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# Embedded Development Board Product Datasheet

## EMB043TFTDEV

4.3" TFT Development Board for Microchip  
Development Tools

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## 1. Product Description

The Displaytech EMB043TFTDEV is a development board for the Displaytech DT043BTFT TFT display module. The EMB043TFTDEV interfaces with any Microchip Display Connector V1 capable development board, such as the, PIC24FJ256DA210 Development Board, and the Graphics PICtail Plus Boards.

## 2. External Interfaces

The EMB043TFTDEV supports driving the DT043BTFT's COG Himax HX8257-A TFT driver via the 24-bit parallel mode with 8 data lines per Red, Green, and Blue. The 24-bit serial mode of the HX8257-A driver is not supported. The parallel RGB data interface can be implemented with reduced bit counts. The operation mode is configured via SPI 3-Wire serial interface. The SPI command structure is given in the HX8257-A datasheet. Please see the [DT043BTFT datasheet](#) and the [HX8257-A datasheet](#) for more information.

### 2.1. Display Connector V1 (16-bit RGB) Interface

When connected to the Display Connector V1 connection (RGB interface), the HX8257-A configuration registers are manipulated via the Microchip SPI interface. Microchip SPI interfaces, depending on the particular microcontroller, are 8-bit, 16-bit, or 32-bit interfaces. However, the HX8257-A SPI interface is 24-bits, with a 6-bit device ID, 2-bit R/W, and a 16-bit instruction/data word.

Because of this requirement, the Microchip MCU must be programmed to bit-bang this SPI connection as most Microchip SPI peripherals do not support the HX8257-A interface.

The HX8257-A accepts a 24-bit RGB interface, but all Microchip graphics development tools output a 16-bit RGB signal. This 16-bit RGB interface is connected to the HX8257-A by tying the two LSB of R, G, and B data to ground and tying the next LSB and the MSB of the R and B. This creates a standard 16-bit 565 RGB interface from the original 24-bit interface leading to maximum brightness of each channel. Please see the [PIC24FJ256DA210 Development Board Datasheet](#) for more information.

### 2.2. PICtail Plus (16-bit Parallel) Interface

The EMB043TFTDEV does not support the PICtail Plus Interface.

## 3. Backlight Power

An on-board CAT4139 LED driver powers the backlight of the DT043BTFT and can be controlled via a PWM signal (CN1-B11). See the [DT043BTFT Datasheet](#) and the [schematic](#) for more information. The backlight of the HX8257-A is, therefore, not implemented.

## 4. Example Software

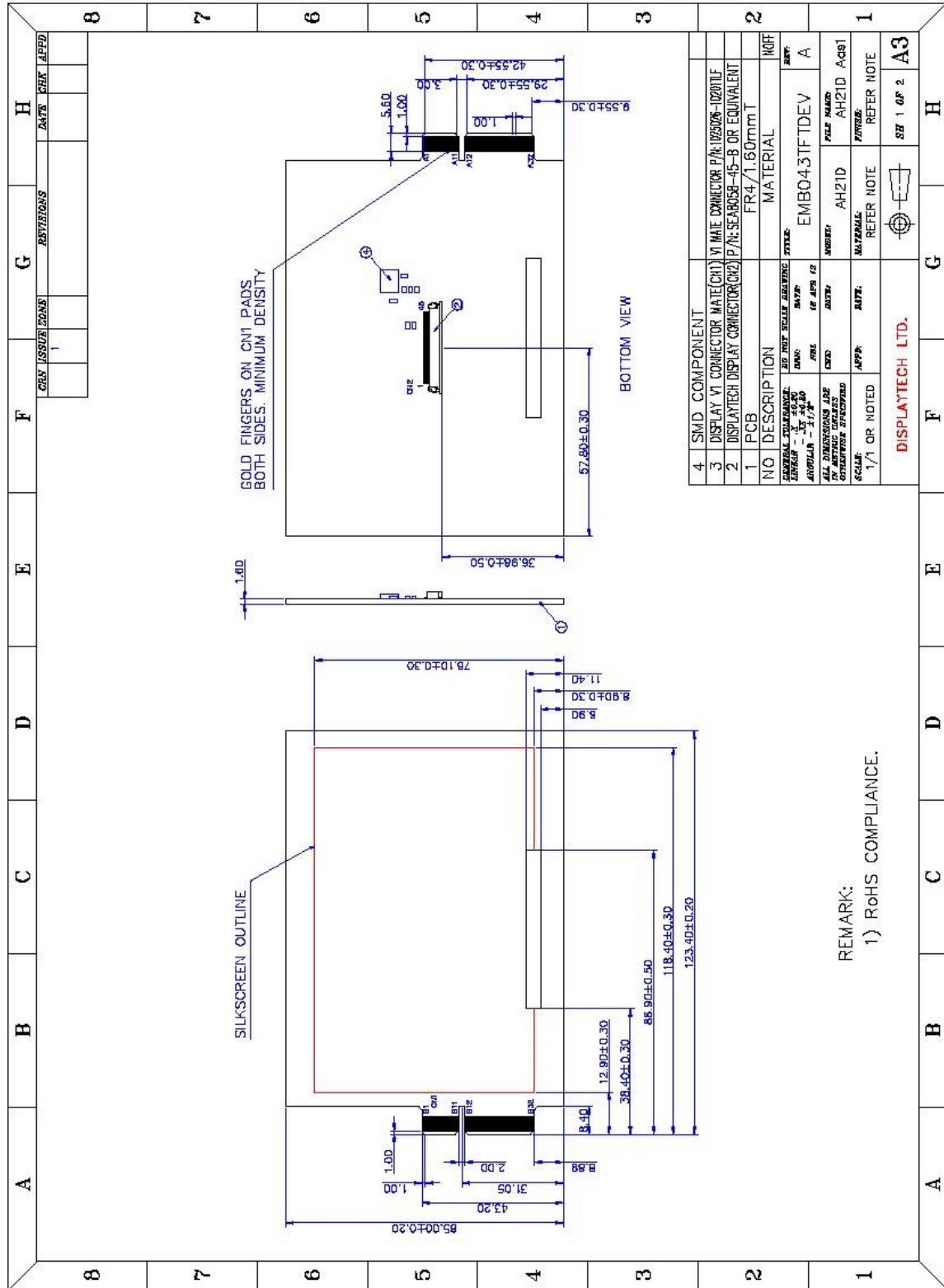
Example software is available from Displaytech upon request. Please contact Displaytech at [sales@displaytech-us.com](mailto:sales@displaytech-us.com).

