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                000000                  .REPT   0
```

IDENTIFICATION

PRODUCT CODE: AC-F084B-MC

PRODUCT NAME: CXPLAB0 PCL11 MODULE

PRODUCT DATE: FEB 1979

MAINTAINER: DAVE WIENS, CSS KANATA

SEQ 0002

1. ABSTRACT

PLA IS AN IOMODX ROUTINE THAT EXERCISES 1 (ONE) PCL11 ATTACHED TO THE PDP-11 SYSTEM UNIBUS. IT EXERCISES PCL11 BY CAUSING THE TRANSMITTER IN THE UNIT TO TRANSMIT A FULL SILO (64. WORDS) TO THE RECEIVER IN THE SAME UNIT. DATA IS OBTAINED FOR THE TRANSMISSION VIA NPR AND READ BACK VIA NPR. DATA IS CHECKED IN CORE BY THE DEC/X11 MONITOR. ALL ERRORS ARE REPORTED ON THE CONSOLE PRINT DEVICE.

2. REQUIREMENTS

HARDWARE: PDP-11 WITH PCL11 ON THE UNIBUS
TDM BUS CABLE DETACHED FROM UNIT UNDER TEST.

STORAGE:: PLA REQUIRES:
1. DECIMAL WORDS: 810
2. OCTAL WORDS: 1452
3. OCTAL BYTES: 3124

OTHER: THIS MODULE IS MEANT TO BE CONFIGURED AND RUN WITH DEC/X11 ONLY.

3. PASS DEFINITION

ONE PASS OF THE PLA MODULE CONSISTS OF 3072 CYCLES OF THE BASIC TEST SEQUENCE: TRANSMIT 64 WORDS TO THE RECEIVER, CHECK RCV'D WORDS FOR DATA ERRORS, TRAP ALL HARDWARE ERRORS. ONE PASS TAKES APPROXIMATELY 30 SECONDS.

4. CONFIGURATION REQUIREMENTS

DEFAULT PARAMETERS:
DEVICE ADDRESS: 164200
VECTOR: 170
PRIORITY (BR1) 5

REQUIRED PARAMETERS:
SR1: MUST CONTAIN PCL11 RCVR TDM-BUS ADDRESS.

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                5.      DEVICE / OPTION SETUP
                        ---------------------

                        SINCE PCL11 IS AN INTER-PROCESSOR COMMUNICATIONS DEVICE,
                        MAKE CERTAIN THAT THE UNIT IS DISCONNECTED FROM THE TDM BUS
                        TO OTHER PROCESSORS.
                          ALSO, IT IS VITAL THAT THE RECEIVERS TDM-BUS ADDRESS BE
                        KNOWN SO THAT IT MAY BE ENTERED INTO "SR1" AT CONFIGURE TIME.

                7.      MODULE OPERATION
                        ----------------

                        TEST SEQUENCE:

                        A.  SET UP DEVICE REGISTER ADDRESSES AND MODULE VARIABLES
                        B.  PREFORM VALIDITY CHECK ON HARDWARE TO INSURE THAT THE
                            MODULE WILL NOT GET "HUNG UP"
                        C.  GET WRITE AND READ INFORMATION FOR NPR
                        D.  ENABLE XMTR AND RCVR NPR - START TRANSMISSION.
                        E.  CHECK FOR XMTR & RCVR ERRORS - REPORT ANY AND RETRY
                            UP TO RETRY LIMIT. MODULE GETS DROPPED IF 10 (OCTAL)
                            ERRORS OCCUR IN ONE CYCLE AND SR1 IS POSITIVE (BIT 15 CLEAR).
                        F.  IF END OF PASS, REPORT AND GO TO C

                7.      OPERATION OPTIONS
                        -----------------

                        SR1 BIT15 SET (1)
                                IF ERROR RETRY LIMIT IS EXCEEDED, RESET RETRY
                                LIMIT AND CONTINUE.
                        SR1 BIT15 CLEAR (0)
                                IF ERROR RETRY LIMIT IS EXCEEDED, A HARD ERROR
                                IS ASSUMED AND THE MODULE IS DROPPED.

                                        NOTE
                                        ----

                                THE RETRY COUNT IS CLEARED EVERY CYCLE UNLESS
                                ERRORS OCCUR.

                        SR1 BITS<7:0>
                                MUST CONTAIN THE CORRECT RECEIVER TDM BUS ADDRESS.
                                (COMMONLY CALLED RECEIVER NUMBER)
                                THIS IS AN OCTAL NUMBER BETWEEN 1 AND 37.
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                        8.      ERROR MESSAGES
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                                A.  THE STANDARD DEC/X11 ERROR ROUTINES ARE USED IN
                                    THIS MODULE.
                                B.  FURTHER PRINTOUTS ARE SELF- EXPLANITORY.
                                C.  ERROR MESSAGES DUMP THE CONTENTS OF THE DEVICE
                                    REGISTERS IN THE FOLLOWING ORDER:
                                RECEIVER:

                                RCR   RSR   RDDB  RDBC  RDBA  RDCRC

                                TRANSMITTER:

                                TCR   TSR   TSDB  TSBC  TSBA  TMMR  TSCRC
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```
                                .ENDR
                        ;PCL11 - DEC/X11 SYSTEM EXERCISER MODULE
                        IOMODX  <PLAB >,164200,170,5,0,0,3072.,0,BUFIN,64.,64.
000000'                 MODULE  'PLAB',164200,170,5,0,0,3072.,0,BUFIN,64.,64.
                                .TITLE  PLAB DEC/X11 SYSTEM EXERCISER MODULE
                        ;       DDXCOM  VERSION  6      23-MAY-78
                                .LIST   BIN
                        ;*****************************************************************************
000000'                 BEGIN:
000000' 046120  041101  040     MODNAM: .ASCII  /PLAB / ;MODULE NAME.
000005'     000         XFLAG:  .BYTE   OPEN            ;USED TO KEEP TRACK OF WBUFF USAGE
000006' 164200          ADDR:   164200+0                ;1ST DEVICE ADDR.
000010' 000170          VECTOR: 170+0                   ;1ST DEVICE VECTOR.
000012'     240         BR1:    .BYTE   PRTY5+0         ;1ST BR LEVEL.
