```
SOURCE ACCESS NAME=      USER2. MBSPSRC. EPGM
OBJECT ACCESS NAME=      USER2. MBSPLST. EPGMO
LISTING ACCESS NAME=     USER2. MBSPLST. EPGML
ERROR ACCESS NAME=
OPTIONS=                 XREF, BUNLST, TUNLST
MACRO LIBRARY PATHNAME=
```

```
0001                *
0002                *
0003                *
0004                *
0005                *                    ****************************
0006          *****************99/4-LCP EPROM PROGRAMMER*********************
0007          *******************        4/19/82         ********************
0008                *                    ********************************
0009                *
0010                *
0011          **************THIS EPROM PROGRAMMER IS DESIGNED***************
0012          ***************PROGRAM BOTH 32K AND 64K 5V ONLY **************
0013          **************              PARTS                **************
0014                *
0015                *
0016                *
0017          *****************FUTURE MEMORY REDUCTION FIXES***************
0018                *
0019                *    CHECK MESSAGES TO REDUCE MESSAGE SPACE BY USING MORE XOP
0020                *    14 INSTRUCTIONS.
0021                *
0022                *    USE A SUBROUTINE TO PERFORM FOUR "LI" OPERATIONS IN THE
0023                *    MERGE AND SPLIT ROUTINES
0024          ***************************EQUATES***************************
0025                *
0026      0004  ACINC  EQU  >4          ADDRESS CTR INC DISPLACEMENT
0027      0005  BEAR   EQU  R5          BUFFER END ADDRESS REGISTER
0028      0005  BIGROM EQU  >5          64K EPROM SELECT RY CRU DISP
0029      0006  BSAR   EQU  R6          BUFFER START ADDRESS REGISTER
0030      0004  BSARR  EQU  R4          TEMPORARY BUFFER ST ADDR REG
0031      0D0A  CRLF   EQU  >0D0A       ASCII CAR RET AND LINE FEED
0032      5000  EPD    EQU  >5000       PROGRAMMER EPROM DATA PORT
0033      1000  EPHW   EQU  >1000       EPROM PROGRAMMER CRU BASE ADDRESS
0034      5002  EPRMAR EQU  >5002       EPROM PROGRAMMER ADDRESS REGISTER
0035      0007  EPSAR  EQU  R7          EPROM START ADDRESS REGISTER
0036      0009  ERRCNT EQU  R9          ERROR COUNT MAX FOR VERIFY
0037      0007  LED    EQU  >7          LED DISPLACEMENT
0038      0A0A  LFLF   EQU  >0A0A       DOUBLE LINE FEED
0039      0001  MODE   EQU  >1          EPROM READ/PROGRAM CRU DISP
0040      0006  PDPGM  EQU  >6          EPROM CE PIN CONTROL DISPLACEMENT
0041      0002  PLOOPC EQU  R2          PROGRAM LOOP COUNT
0042      0002  POWER  EQU  >2          POWER ON TO EPROM DISPLACEMENT
0043      000A  PTIME  EQU  R10         EPROM BURN TIME
0044      0008  STRDTA EQU  R8          STORE DATA FOR BUFFER INIT
0045      0003  TERCNT EQU  R3          TOTAL ERROR COUNT
0046      0003  VPP    EQU  >3          EPROM PROGRAM VOLTAGE CONTROL DISP
0047      8000  WSPTR  EQU  >8000       WORK SPACE
0048          **********************OPERATOR INTERFACE ROUTINES*************
0049                *
0050                *
0051                *
0052          *******COLD START OR POWER UP USES THE "HELP" TEMPLATE******
0053                *
0054          **********************************************************
0055                *                 99/4-LCP EPROM PROGRAMMER                *
0056                *                                                          *
0057                *                                                          *
0058                *       *   PUSH "C" KEY TO CALL COPY EPROM TO BUFFER       *
0059                *       *   PUSH "I" KEY TO CALL INITIALIZE BUFFER          *
0060                *       *   PUSH "M" KEY TO CALL BUFFER MERGE               *
```

```
0061                  *    *  PUSH "P" KEY TO CALL PROGRAM EPROM                  *
0062                  *    *  PUSH "Q" KEY TO RETURN TO OURBUG                    *
0063                  *    *  PUSH "S" KEY TO CALL BUFFER SPLIT                   *
0064                  *    *  PUSH "V" KEY TO CALL VERIFY EPROM WITH BUFFER       *
0065                  *                                                           *
0066                  *****************************************************************
0067                  *
0068                  *
0069                  *
0070  4000                    AORG  >4000
0071  4000           START
0072                  *
0073                  *********************COLD START**************************
0074                  *
0075        4000      CLDST    EQU   $
0076  4000 02E0               LWPI  WSPTR         INITIALIZE WORKSPACE
      4002 8000
0077  4004 020C               LI    R12,EPHW      POINT R12 TO EPROM PROGRAMMER
      4006 1000
0078  4008 0200               LI    R0,>4100      INITIALIZE R0
      400A 4100
0079  400C 3200               LDCR  R0,8          LEAVE PAGE BIT AND PDPGM ON
0080  400E 04C3               CLR   TERCNT        CLEAR TOTAL ERROR COUNT
0081  4010 0205               LI    BEAR,>B000    INIT BUFFER END ADDR FOR COMPARE
      4012 B000
0082  4014 0204               LI    BSARR,>A000   INIT REFERENCE BUFFER START ADDR
      4016 A000
0083  4018 C184               MOV   BSARR,BSAR    INIT WORKING BUFFER START ADDR
0084  401A 04C7               CLR   EPSAR         INITIALIZE EPROM START ADDRESS
0085  401C 04C8               CLR   STRDTA        SET BUFFER INIT DATA TO 0
0086  401E C808               MOV   STRDTA,@EPRMAR  SET EPROM ADDRESS TO 0
      4020 5002
0087  4022 D808               MOVB  STRDTA,@EPD   SET EPROM DATA REG BITS LOW
      4024 5000
0088  4026 2FA0               XOP   @HSCRN,14     PUT UP "HELP" SCREEN
      4028 41FC
0089  402A 2F40               XOP   R0,13         WAIT FOR REQUEST
0090                  *
0091  402C 1D02               SBO   POWER         TURN ON POWER TO EPROM
0092  402E 0240               ANDI  R0,>7F00      BE SURE LSBY IS 0
      4030 7F00
0093                  *
0094  4032 0280               CI    R0,>4300      SEE IF IT IS A 'C'
      4034 4300
0095  4036 1318               JEQ   COPY          IF YES, GO TO COPY
0096                  *
0097  4038 0280               CI    R0,>4900      SEE IF IT IS A 'I'
      403A 4900
