```
                *       V75 EMULATION MICROPROGRAM.
                *       ENTER AT X'00 IF TESTING IN PAGE 1.
                *
                *       REGISTERS USED:
                *           0 = 620 A REGISTER
                *           1 = 620 B REGISTER
                *           2 = 620 X REGISTER
                *           3-7 = GENERAL PURPOSE REGISTERS
                *           8 = USED BY HALT LOOP TO HOLD INSTRUCTION REGISTER.  THE
                *               CONSOLE IS WIRED TO REQUEST DISPLAY OF REGISTER 8 WHEN
                *               THE INSTRUCTION REGISTER KEY IS PRESSED.
                *           9 = I/O DEVICE SELECTION REGISTER (LOW ORDER 6 BITS)
                *           E = USED FREELY AS WORKING SPACE, AND REQUIRED BY MULTIPLY
                *               AND DIVIDE INSTRUCTIONS.
                *           F = USED FREELY AS WORKING SPACE, AND REQUIRED BY MULTIPLY
                *               AND DIVIDE INSTRUCTIONS.
                *
000A            A       EQU     X'A                                 HEXADECIMAL
000B            B       EQU     X'B                                 DIGITS
000C            C       EQU     X'C
000D            D       EQU     X'D
000E            E       EQU     X'E
000F            F       EQU     X'F
81E5            DISMP   EQU     O'100745                            'EXC   DISMP'  INSTR
                *
                *       SPECIAL REGISTERS.
                *
0008            IH      EQU     8                       INSTRUCTION REGISTER (HALT LOOP)
0009            DR      EQU     9                       I/O DEVICE REGISTER
000E            S1      EQU     E
000F            S2      EQU     F
                *
                *       INTERRUPT MASKS.
                *
000E            M       EQU     E                                   ALLOW I/O ONLY IF M/P
000F            I       EQU     F                                   ALLOW I/O ALWAYS
000C            N       EQU     C                                   DO NOT ALLOW I/O
                *
                *       PAGE NUMBER.
                *
0200            P       EQU     512*1
                *
                *       MACRO TO ORIGIN AT NEXT MULTIPLE OF P(1).
                *
                MORG    MAC
                        ORG     *+P(1)-1
                        ORG     */P(1)*P(1)
                        EMAC
                *
                *       MACRO FOR ILLEGAL INSTRUCTION INTERRUPT ENTRY.
                *
0002            ILLAD   EQU     2                       ILLEGAL INSTRUCTION INTERRUPT
                ILLOP   MAC
                        GMSK    /N(ILLOP1),1(1),IMF,LA1,LB3,RF1,  START I/O @ 4,
                                CFF9,MK1                          P-2->P
                        EMAC
```

```
0000                    58          ALOC    0
                        59  *       INTERRUPT SERVICE.                                                          058
                        60  *       THE STATES WHICH ENABLE THE DECODER ALSO ENABLE INTERRUPTS.  IF              059
                        61  *       A SINGLE WORD INSTRUCTION WAS AT THE INTERRUPT ADDRESS, THE NEXT             060
                        62  *       WORD IS IN THE INSTRUCTION BUFFER BUT SHOULD NOT BE PROCESSED.               061
                        63  *       PROCESSING OF THIS WORD IS INHIBITED BY TRANSFERRING TO INTBAS               062
                        64  *       IF CINTF=1 AND IM=6.  IF CINTF=0 AND NO INTERRUPT IS PENDING, THE            063
                        65  *       INSTRUCTION IS DECODED.  IF AN INTERRUPT IS PENDING AND CINTF=0              064
                        66  *       OR IM NOT =6, CONTROL GOES TO INTBAS+7, WHERE THE INTERRUPT                  065
                        67  *       MICROPROGRAM IN I/OCS IS INITIATED.  IF THE INTERRUPT WASN'T                 066
                        68  *       REALLY AN INTERRUPT, BUT INSTEAD WAS A DMA REQUEST, INTERRUPT               067
                        69  *       PROCESSING MUST BE ABORTED AND THE PIPELINE RESTARTED.  IF IT               068
                        70  *       REALLY IS AN INTERRUPT, CONTROL GOES TO INTBAS+1 WHERE INTERRUPT             069
                        71  *       SERVICING IS COMPLETED.                                                     070
                        72  *                                                                                   071
                        73          MORG    16  INTERRUPT HARDWARE USES INTBAS, INTBAS+1, INTBAS+7           072
                0000    74  INTBAS  EQU     *                                                                   073
                        75          MORG    2   /T(SWA50,SS2MI)                                                 074
0000 13C0090404000000   76  SS2MI   GEN     /P(SS3MI+P),TF0,SF2,GF4,IM8,RF4     (AA)->ALU,IF(P),INCP        075
                        77  *                                                   PAGE JUMP (NOP IN PG 0)         076
0001                    78          ORG     INTBAS+1 INTERRUPT SECOND TRY COMES HERE                            077
0001 0050000101F0000E   79  INT1    GEN     /N(INT2),IM2,RF1,FFF,AAE            WAIT(IO),RE-1->P            078
0002 0CB3C40700000000   80  SWA50   GEN     /F(STA1-2),2(6),FSF,SF1,IME         FSEL(13-12),OS(MIL)         079
0003 0020000240A00000   81  ABORT   GMSK    /N(ABORT1),IM4,LB2,FFA,MK0          I->IBR                      080
0004 0000000240A00000   82  ABORT1  GMSK    /N(SS2MI),IM4,LB2,FFA,MK0           I->IBR                FREE  081
                        83  *       HLT1 AND HLT7 ARE REFERENCED WITH INTERRUPTS ENABLED.                       082
                        84  HLT1    GMSK    /N(HLT2),1(3),AB2,IM4,LB3,FFA,      START I/O AT X'E,           083
0005 3C28001260AEFC00   85                  CMKEFC0                             X'103F->ALU                 084
0006 0028000020A90008   86  HLT7    GEN     /N(HLT1),LB1,FFA,MF1,WR1,24(IH)     DOR->IH                     085
0007                    87          ORG     INTBAS+7 INTERRUPT FIRST TRY COMES HERE                             086
                        88  IWAIT   GEN     2(ABORT),1(7),MT1,GF4,MR1,IME,      ENABLE INTERRUPTS,          087
0007 701C012709F1000E   89                  CLA1,RF1,FFF,WR1,AAE      DISABLE DEC, START IO, P-1->P,RE          088
                        90  ILLOP1  GMSK    /N(ILLOP2),IM2,LB3,FFA,             WAIT(IO)              FREE  089
0008 0048000160A7E1A0   91                  C15(-1-DISMP)                       EXC DISMP -> ALU            090
                        92  ILLOP2  GMSK    /N(INT2),SF1,IM4,LB3,RF3,           ILLAD->DOR,IF(ALU)    FREE  091
0009 00500402630FFFD0   93                  C15(-1-ILLAD)                                                   092
                        94  INT2    GEN     /N(INT3),SF1,IM4,LB1,RF3,FFA,       IF(ALU),IOR->DOR      FREE  093
000A 0058040223A80020   95                  CMF1,BB2                                                        094
                        96  INT3    GEN     /N(INT4),SF1,IM4,LB1,FF9,CF3,       IF(ALU), DOR+1->RF    FREE  095
000B 006004022097010F   97                  CWR1,SH1,BB0,AAF                                                096
000C 000001438OA900FE   98  INT4    GEN     GF5,IM7,FFA,MF1,WR1,BBF,AAE         IBR->I,DECODE,        FREE  097
                        99  *                                                   1->CINTF,S2->S1               098
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                    101  *       V75 CONDITIONAL JUMP INSTRUCTIONS.  THESE ARE DIFFERENT FROM          100
                    102  *       VARIAN STANDARD INSTRUCTIONS.  THE JUMP IF EVEN PARITY AND JUMP       101
                    103  *       IF ODD PARITY INSTRUCTIONS ARE NOT IN VARIANS SET.                    102
                    104  *                                                                            103
                    105  JI1     GEN      /F(JISEL),2(7),FS7,GF2,IM1,RF3,   FSEL(5-3),WAIT(M),       104
000D 00B9C08083000000 106                C23(*-*)                          BB->DOR,SAMPLE             105
                    107              MORG     2   /T(JP5,*)                                          106
                    108  JP4     GEN      /T(JP5,*),TF2,GFC,MR1,RF5,FF9,    DOR(RC),DOR(1)->BB(0),     107
000E 707823200591A0ED 109                CWR1,SC1,WF1,BBE,AAD              INCS,RD+(RE OR RF)->RD     108
000F 2089C08018000102 110  JP5     GEN      /F(JRN),2(1),FS7,GF2,LA3,SH1,AA2  FSEL(3),RD(RC),SAMPLE      109
                    111              MORG     8   REF BY FSEL(5-3) FROM JI1                          110
                0010 112  JISEL   EQU      *                                                         111
0010 00C000000001010E 113  JEP     GEN      /N(JP1),FF0,WR1,SH1,AAE           0->RE                    112
0011 00C000000001010E 114  JOP     GEN      /N(JP1),FF0,WR1,SH1,AAE           0->RE                    113
0012 1F202E4600000000 115  JRZ     GEN      /T(JMP1,SS1M),TF2,SF3,GF9,IMC     CND(ALUZ) IF(MIL), TT    114
0013 1F203A4600000000 116  JRNZ    GEN      /T(JMP1,SS1M),TF3,SF2,GF9,IMC     CND(-ALUZ) IF(MIL), TF   115
0014 1F202DC600000000 117  JRN     GEN      /T(JMP1,SS1M),TF2,SF3,GF7,IMC     CND(ALUS) IF(MIL), TT    116
0015 1F2039C600000000 118  JRP     GEN      /T(JMP1,SS1M),TF3,SF2,GF7,IMC     CND(-ALUS) IF(MIL), TF   117
0016 1F09A24000000000 119  JDPZ    GEN      /S(JDPZ1,SS1M),2(1),FS6,TF2,GF9   ALUZ=>FSEL(2)             118
0017 2F09A24000000000 120  JDPNZ   GEN      /S(JDPZ1,JMP1),2(1),FS6,TF2,GF9   ALUZ=>FSEL(2)             119
0018 00C800000007010F 121  JP1     GEN      /N(JP2),FF0,CF3,WR1,SH1,AAF       1->RF                FREE 120
0019 00D0000062AFFF10 122  JP2     GMSK     /N(JP3),LB3,RF2,FFA,MKFFF1        -14->SC              FREE 121
                    123  JP3     GEN      /N(JP4),MR1,FF0,CF3,WR1,SC1,WF1,  DOR(RC),DOR(1)->BB(0), FREE 122
001A 007000200007A1ED 124                CSH1,BBE,AAD                      1->RD                    123
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                    126  *       INPUT DATA TRANSFER INSTRUCTIONS.                                          125
                    127  *                                                                                  126
                    128  IABM2   GEN      /N(IABM3),1(3),IMF,LB1,FFA,MF1,   START I/O AT X'C,       FREE 127
001B 30E00007A0A9000E 129                CWR1,BB0,24(S1)                   DOR->S1                        128
                    130  IABM3   GMSK     /F(IME1),2(7),FSA,IM2,LB2,FFE,    FSEL(8-6),WAIT(IO),     FREE 129
001C 013A800140EFE00E 131                CMKFE00,16(S1)                    IR & X'1FF V S1                130
                    132  INAB2   GEN      /N(IAB),SF1,IM8,LB1,RF7,FFE,MF1,  IF(P),INCP,             FREE 131
001D 00F0040427E90000 133                CWR1,BB0,AA0                      DOR V A -> A,DOR               132
                    134  IAB     GEN      /N(IWAIT),1(M),GF5,IM6,LB1,FFA,   IBR->I,DEC,INTRPT,      FREE 133
001E E03801432OA90001 135                CMF1,WR1,BB0,AA1                  DOR->B                         134
001F 01C0040424A80000 136  IME2    GEN      /N(SS2M),SF1,IM8,RF4,LB1,FFA,MF1  IF(P),INCP,DOR->ALU     FREE 135
                    137            MORG     8   REF BY FSEL(8-6)                                         136
                    138  IME1    GEN      /N(IME2),SF1,IME,LB1,RF3,FFA,MF1, OS(MIL),IOR->DOR,          137
0020 00F8040723A80820 139                CXF1,BB2                          RESET CINTF                    138
                    140  INA     GEN      /N(SS3M),SF1,IM8,LB1,RF4,FFE,MF1, IF(P),INCP,IOR V A -> A    139
0021 0380040424E90020 141                CWR1,BB2,AA0                                                     140
                    142  INB     GEN      /N(SS3M),SF1,IM8,LB1,RF4,FFE,MF1, IF(P),INCP,IOR V B -> B    141
0022 0380040424E90021 143                CWR1,BB2,AA1                                                     142
0023 00E8000023E80021 144  INAB1   GEN      /N(INAB2),LB1,RF3,FFE,MF1,BB2,AA1 IOR V B -> DOR              143
                    145            ILLOP                                                                  144
0024 10400007E9900010
                    146  CIA     GEN      /N(SS3M),SF1,IM8,LB1,RF4,FFA,MF1, IF(P),INCP,IOR->A           145
0025 0380040424A90020 147                CWR1,BB2,AA0                                                     146
                    148  CIB     GEN      /N(SS3M),SF1,IM8,LB1,RF4,FFA,MF1, IF(P),INCP,IOR->B           147
0026 0380040424A90021 149                CWR1,BB2,AA1                                                     148
                    150  CIAB    GEN      /N(IAB),SF1,IM8,LB1,RF7,FFA,MF1,  IF(P),INCP,IOR->A,DOR       149
0027 00F0040427A90020 151                CWR1,BB2,AA0                                                     150
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                        *       DIVIDE INSTRUCTION.