000013'     000         BR2:    .BYTE   PRTY0+0         ;2ND BR LEVEL.
000014' 000001          DVID1:  0+1                     ;DEVICE INDICATOR 1.
000016' 000000          SR1:    OPEN                    ;SWITCH REGISTER 1
000020' 000000          SR2:    OPEN                    ;SWITCH REGISTER 2
000022' 000000          SR3:    OPEN                    ;SWITCH REGISTER 3
000024' 000000          SR4:    OPEN                    ;SWITCH REGISTER 4
                        ;*****************************************************************************
000026' 150000          STAT:   150000                  ;STATUS WORD.
000030' 000252'         INIT:   START                   ;MODULE START ADDR.
000032' 000252'         SPOINT: MODSP                   ;MODULE STACK POINTER.
000034' 000000          PASCNT: 0                       ;PASS COUNTER.
000036' 006000          ICONT:  3072.                   ;# OF ITERATIONS PER PASS=3072.
000040' 000000          ICOUNT: 0                       ;LOC TO COUNT ITERATIONS
000042' 000000          SOFCNT: 0                       ;LOC TO SAVE TOTAL SOFT ERRORS
000044' 000000          HRDCNT: 0                       ;LOC TO SAVE TOTAL HARD ERRORS
000046' 000000          SOFPAS: 0                       ;LOC TO SAVE SOFT ERRORS PER PASS
000050' 000000          HRDPAS: 0                       ;LOC TO SAVE HARD ERRORS PER PASS
000052' 000000          SYSCNT: 0                       ;# OF SYS ERRORS ACCUMULATED
000054' 000000          RANNUM: 0                       ;HOLDS RANDOM # WHEN RAND MACRO IS CALLED
000056'                 CONFIG:                         ;RESERVED FOR MONITOR USE
000056' 000000          RES1:   0                       ;RESERVED FOR MONITOR USE
000060' 000000          RES2:   0                       ;RESERVED FOR MONITOR USE
000062' 000000          SVR0:   OPEN                    ;LOC TO SAVE R0.
000064' 000000          SVR1:   OPEN                    ;LOC TO SAVE R1.
000066' 000000          SVR2:   OPEN                    ;LOC TO SAVE R2.
000070' 000000          SVR3:   OPEN                    ;LOC TO SAVE R3.
000072' 000000          SVR4:   OPEN                    ;LOC TO SAVE R4.
000074' 000000          SVR5:   OPEN                    ;LOC TO SAVE R5.
000076' 000000          SVR6:   OPEN                    ;LOC TO SAVE R6.
000100' 000000          CSRA:   OPEN                    ;ADDR OF CURRENT CSR.
000102'                 SBADR:                          ;ADDR OF GOOD DATA, OR
000102' 000000          ACSR:   OPEN                    ;CONTENTS OF CSR.
000104'                 WASADR:                         ;ADDR OF BAD DATA, OR
000104' 000000          ASTAT:  OPEN                    ;STATUS REG CONTENTS.
000106'                 ERRTYP:                         ;TYPE OF ERROR
000106' 000000          ASR:    OPEN                    ;EXPECTED DATA.
000110' 000000          AWAS:   OPEN                    ;ACTUAL DATA.
000112' 000270'         RSTRT:  RESTRT                  ;RESTART ADDRESS AFTER END OF PASS
000114' 000000          WDTO:   OPEN                    ;WORDS TO MEMORY PER ITERATION
000116' 000000          WDFR:   OPEN                    ;WORDS FROM MEMORY PER ITERATION
000120' 000000          INTR:   OPEN                    ;# OF INTERRUPTS PER ITERATION
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000122' 000000          IDNUM:  0                       ;MODULE IDENTIFICATION NUMBER=0
000124' 002230'         PBUFVA: BUFIN                   ;READ BUFFER VIRTUAL ADDRESS
000126' 000000          RBUFPA: OPEN                    ;READ BUFFER PHYSICAL ADDRESS
000130' 000000          RBUFEA: OPEN                    ;READ BUFFER EA BITS
000132' 000100          RBUFSZ: 64.                     ;SIZE OF THE READ BUFFER
000134' 000000          WBUFPA: OPEN                    ;WRITE BUFFER PHYSICAL ADDRESS
000136' 000000          WBUFEA: OPEN                    ;WRITE BUFFER EA BITS
000140' 000100          WBUFRQ: 64.                     ;WRITE BUFFER SIZE REQUESTED
000142' 000000          WBUFSZ: OPEN                    ;WRITE BUFFER SIZE AVAILABLE
000144' 000000          CDERCT: OPEN                    ;CDATA/DATCK ERROR COUNT
000146' 000000          CDWDCT: OPEN                    ;CDATA/DATCK WORD COUNT
000150' 000000          FREE:   OPEN                    ;RESERVED FOR FUTURE USE
        000040                  .REPT   SPSIZ           ;MODULE STACK STARTS HERE.
                                .NLIST
                                .WORD   0
                                .LIST
                                .ENDR
000252'                 MODSP:
                        ;*****************************************************************************
                        ;SOME EXTRA DEFINITIONS:

                        ;TRANSMIT START FUNCTION:

            060101      TXMSTR  =       60101

                        ;RECEIVE START FUNCTION:

            060001      RCVSTR  =       60001
```

```
000252' 004767  001126          START:  JSR     PC,SETUP                ;GENERATE DEVICE ADDRESSES
000256' 004767  001322                  JSR     PC,TSTDRP               ;SET MASTER, DROP MODULE?
