



Crystalfontz America, Incorporated

CFA921-TS User Guide



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

CFA921-TS is an assembled product that contains:

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

**CFA921-TS User Guide Release 2013-04-26
for
CFA921-TS Hardware Version: v1.0**

Crystalfontz America, Incorporated

12412 East Saltese Avenue
Spokane Valley, WA 99216-0357

Phone: 888-206-9720

Fax: 509-892-1203

Email: techinfo@crystalfontz.com

URL: www.crystalfontz.com



CFA921-TS Hardware Revision Information

For information about hardware revisions, see the Part Change Notifications (PCNs) under the “Notices” tab on the [CFA921-TS](#) web page.

CFA921-TS User Guide Revision History

Release Date: 2013-04-26
New User Guide.

The Fine Print

Certain applications using CrystalFontz America, Inc. products may involve potential risks of death, personal injury, or severe property or environmental damage (“Critical Applications”). CRYSTALFONTZ AMERICA, INC. PRODUCTS ARE NOT DESIGNED, INTENDED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT APPLICATIONS, DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS. Inclusion of CrystalFontz America, Inc. products in such applications is understood to be fully at the risk of the customer. In order to minimize risks associated with customer applications, adequate design and operating safeguards should be provided by the customer to minimize inherent or procedural hazard. Please contact us if you have any questions concerning potential risk applications.

CrystalFontz America, Inc. assumes no liability for applications assistance, customer product design, software performance, or infringements of patents or services described herein. Nor does CrystalFontz America, Inc. warrant or represent that any license, either express or implied, is granted under any patent right, copyright, or other intellectual property right of CrystalFontz America, Inc. covering or relating to any combination, machine, or process in which our products or services might be or are used.

All specifications in Data Sheets and on our website are, to the best of our knowledge, accurate but not guaranteed. Corrections to specifications are made as any inaccuracies are discovered.

Company and product names mentioned in this publication are trademarks or registered trademarks of their respective owners.

Copyright © 2013 by CrystalFontz America, Inc., 12412 East Saltese Avenue, Spokane Valley, WA 99216-0357 U.S.A.



**Special Terms Applicable for the CFA921-TS
Designated as NOT FCC Approved / FCC NOTICE**

The CFA921-TS has NOT been authorized under the rules of the Federal Communications Commission and may not be offered for further sale or lease, or sold or leased, until authorization is obtained. FCC experimental licensing requirements may apply to Buyer's use.

The CFA921-TS is made available solely to allow product developers to evaluate CrystalFontz technology and/or software associated with the CFA921-TS to determine whether to incorporate such items in a finished product. This is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the conditions that this CFA921-TS not cause harmful interference to licensed radio stations and that this CFA921-TS accept harmful interference. Unless the assembled kit is designed to operate under Part 15 or Part 95 of the FCC Rules, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under Part 5 of the FCC Rules.

This CFA921-TS is not an end product or finished appliance and is not intended or authorized to be integrated into end products as is. Buyer may use the CFA921-TS to create prototypes for its own internal experimental use, and may add components, features, software and/or functionality, in the process of designing its own final products. Buyer shall only assign technically qualified electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, subsystems and systems to use the CFA921-TS, and that such use takes place solely in laboratory/development environments (and not in residential environments). The Non-FCC approved CFA921-TS is FOR ENGINEERING DEVELOPMENT, DEMONSTRATION, AND/OR EVALUATION PURPOSES ONLY.



CONTENTS

INTRODUCTION	5
ACCESSORIES	6
PHYSICAL CHARACTERISTICS	7
ABOUT ESD	7
PIN TABLES	8
120-PIN EXTENSION DEBUG CONNECTOR	8
CARE AND HANDLING PRECAUTIONS	9
APPENDIX A: QUALITY ASSURANCE STANDARDS	11

Preliminary



INTRODUCTION

CFA921-TS is an assembled product that contains these three parts, described below. Software support is already built into the Linux mainline kernel.

❑ **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. The CFA10036 is smaller than the motherboard.

Pin descriptions for the CFA10058 are included in this user guide.

❑ **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. The CFA10036 in this assembled CFA921-TS has an i.MX283 processor. Please refer to the [Freescale i.MX28 Data Sheet](#) for more information on the processor. For more information on the CFA10036, see the *CFA10036 Getting Started Guide* listed under the [Doc/Files](#) tab on the CFA921-TS web page.

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

❑ **CFAF800480A-050T-TS TFT Display**

The CFAF800480A-050T-TS is an 800 x 480 full color touch screen display. The active area is 5-inches diagonal. Supply voltage is 3.3v. For more information, see the *CFAF800480A-050T-TS Data Sheet* listed under the [Doc/Files](#) tab on the CFAF800480A-050T-TS web page.

The TFT is connected to the CFA10058 by its FPC.