                        *
                                MORG    2   /T(DIV2,DIV1)
0028 01480000006701FF   DIV1    GEN     /N(DIV2),FF6,CF3,WR1,SH1,BBF,AAF   -RF->RF
                        DIV2    GEN     /T(DIV4,DIV3),TF2,GFA,FF2,CF3,     DSB=>DIV4,-RF->RE
0029 51582280002701FE                   CWR1,SH1,BBF,AAE
                                MORG    2   /T(DIV4,DIV3)
002A 0198000003000001   DIV3    GEN     /N(DIV7),RF3,AA1                   B->DOR
002B 0168000010010001   DIV4    GEN     /N(DIV5),LA2,WR1,AA1               B(L)->B,0->DLA0
                                MORG    4   BE CAREFUL:  /S(DIV13&DIV14,DIV12) SELECTS DSB
                        DIV13   GEN     /S(SS3M,DIV15),2(8),FSF,TF3,SF2,   FSEL(15) IF NO QS
002C 53C3FBC404000000                   CGFF,IM8,RF4                       IF(P) IF NO QS, INCP
002D 0178008003260110   DIV5    GEN     /N(DIV6),GF2,RF3,FF2,CF3,SH1,BB1   -B->DOR,SAMPLE          FREE
002E                            ORG     DIV13+2   REF BY FSEL(DSB)
                        DIV14   GEN     /S(SS3M,DIV15),2(8),FSF,TF2,SF3,   FSEL(15) IF QS,
                                        CGFF,IM8,RF4,FF6,CF3,WR1,SH1,BB0,   IF(P) IF QS, INCP
002E 53C3EFC404670100                   CAA0                               -A->A
002F 019800000023A100   DIV6    GEN     /N(DIV7),FF2,CF1,WR1,SC1,WF1,SH1   DOR(RT),CARRY-A->A      FREE
                                MORG    4   /T(DIV9,DIV10), /T(DIV11,DIV10)
                        DIV10   GEN     /T(DIV11,*),TF2,GFC,MR1,LA2,RF5,   DIVIDE STEP
0030 01882320159192F0                   CFF9,WR1,SC1,XF2,SH2,BBF
                        DIV11   GEN     /S(DIV13,DIV12),2(6),FS2,TF3,GFD,  FSEL(DSB) IF R0(15)=0
0031 A130B34020A90001                   CLB1,FFA,MF1,WR1,BB0,AA1           DOR->B
0032 0180048000000000   DIV9    GEN     /N(DIV10),SF1,GF2                  SET OVERFLOW
0033 01A80080009190E0   DIV7    GEN     /N(DIV8),GF2,FF9,WR1,SC1,XF2,BBE   FIRST DIVIDE STEP       FREE
                                MORG    2   /S(DIV13,DIV12)
                        DIV12   GEN     /T(DIV14,DIV13),TF2,GFA,FF9,WR1,   DSB=>DIV14,A+RF->A
0034 61702280009100F0                   CBBF,AA0
                        DIV8    GMSK    /T(DIV9,DIV10),TF3,GFD,LB3,RF2,    R0(15)=>DIV10,-14->SC   FREE
0035 0190334062A000E0                   CFFA,MKE
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                          184  *       INSTRUCTIONS FORCED TOGETHER BY TEST ADDRESSING                                  183
                          185  *                                                                                        184
0036 01C0040404001000     186  SRE81   GEN     /N(SS2M),SF1,IM8,RF4,XF2          IF(P),INCP,J-SIG        FREE  185
0037 0BD8000120A80000     187  HFPT1   GEN     /N(HMEN),IM2,LB1,FFA,MF1          WAIT(IO),DOR->ALU       FREE  186
                          188          MORG    4   /T(JMP2,SS2M), /T(SRE80,SS2M)                                    187
0038 0380040404000000     189  SS2M    GEN     /N(SS3M),SF1,IM8,RF4,FF0,24(*-*)  IF(P),INCP,(AA)->ALU             188
0039 0F20040605000000     190  JMP2    GEN     /N(JMP1),SF1,IMC,RF5              IF(MIL),INC SC                  189
003A 01B0000021960100     191  SRE80   GEN     /N(SRE81),LB1,RF1,FF9,CF3,SH1     DOR+1->P                        190
003B 01E0000100000000     192  HMEN1   GEN     /N(HMEN2),IM2                     WAIT(IO)                FREE  191
                          193  HMEN2   GEN     /F(HREN),2(3),FSA,LB1,RF3,FFA,    FSEL(7-6),IOR->DOR      FREE  192
003C 2B1A800023A80020     194                  CMF1,BB2                                                         193
003D 01F0004000000008     195  HSTT7   GEN     /N(HSTT8),GF1,24(IH)              IH->ALU,IBR->IR         FREE  194
003E 01F8040400000000     196  HSTT8   GEN     /N(HSTT9),SF1,IM8                 IF(P)                   FREE  195
003F 4038014000000000     197  HSTT9   GEN     /N(IWAIT),1(4),GF5                IBR->I,DECODE,ETC       FREE  196
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                    199  *       SINGLE WORD ADDRESSING INSTRUCTIONS.                                                    198
                    200  *       PART OF DOUBLE-WORD EXTENDED INSTRUCTIONS.                                              199
                    201  *                                                                                               200
                    202          MORG    32  REF BY FSEL(15-13)                                                         201
0040 0210041C04000010 203  LDA1   GEN     /N(LDB),SF1,AB3,IM8,RF4,BB1,AA0   INCP,IF(P),SET AA&BB                 202
                    204  ELDA1  GEN     /N(IWAIT),1(M),GF5,LB1,FFA,MF1,   IBR->I,DEC,INTRPT,      FREE 203
0041 E038014020A90010 205                 CWR1,BB1,AA0                      MIL->A                                 204
                    206          MORG    2   LDB,LDX REF BY FSEL(12)                                                    205
                    207  LDB    GEN     /N(IWAIT),1(I),GF5,IM6,LB1,FFA,   IBR->I,DEC,INTRPT,                        206
0042 F038014320A90011 208                 CMF1,WR1,BB1,AA1                  SEL&RESET CINTF,MIL->B                 207
                    209  ELDB1  GEN     /N(IWAIT),1(M),GF5,LB1,FFA,MF1,   IBR->I,DEC,INTRPT,      FREE 208
0043 E038014020A90011 210                 CWR1,BB1,AA1                      MIL->B                                 209
0044                  211          ORG     LDA1+4                                                                     210
0044 1223840404000000 212  SWA31  GEN     /F(LDB),2(4),FSE,SF1,IM8,RF4      FSEL(12),IF(P),INCP                  211
                    213  ELDX1  GEN     /N(IWAIT),1(M),GF5,LB1,FFA,MF1,   IBR->I,DEC,INTRPT,      FREE 212
0045 E038014020A90012 214                 CWR1,BB1,AA2                      MIL->X                                 213
0046                  215          ORG     LDB+4                                                                      214
                    216  LDX    GEN     /N(IWAIT),1(I),GF5,IM6,LB1,FFA,   IBR->I,DEC,INTRPT,                        215
0046 F038014320A90012 217                 CMF1,WR1,BB1,AA2                  SEL&RESET CINTF,MIL->X                 216
0047 0248020020960110 218  EINR1  GEN     /N(INR2),GF8,LB1,FF9,CF3,SH1,BB1  MIL+1->ALU,SAMPLE OVFL FREE 217
0048                  219          ORG     SWA31+4                                                                    218
0048 0238040320A80000 220  INR1   GEN     /N(EINR1),SF1,IM6,LB1,FFA,MF1     OS(ALU),DOR->ALU                     219
                    221  INR2   GEN     /F(SS3M),2(8),FSF,SF1,IM8,RF4,    FSEL(14),MIL+1->ALU,     FREE 220
0049 03C3C40424960110 222                 CLB1,FF9,CF3,SH1,BB1              INCP,IF(P)                             221
                    223          MORG    2   SUB,ANA REF BY FSEL(12)                                                    222
                    224  SUB    GEN     /N(IWAIT),1(I),GFD,IM6,LB1,FF6,   IBR->I,DECODE,EN INT,                     223
004A F038034320670010 225                 CCF3,WR1,BB1,AA0                  SAMPLE OVFL,A-MIL->A                   224
                    226  ESUB1  GEN     /N(IWAIT),1(M),GFD,LB1,FF6,CF3,   IBR->I,DEC,INTRPT,      FREE 225
004B E038034020670010 227                 CWR1,BB1,AA0                      A-MIL->A,SAMPLE OVFL                   226
004C                  228          ORG     SUB+2                                                                      227
                    229  ANA    GEN     /N(IWAIT),1(I),GF5,IM6,LB1,FFB,   IBR->I,DECODE,EN INT,                     228
004C F038014320B90010 230                 CMF1,WR1,BB1,AA0                  A&MIL->A                               229
                    231  EANA1  GEN     /N(IWAIT),1(M),GF5,LB1,FFB,MF1,   IBR->I,DEC,INTRPT,      FREE 230
004D E038014020B90010 232                 CWR1,BB1,AA0                      A&MIL->A                               231
                    233          MORG    2   /S(LDA1,SWA26)                                                            232
004E 02A8040685000000 234  SWA26  GEN     /N(SWA22),SF1,IMD,RF5             OF(MIL),INCS                         233
                    235  EORA1  GEN     /N(IWAIT),1(M),GF5,LB1,FFE,MF1,   IBR->I,DEC,INTRPT,      FREE 234
004F E038014020E90010 236                 CWR1,BB1,AA0                      A V MIL -> A                           235
0050                  237          ORG     INR1+8                                                                     236
0050 0288040404000000 238  ORA1   GEN     /N(ORA2),SF1,IM8,RF4              IF(P),INCP                           237
                    239  ORA2   GEN     /N(IWAIT),1(I),GF5,IM6,LB1,FFE,   IBR->I,DEC,INTRPT,      FREE 238
0051 F038014320E90010 240                 CMF1,WR1,BB1,AA0                  A V MIL -> A                           239
                    241          MORG    2   ADD, ERA REF BY F.SEL(12)                                                  240
                    242  ADD    GEN     /N(IWAIT),1(I),GFD,IM6,LB1,FF9,   IBR->I,DECODE,EN INT,                     241
0052 F038034320910010 243                 CWR1,BB1,AA0                      SAMPLE OVFL,A+MIL->A                   242
                    244  EADD1  GEN     /N(IWAIT),1(M),GFD,LB1,FF9,WR1,   IBR->I,DEC,INTRPT,      FREE 243
0053 E038034020910010 245                 CBB1,AA0                          A+MIL->A,SAMPLE OVFL                   244
0054                  246          ORG     ORA1+4                                                                     245
0054 12A3840404000000 247  SWA35  GEN     /F(ADD),2(4),FSE,SF1,IM8,RF4      FSEL(12),IF(P),INCP                  246
                    248  SWA22  GEN     /S(LDA1,SWA26),2(C),MT1,FSF,TF3,  C.FSEL(15-13)(MIL15=0),FREE 247
0055 7267F2C023A80010 249                 CGFB,LB1,RF3,FFA,MF1,BB1          MIL->OPR                               248
0056                  250          ORG     ADD+4   MORG 16 WITH ADD                                                   249
                    251  ERA    GEN     /N(IWAIT),1(I),GF5,IM6,LB1,FF6,   IBR->I,DECODE,EN INT,                     250
0056 F038014320690010 252                 CMF1,WR1,BB1,AA0                  A XOR MIL -> A                         251
                    253  EERA1  GEN     /N(IWAIT),1(M),GF5,LB1,FF6,MF1,   IBR->I,DEC,INTRPT,      FREE 252
0057 E038014020690010 254                 CWR1,BB1,AA0                      A XOR MIL -> A                         253
0058                  255          ORG     SWA35+4                                                                    254
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0058 5213C40404000000 256  SWA36  GEN    /F(SUB),2(2),FSF,SF1,IM8,RF4      FSEL(12),IF(P),INCP          255
0059 02A8040680000000 257  SWA21  GEN    /N(SWA22),SF1,IMD                 OF(MIL)                FREE  256
                      258         MORG     2    REF BY FSEL(12)                                        257
005A 02D8000020A9001F 259  MUL0   GEN    /N(MUL),LB1,FFA,MF1,WR1,BB1,AAF   MIL->S2                      258
                      260  MUL    GMSK   /T(MUL4,MUL1),TF2,GFD,LB3,RF2,    ROSIGN=>MUL4,15->SC    FREE  259
005B 26A8234062A000E0 261                CFFA,MK000E                                                   260
005C                  262         ORG    SWA36+4                                                        261
005C 52A3800080000000 263  SWA37  GEN    /F(MUL0),2(4),FSE,IM1             FSEL(12),WAIT(M)             262
005D 0FF8000021A80000 264  DORTOP GEN    /N(RESET),RF1,LB1,FFA,MF1,BB0     DOR->P FOR DEBUGGING   FREE  263
005E                  265         ORG    MUL0+4   MORG 16 WITH MUL0                                     264
                      266  DIV0   GEN    /N(DIV),LB1,FFA,MF1,WR1,WF1,BB1,  MIL->S2,MIL15->QS            265
005E 02F8000020A9201F 267                C24(S2)                                                       266
005F 414833C000004000 268  DIV    GEN    /T(DIV2,DIV1),TF3,GFF,VF1,AA0     QS=>DIV1,R0(15)->DSB   FREE  267
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                    270  *       SHIFT INSTRUCTIONS AND INSTRUCTIONS CONSTRAINED TO BE                    269
                    271  *       NEAR SHIFT INSTRUCTIONS BY ADDRESSING.                                   270
                    272  *                                                                                271
                    273          MORG     32  SHIFTS REF BY CND FSEL(8-5), FAIL TO SS3MI                 272
0060 C3003F0415010401 274  ASLB   GEN      /T(*,SS3MI),TF3,SF3,GFC,IM8,LA2,RF5,WR1,SH4,AA1              273
0061 C3083F0415010101 275  LRLB   GEN      /T(*,SS3MI),TF3,SF3,GFC,IM8,LA2,RF5,WR1,SH1,AA1              274
0062 C3103F041D010201 276  ASRB   GEN      /T(*,SS3MI),TF3,SF3,GFC,IM8,LA3,RF5,WR1,SH2,AA1              275
0063 C3183F041D010401 277  LSRB   GEN      /T(*,SS3MI),TF3,SF3,GFC,IM8,LA3,RF5,WR1,SH4,AA1              276
0064 C3203F0415010400 278  ASLA   GEN      /T(*,SS3MI),TF3,SF3,GFC,IM8,LA2,RF5,WR1,SH4                  277
0065 C3283F0415010100 279  LRLA   GEN      /T(*,SS3MI),TF3,SF3,GFC,IM8,LA2,RF5,WR1,SH1                  278
0066 C3303F041D010200 280  ASRA   GEN      /T(*,SS3MI),TF3,SF3,GFC,IM8,LA3,RF5,WR1,SH2                  279
0067 C3383F041D010400 281  LSRA   GEN      /T(*,SS3MI),TF3,SF3,GFC,IM8,LA3,RF5,WR1,SH4                  280
0068 03A0000013004001 282  LASL   GEN      /N(LASL1),LA2,RF3,VF1,AA1                                    281
0069 03B8000003000001 283  LLRL   GEN      /N(LLRL1),RF3,AA1                                            282
006A 0390000013004001 284  LASR   GEN      /N(LASR1),LA2,RF3,VF1,AA1                                    283
006B 0398000003000001 285  LLSR   GEN      /N(LLSR1),RF3,AA1                                            284
                    286          MORG     4   REF BY FSEL FROM RR4                                     285
006C 03C0050404000000 287  ROF    GEN      /N(SS3MI),SF1,GF4,IM8,RF4          RESET OVFL, IF(P),INCP    286
006D 03C0048404000000 288  SOF    GEN      /N(SS3MI),SF1,GF2,IM8,RF4          SET OVFL, IF(P), INCP     287
                    289  TSA    GMSK     /N(TSA1),1(3),AB2,IME,LB3,FFA,     START IO                  288
006E 3F60001760ADFC00 290                  CMKDFC0                                                     289
                    291          ILLOP                                                                   290
006F 10400007E9900010
                    292          MORG     16  REF BY CND FSEL FROM DIV, FSEL FROM MUL,INR              291
0070 E0380143U0000000 293  SS3M   GEN      /N(IWAIT),1(M),GF5,IM6             IBR->I,DECODE, ETC        292
                    294  SHFT1  GEN      /S(ASLB,SS3MI),2(F),FS9,TF3,SF3,   CND(NOT ALUZ) FSEL(8-5)FREE 293
0071 C37A7E4422660100 295                  CGF9,IM8,LB1,RF2,FF6,CF3,SH1,BB0   CND(ALUZ) IF(P),          294
                    296  *                                                  -DOR->SHIFT COUNTER       295
                    297          MORG     2   /T(LASL2,*)                                              296
0072 13A823001D01AA00 298  LASR1  GEN      /T(LASL2,*),TF2,GFC,LA3,RF5,WR1,SC1,WF1,XF1,SH2              297
                    299  LLSR1  GEN      /T(*,LASL3),TF3,SF3,GFC,IM8,LA3,RF5,WR1,SC1,                 298
0073 33983F041D01AC00 300                  CWF1,XF1,SH4                                                299
                    301          MORG     2                                                           300
                    302  LASL1  GEN      /T(LASL2,*),TF2,GFC,LA2,RF5,WR1,   SHFT OVFL => LASL2        301
0074 23A8230015019E00 303                  CSC1,XF3,SH6,AA0                   (A,DOR)LEFT, INC SC       302
0075 03B0040400008800 304  LASL2  GEN      /N(LASL3),SF1,IM8,SC1,WF1,XF3      IF(P),DOR RT,DSB->DOR15   303
                    305          MORG     2   /T(*,LASL3)                                             304
                    306  LASL3  GEN      /N(IWAIT),1(I),GF5,IM6,LB1,FFA,    DECODE,IBR->I,EN INT,     305
0076 F03801432UA90001 307                  CMF1,WR1,AA1                       DOR->B                    306
                    308  LLRL1  GEN      /T(*,LASL3),TF3,SF3,GFC,IM8,LA2,   SHFT OVFL=>LASL3,INC SC   307
0077 33B83F0415018A00 309                  CRF5,WR1,SC1,XF1,SH2               (A,DOR) LEFT ROTATE       308
0078                309          ORG      SS3M+8   REF BY FSEL, MUST BE MORG 32 WITH SHIFTS            309
0078 F038014300000000 311  SS3MI  GEN      /N(IWAIT),1(I),GF5,IM6             IBR->I,DECODE, ETC        310
0079 4BBA800000000000 312  HLT6   GEN      /F(HRDP),2(7),FSA                  FSEL(8-6)            FREE 311
                    313          MORG     2   /S(SS3M,DIV15)                                           312
                    314  DIV15  GEN      /F(SS3M),2(8),FSF,SF1,IM8,FF6,     FSEL(14),IF(P),           313
007A 03C3C40400670111 315                  CCF3,WR1,SH1,BB1,AA1               -B->B                     314
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                         317  *       JUMP AND MARK INSTRUCTION.                                                    316
                         318  *                                                                                     317
                         319  JMRK3   GEN      /N(SS2M),SF1,IM4,LB1,RF1,FF9,CF3,  IF(ALU),MIL+1->P          FREE 318
007B 01C0040221960110    320                  CSH1,BB1                                                           319
                         321              MORG    2    /T(JMRK1,JMRK5)                                          320
007C 01C0040404000000    322  JMRK5   GEN      /N(SS2M),SF1,IM8,RF4                IF(P),INCP                   321
                         323  JMRK1   GEN      /T(JMRK2,JMRK4),TF3,SF2,GFB,IM2,    MIL15=>JMRK4,P+1->ALU,       322
007D 73F83AC108060000    324                  CLA1,CF3                            CND(MIL15=0) OS(MIL)         323
                         325              MORG    2    /T(JMRK2,JMRK4)                                          324
007E 03E8040685000000    326  JMRK4   GEN      /N(JMRK1),SF1,IMD,RF5               OF(MIL),INC SC               325
007F 03D8000088060000    327  JMRK2   GEN      /N(JMRK3),IM1,LA1,CF3               WAIT(M),P+1->ALU             326
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                        329  *       DOUBLE WORD IMMEDIATE INSTRUCTIONS.  NOTE THAT THESE INSTRUCTIONS      328
                        330  *       ARE DIFFERENT FROM VARIAN'S SINCE AN M-FIELD EQUAL TO ZERO OR 8        329
                        331  *       DOES NOT CAUSE UNPREDICTABLE RESULTS.  IN ADDITION, BITS 7, 1         330
                        332  *       AND 0 ARE USED SIMILARLY TO THE USAGE FOR DOUBLE-WORD EXTENDED         331
                        333  *       ADDRESSING INSTRUCTIONS.  WHEN BITS 1 AND 0 ARE EQUAL TO 00, 01       332
