CFA921-TS User Guide

CFAF800480A-050T-TS TFT display shown with CFA10058 mother board. Included CFA10036 not shown.

CFA921-TS is an assembled product that contains:

- CFA10036 SOM (System On Module)
- CFA10058 Mother Board
- CFAF800480A-050T-TS TFT Display

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CFA921-TS User Guide Revision History

Release Date: 2014-08-20

- Added boxed note *About Volatility* on this page.
- Description was expanded and photos were added in the INTRODUCTION (Pg. 5).
- Expanded Optional Accessories (Pg. 6).
- Added a link to the CFA10036's Freescale i.MX28x processor data sheet. See ELECTRICAL CHARACTERISTICS (Pg. 8).
- In PHYSICAL CHARACTERISTICS (Pg. 7), added product dimensions and weight.
- Added table with descriptions of the 30 pins for J_EXP. See 30-Pin Expansion Connector J_EXP (Pg. 11).
- Wherever listed, removed hardware version number.
- Update datasheet to the current template standards.

Release Date: 2013-04-26
First *CFA921-TS User Guide* for new product.

Hardware and Firmware Revisions

For information about hardware and firmware revisions, see Part Change Notifications (PCNs) under the "Product Notices" tab on the CFA921-TS web page.

To ensure that the appropriate people in your organization receive notices, please ask them to subscribe at www.crystalfontz.com/news/pcn.php.

About Volatility

The CFA921-TS has nonvolatile memory.

About Variations

We work continuously to improve our products. Because display technologies are quickly evolving, these products may have component or process changes. Slight variations (for example, contrast, color, or intensity) between lots are normal. If you need the highest consistency, whenever possible, order and arrange delivery for your production runs at one time so your displays will be from the same lot.

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CONTENTS

INTRODUCTION

CFA921-TS is a pre-assembled product that includes our CFA10036 SOM (System On Module) with a Freescale i.MX283 or i.MX287 processor, a motherboard, and a 5-inch 800x480 full color TFT touchscreen display. When you place an order on our website, you can customize your order to include accessories.

CFA921-TS HAS THREE PARTS

The three basic parts of the CFA921-TS are:

1. CFA10058 Mother Board

The CFA921-TS is shipped with our CFAF800480A-050T-TS TFT display mounted on top of the CFA10058 mother board and the CFA10036 SOM (System On Module) mounted on the back of the mother board. The mother board is only a few millimeters larger than the display. As shown in the photo, the CFA10036 is smaller than the motherboard.

