```
0002        C3B0        REV     EQU     'C0'
0003  0200                        NAM     DIOGP     PRIMARY ENTRY
0004  0201                        NAM     DIOGP1    DEMAND ENTRY
0005  0800                        NAM     DIOSP
0006  0801                        NAM     DIOSP1
0007  0880                        NAM     PAR32
0008  0881                        NAM     PAR32A
0009                              EXTR    DEBUG3
0010                    ******
0011                    *
0012                    *  .      DISTRIBUTED I/O TEST FOR LSI 3/05 (93920-11A1)
0013                    *
0014                    ******
0015  0080                        ABS     :80
0016  0080 9F80 0081              JMP     *$+1
0017  0081 0000                  DATA    DEBUG3
0018  0084                        ABS     :84       UNIMPLEMENTED MEM. INT
0019  0084 0000                  DATA    0
0020  0085 0000                  DATA    0
0021  0086 0E0D                  HLT
0022  008C                        ABS     :8C       POWER FAIL
0023  008C 0000                  DATA    0
0024  008D 0000                  DATA    0
0025  008E 0E0D                  HLT
0026                    ******
0027                    *       THE FOLLOWING DATA STATEMENT IDENTIFIES
0028                    *       DISTRIBUTED I/O SYSTEM TEST REVISION
0029                    *       LEVEL.
0030                    ******
0031  008F C3B0                 DATA    REV
0032                    *
0033                    *       MACRO TO ROUND ADDRESSES TO NEAREST
0034                    *       ADDRESS MODULO TO 128
0035                    *
0036                            MACRO   ROUND
0037                            ORG     $+:80&:7F80
```

```
0038                                ENDM
0040                        ******
0041                        *
0042                        *
0043                        *       INTERRUPT LOCATION BLOCK EQUATES
0044                        *
0045        0000            AIOCMD  EQU     0
0046        0001            AIOCNT  EQU     1
0047        0002            AIOADR  EQU     2
0048        0003            AIOCHN  EQU     3
0049        0004            EOBJST  EQU     4
0050        0005            EOBADR  EQU     5
0051                        *
0052                        *       SET UP DIO PORT VECTOR LOCATIONS
0053                        *
0054                        * LOC0=AUTO I/O COMMAND (AIOCMD)
0055                        * LOC1=BYTE COUNT (2'S COMPLEMENT) (AIOCNT)
0056                        * LOC2=BUFFER ADDRESS (AIOADR)
0057                        * LOC3=DATA CHAINING WORD(AIOCHN)
0058                        *       LSB=0 DATA CHAINING, =1 NO DATA CHAINING
0059                        *       HIGH SPEED DISTRIBUTOR ONLY.
0060                        *
0061                        * LOC4=JST TO EOB ROUTINE (EOBJST)
0062                        * LOC5=POINTER TO EOB ROUTINE (EOBADR)
0063                        *
0064                        * LOC6=NOT USED
0065                        * LOC7=NOT USED
0066                        *
0067                        *       INTERRUPT VECTOR OVERLAYS
0068                        *
0069  0090                          REL     $
0070  0090 9F80 0091  JMP     JMP     *$+1
0071  0091                          ABS     $
0072  00C0                          ABS     :C0
0073        00C0        DIOVEC  EQU     $
0074  00C0 0000                     DATA    0,0,0,0
```

```
      00C1 0000
      00C2 0000
      00C3 0000
0075                    *
0076                    *       DIO CHA  #0
0077                    *
0078  00C4 BF80 00C5            JST     *$+1
0079  00C5 0104                DATA    ILLHLT
0080  00C6 0000                DATA    0,0,0,0,0,0
      00C7 0000
      00C8 0000
      00C9 0000
      00CA 0000
      00CB 0000
0081                    *
0082                    *       DIO CHAN #1
0083                    *
0084  00CC BF80 00CD            JST     *$+1
0085  00CD 0104                DATA    ILLHLT
0086  00CE 0000                DATA    0,0,0,0,0,0
      00CF 0000
      00D0 0000
      00D1 0000
      00D2 0000
      00D3 0000
0087                    *
0088                    *       DIO CHAN #2
0089                    *
0090  00D4 BF80 00D5            JST     *$+1
0091  00D5 0104                DATA    ILLHLT
0092  00D6 0000                DATA    0,0,0,0,0,0
      00D7 0000
      00D8 0000
      00D9 0000
      00DA 0000
      00DB 0000
```

```
0093                        *
0094                        *       DIO CHAN #3
0095                        *
0096  00DC BF80 00DD          JST     *$+1
0097  00DD 0104               DATA    ILLHLT
0098  00DE 0000               DATA    0,0,0,0,0,0
      00DF 0000
      00E0 0000
      00E1 0000
      00E2 0000
      00E3 0000
0099                        *
0100                        *       DIO  CHAN #4
0101                        *
0102  00E4 BF80 00E5          JST     *$+1
0103  00E5 0104               DATA    ILLHLT
0104  00E6 0000               DATA    0,0,0,0,0,0
      00E7 0000
      00E8 0000
      00E9 0000
      00EA 0000
      00EB 0000
0105                        *
0106                        *       DIO CHAN #5
0107                        *
0108  00EC BF80 00ED          JST     *$+1
0109  00ED 0104               DATA    ILLHLT
0110  00EE 0000               DATA    0,0,0,0,0,0
      00EF 0000
      00F0 0000
      00F1 0000
      00F2 0000
      00F3 0000
0111                        *
0112                        *       DIO CHAN #6
0113                        *
```

```
0114  00F4 BF80 00F5          JST     *$+1
0115  00F5 0104               DATA    ILLHLT
0116  00F6 0000               DATA    0,0,0,0,0,0
      00F7 0000
      00F8 0000
      00F9 0000
      00FA 0000
      00FB 0000
0117                    *
0118                    *       DIO CHAN #7
0119                    *
0120  00FC BF80 00FD          JST     *$+1
0121  00FD 0104               DATA    ILLHLT
0122  0100                    ABS     :100
0123  0100 0000        INTHLT DATA    0
0124  0101 0E0D               HLT                     :F7     INTERRUPT VECTOR HALT
0125  0102 0E0D               HLT
0126  0103 0E0D               HLT
0127                    *
0128  0104 0000        ILLHLT DATA    0
0129  0105 0E0D               HLT                     :F8     ILLEGAL DIO INTERRUPT (EOB)
0130  0106 0E0D               HLT
0131  0107 0E0D               HLT
0132                    *
0133                    *
0134  01C0                    ABS     :1C0
0135  01C0 0000               DATA    0,0,0,0
      01C1 0000
      01C2 0000
      01C3 0000
0136                    *
0137                    *       DIO CHAN #0
0138                    *
0139  01C4 BF80 01C5          JST     *$+1
0140  01C5 0104               DATA    ILLHLT
0141  01C6 0000               DATA    0,0,0,0,0,0
```

```
      01C7 0000
      01C8 0000
      01C9 0000
      01CA 0000
      01CB 0000
0142                  *
0143                  *       DIO CHAN #1
0144                  *
0145  01CC BF80 01CD          JST     *$+1
0146  01CD 0104               DATA    ILLHLT
0147  01CE 0000               DATA    0,0,0,0,0,0
      01CF 0000
      01D0 0000
      01D1 0000
      01D2 0000
      01D3 0000
0148                  *
0149                  *       DIO CHAN #2
0150                  *
0151  01D4 BF80 01D5          JST     *$+1
0152  01D5 0104               DATA    ILLHLT
0153  01D6 0000               DATA    0,0,0,0,0,0
      01D7 0000
      01D8 0000
      01D9 0000
      01DA 0000
      01DB 0000
0154                  *
0155                  *       DIO CHAN #3
0156                  *
0157  01DC BF80 01DD          JST     *$+1
0158  01DD 0104               DATA    ILLHLT
0159  01DE 0000               DATA    0,0,0,0,0,0
      01DF 0000
      01E0 0000
      01E1 0000
```

```
      01E2 0000
      01E3 0000
0160                  *
0161                  *       DIO CHAN #4
0162                  *
0163  01E4 BF80 01E5          JST     *$+1
0164  01E5 0104               DATA    ILLHLT
0165  01E6 0000               DATA    0,0,0,0,0,0
      01E7 0000
      01E8 0000
      01E9 0000
      01EA 0000
      01EB 0000
0166                  *
0167                  *       DIO CHAN #5
0168                  *
0169  01EC BF80 01ED          JST     *$+1
0170  01ED 0104               DATA    ILLHLT
0171  01EE 0000               DATA    0,0,0,0,0,0
      01EF 0000
      01F0 0000
      01F1 0000
      01F2 0000
      01F3 0000
0172                  *
0173                  *       DIO CHAN #6
0174                  *
0175  01F4 BF80 01F5          JST     *$+1
0176  01F5 0104               DATA    ILLHLT
0177  01F6 0000               DATA    0,0,0,0,0,0
      01F7 0000
      01F8 0000
      01F9 0000
      01FA 0000
      01FB 0000
0178                  *
```

```
0179                        *       DIO CHAN #7
0180                        *
0181  01FC BFB0 01FD               JST     *$+1
0182  01FD 0104                   DATA    ILLHLT
0183  01FE 0000                   DATA    0,0
      01FF 0000
```

```
0185  0280                        ROUND
0186                      ******
0187                      *       THE LSI GENERAL PURPOSE PICOPROCESSOR TEST
0188                      *       IS DESIGNED TO VERIFY THE OPERATION OF
0189                      *       THE GENERAL PURPOSE PICOPROCESSOR'S
0190                      *       FIRMWARE AND ASSOCIATED HARDWARE LOGIC.
0191                      *       THE TEST ASSUMES THAT THE I/O DISTRIBUTOR
0192                      *       AND CABLES ARE CHECKED AND OPERATIONAL.
0193                      *       IN ORDER FOR THIS TEST TO CHECK THE GP
0194                      *       PICOPROCESSOR, A MINIMUM OF TWO (2) MUST
0195                      *       BE USED AND CONNECTED AS ILLUSTRATED IN
0196                      *       THE DIOGP TEST DOCUMENTATION (INCLUDED
0197                      *       IN DOCUMENT NUMBER 93920-00XX - DISTRIBUTED
0198                      *       I/O SYSTEM TEST DOCUMENTATION).
0199                      *
0200                      *       SENSE SWITCH
0201                      *
0202                      *       ON    HALT AT END OF COMPLETE PASS (:XXFF)
0203                      *       OFF   LOOP CONTINUOUSLY ON ALL SEGMENTS
0204                      *
```

```
0206        0022                LIST    :22
0207  0200                      REL     :200
0208        0200        DIOGP   EQU     $
0209  0200 9EF3 0274            JMP     DIOGP2
0210        0201        DIOGP1  EQU     $
0211  0201 86F0 0272            COPY    A,OPDASH
0212  0202 0900                 COPY    =0,A
0213  0203 87CA 024E            COPY    A,SRFLG
0214  0204 87CA 024F            COPY    A,LPINDC
0215        0205        DSR1    EQU     $
0216  0205 09FF                 COPY    =:FF,A
0217  0206 0404                 SELP    A,4
0218  0207 0E0D                 HLT
0219  0208 0104                 IN      4,A       INPUT DATA REG
0220  0209 86D9 0263            COPY    A,GPDAT1 SAVE INPUT
0221  020A 96C5 0250            AND     =:C00,A  ISOLATE DEV ADDRESS BITS
0222  020B 9AC4 0250            XOR     =:C00;A
0223  020C 0E59                 SHIFT   A,RO,6
0224  020D 19C0                 OR      =:C0,A   FORM DEVICE ADDRESS
0225  020E 86D6 0265            COPY    A,GPSAVE SAVE RESULT
0226  020F 0907                 COPY    =7,A
0227  0210 96D2 0263            AND     GPDAT1,A ISOLATE CHAN #
0228  0211 0E01                 SHIFT   A,LO,1
0229  0212 B6D2 0265            OR      GPSAVE,A FORM DEV. ADDR.
0230  0213 86D2 0266            COPY    A,GP1ADR STORE GP 1 DEV ADDR.
0231                      *
0232  0214 09FF                 COPY    =:FF,A
0233  0215 0404                 SELP    A,4
0234  0216 0E0D                 HLT
0235  0217 0104                 IN      4,A       INPUT DATA REGISTER
0236  0218 86CB 0264            COPY    A,GPDAT2 SAVE INPUT
0237  0219 96B6 0250            AND     =:C00,A  ISOLATE DEV ADDRESS BITS
0238  021A 9AB5 0250            XOR     =:C00,A
0239  021B 0E59                 SHIFT   A,RO,6
0240  021C 19C0                 OR      =:C0,A   FORM DEV. ADDR
0241  021D 86C7 0265            COPY    A,GPSAVE SAVE RESULT
```

```
0242  021E 0907              COPY   =7,A
0243  021F 96C4 0264         AND    GPDAT2,A ISOLATE CHAN #
0244  0220 0E01              SHIFT  A,LO,1
0245  0221 B6C3 0265         OR     GPSAVE,A FORM DEV. ADDR
0246  0222 86C4 0267         COPY   A,GP2ADR
0247                  *
0248                  *      FORM INTERRUPT VECTOR ADDRESS (GP1)
0249                  *
0250  0223 82BF 0263         COPY   GPDAT1,A FETCH GP1 DATA REG ENTRY
0251  0224 96AC 0251         AND    =:200,A  ISOLATE INT. LEVEL BIT
0252  0225 9AAB 0251         XOR    =:200,A
0253  0226 0E29              SHIFT  A,RO,3
0254  0227 86BD 0265         COPY   A,GPSAVE SAVE RESULT
0255  0228 82BA 0263         COPY   GPDAT1,A FETCH GP1 DATA REG ENTRY
0256  0229 96A8 0252         AND    =:100,A  ISOLATE INT. LEVEL BIT
0257  022A 9AA7 0252         XOR    =:100,A
0258  022B 0E09              SHIFT  A,RO,1
0259  022C B6B8 0265         OR     GPSAVE,A MERGE TWO BITS
0260  022D 86B7 0265         COPY   A,GPSAVE SAVE RESULT
0261  022E 0910              COPY   =:10,A   FETCH MASK
0262  022F 96B3 0263         AND    GPDAT1,A
0263  0230 0E31              SHIFT  A,LO,4
0264  0231 B6B3 0265         OR     GPSAVE,A FORM MORE OF INT ADDR.
0265  0232 86B2 0265         COPY   A,GPSAVE SAVE RESULT
0266  0233 0907              COPY   =7,A
0267  0234 96AE 0263         AND    GPDAT1,A ISOLATE CHAN #
0268  0235 0E21              SHIFT  A,LO,3
0269  0236 B6AE 0265         OR     GPSAVE,A FORM INT. VECT. ADDR.
0270  0237 86B0 0268         COPY   A,GP1IL  SAVE GP1 INT. LEVEL ADDR.
0271                  *
0272                  *      FORM INTERRUPT VECTOR ADDRESS (GP2)
0273                  *
0274  0238 82AB 0264         COPY   GPDAT2,A FETCH GP2 DATA REG ENTRY
0275  0239 9697 0251         AND    =:200,A  ISOLATE INT. LEVEL BIT
0276  023A 9A96 0251         XOR    =:200,A
0277  023B 0E29              SHIFT  A,RO,3
```

```
0278  023C 86A8 0265          COPY   A,GPSAVE SAVE RESULT
0279  023D 82A6 0264          COPY   GPDAT2,A FETCH GP2 DATA REG ENTRY
0280  023E 9693 0252          AND    =:100,A  ISOLATE INT. LEVEL BIT
0281  023F 9A92 0252          XOR    =:100,A
0282  0240 0E09               SHIFT  A,RO,1
0283  0241 B6A3 0265          OR     GPSAVE,A
0284  0242 86A2 0265          COPY   A,GPSAVE SAVE PARTIAL INT. ADDR.
0285  0243 0910               COPY   =:10,A   FETCH MASK
0286  0244 969F 0264          AND    GPDAT2,A
0287  0245 0E31               SHIFT  A,LO,4
0288  0246 B69E 0265          OR     GPSAVE,A
0289  0247 869D 0265          COPY   A,GPSAVE SAVE PARTIAL INT. ADDRESS
0290  0248 0907               COPY   =7,A
0291  0249 969A 0264          AND    GPDAT2,A ISOLATE CHAN #
0292  024A 0E21               SHIFT  A,LO,3
0293  024B B699 0265          OR     GPSAVE,A FORM COMPLETE INT. ADDR
0294  024C 869C 0269          COPY   A,GP2IL  SAVE GP2 INT. LEVEL ADDR
0295  024D 9EAA 0278          JMP    DSR
0296       000F               LPOOL
      024E 0681
      024F 05EB
      0250 0C00
      0251 0200
      0252 0100
      0253
      0254
      0255
      0256
      0257
      0258
      0259
      025A
      025B
      025C
0297                    *
0298       0400         TAG    EQU    :400     TAG MODE BIT
```

```
0299        0200        BR      EQU     :200        BRANCH MODE BIT
0300        000C        INDATA  EQU     :C          INPUT DATA VALUE
0301        0008        INCMD   EQU     8           INPUT COMMAND VALUE
0302        0004        OUTDTA  EQU     4           OUTPUT DATA VALUE
0303        0000        OUTCMD  EQU     0           OUTPUT COMMAND VALUE
0304        0050        STRTGP  EQU     :50         START PICO ADDRESS
0305        0060        BEGN    EQU     :60
0306        00FC        CH6DA   EQU     :FC
0307        00FE        CH7DA   EQU     :FE
0308        00F0        CH6IL   EQU     :F0
0309        00F8        CH7IL   EQU     :F8
0310  025D BF80 025E    JST     JST     *$+1
0311  025E 6500         AOB     AOB     0*8+0
0312  025F 4500         AIB     AIB     0*8+0
0313  0260 2200         OTX     OUT     X,0*8+0
0314  0261 0100         INA     IN      0*8+0,A
0315  0262 0100         RESET   DATA    :100
0316  0263 0000         GPDAT1  DATA    0           GP 1 CHANNEL/DEV ADR/INT
0317  0264 0000         GPDAT2  DATA    0           GP 2 CHAN/DEV ADR/INT
0318  0265 0000         GPSAVE  DATA    0
0319  0266 00FC         GP1ADR  DATA    CH6DA       CHANNEL 6 DA=:FC
0320  0267 00FE         GP2ADR  DATA    CH7DA       CHANNEL 7 DA=:FE
0321  0268 00F0         GP1IL   DATA    CH6IL       CHANNEL 6 INT. ADDR=:F0
0322  0269 00F8         GP2IL   DATA    CH7IL       CHANNEL 7 INT. ADDR=:F8
0323  026A 0000         GPPASS  DATA    0
0324  026B 0000         GPWAIT  DATA    0
0325  026C 0000         OUTEOB  DATA    0           OUTPUT EOB FLAG
0326  026D 0000         INEOB   DATA    0           INPUT EOB FLAG
0327  026E 0000         INFLG   DATA    0           = 1 FOR GP1, =2 FOR GP2
0328  026F 0000         OUTFLG  DATA    0           = 1 FOR GP1, =2 FOR GP2
0329  0270 0000         GPSTS1  DATA    0           GP1 STATUS
0330  0271 0000         GPSTS2  DATA    0           GP2 STATUS
0331  0272 0000         OPDASH  RES     1,0
0332  0273 0200         OTA     OUT     A,0*8+0
0333        0274        DIOGP2  EQU     $
0334  0274 867D 0272            COPY    A,OPDASH
```

```
0335  0275 0900                COPY   =0,A
0336  0276 8757 024E          COPY   A,SRFLG
0337  0277 8757 024F          COPY   A,LPINDC
0338       0278         DSR    EQU    $
0339  0278 A26F 0268          COPY   GP1IL,X  FETCH GP1 INT. ADDRESS
0340  0279 8263 025D          COPY   JST,A
0341  027A 8484 0004          COPY   A,@EOBJST STORE JST AT INT. VECTOR
0342  027B 8264 0260          COPY   OTX,A    FETCH OTX COMMAND
0343  027C B669 0266          OR     GP1ADR,A FORM DEV. ADDR
0344  027D 1901               OR     =1,A     SET CONTROL BIT
0345  027E 86A8 02AA          COPY   A,OTXCM1 STORE OTX COMMAND
0346  027F 8261 0261          COPY   INA,A
0347  0280 B665 0266          OR     GP1ADR,A FORM INA COMMAND FOR DATA
0348  0281 86AF 02B1          COPY   A,INDTA1 STORE INA COMMAND (GP1)
0349  0282 1901               OR     =1,A     FORM INA COMMAND FOR STATUS
0350  0283 86A9 02AD          COPY   A,INSTA1 STORE STATUS INA (GP1)
0351  0284 A264 0269          COPY   GP2IL,X  FETCH GP2 INT. ADDRESS
0352  0285 8257 025D          COPY   JST,A
0353  0286 8484 0004          COPY   A,@EOBJST
0354  0287 8258 0260          COPY   OTX,A
0355  0288 B65E 0267          OR     GP2ADR,A FORM OTX W/DEV ADDR.
