STACK AT HIGHEST BOUNDRY BELOW 28K
3188                                          ;;**************************************************************
3189  021722  000004                  TST106: SCOPE
3190  021724  012737  000106  001206          MOV     #106,$TESTN     ;;SET TEST NUMBER IN APT MAIL BOX
3191  021732  005737  002216                  TST     CENAB           ;DO WE HAVE MORE THAN 8K?
3192  021736  001516                          BEQ     TST107          ;;IF NOT - NEXT TEST
3193  021740  012737  022040  001110  1$:     MOV     #3$,$LPERR      ;SET UP SCOPE LOOP ADRS
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3194  021746  005002                          CLR     R2              ;CLR ADRS ROTATIONAL VALUE
3195  021750  013700  002214                  MOV     MEMMAX,R0       ;GET LAST 4K MEM BLK
3196  021754  010001                          MOV     R0,R1           ;PUT IT INTO R1
3197  021756  010003                          MOV     R0,R3           ;PUT IT INTO R3 ALSO
3198  021760  062701  020000                  ADD     #20000,R1       ;POINT TO 1ST NON-EXISTENT MEM ADRS IN R1
3199  021764  012737  166000  032342          MOV     #166000,BUFFER  ;SET UP POP INSTR IN LOWEST 8K
3200  021772  012704  020040          2$:     MOV     #20040,R4       ;SET TOP OF STACK INITIALLY IN R4
320:  021776  012737  000034  001164          MOV     #34,$TMP0       ;SET UP STK LEVEL WHERE JSR'ED DPC IS STORED
3202  022004  010337  001124                  MOV     R3,$GDDAT       ;SAVE EXPECTED JSR RETURN ADRS
3203  022010  162703  000004                  SUB     #4,R3           ;REDUCE ADRS BY 4 TO ALLOW FOR JSR ABS INSTR
3204  022014  011337  002210                  MOV     (R3),LDRSV1     ;SAVE LOCATION
3205  022020  016337  000002  002212          MOV     2(R3),LDRSV2    ;SAVE LOCATION
3206  022026  012713  162000                  MOV     #162000,(R3)    ;LOAD UP JSR ABS INSTR
3207  022032  012763  032342  000002          MOV     #BUFFER,2(R3)   ;LOAD UP ABS ADRS TO POP INSTR IN LOWEST 8K
3208  022040  010477  160232          3$:     MOV     R4,@STKPT       ;SET UP CURRENT STACK LEVEL
3209  022044  010377  160174                  MOV     R3,@DPC         ;START AT ADRS IN R3
3210  022050  013737  002244  001122          MOV     DPC,$BDADR      ;SET UP REG ADRS 00
3211  022056  005277  160162                  INC     @DPC            ;PICK UP ABS ADRS (POP INSTR ADRS)
3212  022062  004537  024426                  JSR     R5,DELAY        ;DELAY FOR STACKING
3213  022066  000001                          BITO                    ;COUNT TO ONE
3214  022070  005277  160150                  INC     @DPC            ;PICK UP POP INSTR
3215  022074  004537  024426                  JSR     R5,DELAY        ;STALL FOR POPPING
3216  022100  000001                          BITO                    ;COUNT TO ONE
3217  022102  017737  160136  001126          MOV     @DPC,$BDDAT     ;GET RETURN ADRS FOR DPC
3218  022110  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;IS IT CORRECT?
3219  022116  001401                          BEQ     4$              ;BR IF SO
3220  022120  104035                          ERROR   35              ;DPC FAILED TO RESTORE AT ADRS & STK LEVEL INDICATED
3221  022122  162704  000004          4$:     SUB     #4,R4           ;SET UP NEXT STK SELECTION LEVEL
3222  022126  162737  000004  001164          SUB     #4,$TMP0        ;HAVE WE GONE THRU 8 LEVELS THIS ADRS
3223  022134  100341                          BPL     3$              ;BR IF NOT
3224  022136  013723  002210                  MOV     LDRSV1,(R3)+    ;RESTORE MEM LOC
3225  022142  013713  002212                  MOV     LDRSV2,(R3)     ;RESTORE MEM LOC
3226  022146  005702                          TST     R2              ;IS THIS THE 1ST ADRS PASS?
3227  022150  001003                          BNE     5$              ;BR IF NOT
3228  022152  012702  000002                  MOV     #2,R2           ;SET UP ADRS ROTATIONAL FACTOR IN R2
3229  022156  000401                          BR      6$              ;THIS TIME DON'T ROTATE
3230  022160  006302                  5$:     ASL     R2              ;SELECT NEXT ADRS BIT TO LEFT
3231  022162  010003                  6$:     MOV     R0,R3           ;GET HIGHEST 4K BOUNDRY ADRS
3232  022164  060203                          ADD     R2,R3           ;ADD IN NEXT ADRS BIT FOR TEST
3233  022166  103402                          BCS     TST107          ;;TO NEXT TEST IF ADRS GREATER THAN 16 BITS
3234  022170  020103                          CMP     R1,R3           ;IS THERE ROOM FOR THIS ADRS BIT?
3235  022172  103277                          BCC     2$              ;BR AND EXERCISE THIS BIT IF SO
3236
3237                                  ;;*****************************************************************
3238                                  ;*TEST 107      TEST THAT THE VS60 CAN OPERATE ABOVE 28K
3239                                  ;;*****************************************************************
3240  022174  000004                  TST107: SCOPE
3241  022176  012737  000040  001166          MOV     #40,$TIMES      ;;DO 40 ITERATIONS
3242  022204  012737  000107  001206          MOV     #107,$TESTN     ;;SET TEST NUMBER IN APT MAIL BOX
3243
3244                                  ;THIS TEST USES THE GRAPHPLOT INCREMENT PART OF THE 'LOAD STATUS B'
3245                                  ;INSTR TO HOLD THE CURRENT 4K MEMORY BLOCK ADRS BEING ADDRESSED
3246                                  ;ABOVE 28K.  THE 6 BITS OF THE GRAPHPLOT HAVE THE FOLLOWING RELATIONSHIP:
3247                                  ;16=32K, 20=36K, 22=40K, 24=44K, ETC. UP TO 76=128K.  THE VS60 PREFORMS
3248                                  ;THE FOLLOWING INSTRS IN EA 4K BLK ABOVE 28K - JSR,POP & 'LOAD STATUS
3249                                  ;B' (LD GRAPHPLOT INC).  AN ERROR IS REPORTED IF THE GRAPHPLOT VALUE
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3250                                        ;RECEIVED IS DIFFERENT THAN THE VALUE WRITTEN TO THE 4K BLK UNDER TEST.
3251
3252  022212  005737  002220                TST     KTENAB          ;DO WE HAVE UPPER CORE?
3253  022216  001547                        BEQ     TST110          ;;IF NOT GO TO NEXT TEST
3254  022220  100437                1$:     BMI     3$              ;BR IF MEM ALREADY LOADED WITH DISPLAY CODE
3255  022222  052737  100000  002220        BIS     #100000,KTENAB  ;DO IT 1ST TIME ONLY
3256  022230  012777  001600  157776        MOV     #1600,@KIPAR2   ;START AT 28K
3257  022236  012701  174116                MOV     #174116,R1      ;GRAPHPLOT VALUE WILL CONTAIN 4K MEM BLK NO
3258  022242  012700  040000        2$:     MOV     #40000,R0       ;USE ADRS ZERO & KIPAR2
3259  022246  052737  001400  177572        BIS     #1400,@#KTSR0   ;ENABLE KT MAINT MODE
3260  022254  012720  163001                MOV     #163001,(R0)+   ;SET UP JSR REL INSTR
3261  022260  010120                        MOV     R1,(R0)+        ;SET UP LOAD STATUS B INSTR
3262  022262  012710  166000                MOV     #166000,(R0)    ;SET UP POP INSTR
3263  022266  042737  001400  177572        BIC     #1400,@#KTSR0   ;DISABLE KT
3264  022274  027737  157734  002222        CMP     @KIPAR2,KTMAX   ;HAS INSTR CODE BEEN LOADED THRU CODE
3265  022302  001406                        BEQ     3$              ;BR IF SO
3266  022304  062777  000200  157722        ADD     #200,@KIPAR2    ;ADVANCE TO NEXT 4K BLK
3267  022312  062701  000002                ADD     #2,R1           ;RECORED MEM BLK IN GRAPHPLOT INC INSTR
3268  022316  000751                        BR      2$              ;GO SET UP INSTRS IN NEXT 4K BLK OF CORE
3269  022320  012777  001600  157706  3$:     MOV     #1600,@KIPAR2   ;SET UP 28K ADRS
3270  022326  005077  157722          4$:     CLR     @RLO            ;CLR RELOCATE REG
3271  022332  017700  157676                MOV     @KIPAR2,R0      ;GET CURRENT 4K BLK ADRS
3272  022336  004737  024556                JSR     PC,DPCONV       ;GO CONVERT 4K BLK ADRS INTO 18 BIT ADRS
3273  022342  010037  001124                MOV     R0,$GDDAT       ;SAVE 16 BIT ADRS
3274  022346  010137  002224                MOV     R1,G1716        ;SAVE ADRS BITS 17 & 16
3275  022352  006201                        ASR     R1              ;NOW SET UP RELOCATION REG
3276  022354  103003                        BCC     5$              ;BR IF ADRS BIT 16 IS NOT SET
3277  022356  052777  002000  157670        BIS     #2000,@RLO      ;SET UP RELOCATION REG BIT 10
3278  022364  006201                5$:     ASR     R1              ;LOOK AT ADRS BIT 17
3279  022366  103003                        BCC     6$              ;BR IF ADRS BIT 17 IS NOT SET
3280  022370  052777  004000  157656        BIS     #4000,@RLO      ;SET UP RELOCATION REG BIT 11
3281  022376  012777  020040  157672  6$:     MOV     #20040,@STKPT   ;SET TOP OF STACK
3282  022404  013777  001124  157632        MOV     $GDDAT,@DPC     ;START
3283  022412  004537  024426                JSR     R5,DELAY        ;GO STALL FOR STACKING
3284  022416  000001                        BIT0                    ;COUNT TO 1
3285  022420  005277  157620                INC     @DPC            ;RESUME
3286  022424  004537  024426                JSR     R5,DELAY        ;GO STALL FOR POPPING
3287  022430  000001                        BIT0                    ;COUNT TO 1
3288  022432  005277  157606                INC     @DPC            ;RESUME
3289  022436  012737  022376  001110        MOV     #6$,$LPERR      ;SET UP SCOPE LOOP ADRS
3290  022444  017700  157600                MOV     @XPOS,R0                ;GET ADRS BLK FROM GRAPHPLOT INC BITS
3291  022450  042700  001777                BIC     #1777,R0        ;SAVE ONLY ADRS BLK INFORMATION READ
3292  022454  005001                        CLR     R1              ;CLR HI ORDER ADRS
3293  022456  004737  024570                JSR     PC,DPCON1       ;GO CONVERT BLK ADRS TO A 18 BIT ADRS
3294  022462  010037  001126                MOV     R0,$BDDAT       ;SAVE 16 BIT ADRS READ
3295  022466  010137  002226                MOV     R1,B1716        ;SAVE ADRS BIT 17 & 16
3296  022472  023737  001124  001126        CMP     $GDDAT,$BDDAT   ;IS THE 16 BIT ADRS CORRECT?
3297  022500  001004                        BNE     7$              ;BR IF NOT
3298  022502  023737  002224  002226        CMP     G1716,B1716     ;ADRS BIT 17 & 16 CORRECT?
3299  022510  001401                        BEQ     8$              ;BR IF SO
3300  022512  104070                7$:     ERROR   70              ;VS60 FAILED TO EXECUTE INSTRS AT ADRS INDICATED
3301  022514  062777  000200  157512  8$:     ADD     #200,@KIPAR2    ;SET NEXT 4K BLK
3302  022522  027737  157506  002222        CMP     @KIPAR2,KTMAX   ;HAS INSTR CODE BEEN EXECUTED IN ALL 4K AVAIL BLKS?
3303  022530  101676                        BLOS    4$              ;BR IF NOT
3304  022532  005077  157516                CLR     @RLO            ;INSURE RELOCATE REG 0 BEFORE ADVANCING
3305
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3336                                    ;;*****************************************************************
3337                                    ;*TEST 110      SILO TEST 1 - ALL STATUS READABLE FROM BUS DIRECTLY
3338                                    ;;*****************************************************************
3339  022536  000004                    TST110: SCOPE
3310  022540  012737  000040  001166            MOV     #40,$TIMES      ;;DO 40 ITERATIONS
3311  022546  012737  000110  001206            MOV     #110,$TESTN     ;;SET TEST NUMBER IN APT MAIL BOX
3312  022554  012700  032342                    MOV     #BUFFER,R0      ;GET ADRS WHERE INSTRS GO
3313  022560  012720  152525                    MOV     #152525,(R0)+   ;NAME OF 2525
3314  022564  012720  155661                    MOV     #155661,(R0)+   ;ROTATE,CHAR SC=1,VEC SC=1
3315  022570  012720  164374                    MOV     #164374,(R0)+   ;CONS0=INT,L.P. INTR EN,L.P. SW INTR EN
3316  022574  012720  164750                    MOV     #164750,(R0)+   ;CONS1=INT,-L.P. INTR EN,-L.P. SW INTR EN
3317  022600  012720  170063                    MOV     #170063,(R0)+   ;ITALICS,MENU
3318  022604  012720  175200                    MOV     #175200,(R0)+   ;COLOR=1
3319  022610  012720  112235                    MOV     #112235,(R0)+   ;LONG VEC,INT=1,BLINK,LINE=1,MODE=2
3320  022614  005020                            CLR     (R0)+           ;X=0
3321  022616  005020                            CLR     (R0)+           ;Y=0
3322  022620  012720  164000                    MOV     #164000,(R0)+   ;NOP
3323  022624  012720  151252                    MOV     #151252,(R0)+   ;NAME=1252
3324  022630  012720  155322                    MOV     #155322,(R0)+   ;-ROTATE,CHAR SC=2,VEC SC=2
3325  022634  012720  164270                    MOV     #164270,(R0)+   ;CONS0=-INT,L.P. INTR EN,-L.P. SW INTR EN
3326  022640  012720  164674                    MOV     #164674,(R0)+   ;CONS1=-INT,L.P. INTR EN,L.P. SW INTR EN
3327  022644  012720  170042                    MOV     #170042,(R0)+   ;-ITALICS,-MENU
3328  022650  012720  175400                    MOV     #175400,(R0)+   ;COLOR=2
3329  022654  012720  146426                    MOV     #146426,(R0)+   ;ABS VEC,INT=2,-BLINK,LINE=2,MODE=11
3330  022660  005020                            CLR     (R0)+           ;X=0
3331  022662  005020                            CLR     (R0)+           ;Y=0
3332
3333  022664  012720  164000                    MOV     #164000,(R0)+   ;NOP
3334  022670  012720  153070                    MOV     #153070,(R0)+   ;NAME=3070
3335  022674  012720  155664                    MOV     #155664,(R0)+   ;ROTATE,CHAR SC=1,VEC SC=4
3336  022700  012720  164374                    MOV     #164374,(R0)+   ;CONS0=INT,L.P. INTR EN,L.P. SW INTR EN
3337  022704  012720  164750                    MOV     #164750,(R0)+   ;CONS1=INT,-L.P. INTR EN,-L.P. SW INTR EN
3338  022710  012720  170063                    MOV     #170063,(R0)+   ;ITALICS,MENU
3339  022714  012720  175200                    MOV     #175200,(R0)+   ;COLOR=1
3340  022720  012720  113035                    MOV     #113035,(R0)+   ;LONG VEC,INT=4,BLINK,LINE=1,MODE=2
3341  022724  005020                            CLR     (R0)+           ;X=0
3342  022726  005020                            CLR     (R0)+           ;Y=0
3343  022730  012720  164000                    MOV     #164000,(R0)+   ;NOP
3344  022734  012720  150707                    MOV     #150707,(R0)+   ;NAME=0707
3345  022740  012720  155330                    MOV     #155330,(R0)+   ;-ROTATE,CHAR SC=2,VEC SC=10
3346  022744  012720  164270                    MOV     #164270,(R0)+   ;CONS0=-INT,L.P. INTR EN,-L.P. SW INTR EN
3347  022750  012720  164674                    MOV     #164674,(R0)+   ;CONS1=-INT,L.P. INTR EN,L.P. SW INTR EN
3348  022754  012720  175400                    MOV     #175400,(R0)+   ;COLOR=2
3349  022760  012720  170042                    MOV     #170042,(R0)+   ;-ITALICS,-MENU
3350  022764  012720  146026                    MOV     #146026,(R0)+   ;ABS VEC,INT=0,-BLINK,LINE=2,MODE=11
3351  022770  005020                            CLR     (R0)+           ;X=0
3352  022772  005020                            CLR     (R0)+           ;Y=0
3353  022774  012720  161730                    MOV     #161730,(R0)+   ;JMP REL TO BUFFER START
3354
3355  023000  013700  001252                    MOV     $VECT1,R0       ;GET BASIC VECTOR ADRS
3356  023004  012760  023166  000004            MOV     #3$,4(R0)       ;SET UP INTR RETURN ADRS
3357  023012  012760  000340  000006            MOV     #340,6(R0)      ;SET PRIORITY TO HIGHEST LEVEL ON INTR
3358  023020  012701  023416                    MOV     #BSTART,R1      ;R1 CONTAINS ADRS PTR OF DISPLAY STARTS
3359  023024  012702  023330                    MOV     #SILOR,R2       ;R2 CONTAINS ADRS PTR OF EXPECTED SILO RESULTS
3360  023030  012703  023430                    MOV     #RCNT,R3        ;R3 CONTAINS ADRS PTR OF # OF RESUMES FOR EA SILO LEVEL
3361  023034  012704  023402                    MOV     #BADR,R4        ;R4 CONTAINS ADRS PTR WHERE REG DATA IS EXPECTED
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3362  023040  012705  023330                  MOV     #SILOR,R5       ;R5 WILL UPDATE R2 ON NEXT BUF START ADRS
3363  023044  005037  001164                  CLR     $TMP0           ;$TMP0 CONTAINS SILO LEVEL UNDER TEST
3364  023050  012777  020040  157220  1$:     MOV     #20040,@STKPT   ;TEST DONE WITH MAINT SW 2
3365  023056  012737  000340  177776          MOV     #340,PSW        ;WANT PRIORITY LEVEL AT TOP
3366  023064  011177  157154                  MOV     (R1),@DPC       ;START
3367  023070  011300                          MOV     (R3),R0         ;SET UP RESUME CNTR
3368  023072  005277  157146          2$:     INC     @DPC            ;RESUME
3369  023076  012737  023050  001110          MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
3370  023104  005300                          DEC     R0              ;COUNT RESUME
3371  023106  001371                          BNE     2$              ;BR IF CNT NOT TO ZERO
3372  023110  052777  040000  157160          BIS     #40000,@STKPT   ;SET MAINT SW 3
3373  023116  052777  040000  157142          BIS     #40000,@CONS    ;SET L.P. FLAG 00
3374  023124  005037  177776                  CLR     PSW             ;ALLOW INTR
3375  023130  021616                          CMP     (SP),(SP)       ;LET CPU GRANT REQ
3376  023132  021616                          CMP     (SP),(SP)       ;
3377  023134  021616                          CMP     (SP),(SP)       ;
3378  023136  021616                          CMP     (SP),(SP)       ;
3379  023140  013737  002266  001122          MOV     CONS,$BDADR     ;SET UP REG ADRS 22
3380  023146  012737  144000  001124          MOV     #144000,$GDDAT  ;EXPECT L. P. FLAG
3381  023154  017737  157106  001126          MOV     @CONS,$BDDAT    ;READ REG 22
3382  023162  104001                          ERROR   1               ;L.P. FLAG INTR FAILED USING MAINT MODE 3
3383  023164  000455                          BR      7$              ;NEXT TEST ON INTR FAILURE
3384  023166  022626                  3$:     CMP     (SP)+,(SP)+     ;FIX STACK SINCE NO RTI ON INTR
3385  023170  017437  000000  001122  4$:     MOV     @0(R4),$BDADR   ;GET BUS ADRS WHERE DATA IS
3386  023176  017737  155720  001126          MOV     @$BDADR,$BDDAT  ;GET DATA FROM REG
3387  023204  011237  001124                  MOV     (R2),$GDDAT     ;GET EXPECTED DATA FROM SILOR TABLE
3388  023210  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;CORRECT?
