

SAMPLE PROGRAMS

Here are sample programs to help get started with the following modules:

G1213 = 128 x 32
 G1216 = 128 x 64
 G191C = 192 x 128
 G242C = 240 x 128
 G321D = 320 x 200
 G321E = 320 x 240
 G324E = 320 x 240

For additional programming information, contact the LCD application engineering department at 310-517-7770, fax 310-517-7792.

PROGRAM FOR G1213 LCD MODULE

'SUBROUTINE FOR COMMAND CONTROL

DECLARE SUB FUNC1 ()

'SUBROUTINE FOR DATA CONTROL

DECLARE SUB FUNC2 ()

OUT PORT1,&3FH 'DISPLAY ON COMMAND
 FUNC1
 OUT PORT1,&88H 'SET THE PAGE (X-ADDRESS) TO 0
 FUNC1
 OUT PORT1,&40H 'SET Y-ADDRESS TO 0
 FUNC1
 OUT PORT1,&COH 'SET Z-ADDRESS TO 0
 FUNC1

PAGE = &B8H
 FOR I = 1 TO 4

FOR J = 1 TO 64 '64 BYTES OF DATA TO BE READ
 READ CODE
 OUT PORT1, CODE 'SHOW THE DATA ON THE SCREEN
 FUNC2
 NEXT J

PAGE = PAGE + 1
 OUT PORT1, PAGE 'SET THE PAGE TO NEXT ONE
 FUNC1
 OUT PORT1, &40H 'SET Y ADDRESS TO 0
 FUNC1
 NEXT 1

SUB FUNC1 'COMMAND CONTROL
 OUT PORT2,2 'WRITING TO COMMAND REGISTER
 OUT PORT2,3
 OUT PORT2,2
 END SUB

SUB FUNC2 'DATA CONTROL
 OUT PORT2,0 'WRITING TO DATA REGISTER
 OUT PORT2,1
 OUT PORT2,0
 END SUB

DATA 3EH,7FH,71H,59H,4DH,7FH,3EH,00H 'CHARACTER 0
 DATA 40H,42H,7FH,7FH,40H,40H,00H,00H 'CHARACTER 1
 DATA 62H,73H,59H,49H,6FH,66H,00H,00H 'CHARACTER 2
 DATA 22H,63H,49H,49H,7FH,36H,00H,00H 'CHARACTER 3
 DATA 18H,1CH,16H,53H,7FH,7FH,50H,00H 'CHARACTER 4
 DATA 27H,67H,45H,45H,7DH,39H,00H,00H 'CHARACTER 5
 DATA 3CH,7EH,4BH,49H,79H,30H,00H,00H 'CHARACTER 6
 DATA 03H,03H,71H,79H,0FH,07H,00H,00H 'CHARACTER 7
 DATA 36H,7FH,49H,49H,7FH,36H,00H,00H 'CHARACTER 8
 DATA 06H,4FH,49H,69H,3FH, EH,00H,00H 'CHARACTER 9
 DATA 7CH,7EH,13H, 13H,7EH,7CH,00H,00H 'CHARACTER A
 DATA 41H,7FH,7FH,49H,49H,7FH,36H,00H 'CHARACTER B
 DATA 1CH,3EH,63H,41H,41H,63H,22H,00H 'CHARACTER C
 DATA 41H,7FH,7FH,41H,63H,3EH,1CH,00H 'CHARACTER D
 DATA 41H,7FH,7FH,49H,5DH,41H,63H,00H 'CHARACTER E
 DATA 41H,7FH,7FH,49H,1DH,0IH,03H,00H 'CHARACTER F
 DATA 1CH,3EH,63H,41H,51H,73H,72H,00H 'CHARACTER G
 DATA 7FH,7FH,08H,08H,7FH,7FH,00H,00H 'CHARACTER H
 DATA 00H,41 H,7FH,7FH,41H,00H,00H,00H 'CHARACTER I
 DATA 30H,70H,40H,41H,7FH,3FH,01 H,00H 'CHARACTER J
 DATA 41H,7FH,7FH,08H,1CH,77H,63H,00H 'CHARACTER K
 DATA 41H,7FH,7FH,41H,40H,60H,70H,00H 'CHARACTER L
 DATA 7FH,7FH,0EH,1CH,0EH,7FH,7FH,00H 'CHARACTER M
 DATA 7FH,7FH,06H,0CH,18H,7FH,7FH,00H 'CHARACTER N
 DATA 1CH,3EH,63H,41H,63H,3EH,1CH,00H 'CHARACTER O
 DATA 41H,7FH,7FH,49H,09H,0FH,06H,00H 'CHARACTER P
 DATA 1EH,3FH,21H,71H,7FH,5EH,00H,00H 'CHARACTER Q
 DATA 41H,7FH,7FH,09H,19H,7FH,66H,00H 'CHARACTER R
 DATA 26H,6FH,4DH,59H,73H,32H,00H,00H 'CHARACTER S
 DATA 03H,41H,7FH,7FH,41H,03H,00H,00H 'CHARACTER T
 DATA 3FH,7FH,40H,40H,7FH,3FH,00H,00H 'CHARACTER U
 DATA 1FH,3FH,60H,60H,3FH,1FH,00H,00H 'CHARACTER V
 DATA 7FH,7FH,30H,18H,30H,7FH,7FH,00H 'CHARACTER W
 DATA 43H,67H,3CH,18H,3CH,67H,43H,00H 'CHARACTER X
 DATA 07H,4FH,78H,78H,4FH,07H,00H,00H 'CHARACTER Y
 DATA 47H,63H,71H,59H,4DH,67H,73H,00H 'CHARACTER Z