0356  0289 1901               OR     =1,A     SET CONTROL BIT
0357  028A 86AC 0287          COPY   A,OTXCM2
0358  028B 8255 0261          COPY   INA,A
0359  028C B65A 0267          OR     GP2ADR,A
0360  028D 86B0 02BE          COPY   A,INDTA2
0361  028E 1901               OR     =1,A
0362  028F 86AA 02BA          COPY   A,INSTA2
0363  0290 8262 0273          COPY   OTA,A    FETCH OTA COMMAND
0364  0291 B654 0266          OR     GP1ADR,A
0365  0292 86A1 02B4          COPY   A,OTADA1
0366  0293 825F 0273          COPY   OTA,A
0367  0294 B652 0267          OR     GP2ADR,A
0368  0295 86AB 02C1          COPY   A,OTADA2
0369  0296 8337 024E          COPY   SRFLG,A
0370  0297 11C1 0299          JNE    A,$+2
```

```
0371   0298 9EDA 02F3          JMP     GPTS1     GP BACK TO BACK TEST
0372   0299 13C1 029B          JLT     A,$+2
0373   029A 9F83 029E          JMP     GPSRTT    SERIAL BACK TO BACK TEST
0374   029B 9F83 029F          JMP     PAR32C    32 BIT BACK TO BACK TEST
0375   029C 9F81 029E          JMP     GPSRTT
0376   029D 9ED5 02F3          JMP     GPTS1
0377        000B               LPOOL
       029E 068A
       029F 088D
       02A0
       02A1
       02A2
       02A3
       02A4
       02A5
       02A6
       02A7
       02A8
```

```
0379                    *
0380                    *       SUBROUTINE TO ISSUE CONTROL COMMANDS
0381                    *       TO GP 1 PICOPROGESSOR
0382                    *
0383                    *       CALLING SEQUENCE
0384                    *
0385                    *       LDX     PICO CONTROL WORD
0386                    *       JST     G1OTXC
0387                    *       NORMAL RETURN
0388                    *
0389  02A9 0E0D         G1OTXC ENT
0390  02AA 2200         OTXCM1 OUT     X,0*8+0  OUTPUT CONTROL WORD
0391  02AB 9F7D 02A9           RTN     G1OTXC   EXIT
0392                    *
0393                    *
0394                    *       SUBROUTINE TO INPUT STATUS FROM GP1
0395                    *
0396                    *       CALLING SEQUENCE
0397                    *
0398                    *       JST     INAST1
0399                    *       NORMAL RETURN (A=INPUT STATUS)
0400                    *
0401  02AC 0E0D         INAST1 ENT
0402  02AD 0100         INSTA1 IN      0*8+0,A  INPUT GP1 STATUS
0403  02AE 1837                AND     =:0037,A
0404  02AF 9F7C 02AC           RTN     INAST1   EXIT
0405                    *
0406                    *
0407                    *       SUBROUTINE TO INPUT DATA FROM GP1
0408                    *
0409                    *       CALLING SEQUENCE
0410                    *
0411                    *       JST     INADT1
0412                    *       NORMAL RETURN (A=INPUT DATA)
0413                    *
0414  02B0 0E0D         INADT1 ENT
```

```
0415  02B1 0100        INDTA1 IN     0*8+0,A  INPUT DATA FROM GP1
0416  02B2 9F7D 0280          RTN    INADT1   EXIT
0417                     *
0418                     *
0419                     *       SUBROUTINE TO OUTPUT DATA TO GP1
0420                     *
0421                     *       CALLING SEQUENCE
0422                     *
0423                     *       LDA    DATA WORD
0424                     *       JST    OTADT1
0425                     *       NORMAL RETURN
0426                     *
0427  02B3 0E0D        OTADT1 ENT
0428  02B4 0200        OTADA1 OUT    A,0*8+0  OUTPUT DATA
0429  02B5 9F7D 02B3          RTN    OTADT1   EXIT
0430                     *
0431                     *
0432                     *       SUBROUTINE TO ISSUE CONTROL COMMANDS
0433                     *       TO GP2 PICOPROCESSOR
0434                     *
0435                     *       CALLING SEQUENCE
0436                     *
0437                     *       LDX    PICO COMMAND WORD
0438                     *       JST    G20TXC
0439                     *       NORMAL RETURN
0440                     *
0441  02B6 0E0D        G20TXC ENT
0442  02B7 2200        OTXCM2 OUT    X,0*8+0  OUTPUT CONTROL WORD
0443  02B8 9F7D 02B6          RTN    G20TXC   EXIT
0444                     *
0445                     *
0446                     *       SUBROUTINE TO INPUT STATUS FROM GP2
0447                     *
0448                     *       CALLING SEQUENCE
0449                     *
0450                     *       JST    INAST2
```

```
0451                        *       NORMAL RETURN (A=INPUT STATUS)
0452                        *
0453  02B9 0E0D             INAST2 ENT
0454  02BA 0100             INSTA2 IN      0*8+0,A  INPUT GP2 STATUS
0455  02BB 1837                    AND     =:0037,A
0456  02BC 9F7C 02B9               RTN     INAST2   EXIT
0457                        *
0458                        *
0459                        *       SUBROUTINE TO INPUT DATA FROM GP2
0460                        *
0461                        *       CALLING SEQUENCE
0462                        *
0463                        *       JST     INADT2
0464                        *       NORMAL RETURN (A=INPUT DATA)
0465                        *
0466  02BD 0E0D             INADT2 ENT
0467  02BE 0100             INDTA2 IN      0*8+0,A  INPUT DATA FROM GP2
0468  02BF 9F7D 02BD               RTN     INADT2   EXIT
0469                        *
0470                        *
0471                        *       SUBROUTINE TO OUTPUT DATA TO GP2
0472                        *
0473                        *       CALLING SEQUENCE
0474                        *
0475                        *       LDA     OUTPUT DATA
0476                        *       JST     OTADT2
0477                        *       NORMAL RETURN
0478                        *
0479  02C0 0E0D             OTADT2 ENT
0480  02C1 0200             OTADA2 OUT     A,0*8+0  OUTPUT DATA
0481  02C2 9F7D 02C0               RTN     OTADT2   EXIT
0482                        *
0483                        *
0484                        *       SUBROUTINE TO HANDLE INPUT EOB INTERRUPTS
0485                        *
0486  02C3 0E0D             ININT  ENT
```

```
0487  02C4 86AA 02EF          COPY   A,SAVA    SAVE A
0488  02C5 A6AA 02F0          COPY   X,SAVX    SAVE X
0489  02C6 0030               COPY   S,A       FETCH PSW
0490  02C7 86A9 02F1          COPY   A,SAVS    SAVE PSW
0491  02C8 8225 026E          COPY   INFLG,A   FETCH INPUT FLAG VALUE
0492  02C9 0AFF               SUB    =1,A
0493  02CA 11C5 02D0          JNE    A,ININT1
0494  02CB A2A6 02F2          COPY   =BR;:10,X FETCH BRANCH CODE
0495  02CC BE5C 02A9          JST    G1OTXC    ISSUE COMMAND TO GP1
0496  02CD BE5E 02AC          JST    INAST1    READ GP1 STATUS
0497  02CE 8621 0270          COPY   A,GPSTS1 SAVE GP1 STATUS
0498  02CF 9E84 02D4          JMP    ININT2
0499       02D0          ININT1 EQU    $
0500  02D0 A2A1 02F2          COPY   =BR;:10,X FETCH BRANCH CODE
0501  02D1 BE64 02B6          JST    G2OTXC    ISSUE COMMAND TO GP2
0502  02D2 BE66 02B9          JST    INAST2    FETCH GP2 STATUS
0503  02D3 861D 0271          COPY   A,GPST32 SAVE GP2 STATUS
0504       02D4          ININT2 EQU    $
0505  02D4 DE18 026D          IMS    INEOB     SET INPUT EOB FLAG
0506  02D5 A29A 02F0          COPY   SAVX,X    RESTORE X
0507  02D6 829A 02F1          COPY   SAVS,A    FETCH PSW VALUE
0508  02D7 3000               COPY   A,S       RESTORE PSW
0509  02D8 8296 02EF          COPY   SAVA,A    RESTORE A
0510  02D9 0E85               SBIT   8,S       ENABLE INTERRUPTS
0511  02DA 9F68 02C3          RTN    ININT     EXIT
0512                     *
0513                     *       SUBROUTINE TO HANDLE OUTPUT EOB INTERRUPTS
0514                     *
0515  02DB 0E0D          OUTINT ENT
0516  02DC 8692 02EF          COPY   A,SAVA    SAVE A
0517  02DD A692 02F0          COPY   X,SAVX    SAVE X
0518  02DE 0030               COPY   S,A       FETCH PSW
0519  02DF 8691 02F1          COPY   A,SAVS    SAVE PSW
0520  02E0 820E 026F          COPY   OUTFLG,A FETCH OUTPUT FLAG VALUE
0521  02E1 0AFF               SUB    =1,A
0522  02E2 11C3 02E6          JNE    A,OINT1
```

```
0523  02E3 BE48 02AC          JST     INAST1   READ GP1 STATUS
0524  02E4 860B 0270          COPY    A,GPSTS1 SAVE GP1 STATUS
0525  02E5 9E82 02E8          JMP     OINT2
0526  02E6 BE52 02B9  OINT1   JST     INAST2   READ GP2 STATUS
0527  02E7 8609 0271          COPY    A,GPSTS2 SAVE GP2 STATUS
0528  02E8 DE03 026C  OINT2   IMS     OUTEOB   SET OUTPUT EOB FLAG
0529  02E9 A286 02F0          COPY    SAVX,X   RESTORE X
0530  02EA 8286 02F1          COPY    SAVS,A   FETCH PSW VALUE
0531  02EB 3000               COPY    A,S      RESTORE PSW
0532  02EC 8282 02EF          COPY    SAVA,A   RESTORE A
0533  02ED 0E85               SBIT    8,S      ENABLE INTERRUPTS
0534  02EE 9F6C 02D8          RTN     OUTINT   EXIT
0535                    *
0536  02EF 0000         SAVA  DATA    0        A REG SAVE
0537  02F0 0000         SAVX  DATA    0        X REG SAVE
0538  02F1 0000         SAVS  DATA    0        PSW SAVE
0539       0001               LPOOL
      02F2 0210
```

```
0541                    ******          TEST 1 - GPTS1
0542                    *
0543                    *       FROM HERE TO LABEL 'GPTS1D' THE GP CONNECTED
0544                    *       TO CHANNEL 6 (GP1) WILL BE SET FOR COMMAND
0545                    *       OUTPUT WITH A BYTE COUNT OF -2.  THE GP
0546                    *       CONNECTED TO CHANNEL 7 (GP2) WILL BE SET
0547                    *       FOR COMMAND INPUT WITH A BYTE COUNT OF -2.
0548                    *       THE DATA WORD OUTPUT AND EXPECTED AS INPUT
0549                    *       IS :7F50.  IF ERRORS ARE DETECTED A CODED
0550                    *       HALT WILL RESULT WHICH ARE AS FOLLOWS:
0551                    *
0552                    *       CODED HALT          PURPOSE OF HALT
0553                    *
0554                    *       :XX11               BAD DATA - A=ACTUAL DATA
0555                    *                                      X=EXPECTED DATA
0556                    *       :XX13               INPUT GP DID NOT ISSUE
0557                    *                           END OF BLOCK INTERRUPT
0558                    *
0559                    *       :XX14               OUTPUT GP DID NOT ISSUE
0560                    *                           END OF BLOCK INTERRUPT
0561                    ******
0562                    *
0563                    *       ENTRY POINT FOR USING PREVIOUSLY ENTERED
0564                    *       CHANNEL ASSIGNMENTS.
0565                    *
0566          02F3      GPTS1   EQU     $
0567  02F3 0E87                 RBIT    8,S         DISABLE INTERRUPTS
0568  02F4 A3CB 0340            COPY    GP1IL,X     FETCH GP 1 INT. ADDR.
0569  02F5 83CB 0341            COPY    AOB,A       FETCH AOB COMMAND
0570  02F6 B7CB 0342            OR      GP1ADR,A    FORM DEVICE ADDRESS
0571  02F7 8480 0000            COPY    A,@AIOCMD
0572  02F8 08FE                 COPY    =-2,A       -2 --> AR
0573  02F9 8481 0001            COPY    A,@AIOCNT   AUTO I/O COUNT = 2 BYTES
0574  02FA 82C8 0343            COPY    =OUTINT,A   ADDR OF EOB ROUTINE (OUT)
0575  02FB 8485 0005            COPY    A,@EOBADR
0576  02FC 82C7 0344            COPY    =GPOUT,A    FETCH ADDR. OF OUTPUT BUFF
```

```
0577  02FD 0E01              SHIFT  A,LO,1   CONVERT TO
0578  02FE 0AFF              SUB    =1,A      BYTE ADDRESS -1
0579  02FF 8482 0002         COPY   A,@AIOADR
0580  0300 0901              COPY   =1,A
0581  0301 87C3 0345         COPY   A,OUTFLG SET OUTPUT FLAG FOR GP1
0582  0302 A3C3 0346         COPY   GP2IL,X  FETCH GP 2 INT. ADDR
0583  0303 83C3 0347         COPY   AIB,A    FETCH AIB COMMAND
0584  0304 87C3 0348         OR     GP2ADR,A FORM AIB W/DEV ADDR
0585  0305 8480 0000         COPY   A,@AIOCMD
0586  0306 08FE              COPY   =-2,A    -2 --> AR
0587  0307 87C1 0349         COPY   A,GPPASS SET PASS COUNT =-2
0588  0308 8481 0001         COPY   A,@AIOCNT AUTO I/O COUNT = 2 BYTES
0589  0309 82C0 034A         COPY   =ININT,A ADDR OF EOB ROUTINE (IN)
0590  030A 8485 0005         COPY   A,@EOBADR
0591  030B 82BF 034B         COPY   =GPIN,A  FETCH ADDR OF INPUT BUFF
0592  030C 0E01              SHIFT  A,LO,1   CONVERT TO
0593  030D 0AFF              SUB    =1,A      BYTE ADDRESS -1
0594  030E 8482 0002         COPY   A,@AIOADR
0595  030F 0902              COPY   =2,A
0596  0310 87BB 034C         COPY   A,INFLG  SET INPUT FLAG FOR GP2
0597  0311 0900              COPY   =0,A
0598  0312 87BA 034D         COPY   A,GPWAIT
0599  0313 87BA 034E         COPY   A,OUTEOB
0600  0314 87BA 034F         COPY   A,INEOB
0601                    *
0602                    *      AT THIS POINT GP1 INT VECTOR SET FOR
0603                    *      OUTPUT (2 BYTES), GP2 INT VECTOR SET
0604                    *      FOR INPUT (2 BYTES).
0605                    *
0606  0315 A2BA 0350         COPY   =:100,X  RESET CODE
0607  0316 BE12 02A9         JST    G1OTXC   ISSUE COMMAND TO GP1
0608  0317 BE1E 02B6         JST    G2OTXC   ISSUE COMMAND TO GP2
0609  0318 A2B8 0351         COPY   =TAG;OUTCMD,X FETCH OUTPUT/COMMAND CODE
0610  0319 BE0F 02A9         JST    G1OTXC   ISSUE COMMAND TO GP1
0611  031A A2B7 0352         COPY   =TAG;INCMD,X FETCH INPUT/COMMAND CODE
0612  031B BE1A 02B6         JST    G2OTXC   ISSUE COMMAND TO GP2
```

```
0613                        *
0614                        *       AT THIS POINT GP1 SET FOR INPUT COMMAND MODE
0615                        *       AND GP2 SET FOR OUTPUT COMMAND MODE
0616                        *
0617  031C 82B6 0353                COPY    =:7F50,A FETCH DATA
0618  031D 87A6 0344  GPTS1A COPY   A,GPOUT  PUT IN OUTPUT BUFFER
0619  031E 0900                     COPY    =0,A
0620  031F 87AD 034D                COPY    A,GPWAIT
0621  0320 87AA 034B                COPY    A,GPIN   CLEAR INPUT BUFFER
0622                        *
0623                        *       HERE WE START GP1
0624                        *
0625  0321 A2B2 0354                COPY    =BR;STRTGP,X FETCH START CODE
0626  0322 BE06 02A9                JST     G1OTXC   ISSUE COMMAND TO GP1
0627                        *
0628                        *       HERE WE START GP2
0629                        *
0630  0323 A2B1 0355                COPY    =BR;BEGN,X FETCH START INPUT CODE
0631  0324 BE11 02B6                JST     G2OTXC   ISSUE COMMAND TO GP2
0632        0325          GPT1A1 EQU      $
0633  0325 0E85                     SBIT    8,S      ENABLE INTERRUPTS
0634        0326          GPTS1B EQU      $
0635  0326 83A8 034F                COPY    INEOB,A  FETCH INPUT EOB FLAG
0636  0327 1143 032B                JEQ     A,GPTS1E JUMP IF CLEAR
0637  0328 83A5 034E                COPY    OUTEOB,A FETCH OUTPUT EOB FLAG
0638  0329 1141 032B                JEQ     A,GPTS1E JUMP IF CLEAR
0639  032A 9E88 0333                JMP     GPTS1F
0640  032B DFA1 034D  GPTS1E IMS     GPWAIT
0641  032C 9E79 0326                JMP     GPTS1B
0642  032D 83A1 034F                COPY    INEOB,A  FETCH INPUT EOB FLAG
0643  032E 11C1 0330                JNE     A,$+2
0644  032F 0E0D                     HLT
0645  0330 8390 034E                COPY    OUTEOB,A FETCH OUTPUT EOB FLAG
0646  0331 11C1 0333                JNE     A,$+2
0647  0332 0E0D                     HLT
0648        0333          GPTS1F EQU      $
```

```
0649  0333 0900              COPY   =0,A
0650  0334 8799 034E         COPY   A,OUTEOB CLEAR EOB FLAGS
0651  0335 8799 034F         COPY   A,INEOB
0652                  *
0653                  *      HERE WE CHECK INPUT DATA
0654                  *
0655  0336 8394 0348         COPY   GPIN,A
0656  0337 988C 0344         XOR    GPOUT,A
0657  0338 1143 033C         JEQ    A,GPTS1C JUMP IF DATA OK
0658  0339 A38A 0344         COPY   GPOUT,X  FETCH EXPECTED DATA
0659  033A 8390 034B         COPY   GPIN,A   FETCH ACTUAL DATA
0660  033B 0E0D              HLT
0661       033C        GPTS1C EQU    $
0662  033C DF8C 0349         IMS    GPPASS   BUMP PASS COUNT
0663  033D 9E9A 0358         JMP    GPTS1D   JUMP IF NOT FINISHED
0664                  *
0665                  *      HERE WE EXIT TO NEXT TEST
0666                  *
0667  033E 9E34 02F3         JMP    GPTS1    PATCHABLE LOOP
0668  033E                   ORG    $-1
0669  033E 0000              NOP
0670  033F 9EDE 039E         JMP    GPTS2    JUMP TO TEST SEGMENT 2
0671       0018              LPOOL
      0340 0268
      0341 025E
      0342 0266
      0343 02DB
      0344 0A0F
      0345 026F
      0346 0269
      0347 025F
      0348 0267
      0349 026A
      034A 02C3
      034B 0B0F
      034C 026E
```

```
      034D 026B
      034E 026C
      034F 026D
      0350 0100
      0351 0400
      0352 0408
      0353 7F50
      0354 0250
      0355 0260
      0356
      0357
0672                  ******
0673                  *       FROM HERE TO THE LABEL 'GPTS2' THE GP
0674                  *       CONNECTED TO CHANNEL 6 (GP1) WILL BE
0675                  *       SET FOR COMMAND INPUT AND THE GP CONNECTED
0676                  *       TO CHANNEL 7 (GP2) WILL BE SET FOR COMMAND
0677                  *       OUTPUT, BOTH GP'S WILL HAVE A BYTE COUNT
0678                  *       OF -2.  THE DATA WORD OUTPUT AND EXPECTED
0679                  *       AS INPUT IS :6A0F.  IF ERRORS ARE DETECTED
0680                  *       A CODED HALT WILL RESULT, WHICH ARE AS
0681                  *       FOLLOWS:
0682                  *
0683                  *       CODED HALT        PURPOSE OF HALT
0684                  *
0685                  *       :XX91             BAD DATA - A=ACTUAL DATA
0686                  *                                    X=EXPECTED DATA
0687                  *       :XX93             INPUT GP DID NOT ISSUE
0688                  *                         END OF BLOCK INTERRUPT
0689                  *       :XX94             OUTPUT GP DID NOT ISSUE
0690                  *                         END OF BLOCK INTERRUPT
0691                  ******
0692                  *
0693                  *       HERE WE INITIALIZE GP1 FOR INPUT AND
0694                  *       GP2 FOR OUTPUT
0695                  *
0696      0358        GPTS1D EQU    $
```

```
0697  0358 0E87            RBIT   8,S       DISABLE INTERRUPTS
0698  0359 A366 0340       COPY   GP1IL,X   FETCH GP1 INT. ADDR
0699  035A 836C 0347       COPY   AIH,A
0700  035B B766 0342       OR     GP1ADR,A
0701  035C 8480 0000       COPY   A,@AIOCMD
0702  035D 826D 034B       COPY   =GPIN,A   INPUT BUFFER ADDRESS
0703  035E 0E01            SHIFT  A,LO,1    CONVERT TO
0704  035F 0AFF            SUB    =1,A      BYTE ADDRESS -1
0705  0360 8482 0002       COPY   A,@AIOADR
0706  0361 08FE            COPY   =-2,A
0707  0362 8481 0001       COPY   A,@AIOCNT
0708  0363 8266 034A       COPY   =ININT,A INPUT EOB ROUTINE ADDR
0709  0364 8485 0005       COPY   A,@EOBADR
0710  0365 0901            COPY   =1,A
0711  0366 8765 034C       COPY   A,INFLG   SET INPUT FLAG FOR GP1
0712  0367 A26A 0352       COPY   =TAG;INCMD,X COMMAND/INPUT CODE
0713  0368 BFB2 039B       JST    G1OTXC    ISSUE COMMAND TO GP1
0714  0369 A35C 0346       COPY   GP2IL,X   FETCH GP2 INT. ADDR
0715  036A 8356 0341       COPY   AOB,A
0716  036B B75C 0348       OR     GP2ADR,A
0717  036C 8480 0000       COPY   A,@AIOCMD
0718  036D 8256 0344       COPY   =GPOUT,A OUTPUT BUFFER ADDRESS
0719  036E 0E01            SHIFT  A,LO,1    CONVERT TO
0720  036F 0AFF            SUB    =1,A      BYTE ADDRESS -1
0721  0370 8482 0002       COPY   A,@AIOADR
0722  0371 08FE            COPY   =-2,A
0723  0372 8481 0001       COPY   A,@AIOCNT
0724  0373 824F 0343       COPY   =OUTINT,A OUTPUT EOB ROUTINE ADDR
0725  0374 8485 0005       COPY   A,@EOBADR
0726  0375 0900            COPY   =0,A
0727  0376 8756 034D       COPY   A,GPWAIT
0728  0377 8756 034E       COPY   A,OUTEOB
0729  0378 8756 034F       COPY   A,INEOB
0730  0379 0902            COPY   =2,A
0731  037A 874A 0345       COPY   A,OUTFLG SET OUTPUT FLAG FOR GP2
0732  037B A255 0351       COPY   =TAG;OUTCMD,X COMMAND OUTPUT CODE
```

```
0733  037C BF9F 039C          JST    G2OTXC   ISSUE COMMAND TO GP2
0734  037D A256 0354          COPY   =BR;STRTGP,X FETCH START OUTPUT CODE
0735  037E BF9D 039C          JST    G2OTXC   ISSUE COMMAND TO GP2
0736  037F A255 0355          COPY   =BR;BEGN,X FETCH INPUT START CODE
0737  0380 BF9A 039B          JST    G1OTXC   ISSUE COMMAND TO GP1
0738  0381 829B 039D          COPY   =:6A0F,A FETCH DATA
0739  0382 8741 0344          COPY   A,GPOUT  STORE DATA IN OUTPUT BUFF
0740  0383 0900               COPY   =0,A
0741  0384 8748 034D          COPY   A,GPWAIT
0742  0385 8745 034B          COPY   A,GPIN
0743  0386 0E85               SBIT   8,S      ENABLE INTERRUPTS
0744        0387        GPTS1G EQU    $
0745  0387 8347 034F          COPY   INEOB,A  FETCH INPUT EOB FLAG
0746  0388 1143 038C          JEQ    A,GPTS1H JUMP IF CLEAR
0747  0389 8344 034E          COPY   OUTEOB,A FETCH OUTPUT EOB FLAG
0748  038A 1141 038C          JEQ    A,GPTS1H JUMP IF CLEAR
0749  038B 9E88 0394          JMP    GPTS1I
0750  038C DF40 034D  GPTS1H  IMS    GPWAIT
0751  038D 9E79 0387          JMP    GPTS1G
0752  038E 8340 034F          COPY   INEOB,A  FETCH INPUT EOB FLAG
0753  038F 11C1 0391          JNE    A,$+2    JUMP IF FLAG SET
0754  0390 0E0D               HLT
0755  0391 833C 034E          COPY   OUTEOB,A FETCH OUTPUT EOB FLAG
0756  0392 11C1 0394          JNE    A,$+2    JUMP IF FLAG SET
0757  0393 0E0D               HLT
0758        0394        GPTS1I EQU    $
0759  0394 0900               COPY   =0,A
0760  0395 8739 034F          COPY   A,INEOB  CLEAR INPUT EOB FLAG
0761  0396 8737 034E          COPY   A,OUTEOB CLEAR OUTPUT EOB FLAG
0762  0397 8333 0348          COPY   GPIN,A   FETCH INPUT DATA
0763  0398 9B2B 0344          XOR    GPOUT,A
0764                          *
0765  0399 9E3E 0358          JMP    GPTS1D   PATCHABLE LOOP
0766  0399                    ORG    $-1
0767  0399 0000               NOP
0768        039A        GPTS1J EQU    $
```

```
0769  039A 9E21 033C          JMP     GPTS1C
0770                    *
0771        0003                LPOOL
      039B 02A9
      039C 02B6
      039D 6A0F
```

```
0773                    ******
0774                    *           TEST 2  - GPTS2
0775                    *       THIS TEST IS DESIGNED TO CHECK THE TWOBYTE
0776                    *       FEATURE OF THE GP'S.  THE GP CONNECTED TO
0777                    *       CHANNEL 6 (GP1) IS SET FOR DATA OUTPUT AND A
0778                    *       BYTE COUNT OF -1.  THE GP CONNECTED TO
0779                    *       CHANNEL 7 (GP2) IS SET FOR DATA INPUT AND
0780                    *       A BYTE COUNT OF -2.  A DATA WORD OF :3377
0781                    *       IS OUTPUT, AND :3333 IS EXPECTED AS INPUT.