0098  403C 1349               JEQ   INITB         IF YES, GO TO INITIALIZE BUFFER
0099                  *
0100  403E 0280               CI    R0,>5100      SEE IF IT IS A 'Q'
      4040 5100
0101  4042 1602               JNE   SCN1          IF NOT EQUAL, CONTINUE SCAN
0102  4044 0460               B     @>053C        RETURN TO OURBUG
      4046 053C
0103                  *
0104        4048      SCN1     EQU   $
0105  4048 0280               CI    R0,>4D00      SEE IF IT IS A 'M'
      404A 4D00
0106  404C 1355               JEQ   MERG          IF YES, GO TO BUFFER MERGE
```

```
0107                  *
0108  404E 0280        CI    R0,>5000      SEE IF IT IS A 'P'
      4050 5000
0109  4052 1364        JEQ   PRGM          IF YES, GO TO PROGRAM
0110                  *
0111  4054 0280        CI    R0,>5300      SEE IF IT IS A 'S'
      4056 5300
0112  4058 1339        JEQ   SPLITX        IF YES, GO TO SPLIT ROUTINE
0113                  *
0114  405A 0280        CI    R0,>5600      SEE IF IT IS A 'V'
      405C 5600
0115  405E 1337        JEQ   VERFYX        IF YES, GO TO VERIFY
0116                  *
0117  4060 0200        LI    R0,>0700      SET UP FOR A BEEP
      4062 0700
0118  4064 2F00        XOP   R0,12         MAKE A BEEPING NOISE
0119  4066 10CC        JMP   CLDST         NOT A VALID CHARACTER, PUNT
0120                  *
0121              ******************************************************************
```

```
0123                  *
0124                  *
0125                  *                      ****************
0126                  ********************COPY TEMPLATE**************************
0127                  *                    ****************
0128                  *
0129                  ************************************************************
0130                  *   99/4-LCP EPROM PROGRAMMER COPY EPROM TO BUFFER FUNCTION *
0131                  *                                                          *
0132                  *      USE SPACE BAR TO GO FROM LINE TO LINE, LAST FOUR     *
0133                  *      CHARACTERS  ENTERED WILL BE USED FOR AN ADDRESS.     *
0134                  *           PUSH "H"  KEY FOR "HELP" TEMPLATE.              *
0135                  *                                                          *
0136                  *                                                          *
0137                  *                   EPROM = 32K                            *
0138                  *                   EPROM START ADDRESS = >0000             *
0139                  *                   BUFFER START ADDRESS = >A000            *
0140                  *                   BUFFER END ADDRESS = >AFFE              *
0141                  *                                                          *
0142                  ************************************************************
0143                  *
0144                  ********************COPY EPROM ROUTINE*********************
0145                  *
0146      4068   COPY    EQU   $
0147 4068 2FA0           XOP   @CPYSC,14           PUT UP COPY TEMPLATE
     406A 434E
0148 406C 06A0           BL    @PARGET             CALL SR FOR PARAMETERS
     406E 4088
0149                  *
0150      4070   CY1     EQU   $
0151 4070 1D06           SBO   PDPGM               TURN ON EPROM CHIP SELECT
0152 4072 C807           MOV   EPSAR,@EPRMAR       LOAD EPROM ADDRESS COUNTER
     4074 5002
0153      4076   CY2     EQU   $
0154 4076 DDA0           MOVB  @EPD,*BSAR+         MOVE DATA FROM EPROM TO BUFFER
     4078 5000
0155 407A 8146           C     BSAR,BEAR           SEE IF THRU
0156 407C 1D04           SBO   ACINC               MAKE EPROM ADDR REG STROBE
0157 407E 1E04           SBZ   ACINC               MAKE EPROM ADDR REG STROBE
0158 4080 11FA           JLT   CY2                 IF NOT THRU, MOVE AGAIN
0159                  *
0160 4082 2FA0           XOP   @CYTHRU,14          PUT COPY THRU ON SCREEN
     4084 44C8
0161                  *
0162 4086 102E           JMP   WTFK                CONTINUE AT WAIT FOR ANY KEY
0163                  *
0164      4088   PARGET EQU   $
0165 4088 2FA0           XOP   @XCRLF,14           DO A CR AND LF
     408A 44C4
0166 408C 2E40           XOP   R0,9                READ WORD FOR EPROM TYPE
0167 408E 4096           DATA  CNP1                NO CHANGE RETURN
0168 4090 4000           DATA  CLDST               ERROR RETURN ADDRESS
0169                  *
0170 4092 1D05           SBO   BIGROM              IS A 64K, TURN ON RELAY (NOT
0171                  *                            NEEDED FOR BUFFER INIT FUNCTION
0172 4094 0608           DEC   STRDTA              MAKE INIT DATA = >FFFF
0173                  *
0174      4096   CNP1    EQU   $
0175 4096 2E88           XOP   STRDTA,10           WRITE EPROM TYPE/BUFFER DATA
0176 4098 2FA0           XOP   @XCRLF,14           DO A CR AND LF
```

```
            409A  44C4
0177  409C  2E40          XOP   RO,9              LOOK FOR EPROM START ADDRESS
0178  409E  40A4          DATA  CNP2              NO CHANGE RETURN ADDRESS
0179  40A0  4000          DATA  CLDST             ERROR RETURN ADDRESS
0180  40A2  C1C0          MOV   RO,EPSAR          GET NEW EPROM START ADDR REG
0181                *
0182        40A4  CNP2    EQU   $
0183  40A4  2E87          XOP   EPSAR,10          WRITE EPROM START ADDRESS
0184  40A6  2FA0          XOP   @XCRLF,14         DO A CR AND LF
            40A8  44C4
0185  40AA  2E40          XOP   RO,9              LOOK FOR BUFFER START ADDR
0186  40AC  40B4          DATA  CNP3              NO CHANGE RETURN ADDRESS
0187  40AE  4000          DATA  CLDST             ERROR RETURN ADDRESS
0188  40B0  C180          MOV   RO,BSAR           SAVE NEW BUFFER START ADDR
0189  40B2  C100          MOV   RO,BSARR          SAVE NEW BUFFER START ADDR
0190  40B4
0191        40B4  CNP3    EQU   $
0192  40B4  2E86          XOP   BSAR,10           WRITE BUFFER START ADDRESS
0193  40B6  2FA0          XOP   @XCRLF,14         DO A CR AND LF
            40B8  44C4
0194  40BA  2E40          XOP   RO,9              LOOK FOR BUFFER END ADDRESS
