```
0001   .MAIN
01B               0;                                        RCSL: 52AA  737
02                ;                                        AUTHOR:KNUD E. HANSEN
03                ;                                        EDITED:   78.01.30
04                ;                                        REPLACE: RCSL 44RT 1369
05                ;
06                ;
07                ;
08                ;
09                ;
10                ;
11                ;
12                ;
13                ;
14                ;
15                ;
16                ;
17                ;                          FPA 702
18                ;
19                ;                        TESTPROGRAM
20                ;
21                ;                    TO BE USED ON RC3603
22                ;                    WITH EXTENDED MEMORY.
23                ;
24                ;
25                ;
26                ;
27                ;
28                ;
29                ;
30                ;
31                ;
32                ;
33                ;
34                ;
35                ;
36                ;
37                ;
38                ;
39                ;
40                ;
41                ;
42                ;
43                ;
44                ;  KEYWORDS: FP A702, TESTPROGRAM.
45                ; ----------------------------------------------------------------
46                ; ABSTRACT : THIS PAPER DESCRIBES A TESTPROGRAM TO FPA702.
47                ;
48                ;            RUN ON RC3603 WITH EXTENDED MEMORY(128KBYTES)
49                ;
50                ;          BINARY TAPE:    RCSL 52-AA738
51                ;          ASCII TAPE :    RCSL 52-AA739
52                ;
53
54
55
```

```
↑ 0002  .MAIN
01                ;*****************************************************************
02                ;
03                ;
04                ; DESCRIPTION:    TESTPROGRAM FOR FPA702.
05                ;
06                ;                 RC3603 WITH EXTENDED MEMORY.
07                ;
08                ; REVISION HISTORY:
09                ;
10                ;         REV.            DATE.               INITIALS.
11                ;
12                ;         00              78.01.30            KNEH
13                ;
14                ;
15                ;
16                ;;
17                ;
18                ; COPYRIGHT (C) A/S REGNECENTRALEN, 1976
19                ; ALL RIGHTS RESERVED.
20                ; *****************************************************************
21
22
23
24
```

```
↑ 0003  .MAIN
01
02
03                ;  FPA702 TEST
04                ;
05                ;1. DESCRIPTION
06                ;    FPA702 TEST IS A MAINTENANCE PROGRAM DESIGNED
07                ;    TO TEST THE FPA702, FRONT END PROCESSOR
08                ;    ADAPTER TO RC3600.
09                ;    THE PROGRAM CONSISTS OF 3 SEPARATE MODULES:
10                ;   1. LOOP-BACK TEST ON A SINGLE FPA702.
11                ;    2. LOOP TEST BETWEEN TWO FPA702 CONNECTED
12                ;       TO THE SAME CPU.
13                ;    3. LOOP TEST BETWEEN TWO FPA702 EACH
14                ;       CONNECTED TO A CPU.
15                ;
16                ;
17                ;2. EQUIPMENT REQUIREMENTS.
18                ;    RC3603 CPU.
19                ;    16K READ/WRITE MEMORY.
20                ;    CONSOLE TELETYPE OR CRT DISPLAY.
21                ;    ONE OR TWO FPA702 CONTROLLERS.
22                ;    ONE OR TWO CABLES, CBL276 OR CBL259.
23                ;
24                ; IF LOOP3 TEST, THE REMOTE CPU MUST BE EQUIPPED
25                ; WITH AUTOLOAD FEATURE F01.
26                ;3. OPERATING PROCEDURE.
27                ;3.1 LOAD USING BINARY LOADER.
28                ;3.2 STARTING ADDRESSES:
29                ;3.2.1 DIAGNOSTIC ON A SINGLE FPA702
30                ;       STARTING ADDRESS=000003.
31                ;3.2.2 DIAGNOSTIC ON TWO FPA702 ON SAME CPU
32                ;       STARTING ADDRESS=000005.
33                ;3.2.3 DIAGNOSTIC ON TWO FPA702 ON EACH CPU
34                ;       STARTING ADDRESS=000007.
35                ;3.3 SWITCH SETTING:
36                ;       SWITCH 0 (1) WHEN THE DIAGNOSTIC IS RESTARTED
37                ;                    NEW OPERATOR PARAMETERS ARE
38                ;                    REQUIRED.
39                ;       SWITCH 0 (1) PROCEED FROM A FAILING LOOP.
40                ;       SWITCH 1 (1) INHIBIT PRINTOUT.
41                ;       SWITCH 2 (1) PRINT THE FAILING RATE.
42                ;WHEN STARTING AS DESCRIBED IN 3.2.1-3 WITH SW<0>=1
43                ;THE TESTPROGRAM WILL OUTPUT THE MESSAGE ''SET DEVICE CODE
44                ;RECEIVER1" ON OCP AND CONSOLE AND HALT.
45                ; THE OPERATOR PLACES THE DEVICE CODE FOR RECEIVER1 ON
46                ;THE DATASWITCHES 10-15 ON THE DIAGNOSTIC PANEL FOR THE CPU
47                ;AND PUSHES CONTINUE.
48                ;THEN THE TESTPROGRAM WILL OUTPUT THE MESSAGE "SET DEVICE CODE
49                ;RECEIVER2" AND THEN HALT.
50                ;THE OPERATOR PLACES THE DEVICE CODE FOR RECEIVER2 ON THE
51                ;DATASWITCHES 10-15 AND PUSHES CONTINUE. THEN THE
52                ;TESTPROGRAM IS RUNNING.
53                ;;
54                ;  3.4 DEVICE CODE SETTING.
55                ;  LOOP1 TEST RUNS BETWEEN THE TRANSMITTER AND RECEIVER IN THE
56                ;  SAME FPA. ONLY SETTING "DEVICE CODE RECEIVER1" < SEE ABOVE>
57                ;  IS NECESSARY.
58                ;
59                ;  LOOP2 TEST RUNS BETWEEN TRANSMITTER <XMT1>-RECEIVER<REC1>
```

```
0004  .MAIN
01                ;  ON ONE FPA AND TRANSMITTER<XMT2>-RECEIVER <REC2> ON ANOTHER
02                ;  FPA. BUT BOTH FPA'S ARE CONNECTED TO THE SAME CPU.
03                ;
04                ;  LOOP3 TEST RUNS BETWEEN TWO FPA'S EACH CONNECTED TO A CPU.
05                ;  THE DEVICE CODE IN THE TWO FPA'S MUST BE THE SAME <RECEIVER1>
06                ;  BEFORE STARTING TEST3 THE DATASWITCHES ON THE REMOTE CPU
07                ;  MUST BE SET AS FOLLOWS:
08                ;
09                ;  SW<0> = 1.
10                ;  SW<10-15> = DEVICE CODE FOR RECEIVER1.
11                ;
12
13
14
15
```

```
↑ 0005   .MAIN
01
02                ;5.   RUNNING TIMES.
03                ;      THE DIAGNOSTIC WILL RUN UNTIL MANUALLY STOPPED.
04                ;      IF AN ERROR IS DETECTED THE PROGRAM WILL HALT
05                ;      AT LOCATION "ERR1+1". THE OPERATOR MAY CHANGE
06                ;      SWITCH SETTINGS AT THIS TIME IF DESIRED.
07                ;      IF SWITCH 0 AND 1 ARE ZERO PRESSING CONTINUE
08                ;      WILL CAUSE PRINTOUT OF THE ERROR LOCATION. THE
09                ;      RUNTIME WILL ENTER A LOOP SUITABLE FOR SCOPING
10                ;      THE MALFUNCTION.
11                ;      WHEN THE PROGRAM IS IN A SCOPE LOOP, SETTING
12                ;      SWITCH 2(1) WILL CAUSE THE FAILURE RATE TO BE
13                ;      PRINTED. SETTING SWITCH 0(1) WILL CAUSE THE
14                ;      PROGRAM TO PROCEED TO THE NEXT TEST.
15                ;      IF THE DISABLE AUTO SWITCH IS IN THE OFF STATE
16                ;      DURING DIAGNOSTIC 1 AND 2, THE AUTO INDICATOR
17                ;      WILL LIGT ONE TIME DURING EACH RUNTIME.
18                ;
19                ;      ACCUMULATED PASS NO. IS WRITTEN AFTER RUN OF THE
20                ;      SELECTED TEST.
21                ;
22                ; INCLUDED IN THE FPA702 TESTPROGRAM IS A SIMPLE
23                ; SCOPE LOOP TO TEST THE DATA PATHES IF THE NORMAL TESTPROGRAM
24                ; INDICATES A DATA ERROR.
25                ; THIS TEST IS STARTED MANUALLY IN ADD. 1000 AND WILL RUN
26                ; UNTILL STOPPED MANUALLY.
27                ;
28                ;
29                ; IF THIS TESTPROGRAM SHOULD RUN IN EXTENDED MEMORY
30                ; THEN MANUALLY CHANGE THE XMT AND REC BUFFER POINTERS
31                ; ( C40 AND C46 ) TO POINT INTO THE UPPER MEMORY.
32                ; CAUTION:
33                ;--------
34                ; ONLY LOOP1 TEST CAN RUN IN EXTENDED MEMORY.
35                ;
36                ;
37                ;
38                ;
39
40
41
```

```
↑ 0006  .MAIN
01
02                ;
03                ;
04                ;
05                   CONTENTS :                                          PAGE:
06                    ----------                                          ------
07                ;
08                ;
09                ;
10                ;  PART 1 :
11                ;  ----------
12                ;
13                ; TEST1: TEST OF BUSY AND DONE FLAGS IN
14                ;         TRANSMITTER..................................... 13
15                ; TEST2: TEST OF BUSY AND DONE FLAGS IN
16                ;         RECEIVER ....................................... 15
17                ; TEST3: TEST OF ADDRESS COUNTER IN TRANSMITTER..... 16
18                ; TEST4: TEST OF BYTE COUNTER IN TRANSMITTER.....16
19                ; TEST5: TEST OF ADDRESS COUNTER IN RECEIVER..... 17
20                ; TEST6: TEST OF BYTE COUNTER IN RECEIVER..... 17
21                ; TEST7: TEST OF XMT. TIMEOUT WITHOUT INTERRUPT..... 18
22                ; TEST8: TEST OF RECEIVED RESET WITHOUT INTERRUPT..... 18
23                ; TEST9: TEST OF XMT. TIMEOUT WITH INTERRUPT..... 20
24                ; TEST10:TEST OF XMT. TIMEOUT WITH INTERRUPT MASKOUT... 20
25                ; TEST11:TEST OF REVETVED RESET WITH INTERRUPT..... 21
26                ; TEST12:TEST OF RECEIVED RESET WITH INTERRUPT MASKOUT. 21
27                ; TEST13:TEST OF DATA..... 23
28                ; TEST14:TEST OF DATA..... 23
29                ; TEST15:TEST OF OVERFLOW STATUS IN RECEIVER..... 27
30                ;
31                ;
32                ;  PART 2 :
33                ;  ----------
34                ;
35                ; TEST16:TEST OF THE TRANSMIT STATUS COMMAND..... 29
36                ;         IN THE RECEIVER.
37                ; TEST18:TEST OF THE RECEIVE STATUS COMMAND..... 30
38                ;         IN THE TRANSMITTER.
39                ; TEST20:TEST OF THE TRANSMIT STATUS - ..... 31
40                ;         RECEIVE BLOCK COMMAND IN THE RECEIVER.
41                ; TEST22:TEST OF THE TRANSMIT BLOCK - ..... 34
42                ;         RECEIVE STATUS COMMAND IN THE TRANSMITTER.
43                ; PART 3:
44                ;----------
45                ; TEST 24: AUTOLOAD REMOTE CPU AND HANDSHAKE WITH ..... 40
46                ;           THIS CPU USING STATUS COMMANDS.
47                ; TEST 27: AUTOLOAD REMOTE CPU AND TEST DATA .....42
48                ;
49                ;
50
51
52
53
```

```
↑ 0007  .MAIN
01
02                  ;
03                  ;
04          000001              .LOC 1
05 00001 000000 INTRP:            0
06 00002 000000                   0
07          000002              .LOC   2      ;
08 00002 000000 C2:               0           ; IF BIT15=1 THEN STOP AFTER
09                                            ; ONE RUNTIME ELSE REPEAT
10                                            ; THE TEST.
11          000003              .LOC 3
12 00003 024175 C3:       LDA    1,   NEX1   ;
13 00004 000010           JMP      D1        ;
14 00005 024214 C5:       LDA    1,   NEX16  ;
15 00006 000010           JMP      D1        ;
16 00007 024224 C7:       LDA    1,   NEX24  ;
17 00010 044116 D1:     STA      1, TEST     ;
18 00011 126420         SUBZ   1,1
19 00012 044232           STA    1, PASSN
20 00013 074477           READS      3        ;
21 00014 175112           MOVL# 3,3,SZC       ;
22 00015 002124           JMP    @ TSDC       ;
23 00016 002116           JMP    @ TEST       ;
24          000020              .LOC 20
25          000010              .RDX  8
26 00020 000000 C20:              0           ; XMT BLOCK POINTER.
27 00021 000000 C21:              0           ; REC BLOCK POINTER.
28          000030              .LOC 30
29 00030 000000 C30:              0           ; WORD COUNT.
30          000040              .LOC 40
31 00040 010000 C40:      10000               ; START ADD.,XMT.
32 00041 010000 C41:      10000               ; BYTE COUNT,XMT.
33 00042 000000 C42:          0               ; COMMAND0,XMT.
34 00043 000400 C43:        400               ; COMMAND1,XMT.
35 00044 001000 C44:       1000               ; COMMAND2,XMT.
36 00045 001400 C45:       1400               ; COMMAND3,XMT.
37 00046 020000 C46:      20000               ; START ADD.,REC.
38 00047 010000 C47:      10000               ; BYTE COUNT,REC.
39 00050 000000 C50:          0               ; COMMAND0,REC.
40 00051 000400 C51:        400               ; COMMAND1,REC.
41 00052 001000 C52:       1000               ; COMMAND2,REC.
42 00053 001400 C53:       1400               ; COMMAND3,REC.
43 00054 002000 C54:       2000               ; XMT. AUTOLOAD.
44 00055 000000 C55:          0               ; XMT RESET.
45 00056 000047 C56:        .XMT1             ;
46 00057 000046 C57:        .REC1             ;
47 00060 000014 C60:        .TIM              ;
48 00061 000377 C61:        377               ; BYTE MASK.
49 00062 000000 C62:          0               ; START BYTE ACCUMULATOR.
50 00063 000000 C63:          0               ; ADD CONSTANT.
51 00064 000000 C64:          0               ;
52 00065 000010 C65:         10               ; XMT BYTE COUNT.