0782                    *       ERRORS WILL BE INDICATED BY CODED HALTS
0783                    *       WHICH ARE DESCRIBED AS FOLLOWS:
0784                    *
0785                    *       CODED HALT        PURPOSE OF HALT
0786                    *
0787                    *       :XX21             BAD DATA - A=ACTUAL DATA
0788                    *                                    X=EXPECTED DATA
0789                    *       :XX23                INPUT GP DID NOT ISSUE
0790                    *                            END OF BLOCK INTERRUPT
0791                    *       :XX24                OUTPUT GP DID NOT ISSUE
0792                    *                            END OF BLOCK INTERRUPT
0793                    ******
0794         039E       GPTS2   EQU     $
0795   039E  0E87               RBIT    8,S         DISABLE INTERRUPTS
0796   039F  A320 0340           COPY    GP1IL,X     FETCH GP1 INT ADDR
0797   03A0  8320 0341           COPY    A0B,A
0798   03A1  B720 0342           OR      GP1ADR,A
0799   03A2  8480 0000           COPY    A,@AIOCMD
0800   03A3  08FF                COPY    =-1,A
0801   03A4  8481 0001           COPY    A,@AIOCNT OUTPUT BYTE COUNT =1
0802   03A5  821D 0343           COPY    =OUTINT,A OUTPUT EOB ROUTINE
0803   03A6  8485 0005           COPY    A,@EOBADR
0804   03A7  821C 0344           COPY    =GPOUT,A OUTPUT BUFFER ADDR
0805   03A8  0E01                SHIFT   A,LO,1     CONVERT TO
0806   03A9  0AFF                SUB     =1,A       BYTE ADDRESS -1
0807   03AA  8482 0002           COPY    A,@AIOADR
0808   03AB  0901                COPY    =1,A
```

```
0809  03AC 8718 0345          COPY   A,OUTFLG
0810  03AD A318 0346          COPY   GP2IL,X  FETCH GP2 INT ADDR
0811  03AE 8318 0347          COPY   AIB,A
0812  03AF 8718 0348          OR     GP2ADR,A
0813  03B0 8480 0000          COPY   A,@AIOCMD
0814  03B1 08FE               COPY   =-2,A
0815  03B2 8716 0349          COPY   A,GPPASS SET PASS COUNT = 2
0816  03B3 8481 0001          COPY   A,@AIOCNT
0817  03B4 8215 034A          COPY   =ININT,A INPUT EOB ROUTINE
0818  03B5 8485 0005          COPY   A,@EOBADR
0819  03B6 8214 034B          COPY   =GPIN,A  INPUT BUFFER ADDR
0820  03B7 0E01               SHIFT  A,LO,1   CONVERT TO
0821  03B8 0AFF               SUB    =1,A     BYTE ADDRESS -1
0822  03B9 8482 0002          COPY   A,@AIOADR
0823  03BA 0902               COPY   =2,A
0824  03BB 8710 034C          COPY   A,INFLG
0825  03BC 0900               COPY   =0,A
0826  03BD 870F 034D          COPY   A,GPWAIT
0827  03BE 870F 034E          COPY   A,OUTEOB
0828  03BF 870F 034F          COPY   A,INEOB
0829                    *
0830                    *      AT THIS POINT GP1 INT. VECTOR SET FOR
0831                    *      OUTPUT (1 BYTE), GP2 INT. VECTOR SET
0832                    *      FOR INPUT (2 BYTES)
0833                    *
0834  03C0 A2BB 03FC          COPY   =:100,X  RESET CODE
0835  03C1 BF59 039B          JST    G1OTXC   ISSUE COMMAND TO GP1
0836  03C2 BF59 039C          JST    G2OTXC   ISSUE COMMAND TO GP2
0837  03C3 A2B9 03FD          COPY   =TAG;OUTDTA,X FETCH OUTPUT COMMAND CODE
0838  03C4 BF56 039B          JST    G1OTXC   ISSUE COMMAND TO GP1
0839  03C5 A2B8 03FE          COPY   =TAG;INDATA,X FETCH INPUT COMMAND CODE
0840  03C6 BF55 039C          JST    G2OTXC   ISSUE COMMAND TO GP2
0841                    *
0842                    *      AT THIS POINT GR1 SET FOR INPUT DATA MODE,
0843                    *      GP2 SET FOR OUTPUT DATA MODE
0844                    *
```

```
0845  03C7 82B7 03FF          COPY   =:3377,A FETCH DATA WORD
0846  03C8 87B7 0400  GPTS2A  COPY   A,GPOUT  PUT IN OUTPUT BUFFER
0847  03C9 0900              COPY   =0,A
0848  03CA 87B6 0401          COPY   A,GPIN   CLEAR INPUT BUFFER
0849  03CB 87B6 0402          COPY   A,GPWAIT CLEAR WAIT CELL
0850                    *
0851                    *      HERE WE START GP1
0852                    *
0853  03CC A2B6 0403          COPY   =BR;STRTGP,X FETCH START CODE
0854  03CD BF4D 039B          JST    G1OTXC   ISSUE COMMAND TO GP1
0855                    *
0856                    *      HERE WE START GP2
0857                    *
0858  03CE A2B5 0404          COPY   =BR;BEGN,X
0859  03CF BF4C 039C          JST    G2OTXC   ISSUE COMMAND TO GP2
0860        03D0        GPT2A1 EQU    $
0861  03D0 0E85               SBIT   8,S      ENABLE INTERRUPTS
0862        03D1        GPT2A2 EQU    $
0863  03D1 83B3 0405          COPY   INEOB,A  FETCH INPUT EOB FLAG
0864  03D2 1143 03D6          JEQ    A,GPTS2D JUMP IF CLEAR
0865  03D3 83B2 0406          COPY   OUTEOB,A FETCH OUTPUT EOB FLAG
0866  03D4 1141 03D6          JEQ    A,GPTS2D JUMP IF CLEAR
0867  03D5 9E88 03DE          JMP    GPTS2E
0868  03D6 DFAB 0402  GPTS2D  IMS    GPWAIT
0869  03D7 9E79 03D1          JMP    GPT2A2
0870  03D8 83AC 0405          COPY   INEOB,A  FETCH INPUT EOB FLAG
0871  03D9 11C1 03DB          JNE    A,$+2    JUMP IF SET
0872  03DA 0E0D               HLT
0873  03DB 83AA 0406          COPY   OUTEOB,A FETCH OUTPUT EOB FLAG
0874  03DC 11C1 03DE          JNE    A,$+2    JUMP IF JET
0875  03DD 0E0D               HLT
0876        03DE        GPTS2E EQU    $
0877  03DE 0900               COPY   =0,A
0878  03DF 87A6 0406          COPY   A,OUTEOB CLEAR EOB
0879  03E0 87A4 0405          COPY   A,INEOB  FLAGS
0880                    *
```

```
0881                        *       HERE WE CHECK INPUT DATA
0882                        *
0883  03E1 839E 0400                COPY    GPOUT,A  FETCH OUTPUT DATA
0884  03E2 0E79                     SHIFT   A,R0,8   RIGHT JUSTIFY LEFT BYTE
0885  03E3 87A3 0407                COPY    A,GPSAVE SAVE FOR FUTURE USE
0886  03E4 839B 0400                COPY    GPOUT,A  FETCH OUTPUT DATA
0887  03E5 96A2 0408                AND     =:FF00,A ISOLATE LEFT BYTE
0888  03E6 B7A0 0407                OR      GPSAVE,A FORM EXPECTED DATA
0889  03E7 879F 0407                COPY    A,GPSAVE SAVE
0890  03E8 8398 0401                COPY    GPIN,A   FETCH INPUT DATA
0891  03E9 9B9D 0407                XOR     GPSAVE,A TEST DATA
0892  03EA 1143 03EE                JEQ     A,GPTS2B
0893  03EB A39B 0407                COPY    GPSAVE,X FETCH EXPECTED DATA
0894  03EC 8394 0401                COPY    GPIN,A   FETCH ACTUAL DATA
0895  03ED 0E0D                     HLT
0896       03EE             GPTS2B EQU     $
0897  03EE DF9A 0409                IMS     GPPASS   BUMP PASS COUNT
0898  03EF 9E9C 040C                JMP     GPTS2C   JUMP IF NOT FINISHED
0899                        *
0900                        *       HERE WE EXIT TO NEXT TEST
0901                        *
0902  03F0 9E2D 039E                JMP     GPTS2    PATCHABLE LOOP
0903  03F0                          ORG     $-1
0904  03F0 0000                     NOP
0905  03F1 9EF7 0469                JMP     GPTS3
0906  03F2 0000                     DATA    0,0,0,0,0,0,0,0,0,0
      03F3 0000
      03F4 0000
      03F5 0000
      03F6 0000
      03F7 0000
      03F8 0000
      03F9 0000
      03FA 0000
      03FB 0000
0907       0010                     LPOOL
```

```
                03FC 0100
                03FD 0404
                03FE 040C
                03FF 3377
                0400 0A0F
                0401 0B0F
                0402 026B
                0403 0250
                0404 0260
                0405 026D
                0406 026C
                0407 0265
                0408 FF00
                0409 026A
                040A
                040B
0908            ******
0909            *       FROM THIS POINT TO THE LABEL 'GPTS3' THE
0910            *       GP CONNECTED TO CHANNEL 6 (GP1) WILL BE SET
0911            *       FOR DATA INPUT WITH A BYTE COUNT OF -2.
0912            *       THE GP CONNECTED TO CHANNEL 7 (GP2) WILL BE
0913            *       SET FOR DATA OUTPUT WITH A BYTE COUNT OF -1
0914            *       THE DATA WORD OUTPUT IS :5522, THE EXPECTED
0915            *       INPUT WORD IS :5555.  ERRORS WILL BE
0916            *       INDICATED BY CODED HALTS WHICH ARE DESCRIBED
0917            *       AS FOLLOWS:
0918            *
0919            *       CODED HALT          PURPOSE OF HALT
0920            *
0921            *       :XXA1               BAD DATA - A=ACTUAL DATA
0922            *                                      X=EXPECTED DATA
0923            *       :XXA3               INPUT GP DID NOT ISSUE
0924            *                           END OF BLOCK INTERRUPT
0925            *       :XXA4               OUTPUT GP DID NOT ISSUE
0926            *                           END OF BLOCK INTERRUPT
0927            ******
```

```
0928                        *
0929                        *       HERE WE INITIALIZE GP1 FOR INPUT AND
0930                        *       GP2 FOR OUTPUT
0931                        *
0932        040C            GPTS2C  EQU     $
0933   040C 0E87                    RBIT    8,S         DISABLE INTERRUPTS
0934   040D A26E 03FC               COPY    =:100,X     FETCH RESET CODE
0935   040E BF0C 039B               JST     G10TXC      ISSUE COMMAND TO GP1
0936   040F BF0C 039C               JST     G20TXC      ISSUE COMMAND TO GP2
0937   0410 A3CB 045C               COPY    GP1IL,X     FETCH GP1 INT. ADDR
0938   0411 83CB 045D               COPY    AIB,A
0939   0412 B7CB 045E               OR      GP1ADR,A
0940   0413 8480 0000               COPY    A,@AIOCMD
0941   0414 826C 0401               COPY    =GPIN,A     INPUT BUFFER ADDRESS
0942   0415 0E01                    SHIFT   A,LO,1      CONVERT TO
0943   0416 0AFF                    SUB     =1,A        BYTE ADDRESS -1
0944   0417 8482 0002               COPY    A,@AIOADR
0945   0418 08FE                    COPY    =-2,A
0946   0419 8481 0001               COPY    A,@AIOCNT
0947   041A 82C4 045F               COPY    =ININT,A
0948   041B 8485 0005               COPY    A,@EOBADR
0949   041C 0901                    COPY    =1,A
0950   041D 87C2 0460               COPY    A,INFLG
0951   041E A25F 03FE               COPY    =TAG;INDATA,X
0952   041F BFC1 0461               JST     G10TXC      ISSUE COMMAND TO GP1
0953   0420 A3C1 0462               COPY    GP2IL,X     FETCH GP2 INT. ADDRESS
0954   0421 83C1 0463               COPY    AOB,A
0955   0422 B7C1 0464               OR      GP2ADR,A
0956   0423 8480 0000               COPY    A,@AIOCMD
0957   0424 825B 0400               COPY    =GPOUT,A OUTPUT BUFFER ADDRESS
0958   0425 0E01                    SHIFT   A,LO,1      CONVERT TO
0959   0426 0AFF                    SUB     =1,A        BYTE ADDRESS -1
0960   0427 8482 0002               COPY    A,@AIOADR
0961   0428 08FF                    COPY    =-1,A
0962   0429 8481 0001               COPY    A,@AIOCNT
0963   042A 82BA 0465               COPY    =OUTINT,A EOB INT. ADDRESS
```

```
0964  042B 8485 0005          COPY   A,@EOBADR
0965  042C 0902               COPY   =2,A
0966  042D 87B8 0466          COPY   A,OUTFLG
0967  042E A24E 03FD          COPY   =TAG;OUTDTA,X
0968  042F BFB7 0467          JST    G20TXC   ISSUE COMMAND TO GP2
0969  0430 0900               COPY   =0,A
0970  0431 8750 0402          COPY   A,GPWAIT
0971  0432 8753 0406          COPY   A,OUTEOB
0972  0433 8751 0405          COPY   A,INEOB
0973  0434 8283 0468          COPY   =:5522,A
0974  0435 874A 0400          COPY   A,GPOUT
0975  0436 0900               COPY   =0,A
0976  0437 874A 0402          COPY   A,GPWAIT
0977  0438 8748 0401          COPY   A,GPIN
0978  0439 A249 0403          COPY   =BR;STRTGP,X
0979  043A BFAC 0467          JST    G20TXC
0980  043B A248 0404          COPY   =BR;BEGN,X
0981  043C BFA4 0461          JST    G10TXC
0982  043D 0E85               SBIT   8,S      ENABLE INTERRUPTS
0983        043E        GPTS2F EQU    $
0984  043E 8346 0405          COPY   INEOB,A  FETCH INPUT EOB FLAG
0985  043F 1143 0443          JEG    A,GPTS2G JUMP IF CLEAR
0986  0440 8345 0406          COPY   OUTEOB,A FETCH OUTPUT EOB FLAG
0987  0441 1141 0443          JEQ    A,GPTS2G JUMP IF CLEAR
0988  0442 9E88 044B          JMP    GPTS2H
0989        0443        GPTS2G EQU    $
0990  0443 DF3E 0402          IMS    GPWAIT
0991  0444 9E79 043E          JMP    GPTS2F
0992  0445 833F 0405          COPY   INEOB,A  FETCH INPUT EOB FLAG
0993  0446 11C1 0448          JNE    A,$+2
0994  0447 0E0D               HLT
0995  0448 833D 0406          COPY   OUTEOB,A FETCH OUTPUT EOB FLAG
0996  0449 11C1 044B          JNE    A,$+2
0997  044A 0E0D               HLT
0998  044B 0900         GPTS2H COPY   =0,A
0999  044C 8739 0406          COPY   A,OUTEOB
```

```
1000  044D 8737 0405          COPY    A,INEOB
1001  044E 8331 0400          COPY    GPOUT,A  FETCH OUTPUT DATA
1002  044F 0E79               SHIFT   A,RO,8   RIGHT JUSTIFY LEFT BYTE
1003  0450 8736 0407          COPY    A,GPSAVE
1004  0451 832E 0400          COPY    GPOUT,A  FETCH OUTPUT DATA
1005  0452 9635 0408          AND     =:FF00,A ISOLATE LEGT BYTE
1006  0453 8733 0407          OR      GPSAVE,A
1007  0454 8732 0407          COPY    A,GPSAVE
1008  0455 832B 0401          COPY    GPIN,A
1009  0456 9B30 0407          XOR     GPSAVE,A
1010  0457 1143 045B          JEQ     A,GPTS2I
1011  0458 A32E 0407          COPY    GPSAVE,X
1012  0459 8327 0401          COPY    GPIN,A
1013  045A 0E0D               HLT
1014       045B         GPTS2I EQU     $
1015  045B 9E12 03EE          JMP     GPTS2B
1016       000D               LPOOL
      045C 0268
      045D 025F
      045E 0266
      045F 02C3
      0460 026E
      0461 02A9
      0462 0269
      0463 025E
      0464 0267
      0465 02DB
      0466 026F
      0467 0286
      0468 5522
```

```
1018                    ******
1019                    *               TEST 3 - GPTS3
1020                    *       THIS TEST IS DESIGNED TO TEST THE INPUT GP
1021                    *       WILL NOT END OF BLOCK WHEN ITS BYTE COUNT
1022                    *       IS GREATER THAN THE OUTPUT BYTE COUNT.  THE
1023                    *       GP CONNECTED TO CHANNEL 6 (GP1) IS SET FOR
1024                    *       COMMAND INPUT WITH A BYTE COUNT OF -4.  THE
1025                    *       GP CONNECTED TO CHANNEL 7 (GP2) IS SET FOR
1026                    *       COMMAND OUTPUT WITH A BYTE COUNT OF -2.
1027                    *       THE FOLLOWING CODED HALTS WILL INDICATE
1028                    *       AN ERROR:
1029                    *
1030                    *       CODED HALT          PURPOSE OF HALT
1031                    *
1032                    *       :XX34               OUTPUT GP DID NOT ISSUE
1033                    *                           END OF BLOCK INTERRUPT
1034                    *       :XX3F               INPUT GP BLOCK COUNT NOT
1035                    *                           -2 AFTER OUTPUT EOB.
1036                    ******
1037         0469       GPTS3   EQU     $
1038   0469 0E87                RBIT    8,S         DISABLE INTERRUPTS
1039   046A 0901                COPY    =1,A
1040   046B 8774 0460           COPY    A,INFLG     SET INPUT FLAG FOR GP1
1041   046C A36F 045C           COPY    GP1IL,X     FETCH GP1 INT. ADDR.