                        334  *       OR 10. INDEXING AND INDIRECT ADDRESSING ARE PERFORMED.  THUS,          333
                        335  *       NEGATIVE OPERANDS ARE NOT POSSIBLE.  WHEN BITS 1 AND 0 ARE EQUAL      334
                        336  *       TO 11. THE ACTION IS THE SAME AS VARIAN'S ACTION.  NOTE THAT THE      335
                        337  *       VARIAN ASSEMBLER ASSEMBLES BITS 1 AND 0 AS 00, NOT 11.  THIS          336
                        338  *       PROGRAM MAY BE MADE TO EXECUTE PROGRAMS SO ASSEMBLED BY               337
                        339  *       EXCHANGING IMMREL(X'168) AND IMMNI(X'16B), AND BY EXCHANGING          338
                        340  *       IMRL AND IMNI BELOW.                                                  339
                        341  *                                                                             340
                        342          MORG    32  REF BY CND FSEL, FAIL TO IMIND                           341
                  0080  343  IMMBAS EQU     *                                                             342
                        344  *       THE FOLLOWING INSTRUCTION IMPLEMENTS AN INDEXED SHIFT CAPABILITY.     343
                        345  *       BITS 8-5 OF THE ADDRESS WORD SHOULD BE SET AS FOR SHIFT               344
                        346  *       INSTRUCTIONS.  NOTE THAT ERRATIC RESULTS OCCUR IF THE CONTENTS        345
                        347  *       OF BITS 8-5 > X'B.  SINCE THIS INSTRUCTION CANNOT DO 0 -> CINTF,      346
                        348  *       ERRATIC RESULTS WILL OCCUR IF INDEXED SHIFTS ARE THE TARGET           347
                        349  *       OF INTERRUPTS.  INTERRUPTABILITY IS AS FOR SHIFTS.                    348
                        350  IXSHFT GMSK    /N(SHFT1),TF0,SF2,GF3,IM8,RF7,    IF(P),INCP,IBR->I        349
0080 038808C4077001F0   351                 CFF7,MK001F                       DOR&X'1F->DOR,SAMPLE     350
                        352  *       NEXT 8 INSTRUCTIONS ALL DO: 0 -> CINTF.                               351
                        353  ILDA    GEN     /N(SS2M),LB1,RF4,FFA,MF1,WR1,XF1. INCP. DOR->A               352
0081 01C0000024A90800   354                 CBB0,AA0                                                      353
                        355  ILDB    GEN     /N(SS2M),LB1,RF4,FFA,MF1,WR1,XF1. INCP. DOR->B               354
0082 01C0000024A90800   356                 CBB0,AA0                                                      355
                        357  ILDX    GEN     /N(SS2M),LB1,RF4,FFA,MF1,WR1,XF1. INCP. DOR->X               356
0083 01C0000024A90802   358                 CBB0,AA2                                                      357
                        359  IINR    GEN     /F(IST2),2(1),FS1,GF8,LB1,RF3,    FSEL(CINTF), DOR+1->DOR  358
0084 6488420023960900   360                 CFF9,CF3,XF1,SH1,BB0              SAMPLE OVERFLOW          359
0085 6488400003000800   361  ISTA    GEN     /F(IST2),2(1),FS1,RF3,XF1,AA0     FSEL(CINTF),A->DOR       360
0086 6488400003000801   362  ISTB    GEN     /F(IST2),2(1),FS1,RF3,XF1,AA1     FSEL(CINTF),B->DOR       361
0087 6488400003000802   363  ISTX    GEN     /F(IST2),2(1),FS1,RF3,XF1,AA2     FSEL(CINTF),X->DOR       362
0088 6488400003000900   364  ISTZ    GEN     /F(IST2),2(1),FS1,RF3,XF1,SH1     FSEL(CINTF),0->DOR       363
                        365  *       NEXT 7 INSTRUCTIONS ALL DO: 0->CINTF, INCP                            364
                        366  IORA    GEN     /N(SS2M),LB1,RF4,FFE,MF1,WR1,XF1. A V DOR -> A                 365
0089 01C0000024E90800   367                 CBB0,AA0                                                      366
                        368  IADD    GEN     /N(SS2M),GF8,LB1,RF4,FF9,WR1,XF1. A+DOR->A,SAMPLE OVFL        367
008A 01C0020024910800   369                 CBB0,AA0                                                      368
                        370  IERA    GEN     /N(SS2M),LB1,RF4,FF6,MF1,WR1,XF1. A XOR DOR -> A              369
008B 01C0000024690800   371                 CBB0,AA0                                                      370
                        372  ISUB    GEN     /N(SS2M),GF8,LB1,RF4,FF6,CF3,WR1. A-DOR->A,SAMPLE OVFL        371
008C 01C0020024670800   373                 CXF1,BB0,AA0                                                  372
                        374  IANA    GEN     /N(SS2M),LB1,RF4,FFB,MF1,WR1,XF1. A&DOR->A                    373
008D 01C0000024B90800   375                 CBB0,AA0                                                      374
                        376  IMUL    GEN     /N(MUL),LB1,RF4,FFA,MF1,WR1,XF1,  DOR->RF                     375
008E 02D8000024A9080F   377                 CBB0,AAF                                                      376
                        378  IDIV    GEN     /N(DIV),LB1,RF4,FFA,MF1,WR1,NF1,  DOR->RF, ALU15->QS          377
008F 02F8000024A9280F   379                 CXF1,BB0,AAF                                                  378
                        380          MORG    16  REF BY CND FSEL, FAIL TO IMIND                            379
                  0090  381  IMXC    EQU     *   IMMEDIATE INSTRUCTION INDEX COMPUTATION                   380
                        382  *       NEXT 3 INSTRUCTIONS DO C.FSEL(6-3) (QS=0), C.OF(A) (QS=1)             381
                        383  IMRL    GEN     /S(IMMBAS,IMIND),2(F),FS7,TF3,    P+DOR->DOR               382
0090 C479FFC2AB900000   384                 CSF3,GFF,IM5,LA1,LB1,RF3,FF9,BB0                              383
                        385  IMIX    GEN     /S(IMMBAS,IMIND),2(F),FS7,TF3,    X+DOR->DOR               384
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0091 C479FFC2A3900002 386                CSF3,GFF,IM5,LB1,RF3,FF9,BB0,AA2                                  385
                      387  IMIB   GEN     /S(IMMBAS,IMIND),2(F),FS7,TF3,     B+DOR->DOR                    386
0092 C479FFC2A3900001 388                CSF3,GFF,IM5,LB1,RF3,FF9,BB0,AA1                                  387
                      389  IMNI   GEN     /F(IMMBAS),2(F),FS7,LB1,RF3,FFA,  MIL->DOR, FSEL(6-3)           388
0093 0479C00023A80010 390                CMF1,BB1                                                          389
                      391         MORG    2   REF BY FSEL(7)                                               390
                      392  IMPRE  GEN     /F(IMXC),2(3),FS4,LB1,RF3,        FSEL(1-0),                    391
0094 0499000023A82010 393                CFFA,MF1,WF1,BB1                  MIL->DOR,MIL15->QS              392
                      394  IMPOST GEN     /S(IMXC,IMPST1),2(3),FS4,TF3,GFB, C.FSEL(1-0) (MIL15=0),        393
0095 549932C023A80010 395                CLB1,RF3,FFA,MF1,BB1              MIL->DOR                      394
                      396         MORG    2   /T(IMPSTI,IMIND1)                                            395
                      397  IMIND1 GEN     /S(IMMBAS,IMIND),2(F),FS7,TF3,    C.FSEL(6-3) (MIL15=0),        396
0096 C479FCC2A3A80010 398                CSF3,GF3,IM5,LB1,RF3,FFA,MF1,BB1  C.OF(A) (MIL15=1),            397
                      399  *                                                 MIL->DOR                      398
                      400  IMPSTI GEN     /S(IMXC,IMIND),2(3),FS4,TF3,SF3,  C.FSEL(1-0) (MIL15=0),        399
0097 44993EC2A3A80010 401                CGFB,IM5,LB1,RF3,FFA,MF1,BB1      C.OF(A) (MIL15=0),            400
                      402  *                                                 MIL->DOR                      401
                      403         MORG    2   /S(IMXC,IMIND)                                              402
0098 34B833C085000000 404  IMIND  GEN     /T(IMPSTI,IMIND1),TF3,GFF,IM1,RF5 WAIT(M),QS=>IMIND1,INCS       403
0099 0380040424A80000 405  IST4   GEN     /N(SS3M),SF1,IM8,LB1,RF4,FFA,MF1  IF(P),INCP,DOR->ALU    FREE   404
                      406         MORG    2   /S(IMXC,IMPST1)                                              405
009A 04C00402A0A80000 407  IMPST1 GEN     /N(IMIND),SF1,IM5,LB1,FFA,MF1,BB0 OF(ALU),DOR->ALU               406
009B 351A800818000000 408  RR1    GEN     /F(RR2),TS3,2(3),FSA,MR0,AB1,LA3  I(5-3)->BB,FSEL(7-6),  FREE   407
                      409  *                                                 GET BYTA READY FOR SBT1       408
                      410         MORG    2   REF BY FSEL(CINTF)                                           409
009C 055804030000000F 411  IST2   GEN     /N(IST3),SF1,IM6,AAF              OS(ALU),RF->ALU               410
009D 0558040500000000 412  IST1   GEN     /N(IST3),SF1,IMA                  OS(P)                         411
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                    414  *       V75 REGISTER - REGISTER AND BYTE INSTRUCTIONS.                                  413
                    415  *                                                                                      414
009E 04F8008098000100 416  LBT2    GEN      /N(LBT3),GF2,IM1,LA3,SH1,24(*-*)  AA(RC),SAMPLE,WAIT(M)  FREE  415
                    417  LBT3    GEN      /F(LBT4),2(1),FS2,SF3,GF7,IM8,     FSEL(BYTA),MIL->DOR,   FREE  416
009F 65088DC427000010 418                 CRF7,LB1,BB1                       CND(ALUS) IF(P), INCP          417
                    419          MORG     16  REF BY FSEL WITH REG SEL FROM RR1.                              418
00A0 250A400003000000 420  RR2     GEN      /F(RR5),2(1),FS9,RF3,FF0,24(*-*)  AA->DOR,FSEL(5)               419
                    421  RRAD    GEN      /N(SS3MI),SF1,GF6,IM8,RF4,FF9,     IF(P),INCP,AA+BB->AA,          420
00A1 03C0058404910000 422                 CWR1,23(*-*),24(*-*)               SAMPLE OVERLOW                 421
                    423  RRSB    GEN      /N(SS3MI),SF1,GF6,IM8,RF4,FF6,     IF(P),INCP,AA-BB->AA,          422
00A2 03C0058404670000 424                 CCF3,WR1,23(*-*),24(*-*)           SAMPLE OVERLOW                 423
00A3 03C0040404A90000 425  RRT     GEN      /N(SS3MI),SF1,IM8,RF4,FFA,MF1,WR1 IF(P),INCP,BB->AA              424
                    426          MORG     2   REF BY FSEL(5) FROM RR2                                        425
00A4 0599C01000000000 427  RR5     GEN      /F(RR4),2(3),TS0,FS7,MR0,AB2,BB0  FSEL(4-3),I(2-0)->AA           426
                    428  RR3     GEN      /F(LDR1-4),2(7),TS0,FS7,SF1,IM8,   I(2-0)->AA,1->BB,              427
00A5 05B9C41407000810 429                 CRF7,MR0,AB2,XF1,BB1,AA0           IF(P),INCP,FSEL(5-3),          428
                    430  *                                                  I5=1,R0->DOR,0->CINTF          429
                    431          MORG     2   /T(LBT1,LBSBI1), /T(SBT1,LBSBTI)                              430
00A6 0538041E80000000 432  LBSBI1  GEN      /N(LBSBI2),SF1,IMD,AB3             OF(MIL),HOLD AA&BB             431
00A7 4509C01860000000 433  LBSBI2  GEN      /F(LBT1),2(1),FS7,AB3,IM1          FSEL(3),WAIT(M),HOLD           432
                    434          MORG     2   REF BY FSEL(3) FROM LBSBI2                                     433
                    435  LBT1    GEN      /N(LBT2),SF1,IM5,AB3,LB1,LA3,FF9,  IF(ALU),MIL+AA(RA)             434
00A8 04F0041AB8900200 436                 CSH2,23(*-*),24(*-*)               HOLD AA&BB                     435
                    437  SBT1    GEN      /F(SBT2),2(1),FS2,SF1,IM7,LB1,     FSEL(BYTA),BS(ALU),            436
00A9 55088403B8900200 438                 CLA3,FF9,SH2,23(*-*),24(*-*)       MIL+AA(RA)                     437
                    439          MORG     2   REF BY FSEL(BYTA) FROM SBT1                                    438
00AA 04C8000027A80070 440  SBT2    GEN      /N(IST4),RF7,LB1,FFA,MF1,BB7       ORLS->DOR,INCP                 439
00AB 04C8000024A80000 441  IST3    GEN      /N(IST4),LB1,RF4,FFA,MF1,BB0       INCP,DOR->ALU                  440
                    442          MORG     2   REF BY FSEL(BYTA) FROM LBT3                                    441
                    443  LBT4    GEN      /N(LBT5),SF1,IM8,RF3,LB1,FFA,MF1,  OLSE->DOR,IF(P)          FSEL  442
00AC 0568040423A80050 444                 CBB5                                                              443
                    445  LBT5    GEN      /N(IWAIT),1(M),GF5,IM6,LB1,FFA,    ORZF->R0,IBR->1,DECODE,FSEL    444
00AD E03801432OA90060 446                 CMF1,WR1,BB6,AA0                   SEL&RST CINTF,INTRPT           445
00AE 05C8000080000000 447  OME2    GEN      /N(OAR1),IM1                       WAIT(M)                  FREE  446
                    448  OABM2   GMSK     /F(OME3),2(3),FSA,IM2,LB2,FFE,     FSEL(7-6),WAIT(IO),      FREE  447
00AF 659A800140EFE00E 449                 CMKFE00,16(S1)                     I&X'1FF V S1 -> ALU            448
                    450          MORG     16  REF BY FSEL WITH REG SEL FROM RR5.                           449
00B0 6319000000000000 451  RR4     GEN      /F(ROF),2(3),FS4                   FSEL(1-0)                      450
                    452  INCR    GEN      /N(SS3MI),SF1,GF6,IM8,RF4,LB1,     IF(P),INCP,DOR+1->AA,          451
00B1 03C0058424910200 453                 CFF9,WR1,SH2,23(*-*),24(*-*)             SAMPLE OVERFLOW          452
                    454  DECR    GEN      /N(SS3MI),SF1,GF6,IM8,RF4,LB1,     IF(P),INCP,DOR-1->AA,          453
00B2 03C0058424970200 455                 CFF9,CF3,WR1,SH2,23(*-*),24(*-*)   SAMPLE OVERFLOW                 454
00B3 03C0040404090000 456  COMR    GEN      /N(SS3MI),SF1,IM8,RF4,FF0,MF1,WR1 IF(P),INCP,NOT AA->AA          455
00B4                457          ORG      RR4+4    REF BY FSEL(5-3) WITH REG SEL FROM RR3.  I(5)=1.       456
                    458  LDR1    GEN      /N(SS3M),SF1,IM8,RF4,LB1,FFA,MF1,  IF(P),INCP,MIL->AA              457
00B4 0380040424A90000 459                 CWR1,23(*-*),24(*-*)                                              458
                    460  ADR1    GEN      /N(SS3M),SF1,GF6,IM8,RF4,LB1,FF9,  IF(P),INCP,MIL+AA->AA,          459
00B5 0380058424910000 461                 CWR1,23(*-*),24(*-*)               SAMPLE OVERFLOW                460
00B6 354032D800000000 462  LBT     GEN      /T(LBT1,LBSBI1),TF3,GFB,AB3        MILS=>LBSBTI,HOLD AA&BB        461
                    463  SBT     GEN      /T(SBT1,LBSBI1),TF3,GFB,AB3,LA1,   MILS=>LBSBTI,HOLD AA&BB        462
00B7 354832D809F00000 464                 CRF1,FFF                           P-1->P (FOR MPLE)              463
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                         466  *       OUTPUT DATA TRANSFER INSTRUCTIONS.                                          465
                         467  *                                                                                   466
                         468          MORG    4   REF BY FSEL                                                    467
00B8 0570040680000800    469  OME1    GEN     /N(OME2),SF1,IMD,XF1                OF(MIL),RESET CINTF         468
                         470  OAR1    GEN     /N(OABM2),1(7),IMF,LB1,FFA,MF1,     START I/O AT X'1C,         469
00B9 75780007A0A9000E    471                  CWR1,BB0,24(S1)                     DOR->S1                    470
                         472  OBR1    GEN      /N(OABM2),1(7),IMF,LB1,FFA,MF1,    START I/O AT X'1C,         471
00BA 75780007A0A9000E    473                  CWR1,BB0,24(S1)                     DOR->S1                    472
                         474  OAB1    GEN      /N(OABM2),1(7),IMF,LB1,FFA,MF1,    START I/O AT X'1C,         473
00BB 75780007A0A9000E    475                  CWR1,BB0,24(S1)                     DOR->S1                    474
                         476          MORG    4   REF BY FSEL                                                    475
00BC 0F10000124A80010    477  OME3    GEN     /N(SS1M),IM2,LB1,RF4,FFA,MF1,BB1    WAIT(IO),INCP,MIL->ALU     476
00BD 01C0000100000000    478  OAR2    GEN     /N(SS2M),IM2,AA0                    WAIT(IO),A->ALU            477
00BE 01C0000100000001    479  OBR2    GEN     /N(SS2M),IM2,AA1                    WAIT(IO),B->ALU            478
00BF 01C0000100E80010    480  OAB2    GEN     /N(SS2M),IM2,FFE,MF1,BB1,AA0        WAIT(IO),A V B->ALU        479
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                        482  *       BIT TEST INSTRUCTION.                                                    481
                        483  *                                                                                482
                        484          MORG    16  REF BY FSEL(3-0)                                           483
00C0 068A000063AFFFE0   485  BT20    GMSK    /F(BT30),2(1),FS8,LB3,RF3,FFA,MKFFFE                          484
00C1 068A000063AFFFD0   486  BT21    GMSK    /F(BT30),2(1),FS8,LB3,RF3,FFA,MKFFFD                          485
00C2 068A000063AFFFB0   487  BT22    GMSK    /F(BT30),2(1),FS8,LB3,RF3,FFA,MKFFFB                          486
00C3 068A000063AFFF70   488  BT23    GMSK    /F(BT30),2(1),FS8,LB3,RF3,FFA,MKFFF7                          487
00C4 068A000063AFFEF0   489  BT24    GMSK    /F(BT30),2(1),FS8,LB3,RF3,FFA,MKFFEF                          488
00C5 068A000063AFFDF0   490  BT25    GMSK    /F(BT30),2(1),FS8,LB3,RF3,FFA,MKFFDF                          489
00C6 068A000063AFFBF0   491  BT26    GMSK    /F(BT30),2(1),FS8,LB3,RF3,FFA,MKFFBF                          490
00C7 068A000063AFF7F0   492  BT27    GMSK    /F(BT30),2(1),FS8,LB3,RF3,FFA,MKFF7F                          491
00C8 068A000063AFEFF0   493  BT28    GMSK    /F(BT30),2(1),FS8,LB3,RF3,FFA,MKFEFF                          492
00C9 068A000063AFDFF0   494  BT29    GMSK    /F(BT30),2(1),FS8,LB3,RF3,FFA,MKFDFF                          493
00CA 068A000063AFBFF0   495  BT2A    GMSK    /F(BT30),2(1),FS8,LB3,RF3,FFA,MKFBFF                          494
00CB 068A000063AF7FF0   496  BT2B    GMSK    /F(BT30),2(1),FS8,LB3,RF3,FFA,MKF7FF                          495
00CC 068A000063AEFFF0   497  BT2C    GMSK    /F(BT30),2(1),FS8,LB3,RF3,FFA,MKEFFF                          496
00CD 068A000063ADFFF0   498  BT2D    GMSK    /F(BT30),2(1),FS8,LB3,RF3,FFA,MKDFFF                          497
00CE 068A000063ABFFF0   499  BT2E    GMSK    /F(BT30),2(1),FS8,LB3,RF3,FFA,MKBFFF                          498
00CF 068A000063A7FFF0   500  BT2F    GMSK    /F(BT30),2(1),FS8,LB3,RF3,FFA,MK7FFF                          499
                        501          MORG    2   REF BY FSEL(4)                                            500
00D0 168A408020B80000   502  BT30    GEN     /F(BT40),2(1),FS9,GF2,LB1,FFB,MF1                              501
00D1 168A408020B80001   503  BT31    GEN     /F(BT40),2(1),FS9,GF2,LB1,FFB,MF1,AA1                          502
                        504          MORG    2   REF BY FSEL(5)                                            503
00D2 1F503A4600000000   505  BT40    GEN     /T(BT50,SS1M),TF3,SF2,GF9,IMC                                  504
00D3 1F502E4600000000   506  BT41    GEN     /T(BT50,SS1M),TF2,SF3,GF9,IMC                                  505
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                        *       MULTIPLY INSTRUCTION.
