ISIS-II MCS-48/UPI-41 MACRO ASSEMBLER V2.0   PAGE   1
CONTROL PROGRAM FOR 18XX PROJECT

V 23

SUMRES DEE =

```
 LOC OBJ        SEQ        SOURCE STATEMENT

               1 $PAGELENGTH(72) MACROFILE(:F1:) NOGEN DEBUG
               2 $TITLE('CONTROL PROGRAM FOR 18XX PROJECT')
               3                                    ;
               4                                    ;MACRO DEFINITIONS
               5                                    ;
               6 SBOC   MACRO   BFLAG              ;SET FLAG IN COMMON
               7        MOV     A,R7
               8        ORL     A,#BFLAG
               9        MOV     R7,A
              10        ENDM
              11 SBZC   MACRO   BFLAG              ;SETOF FLAG COMMON
              12        MOV     A,R7
              13        ANL     A,#255-(BFLAG)
              14        MOV     R7,A
              15        ENDM
              16 SBOL   MACRO   BFLAG              ;SET FLAG IN LOCAL
              17        MOV     A,R6
              18        ORL     A,#BFLAG
              19        MOV     R6,A
              20        ENDM
              21 SBZL   MACRO   BFLAG              ;SETOF FLAG LOCAL
              22        MOV     A,R6
              23        ANL     A,#255-(BFLAG)
              24        MOV     R6,A
              25        ENDM
              26 JCFG   MACRO   BITNO,LABL         ;JUMP IF COMMON FLAG
              27        MOV     A,R7
              28        JB&BITNO    LABL
              29        ENDM
              30 JNCFG  MACRO   BITNO,LABL         ;JUMP IF NOT COMMON FLAG
              31        MOV     A,R7
              32        CPL     A
              33        JB&BITNO    LABL
              34        ENDM
              35 JLFG   MACRO   BITNO,LABL         ;JUMP IF LOCAL FLAG
              36        MOV     A,R6
              37        JB&BITNO    LABL
              38        ENDM
              39 JNLFG  MACRO   BITNO,LABL         ;JUMP IF NOT LOCAL FLAG
              40        MOV     A,R6
              41        CPL     A
              42        JB&BITNO    LABL
              43        ENDM
              44 JNE2   MACRO   FLDA,FLDB,LABL     ;JUMP 2-BYTE NOT EQ
              45        MOV     R0,#FLDA
              46        MOV     R1,#FLDB
              47        MOV     A,@R0
              48        XRL     A,@R1
              49        JNZ     LABL
              50        INC     R0
              51        INC     R1
              52        MOV     A,@R0
              53        XRL     A,@R1
              54        JNZ     LABL
              55        ENDM
              56 MOV2   MACRO   TO,FROM            ;MOVE 2-BYTE VALUE
              57        MOV     R0,#FROM
              58        MOV     R1,#TO
```

CONTROL PROGRAM FOR 18XX PROJECT

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LOC  OBJ        SEQ        SOURCE STATEMENT

                59         MOV    A,@R0
                60         MOV    @R1,A
                61         INC    R0
                62         INC    R1
                63         MOV    A,@R0
                64         MOV    @R1,A
                65         ENDM
                66 MOV3    MACRO  TO,FROM              ;MOVE 3-BYTE FIELD
                67         MOV    R0,#FROM
                68         MOV    R1,#TO
                69         MOV    A,@R0
                70         MOV    @R1,A
                71         INC    R0
                72         INC    R1
                73         MOV    A,@R0
                74         MOV    @R1,A
                75         INC    R0
                76         INC    R1
                77         MOV    A,@R0
                78         MOV    @R1,A
                79         ENDM
                80 JTPNE   MACRO  STATE,LABL           ;JUMP IF R5 NE STATE
                81         MOV    A,R5
                82         XRL    A,#STATE
                83         JNZ    LABL
                84         ENDM