1042   046D 836F 045D           COPY    AIB,A
1043   046E B76F 045E           OR      GP1ADR,A
1044   046F 8480 0000           COPY    A,@AIOCMD
1045   0470 08FC                COPY    =-4,A
1046   0471 8481 0001           COPY    A,@AIOCNT
1047   0472 826C 045F           COPY    =ININT,A
1048   0473 8485 0005           COPY    A,@EOBADR
1049   0474 820C 0401           COPY    =GPIN,A
1050   0475 0E01                SHIFT   A,LO,1       CONVERT TO
1051   0476 0AFF                SUB     =1,A        BYTE ADDRESS -1
1052   0477 8482 0002           COPY    A,@AIOADR
1053   0478 0902                COPY    =2,A
```

```
1054  0479 876C 0466          COPY   A,OUTFLG SET OUTPUT FLAG FOR GP2
1055  047A A367 0462          COPY   GP2IL,X  FETCH GP2 INT. ADDR
1056  047B A366 0462          COPY   GP2IL,X  FETCH GP2 INT. ADDR
1057  047C 8366 0463          COPY   AOB,A
1058  047D B766 0464          OR     GP2ADR,A
1059  047E 8480 0000          COPY   A,@AIOCMD
1060  047F 08FE               COPY   =-2,A
1061  0480 87C3 04C4          COPY   A,GPPASS SET PASS COUNT =2
1062  0481 8481 0001          COPY   A,@AIOCNT
1063  0482 8262 0465          COPY   =OUTINT,A
1064  0483 8485 0005          COPY   A,@EOBADR
1065  0484 82C0 04C5          COPY   =GPOUT,A OUTPUT BUFFER ADDRESS
1066  0485 0E01               SHIFT  A,LO,1   CONVERT TO
1067  0486 0AFF               SUB    =1,A     BYTE ADDRESS -1
1068  0487 8482 0002          COPY   A,@AIOADR
1069  0488 0900               COPY   =0,A
1070  0489 87BC 04C6          COPY   A,GPWAIT
1071  048A 87BC 04C7          COPY   A,OUTEOB
1072  048B 87BC 04C8          COPY   A,INEOB
1073                     *
1074                     *    AT THIS POINT GP1 INT. VECTOR SET FOR
1075                     *    INPUT (4 BYTES) AND GP2 INT. VECTOR SET
1076                     *    FOR OUTPUT (2 BYTES)
1077                     *
1078  048C A2BC 04C9          COPY   =:100,X  RESET CODE
1079  048D BF53 0461          JST    G1OTXC   ISSUE COMMAND TO GP1
1080  048E BF58 0467          JST    G2OTXC   ISSUE COMMAND TO GP2
1081  048F A2BA 04CA          COPY   =TAG;INCMD,X FETCH COMMAND INPUT CODE
1082  0490 BF50 0461          JST    G1OTXC   ISSUE COMMAND TO GP1
1083  0491 A2B9 04CB          COPY   =TAG;OUTCMD,X FETCH COMMAND OUTPUT CODE
1084  0492 BF54 0467          JST    G2OTXC   ISSUE COMMAND TO GP2
1085                     *
1086                     *    AT THIS POINT GP1 SET FOR COMMAND INPUT
1087                     *    AND GP2 SET FOR COMMAND OUTPUT
1088                     *
1089  0493 82B8 04CC          COPY   =:1111,A FETCH DATA
```

```
1090  0494 A2B0 04C5          COPY   =GPOUT,X FETCH OUTPUT BUFFER ADDR.
1091  0495 8480 0000          COPY   A,@0
1092  0496 2B01               ADD    =1,X
1093  0497 8AB4 04CC          ADD    =:1111,A
1094  0498 8480 0000          COPY   A,@0
1095  0499 2B01               ADD    =1,X
1096  049A 8AB1 04CC          ADD    =:1111,A
1097  049B 8480 0000          COPY   A,@0
1098  049C 2B01               ADD    =1,X
1099  049D 8AAE 04CC          ADD    =:1111,A
1100  049E 8480 0000          COPY   A,@0
1101                    *
1102                    *      AT THIS POINT OUTPUT BUFFER SET WITH
1103                    *      :1111,:2222,:3333,:4444.
1104                    *
1105                    *      HERE WE START GP1
1106                    *
1107       049F         GPTS3A EQU    $
1108  049F A2AD 04CD           COPY   =BR;BEGN,X FETCH START CODE
1109  04A0 BF40 0461           JST    G1OTXC   ISSUE COMMAND TO GP1
1110                    *
1111                    *      HERE WE START GP2
1112                    *
1113  04A1 A2AC 04CE           COPY   =BR;STRTGP,X
1114  04A2 BF44 0467           JST    G2OTXC   ISSUE COMMAND TO GP2
1115  04A3 0E85                SBIT   8,S      ENABLE INTERRUPTS
1116  04A4 83A2 04C7  GPTS3B   COPY   OUTEOB,A FETCH OUTPUT EOB FLAG
1117  04A5 11C4 04AA           JNE    A,GPTS3C JUMP IF OUTPUT EOB
1118  04A6 DF9F 04C6           IMS    GPWAIT
1119  04A7 9E7C 04A4           JMP    GPTS3B
1120  04A8 0E0D                HLT
1121                    *
1122  04A9 9E3F 0469           JMP    GPTS3    PATCHABLE LOOP
1123  04A9                     ORG    $-1
1124  04A9 0000                NOP
1125                    *
```

```
1126  04AA 839A 04C5  GPTS3C COPY   GPOUT,A
1127  04AB 9BA3 04CF         XOR    GPIN,A
1128  04AC 1164 04D1         JEQ    A,GPTS3D
1129  04AD 0E0D              HLT
1130                 *
1131                 *        HERE WE EXIT TO NEXT TEST
1132                 *
1133       04AE      GPT3C1 EQU    $
1134  04AE 9E3A 0469         JMP    GPTS3     PATCHABLE LOOP
1135  04AE                   ORG    $-1
1136  04AE 0000              NOP
1137  04AF 9EE3 0513         JMP    GPTS4
1138  04B0 0000              RES    10,0      10 NOP'S
1139  04BA 0000              RES    10,0      10 NOP'S
1140       000D              LPOOL
           04C4 026A
           04C5 0A0F
           04C6 026B
           04C7 026C
           04C8 026D
           04C9 0100
           04CA 0408
           04CB 0400
           04CC 1111
           04CD 0260
           04CE 0250
           04CF 0B0F
           04D0
1141                 ******
1142                 *        HERE THE GP CONNECTED TO CHANNEL 6 (GP1)
1143                 *        IS SET FOR COMMAND OUTPUT WITH A BYTE COUNT
1144                 *        OF -2.  THE GP CONNECTED TO CHANNEL 7 (GP2)
1145                 *        IS SET FOR COMMAND INPUT WITH A BYTE COUNT
1146                 *        OF -4.  THE FOLLOWING CODED HALTS WILL
1147                 *        INDICATE AN ERROR:
1148                 *
```

```
1149                    *       CODED HALT        PURPOSE OF HALT
1150                    *
1151                    *       :XXB4             OUTPUT GP DID NOT ISSUE
1152                    *                         END OF BLOCK INTERRUPT
1153                    *       :XXBF             INPUT GP BLOCK COUNT NOT
1154                    *                         -2 AFTER OUTPUT EOB
1155                    ******
1156                    *
1157  04D1 0902         GPTS3D  COPY    =2,A
1158  04D2 870D 0460            COPY    A,INFLG   SET INPUT FLAG FOR GP2
1159  04D3 0E87                 RBIT    8,S       DISABLE INTERRUPTS
1160  04D4 A274 04C9            COPY    =:100,X   FETCH RESET CODE
1161  04D5 BF08 0461            JST     G10TXC    ISSUE COMMAND TO GP1
1162  04D6 BF10 0467            JST     G20TXC    ISSUE COMMAND TO GP2
1163  04D7 A304 045C            COPY    GP1IL,X   FETCH GP1 INT. ADDR.
1164  04D8 830A 0463            COPY    A0B,A
1165  04D9 B704 045E            OR      GP1ADR,A
1166  04DA 8480 0000            COPY    A,@AIOCMD
1167  04DB 08FE                 COPY    =-2,A
1168  04DC 8481 0001            COPY    A,@AIOCNT
1169  04DD 82AC 050A            COPY    =OUTINT,A
1170  04DE 8485 0005            COPY    A,@EOBADR
1171  04DF 8265 04C5            COPY    =GPOUT,A
1172  04E0 0E01                 SHIFT   A,LO,1    CONVERT TO
1173  04E1 0AFF                 SUB     =1,A      BYTE ADDRESS -1
1174  04E2 8482 0002            COPY    A,@AIOADR
1175  04E3 0901                 COPY    =1,A
1176  04E4 87A6 050B            COPY    A,OUTFLG SET OUTPUT FLAG FOR GP2
1177  04E5 A265 04CB            COPY    =TAG;OUTCMD,X COMMAND OUTPUT CODE
1178  04E6 BFA5 050C            JST     C10TXC    ISSUE COMMAND TO GP1
1179  04E7 A3A5 050D            COPY    GP2IL,X
1180  04E8 83A5 050E            COPY    AIB,A
1181  04E9 B7A5 050F            OR      GP2ADR,A
1182  04EA 8480 0000            COPY    A,@AIOCMD
1183  04EB 08FC                 COPY    =-4,A
1184  04EC 8481 0001            COPY    A,@AIOCNT
```

```
1185  04ED 82A2 0510          COPY   =ININT,A
1186  04EE 8485 0005          COPY   A,@EOBADR
1187  04EF 825F 04CF          COPY   =GPIN,A
1188  04F0 0E01               SHIFT  A,LO,1   CONVERT TO
1189  04F1 0AFF               SUB    =1,A     BYTE ADDRESS -1
1190  04F2 8482 0002          COPY   A,@AIOADR
1191  04F3 A256 04CA          COPY   =TAG;INCMD,X COMMAND/INPUT CODE
1192  04F4 BF9C 0511          JST    G2OTXC   ISSUE COMMAND TO GP2
1193  04F5 0900               COPY   =0,A
1194  04F6 874F 04C6          COPY   A,GPWAIT
1195  04F7 874F 04C7          COPY   A,OUTEOB
1196  04F8 874F 04C8          COPY   A,INEOB
1197  04F9 8755 04CF          COPY   A,GPIN   CLEAR INPUT
1198  04FA 8797 0512          COPY   A,GPIN+1 BUFFER
1199  04FB A252 04CE          COPY   =BR;STRTGP,X FETCH OUTPUT START CODE
1200  04FC BF8F 050C          JST    G1OTXC   ISSUE COMMAND TO GP1
1201  04FD A24F 04CD          COPY   =BR;BEGN,X FETCH INPUT START CODE
1202  04FE BF92 0511          JST    G2OTXC   ISSUE COMMAND TO GP2
1203  04FF 0E85               SBIT   8,S      ENABLE INTERRUPTS
1204        0500        GPTS3E EQU    $
1205  0500 8346 04C7          COPY   OUTEOB,A FETCH OUTPUT EOB FLAG
1206  0501 11C4 0506          JNE    A,GPTS3F
1207  0502 DF43 04C6          IMS    GPWAIT
1208  0503 9E7C 0500          JMP    GPTS3E
1209  0504 0E0D               HLT
1210                          *
1211  0505 9E4B 04D1          JMP    GPTS3D   PATCHABLE LOOP
1212  0505                    ORG    $-1
1213  0505 0000               NOP
1214                          *
1215        0506        GPTS3F EQU    $
1216  0506 833E 04C5          COPY   GPOUT,A  COMPARE BUFFERS EQUAL
1217  0507 9B47 04CF          XOR    GPIN,A
1218  0508 114A 0513          JEQ    A,GPTS4  YES
1219  0509 0E0D               HLT
1220        0009              LPOOL
```

```
050A 02DB
050B 026F
050C 02A9
050D 0269
050E 025F
050F 0267
0510 02C3
0511 02B6
0512 0B10
```

```
1222                    ******          TEST 4 - GPTS4
1223                    *
1224                    *               THIS TEST PUTS BOTH GP'S IN THE
1225                    *               OUTPUT COMMAND MODE.  THE BYTE
1226                    *               COUNT FOR BOTH IS -2.  WHEN THE
1227                    *               GP'S ARE STARTED, AN END-OF-BLOCK
1228                    *               INTERRUPT IS EXPECTED IMMEDIATELY.
1229                    *               IF AN ERROR OCCURS A CODED HALT OF
1230                    *               :XX44 WILL RESULT.  THIS WILL
1231                    *               INDICATE THAT AN END-OF-BLOCK
1232                    *               INTERRUPT DID NOT OCCUR.  A PROBABLE
1233                    *               CAUSE FOR THIS ERROR WOULD BE THE
1234                    *               INABILITY OF THE FIRM WARE TO DETECT
1235                    *               THAT THE POWER STATUS BIT WAS OFF
1236                    *               INDICATING NO POWER.
1237                    ******
1238         0513       GPTS4   EQU     $
1239   0513  0E87               RBIT    8,S       DISABLE INTERRUPTS
1240   0514  0901               COPY    =1,A
1241   0515  8775  050B         COPY    A,OUTFLG SET OUTPUT FLAG FOR GP1
1242   0516  A3C2  0559         COPY    GP1IL,X
1243   0517  83C2  055A         COPY    A0B,A
1244   0518  B7C2  055B         OR      GP1ADR,A
1245   0519  8480  0000         COPY    A,@AIOCMD
1246   051A  08FE               COPY    =-2,A
1247   051B  8481  0001         COPY    A,@AIOCNT
1248   051C  8228  04C5         COPY    =GPOUT,A
1249   051D  0E01               SHIFT   A,LO,1    CONVERT TO
1250   051E  0AFF               SUB     =1,A      BYTE ADDRESS -1
1251   051F  8482  0002         COPY    A,@AIOADR
1252   0520  8269  050A         COPY    =OUTINT,A
1253   0521  8485  0005         COPY    A,@EOBADR
1254   0522  A36A  050D         COPY    GP2IL,X
1255   0523  8386  055A         COPY    A0B,A
1256   0524  B76A  050F         OR      GP2ADR,A
1257   0525  8480  0000         COPY    A,@AIOCMD
```

```
1258  0526 08FE              COPY    =-2,A
1259  0527 871C 04C4         COPY    A,GPPASS
1260  0528 8481 0001         COPY    A,@AIOCNT
1261  0529 821B 04C5         COPY    =GPOUT,A
1262  052A 0E01              SHIFT   A,LO,1   CONVERT TO
1263  052B 0AFF              SUB     =1,A     BYTE ADDRESS -1
1264  052C 8482 0002         COPY    A,@AIOADR
1265  052D 825C 050A         COPY    =OUTINT,A
1266  052E 8485 0005         COPY    A,@EOBADR
1267  052F 0900              COPY    =0,A
1268  0530 8715 04C6         COPY    A,GPWAIT
1269  0531 8715 04C7         COPY    A,OUTEOB
1270  0532 8715 04C8         COPY    A,INEOB
1271                  *
1272                  *      AT THIS POINT BOTH GP1 AND GP2 INT. VECT.
1273                  *      SET FOR OUTPUT
1274                  *
1275  0533 A215 04C9         COPY    =:100,X  RESET CODE
1276  0534 BF57 050C         JST     G1OTXC   ISSUE COMMAND TO GP1
1277  0535 BF5B 0511         JST     G2OTXC   ISSUE COMMAND TO GP2
1278  0536 A214 04CB         COPY    =TAG;OUTCMD,X COMMAND OUTPUT CODE
1279  0537 BF54 050C         JST     G1OTXC   ISSUE COMMAND TO GP1
1280  0538 BF58 0511         JST     G2OTXC   ISSUE COMMAND TO GP2
1281                  *
1282                  *      HERE WE START GP1
1283                  *
1284  0539 0E85              SBIT    8,S      ENABLE INTERRUPTS
1285  053A A213 04CE         COPY    =BR;STRTGP,X FETCH START CODE
1286  053B BF50 050C         JST     G1OTXC   ISSUE COMMAND TO GP1
1287  053C 830A 04C7  GPTS4A COPY    OUTEOB,A FETCH OUTPUT EOB FLAG
1288  053D 11C3 0541         JNE     A,GPTS4B
1289  053E DF07 04C6         IMS     GPWAIT
1290  053F 9E7C 053C         JMP     GPTS4A
1291  0540 0E0D              HLT
1292                  *
1293                  *      HERE WE START GP2 FOR OUTPUT
```

```
1294                        *
1295  0541 9E89 0548  GPTS4B JMP    GPTS4D
1296  0542 0902       GPTS4C COPY   =2,A
1297  0543 8747 050B         COPY   A,OUTFLG SET OUTPUT FLAG FOR GP2
1298  0544 0E87              RBIT   8,S      DISABLE INTERRUPTS
1299  0545 0900              COPY   =0,A
1300  0546 8795 055C         COPY   A,OUTEOB
1301  0547 A295 055D         COPY   =BR;STRTGP,X FETCH START CODE
1302  0548 BF48 0511         JST    G20TXC   ISSUE COMMAND TO GP2
1303  0549 0E85              SBIT   8,S      ENABLE INTERRUPTS
1304  054A 9E71 053C         JMP    GPTS4A
1305  054B DF92 055E  GPTS4D IMS    GPPASS
1306  054C 9E75 0542         JMP    GPTS4C
1307                        *
1308                        *       HERE WE EXIT TO NEXT TEST
1309                        *
1310  054D 9E45 0513         JMP    GPTS4    PATCHABLE LOOP
1311  054D                   ORG    $-1
1312  054D 0000              NOP
1313  054E 9E91 0560         JMP    GPTS5
1314  054F 0000              RES    10,0     10 NOP'S
1315       0007              LPOOL
       0559 0268
       055A 025E
       055B 0266
       055C 026C
       055D 0250
       055E 026A
       055F
```

```
1317                    ******          TEST S - GPTS5
1318                    *
1319                    *               THIS TEST USE THE PROGRAMMED I/O
1320                    *               FEATURE TO DETERMINE IF THE BUSY
1321                    *               STATUS BIT CAN BE SET.  THE GP
1322                    *               CONNECTED TO CHANNEL 6 (GP1) IS
1323                    *               SET TO OUTPUT COMMAND. THE GP
1324                    *               CONNECTED TO CHANNEL 7 (GP2) IS
1325                    *               SET TO INPUT COMMAND.  THE FOLLOWING
1326                    *               CODED HALTS ARE ERROR ENCOUNTERED.
1327                    *
1328                    *       CODED HALT      PURPOSE OF HALT
1329                    *
1330                    *       !XX51           BAD DATA - A=ACTUAL DATA
1331                    *                                  X=EXPECTED DATA
1332                    *       !XX52           STATUS ERROR
1333                    *                       A=ACTUAL, X=EXPECTED
1334                    ******
1335         0560       GPTS5   EQU     $
1336  0560   0E87               RBIT    8,S     DISABLE INTERRUPTS
1337  0561   0901               COPY    =1,A
1338  0562   8728 0508          COPY    A,OUTFLG SET OUTPUT FLAG = GP1
1339  0563   08FE               COPY    =-2,A
1340  0564   8779 055E          COPY    A,GPPASS
1341  0565   0902               COPY    =2,A
1342  0566   8788 05A2          COPY    A,INFLG  SET INPUT FLAG = GP2
1343                    *
1344                    *       HERE WE SET GP1 FOR COMMAND OUTPUT
1345                    *       AND GP2 FOR COMMAND INPUT.