                        *
                                MORG    2   /T(MUL4,MUL1)
00D4 06C00080009000F1   MUL1    GEN     /N(MUL2),GF2,FF9,BBF,AA1          RF+B->ALU,SAMPLE
00D5 06B0000013004001   MUL4    GEN     /N(MUL5),LA2,RF3,VF1,AA1          B(L)->DOR,B15->DSB
                                MORG    2   /T(MUL3,MUL5)
                        MUL5    GEN     /N(MUL7),MR1,FF3,MF1,WR1,SC1,     ZERO -> RE, DOR(RT),
00D6 06C800200039A80E                   CWF1,XF1,AAE                      DOR01 -> BAD0
00D7 06B00200009000F1   MUL3    GEN     /N(MUL5),GF8,FF9,BBF,AA1          RF+B->ALU,SAMPLE OVFL
                        MUL2    GEN     /T(MUL3,MUL5),TF2,GF9,LA2,RF3,    ALUZ=>MUL3,B(L)->DOR,  FREE
00D8 36B8224013004001                   CVF1,AA1                          B15->DSB
                        MUL7    GEN     /N(MUL8),MR1,RF5,FF9,WR1,SC1,WF1, FIRST MULTIPLY STEP    FREE
00D9 06D000200591A800                   CXF1
                                MORG    2
                        MUL8    GEN     /T(MUL9,*),TF2,GFC,MR1,LA3,RF5,   MULTIPLY STEP
00DA 56D823201D91A800                   CFF9,WR1,SC1,WF1,XF1
00DB 06F000001801A800   MUL9    GEN     /N(MUL11),LA3,WR1,SC1,WF1,XF1,SH0 A,DOR(RT),MULS->DLA15
                                MORG    2   /T(MUL12,MUL13)
                        MUL13   GEN     /F(SS3M),2(8),FSF,SF1,IM8,RF4,    FSEL(14),IF(P),INCP
00DC 03C3C4041C010401                   CLA3,WR1,SH4,AA1                  SHIFT B
00DD 06E00000006700F0   MUL12   GEN     /N(MUL13),FF6,CF3,WR1,BBF         A-RF->A
                        MUL11   GEN     /T(MUL12,MUL13),TF2,GFA,LB1,FFA,  DSB=>MUL12,DOR->B      FREE
00DE 66E8228020A90001                   CMF1,WR1,AA1
00DF 0000000000000000           GEN                                       EMPTY WORD!
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                    533  *       V75 DOUBLE PRECISION AND REGISTER-MEMORY INSTRUCTIONS.                    533
                    534  *                                                                                534
                    535          MORG     16   /T(DPRM2,DPRM1) WITH AB2 FOR REG SEL                       535
                    536  DPRM1   GEN      /T(DPRM4,DPRM3),TF3,SF3,          CND(-MILS) FSEL(8-6)   TFRS 536
00E0 27A83EC2A3A80010 537                CGFB,IM5,LB1,RF3,FFA,MF1,BB1      CND(MILS) OF(ALU),          537
                    538  *                                                 MIL->DOR                    538
                    539  DPRM2   GEN      /T(DPRM4,DPRM3),TF3,SF3,          CND(-MILS) FSEL(8-6)   TTRS 539
00E1 27A83EC2A3900010 540                CGFB,IM5,LB1,RF3,FF9,BB1,24(*-*)  CND(MILS) OF(ALU),          540
                    541  *                                                 MIL+AA->DOR                 541
00E2 071800008000000E 542  DST1    GEN      /N(DST2),IM1,FF0,AAE              WAIT(M),RE->ALU        FREE 542
                    543  DST2    GEN      /N(DPRMST),SF1,AB3,IM6,LB1,FF9,   OS(ALU),DOR+1->ALU,   FREE 543
00E3 0720041B2096010F 544                CCF3,BB0,SH1,AAF                  F->AA                       544
00E4 01C0001804000000 545  DPRMST GEN      /N(SS2M),AB3,RF4,FF0,24(*-*)      INCP,AA->ALU,HOLD AA   FREE 545
                    546  DADSB1  GEN      /F(DADD2),2(1),FS7,GF2,IM1,RF3,   RF+RF->DOR,SAMPLE      FREE 546
00E5 3709C080839000FF 547                CFF9,BBF,AAF                      WAIT(M)                     547
                    548          MORG     2   REF BY FSEL FROM DADSB1                                  548
                    549  DADD2   GEN      /F(DPDOR1),2(1),FSA,GF8,LB1,FF9,  RE+MIL+CARRY->RE,      FSEL 549
00E6 670A82002093A01E 550                CCF1,WR1,SC1,WF1,BB1,AAE          DOR(RC),SAMPLE OVERFLOW     550
                    551  DSUB2   GEN      /F(DPDOR1),2(1),FSA,GF8,LB1,FF6,  RE-MIL+CARRY->RE,      FSEL 551
00E7 670A82002063A01E 552                CCF1,WR1,SC1,WF1,BB1,AAE          DOR(RC),SAMPLE OVERFLOW     552
                    553  DLD1    GEN      /F(DPDOR1),2(1),FSA,LB1,FFA,MF1,  MIL->RE                 FREE 553
00E8 670A800020A9001E 554                CWR1,BB1,AAE                                                  554
                    555  DAN1    GEN      /F(DPDOR1),2(1),FSA,LB1,FF8,MF1,  RE & MIL->RE             FREE 555
00E9 670A80002089001E 556                CWR1,BB1,AAE                                                  556
                    557  DOR1    GEN      /F(DPDOR1),2(1),FSA,LB1,FFE,MF1,  RE V MIL->RE             FREE 557
00EA 670A800020E9001E 558                CWR1,BB1,AAE                                                  558
                    559  DER1    GEN      /F(DPDOR1),2(1),FSA,LB1,FF6,MF1,  RE XOR MIL->RE           FREE 559
00EB 670A80002069001E 560                CWR1,BB1,AAE                                                  560
                    561          MORG     2   REF BY FSEL FROM DLD1,DADD2,DSUB2,DAN1,DOR1,DER1         561
                    562  DPDOR1  GEN      /N(DPRER0),SF1,IM8,LB1,RF4,FFA,   IF(P),INCP,DOR->R1      FSEL 562
00EC 0770040424A90001 563                CMF1,WR1,BB0,AA1                                              563
                    564  DPDOR5  GEN      /N(DPRER4),SF1,IM8,LB1,RF4,FFA,   IF(P),INCP,DOR->R5      FSEL 564
00ED 0778040424A90005 565                CMF1,WR1,BB0,AA5                                              565
                    566  DPRER0  GEN      /N(IWAIT),1(M),GF5,IM6,FFA,MF1,   IBR->I,DECODE,INTRPT,   FREE 566
00EE E038014300A900E0 567                CWR1,BBE,AA0                      SEL&RST CINTF,RE->R0        567
                    568  DPRER4  GEN      /N(IWAIT),1(M),GF5,IM6,FFA,MF1,   IBR->I,DECODE,INTRPT,   FREE 568
00EF E038014300A900E4 569                CWR1,BBE,AA4                      SEL&RST CINTF,RE->R4        569
                    570          MORG     16  REF BY FSEL FROM DPRM4                                   570
00F0 07C8040224A80000 571  RMLD    GEN      /N(RM1),SF1,IM4,LB1,RF4,FFA,MF1   OF(ALU),INCP,DOR->ALU  FSEL 571
                    572  RMST    GEN      /N(DPRMST),TS3,SF1,AB2,IM6,LB1,   OS(ALU),DOR->ALU,       FSEL 572
00F1 3720041320A80000 573                CFFA,MF1,BB0                      I(5-3)->AA                  573
00F2 07C8040224A80000 574  RMAD    GEN      /N(RM1),SF1,IM4,LB1,RF4,FFA,MF1   OF(ALU),INCP,DOR->ALU  FSEL 574
00F3 07C8040224A80000 575  RMSB    GEN      /N(RM1),SF1,IM4,LB1,RF4,FFA,MF1   OF(ALU),INCP,DOR->ALU  FSEL 575
                    576          MORG     2   FAIL OF CND FSEL TO RMLD ETC.                            576
00F4 0700000085000000 577  DPRM3   GEN      /N(DPRM1),IM1,RF5                 WAIT(M),INCS           TF   577
00F5 078A840208060000 578  DPRM4   GEN      /F(RMLD),2(7),FSA,SF1,IM4,LA1,CF3 IF(ALU),P+1->ALU       TT   578
00F6                 579          ORG      RMLD+6                                                       579
00F6 07E0000000A9000E 580  DPR0RE  GEN      /N(DPR1RF),FFA,MF1,WR1,BB0,AAE    R0->RE                 FSEL 580
00F7 07E8000000A9004E 581  DPR4RE  GEN      /N(DPR5RF),FFA,MF1,WR1,BB4,AAE    R4->RE                 FSEL 581
00F8                 582          ORG      RMLD+8   REF BY FSEL WITH REG SEL FROM RM1, 1 IMPOSSIBLE     582
                    583  RMLD1   GEN      /N(IWAIT),1(M),GF5,IM6,LB1,FFA,   IBR->I,DECODE,INTRPT,   FSRS 583
00F8 E03801432OA90000 584                CMF1,WR1,23(*-*),24(*-*)          SEL&RST CINTF,MIL->AA       584
                    585  *       RM1 IS NOT REFERENCED BY FIELD SELECTION.                                585
                    586  RM1     GEN      /F(RMLD1-8),TS3,2(B),FSA,SF1,AB2, IF(P),INCP,I(5-3)->AA, FREE 586
00F9 370A841404000010 587                CIM8,RF4,BB1                      1->BB,FSEL(7-6)             587
00FA                 588          ORG      RMLD1+2                                                      588
                    589  RMAD1   GEN      /N(IWAIT),1(M),GFD,IM6,LB1,FF9,   IBR->I,DECODE,INTRPT,   FSRS 589
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00FA E038034320910000                 CWR1,23(*-*),24(*-*)                SEL&RST CINTF,
                        *                                                 MIL+AA->AA,SAMPLE OVFL
                        RMSB1   GEN    /N(IWAIT),1(M),GFD,IM6,LB1,FF6,    IBR->I,DECODE,INTRPT,   FSRS
00FB E038034320670000                 CCF3,WR1,23(*-*),24(*-*)            SEL&RST CINTF,
                        *                                                 AA-MIL->AA,SAMPLE OVFL
00FC 07F0000000A9001F   DPR1RF  GEN    /N(DP1),FFA,MF1,WR1,BB1,AAF        R1->RF                  FREE
00FD 07F0000000A9005F   DPR5RF  GEN    /N(DP1),FFA,MF1,WR1,BB5,AAF        R5->RF                  FREE
00FE 07F80402A0960100   DP1     GEN    /N(DP2),SF1,IM5,LB1,FF9,CF3,SH1    OF(ALU),DOR+1->ALU      FREE
                        DP2     GEN    /F(DLD),2(7),FS7,SF1,IM5,LB1,FFA,  OF(ALU),DOR->ALU,       FREE
00FF 0839C402A0A80000                 CMF1,BB0                            FSEL(5-3)
                                MORG    8   REF BY FSEL FROM DP2
0100 07400000A7A80010   DLD     GEN    /N(DLD1),IM1,LB1,RF7,FFA,MF1,BB1   WAIT(M),INCP,MIL->DOR   FSEL
0101 071004010000000E   DST     GEN    /N(DST1),SF1,IM2,AAE               OVR(OS),RE->ALU         FSEL
                        DADD    GEN    /N(DADSB1),LB1,RF4,FF9,WR1,BB1,    RF+MIL->RF,INCP         FSEL
0102 072800002491001F                 CAAF
                        DSUB    GEN    /N(DADSB1),LB1,RF4,FF6,CF3,WR1,    RF-MIL->RF,INCP         FSEL
0103 072800002467001F                 CBB1,AAF
                        DAN     GEN    /N(DAN1),IM1,LB1,RF7,FFB,MF1,      RF&MIL->RF,INCP,        FSEL
0104 07480000A7B8001F                 CBB1,AAF                            WAIT(M)
                        DOR     GEN    /N(DOR1),IM1,LB1,RF7,FFE,MF1,      RF V MIL->RF,INCP,      FSEL
0105 07500000A7E8001F                 CBB1,AAF                            WAIT(M)
                        DER     GEN    /N(DER1),IM1,LB1,RF7,FF6,MF1,      RF XOR MIL->RF,INCP,FSEL
0106 07580000A768001F                 CBB1,AAF                            WAIT(M)
                                ILLOP                                                                FSEL
0107 10400007E9900010
                        *       DPRM CAN'T DO IF(P) BECAUSE THE MEMORY LATCH ISN'T A TRUE-D
                        *       LATCH. SO THE TESTS AT DPRM1, DPRM2 DO NOT WORK PROPERLY IF THE
                        *       MEMORY IS ACTIVE.