000262' 105767  001734                  TSTB    DEVICE                  ;IF SET, DROP MODULE
000266' 001045                          BNE     FINI
000270'
000270' 104415  000000' 000124' RESTRT:  GETPAS,BEGIN, RBUFVA            ;GET PHYSICAL ADDRESS FROM 16-BIT RBUFVA
000276' 016767  177630  001702          MOV     RBUFSZ,RCBC             ;GET RCVR BUFF SIZE
000304' 006367  001676                  ASL     RCBC                    ;DOUBLE IT FOR BYTE COUNT
000310' 005467  001672                  NEG     RCBC                    ;NEGATE BYTE COUNT
000314'
000314' 104414  000000' BCGW:   GWBUFS, BEGIN           ;GET WRITE BUFFER INFORMATION
000320' 016767  177616  001662          MOV     #BUFSZ,TXBC             ;GET ALLOCATED BUFFER SIZE
000326' 006367  001656                  ASL     TXBC                    ;DOUBLE IT FOR BYTE COUNT
000332' 005467  001652                  NEG     TXBC                    ;NEGATE BYTE COUNT
000336' 105067  001662          BCOK:   CLRB    ERFLG                   ;CLEAR ERRORS FLAG
000342' 004767  000???                  JSR     PC,TRNSFR               ;SEND SOME DATA & RCV IT
000346' 105767  001652                  TSTB    ERFLG                   ;IF ERRORS, RETRY UP TO 10 TIMES
000352' 001023                          BNE     RETRY
000354' 004767  001006                  JSR     PC,ERSUB2               ;LOAD ERROR INFORMATION
000360' 104412  000000' 000126'         CDATA$,BEGIN,RBUFPA     ; REQUEST FOR MONITOR TO CHECK DATA
000366' 000370'                         .+2                     ; IF ERROR, CONTINUE
000370' 105067  001627                  CLRB    TRY                     ;REFRESH RETRY COUNT
000374'                         PASS:
000374' 104413  000000'                 ENDIT$,BEGIN            ;SIGNAL END OF ITERATION.
                                                                ;MONITOR SHALL TEST END OF PASS
000400' 000745                          BR      BCGW
000402' 052777  000002  002042  FINI:   BIS     #BIT1,@RCR              ;CLEAR RCVR HDWARE
000410' 052777  000002  002012          BIS     #BIT1,@TCR              ;CLEAR XMTR HDWARE
000416' 104410  000000'                 END$,BEGIN              ;
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000422'                 RETRY:                                  ;ERROR RETRY RTN ENTRY POINT
000422' 105267  001575          INCB    TRY                     ;COUNT THE RETRYS
000426' 122767  000010  001567  CMPB    #10,TRY                 ;LIMIT EXCEEDED?
000434' 001340                  BNE     BCOK                    ;NO,GO TRY AGAIN
000436' 104403  000000' 002474'         MSG$,BEGIN,EXCED        ;ASCII MESSAGE CALL WITH COMMON HEADER
000444' 012777  000002  002000  MOV     #BIT1,@RCR              ;CLEAR RCVR HDWARE
000452' 012777  000002  001750  MOV     #BIT1,@TCR              ;CLEAR XMTR HDWARE
000460' 005767  177332          TST     SR1                     ;DROP THE MODULE?
000464' 100724                  BMI     BCOK                    ;NOT IF SR1 BIT15=1
000466' 000745                  BR      FINI                    ;YES,IF SR1 BIT15=0

                        ;PCL DRIVE SUBROUTINE
                        ;CALLED BY: JSR PC,TRNSFR

                        ;TRANSFER 64 WORDS TO XMTR VIA NPR
                        ;TRANSMIT IT TO THE RECEIVER VIA TDM BUS
                        ;TRANSFER RCV' DATA TO MODULE (BUFIN) VIA NPR
                        ;WAIT FOR COMPLETION FROM XMTR & RCVR

000470'                 TRNSFR:                                 ;DRIVER SUBROUTINE ENTRY
000470' 012777  000002  001754  MOV     #BIT1,@RCR              ;CLR RCVR HDWARE
000476' 012777  000002  001724  MOV     #BIT1,@TCR              ;CLR XMTR HDWARE
000504' 016777  001476  001746  MOV     RCBC,@RDBC              ;LOAD RCVR BYTE COUNT
000512' 016777  001472  001716  MOV     TXBC,@TSBC              ;LOAD XMTR BYTE COUNT
000520' 016777  177402  001734  MOV     RBUFPA,@RDBA            ;LOAD RCVR NPR DEST ADDRESS
000526' 016767  177376  001462  MOV     RBUFEA,RFUNCT           ;AND GET EXT ADDR BITS
000534' 016777  177374  001676  MOV     WBUFPA,@TSBA            ;LOAD XMTR NPR SOURCE ADDRESS
000542' 016767  177370  001450  MOV     WBUFEA,XFUNCT           ;AND GET EXT ADDR BITS
000550' 116767  177242  001443  MOVB    SR1,XFUNCT+1            ;GET RCVR ADDRESS FOR XMTR
000556' 052767  060001  001432  BIS     #RCVSTR,RFUNCT          ;LOAD RCV FUNCTION AND GO
000564' 052767  060101  001426  BIS     #TXMSTR,XFUNCT          ;LOAD XMTR FUNCTION AND GO
000572' 012777  000620' 001672  MOV     #TXINT,@TXVECT          ;SET XMTR INTR ENTRY POINT
000600' 016777  001412  001644  MOV     RFUNCT,@RCR             ;CONNECT RCVR FIRST
000606' 016777  001406  001614  MOV     XFUNCT,@TCR             ;NOW CONNECT XMTR
000614' 104400  000000'         EXIT$,BEGIN                     ;EXIT TO MONITOR. MODULE WAIT FOR INTERRUPT.
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                                        ;TRANSMITTER INTERRUPT ENTRY POINT
000620'                                 TXINT:
000620' 042777  000100  001602                  BIC     #BIT6,@TCR              ;XMTR INTR ENTRY POINT
                                                                                ;CLEAR XMTR INTR ENABLE
                                        ;-----------------------------------------------------------------------
000626' 000004  000000' 000634'                 PIRQ$,BEGIN,11$         ; QUEUE UP TO CONTINUE AT 11$ AND RTI
                                        ;-----------------------------------------------------------------------
000634' 004767  000056                  11$:    JSR     PC,TXERS                ;GO CHECK FOR XMTR ERRORS
000640' 105767  001362                          TSTB    TXMERS                  ;IF ANY ERRORS, SET ERFLG
000644' 001015                                  BNE     24$
000646' 004767  000314                  12$:    JSR     PC,RCERS                ;GO CHECK FOR RCVR ERRORS
000652' 105767  001347                          TSTB    RCVERS                  ;IF ERRORS, SET ERFLG
000656' 001001                                  BNE     23$
000660' 000207                          13$:    RTS     PC                      ;RETURN
                                        ;
000662' 105067  001337                  23$:    CLRB    RCVERS                  ;CLR RCVR ERR FLG
000666' 112767  177777  001330                  MOVB    #-1,ERFLG               ;SET ERROR FLAG
000674' 000167  177760                          JMP     13$
000700' 105067  001322                  24$:    CLRB    TXMERS                  ;CLR XMTR ERR FLG
000704' 112767  177777  001312                  MOVB    #-1,ERFLG               ;SET ERROR FLAG
000712' 000167  177730                          JMP     12$
```



```
                                        ;CHECK FOR TRANSMITTER ERRORS AND REPORT, IF ANY
000716'                                 TXERS:                                  ;ENTRY POINT FOR XMTR ERR CHK
000716' 112767  177777  001302                  MOVB    #-1,TXMERS              ;SET XMTR EROR FLAG
000724' 032777  100000  001500                  BIT     #BIT15,@TSR             ;HARDWARE ERROR?