53 00066 000006 C66:          6               ; REC BYTE COUNT.
54 00067 000000 C67:          0               ; STATUS BYTE CCCUMULATOR.
55 00070 000000 MASK0:        0               ; DISABLE INTERRUPT MASK.
56 00071 010000 MASK1:    10000               ; ENABLE INTERRUPT MASK.
57
58 00072 125252 C74:     125252               ;
59 00073 052525 C75:     052525               ;
```

```
00074 000004 C76:        4        ;
00075 010000 C70:    10000        ; NUMBER OF BYTES TO BE
                                  ; AUTOLOADED TO THE REMOTE
                                  ; CPU.
00076 100226 C71:    @NEX26     ;
00077 100231 C72:      @NEX29     ;
00100 000000 C73:        0        ;
                  ;
                  ;
                  ;
```

```
↑ 0009  .MAIN
01
02 00101 000000 NUMR1:          0            ;
03 00102 000000 NUMR2:          0            ;
04 00103 000000 NUMT1:          0            ;
05 00104 000000 NUMT2:          0            ;
06 00105 160000 MADC:        160000          ;
07 00106 000077 MADC1:          77           ;
08 00107 177700 MADC2:       177700          ;
09 00110 000046 FIXR1:         .REC1         ;
10 00111 000074 FIXR2:         .REC2         ;
11 00112 000047 FIXT1:         .XMT1         ;
12 00113 000075 FIXT2:         .XMT2         ;
13 00114 000400 FIRST:         TES1
14 00115 002271 LAST:           ENTER        ;
15 00116 000000 TEST:           0            ;
16 00117 002553 TCRLF:      CRLF            ;
17 00120 002452 TPDEC:       PDEC           ;
18 00121 002430 TMESS:       MESS           ;
19 00122 002447 TPOCT:       POCT           ;
20 00123 060000 ION:        060000          ;
21 00124 002773 ISDC:           SDC          ;
22
23 00125 002271 ENTER
24       006125 SETUP=          JSR   @.-1    ;
25 00126 002512 CYCLE
26       006126 LOOP=           JSR   @.-1    ;
27 00127 002366 ERR
28       006127 EHALT=          JSR   @.-1    ;
29 00130 002553 CRLF
30       006130 PCRLF=          JSR   @.-1    ;
31 00131 002430 MESS
32       006131 MESSAGE=        JSR   @.-1    ;
33 00132 002445 ZOCT
34       006132 TYPZ1=          JSR   @.-1    ;
35 00133 002452 PDEC
36       006133 TYPDEC=         JSR   @.-1    ;
37 00134 002447 POCT
38       006134 TYPAC1=         JSR   @.-1    ;
39
40 00135 002741 A3
41       006135 ERMES=          JSR   @.-1
42
43                DEVC0:       .TXTE   @SET DEVICE CODE RECEIVER1@
   00136 142523
   00137 120324
   00140 142504
   00141 144526
   00142 142703
   00143 141640
   00144 042317
   00145 120505
   00146 142722
   00147 142703
   00150 053311
   00151 151305
   00152 000261
44                DEVC1:        .TXTE   @SET DEVICE CODE  RECEIVER 2@
   00153 142523
   00154 120324
```

```
0010  .MAIN
 00155 142504
 00156 144526
 00157 142703
 00160 141640
 00161 042317
 00162 120305
 00163 151240
 00164 141705
 00165 144705
 00166 142526
 00167 120322
 00170 000262
0011
0012                PPASS:      .TXTE    @ PASS @
 00171 050240
 00172 051501
 00173 120123
 00174 000000
0013
0014
0015
0016
```

```
↑ 0011  .MAIN
01
02
03                ;
04                ;
05                ;
06                ;
07                ;
08 00175 000400 NEX1:     TES1        ;
09 00176 000457 NEX2:     TES2        ;
10 00177 000477 NEX3:     TES3        ;
11 00200 000512 NEX4:     TES4        ;
12 00201 000524 NEX5:     TES5        ;
13 00202 000545 NEX6:     TES6        ;
14 00203 000565 NEX7:     TES7        ;
15 00204 000612 NEX8:     TES8        ;
16 00205 000675 NEX9:     TES9        ;
17 00206 000714 NEX10:    TES10       ;
18 00207 000733 NEX11:    TES11       ;
19 00210 000752 NEX12:    TES12       ;
20 00211 001037 NEX13:    TES13       ;
21 00212 001046 NEX14:    TES14       ;
22 00213 001240 NEX15:    TES15       ;
23 00214 001343 NEX16:    TES16       ;
24 00215 001346 NEX17:    TES17       ;
25 00216 001375 NEX18:    TES18       ;
26 00217 001400 NEX19:    TES19       ;
27 00220 001437 NEX20:    TES20       ;
28 00221 001444 NEX21:    TES21       ;
29 00222 001571 NEX22:    TES22       ;
30 00223 001576 NEX23:    TES23       ;
31
32 00224 002040 NEX24:    TES24       ;
33 00225 002047 NEX25:    TES25       ;
34 00226 002073 NEX26:    TES26       ;
35 00227 002110 NEX27:    TES27       ;
36 00230 002120 NEX28:    TES28       ;
37 00231 002235 NEX29:    TES29       ;
38 00232 000000 PASSN:    0       ;
39 00233 001000 NEXA1:    A1        ;
40                ;NEXA2:       A2        ;
41 00234 000641 CALL1:    TIER        ; TIMER SUBROUTINE.
42 00235 000651 CALL2:    INTSUB      ; INTERRUPT ROUTINE.
43 00236 001155 CALL3:    DATAGEN     ; DATAGENERATOR
44                                    ; SUBROUTINE.
45 00237 001176 CALL4:    DATACHECK   ; DATACHECK SUBROUTINE.
46 00240 001751 CALL5:    AUTO        ; AUTOLOAD SUBROUTINE.
47 00241 000661 WAIT1:    WITR        ;
48 00242 000662 RTN1:     ITRRTN      ;
49
50
51        000047 .XMT1=       47      ; DEV. NO. XMT1.
52        000046 .REC1=       46      ; DEV. NO. REC1.
53        000014 .TIM=        14      ; DEV. NO. TIMER.
54        000075 .XMT2=       75      ; DEV. NO. XMT2.
55        000074 .REC2=       74      ; DEV. NO. REC2.
56        000035 .DISP=      35      ; DEV.NO. RC3600 DISPLAY.
57        000367          .LOC  367   ;
58 00367 063646         SKPDN   , .REC1   ;
59 00370 000367         JMP   .-1         ;
```

```
  0012   .MAIN
01 00371 066446          DIC    1, .REC1      ; WAIT END OF RESET
02 00372 127100          ADDL   1,1           ; PULSE.
03 00373 125100          MOVL   1,1           ;
04 00374 125102          MOVL   1,1,SZC       ;
05 00375 000376          JMP     .+1          ;
06 00376 002100          JMP    @ C73         ; GO TO TEST LOOP.
07 00377 000367          JMP    .-10          ;
08
09
10
11
```

```
↑ 0013  .MAIN
01
02
03
04
05
06          000400              .LOC    400
07          000010              .RDX      8
08
09
10
11                  ;  TEST1 : TEST OF BUSY AND DONE IN TRANSMITTER.
12
13  00400  006125  TES1:    SETUP             ; THE SELR LINE IS
14  00401  063500             SKPBZ    0       ; GROUNDED.
15  00402  006127             EHALT             ;
16  00403  006126             LOOP              ;
17  00404  006125             SETUP             ; THE SELD LINE IS
18  00405  063700             SKPDZ    0       ; GROUNDED.
19  00406  006127             EHALT             ;
20  00407  006126             LOOP              ;
21  00410  006125             SETUP             ;
22  00411  060247             NIOC     , .XMT1  ; CLEAR BYSY AND DONE.
23  00412  063747             SKPDZ    , .XMT1  ;
24  00413  006127             EHALT             ; CAN'T RESET DONE.
25  00414  063547             SKPBZ    , .XMT1  ;
26  00415  006127             EHALT             ; CAN'T RESET BUSY.
27  00416  006126            LOOP               ;
28  00417  006125             SETUP              ;
29  00420  024045             LDA      1, C45   ; START XMT WITH
30  00421  067147             DOCS     1, .XMT1 ; COMMAND3< NOP >.
31  00422  063747             SKPDZ    , .XMT1  ; START CAN'T CLEAR
32  00423  006127             EHALT             ; DONE.
33  00424  063647             SKPBN    , .XMT1  ; START CAN'T CLEAR
34                                               ; BUSY.
35  00425  006127             EHALT           ;
36  00426  006126            LOOP             ;
37  00427  006125             SETUP             ; AFTER A IO RESET
38  00430  062677             IORST             ; WITH INTERRUPTS MASKOUT
39  00431  102000             ADC      0,0      ;
40  00432  062077             NSKO     0        ; INTA SHOULD READ BACK
41  00433  061477             INTA     0        ; ALL ZEROES. CHECK O.C.
42  00434  101004             MOV      0,0,SZR  ; GATES AND GATE ( INTA,INTR)
43  00435  006127             EHALT             ; AND THE INTR REQ FLOPS.
44  00436  006126             LOOP              ;
45  00437  006125             SETUP             ; THE FPA ( REC OR XMT )
46  00440  062677             IORST             ; INTR REQ FAILED.
47  00441  061477             INTA     0        ;
48  00442  101004             MOV      0,0,SZR  ;
49  00443  006127             EHALT             ;
50  00444  006126             LOOP              ;
51
52  00445  006125             SETUP             ; A INTERRUPT OCCURRED WHEN
53  00446  102620             SUBZR    0,0      ; THE INTERRUPT SYSTEM WAS
54  00447  040001             STA      0,1      ; TURNED ON.
55  00450  060177             NIOS     CPU      ; THE INTR LINE ( 1003-A30 )
56  00451  000401             JMP      .+1      ; IS GROUNDED.
57  00452  063477             SKPBN    CPU      ;
58  00453  006127             EHALT             ;
59  00454  006126             LOOP              ;
```

```
  0014   .TAIL
01 00455 060277          NIOC    CPU     ;
02 00456 002176          JMP     @ NEX2      ;GO TO NEXT TEST.
03
04
05
06
07
```

```
↑ 0015  .MAIN
01
02
03
04
05
06                    ;TEST2 : TEST OF BUSY AND DONE IN RECEIVER.
07
08 00457 006125 TES2:   SETUP                ;
09 00460 060246          NIOC     , .REC1    ; CLEAR BUSY AND DONE.
10 00461 063746          SKPDZ    , .REC1    ;
11 00462 006127          EHALT               ; CAN'T RESET DONE.
12 00463 063546          SKPBZ    , .REC1    ;
13 00464 006127          EHALT               ; CAN'T RESET BUSY.
14 00465 006126         LOOP                 ;
15 00466 006125          SETUP               ;
16 00467 024053          LDA      1, C53     ; START REC WITH
17 00470 067146          DOCS     1, .REC1   ; COMMAND3 < NOP >.
18 00471 063746          SKPDZ    , .REC1    ; START CAN'T CLEAR
19 00472 006127          EHALT               ; DONE.
20 00473 063446          SKPBN    , .REC1    ; START CAN'T CLEAR
21 00474 006127          EHALT               ; BUSY.
22 00475 006126         LOOP                 ;
23 00476 002177          JMP      @ NEX3     ; GO TO NEXT TEST.
24
25
26
27
28
29
30
31
32
```

```
                          ;  TEST3 : TEST OF ADDRESS COUNTER IN TRANSMITTER.

00477 126520 TES3:     SUBZL    1,1          ; AC1:=1, CARRY:=0.
00500 006125          SETUP                 ;
00501 065047           DOA      1, .XMT1    ; ADD.COUNT:= AC1.
00502 070447           DIA      2, .XMT1    ; AC2:= ADD.COUNTER.
00503 132414           SUB#     1,2,SZR     ; IF ERROR:
00504 006127           EHALT                ; AC1= WANTED CONTENTS.
                                            ; AC2= CURRENT CONTENTS.
00505 006126          LOOP                  ;
00506 125100           MOVL     1,1         ; SHIFT AC1 LEFT.
00507 125113           MOVL#    1,1,SNC     ;
00510 000771           JMP       .-7        ; REPEAT TES3.
00511 002200           JMP       @NEX4      ; GO TO NEXT TEST.

                          ;  TEST4 : TEST OF BYTE COUNTER IN TRANSMITTER.

00512 126520 TES4:     SUBZL     1,1        ; AC1:=1, CARRY:=0.
00513 006125          SETUP                 ;
00514 066047           DOB       1, .XMT1   ; BYTE COUNT:=AC1.
00515 071447           DIB       2, .XMT1   ; AC2:= BYTE COUNTER.
00516 132414           SUB#      1,2,SZR    ; IF ERROR:
00517 006127           EHALT                ; AC1= WANTED CONTENTS.
                                            ; AC2= CURRENT CONTENTS.
00520 006126          LOOP                  ;
00521 125103           MOVL      1,1,SNC    ; SHIFT AC1 LEFT.
00522 000772           JMP        .-6       ; REPEAT.
00523 002201           JMP       @NEX5      ; GO TO NEXT TEST.
```

```
↑ 0017  .MAIN
01
02
03
04
05
06                ;  TEST5 : TEST OF ADDRESS COUNTER IN RECEIVER.
07
08 00524 006125 TES5:    SETUP               ;
09 00525 062677           DICC     0, CPU     ; IO RESET.
10 00526 064446           DIA      1, .REC1   ; AC1:= ADD.COUNTER.
11 00527 125014           MOV#     1,1,SZR    ; IORST CAN'T CLEAR
12 00530 006127           EHALT               ; ADDRESS COUNTER.
13 00531 006126           LOOP                ;
14 00532 126520           SUBZL    1,1        ; AC1:=1, CARRY:=0.
15 00533 006125           SETUP               ;
16 00534 065046           DOA      1, .REC1   ; ADD.COUNT:=AC1.
17 00535 070446           DIA      2, .REC1   ; AC2:= ADD.COUNTER.
18 00536 132414           SUB#     1,2,SZR    ; IF ERROR:
19 00537 006127           EHALT               ; AC1= WANTED CONTENTS.
20                                            ; AC2= CURRENT CONTENTS.
21 00540 006126           LOOP                ;
22 00541 125100           MOVL     1,1        ; SHIFT AC1 LEFT.
23 00542 125113           MOVL#    1,1,SNC    ;
24 00543 000771           JMP       .-7       ; REPEAT.
25 00544 002202           JMP      @ NEX6     ; GO TO NEXT TEST.