PROGRAM FOR G1216 LCD MODULE

'SUBROUTINE FOR COMMAND CONTROL

DECLARE SUB FUNC11 ()

DECLARE SUB FUNC12 ()

'SUBROUTINE FOR DATA CONTROL

DECLARE SUB FUNC21 ()

DECLARE SUB FUNC22 ()

```

OUT PORT1,&3FH      'DISPLAY ON COMMAND
FUNC11
FUNC12
OUT PORT1,&B8H      'SET THE PAGE (X-ADDRESS) TO 0
FUNC11
FUNC12
OUT PORT1,&40H      'SET Y-ADDRESS TO 0
FUNC11
FUNC12
OUT PORT1,&COH      'SET Z-ADDRESS TO 0
FUNC11
FUNC12

PAGE = &B8H
FOR I = 1 TO 4

FOR J = 1 TO 64      '64 BYTES OF DATA TO BE READ
READ CODE
OUT PORT1,CODE      'SHOW THE DATA ON THE SCREEN
FUNC11
FUNC22
NEXT J

PAGE = PAGE + 1
OUT PORT1,PAGE      'SET THE PAGE TO NEXT ONE
FUNC11
FUNC12
OUT PORT1,&40H      'SET Y-ADDRESS TO 0
FUNC11
FUNC12
NEXT I

SUB FUNC11          'COMMAND CONTROL FOR LEFT HALF
OUT PORT2,9        'WRITING TO COMMAND REGISTER
OUT PORT2,8
OUT PORT2,9
END SUB

SUB FUNC12          'COMMAND CONTROL FOR RIGHT HALF
OUT PORT2,3        'WRITING TO COMMAND REGISTER
OUT PORT2,2
OUT PORT2,3
END SUB

```

```

SUB FUNC21          'DATA CONTROL FOR LEFT HALF
OUT PORT2,13       'WRITING TO DATA REGISTER
OUT PORT2,12
OUT PORT2,13
END SUB

```

```

SUB FUNC22          'DATA CONTROL FOR RIGHT HALF
OUT PORT2,7        'WRITING TO DATA REGISTER
OUT PORT2,6
OUT PORT2,7
END SUB