000732' 001430                                  BEQ     10$                     ;NO, CHECK FURTHER
000734' 032777  004000  001470                  BIT     #BIT11,@TSR             ;WAS IT MASTER DOWN?
000742' 001412                                  BEQ     2$                      ;NO, REPORT WHAT IT WAS
000744' 104403  000000' 002500'                 MSGNS,BEGIN,MSTDWN      ;ASCII MESSAGE CALL WITH COMMON HEADER
000752' 004767  000626                          JSR     PC,TSTDRP               ;GO SEE IF WE CAN KEEP MODULE
000756' 105767  001240                          TSTB    DEVICE                  ;OK?
000762' 001474                                  BEQ     TXRRTN                  ;YES, TRY AGAIN
000764' 000167  177412                          JMP     FINI                    ;NO, DROP THE MODULE BECAUSE
                                                                                ;THE HARDWARE IS NON-RUNABLE
000770' 004767  000354                  2$:     JSR     PC,ERSUB1               ;LOAD ERROR INFORMATION
000774' 012767  000020  177104                  MOV     #20,ERRTYP              ;UNKNOWN XMTR ERROR
                                        ;*****************************************************************
001002' 104405  000000' 002430'                 HRDER$,BEGIN,TABLE1     ;XMTR HARDWARE ERROR
                                        ;*****************************************************************
001010' 000167  000140                          JMP     TXRRTN                  ;TRY AGAIN
001014' 032777  000020  001410          10$:    BIT     #BIT4,@TSR              ;WAS RCVR BUSY OR NOT THERE?
001022' 001415                                  BEQ     3$                      ;NO, CONTINUE CHECK
001024' 104403  000000' 002504'                 MSGNS,BEGIN,WRCAD       ;ASCII MESSAGE CALL WITH COMMON HEADER
001032' 004767  000312                          JSR     PC,ERSUB1               ;GET ERROR INFORMATION
001036' 012767  000007  177042                  MOV     #7,ERRTYP               ;SELECTION ERROR
                                        ;*****************************************************************
001044' 104406  000000' 002430'                 SOFER$,BEGIN,TABLE1     ;RCVR BUSY OR WRONG ADDR
                                        ;*****************************************************************
001052' 000167  000076                          JMP     TXRRTN                  ;TRY AGAIN
001056' 132777  000004  001364          3$:     BITB    #BIT2,@TMMRH            ;IS NOW MASTER CAUSING INTERRUPT?
001064' 001410                                  BEQ     4$                      ;NO, CONTINUE CHECK
001066' 142777  000004  001354                  BICB    #BIT2,@TMMRH            ;YES, CLEAR IT
001074' 104403  000000' 002510'                 MSGNS,BEGIN,NMSINT      ;ASCII MESSAGE CALL WITH COMMON HEADER
001102' 000167  000046                          JMP     TXRRTN                  ;TRY AGAIN
001106' 032777  000040  001316          4$:     BIT     #BIT5,@TSR              ;WAS MESSAGE REJECTED?
001114' 001405                                  BEQ     5$                      ;NO, CONTINUE CHECK
001116' 104403  000000' 002514'                 MSGNS,BEGIN,MRJCT       ;ASCII MESSAGE CALL WITH COMMON HEADER
001124' 000167  000024                          JMP     TXRRTN                  ;TRY AGAIN
001130' 032777  000200  001274          5$:     BIT     #BIT7,@TSR              ;SUCCESSFUL TRANSFER
001136' 001007                                  BNE     TXOK                    ;YES, OK LEAVE
001140' 012767  000011  176740                  MOV     #11,ERRTYP              ;ILLEGAL INTR OR DONE CLR
                                        ;*****************************************************************
001146' 104406  000000' 002430'                 SOFER$,BEGIN,TABLE1     ;UNKNOWN INTERRUPT
                                        ;*****************************************************************
001154' 000207                          TXRRTN: RTS     PC                      ;RETURN TO CALLER
                                        ;
001156' 105067  001044                  TXOK:   CLRB    TXMERS                  ;NO ERRORS, SKIP RETRY
001162' 000167  177766                          JMP     TXRRTN
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                                        ;CHECK FOR RECEIVER ERRORS AND REPORT, IF ANY.
                                        ;
001166'                                 RCERS:                          ;ENTRY POINT FOR RCVR ERR CHK
001166' 112767  177777  001031          MOVB    #-1,RCVERS              ;SET RCVR ERROR FLAG
001174' 032777  100000  001252          BIT     #BIT15,@RSR             ;HARDWARE ERROR?
001202' 001412                          BEQ     10$                     ;NO,CHECK FURTHER
001204' 004767  000156                  JSR     PC,ERSUB2               ;LOAD ERROR INFORMATION
001210' 012767  000017  176670          MOV     #17,ERRTYP              ;UNKNOWN RECEIVER ERROR
                                        ;*****************************************************************
001216' 104405  000000' 002452'         HRDER$,BEGIN,TABLE2     ;RCVR HARDWARE ERROR
                                        ;*****************************************************************
001224' 000167  000106                  JMP     RCRRTN                  ;ERROR RETURN
001230' 032777  000400  001216  10$:     BIT     #BIT8,@RSR              ;DATA OUTPUT RDY SET?