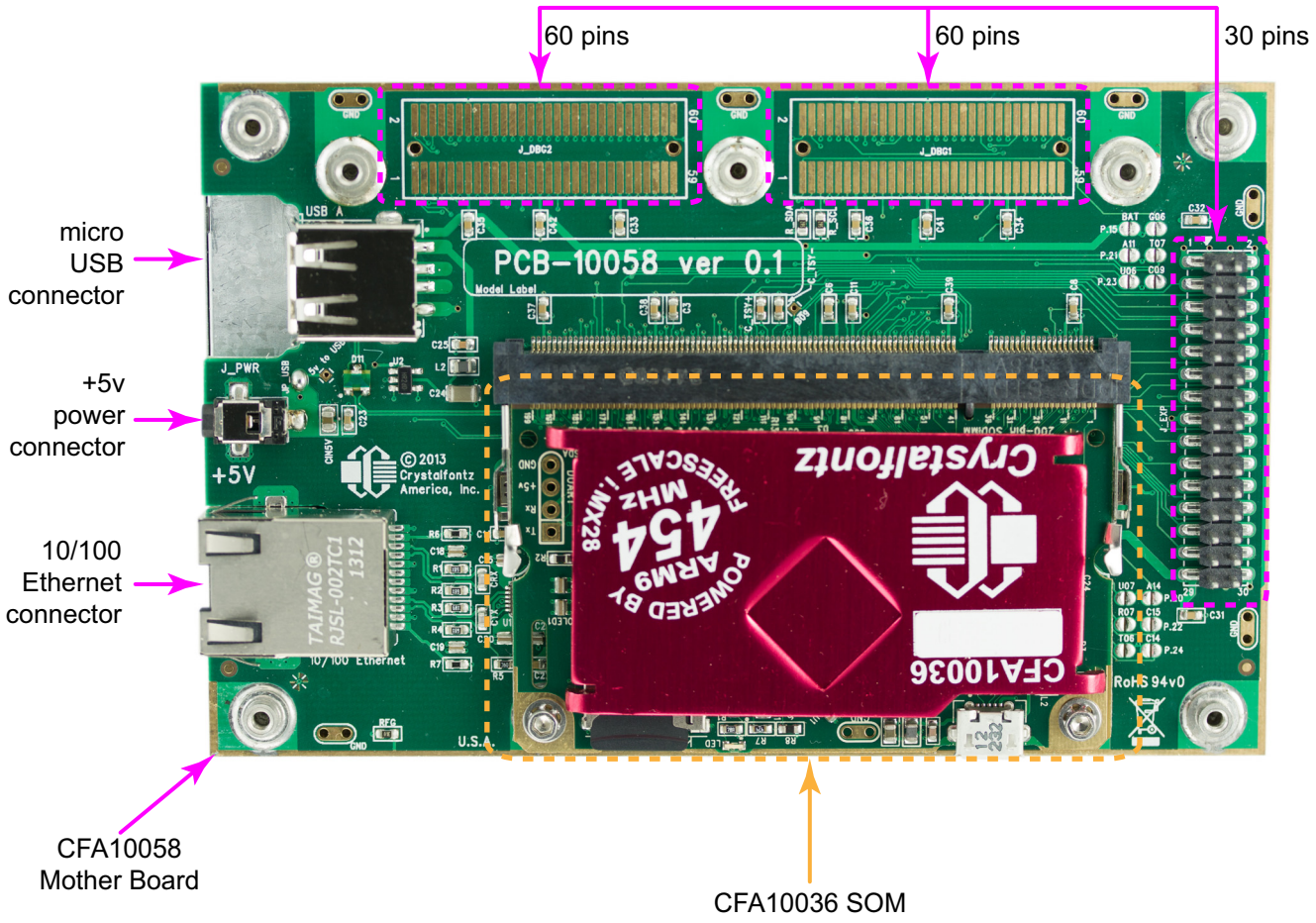


Figure 1. CFA10058 Mother Board Details (Shown With CFA10036 SOM Mounted On Back)

Pin descriptions for the CFA10058 are included in this *User Guide*. See PIN TABLES (Pg. 9).

2. CFA10036 SOM (System On Module)

The CFA10036 is a small, highly functional ARM9-based Linux SOM (System On Module) shipped with a full Linux operating system. Because a full Linux mainline kernel is already ported to the CFA10036, you can devote your

resources to applications in the languages of your choice. It is low cost, easy to use, and has lots of GPIO. You can choose the i.MX283 or i.MX287. Please refer to the Freescale i.MX28 Data Sheet for more information on the processors. For more information on the CFA10036, see the files listed under the Datasheets & Files tab on the CFA10036 web page.

Blind threaded SMT standoffs hold the CFA10036 SOM securely to the back of the CFA10058 mother board.

3. CFAF800480A-050T-TS TFT Display

The CFAF800480A-050T-TS is a 800 x 480 full color TFT touch screen display. The active area is 5.0 inches diagonal. Supply voltage is 3.3v. For more information, see the *CFAF800480A-050T-TS Data Sheet* listed under the Datasheets & Files tab on the CFAF800480A-050T-TS web page.

The TFT is connected to the CFA10058 by its FPC (Flexible Printed Circuit).

OPTIONAL ACCESSORIES

When you place an order on our website for a CFA921-TS, you will be offered choices to add additional parts to your order. These parts include:

CFAL12832D-B OLED Display Module

The optional CFAL12832D-B can be mounted onto the CFA10036 with its ZIF connector. This 128x32 OLED graphics module displays light (near-white) characters on a dark (near-black) background. Less than 0.5-inch high (11.5 mm), the OLED is useful for status messages and debugging.