```

```

DATA 3EH,7FH,71H,59H,4DH,7FH,3EH,00H  'CHARACTER 0
DATA 40H,42H,7FH,7FH,40H,40H,00H,00H  'CHARACTER 1
DATA 62H,73H,59H,49H,6FH,66H,00H,00H  'CHARACTER 2
DATA 22H,63H,49H,49H,7FH,36H,00H,00H  'CHARACTER 3
DATA 18H,1CH,16H,53H,7FH,7FH,50H,00H  'CHARACTER 4
DATA 27H,67H,45H,45H,7DH,39H,00H,00H  'CHARACTER 5
DATA 3CH,7EH,4BH,49H,79H,30H,00H,00H  'CHARACTER 6
DATA 03H,03H,71H,79H,0FH,07H,00H,00H  'CHARACTER 7
DATA 36H,7FH,49H,49H,7FH,36H,00H,00H  'CHARACTER 8
DATA 06H,4FH,49H,69H,3FH,1EH,00H,00H  'CHARACTER 9
DATA 7CH,7EH,13H,13H,7EH,7CH,00H,00H  'CHARACTER A
DATA 41H,7FH,7FH,49H,49H,7FH,36H,00H  'CHARACTER B
DATA 1CH,3EH,63H,41H,41H,63H,22H,00H  'CHARACTER C
DATA 41H,7FH,7FH,41H,63H,3EH,1CH,00H  'CHARACTER D
DATA 41H,7FH,7FH,49H,5DH,41H,63H,00H  'CHARACTER E
DATA 41H,7FH,7FH,49H,1DH,01H,03H,00H  'CHARACTER F
DATA 1CH,3EH,63H,41H,51 H,73H,72H,00H  'CHARACTER G
DATA 7FH,7FH,08H,08H,7FH,7FH,00H,00H  'CHARACTER H
DATA 00H,41H,7FH,7FH,41H,00H,00H,00H  'CHARACTER I
DATA 30H,70H,40H,41H,7FH,3FH,01H,00H  'CHARACTER J
DATA 41H,7FH,7FH,08H,1CH,77H,63H ,00H  'CHARACTER K
DATA 41H,7FH,7FH,41H,40H,60H,70H,00H  'CHARACTER L
DATA 7FH,7FH,0EH,1CH,0EH,7FH,7FH,00H  'CHARACTER M
DATA 7FH,7FH,06H,0CH,18H,7FH,7FH,00H  'CHARACTER N
DATA 1CH,3EH,63H,41H,63H,3EH,1CH,00H  'CHARACTER O
DATA 41H,7FH,7FH,49H,09H,0FH,06H,00H  'CHARACTER P
DATA 1EH,3FH,21 H,71H,7FH,5EH,00H,00H  'CHARACTER Q
DATA 41H,7FH,7FH,09H,19H,7FH,66H,00H  'CHARACTER R
DATA 26H,6FH,4DH,59H,73H,32H,00H,00H  'CHARACTER S
DATA 03H,41H,7FH,7FH,41H,03H,00H,00H  'CHARACTER T
DATA 3FH,7FH,40H,40H,7FH,3FH,00H,00H  'CHARACTER U
DATA 1FH,3FH,60H,60H,3FH,1 FH,00H,00H  'CHARACTER V
DATA 7FH,7FH,30H,18H,30H,7FH,7FH,00H  'CHARACTER W
DATA 43H,67H,3CH,18H,3CH,67H,43H,00H  'CHARACTER X
DATA 07H,4FH,78H,78H,4FH,07H,00H,00H  'CHARACTER Y
DATA 47H,63H,71H,59H,4DH,67H,73H,00H  'CHARACTER Z

```

SAMPLE PROGRAMS (CONTINUED)