                        DPRM    GEN    /T(DPRM2,DPRM1),TS0,TF3,GF9,       ALUZ=>DPRM1,WAIT(M),    FREE
0108 0708325080000810                 CAB2,IM1,XF1,BB1                    0->CINTF,I(2-0)->AA
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                        620  *       EXECUTE REMOTE INSTRUCTION.                                          620
                        621  *                                                                           621
0109 C038014300000000   622  SS3     GEN     /N(IWAIT),1(N),GF5,IM6          DECODE, EN INTS, ETC   FREE 622
                        623          MORG    2   /T(XEC1,XEC3)                                           623
010A 0860040404000000   624  XEC3    GEN     /N(SS2),SF1,IM8,RF4             IF(P),INCP                 624
010B 687022C000000000   625  XEC1    GEN     /T(XEC2,SS2),TF2,GFB            MIL15=>XEC2                625
                        626          MORG    2   /T(XEC2,SS2), FSEL(STEP)                               626
010C 0848040404000000   627  SS2     GEN     /N(SS3),SF1,IM8,RF4             IF(P),INCP                 627
010D 0BB8000084000000   628  HSTT4   GEN     /N(HSTT5),IM1,RF4               WAIT(M),INCP               628
010E 0858040605000000   629  XEC2    GEN     /N(XEC1),SF1,IMC,RF5            IF(MIL),INC SC             629
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                    631  *       SET I/O DEVICE SELECTION REGISTER.  THIS IS NOT A VARIAN                631
                    632  *       INSTRUCTION.  THIS INSTRUCTION PLACES 6 BITS IN REGISTER DR,            632
                    633  *       WHICH ARE SUBSEQUENTLY INCLUSIVE-OR'ED WITH ALL DEVICE SELECTION        633
                    634  *       SPECIFICATIONS SENT TO THE I/O BUS.  THE OCTAL FORM FOR THIS            634
                    635  *       INSTRUCTION IS:                                                        635
                    636  *       107TDD   WHERE                                                         636
                    637  *                T=0:  DD->DR            T=4:  X->DR                           637
                    638  *                T=1:  A->DR             T=5:  A V X -> DR                     638
                    639  *                T=2:  B->DR             T=6:  B V X -> DR                     639
                    640  *                T=3:  A V B -> DR       T=7:  A V B V X -> DR                 640
                    641  *                                                                              641
                    642  SETXIT GEN     /N(IWAIT),1(I),GF5,IM6,LB1,FFA,   DECODE,IBR->I,EN INT   FREE 642
010F F03801432OA90009 643               CMF1,WR1,BB0,24(DR)               DOR->DR                    643
                    644          MORG    8   REFERENCED BY FSEL(8-6)                                   644
                    645  SETI    GMSK    /N(SETXIT),SF1,IM8,LB2,RF7,FFA,   I&O'77->DOR                645
0110 0878040447AFFC00 646               CMKFFC0                           IF(P),INCP                 646
                    647  SETA    GMSK    /N(SETXIT),SF1,IM8,LB3,RF7,FF7,   DR&O'77->DOR               647
0111 08780404677003F9 648               CMK3F,16(DR)                      IF(P),INCP                 648
                    649  SETB    GMSK    /N(SETXIT),SF1,IM8,LB3,RF7,FF7,   B&O'77->DOR                649
0112 08780404677003F1 650               CMK3F,AK1                         IF(P),INCP                 650
0113 0888000000E90019 651  SETAB   GEN     /N(SETA),FFE,MF1,WR1,BB1,24(DR)   B V DR -> DR               651
                    652  SETX    GMSK    /N(SETXIT),SF1,IM8,LB3,RF7,FF7,   X&O'77->DOR                652
0114 08780404677003F2 653               CMK3F,AK2                         IF(P),INCP                 653
0115 0888000000E90029 654  SETAX   GEN     /N(SETA),FFE,MF1,WR1,BB2,24(DR)   X V DR -> DR               654
0116 08A8000000A90019 655  SETBX   GEN     /N(SETAX),FFA,MF1,WR1,BB1,24(DR)  B->DR                      655
0117 08A8000000E90019 656  SETABX  GEN     /N(SETAX),FFE,MF1,WR1,BB1,24(DR)  B V DR -> DR               656
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                        *       EXTERNAL CONTROL INSTRUCTION.
                        *
                        EXC2    GEN     /N(EXC3),1(1),IMF,LB1,FFA,MF1,    START IO,DOR->S1        FREE
0118 18C80007A0A9000E                   CWR1,BB0,24(S1)
0119 0860000140EFE00E   EXC3    GMSK    /N(SS2),IM2,LB2,FFE,MKFE00,16(S1) WAIT(IO),I&O'777 V S1  FREE
                        EXC22   GMSK    /N(SS2),IM2,LB2,FFE,MK7E00,   I&X'81FF V DR, WAIT(IO)    FREE
011A 0860000140E7E009                   C16(DR)
                        *       SENSE INSTRUCTION.
                        *
                        SEN2    GEN     /N(SEN3),1(1),IMF,LB1,FFA,MF1,    START I/O AT X'4,       FREE
011B 18E00007A0A9080E                   CWR1,XF1,BB0,24(S1)               DOR->S1,RESET CINTF
                        SEN3    GMSK    /N(SEN4),IM2,LB2,FFE,MKFE00,      WAIT(IO),               FREE
011C 08E8000140EFE00E                   C16(S1)                           I&X'1FF V S1 ->ALU
011D 1F702C4604000000   SEN4    GEN     /T(SEN5,SS1M),TF2,SF3,GF1,IMC,RF4 I/O SENSE=>SEN5,INCP,  FREE
                        *                                                 IF(MIL) IF I/O SENSE
                                MORG    2   /T(SEN6,SEN7)
011E 0F70040605000000   SEN7    GEN     /N(SEN5),SF1,IMC,RF5              IF(MIL),INCSC
011F 0380040400000000   SEN6    GEN     /N(SS3M),SF1,IM8                  IF(P)
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                        677  *       DOUBLE-WORD EXTENDED INSTRUCTIONS.  NOTE THAT THESE INSTRUCTIONS      677
                        678  *       ARE DIFFERENT FROM VARIAN'S SINCE AN M-FIELD EQUAL TO ZERO OR 8       678
                        679  *       DOES NOT CAUSE UNPREDICTABLE RESULTS.                                 679
                        680  *                                                                             680
                        681          MORG     32  ELDA ETC REF BY CND FSEL, FAIL TO DEIND                 681
                    0120 682  EXTBAS EQU      *                                                           682
                        683  DLBX    GEN      /N(DL1),SF1,IM5,LB1,RF4,FF9,CF3,  OF(ALU), DOR+1->ALU,      683
0120 09C80402A4960100   684                   CSH1,BB0                          INCP                      684
0121 020804020106000E   685  ELDA    GEN      /N(ELDA1),SF1,IM4,RF1,FF0,CF3,AAE IF(A),S1+1->P              685
0122 021804020106000E   686  ELDB    GEN      /N(ELDB1),SF1,IM4,RF1,FF0,CF3,AAE IF(A),S1+1->P              686
0123 022804020106000E   687  ELDX    GEN      /N(ELDX1),SF1,IM4,RF1,FF0,CF3,AAE IF(A),S1+1->P              687
0124 023804032A80000    688  EINR    GEN      /N(EINR1),SF1,IM6,LB1,RF4,FFA,MF1 OS(A),DOR->ALU,INCP        688
0125 01C0041904000000   689  ESTA    GEN      /N(SS2M),SF1,IM2,AB3,RF4,AA0      OVR(OS),A->AA,INCP        689
0126 01C0041904000001   690  ESTB    GEN      /N(SS2M),SF1,IM2,AB3,RF4,AA1      OVR(OS),B->AA,INCP        690
0127 01C0041904000002   691  ESTX    GEN      /N(SS2M),SF1,IM2,AB3,RF4,AA2      OVR(OS),X->AA,INCP        691
                        692  ESTZ    GEN      /N(SS2M),SF1,IM2,AB2,RF4,SH1,WR1. OVR(OS),INCP,0->F,F->AA    692
0128 01C004110401010F   693                   CAAF                                                        693
0129 027804020106000E   694  EORA    GEN      /N(EORA1),SF1,IM4,RF1,FF0,CF3,AAE IF(A),S1+1->P              694
012A 029804020106000E   695  EADD    GEN      /N(EADD1),SF1,IM4,RF1,FF0,CF3,AAE IF(A),S1+1->P              695
012B 02B804020106000E   696  EERA    GEN      /N(EERA1),SF1,IM4,RF1,FF0,CF3,AAE IF(A),S1+1->P              696
012C 025804020106000E   697  ESUB    GEN      /N(ESUB1),SF1,IM4,RF1,FF0,CF3,AAE IF(A),S1+1->P              697
012D 026804020106000E   698  EANA    GEN      /N(EANA1),SF1,IM4,RF1,FF0,CF3,AAE IF(A),S1+1->P              698
012E 02D0000084000000   699  EMUL    GEN      /N(MUL0),IM1,RF4                  WAIT(M),INCP              699
012F 02F0000084000000   700  EDIV    GEN      /N(DIV0),IM1,RF4                  WAIT(M),INCP              700
                        701          MORG     16  REF BY CND FSEL, FAIL TO DEIND                         701
                        702  DERL    GEN      /S(EXTBAS,DEIND),2(F),FS7,TF3,    C.FSEL(6-3) (QS=0),       702
0130 C979F7C2AB900000   703                   CSF1,GFF,IM5,LA1,LB1,RF3,FF9,BB0  OF(A),P+DOR->DOR          703
                        704  DEIX    GEN      /S(EXTBAS,DEIND),2(F),FS7,TF3,    C.FSEL(6-3) (QS=0),       704
0131 C979F7C2A3900002   705                   CSF1,GFF,IM5,LB1,RF3,FF9,BB0,AA2  OF(A),X+DOR->DOR          705
                        706  DEIB    GEN      /S(EXTBAS,DEIND),2(F),FS7,TF3,    C.FSEL(6-3) (QS=0),       706
0132 C979F7C2A3900001   707                   CSF1,GFF,IM5,LB1,RF3,FF9,BB0,AA1  OF(A),B+DOR->DOR          707
                        708  DENI    GEN      /S(EXTBAS,DEIND),2(F),FS7,TF3,    C.FSEL(6-3) (QS=0),       708
0133 C979F7C2A0A80000   709                   CSF1,GFF,IM5,LB1,FFA,MF1,BB0      OF(A),DOR->ALU            709
                        710          MORG     2   REF BY FSEL(7)                                          710
                        711  DEPRE   GEN      /F(DERL),2(3),FS4,LB1,RF3,        FSEL(1,0),                711
0134 0999000023A82010   712                   CFFA,MF1,WF1,BB1                  MIL->DOR,MIL15->QS        712
                        713  DEPOST  GEN      /S(DERL,DEPST1),2(3),FS4,TF3,     C.FSEL(1,0) (MIL15=0),    713
0135 599932C023A80010   714                   CGFB,LB1,RF3,FFA,MF1,BB1          MIL->DOR                  714
                        715          MORG     2   /T(DEPSTI,DEIND1)                                       715
                        716  DEIND1  GEN      /S(EXTBAS,DEIND),2(F),FS7,TF3,    C.FSEL(6-3) (MIL15=0),    716
0136 C979F6C2A3A80010   717                   CSF1,GFB,IM5,LB1,RF3,FFA,MF1,BB1  OF(A),MIL->DOR            717
                        718  DEPSTT  GEN      /S(DERL,DEIND),2(3),FS4,TF3,SF3,  C.FSEL(1,0) (MIL15=0),    718
0137 49993EC2A3A80010   719                   CGFB,IM5,LB1,RF3,FFA,MF1,BB1      CND(MIL15=1) OF(ALU),     719
                        720  *                                                    MIL->DOR                  720
                        721          MORG     2   /S(EXTBAS,DEIND)                                        721
0138 39B833C085000000   722  DEIND   GEN      /T(DEPSTI,DEIND1),TF3,GFF,IM1,RF5 WAIT(M),QS=>DEIND1,INCS   722
                        723  DL1     GEN      /N(ELDB1),SF1,IM8,LB1,RF4,FFA,    IF(P),INCP,MIL->X       FREE 723
0139 021804042A90012    724                   CMF1,WR1,BB1,AA2                                            724
                        725          MORG     2   /S(DERL,DEPST1)                                         725
013A 09C00402A0A80000   726  DEPST1  GEN      /N(DEIND),SF1,IM5,LB1,FFA,MF1,BB0 OF(ALU),DOR->ALU          726
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                    728  *       SKIP IF REGISTER EQUAL.  THIS CODE IS SOMEWHAT DIFFERENT FROM          728
                    729  *       VARIAN'S SINCE SETTING OF MORE THAN ONE OF THE A, B OR X BITS          729
                    730  *       DOES NOT CAUSE UNPREDICTABLE RESULTS.                                 730
                    731  *                                                                             731
013B 0A48000089100000 732  SRE5X  GEN     /N(SRE60),IM1,LA1,RF1,FF1,BB0     WAIT(M),P V A -> P     FREE 732
                    733           MORG    4   REF BY FSEL(1-0)                                        733
                    734  SRE20  GEN     /S(SRE50,SRE30),2(7),FS7,TF3,SF2, CND(MIL15=0) FSEL(5-3),     734
013C 4A39FAC2A8900010 735                CGFB,IM5,LB1,LA1,FF9,BB1          CND(MIL15=0) OF(ALU),     735
                    736  *                                                 P+MIL->ALU                 736
                    737  SRE21  GEN     /S(SRE50,SRE30),2(7),FS7,TF3,SF2, CND(MIL15=0) FSEL(5-3),     737
013D 4A39FAC2A0900012 738                CGFB,IM5,LB1,FF9,BB1,AA2          CND(MIL15=0) OF(ALU),     738
                    739  *                                                 X+MIL->ALU                 739
                    740  SRE22  GEN     /S(SRE50,SRE30),2(7),FS7,TF3,SF2, CND(MIL15=0) FSEL(5-3),     740
013E 4A39FAC2A0900011 741                CGFB,IM5,LB1,FF9,BB1,AA1          CND(MIL15=0) OF(ALU),     741
                    742  *                                                 B+MIL->ALU                 742
                    743  SRE23  GEN     /S(SRE50,SRE30),2(7),FS7,TF3,SF1, CND(MIL15=0) FSEL(5-3),     743
013F 4A39F6C680000000 744                CGF8,IMD                          OF(MIL)                    744
                    745           MORG    16  SRE5+ REF BY CND FSEL                                   745
0140 0A48000081000100 746  SRE50  GEN     /N(SRE60),IM1,RF1,SH1             WAIT(M),0->P               746
0141 0A48000081000000 747  SRE51  GEN     /N(SRE60),IM1,RF1,AA0             WAIT(M),A->P               747
0142 0A48000081000001 748  SRE52  GEN     /N(SRE60),IM1,RF1,AA1             WAIT(M),B->P               748
0143 0A48000081100010 749  SRE53  GEN     /N(SRE60),IM1,RF1,FF1,BB1,AA0     WAIT(M),A V B -> P         749
0144 0A48000081000002 750  SRE54  GEN     /N(SRE60),IM1,RF1,AA2             WAIT(M),X->P               750
0145 0A48000081100020 751  SRE55  GEN     /N(SRE60),IM1,RF1,FF1,BB2,AA0     WAIT(M),A V X -> P         751
0146 0A48000081100021 752  SRE56  GEN     /N(SRE60),IM1,RF1,FF1,BB2,AA1     WAIT(M),B V X -> P         752
0147 09D8000001100021 753  SRE57  GEN     /N(SRE5X),RF1,FF1,BB2,AA1         B V X -> P                 753
                    754           MORG    2   MORG 32 WITH SRE50                                      754
0148 0A50040680000000 755  SRE30  GEN     /N(SRE40),SF1,IMD                 OF(MIL)                    755
0149 0A5800828680010 756  SRE60  GEN     /N(SRE70),GF2,LB1,LA1,FF6,MF1,BB1 MIL XOR P, SAMPLE      FREE 756
                    757           MORG    2   MORG 32 WITH SRE50                                      757
014A 6999000085000000 758  SRE40  GEN     /F(SRE20),2(3),FS4,IM1,RF5        FSEL(1-0),WAIT(M),INCS     758
                    759  SRE70  GEN     /T(SRE80,SS2M),TF2,SF2,GF9,IM4,   CND(NO ALUZ) IF(ALU),  FREE 759
014B 41D02A4221000000 760                CLB1,RF1,BB0                      DOR->P                     760
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                        *       REGISTER - TO - REGISTER TRANSFER INSTRUCTIONS.