26
27
28
29
30
31                ;  TEST6 : TEST OF BYTE COUNTER IN RECEIVER.
32
33 00545 006125 TES6:    SETUP               ;
34 00546 062677           DICC     0, CPU     ; IO RESET.
35 00547 065446           DIB      1, .REC1   ; AC1:= BYTE COUNTER.
36 00550 125014           MOV#     1,1,SZR    ; IORST CAN'T CLEAR
37 00551 006127           EHALT               ; BYTE COUNTER.
38 00552 006126           LOOP                ;
39 00553 126520           SUBZL    1,1        ; AC1:=1, CARRY:=0.
40 00554 006125           SETUP               ;
41 00555 066046           DOB      1, .REC1   ; BYTE COUNT:=AC1.
42 00556 071446           DIB      2, .REC1   ; AC2:= BYTE COUNTER.
43 00557 132414           SUB#     1,2,SZR    ; IF ERROR:
44 00560 006127           EHALT               ; AC1=WANTED CONTENTS.
45                                            ; AC2=CURRENT CONTENTS.
46 00561 006126           LOOP                ;
47 00562 125103           MOVL     1,1,SNC    ; SHIFT AC1 LEFT.
48 00563 000772           JMP       .-6       ; REPEAT.
49 00564 002203           JMP      @ NEX7     ; GO TO NEXT TEST.
50
51
52
53
54
55
56
57
```

```
↑ 0018  .MAIN
01
02
03                ;TEST7 :  TEST OF TRANSMITTER TIMEOUT WITHOUT
04                ;         INTERRUPT.
05
06 00565 006125 TES7:  SETUP              ;
07 00566 066447         DIC   1, .XMT1    ;
08                                        ;
09 00567 024053           LDA     1, C53      ; START REC WITH
10 00570 067146           DOCS    1, .REC1    ; COMMAND3 < NOP >.
11 00571 024044           LDA     1, C44      ; START XMT WITH
12 00572 067147           DOCS    1, .XMT1    ; COMMAND2< XMT BLOCK >.
13 00573 006234           JSR      @ CALL1    ; CALL TIMER.
14 00574 063647           SKPDN    , .XMT1    ; TIMEOUT CAN'T
15 00575 006127           EHALT                ; TERMINATE TRANSMITTER.
16 00576 066447           DIC     1, .XMT1    ; GET STATUS.
17 00577 125100           MOVL    1,1         ;
18 00600 125105           MOVL    1,1,SNC     ; CAN'T SET TIMEOUT
19 00601 006127           EHALT               ;
20 00602 006126         LOOP                  ;
21 00603 006125           SETUP               ;
22 00604 066447           DIC     1, .XMT1    ; GET STATUS.
23 00605 125100           MOVL    1,1         ;
24 00606 125102           MOVL    1,1,SZC     ;
25 00607 006127           EHALT               ; CAN'T RESET TIMEOUT.
26 00610 006126         LOOP                  ;
27 00611 002204           JMP      @ NEX8     ; GO TO NEXT TEST.
28
29
30                ;  TEST8 : TEST OF RECEIVED RESET WITHOUT INTERRUPT.
31
32 00612 006125 TES8:    SETUP               ;
33 00613 066446           DIC    1, .REC1     ;
34 00614 024053           LDA     1, C53      ; START REC WITH
35 00615 067146           DOCS    1, .REC1    ; COMMAND3 < NOP >.
36 00616 024055           LDA     1, C55      ; TRANSMIT RESET
37 00617 067347           DOCP    1, .XMT1    ; PULSE.
38 00620 006234           JSR      @ CALL1    ; CALL TIMER.
39 00621 063646           SKPDN    , .REC1    ; RECEIVED RESET CAN'T
40 00622 006127           EHALT                ; TERMINATE RECEIVER.
41 00623 066446           DIC     1, .REC1    ; GET STATUS.
42 00624 127100           ADDL    1,1         ;
43 00625 125100           MOVL    1,1         ;
44 00626 125103           MOVL    1,1,SNC     ;
45 00627 006127           EHALT               ; CAN'T SET RECEIVED RESET
46                                            ; STATUS FLAG.
47 00630 006126         LOOP                  ;
48 00631 006125           SETUP               ;
49 00632 066446           DIC     1, .REC1    ; GET STATUS.
50 00633 127100           ADDL    1,1         ;
51 00634 125100           MOVL    1,1         ;
52 00635 125102           MOVL    1,1,SZC     ; CAN'T RESET RECEIVED
53 00636 006127           EHALT               ; RESET STATUS FLAG.
54 00637 006126         LOOP                  ;
55 00640 002205           JMP      @ NEX9     ; GO TO NEXT TEST.
56
57
58
```

```
                        ;       TIMER SUBROUTINE.

00641 126520 TIEP:      SUBZL      1,1          ; AC1:=1, CARRY:=0.
00642 065114            DOAS       1, .TIM      ; START TIMER.
00643 063614            SKPDN       , .TIM      ;
00644 000777            JMP        .-1          ;
00645 065114            DOAS       1, .TIM      ;
00646 063614            SKPDN       , .TIM      ;
00647 000777            JMP        .-1          ;
00650 001400            JMP         0,3         ; RETURN TO CALL +1 .


                        ;       INTERRUPT SUBROUTINE.

00651 126520 INTSUB:    SUBZL      1,1          ; AC1:=1, CARRY:=0.
00652 065114            DOAS       1, .TIM      ; START TIMER.
00653 063614            SKPDN       , .TIM      ; WAIT TIMER TERMINATE.
00654 000777            JMP        .-1          ;
00655 065114            DOAS       1, .TIM      ;
00656 024242            LDA        1, RTN1      ; START ADDRESS
00657 044001            STA        1, INTRP     ; INTR. ROUTINE.
00660 060177            INTEN                   ; ENABLE INTERRUPT.
00661 002241 WITR:      JMP        @ WAIT1      ;   WAIT INTERRUPT.
                                                ;
00662 060277 ITRRTN:    NIOC       CPU          ; DISABLE FURTHER ITR.
00663 071477            DIB        2, CPU       ; AC2:= ITR.DEV.NO.
00664 024060            LDA        1, C60       ; AC1:= DEV.NO.RTC.
00665 146415            SUB#       2,1,SNR      ; IS ITR.DEV.=RTC.
00666 001400            JMP        0,3          ; YES, RETURN TO
                                                ; CALL +1.
00667 024405            LDA        1,CTTI  ;
00670 060210            NIOC        , .TTI ;
00671 146415            SUB#       2,1,SNR      ; REMOVE INTERRUPT FROM
00672 001757            JMP        INTSUB       ; TTY INPUT.
00673 001401            JMP        1,3          ; NO, RETURN TO
                                                ; CALL +2.
00674 000010 CTTI:      .TTI                    ; INTERRUPT FROM TTI.
      000010 .TTI=      10
```

```
↑ 0020  .MAIN
01
02
03                ;  TEST9 : TEST OF TRANSMITTER TIMEOUT
04                ;           WITH INTERRUPT.
05
06 00675 006125 TES9:    SETUP                ;
07 00676 066447           DIC     1, .XMT1     ;
08 00677 024070            LDA        1, MASK0 ; SET ITR. DISABLE
09 00700 066077            DOB        1, CPU   ; FLAG=0 IN FPA702.
10 00701 024053            LDA        1, C53   ; START REC WITH
11 00702 067146            DOCS       1, .REC1 ; COMMAND3 < NOP >.
12 00703 024044            LDA        1, C44   ; START XMT WITH
13 00704 067147            DOCS       1, .XMT1 ; COMMAND2 < XMT BLOCK >.
14 00705 006235            JSR        @ CALL2  ; GET INTERRUPT.
15 00706 006127            EHALT               ; NO TIMEOUT INTERRUPT.
16 00707 024112            LDA        1, FIXT1 ; AC1:=XMT1 DEV.NO.
17 00710 146414            SUB#       2,1,SZR  ; NOT CORRECT
18 00711 006127            EHALT               ; XMT.DEV.NO.
19                                             ; AC1=WANTED DEV.NO.
20                                             ; AC2=RECEIVED DEV.NO.
21 00712 006126           LOOP                 ;
22 00713 002206            JMP        @ NEX10  ; GO TO NEXT TEST.
23
24
25
26                ;  TEST10 : TEST OF TRANSMITTER TIMEOUT
27                ;            WITH INTERRUPT MASKOUT.
28
29 00714 006125 TES10:   SETUP                ;
30 00715 066447           DIC     1, .XMT1     ;
31 00716 024071            LDA        1, MASK1 ; SET ITR. DISABLE
32 00717 066077            DOB        1, CPU   ; FLAG=1 IN FPA702.
33 00720 024053            LDA        1, C53   ; START REC WITH
34 00721 067146            DOCS       1, .REC1 ; COMMAND3 < NOP >.
35 00722 024044            LDA        1, C44   ; START XMT WITH
36 00723 067147            DOCS       1, .XMT1 ; COMMAND2 < XMT BLOCK >.
37 00724 006235            JSR         @ CALL2 ; GET INTERRUPT.
38 00725 002207            JMP         @ DEX11 ; GO TO NEXT TEST.
39 00726 024112            LDA        1, FIXT1 ; AC1:=XMT1 DEV.NO.
40 00727 146415            SUB#       2,1,SNR  ; ITR.DISABLE CAN'T
41 00730 006127            EHALT               ; DISABLE TRANSMITTER
42                                             ; INTERRUPTS.
43 00731 006126           LOOP                 ;
44 00732 000772            JMP        .-6      ;
45
46
47
48
49
50
51
```

```
↑ 0021   .MAIN
01
02
03
04
05                ;  TEST11 : TEST OF RECEIVED RESET WITH INTERRUPT.
06
07 00733 006125 TES11:  SETUP                ;
08 00734 066446          DIC    1, .REC1     ;
09 00735 024070           LDA       1, MASK0 ; SET ITR. DISABLE
10 00736 066077           DOB       1, CPU   ; FLAG=0 IN FPA702.
11 00737 024053           LDA       1, C53   ; START REC WITH
12 00740 067146           DOCS      1, .REC1 ; COMMAND3 < NOP >.
13 00741 024055           LDA       1, C55   ;
14 00742 067347           DOCP      1, .XMT1 ; XMT RESET PULSE.
15 00743 006235           JSR       @ CALL2  ; GET INTERRUPT.
16 00744 006127           EHALT              ; NO RECEIVED RESET
17                                           ; INTERRUPT.
18 00745 024110           LDA       1, FIXR1 ;
19 00746 146414           SUB#      2,1,SZR  ;
20 00747 006127           EHALT              ; NOT REC. DEV. NO.
21 00750 006126          LOOP               ;
22 00751 002210           JMP       @ NEX12  ; GO TO NEXT TEST.
23
24
25                ;  TEST12 : TEST OF RECEIVED RESET WITH
26                ;           INTERRUPT MASKOUT.
27
28 00752 006125 TES12:  SETUP                ;
29 00753 066446           DIC    1, .REC1     ;
30 00754 024071           LDA       1, MASK1 ; SET ITR. DISABLE
31 00755 066077           DOB       1, CPU   ; FLAG=1 IN FPA702.
32 00756 024053           LDA       1, C53   ; START REC WITH
33 00757 067146           DOCS      1, .REC1 ; COMMAND3 < NOP >.
34 00760 024055           LDA       1, C55   ;
35 00761 067347           DOCP      1, .XMT1 ; XMT RESET PULSE.
36 00762 006235           JSR       @ CALL2  ; GET INTERRUPT.
37 00763 002211           JMP       @ NEX13  ; GO TO NEXT TEST.
38 00764 024110           LDA       1, FIXR1 ;
39 00765 146415           SUB#      2,1,SNR  ;
40 00766 006127           EHALT              ; ITR.DISABLE CAN'T
41                                           ; DISABLE RECEIVER
42                                           ; INTERRUPT.
43 00767 006126          LOOP               ;
44 00770 000772           JMP       .-6      ;
45
46
47
48
49
50
51
```

```
↑ 0022  .MAIN
01                      ;
02                      ;DATA PATH TEST.
03                      ; THIS IS A SIMPLE TEST LOOP TO DETECT ERRORS IN THE DATA PATHS.
04                      ; ONLY A STARTBYTE AND TWO DATA BYTE IS TRANSMITTED. THESE BYTES
05                      ; ARE TAKEN FROM MEMORY AND CAN BE CHANGED BY THE OPERATOR.
06                      ; THIS LOOP IS NOT INCOPORATED IN THE NORMAL TESTPROGRAM FLOW
07                      ; AND CAN ONLY BE ENTERED MANUALLY.
08                      ;
09                      ; THE TRANSMITTER SEND THE STARTBYTE IN STBY AND THE TWO DATABYTE
10                      ; IN TRBY.
11                      ; THE RECEIVED STARTBYTE IS PLACED IN REBY.
12                      ; THE RECEIVED DATABYTES ARE PLACED IN REBY.
13                      ; THE TRANSMITER STARTADDRESS AND THE RECEIVER STARTADDRESS ARE
14                      ; PLACED IN XMTA AND RECA AND CAN BE CHANGED BY THE OPERATOR.
15                      ; BEFORE STARTING THIS LOOP THE OPERATOR MUST PLACE THE
16                      ; WANTED TESTPATTERN IN STBY AND TRBY.
17
18
19 00771 000001 STBY:   1                       ; STARTBYTE TRANSMITTED.
20 00772 000000 SRBY:   0                       ; STARTBYTE RECEIVED.
21 00773 000000 TRBY:   0                       ; DATA BYTE TRANSMITTED.
22 00774 000000 REBY:   0                       ; DATA BYTE RECEIVED.
23 00775 000002 C100:   2                       ; BYTE COUNT.
24
25 00776 020000 RECA:   20000                   ; STARTADDRESS,RECEIVER.
26 00777 010000 XMTA:   10000                   ; STARTADDRESS,TRANSMITTER.
27
28 01000 066446 A1:     DIC     1,    .REC1     ;
29 01001 024776         LDA     1,    XMTA      ; ADD.COUNT,XMT
30 01002 065047         DOA     1,    .XMT1     ; :=AC1.
31 01003 024773         LDA     1,    RECA      ; ADD.COUNT,REC
32 01004 065046         DOA     1,    .REC1     ;
33 01005 024770         LDA     1,    C100      ;
34 01006 124400         NEG     1,1             ; BYTE COUNT,REC,XMT
35 01007 066047         DOB     1,    .XMT1     ; :=AC1.
36 01010 066046         DOB     1,    .REC1     ;
37 01011 024762         LDA     1,    TRBY      ;
38 01012 030040         LDA     2,    C40       ;
39 01013 045000         STA     1,0,2           ; START REC1
40 01014 024052         LDA     1,    C52       ; WITH READ BLOCK.