PROGRAM For G191C LCD MODULE

```
'SUBROUTINE FOR COMMAND CONTROL
DECLARE SUB FUNC1 ()
'SUBROUTINE FOR DATA CONTROL
DECLARE SUB FUNC2 ()

OUT PORT1,&40H      'SYSTEM SET COMMAND
FUNC1
OUT PORT1,&30H      'P1: MODE OF OPERATION
FUNC2
OUT PORT1,&85H      'P2: WIDTH OF A CHARACTER FIELD
FUNC2
OUT PORT1,&07H      'P3: HEIGHT OF A CHARACTER FIELD
FUNC2
OUT PORT1,&1 FH      'P4: CHARACTERS PER ROW
FUNC2
OUT PORT1,&7CH      'P5: FRAME FREQUENCY CONTROL
FUNC2
OUT PORT1,&7FH      'P6: LINES PER GRAPHIC SCREEN
FUNC2
OUT PORT1,&20H      'P7: VIRTUAL SCREEN WIDTH LOW BYTE
FUNC2
OUT PORT1,&00H      'P8: VIRTUAL SCREEN WIDTH HIGH BYTE
FUNC2
OUT PORT1,&59H      'DISPLAY ON COMMAND
FUNC1
OUT PORT1,&05H      'LAYER 1 ON WITH CURSOR
FUNC2
OUT PORT1 ,&5BH     'OVERLAY COMMAND
FUNC1
OUT PORT1,&00H      'SIMPLE OVERLAY
FUNC2
OUT PORT1,&44H      'SCROLL COMMAND
FUNC1
OUT PORT1,&00H      'FIRST LAYER LOW BYTE
FUNC2
OUT PORT1,&00H      'FIRST LAYER HIGH BYTE
FUNC2
OUT PORT1,&7FH      'LINES OF THE LAYER
FUNC2
OUT PORT1,&00H      'SECOND LAYER LOW BYTE
FUNC2
OUT PORT1,&04H      'SECOND LAYER HIGH BYTE
FUNC2
PORT1,&7FH          'LINES OF THE LAYER
FUNC2
OUT PORT1,&5DH      'CURSOR FORMAT COMMAND
FUNC1
OUT PORT1,&05H      'CURSOR WIDTH
FUNC2
OUT PORT1,&87H      'CURSOR HEIGHT
FUNC2
```

```
OUT PORT1,&4CH      'CURSOR DIRECTION COMMAND
FUNC1              (SHIFT RIGHT)

OUT PORT1,&46H      'CURSOR WRITE COMMAND
FUNC1

OUT PORT1,&00H      'CURSOR POSITION LOW BYTE
FUNC2

OUT PORT1,&00H      'CURSOR POSITION HIGH BYTE
FUNC2

OUT PORT1 ,&42H     'MEMORY WRITE COMMAND
FUNC1
FOR I = 1 TO 16    '16 LINES OF DATA TO BE READ
READ ASCII$
FOR CHAR = 1 TO LEN(ASCII$)
ONES$ = MID$(ASCII$,CHAR,1)
CODE = ASC(ONES$)
OUT PORT1,CODE
FUNC2
NEXT CHAR
NEXT I

SUB FUNC1          'COMMAND CONTROL
OUT PORT2,2        'WRITING TO COMMAND REGISTER
OUT PORT2,3
OUT PORT2,2
END SUB

SUB FUNC2          'DATA CONTROL
OUT PORT2,0        'WRITING TO DATA REGISTER
OUT PORT2,1
OUT PORT2,0
END SUB

DATA*****
DATA**              **
DATA**   G191C LCD MODULE   **
DATA**   192 x 128 DOT MATRIX LCD   **
DATA**   EL BACK LIGHT   **
DATA**   FSTN FOR BLACK & WHITE   **
DATA**              **
DATA**   DIMENSION:   **
DATA**   98 x 86 x 13 (mm)   **
DATA**              **
DATA**   VIEWING AREA:   **
DATA**   78 x 54 (mm)   **
DATA**              **
DATA**   SEIKO INSTRUMENTS INC.   **
DATA**              **
DATA*****
```

PROGRAM For G2436 LCD MODULE

'SUBROUTINE FOR COMMAND CONTROL

DECLARE SUB FUNC1 ()