1346                    *
1347  0567   A288 05A3          COPY    =TAG;OUTCMD,X FETCH OUTPUT CMD CODE
1348  0568   BF23 050C          JST     G10TXC  ISSUE COMMAND TO GP1
1349  0569   A28A 05A4          COPY    =TAG;INCMD,X FETCH COMMAND IN CODE
1350  056A   BF26 0511          JST     G20TXC  ISSUE COMMAND TO GP2
1351                    *
1352                    *       HERE WE OUTPUT DATA VIA GP1
```

```
1353                        *
1354  056B 82B9 05A5        COPY   =:FFFF,A FETCH DATA
1355  056C BFB9 05A6        JST    OTADT1   OUTPUT DATA TO GP1
1356                        *
1357                        *      HERE WE INPUT DATA VIA GP2
1358                        *
1359  056D BFB9 05A7        JST    INADT2
1360       056E             GPTS5A EQU    $
1361  056E 0CFF             CLSN   =:FF,A   TEST FOR INPUT DATA
1362  056F 9E82 0572        JMP    GPTS5B
1363  0570 29FF             COPY   =:FF,X   FETCH EXPECTED DATA
1364  0571 0E0D             HLT
1365                        *
1366                        *      HERE WE JUMP TO FIRMWARE TO TEST FOR
1367                        *      BUSY CONDITIONED IN GP1
1368                        *
1369       0572             GPTS5B EQU    $
1370  0572 8FB5 05A8        JST    INAST1   FETCH GP1 STATUS
1371  0573 17FF             XOR    =:00FF,A FORM COMPLEMENT OF STATUS
1372  0574 87B4 05A9        COPY   A,GPSTS1 SAVE STATUS
1373  0575 1804             AND    =4,A     ISOLATE BUSY BIT
1374  0576 11D1 0588        JNE    A,GPTS5E JUMP IF BUSY BIT ON
1375  0577 83B1 05A9        COPY   GPSTS1,A
1376  0578 1801             AND    =1,A
1377  0579 11CE 0588        JNE    A,GPTS5E JUMP IF POWER BIT ON
1378  057A 83AE 05A9        COPY   GPSTS1,A FETCH GP1 STATUS
1379  057B 2904             COPY   =4,X     FETCH EXPECTED STATUS
1380  057C 0E0D             HLT
1381                        *
1382  057D 9E62 0560        JMP    GPTS5    PATCHABLE LOOP
1383  057D                  ORG    $-1
1384  057D 0000             NOP
1385                        *
1386                        *
1387                        *
1388                        *      HERE WE JUMP TO FIRMWARE TO TEST FOR
```

```
1389                        *       BUSY CONDITION IN GP2
1390                        *
1391  057E 0000                     RES     10,0
1392       0588             GPTS5E EQU     $
1393  0588 BFA1 05AA               JST     INAST2   FETCH GP2 STATUS
1394  0589 17FF                    XOR     =:00FF,A FORM COMPLEMENT OS STATUS
1395  058A 87A0 05AB               COPY    A,GPSTS2 SAVE GP2 STATUS
1396  058B 1804                    AND     =4,A     ISOLATE BUSY BIT
1397  058C 11C7 0594               JNE     A,GPTS5C JUMP IF BUSY
1398  058D 839D 05AB               COPY    GPSTS2,A FETCH GP2 STATUS
1399  058E 1801                    AND     =1,A
1400  058F 11C4 0594               JNE     A,GPTS5C JUMP IF POWER BIT ON
1401  0590 839A 05AB               COPY    GPSTS2,A FETCH GP2 STATUS
1402  0591 2904                    COPY    =4,X     FETCH EXPECTED STATUS
1403  0592 0E0D                    HLT
1404  0593 9E4C 0560               JMP     GPTS5    PATCHABLE LOOP
1405  0593                         ORG     $-1
1406  0593 0000                    NOP
1407  0594 DF49 055E   GPTS5C      IMS     GPPASS
1408  0595 9E98 05AE               JMP     GPTS5D
1409                        *
1410                        *       HERE WE EXIT TO NEXT TEST
1411                        *
1412  0596 9E49 0560               JMP     GPTS5    PATCHABLE LOOP
1413  0596                         ORG     $-1
1414  0596 0000                    NOP
1415  0597 9EA2 05BA               JMP     GPTS6
1416  0598 0000                    RES     10,0
1417       000C                    LPOOL
      05A2 026E
      05A3 0400
      05A4 0408
      05A5 FFFF
      05A6 02B3
      05A7 02B0
      05A8 02AC
```

```
      05A9 0270
      05AA 0289
      05AB 0271
      05AC
      05AD
1418                  *
1419                  *       HERE WE SET GP1 FOR INPUT AND GP2 FOR OUTPUT
1420                  *
1421  05AE A275 05A4  GPTS5D COPY   =TAG;INCMD,X FETCH COMMAND IN CODE
1422  05AF BF86 05B6        JST    G1OTXC   ISSUE COMMAND TO GP1
1423  05B0 A272 05A3        COPY   =TAG;OUTCMD,X FETCH COMMAND OUT CODE
1424  05B1 BF85 05B7        JST    G2OTXC   ISSUE COMMAND TO GP2
1425  05B2 8272 05A5        COPY   =:FFFF,A
1426  05B3 BF84 05B8        JST    OTADT2   OUTPUT DATA VIA GP2
1427  05B4 BF84 05B9        JST    INADT1   INPUT DATA VIA GP1
1428  05B5 9E38 056E        JMP    GPTS5A
1429       0004             LPOOL
      05B6 02A9
      05B7 02B6
      05B8 02C0
      05B9 02B0
```

```
1431                    ******      TEST 6 - GPTS6
1432                    *
1433                    *           THE GP'S ARE SET TO INPUT COMMAND,
1434                    *           A BRANCH IS THEN EXECUTED TO
1435                    *           FIRM WARE LOCATION 4 (WHICH ASSERTS
1436                    *           FS) STATUS IS READ AND TEST FOR FS
1437                    *           TO BE PRESENT (BIT 5).  THE FOLLOWING
1438                    *           ARE CODED HALTS THAT CAN OCCUR.
1439                    *
1440                    *     CODED HALT        PURPOSE OF HALT
1441                    *
1442                    *     :XX61             FS NOT ON - (GP2)
1443                    *                       A=ACTUAL, X=EXPECTED
1444                    *     :XX62             FS NOT OFF - (GP2)
1445                    *                       A=ACTUAL, X=EXPECTED
1446                    *     :XX63             FS NOT ON - (GP1)
1447                    *                       A=ACTUAL, X=EXPECTED
1448                    *     :XX64             FS NOT OFF - (GP1)
1449                    *                       A=ACTUAL, X=EXPECTED
1450                    *
1451                    ******
1452                    *
1453                    *     THIS SECTION WILL TEST FOR FS TO
1454                    *     BE ASCERTED.
1455                    *NOTICE - THIS TEST IS NOT POSSIBLE WHEN DMA
1456                    * I/O DISTRIBUTOR IS USED.
1457                    *
1458        05BA        GPTS6  EQU    $
1459  05BA 83A3 05DE           COPY   OPDASH,A
1460  05BB 0C80                CLSN   =:80,A
1461  05BC 9FA2 05DF           JMP    GPDAR
1462                    *
1463  05BD A266 05A4           COPY   =TAG;INCRD,X FETCH INPUT COMMAND CODE
1464  05BE BF77 05B6           JST    G1OTXC   ISSUE COMMAND TO GP1
1465  05BF BF77 05B7           JST    G2OTXC   ISSUE COMMAND TO GP2
1466  05C0 A29F 05E0           COPY   =BR;:40,X BRANCH TO LOC 4 CODE
```

```
1467  05C1 BF74 05B6          JST    G1OTXC   ISSUE COMMAND TO GP1
1468  05C2 BF67 05AA          JST    INAST2   FETCH GP2 STATUS
1469  05C3 1820               AND    =:20,A   TEST FOR FS PRESENT
1470  05C4 1142 05C7          JEQ    A,GPTS6A JUMP IF PRESENT
1471  05C5 2900               COPY   =0,X     FETCH EXPECTED STATUS
1472  05C6 0E0D               HLT            :61      BAD STATUS (GP2) FS NOT ON
1473       05C7         GPTS6A EQU    $
1474  05C7 A299 05E1          COPY   =BR;0,X  BRANCH TO LOC 0 CODE
1475  05C8 BF6D 05B6          JST    G1OTXC   ISSUE COMMAND TO GP1
1476  05C9 BF60 05AA          JST    INAST2   FETCH GP2 STATUS
1477  05CA 1820               AND    =:20,A   TEST FOR FS
1478  05CB 11C2 05CE          JNE    A,GPTS6B JUMP IF FS OFF
1479  05CC 2920               COPY   =:20,X   FETCH EXPECTED STATUS
1480  05CD 0E0D               HLT
1481       05CE         GPTS6B EQU    $
1482  05CE A291 05E0          COPY   =BR;:40,X BRANCH TO LOC 4 CODE
1483  05CF BF67 05B7          JST    G2OTXC   ISSUE COMMAND TO GP2
1484  05D0 BF57 05A8          JST    INAST1   FETCH GP1 STATUS
1485  05D1 1820               AND    =:20,A   TEST FOR FS
1486  05D2 1142 05D5          JEQ    A,GPTS6C JUMP IF FS ON
1487  05D3 2900               COPY   =0,X     FETCH EXPECTED STATUS
1488  05D4 0E0D               HLT
1489       05D5         GPTS6C EQU    $
1490  05D5 A28B 05E1          COPY   =BR;0,X  BRANCH TO LOC ZERO CODE
1491  05D6 BF60 05B7          JST    G2OTXC   ISSUE COMMAND TO GP2
1492  05D7 BF50 05A8          JST    INAST1   FETCH GP1 STATUS
1493  05D8 1820               AND    =:20,A   TEST FS BIT
1494  05D9 11C2 05DC          JNE    A,GPTS6D JUMP IF FS OFF
1495  05DA 2920               COPY   =:20,X   EXPECTED STATUS
1496  05DB 0E0D               HLT
1497       05DC         GPTS6D EQU    $
1498  05DC 9E5D 05BA          JMP    GPTS6    PATCHABLE LOOP
1499  05DC                    ORG    $-1
1500  05DC 0000               NOP
1501  05DD 9E85 05E3          JMP    GPTS7
1502       0005               LPOOL
```

```
      05DE 0272
      05DF 0684
      05E0 0240
      05E1 0200
      05E2
1503        05E3        GPTS7   EQU     $
1504  05E3  8287 05EB            COPY    LPINDC,A FETCH LOOP INDICATOR
1505  05E4  0B01                ADD     =1,A     BUMP BY 1
1506  05E5  8685 05EB            COPY    A,LPINDC SAVE
1507  05E6  0404                SELP    A,0*8+4  OUTPUT LOOP INDICATION
1508  05E7  9F84 05EC            JMP     GPTS1    PATCHABLE LOOP
1509  05E7                      ORG     $-1
1510  05E7  0000                NOP
1511  05E8  16C1 05EA            JF      SS,$+2   JUMP IF SENSE SWITCH OFF
1512  05E9  0E0D                HLT
1513  05EA  9F81 05EC            JMP     GPTS1
1514  05EB  0000        LPINDC  DATA    0
1515        0001                LPOOL
      05EC  02F3
1516                    *   GPSETV IS A SUBROUTINE WHICH SETS UP INTERRUPT LOCATIONS
1517  05ED  0E0D        GPSETV  ENT
1518  05EE  0E87                RBIT    8,S
1519  05EF  A39A 060A           COPY    GP1IL,X
1520  05F0  839A 060B           COPY    A0B,A
1521  05F1  B79A 060C           OR      GP1ADR,A
1522  05F2  8480 0000           COPY    A,@AIOCMD
1523  05F3  8299 060D           COPY    =VBYTC1,A
1524  05F4  8481 0001           COPY    A,@AIOCNT
1525  05F5  8298 060E           COPY    =T2E0BE,A
1526  05F6  8485 0005           COPY    A,@E0BADR
1527  05F7  8297 060F           COPY    =GPOUT,A
1528  05F8  0E01                SHIFT   A,LO,1
1529  05F9  0AFF                SUB     =1,A
1530  05FA  8482 0002           COPY    A,@AIOADR
1531  05FB  A394 0610           COPY    GP2IL,X
1532  05FC  8394 0611           COPY    AIB,A
```

```
1533  05FD 8794 0612          OR      GP2ADR,A
1534  05FE 8480 0000          COPY    A,@AIOCMD
1535  05FF 828D 060D          COPY    =VBYTC1,A
1536  0600 8481 0001          COPY    A,@AIOCNT
1537  0601 828C 060E          COPY    =T2EOBE,A
1538  0602 8485 0005          COPY    A,@EOBADR
1539  0603 828F 0613          COPY    =GPIN,A
1540  0604 0E01               SHIFT   A,LO,1
1541  0605 0AFF               SUB     =1,A
1542  0606 8482 0002          COPY    A,@AIOADR
1543  0607 08FE               COPY    =-2,A
1544  0608 86E7 0670          COPY    A,T2CNTR
1545  0609 9F63 05ED          RTN     GPSETV
1546       000B               LPOOL
      060A 0268
      060B 025E
      060C 0266
      060D FE00
      060E 0663
      060F 0A0F
      0610 0269
      0611 025F
      0612 0267
      0613 0B0F
      0614
1547                     *
1548                     * BIFDIE IS A ROUTINE WHICH INITIALIZES BUFFERS
1549                     *
1550  0615 0E0D          BUFDIE ENT
1551  0616 A2A2 0639             COPY    =VBYTCT,X       INITIALIZE FOR INPUT BUFFER
1552  0617 A6DC 0674             COPY    X,T1CNTR
1553  0618 A27A 0613             COPY    =GPIN,X
1554  0619 82A0 063A             COPY    =:5050,A PUT :5050 IN
1555  061A 8480 0000  DXTVAL     COPY    A,@0      INPUT BUFFER
1556  061B 2801                  ADD     =1,X      BUMP INDEX
1557  061C DED7 0674             IMS     T1CNTR    FINISHED?
```

```
1558  061D 9E7C 061A          JMP     DXTVAL    NO
1559  061E A29A 0639          COPY    =VBYTCT,X       YES
1560  061F A6D4 0674          COPY    X,T1CNTR INITIALIZE STUFF
1561  0620 A26E 060F          COPY    =GPOUT,X FOR OUT BUFFER
1562  0621 8299 063B          COPY    =:A0A0,A PUT :A0A0 IN
1563  0622 8480 0000  DXTVL1  COPY    A,@0      OUTPUT BUFFER
1564  0623 2801               ADD     =1,X      BUMP INDEX
1565  0624 DECF 0674          IMS     T1CNTR    FINISCHER?
1566  0625 9E7C 0622          JMP     DXTVL1    NO
1567  0626 9F6E 0615          RTN     BUFDIE    YES -RETURN
1568                        *   BUFINT IS A ROUTINE WHICH INITIALIZES BUFFERS
1569  0627 0E0D         BUFINT ENT
1570  0628 A290 0639          COPY    =VBYTCT,X
1571  0629 A6CA 0674          COPY    X,T1CNTR
1572  062A A268 0613          COPY    =GPIN,X
1573  062B 8290 063C          COPY    =:0A0A,A
1574  062C 8480 0000  NXTVAL  COPY    A,@0
1575  062D 2801               ADD     =1,X
1576  062E DEC5 0674          IMS     T1CNTR
1577  062F 9E7C 062C          JMP     NXTVAL
1578  0630 A288 0639          COPY    =VBYTCT,X
1579  0631 A6C2 0674          COPY    X,T1CNTR
1580  0632 A25C 060F          COPY    =GPOUT,X
1581  0633 8289 063D          COPY    =:0505,A
1582  0634 8480 0000  NXTVL1  COPY    A,@0
1583  0635 2801               ADD     =1,X
1584  0636 DEBD 0674          IMS     T1CNTR
1585  0637 9E7C 0634          JMP     NXTVL1
1586  0638 9F6E 0627          RTN     BUFINT
1587                        *   BUFCHK IS A ROUTINE WHICH CHECKS THE INPUT BUFFER AND OUTPUT
1588                        *   BUFFER
1589       0006                 LPOOL
      0639 FF00
      063A 5050
      063B A0A0
      063C 0A0A
```

```
      063D 0505
      063E
1590  063F 0E0D        BUFCHK ENT
1591  0640 A252 0613          COPY   =GPIN,X
1592  0641 A6AF 0671          COPY   X,GPINN
1593  0642 A24C 060F          COPY   =GPOUT,X
1594  0643 A6AE 0672          COPY   X,GPOUT1
1595  0644 A274 0639          COPY   =VBYTCT,X
1596  0645 A6AE 0674          COPY   X,T1CNTR
1597  0646 A2AA 0671  NXTVL2  COPY   GPINN,X
1598  0647 8080 0000          COPY   @0,A
1599  0648 86AA 0673          COPY   A,INVAL
1600  0649 A2A8 0672          COPY   GPOUT1,X
1601  064A 8080 0000          COPY   @0,A
1602  064B 9AA7 0673          XOR    INVAL,A
1603  064C 1141 064E          JEQ    A,$+2
1604  064D 0E0D               HLT
1605  064E DEA2 0671          IMS    GPINN
1606  064F DEA2 0672          IMS    GPOUT1
1607  0650 DEA3 0674          IMS    T1CNTR
1608  0651 9E74 0646          JMP    NXTVL2
1609  0652 9F6C 063F          RTN    BUFCHK
1610       0003               LPOOL
      0653
      0654
      0655
1611  0656 0E0D        TIMOUT ENT
1612  0657 08F0               COPY   =DELAY1,A
1613  0658 869D 0676          COPY   A,WAIT1
1614  0659 08F0               COPY   =DELAY2,A
1615  065A 869C 0677          COPY   A,WAIT2
1616  065B 0E85        STS202 SBIT   8,S
1617  065C DE9A 0677   SIS203 IMS    WAIT2
1618  065D 9E7D 065B          JMP    STS202
1619  065E 0E17               RBIT   OV,S
1620  065F DE96 0676          IMS    WAIT1
```

```
1621  0660 9E7A 065B          JMP     STS202
1622  0661 0E0D               HLT
1623  0662 9F73 0656          RTN     TIMOUT
1624  0663 0E0D       T2EOBE  ENT
1625  0664 DE8B 0670          IMS     T2CNTR
1626  0665 9F7D 0663          RTN     T2EOBE
1627  0666 9F80 0667          JMP     *TS205
1628  0667 0000       TS205   DATA    $-$
1629  0668 0E0D       ERROR   ENT
1630  0669 868B 0675          COPY    A,ASAVE
1631  066A 827D 0668          COPY    ERROR,A  GET THE -P- REGISTER
1632  066B 0AFF               SUB     =1,A
1633  066C 0404               SELP    A,4      OUTPUT IT TO CONSOLE
1634  066D 0E0D               HLT
1635  066E 8286 0675          COPY    ASAVE,A  RESTORE -A- REGISTER
1636  066F 9F78 0668          RTN     ERROR
1637       FF00       VBYTCT  EQU     :FF00
1638       1668       PARONI  EQU     :1668
1639  0670 0000       T2CNTR  RES     1,0
1640  0671 0000       GPINN   RES     1,0
1641  0672 0000       GPOUT1  RES     1,0
1642  0673 0000       INVAL   RES     1,0
1643  0674 0000       T1CNTR  RES     1,0
1644  0675 0000       ASAVE   RES     1,0
1645       FFF0       DELAY1  EQU     -16
1646       FFF0       DELAY2  EQU     -16
1647  0676 0000       WAIT1   RES     1,0
1648  0677 0000       WAIT2   RES     1,0
1649  0678 0738       C8MIC   DATA    C8MICD
1650  0679 072D       C7MIC   DATA    C7MICD
1651  067A 0000       PARS    RES     1,0
1652       80AA       SPCHS7  EQU     :80AA
1653       FE00       VBYTC1  EQU     :FE00
1654       0668       GPINCM  EQU     :668
1655       0250       GPOUCM  EQU     :250
1656  067B 0000       GPSRI   RES     1,0
```

```
1657  067C 0000        GPOUI  RES    1,0
1658  067D 0000        MEMVAL RES    1,0
1659  067E 0000        ILMEMT RES    1,0
1660  067F 0000        ILMM   RES    1,0
1661  0680 0000        LENGTH RES    1,0
1662  0681 0000        SRFLG  RES    1,0
1663       FFF0        COUNT2 EQU    :FFF0
1664       FFF8        COUNT3 EQU    :FFF8
1665       0099        D99    EQU    :99
1666       0080        D80    EQU    :80
```

```
1668         0002                LPOOL
      0682
      0683
1669         0684        GPDAR   EQU     $
1670   0684  A2D6 06DB           COPY    =PARONI,X
1671   0685  A674 067A           COPY    X,PARS
1672   0686  A2D5 06DC           COPY    =GPINCM,X
1673   0687  A673 067B           COPY    X,GPSRI
1674   0688  A2D4 06DD           COPY    =GPOUCM,X
1675   0689  A672 067C           COPY    X,GPOUI
1676         068A        GPSRTT  EQU     $
1677                     *    DATA TRANSFER BETWEEN CHANNEL PAIR
1678   068A  BFD3 06DE           JST     GPSETV
1679   068B  82D3 06DF           COPY    =TS206,A SET EOB SERVICE ADDRESS
1680   068C  865A 0667           COPY    A,TS205
1681   068D  BE19 0627           JST     BUFINT
1682   068E  A2D1 06E0           COPY    =:100,X
1683   068F  BFD1 06E1           JST     G10TXC
1684   0690  BFD1 06E2           JST     G20TXC
1685   0691  A2D1 06E3           COPY    =:402,X  REQUEST TO SEND
1686   0692  BFCE 06E1           JST     G10TXC
1687   0693  0914                COPY    =20,A
1688   0694  BFCF 06E4           JST     WAIT
1689   0695  0E87                RBIT    8,S
1690   0696  A264 067B           COPY    GPSR1,X
1691   0697  BFCA 06E2           JST     G20TXC
1692   0698  A263 067C           COPY    GPOUI,X
1693   0699  BFC7 06E1           JST     G10TXC
1694   069A  BE3B 0656           JST     TIMOUT
1695   069B  BE23 063F   TS206   JST     BUFCHK
1696                     *
1697                     * THIS CODE IS FOR 7 BIT TRANSFER ONLY
1698                     *
1699   069C  83C8 06E5           COPY    OPDASH,A DIEHOLD (7BIT)?
1700   069D  0C99                CAI     D99
1701   069E  9E81 06A0           JMP     $+2
```

```
1702  069F 9E9D 06BD          JMP    PARTY     NO
1703  06A0 BF8D 06DE          JST    GPSETV
1704  06A1 82C4 06E6          COPY   =TS208,A SET EOB SERVICE ADDR
1705  06A2 8644 0667          COPY   A,TS205
1706  06A3 BFC3 06E7          JST    BUFDIE    FILL BUFFERS A0A0,5050
1707  06A4 A2BB 06E0          COPY   =:100,X   RESET BOTH PICOS
1708  06A5 BFBB 06E1          JST    G1OTXC
1709  06A6 BFBB 06E2          JST    G2OTXC
1710  06A7 A2BB 06E3          COPY   =:402,X   REQUEST TO SEND
1711  06A8 BFB8 06E1          JST    G1OTXC
1712  06A9 0914               COPY   =20,A
1713  06AA BFB9 06E4          JST    WAIT
1714  06AB 0E87               RBIT   8,S
1715  06AC A24E 067B          COPY   GPSRI,X
1716  06AD BFB4 06E2          JST    G2OTXC    START INPUT
1717  06AE A3B9 06E8          COPY   GPOUT,X
1718  06AF BFB1 06E1          JST    G1OTXC    START OUTPUT
1719  06B0 BE25 0656          JST    TIMOUT
1720       06B1          TS208  EQU    $
1721  06B1 A207 0639          COPY   =VBYTCT,X       CHECK RESULTS
1722  06B2 A641 0674          COPY   X,T1CNTR
1723  06B3 A2B5 06E9          COPY   =GPIN,X
1724  06B4 8080 0000  DBACK   COPY   @0,A
1725  06B5 863D 0673          COPY   A,INVAL
1726  06B6 82B3 06EA          COPY   =:2020,A ONLY 7 BIT TRANSFER
1727  06B7 9A3B 0673          XOR    INVAL,A
1728  06B8 1141 06BA          JEQ    A,$+2     YES
1729  06B9 0E0D               HLT              NO-ERROR
1730  06BA 2B01               ADD    =1,X
1731  06BB DE38 0674          IMS    T1CNTR    FINISHED?