41 01015 067146         DOCS    1,    .REC1     ;
42 01016 024753         LDA     1,    STBY      ;
43 01017 030061         LDA     2,    C61       ;
44 01020 147400         AND     2,1             ; START XMT1
45 01021 030044         LDA     2,    C44       ; WITH XMT BLOCK
46 01022 147000         ADD     2,1             ;
47 01023 067147         DOCS    1,    .XMT1     ;
48 01024 063647         SKPDN   ,     .XMT1     ; WAIT XMT1 TERMINATE.
49 01025 000777         JMP           .-1       ;
50 01026 063646         SKPDN   ,     .REC1     ;
51 01027 000777         JMP           .-1       ; WAIT REC1 TERMINATE.
52 01030 066446         DIC     1,    .REC1     ;
53 01031 030061         LDA     2,    C61       ;
54 01032 147400         AND     2,1             ;
55 01033 044737         STA     1,    SRBY      ;
56 01034 026742         LDA     1,    @RECA     ;
57 01035 044737         STA     1,    REBY      ;
58 01036 000742         JMP           A1        ;
59
```

```
  0023  .MAIN
01
02
03
04                ;  TEST13 : TEST OF DATA.
05
06 01037 126520 TES13:   SUBZL    1,1        ; RESET START BYTE
07 01040 044062          STA      1, C62     ; ACCUMULATOR.
08 01041 066446          DIC      1, .REC1   ;
09
10 01042 062701          DICP     0,1
11 01043 063601          SKPDN    1
12 01044 006135          ERMES
13 01045 006125          SETUP              ;
14 01046 006236 TES14:   JSR      @ CALL3    ; CALL DATA GENERATOR.
15 01047 024040          LDA      1, C40     ; ADD.COUNT,XMT
16 01050 065047          DOA      1, .XMT1   ; := AC1.
17 01051 024041          LDA      1, C41     ;
18 01052 124400          NEG      1,1        ; BYTE COUNT,XMT
19 01053 066047          DOB      1, .XMT1   ; := AC1.
20 01054 024046          LDA      1, C46     ; ADD.COUNT,REC
21 01055 065046          DOA      1, .REC1   ; := AC1.
22 01056 024047          LDA      1, C47     ;
23 01057 124400          NEG      1,1        ; BYTE COUNT,REC
24 01060 066046          DOB      1, .REC1   ; := AC1.
25 01061 024052          LDA      1, C52     ; START REC WITH
26 01062 067146          DOCS     1, .REC1   ; COMMAND2
27                                           ; < READ BLOCK >.
28 01063 024044          LDA      1, C44     ; START XMT WITH
29 01064 030062          LDA      2, C62     ; COMMAND2
30 01065 147000          ADD      2,1        ; < XMT BLOCK >.
31 01066 067147          DOCS     1, .XMT1   ;
32 01067 063647          SKPDN      , .XMT1  ; WAIT TRANSMITTER
33 01070 000777          JMP        .-1      ; TERMINATE.
34 01071 063646          SKPDN      , .REC1  ; WAIT RECEIVER
35 01072 000777          JMP        .-1      ; TERMINATE.
36 01073 006237          JSR      @ CALL4    ; CALL DATA CHECK.
37 01074 066446          DIC      1, .REC1   ; GET REC STATUS.
38 01075 125102          MOVL     1,1,SZC    ;
39 01076 006127          EHALT               ; OVERFLOW ERROR.
40 01077 125100          MOVL     1,1        ;
41 01100 125102          MOVL     1,1,SZC    ;
42 01101 006127          EHALT               ; PARITY ERROR.
43 01102 125102          MOVL     1,1,SZC    ;
44 01103 006127          EHALT               ; RECEIVED RESET.
45 01104 066446          DIC      1, .REC1   ; GET REC STATIS.
46 01105 030061          LDA      2, C61     ; MASK START BYTE.
47 01106 147400          AND      2,1        ;
48 01107 030062          LDA      2, C62     ;
49 01110 146414          SUB#     2,1,SZR    ; START BYTE ERROR:
50 01111 006127          EHALT               ; AC1=REC START BYTE.
51                                           ; AC2=XMT START BYTE.
52 01112 151100          MOVL     2,2        ;
53 01113 024061          LDA      1, C61     ;
54 01114 147400          AND      2,1        ;
55 01115 044062          STA      1, C62     ;
56 01116 010063          ISZ      C63        ; INCR ADDER CONSTANT.
57 01117 000401          JMP      .+1        ;
58 01120 075446          DIR      3, .REC1   ; READ BYTE
59 01121 175014            MOV#    3,3,SZR   ; COUNTER,REC.
```

```
  0024   .MAIN
01 01122 006127                EHALT                   ; BYTE ERROR
02                                                     ; IN REC1.
03
04
05
```

```
↑ 0025  .MAIN
01
02
03 01123 075447          DIB    3, .XMT1      ; READ BYTE
04 01124 175014          MOV#   3,3,SZR       ; COUNTER,XMT.
05 01125 006127          EHALT                ; BYTE COUNT
06                                            ; ERROR IN XMT1.
07 01126 034047          LDA    3, C47        ;
08 01127 175220          MOVZR  3,3           ;
09 01130 030046          LDA    2, C46        ;
10 01131 157000          ADD    2,3           ; AC3=WANTED
11                                            ; LAST ADDRESS.
12 01132 070446           DIA   2, .REC1      ; AC2=CURRENT
13 01133 172414          SUB#   3,2,SZR       ; LAST ADDRESS.
14 01134 006127          EHALT                ; ADD.COUNT ERROR IN REC1.
15 01135 034041          LDA    3, C41        ;
16 01136 175220          MOVZR  3,3           ;
17 01137 030040          LDA    2, C40        ;
18 01140 157000          ADD    2,3           ; AC3=WANTED
19                                            ; LAST ADDRESS.
20 01141 070447          DIA    2, .XMT1      ; AC2=CURRENT
21 01142 172414          SUB#   3,2,SZR       ; LAST ADDRESS.
22 01143 006127          EHALT                ; ADD.COUNT ERROR IN XMT1.
23 01144 006126          LOOP                 ;
24 01145 125004           MOV       1,1,SZR   ;
25 01146 002212           JMP       @ NEX14   ; REPEAT.
26 01147 024054           LDA    1, C54       ; TRANSMIT AUTO
27 01150 067347           DOCP     1, .XMT1   ; PULSE.
28 01151 006234           JSR       @ CALL1   ; CALL TIMER.
29 01152 062677           DICC     0, CPU     ; IO RESET.
30 01153 006234           JSR       @ CALL1   ; CALL TIMER.
31 01154 002213           JMP       @ NEX15   ; GO TO NEXT TEST.
32
33
34
35
36
```

```
↑ 0026  .MAIN
01
02
03
04
05                ;            DATA GENERATOR ROUTINE.
06
07 01155 152520 DATAGEN:  SUBZL   2,2        ; AC2:=1, CARRY:=0.
08
09 01156 054461           STA     3,ACD3
10 01157 024040           LDA     1, C40     ; INIT XMT DATA BUFFER
11 01160 146440           SUBO    2,1        ; ADDRESS POINTER.
12 01161 044020           STA     1, C20     ;
13 01162 024041           LDA     1, C41     ;
14 01163 125200           MOVR    1,1        ; NO. OF WORDS.
15 01164 044030           STA     1, C30     ;
16 01165 030063           LDA     2, C63     ;
17
18 01166 010020 A4:       ISZ     C20
19 01167 024020           LDA     1, C20     ;
20 01170 147000           ADD     2,1        ;
21
22 01171 034020           LDA     3,C20
23 01172 045400           STA     1, 0,3   ; STORE WORD.
24 01173 014030           DSZ      C30       ; DECR WORD COUNT.
25 01174 000772           JMP     A4         ; SKIP IF ZERO.
26 01175 002442           JMP     @ACD3        ; RETURN TO CALL +1.
27
28
29
30
31                ;            DATA CHECK ROUTINE.
32
33 01176 126520 DATAC:     SUBZL   1,1        ; AC1:=1, CARRY:=0.
34 01177 054440           STA     3, ACD3    ; SAVE AC3.
35 01200 050435            STA     2, ACD2   ; SAVE AC2.
36 01201 044435            STA     1, ACD1   ; SAVE AC1.
37 01202 030040            LDA     2, C40    ;
38 01203 132400            SUB     1,2       ; INIT XMT BUFFER
39 01204 050020            STA     2, C20    ; POINTER.
40 01205 126520            SUBZL   1,1       ;
41 01206 030046            LDA     2, C46    ;
42 01207 132400            SUB     1,2       ; INIT REC BUFFER
43 01210 050021            STA     2, C21    ; POINTER.
44 01211 024041            LDA     1, C41    ;
45 01212 125220            MOVZR   1,1       ; INIT WORD COUNT.
46 01213 044030            STA     1, C30    ;
47
48 01214 010021 A2:        ISZ     C21
49 01215 000401            JMP     .+1
50 01216 010020            ISZ     C20
51 01217 000401            JMP     .+1
52 01220 030021            LDA     2,C21
53 01221 034020            LDA     3,C20
54 01222 021000            LDA     0,0,2
55 01223 025400            LDA      1,0,3
56 01224 111000            MOV     0,2
57 01225 132414            SUB#    1,2,SZR   ; DATA ERROR:
58 01226 006127            EHALT               ; AC1= XMT WORD.
59                                              ; AC2= REC WORD.
```

```
  0027  .MAIN
01                                                    ; AC3= RETURN.
02  01227  014030              DSZ       C30         ; DECR WORD COUNT
03  01230  000764              JMP       A2        ; SKIP IF ZERO.
04  01231  034406            LDA     3, ACD3     ;
05  01232  030403              LDA     2, ACD2     ; RESTORE
06  01233  024403              LDA     1, ACD1     ; ACCUMULATORS.
07  01234  001400              JMP     0,3         ; RETURN TO CALL+1.
08  01235  000000  ACD2:     0
09  01236  000000  ACD1:      0
10  01237  000000  ACD3:      0                    ;
11
12
13
14
15
16
17                ;  TEST15 : TEST OF OVERFLOW STATUS IN RECEIVER.
18
19  01240  006125  TES15:      SETUP              ;
20
21  01241  062701              DICP      0,1
22  01242  063601              SKPDN     1
23  01243  006135              ERMES
24  01244  024040              LDA       1, C40    ;
25  01245  030066              LDA       2, C66    ;
26  01246  151220              MOVZR     2,2       ;
27  01247  133000              ADD       1,2       ;
28  01250  151400              INC       2,2       ;
29  01251  034072              LDA       3, C74    ;
30  01252  055000              STA       3,0,2       ;
31  01253  024046              LDA       1, C46    ;
32  01254  030066              LDA       2, C66    ;
33  01255  151220              MOVZR     2,2       ;
34  01256  133000              ADD       1,2       ;
35  01257  151400              INC       2,2       ;
36  01260  034073              LDA       3, C75    ;
37  01261  055000              STA       3,0,2       ;
38  01262  024040              LDA       1, C40    ; SET ADD.COUNT,XMT.
39  01263  065047              DOA       1, .XMT1  ;
40  01264  024065              LDA       1, C65    ; SET BYTECOUNT,XMT.
41  01265  124400              NEG       1,1       ;
42  01266  066047              DOB       1, .XMT1  ;
43  01267  024046              LDA       1, C46    ; SET ADD.COUNT,REC.
44  01270  065046              DOA       1, .REC1  ;
45  01271  024066              LDA       1, C66    ; SET BYTECOUNT,REC.
46  01272  124400              NEG       1,1       ;
47  01273  066046              DOB       1, .REC1  ;
48  01274  024052              LDA       1, C52    ; START REC WITH
49  01275  067146              DOCS      1, .REC1  ; COMMAND2
50                                                  ; < READ BLOCK >.
51  01276  024044              LDA       1, C44    ; START XMT WITH
52  01277  067147              DOCS      1, .XMT1  ; COMMAND2
53                                                  ; < XMT BLOCK >.
54  01300  063647              SKPDN     , .XMT1   ; WAIT XMT
55  01301  000777              JMP       .-1       ; TERMINATE.
56  01302  063646              SKPDN     , .REC1   ; WAIT REC
57  01303  000777              JMP       .-1       ; TERMINATE.
58  01304  066446              DIC       1, .REC1  ; GET REC STATUS.
59  01305  125105              MOVL      1,1,SNC   ; CAN'T SET OVERFLOW
```

```
01306 006127      EHALT               ; STATUS FLAG.
01307 034066      LDA   3, C66        ;
01310 175220     MOVZR  3,3         ;
01311 175400      INC   3,3           ;
01312 024046      LDA   1, C46        ;
01313 137000      ADD   1,3           ;
01314 031400      LDA   2,0,3           ;
01315 024075      LDA   1, C75        ;
01316 146414      SUB#  2,1,SZR ; THE WORD AFTER THE
01317 006127      EHALT               ; THE REC BUFFER IS DESTROTED.
01320 006126      LOOP                ;
01321 006125      SETUP               ;
01322 066446      DIC   1, .REC1      ; GET REC STATUS.
01323 125102      MOVL  1,1,SZC       ; CAN'T RESET OVERFLOW
01324 006127      EHALT               ; STATUS FLAG.
01325 006126     LOOP               ;
01326 006125      SETUP               ;
01327 024002      LDA   1, C2         ; IF BIT15 IN C2 IS
01330 125202      MOVR  1,1,SZC       ; EQUAL TO ONE THEN
01331 006127      EHALT               ; STOP ELSE REPEAT.
01332 006126     LOOP               ;
01333 006130      PCRLF
01334 006131      MESSAGE
01335 006171      PPASS

01336 010232      ISZ   PASSN
01337 000401      JMP   .+1
01340 024232      LDA   1,PASSN
01341 006133      TYPDEC
01342 002175      JMP   @ NEX1        ; RETURN TO TEST1.
```

```
↑ 0029  .MAIN
01
02
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04
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06
07
08                ;     TEST16 : TEST OF THE TRANSMIT STATUS
09                ;              COMMAND IN RECEIVER.
10                ;              ANOTHER FPA702 IS USED TO
11                ;              CHECK THIS STATUS.
12
13 01343 126520 TES16:      SUBZL   1,1       ; INIT XMT STATUS
14 01344 044067             STA     1, C67    ; BYTE ACCUMULATOR.