001236' 001415                          BEQ     3$                      ;NO,CONTINUE CHECK
001240' 104403  000000' 002522'         MSGN$,BEGIN,ERDOPR      ;ASCII MESSAGE CALL WITH COMMON HEADER
001246' 004767  000114                  JSR     PC,ERSUB2               ;LOAD ERROR INFORMATION
001252' 012767  000044  176626          MOV     #44,ERRTYP              ;FLAG SHOULD NOT BE SET
                                        ;*****************************************************************
001260' 104406  000000' 002452'         SOFER$,BEGIN,TABLE2     ;DAT OUT RDY SET
                                        ;*****************************************************************
001266' 000167  000044                  JMP     RCRRTN                  ;ERROR RETURN
001272' 032777  000040  001154  3$:     BIT     #BIT5,@RSR              ;REJECT COMPLETED INTERRUPT?
001300' 001415                          BEQ     4$                      ;NO, CONTINUE CHECK
001302' 104403  000000' 002530'         MSGN$,BEGIN,MRJTD       ;ASCII MESSAGE CALL WITH COMMON HEADER
001310' 004767  000052                  JSR     PC,ERSUB2               ;LOAD ERROR INFORMATION
001314' 012767  000044  176564          MOV     #44,ERRTYP              ;FLAG SHOULD NOT BE SET
                                        ;*****************************************************************
001322' 104406  000000' 002452'         SOFER$,BEGIN,TABLE2     ;REJ COMPL SET
                                        ;*****************************************************************
001330' 000167  000002                  JMP     RCRRTN                  ;ERROR RETURN
001334' 000401                  4$:     BR      RCOK                    ;SHOULDN'T BE HERE, LEAVE.
001336' 000207                  RCRRTN: RTS     PC                      ;RETURN TO CALLER
                                        ;
001340' 105067  000661          RCOK:   CLRB    RCVERS                  ;NO ERRORS, SKIP RETRY
001344' 000167  177766                  JMP     RCRRTN
```



```
001350'                                 ERSUB1:                         ;RTN TO LD XMTR ERR INFO
001350' 016767  001056  176522          MOV     TSR,CSRA                ;LOAD ADDR OF XMTR STATUS REG
001356' 017767  001050  176516          MOV     @TSR,ACSR               ;LOAD CONTENTS OF XMTR STAT REG
001364' 000207                          RTS     PC                      ;RETURN
                                        ;
001366'                                 ERSUB2:                         ;ROUTINE TO LD RCVR ERR INFO
001366' 016767  001062  176504          MOV     RSR,CSRA                ;LOAD ADDR OF RCVR STAT REG
001374' 017767  001054  176500          MOV     @RSR,ACSR               ;LD CONTENTS OF RCVR STAT REG
001402' 000207                          RTS     PC                      ;RETURN
                                        ;
                                        ;
                                        ;ROUTINE TO GENERATE DEVICE ADDRSSES AND VECTORS
                                        ;
001404'                                 SETUP:                          ;SETUP ROUTINE ENTRY POINT
001404' 016700  176376                  MOV     ADDR,R0                 ;GET DEVICE BASIC ADDRESS
001410' 010067  001014                  MOV     R0,TCR                  ;TCR ADDRESS
001414' 005720                          TST     (R0)+
001416' 010067  001010                  MOV     R0,TSR                  ;TSR ADDRESS
001422' 005720                          TST     (R0)+
001424' 010067  001004                  MOV     R0,TSDB                 ;TSDB ADDRESS
001430' 005720                          TST     (R0)+
001432' 010067  001000                  MOV     R0,TSBC                 ;TSBC ADDRESS
001436' 005720                          TST     (R0)+
001440' 010067  000774                  MOV     R0,TSBA                 ;TSBA ADDRESS
001444' 005720                          TST     (R0)+
001446' 010067  000770                  MOV     R0,TMMR                 ;TMMR ADDRESS
001452' 005200                          INC     R0
001454' 010067  000770                  MOV     R0,TMMRH                ;TMMR HIGH BYTE
001460' 005200                          INC     R0
001462' 010067  000756                  MOV     R0,TSCRC                ;TSCRC ADDRESS
001466' 016700  176316                  MOV     VECTOR,R0               ;GET BASIC VECTOR
001472' 010067  000774                  MOV     R0,TXVECT               ;SAVE IT
001476' 012720  000620'                 MOV     #TXINT,(R0)+            ;SET INTR POINTER IN CASE.
001502' 116710  176304                  MOVB    BR1,(R0)                ;SET XMTR PRIORITY
001506' 005720                          TST     (R0)+
001510' 010067  000754                  MOV     R0,RCVECT               ;SAVE RCVR VECTOR
001514' 062700  000002                  ADD     #2,R0
001520' 116710  176266                  MOVB    BR1,(R0)
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447  001524' 016700  176256          MOV     ADDR,R0                 ;GET DEVICE BASIC ADDRESS
448  001530' 062700  000020          ADD     #20,R0                  ;ADD OFFSET FOR RCVR ADDRS
449  001534' 010067  000712          MOV     R0,RCR                  ;RCR ADDRESS
450  001540' 005720                  TST     (R0)+
451  001542' 010067  000706          MOV     R0,RSR                  ;RSR ADDRESS
452  001546' 005720                  TST     (R0)+
453  001550' 010067  000702          MOV     R0,RDDB                 ;RDDB ADDRESS
454  001554' 005720                  TST     (R0)+
455  001556' 010067  000676          MOV     R0,RDBC                 ;RDBC ADDRESS
456  001562' 005720                  TST     (R0)+
457  001564' 010067  000672          MOV     R0,RDBA                 ;RDBA ADDRESS
458  001570' 022020                  CMP     (R0)+,(R0)+
459  001572' 010067  000666          MOV     R0,RDCRC                ;RDCRC ADDRESS
460  001576' 105067  000421          CLRB    TRY                     ;CLEAR RETRY COUNTER
461  001602' 000207                  RTS     PC                      ;RETURN
```



```
462                                     ;THIS ROUTINE TESTS IF THE DEVICE IS WORTHY OF RUNNING WITH
463                                     ;DEC/X11 MODULE.
464                                     ;  IT CHECKS THAT MASTER IS SET, (IF NOT, THAT IT CAN BE SET)
465                                     ;THEN DOES A SIMPLE TEST TO SEE IF THE DEVICE CAN INTERRUPT
466                                     ;AND GO
467                                     ;IF THIS TEST FAILS, THE MODULE WILL BE DROPPED.
