DISPLAY AUDIO TOUCH

3 FUNCTIONS, 1 CHIP
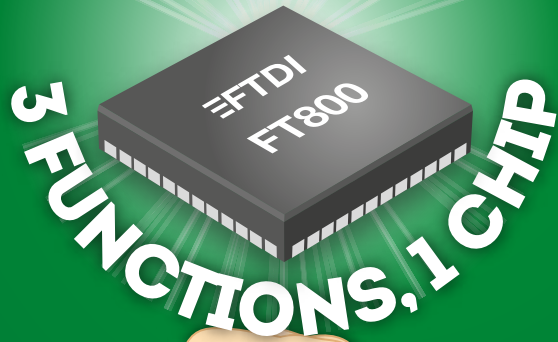
≡FTDI FT800

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EVE TECHNOLOGY

FTDI Chip's FT800 combines display, audio and touch into a single chip, providing an optimized solution that reduces board area, power, and BOM costs, while providing a high quality graphic solution that outputs to 1/16th pixel resolution for QVGA/ WQVGA TFT display panels. With its revolutionary EVE (Embedded Video Engine) technology, an object oriented methodology is deployed from display development through to graphic rendering. This unique approach eliminates the need for traditional frame buffer memory and requires minimal bandwidth from the system host.

Development Systems

Development systems are offered to meet prototyping needs and end-product design requirements. The credit card size, VM800C systems, are offered with or without displays. The VM800B systems provide an elegant, form-fitted encasement in colors of black or pearl. All boards include SPI headers for easy integration with the system host.

VM800C35A-N and VM800C43A-N

Video modules with the FT800 on a microcontroller adaptor board, oriented with a connector for 3.5" and 4.3" (or 5") displays, but with **no** display.

VM800C35A-D, VM800C43A-D, and VM800C50A-D

Video modules with the FT800 on a microcontroller adaptor board, connected to 3.5", 4.3", and 5.0" displays, respectively.

VM800B35A-BK, VM800B43A-BK, VM800B50A-BK

Low cost, finely finished video sub-system designed for industrial or commercial environments with precision, fitted bezel; offered in black or pearl (-PL).
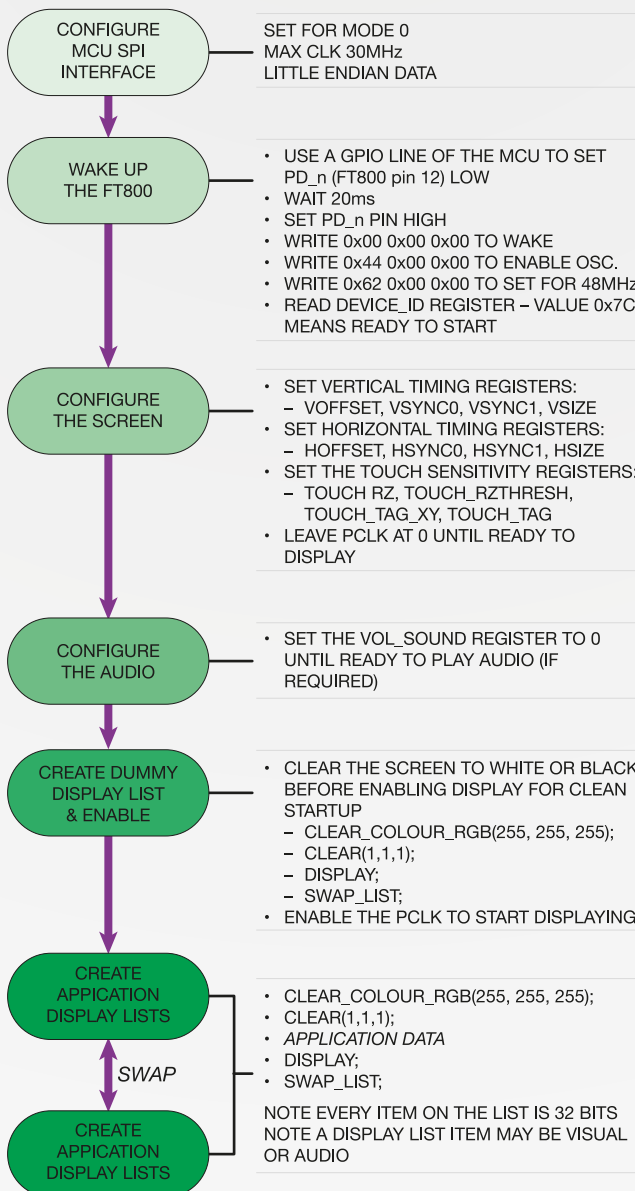
VM800B type development module

VM800C35A-D development module

Feature Set:

- Integrated with resistive touch screen LCD panel for –D, -BK, and –PL models.

- On board LCD backlight LED Driver.

- 3 stage audio filter, power amplifier and micro speaker (8 ohm)
  – Audio line out option.

- Multiple power supply options; 2.1mm power jack , SPI master connector or via USB Micro-B port.

