Other I/O

LCD display

Flash ROM

SPI EPROM

Keyboard (PS/2)

UART connectors

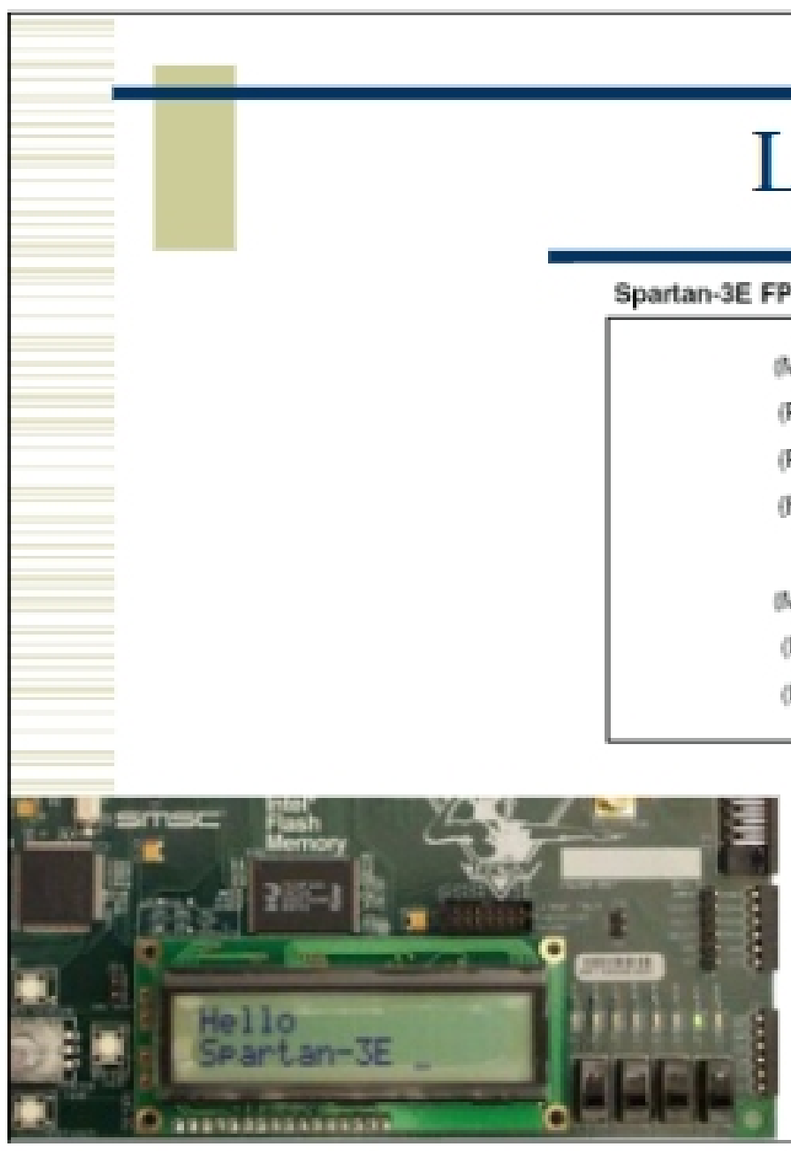
DAC

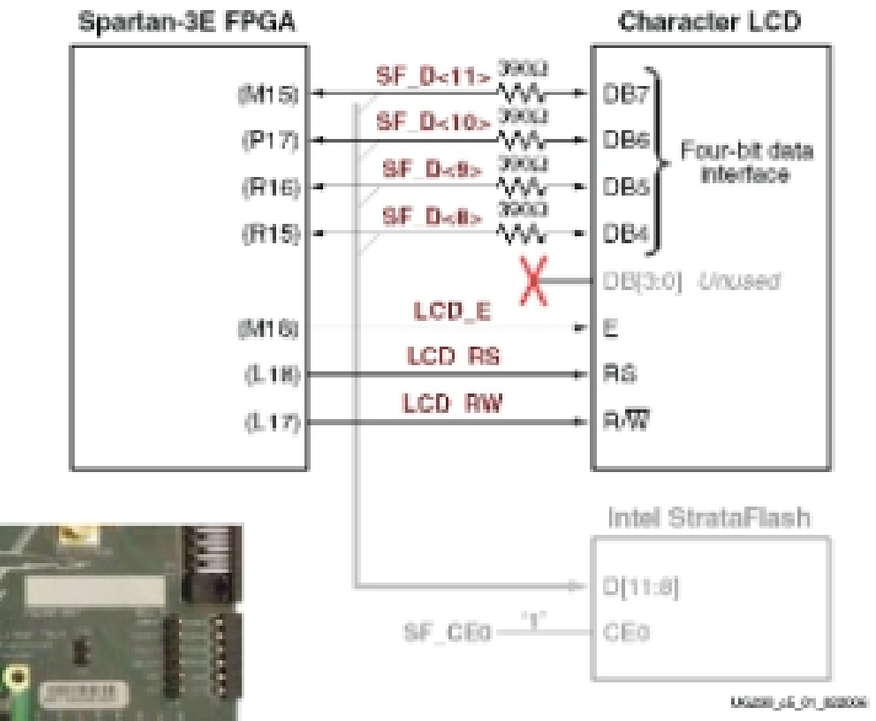
ADC

LCD Display

- 2-line, 16 character LCD display
  - 4-bit interface
  - Relatively easy to use once you have it mapped into your processor's memory-mapped I/O
  - Send characters to it, they show up on the screen
  - Not fast!
    - Scrolling at half-second intervals is about as fast as you can go and still have a clear display