468
469  001604'                            TSTDRP:                         ;DROP TEST ROUTINE ENTRY
470  001604' 052777  000002  000616          BIS     #BIT1,@TCR         ;CLEAR XMTR HDWARE
471  001612' 052777  000002  000632          BIS     #BIT1,@RCR         ;CLEAR RCVR HDWARE
472  001620' 105067  000376                  CLRB    DEVICE             ;CLEAR HARD ERROR FLAG
473  001624' 105077  000620                  CLRB    @TMMRH             ;CLEAR MASTER, AUTO ADDR ETC.
474  001630' 112777  000021  000612          MOVB    #21,@TMMRH         ;SET MASTER & AUTO ADDR
475  001636' 132777  000021  000604          BITB    #21,@TMMRH         ;ARE THEY SET?
476  001644' 001416                          BNE     1$                 ;YES, NEXT TEST
477  001646' 112767  177777  000346          MOVB    #-1,DEVICE         ;NO, SET DEVICE TO DROP MODULE
478  001654' 104403  000000' 002536'         MSGN$,BEGIN,MSHDER      ;ASCII MESSAGE CALL WITH COMMON HEADER
479  001662' 012767  000042  176216          MOV     #42,ERRTYP         ;ACTIVE BIT SHD BE SET.
480                                          ;*****************************************************************
481  001670' 104405  000000' 002430'         ERDER$,BEGIN,TABLE1     ;MASTER OR AUTO ADDR CLR
482                                          ;*****************************************************************
483  001676' 000167  000266                  JMP     TSTRTN             ;EXIT
484  001702' 012777  120000  000520  1$:     MOV     #120000,@TCR       ;SET RIB & SND WD
485  001710' 012777  177777  000516          MOV     #-1,@TSDB          ;PUT A WORD INTO SILO
486  001716' 012767  177600  000270          MOV     #-200,CLK          ;SET UP TO WAIT A BIT
487  001724'                         2$:
488  001724' 104407  000000'                 BREAK$,BEGIN            ;TEMPORARY RETURN TO MONITOR....
489  001730' 104407  000000'                 BREAK$,BEGIN            ;THEN CONTINUE AT NEXT INSTRUCTION.
490  001734' 032777  000020  000470          BIT     #BIT4,@TSR         ;TDM BUS BUSY SET?
491  001742' 001416                          BNE     3$                 ;YES, NEXT TEST
492  001744' 005267  000244                  INC     CLK                ;NO, WAIT A WHILE
493  001750' 001365                          BNE     2$
494  001752' 112767  177777  000242          MOVB    #-1,DEVICE         ;SET DEVICE TO DROP MODULE
495  001760' 012767  000006  176120          MOV     #6,ERRTYP          ;DEVICE WON'T GO.
496                                          ;*****************************************************************
497  001766' 104405  000000' 002430'         ERDER$,BEGIN,TABLE1     ;XMTR WON'T GO
498                                          ;*****************************************************************
499  001774' 000167  000170                  JMP     TSTRTN             ;EXIT
500  002000' 052777  010000  000424  3$:     BIS     #BIT12,@TSR        ;CAUSE FORCED TXM ERR
501  002006' 012767  177600  000200          MOV     #-200,CLK          ;SET UP TO WAIT A BIT
502  002014'                         4$:
503  002014' 104407  000000'                 BREAK$,BEGIN            ;TEMPORARY RETURN TO MONITOR....
504  002020' 104407  000000'                 BREAK$,BEGIN            ;THEN CONTINUE AT NEXT INSTRUCTION.
505  002024' 032777  020000  000376          BIT     #BIT13,@TCR        ;IS SND WD CLEAR NOW?
506  002032' 001416                          BEQ     5$                 ;YES, XMTR LOOKS OK
507  002034' 005267  000154                  INC     CLK                ;WAIT & GIVE IT A CHANCE
508  002040' 001365                          BNE     4$
509  002042' 112767  177777  000152          MOVB    #-1,DEVICE         ;SET DEVICE TO DROP MODULE
510  002050' 012767  000023  176030          MOV     #23,ERRTYP         ;DEVICE FAILED TO INTERRUPT
511                                          ;*****************************************************************
512  002056' 104405  000000' 002430'         ERDER$,BEGIN,TABLE1     ;XMTR WON'T INTERRUPT
513                                          ;*****************************************************************
514  002064' 000167  000100                  JMP     TSTRTN             ;EXIT
```

```
002070' 012777  000002  000332  5$:     MOV     #BIT1,@TCR              ;CLEAR XMTR HDWARE
002076' 052777  020000  000346          BIS     #BIT13,@RCR             ;SET RCV WD IN RCVR
002104' 052777  010000  000342          BIS     #BIT12,@RSR             ;CAUSE FAKE TXM ERR IN RCVR
002112' 012767  177600  000074          MOV     #-200,CLK               ;SET UP TO WAIT A BIT
002120'                         6$:
002120' 104407  000000'                 BREAK$,BEGIN            ;TEMPORARY RETURN TO MONITOR...
002124' 104407  000000'                 BREAK$,BEGIN            ;THEN CONTINUE AT NEXT INSTRUCTION.
002130' 032777  020000  000314          BIT     #BIT13,@RCR             ;IS RCV WD CLEAR NOW?
002136' 001414                          BEQ     TSTRTN                  ;YES, RCVR LOOKS GOOD TOO
002140' 005267  000050                  INC     CLK                     ;NO,WAIT & GIVE IT A CHANCE
002144' 001365                          BNE     6$
002146' 112767  177777  000046          MOVB    #-1,DEVICE              ;SET DEVICE TO DROP MODULE
002154' 012767  000023  175724          MOV     #23,ERRTYP              ;DEVICE FAILED TO INTERRUPT
                                ;*****************************************************************
002162' 104405  000000' 002452'         ERROR$,BEGIN,TABLE2     ;RCVR WON'T INTERRUPT
                                ;*****************************************************************
002170' 052777  000002  000254  TSTRTN: BIS     #BIT1,@RCR              ;CLEAR RCVR HDWARE
002176' 052777  000002  000224          BIS     #BIT1,@TCR              ;CLEAR XMTR HDWARE
002204' 000207                          RTS     PC                      ;RETURN
```



```
                                ;CONSTANT AND VARIABLE STORAGE

002206' 000000                  RCBC:   .WORD   0
002210' 000000                  TXBC:   .WORD   0
002212' 000000                  CNT:    .WORD   0
002214' 000000                  CLK:    .WORD   0
002216' 000000                  RFUNCT: .WORD   0
002220' 000000                  XFUNCT: .WORD   0
002222'     000                 DEVICE: .BYTE   0
002223'     000                 TRY:    .BYTE   0
002224'     000                 ERFLG:  .BYTE   0
002225'     000                 RCVERS: .BYTE   0
002226'     000                 TXMERS: .BYTE   0
                    002230'             .EVEN
002230' 000100                  BUFIN:  .BLKW   64.