                85 JTPE    MACRO  STATE,LABL           ;JUMP IF R5 EQ STATE
                86         MOV    A,R5
                87         XRL    A,#STATE
                88         JZ     LABL
                89         ENDM
                90 SBO     MACRO  BYTE,BFLAG           ;GENERAL SET BIT ONE
                91         MOV    R0,#BYTE
                92         MOV    A,@R0
                93         ORL    A,#BFLAG
                94         MOV    @R0,A
                95         ENDM
                96 SBZ     MACRO  BYTE,BFLAG           ;GENERAL SET BIT ZERO
                97         MOV    R0,#BYTE
                98         MOV    A,@R0
                99         ANL    A,#255-(BFLAG)
               100         MOV    @R0,A
               101         ENDM
               102 JGFO    MACRO  BYTE,BITNO,LABL      ;JUMP GENERAL FLAG BIT
               103         MOV    R0,#BYTE
               104         MOV    A,@R0
               105         JB&BITNO   LABL
               106         ENDM
               107 JNGFO   MACRO  BYTE,BITNO,LABL      ;JUMP GENERAL FLAG BIT ZERO
               108         MOV    R0,#BYTE
               109         MOV    A,@R0
               110         CPL    A
               111         JB&BITNO   LABL
               112         ENDM
               113 JDZ     MACRO  BYTE,LABL            ;JUMP IF DELAY ZERO
               114         MOV    R0,#BYTE
               115         MOV    A,@R0
               116         JZ     LABL
               117         ENDM
               118 JDNZ    MACRO  BYTE,LABL            ;JUMP IF DELAY NOT ZERO
               119         MOV    R0,#BYTE
```

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LOC  OBJ        SEQ        SOURCE STATEMENT

               120        MOV    A,@R0
               121        JNZ    LBAL
               122        ENDM
               123 CMP    MACRO  OPA,OPB,LEN            ;COMPARE OPA,OPB LENGTH LEN
               124                                     ;A00 = 0    A = B
               125                                     ;CARRY,     A < B
               126                                     ;NO CARRY,  A > B
               127        LOCAL  NXTBY,NEX
               128        MOV    R2,#LEN
               129        MOV    R0,#OPA
               130        MOV    R1,#OPB
               131 NXTBY:
               132        MOV    A,@R0
               133        CPL    A
               134        ADD    A,@R1
               135        INC    A
               136        JNZ    NEX
               137        INC    R0
               138        INC    R1
               139        DJNZ   R2,NXTBY
               140 NEX:
               141        ENDM
               142 ADD2   MACRO  RESULT                ;ADD R1 TO 2-BYTE FIELD
               143        MOV    R0,#RESULT+1
               144        MOV    A,@R0
               145        ADD    A,R1
               146        DA     A
               147        MOV    @R0,A
               148        DEC    R0
               149        MOV    A,@R0
               150        ADDC   A,#0
               151        DA     A
               152        MOV    @R0,A
               153        ENDM
               154 SUB2   MACRO  RESULT                ;SUB R1 FROM 2-BYTE FIELD
               155        MOV    R0,#RESULT+1
               156        MOV    A,@R0
               157        ADD    A,R1
               158        DA     A
               159        MOV    @R0,A
               160        DEC    R0
               161        MOV    A,@R0
               162        ADDC   A,#99H
               163        DA     A
               164        MOV    @R0,A
               165        ENDM
               166 ZROPG  MACRO
               167        IF     LOW $ LT 9
               168        ERR    NO ROOM IN PAGE
               169        ELSE
               170        REPT   256-LOW $
               171        DB     0
               172        ENDM
               173        ENDIF