3389  023216  001401                          BEQ     5$              ;BR IF SO
3390  023220  104002                          ERROR   2               ;SILO FAILURE AT LEVEL INDICATED
3391  023222  062702  000002          5$:     ADD     #2,R2           ;BUMP ADRS PTR OF EXPECTED SILO RESULTS
3392  023226  062704  000002                  ADD     #2,R4           ;BUMP ADRS PTR OF REG ADRS WHERE DATA IS READ
3393  023232  005714                          TST     (R4)            ;DONE CHECKS?
3394  023234  001355                          BNE     4$              ;BR IF NOT
3395  023236  012704  023402                  MOV     #BADR,R4        ;RESET REG ADRS PTR
3396  023242  005712                          TST     (R2)            ;AT END OF RESULT TABLE?
3397  023244  001002                          BNE     6$              ;BR IF NOT
3398  023246  012702  023330                  MOV     #SILOR,R2       ;RESET ADRS PTR OF EXPECTED RESULTS
3399  023252  062703  000002          6$:     ADD     #2,R3           ;POINT TO NEXT RESUME CNT FOR NEXT SILO LEVEL
3400  023256  005237  001164                  INC     $TMP0           ;ADVANCE TO NEXT SILO LEVEL
3401  023262  022737  000004  001164          CMP     #4,$TMP0        ;ALL 4 LEVELS TESTED AT THIS STARTING ADRS?
3402  023270  001267                          BNE     1$              ;BR IF NOT - REPEAT TEST CHECKING NEXT SILO LEVEL
3403  023272  005037  001164                  CLR     $TMP0           ;RESET SILO LEVEL FOR TESTING WITH DIFF DATA
3404  023276  012703  023430                  MOV     #RCNT,R3        ;RESET RESUME CNT ADRS PTR
3405  023302  062705  000012                  ADD     #12,R5          ;NEW RESULT ADRS FOR NEXT BUF START ADRS
3406  023306  010502                          MOV     R5,R2           ;UPDATE RESULT PTR
3407  023310  062701  000002                  ADD     #2,R1           ;BUMP BUFFER STARTING ADRS PTR - THIS CAUSES
3408                                                                  ;DIFFERENT DATA PATTERNS THRU SILO
3409  023314  005711                          TST     (R1)            ;ALL 4 BUFFER ADRS STARTS BEEN DONE?
3410  023316  001254                          BNE     1$              ;BR IF NOT
3411  023320  004737  024626          7$:     JSR     PC,RSTVEC       ;GO RESTORE VECTOR WITH HALT
3412  023324  000005                          RESET                   ;CLR VS60 BEFORE ADVANCING
3413  023326  000445                          BR      TST111          ;;TO NEXT TEST
3414
3415  023330  032364                  SILOR:  BUFFER+22       ;DPC RETURN ADRS
3416  023332  010631                          10631   ;MODE=2,INT=1,L.P. FLAG,ITALICS,BLINK,LINE=1
3417  023334  002501                          2501    ;ROTATE,CHAR SC=1,MENU,VCT CS=1
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3418  023336  147004                          147004  ;CONSO=INT,L.P. FLG,L.P. INTR EN,L.P. SW EN,CONS1=INT,COLOR=1
3419  023340  002525                          2525    ;NAME=2525
3420  023342  032410                          BUFFER+46       ;DPC RETURN ADRS
3421  023344  045202                          45202   ;MODE=11,INT=2,L.P. FLG,LINE=2
3422  023346  001002                          1002    ;CHAR SC=2,VCT SC=2
3423  023350  044070                          44070   ;CONSO=L.P.FLG,L.P. INTR EN,CONS1=L.P. FLG INTR EN,L.P. SW EN,COLOR=2
3424  023352  001252                          1252    ;NAME=1252
3425  023354  032434                          BUFFER+72       ;DPC RETURN ADRS
3426  023356  012231                          12231   ;MODE=2,INT=3,L.P. FLG,ITALICS,BLINK,LINE=1
3427  023360  002504                          2504    ;ROTATE,CHAR SC=1,MENU,VEC SC=4
3428  023362  147004                          147004  ;CONSO=INT,L.P. FLG,L.P. INTR EN,L.P. SW EN,CONS1=INT,COLOR=1
3429  023364  003070                          3070    ;NAME=3070
3430  023366  032460                          BUFFER+116      ;DPC RETURN ADRS
3431  023370  044202                          44202   ;MODE=11,INT=0,L.P. FLG,LINE=2
3432  023372  001010                          1010    ;CHAR SC=2,VCT SC=4
3433  023374  044070                          44070   ;CONSO=L.P. FLG,L.P. INTR EN,CONS1=L.P. FLG FLG EN,L.P. SE EN,COLOR=2
3434  023376  000707                          707     ;NAME=707
3435  023400  000000                          0       ;TERMINATOR
3436
3437  023402  002244                  BADR:   DPC     ;THIS TABLE CONTAINS REGS ADRS WHERE DATA IS EXPECTED
3438  023404  002246                          SREG0
3439  023406  002256                          SREG1
3440  023410  002266                          CONS
3441  023412  002270                          DNAME
3442  023414  000000                          0
3443
3444  023416  032342                  BSTART: BUFFER  ;THIS TABLE CONTAINS DIFFERENT STARTING ADRS FOR TESTING
3445                                          ;EACH SILO LEVEL
3446  023420  032366                          BUFFER+24
3447  023422  032412                          BUFFER+50
3448  023424  032436                          BUFFER+74
3449  023426  000000                          0
3450
3451  023430  000017                  RCNT:   17      ;THIS TABLE CONTROLS THE AMOUNT OF RESUMES NEEDED TO
3452                                          ;CYCLE THRU ALL FOUR LEVELS OF SILO
3453  023432  000031                          31
3454  023434  000043                          43
3455  023436  000055                          55
3456  023440  000000                          0
3457
3458                                  ;;**********************************************************************
3459                                  ;*TEST 111      SILO TEST 2 - ALL STATUS VERIFIED ON STACK
3460                                  ;**********************************************************************
3461  023442  000004                  TST111: SCOPE
3462  023444  012737  000040  001166          MOV     #40,$TIMES      ;;DO 40 ITERATIONS
3463  023452  012737  000111  001206          MOV     #111,$TESTN     ;;SET TEST NUMBER IN APT MAIL BOX
3464  023460  012700  032342                  MOV     #BUFFER,R0      ;GET ADRS WHERE INSTR'S GO
3465  023464  012720  171600                  MOV     #171600,(R0)+   ;STOP INTR EN,-L.P. HIT EN
3466  023470  012720  176357                  MOV     #176357,(R0)+   ;QUE CNTRL,-EDGE FLG INTR EN,QUE,CHAR STRING ESC
3467  023474  012720  164770                  MOV     #164770,(R0)+   ;CONS1=INT,L.P. INTR EN
3468  023500  012720  102200                  MOV     #102200,(R0)+   ;CHAR INSTR,INT=1
3469  023504  012720  007015                  MOV     #7015,(R0)+     ;SHIFT OUT & 'CR'
3470  023510  012720  164000                  MOV     #164000,(R0)+   ;NOP OR JSR REL +1 WHEN CHECKING SILO
3471  023514  012720  164000                  MOV     #164000,(R0)+   ;NOP
3472  023520  012720  171300                  MOV     #171300,(R0)+   ;-STOP INTR EN,L.P. HIT EN
3473  023524  012720  176272                  MOV     #176272,(R0)+   ;-QUE CNTRL,EDGE FLG INTR EN,-QUE,-CHAR STRING ESC
```

```
3474  023530  012720  164770                      MOV     #164770,(R0)+   ;CONS1=INT,L.P. INTR EN
3475  023534  012720  102400                      MOV     #102400,(R0)+   ;CHAR INSTR,INT=2
3476  023540  012720  006417                      MOV     #6417,(R0)+     ;SHIFT OUT OFF & 'CR'
3477  023544  012720  164000                      MOV     #164000,(R0)+   ;NOP OR JSR REL +1 WHEN CHECKING SILO
3478  023550  012720  164000                      MOV     #164000,(R0)+   ;NOP
3479  023554  012720  171600                      MOV     #171600,(R0)+   ;STOP INTR EN,-L.P. HIT EN
3480  023560  012720  176357                      MOV     #176357,(R0)+   ;QUE CNTRL,-EDGE FLG INTR EN,QUE,CHAR STRING ESC
3481  023564  012720  164770                      MOV     #164770,(R0)+   ;CONS1=INT,L.P. INTR EN
3482  023570  012720  102600                      MOV     #102600,(R0)+   ;CHAR INSTR,INT=3
3483  023574  012720  007015                      MOV     #7015,(R0)+     ;SHIFT OUT & 'CR'
3484  023600  012720  164000                      MOV     #164000,(R0)+   ;NOP OR JSR REL +1 WHEN CHECKING SILO
3485  023604  012720  164000                      MOV     #164000,(R0)+   ;NOP
3486  023610  012720  171300                      MOV     #171300,(R0)+   ;-STOP INTR EN,L.P. HIT EN
3487  023614  012720  176272                      MOV     #176272,(R0)+   ;-QUE CNTRL,EDGE FLG INTR EN,-QUE,-CHAR STRING ESC
3488  023620  012720  164770                      MOV     #164770,(R0)+   ;CONS1=INT,L.P INTR EN
3489  023624  012720  103000                      MOV     #103000,(R0)+   ;CHAR INSTR,INT=4
3490  023630  012720  006417                      MOV     #6417,(R0)+     ;SHIFT OUT OFF & 'CR'
3491  023634  012720  164000                      MOV     #164000,(R0)+   ;NOP OR JSR REL +1 WHEN CHECKING SILO
3492  023640  012720  161744                      MOV     #161744,(R0)+   ;JMP REL TO BUFFER START
3493  023644  013700  001252                      MOV     $VECT1,R0       ;GET BASIC VECTOR ADRS
3494  023650  012760  024030  000004            MOV     #3$,4(R0)       ;SET UP INTR RETURN ADRS
3495  023656  012760  000340  000006            MOV     #340,6(R0)      ;HIGHEST PRIORITY ON INTR
3496  023664  012737  023712  001110            MOV     #1$,$LPERR      ;SET UP SCOPE LOOP ADRS
3497  023672  012701  024236                      MOV     #BSTRT,R1       ;R1 CONTAINS ADRS PTR OF DISPLAY STARTS
3498  023676  012702  024230                      MOV     #SILOR1,R2      ;R2 CONTAINS ADRS PTR OF EXPECTED SILO DATA
3499  023702  012703  024250                      MOV     #RCNT1,R3       ;R3 CONTAINS ADRS PTR OF # OF RESUMES FOR EA SILO LEVEL
3500  023706  005037  001164                      CLR     $TMP0           ;$TMP0 CONTAINS SILO LEVEL UNDER TEST
3501  023712  012777  020040  156356  1$:       MOV     #20040,@STKPT   ;SET MAINT SW 2 & TOP OF STACK
3502  023720  012737  000340  177776            MOV     #340,PSW        ;WANT PRIORITY AT TOP
3503  023726  011177  156312                      MOV     (R1),@DPC       ;START
3504  023732  011300                              MOV     (R3),R0         ;SET UP RESUME CNTR
3505  023734  005277  156304            2$:     INC     @DPC            ;RESUME
3506  023740  004537  024426                      JSR     R5,DELAY        ;STALL
3507  023744  000004                              BIT2                    ;COUNT TO 4
3508  023746  005300                              DEC     R0              ;COUNT RESUME
3509  023750  001371                              BNE     2$              ;BR IF COUNT NOT TO ZERO
3510  023752  052777  040000  156316            BIS     #40000,@STKPT   ;SET MAINT SW 3
3511  023760  052777  000400  156300            BIS     #400,@CONS      ;SET L.P. FLAG 01
3512  023766  005037  177776                      CLR     PSW             ;ALLOW INTR
3513  023772  021616                              CMP     (SP),(SP)       ;LET CPU GRANT REQ
3514  023774  021616                              CMP     (SP),(SP)       ;
3515  023776  021616                              CMP     (SP),(SP)       ;
3516  024000  021616                              CMP     (SP),(SP)       ;
3517  024002  013737  002266  001122            MOV     CONS,$BDADR     ;SET UP ADRS REG 22
3518  024010  012737  101440  001124            MOV     #101440,$GDDAT  ;EXPECT L.P. FLAG 01,INTS,L.P. EN
3519  024016  017737  156244  001126            MOV     @CONS,$BDDAT    ;READ REG 22
3520  024024  104001                              ERROR   1               ;L.P. FLAG 01 FAILED TO INTR USING MAINT MODE 3
3521  024026  000474                              BR      7$              ;NEXT TEST ON INTR FAILURE
3522  024030  022626                      3$:     CMP     (SP)+,(SP)+     ;FIX STACK SINCE NO RTI
3523  024032  017737  156206  024226            MOV     @DPC,DPCSAV     ;GET DPC ADRS
3524  024040  012777  163000  000160            MOV     #163000,@DPCSAV ;SET UP JSR REL AT SILO RESTORED DPC
3525  024046  013777  024226  156170            MOV     DPCSAV,@DPC     ;SHOULD DO A JSR NOW(RESTORED SILO DATA TO STACK)
3526  024054  004537  024426                      JSR     R5,DELAY        ;STALL FOR STACKING
3527  024060  000001                              BIT0                    ;COUNT TO 1
3528  024062  012777  164000  000136            MOV     #164000,@DPCSAV ;RESTORE NOP INSTR FOR NEXT STARTS
3529  024070  013737  002272  001122            MOV     STKVAL,$BDADR   ;SET UP REG ADRS 26
```

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3530  024076  052777  000037  156172          BIS     #37,@STKPT      ;DATA IS IN BYTE 3 OF STACK LEVEL 1
3531  024104  017737  156162  001126          MOV     @STKVAL,$BDDAT  ;READ SAVE STATUS FROM STACK
3532  024112  011237  001124                  MOV     (R2),$GDDAT     ;GET EXPECTED STATUS
3533  024116  023737  001124  001126          CMP     $GDDAT,$BDDAT   ;CORRECT?
3534  024124  001401                          BEQ     4$              ;BR IF SO
3535  024126  104002                          ERROR   2               ;SILO FAILED AT LEVEL INDICATED - DATA VERIFIED FROM STK
3536  024130  062702  000002          4$:     ADD     #2,R2           ;BUMP ADRS PTR OF EXPECTED SILO RESULTS
3537  024134  005712                          TST     (R2)            ;AT END OR RESULT TABLE?
3538  024136  001002                          BNE     5$              ;BR IF NOT
3539  024140  012702  024230                  MOV     #SILOR1,R2      ;RESET ADRS PTR OF EXPECTED RESULTS
3540  024144  062703  000002          5$:     ADD     #2,R3           ;POINT TO NEXT RESUME CNT FOR NEXT SILO LEVEL
3541  024150  005237  001164                  INC     $TMPO           ;ADVANCE TO NEXT SILO LEVEL
3542  024154  022737  000004  001164          CMP     #4,$TMPO        ;ALL 4 LEVELS TESTED AT THIS STARTING ADRS?
3543  024162  001253                          BNE     1$              ;BR IF NOT - REPEAT TEST CHECKING NEXT SILO LEVEL
3544  024164  005037  001164                  CLR     $TMPO           ;RESET SILO LEVEL FOR TESTING WITH DIFF DAT
3545  024170  012703  024250                  MOV     #RCNT1,R3       ;RESET RESUME CNT ADRS PTR
3546  024174  062702  000002                  ADD     #2,R2           ;NEW RESULT ADRS FOR NEXT BUF STARTING ADRS
3547  024200  005712                          TST     (R2)            ;END OF TABLE?
3548  024202  001002                          BNE     6$              ;BR IF NOT
3549  024204  012702  024230                  MOV     #SILOR1,R2      ;RESET RESULT ADRS
3550  024210  062701  000002          6$:     ADD     #2,R1           ;BUMP BUFFER STARTING ADRS PTR - THIS
3551                                                                  ;CAUSES DIFFERNT DATA PATTERNS THRU SILO
3552  024214  005711                          TST     (R1)            ;ALL 4 BUFFER ADRS STARTS BEEN DONE?
3553  024216  001235                          BNE     1$              ;BR IF NOT
3554  024220  004737  024626          7$:     JSR     PC,RSTVEC       ;GO RESTORE VECTOR WITH HALT
3555  024224  000416                          BR      TST112          ;;GO TO NEXT TEST
3556
3557  024226  000000          DPCSAV: 0       ;THIS LOCATION SAVES THE DPC THAT WAS RESTORED FROM THE SILO
3558
3559  024230  053465          SILOR1: 53465   ;SHIFT OUT,CHAR STRING ESC,-EDGE FLG INTR EN,QUE,QUE CNTRL
3560                                          ;L.P. INTR EN 01,INT 00&01,-L.P. HIT DIS,STOP INTR EN
3561  024232  005066                  5066    ;-SHIFT OUT,-CHAR STRING ESC,EDGE FLG INTR EN,-QUE,-QUE CNTRL,
3562                                          ;L.P. INTR EN 01,INT 00&01,L.P. HIT DIS,-STOP INTR EN
3563  024234  000000                  0       ;TERMINATOR
3564
3565  024236  032342          BSTRT:  BUFFER  ;THIS TABLE CONTAINS DIFFERENT STARTING ADRS FOR TESTING
3566                                          ;EACH SILO LEVEL
3567  024240  032360                  BUFFER+16
3568  024242  032376                  BUFFER+34
3569  024244  032414                  BUFFER+52
3570  024246  000000                  0
3571
3572  024250  000011          RCNT1:  11      ;THIS TABLE CONTROLS THE  AMOUNT OF RESUMES NEEDED TO
3573  024252  000020                  20      ;CYCLE THRU ALL FOUR LEVELS OF SILO
3574  024254  000027                  27
3575  024256  000036                  36
3576  024260  000000                  0
3577
3578                                  ;;*****************************************************************
3579                                  ;*TEST 112       TEST FOR HALT AT END OF DIAGNOSTIC (SW12 SET)
3580                                  ;;*****************************************************************
3581  024262  000004          TST112: SCOPE
3582  024264  012737  000112  001206          MOV     #112,$TESTN     ;;SET TEST NUMBER IN APT MAIL BOX
3583  024272  032777  010000  154640          BIT     #BIT12,@SWR     ;IS SR12 SET?