002430'                         TABLE1:
002430' 000000                  TCR:    .WORD   0
002432' 000000                  TSR:    .WORD   0
002434' 000000                  TSDB:   .WORD   0
002436' 000000                  TSBC:   .WORD   0
002440' 000000                  TSBA:   .WORD   0
002442' 000000                  TMMR:   .WORD   0
002444' 000000                  TSCRC:  .WORD   0
002446' 177777                          .WORD   177777

002450' 000000                  TMMRH:  .WORD   0

002452'                         TABLE2:
002452' 000000                  RCR:    .WORD   0
002454' 000000                  RSR:    .WORD   0
002456' 000000                  RDDB:   .WORD   0
002460' 000000                  RDBC:   .WORD   0
002462' 000000                  RDBA:   .WORD   0
002464' 000000                  RDCRC:  .WORD   0
002466' 177777                          .WORD   177777
002470' 000000                  RCVECT: .WORD   0
002472' 000000                  TXVECT: .WORD   0
```

```
                                        ;ASCII MESSAGE STORAGE
002474' 002544'                 EXCED:  MSG1
002476' 177777                          177777
002500' 002612'                 MSTDWN: MSG2
002502' 177777                          177777
002504' 002644'                 WRCAD:  MSG3
002506' 177777                          177777
002510' 002707'                 NMSINT: MSG4
002512' 177777                          177777
002514' 003067'                 MRJCT:  MSG11
002516' 002753'                         MSG5
002520' 177777                          177777
002522' 003077'                 ERDOPR: MSG12
002524' 003012'                         MSG7
002526' 177777                          177777
002530' 003077'                 MRJTD:  MSG12
002532' 002753'                         MSG5
002534' 177777                          177777
002536' 003107'                 MSHDER: MSG13
002540' 003042'                         MSG8
002542' 177777                          177777
```



```
002544' 042445  051122  051117  MSG1:   .ASCIZ  '%ERROR RETRY FOR THIS CYCLE EXCEEDED%'
002552' 051040  052105  054522
002560' 043040  051117  052040
002566' 044510  020123  054523
002574' 046103  020105  054105
002602' 042503  042105  042105
002610' 000045
002612' 050045  046103  046440  MSG2:   .ASCIZ  '%PCL MASTER WENT DOWN !!%'
002620' 051501  042524  020122
002626' 042527  052116  042040
002634' 053517  020116  020441
002642' 000045
002644' 051045  053103  020122  MSG3:   .ASCIZ  '%RCVR BUSY, OR WRONG RCVR ADDRESS%'
002652' 052502  054523  020054
002660' 051117  053440  047522
002666' 043516  051040  053103
002674' 020122  042101  051104
002702' 051505  022523  000
002707'    045  040515  052123  MSG4:   .ASCIZ  '%MASTER HAS JUST SET ON THIS PCL11%'
002714' 051105  044040  051501
002722' 042040  051525  020124
002730' 042523  020124  047117
002736' 052040  044510  020123
002744' 041520  030514  022461
002752'    000
002753'    040  042515  051523  MSG5:   .ASCIZ  ' MESSAGE WAS REJECTED BY RCVR%'
002760' 043501  020105  040527
002766' 020123  042522  042512
002774' 052103  042105  041040
003002' 020131  041522  051126
003010' 000045
003012' 042040  052101  020101  MSG7:   .ASCIZ  ' DATA OUTPUT READY SET%'
003020' 052517  050124  052125
003026' 051040  040505  054504
003034' 051440  052105  000045
003042' 040515  052123  051105  MSG8:   .ASCIZ  'MASTER WILL NOT SET%'
003050' 053440  046111  020114
003056' 047516  020124  042523
003064' 022524      000
003067'    045  054055  052115  MSG11:  .ASCIZ  '%-XMTR-'
003074' 026522      000
003077'    045  051055  053103  MSG12:  .ASCIZ  '%-RCVR-'
003104' 026522      000
003107'    045  040510  042122  MSG13:  .ASCIZ  '%HARD ERROR%'
003114' 042440  051122  051117
003122' 000045
000001                          .END
```

```
ACSR    000102R          196#    411*    416*
ADDR    000006R          162#    423     447
ADDR22= 001000           225#
ASB     000106R          200#
ASTAT   000104R          198#
A%AS    000110R          201#
BCGW    000314R          245#    264
BCOK    000336R          251#    272     277
BEGIN   000000R          159#    240     246     257     262     268     273     303     309     334     343     348     352
                         358     362     368     383     388     392     397     401     478     481     488     489     497
                         503     504     512     520     521     529
BIT0    = 000001         225#
BIT1    = 000002         225#    266     267     274     275     289     290     470     471     515     531     532
BIT10   = 002000         225#
BIT11   = 004000         225#    332
BIT12   = 010000         225#    500     517
BIT13   = 020000         225#    505     516     522
BIT14   = 040000         225#
BIT15   = 100000         225#    330     378
BIT2    = 000004         225#    355     357
BIT3    = 000010         225#
BIT4    = 000020         225#    346     490
BIT5    = 000040         225#    360     395
BIT6    = 000100         225#    307
BIT7    = 000200         225#    364
BIT8    = 000400         225#    386
BIT9    = 001000         225#
BREAK$= 104407           225#    488     489     503     504     520     521
BR1     000012R          164#    442     446
BR2     000013R          165#
BTOD$  = 104421          225#
BUFIN   002230R          207#    548#
CDATA$= 104412           225#    257
CDERCT  000144R          215#
CDWDCT  000146R          216#
CLK     002214R          486*    492*    501*    507*    518*    524*    539#
CNT     002212R          538#
CONFIG  000056R          184#
CSRA    000100R          194#    410*    415*
DATCK$= 104411           225#
DATER$= 104404           225#
DEVICE  002222R          236     336     472*    477*    494*    509*    526*    542#
DVID1   000014R          166#
ENDIT$= 104413           225#    262
END$   = 104410          225#    268
ERDOPR  002522R          388     585#
ERFLG   002524R          251*    253     321*    324*    544#
ERRTYP  000176R          199#    341*    350*    366*    381*    390*    399*    479*    495*    510*    527*
ERSUB1  001350R          340     349     409#
ERSUB2  001366R          255     380     389     398     414#