               174        ENDM
               175 R2ROM  MACRO  PAGE                  ;ADD ROM PAGE
               176 TPG&PAGE:
               177        MOV    R0,#LOW TPG&PAGE + 2
               178 TPG&P&PAGE:
               179        MOV    A,R0
               180        DEC    A
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LOC  OBJ        SEQ        SOURCE STATEMENT

               181        MOVP    A,@A
               182        ADDC    A,R1
               183        MOV     R1,A
               184        DJNZ    R0,TPCHKPAGE
               185        ENDM
               186                          ;
               187                          ;DEFINITION OF RAM AREA
               188                          ;
0000           189 RAM    EQU     0          ;RAM START ADDR
0000           190 REGB0  EQU     0          ;REGISTER BANK 0 (MAIN ROUTINE)
0008           191 STACK  EQU     8          ;STACK ADDR (MAX LEVEL = 2)
               192                          ;FIRST 6 BYTES ARE IN STACK
0012           193 TAPCNT EQU     STACK+10   ;TAPE COUNTER (BCD)
0014           194 TAPCNO EQU     TAPCNT+2   ;TAPE COUNTER OFFSET
0015           195 TMCHDL EQU     TAPCNO+1   ;TIME CHANGE DELAY (OVERLOAD)
0016           196 STSTRB EQU     TMCHDL+1   ;STORED STROBE
0017           197 FLSHCT EQU     STSTRB+1   ;ERROR FLASH COUNTER
0018           198 REGB1  EQU     24         ;DECR ROUTINE REG BANK
0020           199 USRAM  EQU     32         ;USER RAM AREA
0020           200 REMB   EQU     USRAM      ;SECOND REMOTE INP
0021           201 REMC   EQU     REMB+1     ;ACCEPTED REMOTE INP
0022           202 LOCB   EQU     REMC+1     ;SECOND LOCAL INPUT
0023           203 LOCC   EQU     LOCB+1     ;ACCEPTED LOCAL INPUT
0024           204 DISP   EQU     LOCC+1     ;DISPLAY DIGITS + STROBE
0025           205 GOTOST EQU     DISP+1     ;TAPE GO TO ADDR
0026           206 MINCT  EQU     GOTOST+2   ;COUNT FOR 1 MINUTE
0027           207 TMPIPT EQU     MINCT+1    ;TEMP MEMINPUT
0028           208 MIPDLY EQU     TMPIPT+2   ;DELAY FOR NEW MEMINPUT

002B           209 SECOFS EQU     MIPDLY+1   ;1 SECOND OFFSET
002C           210 PRGTIM EQU     SECOFS+1   ;PROGRAMMED TIME
002E           211 DELAY  EQU     PRGTIM+2   ;HARDWARE DELAY
002F           212 EOTDLY EQU     DELAY+1    ;TAPE END DELAY
0030           213 TEMDSP EQU     EOTDLY+1   ;TEMP DISPLAY
0032           214 RECST  EQU     TEMDSP+2   ;RECORD START POINT
0036           215 PRGFTN EQU     RECST+3    ;PROGRAMMED FUNCTION
0037           216 IOLIN1 EQU     PRGFTN+1   ;IO LINE 1
0038           217 IOLIN4 EQU     IOLIN1+1   ;IO LINE 4
0039           218 FLSDLY EQU     IOLIN4+1   ;RECPAUSE FLASH DELAY
003A           219 IOLINB EQU     FLSDLY+1   ;INPUT IOLINE 2
003B           220 IOLIND EQU     IOLINB+1   ;INPUT IOLINE 4
003C           221 FRQCNT EQU     IOLIND+1   ;FRQCNT FOR 1 MINUTE
003E           222 TIME   EQU     FRQCNT+2   ;TIME HRS + MINS BCD
               223                          ;
               224                          ;REGISTER DEFINITIONS
               225                          ;
               226                          ;REG BANK 0 + 1
               227                          ;
0007           228 CMNFLG EQU     7          ;COMMON FLAGS + MIP FLGS
0006           229 LOCFLG EQU     6          ;LOCAL FLAGS
               230                          ;REG BANK 0
0005           231 FFAD   EQU     5          ;FFAD + REN BITS
               232                          ;R4 = PROG M1 RETURN
               233                          ;R3 = FREE
               234                          ;R2 = ADDR REG
               235                          ;
               236                          ;REG BANK 1
               237                          ;R5 = REM INP 1
               238                          ;R4 = STROBE
               239                          ;R3 = 10 MSEC OFFSET
               240                          ;R2 = DELAY FOR REMOTE