3584  024300  001401                          BEQ     $EOP            ;BR IF NOT
3585  024302  000000                          HALT                    ;COMPLETED PASS - SW12 SAYS HALT
```

```
                                        .SBTTL  END OF PASS ROUTINE

                                        ;;**********************************************************************
                                        ;*INCREMENT THE PASS NUMBER ($PASS)
                                        ;*TYPE "END PASS #XXXXX" (WHERE XXXXX IS A DECIMAL NUMBER)
                                        ;*IF THERES A MONITOR GO TO IT
                                        ;*IF THERE ISN'T JUMP TO FSTART

024304                                  $EOP:
024304  000004                                SCOPE
024306  005037  001102                       CLR     $TSTNM          ;;ZERO THE TEST NUMBER
024312  005037  001166                       CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
024316  005237  001210                       INC     $PASS           ;;INCREMENT THE PASS NUMBER
024322  042737  100000  001210               BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
024330  005327                               DEC     (PC)+           ;;LOOP?
024332  000001                  $EOPCT: .WORD   1
024334  003022                          BGT     $DOAGN          ;;YES
024336  012737                          MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
024340  000001                  $ENDCT: .WORD   1
024342  024332                          $EOPCT
024344  104400  024411                  TYPE    ,$ENDMG         ;;TYPE "END PASS #"
024350  013746  001210                  MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
024354  104404                          TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
024356  104400  024406                  TYPE    ,$ENULL         ;;TYPE A NULL CHARACTER
024362  013700  000042          $GET42: MOV     @#42,R0         ;;GET MONITOR ADDRESS
024366  001405                          BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
024370  000005                          RESET                   ;;CLEAR THE WORLD
024372  004710                  $ENDAD: JSR     PC,(R0)         ;;GO TO MONITOR
024374  000240                          NOP                     ;;SAVE ROOM
024376  000240                          NOP                     ;;FOR
024400  000240                          NOP                     ;;ACT11
024402                          $DOAGN:
024402  000137                          JMP     @(PC)+          ;;RETURN
024404  003244                  $RTNAD: .WORD   RSTART
024406     377     377     000  $ENULL: .BYTE   -1,-1,0          ;;NULL CHARACTER STRING
024411     015  042412  042116  $ENDMG: .ASCIZ  <15><12>/END PASS #/
024416  050040  051501  020123
024424  000043
```

```
3624                                    ;;*****************************************************************
3625                                    ;THIS ROUTINE WILL STALL FOR THE NO OF COUNTS IN THE ADRS OF R5
3626                                    ;;*****************************************************************
3627  024426  012537  002206           DELAY:  MOV     (R5)+,DLYCNT    ;GET DELAY COUNT
3628  024432  005337  002206           1$:     DEC     DLYCNT          ;START COUNTING
3629  024436  001375                           BNE     1$              ;BR IF MORE COUNTS
3630  024440  000205                           RTS     R5              ;EXIT DELAY ROUTINE
3631
3632                                    ;;*****************************************************************
3633                                    ;THIS ROUTINE SETS UP JSR, POP & TEST INSTR FOR POP-RESTORE TESTS
3634                                    ;;*****************************************************************
3635  024442  012777  020040  155626   POPSET: MOV     #20040,@STKPT   ;SET TOP OF STK
3636  024450  012737  163000  032344           MOV     #163000,BUFFER+2        ;SET UP JSR REL INSTR
3637  024456  012737  166000  032350           MOV     #166000,BUFFER+6        ;SET UP POP-RESTORE INSTR
3638  024464  012437  032346                   MOV     (R4)+,BUFFER+4  ;SET UP INSTRUCTION UNDER TEST
3639  024470  000204                           RTS     R4              ;RETURN
3640
3641                                    ;;*****************************************************************
3642                                    ;THIS ROUTINE CONTROLS JSR, POP & TEST INSTR SEQUENCE FOR POP-RESTORE TESTS
3643                                    ;;*****************************************************************
3644  024472  012777  020040  155576   DO:     MOV     #20040,@STKPT   ;SET TOP OF STK
3645  024500  012777  032342  155536           MOV     #BUFFER,@DPC    ;START -SET BITS UNDER TEST
3646  024506  052777  020000  155562           BIS     #20000,@STKPT   ;FUMBLE
3647  024514  005277  155524                   INC     @DPC            ;ADVANCE TO JSR INSTR
3648  024520  004537  024426                   JSR     R5,DELAY        ;STALL FOR STACKING
3649  024524  000004                           BIT2                    ;COUNT TO 4
3650  024526  012777  032346  155510           MOV     #BUFFER+4,@DPC  ;START -RESET BITS UNDER TEST
3651  024534  052777  020000  155534           BIS     #20000,@STKPT   ;FUMBLE
3652  024542  005277  155476                   INC     @DPC            ;ADVANCE TO POP INSTR
3653  024546  004537  024426                   JSR     R5,DELAY        ;STALL FOR RESTORING
3654  024552  000004                           BIT2                    ;COUNT TO 4
3655  024554  000207                           RTS     PC              ;RETURN
3656
3657                                    ;;*****************************************************************
3658                                    ;THIS ROUTINE CONVERTS A KT11 PAGE ADRS TO A 18 BIT ADRS
3659                                    ;;*****************************************************************
3660  024556  005001                   DPCONV: CLR     R1              ;CLR HI ORDER ADRS
3661  024560  006300                           ASL     R0              ;START SHIFTING LEFT
3662  024562  006300                           ASL     R0              ;
3663  024564  006300                           ASL     R0              ;
3664  024566  006300                           ASL     R0              ;
3665  024570  100002                   DPCON1: BPL     1$              ;BR IF ADRS BIT 17 IS CLR
3666  024572  012701  000002                   MOV     #2,R1           ;SET ADRS BIT 17 INDICATION IN BIT 1 - R1
3667  024576  006300                   1$:     ASL     R0              ;LOOK AT ADRS BIT 16
3668  024600  100001                           BPL     2$              ;BR IF ADRS BIT 16 IS CLR
3669  024602  005201                           INC     R1              ;SET ADRS BIT 16 INDICATION IN BIT 0 - R1
3670  024604  006300                   2$:     ASL     R0              ;COMPLETE LEFT JUSTIFICATION
3671  024606  000207                           RTS     PC              ;RETURN
3672
```

```
                                        ;;*****************************************************************
                                        ;THIS CODE REPORTS ANY KT11 ERROR AND HALTS
                                        ;;*****************************************************************
024610  042737  001400  177572  KTSER:  BIC     #1400,@#KTSRO   ;DISABLE KT11
024616  104400  027457                  TYPE    ,MSG2           ;GO REPORT KT11 THAT A ERROR TRAP OCCURRED
024622  000000                  1$:     HALT                    ;KT11 ERROR TRAP - RUN KT11 DIAG OR
024624  000776                          BR      1$              ;RESTART

                                        ;;*****************************************************************
                                        ;THIS CODE RESETS ALL VS60 VECTORS WITH HALTS
                                        ;;*****************************************************************
024626  012737  000340  177776  RSTVEC: MOV     #340,PSW        ;RESET PRIORITY TO HIGHEST LEVEL
024634  012701  000010                  MOV     #10,R1          ;SET UP VECTOR LOCATION COUNT
024640  013700  001252                  MOV     $VECT1,R0       ;GET 1ST VS60 VECTOR ADRS
024644  010010                  1$:     MOV     R0,(R0)         ;SET UP ADRS TO HALT
024646  062720  000002                  ADD     #2,(R0)+        ;POINT IT TO HALT
024652  005020                          CLR     (R0)+           ;SET UP HALT
024654  005301                          DEC     R1              ;COUNT THIS VECTOR RESTORE
024656  001372                          BNE     1$              ;BR IF MORE TO RESTORE
024660  000207                          RTS     PC              ;RETURN IF ALL DONE

                                        ;;*****************************************************************
                                        ;THIS ROUTINE MAKES UP A 12 BIT TANGENT FROM THE X OR Y POS
                                        ;REGS AND THE X OR Y DYNAMIC OFFSET REGS (HI ORDER 2 BITS) AND
                                        ;LEAVES THE RESULT IN $BDDAT
                                        ;;*****************************************************************
024662  042737  176000  001126  TANCON: BIC     #176000,$BDDAT  ;SAVE LOW ORDER BITS ONLY
024670  042705  147777                  BIC     #147777,R5      ;ONLY WANT BITS 10 & 11
024674  006205                          ASR     R5              ;ROTATE 2 RIGHT
024676  006205                          ASR     R5              ;
024700  060537  001126                  ADD     R5,$BDDAT       ;MAKE UP 12 BIT TANGENT
024704  000207                          RTS     PC              ;RETURN
```

```
3706                                    ;;*****************************************************************
3707                                    ;THIS ROUTINE UPDATES THE TANGENT IN & GDDAT FOR EVERY INCREASE
3708                                    ; IN VECTOR OF X OR Y
3709                                    ;;*****************************************************************
3710  024706  001010                    CALTAN: BNE     1$              ;BR AND SET UP TANGENT IF VECTOR NON-ZERO
3711  024710  012703  000400                    MOV     #400,R3         ;R3 COUNTS EVERY 256+4 ADDS TO TANGENT
3712  024714  012737  000001  001124            MOV     #1,$GDDAT       ;TANGENT WILL BE 1 WHEN VECTOR LENGTH 0
3713  024722  005037  025016                    CLR     TANGNT          ;TANGENT HOLDING LOC
3714  024726  000432                            BR      3$              ;RETURN WITH ZERO TANGENT
3715  024730  013737  025016  001124  1$:       MOV     TANGNT,$GDDAT   ;GET LAST VALUE
3716  024736  062737  000005  001124            ADD     #5,$GDDAT       ;ADD 4 AND 1 FOR FRACTIONAL ROUNDING IN HARDWARE
3717  024744  062737  000004  025016            ADD     #4,TANGNT       ;ADD 4 ON EVERY COUNT OF VECTOR LENGTH
3718  024752  005303                            DEC     R3              ;ROUND UP EVERY 11.25 DEGREES
3719  024754  001010                            BNE     2$              ;BR IF NOT REQUIRED
3720  024756  062737  000001  001124            ADD     #1,$GDDAT       ;ROUND UP EVERY 256
3721  024764  062737  000001  025016            ADD     #1,TANGNT       ;SAME
3722  024772  012703  000400                    MOV     #400,R3         ;RESET 256 COUNT
3723  024776  032737  010000  001124  2$:       BIT     #10000,$GDDAT   ;TEST TANGENT FOR GREATER THAN 12 BITS
3724  025004  001403                            BEQ     3$              ;BR IF NOT
3725  025006  012737  007777  001124            MOV     #7777,$GDDAT    ;CAN'T GET GREATER THAN 7777
3726  025014  000207                    3$:     RTS     PC              ;RETURN WITH TANGENT IN $GDDAT
3727
3728  025016  000000                    TANGNT: 0                       ;LOC MAINTAINS TANGENT MINUS 1
3729
3730                                    ;;*****************************************************************
3731                                    ;THIS ROUTINE STARTS THE DISPLAY WITH MAINT. SW 2, THEN SETS
3732                                    ;MAINT. SW 3, AND THEN ISSUES A # OF RESUMES SPECIFIED
3733                                    ;BY R5 AT WHICH TIME IT WILL EXIT
3734                                    ;;*****************************************************************
3735  025020                            EXECUTE:
3736  025020  012537  025070                    MOV     (R5)+,CNTR      ;SET UP THE RESUME COUNTER
3737  025024  012777  020040  155244            MOV     #20040,@STKPT   ;SET MAINT SW 2 AND TOP OF STACK
3738  025032  012777  032342  155204            MOV     #BUFFER,@DPC    ;START DISPLAY
3739  025040  052777  040000  155230  1$:       BIS     #40000,@STKPT   ;SET MAINT SW 3
3740  025046  052777  040000  155222            BIS     #40000,@STKPT   ;AGAIN
3741  025054  005277  155164                    INC     @DPC            ;RESUME
3742  025060  005337  025070                    DEC     CNTR            ;COUNT RESUME
3743  025064  001365                            BNE     1$              ;BR IF MORE RESUMES TO FOLLOW
3744  025066  000205                            RTS     R5              ;EXIT
3745
3746  025070  000000                    CNTR:   0                       ;CNTR USED ABOVE
3747
```

```
                                        .SBTTL  SCOPE HANDLER ROUTINE
                                        ;;**********************************************************************
                                        ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
                                        ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
                                        ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
                                        ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
                                        ;*SW14=1         LOOP ON TEST
                                        ;*SW11=1         INHIBIT ITERATIONS
                                        ;*SW09=1         LOOP ON ERROR
                                        ;*SW08=1         LOOP ON TEST IN SWR<7:0>
                                        ;*CALL
                                        ;*      SCOPE            ;;SCOPE=IOT

025072                                  $SCOPE:
025072  032777  040000  154040  1$:     BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
025100  001114                         BNE     $OVER           ;;YES IF SW14=1
                                        ;*****START OF CODE FOR THE XOR TESTER*****
025102  000416                         $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
                                                                        ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
025104  013746  000004                         MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
025110  012737  025130  000004                 MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
025116  005737  177060                         TST     @#177060        ;;TIME OUT ON XOR?
025122  012637  000004                         MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
025126  000463                         BR      $SVLAD          ;;GO TO THE NEXT TEST
025130  022626                  5$:    CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
025132  012637  000004                 MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
025136  000423                         BR      7$              ;;LOOP ON THE PRESENT TEST
025140                                  6$:;*****END OF CODE FOR THE XOR TESTER*****
025140  032777  000400  153772         BIT     #BIT08,@SWR     ;;LOOP ON SPEC. TEST?
025146  001404                         BEQ     2$              ;;BR IF NO
025150  127737  153764  001102         CMPB    @SWR,$TSTNM     ;;ON THE RIGHT TEST?    SWR<7:0>
025156  001465                         BEQ     $OVER           ;;BR IF YES
025160  105737  001103          2$:    TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
025164  001421                         BEQ     3$              ;;BR IF NO
025166  123737  001115  001103         CMPB    $ERMAX,$ERFLG   ;;MAX. ERRORS FOR THIS TEST OCCURRED?
025174  101015                         BHI     2$              ;;BR IF NO
025176  032777  001000  153734         BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
025204  001404                         BEQ     4$              ;;BR IF NO
025206  013737  001110  001106  7$:    MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
025214  000446                         BR      $OVER
025216  105037  001103          4$:    CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
025222  005037  001166                 CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
025226  000415                         BR      1$              ;;ESCAPE TO THE NEXT TEST
025230  032777  004000  153702  3$:    BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
025236  001011                         BNE     1$              ;;BR IF YES
025240  005737  001210                 TST     $PASS           ;;IF FIRST PASS OF PROGRAM
025244  001406                         BEQ     1$              ;;      INHIBIT ITERATIONS
025246  005237  001104                 INC     $ICNT           ;;INCREMENT ITERATION COUNT
025252  023737  001166  001104         CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
025260  002024                         BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
025262  012737  000001  001104  1$:    MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
025270  013737  025346  001166         MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
025276  105237  001102          $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
025302  113737  001102  001206         MOVB    $TSTNM,$TESTN   ;;SET TEST NUMBER IN APT MAILBOX
025310  011637  001106                 MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
```

```
 3804  025314  011637  001110                    MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
 3805  025320  005037  001170                    CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
 3806  025324  112737  000001  001115            MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
 3807  025332  013777  001102  153602  $OVER:    MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
 3808  025340  013716  001106                    MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
 3809  025344  000002                            RTI                     ;;FIXES PS
 3810  025346  003720                  $MXCNT:   2000.                   ;;MAX. NUMBER OF ITERATIONS
```

```
                                        .SBTTL  APT COMMUNICATIONS ROUTINE
                                        ;;**************************************************************
025350  112737  000001  025614  $ATY1:  MOVB    #1,$FFLG        ;;TO REPORT FATAL ERROR
025356  112737  000001  025612  $ATY3:  MOVB    #1,$MFLG        ;;TO TYPE A MESSAGE
025364  000403                        BR      $ATYC
025366  112737  000001  025614  $ATY4:  MOVB    #1,$FFLG        ;;TO ONLY REPORT FATAL ERROR
025374                          $ATYC:
025374  010046                        MOV     R0,-(SP)        ;;PUSH R0 ON STACK
025376  010146                        MOV     R1,-(SP)        ;;PUSH R1 ON STACK
025400  105737  025612                TSTB    $MFLG           ;;SHOULD TYPE A MESSAGE?
025404  001450                        BEQ     5$              ;;IF NOT:  BR
025406  122737  000001  001222        CMPB    #APTENV,$ENV    ;;OPERATING UNDER APT?
025414  001031                        BNE     3$              ;;IF NOT:  BR
025416  132737  000100  001223        BITB    #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
025424  001425                        BEQ     3$              ;;IF NOT:  BR
025426  017600  000004                MOV     @4(SP),R0       ;;GET MESSAGE ADDR.
025432  062766  000002  000004        ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
025440  005737  001202          1$:   TST     $MSGTYPE        ;;SEE IF DONE W/ LAST XMISSION?
025444  001375                        BNE     1$              ;;IF NOT:  WAIT
025446  010037  001216                MOV     R0,$MSGAD       ;;PUT ADDR IN MAILBOX
025452  105720                  2$:   TSTB    (R0)+           ;;FIND END OF MESSAGE
025454  001376                        BNE     2$
025456  163700  001216                SUB     $MSGAD,R0       ;;SUB START OF MESSAGE
025462  006200                        ASR     R0              ;;GET MESSAGE LNGTH IN WORDS
025464  010037  001220                MOV     R0,$MSGLGT      ;;PUT LENGTH IN MAILBOX
025470  012737  000004  001202        MOV     #4,$MSGTYPE     ;;TELL APT TO TAKE MSG.
025476  000413                        BR      5$
025500  017637  000004  025524  3$:   MOV     @4(SP),4$       ;;PUT MSG ADDR IN JSR LINKAGE
025506  062766  000002  000004        ADD     #2,4(SP)                ;;BUMP RETURN ADDRESS
025514  013746  177776                MOV     177776,-(SP)    ;;PUSH 177776 ON STACK
025520  004737  026154                JSR     PC,$TYPE        ;;CALL TYPE MACRO
025524  000000                  4$:   .WORD   0
025526                          5$:
025526  105737  025614          10$:  TSTB    $FFLG           ;;SHOULD REPORT FATAL ERROR?