1732  06BC 9E77 06B4          JMP    DBACK     NO
1733                        *   IN THE FOLLOWING PORTION OF THE PROGRAM
1734                        *   PARITY STANDARDIZATION IS CHECKED
1735  06BD A2A2 06E0  PARTY  COPY   =:100,X
1736  06BE BFA2 06E1          JST    G1OTXC
1737  06BF BFA2 06E2          JST    G2OTXC
```

```
1738  06C0 BF9D 06DE          JST     GPSETV
1739  06C1 82A9 06EB          COPY    =TS207,A
1740  06C2 8624 0667          COPY    A,TS205
1741  06C3 BFA8 06EC          JST     BUFINT
1742  06C4 A29E 06E3          COPY    =:402,X  REQUEST TO SEND
1743  06C5 BF9B 06E1          JST     G1OTXC
1744  06C6 0914               COPY    =20,A
1745  06C7 BF9C 06E4          JST     WAIT
1746  06C8 0E87               RBIT    8,S
1747  06C9 A230 067A          COPY    PARS,X
1748  06CA BF97 06E2          JST     G2OTXC
1749  06CB A230 067C          COPY    GPOUI,X
1750  06CC BF94 06E1          JST     G1OTXC
1751  06CD BE08 0656          JST     TIMOUT
1752        06CE        TS207 EQU     $
1753  06CE A29E 06ED          COPY    =VBYTCT,X
1754  06CF A624 0674          COPY    X,T1CNTR
1755  06D0 A298 06E9          COPY    =GPIN,X
1756  06D1 8080 0000  PBACK   COPY    @0,A
1757  06D2 8620 0673          COPY    A,INVAL
1758  06D3 829A 06EE          COPY    =:0505,A
1759  06D4 9A1E 0673          XOR     INVAL,A
1760  06D5 1141 06D7          JEQ     A,$+2
1761  06D6 0E0D               HLT
1762  06D7 2B01               ADD     =1,X
1763  06D8 DE1B 0674          IMS     T1CNTR
1764  06D9 9E77 06D1          JMP     PBACK
1765  06DA 9E95 06F0          JMP     SPCHDT   NO
1766       0015               LPOOL
      06DB 1668
      06DC 0668
      06DD 0250
      06DE 05ED
      06DF 069B
      06E0 0100
      06E1 02A9
```

```
06E2 02B6
06E3 0402
06E4 078B
06E5 0272
06E6 06B1
06E7 0615
06E8 0A0F
06E9 0B0F
06EA 2020
06EB 06CE
06EC 0627
06ED FF00
06EE 0505
06EF
```

```
1768        06F0          SPCHDT EQU    $
1769  06F0  8210 0681            COPY   SRFLG,A  SERIAL TEST?
1770  06F1  1143 06F5            JEQ    A,$+4    NO
1771  06F2  1241 06F4            JGT    A,$+2    YES
1772  06F3  0E0D                 HLT             SHOULD NEVER GET HERE
1773  06F4  9EC9 073E            JMP    TEST1X
1774  06F5  836F 06E5            COPY   OPDASH,A NEW IOD?
1775  06F6  0E49                 SHIFT  A,R0,5
1776  06F7  3641 06F9            JT     OV,SPCHD1 YES
1777  06F8  9EC0 0739            JMP    C8MICD+1 NO
1778  06F9  BF64 06DE  SPCHD1    JST    GPSETV
1779  06FA  8292 070D            COPY   =TS209,A
1780  06FB  8792 070E            COPY   A,TS205
1781  06FC  A392 070F            COPY   GP1IL,X
1782  06FD  8292 0710            COPY   =:FFF9,A
1783  06FE  8481 0001            COPY   A,@AIOCNT
1784  06FF  A391 0711            COPY   GP2IL,X
1785  0700  8481 0001            COPY   A,@AIOCNT
1786  0701  BF6A 06EC            JST    BUFINT
1787  0702  A365 06E8            COPY   GPOUT,X
1788  0703  828E 0712            COPY   =:AA07,A
1789  0704  8483 0003            COPY   A,@3
1790  0705  A28D 0713            COPY   =SPCHS7,X
1791  0706  BF5B 06E2            JST    G20TXC
1792  0707  A28C 0714            COPY   =:2E68,X
1793  0708  BF59 06E2            JST    G20TXC
1794  0709  A38B 0715            COPY   GPOUI,X
1795  070A  BF56 06E1            JST    G10TXC
1796  070B  BF8A 0716            JST    TIMOUT
1797  070C  9E8C 0719            JMP    TS209
1798        000C                 LPOOL
      070D  0719
      070E  0667
      070F  0268
      0710  FFF9
      0711  0269
```

```
                0712 AA07
                0713 80AA
                0714 2E68
                0715 067C
                0716 0656
                0717
                0718
1799                0719        TS209   EQU     $
1800    0719 A375 070F                  COPY    GP1IL,X
1801    071A 8081 0001                  COPY    @AIOCNT,A
1802    071B 0C00                       CLSN    =0,A
1803    071C 9E81 071E                  JMP     $+2
1804    071D 0E0D                       HLT
1805    071E A372 0711                  COPY    GP2IL,X
1806    071F 0C00                       CLSN    =0,A
1807    0720 9E81 0722                  JMP     MICROD
1808    0721 0E0D                       HLT
1809                0722        MICROD  EQU     $
1810    0722 83D1 0774                  COPY    JST,A
1811    0723 A368 070F                  COPY    GP1IL,X
1812    0724 8484 0004                  COPY    A,@4
1813    0725 83CF 0775                  COPY    C7MIC,A
1814    0726 8485 0005                  COPY    A,@EOBADR
1815    0727 A2CE 0776                  COPY    =:4000,X
1816    0728 BF38 06E1                  JST     G10TXC
1817    0729 0E85                       SBIT    8,S
1818    072A 0000                       NOP
1819    072B 0000                       NOP
1820    072C 9E75 0722                  JMP     MICROD
1821    072C                            ORG     $-1
1822    072C 0E0D                       HLT
1823                072D        C7MICD  EQU     $
1824    072D 83C6 0774                  COPY    JST,A
1825    072E A362 0711                  COPY    GP2IL,X
1826    072F 8484 0004                  COPY    A,@4
1827    0730 83C6 0777                  COPY    C8MIC,A
```

```
1828  0731 8485 0005          COPY    A,@EOBADR
1829  0732 A2C3 0776          COPY    =:4000,X
1830  0733 BF2E 06E2          JST     C20TXC
1831  0734 0E85               SBIT    8,S
1832  0735 0000               NOP
1833  0736 0000               NOP
1834  0737 9E75 072D          JMP     C7MICD
1835  0737                    ORG     $-1
1836  0737 0E0D               HLT
1837  0738 0E0D       C8MICD  ENT
1838  0739 16C1 073B          JF      SS,$+2
1839  073A 0E0D               HLT
1840  073B 9EC6 0782          JMP     TEST2X
1841  073C 0000       TITRY   RES     1,0
1842  073D 0000       TITRYA  RES     1,0
```

```
1844                        *
1845                        * THIS FIRST TEST (TEST1X) TESTS THE MODEM
1846                        * CONTROL SIGNALS GENERATED AND RECEIVED
1847                        * BY THE PICO'S
1848                        *
1849  073E A3B9 0778  TEST1X COPY   RESET,X  RESET CODE
1850  073F BF21 06E1         JST    G1OTXC
1851  0740 BF21 06E2         JST    G2OTXC
1852  0741 08FD              COPY   =-3,A
1853  0742 8679 073C         COPY   A,TITRY  RETRY COUNTER
1854  0743 A3B4 0778  TEST17 COPY   RESET,X
1855  0744 BF1C 06E1         JST    G1OTXC
1856  0745 BF1C 06E2         JST    G2OTXC
1857  0746 BFB2 0779         JST    INAST2
1858  0747 87B2 077A         COPY   A,GPSTS2 SAVE STATUS
1859  0748 0C13              CLSN   =:13,A   DSR AND BUFFER EMPTY
1860  0749 9E83 074D         JMP    TEST10   OKAY....CONTINUE
1861  074A DE71 073C         IMS    TITRY    HAS IT BEEN 3 TIMES
1862  074B 9E77 0743         JMP    TEST17   NO
1863  074C 0E0D              HLT
1864       074D         TEST10 EQU    $
1865  074D 08FD              COPY   =-3,A
1866  074E 866D 073C         COPY   A,TITRY  RETRY COUNTER
1867  074F A3A8 0778  TEST13 COPY   RESET,X  CODE
1868  0750 BF10 06E1         JST    G1OTXC
1869  0751 A2A9 077B         COPY   =:401,X  DATA TERN NOT READY
1870  0752 BF0E 06E1         JST    G1OTXC
1871  0753 BFA5 0779         JST    INAST2
1872  0754 87A5 077A         COPY   A,GPSTS2 SAVE STATUS
1873  0755 0C17              CLSN   =:17,A   ONLY BUFR EMPTY SET
1874  0756 9E83 075A         JMP    TEST12   YES- IT WAS
1875  0757 DE64 073C         IMS    TITRY    NO- 3 TIMES
1876  0758 9E76 074F         JMP    TEST13   NO
1877  0759 0E0D              HLT
1878       075A         TEST12 EQU    $
1879  075A 08FD              COPY   =-3,A
```

```
1880  075B 8661 073D          COPY   A,TITRYA
1881  075C 865F 073C          COPY   A,TITRY  RETRY COUNTER
1882  075D A39A 0778  TEST14  COPY   RESET,X  RESET CODE
1883  075E BF9D 077C          JST    G10TXC
1884  075F A29D 077D          COPY   =:402,X  REQUEST AND DATA READY
1885  0760 BF9B 077C          JST    G10TXC
1886  0761 090A               COPY   =10,A
1887  0762 BEA8 078B          JST    WAIT     SHORT DELDAY
1888  0763 BF9A 077E          JST    INAST1
1889  0764 879A 077F          COPY   A,GPSTS1 SAVE STATUS
1890  0765 0C11               CLSN   =:11,A   IS IT OK?
1891  0766 9E83 076A          JMP    TEST15   YES
1892  0767 DE55 073D          IMS    TITRYA   3 TIMES
1893  0768 9E74 075D          JMP    TEST14   NO-TRY AGAIN
1894  0769 0E0D               HLT
1895       076A       TEST15  EQU    $
1896  076A BF8E 0779          JST    INAST2
1897  076B 878E 077A          COPY   A,GPSTS2
1898  076C 0C12               CLSN   =:12,A   IS IT OK?
1899  076D 9E94 0782          JMP    TEST2X   YES-GO AWAY
1900  076E DE4D 073C          IMS    TITRY    3 TIMES HERE
1901  076F 9E81 0771          JMP    TEST16   NO
1902  0770 0E0D               HLT
1903       0771       TEST16  EQU    $
1904  0771 08FD               COPY   =-3,A    RESET PICO 1
1905  0772 864A 073D          COPY   A,TITRYA RETRY COUNTER
1906  0773 9E69 075D          JMP    TEST14
1907       000E               LPOOL
      0774 025D
      0775 0679
      0776 4000
      0777 0678
      0778 0262
      0779 0289
      077A 0271
      077B 0401
```

```
      077C 02A9
      077D 0402
      077E 02AC
      077F 0270
      0780
      0781
1908                        *
1909  0782 8386 0789  TEST2X COPY   LPINDC,A GET LOOP INDICATOR
1910  0783 0801              ADD    =1,A
1911  0784 8784 0789         COPY   A,LPINDC BUMP BY 1
1912  0785 0404              SELP   A,0*8+4  OUTPUT
1913  0786 16C1 0788         JF     SS,$+2
1914  0787 0E0D              HLT             SENSE ON
1915  0788 9F81 078A         JMP    DSR
1916       0002              LPOOL
      0789 05EB
      078A 0278
1917                        *
1918  078B 0E0D        WAIT  ENT
1919  078C 0001              NEG    A,A
1920  078D 8784 0792         COPY   A,WAIT1
1921  078E 0E85        WLOOP SBIT   6,S
1922  078F DF82 0792         IMS    WAIT1
1923  0790 9E7D 078E         JMP    WLOOP
1924  0791 9F79 078B         RTN    WAIT
1925       0001              LPOOL
      0792 0676
```

```
1927  0800                        ROUND
1928                      *   FOR SERIAL PICO PROCESSOR TEST ENTER AT DIOSP
1929                      *   FOR DEFAULT AND DIOSP1 FOR DEMAND MODE
1930                      *   PARAMETERS FOR SPECIAL TEST ARE SET AND
1931                      *   THEN IT IS EXECUTED AS A PART OF C P PROCESSOR TEST
1932        0800          DIOSP  EQU    $
1933  0800 9E8C 080D              JMP    DIOSPA
1934        0801          DIOSP1 EQU    $
1935  0801 8797 0819              COPY   A,OPDASH
1936  0802 0900                   COPY   =0,A
1937  0803 8705 0789              COPY   A,LPINDC
1938  0804 0901                   COPY   =1,A
1939  0805 8794 081A              COPY   A,SRFLG
1940  0806 8294 0810              COPY   =:210,A
1941  0807 8794 081C              COPY   A,GPSRI
1942  0808 8294 081D              COPY   =:612,A
1943  0809 8794 081E              COPY   A,GPOUI
1944  080A 8294 081F              COPY   =:1210,A
1945  080B 8794 0820              COPY   A,PARS
1946  080C 9F94 0821              JMP    DSR1
1947        080D          DIOSPA EQU    $
1948  080D 878B 0819              COPY   A,OPDASH
1949  080F 0900                   COPY   =0,A
1950  080F 8792 0822              COPY   A,LPINDC
1951  0810 0901                   COPY   =1,A
1952  0811 8788 081A              COPY   A,SRFLG
1953  0812 8288 081B              COPY   =:210,A
1954  0813 8788 081C              COPY   A,GPSRI
1955  0814 8288 081D              COPY   =:612,A
1956  0815 8788 081E              COPY   A,GPOUI
1957  0816 8288 081F              COPY   =:1210,A
1958  0817 8788 0820              COPY   A,PARS
1959  0818 9F8A 0823              JMP    DSR
1960        000B                  LPOOL
      0819 0272
      081A 0681
```

```
081B 0210
081C 067B
081D 0612
081E 067C
081F 1210
0820 067A
0821 0205
0822 05EB
0823 0278
```

```
1962  0880                        ROUND
1963                      *       FOR 32 BIT PARALLEL BACK TO BACK TEST ENTER
1964                      *       AT PAR32 FOR DEFAULT AND PAR32A FOR
1965                      *       DEMAND MODE.-DEVICE CODES AND CHANNEL
1966                      *       ADDRESS ARE SETUP AS PART OF G P PROCESSOR
1967                      *       TEST.
1968        0880          PAR32   EQU     $         DEFAULT ENTRY
1969  0880  9E86 0887              JMP     PAR32B
1970        0881          PAR32A  EQU     $         DEMAND ENTRY
1971  0881  8717 0819              COPY    A,OPDASH SAVE DMA OR IOD TYPE
1972  0882  0900                    COPY    =0,A
1973  0883  871E 0822              COPY    A,LPINDC INITIALIZE LOOP INDICATOR
1974  0884  08FF                    COPY    =-1,A
1975  0885  8714 081A              COPY    A,SRFLG  SET PARALLEL 32 FLAG.
1976  0886  9F1A 0821              JMP     DSR1
1977                      *
1978  0887  8711 0819   PAR32B COPY    A,OPDASH SAVE DMA OR IOD TYPE
1979  0888  0900                    COPY    =0,A
1980  0889  8718 0822              COPY    A,LPINDC INITIALIZE LOOP INDICATOR
1981  088A  08FF                    COPY    =-1,A
1982  088B  870E 081A              COPY    A,SRFLG  SET PARALLEL 32 FLAG
1983  088C  9F16 0823              JMP     DSR
1984        0000                    LPOOL
1985                      * 8 BIT DATA TRANSFER
1986        088D          PAR32C  EQU     $
1987  088D  82A2 0880              COPY    =PAR32F,A SET EOB SERVICE LOC.
1988  088E  87A2 0881              COPY    A,TS205
1989  088F  BFA2 0882              JST     READY    READY AUTO I/O
1990  0890  A2A2 0883              COPY    =:64C,X  DATA INPUT-8 BITS
1991  0891  BFA2 0884              JST     G20TXC
1992  0892  A2A2 0885              COPY    =:634,X  DATA OUTPUT-8 BITS
1993  0893  BFA2 0886              JST     G10TXC
1994  0894  BFA2 0887              JST     TIMOUT
1995  0895  BFA2 0888   PAR32F JST     P32CHK
1996                      *
1997                      * 16 BIT DATA TRANSFER
```

```
1998                        *
1999  0896 82A2 08B9        PAR32G COPY   =PAR32G,A
2000  0897 8799 08B1               COPY   A,TS205
2001  0898 BF99 08B2               JST    READY     READY AUTO I/O
2002  0899 A2A0 08BA               COPY   =:64D,X   DATA INPUT-16 BITS
2003  089A BF99 08B4               JST    G20TXC
2004  089B A29F 08BB               COPY   =:635,X   DATA OUTPUT-16 BITS
2005  089C BF99 08B6               JST    G10TXC
2006  089D BF99 08B7               JST    TIMOUT
2007  089E BF99 08B8               JST    P32CHK
2008                        *
2009                        * 24 BIT DATA TRANSFER
2010                        *
2011  089F 829C 08BC        PAR32H COPY   =PAR32H,A
2012  08A0 8790 08B1               COPY   A,TS205
2013  08A1 BF90 08B2               JST    READY     READY AUTO I/O
2014  08A2 A29A 08BD               COPY   =:64E,X   DATA INPUT-24 BITS
2015  08A3 BF90 08B4               JST    G20TXC
2016  08A4 A299 08BE               COPY   =:636,X   DATA OUTPUT-24 BITS
2017  08A5 BF90 08B6               JST    G10TXC
2018  08A6 BF90 08B7               JST    TIMOUT
2019  08A7 BF90 08B8        PAR32H JST    P32CHK
2020                        *
2021                        * 32 BIT DATA TRANSFER
2022                        *
2023  08A8 8296 08BF               COPY   =PAR32I,A
2024  08A9 8787 08B1               COPY   A,TS205
2025  08AA BF87 08B2               JST    READY     READY AUTO I/O
2026  08AB A294 08C0               COPY   =:64F,X   DATA INPUT-32 BITS
2027  08AC BF87 08B4               JST    G20TXC
2028  08AD A293 08C1               COPY   =:637,X   DATA OUTPUT-32 BITS
2029  08AE BF87 08B6               JST    G10TXC
2030  08AF BF87 08B7               JST    TIMOUT
2031       0012                    LPOOL
      08B0 0895
      08B1 0667
```

```
08B2 0998
08B3 064C
08B4 02B6
08B5 0634
08B6 02A9
08B7 0656
08B8 09F9
08B9 089E
08BA 064D
08BB 0635
08BC 08A7
08BD 064E
08BE 0636
08BF 08C2
08C0 064F
08C1 0637
2032  08C2 BF75 0888  PAR32I JST    P32CHK
2033                  *
2034                  * 24 BIT OUTPUT AND 8 BIT INPUT TRANSFER
2035                  *
2036  08C3 82C1 0905          COPY   =PAR32J,A
2037  08C4 876C 0881          COPY   A,TS205
2038  08C5 BF6C 0882          JST    READY
2039  08C6 A3BF 0906          COPY   GP2IL,X  SET AUTO INPUT TO
2040  08C7 82BF 0907          COPY   =:FF80,A NEG 128 COUNT
2041  08C8 8481 0001          COPY   A,@AIOCNT
2042  08C9 A269 0883          COPY   =:64C,X  8 BIT INPUT
2043  08CA BF69 0884          JST    G2UTXC
2044  08CB A272 08BE          COPY   =:636,X  24 BIT OUTPUT
2045  08CC BF69 0886          JST    G1UTXC
2046  08CD BF69 0887          JST    TIMOUT
2047                  *
2048                  * CHK BUFFERS FOR PROPER TRANSFER
2049                  *
2050  08CE A3B9 0908  PAR32J COPY    GPINB,X  INPUT BUFFER BEG.BYTE
2051  08CF A7B9 0909          COPY   X,GPINN
```

```
2052  08D0 A3B9 090A          COPY   GPOUTB,X OUTPUT BUFFER BEG.BYTE
2053  08D1 A7B9 090B          COPY   X,GPOUT1
2054  08D2 A2B4 0907          COPY   =:FF80,X 128 COMPARES
2055  08D3 A7B8 090C          COPY   X,T1CNTR
2056  08D4 A3B4 0909  P824LP  COPY   GPINN,X
2057  08D5 0E25               SBM
2058  08D6 8080 0000          COPYB  @0,A     GET FROM INPUT
2059  08D7 0E27               SWM
2060  08D8 87B4 090D          COPY   A,INVAL
2061  08D9 A3B1 090B          COPY   GPOUT1,X
2062  08DA 0E25               SBM
2063  08DB 8082 0001          COPYB  @2,A     GET FROM OUTPUT
2064  08DC 0E27               SWM
2065  08DD 9BAF 090D          XOR    INVAL,A
2066  08DE 1141 08E0          JEQ    A,$+2    EQUAL?
2067  08DF 0E0D               HLT             NO
2068  08E0 DFA8 0909          IMS    GPINN
2069  08E1 83A9 090B          COPY   GPOUT1,A
2070  08E2 0B03               ADD    =3,A
2071  08E3 87A7 090B          COPY   A,GPOUT1
2072  08E4 DFA7 090C          IMS    T1CNTR   FINISHED
2073  08E5 9E6E 08D4          JMP    P824LP   NO
2074                    *
2075                    * 32 BIT OUTPUT  16 BIT INPUT TRANSFER
2076                    *
2077  08E6 82A7 090E          COPY   =PAR32K,A
2078  08E7 8749 08B1          COPY   A,TS205
2079  08E8 BF49 08B2          JST    READY
2080  08E9 A39C 0906          COPY   GP2IL,X  SET AUTO INPUT TO
2081  08EA 82A4 090F          COPY   =:FF40,A NEG 192 COUNT
2082  08EB 8481 0001          COPY   A,@AIOCNT
2083  08EC A24D 08BA          COPY   =:64D,X  16 BIT INPUT
2084  08ED BF46 08B4          JST    G2OTXC
2085  08EE A252 08C1          COPY   =:637,X  32 BIT OUTPUT
2086  08EF BF46 08B6          JST    G1OTXC
2087  08F0 BF46 08B7          JST    TIMOUT
```

```
2088                    *
2089                    * CHK BUFFER FOR PROPER TRANSFER
2090                    *
2091  08F1 A29E 0910  PAR32K COPY   =GPIN,X  INPUT BUFFER BEG.