### 5. Pin Connection Table

DT035TFT-TS		Display Connector V1		DT035TFT-TS		Display Connector V1	
Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	A2	GND	24	B3	A23	B3
2	GND	A2	GND	25	B4	B22	B4
3	VDD	A3	VDD	26	B5	A19	B5
4	RESET	A27	RESET	27	B6	B18	B6
5	R0-1-2-7	A15	R0-1-2-7	28	B0-1-2-7	A18	B0-1-2-7
6	R0-1-2-7	A15	R0-1-2-7	29	PCLK	A13	PCLK
7	R0-1-2-7	A15	R0-1-2-7	30	DISP	A4	DISP
8	R3	A20	R3	31	HSYNC	B14	HSYNC
9	R4	B19	R4	32	VSYNC	A14	VSYNC
10	R5	A16	R5	33	DE	B13	DE
11	R6	B15	R6	34	VDD	A3	VDD
12	R0-1-2-7	A15	R0-1-2-7	35	VDD	A3	VDD
13	G0-1-7	B16	G0-1-7	36	CS	B27	CS
14	G0-1-7	B16	G0-1-7	37	SCL	A28	SCL
15	G2	A22	G2	38	SDI	B28	SDI
16	G3	B21	G3	39	SDO	A29	SDO
17	G4	A21	G4	40	XR	A7	XR
18	G5	B17	G5	41	YD	B7	YD
19	G6	A17	G6	42	XL	A6	XL
20	G0-1-7	B16	G0-1-7	43	YU	B6	YU
21	B0-1-2-7	A18	B0-1-2-7	44	BKLTk	From B11 BKLT_PWM through BKLT driver	
22	B0-1-2-7	A18	B0-1-2-7	45	BKLTa		
23	B0-1-2-7	A18	B0-1-2-7	--	--	--	--
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**Display Connector V1 No Connects (NC):**  
A32 B32 A31 B31 A30 B30 B29 A26 B26 A25 B25 A24 B24 B23 B20 A12 B12 A11 A10 B10 A9 B9  
A8 B8 A5 B5 B4 B3 B2 A1 B1

### 6. Mechanical Drawing







## 8. Bill of Materials

Manufacturer	Part Number	Package	Qty	Value	Designator	Description
TDK	C1608X7R1V105M	0603	1	1uF	C2	Capacitor
Displaytech	SEA8058-45	-	1	-	CN2	Displaytech FFC/FPC ZIF 45 Position
ON Semiconductor	MBR130LSFT1G	SOD-123FL	1	-	D1	Diode
Sumida	CDRH6D28NP-220NC	-	1	22uH 1.2A	L1	Inductor
Vishay	CRCW06031K00FKEA	0603	1	1K	R3	Resistor
Vishay	CRCW06037R50JNEA	0603	1	7.5	R4	Resistor
Vishay	CRCW0603100KFKEAHP	0603	2	100K	R1, R2	Resistor
ON Semiconductor	CAT4139TD-GT3	TSOT-23-5	1	-	U1	Switch-Mode LED Driver

## 9. Component Datasheets

Displaytech DT043BTFT	<a href="#">Link</a>
Himax HX8257-A01 TFT Driver	<a href="#">Link</a>
ON Semiconductor CAT4104 LED Driver	<a href="#">Link</a>
Microchip Explorer 16 Development Board	<a href="#">Link</a>
Microchip Starter Kit I/O Expansion Board	<a href="#">Link</a>
Microchip PIC24FJ256DA210 Development Board	<a href="#">Link</a>
On Semiconductor CAT4104	<a href="#">Link</a>