                        *
014C 0AB9040423E80000   REG30   GEN     /F(REG20),2(7),FS4,SF1,IM8,LB1,RF3,FFE,MF1                FREE
014D 0A80058420910500   REG41   GEN     /N(REG20),SF1,GF6,IM8,LB1,FF9,WR1,SH5                     FREE
014E 0A80058420910501   REG42   GEN     /N(REG20),SF1,GF6,IM8,LB1,FF9,WR1,SH5,AA1                 FREE
014F 0A88058420910501   REG43   GEN     /N(REG21),SF1,GF6,IM8,LB1,FF9,WR1,SH5,AA1                 FREE
                                MORG    16  REF BY CND FSEL(2-0)
0150 F038014300000000   REG20   GEN     /N(IWAIT),1(I),GF5,IM6
0151 F038034320910500   REG21   GEN     /N(IWAIT),1(I),GFD,IM6,LB1,FF9,WR1,SH5
0152 F038034320910501   REG22   GEN     /N(IWAIT),1(I),GFD,IM6,LB1,FF9,WR1,SH5,AA1
0153 0A680580A0910501   REG23   GEN     /N(REG41),SF1,GF6,IM1,LB1,FF9,WR1,SH5,AA1
0154 F038034320910502   REG24   GEN     /N(IWAIT),1(I),GFD,IM6,LB1,FF9,WR1,SH5,AA2
0155 0A680580A0910502   REG25   GEN     /N(REG41),SF1,GF6,IM1,LB1,FF9,WR1,SH5,AA2
0156 0A700580A0910502   REG26   GEN     /N(REG42),SF1,GF6,IM1,LB1,FF9,WR1,SH5,AA2
0157 0A780580A0910502   REG27   GEN     /N(REG43),SF1,GF6,IM1,LB1,FF9,WR1,SH5,AA2
                        ************************   D E C O D E R   ***************************
0158                            ORG     X'158    DECODER REFERENCES NEXT 8 INSTRUCTIONS          *
0158 0AB9240407000100   REG18   GEN     /S(REG20,REG20),2(7),FS4,TF2,SF1,IM8,RF7,SH1             *
0159 0AB9240407000001   REG1A   GEN     /S(REG20,REG20),2(7),FS4,TF2,SF1,IM8,RF7,AA1             *
015A 0AB9240407000002   REG1C   GEN     /S(REG20,REG20),2(7),FS4,TF2,SF1,IM8,RF7,AA2             *
                        REG1E   GEN     /S(REG20,REG20),2(7),FS4,TF2,SF1,IM8,RF7,FFE,            *
015B 0AB9240407E80021                  CMF1,BB2,AA1                                             *
015C 0AB9240407000000   REG19   GEN     /S(REG20,REG20),2(7),FS4,TF2,SF1,IM8,RF7                 *
                        REG1B   GEN     /S(REG20,REG20),2(7),FS4,TF2,SF1,IM8,RF7,FFE,            *
015D 0AB9240407E80010                  CMF1,BB1                                                 *
                        REG1D   GEN     /S(REG20,REG20),2(7),FS4,TF2,SF1,IM8,RF7,FFE,            *
015E 0AB9240407E80020                  CMF1,BB2                                                 *
015F 8A60280407E80021   REG1F   GEN     /T(REG30,REG20),TF2,SF2,IM8,RF7,FFE,MF1,BB2,AA1          *
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                    792  *       HALT LOOP PROCESSING.  CONTROL GETS HERE VIA THE HALT                  792
                    793  *       INTRUCTIONS, THE RESET KEY AND THE STEP KEY.                           793
                    794  *                                                                              794
                    795          MORG     16  REF BY FSEL(5-4), (5-4)=11 IMPOSSIBLE, REG FLD SELECT     795
0160 0BC8000000000000 796  HREN1   GEN      /N(HMEM)                          NOP (CAN'T CHANGE STAT)     796
0161 0BC8000021A80000 797  HREN2   GEN      /N(HMEM),LB1,RF1,FFA,MF1          DOR->P                      797
0162 0BC8000020A90000 798  HREN3   GEN      /N(HMEM),LB1,FFA,MF1,WR1          DOR->R**                    798
                    799  *       HMDP1 IS NOT REFERENCED BY FSEL.                                       799
0163 0B80001884000010 800  HMDP1   GEN      /N(HRDP1),IM1,RF4,AB3,BB1         WAIT(M),INCP,"MIL"->BB FREE 800
                    801          MORG     4   REF BY FSEL(7-6), (7-6)=10 IMPOSSIBLE                      801
0164 0B1A003000000000 802  HREN    GEN      /F(HREN1),1(0),2(3),FS8,AB2,MR1   FSEL(5-4),(3-0)->AA          802
0165 4028010600000000 803  HMEMA   GEN      /N(HLT1),1(4),GF4,IMC             SAMPLE INTERRUPTS           803
                    804  *       HMEN4 IS NOT REFERENCED BY FSEL                                        804
0166 0BC8000024A80000 805  HMEN4   GEN      /N(HMEM),LB1,RF4,FFA,MF1          WAIT(M),INCP,DOR->ALU  FREE 805
0167 0B30040500000000 806  HMEN3   GEN      /N(HMEN4),SF1,IMA                 OS(P)                       806
                    807  ************************  D E C O D E R  ****************************          807
0168                808          ORG      X'168   DECODER REFERENCES NEXT 8 INSTRUCTIONS.      *      808
                    809  IMMREL  GEN      /F(IMPRE),2(1),FSB,SF1,IM4,LA1,   P+1->S1,IF(A),0->QS,  *      809
0168 248AC4020807200E 810                 CFF0,CF3,WR1,WF1,24(S1)           FSEL(7)                 *      810
                    811  IMMIX   GEN      /F(IMPRE),2(1),FSB,SF1,IM4,LA1,   P+1->S1,IF(A),0->QS,  *      811
0169 248AC4020807200E 812                 CFF0,CF3,WR1,WF1,24(S1)           FSEL(7)                 *      812
                    813  IMMIB   GEN      /F(IMPRE),2(1),FSB,SF1,IM4,LA1,   P+1>S1,IF(A),0->QS,   *      813
016A 248AC4020807200E 814                 CFF0,CF3,WR1,WF1,24(S1)           FSEL(7)                 *      814
                    815  IMMNI   GEN      /N(IMNI),SF1,IM4,LA1,FF0,CF3,     P+1->S1,IF(A)           *      815
016B 049804020807000E 816                 CWR1,24(S1)                                               *      816
                    817  DE#1    GEN      /F(DEPRE),2(1),FSB,SF1,IM4,LA1,   P+1->S1,IF(A),0->QS,  *      817
016C 298AC4020807280E 818                 CFF0,CF3,WR1,WF1,XF1,AAE          FSEL(7),0->CINTF        *      818
                    819  DE#2    GEN      /F(DEPRE),2(1),FSB,SF1,IM4,LA1,   P+1->S1,IF(A),0->QS,  *      819
016D 298AC4020807280E 820                 CFF0,CF3,WR1,WF1,XF1,AAE          FSEL(7),0->CINTF        *      820
                    821  DE#3    GEN      /F(DEPRE),2(1),FSB,SF1,IM4,LA1,   P+1->S1,IF(A),0->QS,  *      821
016E 298AC4020807280E 822                 CFF0,CF3,WR1,WF1,XF1,AAE          FSEL(7),0->CINTF        *      822
                    823  DE#4    GEN      /F(DEPRE),2(1),FSB,SF1,IM4,LA1,   P+1->S1,IF(A),0->QS,  *      823
016F 298AC4020807280E 824                 CFF0,CF3,WR1,WF1,XF1,AAE          FSEL(7),0->CINTF        *      824
                    825  ************************************************************************      825
                    826          MORG     16  REF BY FSEL(5-4), (5-4)=11 IMPOSSIBLE, REG FLD SELECT     826
0170 0B9800002 3A80000 827  HRDP1   GEN      /N(HFPT),LB1,RF3,FFA,MF1          STATUS->DOR                 827
0171 0B9800000B000000 828  HRDP2   GEN      /N(HFPT),LA1,RF3                  P->DOR                      828
0172 0B9800000 3000000 829  HRDP3   GEN      /N(HFPT),RF3                      R**->DOR                    829
                    830  *       HFPT IS NOT REFERENCED BY FSEL.                                        830
                    831  HFPT    GMSK     /N(HFPT1),1(7),AB2,IMF,LB3,FFA,   START IO @ X'1E        FREE 831
0173 71B80017E0ABFC00 832                 CMKBFC0                           X'403F->ALU (OTO)           832
                    833          MORG     2   /T(HSTT6,HSTT2)                                        833
0174 6808C40400000000 834  HSTT2   GEN      /F(SS2),2(1),FS3,SF1,IM8          FSEL(STEP),IF(P)            834
0175 01E8000200000008 835  HSTT6   GEN      /N(HSTT7),IM4,24(IH)              IH->IBR,MIL                 835
0176 2BA8324000000000 836  HSTT1   GEN      /T(HSTT6,HSTT2),TF3,GF9           ALUZ=>HSTT2             FREE 836
0177 0DA0004000000000 837  HSTT5   GEN      /N(HLT),GF1                       IBR->I                  FREE 837
                    838          MORG     8   REF BY FSEL(8-6)                                       838
                    839  HRDP    GEN      /F(HRDP1),1(0),2(3),FS8,MR1,AB2,  FSEL(5-4), (3-0)->AA        839
0178 0B9A003000000030 840                 CBB3                              STATUS->BB                  840
0179 4028010600000000 841  HMEM    GEN      /N(HLT1),1(4),GF4,IMC             SAMPLE INTERRUPTS           841
                    842  HSTT    GMSK     /N(HSTT1),GF2,LB3,FFB,MK01FF,     IH&X'FE00,SAMPLE ALU        842
017A 0BB0008060B01FF8 843                 C16(IH)                           (WAS IT A HALT INST?)       843
                    844  HMEN    GMSK     /N(HMEN1),1(3),AB2,IMF,LB3,FFA,   START IO @ x'E,            844
017B 31D80017E0ADFC00 845                 CMKDFC0                           X'203F->ALU (DTI)           845
                    846  ABL10   GMSK     /N(ABL20),SF1,GF4,IM6,LB3,RF1,    OS(ALU),X'80->P,            846
017C 0C98050361AFF7F0 847                 CFFA,MKFF7F                       RESET OVERFLOW              847
017D 0B18040480000000 848  HMDP    GEN      /N(HMDP1),SF1,IM9                 OF(P)                       848
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                         849  ABL11  GMSK    /N(ABL21),SF1,GF2,IM6,LB3,RF1,    OS(ALU),X'80->P              849
017E 0CA8048361AFF7F0    850                 CFFA,MKFF7F                       SET OVERFLOW                 850
                         851  ABL30  GMSK    /N(ABL31),SF1,IM6,LB3,RF1,FFA,    OS(ALU),X'258->P             851
017F 0D88040361AFDA70    852                 CMKFDA7                                                        852
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                        854  *       INDEXED JUMP INSTRUCTION.                                                    854
                        855  *       NOTE THAT THIS VERSION OF IJMP DIFFERS FROM VARIAN'S VERSION                  855
                        856  *       SINCE BIT 2 MAY BE USED TO INDICATE PRE- OR POST-INDEXING, AS MAY             856
                        857  *       BE DONE USING BIT 7 WITH OTHER EXTENDED ADDRESSING INSTRUCTIONS.              857
                        858  *       ALSO. BITS 4&3 HAVE THE FOLLOWING MEANING:                                   858
                        859  *           00 - JUMP                                                                859
                        860  *           11 - XEC                                                                 860
                        861  *           01 - JSR,X                                                               861
                        862  *           10 - JSR,B                                                               862
                        863  *       IJRL.IJIX,IJIB,IJNI,IJIND1 ALL DO CND FSEL (6,4,3) BUT BIT 6 = 1.            863
                        864          MORG    16    REF BY CND FSEL(1-0)                                           864
                        865  IJRL    GEN      /S(IJXIT,IJIND),2(B),FS7,TF3,SF1. QS=>IJIND,P+DOR->DOR,           865
0180 3C59F7C22B901000   866                  CGFF,IM4,LA1,LB1,RF3,FF9,XF2,BB0   IF(A),EN JUMP SIGNAL           866
                        867  IJIX    GEN      /S(IJXIT,IJIND),2(B),FS7,TF3,SF1. QS=>IJIND,X+DOR->DOR,           867
0181 3C59F7C223901002   868                  CGFF,IM4,LB1,RF3,FF9,XF2,BB0,AA2   IF(A),EN JUMP SIGNAL           868
                        869  IJIB    GEN      /S(IJXIT,IJIND),2(B),FS7,TF3,SF1. QS=>IJIND,B+DOR->DOR            869
0182 3C59F7C223901001   870                  CGFF,IM4,LB1,RF3,FF9,XF2,BB0,AA1   IF(A),EN JUMP SIGNAL           870
                        871  IJNI    GEN      /S(IJXIT,IJIND),2(B),FS7,TF3,SF1. QS=>IJIND,DOR->ALU.             871
0183 3C59F7C220A81000   872                  CGFF,IM4,LB1,FFA,MF1,XF2,BB0       IF(A),EN JUMP SIGNAL           872
                        873          MORG     2    /T(IJPOST,IJIND1)                                             873
                        874  IJIND1  GEN      /S(IJXIT,IJIND),2(B),FS7,TF3,SF1. MIL15=>IJIND,MIL->DOR,           874
                        875                  CGFB,IM4,LB1,RF3,FFA,MF1,WF1,XF2,  MIL15->QS,J-SIG,IF(A)           875
0184 3C59F6C223A83010   876                  CBB1                                                               876
0185 0C38000063AFFC00   877  HLT2    GMSK     /N(HLT3),LB3,RF3,FFA,MKFFC0        0'77->DOR              FREE 877
                        878          MORG     2    /S(IJXIT,IJIND)                                               878
0186 2C6833C085000000   879  IJIND   GEN      /T(IJPOST,IJIND1),TF3,GFF,IM1,RF5 WAIT(M),QS=>IJIND1,INCS          879
                        880  HLT3    GEN      /N(HLT4),IM2,LB1,FFB,MF1,WR1,BB0, WAIT(10),DOR&DR->DR     FREE 880
0187 0C70000120B90009   881                  C24(DR)                                                            881
                        882          MORG     8    REF BY CND FSEL(6,4,3) WITH BIT 6 ALWAYS = 1.                 882
                        883  IJXIT   GEN      /N(SS3M),SF1,IM4,LB1,RF1,FF9,CF3, IF(A),DOR+1->P                   883
0188 0380040221960100   884                  CSH1,BB0                                                           884
0189 0C40000008070002   885  IJPX    GEN      /N(IJXIT),LA1,FF0,CF3,WR1,AA2      P+1->X                         885
018A 0C40000008070001   886  IJPB    GEN      /N(IJXIT),LA1,FF0,CF3,WR1,AA1      P+1->B                         886
018B 0848040404000000   887  IJXEC   GEN      /N(SS3),SF1,IM8,RF4 (SAME AS SS2) IF(P),INCP                       887
                        888          MORG     2    REF BY FSEL(2)                                                888
                        889  IJPRE   GEN      /F(IJRL),2(3),FS4,LB1,RF3,         FSEL(1-0),                     889
018C 0C19000023A82010   890                  CFFA,MF1,WF1,BB1                   MIL->DOR,MIL15->QS             890
                        891  IJPOST  GEN      /S(IJRL,IJIND),2(3),FS4,TF3,SF3,   C.FSEL(1-0) (MIL15=0),         891
018D 3C193EC2A3A80010   892                  CGFB,IM5,LB1,RF3,FFA,MF1,BB1       C.OF(ALU) (MIL15=1),           892
                        893  *                                                  MIL->DOR                       893
018E 0C78000223A80020   894  HLT4    GEN      /N(HLT5),IM4,LB1,RF3,FFA,MF1,BB2  IOR->DOR,ALU->IBR       FREE 894
018F 03C8004020A80000   895  HLT5    GEN      /N(HLT6),GF1,LB1,FFA,MF1,BB0      DOR->ALU,IBR->IR           FREE 895
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                     897  *       SINGLE WORD ADDRESSING STORE INSTRUCTIONS.                                    897
                     898  *       AUTOMATIC BOOTSTRAP LOADER FOR TELETYPE AND HIGH-SPEED PAPER TAPE             898
                     899  *       DEPOSITED AT 0200, STARTED WITH X=07000 AT 0212.                              899
                     900  *                                                                                     900
                     901          MORG    8   REF BY FSEL(13-12), 00 NOT POSSIBLE.                             901
                0190 902  STABX1  EQU     *                                                                     902
0190 0000000000000000 903          GEN                                          EMPTY WORD !                  903
0191 0000000000000000 904          GEN                                          EMPTY WORD !                  904