2092  08F2 A796 0909         COPY   X,GPINN
2093  08F3 A29D 0911         COPY   =GPOUT,X OUTPUT BUFFER BEG.
2094  08F4 A796 090B         COPY   X,GPOUT1
2095  08F5 A29C 0912         COPY   =:FFA0,X NO. TO COMPARE (-96)
2096  08F6 A795 090C         COPY   X,T1CNTR
2097  08F7 A391 0909  P1632L COPY   GPINN,X
2098  08F8 8080 0000         COPY   @0,A     GET FROM INPUT BUFFER
2099  08F9 8793 090D         COPY   A,INVAL
2100  08FA A390 090B         COPY   GPOUT1,X
2101  08FB 8081 0001         COPY   @1,A
2102  08FC 9B90 090D         XOR    INVAL,A
2103  08FD 1141 08FF         JEQ    A,$+2    EQUAL?
2104  08FE 0E0D              HLT             NO
2105  08FF DF89 0909         IMS    GPINN    YES
2106  0900 DF8A 090B         IMS    GPOUT1   TWICE FOR OUTPUT
2107  0901 DF89 090B         IMS    GPOUT1
2108  0902 DF89 090C         IMS    T1CNTR
2109  0903 9E73 08F7         JMP    P1632L   NO
2110  0904 9E8F 0914         JMP    PAR32L   PROGRAMMED I/O ROUTINE
2111       000F              LPOOL
      0905 08CE
      0906 0269
      0907 FF80
      0908 09F8
      0909 0671
      090A 09F7
      090B 0672
      090C 0674
      090D 0673
      090E 08F1
      090F FF40
      0910 0B0F
```

```
0911 0A0F
0912 FFA0
0913
```

```
2113                    *
2114                    * THIS SECTION TESTS PROGRAMMED I/O FOR 32 BIT PARALLEL PICO'S
2115                    * BACK TO BACK. - 8,16,24, AND 32 BITS ARE PASSED FROM OUTPUT
2116                    * BUFFER TO INPUT BUFFER AND CHECKED FOR ACCURACY.
2117                    *
2118        0914        PAR32L EQU    $
2119  0914 BF98 092D            JST    BUFINT   SET UP BUFFERS
2120  0915 A298 092E            COPY   =:404,X  SET FOR 8 BIT OUTPUT
2121  0916 8298 092F            COPY   =:40C,A  SET FOR 8 BIT INPUT
2122  0917 BEA1 0939            JST    PIO32    DO PROGRAMMED I/O TRANSFER
2123  0918 0901                 COPY   =1,A
2124  0919 BEE6 0980            JST    CHKRE    CHECK RESULTS
2125  091A BF92 092D            JST    BUFINT   SET UP BUFFERS
2126  091B A294 0930            COPY   =:405,X  SET FOR 16 BIT OUTPUT
2127  091C 8294 0931            COPY   =:40D,A  SET FOR 16 BIT INPUT
2128  091D BE9B 0939            JST    PIO32    DO PROGRAMMED I/O TRANSFER
2129  091E 0902                 COPY   =2,A
2130  091F BEE0 0980            JST    CHKRE    CHECK RESULTS
2131  0920 BF8C 092D            JST    BUFINT   SET UP BUFFERS
2132  0921 A290 0932            COPY   =:406,X  SET FOR 24 BIT OUTPUT
2133  0922 8290 0933            COPY   =:40E,A  SET FOR 24 BIT OUTPUT
2134  0923 BE95 0939            JST    PIO32    DO PROGRAMMED I/O TRANSFER
2135  0924 0903                 COPY   =3,A
2136  0925 BEDA 0980            JST    CHKRE    CHECK RESULTS
2137  0926 BF86 092D            JST    BUFINT   SET UP BUFFERS
2138  0927 A28C 0934            COPY   =:407,X  SET FOR 32 BIT OUTPUT
2139  0928 828C 0935            COPY   =:40F,A  SET FOR 32 BIT INPUT
2140  0929 BE8F 0939            JST    PIO32    DO PROGRAMMED I/O TRANSFER
2141  092A 0904                 COPY   =4,A
2142  092B BED4 0980            JST    CHKRE    CHECK RESULTS
2143  092C 9F89 0936            JMP    TEST2X   END OF 32 BIT-LOOP AGAIN
2144        000C                LPOOL
      092D  0627
      092E  0404
      092F  040C
      0930  0405
```

```
      0931 040D
      0932 0406
      0933 040E
      0934 0407
      0935 040F
      0936 0782
      0937
      0938
2145                  *   P I O 3 2
2146                  *    THIS IS A SUBROUTINE WHICH TRANSFERS CHARACTERS USING
2147                  *   .PROGRAMMED I/O AND 32 BIT PARALLEL PICO'S BACK TO BACK
2148                  *    X-REG EQUALS OUTPUT MICRO-ENGINE BRANCH WITH PROPER MODE BITS
2149                  *    A-REG EQUALS INPUT MICRO-ENGINE BRANCH WITH PROPER MODE BITS
2150                  *    OUTPUT BUFFER IS GPOUT - INPUT BUFFER IS GPIN
2151  0939 0E0D       PIO32  ENT
2152  093A A751 090C         COPY   X,T1CNTR OUTPUT COMMAND WORD SAVE
2153  093B B7B9 0975         COPY   A,T2CNTR INPUT COMMAND WORD SAVE
2154  093C A3B9 0976         COPY   RESET,X  RESET BOTH CHANNELS
2155  093D BFB9 0977         JST    G1OTXC   OUTPUT CHAN
2156  093E BFB9 0978         JST    G2OTXC   INPUT CHAN
2157  093F A34C 090C         COPY   T1CNTR,X OUTPUT COMMAND
2158  0940 BFB6 0977         JST    G1OTXC   SET MODE (040-)
2159  0941 BFB7 0979         JST    INAST1   GET STATUS
2160  0942 0E29              SHIFT  A,RO,3   BUSY
2161  0943 368D 0941         JF     OV,$-2   YES
2162  0944 A345 090A         COPY   GPOUTB,X NO-GET BYTE ADDRESS
2163  0945 BFB3 0979  PIO32A JST    INAST1   ALL BYTES TRANSFERRED?
2164  0946 0E49              SHIFT  A,RO,S
2165  0947 3646 094E         JT     OV,PIO32B
2166  0948 0E25              SBM             NO
2167  0949 8080 0000         COPYB  @0,A
2168  094A 0E27              SWM
2169  094B BFAE 097A         JST    OTADT1   OUTPUT DATA
2170  094C 2B01              ADD    =1,X
2171  094D 9E77 0945         JMP    PIO32A
2172  094E 0E25       PIO32B SBM
```

```
2173  094F 8080 0000          COPYB  @0,A
2174  0950 0E27               SWM
2175  0951 BFA8 097A          JST    OTADT1   OUTPUT LAST DATA
2176  0952 A2A8 097B          COPY   =:210,X
2177  0953 BFA3 0977          JST    G1OTXC   BEGIN AT   :1
2178  0954 A3A0 0975          COPY   T2CNTR,X INPUT COMMAND
2179  0955 BFA2 0978          JST    G2OTXC   SET MODE (040-)
2180  0956 BFA5 097C          JST    INAST2   GET STATUS
2181  0957 0E29               SHIFT  A,R0,3   BUSY?
2182  0958 36BD 0956          JF     OV,$-2   YES
2183  0959 A2A1 0978          COPY   =:210,X  NO- ASSERT STEP
2184  095A BF9D 0978          JST    G2OTXC
2185  095B BFA0 097C          JST    INAST2   GET STATUS (FSA)
2186  095C 0E19               SHIFT  A,R0,2
2187  095D 3630 095B          JT     OV,$-2   NO FSA
2188  095E A329 0908          COPY   GPINB,X  YES FSA-GET BYTE INPUT ADDRESS
2189  095F BF9C 097C  PI032C  JST    INAST2   ALL BYTES TRANSFERRED?
2190  0960 0E49               SHIFT  A,R0,5
2191  0961 3646 0968          JT     OV,PI032D YES
2192  0962 BF9A 097D          JST    INADT2   INPUT DATA
2193  0963 0E25               SBM
2194  0964 8480 0000          COPYB  A,@0
2195  0965 0E27               SWM
2196  0966 2B01               ADD    =1,X
2197  0967 9E77 095F          JMP    PI032C
2198  0968 BF94 097D  PI032D  JST    INADT2   INPUT LAST
2199  0969 0E25               SBM
2200  096A 8480 0000          COPYB  A,@0
2201  096B 0E27               SWM
2202  096C A291 097E          COPY   =:220,X  ASSERT FS
2203  096D BF8A 0978          JST    G2OTXC
2204  096E BF8D 097C          JST    INAST2   FSA SET?
2205  096F 0E19               SHIFT  A,R0,2
2206  0970 363D 096E          JT     OV,$-2   YES - FSA
2207  0971 A28D 097F          COPY   =:200,X  NO-FSA-IDLE BOTH
2208  0972 BF84 0977          JST    G1OTXC
```

```
2209  0973 BF84 0978          JST    G20TXC
2210  0974 9F44 0939          RTN    PIO32
2211       000B               LPOOL
      0975 0670
      0976 0262
      0977 02A9
      0978 02B6
      0979 02AC
      097A 02B3
      097B 0210
      097C 02B9
      097D 02BD
      097E 0220
      097F 0200
2212                     *
2213                     *  CHECK RESULTS OF PROGRAMMED I/O TRANSFER
2214                     *
2215  0980 0E0D          CHKRE  ENT
2216  0981 0001                 NEG    A,A          NEGATE COUNT
2217  0982 8709 090C            COPY   A,T1CNTR
2218  0983 A2F4 09F8            COPY   GPINB,X      SET UP BYTE ADDRESSES
2219  0984 A704 0909            COPY   X,GPINN
2220  0985 A2F1 09F7            COPY   GPOUTB,X
2221  0986 A7C6 09CD            COPY   X,GPOUT1
2222  0987 A3C6 09CE  CHKLOP    COPY   GPINN,X
2223  0988 0E25                 SBM
2224  0989 8080 0000            COPYB  @0,A         GET FROM INPUT
2225  098A 0E27                 SWM
2226  098B 87C3 09CF            COPY   A,INVAL
2227  098C A3C0 09CD            COPY   GPOUT1,X
2228  098D 0E25                 SBM
2229  098E 8080 0000            COPYB  @0,A         GET FROM OUTPUT
2230  098F 0E27                 SWM
2231  0990 9BBE 09CF            XOR    INVAL,A
2232  0991 1141 0993            JEQ    A,$+2        EQUAL
2233  0992 0E0D                 HLT                 NO - ERROR
```

```
2234  0993 DFB9 09CD          IMS    GPOUT1
2235  0994 DFB9 09CE          IMS    GPINN
2236  0995 DFBA 09D0          IMS    T1CNTR   FINISHED?
2237  0996 9E70 0987          JMP    CHKLOP
2238  0997 9F68 0980          RTN    CHKRE
2239                    *
2240                    * THIS ROUTINE SETUP AUTO I/O STUFF
2241                    *
2242  0998 0E0D         READY ENT
2243  0999 A2B7 09D1          COPY   =:410,X  PRE-SET BUFFER FULL
2244  099A BF5C 0977          JST    G1OTXC
2245  099B BF5C 0978          JST    G2OTXC
2246  099C A359 0976          COPY   RESET,X  RESET PICO'S
2247  099D BF59 0977          JST    G1OTXC
2248  099E BF59 0978          JST    G2OTXC
2249  099F BF59 0979          JST    INAST1
2250  09A0 87B1 09D2          COPY   A,GPSTS1
2251  09A1 0C36               CLSN   =:36,A   CHK STATUS
2252  09A2 9E81 09A4          JMP    PAR32D   GOOD
2253  09A3 0E0D               HLT             BAD
2254  09A4 BF57 097C  PAR32D  JST    INAST2
2255  09A5 87AD 09D3          COPY   A,GPSTS2
2256  09A6 0C36               CLSN   =:36,A   CHK STATUS
2257  09A7 9E81 09A9          JMP    PAR32E   CONTINUE - GOOD
2258  09A8 0E0D               HLT             BAD
2259  09A9 BE86 09B0  PAR32E  JST    SET32V   SET INT. LOCATIONS
2260  09AA BEB6 09E1          JST    FILBUF   INITIALIZE BUFFERS
2261  09AB A2A8 09D4          COPY   =:100,X  RESET PICO'S
2262  09AC BF4A 0977          JST    G1OTXC
2263  09AD BF4A 0978          JST    G2OTXC
2264  09AE 0E87               RBIT   8,S
2265  09AF 9F68 0998          RTN    READY
2266                    *
2267                    * THIS ROUTINE SET UP INTERRUPT LOCATIONS
2268                    *
2269  09B0 0E0D         SET32V ENT
```

```
2270  09B1 0E87            RBIT   8,S
2271  09B2 A3A2 09D5       COPY   GP1IL,X
2272  09B3 83A2 09D6       COPY   AOB,A
2273  09B4 B7A2 09D7       OR     GP1ADR,A
2274  09B5 8480 0000       COPY   A,@AIOCMD
2275  09B6 82A1 09D8       COPY   =:FE80,A SET MINUS COUNT (-192)
2276  09B7 8481 0001       COPY   A,@AIOCNT
2277  09B8 82A0 09D9       COPY   =T2EOBE,A SET EOB ADDRESS
2278  09B9 8485 0005       COPY   A,@EOBADR
2279  09BA 829F 09DA       COPY   =GPOUT,A SET BYTE ADDRESS
2280  09BB 0E01            SHIFT  A,LO,1
2281  09BC 0AFF            SUB    =1,A
2282  09BD 8482 0002       COPY   A,@AIOADR
2283  09BE A39C 09DB       COPY   GP2IL,X  SET AUTO-IN INST.
2284  09BF 839C 09DC       COPY   AIB,A
2285  09C0 B79C 09DD       OR     GP2ADR,A
2286  09C1 8480 0000       COPY   A,@AIOCMD
2287  09C2 8295 0008       COPY   =:FE80,A
2288  09C3 8481 0001       COPY   A,@AIOCNT
2289  09C4 8294 09D9       COPY   =T2EOBE,A SET EOB ADDRESS
2290  09C5 8485 0005       COPY   A,@EOBADR
2291  09C6 8297 09DE       COPY   =GPIN,A  SET BYTE ADDRESS
2292  09C7 0E01            SHIFT  A,LO,1
2293  09C8 0AFF            SUB    =1,A
2294  09C9 8482 0002       COPY   A,@AIOADR
2295  09CA 08FE            COPY   =-2,A    EOB COUNT (-2)
2296  09CB 8729 0975       COPY   A,T2CNTR
2297  09CC 9F63 0980       RTN    SET32V
2298       0014            LPOOL
      09CD 0672
      09CE 0671
      09CF 0673
      09D0 0674
      09D1 0410
      09D2 0270
      09D3 0271
```

```
      09D4 0100
      09D5 0268
      09D6 025E
      09D7 0266
      09D8 FE80
      09D9 0663
      09DA 0A0F
      09DB 0269
      09DC 025F
      09DD 0267
      09DE 0B0F
      09DF
      09E0
2299                  *
2300                  * THIS ROUTINE INITIALIZES BUFFERS FOR 32 BIT TESTING.
2301                  *
2302  09E1 0E0D       FILBUF ENT
2303  09E2 A2AA 0A0D        COPY   =:FF40,X SET 192 WORDS TO
2304  09E3 A76C 09D0        COPY   X,T1CNTR :FFFF IN INPUT BUFFER
2305  09E4 A279 09DE        COPY   =GPIN,X  BUFFER
2306  09E5 82A8 0A0E        COPY   =:FFFF,A
2307  09E6 8480 0000  NXLOP COPY   A,@0
2308  09E7 2801             ADD    =1,X
2309  09E8 DF67 09D0        IMS    T1CNTR
2310  09E9 9E7C 09E6        JMP    NXLOP
2311  09EA A26D 09D8        COPY   =:FE80,X SET OUTPUT BUFFER
2312  09EB A764 09D0        COPY   X,T1CNTR WITH INCREASING
2313  09EC A28A 09F7        COPY   GPOUTB,X PATTERN (0....C0)
2314  09ED 0900             COPY   =0,A
2315  09EE 0E25       NXPP  SBM
2316  09EF 8480 0000        COPYB  A,@0
2317  09F0 0E27             SWM
2318  09F1 2801             ADD    =1,X
2319  09F2 0801             ADD    =1,A
2320  09F3 DF5C 09D0        IMS    T1CNTR   JMP OUT IF ZERO
2321  09F4 9E79 09EE        JMP    NXPP
```

```
2322  09F5 0E27                SWM
2323  09F6 9F6A 09E1           RTN     FILBUF
2324  09F7 141E 0A0F  GPOUTB   BAC     GPOUT
2325  09F8 161E 0B0F  GPINB    BAC     GPIN
2326                  *
2327                  * THIS ROUTINE CHECKS BUFFERS EQUAL FOR PAR32
2328                  *
2329  09F9 0E0D       P32CHK   ENT
2330  09FA A263 09DE           COPY    =GPIN,X  INPUT BUFFER BEG.
2331  09FB A752 09CE           COPY    X,GPINN
2332  09FC A25D 09DA           COPY    =GPOUT,X OUTPUT BUFFER BEG.
2333  09FD A74F 09CD           COPY    X,GPOUT1
2334  09FE A28E 0A0D           COPY    =:FF40,X NO. TO COMPARE (-192)
2335  09FF A750 09D0           COPY    X,T1CNTR
2336  0A00 A34D 09CE  P32LOP   COPY    GPINN,X
2337  0A01 8080 0000           COPY    @0,A     GET FROM INPUT BUF.
2338  0A02 874C 09CF           COPY    A,INVAL
2339  0A03 A349 09CD           COPY    GPOUT1,X
2340  0A04 8080 0000           COPY    @0,A     GET FROM OUTPUT BUF.
2341  0A05 9B49 09CF           XOR     INVAL,A
2342  0A06 1141 0A08           JEQ     A,$+2    EQUAL?
2343  0A07 0E0D                HLT              NO - ERROR
2344  0A08 DF45 09CE           IMS     GPINN    YES
2345  0A09 DF43 09CD           IMS     GPOUT1
2346  0A0A DF45 09D0           IMS     T1CNTR   FINISHED?