0195  40BC  40C4          DATA  CNP4              NO CHANGE RETURN ADDRESS
0196  40BE  4000          DATA  CLDST             ERROR RETURN ADDRESS
0197  40C0  05C0          INCT  RO                FIX FOR END COMPARISON
0198  40C2  C140          MOV   RO,BEAR           SAVE NEW BUFFER END ADDRESS
0199        40C4  CNP4    EQU   $
0200  40C4  2E85          XOP   BEAR,10           WRITE BUFFER END ADDRESS
0201  40C6  2FA0          XOP   @XCRLF,14         DO CR AND LF
            40C8  44C4
0202  40CA  045B          B     *R11              RETURN TO CALLER
0203                *
0204                *
0205                *
0206                ****************************************************************
0207                *
0208        40CC  SPLITX  EQU   $
0209  40CC  1052          JMP   SPLIT
0210                *
0211        40CE  VERFYX  EQU   $
0212  40CE  1063          JMP   VERFY
0213                *
0214                ****************************************************************
```

```
0216                  *
0217                  *
0218                  *              ************************************
0219              ****************BUFFER INITIALIZATION TEMPLATE*****************
0220                  *              ************************************
0221                  *
0222                  *              ********************************************************
0223                  *      99/4-LCP EPROM PROGRAMMER BUFFER INIT FUNCTION       *
0224                  *                                                                *
0225                  *      USE SPACE BAR TO GO FROM ONE FUNCTION TO ANOTHER.       *
0226                  *              PUSH THE "H" KEY FOR HELP.                     *
0227                  *                                                                *
0228                  *              LOAD WORDS WITH >FFFF                          *
0229                  *              EPROM START ADDRESS = >0000                    *
0230                  *              BUFFER START ADDRESS = >A000                    *
0231                  *              BUFFER END ADDRESS = >AFFE                      *
0232                  *                                                                *
0233                  *              ********************************************************
0234                  *
0235                  *
0236          40D0   INITB  EQU   $
0237 40D0 2FA0               XOP   @INITSC,14        PUT UP INITIALIZATION SCREEN
     40D2 467A
0238 40D4 06A0               BL    @PARGET           CALL SR TO GET PARAMETERS
     40D6 4088
0239 40D8 1E05               SBZ   BIGROM            TURN OFF RELAY, NOT NEEDED
0240                  *
0241          40DA   INIT1  EQU   $
0242 40DA CD88               MOV   STRDTA,*BSAR+      STORE A WORD OF DATA
0243 40DC 8146               C     BSAR,BEAR         SEE IF THRU
0244 40DE 11FD               JLT   INIT1             IF NO, MOVE AGAIN
0245                  *
0246 40E0 2FA0               XOP   @INITC,14         PRINT INIT COMPLETE
     40E2 47DA
0247                  *
0248          40E4   WTFK   EQU   $
0249 40E4 1D06               SBO   PDPGM             SET EPROM CE LOW
0250 40E6 1E02               SBZ   POWER             TURN OFF POWER TO EPROM
0251 40E8 1E01               SBZ   MODE              TRISTATE EPROM DTA REF OUTPUTS
0252 40EA 04C0               CLR   R0                SET UP TO 0 THE EPROM ADDR REG
0253 40EC C800               MOV   R0,EPRMAR         LOAD EPROM ADDRESS COUNTER
     40EE 5002
0254 40F0 2FA0               XOP   @PAKM,14          PRINT PUSH ANY KEY MSG
     40F2 47E2
0255 40F4 2F40               XOP   R0,13             WAIT FOR ANY KEY
0256 40F6 1084               JMP   CLDST
0257                  *
0258                  ********************************************************
```

```
0260                *
0261                *                          *****************
0262                ***********************  BUFFER MERGE  **************************
0263                **********************    TEMPLATE     **************************
0264                *                          *****************
0265                *
0266                **********************************************************************
0267                *       99/4-LCP EPROM PROGRAMMER BUFFER MERGE ROUTINE           *
0268                *                                                                 *
0269                *       USE SPACE BAR TO GO FROM LINE TO LINE.   LAST FOUR        *
0270                *      CHARACTERS ENTERED WILL BE USED FOR AN ADDRESS.           *
0271                *            PUSH "H" KEY FOR "HELP" TEMPLATE.                    *
0272                *                                                                 *
0273                *                                                                 *
0274                *             MSBY BUFFER START ADDRESS = >A000                   *
0275                *             LSBY BUFFER START ADDRESS = >B000                   *
0276                *             MERGE BUFFER START ADDRESS = >C000                  *
0277                *             MERGE BUFFER END ADDRESS = >CFFE                    *
0278                *                                                                 *
0279                *                                                                 *
0280                **********************************************************************
0281                *
0282                *
0283        40F8    MERG    EQU   $
0284  40F8 2FA0            XOP   @MERGT,14            PUT UP BUFFER BUILD TEMPLATE
      40FA 4966
0285  40FC 0208            LI    STRDTA,>A000         SET UP FOR MSBY START ADDRESS
      40FE A000
0286  4100 0207            LI    EPSAR,>B000          SET UP FOR LSBY START ADDRESS
      4102 B000
0287  4104 0206            LI    BSAR,>C000           SET UP FOR BUFFER ST ADDRESS
      4106 C000
0288  4108 0205            LI    BEAR,>D000           SET UP FOR BUFFER END ADDRESS
      410A D000
0289                *
0290  410C 06A0            BL    @PARGET              CALL SR TO GET PARAMETERS
