AZ DISPLAYS, INC.

TECHNICAL BRIEF
BY: AZD ENGINEERING

Character Generator ROMs

AZ Displays character modules (for example, 8x2 or 16x2) contain a character generator ROM with built-in fonts. In order to call out a letter of an alphabet or a digit on the screen, a user must simply address a coordinate code from the font table.

Software Program Code

One of the most powerful features of the controller used on Character modules is the ability to display custom characters. The standard controller used on most character modules is a derivative of the Hitachi HD44780. A total of 8 custom character fonts can be available to be displayed at any one time. As shown on the ASCI table for ROM code, addresses 0000 0000 through 0000 0111 are the addresses for the custom characters.

To build a custom character, a Set CGRAM instruction to one of these addresses needs to be sent. Address (0010 0000) would be the 1st available address. Next (7) Write Data commands with appropriate 1's and 0's (bits B0 –B4 only) will fill in the data for the custom character. The table below shows the relationship between the DDRAM, CGRAM, and character pattern. Always use al 0's for the 8th data line (cursor position).

The custom character can be generated by using the address described in paragraph one during writing to the display. If more custom characters are needed, a custom character can be over written to store a new character. The old character will be lost.

Character Code (DDRAM Data)									CGRAM Address						Character Patterns (CGRAM Data)							
b7	b6	b5	b4	b3	b3	b1	b0		b5	b4	b3	b2	b1	b0	b7	b6	b5	b4	b3	b2	b1	b0
0	0	0	0	-	0	0	0		0	0	0	0	0	0	-	-	-	1	1	1	1	1
					0	0	0					0	0	1				0	0	1	0	0
					0	0	0					0	1	0				0	0	1	0	0
					0	0	0					0	1	1				0	0	1	0	0
					0	0	0					1	0	0				0	0	1	0	0
					0	0	0					1	0	1				0	0	1	0	0
					0	0	0					1	1	0				0	0	1	0	0
					0	0	0					1	1	1				0	0	0	0	0
0	0	0	0	-	0	0	1		0	0	0	0	0	0	-	-	-	1	1	1	1	0
					0	0	1					0	0	1				1	0	0	0	1
					0	0	1					0	1	0				1	0	0	0	1
					0	0	1					0	1	1				1	1	1	1	0
					0	0	1					1	0	0				1	0	1	0	0
					0	0	1					1	0	1				1	0	0	1	0
					0	0	1					1	1	0				1	0	0	0	1
					0	0	1					1	1	1				0	0	0	0	0

New Releases

AZD character modules are available with various language fonts. The following standard LCDs have already been designed with special fonts (many more available upon request): ACM0802C-RN-GBS-EUR-D (8x2 with European font), ACM1602K-FL-GBS-02 (16x2 with European font), and ACM1602K-FL-YTS-HEB-G (16x2 with Hebrew font).