               241                          ;
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   LOC  OBJ      SEQ         SOURCE STATEMENT

                 242                             ;FLAG DEFINITION
                 243                             ;
                 244                             ;COMMON FLAGS
                 245                             ;
   0000          246 DSPUD  EQU    0             ;DISPLAY UPDATE
   0001          247 NOTMDS EQU    1             ;NO TIME DISPLAY
   0002          248 FWDFLG EQU    2             ;TAPE MOTION FORWARD
   0003          249 GOTOFG EQU    3             ;GO TO ACTIVE
                 250                             ;FWDFLG IN FLAG F1
                 251                             ;
                 252                             ;LOCAL FLAGS MAIN ROUTINE
                 253                             ;
   0000          254 PROFLG EQU    0             ;PROG FTN WAITING
   0001          255 MIPFLG EQU    1             ;MEM INPUT ACTIVE
   0002          256 RECFLG EQU    2             ;RECORDING
   0003          257 RRLFLG EQU    3             ;RELEASE FOR RECORD
   0004          258 ARWFLG EQU    4             ;AUTOREWIND
   0005          259 RPSFLG EQU    5             ;RECORD PAUSE
   0006          260 PSTFLG EQU    6             ;PROGRAMMED START
                 261                             ;
                 262                             ;MIP FLAGS (IN CMWFLG)
                 263                             ;
   0005          264 MDSCPT EQU    5             ;MDS DECIMAL POINT
   0006          265 SETFLG EQU    6             ;SET TIME FLAG
   0007          266 SETGTO EQU    7             ;SET GOTO
                 267                             ;
                 268                             ;DECREMENTER LOCAL FLAGS
                 269                             ;
   0000          270 TPSTAT EQU    0             ;TAPE STATUS
   0001          271 CKSTAT EQU    1             ;CLOCK STATUS
   0002          272 CKCAL  EQU    2             ;CLOCK CALIBRATED
   0003          273 REMI   EQU    3             ;REMOTE INPUT
   0004          274 REMSB  EQU    4             ;REMOTE START BIT
                 275                             ;
                 276                             ;EQUIVALENT VALUES FOR ALL FLAGS
                 277                             ;
   0001          278 BDSPUD EQU    1
   0002          279 BNOTMD EQU    2
   0004          280 BFWDFG EQU    4
   0008          281 BGOTOF EQU    8
   0001          282 BPROFG EQU    1
   0002          283 BMIPFG EQU    2
   0004          284 BRECFG EQU    4
   0008          285 BRRLFG EQU    8
   0010          286 BARWFG EQU    16
   0020          287 BRPSFG EQU    32
   0040          288 BPSTFG EQU    64
   0020          289 BMDSCP EQU    32
   0040          290 BSETFG EQU    64
   0080          291 BSETGT EQU    128
   0001          292 BTPSTA EQU    1
   0002          293 BCKSTA EQU    2
   0004          294 BCKCAL EQU    4
   0008          295 BREMI  EQU    8
   0010          296 BREMSB EQU    16
                 297                             ;
                 298                             ;VALUES FOR FFRWD
                 299                             ;
   0004          300 FF     EQU    4
   0002          301 RW     EQU    2
   0008          302 PL     EQU    8
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LOC  OBJ       SEQ         SOURCE STATEMENT

0006          303 ST      EQU     6                    ;STOP
              304                                      ;
              305                                      ;BITS FOR IOLIN1
              306                                      ;
0004          307 MUTE    EQU     4                    ;MUTE
0010          308 BMUTE   EQU     16                   ;BIT FOR MUTE
              309                                      ;