      410E 4088
0291  4110 1E05            SBZ   BIGROM               TURN OFF RELAY IF IT IS ON
0292                *
0293        4112    MERG1   EQU   $
0294  4112 DDB8            MOVB  *STRDTA+,*BSAR+      MOVE MSBY TO BUILD BUFFER
0295  4114 DDB7            MOVB  *EPSAR+,*BSAR+       MOVE LSBY TO BUILD BUFFER
0296  4116 8146            C     BSAR,BEAR            SEE IF THRU WITH MOVING
0297  4118 1AFC            JL    MERG1                IF NOT THRU, MOVE AGAIN
0298  411A 10E4            JMP   WTFK                 AM THRU, WAIT FOR ANY KEY
0299  411C
0300                **********************************************************************
0301                *
```

```
0303                    *               ****************************
0304            ********************EPROM PROGRAM TEMPLATE***********************
0305                    *               ****************************
0306            ******************************************************************
0307            *       99/4-LCP EPROM PROGRAMMER PROGRAM FUNCTION              *
0308            *                   WITH AUTO VERIFY                            *
0309            *                                                              *
0310            *   PUSH SPACE BAR TO GO FROM ONE FUNCTION TO ANOTHER.         *
0311            *            PUSH THE "H" KEY FOR HELP.                        *
0312            *                                                              *
0313            *             EPROM = 32K                                      *
0314            *             EPROM START ADDRESS = >0000                      *
0315            *             BUFFER START ADDRESS = >A000                     *
0316            *             BUFFER END ADDRESS = >AFFE                       *
0317            *                                                              *
0318            ******************************************************************
0319            *
0320            *
0321            ********************EPROM PROGRAM ROUTINE**********************
0322            *
0323       411C PRGM    EQU   $
0324 411C 1E06         SBZ   PDPGM              SET EPROM CS HIGH
0325 411E 2FA0         XOP   @PGMSC,14          PUT UP PROGRAM SCREEN
     4120 4808
0326 4122 06A0         BL    @PARGET            CALL SR TO GET PARAMETERS
     4124 4088
0327            *
0328 4126 1D07         SBO   LED                TURN ON LED
0329 4128 1D01         SBO   MODE               SET UP TO PROGRAM EPROM
0330       412A PRGM1   EQU   $
0331 412A 0202         LI    PLOOPC,>1E         SET UP FOR 30 LOOPS
     412C 001E
0332 412E 020A         LI    PTIME,>0125        SET UP FOR 2MS PGM PULSE
     4130 0125
0333            *
0334            *
0335            ****************NEED DELAY FOR RELAY CLOSURE****************
0336            *
0337 4132 0200         LI    R0,>1000           SET UP FOR RELAY CLOSING TIME
     4134 1000
0338            *
0339       4136 PRGM7   EQU   $
0340 4136 0600         DEC   R0                 UPDATE DELAY LOOP COUNT
0341 4138 16FE         JNE   PRGM7              IF NOT COUNTED TO 0, DEC AGAIN
0342            *
0343            *
0344       413A PRGM4   EQU   $
0345 413A C807         MOV   EPSAR,@EPRMAR      LOAD EPROM ADDRESS COUNTER
     413C 5002
0346            *
0347            *
0348            *******************PROGRAM LOOP**********************
0349            *
0350       413E PRGM2   EQU   $
0351 413E D036         MOVB  *BSAR+,R0          GET DATA FOR >FF COMPARISON
0352 4140 9800         CB    R0,@FF             SEE IF ALL ONES
     4142 41FA
0353 4144 1309         JEQ   PRGM8              IF YES, FALL THRU PGM SECTION
0354 4146 D800         MOVB  R0,EPD             PUT DATA IN EPROM DATA REG
     4148 5000
```

```
0355 414A 1D03              SBO   VPP            TURN ON PROGRAM VLOTAGE
0356 414C 1D06              SBO   PDPGM          TURN ON 32K CS*
0357 414E C00A              MOV   PTIME,R0       SET UP FOR DELAY
0358      4150     PRGM3    EQU   $
0359 4150 0600              DEC   R0             UPDATE LOOP COUNT
0360 4152 16FE              JNE   PRGM3          IF NOT 0, DECREMENT AGAIN
0361                *
0362 4154 1E06              SBZ   PDPGM          TURN OFF 32K CS*
0363 4156 1E03              SBZ   VPP            TURN OFF PROGRAMMING VOLTAGE
0364                *
0365                ***********************************************************
0366                *
0367      4158     PRGM8    EQU   $
0368 4158 1D04              SBO   ACINC          INCREMENT THE EPROM ADDR CTR
0369 415A 1E04              SBZ   ACINC          INCREMENT THE EPROM ADDR CTR
0370 415C 8146              C     BSAR,BEAR      SEE IF THRU THE BUFFER RANGE
0371 415E 11EF              JLT   PRGM2          IF NO, NEED TO BURN AGAIN
0372                *
0373 4160 C184              MOV   BSARR,BSAR     RESTORE BUFFER START ADDRESS
0374                *
0375                *******************OPERATOR FEEDBACK*********************
0376 4162 0200              LI    R0,>2100       GET ASCII FOR !
     4164 2100
0377 4166 2F00              XOP   R0,12          PRINT IT
0378                *
0379 4168 0602              DEC   PLOOPC         UPDATE THE LOOP COUNT
0380 416A 16E7              JNE   PRGM4          IF NOT 0, CONTINUE PROGRAM
0381                *
0382 416C 1E01              SBZ   MODE           GET OUT OF PROGRAMMING MODE
0383 416E 1E07              SBZ   LED            TURN OFF LED
0384 4170 1016              JMP   VFY            CONTINUE IN VERIFY ROUTINE
0385                *
0386                ******************THROUGH WITH PROGRAMMING*****************
0387                ********************NOW NEED TO VERIFY*********************
0388                *
0389      4172     PGTHRU   EQU   $
0390                *        GET VALUES FOR VARIOUS REGISTERS, PROGRAM EPROM,
0391                *        SET UP PARAMETERS FOR VERIFY, DO VERIFY
0392                *        BE SURE TO HAVE OPERATOR FEEDBACK ON SCREEN DURING
0393                *        PROGRAM TIME.  BE SURE TO RESTORE BSAR FROM BSART
0394                *        BEFORE LEAVING PRGM!