'SUBROUTINE FOR DATA CONTROL

DECLARE SUB FUNC2 ()

```

OUT PORT1,40H      'SYSTEM SET COMMAND
FUNC1
OUT PORT1,&30H    'P1: MODE OF OPERATION
FUNC2
OUT PORT1,&87H    'P2: WIDTH OF A CHARACTER FIELD
FUNC2
OUT PORT1,&07H    'P3: HEIGHT OF A CHARACTER FIELD
FUNC2
OUT PORT1,&IDH    'P4: CHARACTERS PER ROW
FUNC2
OUT PORT1,&F8H    'P5: FRAME FREQUENCY CONTROL
FUNC2
OUT PORT1,&3FH    'P6: LINES PER GRAPHIC SCREEN
FUNC2
OUT PORT1,&1DH    'P7: VIRTUAL SCREEN WIDTH LOW BYTE
FUNC2
OUT PORT1,&00H    'P8: VIRTUAL SCREEN WIDTH HIGH BYTE
FUNC2

OUT PORT1,&59H    'DISPLAY ON COMMAND
FUNC1
OUT PORT1,&05H    'LAYER 1 ON WITH CURSOR
FUNC2

OUT PORT1,&5BH    'OVERLAY COMMAND
FUNC1
OUT PORT1,&00H    'SIMPLE OVERLAY
FUNC2
OUT PORT1,&44H    'SCROLL COMMAND
FUNC1
OUT PORT1,&00H    'FIRST LAYER LOW BYTE
FUNC2
OUT PORT1,&00H    'FIRST LAYER HIGH BYTE
FUNC2
OUT PORT1 ,&3FH  'LINES OF THE LAYER
FUNC2
OUT PORT1,&00H    'SECOND LAYER LOW BYTE
FUNC2
OUT PORT1,&04H    'SECOND LAYER HIGH BYTE
FUNC2
OUT PORT1,&3FH    'LINES OF THE LAYER
FUNC2
    
```

```

OUT PORT1,&5DH    'CURSOR FORMAT COMMAND
FUNC1
OUT PORT1,&07H    'CURSOR WIDTH
FUNC2
OUT PORT1,&87H    'CURSOR HEIGHT
FUNC2
OUT PORT1,&4CH    'CURSOR DIRECTION COMMAND
FUNC1              (SHIFT RIGHT)

OUT PORT1,&46H    'CURSOR WRITE COMMAND
FUNC1
OUT PORT1,&00H    'CURSOR POSITION LOW BYTE
FUNC2
OUT PORT1,&00H    'CURSOR POSITION HIGH BYTE
FUNC2

OUT PORT1,&42H    'MEMORY WRITE COMMAND
FUNC1
FOR I = 1 TO 8    '8 LINES OF DATA TO BE READ
  READ ASCII$
  FOR CHAR = 1 TO LEN(ASCII$)
    ONE$ = MID$(ASCII$,CHAR,1)
    CODE = ASC(ONE$)
    OUT PORT1,CODE
  FUNC2
NEXT CHAR
NEXT I

SUB FUNC1          'COMMAND CONTROL
  OUT PORT2,2      'WRITING TO COMMAND REGISTER
  OUT PORT2,3
  OUT PORT2,2
END SUB

SUB FUNC2          'DATA CONTROL
  OUT PORT2,0      'WRITING TO DATA REGISTER
  OUT PORT2,1
  OUT PORT2,0
END SUB

DATA*****
DATA**
DATA**   G2436 LCD MODULE
DATA**   240 x 64 DOT MATRIX LCD
DATA**   CCFL BACK LIGHT
DATA**   FSTN FOR BLACK & WHITE
DATA**
DATA*****
    
```

SAMPLE PROGRAMS (CONTINUED)

PROGRAM FOR G242C LCD MODULE

'SUBROUTINE FOR COMMAND CONTROL

DECLARE SUB FUNC1 ()

'SUBROUTINE FOR DATA CONTROL

DECLARE SUB FUNC2 ()

```

OUT PORT1,&40H      'SYSTEM SET COMMAND
FUNC1
OUT PORT1,&30H      'P1: MODE OF OPERATION
FUNC2
OUT PORT1,&87H      'P2: WIDTH OF A CHARACTER FIELD
FUNC2
OUT PORT1,&07H      'P3: HEIGHT OF A CHARACTER FIELD
FUNC2
OUT PORT1,&IDH      'P4: CHARACTERS PER ROW
FUNC2
OUT PORT1,&7FH      'P5: FRAME FREQUENCY CONTROL
FUNC2
OUT PORT1,&7FH      'P6: LINES PER GRAPHIC SCREEN
FUNC2
OUT PORT1,&IEH      'P7: VIRTUAL SCREEN WIDTH LOW BYTE
FUNC2
OUT PORT1,&00H      'P8: VIRTUAL SCREEN WIDTH HIGH BYTE
FUNC2