025532  001416                        BEQ     12$             ;;IF NOT:  BR
025534  005737  001222                TST     $ENV            ;;RUNNING UNDER APT?
025540  001413                        BEQ     12$             ;;IF NOT:  BR
025542  005737  001202          11$:  TST     $MSGTYPE        ;;FINISHED LAST MESSAGE?
025546  001375                        BNE     11$             ;;IF NOT:  WAIT
025550  017637  000004  001204        MOV     @4(SP),$FATAL   ;;GET ERROR #
025556  062766  000002  000004        ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
025564  005237  001202                INC     $MSGTYPE        ;;TELL APT TO TAKE ERROR
025570  105037  025614          12$:  CLRB    $FFLG           ;;CLEAR FATAL FLAG
025574  105037  025613                CLRB    $LFLG           ;;CLEAR LOG FLAG
025600  105037  025612                CLRB    $MFLG           ;;CLEAR MESSAGE FLAG
025604  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
025606  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
025610  000207                        RTS     PC              ;;RETURN
025612     000          $MFLG:  .BYTE   0               ;;MESSG. FLAG
025613     000          $LFLG:  .BYTE   0               ;;LOG FLAG
025614     000          $FFLG:  .BYTE   0               ;;FATAL FLAG
025616                             .EVEN
000200                  APTSIZE=200
000001                  APTENV=001
000100                  APTSPOOL=100
```

```
  3867           000040                   APTCSUP=040
  3868                                    .SBTTL  ERROR HANDLER ROUTINE
  3869
  3870                                    ;;;**********************************************************************
  3871                                    ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
  3872                                    ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
  3873                                    ;*AND GO TO $ERRTYP ON ERROR
  3874                                    ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
  3875                                    ;*SW15=1        HALT ON ERROR
  3876                                    ;*SW13=1        INHIBIT ERROR TYPEOUTS
  3877                                    ;*SW10=1        BELL ON ERROR
  3878                                    ;*SW09=1        LOOP ON ERROR
  3879                                    ;*CALL
  3880                                    ;*      ERROR   N       ;;ERROR=EMT AND N=ERROR ITEM NUMBER
  3881
  3882  025616                            $ERROR:
  3883  025616  113737  001102  002204            MOVB $TSTNM,TSTNUM
  3884  025624  105237  001103           7$:      INCB    $ERFLG          ;;SET THE ERROR FLAG
  3885  025630  001775                            BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
  3886  025632  013777  001102  153302            MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
  3887  025640  032777  002000  153272            BIT     #BIT10,@SWR     ;;BELL ON ERROR?
  3888  025646  001402                            BEQ     1$              ;;NO - SKIP
  3889  025650  104400  001172                    TYPE    ,$BELL          ;;RING BELL
  3890  025654  005237  001112           1$:      INC     $ERTTL          ;;COUNT THE NUMBER OF ERRORS
  3891  025660  011637  001116                    MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
  3892  025664  162737  000002  001116            SUB     #2,$ERRPC
  3893  025672  117737  153220  001114            MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
  3894  025700  032777  020000  153232            BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
  3895  025706  001004                            BNE     20$             ;;SKIP TYPEOUTS
  3896  025710  004737  026020                    JSR     PC,$ERRTYP      ;;GO TO USER ERROR ROUTINE
  3897  025714  104400  001177                    TYPE    ,$CRLF
  3898  025720                           20$:
  3899  025720  122737  000001  001222            CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
  3900  025726  001007                            BNE     2$              ;;NO,SKIP APT ERROR REPORT
  3901  025730  113737  001114  025742            MOVB    $ITEMB,21$      ;;SET ITEM NUMBER AS ERROR NUMBER
  3902  025736  004737  025366                    JSR     PC,$ATY4        ;;REPORT FATAL ERROR TO APT
  3903  025742     000                   21$:     .BYTE   0
  3904  025743     000                            .BYTE   0
  3905  025744  000777                   22$:     BR      22$             ;;APT ERROR LOOP
  3906  025746  005777  153166           2$:      TST     @SWR            ;;HALT ON ERROR
  3907  025752  100001                            BPL     3$              ;;SKIP IF CONTINUE
  3908  025754  000000                            HALT                    ;;HALT ON ERROR!
  3909  025756  032777  001000  153154    3$:     BIT     #BIT09,@SWR     ;;LOOP ON ERROR SWITCH SET?
  3910  025764  001402                            BEQ     4$              ;;BR IF NO
  3911  025766  013716  001110                    MOV     $LPERR,(SP)     ;;FUDGE RETURN FOR LOOPING
  3912  025772  005737  001170           4$:      TST     $ESCAPE         ;;CHECK FOR AN ESCAPE ADDRESS
  3913  025776  001402                            BEQ     5$              ;;BR IF NONE
  3914  026000  013716  001170                    MOV     $ESCAPE,(SP)    ;;FUDGE RETURN ADDRESS FOR ESCAPE
  3915  026004                           5$:
  3916  026004  022737  024372  000042            CMP     #$ENDAD,@#42    ;;ACT-11 AUTO-ACCEPT?
  3917  026012  001001                            BNE     6$              ;;BRANCH IF NO
  3918  026014  000000                            HALT                    ;;YES
  3919  026016                           6$:
  3920  026016  000002                            RTI                     ;;RETURN
```

```
                                .SBTTL  ERROR MESSAGE TYPEOUT ROUTINE

                                ;;**********************************************************************
                                ;*THIS ROUTINE USES THE "ITEM CONTROL BYTE" ($ITEMB) TO DETERMINE WHICH
                                ;*ERROR IS TO BE REPORTED. IT THEN OBTAINS, FROM THE "ERROR TABLE" ($ERRTB),
                                ;*AND REPORTS THE APPROPRIATE INFORMATION CONCERNING THE ERROR.

026020                          $ERRTYP:
026020  104400  001177                  TYPE    $CRLF           ;;"CARRIAGE RETURN" & "LINE FEED"
026024  010046                          MOV     R0,-(SP)        ;;SAVE R0
026026  005000                          CLR     R0              ;;PICKUP THE ITEM INDEX
026030  153700  001114                  BISB    @#$ITEMB,R0
026034  001004                          BNE     1$              ;;IF ITEM NUMBER IS ZERO, JUST
                                                                ;;TYPE THE PC OF THE ERROR
026036  013746  001116                  MOV     $ERRPC,-(SP)    ;;SAVE $ERRPC FOR TYPEOUT
                                                                ;;ERROR ADDRESS
026042  104401                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
026044  000426                          BR      6$              ;;GET OUT
026046  005300                  1$:     DEC     R0              ;;ADJUST THE INDEX SO THAT IT WILL
026050  006300                          ASL     R0              ;;      WORK FOR THE ERROR TABLE
026052  006300                          ASL     R0
026054  006300                          ASL     R0
026056  062700  001264                  ADD     #$ERRTB,R0      ;;FORM TABLE POINTER
026062  012037  026072                  MOV     (R0)+,2$        ;;PICKUP "ERROR MESSAGE" POINTER
026066  001404                          BEQ     3$              ;;SKIP TYPEOUT IF NO POINTER
026070  104400                          TYPE                    ;;TYPE THE "ERROR MESSAGE"
026072  000000                  2$:     .WORD   0               ;;"ERROR MESSAGE" POINTER GOES HERE
026074  104400  001177                  TYPE    $CRLF           ;;"CARRIAGE RETURN" & "LINE FEED"
026100  012037  026110          3$:     MOV     (R0)+,4$        ;;PICKUP "DATA HEADER" POINTER
026104  001404                          BEQ     5$              ;;SKIP TYPEOUT IF 0
026106  104400                          TYPE                    ;;TYPE THE "DATA HEADER"
026110  000000                  4$:     .WORD   0               ;;"DATA HEADER" POINTER GOES HERE
026112  104400  001177                  TYPE    $CRLF           ;;"CARRIAGE RETURN" & "LINE FEED"
026116  011000                  5$:     MOV     (R0),R0         ;;PICKUP "DATA TABLE" POINTER
026120  001004                          BNE     7$              ;;GO TYPE THE DATA
026122  012600                  6$:     MOV     (SP)+,R0        ;;RESTORE R0
026124  104400  001177                  TYPE    $CRLF           ;;"CARRIAGE RETURN" & "LINE FEED"
026130  000207                          RTS     PC              ;;RETURN
026132                          7$:
026132  013046                          MOV     @(R0)+,-(SP)    ;;SAVE @(R0)+ FOR TYPEOUT
026134  104401                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
026136  005710                          TST     (R0)            ;;IS THERE ANOTHER NUMBER?
026140  001770                          BEQ     6$              ;;BR IF NO
026142  104400  026150                  TYPE    ,8$             ;;TYPE TWO(2) SPACES
026146  000771                          BR      7$              ;;LOOP
026150  020040      000         8$:     .ASCIZ  /  /            ;;TWO(2) SPACES
026154                                  .EVEN
```

```
                                        .SBTTL  TYPE ROUTINE

                                        ;;*****************************************************************
                                        ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
                                        ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
                                        ;*NOTE1:         $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
                                        ;*NOTE2:         $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
                                        ;*NOTE3:         $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
                                        ;*
                                        ;*CALL:
                                        ;*1) USING A TRAP INSTRUCTION
                                        ;*       TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
                                        ;*OR
                                        ;*       TYPE
                                        ;*       MESADR
                                        ;*

026154  105737  001157          $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
026160  100002                          BPL     1$              ;;BR IF YES
026162  000000                          HALT                    ;;HALT HERE IF NO TERMINAL
026164  000430                          BR      3$              ;;LEAVE
026166  010046                  1$:     MOV     R0,-(SP)        ;;SAVE R0
026170  017600  000002                  MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
026174  122737  000001  001222          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
026202  001011                          BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
026204  132737  000100  001223          BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
026212  001405                          BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
026214  010037  026224                  MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
026220  004737  025356                  JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
026224  000000                  61$:    .WORD   0               ;;MESSAGE ADDRESS
026226  132737  000040  001223  62$:    BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
026234  001003                          BNE     60$             ;;YES,SKIP TYPE OUT
026236  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
026240  001005                          BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
026242  005726                          TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
026244  012600                  60$:    MOV     (SP)+,R0        ;;RESTORE R0
026246  062716  000002          3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
026252  000002                          RTI                     ;;RETURN
026254  122716  000011          4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
026260  001430                          BEQ     8$
026262  122716  000200                  CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
026266  001006                          BNE     5$
026270  005726                          TST     (SP)+           ;;POP  <CR><LF> EQUIV
026272  104400                          TYPE                    ;;TYPE A CR AND LF
026274  001177                          $CRLF
026276  105037  026432                  CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
026302  000755                          BR      2$              ;;GET NEXT CHARACTER
026304  004737  026366          5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
026310  123726  001156          6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
026314  001350                          BNE     2$              ;;IF NO GO GET NEXT CHAR.
026316  013746  001154                  MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
                                                                ;;AND THE NULL CHAR.
026322  105366  000001          7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
026326  002770                          BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
026330  004737  026366                  JSR     PC,$TYPEC       ;;GO TYPE A NULL
026334  105337  026432                  DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
```

```
 4024  026340  000770                          BR      7$              ;;LOOP
 4025
 4026                                  ;HORIZONTAL TAB PROCESSOR
 4027
 4028  026342  112716  000040          8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
 4029  026346  004737  026366          9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
 4030  026352  132737  000007  026432          BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
 4031  026360  001372                          BNE     9$              ;;TAB STOP
 4032  026362  005726                          TST     (SP)+           ;;POP SPACE OFF STACK
 4033  026364  000724                          BR      2$              ;;GET NEXT CHARACTER
 4034  026366  105777  152556          $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
 4035  026372  100375                          BPL     $TYPEC
 4036  026374  116677  000002  152550        MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
 4037  026402  122766  000015  000002        CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
 4038  026410  001003                          BNE     1$              ;;BRANCH IF NO
 4039  026412  105037  026432                CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
 4040  026416  000406                          BR      $TYPEX          ;;EXIT
 4041  026420  122766  000012  000002  1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
 4042  026426  001402                          BEQ     $TYPEX          ;;BRANCH IF YES
 4043  026430  105227                          INCB    (PC)+           ;;COUNT THE CHARACTER
 4044  026432  000000          $CHARCNT:.WORD  0               ;;CHARACTER COUNT STORAGE
 4045  026434  000207          $TYPEX: RTS     PC
 4046
```

```
                                .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE

                                ;;**************************************************************
                                ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
                                ;*OCTAL (ASCII) NUMBER AND TYPE IT.
                                ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
                                ;*CALL:
                                ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                ;*      TYPOS                   ;;CALL FOR TYPEOUT
                                ;*      .BYTE   N               ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
                                ;*      .BYTE   M               ;;M=1 OR 0
                                ;*                                      ;;1=TYPE LEADING ZEROS
                                ;*                                      ;;0=SUPPRESS LEADING ZEROS
                                ;*
                                ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
                                ;*$TYPOS OR $TYPOC
                                ;*CALL:
                                ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                ;*      TYPON                   ;;CALL FOR TYPEOUT
                                ;*
                                ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
                                ;*CALL:
                                ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                ;*      TYPOC                   ;;CALL FOR TYPEOUT

026436  017646  000000          $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
026442  116637  000001  026661          MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
026450  112637  026663                  MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
026454  062716  000002                  ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
026460  000406                          BR      $TYPON
026462  112737  000001  026661  $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
026470  112737  000006  026663          MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
026476  112737  000005  026660  $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
026504  010346                          MOV     R3,-(SP)        ;;SAVE R3
026506  010446                          MOV     R4,-(SP)        ;;SAVE R4
026510  010546                          MOV     R5,-(SP)        ;;SAVE R5
026512  113704  026663                  MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
026516  005404                          NEG     R4
026520  062704  000006                  ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
026524  110437  026662                  MOVB    R4,$OMODE       ;;SAVE IT FOR USE
026530  113704  026661                  MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
026534  016605  000012                  MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
026540  005003                          CLR     R3              ;;CLEAR THE OUTPUT WORD
026542  006105                  1$:     ROL     R5              ;;ROTATE MSB INTO "C"
026544  000404                          BR      3$              ;;GO DO MSB
026546  006105                  2$:     ROL     R5              ;;FORM THIS DIGIT
026550  006105                          ROL     R5
026552  006105                          ROL     R5
026554  010503                          MOV     R5,R3
026556  006103                  3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
026560  105337  026662                  DECB    $OMODE          ;;TYPE THIS DIGIT?
026564  100016                          BPL     7$              ;;BR IF NO
026566  042703  177770                  BIC     #177770,R3      ;;GET RID OF JUNK
026572  001002                          BNE     4$              ;;TEST FOR 0
026574  005704                          TST     R4              ;;SUPPRESS THIS 0?
026576  001403                          BEQ     5$              ;;BR IF YES
```

```
 4103  026600  005204                    4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
 4104  026602  052703  000060                    BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
 4105  026606  052703  000040            5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
 4106  026612  110337  026656                    MOVB    R3,8$           ;;SAVE FOR TYPING
 4107  026616  104400  026656                    TYPE    ,8$             ;;GO TYPE THIS DIGIT
 4108  026622  105337  026660            7$:     DECB    $OCNT           ;;COUNT BY 1
 4109  026626  003347                            BGT     2$              ;;BR IF MORE TO DO
 4110  026630  002402                            BLT     6$              ;;BR IF DONE
 4111  026632  005204                            INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
 4112  026634  000744                            BR      2$              ;;GO DO THE LAST DIGIT
 4113  026636  012605                    6$:     MOV     (SP)+,R5        ;;RESTORE R5
 4114  026640  012604                            MOV     (SP)+,R4        ;;RESTORE R4
 4115  026642  012603                            MOV     (SP)+,R3        ;;RESTORE R3
 4116  026644  016666  000002  000004            MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
 4117  026652  012616                            MOV     (SP)+,(SP)
 4118  026654  000002                            RTI                     ;;RETURN
 4119  026656     000                    8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
 4120  026657     000                            .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
 4121  026660     000                    $OCNT:  .BYTE   0               ;;OCTAL DIGIT COUNTER
 4122  026661     000                    $OFILL: .BYTE   0               ;;ZERO FILL SWITCH
 4123  026662  000000                    $OMODE: .WORD   0               ;;NUMBER OF DIGITS TO TYPE
```

```
                                .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
                                ;;**************************************************************
                                ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
                                ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
                                ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
                                ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
                                ;*REPLACED WITH SPACES.
                                ;*CALL:
                                ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
                                ;*      TYPDS                   ;;GO TO THE ROUTINE

026664                          $TYPDS:
026664  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
026666  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
026670  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
026672  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
026674  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
026676  012746  020200                  MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
026702  016605  000020                  MOV     20(SP),R5       ;;GET THE INPUT NUMBER
026706  100004                          BPL     1$              ;;BR IF INPUT IS POS.
026710  005405                          NEG     R5              ;;MAKE THE BINARY NUMBER POS.
026712  112766  000055  000001          MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
026720  005000                  1$:     CLR     R0              ;;ZERO THE CONSTANTS INDEX
026722  012703  027100                  MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
026726  112723  000040                  MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
026732  005002                  2$:     CLR     R2              ;;CLEAR THE BCD NUMBER
026734  016001  027070                  MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
026740  160105                  3$:     SUB     R1,R5           ;;FORM THIS BCD DIGIT
026742  002402                          BLT     4$              ;;BR IF DONE
026744  005202                          INC     R2              ;;INCREASE THE BCD DIGIT BY 1
026746  000774                          BR      3$
026750  060105                  4$:     ADD     R1,R5           ;;ADD BACK THE CONSTANT
026752  005702                          TST     R2              ;;CHECK IF BCD DIGIT=0
026754  001002                          BNE     5$              ;;FALL THROUGH IF 0
026756  105716                          TSTB    (SP)            ;;STILL DOING LEADING 0'S?
026760  100407                          BMI     7$              ;;BR IF YES
026762  106316                  5$:     ASLB    (SP)            ;;MSD?
026764  103003                          BCC     6$              ;;BR IF NO
026766  116663  000001  177777          MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
026774  052702  000060          6$:     BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
027000  052702  000040          7$:     BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
027004  110223                          MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
027006  005720                          TST     (R0)+           ;;JUST INCREMENTING
027010  020027  000010                  CMP     R0,#10          ;;CHECK THE TABLE INDEX
027014  002746                          BLT     2$              ;;GO DO THE NEXT DIGIT
027016  003002                          BGT     8$              ;;GO TO EXIT
027020  010502                          MOV     R5,R2           ;;GET THE LSD
027022  000764                          BR      6$              ;;GO CHANGE TO ASCII
027024  105726                  8$:     TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
027026  100003                          BPL     9$              ;;BR IF NO
027030  116663  177777  177776          MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
027036  105013                  9$:     CLRB    (R3)            ;;SET THE TERMINATOR
027040  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
027042  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
027044  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
```

```
 4180  027046  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
 4181  027050  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
 4182  027052  104400  027100                  TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
 4183  027056  016666  000002  000004          MOV     2(SP),4(SP)     ;;ADJUST THE STACK
 4184  027064  012616                          MOV     (SP)+,(SP)
 4185  027066  000002                          RTI                     ;;RETURN TO USER
 4186  027070  023420                $DTBL:    10000.