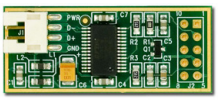
CFA10040PWR Power Supply

The CFA10040PWR is a110 VAC +5v wall power supply that can be used to power the CFA10058 mother board. Cord length is ~63 inches.

WR-USB-Y27 Cable

The WR-USB-Y27 is about 6 feet, 3.75 inches long. It has two different types of USB connectors, one smaller than the other. Connect the cable's smaller micro B USB female connector to theCFA10036's micro B male USB connector. Connect the cable's larger USB-A female connector to your PC's USB-A connector. This cable can be ordered separately.

WR-DBG-Y42 Debug Kit


The WR-DBG-Y42 kit has a USB633 TTL-To-USB converter. This small PCB can mount on the CFA10036's DUART for debugging and early board bring up. It is a dedicated Rx/Tx debug UART port with 0.1" centers. Connect the USB633 to the dedicated CFA10036's DUART (located to the right of the red heat dissipater). Pins 2 through 5 on the USB633 need to be connected to pins 1 through 4 on the CFA10036 SOM.

The included WR-USB-Y03 is about 6-feet long. This cable has two different types of USB connectors, one smaller than the other. Connect the cable's smaller 2 mm female USB connector to the CFA10058's USB connector. Connect the cable's larger USB-A female connector to your host's USB-A connector.

CFA-WIFI-01 WiFi Adapter

For additional network connectivity options, add the CFA-WIFI-01 USB 802.1b/g/n WiFi dongle/adapter.

PHYSICAL CHARACTERISTICS

Specifications	
Overall Dimensions	121.50 (W) x 77.50 (H) x 18.5 (D) millimeters (includes connector on back)
Weight	Approximately 189 grams
Operating Temperature	-20°C to -70°C
Humidity (RH noncondensing)	90%

For specifications of the TFT display module, see the Datasheets & Files tab on the CFAF800480A-050T-TS web page.

ELECTRICAL CHARACTERISTICS

For electrical characteristics on the CFA10036's processor (your choice of i.MX283 or a i.MX287), please see the Freescale i.MX28 Data Sheet.

ABOUT ESD

The circuitry is industry standard CMOS logic and is susceptible to ESD damage. Please use industry standard antistatic precautions as you would for any other static sensitive devices such as expansion cards, motherboards, or integrated circuits. Ground your body, work surfaces, and equipment.

PIN TABLES

120-PIN EXPANSION DEBUG CONNECTOR

The SAMTEC FSI-130-10-L-D-AD connector can be used to connect to the CFA10058's J_DBG1 and J_DBG2 expansion ports.

DBG1

DBG1 Connector	Pin	Signal
1	G06	P3.21
2	G07	P3.20
3	K08	P3.18
4	L07	P3.17
5	K07	P3.16
6	B14	HSADC0
7	C14	LRADC6
8	D15	LRADC5
9	D13	LARDC4
10	D09	LRADC3
11	C08	LARDC2
12	C09	LRAC1
13	VDD_+3.3V	
14	GND	
15	C15	LARDC0
16	(A11)	PSWITCH_RAW
17	(A14)	RESET_RAW
18	E14	P4.20
19	B09	DEBUG
20	D14	JTAG_TRST
21	E13	JTAG_TDO
22	E12	JTAG_TDI
23	E11	JTAG_TCK
24	D12	JTAG_TMS
25	U06	P0.06
26	R07	P0.05
27	T07	P0.04
28	U07	P0.03
29	DCDC_BATTERY	
30	GND	

DBG1 Connector	Pin	Signal
31	R08	P0.02
32	T08	P0.01
33	U08	P0.00
34	L08	P0.23
35	M08	P0.22
36	N08	P.021
37	N06	P0.20
38	M09	P0.19
39	M07	P0.18
40	N09	P0.17
41	N07	P0.16
42	K06	P3.15
43	L06	P3.14
44	L05	P3.13
45	M05	P3.12
46	H07	P3.11
47	VDD_+3.3V	
48	GND	
49	H06	P3.10
50	F05	P3.09
51	F06	P3.08
52	L09	P0.28
53	P07	P0.27
54	P06	P0.26
55	P08	P0.25
56	R06	P0.24
57	N05	P1.31
58	N01	P1.30
59	M01	P1.29
60	L01	P1.28