0395                *
0396                *
0397                ***********************************************************
```

```
0399                   *
0400                   *                    *******************
0401        ******************* BUFFER SPLIT ******************************
0402                   *                    *******************
0403                   *
0404                   ***************************************************************
0405                   *       99/4-LCP EPROM PROGRAMMER BUFFER SPLIT ROUTINE       *
0406                   *                                                            *
0407                   *    USE SPACE BAR TO GO FROM LINE TO LINE.  LAST FOUR       *
0408                   *   CHARACTERS ENTERED WILL BE USED FOR AN ADDRESS.          *
0409                   *       PUSH "H" KEY FOR THE "HELP"TEMPLATE.                  *
0410                   *                                                            *
0411                   *                                                            *
0412                   *        MSBY BUFFER START ADDRESS = >A000                    *
0413                   *        LSBY BUFFER START ADDRESS = >B000                    *
0414                   *        SPLIT BUFFER START ADDRESS = >C000                   *
0415                   *        SPLIT BUFFER END ADDRESS = >CFFF                     *
0416                   *                                                            *
0417                   ***************************************************************
0418        4172   SPLIT   EQU   $
0419  4172 2FA0            XOP   @SPLITT,14
      4174 4ADA
0420  4176 0208            LI    STRDTA,>A000      SET UP MSBY BUFFER START ADDR
      4178 A000
0421  417A 0207            LI    EPSAR,>B000       SET UP LSBY BUFFER START ADDR
      417C B000
0422  417E 0206            LI    BSAR,>C000        SET UP SPLIT BUFFER START ADDR
      4180 C000
0423  4182 0205            LI    BEAR,>D000        SET UP SPLIT BUFFER END ADDR
      4184 D000
0424                   *
0425  4186 06A0            BL    @PARGET           CALL SR TO GET PARAMETERS
      4188 4088
0426  418A 1E05            SBZ   BIGROM            TURN OFF RELAY IF ON
0427                   *
0428        418C   SPLIT1 EQU   $
0429  418C DE36            MOVB  *BSAR+,*STRDTA+   GET MSBY, AND PUT IT IN SPLT B
0430  418E DDF6            MOVB  *BSAR+,*EPSAR+    GET LSBY, AND PUT IT IN SPLT B
0431  4190 8146            C     BSAR,BEAR         SEE IF THRU
0432  4192 1AFC            JL    SPLIT1            IF NOT, MOVE ANOTHER BYTE
0433  4194 10A7            JMP   WTFK              AM THRU, WAIT FOR ANY KEY
0434                   *
0435                   ***************************************************************
```

```
0437                  *
0438                  *                    **********************
0439                  ********************EPROM VERIFY TEMPLATE*********************
0440                  *                    **********************
0441                  *
0442                  *************************************************************
0443                  *          99/4-LCP EPROM PROGRAMMER VERIFY FUNCTION         *
0444                  *                                                            *
0445                  *                                                            *
0446                  *      USE SPACE BAR TO GO FROM ONE PARAMETER TO ANOTHER.    *
0447                  *                  PUSH "H" KEY FOR HELP.                    *
0448                  *                                                            *
0449                  *                  EPROM = 32K                               *
0450                  *                  EPROM START ADDRESS = >0000               *
0451                  *                  BUFFER START ADDRESS = >A000              *
0452                  *                  BUFFER END ADDRESS = >AFFE                *
0453                  *                                                            *
0454                  *************************************************************
0455                  *
0456                  *
0457        4196   VERFY   EQU   $
0458 4196  2FA0              XOP   @VSCRN,14            PUT ON VERIFY TEMPLATE
     4198  44F8
0459 419A  06A0              BL    @PARGET              CALL SR TO GET PARAMETERS
     419C  4088
0460                  *
0461        419E   VFY     EQU   $
0462 419E  0209              LI    ERRCNT,>0008         INITIALIZE DEFAULT ERROR CNT
     41A0  0008
0463 41A2  1D06              SBO   PDPGM                TURN ON EPROM CHIP SELECT
0464 41A4  C807              MOV   EPSAR,@EPRMAR        MOVE EPROM START ADDR TO PGMR
     41A6  5002
0465        41A8   VFY2    EQU   $
0466 41A8  D020              MOVB  @EPD,R0              GET EPROM DATA
     41AA  5000
0467 41AC  D076              MOVB  *BSAR+,R1            GET REFERENCE DATA
0468 41AE  9040              CB    R0,R1                CMP BYTES IN EPROM AND BUFFER
0469 41B0  1608              JNE   VERR                 IF NOT THE SAME, GO TO VERR
0470        41B2   VFY1    EQU   $
0471 41B2  1D04              SBO   ACINC                INC EPROM ADDR CTR