 4187  027072  001750                          1000.
 4188  027074  000144                          100.
 4189  027076  000012                          10.
 4190  027100  000004                $DBLK:    .BLKW   4
```

```
                                        .SBTTL  TRAP DECODER

                                        ;;**************************************************************
                                        ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
                                        ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
                                        ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
                                        ;*GO TO THAT ROUTINE.

027110  010046                  $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
027112  016600  000002                  MOV     2(SP),R0        ;;GET TRAP ADDRESS
027116  005740                          TST     -(R0)           ;;BACKUP BY 2
027120  111000                          MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
027122  006300                          ASL     R0              ;;POSITION FOR INDEXING
027124  016000  027132                  MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
027130  000200                          RTS     R0              ;;GO TO ROUTINE

                                        .SBTTL  TRAP TABLE

                                        ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
                                        ;*BY THE "TRAP" INSTRUCTION.

                                        ;       ROUTINE
                                        ;       -------
027132                          $TRPAD:
027132  026154                          $TYPE   ;;CALL=TYPE     TRAP+0(104400)  TTY TYPEOUT ROUTINE
027134  026462                          $TYPOC  ;;CALL=TYPOC    TRAP+1(104401)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
027136  026436                          $TYPOS  ;;CALL=TYPOS    TRAP+2(104402)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
027140  026476                          $TYPON  ;;CALL=TYPON    TRAP+3(104403)  TYPE OCTAL NUMBER (AS PER LAST CALL)
027142  026664                          $TYPDS  ;;CALL=TYPDS    TRAP+4(104404)  TYPE DECIMAL NUMBER (WITH SIGN)
```

```
                                        .SBTTL  POWER DOWN AND UP ROUTINES

                                        ;;**********************************************************************
                                        ;POWER DOWN ROUTINE
027144  012737  027310  000024  $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
027152  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
027160  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
027162  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
027164  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
027166  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
027170  010446                          MOV     R4,-(SP)        ;;PUSH R4 ON STACK
027172  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
027174  017746  151740                  MOV     @SWR,-(SP)      ;;PUSH @SWR ON STACK
027200  010637  027314                  MOV     SP,$SAVR6       ;;SAVE SP
027204  012737  027216  000024          MOV     #$PWRUP,@#PWRVEC ;;SET UP VECTOR
027212  000000                          HALT
027214  000776                          BR      .-2             ;;HANG UP

                                        ;;**********************************************************************
                                        ;POWER UP ROUTINE
027216  012737  027310  000024  $PWRUP: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST DOWN
027224  013706  027314                  MOV     $SAVR6,SP       ;;GET SP
027230  005037  027314                  CLR     $SAVR6          ;;WAIT LOOP FOR THE TTY
027234  005237  027314          1$:     INC     $SAVR6          ;;WAIT FOR THE INC
027240  001375                          BNE     1$              ;;OF  WORD
027242  012677  151672                  MOV     (SP)+,@SWR      ;;POP STACK INTO @SWR
027246  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
027250  012604                          MOV     (SP)+,R4        ;;POP STACK INTO R4
027252  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
027254  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
027256  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
027260  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
027262  012737  027144  000024          MOV     #$PWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
027270  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
027276  104400                          TYPE                    ;;REPORT THE POWER FAILURE
027300  027316                  $PWRMG: .WORD   PWRMSG          ;;POWER FAIL MESSAGE POINTER
027302  012716                          MOV     (PC)+,(SP)      ;;RESTART AT RSTART
027304  003244                  $PWRAD: .WORD   RSTART          ;;RESTART ADDRESS
027306  000002                          RTI
027310  000000                  $ILLUP: HALT                    ;;THE POWER UP SEQUENCE WAS STARTED
027312  000776                          BR      .-2             ;; BEFORE THE POWER DOWN WAS COMPLETE
027314  000000                  $SAVR6: 0                       ;;PUT THE SP HERE
027316  005015  042522  052123          PWRMSG: .ASCIZ  <15><12>/RESTARTED AFTER A POWER FAILURE/<15><12><12>
027324  051101  042524  020104
027332  043101  042524  020122
027340  020101  047520  042527
027346  020122  040506  046111
027354  051125  006505  005012
027362     000
```

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                                                        .SBTTL  ASCII MESSAGES
                                                
027363     015  051412  040524  MSG1:   .ASCIZ  <15><12>/START OF MD-11-DZVSC-B   VS60 INSTRUCTION TEST PART III/<15><12
027370  052122  047440  020106
027376  042115  030455  026461
027404  055104  051526  026503
027412  020102  020040  051526
027420  030066  044440  051516
027426  051124  041525  044524
027434  047117  052040  051505
027442  020124  040520  052122
027450  044440  044511  005015
027456     000
027457     015  045412  030524  MSG2:   .ASCIZ  <15><12>/KT11 ER TRAP/
027464  020061  051105  052040
027472  040522  000120
027476  005015  042515  047515  MSG3:   .ASCIZ  <15><12>/MEMORY SIZE =/
027504  054522  051440  055111
027512  020105  000075
027516  006513  000012          MSG4:   .ASCIZ  /K/<15><12>
027522  027114  027120  043040  EM1:    .ASCIZ  /L.P. FLAG INTR FAILURE/
027530  040514  020107  047111
027536  051124  043040  044501
027544  052514  042522     000
027551     123  046111  020117  EM2:    .ASCIZ  /SILO FAILURE AT LEVEL INDICATED/
027556  040506  046111  051125
027564  020105  052101  046040
027572  053105  046105  044440
027600  042116  041511  052101
027606  042105     000
027611     123  045524  050040  EM3:    .ASCIZ  /STK PTR DEC ER/
027616  051124  042040  041505
027624  042440  000122
027630  052123  041501  020113  EM4:    .ASCIZ  /STACK OVERFLOW ER/
027636  053117  051105  046106
027644  053517  042440  000122
027652  050104  020103  052123  EM5:    .ASCIZ  /DPC STKING ER/
027660  044513  043516  042440
027666  000122
027670  050104  020125  040516  EM6:    .ASCIZ  /DPU NAME STKING ER/
027676  042515  051440  045524
027704  047111  020107  051105
027712     000
027713     115  042117  020105  EM7:    .ASCIZ  /MODE STKING ER/
027720  052123  044513  043516
027726  042440  000122
027732  042526  052103  051117  EM10:   .ASCIZ  /VECTOR SCALE STKING ER/
027740  051440  040503  042514
027746  051440  045524  047111
027754  020107  051105     000
027761     103  040510  040522  EM11:   .ASCIZ  /CHARACTER SCALE STKING ER/
027766  052103  051105  051440
027774  040503  042514  051440
030002  045524  047111  020107
030010  051105     000
030013     103  040510  040522  EM12:   .ASCIZ  /CHARACTER ROTATE STKING ER/
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 4328  030020  052103  051105  051040
 4329  030026  052117  052101  020105
 4330  030034  052123  044513  043516
 4331  030042  042440  000122
 4332  030046  047111  042524  051516  EM13:   .ASCIZ  /INTENSITY LEVEL STKING ER/
 4333  030054  052111  020131  042514
 4334  030062  042526  020114  052123
 4335  030070  044513  043516  042440
 4336  030076  000122
 4337  030100  047503  047514  020122  EM14:   .ASCIZ  /COLOR LEVEL STKING ER/
 4338  030106  042514  042526  020114
 4339  030114  052123  044513  043516
 4340  030122  042440  000122
 4341  030126  052111  046101  041511  EM15:   .ASCIZ  /ITALICS STKING ER/
 4342  030134  020123  052123  044513
 4343  030142  043516  042440  000122
 4344  030150  042515  052516  051440  EM16:   .ASCIZ  /MENU STKING ER/
 4345  030156  045524  047111  020107
 4346  030164  051105     000
 4347  030167     102  044514  045516  EM17:   .ASCIZ  /BLINK ENA STKING ER/
 4348  030174  042440  040516  051440
 4349  030202  045524  047111  020107
 4350  030210  051105     000
 4351  030213     123  047524  020120  EM20:   .ASCIZ  /STOP INT ENA STKING ER/
 4352  030220  047111  020124  047105
 4353  030226  020101  052123  044513
 4354  030234  043516  042440  000122
 4355  030242  050114  044040  052111  EM21:   .ASCIZ  /LP HIT DISABLE STKING ER/
 4356  030250  042040  051511  041101
 4357  030256  042514  051440  045524
 4358  030264  047111  020107  051105
 4359  030272     000
 4360  030273     114  020104  052123  EM22:   .ASCIZ  /LD STAUTS ENA STKING ER/
 4361  030300  052501  051524  042440
 4362  030306  040516  051440  045524
 4363  030314  047111  020107  051105
 4364  030322     000
 4365  030323     105  043504  020105  EM23:   .ASCIZ  /EDGE INT ENA STKING ER/
 4366  030330  047111  020124  047105
 4367  030336  020101  052123  044513
 4368  030344  043516  042440  000122
 4369  030352  044103  051101  051440  EM24:   .ASCIZ  /CHAR STRING ESCAPE STKING ER/
 4370  030360  051124  047111  020107
 4371  030366  051505  040503  042520
 4372  030374  051440  045524  047111
 4373  030402  020107  051105     000
 4374  030407     104  050105  044124  EM25:   .ASCIZ  /DEPTH QUE STKING ER/
 4375  030414  050440  042525  051440
 4376  030422  045524  047111  020107
 4377  030430  051105     000
 4378  030433     114  047111  020105  EM26:   .ASCIZ  /LINE TYPE STKING ER/
 4379  030440  054524  042520  051440
 4380  030446  045524  047111  020107
 4381  030454  051105     000
 4382  030457     111  052116  047105  EM27:   .ASCIZ  /INTENSITY ENA STKING ER/
 4383  030464  044523  054524  042440
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 4384  030472  040516  051440  045524
 4385  030500  047111  020107  051105
 4386  030506     000
 4387  030507     114  050056  020056  EM30:   .ASCIZ  /L.P. INTR ENA STKING ER/
 4388  030514  047111  051124  042440
 4389  030522  040516  051440  045524
 4390  030530  047111  020107  051105
 4391  030536     000
 4392  030537     114  050056  020056  EM31:   .ASCIZ  /L.P. SW INTR ENA STKING ER/
 4393  030544  053523  044440  052116
 4394  030552  020122  047105  020101
 4395  030560  052123  044513  043516
 4396  030566  042440  000122
 4397  030572  044123  043111  020124  EM32:   .ASCIZ  /SHIFT OUT STKING ER/
 4398  030600  052517  020124  052123
 4399  030606  044513  043516  042440
 4400  030614  000122
 4401  030616  052123  020113  052120  EM33:   .ASCIZ  /STK PTR INC ER/
 4402  030624  020122  047111  020103
 4403  030632  051105     000
 4404  030635     123  045524  052440  EM34:   .ASCIZ  /STK UNDERFLOW ER/
 4405  030642  042116  051105  046106
 4406  030650  053517  042440  000122
 4407  030656  050104  020103  047520  EM35:   .ASCIZ  /DPC POP ER/
 4408  030664  020120  051105     000
 4409  030671     116  046501  020105  EM36:   .ASCIZ  /NAME POP ER/
 4410  030676  047520  020120  051105
 4411  030704     000
 4412  030705     126  041505  047524  EM37:   .ASCIZ  /VECTOR SCALE POP ER/
 4413  030712  020122  041523  046101
 4414  030720  020105  047520  020120
 4415  030726  051105     000
 4416  030731     103  040510  020122  EM40:   .ASCIZ  /CHAR SCALE POP ER/
 4417  030736  041523  046101  020105
 4418  030744  047520  020120  051105
 4419  030752     000
 4420  030753     103  040510  020122  EM41:   .ASCIZ  /CHAR ROTATE POP ER/
 4421  030760  047522  040524  042524
 4422  030766  050040  050117  042440
 4423  030774  000122
 4424  030776  047503  047514  020122  EM42:   .ASCIZ  /COLOR LEVEL POP ER/
 4425  031004  042514  042526  020114
 4426  031012  047520  020120  051105
 4427  031020     000
 4428  031021     111  040524  044514  EM43:   .ASCIZ  /ITALICS POP ER/
 4429  031026  051503  050040  050117
 4430  031034  042440  000122
 4431  031040  042515  052516  050040  EM44:   .ASCIZ  /MENU POP ER/
 4432  031046  050117  042440  000122
 4433  031054  047111  042524  051516  EM45:   .ASCIZ  /INTENSITY ENA POP ER/
 4434  031062  052111  020131  047105
 4435  031070  020101  047520  020120
 4436  031076  051105     000
 4437  031101     114  050056  020056  EM46:   .ASCIZ  /L.P. INTR ENA POP ER/
 4438  031106  047111  051124  042440
 4439  031114  040516  050040  050117
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4440  031122  042440  000122
4441  031126  027114  027120  051440  EM47:   .ASCIZ  /L.P. SW INTR ENA POP ER/
4442  031134  020127  047111  051124
4443  031142  042440  040516  050040
4444  031150  050117  042440  000122
4445  031156  044514  042516  052040  EM50:   .ASCIZ  /LINE TYPE POP ER/
4446  031164  050131  020105  047520
4447  031172  020120  051105     000
4448  031177     111  052116  047105  EM51:   .ASCIZ  /INTENSITY LEVEL POP ER/
4449  031204  044523  054524  046040
4450  031212  053105  046105  050040
4451  031220  050117  042440  000122
4452  031226  046102  047111  020113  EM52:   .ASCIZ  /BLINK POP ER/
4453  031234  047520  020120  051105
4454  031242     000
4455  031243     115  042117  020105  EM53:   .ASCIZ  /MODE POP ER/
4456  031250  047520  020120  051105
4457  031256     000
4458  031257     123  047524  020120  EM54:   .ASCIZ  /STOP INTR ENA POP ER/
4459  031264  047111  051124  042440
4460  031272  040516  050040  050117
4461  031300  042440  000122
4462  031304  042504  052120  020110  EM55:   .ASCIZ  /DEPTH QUE POP ER/
4463  031312  052521  020105  047520
4464  031320  020120  051105     000
4465  031325     105  043504  020105  EM56:   .ASCIZ  /EDGE INTR ENA POP ER/
4466  031332  047111  051124  042440
4467  031340  040516  050040  050117
4468  031346  042440  000122
4469  031352  044103  051101  051440  EM57:   .ASCIZ  /CHAR STRING ESC POP ER/
4470  031360  051124  047111  020107
4471  031366  051505  020103  047520
4472  031374  020120  051105     000
4473  031401     114  050056  020056  EM60:   .ASCIZ  /L.P. HIT DISABLE POP ER/
4474  031406  044510  020124  044504
4475  031414  040523  046102  020105
4476  031422  047520  020120  051105
4477  031430     000
4478  031431     123  044510  052106  EM61:   .ASCIZ  /SHIFT OUT POP ER/
4479  031436  047440  052125  050040
4480  031444  050117  042440  000122
4481  031452  042524  046522  047111  EM62:   .ASCIZ  /TERMINATE CHAR POP ER/
4482  031460  052101  020105  044103
4483  031466  051101  050040  050117
4484  031474  042440  000122
4485  031500  052123  020113  053117  EM63.   .ASCIZ  /STK OVFLO INT ER/
4486  031506  046106  020117  047111
4487  031514  020124  051105     000
4488  031521     123  045524  052440  EM64:   .ASCIZ  /STK UNFLO INT ER/
4489  031526  043116  047514  044440
4490  031534  052116  042440  000122
4491  031542  042504  052114  020101  EM65:   .ASCIZ  /DELTA LENGTH ER/
4492  031550  042514  043516  044124
4493  031556  042440  000122
4494  031562  040524  043516  047105  EM66:   .ASCIZ  /TANGENT ER/
4495  031570  020124  051105     000
```

```
 4496  031575     104  041520  030440  EM6?:   .ASCIZ  /DPC 16-17 ER/
 4497  031602  026466  033461  042440
 4498  031610  000122
 4499  031612  051526  030066  046440  EM70:   .ASCIZ  /VS60 MEM ADRS FAILURE/
 4500  031620  046505  040440  051104
 4501  031626  020123  040506  046111
 4502  031634  051125  000105
 4503  031640  052123  050117  043040  EM71:   .ASCIZ  /STOP FLAG FAILED TO SET/
 4504  031646  040514  020107  040506
 4505  031654  046111  042105  052040
 4506  031662  020117  042523  000124
 4507  031670  052123  051101  020124  EM72:   .ASCIZ  /START FAILED TO SET 'TOP OF STK'/
 4508  031676  040506  046111  042105
 4509  031704  052040  020117  042523
 4510  031712  020124  052047  050117
 4511  031720  047440  020106  052123
 4512  031726  023513     000
 4513  031731     105  051122  041520  DH1:    .ASCIZ  /ERRPC   TSTNUM  BUSADRS EXPCT   RCVD/
 4514  031736  020040  052040  052123
 4515  031744  052516  020115  041040
 4516  031752  051525  042101  051522
 4517  031760  042440  050130  052103
 4518  031766  020040  051040  053103
 4519  031774  000104
 4520  031776  051105  050122  020103  DH2:    .ASCIZ  /ERRPC   TSTNUM  BUSADRS EXPCT   RCVD    STK SEL/
 4521  032004  020040  051524  047124
 4522  032012  046525  020040  052502
 4523  032020  040523  051104  020123
 4524  032026  054105  041520  020124
 4525  032034  020040  041522  042126
 4526  032042  020040  020040  052123
 4527  032050  020113  042523  000114
 4528  032056  051105  050122  020103  DH3:    .ASCIZ  /ERRPC   TSTNUM  GDPC-HI GDPC    BDPC-HI BDPC/
 4529  032064  020040  051524  047124
 4530  032072  046525  020040  042107
 4531  032100  041520  044055  020111
 4532  032106  042107  041520  020040
 4533  032114  020040  042102  041520
 4534  032122  044055  020111  042102
 4535  032130  041520     000
 4536  032133     105  051122  041520  DH4:    .ASCIZ  /ERRPC   TSTNUM  VECTOR  EXPCT   RCVD/
 4537  032140  020040  052040  052123
 4538  032146  052516  020115  053040
 4539  032154  041505  047524  020122
 4540  032162  042440  050130  052103
 4541  032170  020040  051040  053103
 4542  032176  000104
 4543  032200  051105  050122  020103  DH5:    .ASCIZ  /ERRPC   TSTNUM  BUSADRS EXPCT   RCVD    LEVEL/
 4544  032206  020040  051524  047124
 4545  032214  046525  020040  052502
 4546  032222  040523  051104  020123
 4547  032230  054105  041520  020124
 4548  032236  020040  041522  042126
 4549  032244  020040  020040  042514
 4550  032252  042526  000114