```

```

OUT PORT1,&59H      'DISPLAY ON COMMAND
FUNC1
OUT PORT1,&05H      'LAYER 1 ON WITH CURSOR
FUNC2

```

```

OUT PORT1,&5BH      'OVERLAY COMMAND
FUNC1
OUT PORT1,&00H      'SIMPLE OVERLAY
FUNC2

```

```

OUT PORT1,&44H      'SCROLL COMMAND
FUNC1
OUT PORT1,&00H      'FIRST LAYER LOW BYTE
FUNC2
OUT PORT1,&00H      'FIRST LAYER HIGH BYTE
FUNC2
OUT PORT1,&3FH      'LINES OF THE LAYER
FUNC2
OUT PORT1,&00H      'SECOND LAYER LOW BYTE
FUNC2
OUT PORT1,&04H      'SECOND LAYER HIGH BYTE
FUNC2
OUT PORT1,&3FH      'LINES OF THE LAYER
FUNC2

```

```

OUT PORT1,&5DH      'CURSOR FORMAT COMMAND
FUNC1
OUT PORT1,&07H      'CURSOR WIDTH
FUNC2

```

```

OUT PORT1,&87H      'CURSOR HEIGHT
FUNC2
OUT PORT1,&4CH      'CURSOR DIRECTION COMMAND
FUNC1              (SHIFT RIGHT)

```

```

OUT PORT1,&46H      'CURSOR WRITE COMMAND
FUNC1
OUT PORT1,&00H      'CURSOR POSITION LOW BYTE
FUNC2
OUT PORT1,&00H      'CURSOR POSITION HIGH BYTE
FUNC2

```

```

OUT PORT1,&42H      'MEMORY WRITE COMMAND
FUNC1
FOR I = 1 TO 16    '16 LINES OF DATA TO BE READ
  READ ASCII$
  FOR CHAR = 1 TO LEN(ASCII$)
    ONES$ = MID$(ASCII$,CHAR,I)
    CODE = ASC(ONES$)
    OUT PORT1,CODE
  FUNC2
NEXT CHAR
NEXT I

```

```

SUB FUNC1          'COMMAND CONTROL
  OUT PORT2,&2H     'WRITING TO COMMAND REGISTER
  OUT PORT2,&3H
  OUT PORT2,&2H
END SUB

```

```

SUB FUNC2          'DATA CONTROL
  OUT PORT2,&0H     'WRITING TO DATA REGISTER
  OUT PORT2,&1H
  OUT PORT2,&0H
END SUB

```

```

DATA*****
DATA**          **
DATA**   G242C LCD MODULE   **
DATA**   240 x 128 DOT MATRIX LCD   **
DATA**   CCFL BACK LIGHT   **
DATA**   FSTN FOR BLACK & WHITE   **
DATA**          **
DATA**   DIMENSION:   **
DATA**   180 x 110 x 15 (mm)   **
DATA**          **
DATA**   VIEWING AREA:   **
DATA**   134 x 76 (mm)   **
DATA**          **
DATA**   SEIKO INSTRUMENTS INC.   **
DATA**          **
DATA*****