DBG2

DBG2 Connector	Pin	Signal
1	E02	P4.16
2	F02	P4.08
3	F01	P4.07
4	F04	P4.06
5	H02	P4.04
6	H01	P4.03
7	E04	P4.02
8	H04	P4.01
9	G04	P4.00
10	J03	P4.15
11	J04	P4.14
12	F03	P4.13
13	VDD_+5V	
14	GND	
15	G02	P4.12
16	G01	P4.11
17	J02	P4.10
18	J01	P4.09
19	E03	P4.05
20	J05	P3.07
21	K05	P3.06
22	K04	P3.05
23	L04	P3.04
24	J07	P3.03
25	J06	P3.02
26	H05	P3.01
27	G05	P3.00
28	D02	P2.27
29	DCDC_BATTERY	
30	GND	

DBG2 Connector	Pin	Signal
31	B02	P2.026
32	C02	P2.25
33	A02	P2.24
34	C04	P2.19
35	B03	P2.18
36	C03	P2.17
37	A03	P2.16
38	E01	P2.15
39	D01	P2.14
40	C01	P2.13
41	B01	P2.12
42	A06	P2.10
43	D10	P2.09
44	A04	P2.08
45	B04	P2.07
46	D05	P2.06
47	VDD_+3.3V	
48	GND	
49	C05	P2.05
50	A05	P2.03
51	D06	P2.02
52	C06	P2.01
53	B06	P2.00
54	M06	P3.30
55	D07	P3.27
56	E08	P3.26
57	D08	P3.25
58	C07	P3.24
59	E07	P3.23
60	F07	P3.22

30-PIN EXPANSION CONNECTOR J_EXP

Definitions for the devices by default in the i.MX28 processor are here:
`output/build/linux-dd2373e5/arch/arm/boot/dts/imx28.dtsi`.

Definitions for the devices included in the default build for the CFA921-TS (may need to refer to **`imx28.dtsi`**) are here:
`output/build/linux-dd2373e5/arch/arm/boot/dts/imx28-cfa10058.dts`

Documentation for the 4-digit hexadecimal pin muxes found in the above files are here, referenced from the root of the Linux kernel source tree:
`/Documentation/devicetree/bindings/pinctrl/fsl,mxs-pinctrl.txt`

DBG1 Connector	Pin	Signal	MUX0	MUX1	MUX2	Jumper
1	3.3V					
3	A3	P2.16	SSP2_SCK	AUART2_RX	SAIF0_SDATA1	
5	B3	P2.18	SSP2_D0	AUART3_RX	SAIF1_SDATA1	
7	K7	P3.16	PWM_0	I2C1_SCL	DUART_RX	
9	K8	P3.18	PWM_2	USB0_ID	USB1_OC	
11	E7	P3.23	SAIF0_SDATAO	PWM_6	AUART4_TX	
13	P8	P0.25	GPMI_WRN	SSP1_SCK		
15	G6	P3.21	SAIF0_LRCLK	PWM_4	AUART4_RTS	A15:BATT
17	U8	P0.00	GPMI_D0	SSP1_D0		
19	R8	P0.02	GPMI_D2	SSP1_D2		
21	T7	P0.04	GPMI_D4	SSP1_D4		A11:PSWITCH
23	U6	P0.06	GPMI_D6	SSP1_D6		C9LRADC1
25	C7	P3.24	I2C0_SCL	TIMROTA	DUART_RX	
27	N6	P0.20	GPMI_READY0	SSP1_CD	USB0_ID	
29	5.0V					
2	GND					
4	C3	P2.17	SSP2_CMD	AUART2_TX	SAIF0_SDATA2	
6	C4	P2.19	SSP2_D3	AUART3_TX	SAIF1_SDATA2	
8	L7	P3.17	PWM_I	I2C1_SDA	DUART_TX	
10	F7	P3.22	SAIF0_BITCLK	PWM_5	AUART4_RX	
12	E8	P3.26	SAIF1_SDATA0	PWM_7	SAIF0_SDATA1	
14	N8	P0.21	GPMI_READY1	SSP1_CMD		
16	GND					
18	T8	P0.01	GPMI_D1	SSP1_D1		
20	U7	P0.03	GPMI_D3	SSP1_D3		A14:RESET
22	R7	P0.05	GPMI_D5	SSP1_D5		C15:LRADC0
24	T6	P0.07	GPMI_D7	SSP1_D7		C14:LRADC6
26	D8	P3.25	I2C0_SDA	TIMROTB	DUART_TX	
28	G7	P3.20	SAIF0_MCLK	PWM_3	AUART4_CTS	
30	GND					