 4551                          .EVEN
```

```
 4552  032256  001116  002204  001122  DT1:    .WORD   $ERRPC,TSTNUM,$BDADR,$GDDAT,$BDDAT,0
 4553  032264  001124  001126  000000
 4554  032272  001116  002204  001122  DT2:    .WORD   $ERRPC,TSTNUM,$BDADR,$GDDAT,$BDDAT,$TMP0,0
 4555  032300  001124  001126  001164
 4556  032306  000000
 4557  032310  001116  002204  002224  DT3:    .WORD   $ERRPC,TSTNUM,G1716,$GDDAT,B1716,$BDDAT,0
 4558  032316  001124  002226  001126
 4559  032324  000000
 4560  032326  001116  002204  001164  DT4:    .WORD   $ERRPC,TSTNUM,$TMP0,$GDDAT,$BDDAT,0
 4561  032334  001124  001126  000000
 4562
 4563                                  ;;*****************************************************************
 4564                                  ;THIS IS THE WORKING AREA FOR ALL VS60 MPR'S (INSTR & DATA)
 4565                                  ;FROM HERE TO THE END OF MEMORY
 4566                                  ;;*****************************************************************
 4567  032342  000000                  BUFFER: 0                       ;LOCATIONS START HERE FOR TESTING
 4568          000001                  .END                            ;END OF PROGRAM
```

```
ABASE = 172000          433#    535     576
ACDW1 = 000C00          535     578
ACDW2 = 000000          535
ACPUOP= 000003          535     550
ADDW0 = 000C00          535
ADDW1 = 000000          535
ADDW10= 000000          535
ADDW11= 000000          535
ADDW12= 000000          535
ADDW13= 000000          535
ADDW14= 000000          535
ADDW15= 000000          535
ADDW2 = 000000          535
ADDW3 = 000000          535
ADDW4 = 000000          535
ADDW5 = 000000          535
ADDW6 = 000000          535
ADDW7 = 000000          535
ADDW8 = 000000          535
ADDW9 = 000000          535
ADEVCT= 000000          535     541
ADEVM = 000000          535     577
AENV  = 000000          535     546
AENVM = 000000          535     547
AFATAL= 005000          535     538
AMADR1= 000000          535     563
AMADR2= 000000          535     567
AMADR3= 000000          535     570
AMADR4= 000000          535     573
AMAMS1= 000000          535     557
AMAMS2= 000000          535     565
AMAMS3= 000000          535     568
AMAMS4= 000000          535     571
AMSGAD= 000000          535     543
AMSGLG= 000000          535     544
AMSGTY= 000000          535     537
AMTYP1= 000000          535     558
AMTYP2= 000000          535     566
AMTYP3= 000000          535     569
AMTYP4= 000000          535     572
ANAME   002264         1036#
APASS = 000000          535     540
APRIOR= 000004          435#    535
APTCSU= 000040         3867#   3998
APTENV= 000001         3823    3865#   3899    3991
APTSIZ= 000200         1086    3864#
APTSPO= 000100         3825    3866#   3993
ASWREG= 000000          535     548
ATESTN= 000000          535     539
AUNIT = 000000          535     542
AUSWR = 000000          535     549
AVECT1= 000320          434#    535     574
AVECT2= 000000          535     575
BADR    023402         3361    3395    3437#
BIT0  = 000001          418#    1195    1218    1260    1263    1286    1289    1292    1319    1354    1388    1421    1453
                       1485    1517    1548    1579    1610    1641    1672    1699    1729    1760    1791    1822    1852
```

```
                        1882    1913    1945    1976    2007    2038    2069    3104    2175    2178    2606    2633    2660
                        2687    2714    2741    2808    2936    2864    2903    3165    3213    3216    3284    3287    3527
BIT00 = 000001           408*    418
BIT01 = 000002           407*    417
BIT02 = 000004           406*    416
BIT03 = 000010           405*    415
BIT04 = 000020           404*    414
BIT05 = 000040           403*    413
BIT06 = 000100           402*    412
BIT07 = 000200           401*    411
BIT08 = 000400           400*    410    3777
BIT09 = 001000           399*    409    3785    3909
BIT1  = 000002           417*
BIT10 = 002000           398*   3887
BIT11 = 004000           397*   3792
BIT12 = 010000           396*   3583
BIT13 = 020000           395*   3894
BIT14 = 040000           394*   3763
BIT15 = 100000           393*
BIT2  = 000004           416*   2776    3507    3649    3654
BIT3  = 000010           415*   2101
BIT4  = 000020           414*   2813    2841
BIT5  = 000040           413*
BIT6  = 000100           412*
BIT7  = 000200           411*
BIT8  = 000400           410*
BIT9  = 001000           409*
BPTVEC= 000014           425*
BSTART  023416          3358    3444*
BSTRT   024236          3497    3565*
BUFFER  032342          1191*   1193    1215*   1216    1252*   1255    1258    1278*   1279    1284    1308*   1309*   1315
                        1332*   1343*   1348*   1349*   1350    1378*   1379*   1384    1401*   1411*   1412*   1417    1434*
                        1443*   1444*   1449    1464*   1475*   1476*   1481    1483    1496*   1507*   1508*   1513    1528*
                        1538*   1539*   1544    1559*   1569*   1570*   1575    1590*   1600*   1601*   1606    1608    1621*
                        1631*   1632*   1637    1652*   1662*   1663*   1668    1683*   1692*   1693*   1695    1707    1709*
                        1719*   1720*   1725    1740*   1750*   1751*   1756    1771*   1781*   1782*   1787    1802*   1812*
                        1813*   1818    1833*   1844*   1845*   1847    1860    1862*   1872*   1873*   1878    1880    1893*
                        1903*   1904*   1909    1924*   1935*   1936*   1941    1956*   1966*   1967*   1972    1987*   1997*
                        1998*   2003    2018*   2028*   2029*   2034    2049*   2059*   2060*   2065    2080*   2090*   2091*
                        2092*   2097    2115*   2126*   2127    2147*   2148    2169    2171*   2172*   2173    2176    2195*
                        2196*   2206*   2220*   2221*   2231*   2245*   2246*   2257*   2270*   2279*   2280*   2294*   2295*
                        2306*   2319*   2320*   2329*   2342*   2351*   2352*   2365*   2374*   2375*   2388*   2397*   2398*
                        2409*   2420*   2421*   2432*   2443*   2444*   2455*   2466*   2467*   2478*   2489*   2490*   2503*
                        2504*   2514*   2528*   2529*   2540*   2551*   2560*   2563*   2577*   2578*   2579*   2581*   2600*
                        2604    2615*   2616*   2627*   2631    2642*   2643*   2654*   2658    2669*   2670*   2681*   2685
                        2696*   2697*   2708*   2712    2723*   2724*   2735*   2739    2750*   2751*   2763    2772    2785*
                        2786*   2796    2797*   2798*   2799*   2803*   2804    2826    2827*   2828*   2829*   2832    2833*
                        2860*   2862    2899*   2901    2934    2945*   2967    2978*   3000    3012*   3013*   3043    3053*
                        3083    3093*   3199*   3207    3312    3415    3420    3425    3430    3444    3446    3447    3448
                        3464    3565    3567    3568    3569    3636*   3637*   3638*   3645    3650    3738    4567*
B1716   002226           1015*  3295*   3298    4557
CALTAN  024706          3054    3094    3710*
CENAB   002216           1011*  1100*   1119*   3147    3191
CNTR    025070          3736*   3742*   3746*
CONS    002266          1037*   2289    2297    2361    2367    2384    2390    2407    2413    2430    2436    2453    2459
                        2476    2482    3373*   3379    3381    3440    3511*   3517    3519
```

DZVSCB.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
CR     = 000015   333#  4037  4047
CRLF   = 000200   334#  4008  4047
CSIZR    002616  1100#
DDISP  = 177570   340#   512  1074
DELAY    024426  1194  1217  1259  1285  1288  1318  1353  1387  1420  1452  1484  1516  1547
                 1578  1609  1640  1671  1698  1728  1759  1790  1821  1651  1881  1912  1944
                 1975  2006  2037  2068  2100  2103  2174  2177  2605  2632  2659  2686  2713
                 2740  2775  2807  2812  2835  2840  2863  2902  3164  3212  3215  3283  3286
                 3506  3526  3627#  3648  3653
DH1      031731   599   613   620   779   786   793   800   807   814   821   827   834   841
                  848   855   862   869   875   882   889   896   903   910   917   923   930
                  937   944   951   971   985   992  4513#
DH2      031776   627   633   640   647   654   661   668   675   682   689   696   703   710
                  717   724   730   737   744   751   758   765   773  4520#
DH3      032056   978  4528#
DH4      032133   958   965  4536#
DH5      032200   606  4543#
DISPLA   001142   512#  1074*  1082*  3807*  3886*
DISPRE   000174   443#  1082
DLYCNT   002206  1007#  3627*  3628*
DNAME    002270  1038#  2191  2196  3441
DO       024472  2197  2222  2247  2271  2296  2321  2343  2366  2389  2412  2435  2458  2481
                 2505  2530  2554  2580  2603  2630  2657  2684  2711  2738  3644#
DPC      002244  1028#  1094  1098  1193*  1216*  1239*  1258*  1284*  1287*  1315*  1317*  1350*  1352*
                 1384*  1386*  1417*  1419*  1449*  1451*  1481*  1483*  1513*  1515*  1544*  1546*  1575*
                 1577*  1606*  1608*  1637*  1639*  1668*  1670*  1695*  1697*  1725*  1727*  1756*  1758*
                 1787*  1789*  1818*  1820*  1847*  1850*  1878*  1880*  1909*  1911*  1941*  1943*  1972*
                 1974*  2003*  2005*  2034*  2036*  2065*  2067*  2097*  2099*  2102*  2127*  2148*  2168
                 2173*  2176*  2179  2582*  2604*  2631*  2658*  2685*  2712*  2739*  2772*  2774*  2804*
                 2806*  2809*  2810  2811*  2814  2832*  2834*  2837*  2838  2839*  2842  2862*  2901*
                 3121*  3134*  3163*  3209*  3210  3211*  3214*  3217  3282*  3285*  3288*  3366*  3368*
                 3437  3503*  3505*  3523  3525*  3645*  3647*  3650*  3652*  3738*  3741*
DPCONV   024556  3272  3660#
DPCON1   024570  3293  3665#
DPCSAV   024226  3523*  3524*  3525  3528*  3557#
DSWR   = 177570   339#   511  1073
DT1      032256   600   614   621   780   787   794   801   808   815   822   828   835   842
                  849   856   863   870   876   883   890   897   904   911   918   924   931
                  938   945   952   972   986   993  4552#
DT2      032272   607   628   634   641   648   655   662   669   676   683   690   697   704
                  711   718   725   731   738   745   752   759   766   774  4554#
DT3      032310   979  4557#
DT4      032326   959   966  4560#
EMTVEC=  000030   428#  1057*  1058*
EM1      027522   598  4292#
EM10     027732   646  4318#
EM11     027761   653  4322#
EM12     030013   660  4327#
EM13     030046   667  4332#
EM14     030100   674  4337#
EM15     030126   681  4341#
EM16     030150   688  4344#
EM17     030167   695  4347#
EM2      027551   605  4296#
EM20     030213   702  4351#
EM21     030242   709  4355#
```

EM22	030273	716	4360#										
EM23	030323	723	4365#										
EM24	030352	729	4369#										
EM25	030407	736	4374#										
EM26	030433	743	4378#										
EM27	030457	750	4382#										
EM3	027611	612	4302#										
EM30	030507	757	4387#										
EM31	030537	764	4392#										
EM32	030572	772	4397#										
EM33	030616	778	4401#										
EM34	030635	785	4404#										
EM35	030656	792	4407#										
EM36	030671	799	4409#										
EM37	030705	806	4412#										
EM4	027630	619	4305#										
EM40	030731	813	4416#										
EM41	030753	820	4420#										
EM42	030776	826	4424#										
EM43	031021	833	4428#										
EM44	031040	840	4431#										
EM45	031054	847	4433#										
EM46	031101	854	4437#										
EM47	031126	861	4441#										
EM5	027652	626	4308#										
EM50	031156	868	4445#										
EM51	031177	874	4448#										
EM52	031226	881	4452#										
EM53	031243	888	4455#										
EM54	031257	895	4458#										
EM55	031304	902	4462#										
EM56	031325	909	4465#										
EM57	031352	916	4469#										
EM6	027670	632	4311#										
EM60	031401	922	4473#										
EM61	031431	929	4478#										
EM62	031452	936	4481#										
EM63	031500	943	4485#										
EM64	031521	950	4488#										
EM65	031542	957	4491#										
EM66	031562	964	4494#										
EM67	031575	970	4496#										
EM7	027713	639	4315#										
EM70	031612	977	4499#										
EM71	031640	984	4503#										
EM72	031670	991	4507#										
ERRVEC=	000004	421#	1071	1072*	1083*	1102*	1113*	1124*	1135*	1137*	1149*	3768	3769*	3771*	3774*
EXECUT	025020	2946	2979	3014	3055	3095	3735#								
GNS =	****** U	442	4215	4216	4217	4218	4219								
G1716	002224	1014#	3274*	3298	4557										
HT =	000011	331#	4006	4047											
IOTVEC=	000020	426#	1055*	1056*											
KIPAR0	002230	1019#	1126*												
KIPAR2	002234	1021#	1128*	1143*	1144	1150*	1151	3256*	3264	3266*	3269*	3271	3301*	3302	
KIPAR7	002240	1023#	1130*	1144											

```
KIPDR0  002232          1020*  1127*
KIPDR2  002236          1022*  1129*
KIPDR7  002242          1024*  1131*
KTENAB  002220          1012*  1101*  1110*  1120   1134*  1154*  3252   3255*
KTERRV= 000250          1001*  1123*
KTMAX   002222          1013*  1151*  1152   1156   3264   3302
KTSER   024610          1123   3676*
KTSIZR  002736          1121   1123*
KTSR0 = 177572          1002*  1125   1139*  1142*  1147*  3259*  3263*  3676*
LDRSV1  002210          1008*  3160*  3174   3204*  3224
LDRSV2  002212          1009*  3205*  3225
LF    = 000012           332*  4041   4047
MAINT1= 010000           998*  3119
MAINT2= 020000           999*
MEMMAX  002214          1010*  1115*  1162   3152   3195
MSG1    027363          1092   4274*
MSG2    027457          3677   4285*
MSG3    027476          1170   4288*
MSG4    027516          1173   4291*
OPEN  = 000000           997*  1006   1007   1008   1009   1010   1011   1012   1013   1014   1015   1028   1029
                        1030   1031   1032   1033   1034   1035   1036   1037   1038   1039   1040   1041   1042
                        1043
PC    =%000007           352*  2197*  2222*  2247*  2271*  2296*  2321*  2343*  2366*  2389*  2412*  2435*  2458*
                        2481*  2505*  2530*  2554*  2580*  2603*  2630*  2657*  2684*  2711*  2738*  2884*  2923*
                        3054*  3061*  3094*  3101*  3272*  3293*  3411*  3554*  3600*  3603*  3613*  3618   3655*
                        3671*  3692*  3704*  3726*  3842*  3859*  3896*  3902*  3958*  3996*  4015*  4022*  4029*
                        4043*  4045*  4258
PIRQ  = 177772           338*
PIRQVE= 000240           432*
PCPSET  024442          2193   2218   2243   2268   2292   2317   2340   2363   2386   2410   2433   2456   2479
                        2501   2526   2552   2575   2601   2628   2655   2682   2709   2736   3635*
PR0   = 000000           355*
PR1   = 000040           356*
PR2   = 000100           357*
PR3   = 000140           358*
PR4   = 000200           359*
PR5   = 000240           360*
PR6   = 000300           361*
PR7   = 000340           362*
PS    = 177776           335*   336
PSW   = 177776           336*  1176*  1210*  2759*  2861*  2865*  2900*  2904*  3365*  3374*  3502*  3512*  3684*
PWRMSG  027316          4257   4264*
PWRVEC= 000024           427*  1061*  1062*  4226*  4227*  4236*  4242*  4254*  4255*
RCNT    023430          3360   3404   3451*
RCNT1   024250          3499   3545   3572*
RESVEC= 000010           422*
RL0     002254          1032*  3120*  3133*  3140*  3270*  3277*  3280*  3304*
RSTART  003244           483   1169   1174*  3619   4259
RSTVEC  024626          2884   2923   3411   3554   3624*
R0    =%000000           343*  1093*  1095   1096*  1103*  1104   1107*  1108   1114*  1115   1116   1138*  1140
                        1141   1156*  1157*  1158*  1159*  1160*  1162*  1163*  1164*  1165*  1166*  1167*  1171
                        1189*  1192   1201*  1214*  1219*  1253*  1261   1266   1269*  1281*  1290   1295   1298*
                        1313*  1320   1325   1328*  1346*  1355   1360   1363*  1382*  1389   1394   1397*  1415*
                        1422   1427   1430*  1447*  1454   1459   1462*  1479*  1486   1491   1494*  1511*  1518
                        1523   1526*  1542*  1549   1554   1557*  1573*  1580   1585   1588*  1604*  1611   1616
                        1619*  1635*  1642   1647   1650*  1666*  1673   1678   1681*  1723*  1730   1735   1738*
```

DZVSCB.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
                        1754* 1761  1766  1769* 1785* 1792  1797  1800* 1816* 1823  1828  1831* 1876*
                        1883  1888  1891* 1907* 1914  1919  1922* 1939* 1946  1951  1954* 1970* 1977
                        1982  1985* 2001* 2008  2013  2016* 2032* 2039  2044  2047* 2063* 2070  2075
                        2078* 2095* 2105  2110  2113* 2146* 2150* 2242* 2246  2254* 2291* 2295  2303*
                        2525* 2529  2536* 2800* 2902  2803  2818* 2858* 2866* 2896* 2905* 2934* 2935*
                        2936* 2937* 2938* 2939* 2940* 2941* 2942* 2943* 2945  2952  2955* 2956  2967*
                        2968* 2969* 2970* 2971* 2972* 2973* 2974* 2975* 2976* 2978  2985  2988* 2989
                        3000* 3001* 3002* 3003* 3004* 3005* 3006* 3007* 3008* 3009* 3011  3012  3023*
                        3026  3031  3043* 3044* 3045* 3046* 3047* 3048* 3049* 3050* 3051* 3052* 3053
                        3064  3066* 3067  3083* 3084* 3085* 3086* 3087* 3088* 3089* 3090* 3091* 3092*
                        3093  3104  3106* 3107  3117* 3120  3129* 3152* 3153  3154  3180  3195* 3196
                        3197  3231  3258* 3260* 3261* 3262* 3271* 3273  3290* 3291* 3294  3312* 3313*
                        3314* 3315* 3316* 3317* 3318* 3319* 3320* 3321* 3322* 3323* 3324* 3325* 3326*
                        3327* 3328* 3329* 3330* 3331* 3333* 3334* 3335* 3336* 3337* 3338* 3339* 3340*
                        3341* 3342* 3343* 3344* 3345* 3346* 3347* 3348* 3349* 3350* 3351* 3352* 3353*
                        3355* 3356* 3357* 3367* 3370* 3464* 3465* 3466* 3467* 3468* 3469* 3470* 3471*
                        3472* 3473* 3474* 3475* 3476* 3477* 3478* 3479* 3480* 3481* 3482* 3483* 3484*
                        3485* 3486* 3487* 3488* 3489* 3490* 3491* 3492* 3493* 3494* 3495* 3504* 3508*
                        3610* 3613  3661* 3662* 3663* 3664* 3667* 3670* 3686* 3687* 3688* 3689* 3819