15 01345 006125           SETUP               ;
16 01346 024051 TES17:      LDA     1, C51    ;
17 01347 030067             LDA     2, C67    ;
18 01350 147000             ADD     2,1       ; START REC1 WITH
19 01351 067146             DOCS    1, .REC1; COMMAND1<XMT STATUS>.
20 01352 024043             LDA     1, C43    ; START XMT2 WITH
21 01353 067175             DOCS    1, .XMT2; COMMAND1<REC STATUS>.
22 01354 063646             SKPDN     , .REC1; WAIT REC1
23 01355 000777             JMP       .-1     ; TERMINATE.
24 01356 063675             SKPDN     , .XMT2; WAIT XMT2
25 01357 000777             JMP       .-1     ; TERMINATE.
26 01360 066475             DIC     1, .XMT2; STATUS FROM XMT2.
27 01361 034061             LDA     3, C61    ; MASK STATUS BYTE.
28 01362 167400             AND     3,1       ;
29 01363 030067             LDA     2, C67    ; AC2= XMT STATUS.
30 01364 146414             SUB#    2,1,SZR ; AC1= RECSTATUS.
31 01365 006127             EHALT             ; STATUS BYTE ERROR.
32 01366 006126           LOOP                ;
33 01367 151100             MOVL    2,2       ;
34 01370 173400             AND     3,2       ; SHIFT STATUS BYTE.
35 01371 050067             STA     2, C67    ;
36 01372 151004             MOV     2,2,SZR ;
37 01373 002215             JMP   @ NEX17     ; REPEAT.
38 01374 002216             JMP   @ NEX18     ; GO TO NEXT TEST.
39
40
41
42
43
44
```

```
↑ 0130   .MAIN
01
02
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04
05
06                ;     TEST18 : TEST OF THE RECEIVE STATUS COMMAND
07                ;              IN FPA702 TRANSMITTER.
08                ;              ANOTHER FPA702 IS USED TO GENERATE
09                ;              THIS STATUS.
10
11
12 01375 126520 TES18:    SUBZL   1,1          ; INIT XMT STATUS
13 01376 044067           STA     1, C67       ; BYTE ACCUMULATOR.
14 01377 006125           SETUP                ;
15 01400 024051 TES19:    LDA     1, C51       ;
16 01401 030067           LDA     2, C67       ;
17 01402 147000           ADD     2,1          ; START REC2 WITH
18 01403 067174           DOCS    1, .REC2     ; COMMAND1<XMT STATUS>.
19 01404 024046           LDA     1, C46       ; ADD.COUNT,REC1 LOAD.
20 01405 065046           DOA     1, .REC1     ;
21 01406 024066           LDA     1, C66       ; BYTE COUNT LOAD.
22 01407 124400           NEG     1,1          ;
23 01410 066046           DOB     1, .REC1     ;
24 01411 024052           LDA     1, C52       ; START REC1 WITH
25 01412 067146           DOCS    1, .REC1     ; READ BLOCK.
26 01413 024043           LDA     1, C43       ; START XMT1 WITH
27 01414 067147           DOCS    1, .XMT1     ; COMMAND1<REC STATUS>.
28 01415 063674           SKPDN     , .REC2    ; WAIT REC2
29 01416 000777           JMP       .-1        ; TERMINATE.
30 01417 063647           SKPDN     , .XMT1    ; WAIT XMT1
31 01420 000777           JMP       .-1        ; TERMINATE.
32 01421 066447           DIC     1, .XMT1     ; STATUS FROM XMT1.
33 01422 034061           LDA     3, C61       ; MASK STATUS BYTE.
34 01423 167400           AND     3,1          ;
35 01424 030067           LDA     2, C67       ; AC2= XMT STATUS.
36 01425 146414           SUB#    2,1,SZR      ; AC1= REC STATUS.
37 01426 006127           EHALT                ; STATUS BYTE ERROR.
38 01427 006126           LOOP                 ;
39 01430 151100           MOVL    2,2          ;
40 01431 173400           AND     3,2          ; SHIFT STATUS BYTE.
41 01432 050067           STA     2, C67       ;
42 01433 151004           MOV     2,2,SZR      ;
43 01434 002217           JMP   @ NEX19        ; REPEAT.
44 01435 060246           NIOC  , .REC1        ; STOP REC1.
45 01436 002220           JMP   @ NEX20        ; GO TO NEXT TEST.
46
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```

```
↑ 0031  .MAIN
01
02
03
04
05                ;    TEST20 : TEST OF THE TRANSMIT STATUS -
06                ;             RECEIVE BLOCK COMMAND IN THE
07                ;             FPA702 RECEIVER.
08
09 01457 126520 TES20:    SUBZL   1,1       ; INIT STATUS BYTE
10 01440 044067           STA     1, C67    ; AND START BYTE
11 01441 044062           STA     1, C62    ; ACCUMULATORS.
12 01442 066446           DIC     1, .REC1;
13 01443 006125           SETUP               ;
14 01444 006236 TES21:    JSR     @ CALL3     ;CALL DATA GENERATOR.
15 01445 024043           LDA     1, C43    ; START XMT2 WITH
16 01446 067175           DOCS    1, .XMT2  ; REC STATUS COMMAND.
17 01447 024046           LDA     1, C46    ; ADD.COUNT LOAD.
18 01450 065046           DOA     1, .REC1  ;
19 01451 024047           LDA     1, C47    ; BYTE COUNT LOAD.
20 01452 124400           NEG     1,1       ;
21 01453 066046           DOB     1, .REC1  ;
22 01454 030067           LDA     2, C67    ;
23 01455 024050           LDA     1, C50    ; START REC1 WITH
24 01456 147000           ADD     2,1       ; TRANSMIT STATUS -
25 01457 067146           DOCS    1, .REC1  ; RECEIVE BLOCK.
26 01460 063675           SKPDN     , .XMT2 ; WAIT XMT2
27 01461 000777           JMP       .-1     ; TERMINATE.
28 01462 024040           LDA     1, C40    ; ADD.COUNT,XMT2
29 01463 065075           DOA     1, .XMT2  ; LOAD.
30 01464 024041           LDA     1, C41    ; BYTE COUNT,XMT2
31 01465 124400           NEG     1,1       ;
32 01466 066075           DOB     1, .XMT2  ; LOAD.
33 01467 024062           LDA     1, C62    ;
34 01470 030044           LDA     2, C44    ; START XMT2 WITH
35 01471 147000           ADD     2,1       ; TRANSMIT BLOCK
36 01472 067175           DOCS    1, .XMT2  ; COMMAND.
37 01473 063675           SKPDN     , .XMT2 ; WAIT XMT2
38 01474 000777           JMP       .-1     ; TERMINATE.
39 01475 063646           SKPDN     , .REC1 ; WAIT REC1
40 01476 000777           JMP       .-1     ; TERMINATE.
41 01477 066475           DIC     1, .XMT2  ; STATUS FROM XMT2.
42 01500 030061           LDA     2, C61    ; MASK STATUS BYTE.
43 01501 147400           AND     2,1       ;
44 01502 034067           LDA     3, C67    ; AC1= REC STATUS.
45 01503 166414           SUB#    3,1,SZR   ; AC3= XMT STATUS.
46 01504 006127           EHALT               ; STATUS BYTE ERROR.
47 01505 066475           DIC   1, .XMT2    ;
48 01506 125102           MOVL    1,1,SZC   ;
49 01507 006127           EHALT               ; DISCONNECT.
50 01510 125102           MOVL    1,1,SZC   ;
51 01511 006127           EHALT               ; TIMEOUT.
52 01512 175100           MOVL    3,3       ;
53 01513 173400           AND     3,2       ;
54 01514 050067           STA     2, C67    ;
55 01515 006237           JSR   @ CALL4     ; CALL DATA CHECK.
56
57
58
59
```

0032 .MAIN
01
02

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↑ 0033   .MAIN
01
02
03
04
05  01516  066446            DIC     1, .REC1 ; STATUS FROM REC1.
06  01517  125102            MOVL    1,1,SZC  ;
07  01520  006127            EHALT            ;OVERFLOW ERROR.
08  01521  125100            MOVL    1,1      ;
09  01522  125102            MOVL    1,1,SZC  ;
10  01523  006127            EHALT            ; PARITY ERROR.
11  01524  125102            MOVL    1,1,SZC  ;
12  01525  006127            EHALT            ; RECEIVED RESET.
13  01526  066446            DIC     1, .REC1 ; STATUS FROM REC1.
14  01527  050061            LDA     2, C61   ; MASK START BYTE.
15  01530  147400            AND     2,1      ;
16  01531  034062            LDA     3, C62   ; START BYTE ERROR:
17  01532  166414            SUB#    3,1,SZR  ; AC3= XMT START BYTE.
18  01533  006127            EHALT            ; AC1= REC START BYTE.
19  01534  175100            MOVL    3,3      ;
20  01535  173400            AND     3,2      ;
21  01536  050062            STA     2, C62   ;
22  01537  010063            ISZ     C63      ;
23  01540  000401            JMP     .+1      ;
24  01541  065446            DIB   1, .REC1   ; READ BYTE
25  01542  125014            MOV#    1,1,SZR  ; COUNTER,REC.
26  01543  006127            EHALT            ; BYTE COUNTER
27                                           ; ERROR IN REC1.
28  01544  065475            DIB     1, .XMT2 ; READ BYTE
29  01545  125014            MOV#    1,1,SZR  ; COUNTER,XMT.
30  01546  006127            EHALT            ; BYTE COUNTER
31                                           ; ERROR IN XMT2.
32  01547  024047            LDA     1, C47   ;
33  01550  125220            MOVZR   1,1      ;
34  01551  034046            LDA     3, C46   ;
35  01552  167000            ADD     3,1      ; AC1=WANTED
36                                           ; LAST ADDRESS.
37  01553  074446            DIA     3, .REC1 ; AC3=CURRENT
38  01554  136414            SUB#    1,3,SZR  ; LAST ADDRESS.
39  01555  006127            EHALT            ; ADD.COUNT ERROR IN REC1.
40  01556  024041            LDA     1, C41   ;
41  01557  125220            MOVZR   1,1      ;
42  01560  034040            LDA     3, C40   ;
43  01561  167000            ADD     3,1      ; AC1=WANTED
44                                           ;LAST ADDRESS.
45  01562  074475            DIA     3, .XMT2 ; AC3=CURRENT
46  01563  136414            SUB#    1,3,SZR  ; LAST ADDRESS.
47  01564  006127            EHALT            ; ADD.COUNT ERROR IN XMT2.
48  01565  006126          LOOP               ;
49  01566  151004            MOV   2,2,SZR    ;
50  01567  002221            JMP     @ NEX21  ; REPEAT.
51  01570  002222            JMP     @ NEX22  ; GO TO NEXT TEST.
52
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54
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```

```
↑ 0135  .MAIN
01
02
03
04                      ;    TEST22 : TEST OF THE TRANSMIT BLOCK -
05                      ;             RECEIVE STATUS COMMAND IN FPA702
06                      ;             TRANSMITTER.
07
08 01571 126520 TES22:    SUBZL   1,1          ; INIT STATUS BYTE
09 01572 044067           STA     1, C67       ; AND START BYTE
10 01573 044062           STA     1, C62       ; ACCUMULATORS.
11 01574 066474           DIC     1, .REC2     ;
12 01575 006125           SETUP                ;
13 01576 006236 TES23:    JSR     @ CALL3      ; CALL DATA GENERATOR.
14 01577 024046           LDA     1, C46       ; ADD.COUNT,REC2
15 01600 065074           DOA     1, .REC2     ; LOAD.
16 01601 024047           LDA     1, C47       ; BYTE COUNT,REC2
17 01602 124400           NEG       1,1        ;
18 01603 066074           DOB     1, .REC2     ; LOAD.
19 01604 024052           LDA     1, C52       ; START REC2 WIYH
20 01605 067174           DOCS    1, .REC2     ; READ BLOCK.
21 01606 024040           LDA     1, C40       ; ADD.COUNT,XMT1
22 01607 065047           DOA     1, .XMT1     ; LOAD.
23 01610 024041           LDA     1, C41       ; BYTE COUNT,XMT1
24 01611 124400           NEG     1,1          ;
25 01612 066047           DOB     1, .XMT1     ; LOAD.
26 01613 024042           LDA     1, C42       ;
27 01614 050062           LDA     2, C62       ; START XMT1 WITH
28 01615 147000           ADD     2,1          ; TRANSMIT BLOCK -
29 01616 067147           DOCS    1, .XMT1     ; RECEIVE STATUS.
30 01617 063674           SKPDN     , .REC2    ; WAIT REC2
31 01620 000777           JMP       .-1        ; TERMINATE.
32 01621 024043           LDA     1, C43       ;
33 01622 050067           LDA     2, C67       ;
34 01623 147000           ADD     2,1          ; START REC2 WITH
35 01624 067174           DOCS    1, .REC2     ; TRANSMIT STATUS.
36 01625 063674           SKPDN     , .REC2    ; WAIT REC2
37 01626 000777           JMP       .-1        ; TERMINATE.
38 01627 063647           SKPDN     , .XMT1    ; WAIT XMT1
39 01630 000777           JMP       .-1        ; TERMINATE.
40 01631 066447           DIC     1, .XMT1     ; STATUS FROM XMT1.
41 01632 050061           LDA     2, C61       ; MASK STATUS BYTE.
42 01633 147400           AND     2,1          ; AC1= REC STATUS.
43 01634 054067           LDA     3, C67       ; AC3= XMT STATUS.
44 01635 166414           SUB#    3,1,SZR      ;
45 01636 006127           EHALT                ; STATUS BYTE ERROR.
46 01637 066447           DIC   1, .XMT1       ;
47 01640 125102           MOVL    1,1,SZC      ;
48 01641 006127           EHALT                ; DISCONNECT.
49 01642 125102           MOVL    1,1,SZC      ;
50 01643 006127           EHALT                ; TIMEOUT.
51 01644 175100           MOVL    3,3          ;
52 01645 173400           AND     3,2          ;
53 01646 050067           STA     2, C67       ;
54 01647 006237           JSR     @ CALL4      ; CALL DATA CHECK.
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57
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↑ 0057  .MAIN
01
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04
05 01650 066474          DIC     1, .REC2  ; STATUS FROM REC2.
06 01651 125102          MOVL    1,1,SZC   ;
07 01652 006127          EHALT             ; OVERFLOW ERROR.
08 01653 125100          MOVL    1,1       ;
09 01654 125102          MOVL    1,1,SZC   ;
10 01655 006127          EHALT             ; PARITY ERROR.
11 01656 125102          MOVL    1,1,SZC   ;
12 01657 006127          EHALT             ; RECEIVED RESET.
13 01660 066474          DIC     1, .REC2  ; STATUS FROM REC2.