              310                                      ;BITS FOR IOLIN2 / IOLIN3
              311                                      ;
0003          312 DISKIN  EQU     3                    ;DISK INDICATOR
0008          313 BDISK   EQU     8                    ;
              314                                      ;
              315                                      ;BITS FOR IOLIN3
              316                                      ;
0007          317 WAITIN  EQU     7                    ;WAIT INDICATOR
0080          318 BWAIT   EQU     128                  ;
              319                                      ;
              320                                      ;BITS FOR IOLIN4 / IOLIN5
              321                                      ;
0000          322 TAPOWR  EQU     0                    ;TAPE POWER
0001          323 BTAPOW  EQU     1                    ;
0001          324 FFWD    EQU     1                    ;FAST FORWARD (IN R5)
0002          325 REWD    EQU     2                    ;REWIND (IN R5)
0003          326 RECDSP  EQU     3                    ;RECORD DISPLAY
0008          327 BRECDS  EQU     8                    ;
0004          328 DSCPT   EQU     4                    ;DECIMAL POINT
0010          329 BDSCPT  EQU     16                   ;

0005          330 TAPIND  EQU     5                    ;TAPE LOADED INDIC
0020          331 BTAPIN  EQU     32                   ;
0006          332 RECALW  EQU     6                    ;RECORD ALLOWED
0040          333 BRECAL  EQU     64                   ;
0007          334 GRAMSP  EQU     7                    ;GRAMOPHONE STOP
0080          335 BGRAMS  EQU     128                  ;
              336                                      ;
              337                                      ;INTERRUPT VECTORS AND
              338                                      ;TIMER INTERRUPT ROUTINE
              339                                      ;
0000          340         ORG     0                    ;RESET VECTOR
0000 6400     341         JMP     RESETR
0002 00       342         DB      0
0003          343         ORG     3
0003 15       344         DIS     I                    ;DISABLE INTERRUPT
0004 6400     345         JMP     RESETR
0006 00       346         DB      0
0007          347         ORG     7                    ;TIMER INTERRUPT ROUTINE
0007 2F       348         XCH     A,R7                 ;STORE A AND GET CHKFLG
0008 D5       349         SEL     RB1
0009 AF       350         MOV     R7,A
000A 23B5     351         MOV     A,#256-11            ;TIMER COUNT VALUE 5.185 MS
000C 62       352         MOV     T,A
000D 55       353         STRT    T                    ;START TIMER
              354                                      ;CHECK REMOTE
000E FE       355         MOV     A,R6                 ;LOCAL FLAGS
000F 53F7     356         ANL     A,#255-BREM1         ;ASSUME REMOTE LOW
0011 8615     357         JNI     LRM2
0013 4308     358         ORL     A,#BREM1             ;SET REMOTE
              359 LRM2:
0015 AE       360         MOV     R6,A                 ;RESTORE FLAGS
              361                                      ;
              362                                      ;OUTPUT ALL I/O LINES
              363                                      ;
```

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LOC  OBJ        SEQ        SOURCE STATEMENT

0016 1C         364        INC     R4                      ;NEW STROBE
0017 23FB       365        MOV     A,#256-5
0019 6C         366        ADD     A,R4
001A C654       367        JZ      LOOO5                   ;DISPLAY DIGITS
001C E620       368        JNC     LNADG
001E BC01       369        MOV     R4,#1                   ;SET STROBE 1
                370 LNADG:
0020 B931       371        MOV     R1,#TEMDSP
                372        JNCFG   XDSPUD,LNOUPD
0026 B912       376        MOV     R1,#TRPCNT
                377        JNOPG   IOLIN4,XDSCPT,LNOUPD