                        3827* 3831  3832  3834* 3835* 3836  3858* 3930  3931* 3932* 3939* 3940* 3941*
                        3942* 3943* 3944  3949  3954* 3956* 3960  3962  3989  3990* 3995  4000  4003*
                        4137  4147* 4151  4167  4168  4181* 4199  4200* 4201  4202* 4203* 4204* 4205*
                        4228  4253*
R1      =%000001         344# 1094* 1095* 1097* 1098  1104* 1105  1106  1254* 1257  1268* 1280* 1283
                        1297* 1312* 1314  1327* 1345* 1347  1362* 1381* 1383  1396* 1414* 1416  1429*
                        1446* 1448  1461* 1478* 1480  1493* 1510* 1512  1525* 1541* 1543  1556* 1572*
                        1574  1587* 1603* 1605  1618* 1634* 1636  1649* 1665* 1667  1680* 1722* 1724
                        1737* 1753* 1755  1768* 1784* 1786  1799* 1815* 1817  1830* 1875* 1877  1890*
                        1906* 1908  1921* 1938* 1940  1953* 1969* 1971  1984* 2000* 2002  2015* 2031*
                        2033  2046* 2062* 2064  2077* 2034* 2096  2112* 2853* 2854* 2855* 2892* 2893*
                        2894* 3010* 3013  3025* 3026  3029  3042* 3060  3071* 3082* 3100  3153* 3155*
                        3183  3196* 3198* 3234  3257* 3261  3267* 3274  3275* 3278* 3292* 3295  3358*
                        3366  3407* 3409  3497* 3503  3550* 3552  3660* 3666* 3669* 3685* 3690* 3820
                        3857* 4138  4151* 4152  4156  4180* 4229  4252*
R2      =%000002         345# 1342* 1349  1365  1367* 2999* 3017  3018  3028* 3041* 3058  3059  3070*
                        3081* 3098  3099  3151* 3175  3177* 3179* 3181  3194* 3226  3228* 3230* 3232
                        3359* 3387  3391* 3396  3398* 3406* 3498* 3532  3536* 3537  3539* 3546* 3547
                        3549* 4139  4150* 4154* 4157  4164* 4165* 4166  4171* 4179* 4230  4251*
R3      =%000003         346# 3154* 3158  3159* 3160  3161* 3163  3174* 3180* 3181* 3183  3197* 3202
                        3203* 3204  3205  3206* 3207* 3209  3224* 3225* 3231* 3232* 3234  3360* 3367
                        3399* 3404* 3499* 3504  3540* 3545* 3711* 3718* 3722* 4080  4089* 4095* 4096*
                        4099* 4104* 4105* 4106  4115* 4140  4148* 4149* 4163* 4166* 4175* 4176* 4178*
                        4231  4250*
R4      =%000004         347# 2193* 2218* 2243* 2268* 2292* 2317* 2340* 2363* 2386* 2410* 2433* 2456*
                        2479* 2501* 2526* 2552* 2575* 2601* 2628* 2655* 2682* 2709* 2736* 2763* 2764*
                        2765* 2766* 2767* 2768* 2769* 2770* 2773* 2777* 3156* 3162  3171* 3200* 3208
                        3221* 3361* 3385  3392* 3393  3395* 3638  3639* 4081  4083* 4084* 4085* 4086
                        4087* 4101  4103* 4111* 4114* 4232  4249*
R5      =%000005         348# 1194* 1217* 1259* 1285* 1288* 1318* 1353* 1387* 1420* 1452* 1484* 1516*
                        1547* 1578* 1609* 1640* 1671* 1698* 1728* 1759* 1790* 1821* 1851* 1881* 1912*
                        1944* 1975* 2006* 2037* 2068* 2100* 2103* 2174* 2177* 2605* 2632* 2659* 2686*
                        2713* 2740* 2775* 2807* 2812* 2835* 2840* 2863* 2902* 2946* 2979* 3014* 3055*
                        3060* 3095* 3100* 3164* 3212* 3215* 3283* 3286* 3362* 3405* 3406  3506* 3526*
                        3627  3630* 3648* 3653* 3700* 3701* 3702* 3703  3736  3744* 4082  4088* 4090*
                        4092* 4093* 4094* 4095  4113* 4141  4143* 4145* 4152* 4156* 4171  4177* 4233
                        4248*
```

```
R6      =%000006        349*    351     1049*   1050*   1051    1112    1133    1148    2872    2911
R7      =%000007        350*    352
SETPTR  002576          1095*   1099
SILOR   023330          3359    3362    3398    3415*
SILOR1  024230          3498    3539    3549    3559*
SP      =%000006        351*    1053*   1071*   1079*   1083    1171*   1175*   3375    3376    3377    3378    3384    3513
                        3514    3515    3516    3522    3607*   3768*   3771    3773    3774    3803    3804    3808*   3819*
                        3820*   3827    3828*   3839    3840*   3841*   3851    3852*   3857    3858    3891    3911*   3914*
                        3930*   3935*   3956    3960*   3989*   3990    4000*   4002    4003    4004*   4006    4008    4010
                        4016    4018*   4020*   4028*   4032    4036    4037    4041    4072*   4073    4074    4075*   4080*
                        4081*   4082*   4088    4113    4114    4115    4116*   4117*   4137*   4138*   4139*   4140*   4141*
                        4142*   4143    4146*   4159    4161*   4163    4173    4175    4177    4178    4179    4180    4181
                        4183*   4184*   4199*   4200    4228*   4229*   4230*   4231*   4232*   4233*   4234*   4235    4243*
                        4247    4248    4249    4250    4251    4252    4253    4258*
SREG0   002246          1029*   2315    2322    2499    2506    2523    2531    2549    2555    2573    2584    2880    2919
                        3438
SREG1   002256          1033*   1211    1221    1225    2149    2152    2156    2216    2223    2240    2248    2266    2272
                        2338    2344    2856    2868    2873    2895    2907    2912    3122    3123    3136    3439
STACK = 001100          326*    1053    1175
START   002304          446     1046*
START1  002566          1091    1093*
STKLMT= 177774          337*
STKPT   002276          1041*   1188    1192*   1196    1212*   1236    1238*   1240    1257*   1261*   1283*   1290*   1314*
                        1320*   1347*   1355*   1383*   1389*   1416*   1422*   1448*   1454*   1480*   1486*   1512*   1518*
                        1543*   1549*   1574*   1580*   1605*   1611*   1636*   1642*   1667*   1673*   1694*   1700*   1724*
                        1730*   1755*   1761*   1786*   1792*   1817*   1823*   1846*   1853*   1877*   1883*   1908*   1914*
                        1940*   1946*   1971*   1977*   2002*   2008*   2033*   2039*   2064*   2070*   2096*   2105*   2124*
                        2128    2129    2144*   2170*   2607*   2634*   2661*   2688*   2715*   2742*   2771*   2779*   2801*
                        2831*   2857*   2897*   3119*   3162*   3166*   3208*   3281*   3364*   3372*   3501*   3510*   3530*
                        3635*   3644*   3646*   3651*   3737*   3739*   3740*
STKVAL  002272          1039*   1251    1262    1277    1291    1316    1321    1351    1356    1385    1390    1418    1423
                        1450    1455    1482    1487    1514    1519    1545    1550    1576    1581    1607    1612    1638
                        1643    1669    1674    1696    1701    1726    1731    1757    1762    1788    1793    1819    1824
                        1848    1854    1879    1884    1910    1915    1933    1942    1947    1973    1978    2004    2009
                        2035    2040    2066    2071    2098    2106    2598    2608    2625    2635    2652    2662    2679
                        2689    2706    2716    2733    2743    2761    2780    3150    3167    3529    3531
SWR     001140          511*    1051    1073*   1075    1081*   1088*   3583    3763    3777    3779    3785    3792    3887
                        3894    3906    3909    4234    4247*
SWREG   000176          444*    1081
SW0     = 000001        390*
SW00    = 000001        380*    390
SW01    = 000002        379*    389
SW02    = 000004        378*    388
SW03    = 000010        377*    387
SW04    = 000020        376*    386
SW05    = 000040        375*    385
SW06    = 000100        374*    384
SW07    = 000200        373*    383
SW08    = 000400        372*    382
SW09    = 001000        371*    381
SW1     = 000002        389*
SW10    = 002000        370*
SW11    = 004000        369*
SW12    = 010000        368*
SW13    = 020000        367*
SW14    = 040000        366*
```

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SW15  = 100000            365#
SW2   = 000004            388#
SW3   = 000010            387#
SW4   = 000020            386#
SW5   = 000040            385#
SW6   = 000100            384#
SW7   = 000200            383#
SW8   = 000400            382#
SW9   = 001000            381#
TANCON  024662           3061    3101    3699#
TANGNT  025016           3713*   3715    3717*   3721*   3728#
TBITVE= 000014            423#
TERMCH  002274           1040#   2802*   2830*
TKVEC = 000060            430#
TPVEC = 000064            431#
TRAPVE= 000034            429#   1059*   1060*
TRTVEC= 000014            424#
TSTNUM  002204           1006#   3883*   4552    4554    4557    4560
TST1    003264           1185#
TST10   004546           1366    1374#
TST100  020370           2962#
TST101  020544           2995#
TST102  020742           3024    3037#
TST103  021134           3069    3077#
TST104  021312           3113#
TST105  021506           3145#
TST106  021722           3148    3182    3189#
TST107  022174           3192    3233    3240#
TST11   004744           1400    1407#
TST110  022536           3253    3309#
TST111  023442           3413    3461#
TST112  024262           3555    3581#
TST12   005144           1433    1440#
TST13   005334           1471#
TST14   005534           1503#
TST15   005732           1535#
TST16   006122           1566#
TST17   006310           1597#
TST2    003412           1208#
TST20   006502           1628#
TST21   006670           1659#
TST22   007060           1689#
TST23   007230           1708    1716#
TST24   007420           1747#
TST25   007606           1778#
TST26   007776           1809#
TST27   010166           1840#
TST3    003546           1226    1234#
TST30   010346           1869#
TST31   010534           1900#
TST32   010724           1931#
TST33   011122           1963#
TST34   011312           1994#
TST35   011502           2025#
TST36   011672           2056#
TST37   012062           2087#
```

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TST4    003632          1243    1249#
TST40   012272          2122#
TST41   012404          2141#
TST42   012534          2166#
TST43   012652          2181    2187#
TST44   013006          2204    2212#
TST45   013142          2229    2237#
TST46   013300          2255    2263#
TST47   013426          2278    2286#
TST5    003772          1275#
TST50   013564          2304    2312#
TST51   013712          2328    2335#
TST52   014040          2350    2358#
TST53   014166          2373    2381#
TST54   014314          2396    2404#
TST55   014442          2419    2427#
TST56   014570          2442    2450#
TST57   014716          2465    2473#
TST6    004144          1305#
TST60   015044          2488    2496#
TST61   015172          2512    2520#
TST62   015330          2538    2546#
TST63   015456          2562    2569#
TST64   015624          2595#
TST65   015772          2614    2622#
TST66   016142          2641    2649#
TST67   016312          2668    2676#
TST7    004342          1331    1338#
TST70   016462          2695    2703#
TST71   016632          2722    2730#
TST72   017002          2749    2757#
TST73   017220          2793#
TST74   017406          2824#
TST75   017554          2844    2850#
TST76   017774          2889#
TST77   020214          2928#
TYPCOR  003202          1118    1122    1136    1155    1162#
TYPDS = 104404          1172    3608    4219#
TYPE  = 104400          1092    1170    1173    3606    3609    3677    3889    3897    3929    3946    3948    3951    3953
                        3957    3964    4011    4107    4182    4215#   4256
TYPMEM  003216          1161    1167#
TYPOC = 104401          3937    3961    4216#
TYPON = 104403          4218#
TYPOS = 104402          4217#
XDOFF   002260          1034#   3071    3082
XPOS    002250          1030#   2933    2949    3028    3070    3081    3290
YDOFF   002262          1035#   3042
YPOS    002252          1031#   2966    2982    2999    3041
ZDOFF   002302          1043#
ZPOS    002300          1042#
$APTHD  001000           468     474#
$ASTAT= ****** U        3845    3860
$ATYC   025374          3816    3818#
$ATY1   025350          3814#
$ATY3   025356          3815#   3996
$ATY4   025366          3817#   3902
```

```
$AUTOB  001134          508#
$BASE   001256          576#  1093
$BDADR  001122          503#  1188*  1211*  1236*  1251*  1277*  1316*  1351*  1385*  1418*  1450*  1482*  1514*
                       1545*  1576*  1607*  1638*  1669*  1696*  1726*  1757*  1788*  1819*  1848*  1879*  1910*
                       1933*  1942*  1973*  2004*  2035*  2066*  2098*  2128*  2149*  2168*  2191*  2216*  2240*
                       2266*  2289*  2315*  2338*  2361*  2384*  2407*  2430*  2453*  2476*  2499*  2523*  2549*
                       2573*  2598*  2625*  2652*  2679*  2706*  2733*  2761*  2810*  2838*  2856*  2895*  2933*
                       2966*  3017*  3058*  3098*  3122*  3150*  3210*  3379*  3385*  3386   3517*  3529*  4552
                       4554
$BDDAT  001126          505#  1196*  1197*  1198   1223*  1228*  1240*  1241*  1242   1262*  1263*  1264   1291*
                       1292*  1293   1321*  1322*  1323   1356*  1357*  1358   1390*  1391*  1392   1423*  1424*
                       1425   1455*  1456*  1457   1487*  1488*  1489   1519*  1520*  1521   1550*  1551*  1552
                       1581*  1582*  1583   1612*  1613*  1614   1643*  1644*  1645   1674*  1675*  1676   1701*
                       1702*  1703   1731*  1732*  1733   1762*  1763*  1764   1793*  1794*  1795   1824*  1825*
                       1826   1854*  1855*  1856   1884*  1885*  1886   1915*  1916*  1917   1947*  1948*  1949
                       1978*  1979*  1980   2009*  2010*  2011   2040*  2041*  2042   2071*  2072*  2073   2106*
                       2107*  2108   2129*  2130*  2131   2154*  2159*  2179*  2180   2198*  2199*  2200   2223*
                       2224*  2225   2248*  2249*  2250   2272*  2273*  2274   2297*  2298*  2299   2322*  2323*
                       2324   2344*  2345*  2346   2367*  2368*  2369   2390*  2391*  2392   2413*  2414*  2415
                       2436*  2437*  2438   2459*  2460*  2461   2482*  2483*  2484   2506*  2507*  2508   2531*
                       2532*  2533   2555*  2556*  2557   2584*  2585*  2586   2608*  2609*  2610   2635*  2636*
                       2637   2662*  2663*  2664   2689*  2690*  2691   2716*  2717*  2718   2743*  2744*  2745
                       2780*  2781*  2782   2814*  2815   2842*  2843   2868*  2869*  2875*  2882*  2907*  2908*
                       2914*  2921*  2949*  2950   2982*  2983   3018*  3019   3059*  3062   3099*  3102   3123*
                       3124*  3125   3136*  3137*  3167*  3168   3217*  3218   3294*  3296   3381*  3386*  3388
                       3519*  3531*  3533   3699*  3703*  4552   4554   4557   4560
$BELL   001172          527#  3889   3921
$CDWI   001262          578#
$CHARC  026432         4013*  4023*  4030   4039*  4044#
$CKSWR= ****** U        4222
$CMTAG  001100          491#  1048   1049   1057   1063   1064   1065
$CM1  = 000001          523#   524#
$CM2  = 000002          523#   524#
$CM3  = 000001          521#   523
$CM4  = 000001          524#   525#
$CPUOP  001230          550#
$CRLF   001177          529#  3897   3921   3929   3948   3953   3957   4012   4047
$DBLK   027100         4148   4182   4190#
$DEVCT  001212          541#
$DEVM   001260          577#
$DOAGN  024402         3602   3611   3617#
$DTBL   027070         4151   4186#
$ENDAD  024372          453   3613#  3916
$ENDCT  024340         1063   3604#
$ENDMG  024411         3606   3621#
$ENULL  024406         3609   3620#
$ENV    001222          546#  3823   3847   3899   3991
$ENVM   001223          547#  1086   3825   3993   3998
$EOP    024304         3584   3594#
$EOPCT  024332         1063*  3601#  3605
$ERFLG  001103          494#  3753   3781   3783   3789*  3811   3884*  3921
$ERMAX  001115          500#  1066*  3783   3806*  3811
$ERROR  025616         1057   3882#
$ERRPC  001116          501#  3891*  3892*  3893   3921   3935   4552   4554   4557   4560
$ERRTB  001264          595#  3943
$ERRTY  026020         3896   3928#
```

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$ERTTL  001112            498#  3890*  3921
$ESCAP  001170            526#  1065*  3805*  3912  3914  3921
$ETABL  001222            545#
$ETEND  001264            480    579#
$FATAL  001204            538#  3851*
$FFLG   025614           3814*  3817*  3845  3854*  3862#
$FILLC  001156            519#  4016   4047
$FILLS  001155            518#  4047
$GDADR  001120            502#
$GDDAT  001124            504#  1190*  1198  1202*  1213*  1227*  1237*  1242  1255*  1264  1279*  1293  1310*
                         1323   1330*  1341*  1358  1368*  1377*  1392  1399*  1410*  1425  1432*  1442*  1457
                         1465*  1474*  1489  1497*  1506*  1521  1529*  1537*  1552  1560*  1568*  1583  1591*
                         1599*  1614  1622*  1630*  1645  1653*  1661*  1676  1684*  1691*  1703  1718*  1733
                         1741*  1749*  1764  1772*  1780*  1795  1803*  1811*  1826  1834*  1843*  1856  1871*
                         1886  1894*  1902*  1917  1925*  1934*  1949  1957*  1965*  1980  1988*  1996*  2011
                         2019*  2027*  2042  2050*  2058*  2073  2081*  2089*  2108  2116*  2125*  2131  2134*
                         2135  2145*  2158*  2169*  2180  2192*  2196  2200  2203*  2217*  2221  2225  2228*
                         2241*  2250  2253*  2267*  2274  2277*  2290*  2299  2302*  2316*  2320  2324  2327*
                         2339*  2346  2349*  2362*  2369  2372*  2385*  2392  2395*  2408*  2415  2418*  2431*
                         2438  2441*  2454*  2461  2464*  2477*  2484  2487*  2500*  2504  2508  2511*  2524*
                         2533  2537*  2550*  2557  2561*  2574*  2579  2586  2589*  2599*  2610  2613*  2626*
                         2637  2640*  2653*  2664  2667*  2680*  2691  2694*  2707*  2718  2721*  2734*  2745
                         2748*  2762*  2782  2787*  2796*  2815  2826*  2843  2859*  2878*  2898*  2917*  2944*
                         2950  2954*  2977*  2983  2987*  3011*  3019  3021  3029*  3031*  3062  3102  3116*