EXCED   002474R          273     574#
EXITS = 104400           225#    303
FINI    000422R          237     266#    278     338
FREE    002150R          217#
GETPA$= 104415           225#    240
GWBUF$= 104414           225#    246
```



```
HRDCNT  000044R          179#
HRDER$= 104405           225#    343     383     481     497     512     529
HRDPA$  000050R          181#
ICUNT   000036R          176#
ICOUNT  000040R          177#
IDNUM   000122R          206#
IMODX.= 000000           218#    247
INIT    000030R          173#
INTR    000120R          205#
MAP22$= 104416           225#
MODNAM  000060R          160#
MODSP   000252R          174     223#
MRJCT   002514R          392     582#
MRJTD   002530R          397     588#
MSGN$  = 104403          225#    273     334     348     358     362     388     397     478
MSGS$  = 104402          225#
MSG$   = 104401          225#
MSG1    002544R          574     594#
MSG11   003067R          582     633#
MSG12   003077R          585     588     635#
MSG13   003107R          591     637#
MSG2    002612R          576     601#
MSG3    002644R          578     606#
MSG4    002707R          580     612#
MSG5    002753R          583     589     619#
MSG7    003012R          586     625#
MSG8    003042R          592     629#
MSHDFR  002536R          478     591#
MSTDWN  002500R          334     576#
MWSINT  002510R          388     580#
NULL   = 000000          225#
OPEN   = 000000          161     167     168     169     170     187     188     189     190     191     192     193     194
                         196     198     200     201     203     204     205     208     209     211     212     214     215
                         216     217     225#
OTOA$  = 104420          225#
PASCNT  000034R          175#
PASS    000374R          261#
PIRQ$  = 000004          225#    309
POPSP  = 005726          225#
POPSP2= 022626           225#
PRTY   = 000000          225#
PRTY0  = 000000          165     225#
PRTY1  = 000040          225#
PRTY2  = 000100          225#
PRTY3  = 000140          225#
PRTY4  = 000200          225#
PRTY5  = 000240          164     225#
PRTY6  = 000300          225#
PRTY7  = 000340          225#
PS     = 177776          225#
PSW    = 177776          225#
PUSH   = 005746          225#
PUSH2  = 024646          225#
RAND$  = 104417          225#
RANNUM  000054R          183#
RBUFEA  000130R          209#    294
```

```
RBUFPA  000126R          208#    257     293
RBUFSZ  000132R          210#    241
RBUFVA  000124R          207#    240
RCBC    002206R          241*    242*    243*    291     536#
RCERS   001166R          315     376#
RCOK    001340R          404     407#
RCR     002452R          266*    274*    289*    301*    449*    471*    516*    522     531*    563#
RCRRTN  001336R          385     394     403     405#    408
RCVECT  002470R          444*    570#
RCVERS  002225R          316     320*    377*    407*    545#
RCVSTR= 060001           233#    290
RDBA    002462R          293*    457*    567#
RDBC    002460R          291*    455*    566#
RDCRC   002464R          459*    568#
RDDB    002456R          453*    565#
RESTRT  000270R          202     239#
RES1    000056R          185#
RES2    000060R          186#
RETRY   000422R          254     269#
RFUNCT  002216R          294*    298*    301     540#
RSR     002454R          378     386     395     415     416     451*    517*    564#
RSTRT   000112R          202#
SBADR   000102R          195#
SETUP   001404R          234     422#
SOFCNT  000042R          178#
SOFERS= 104406           225#    352     368     392     401
SOFPAS  000046R          180#
SPOINT  000032R          174#
SPSIZ =  000040            1#    218
SR1     000016R          167#    276     297
SR2     000020R          168#
SR3     000022R          169#
SR4     000024R          170#
START   000252R          173     234#
STAT    000026R          172#
SVR0    000062R          187#
SVR1    000064R          188#
SVR2    000066R          189#
SVR3    000070R          190#
SVR4    000072R          191#
SVR5    000074R          192#
SVR6    000076R          193#
SYSCNT  000052R          182#
TABLE1  002430R          343     352     368     481     497     512     550#
TABLE2  002452R          383     392     401     529     562#
TCR     002430R          267*    275*    290*    302*    307*    424*    470*    484*    505     515*    532*    551#
TMMR    002442R          434*    556#
TMMRH   002450R          355     357*    436*    473*    474*    475     560#
TRNSFR  000470R          252     288#
TRPDFD= 000022           225#
TRY     002223R          260*    270*    271     460*    543#
TSBA    002440R          295*    432*    555#
TSBC    002436R          292*    430*    554#
TSCRC   002444R          436*    557#
TSDB    002434R          428*    485*    553#
TSR     002432R          330     332     346     360     364     410     411     426*    490     500*    552#
```



```
TSTDRP  001604R          235     335     469#
TSTRTN  002170R          483     499     514     523     531#
TXBC    002210R          247*    248*    249*    292     537#
TXERS   000716R          312     328#
TXINT   000620R          300     306#    441
TXMERS  002226R          313     323*    329*    372*    546#
TXMSTR= 060101           229#    299
TXOK    001156R          365     372#
TXRRTN  001154R          337     345     354     359     363     370#    373
TXVECT  002472R          300*    440*    571#
VECTOR  000010R          163#    439
WASADR  000104R          197#
WBUFBA  000136R          212#    296
WBUFPA  000134R          211#    295
WBUFRQ  000140R          213#
WBUFSZ  000142R          214#    247
WDFR    000116R          204#
WDTO    000114R          203#
WRCAD   002504R          348     578#
XFLAG   000005R          161#
XFUNCT  002220R          296*    297*    299*    302     541#
.       = 003124R          259     547#    548#

. ABS.  000000      000
        003124      001

 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

 XPLAB0,XPLAB0/SOL/CRF:SYM=DDXCOM,XPLAB0
 RUN-TIME:  1  2  .3 SECONDS
 RUN-TIME RATIO: 18/4=4.1
 CORE USED:  8K  (15 PAGES)
```