002E B978       382        MOV     R1,#78H                 ;BLANK DIG
                383        JCFG   XNOTNDS,LNOTIN
0033 B93E       386        MOV     R1,#TINE
                387 LNOUPD:
0035 FC         388        MOV     A,R4                    ;STROBE
0036 07         389        DEC     A
0037 323A       390        JB1     LFRSTB
0039 19         391        INC     R1
                392 LFRSTB:
003A 1240       393        JB0     LFRSTN
003C F1         394        MOV     A,@R1
003D 47         395        SWAP    A
003E 0441       396        JMP     LGTST
                397 LFRSTN:
0040 F1         398        MOV     A,@R1
                399 LGTST:
0041 77         400        RR      A
0042 5378       401        ANL     A,#78H
0044 A9         402        MOV     R1,A
                403 LNOTIN:
                404        JOZ     FLSHCT,LOUTD
0046 B250       408        JB5     LCLRD
0048 B900       409        MOV     R1,#0                   ;CLEAR DIG
004A 045A       410        JMP     LOUTD
                411 LCLRD:
0050 B978       412        MOV     R1,#78H                 ;CLEAR DIGIT
0052 045A       413        JMP     LOUTD
                414 LOOO5:
0054 B824       415        MOV     R0,#DISP
0056 F0         416        MOV     A,@R0
0057 47         417        SWAP    A
0058 77         418        RR      A
0059 A9         419        MOV     R1,A
                420 LOUTD:
005A F9         421        MOV     A,R1
005B 76CF       422        JF1     LOUTF
005D 4280       423        ORL     A,#80H
                424 LOUTF:
005F 4C         425        ORL     A,R4                    ;STROBE VALUE
0060 B800       426        MOV     R0,#0
0062 90         427        MOVX    @R0,A
0063 B920       428        MOV     R1,#IOLIN4
0065 F1         429        MOV     A,@R1
0066 B900       430        MOV     R1,#REGOBO/FFRQW
0068 41         431        ORL     A,@R1
0069 B801       432        MOV     R0,#1
006B 90         433        MOVX    @R0,A
006C B837       434        MOV     R0,#IOLIN1
006E F0         435        MOV     A,@R0
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LOC  OBJ         SEQ         SOURCE STATEMENT

                 437                                     ;
                 438                                     ;CHECK TAPE GOTO
                 439                                     ;
                 440         JNGT0   NGOTOFG,NOGOTO      ;NO GOTO FLAG
                 444         JNE2    GOTOST,TAPCNT,NOGOTO ;NOT COUNTER YET
0082 B814        455         MOV     R0,#TAPCND          ;COUNT OFFSET
0084 F0          456         MOV     A,@R0
0085 B827        457         MOV     R0,#GOTOST+2        ;3RD BYTE
0087 D0          458         XRL     A,@R0
0088 968E        459         JNZ     NOGOTO
008A B805        460         MOV     R0,#REG80+FFRAD     ;TAPE STATUS
008C B086        461         MOV     @R0,#ST             ;STOP TAPE
                 462 NOGOTO:
                 463                                     ;
                 464                                     ;TAPE COUNTER ROUTINE
                 465                                     ;
008E 2306        466         MOV     A,#ST
0090 B805        467         MOV     R0,#REG80+FFRAD
0092 D0          468         XRL     A,@R0               ;TAPE STOPPED
0093 9699        469         JNZ     LTPMOV              ;NO
0095 B830        470         MOV     R0,#EOTDLY          ;SET EOT DELAY
0097 B0BF        471         MOV     @R0,#256-65         ;650 MSEC DELAY
                 472 LTPMOV:
                 473         JNLFG   XTASTAT,LTPLOW      ;LOW LAST STATUS
009D 36BD        477         JT0     LETPST              ;STILL HIGH
                 478         SBOL    RTP-STA
00A3 04AB        482         JMP     LUPCCT
                 483 LTPLOW:
00A5 26BD        484         JNT0    LETPST
                 485         SBOL    BTPSTA
                 489 LUPCCT:
00A9 B830        490         MOV     R0,#EOTDLY          ;SET EOT DELAY.