0472 41B4  1E04              SBZ   ACINC                INC EPROM ADDR CTR
0473 41B6  8146              C     BSAR,BEAR            SEE IF THROUGH
0474 41B8  16F7              JNE   VFY2                 DO ANOTHER BYTE VERIFY
0475                  *
0476        41BA   VFIN    EQU   $
0477 41BA  2FA0              XOP   @VERTH,14            WRITE VERIFY ERROR COUNT MSG
     41BC  4636
0478 41BE  2E83              XOP   TERCNT,10            WRITE ERROR COUNT
0479 41C0  1091              JMP   WTFK                 CONTINUE WITH WAIT FOR ANY KEY
0480        41C2   VERR    EQU   $
0481 41C2  C249              MOV   ERRCNT,ERRCNT        GET STATUS OF ERROR COUNT
0482 41C4  1318              JEQ   VERR1                IF ZERO, SKIP ERROR PRINTING
0483 41C6  0609              DEC   ERRCNT               UPDATE ERRORS LOGGED COUNTER
0484 41C8  2FA0              XOP   @XCRLF,14            DO CR AND LF
     41CA  44C4
0485 41CC  0606              DEC   BSAR                 BACK UP BUFFER START ADDR REG
0486 41CE  2E86              XOP   BSAR,10              PRINT ADDRESS
0487 41D0  0586              INC   BSAR                 RESTORE BSAR FOR THRU CK LATER
0488 41D2  2FA0              XOP   @DSP,14              DO DOUBLE SPACE
     41D4  4676
```

```
0489 41D6 0240          ANDI RO,>FF00          SAVE MSBY OF EPROM DATA
     41D8 FF00
0490 41DA 06C0          SWPB RO                SWAP BYTES
0491 41DC 0B40          SRC  RO,4              ALIGN MSN
0492 41DE 2E00          XOP  RO,8              PRINT MSN
0493 41E0 0BC0          SRC  RO,12             ALIGN LSN
0494 41E2 2E00          XOP  RO,8              PRINT LSN
0495 41E4 2FA0          XOP  @DSP,14           DOUBLE SPACE FOR NEXT BYTE
     41E6 4676
0496 41E8 0241          ANDI R1,>FF00          SAVE MSYB OF BUFFER DATA
     41EA FF00
0497 41EC 06C1          SWPB R1                SWAP BYTES
0498 41EE 0B41          SRC  R1,4              ALIGN MSN
0499 41F0 2E01          XOP  R1,8              PRINT MSN
0500 41F2 0BC1          SRC  R1,12             ALIGN LSN
0501 41F4 2E01          XOP  R1,8              PRINT LSN
0502      41F6 VERR1    EQU  $
0503 41F6 0583          INC  TERCNT            INCREMENT TOTAL ERROR COUNT
0504 41F8 10DC          JMP  VFY1              SEE IF THRU WITH VERIFY OP'TN
0505           *
0506           ******************EPROM INTERFACE ROUTINES********************
0507           *
0508      41FA FF       EQU  $
0509 41FA FFFF          DATA >FFFF
0510      41FC HSCRN    EQU  $
0511           *                               HELP TEMPLATE
0512 41FC 1A0A          DATA >1A0A,LFLF
     41FE 0A0A
0513 4200   20          TEXT '          99/4-LCP EPROM PROGRAMMER '
0514 4224 0D0A          DATA CRLF,LFLF
     4226 0A0A
0515 4228   23          TEXT '#  PUSH "C" KEY TO CALL COPY EPROM TO BUFFER'
0516 4254 0D0A          DATA CRLF
0517 4256   23          TEXT '#  PUSH "I" KEY TO CALL INITIALIZE BUFFER '
0518 4280 0D0A          DATA CRLF
0519 4282   23          TEXT '#  PUSH "M" KEY TO CALL BUFFER MERGE'
0520 42A6 0D0A          DATA CRLF
0521 42A8   23          TEXT '#  PUSH "P" KEY TO CALL PROGRAM EPROM '
0522 42CE 0D0A          DATA CRLF
0523 42D0   23          TEXT '#  PUSH "Q" KEY TO RETURN TO HCBUG'
0524 42F2 0D0A          DATA CRLF
0525 42F4   23          TEXT '#  PUSH "S" KEY TO CALL BUFFER SPLIT'
0526 4318 0D0A          DATA CRLF
0527 431A   23          TEXT '#  PUSH "V" KEY TO CALL VERIFY EPROM'
0528 433E   20          TEXT ' WITH BUFFER'
0529 434A 0D0A          DATA  CRLF
0530 434C   00          BYTE 0                 END OF MESSAGE
0531 434E                EVEN
0532      434E CPYSC    EQU  $
0533           *                               COPY TEMPLATE
0534 434E 1A0A          DATA >1A0A,LFLF
     4350 0A0A
0535 4352   20          TEXT ' 99/4-LCP EPROM PROGRAMMER  COPY '
0536 4374   45          TEXT 'EPROM TO BUFFER FUNCTION'
0537 438C 0D0A          DATA CRLF
0538 438E   20          TEXT '   USE SPACE BAR TO GO FROM LINE TO LINE.  '
0539 43BA   4C          TEXT 'LAST FOUR '
0540 43C4 0D0A          DATA CRLF
0541 43C6   20          TEXT '   CHARACTERS ENTERED WILL BE USED FOR AN '
0542 43F0   41          TEXT 'ADDRESS '
```

```
0543 43F8 0D0A          DATA CRLF
0544 43FA   20          TEXT '           PUSH "H" KEY FOR "HELP" TEMPLATE. '
0545 4424 0D0A          DATA CRLF,LFLF
     4426 0A0A
0546 4428   20          TEXT '                  EPROM = 32K '
0547 4442 0D0A          DATA CRLF
0548 4444   20          TEXT '             EPROM START ADDRESS = >0000 '
0549 446E 0D0A          DATA CRLF
0550 4470   20          TEXT '             BUFFER START ADDRESS = >A000'
0551 449A 0D0A          DATA CRLF
0552 449C   20          TEXT '             BUFFER END ADDRESS = >AFFE'
0553      44C4  XCRLF   EQU  $
0554 44C4 0D0A          DATA CRLF
0555 44C6   00          BYTE 0                    END OF MESSAGE
0556 44C8               EVEN
0557      44C8  CYTHRU  EQU  $
0558 44C8 0D0A          DATA CRLF
0559 44CA   20          TEXT '       COPY FROM EPROM TO BUFFER COMPLETE'
0560 44F4 0D0A          DATA CRLF
0561 44F6   00          BYTE 0                    END OF MESSAGE
0562 44F8               EVEN
0563      44F8  VSCRN   EQU  $
0564 44F8 1A0A          DATA >1A0A,LFLF
     44FA 0A0A
0565 44FC   20          TEXT '          99/4-LCP EPROM PROGRAMMER VERIFY '