14 01661 030061          LDA     2, C61    ;
15 01662 147400          AND     2,1       ; AC3= XMT START BYTE.
16 01663 034062          LDA     3, C62    ; AC1= REC START BYTE.
17 01664 166414          SUB#    3,1,SZR   ;
18 01665 006127          EHALT             ; START BYTE ERROR.
19 01666 175100          MOVL    3,3       ;
20 01667 173400          AND     3,2       ;
21 01670 050062          STA     2, C62    ;
22 01671 010063          ISZ      C63      ;INCR CONSTANT.
23 01672 000401          JMP      .+1      ;
24 01673 065474          DIB     1, .REC2  ; READ BYTE
25 01674 125014          MOV#    1,1,SZR   ; COUNTER,REC.
26 01675 006127          EHALT             ; BYTE COUNT
27                                         ; ERROR IN REC2.
28 01676 065447          DIB     1, .XMT1  ; READ BYTE
29 01677 125014          MOV#    1,1,SZR   ; COUNTER,XMT.
30 01700 006127          EHALT             ; BYTE COUNT
31                                         ; ERROR IN XMT1.
32 01701 024047          LDA     1, C47    ;
33 01702 125220          MOVZR   1,1       ;
34 01703 034046          LDA     3, C46    ; AC1=WANTED
35 01704 167000          ADD     3,1       ; LAST ADDRESS.
36                                         ;
37 01705 074474          DIA     3, .REC2  ; AC3=CURRENT
38 01706 136414          SUB#    1,3,SZR   ; LAST ADDRESS.
39 01707 006127          EHALT             ; ADD.COUNT ERROR IN REC2.
40 01710 024041          LDA     1, C41    ;
41 01711 125220          MOVZR   1,1       ;
42 01712 034040          LDA     3, C40    ;
43 01713 167000          ADD     3,1       ; AC1=WANTED
44                                         ; LAST ADDRESS.
45 01714 074447          DIA     3, .XMT1  ; AC3=CURRENT
46 01715 136414          SUB#    1,3,SZR   ; LAST ADDRESS.
47 01716 006127          EHALT             ; ADD.COUNT ERROR IN XMT1.
48 01717 006126        LOOP                ;
49 01720 151004          MOV     2,2,SZR   ;
50 01721 002223          JMP      @ NEX23  ; REPEAT.
51 01722 024054        LDA     1, C54      ;
52 01723 067347          DOCP    1, .XMT1  ; TRANSMIT AUTO PULSE.
53 01724 006234          JSR      @ CALL1  ; CALL TIMER.
54 01725 062677          DICC    0, CPU    ; IO RESET.
55 01726 006234          JSR      @ CALL1  ; CALL TIMER.
56 01727 024054          LDA     1, C54    ; TRANSMIT AUTO PULSE.
57 01730 067375          DOCP    1, .XMT2  ;
58 01731 006234          JSR      @ CALL1  ; CALL TIMER.
59 01732 062677          DICC    0, CPU    ; IO RESET.
```

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  0038   .PAGE
01 01733 006234            JSR     @ CALL1     ; CALL TIMER.
02 01734 006125          SETUP                 ;
03 01735 024002            LDA     1, C2       ; IF BIT15=1 IN C2
04 01736 125202            MOVR    1,1,SZC     ; THEN STOP ELSE REPEAT.
05 01737 006127            EHALT               ;
06 01740 006126          LOOP                  ;
07 01741 006130            PCRLF
08 01742 006131              MESSAGE
09 01743 000171              PPASS
10
11 01744 010232            ISZ     PASSN
12 01745 000401            JMP     .+1
13 01746 024232            LDA     1,PASSN
14 01747 006133            TYPDEC
15 01750 002214            JMP     @ NEX16     ; RETURN TO TEST16.
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                        ;       AUTOLOAD SUBROUTINE.
                        ; THIS PROGRAM TRANSMIT THE TESTPRORAM TO
                        ; THE REMOTE CPU.
                        ;
                        ;
01751 020054 AUTO:      LDA     0, C54          ; TRANSMIT AUTO
01752 063347            DOCP    0, .XMT1        ; PULSE.
01753 054436            STA     3, AUT3         ; SAVE AC3.
01754 006234           JSR     @ CALL1         ; CALL TIMER.
01755 020043            LDA     0, C43          ; RECEIVE STATUS COMMAND
01756 063147            DOCS    0, .XMT1        ;
01757 004446          JSR     AUT6
01760 000401            JMP     .+1
01761 062447            DIC     0, .XMT1; XMT1 STATUS.
01762 024061            LDA     1, C61          ;
01763 107400            AND     0,1             ; MASK STATUS BYTE.
01764 125014            MOVR    1,1,SZR         ;
01765 000431            JMP     AUT1                    ; NOT ZERO STATUS AS
                                                ; RESPONSE TO AUTO PULSE.
01766 126400            SUB     1,1             ;
01767 065047            DOA     1, .XMT1        ; ADD.COUNT LOAD.
01770 024075            LDA     1, C70          ;
01771 124400            NEG     1,1             ; BYTE COUNT LOAD.
01772 066047            DOB     1, .XMT1        ;
01773 024044            LDA     1, C44          ; START XMT1 WITH
01774 067147            DOCS    1, .XMT1        ; XMT BLOCK COMMAND.
01775 004430           JSR     AUT6
01776 000401             JMP     .+1
01777 066447           DIC     1, .XMT1
02000 125102            MOVL    1,1,SZC
02001 000415            JMP     AUT1                ; DISCONNECT.
02002 125102            MOVL    1,1,SZC
02003 000413            JMP     AUT1                ; TIMEOUT.
02004 006234            JSR     @ CALL1       ; CALL TIMER.
02005 006234           JSR     @ CALL1
02006 006234             JSR     @ CALL1
02007 034402            LDA     3, AUT3       ; RESTORE AC3.
02010 001400            JMP     0,3             ; RETURN TO CALL+1.
02011 000000 AUT3:        0
02012 000012 AUT4:           12
02013 000000 AUT5:        0
02014 000000 AUT7:           0
02015 000000 AUT8:           0
02016 060247 AUT1:           NIOC       , .XMT1
02017 060246                 NIOC       , .REC1
02020 006234                 JSR    @ CALL1
02021 006234                 JSR    @ CALL1
02022 006234                 JSR    @ CALL1
02023 034766                 LDA    3, AUT3
02024 000725                 JMP      AUTO
02025 024765 AUT6:           LDA    1, AUT4
02026 044767                 STA    1, AUT8
02027 054764                 STA    3, AUT5
```

```
   0040   .MAIN
01 02050 006234          JSP   @ CALL1
02 02051 014764          DSZ     AUT8
03 02052 000402          JMP     .+2
04 02053 000765          JMP     AUT1
05 02054 063647          SKPDN   , .+1
06 02055 000773          JMP     .-5
07 02056 034755          LDA   3, AUT5
08 02057 001400          JMP   0,3
09
10
11
12
13
14
```

```
↑ 0041  .=41⊕
01
02
03
04                ;  TEST24: THIS TEST AUTOLOAD THE REMOTE CPU
05                ;           WITH THE TESTPROGRAM AND START THIS
06                ;           CPU IN TES26.
07
08
09 02040 006125 TES24:   SETUP              ;
10 02041 024061           LDA    1, C61     ; INIT STATUS BYTE
11 02042 044067           STA    1, C67     ; ACCUMULATOR.
12 02043 024076           LDA    1, C71     ; SET START ADDRESS TO
13 02044 044100           STA    1, C73     ; TO THE REMOTE CPU.
14 02045 006240           JSR    @CALL5     ; AUTOLOAD REMOTE.
15 02046 006125           SETUP              ;
16 02047 024051 TES25:    LDA    1, C51     ;
17 02050 030067           LDA    2, C67     ;
18 02051 147000           ADD    2,1        ; START REC1 WITH
19 02052 067146           DOCS   1, .REC1   ; XMT STATUS COMMAND.
20 02053 063646           SKPDN    , .REC1  ; WAIT REC1
21 02054 000777           JMP     .-1       ; TERMINATE.
22 02055 024043           LDA     1, C43    ; START XMT1 WITH
23 02056 067147           DOCS    1, .XMT1  ; REC STATUS COMMAND.
24 02057 063647           SKPDN     , .XMT1 ; WAIT XMT1
25 02060 000777           JMP      .-1    ; TERMINATE.
26 02061 066447           DIC      1, .XMT1 ; XMT1 STATUS.
27 02062 030061           LDA      2, C61   ;
28 02063 147400           AND      2,1      ; MASK STATUS BYTE
29 02064 034067           LDA      3, C67   ; FROM DEVICE STATUS.
30 02065 166414           SUB#     3,1,SZR  ;
31 02066 006127           EHALT             ; STATUS BYTE ERROR.
32                                          ; AC3=XMT START BYTE.
33                                          ; AC1=REC START BYTE.
34 02067 006126           LOOP             ;
35 02070 014067            DSZ      C67     ; DECR STATUS BYTE
36 02071 002225            JMP    @ NEX25   ; ACCUMULATOR.
37 02072 002227            JMP    @ NEX27   ;
38
39
40
41
```

```
↑ 0042  .MAIN
01
02
03
04                ;  TEST26: THIS IS A STATUS ECHKO PROGRAM
05                ;           TO THE REMOTE CPU TO COMMUNICATE
06                ;           WITH TEST24.
07                ;
08
09
10 02073 024043 TES26:    LDA   1, C43      ; START XMT1 WITH
11 02074 067147           DOCS  1, .XMT1    ; REC STATUS COMMAND.
12 02075 065647           SKPDN   , .XMT1   ; WAIT XMT1
13 02076 000777           JMP   .-1         ; TERMINATE.
14 02077 066447           DIC   1, .XMT1    ; XMT1 STATUS.
15 02100 030061           LDA   2, C61      ;
16 02101 147400           ADD   2,1         ;
17 02102 030051           LDA   2, C51      ;
18 02103 147400           ADD   2,1         ; START REC1 WITH
19 02104 067146           DOCS  1, .REC1    ; XMT STATUS COMMAND.
20 02105 065646           SKPDN   , .REC1   ; WAIT REC1
21 02106 000777           JMP     .-1       ; TERMINATE.
22 02107 002226           JMP   @ NEX26     ;
23
24
25
26
```

```
T 0043  .MAIN
01
02
03
04                ;  TEST27: THIS TEST AUTOLOAD THE REMOTE CPU WITH
05                ;           THE TESTPROGRAM AND START THIS CPU IN TEST29.
06                ;
07                ;
08 02110 006125 TES27:   SETUP            ;
09 02111 024061          LDA    1, C61    ; INIT START BYTE
10 02112 044062          STA    1, C62    ; ACCUMULATOR.
11 02113 066446          DIC    1, .REC1  ;
12 02114 030077          LDA    2, C72    ; SET REMOTE START
13 02115 050100          STA    2, C73    ; POINT.
14 02116 006240          JSR    @ CALL5   ; CALL AUTOLOAD.
15 02117 006125          SETUP             ;
16 02120 006236 TES28:   JSR    @ CALL3   ; CALL DATA GENERATOR.
17 02121 024040          LDA    1, C40    ; ADD.COUNT,XMT
18 02122 065047          DOA    1, .XMT1  ; LOAD.
19 02123 024041          LDA    1, C41    ;
20 02124 124400          NEG    1,1       ; BYTE COUNT,XMT
21 02125 066047          DOB    1, .XMT1  ; LOAD.
22 02126 024044          LDA    1, C44    ; START XMT1 WITH
23 02127 050062          LDA    2, C62    ; XMT BLOCK.
24 02130 147000          ADD    2,1       ;
25 02131 067147          DOCS   1, .XMT1  ;
26 02132 063647          SKPDN    , .XMT1 ; WAIT XMT1
27 02133 000777          JMP      .-1     ; TERMINATE.
28 02134 066447          DIC    1, .XMT1  ; STATUS XMT1.
29 02135 125102          MOVL   1,1,SZC   ;
30 02136 006127          EHALT             ; DISCONNECT.
31 02137 125102          MOVL   1,1,SZC   ;
32 02140 006127          EHALT             ; TIMEOUT.
33 02141 024046          LDA    1, C46    ; ADD.COUNT,REC
34 02142 065046          DOA    1, .REC1  ; LOAD.
35 02143 024047          LDA    1, C47    ;
36 02144 124400          NEG    1,1       ; BYTE COUNT,REC
37 02145 066046          DOB    1, .REC1  ; LOAD.
38 02146 024052          LDA    1, C52    ; START REC1 WITH
39 02147 067146          DOCS   1, .REC1  ; REC BLOCK.
40 02150 063646          SKPDN    , .REC1 ; WAIT REC1
41 02151 000777          JMP      .-1     ; TERMINATE.
42 02152 006257          JSR    @ CALL4   ; CALL DATA CHECK.
43 02153 066446          DIC    1, .REC1  ; REC1 STATUS.
44 02154 125102          MOVL   1,1,SZC   ;
45 02155 006127          EHALT             ; OVERFLOW ERROR.
46 02156 125100          MOVL   1,1       ;
47 02157 125102          MOVL   1,1,SZC   ;
48 02160 006127          EHALT             ; PARITY ERROR.
49 02161 125102          MOVL   1,1,SZC   ;
50 02162 000401          JMP .+1             ; RECEIVED RESET.
51 02163 066446          DIC    1, .REC1  ; REC1 STATUS.
52 02164 030061          LDA    2, C61    ;
53 02165 147400          AND    2,1       ;
54 02166 030062          LDA    2, C62    ;
55 02167 146414          SUB#   2,1,SZR   ; START BYTE ERROR:
56 02170 006127          EHALT             ; AC1=REC START BYTE
57                                         ; AC2=XMT START BYTE.
58 02171 010063          ISZ    C63       ;
59 02172 000401          JMP    .+1       ;
```

```
  0044   .MAIN
01 02173 075446            DIR     3, .REC1 ;
02 02174 175014            MOV#    3,3,SZR  ; BYTE COUNT ERROR,REC1.
03 02175 006127            EHALT            ;
04 02176 075447            DIR     3, .XMT1 ;
05 02177 175014            MOV#    3,3,SZR  ; BYTE COUNT ERROR,XMT.
06 02200 006127            EHALT            ;
07 02201 034047            LDA     3, C47   ;
08 02202 175220            MOVZR   3,3      ;
09 02203 030046            LDA     2, C46   ;
10 02204 157000            ADD     2,3      ; AC3=WANTED LAST ADDRESS.
11 02205 070446            DIA     2, .REC1 ; AC2=CURRENT LAST ADDRESS.