                         3125  3128*  3132*  3158*  3168  3202*  3218  3273*  3282  3296  3380*  3387*  3388
                         3518*  3532*  3533  3712*  3715*  3716*  3720*  3723  3725*  4552  4554  4557  4560
$GET42  024362            3610#
$GTSWR= ****** U          4221
$HD   = 000000             311
$HIBTS  001000             475#
$ICNT   001104             495#  3796*  3797  3799*  3810
$ILLUP  027310            4226   4242   4261#
$INTAG  001135             509#
$ITEMB  001114             499#  3893*  3901  3921  3932
$LF     001200             530#  3921   4047
$LFLG   025613            3855*  3861#
$LPADR  001106             496#  1067*  3787*  3803*  3808  3810
$LPERR  001110             497#  1068*  1187*  1256*  1282*  1311*  1344*  1380*  1413*  1445*  1477*  1509*  1540*
                          1571*  1602*  1633*  1664*  1721*  1752*  1783*  1814*  1874*  1905*  1937*  1968*  1999*
                          2030*  2061*  2093*  2190*  2215*  2239*  2265*  2288*  2314*  2337*  2360*  2383*  2406*
                          2429*  2452*  2475*  2498*  2522*  2548*  2572*  2597*  2624*  2651*  2678*  2705*  2732*
                          2760*  2805*  2932*  2965*  2998*  3040*  3080*  3118*  3131*  3149*  3193*  3289*  3369*
                          3496*  3787   3804*  3810  3911
$MADR1  001234             563#
$MADR2  001240             567#
$MADR3  001244             570#
$MADR4  001250             573#
$MAIL   001202             476    480    536#  1085  1186  1209  1235  1250  1276  1307  1340  1376  1409
                          1441   1473   1505  1536  1567  1598  1629  1660  1690  1717  1748  1779  1810
                          1842   1870   1901  1932  1964  1995  2026  2057  2088  2123  2143  2167  2189
                          2214   2238   2264  2287  2313  2336  2359  2382  2405  2428  2451  2474  2497
                          2521   2547   2571  2596  2623  2650  2677  2704  2731  2758  2795  2825  2852
                          2891   2930   2964  2997  3039  3079  3115  3146  3190  3242  3311  3463  3582
                          3802   3899   3991
$MAMS1  001232             557#
$MAMS2  001236             565#
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$MARK3  001342          568#
$MARK4  001246          571#
$MBADR  001002          476#
$MFLG   025612         3815*  3821   3856*  3860#
$MSGAD  001216          543#  3831*  3834
$MSGLG  001220          544#  3836*
$MSGTY  001202          527#  3829   3837*  3849   3853*
$MTYP1  001233          558#
$MTYP2  001237          566#
$MTYP3  001243          569#
$MTYP4  001247          572#
$MXCNT  025346         3800   3810#
$NUM    001154          517#  4018   4047
$NUMST= 000001         1182#  1205#  1231#  1246#  1272#  1302#  1335#  1371#  1404#  1437#  1468#  1500#  1532#
                       1563#  1594#  1625#  1656#  1686#  1713#  1744#  1775#  1806#  1837#  1866#  1897#  1928#
                       1960#  1991#  2022#  2053#  2084#  2119#  2138#  2163#  2184#  2209#  2234#  2260#  2283#
                       2309#  2332#  2355#  2378#  2401#  2424#  2447#  2470#  2493#  2517#  2543#  2566#  2592#
                       2619#  2646#  2673#  2700#  2727#  2754#  2790#  2821#  2847#  2886#  2925#  2959#  2992#
                       3034#  3074#  3110#  3142#  3186#  3237#  3306#  3458#  3578#
$OCNT   026660         4079*  4108*  4121#
$OMODE  026652         4074*  4078*  4083   4086*  4097*  4123#
$OVER   025332         3764   3780   3788   3796   3807#
$PASS   001210          540#  1085*  3598*  3599*  3607   3620   3794   3811
$PRSTM  001006          478#
$PWRAD  027204         4259#
$PWRON  027144         1061   4226#  4254
$PWRMG  027300         4257#
$PWRUP  027216         4236   4242#
$QUES   001176          528#  3921   4047
$PDCHR= ****** U       4222
$PDDEC= ****** U       4222
$PDLIN= ****** U       4222
$PDOCT= ****** U       4222
$REGAD  001160          521#
$REGD   001162          523#
$RTNAD  024404         3619#
$R2A  = ****** U       4222
$SAVRE= ****** U       4222
$SAVPS  027314         4235*  4243   4244*  4245*  4263#
$SCOPE  025072         1055   3762#
$SETUP= 000037         1046#  1054   1055   1057   1059   1061   1063   1064   1065   1067   3596   3763   3883
                       3909   3916
$STUP = 177777         1046#
$SVLAD  025276         3772   3801#
$SVPC = 000204          451#   456
$SWR  = 167400          301#   311    315    316    317    318    319    320    321    322    525    526    527
                       1064   1065   1067   1068   1186   1209   1235   1250   1276   1306   1339   1375   1408
                       1441   1472   1504   1536   1567   1598   1629   1660   1690   1717   1748   1779   1810
                       1841   1870   1901   1932   1964   1995   2026   2057   2088   2123   2142   2167   2188
                       2213   2238   2264   2287   2313   2336   2359   2382   2405   2428   2451   2474   2497
                       2521   2547   2570   2596   2623   2650   2677   2704   2731   2758   2794   2825   2851
                       2890   2929   2963   2996   3038   3078   3114   3146   3190   3241   3310   3462   3582
                       3591   3597   3612   3618   3620   3754   3755   3756   3757   3758   3763   3775   3777
                       3778   3781   3782   3783   3790   3791   3792   3804   3807   3910   3874   3875   3876
                       3877   3878   3887   3894   3906   3909   3921   4260
$SWREG  001224          548#  1089
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$SWRMK= 000000          322     323    3758    3759    3779
$TESTN  001206          539#   1186#   1209#   1235#   1250#   1276#   1307#   1340#   1376#   1409#   1441#   1473#   1505#
                       1536#   1567#   1598#   1629#   1660#   1690#   1717#   1748#   1779#   1810#   1842#   1870#   1901#
                       1932#   1964#   1995#   2026#   2057#   2088#   2123#   2143#   2167#   2189#   2214#   2238#   2264#
                       2287#   2313#   2336#   2359#   2382#   2405#   2428#   2451#   2474#   2497#   2521#   2547#   2571#
                       2596#   2623#   2650#   2677#   2704#   2731#   2758#   2795#   2825#   2852#   2891#   2930#   2964#
                       2997#   3039#   3079#   3115#   3146#   3190#   3242#   3311#   3463#   3582#   3802#
$TIMES  001166          525#   1064#   1306#   1339#   1375#   1408#   1472#   1504#   1841#   2142#   2188#   2213#   2570#
                       2794#   2851#   2890#   2929#   2963#   2996#   3038#   3078#   3114#   3241#   3310#   3462#   3597#
                       3790#   3797    3800#   3810
$TKB    001146          514#
$TKS    001144          513#
$TMPO   001164          524#   1256#   1295#   1325#   1360#   1394#   1427#   1459#   1491#   1523#   1554#   1585#   1616#
                       1647#   1678#   1705#   1735#   1766#   1797#   1828#   1858#   1888#   1919#   1951#   1982#   2013#
                       2044#   2075#   2110#   2952#   2985#   3021#   3064#   3104#   3157#   3166    3172#   3201#   3222#
                       3363#   3400#   3401    3403#   3500#   3541#   3542    3544#   4554    4560
$TN   = 000113          301#    311    1182    1186#   1205    1209#   1226    1231    1235#   1243    1246    1250#   1272
                       1276#   1302    1306#   1307    1331    1335    1339#   1340    1366    1371    1375#   1376    1400
                       1404    1408#   1409    1433    1437    1441#   1468    1472#   1473    1500    1504#   1505    1532
                       1536#   1563    1567#   1594    1598#   1625    1629#   1656    1660#   1686    1690#   1708    1713
                       1717#   1744    1748#   1775    1779#   1806    1810#   1837    1841#   1842    1866    1870#   1897
                       1901#   1928    1932#   1960    1964#   1991    1995#   2022    2026#   2053    2057#   2084    2088#
                       2119    2123#   2138    2142#   2143    2163    2167#   2181    2184    2188#   2189    2204    2209
                       2213#   2214    2229    2234    2238#   2255    2260    2264#   2278    2283    2287#   2304    2309
                       2313#   2328    2332    2336#   2350    2355    2359#   2373    2378    2382#   2396    2401    2405#
                       2419    2424    2428#   2442    2447    2451#   2465    2470    2474#   2488    2493    2497#   2512
                       2517    2521#   2538    2543    2547#   2562    2566    2570#   2571    2592    2596#   2614    2619
                       2623#   2641    2646    2650#   2668    2673    2677#   2695    2700    2704#   2722    2727    2731#
                       2749    2754    2758#   2790    2794#   2795    2821    2825#   2844    2847    2851#   2852    2886
                       2890#   2891    2925    2929#   2930    2959    2963#   2964    2992    2996#   2997    3024    3034
                       3038#   3039    3069    3074    3078#   3079    3110    3114#   3115    3142    3146#   3149    3182
                       3186    3190#   3192    3233    3237    3241#   3242    3253    3306    3310#   3311    3413    3458
                       3462#   3463    3555    3578    3582#
$TPB    001152          216#   4036*   4047
$TPFLG  001157          320#   3985    4047
$TPS    001150          515#   4034    4047
$TRAP   027110         1059    4199#
$TPP  = 000005         4207#   4216#   4217#   4218#   4219#   4220#
$TRPAD  027132         4204    4214#
$TSTM   001004          477#
$TSTNM  001102          493#   1177*   3596*   3753    3779    3801*   3802    3807    3811    3883    3886    3921
$TYPBN= ****** U       4220
$TYPDS  026664         4136#   4219
$TYPE   026154         3842    3985#   4207    4215
$TYPEC  026366         4015    4022    4029    4034#   4035
$TYPEX  026434         4040    4042    4045#
$TYPOC  026462         4077#   4216
$TYPON  026476         4076    4079#   4218
$TYPOS  026436         4072#   4217
$UNIT   001214          542#
$UNITM  001010          479#
$USWR   001226          549#
$VECT1  001252          574#   2853    2892    3355    3493    3686
$VECT2  001254          575#
$XTSTR  025102         3766#
$$GET4= 000000         3612#
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$DFILL  026661          4073*  4077*  4087   4122#
$40CAT= ****** U        3763   3896
.       = 033344         438#   442#   451    452#   454#   456#   457#   464    465#   467#   469#   482#   490#
                         531   1052   1067   1068   3620   3624   3810   3811   3863#  3921   3967#  4047   4190#
                        4238   4262
.$ASTA= ****** U        3815   3818
.$X     = 001000         464#   469
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COMMEN     1#    433#
ENDCOM     1#    433#
ERROR    327#   1200   1224   1229   1244   1267   1296   1326   1361   1395   1428   1460   1492   1524   1555
        1586   1617   1648   1679   1706   1736   1767   1798   1829   1859   1889   1920   1952   1983   2014
        2045   2076   2111   2133   2155   2160   2182   2202   2227   2252   2276   2301   2326   2348   2371
        2394   2417   2440   2463   2486   2510   2535   2559   2588   2612   2639   2656   2693   2720   2747
        2784   2817   2845   2870   2876   2883   2909   2915   2922   2953   2986   3022   3065   3105   3127
        3139   3170   3220   3300   3382   3390   3520   3535
ESCAPE     1#    433#
GETPRI     1#    433#
GETSWR     1#    433#
MULT       1#    433#
NEWTST     1#    433#   1182   1205   1231   1246   1272   1302   1335   1371   1404   1437   1468   1500   1532
        1563   1594   1625   1656   1686   1713   1744   1775   1806   1837   1866   1897   1928   1960   1991
        2022   2053   2084   2119   2138   2163   2184   2209   2234   2260   2283   2309   2332   2355   2378
        2401   2424   2447   2470   2493   2517   2543   2566   2592   2619   2646   2673   2700   2727   2754
        2790   2821   2847   2886   2925   2959   2992   3034   3074   3110   3142   3186   3237   3306   3458
        3578
POP        1#    433#   3857   3858   4177   4247   4248
PUSH       1#    433#   3818   3820   3841   4136   4228   4234
REPORT     1#    433#
SCOPE    328#   1185   1208   1234   1249   1275   1305   1338   1374   1407   1440   1471   1503   1535   1566
        1597   1628   1659   1689   1716   1747   1778   1809   1840   1869   1900   1931   1963   1994   2025
        2056   2087   2122   2141   2166   2187   2212   2237   2263   2286   2312   2335   2358   2381   2404
        2427   2450   2473   2496   2520   2546   2569   2595   2622   2649   2676   2703   2730   2757   2793
        2824   2850   2889   2928   2962   2995   3037   3077   3113   3145   3189   3240   3309   3461   3581
        3595
SETPRI     1#    433#
SETTRA   4207#   4216   4217   4218   4219
SETUP      1#    433#   1046
SKIP       1#    433#   1226   1243   1331   1366   1400   1433   1708   2181   2204   2229   2255   2278   2304
        2328   2350   2373   2396   2419   2442   2465   2488   2512   2538   2562   2614   2641   2668   2695
        2722   2749   2844   3024   3069   3148   3182   3192   3233   3253   3413   3555
SLASH      1#    433#
SPACE    433#
STARS      1#    433#    449    451    463    470    486    531    534   1182   1184   1205   1207   1231   1233
        1246   1248   1272   1274   1302   1304   1335   1337   1371   1373   1404   1406   1437   1439   1468
        1470   1500   1502   1532   1534   1563   1565   1594   1596   1625   1627   1656   1658   1686   1688
        1713   1715   1744   1746   1775   1777   1806   1808   1837   1839   1866   1868   1897   1899   1928
        1930   1960   1962   1991   1993   2022   2024   2053   2055   2084   2086   2119   2121   2138   2140
        2163   2165   2184   2186   2209   2211   2234   2236   2260   2262   2283   2285   2309   2311   2332
        2334   2355   2357   2378   2380   2401   2403   2424   2426   2447   2449   2470   2472   2493   2495
        2517   2519   2543   2545   2566   2568   2592   2594   2619   2621   2646   2648   2673   2675   2700
        2702   2727   2729   2754   2756   2790   2792   2821   2823   2847   2849   2886   2888   2925   2927
        2959   2961   2992   2994   3034   3036   3074   3076   3110   3112   3142   3144   3186   3188   3237
        3239   3306   3308   3458   3460   3578   3580   3588   3624   3626   3632   3634   3641   3643   3657
        3659   3673   3675   3681   3683   3694   3698   3706   3709   3730   3734   3750   3813   3870   3923
        3970   4049   4126   4193   4224   4240   4563   4566
SWRSU      1#    433#   1069#
TRMTRP   4207#
TYPBIN     1#    433#
TYPDEC     1#    433#   3607
TYPNAM     1#    433#
TYPNUM     1#    433#
TYPOCS     1#    433#
TYPOCT     1#    433#   3935   3959
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DZVSCB.P11 CROSS REFERENCE TABLE -- MACRO NAMES

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$SCMRE    484#    523
$SCMTM    484#    524
$SESCA      1#    433#
$SNEWT      1#    433#   1182   1205   1231   1246   1272   1302   1335   1371   1404   1437   1468   1500   1532
         1563    1594   1625   1656   1686   1713   1744   1775   1806   1837   1866   1897   1928   1960   1991
         2022    2053   2084   2119   2138   2163   2184   2209   2234   2260   2283   2309   2332   2355   2378
         2401    2424   2447   2470   2493   2517   2543   2566   2592   2619   2646   2673   2700   2727   2754
         2790    2821   2847   2886   2925   2959   2992   3034   3074   3110   3142   3186   3237   3306   3458
         3578
$SSET     4207#   4216   4217   4218   4219
$SSETM    1085#
$SSKIP      1#    433#   1226   1243   1331   1366   1400   1433   1708   2181   2204   2229   2255   2278   2304
         2328    2350   2373   2396   2419   2442   2465   2488   2512   2538   2562   2614   2641   2668   2695
         2722    2749   2844   3024   3069   3148   3182   3192   3233   3253   3413   3555
.EQUAT      1#    301#    323
.HEADE      1#    301#
.KT11       1#
.SETUP      1#    301#   1046
.SWRHI      1#    301#    311
.SWRLO    323#
.$ACT1      1#    301#    447
.$APTB      1#    301#    532#
.$APTH      1#    301#    459
.$APTY      1#    301#   3811
.$ASTA      1#
.$CATC      1#    301#    436
.$CMTA      1#    301#    484
.$D82D      1#
.$D820      1#
.$DIV       1#
.$EOP       1#    301#   3586
.$ERRO      1#    301#   3868
.$ERPT      1#    301#   3921
.$MULT      1#
.$POWE      1#    301#   4222
.$RAND      1#
.$RDDE      1#
.$RDGC      1#
.$READ      1#
.$R2AZ      1#
.$SAVE      1#
.$SB2D      1#
.$SB20      1#
.$SCOP      1#    301#   3748
.$SIZE      1#
.$SUPR      1#
.$TRAP      1#    301#   4191
.$TYPB      1#
.$TYPD      1#    301#   4124
.$TYPE      1#    301#   3968
.$TYPO      1#    301#   4047
.$40CA      1#
.1170       1#
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DZVSCB.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

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	3392	3399	3405	3407	3536	3540	3546	3550	3688	3703	3716	3717	3720	3721	3828
	3840	3852	3943	4004	4075	4085	4156								
ASL	1157	1159	1160	3179	3230	3661	3662	3663	3664	3667	3670	3940	3941	3942	4203
ASLB	4161														
ASR	1164	1165	1166	3275	3278	3701	3702	3835							
BCC	3184	3235	3276	3279	4162										
BCS	3069	3182	3233												
BEQ	1087	1199	1220	1222	1243	1265	1294	1324	1359	1366	1393	1426	1458	1490	1522
	1553	1584	1615	1646	1677	1704	1734	1765	1796	1827	1857	1887	1918	1950	1981
	2012	2043	2074	2109	2132	2151	2153	2181	2201	2226	2251	2275	2300	2325	2347
	2370	2393	2416	2439	2462	2485	2509	2534	2558	2587	2611	2638	2665	2692	2719
	2746	2783	2816	2844	2881	2920	2951	2957	2984	2990	3020	3063	3103	3126	3138
	3148	3169	3192	3219	3253	3265	3299	3389	3534	3584	3611	3724	3778	3780	3782
	3786	3795	3822	3826	3846	3848	3885	3888	3910	3913	3945	3950	3963	3994	4007
	4042	4102													
BGE	3798														
BGT	3602	4109	4170												
BHI	1117	3027	3068	3784											
BHIS	1153														
BIC	1142	1197	1241	1263	1298	1322	1357	1391	1424	1456	1488	1520	1551	1582	1613
	1644	1675	1702	1709	1732	1763	1794	1825	1855	1862	1885	1916	1948	1979	2010
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DZVSCB.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

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