0566 4524   46          TEXT 'FUNCTION'
0567 452C 0D0A          DATA CRLF
0568 452E 0A0A          DATA LFLF
0569 4530   20          TEXT '   USE SPACE BAR TO GO FROM ONE '
0570 4550   50          TEXT 'PARAMETER TO ANOTHER. '
0571 4566 0D0A          DATA CRLF
0572 4568   20          TEXT '        PUSH "H" KEY FOR THE HELP TEMPLATE. '
0573 4592 0D0A          DATA CRLF
0574 4594 0A0A          DATA LFLF
0575 4596   20          TEXT '                  EPROM = 32K '
0576 45B0 0D0A          DATA CRLF
0577 45B2   20          TEXT '             EPROM START ADDRESS = >0000 '
0578 45DC 0D0A          DATA CRLF
0579 45DE   20          TEXT '             BUFFER START ADDRESS = >A000'
0580 4608 0D0A          DATA CRLF
0581 460A   20          TEXT '             BUFFER END ADDRESS = >AFFE'
0582 4632 0D0A          DATA CRLF
0583 4634   00          BYTE 0                    END OF MESSAGE
0584 4636               EVEN
0585      4636  VERTH   EQU  $
0586 4636 0D0A          DATA CRLF
0587 4638   56          TEXT 'VERIFY THROUGH, ERROR COUNT IS  '
0588 4658   00          BYTE 0
0589 465A               EVEN
0590      465A  VERXIT  EQU  $
0591 465A 0D0A          DATA CRLF
0592 465C   50          TEXT 'PUSH ANY KEY TO CONTINUE'
0593 4674   00          BYTE 0
0594 4676               EVEN
0595      4676  DSP     EQU  $
0596 4676 2020          DATA >2020
0597 4678 0000          DATA >0000
0598      467A  INITSC  EQU  $
0599 467A 1A0A          DATA >1A0A,LFLF
     467C 0A0A
```

```
0600 467E    20           TEXT ' 99/4-LCP EPROM PROGRAMMER BUFFER INIT '
0601 46A6    46           TEXT 'FUNCTION'
0602 46AE  0D0A           DATA CRLF
0603 46B0  0A0A           DATA LFLF
0604 46B2    20           TEXT ' USE SPACE BAR TO GO FROM ONE FUNCTION '
0605 46DA    54           TEXT 'TO ANOTHER'
0606 46E4  0D0A           DATA CRLF
0607 46E6    20           TEXT '            PUSH THE "H" KEY FOR HELP'
0608 470C  0D0A           DATA CRLF
0609 470E  0A0A           DATA LFLF
0610 4710    20           TEXT '           LOAD DATA = >0000'
0611 4730  0D0A           DATA CRLF
0612 4732    20           TEXT '          EPROM START ADDRESS = >0000'
0613 475C  0D0A           DATA CRLF
0614 475E    20           TEXT '          BUFFER START ADDRESS = >A000 '
0615 478A  0D0A           DATA CRLF
0616 478C    20           TEXT '          BUFFER END ADDRESS = >AFFE '
0617 47B6  0D0A           DATA CRLF
0618 47B8    00           BYTE 0              END OF MESSAGE
0619 47BA               EVEN
0620       47BA  INITC   EQU  $
0621 47BA  0D0A           DATA CRLF
0622 47BC    20           TEXT '       BUFFER INITIALIZATION COMPLETE '
0623 47E0    00           BYTE 0
0624 47E2               EVEN
0625       47E2  PAKM    EQU  $
0626 47E2  0D0A           DATA CRLF
0627 47E4    20           TEXT '          PUSH ANY KEY TO CONTINUE'
0628 4806    00           BYTE 0
0629 4808               EVEN
0630       4808  PGMSC   EQU  $
0631 4808  1A0A           DATA >1A0A,LFLF
     480A  0A0A
0632 480C    20           TEXT '    99/4-LCP EPROM PROGRAMMER PROGRAM '
0633 4832    46           TEXT 'FUNCTION'
0634 483A  0D0A           DATA CRLF
0635 483C    20           TEXT '           WITH AUTO VERIFY'
0636 485C  0D0A           DATA CRLF
0637 485E  0A0A           DATA LFLF
0638 4860    20           TEXT '   USE SPACE BAR TO GO FROM ONE FUNCTION '
0639 488A    54           TEXT 'TO ANOTHER. '
0640 4896  0D0A           DATA CRLF
0641 4898    20           TEXT '           PUSH THE "H" KEY FOR HELP '
0642 48C0  0D0A           DATA CRLF
0643 48C2  0A0A           DATA LFLF
0644 48C4    20           TEXT '          EPROM = 32K'
0645 48DE  0D0A           DATA CRLF
0646 48E0    20           TEXT '          EPROM START ADDRESS = >0000'
0647 490A  0D0A           DATA CRLF
0648 490C    20           TEXT '          BUFFER START ADDRESS = >A000 '
0649 4938  0D0A           DATA CRLF
0650 493A    20           TEXT '          BUFFER END ADDRESS = >AFFE '
0651 4964    00           BYTE >0              END OF MESSAGE
0652 4966               EVEN
0653       4966  MERGT   EQU  $
0654 4966  1A0A           DATA >1A0A,LFLF
     4968  0A0A
0655 496A    20           TEXT ' 99/4-LCP EPROM PROGRAMMER BUFFER MERGE '
0656 4992    46           TEXT 'FUNCTION'
0657 499A  0D0A           DATA CRLF
```

```
0658 499C 0A0A              DATA LFLF
0659 499E   20              TEXT ' USE SPACE BAR TO GO FROM LINE TO LINE. '
0660 49C6   20              TEXT ' FOUR '
0661 49CC 0D0A              DATA CRLF
0662 49CE   20              TEXT ' CHARACTERS ENTERED WILL BE USED FOR AN '
0663 49F6   41              TEXT 'ADDRESS. '
0664 49FE 0D0A              DATA CRLF
0665 4A00   20              TEXT '         PUSH "H" KEY FOR "HELP"TEMPLATE'
0666 4A26 0D0A              DATA CRLF
0667 4A28 0A0A              DATA LFLF
0668 4A2A   20              TEXT '      MSBY BUFFER START ADDRESS = >A000  '
0669 4A54 0D0A              DATA CRLF
0670 4A56   20              TEXT '      LSBY BUFFER START ADDRESS = >B000  '
0671 4A80 0D0A              DATA CRLF
0672 4A82   20              TEXT '     MERGE BUFFER START ADDRESS = >C000 '
0673 4AAC 0D0A              DATA CRLF
0674 4AAE   20              TEXT '     MERGE BUFFER END ADDRESS = >CFFF '
0675 4AD6 0D0A              DATA CRLF
0676 4AD8   00              BYTE 0                 END OF MESSAGE
0677 4ADA                   EVEN