12 02206 172414            SUB#    3,2,SZR  ;
13 02207 006127            EHALT            ; ADD.COUNT ERROR IN REC1.
14 02210 034041                LDA     3, C41   ;
15 02211 175220            MOVZR   3,3      ;
16 02212 030040            LDA     2, C40   ;
17 02213 157000            ADD     2,3      ; AC3=WANTED LAST ADDRESS.
18 02214 070447            DIA     2, .XMT1 ; AC2=CURRENT LAST ADDRESS.
19 02215 172414            SUB#     3,2,SZR ;
20 02216 006127            EHALT            ; ADD.COUNT ERROR IN XMT1.
21 02217 014062            DSZ      C62     ;
22 02220 002230            JMP    @ NEX28   ;
23 02221 006125          SETUP              ;
24 02222 024062            LDA     1, C2    ; IF BIT 15=1 IN C2
25 02223 125202            MOVR    1,1,SZC  ; THEN STOP ELSE
26 02224 006127            EHALT            ; REPEAT.
27 02225 006130            PCRLF
28 02226 006131            MESSAGE
29 02227 000171            PPASS
30
31 02230 010232            ISZ    PASSN
32 02231 024232            LDA    1,PASSN
33 02232 024232            LDA    1,PASSN
34 02233 006135            TYPDEC
35 02234 002224            JMP    @ NEX24   ;
36
37
38
39
40
```

```
↑ 0045  .MAIN
01
02                ;  TEST29: THIS IS A DATA ECHO PROGRAM TO
03                ;           THE REMOTE CPU TO COMMUNICATE
04                ;           WITH TEST27.
05
06 02235 024040 TES29:    LDA    1, C40      ; ADD.COUNT,REC1
07 02236 065046           DOA    1, .REC1    ; LOAD.
08 02237 024041           LDA    1, C41      ; BYTE COUNT,REC1
09 02240 124400           NEG    1,1         ; LOAD.
10 02241 066046           DOB    1, .REC1    ;
11 02242 024052           LDA    1, C52      ; START REC1 WITH
12 02243 067146           DOCS   1, .REC1    ; REC BLOCK COMMAND.
13 02244 063646           SKPDN  , .REC1     ; WAIT REC1
14 02245 000777           JMP      .-1       ; TERMINATE.
15 02246 060446           DIC    1, .REC1    ; REC1 STATUS.
16 02247 030061           LDA    2, C61      ;
17 02250 133400           AND    1,2         ;
18 02251 024040           LDA    1, C40      ; ADD.COUNT,XMT1
19 02252 065047           DOA    1, .XMT1    ; LOAD.
20 02253 024041           LDA    1, C41      ;
21 02254 124400           NEG    1,1         ; BYTE COUNT,XMT1
22 02255 066047           DOB    1, .XMT1    ; LOAD.
23 02256 024044           LDA    1, C44      ; START XMT1 WITH
24 02257 147000           ADD    2,1         ; XMT BLOCK COMMAND.
25 02260 067147           DOCS   1, .XMT1    ;
26 02261 063647           SKPDN  , .XMT1     ; WAIT XMT1
27 02262 000777           JMP      .-1       ; TERMINATE.
28 02263 060447           DIC    1, .XMT1    ; XMT1 STATUS.
29 02264 125102           MOVL   1,1,SZC     ;
30 02265 063077           HALT               ; DISCONNECT.
31 02266 125102           MOVL   1,1,SZC     ;
32 02267 063077           HALT               ; TIMEOUT.
33 02270 002231           JMP    @ NEX29     ;
34
35
36
37
```

```
↑ 0046   .MAIN
01 02271 054420 ENTEP:  STA     3,LOOPR ;LOOP ITERATE RETURN
02 02272 054407         LDA     3,ITR   ;THIS ROUTINE INITIALIZES
03 02273 054407         STA     3,ITRCT ;EACH TEST
04 02274 176400         SUB     3,3
05 02275 054406         STA     3,ESWIT
06 02276 054406         STA     3,ERRCT
07 02277 000401         JMP     .+1             ;,I/O RESET
08 02300 002411         JMP     @LOOPR
09
10 02301 000144 ITR:    144
11 02302 000000 ITRCT:  0
12 02303 000000 ESWIT:  0
13 02304 000000 ERRCT:  0
14 02305 000000 BACK:   0
15 02306 000000 SAV2:   0
16 02307 000000 SAV1:   0
17 02310 000000 SAV0:   0
18 02311 000000 LOOPR:  0
19
20 02312 054773 CYCLE:  STA     3,BACK ;END OF TEST ITERATION
21 02313 050773         STA     2,SAV2  ;ROUTINE
22 02314 044773         STA     1,SAV1  ;SAVE THE ACS
23 02315 040773         STA     0,SAV0
24 02316 014764         DSZ     ITRCT
25 02317 000436         JMP     CYCTS   ;NOT 100 TIMES ITERATED
26
27 02320 034761         LDA     3,ITR   ;RESET ITERATION CNTR
28 02321 054761         STA     3,ITRCT
29 02322 074477         READS   3
30 02323 030760         LDA     2,ESWIT ;IF SWITCH 2=(1)
31 02324 175120         MOVZL   3,3     ;AND A ERROR HAS OCCURED
32 02325 175100         MOVL    3,3     ;THE ERROR RATE WILL
33 02326 151005         MOV     2,2,SNR ;BE PRINTED
34 02327 000414         JMP     NOEX
35 02330 175103         MOVL    3,3,SNC
36 02331 000421         JMP     PCENT-1
37
38 02332 006117         JSR     @ICRLF  ;PRINT CARRIAGE
39 02333 024751         LDA     1,ERRCT
40
41 02334 020745         LDA     0, ITR
42 02335 106432         SUBZ#   0,1,SZC
43 02336 004411         JSR     CORR
44 02337 006120         JSR     @IPDEC  ;PRINT VALUE
45 02340 020413         LDA     0,PCENT ;EXAMPLE:89 %
46 02341 006465         JSR     @ICHAR
47 02342 000410         JMP     PCENT-1
48
49 02343 020745 NOEX:   LDA     0,SAV0  ;NORMAL EXIT,NO ERR
50 02344 024743         LDA     1,SAV1
51 02345 030741         LDA     2,SAV2
52 02346 002737         JMP     @BACK
53
54 02347 024732 CORR:   LDA     1, ITR
55 02350 044734         STA     1, ERRCT
56 02351 001400         JMP     0,3
57
58
59
```

```
↑ 0348  .TAIT
01 02352 102401          SUB     0,0,SKP
02 02353 000245 PCRNT:   245                 ;CHARACTOR
03 02354 040750          STA     0,ERRCT ;RESET ERROR COUNT
04 02355 020753 CYCTS:   LDA     0,SAV0  ;RESTORE ACS
05 02356 024731          LDA     1,SAV1
06 02357 030727          LDA     2,SAV2
07 02360 034726          LDA     3,ESWIT
08 02361 175004          MOV     3,3,SZR
09 02362 074477          READS   3
10 02363 175113          MOVL#   3,3,SNC ;SWITCH 0
11 02364 002725          JMP     @LOOPR  ;(1)=LOOP ROUTINE
12 02365 002720          JMP     @BACK   ;(0)=PROCEED TO NEXT TEST
13
14 02366 054717 ERR:     STA     3,BACK ;ERROR SUBROUTINE
15 02367 050717          STA     2,SAV2
16 02370 044717          STA     1,SAV1
17 02371 040717          STA     0,SAV0
18
19 02372 034711          LDA     3,ESWIT
20 02373 175005          MOV     3,3,SNR
21 02374 000407          JMP     ERR1
22 02375 030711 ERET:    LDA     2,SAV2  ;RESTORE ACS
23 02376 024711          LDA     1,SAV1
24 02377 020711          LDA     0,SAV0
25 02400 014004          ISZ     ERRCT   ;COUNT
26 02401 000401          JMP     .+1     ;ERRORS,I/O RESET
27 02402 002703          JMP     @BACK   ;EXIT
28
29 02403 054702 ERR1:    LDA     3,BACK ;ERROR, C(3)=PC
30 02404 063077          HALT            ;OPERATOR,SET SWITCHS!
31 02405 054676          STA     3,ESWIT
32 02406 074477          READS   3
33 02407 175100          MOVL    3,3
34 02410 175113          MOVL#   3,3,SNC ;LOOK AT SWITCH 1
35 02411 004402          JSR     @PRINT  ;PRINT ERROR DATA
36 02412 000763          JMP     ERET
37
38
39
40
```

```
T 0049  .MAIN
01 02413 054670 EPRINT: STA     -3,ESWIT ;ERROR MESSAGE PRINTER
02 02414 006117         JSR     @ICRLF   ;PRINT CARRIAGE
03 02415 006121         JSR     @PMESS   ;AND HEADER
04 02416 002426         HEADER
05 02417 020666         LDA     0,RACK
06 02420 126000         ADC     1,1
07 02421 107000         ADD     0,1
08 02422 005122         JSR     @TPOCT   ;PC OF ERROR
09 02423 002660         JMP     @ESWIT   ;RETURN TO CALL
10
11 02424 002524 ICHAR:  CHAR
12 02425 002577 TTYPE:  TYPE
13
14              HEADER: .TXT !
15 02426 041520 PC      !
   02427 000011
16
17
18
19
```

```
↑ 0050  .MAIN
01                ;TELETYPE AND DISPLAY NON INTERRUPT PACKAGE
02                ;"MESS" PRINTS ASCII MESSAGES AS SPECIFIED BY ASSEMBLER
03                ;"CHAR" PRINTS ASCII CHARACTOR, C(0)R,C(0)L MUST BE 0
04                ;WILL RETURN +2 IF C(0)R=0,CORRECTS THE PARITY,33 SIMULATE
05                ;"TYPE" PRINTS C(0)R. MUST HAVE PROPER PARITY. RETURN IS
06                ;TO CALL+1.REPLACE THIS ROUTINE WITH INTERRUPT TYPE IF DESIRED.
07                ;"CRLF" PRINTS A CARRIAGE RETURN
08                ;"POCT" PRINTS C(1) IN OCTAL FOLLOWED BY A TAB
09                ;"PDEC" PRINTS C(1) IN DECIMAL, LEADING ZEROS SUPPRESSED
10                ;FOLLOWED BY A TAB.
11
12 02430 054546 MESS:   STA     3,MESSR ;PRINT A TEXT MESSAGE
13 02431 014545         ISZ     MESSR
14 02432 031400         LDA     2,0,3   ;C(2) POINTS TO MESSAGE
15 02433 024542         LDA     1,C377  ;A 8 BIT MASK
16 02434 021000         LDA     0,0,2   ;C(2)=DATA WORD
17 02435 125112         MOVL#   1,1,SZC
18 02436 123701         ANDS    1,0,SKP
19 02437 125401         AND     1,0,SKP ;C(0)=DATA CHARACTER RIGHT
20 02440 151400         INC     2,2     ;INC TO NEXT WORD
21 02441 124000         COM     1,1     ;FLIP MASK
22 02442 004462         JSR     CHAR    ;PRINT
23 02443 000771         JMP     MESS+4  ;ANOTHER
24 02444 002552         JMP     @MESSR  ;LAST
25
26 02445 020525 ZOCT:   LDA     0,CH240
27 02446 101001         MOV     0,0,SKP
28
29 02447 020525 POCT:   LDA     0,CX60
30 02450 030433         LDA     2,OCTAB ;PRINT C(1) IN OCTAL
31 02451 000403         JMP     .+3
32 02452 030441 PDEC:   LDA     2,DECTB ;PRINT C(1) IN DECIMAL
33 02453 020517         LDA     0,CH240 ;SUPPRESS LEADING ZEROS
34 02454 054447         STA     3,PADRET;BOTH ENTRYS PRINT NUMBER
35 02455 040445         STA     0,ZSUPP ;THEN TAB TO NEXT POSITION
36 02456 050401         STA     2,.+1
37 02457 000000 DECOCT: 0       ;A"LDA 2,TABLE" INSTRUCTION
38 02460 010777         ISZ     .-1
39 02461 054442         LDA     3,RADRET;SETUP "TAB" AT END
40 02462 020503         LDA     0,CHTAB
41 02463 151005         MOV     2,2,SNR ;IF TABLE ENTRY=0
42 02464 000440         JMP     CHAR    ;EXTIT WITH TAB
43 02465 034435         LDA     3,ZSUPP ;ZEROS SUPPRESS STUF
44 02466 102400         SUB     0,0
45 02467 146512 DECOT:  SUBL#   2,1,SZC
46 02470 000405         JMP     DECP
47 02471 146400         SUB     2,1     ;FORM THE DIGIT
48 02472 034502         LDA     3,CX60
49 02473 101400         INC     0,0
50 02474 000773         JMP     DECOT
51 02475 151235 DECP:   MOVZR#  2,2,SNR
52 02476 034476         LDA     3,CX60
53 02477 054423         STA     3,ZSUPP ;C(0)=DIGIT
54 02500 163000         ADD     3,0     ;MAKE ASCII
55 02501 004423         JSR     CHAR    ;PRINT
56 02502 000755         JMP     DECOCT  ;GET NEXT DIGIT
57
58
59
```

```
0051  .MAIN
01
```

```
↑ 0252   .=ALG
01 02503 030425 OCTAB:  LDA     2,.+1+.-DECOCT
02 02504 100000         100000
03 02505 010000         10000
04 02506 001000         1000
05 02507 000144         100
06 02510 000012         10
07 02511 000001         1
08 02512 000000         0
09
10 02513 030435 DECTB:  LDA     2,.+1+.-DECOCT
11       000012 .RDX 10
12 02514 023420         10000
13 02515 001750         1000
14 02516 000144         100
15 02517 000012         10
16 02520 000001         1
17 02521 000000         0
18       000010 .RDX 8
19
20 02522 000000 ZSUPP:  0
21 02523 000000 RADRET: 0
22
23 02524 054442 CHAR:   STA     3,CHRET ;PRINT C(3) RIGHT
24 02525 101325         MOVZS   0,0,SNR ;RETURN +2 IF NULL
25 02526 001401         JMP     1,3
26 02527 054440         STA     0,CHSAV
27 02530 176000         ADC     3,3     ;COMPUTE THE PARITY
28 02531 117000         ADD     0,3
29 02532 163404         AND     3,0,SZR
30 02533 000775         JMP     .-3
31 02534 176660         SUBCR   3,3     ;COMBIND PARITY WITH CHAR
32 02535 020432         LDA     0,CHSAV
33 02536 163300         ADDS    3,0
34
35 02537 034426 CHAR1:  LDA     3,CHTAB ;IS THIS A TAB
36 02540 116405         SUB     0,3,SNR
37 02541 000403         JMP     .+3     ;YES
38 02542 004435         JSR     TYPE    ;NO PRINT IT
39 02543 002423         JMP     @CHRET  ;EXIT
40
41 02544 020424         LDA     0,CHORZ ;SIMULATE A TAB
42 02545 034424         LDA     3,CHAR7 ;VIA 1 TO 8 SPACES
43 02546 117405         AND     0,3,SNR
44 02547 002417         JMP     @CHRET
45 02550 020422         LDA     0,CH240
46 02551 004426         JSR     TYPE
47 02552 000772         JMP     .-6
48
49
50
51
```

```
T 0053  .MAIN
01 02553 054420 CRLF:   STA     3,CRLFR ;SAVE RETURN
02 02554 020410         LDA     0,C215
03 02555 004747         JSR     CHAR    ;PRINT CARRIAGE AND LF
04 02556 020405         LDA     0,C212
05 02557 004745         JSR     CHAR
06 02560 102400         SUB     0,0
07 02561 040407         STA     0,CHORZ ;CLEAR HORZ POSITION
08 02562 002411         JMP     @CRLFR  ;EXIT
09
10 02563 000212 C212:   212
11 02564 000215 C215:   215
12 02565 000011 CHTAB:  11
13 02566 000000 CHRET:  0
14 02567 000000 CHSAV:  0
15 02570 000000 CHORZ:  0
16 02571 000007 CHAR7:  7
17 02572 000240 CH240:  240
18 02573 000000 CRLFR:  0
19 02574 000060 CX60:   60
20
21 02575 000377 C377:   377
22 02576 000000 MESSR:  0
23 02577 054421 TYPE:   STA     3,TYPRET;TYPE THE C(0)R IF
24 02600 010770         ISZ     CHORZ
25 02601 074477         READS   3       ;SWITCH 1(0).