CARE AND HANDLING PRECAUTIONS

For optimum operation of the CFA921-TS and to prolong its life, please follow the precautions described below

> Note
> The care and handling precautions listed below apply to the *CFA10058* mother board and the *CFA10036* SOM in this assembled product.
>
> For the *CFAF800480A-050T-TS* TFT, see the care and handling in the Data Sheet under the Datasheets&Files tab on the display module's web page.

ESD (ELECTRO-STATIC DISCHARGE) SPECIFICATIONS

The circuitry is industry standard CMOS logic and is susceptible to ESD damage. Please use industry standard antistatic precautions as you would for any other static sensitive devices such as expansion cards, motherboards, or integrated circuits. Ground your body, work surfaces, and equipment.

DESIGN AND MOUNTING

- Do not disassemble or modify.
- Solder only to the I/O terminals.
- Do not reverse polarity to the power supply connections. Reversing polarity will immediately ruin the product.

AVOID SHOCK, IMPACT, TORQUE, OR TENSION

- Do not expose to strong mechanical shock, impact, torque, or tension.
- Do not drop, toss, bend, or twist.
- Do not place weight or pressure on the product.

OPERATION

- Your circuit should be designed to protect the product from ESD and power supply transients.
- Observe the operating temperature limitations: a minimum of 0°C to a maximum of 50°C noncondensing with minimal fluctuation. Operation outside of these limits may shorten life and/or harm display. Changes in temperature can result in changes in contrast.
  - At lower temperatures.
  - At higher temperature.
- Operate away from dust, moisture, and direct sunlight.

STORAGE AND RECYCLING

- Store in an ESD-approved container away from dust, moisture, and direct sunlight with humidity less than 90% noncondensing.
- Observe the storage temperature limitations: a minimum of -20°C minimum to +80°C noncondensing maximum with minimal fluctuations. Rapid temperature changes can cause moisture to form, resulting in permanent damage.

- Do not allow weight to be placed on the products while they are in storage.
- To discard, please recycle your products at an approved facility.

QUALITY ASSURANCE STANDARDS

Note

The quality standards listed below apply to the *CFA10058* mother board and the *CFA10036* SOM in this assembled product.

For the *CFAF800480A-050T-TS* TFT, see the quality assurance standards in the Data Sheet under the Datasheets&Files tab on the display module's web page.

INSPECTION CONDITIONS

- Environment
  - Temperature: 25±5°C
  - Humidity: 30~85% RH

ACCEPTANCE SAMPLING

Defect Type	AQl
Major	≤.65%
Minor	<1.0%
*Acceptable Quality Level: maximum allowable error rate or variation from standard	

DEFECTS CLASSIFICATION

Defects are defined as:

- A *major defect* is a defect that substantially reduces usability of unit for its intended purpose.
- A *minor defect*: is a defect that is unlikely to reduce usability for its intended purpose.

ACCEPTANCE STANDARDS

#	DEFECT TYPE	ACCEPTANCE STANDARDS CRITERIA	MAJOR / MINOR
1	PCB defects	1. Oxidation or contamination on connectors.* 2. Wrong parts, missing parts, or parts not in specification.* 3. Jumpers set incorrectly. 4. Solder (if any) on bezel, LED pad, zebra pad, or screw hole pad is not smooth. **Minor if display functions correctly. Major if the display fails.*	Minor
2	Soldering defects	1. Unmelted solder paste. 2. Cold solder joints, missing solder connections, or oxidation.* 3. Solder bridges causing short circuits.* 4. Residue or solder balls. 5. Solder flux is black or brown. **Minor if display functions correctly. Major if the display fails.*	Minor