0678      4ADA   SPLITT EQU  $
0679 4ADA 1A0A              DATA >1A0A,LFLF
     4ADC 0A0A
0680 4ADE   20              TEXT '  99/4-LPC EPROM PROGRAMMER BUFFER SPLIT '
0681 4B08   52              TEXT 'ROUTINE '
0682 4B10 0D0A              DATA CRLF
0683 4B12 0A0A              DATA LFLF
0684 4B14   20              TEXT '  USE SPACE BAR TO GO FROM LINE TO LINE.  '
0685 4B3E   20              TEXT ' LAST FOUR'
0686 4B48 0D0A              DATA CRLF
0687 4B4A   20              TEXT ' CHARACTERS ENTERED WILL BE USED FOR AN  '
0688 4B74   41              TEXT 'ADDRESS. '
0689 4B7C 0D0A              DATA CRLF
0690 4B7E   20              TEXT '      PUSH THE "H" KEY FOR THE "HELP"'
0691 4BA2   20              TEXT ' TEMPLATE '
0692 4BAC 0D0A              DATA CRLF
0693 4BAE 0A0A              DATA LFLF
0694 4BB0   20              TEXT '      MSBY BUFFER START ADDRESS = >A000'
0695 4BD6 0D0A              DATA CRLF
0696 4BD8   20              TEXT '      LSBY BUFFER START ADDRESS = >B000'
0697 4BFE 0D0A              DATA CRLF
0698 4C00   20              TEXT '      SPLIT BUFFER START ADDRESS = >C000 '
0699 4C28 0D0A              DATA CRLF
0700 4C2A   20              TEXT '      SPLIT BUFFER END ADDRESS = >CFFF '
0701 4C50 0D0A              DATA CRLF
0702 4C52   00              BYTE 0                 END OF MESSAGE
0703 4C54                   EVEN
0704      4C54   PGMEND EQU  $
0705 4C54         END
NO ERRORS,    NO WARNINGS
```

LABEL	VALUE	DEFN	REFERENCES								
$	4C54		0075	0104	0146	0150	0153	0164	0174	0182	0191
			0199	0208	0211	0236	0241	0248	0283	0293	0323
			0330	0339	0344	0350	0358	0367	0389	0418	0428
			0457	0461	0465	0470	0476	0480	0502	0508	0510
			0532	0553	0557	0563	0585	0590	0595	0598	0620
			0625	0630	0653	0678	0704				
ACINC	0004	0026	0156	0157	0368	0369	0471	0472			
BEAR	0005	0027	0081	0155	0198	0200	0243	0288	0296	0370	0423
			0431	0473							
BIGROM	0005	0028	0170	0239	0291	0426					
BSAR	0006	0029	0083	0154	0155	0188	0192	0242	0243	0287	0294
			0295	0296	0351	0370	0373	0422	0429	0430	0431
			0467	0473	0485	0486	0487				
BSARR	0004	0030	0082	0083	0189	0373					
CLDST	4000	0075	0119	0168	0179	0187	0196	0256			
CNP1	4096	0174	0167								
CNP2	40A4	0182	0178								
CNP3	40B4	0191	0186								
CNP4	40C4	0199	0195								
COPY	4068	0146	0095								
CPYSC	434E	0532	0147								
CRLF	0D0A	0031	0514	0516	0518	0520	0522	0524	0526	0529	0537
			0540	0543	0545	0547	0549	0551	0554	0558	0560
			0567	0571	0573	0576	0578	0580	0582	0586	0591
			0602	0606	0608	0611	0613	0615	0617	0621	0626
			0634	0636	0640	0642	0645	0647	0649	0657	0661
			0664	0666	0669	0671	0673	0675	0682	0686	0689
			0692	0695	0697	0699	0701				
CY1	4070	0150									
CY2	4076	0153	0158								
CYTHRU	44C8	0557	0160								
DSP	4676	0595	0488	0495							
END	4C54	0705									
EPD	5000	0032	0087	0154	0354	0466					
EPHW	1000	0033	0077								
EPRMAR	5002	0034	0086	0152	0253	0345	0464				
EPSAR	0007	0035	0084	0152	0180	0183	0286	0295	0345	0421	0430
			0464								
ERRCNT	0009	0036	0462	0481	0481	0483					
FF	41FA	0508	0352								
HSCRN	41FC	0510	0088								
INIT1	40DA	0241	0244								
INITB	40D0	0236	0098								
INITC	47BA	0620	0246								
INITSC	467A	0598	0237								
LED	0007	0037	0328	0383							
LFLF	0A0A	0038	0512	0514	0534	0545	0564	0568	0574	0599	0603
			0609	0631	0637	0643	0654	0658	0667	0679	0683
			0693								
MERG	40F8	0283	0106								
MERG1	4112	0293	0297								
MERGT	4966	0653	0284								
MODE	0001	0039	0251	0329	0382						
PAKM	47E2	0625	0254								
PARGET	4088	0164	0148	0238	0290	0326	0425	0459			
PDPGM	0006	0040	0151	0249	0324	0356	0362	0463			
PGMEND	4C54	0704									
PGMSC	4808	0630	0325								
PGTHRU	4172	0389									
PLOOPC	0002	0041	0331	0379							

LABEL	VALUE	DEFN	REFERENCES								
POWER	0002	0042	0091	0250							
PRGM	411C	0323	0109								
PRGM1	412A	0330									
PRGM2	413E	0350	0371								
PRGM3	4150	0358	0360								
PRGM4	413A	0344	0380								
PRGM7	4136	0339	0341								
PRGM8	4158	0367	0353								
PTIME	000A	0043	0332	0357							
R0	0000		0078	0079	0089	0092	0094	0097	0100	0105	0108
			0111	0114	0117	0118	0166	0177	0180	0185	0188
			0189	0194	0197	0198	0252	0253	0255	0337	0340
			0351	0352	0354	0357	0359	0376	0377	0466	0468
			0489	0490	0491	0492	0493	0494			
R1	0001		0467	0468	0496	0497	0498	0499	0500	0501	
R10	000A		0043								
R11	000B		0202								
R12	000C		0077								
R2	0002		0041								
R3	0003		0045								
R4	0004		0030								
R5	0005		0027								
R6	0006		0029								
R7	0007		0035								
R8	0008		0044								
R9	0009		0036								
SCN1	4048	0104	0101								
SPLIT	4172	0418	0209								
SPLIT1	418C	0428	0432								
SPLITT	4ADA	0678	0419								
SPLITX	40CC	0208	0112								
START	4000	0071									
STRDTA	0008	0044	0085	0086	0087	0172	0175	0242	0285	0294	0420
			0429								
TERCNT	0003	0045	0080	0478	0503						
VERFY	4196	0457	0212								
VERFYX	40CE	0211	0115								
VERR	41C2	0480	0469								
VERR1	41F6	0502	0482								
VERTH	4636	0585	0477								
VERXIT	465A	0590									
VFIN	41BA	0476									
VFY	419E	0461	0384								
VFY1	41B2	0470	0504								
VFY2	41A8	0465	0474								
VPP	0003	0046	0355	0363							
VSCRN	44F8	0563	0458								
WSPTR	8000	0047	0076								
WTFK	40E4	0248	0162	0298	0433	0479					
XCRLF	44C4	0553	0165	0176	0184	0193	0201	0484			