26 02602 175100         MOVL    3,3
27 02603 175102         MOVL    3,3,SZC
28 02604 002414         JMP     @TYPRET ;INHIBIT TYPE EXIT.
29 02605 063511         SKPBZ   TTO
30 02606 000777         JMP     .-1
31 02607 061111         DOAS    0,TTO
32 02610 063511         SKPBZ   TTO
33 02611 000777         JMP     .-1
34 02612 063535         SKPBZ   .DISP
35 02613 000777         JMP     .-1
36 02614 061135         DOAS    0,.DISP
37 02615 063535         SKPBZ   .DISP
38 02616 000777         JMP     .-1
39 02617 002401         JMP     @TYPRET
40 02620 000000 TYPRET: 0
41
42
43
44
```

```
↑ 0054   .PAT:
01          000120 DAT:     .BLK     120
02
03  02741 006130 AS:       PCRLF
04  02742 006151            MESSAGE
05  02743 002746            EXTM
06  02744 000077            HALT
07  02745 002116            JMP      @TEST
08
09
10                  EXTM:   .TXTE @ SET EXTENDED MEMORY SWITCH AND CONTINUE @
    02746 051640
    02747 152505
    02750 142640
    02751 152330
    02752 047305
    02753 142504
    02754 120104
    02755 142515
    02756 147515
    02757 054722
    02760 051640
    02761 144727
    02762 141724
    02763 120110
    02764 047101
    02765 120104
    02766 147703
    02767 152116
    02770 047511
    02771 142525
    02772 000240
11
12
13
14
15
16
```

```
↑ 0055  .MAIN
01
02                ;    SET DEVICE CODE PROGRAM ******
03
04 02773 006130 SDC:       PCRLF              ;
05 02774 006131            MESSAGE            ;
06 02775 000136            DEVCO              ;
07 02776 063077            HALT               ;
08 02777 074477            READS    3         ;
09 03000 030106            LDA      2, MADC1  ;
10 03001 157400            AND      2,3       ;
11 03002 054101            STA      3, NUMR1  ; STORE WANTED DEVICE
12 03003 175400            INC      3,3       ; NUMBERS FOR
13 03004 054103            STA      3, NUMT1  ; REC1,XMT1.
14 03005 006130            PCRLF              ;
15 03006 006131            MESSAGE            ;
16 03007 000153            DEVC1              ;
17 03010 063077            HALT               ;
18 03011 074477            READS     3        ;
19 03012 030106            LDA      2, MADC1  ;
20 03013 157400            AND      2,3       ;
21 03014 054102            STA      3, NUMR2  ; STORE WANTED DEVICE
22 03015 175400            INC      3,3       ; NUMBERS FOR
23 03016 054104            STA      3, NUMT2  ; REC2,XMT2.
24 03017 054114            LDA      3, FIRST  ;
25 03020 021400 CDCL:      LDA      0,0,3     ; LOAD WORD.
26 03021 024105            LDA      1, MADC   ;
27 03022 107400            AND      0,1       ; AC1=BIT0,1,2.
28 03023 030125            LDA      2, IOM    ;
29 03024 132415            SUB#     1,2,SNR   ; IO INSTRICTION?
30 03025 000406            JMP      INVES     ; YES.
31 03026 175400 CDCI:      INC      3,3       ;
32 03027 030115            LDA      2, LAST   ;
33 03030 156414            SUB#     2,3,SZR   ;
34 03031 000767            JMP      CDCL      ;
35 03032 000437            JMP    OPCOD       ;
36 03033 024106 INVES:     LDA      1, MADC1  ;
37 03034 107400            AND      0,1       ;
38 03035 030110            LDA      2, FIXR1  ;
39 03036 132415            SUB#     1,2,SNR   ;
40 03037 000413            JMP      SETR1     ;
41 03040 030111            LDA      2, FIXR2  ;
42 03041 132415            SUB#     1,2,SNR   ;
43 03042 000412            JMP     SETR2      ;
44 03043 030112            LDA      2, FIXT1  ;
45 03044 132415            SUB#     1,2,SNR   ;
46 03045 000411            JMP      SETT1     ;
47 03046 030113            LDA      2, FIXT2  ;
48 03047 132415            SUB#     1,2,SNR   ;
49 03050 000410            JMP      SETT2     ;
50 03051 000755            JMP      CDCI      ;
51 03052 024101 SETR1:     LDA      1, NUMR1  ;
52 03053 000406            JMP      CNUM      ;
53 03054 024102 SETR2:     LDA      1, NUMR2  ;
54 03055 000404            JMP      CNUM      ;
55 03056 024103 SETT1:     LDA     1, NUMT1   ;
56 03057 000402            JMP      CNUM      ;
57 03060 024104 SETT2:     LDA      1, NUMT2  ;
58 03061 146415 CNUM:      SUB#     2,1,SNR   ; CHANGE IS NOT
59 03062 000744            JMP      CDCI      ; NECESSARY.
```

```
  0056  .MAIN
01 03063 050107            LDA     2, MADC2  ; MASK OUT DEVICE CODE
02 03064 143400            AND     2,0       ; PUT NEW DEV.CODE
03 03065 123000  --        ADD     1,0       ; IN WORD AND
04 03066 041400            STA     0,0,3     ; STORE THIS WORD BACK
05 03067 000737            JMP     CDCI      ; IN MEMORY.
06 03070 000116 BEGX:      TEST              ;
07 03071 024101 OPCOD:   LDA   1, NUMR1    ;
08 03072 044110            STA   1, FIXR1    ;
09 03073 024102            LDA   1, NUMR2    ;
10 03074 044111            STA   1, FIXR2    ;
11 03075 024103            LDA   1, NUMT1    ;
12 03076 044112            STA   1, FIXT1    ;
13 03077 024104            LDA   1, NUMT2    ;
14 03100 044113            STA   1, FIXT2    ;
15 03101 002116            JMP   @ TEST      ;
16                 .END
  0057  .MAIN

A1          001000      11/39   22/28   22/58
A2          001214      26/48   27/03
A3          002741       9/40   54/03
A4          001166      26/18   26/25
ACD1        001236      26/36   27/06   27/09
ACD2        001235      26/35   27/05   27/08
ACD3        001237      26/39   26/26   26/34   27/04   27/10
AJT1        002016      39/21   39/34   39/36   39/48   40/04
AJT3        002011      39/11   39/40   39/42   39/53
AJT4        002012      39/43   39/56
AJT5        002013      39/44   39/59   40/07
AJT6        002025      39/15   39/30   39/56
AJT7        002014      39/45
AJT8        002015      39/46   39/57   40/02
AJTO        001751      11/46   39/09   39/54
BACK        002305      46/14   46/20   46/52   48/12   48/14   48/27   48/29   49/05
BEGX        003070      56/06
C100        000775      22/23   22/33
C2          000002       7/08   28/18   38/03   44/24
C20         000020       7/26   26/12   26/18   26/19   26/22   26/39   26/50   26/53
C21         000021       7/27   26/43   26/48   26/52
C212        002563      53/04   53/10
C215        002564      53/02   53/11
C3          000003       7/12
C30         000030       7/29   26/15   26/24   26/46   27/02
C377        002575      50/15   53/21
C40         000040       7/31   22/38   23/15   25/17   26/10   26/37   27/24   27/38
                        31/28   33/42   35/21   37/42   43/17   44/16   45/06   45/18
C41         000041       7/32   23/17   25/15   26/13   26/44   31/30   33/40   35/23
                        37/40   43/19   44/14   45/08   45/20
C42         000042       7/33   35/26
C43         000043       7/34   29/20   30/26   31/15   35/32   39/13   41/22   42/10
C44         000044       7/35   18/11   20/12   20/35   22/45   23/28   27/51   31/34
                        39/28   43/22   45/23
C45         000045       7/36   13/29
C46         000046       7/37   23/20   25/09   26/41   27/31   27/43   28/05   30/19
                        31/17   33/34   35/14   37/34   43/33   44/09
C47         000047       7/38   23/22   25/07   31/19   33/32   35/16   37/32   43/35
                        44/07
C5          000005       7/14
C50         000050       7/39   31/23
C51         000051       7/40   29/16   30/15   41/16   42/17
C52         000052       7/41   22/40   23/25   27/48   30/24   35/19   43/38   45/11
C53         000053       7/42   15/16   18/09   18/34   20/10   20/33   21/11   21/32
C54         000054       7/43   25/26   37/51   37/56   39/09
C55         000055       7/44   18/36   21/13   21/34
C56         000056       7/45
C57         000057       7/46
C60         000060       7/47   19/32
C61         000061       7/48   22/43   22/53   23/46   23/53   29/27   30/33   31/42
```

		33/14	35/41	37/14	39/18	41/10	41/27	42/15	43/09
		43/52	45/16						
C62	000062	7/49	23/07	23/29	23/48	23/55	31/11	31/33	33/16
		33/21	35/10	35/27	37/16	37/21	43/10	43/23	43/54
		44/21							
C63	000063	7/50	23/56	26/16	33/22	37/22	43/58		
C64	000064	7/51							
C65	000065	7/52	27/40						
C66	000066	7/53	27/25	27/32	27/45	28/02	30/21		

0061 .MAIN

TES2	000457	11/09	15/08						
TES20	001437	11/27	31/09						
TES21	001444	11/28	31/14						
TES22	001571	11/29	35/08						
TES23	001576	11/30	35/13						
TES24	002040	11/32	41/09						
TES25	002047	11/33	41/16						
TES26	002073	11/34	42/10						
TES27	002110	11/35	43/08						
TES28	002120	11/36	43/16						
TES29	002235	11/37	45/06						
TES3	000477	11/10	16/07						
TES4	000512	11/11	16/22						
TES5	000524	11/12	17/08						
TES6	000545	11/13	17/33						
TES7	000565	11/14	18/06						
TES8	000612	11/15	18/32						
TES9	000675	11/16	20/06						
TEST	000116	7/17	7/23	9/15	54/07	56/06	56/15		
TIER	000641	11/41	19/08						
TRBY	000773	22/21	22/37						
TYPAC	006134	9/38							
TYPDE	006133	9/36	28/29	38/14	44/34				
TYPE	002577	49/12	52/36	52/46	53/23				
TYPRE	002620	53/23	53/28	53/39	53/40				
TYPZ1	006132	9/34							
WAIT1	000241	11/47	19/28						
WITR	000661	11/47	19/28						
XMTA	000777	22/26	22/29						
ZOCT	002445	9/33	50/26						
ZSUPP	002522	50/35	50/43	50/53	52/20				
.DISP	000035	11/56	53/34	53/36	53/37				
.REC1	000046	7/46	9/09	11/52	11/58	12/01	15/09	15/10	15/12
		15/17	15/18	15/20	17/10	17/16	17/17	17/35	17/41
		17/42	18/10	18/33	18/35	18/39	18/41	18/49	20/11
		20/34	21/08	21/12	21/29	21/33	22/28	22/32	22/36
		22/41	22/50	22/52	23/08	23/21	23/24	23/26	23/34
		23/37	23/45	23/58	25/12	27/44	27/47	27/49	27/56
		27/58	28/13	29/19	29/22	30/20	30/23	30/25	30/44
		31/12	31/18	31/21	31/25	31/39	33/05	33/15	33/24
		33/37	39/49	41/19	41/20	42/19	42/20	43/11	43/34
		43/37	43/39	43/40	43/43	43/51	44/01	44/11	45/07
		45/10	45/12	45/13	45/15				
.REC2	000074	9/10	11/55	30/18	30/28	35/11	35/15	35/18	35/20
		35/30	35/35	35/36	37/05	37/13	37/24	37/37	
.TIM	000014	7/47	11/53	19/09	19/10	19/12	19/13	19/21	19/22
		19/24							
.TTI	000010	19/37	19/42	19/43					
.XMT1	000047	7/45	9/11	11/51	13/22	13/23	13/25	13/30	13/31
		13/33	16/09	16/10	16/24	16/25	18/07	18/12	18/14
		18/16	18/22	18/37	20/07	20/13	20/30	20/36	21/14
		21/35	22/30	22/35	22/47	22/48	23/16	23/19	23/31
		23/32	25/03	25/20	25/27	27/39	27/42	27/52	27/54
		30/27	30/30	30/32	35/22	35/25	35/29	35/38	35/40
		35/46	37/28	37/45	37/52	39/10	39/14	39/17	39/24
		39/27	39/29	39/32	39/48	40/05	41/23	41/24	41/26
		42/11	42/12	42/14	43/18	43/21	43/25	43/26	43/28
		44/04	44/18	45/19	45/22	45/25	45/26	45/28	
.XMT2	000075	9/12	11/54	29/21	29/24	29/26	31/16	31/26	31/29

0062 .441"

51/32 51/36 51/57 31/41 51/47 33/28 33/45 37/57