2347  0A0B 9E74 0A00           JMP     P32LOP   NO
2348  0A0C 9F6C 09F9           RTN     P32CHK   YES
2349       0002                LPOOL
      0A0D FF40
      0A0E FFFF
2350  0A0F             GPOUT   RES     :100
2351  0B0F             GPIN    RES     :100
2352  0C0F 0000                RES     $/:FF-$&:FF+1,0
2353  0D00 0D01        MEMAD   DATA    MEMAD1
2354  0D01 0D01        MEMAD1  DATA    $
2355                          END
```

0000 ERRORS
0000 WARNING

U  0000  A

0211 0212 0213 0214 0216 0217 0219 0220
0221 0222 0223 0224 0225 0226 0227 0228
0229 0230 0232 0233 0235 0236 0237 0238
0239 0240 0241 0242 0243 0244 0245 0246
0250 0251 0252 0253 0254 0255 0256 0257
0258 0259 0260 0261 0262 0263 0264 0265
0266 0267 0268 0269 0270 0274 0275 0276
0277 0278 0279 0280 0281 0282 0283 0284
0285 0286 0287 0288 0289 0290 0291 0292
0293 0294 0314 0332 0334 0335 0336 0337
0340 0341 0342 0343 0344 0345 0346 0347
0348 0349 0350 0352 0353 0354 0355 0356
0357 0358 0359 0360 0361 0362 0363 0364
0365 0366 0367 0368 0369 0370 0372 0402
0403 0415 0428 0454 0455 0467 0480 0487
0489 0490 0491 0492 0493 0497 0503 0507
0508 0509 0516 0518 0519 0520 0521 0522
0524 0527 0530 0531 0532 0569 0570 0571
0572 0573 0574 0575 0576 0577 0578 0579
0580 0581 0583 0584 0585 0586 0587 0588
0589 0590 0591 0592 0593 0594 0595 0596
0597 0598 0599 0600 0617 0618 0619 0620
0621 0635 0636 0637 0638 0642 0643 0645
0646 0649 0650 0651 0655 0656 0657 0659
0699 0700 0701 0702 0703 0704 0705 0706
0707 0708 0709 0710 0711 0715 0716 0717
0718 0719 0720 0721 0722 0723 0724 0725
0726 0727 0728 0729 0730 0731 0738 0739
0740 0741 0742 0745 0746 0747 0748 0752
0753 0755 0756 0759 0760 0761 0762 0763
0797 0798 0799 0800 0801 0802 0803 0804
0805 0806

0312  AIB
0583 0699 0811 0938 1042 1180 1532 2284

0047  AIOADR
0579 0594 0705 0721 0807 0822 0944 0960
1052 1068 1174 1190 1251 1264 1530 1542
2282 2294

0048  AIOCHN

```
     0045  AIOCMD     0571  0585  0701  0717  0799  0813  0940  0956
                      1044  1059  1166  1182  1245  1257  1522  1534
                      2274  2286
     0046  AIOCNT     0573  0588  0707  0723  0801  0816  0946  0962
                      1046  1062  1168  1184  1247  1260  1524  1536
                      1783  1785  1801  2041  2082  2276  2288
     0311  AOB        0569  0715  0797  0954  1057  1164  1243  1255
                      1520  2272
     1644  ASAVE      1630  1635
     0305  BEGN       0630  0736  0858  0980  1108  1201
     0299  BR         0494  0500  0625  0630  0734  0736  0853  0858
                      0978  0980  1108  1115  1199  1201  1285  1301
                      1466  1474  1482  1490
     1590  BUFCHK     1609  1695*
     1550  BUFDIE     1567  1706*
     1569  BUFINT     1586  1681* 1741* 1786* 2119* 2125* 2131* 2137*
     1650  C7MIC      1813
     1823  C7MICD     1650  1834
     1649  C8MIC      1827
     1837  C8MICD     1649  1777
     0306  CH6DA      0319
     0308  CH6IL      0321
     0307  CH7DA      0320
     0309  CH7IL      0322
     2222  CHKLOP     2237
     2215  CHKRE      2124* 2130* 2136* 2142* 2238
     1663  COUNT2
     1664  COUNT3
     1666  D80
     1665  D99        1700
     1724  DBACK      1732
X    0000  DEBUG3     0009  0017
     1645  DELAY1     1612
     1646  DELAY2     1614
N    0208  DIOGP      0003
N    0210  DIOGP1     0004
     0333  DIOGP2     0209
```

```
N    1932  DIOSP     0005
N    1934  DIOSP1    0006
     1947  DIOSPA    1933
     0073  DIOVEC
     0338  DSR       0295  1915  1959  1983
     0215  DSR1      1946  1976
     1555  DXTVAL    1558
     1563  DXTVL1    1566
     0050  EOBADR    0575  0590  0709  0725  0803  0818  0948  0964
                     1048  1064  1170  1186  1253  1266  1526  1538
                     1814  1828  2278  2290
     0049  EOBJST    0341  0353
     1629  ERROR     1631  1636
     2302  FILBUF    2260* 2323
     0389  G1OTXC    0391  0495* 0607* 0610* 0626* 0713* 0737* 0835*
                     0838* 0854* 0935* 0952* 0981* 1079* 1082* 1109*
                     1161* 1178* 1200* 1276* 1279* 1286* 1348* 1422*
                     1464* 1467* 1475* 1683* 1686* 1693* 1708* 1711*
                     1718* 1736* 1743* 1750* 1795* 1816* 1850* 1855*
                     1868* 1870* 1883* 1885* 1993* 2005* 2017* 2029*
                     2045* 2086* 2155* 2158* 2177* 2208* 2244* 2247*
                     2262*
     0441  G2OTXC    0443  0501* 0608* 0612* 0631* 0733* 0735* 0836*
                     0840* 0859* 0936* 0968* 0979* 1080* 1084* 1114*
                     1162* 1192* 1202* 1277* 1280* 1302* 1350* 1424*
                     1465* 1483* 1491* 1684* 1691* 1709* 1716* 1737*
                     1748* 1791* 1793* 1830* 1851* 1856* 1991* 2003*
                     2015* 2027* 2043* 2084* 2156* 2179* 2184* 2203*
                     2209* 2245* 2248* 2263*
     0319  GP1ADR    0230  0343  0347  0364  0570  0700  0798  0939
                     1043  1165  1244  1521  2273
     0321  GP1IL     0270  0339  0568  0698  0796  0937  1041  1163
                     1242  1519  1781  1800  1811  2271
     0320  GP2ADR    0246  0355  0359  0367  0584  0716  0812  0955
                     1058  1181  1256  1533  2285
     0322  GP2IL     0294  0351  0582  0714  0810  0953  1055  1056
                     1179  1254  1531  1784  1805  1825  2039  2080
```

| | | |
|---|---|---|
| | | 2283 |
| 1669 | GPDAR | 1461 |
| 0316 | GPDAT1 | 0220 0227 0250 0255 0262 0267 |
| 0317 | GPDAT2 | 0236 0243 0274 0279 0286 0291 |
| 2351 | GPIN | 0591 0621 0655 0659 0702 0742 0762 0819 |
| | | 0848 0890 0894 0941 0977 1008 1012 1049 |
| | | 1127 1187 1197 1198 1217 1539 1553 1572 |
| | | 1591 1723 1755 2091 2291 2305 2325 2330 |
| 2325 | GPINB | 2050 2188 2218 |
| 1654 | GPINCM | 1672 |
| 1640 | GPINN | 1592 1597 1605* 2051 2056 2068* 2092 2097 |
| | | 2105* 2219 2222 2235* 2331 2336 2344* |
| 1655 | GPOUCM | 1674 |
| 1657 | GPOUI | 1675 1692 1749 1794 1943 1956 |
| 2350 | GPOUT | 0576 0618 0656 0658 0718 0739 0763 0804 |
| | | 0846 0883 0886 0957 0974 1001 1004 1065 |
| | | 1090 1126 1171 1216 1248 1261 1527 1561 |
| | | 1580 1593 1717 1787 2093 2279 2324 2332 |
| 1641 | GPOUT1 | 1594 1600 1606* 2053 2061 2069 2071 2094 |
| | | 2100 2106* 2107* 2221 2227 2234* 2333 2339 |
| | | 2345* |
| 2324 | GPOUTB | 2052 2162 2220 2313 |
| 0323 | GPPASS | 0587 0662* 0815 0897* 1061 1259 1305* 1340 |
| | | 1407* |
| 0318 | GPSAVE | 0225 0229 0241 0245 0254 0259 0260 0264 |
| | | 0265 0269 0278 0283 0284 0288 0289 0293 |
| | | 0885 0888 0889 0891 0893 1003 1006 1007 |
| | | 1009 1011 |
| 1517 | GPSETV | 1545 1678* 1703* 1738* 1778* |
| 1656 | GPSRI | 1673 1690 1715 1941 1954 |
| 1676 | GPSRTT | 0373 0375 |
| 0329 | GPSTS1 | 0497 0524 1372 1375 1378 1889 2250 |
| 0330 | GPSTS2 | 0503 0527 1395 1398 1401 1858 1872 1897 |
| | | 2255 |
| 0632 | GPT1A1 | |
| 0860 | GPT2A1 | |
| 0862 | GPT2A2 | 0869 |

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1133  GPT3C1
0566  GPTS1     0371  0376  0667  1508  1513
0618  GPTS1A
0634  GPTS1B    0641
0661  GPT31C    0657  0769
0696  GPTS1D    0663  0765
0640  GPTS1E    0636  0638
0648  GPTS1F    0639
0744  GPTS1G    0751
0750  GPTS1H    0746  0748
0758  GPTS1I    0749
0768  GPTS1J
0794  GPTS2     0670  0902
0846  GPTS2A
0896  GPTS2B    0892  1015
0932  GPTS2C    0898
0868  GPTS2D    0864  0866
0876  GPTS2E    0867
0983  GPTS2F    0991
0989  GPTS2G    0985  0987
0998  GPTS2H    0988
1014  GPTS2I    1010
1037  GPTS3     0905  1122  1134
1107  GPTS3A
1116  GPTS3B    1119
1126  GPTS3C    1117
1157  GPTS3D    1128  1211
1204  GPTS3E    1208
1215  GPTS3F    1206
1238  GPTS4     1137  1218  1310
1287  GPTS4A    1290  1304
1295  GPTS4B    1288
1296  GPTS4C    1306
1305  GPTS4D    1295
1335  GPTS5     1313  1382  1404  1412
1360  GPTS5A    1428
1369  GPTS5B    1362
```

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1407  GPTS5C     1397  1400
1421  GPTS5D     1408
1392  GPTS5E     1374  1377
1458  GPTS6      1415  1498
1473  GPTS6A     1470
1481  GPTS6B     1478
1489  GPTS6C     1486
1497  GPTS6D     1494
1503  GPTS7      1501
0324  GPWAIT     0598  0620  0640* 0727  0741  0750* 0826  0849
                 0868* 0970  0976  0990* 1070  1118* 1194  1207*
                 1268  1289*
0128  ILLHLT     0079  0085  0091  0097  0103  0109  0115  0121
                 0140  0146  0152  0158  0164  0170  0176  0182
1659  ILMEMT
1660  ILMM
0314  INA        0346  0358
0414  INADT1     0416  1427*
0466  INADT2     0468  1359* 2192* 2198*
0401  INAST1     0404  0496* 0523* 1370* 1484* 1492* 1888* 2159*
                 2163* 2249*
0453  INAST2     0456  0502* 0526* 1393* 1468* 1476* 1857* 1871*
                 1896* 2180* 2185* 2189* 2204* 2254*
0301  INCMD      0611  0712  1081  1191  1349  1421  1463
0300  INDATA     0839  0951
0415  INDTA1     0348
0467  INDTA2     0360
0326  INEOB      0505* 0600  0635  0642  0651  0729  0745  0752
                 0760  0828  0863  0870  0879  0972  0984  0992
                 1000  1072  1196  1270
0327  INFLG      0491  0596  0711  0824  0950  1040  1158  1342
0486  ININT      0511  0589  0708  0817  0947  1047  1185
0499  ININT1     0493
0504  ININT2     0498
0402  INSTA1     0350
0454  INSTA2     0362
0123  INTHLT
```

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1642 | INVAL | 1599 | 1602 | 1725 | 1727 | 1757 | 1759 | 2060 | 2065 |
| | | 2099 | 2102 | 2226 | 2231 | 2338 | 2341 | | |
| 0070 | JMP | | | | | | | | |
| 0310 | JST | 0340 | 0352 | 1810 | 1824 | | | | |
| 1661 | LENGTH | | | | | | | | |
| U 0000 | LD | 0228 | 0244 | 0263 | 0268 | 0287 | 0292 | 0577 | 0592 |
| | | 0703 | 0719 | 0805 | 0820 | 0942 | 0958 | 1050 | 1066 |
| | | 1172 | 1188 | 1249 | 1262 | 1528 | 1540 | 2280 | 2292 |
| 1514 | LPINDC | 0214 | 0337 | 1504 | 1506 | 1909 | 1911 | 1937 | 1950 |
| | | 1973 | 1980 | | | | | | |
| 2353 | MEMAD | | | | | | | | |
| 2354 | MEMAD1 | 2353 | | | | | | | |
| 1658 | MEMVAL | | | | | | | | |
| 1809 | MICROD | 1807 | 1820 | | | | | | |
| 2307 | NXLOP | 2310 | | | | | | | |
| 2315 | NXPP | 2321 | | | | | | | |
| 1574 | NXTVAL | 1577 | | | | | | | |
| 1582 | NXTVL1 | 1585 | | | | | | | |
| 1597 | NXTVL2 | 1608 | | | | | | | |
| 0526 | OINT1 | 0522 | | | | | | | |
| 0528 | OINT2 | 0525 | | | | | | | |
| 0331 | OPDASH | 0211 | 0334 | 1459 | 1699 | 1774 | 1935 | 1948 | 1971 |
| | | 1978 | | | | | | | |
| 0332 | OTA | 0363 | 0366 | | | | | | |
| 0428 | OTADA1 | 0365 | | | | | | | |
| 0480 | OTADA2 | 0368 | | | | | | | |
| 0427 | OTADT1 | 0429 | 1355* | 2169* | 2175* | | | | |
| 0479 | OTADT2 | 0481 | 1426* | | | | | | |
| 0313 | OTX | 0342 | 0354 | | | | | | |
| 0390 | OTXCM1 | 0345 | | | | | | | |
| 0442 | OTXCM2 | 0357 | | | | | | | |
| 0303 | OUTCMD | 0609 | 0732 | 1083 | 1177 | 1278 | 1347 | 1423 | |
| 0302 | OUTDTA | 0837 | 0967 | | | | | | |
| 0325 | OUTEOB | 0528* | 0599 | 0637 | 0645 | 0650 | 0728 | 0747 | 0755 |
| | | 0761 | 0827 | 0865 | 0873 | 0878 | 0971 | 0986 | 0995 |
| | | 0999 | 1071 | 1116 | 1195 | 1205 | 1269 | 1287 | 1300 |
| 0328 | OUTFLG | 0520 | 0581 | 0731 | 0809 | 0966 | 1054 | 1176 | 1241 |

```
                        1297  1338
     0515  OUTINT       0534  0574  0724  0802  0963  1063  1169  1252
                        1265
U    0000  OV           1619  1776  2161  2165  2182  2187  2191  2206
     2097  P1632L       2109
     2329  P32CHK       1995* 2007* 2019* 2032* 2348
     2336  P32LOP       2347
     2056  P824LP       2073
N    1968  PAR32        0007
N    1970  PAR32A       0006
     1978  PAR32B       1969
     1986  PAR32C       0374
     2254  PAR32D       2252
     2259  PAR32E       2257
     1995  PAR32F       1987
     2007  PAR32G       1999
     2019  PAR32H       2011
     2032  PAR32I       2023
     2050  PAR32J       2036
     2091  PAR32K       2077
     2118  PAR32L       2110
     1638  PARONI       1670
     1651  PARS         1671  1747  1945  1958
     1735  PARTY        1702
     1756  PBACK        1764
     2151  PIO32        2122* 2128* 2134* 2140* 2210
     2163  PIO32A       2171
     2172  PIO32B       2165
     2189  PIO32C       2197
     2198  PIO32D       2191
     2242  READY        1989* 2001* 2013* 2025* 2038* 2079* 2265
     0315  RESET        1849  1854  1867  1882  2154  2246
     0002  REV          0031
U    0000  RO           0223  0239  0253  0258  0277  0282  0884  1002
                        1775  2160  2164  2181  2186  2190  2205
U    0000  ROUND        0036
U    0000  S            0489  0508  0510  0518  0531  0533  0567  0633
```

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 0697 | 0743 | 0795 | 0861 | 0933 | 0982 | 1038 | 1115 |
| | | | 1159 | 1203 | 1239 | 1284 | 1298 | 1303 | 1336 | 1518 |
| | | | 1616 | 1619 | 1689 | 1714 | 1746 | 1817 | 1831 | 1921 |
| | | | 2264 | 2270 | | | | | | |
| | 0536 | SAVA | 0487 | 0509 | 0516 | 0532 | | | | |
| | 0538 | SAVS | 0490 | 0507 | 0519 | 0530 | | | | |
| | 0537 | SAVX | 0488 | 0506 | 0517 | 0529 | | | | |
| | 2269 | SET32V | 2259* | 2297 | | | | | | |
| | 1617 | SIS203 | | | | | | | | |
| | 1778 | SPCHD1 | 1776 | | | | | | | |
| | 1768 | SPCHDT | 1765 | | | | | | | |
| | 1652 | SPCHS7 | 1790 | | | | | | | |
| | 1662 | SRFLG | 0213 | 0336 | 0369 | 1769 | 1939 | 1952 | 1975 | 1982 |
| U | 0000 | SS | 1511 | 1838 | 1913 | | | | | |
| | 0304 | STRTGP | 0625 | 0734 | 0853 | 0978 | 1113 | 1199 | 1285 | 1301 |
| | 1616 | STS202 | 1618 | 1621 | | | | | | |
| | 1643 | T1CNTR | 1552 | 1557* | 1560 | 1565* | 1571 | 1576* | 1579 | 1584* |
| | | | 1596 | 1607* | 1722 | 1731* | 1754 | 1763* | 2055 | 2072* |
| | | | 2096 | 2108* | 2152 | 2157 | 2217 | 2236* | 2304 | 2309* |
| | | | 2312 | 2320* | 2335 | 2346* | | | | |
| | 1639 | T2CNTR | 1544 | 1625* | 2153 | 2178 | 2296 | | | |
| | 1624 | T2EOBE | 1525 | 1537 | 1626 | 2277 | 2289 | | | |
| | 0298 | TAG | 0609 | 0611 | 0712 | 0732 | 0837 | 0839 | 0951 | 0967 |
| | | | 1081 | 1083 | 1177 | 1191 | 1278 | 1347 | 1349 | 1421 |
| | | | 1423 | 1463 | | | | | | |
| | 1864 | TEST10 | 1860 | | | | | | | |
| | 1878 | TEST12 | 1874 | | | | | | | |
| | 1867 | TEST13 | 1876 | | | | | | | |
| | 1882 | TEST14 | 1893 | 1906 | | | | | | |
| | 1895 | TEST15 | 1891 | | | | | | | |
| | 1903 | TEST16 | 1901 | | | | | | | |
| | 1854 | TEST17 | 1862 | | | | | | | |
| | 1849 | TEST1X | 1773 | | | | | | | |
| | 1909 | TEST2X | 1840 | 1899 | 2143 | | | | | |
| | 1611 | TIMOUT | 1623 | 1694* | 1719* | 1751* | 1796* | 1994* | 2006* | 2018* |
| | | | 2030* | 2046* | 2087* | | | | | |
| | 1841 | TITRY | 1853 | 1861* | 1866 | 1875* | 1881 | 1900* | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1842 | TITRYA | 1880 | 1892* | 1905 | | | | |
| | 1628 | TS205 | 1627 | 1680 | 1705 | 1740 | 1780 | 1988 | 2000 | 2012 |
| | | | 2024 | 2037 | 2078 | | | | | |
| | 1695 | TS206 | 1679 | | | | | | | |
| | 1752 | TS207 | 1739 | | | | | | | |
| | 1720 | TS208 | 1704 | | | | | | | |
| | 1799 | TS209 | 1779 | 1797 | | | | | | |
| | 1653 | VBYTC1 | 1523 | 1535 | | | | | | |
| | 1637 | VBYTCT | 1551 | 1559 | 1570 | 1578 | 1595 | 1721 | 1753 | |
| | 1918 | WAIT | 1688* | 1713* | 1745* | 1887* | 1924 | | | |
| | 1647 | WAIT1 | 1613 | 1620* | 1920 | 1922* | | | | |
| | 1648 | WAIT2 | 1615 | 1617* | | | | | | |
| | 1921 | WLOOP | 1923 | | | | | | | |
| U | 0000 | X | 0313 | 0339 | 0351 | 0390 | 0442 | 0488 | 0494 | 0500 |
| | | | 0506 | 0517 | 0529 | 0566 | 0582 | 0606 | 0609 | 0611 |
| | | | 0625 | 0630 | 0658 | 0698 | 0712 | 0714 | 0732 | 0734 |
| | | | 0736 | 0796 | 0810 | 0834 | 0837 | 0839 | 0853 | 0858 |
| | | | 0893 | 0934 | 0937 | 0951 | 0953 | 0967 | 0978 | 0980 |
| | | | 1011 | 1041 | 1055 | 1056 | 1078 | 1081 | 1083 | 1090 |
| | | | 1092 | 1095 | 1098 | 1108 | 1113 | 1160 | 1163 | 1177 |
| | | | 1179 | 1191 | 1199 | 1201 | 1242 | 1254 | 1275 | 1278 |
| | | | 1285 | 1301 | 1347 | 1349 | 1363 | 1379 | 1402 | 1421 |
| | | | 1423 | 1463 | 1466 | 1471 | 1474 | 1479 | 1482 | 1487 |
| | | | 1490 | 1495 | 1519 | 1531 | 1551 | 1552 | 1553 | 1556 |
| | | | 1559 | 1560 | 1561 | 1564 | 1570 | 1571 | 1572 | 1575 |
| | | | 1578 | 1579 | 1580 | 1583 | 1591 | 1592 | 1593 | 1594 |
| | | | 1595 | 1596 | 1597 | 1600 | 1670 | 1671 | 1672 | 1673 |
| | | | 1674 | 1675 | 1682 | 1685 | 1690 | 1692 | 1707 | 1710 |
| | | | 1715 | 1717 | 1721 | 1722 | 1723 | 1730 | 1735 | 1742 |
| | | | 1747 | 1749 | 1753 | 1754 | 1755 | 1762 | 1781 | 1784 |
| | | | 1787 | 1790 | 1792 | 1794 | 1800 | 1805 | 1811 | 1815 |
| | | | 1825 | 1829 | 1849 | 1854 | 1867 | 1869 | 1882 | 1884 |
| | | | 1990 | 1992 | 2002 | 2004 | 2014 | 2016 | 2026 | 2028 |
| | | | 2039 | 2042 | 2044 | 2050 | 2051 | 2052 | 2053 | 2054 |
| | | | 2055 | 2056 | 2061 | 2080 | 2083 | 2085 | 2091 | 2092 |
| | | | 2093 | 2094 | 2095 | 2096 | 2097 | 2100 | 2120 | 2126 |
| | | | 2132 | 2138 | 2152 | 2154 | 2157 | 2162 | 2170 | 2176 |

2178 2183 2188 2196 2202 2207 2218 2219
2220 2221 2222 2227 2243 2246 2261 2271
2283 2303 2304 2305 2308 2311 2312 2313
2318 2330 2331 2332 2333 2334 2335 2336
2339

2355 SOURCE LINES

```
PAGE   1     03/23/77  11:40:08  OS:LNK (82) MEMORY MAP

CREATED FILE  LBACK4

MISSING
  DEBUG3  G:0     G:1     G:2     G:3     G:4     G:5     G:6     G:7     G:8     G:9     G:A
  G:B     G:C     G:D     G:E     G:F     G:G     G:H     G:I     G:J     G:K     G:L     G:M
  G:N     G:O     G:P     G:Q     G:R     G:S     G:T     G:U     G:V     G:W     G:X     G:Y
  G:Z

PROGRAM
  DIOGP   0200R   DIOGP1 0201R   DIOSP   0800R   DIOSP1 0801R   PAR32   0680R   PAR32A 0881R
  PIDBG   0D02R

MEMORY USAGE
  MAIN MEMORY PROGRAM      0080-027F
  RELOCATABLE PROGRAM      0090-113A
SCRATCHPAD USAGE TABLE:
ADDR 0 1 2 3 4 5 6 7 8 9 A B C D E F    LEGEND:
0000 . . . . . . . . . . . . . . . .      A=ABSOLUTE LITERAL
0010 . . . . . . . . . . . . . . . .      B=BYTE RELOCATABLE LITERAL
0020 . . . . . . . . . . . . . . . .      P=ABSOLUTE PROGRAM
0030 . . . . . . . . . . . . . . . .      R=WORD RELOCATABLE LITERAL
0040 . . . . . . . . . . . . . . . .      S=SREL PROGRAM
0050 . . . . . . . . . . . . . . . .      W=WORD RELOCATABLE INDEX POINTER
0060 . . . . . . . . . . . . . . . .      X=ABSOLUTE INDEX POINTER
0070 . . . . . . . . . . . . . . . .      Y=BYTE RELOCATABLE INDEX POINTER

PROCESSED LSI 3 OBJECT

 NO ERRORS
```