```

PROGRAM FOR G321D LCD MODULE

```
'SUBROUTINE FOR COMMAND CONTROL
DECLARE SUB FUNC1 ()
'SUBROUTINE FOR DATA CONTROL
DECLARE SUB FUNC2 ()

OUT PORT1,&40H      'SYSTEM SET COMMAND
FUNC1
OUT PORT1,&30H      'P1: MODE OF OPERATION
FUNC2
OUT PORT1,&87H      'P2: WIDTH OF A CHARACTER FIELD
FUNC2
OUT PORT1,&07H      'P3: HEIGHT OF A CHARACTER FIELD
FUNC2
OUT PORT1,&27H      'P4: CHARACTERS PER ROW
FUNC2
OUT PORT1,&4FH      'P5: FRAME FREQUENCY CONTROL
FU NC2
OUT PORT1,&C7H      'P6: LINES PER GRAPHIC SCREEN
FUNC2
OUT PORT1,&28H      'P7: VIRTUAL SCREEN WIDTH LOW BYTE
FUNC2
OUT PORT1,&00H      'P8: VIRTUAL SCREEN WIDTH HIGH BYTE
FUNC2

OUT PORT1,&59H      'DISPLAY ON COMMAND
FUNC1
OUT PORT1,&05H      'LAYER 1 ON WITH CURSOR
FUNC2

OUT PORT1,&5BH      'OVERLAY COMMAND
FUNC1
OUT PORT1,&00H      'SIMPLE OVERLAY
FUNC2
OUT PORT1,&44H      'SCROLL COMMAND
FUNC1
OUT PORT1,&00H      'FIRST LAYER LOW BYTE
FUNC2
OUT PORT1,&00H      'FIRST LAYER HIGH BYTE
FUNC2
OUT PORT1,&C7H      'LINES OF THE LAYER
FUNC2
OUT PORT1,&00H      'SECOND LAYER LOW BYTE
FUNC2
OUT PORT1,&08H      'SECOND LAYER HIGH BYTE
FUNC2
OUT PORT1,&C7H      'LINES OF THE LAYER
FUNC2

OUT PORT1,&5DH      'CURSOR FORMAT COMMAND
FUNC1
OUT PORT1,&07H      'CURSOR WIDTH
FUNC2
OUT PORT1,&87H      'CURSOR HEIGHT
FUNC2
OUT PORT1,&4CH      'CURSOR DIRECTION COMMAND
FUNC1                (SHIFT RIGHT)
```

```
OUT PORT1,&46H      'CURSOR WRITE COMMAND
FUNC1
OUT PORT1,&00H      'CURSOR POSITION LOW BYTE
FUNC2
OUT PORT1,&00H      'CURSOR POSITION HIGH BYTE
FUNC2
```

```
OUT PORT1,&42H      'MEMORY WRITE COMMAND
FUNC1
FOR I = 1 TO 25      '25 LINES OF DATA TO BE READ
READ ASCII$
FOR CHAR = 1 TO LEN(ASCII$)
ONE$ = MID$(ASCII$,CHAR,1)
CODE = ASC(ONE$)
OUT PORT1,CODE
FUNC2
NEXT CHAR
NEXT I
```

```
SUB FUNC1            'COMMAND CONTROL
OUT PORT2,&2H        'WRITING TO COMMAND REGISTER
OUT PORT2,&3H
OUT PORT2,&2H
END SUB
```

```
SUB FUNC2            'DATA CONTROL
OUT PORT2,&0H        'WRITING TO DATA REGISTER
OUT PORT2,&1H
OUT PORT2,&0H
END SUB
```

```
DATA*****
DATA**              **
DATA**      G321D LCD MODULE      **
DATA**      320 x 200 DOT MATRIX LCD      **
DATA**      CCFL BACK LIGHT      **
DATA**      FSTN FOR BLACK & WHITE      **
DATA**              **
DATA**      DIMENSION:      **
DATA**      166 x 134 x15 (mm)      **
DATA**              **
DATA**      VIEWING AREA:      **
DATA**      128 x 110 (mm)      **
DATA**              **
DATA**      SUITABLE CONTROLLER:      **
DATA**      SED1330FBA, MSM6255GS      **
DATA**              **
DATA**      SUITABLE CONTROLLER BOARD:      **
DATA**      LCDC-1330-32A      **
DATA**              **
DATA**              **
DATA**      SEIKO INSTRUMENTS INC.      **
DATA**      2990 WEST LOMITA BLVD.      **
DATA**      TORRANCE, CA 90505      **
DATA**              **
DATA*****
```

SAMPLE PROGRAMS (CONTINUED)