- SPI slave functionality with 5 V tolerant buffers.

A complete set of documents educate the user on EVE's object-oriented programming language, with detailed datasheets for the FT800 chip and development systems. A sample application software environment and reference code examples allow the designer to experiment with FT800 capabilities as well as develop final display stimulus (i.e. Display Lists).

CONFIGURE MCU SPI INTERFACE	SET FOR MODE 0 MAX CLK 30MHz LITTLE ENDIAN DATA
WAKE UP THE FT800	• USE A GPIO LINE OF THE MCU TO SET PD_n (FT800 pin 12) LOW • WAIT 20ms • SET PD_n PIN HIGH • WRITE 0x00 0x00 0x00 TO WAKE • WRITE 0x44 0x00 0x00 TO ENABLE OSC. • WRITE 0x62 0x00 0x00 TO SET FOR 48MHz • READ DEVICE_ID REGISTER – VALUE 0x7C MEANS READY TO START

CONFIGURE THE SCREEN	• SET VERTICAL TIMING REGISTERS:
	  – VOFFSET, VSYNC0, VSYNC1, VSIZE
	• SET HORIZONTAL TIMING REGISTERS:
	  – HOFFSET, HSYNC0, HSYNC1, HSIZE
	• SET THE TOUCH SENSITIVITY REGISTERS:
	  – TOUCH RZ, TOUCH_RZTHRESH, TOUCH_TAG_XY, TOUCH_TAG
	• LEAVE PCLK AT 0 UNTIL READY TO DISPLAY

CONFIGURE THE AUDIO	• SET THE VOL_SOUND REGISTER TO 0 UNTIL READY TO PLAY AUDIO (IF REQUIRED)

CREATE DUMMY DISPLAY LIST & ENABLE	• CLEAR THE SCREEN TO WHITE OR BLACK BEFORE ENABLING DISPLAY FOR CLEAN STARTUP
	  – CLEAR_COLOUR_RGB(255, 255, 255);
	  – CLEAR(1,1,1);
	  – DISPLAY;
	  – SWAP_LIST;
	• ENABLE THE PCLK TO START DISPLAYING

CREATE APPICATION DISPLAY LISTS	• CLEAR_COLOUR_RGB(255, 255, 255); • CLEAR(1,1,1); • *APPLICATION DATA* • DISPLAY; • SWAP_LIST; NOTE EVERY ITEM ON THE LIST IS 32 BITS NOTE A DISPLAY LIST ITEM MAY BE VISUAL OR AUDIO
SWAP	
CREATE APPICATION DISPLAY LISTS	

As engineers come to understand EVE's programming language, the recommended starting point for design development is through the use of the Sample Application. These detailed software scripts provide easy-to-use code, where the designer can start to experiment with the EVE language and VM800 kit. By loading the Sample Application into a C compiler (e.g. Visual Studio), connecting/enabling a USB to SPI cable accessory (VA800A-SPI), and connecting it to the VM800 kit, the user can create a PC to target environment where they can readily interface to the FT800 and render graphics onto the display (ie. through the use of break-points and executes).

When the designer is comfortable with EVE's instruction set, the complete display description is created via text entry, through the use of the Sample Application and FTDI reference examples. This operation is most likely to be accomplished in the C compiler of the system host micro-controller.

Examples of hardware abstraction layers (HALs), as well as the set-up of the proper memory partitioning are provided in the Sample Application and DS_FT800 datasheet.

When the Sample Application is run, display lists are created that provide the stimulus for rendering graphics. The lists that are constructed, provide a sequence of hex codes for the host MCU to pass over the low bandwidth SPI interface to the VM800. From this point on the VM800 is merely an SPI peripheral to the host MCU. Any processing of instructions from the display list are handled by the FT800 itself producing the image viewed on the display.

EVE Design Tool Accessories

A variety of accessories are available, see below. Most notable is the VA800A-SPI which is a Hi-Speed USB to SPI cable that can be connected to the VM800 SPI header and USB port of a personal computer (PC). By loading the Sample Application onto the PC (e.g. Visual Studio), an easy to use, EVE design environment is established.

VA800A-SPI	USB to SPI smart cable for display stimulus/evaluation
VA-PSU-UK1	UK to USB, 5V/1A power supply
VA-PSU-US1	US to USB, 5V/1A power supply
VA-PSU-EU1	EU to USB, 5V/1A power supply
VA-FC-1M-BKW	Flat USB A to Micro B cable, 1M, black and white
VA-FC-1M-BLW	Flat USB A to Micro B cable, 1M, blue and white
VA-FC-STYLUS1	Resistive Touch Screen Stylus Pen

Note that power supplies / cables are not provided with the VM800 kits. Power options are listed above and must be ordered as a separate line item.

The VM800 development systems are the first display systems being offered by FTDI Chip. Watch for more development aids to come including complete independent display sub-systems.

FTDI Chip offers world-wide customer support resources, should there be technical or support issues that arise.