00AB B0C4        491         MOV     @R0,#256-60
00AF B814        492         MOV     R0,#TAPCND          ;COUNT OFFSET
                 493         JCFG    2FWDFLG,LTCUP       ;FORWARD MOVE
00B4 F0          496         MOV     A,@R0               ;OFFSET
00B5 03FF        497         ADD     A,#0FFH             ;SUB 1
00B7 53B3        498         ANL     A,#03H              ;CLEAR REST
00B9 A0          499         MOV     @R0,A               ;STORE
00BA F6ED        500         JC      LSTTCT             ;CARRY EXCEPT 00 TO 03
00BC B909        501         MOV     R1,#09H            ;SUB 1 FROM TAPCNT
                 502         SUB2    TAPCNT
00CA 04E4        513         JMP     LCLRTC             ;CLEAR TAPE COUNT
                 514 LTCUP:
00CC F0          515         MOV     A,@R0              ;OFFSET
00CD 17          516         INC     A
00CE A0          517         MOV     @R0,A              ;RESTORE
00CF 37          518         CPL     A
00D0 52ED        519         JB2     LSTTCT
00D2 37          520         CPL     A
00D3 53B3        521         ANL     A,#03H
00D5 A0          522         MOV     @R0,A
00D6 B901        523         MOV     R1,#01H            ;ADD 1 TO COUNT
                 524         ADD2    TAPCNT
                 525 LCLRTC:
00E4 37          526         CPL     A                  ;FIRST BYTE IN A
00E5 F6ED        537         JB7     LSTTCT             ;RESULT < 0000
00E7 27          538         CLR     A
00E8 A0          539         MOV     @R0,A              ;CLEAR CTR + OFFSET
00E9 18          540         INC     R0
00EA A0          541         MOV     @R0,A
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LOC  OBJ         SEQ         SOURCE STATEMENT

00EB 18          542         INC     R0
00EC A0          543         MOV     @R0,A
                 544 LSTTC1:
                 545 LCTPST:
00ED 2480        546         JMP     LCLKRT
                 547         ADRON   0
00EF 24A4        557 TPGE0:  JMP     TPG1
                 568         ZKOPG
                 572 LCLKRT:
                 573         JC2     TMCHDL,LCLKUP   ;CLOCK CHANGE DELAY
0105 18          577         INC     @R0
                 578 LCLKUP:
                 579                                 ;
                 580                                 ;UPDATE REAL-TIME CLOCK
                 581                                 ;
                 582         JLFG    XCKSTAT,LCKON   ;LAST STATUS ON
0109 466A        585         JNT1    LCLKUP          ;STILL OFF
                 586         SB0L    BCKSTA          ;SET STATUS ON
010F 2417        588         JMP     LCKCNT
                 591 LCKON:
0111 566A        592         JT1     LCKKUP
                 593         SB2L    BCKSTA          ;SET STATUS OFF
                 597 LCKCNT:
0117 B901        598         MOV     R1,#01H         ;ADD 1 TO FRQCNT
                 599         AD02    FRQCNT
0125 B90B        610         MOV     R1,#1NCT
0127 D1          611         XRL     A,@R1           ;CHECK TIME
0128 966B        612         JNZ     LCLKCH          ;NOT YET TIME
                 613         JLFG    XCKCAL,FRETIN   ;CLOCK CAL
012D B01E        616         MOV     R0,#TIME        ;GET MSEC COUNT
012F 23A5        617         MOV     A,#256-91       ;CHECK >= 910 MSEC
0131 60          618         ADD     A,@R0
0132 B160        619         MOV     @R1,#60H        ;COUNT FOR 50 HZ
0134 F638        620         JC      L50HZ
0136 B172        621         MOV     @R1,#72H        ;COUNT FOR 60 HZ
                 622 L50HZ:
                 626         SB0L    BCKCAL
013C 2445        627         JMP     CLRTIM
                 628 LKCTIM:
013E 001E        629         MOV     R0,#TIME
0140 2324        630         MOV     A,#24H          ;CHECK 24:00
0142 D0          631         XRL     A,@R0
0143 9649        632         JNZ     LINCTM
                 633 CLRTIM:                         ;CLEAR TIME
0145 27          634         CLR     A
0146 A0          635         MOV     @R0,A
0147 18          636         INC     R0
0148 A0          637         MOV     @R0,A
                 638 LINCTM:
0149 B01C        639         MOV     R0,#FRQCNT      ;CLEAR FRQCNT
014B 27          640         CLR     A
014C A0          641         MOV     @R0,A
014D 18          642         INC     R0
014E A0          643         MOV     @R0,A
014F B901        644         MOV     R1,#01H         ;INC TIME
0151 B03F        645         MOV     R0,#TIME+1      ;MINUTES
0153 2359        646         MOV     A,#59H          ;MAX BEFORE INC
0155 D0          647         XRL     A,@R0           ;CHECK FOR 59
0156 966A        648         JNZ     LHOOCK          ;NOT YET
0158 B941        649         MOV     R1,#41H         ;INC HOURS
                 650 LHOOCK:
```