LCD

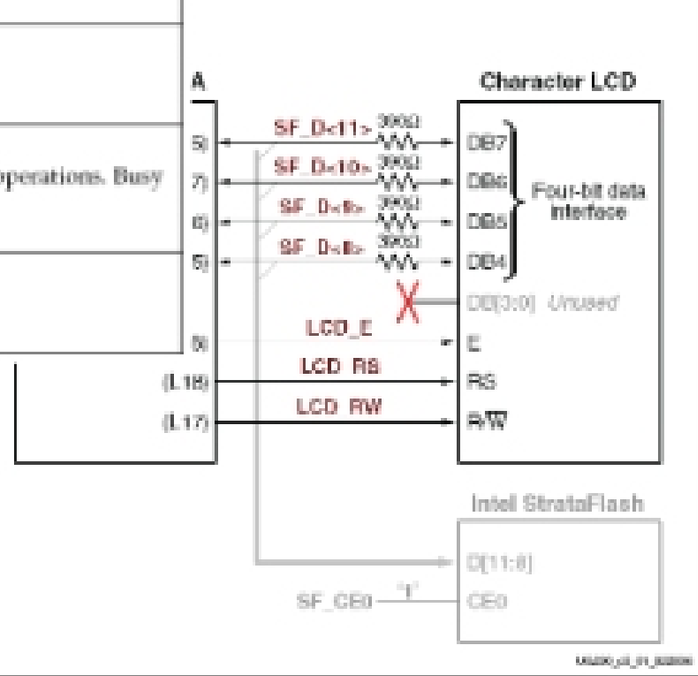




LCD Control

Table 5-1: **Character LCD Interface**

Signal Name	FPGA Pin	Function	
SF_D<11>	M15	Data bit DB7	Shared with StrataFlash pins SF_D<11:8>
SF_D<10>	P17	Data bit DB6	
SF_D<9>	R16	Data bit DB5	
SF_D<8>	R15	Data bit DB4	
LCD_E	M18	Read/Write Enable Pulse 0: Disabled 1: Read/Write operation enabled	
LCD_RS	L18	Register Select 0: Instruction register during write operations. Busy Flash during read operations 1: Data for read or write operations	
LCD_RW	L17	Read/Write Control 0: WRITE, LCD accepts data 1: READ, LCD presents data	



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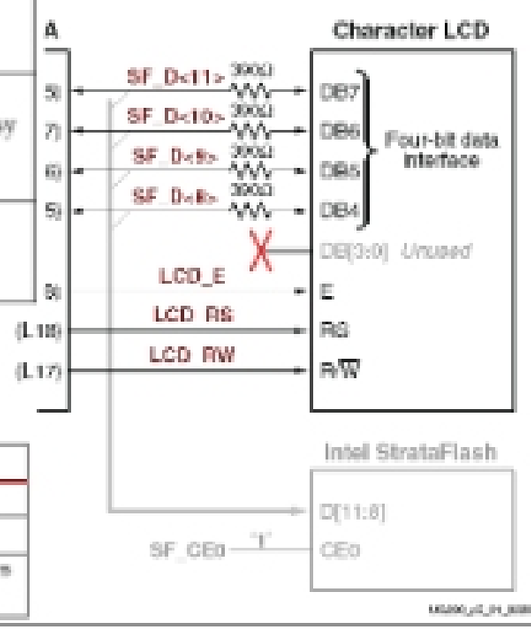

Table 5-2: **LCD/StrataFlash Control Interaction**

SF_CE0	SF_BYTE	LCD_RW	Operation
1	X	X	StrataFlash disabled. Full read/write access to LCD.
X	X	0	LCD write access only. Full access to StrataFlash.
X	0	X	StrataFlash in byte-wide (x8) mode. Upper address lines are not used. Full access to both LCD and StrataFlash.

LCD Data

- Three memory areas inside LCD
  - DD RAM – memory to hold the characters being displayed
    - Two rows of 16 characters to display
    - Also 24 extras per line that can be scrolled
  - CG ROM – Pre-defined character map
    - 192 pre-defined characters
  - CG RAM – RAM to hold 8 custom characters
    - 5x8 bit character/glyphs