PROGRAM FOR G321E/G324E LCD MODULE

```
'SUBROUTINE FOR COMMAND CONTROL
DECLARE SUB FUNC1 ( )
'SUBROUTINE FOR DATA CONTROL
DECLARE SUB FUNC2 ( )
```

```
OUT PORT1,&40H      'SYSTEM SET COMMAND
FUNC1
OUT PORT1, &30H     'P1: MODE OF OPERATION
FUNC2
OUT PORT1, &87H     'P2: WIDTH OF A CHARACTER FIELD
FUNC2
OUT PORT1, &07H     'P3: HEIGHT OF A CHARACTER FIELD
FU NC2
OUT PORT1,&27H      'P4: CHARACTERS PER ROW
FUNC2
OUT PORT1,&42H      'P5: FRAME FREQUENCY CONTROL
FUNC2
OUT PORT1,&EFH      'P6: LINES PER GRAPHIC SCREEN
FUNC2
OUT PORT1,&28H      'P7: VIRTUAL SCREEN WIDTH LOW BYTE
FUNC2
OUT PORT1,&00H      'P8: VIRTUAL SCREEN WIDTH HIGH BYTE
FUNC2
```

```
OUT PORT1,&59H      'DISPLAY ON COMMAND
FUNC1
OUT PORT1,&05H      'LAYER 1 ON WITH CURSOR
FUNC2
```

```
OUT PORT1,&5BH      'OVERLAY COMMAND
FUNC1
OUT PORT1,&00H      'SIMPLE OVERLAY
FUNC2
```

```
OUT PORT1,&44H      'SCROLL COMMAND
FUNC1
OUT PORT1,&00H      'FIRST LAYER LOW BYTE
FUNC2
OUT PORT1,&00H      'FIRST LAYER HIGH BYTE
FUNC2
OUT PORT1, &EFH     'LINES OF THE LAYER
FUNC2
OUT PORT1,&00H      'SECOND LAYER LOW BYTE
FUNC2
OUT PORT1,&08H      'SECOND LAYER HIGH BYTE
FUNC2
OUT PORT1,&EFH      'LINES OF THE LAYER
FUNC2
```

```
OUT PORT1,&5DH      'CURSOR FORMAT COMMAND
FUNC1
OUT PORT1,&07H      'CURSOR WIDTH
FUNC2
OUT PORT1,&87H      'CURSOR HEIGHT
FUNC2
OUT PORT1,&4CH      'CURSOR DIRECTION COMMAND
FUNC1
(SHIFT RIGHT)
```

```
OUT PORT1,&46H      'CURSOR WRITE COMMAND
FUNC1
OUT PORT1,&00H      'CURSOR POSITION LOW BYTE
FUNC2
OUT PORT1,&00H      'CURSOR POSITION HIGH BYTE
FUNC2
```

```
OUT PORT1, &42H    'MEMORY WRITE COMMAND
FUNC1
FOR I = 1 TO 25    '25 LINES OF DATA TO BE READ
READ ASCII$
FOR CHAR = 1 TO LEN(ASCII$)
ONES$ = MID$(ASCII$, CHAR, 1)
CODE = ASC(ONES$)
OUT PORT1, CODE
FUNC2
NEXT CHAR
NEXT I
```

```
SUB FUNC1          'COMMAND CONTROL
OUT PORT2,&2H      'WRITING TO COMMAND REGISTER
OUT PORT2,&3H
OUT PORT2,&2H
END SUB
```

```
SUB FUNC2          'DATA CONTROL
OUT PORT2,&0H      'WRITING TO DATA REGISTER
OUT PORT2,&1H
OUT PORT2,&0H
END SUB
```

```
DATA" *****
DATA**
DATA** G321E LCD MODULE
DATA** 320 x 240 DOT MATRIX LCD
DATA** CCFL BACK LIGHT
DATA** FSTN FOR BLACK & WHITE
DATA**
DATA** DIMENSION:
DATA** 150 x 96 x 14 (mm)
DATA**
DATA** VIEWING AREA:
DATA** 103 x 80 (mm)
DATA**
DATA** SUITABLE CONTROLLER:
DATA** SED1330FBA, MSM6255GS
DATA**
DATA** SUITABLE CONTROLLER BOARD:
DATA** LCDC-1330-32A
DATA**
DATA** SEIKO INSTRUMENTS INC.
DATA** 2990 WEST LOMITA BLVD.
DATA** TORRANCE, CA 90505
DATA**
DATA" *****
```