0192                  905          ORG     STABX1+2                                                           905
                     906  STA1    GEN     /T(SWA50,SS2MI),TF2,SF3,GFB,AB3,  A->ALU,SET AA,INCS               906
0192 00102ED885000000 907                  CIM1,RF5,AA0                      MIL15=>OVR(OF),->SWA50          907
0193 0CB8040564A7A7E0 908  ABL20   GMSK    /N(ABL3),SF1,IMA,LB3,RF4,FFA,MK7A7E    0200 CIB  001      FREE 908
0194                  909          ORG     STA1+2                                                             909
                     910  STB1    GEN     /T(SWA50,SS2MI),TF2,SF3,GFB,AB3,  B->ALU,SET AA,INCS               910
0194 00102ED885000001 911                  CIM1,RF5,AA1                      MIL15=>OVR(OF),->SWA50          911
0195 0CB8040564A7A600 912  ABL21   GMSK    /N(ABL3),SF1,IMA,LB3,RF4,FFA,MK7A60    0200 CIB  037      FREE 912
0196                  913          ORG     STB1+2                                                             913
                     914  STX1    GEN     /T(SWA50,SS2MI),TF2,SF3,GFB,AB3,  X->ALU,SET AA,INCS               914
0196 00102ED885000002 915                  CIM1,RF5,AA2                      MIL15=>OVR(OF),->SWA50          915
0197 0CC0040564AF7F60 916  ABL3    GMSK    /N(ABL4),SF1,IMA,LB3,RF4,FFA,MKF7F6    0201 ASLB 9        FREE 916
                     917          MORG    8   REF BY FSEL(13-12), 00 NOT POSSIBLE.                             917
                0198 918  STABX2  EQU     *                                                                     918
0198 0CC8040564AF7DE0 919  ABL4    GMSK    /N(ABL5),SF1,IMA,LB3,RF4,FFA,MKF7DE    0202 LRLB 1        FREE 919
0199 0CD8040564AF6D90 920  ABL5    GMSK    /N(ABL6),SF1,IMA,LB3,RF4,FFA,MKF6D9    0203 LLRL 6        FREE 920
019A                  921          ORG     STABX2+2                                                           921
019A 0000001800000000 922  STA2    GEN     /N(SS2MI),AB3,AA0                 A->ALU,SET AA                   922
019B 0CE8040564AFDEF0 923  ABL6    GMSK    /N(ABL7),SF1,IMA,LB3,RF4,FFA,MKFDEF    0204 JBZ           FREE 923
019C                  924          ORG     STA2+2                                                             924
019C 0000001800000001 925  STB2    GEN     /N(SS2MI),AB3,AA1                 B->ALU,SET AA                   925
019D 0CF6040564AFF730 926  ABL7    GMSK    /N(ABL8),SF1,IMA,LB3,RF4,FFA,MKFF73    0205 0214          FREE 926
019E                  927          ORG     STB2+2                                                             927
019E 0000001800000002 928  STX2    GEN     /N(SS2MI),AB3,AA2                 X->ALU,SET AA                   928
019F 0D00040564AA5FF0 929  ABL8    GMSK    /N(ABL9),SF1,IMA,LB3,RF4,FFA,MKA5FF    0206 STA  0,X      FREE 929
01A0 0D08040564AFDF70 930  ABL9    GMSK    /N(ABLA),SF1,IMA,LB3,RF4,FFA,MKFDF7    0207 JAZ           FREE 930
01A1 0D10040564AF1FF0 931  ABLA    GMSK    /N(ABLB),SF1,IMA,LB3,RF4,FFA,MKF1FF    0210 07000->DOR    FREE 931
01A2 0D18040564AF59B0 932  ABLB    GMSK    /N(ABLC),SF1,IMA,LB3,RF4,FFA,MKF59B    0211 IXR           FREE 932
                     933  ABLC    GMSK    /T(ABLD1,ABLD0),TF2,SF1,IMA,LB3,RF4,    0212 INCR 1        FREE 933
01A3 2D38240564AF5BE0 934                  CFFA,MKF5BE                                                        934
                     935          MORG    2   /T(ABLD1,ABLD0)                                                935
01A4 0D40040564A7A7E0 936  ABLD0   GMSK    /N(ABLE0),SF1,IMA,LB3,RF4,FFA,MK7A7E    0213 CIB  001              936
                     937  ***************************   D E C O D E R   ****************************      937
01A5                  938          ORG     X'1A5   DECODER REFERENCES NEXT 2 INSTRUCTIONS          *      938
01A5 00100402C0AFE000 939  SWA47   GMSK    /N(SWA50),SF1,IM5,LB2,FFA,MKFE00  OF(ALU),I&X'1FF->ALU  *      939
01A6 02C80402C0AFE000 940  SWA17   GMSK    /N(SWA21),SF1,IM5,LB2,FFA,MKFE00  OF(ALU),I&X'1FF->ALU  *      940
                     941  ************************************************************************      941
01A7 0D4804056 4A7EA00 942  ABLD1   GMSK    /N(ABLE1),SF1,IMA,LB3,RF4,FFA,MK7EA0    0213 EXC  0537             942
01A8 0D5004056 4A7D7E0 943  ABLE0   GMSK    /N(ABLF),SF1,IMA,LB3,RF4,FFA,MK7D7E     0214 SEN  0201     FREE 943
01A9 0D5004056 4A7CA00 944  ABLE1   GMSK    /N(ABLF),SF1,IMA,LB3,RF4,FFA,MK7CA0     0214 SEN  0537     FREE 944
01AA 0D5804056 4AFF7F0 945  ABLF    GMSK    /N(ABLX0),SF1,IMA,LB3,RF4,FFA,MKFF7F    0215 0200          FREE 945
01AB 0D7004056 4AFDFF0 946  ABLX0   GMSK    /N(ABLX1),SF1,IMA,LB3,RF4,FFA,MKFDFF    0216 JMP           FREE 946
                     947  ***************************   D E C O D E R   ****************************      947
01AC                  948          ORG     X'1AC   DECODER REFERENCES NEXT 2 INSTRUCTIONS          *      948
01AC 0840008040AFFF80 949  RM      GMSK    /N(DPRM),GF2,LB2,FFA,MKFFF8         1&7, SAMPLE           *DECO 949
01AD 04D8001000000000 950  RR      GEN     /N(RR1),TS0,MR0,AB2                 I(2-0)->AA            *DECO 950
                     951  ************************************************************************      951
01AE 0D780000E0AFF730 952  ABLX1   GMSK    /N(ABLX2),IM1,LB3,FFA,MKFF73             0217 0214          FREE 952
01AF 0D80000020A90002 953  ABLX2   GEN     /N(ABLX3),LB1,FFA,MF1,WR1,AA2            DOR->X             FREE 953
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01B0 0860050261AFF750 954  ABLX3  GMSK    /N(SS2),SF1,GF4,IM4,LB3,RF1,FFA,MKFF75 0212->P                FREE 954
                      955  *                                                                              955
                      956  *       AUTOMATIC BOOTSTRAP LOADER FOR DISC.                                   956
                      957  *       DEPOSITED AT 01130, STARTED AT 01130.                                  957
                      958  *                                                                              958
01B1 0D90040564A7EF10 959  ABL31  GMSK    /N(ABL32),SF1,IMA,LB3,RF4,FFA,MK7EF1   01130 EXC  0416   FREE 959
01B2 0D98040564A77F10 960  ABL32  GMSK    /N(ABL33),SF1,IMA,LB3,RF4,FFA,MK77F1   01131 EXC2 0016   FREE 960
01B3 0DB8040564A7F710 961  ABL33  GMSK    /N(ABL34),SF1,IMA,LB3,RF4,FFA,MK7F71   01132 EXC  0216   FREE 961
                      962  ************************   D E C O D E R   ****************************      962
01B4                  963          ORG     X'1B4    DECODER REFERENCES NEXT 2 INXTRUCTIONS          *     963
01B4 7F88400000000000 964  HLT    GEN     /F(HLT8),2(1),FS1                  FSEL(CINTF)             *     964
                      965  SWA40  GMSK    /F(STA2-2),2(6),FSF,SF1,IM6,LB2,   FSEL(13-12),OS(ALU),   *     965
01B5 4CB3C40340AF8000 966                 CFFA,MKF800                        I&X'7FF->ALU            *     966
                      967  SWA10  GMSK    /F(LDA1),2(C),MT1,FSF,SF1,IM5,     FSEL(15-13),OS(ALU),   *     967
01B6 0267C402C3AF8000 968                 CLB2,RF3,FFA,MKF800                I&X'7FF->DOR            *     968
                      969  ***************************************************************************     969
01B7 0DC0040564AF5FE0 970  ABL34  GMSK    /N(ABL35),SF1,IMA,LB3,RF4,FFA,MKF5FE   01133 TZA          FREE 970
01B8 0DE0040564A79B10 971  ABL35  GMSK    /N(ABL36),SF1,IMA,LB3,RF4,FFA,MK79B1   01134 OAR  0016   FREE 971
                      972  ************************   D E C O D E R   ****************************      972
01B9                  973          ORG     X'1B9    DECODER REFERENCES NEXT 3 INSTRUCTIONS          *     973
                      974  JMP    GEN     /T(JMP1,SS1M),TF2,SF3,GF5,IMC,     620=>JMP1,RESET CINTF,*     974
01B9 1F202D4604000800 975                 CRF4,XF1                           CND(620) IF(MIL), INCP*     975
                      976  JMRK   GEN     /T(JMRK1,JMRK5),TF2,SF3,GF5,IMD,   620=>JMRK1,             *     976
01BA 63E82D4680000800 977                 CXF1                               CND(620) OF(MIL)        *     977
01BB 58582D4600000800 978  XEC    GEN     /T(XEC1,XEC3),TF2,SF3,GF5,IMC,XF1  620=>XEC1,RESET CINTF,*     978
                      979  *                                                  CND(620) IF(MIL)        *     979
                      980  ***************************************************************************     980
01BC 0DE8040564A7DF10 981  ABL36  GMSK    /N(ABL37),SF1,IMA,LB3,RF4,FFA,MK7DF1   01135 SEN  0016   FREE 981
01BD 0DF0040564AFD9E0 982  ABL37  GMSK    /N(ABL38),SF1,IMA,LB3,RF4,FFA,MKFD9E   01136 01141        FREE 982
01BE 0DF8040564AFDFF0 983  ABL38  GMSK    /N(ABL39),SF1,IMA,LB3,RF4,FFA,MKFDFF   01137 JMP          FREE 983
01BF 0E0004056 4AFDA20 984  ABL39  GMSK    /N(ABL3A),SF1,IMA,LB3,RF4,FFA,MKFDA2   01140 01133        FREE 984
01C0 0E0804056 4A7AB10 985  ABL3A  GMSK    /N(ABL3B),SF1,IMA,LB3,RF4,FFA,MK7AB1   01141 CIA  0016   FREE 985
01C1 0E1004056 4A2D890 986  ABL3B  GMSK    /N(ABL3C),SF1,IMA,LB3,RF4,FFA,MK2D89   01142 ANA  01166  FREE 986
01C2 0E1804056 4AFDF10 987  ABL3C  GMSK    /N(ABL3D),SF1,IMA,LB3,RF4,FFA,MKFDF1   01143 JANZ         FREE 987
01C3 0E2004056 4AFDA70 988  ABL3D  GMSK    /N(ABL3E),SF1,IMA,LB3,RF4,FFA,MKFDA7   01144 01130        FREE 988
01C4 0E4004056 4A7FEE0 989  ABL3E  GMSK    /N(ABL3F),SF1,IMA,LB3,RF4,FFA,MK7FEE   01145 EXC  0021   FREE 989
                      990  ************************   D E C O D E R   ****************************      990
01C5                  991          ORG     X'1C5    DECODER REFERENCES NEXT 3 INSTRUCTIONS          *     991
                      992  SWA44  GMSK    /F(STA2-2),2(6),FSF,SF1,IM6,LB2,   FSEL(13-12),OS(ALU),   *     992
01C5 4CB3C403489FE000 993                 CLA1,FF9,MKFE00                    I&X'1FF + P -> ALU      *     993
                      994  SWA14  GMSK    /F(LDA1),2(C),MT1,FSF,SF1,IM5,     FSEL(15-13),OF(ALU),   *     994
01C6 0267C402CB9FE000 995                 CLB2,LA1,RF3,FF9,MKFE00            I&X'1FF + P -> DOR      *     995
01C7 0388008047AFFE00 996  SHFT   GMSK    /N(SHFT1),GF2,LB2,RF7,FFA,MKFFE0   I(4-0)->DOR,INCP,SAMPL*     996
                      997  ***************************************************************************     997
01C8 0E4804056 4A7F310 998  ABL3F  GMSK    /N(ABL40),SF1,IMA,LB3,RF4,FFA,MK7F31   01146 EXC  0316   FREE 998
01C9 0E5004056 4AF5BD0 999  ABL40  GMSK    /N(ABL41),SF1,IMA,LB3,RF4,FFA,MKF5BD   01147 INCR 2        FREE 999
01CA 0E5804056 4A797101000 ABL41  GMSK    /N(ABL42),SF1,IMA,LB3,RF4,FFA,MK7971   01150 OBR  0016   FREE A00
01CB 0E6004056 4A79AF01001 ABL42  GMSK    /N(ABL43),SF1,IMA,LB3,RF4,FFA,MK79AF   01151 OAR  0020   FREE A01
01CC 0E6804056 4AF9EE01002 ABL43  GMSK    /N(ABL44),SF1,IMA,LB3,RF4,FFA,MKF9EE   01152 OME  0021   FREE A02
01CD 0E7004056 4AFD9B01003 ABL44  GMSK    /N(ABL45),SF1,IMA,LB3,RF4,FFA,MKFD9B   01153 01144        FREE A03
01CE 0E8004056 4A7FEF01004 ABL45  GMSK    /N(ABL46),SF1,IMA,LB3,RF4,FFA,MK7FEF   01154 EXC  0020   FREE A04
                     1005  ************************   D E C O D E R   ****************************      A05
01CF                 1006          ORG     X'1CF    DECODER REFERENCES 'DP'                         *     A06
01CF 0840008040AFFF801007 DP       GMSK    /N(DPRM),GF2,LB2,FFA,MKFFF8        I&7, SAMPLE             *DECO A07
                     1008  ***************************************************************************     A08
01D0 0E8804056 4A7FF101009 ABL46  GMSK    /N(ABL47),SF1,IMA,LB3,RF4,FFA,MK7FF1   01155 EXC  0016   FREE A09
01D1 0E9004056 4A7CF101010 ABL47  GMSK    /N(ABL48),SF1,IMA,LB3,RF4,FFA,MK7CF1   01156 SEN  0416   FREE A10
01D2 0E9804056 4AFD9101011 ABL48  GMSK    /N(ABL49),SF1,IMA,LB3,RF4,FFA,MKFD91   01157 01156        FREE A11
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01D3 0EA0040564A7AB101012  ABL49  GMSK    /N(ABL4A),SF1,IMA,LB3,RF4,FFA,MK7AB1   01160 CIA  0016   FREE A12
01D4 0EB8040564A2D8901013  ABL4A  GMSK    /N(ABL4B),SF1,IMA,LB3,RF4,FFA,MK2D89   01162 ANA  01166  FREE A13
                     1014  ***************************   D E C O D E R   ***************************     A14
01D5                 1015         ORG     X'1D5    DECODER REFERENCES NEXT 2 INSTRUCTIONS          *     A15
                     1016  SWA45  GMSK    /F(STA2-2),2(6),FSF,SF1,IM6,LB2,  FSEL(13-12),OS(ALU),  *     A16
01D5 4CB3C403409FE0021017                CFF9,MKFE00,AK2                   I&X'1FF + X -> ALU    *     A17
                     1018  SWA15  GMSK    /F(LDA1),2(C),MT1,FSF,SF1,IM5,    FSEL(15-13),OF(ALU),  *     A18
01D6 0267C402C39FE0021019                CLB2,RF3,FF9,MKFE00,AK2           I&X'1FF + X -> DOR    *     A19
                     1020  ***********************************************************************     A20
01D7 0F80040564AFDF101021  ABL4B  GMSK    /N(ABL4C),SF1,IMA,LB3,RF4,FFA,MKFDF1   01162 JANZ        FREE A21
                     1022  ***************************   D E C O D E R   ***************************     A22
01D8                 1023         ORG     X'1D8    DECODER REFERENCES NEXT 8 INSTRUCTIONS          *     A23
01D8 0AB90404070001001024  REG10  GEN     /F(REG20),2(7),FS4,SF1,IM8,RF7,SH1                      *     A24
01D9 0AB90404070000011025  REG12  GEN     /F(REG20),2(7),FS4,SF1,IM8,RF7,AA1                      *     A25
01DA 0AB90404070000021026  REG14  GEN     /F(REG20),2(7),FS4,SF1,IM8,RF7,AA2                      *     A26
01DB 0AB9040407E800211027  REG16  GEN     /F(REG20),2(7),FS4,SF1,IM8,RF7,FFE,BB2,AA1,MF1          *     A27
01DC 0AB90404070000001028  REG11  GEN     /F(REG20),2(7),FS4,SF1,IM8,RF7                          *     A28
01DD 0AB9040407E800101029  REG13  GEN     /F(REG20),2(7),FS4,SF1,IM8,RF7,FFE,BB1,MF1              *     A29
01DE 0AB9040407E800201030  REG15  GEN     /F(REG20),2(7),FS4,SF1,IM8,RF7,FFE,BB2,MF1              *     A30
01DF 0A60000007E800211031  REG17  GEN     /N(REG30),RF7,FFE,BB2,AA1,MF1                           *     A31
                     1032  ***********************************************************************     A32
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                    1034  *       INSTRUCTIONS FORCED TOGETHER BY TEST ADDRESSING.                                A34
                    1035  *       JDPZ1. SS1M. JMP1. BT50. SEN5 MUST HAVE THE SAME 5 HIGH-ORDER                   A35
                    1036  *       BITS IN THEIR ADDRESSES.                                                        A36
                    1037  *                                                                                       A37
                    1038          MORG    16  REF BY CND FSEL(2) FROM JDPZ. JDPNZ                                A38
01E0 1089C080000000011039  JDPZ1  GEN     /F(JRZ),2(1),FS7,GF2,FF0,AA1      FSEL(3),R1->ALU,SAMPLE        A39
01E1 1089C080000000051040  JDPZ2  GEN     /F(JRZ),2(1),FS7,GF2,FF0,AA5      FSEL(3),R5->ALU,SAMPLE        A40
