

LCD Connections & More

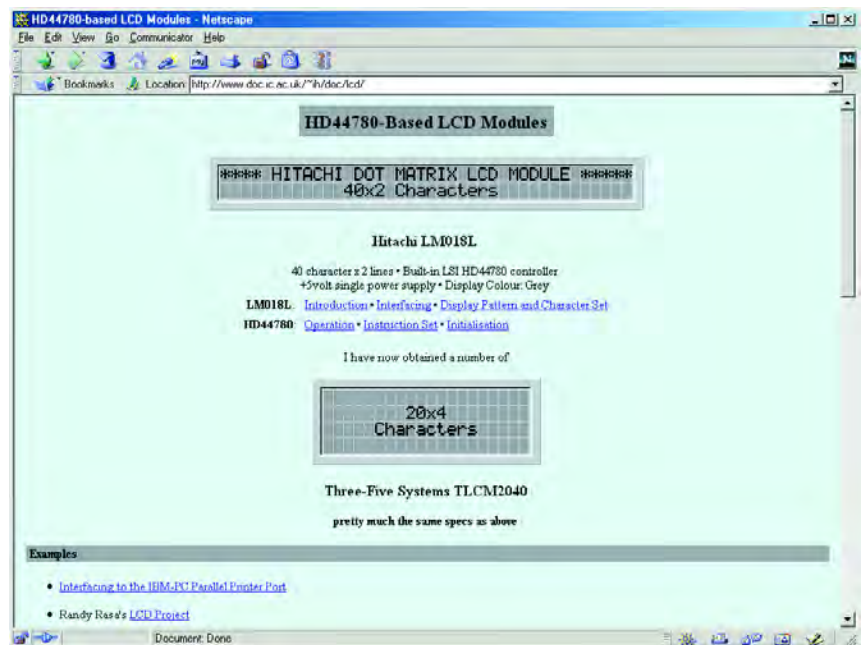
Technical details and applications

By Harry Baggen

Small alphanumeric LCD displays are applied in many electronic circuits, particularly when microcontroller-driven. These displays are easy to control and not expensive. However, you will always need to know their connection details and other salient features. Fortunately the Internet abounds with technical information on LCDs, as well as interesting application briefs.

When designing a microcontroller system, a terminal or any other intelligent circuit that needs to 'show' us something, an alphanumeric LCD is often the easiest way to obtain a readout device. A good choice, really, because LCDs are affordable, they offer a clear readout and are relatively easy to drive in software and hardware. Most commercially available LCDs of the smaller variety use the same controller IC, whether the display has 1, 2 or 4 lines of 8, 16, 20, 24, 32 or 40 characters. In all of these displays you will typically find the Hitachi HD44780 controller or a second source equivalent. The datasheet of this 'evergreen' chip is available in the form of a pdf (Acrobat Reader) document from the **Hitachi** website [1]. However, because of the widespread use of these displays in electronic equipment, there are many other sites on the web that deal with this chip and way it is applied.

A fine page with plenty of information is Ian Harris' **HD44780-Based LCD Modules** [2]. On it Ian provides comprehensive information on 2- and 4-line displays, including their interfacing, display patterns and character sets. You will also find many useful links leading to application examples and other sources of information. Another address for information on this controller, connection details of displays based on the HD44780, as well as on LCD backlighting is that hosted



by **Lampex** [3], a manufacturer of all kinds of LCDs.

If you need information on displays that do not fall in the 'standard' category, you should really visit the LCD page at **EIO** (Electronics Information Online) [4]. This site holds datasheets and specifications

of LCD products from most manufacturers in the field.

Driving a 44780-based LCD is not difficult once you've absorbed some of the relevant manuals that may be picked up from the Internet. At **Peer's LCD pages**, published by Peter Ouweland, an extensive treat-

tise may be found on driving 44780-based LCDs [5]. The material includes application examples for the popular 8051 and PIC microcontrollers.

Another interesting application is **Build your own "2-wire LCD Interface using the PIC16C84" microcontroller** produced by Myke Predko [6]. As indicated by the title, we're dealing with a kind of serial drive of an LCD by means of a PIC. Also worth mentioning is Myke's **LCD Interfacing Reference Page** [7].

If you want to hook up an LCD to a computer, consider the parallel (printer or LPT) port for that purpose. An example (including source code) of how it may be done is available from Craig Peacock's **Beyond Logic** website [8].

Those of you who can not boast to much experience in this area may want to start off at an extensive description containing lots of photographs of an LCD connected to a printer cable, on the **Build your own printer cable LCD display** [9] webpage provided by Overclockers Australia. This project allows all LCD settings to be carried out on the PC using a clearly laid out Windows program.

(025067-1)

Internet addresses

- [1] Hitachi:
<http://semiconductor.hitachi.com/hd44780.pdf>
- [2] HD44780-Based LCD Modules:
www.doc.ic.ac.uk/~ih/doc/lcd/
- [3] Lampex:
www.lampex.com/prod.htm
- [4] EIO LCD-pagina:
www.eio.com/datashet.htm
- [5] How to control a HD44780-based Character-LCD:
<http://home.iae.nl/users/pouweha/lcd/lcd.shtml>
- [6] Build your own "2-Wire LCD Interface" using the PIC16C84 microcontroller:
www.rentron.com/Myke1.htm
- [7] LCD Interfacing Reference Page:
www.myke.com/lcd.htm
- [8] Beyond Logic:
www.beyondlogic.org/parlcd/parlcd.htm
- [9] Build your own printer cable LCD Display:
http://www.overclockers.com.au/techstuff/a_diy_lcd/

