



Summary

The following gives general information on the character display. It also describes how to define a character and how to display a custom character on a character LCD display.

General Information

Up to 8 characters can be defined with the 4x20 character display. Characters are 5 pixels wide and 8 pixels tall. Normally the last row of pixels is left clear and is used by the cursor. Characters are defined by the user and stored into the CG RAM on the display (from address 0x40 to 0x7F).

Each character has 8 bytes and each byte represents a 5 pixel line

Table with 2 columns: Character, Address Bytes. Rows 0-7 showing address ranges from 0x40 to 0x7F.

To Define A Character

Then the characters are called by using their specific address (0x00 to 0x0F) To define characters, first the address must be sent and then the 5 bit data is sent. This is repeated 8 times for the 8 rows of pixels.

In forth:

```
40 COMMAND>DISPLAY
    \ Tell the LCD that we are going to send data
    \ to address 40
04 CHAR>DISPLAY
    \ Send 0 0 1 0 0 to address 40
```

The same code in C:

```
CommandToDisplay( 0x40 );
    \ Tell the LCD that we are going to send
    \ data to address 0x40
CharToDisplay( 0x04 );
    \ Send 0 0 1 0 0 to address 0x40
```

The following forth example shows how to generate an up arrow character at character 7.

```
78 COMMAND>DISPLAY 00 CHAR>DISPLAY\ 0 0 0 0 0
79 COMMAND>DISPLAY 04 CHAR>DISPLAY \ 0 0 1 0 0
7A COMMAND>DISPLAY 0E CHAR>DISPLAY \ 0 1 1 1 0
7B COMMAND>DISPLAY 1F CHAR>DISPLAY \ 1 1 1 1 1
7C COMMAND>DISPLAY 04 CHAR>DISPLAY \ 0 0 1 0 0
7D COMMAND>DISPLAY 04 CHAR>DISPLAY \ 0 0 1 0 0
7E COMMAND>DISPLAY 04 CHAR>DISPLAY \ 0 0 1 0 0
7F COMMAND>DISPLAY 00 CHAR>DISPLAY \ 0 0 0 0 0
    \ Make sure this line is always clear
```

To Display A Custom Character

To display the character we just created, see the following example.

In forth:

```
INIT.DISPLAY
07 CHAR>DISPLAY
```

In C:

```
InitDisplay();
CharToDisplay( 0x07 );
```

Character patterns are saved until the display is powered down or the memory is re-written into. CLEAR.DISPLAY and ClearDisplay() or INIT.DISPLAY and InitDisplay() do not modify the characters.

---

## References

QED Hardware Manual, Appendix J - 4 x 20 character  
LCD Display Data Sheet

QED C/Forth Glossary - See all functions related to  
use of LCD display

The information provided herein is believed to be reliable; however, Mosaic Industries assumes no responsibility for inaccuracies or omissions. Mosaic Industries assumes no responsibility for the use of this information and all use of such information shall be entirely at the user's own risk.

---

## Mosaic Industries

5437 Central Ave Suite 1, Newark, CA 94560

Telephone: (510) 790-8222

Fax: (510) 790-0925