                    1041          MORG    2   T(JMP1,SS1M),T(BT50,SS1M),T(SEN5,SS1M),S(JDPZ1,SS1M)               A41
01E2 01C00404000000001042  SS1M   GEN     /N(SS2M),SF1,IM8                  IF(P)                         A42
                    1043  ***************************  D E C O D E R  ****************************              A43
01E3                1044          ORG     X'1E3    DECODER REFERENCES 'BT10'                        *          A44
01E3 0679000004000800 1045  BT10   GEN     /F(BT20),2(F),FS4,RF4,XF1         FSEL(3-0),INCP,               *  A45
                    1046  *                                                 RESET CINTF                   *    A46
                    1047  ***************************************************************************           A47
                    1048          MORG    2   S(JDPZ1,JMP1)                                                     A48
                    1049  JMP1    GEN     /T(JMP2,SS2M),TF2,GFB,IM5,LB1,    MILS=>JMP2,OF(ALU),           A49
01E4 41C822C2A1A810101050                 CRF1,FFA,MF1,XF2,BB1              MIL->P,JUMP SIGNAL            A50
                    1051  ***************************  D E C O D E R  ****************************              A51
01E5                1052          ORG     X'1E5    DECODER REFERENCES NEXT 3 INSTRUCTIONS           *          A52
                    1053  SWA46   GMSK    /F(STA2-2),2(6),FSF,SF1,IM6,LB2,  FSEL(13-12),OS(ALU),          *  A53
01E5 4CB3C403409FE0011054                 CFF9,MKFE00,AK1                   I&X'1FF + B -> ALU            *    A54
                    1055  SWA16   GMSK    /F(LDA1),2(C),MT1,FSF,SF1,IM5,    FSEL(15-13),OF(ALU),          *  A55
01E6 0267C402C39FE0011056                 CLB2,RF3,FF9,MKFE00,AK1           I&X'1FF + B -> DOR            *    A56
01E7 0068000804000800 1057  JI      GEN     /N(JI1),TS0,AB1,RF4,XF1           I(2-0)->BB,INCP,          *DECO A57
                    1058  *                                                 RESET CINTF                   *    A58
                    1059  ***************************************************************************           A59
                    1060          MORG    2   /T(BT51,BT52)                                                    A60
01E8 0380040400000000 1061  BT52   GEN     /N(SS3M),SF1,IM8                  IF(P)                         A61
01E9 0F5004060500000001062  BT51   GEN     /N(BT50),SF1,IMC,RF5              IF(MIL),INCSC                 A62
                    1063  *       BT50 MUST BE NEAR SS1M                                                          A63
                    1064  BT50    GEN     /T(BT51,BT52),TF2,GFB,LB1,RF1,    MILS=>BT51,MIL+1->P,          A64
01EA 4F4822C0219611101065                 CFF9,CF3,XF2,SH1,BB1              JUMP SIGNAL                   A65
                    1066  ***************************  D E C O D E R  ****************************              A66
01EB                1067          ORG     X'1EB    DECODER REFERENCES 'SRE10'                       *          A67
                    1068  SRE10   GEN     /F(SRE20),2(3),FS4,IM1,LA1,RF3,   F.SEL(1-0),WAIT(M),           *  A68
01EB 699900006B0608001069                 CCF3,XF1                          P+1->DOR,0->CINTF             *    A69
                    1070  ***************************************************************************           A70
01EC 0F6800010000000001071  TSA1    GEN     /N(TSA2),IM2                      WAIT(IO)                  FREE A71
                    1072  TSA2    GEN     /N(SS3MI),SF1,IM8,LB1,RF4,FFA,    IF(P),INCP,IOR->A         FREE A72
01ED 03C0040424A900201073                 CMF1,WR1,BB2,AA0                                                    A73
                    1074  *       SEN5 MUST BE NEAR SS1M.                                                         A74
                    1075  SEN5    GEN     /T(SEN6,SEN7),TF3,GFB,LB1,RF1,    MILS=>SEN7,MIL+1->P           A75
01EE 78F832C0219601101076                 CFF9,CF3,SH1,BB1                                                    A76
                    1077  ***************************  D E C O D E R  ****************************              A77
01EF                1078          ORG     X'1EF    DECODER REFERENCES 'IJMP'                        *          A78
                    1079  IJMP    GEN     /F(IJPRE),2(1),FS6,IM1,FF0,WF1,   FSEL(2),0->QS,                *  A79
01EF 6C0980008000290010 80                CXF1,SH1                          0->CINTF                      *    A80
                    1081  ***************************************************************************           A81
01F0 0F88040564AFDA701082  ABL4C   GMSK    /N(ABL4D),SF1,IMA,LB3,RF4,FFA,MKFDA7   01163 01130       FREE A82
01F1 0F90040564AFDFF01083  ABL4D   GMSK    /N(ABL4E),SF1,IMA,LB3,RF4,FFA,MKFDFF   01164 JMP         FREE A83
01F2 0FA8040564AFE7F01084  ABL4E   GMSK    /N(ABL4F),SF1,IMA,LB3,RF4,FFA,MKFE7F   01165 00600       FREE A84
                    1085  ***************************  D E C O D E R  ****************************              A85
01F3                1086          ORG     X'1F3    DECODER REFERENCES NEXT 2 INSTRUCTIONS           *          A86
                    1087          ILLOP                                                            *          A87
01F3 1040000/E9900010
01F4 08C0000063EF7FF91088  EXC1    GMSK    /N(EXC2),LB3,RF3,FFE,MKF7FF,16(DR)  X'800 V DR -> OPR    *          A88
                    1089  ***************************************************************************           A89
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01F5 0FB00000E0AF00F01090  ABL4F  GMSK    /N(ABL50),IM1,LB3,FFA,MKF00F          01166 07760       FREE A90
01F6 0860040261AFDA701091  ABL50  GMSK    /N(SS2),SF1,IM4,LB3,RF1,FFA,MKFDA7    01130->P          FREE A91
                     1092  ************************  D E C O D E R  ***************************     A92
01F7                 1093         ORG     X'1F7   DECODER REFERENCES NEXT 7 INSTRUCTIONS       *     A93
01F7 18D00007000000001094  EXC21  GEN     /N(EXC22),1(1),IME                 START I/O AT 4       *     A94
                     1095  *      NOTE - BCS WILL BE DETECTED BY WCS ON MACHINES SO EQUIPPED,   *     A95
                     1096  *      RATHER THAN CAUSING ILLEGAL INSTRUCTION PROCESSING.          *     A96
                     1097  BCS    ILLOP                                                        *     A97
01F8 10400007E9900010
01F9 08D8000063EEFFF91098  SEN1   GMSK    /N(SEN2),LB3,RF3,FFE,MKEFFF,16(DR)  X'1000 V DR -> DOR  *     A98
01FA 00D8000063EDFFF91099  IABM1  GMSK    /N(IABM2),LB3,RF3,FFE,MKDFFF,16(DR) X'2000 V DR -> DOR  *     A99
                     1100  OABM1  GMSK    /F(OME1),2(3),FSA,LB3,RF3,FFE,    FSEL(7-6),         *     B00
01FB 459A800063EBFFF91101                 CMKBFFF,16(DR)                    X'2000 V DR -> DOR    *     B01
                     1102  SETDR  GEN     /F(SETI),2(7),FSA,FFA,MF1,WR1,    FSEL(8-6), A->DR      *     B02
01FC 08BA800000A900091103                 CBB0,24(DR)                                             *     B03
                     1104  SETDRX GEN     /F(SETI),2(7),FSA,FFA,MF1,WR1,    FSEL(8-6), A->DR      *     B04
01FD 08BA800000A900091105                 CBB0,24(DR)                                             *     B05
                     1106  ************************************************************************     B06
                     1107  ***************************  R E S E T  ********************************     B07
01FE                 1108         ORG     X'1FE   REF BY FSEL(CINTF)                           *     B08
01FE 0FF8000004000800 1109  HLT8   GEN     /N(RESET),RF4,XF1                  RESET CINTF, INCP    *     B09
01FF                 1110         ORG     X'1FF   HARDWARE INTERRUPTS HERE FOR STEP AND RESET  *     B10
01FF 4030010643A000001111  RESET  GEN     /N(HLT7),1(4),GF4,IMC,LB2,RF3,FFA INTRPT,I->DOR      *     B11
                     1112  ************************************************************************     B12
                     1113         END                                                                   B13
SYMBOLS
000A A       017C ABL10   017E ABL11   0193 ABL20   0195 ABL21
0197 ABL3    017F ABL30   01B1 ABL31   01B2 ABL32   01B3 ABL33
01B7 ABL34   01B8 ABL35   01BC ABL36   01BD ABL37   01BE ABL38
01BF ABL39   01C0 ABL3A   01C1 ABL3B   01C2 ABL3C   01C3 ABL3D
01C4 ABL3E   01C8 ABL3F   0198 ABL4    01C9 ABL40   01CA ABL41
01CB ABL42   01CC ABL43   01CD ABL44   01CF ABL45   01D0 ABL46
01D1 ABL47   01D2 ABL48   01D3 ABL49   01D4 ABL4A   01D7 ABL4B
01F0 ABL4C   01F1 ABL4D   01F2 ABL4E   01F5 ABL4F   0199 ABL5
01F6 ABL50   019B ABL6    019D ABL7    019F ABL8    01A0 ABL9
01A1 ABLA    01A2 ABLB    01A3 ABLC    01A4 ABLD0   01A7 ABLD1
01A8 ABLE0   01A9 ABLE1   01AA ABLF    01AB ABLX0   01AE ABLX1
01AF ABLX2   01B0 ABLX3   0003 ABORT   0004 ABORT1  0052 ADD
0085 ADR1    004C ANA     0064 ASLA    0060 ASLB    0066 ASRA
0062 ASRB    000B B       01F8 BCS     01E3 BT10    00C0 BT20
00C1 BT21    00C2 BT22    00C3 BT23    00C4 BT24    00C5 BT25
00C6 BT26    00C7 BT27    00C8 BT28    00C9 BT29    00CA BT2A
00CB BT2B    00CC BT2C    00CD BT2D    00CF BT2E    00CF BT2F
00D0 BT30    00D1 BT31    00D2 BT40    00D3 BT41    01EA BT50
01E9 BT51    01E8 BT52    000C C       0025 CIA     0027 CIAB
0026 CIB     0083 COMR    000D D       0102 DADD    00E6 DADD2
00E5 DADSB1  0104 DAN     00E9 DAN1    016C DE#1    016D DE#2
016E DE#3    016F DE#4    00B2 DECR    0132 DEIB    0138 DEIND
0136 DEIND1  0131 DEIX    0133 DENI    0135 DEPOST  0134 DEPRE
013A DEPST1  0137 DEPSTI  0106 DER     00EB DER1    0130 DERL
81E5 DISMP   005F DIV     005E DIV0    0028 DIV1    0030 DIV10
0031 DIV11   0034 DIV12   002C DIV13   002E DIV14   007A DIV15
0029 DIV2    002A DIV3    002B DIV4    002D DIV5    002F DIV6
0033 DIV7    0035 DIV8    0032 DIV9    0139 DL1     0120 DLBX
0100 DLD     00E8 DLD1    0105 DOR     00EA DOR1    005D DORTOP
01CF DP      00FE DP1     00FF DP2     00FC DPDOR1  00ED DPDOR5
00F6 DPRORE  00FC DPR1RF  00F7 DPR4RE  00FD DPR5RF  00EE DPRER0
00EF DPRER4  0108 DPRM    00E0 DPRM1   00E1 DPRM2   00F4 DPRM3
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00F5 DPRM4   00E4 DPRMST  0009 DR      0101 DST     00E2 DST1
00E3 DST2    0103 DSUB    00E7 DSUB2   000E E       012A EADD
0053 EADD1   0120 EANA    004D EANA1   012F EDIV    012B EERA
0057 EERA1   0124 EINR    0047 EINR1   0121 ELDA    0041 ELDA1
0122 ELDB    0043 ELDB1   0123 ELDX    0045 ELDX1   012E EMUL
0129 EORA    004F EORA1   0056 ERA     0125 ESTA    0126 ESTB
0127 ESTX    0128 ESTZ    012C ESUB    004B ESUB1   01F4 EXC1
0118 EXC2    01F7 EXC21   011A EXC22   0119 EXC3    0120 EXTBAS
000F F       0173 HFPT    0037 HFPT1   01B4 HLT     0005 HLT1
0185 HLT2    0187 HLT3    018E HLT4    018F HLT5    0079 HLT6
0006 HLT7    01FE HLT8    017D HMDP    0163 HMDP1   0179 HMEM
0165 HMEMA   017B HMEN    003B HMEN1   003C HMEN2   0167 HMEN3
0166 HMEN4   0178 HRDP    0170 HRDP1   0171 HRDP2   0172 HRDP3
0164 HREN    0160 HREN1   0161 HREN2   0162 HREN3   017A HSTT
0176 HSTT1   0174 HSTT2   010D HSTT4   0177 HSTT5   0175 HSTT6
003D HSTT7   003E HSTT8   003F HSTT9   000F I       001E IAB
01FA IABM1   0018 IABM2   001C IABM3   008A IADD    008D IANA
008F IDIV    0088 IERA    0008 IH      0084 IINR    0182 IJIB
0186 IJIND   0184 IJIND1  0181 IJIX    01EF IJMP    0183 IJNI
018A IJPB    018D IJPOST  018C IJPRE   0189 IJPX    0180 IJRL
018B IJXEC   0188 IJXIT   0081 ILDA    0082 ILDB    0083 ILDX
0002 ILLAD   0008 ILLOP1  0009 ILLOP2  0020 IME1    001F IME2
0092 IMIB    0098 IMIND   0096 IMIND1  0091 IMIX    0080 IMMBAS
016A IMMIB   0169 IMMIX   016B IMMNI   0168 IMMREL  0093 IMNI
0095 IMPOST  0094 IMPRE   009A IMPST1  0097 IMPSTI  0090 IMRL
008E IMUL    0090 IMXC    0021 INA     0023 INAB1   001D INAB2
0022 INB     00B1 INCR    0048 INR1    0049 INR2    0001 INT1
000A INT2    000B INT3    000C INT4    0000 INTBAS  0089 IORA
009D IST1    009C IST2    00AB IST3    0099 IST4    0085 ISTA
0086 ISTB    0087 ISTX    0088 IST7    008C ISUB    0007 IWAIT
0080 IXSHFT  0017 JDPNZ   0016 JDPZ    01F0 JDPZ1   01E1 JDPZ2
0010 JEP     01E7 JI      000D JI1     0010 JISEL   01B9 JMP
01E4 JMP1    0039 JMP2    01BA JMRK    007D JMRK1   007F JMRK2
007B JMRK3   007E JMRK4   007C JMRK5   0011 JOP     0018 JP1
0019 JP2     001A JP3     000E JP4     000F JP5     0014 JRN
0013 JRNZ    0015 JRP     0012 JRZ     0068 LASL    0074 LASL1
0075 LASL2   0076 LASL3   006A LASR    0072 LASR1   00A6 LBSBI1
00A7 LBSBI2  00B6 LBT     00A8 LBT1    009F LBT2    009F LBT3
00AC LBT4    00AD LBT5    0040 LDA1    0042 LDB     00B4 LDR1
0046 LDX     0069 LLRL    0077 LLRL1   0066 LLSR    0073 LLSR1
0065 LRLA    0061 LRLB    0067 LSRA    0063 LSRB    000E M
005B MUL     005A MUL0    00D4 MUL1    00DE MUL11   00DD MUL12
00DC MUL13   00D8 MUL2    00D7 MUL3    00D5 MUL4    00D6 MUL5
00D9 MUL7    00DA MUL8    00DB MUL9    000C N       00BB OAB1
00BF OAB2    01FB OABM1   00AF OABM2   00B9 OAR1    00BD OAR2
008A OBR1    00BE OBR2    00B8 OME1    00AE OME2    00BC OME3
0050 ORA1    0051 ORA2    0200 P       01D8 REG10   01DC REG11
01D9 REG12   01DD REG13   01DA REG14   01DE REG15   01DB REG16
01DF REG17   0158 REG18   015C REG19   0159 REG1A   015D REG1B
015A REG1C   015E REG1D   015B REG1E   015F REG1F   0150 REG20
0151 REG21   0152 REG22   0153 REG23   0154 REG24   0155 REG25
0156 REG26   0157 REG27   014C REG30   014D REG41   014E REG42
014F REG43   01FF RESET   01AC RM      00F9 RM1     00F2 RMAD
00FA RMAD1   00F0 RMLD    00F8 RMLD1   00F3 RMSB    00FB RMSB1
00F1 RMST    006C ROF     01AD RR      009B RR1     00A0 RR2
00A5 RR3     00B0 RR4     00A4 RR5     00A1 RRAD    00A2 RRSB
00A3 RRT     000E S1      000F S2      00B7 SBT     00A9 SBT1
00AA SBT2    01F9 SEN1    011B SEN2    011C SEN3    011D SEN4
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01EE SEN5   011F SEN6   011E SEN7   0111 SETA   0113 SETAB
0117 SETABX 0115 SETAX  0112 SETB   0116 SETBX  01FC SETDR
01FD SETDRX 0110 SETI   0114 SETX   010F SETXIT 01C7 SHFT
0071 SHFT1  006D SOF    01EB SRE10  013C SRE20  013D SRE21
013E SRE22  013F SRE23  0148 SRE30  014A SRE40  0140 SRE50
0141 SRE51  0142 SRE52  0143 SRE53  0144 SRE54  0145 SRE55
0146 SRE56  0147 SRE57  013B SRE5X  0149 SRE60  014B SRE70
003A SRE80  0036 SRE81  01E2 SS1M   010C SS2    0038 SS2M
0000 SS2MI  0109 SS3    0070 SS3M   0078 SS3MI  0192 STA1
019A STA2   0190 STABX1 0198 STABX2 0194 STB1   019C STB2
0196 STX1   019E STX2   004A SUB    01B6 SWA10  01C6 SWA14
01D6 SWA15  01E6 SWA16  01A6 SWA17  0059 SWA21  0055 SWA22
004E SWA26  0044 SWA31  0054 SWA35  0058 SWA36  005C SWA37
01B5 SWA40  01C5 SWA44  01D5 SWA45  01E5 SWA46  01A5 SWA47
0002 SWA50  006E TSA    01EC TSA1   01ED TSA2   01BB XEC
010B XEC1   010E XEC2   010A XEC3
  0 ERRORS ASSEMBLY COMPLETE
 14:14:19  /FINI
 14:14:45  /
JOB CONTROL ERROR: JC01
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