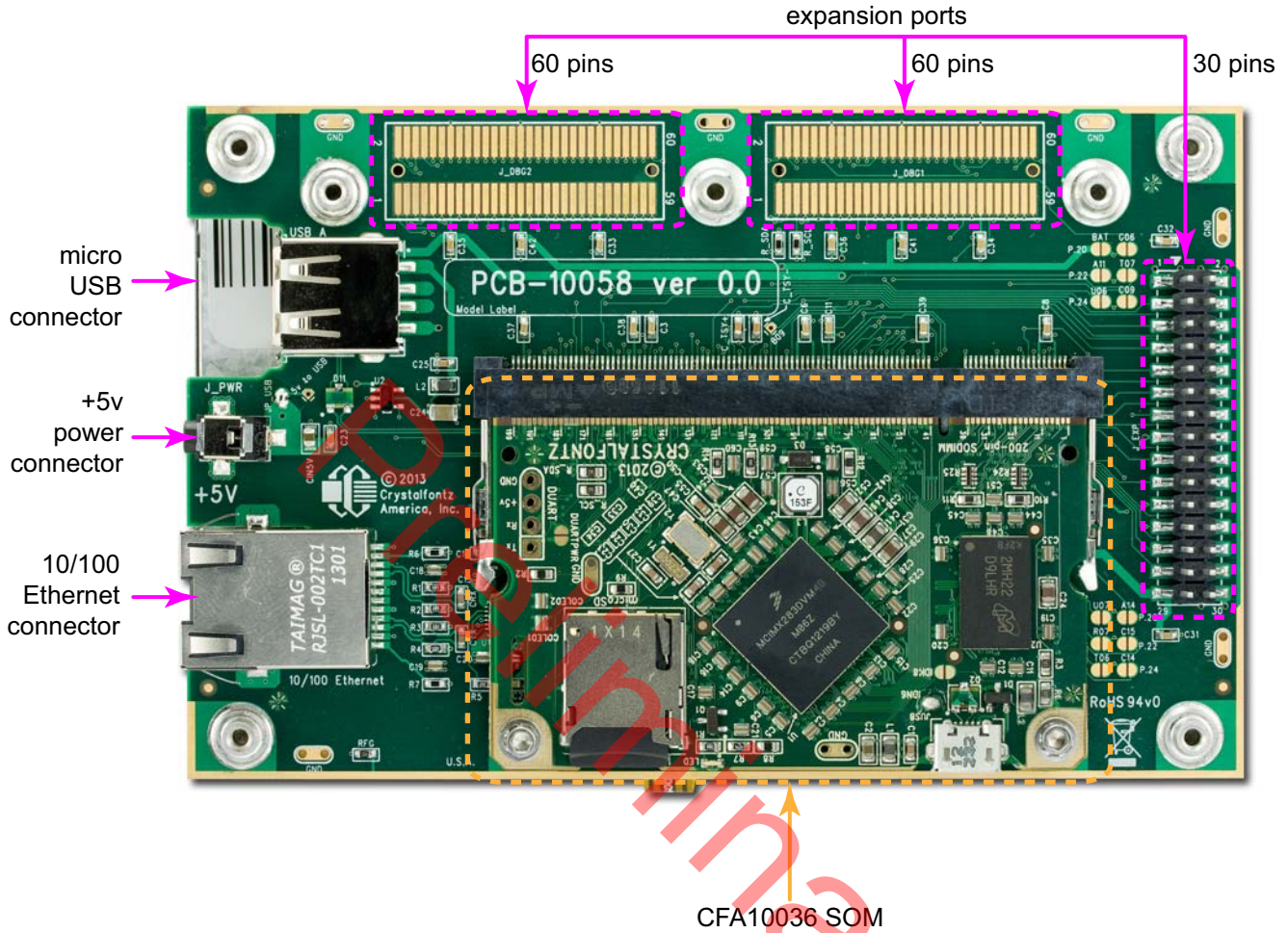


Figure 1. CFA10036 SOM Mounted on Back of CFA10058 Mother Board

ACCESSORIES



CFAL12832D-B

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

The [CFA10040PWR](#) is a 110 VAC +5v wall power supply that can be used to power the CFA10058 mother board. Cord length is ~63 inches.



WR-USB-Y03 Cable

The [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.

PHYSICAL CHARACTERISTICS

Specifications	
Overall Dimensions	TBD (W) x TBD(H) millimeters
Weight	TBD grams
Operating Temperature	-20°C to +70°C
Humidity (RH noncondensing)	90%

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 EXTENSION DEBUG CONNECTOR

The [SAMTEC FSI-130-10-L-D-AD](#) connector can be used to connect to the CFA10058's 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

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 [Doc/Files](#) tab on the display'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.



APPENDIX A: QUALITY ASSURANCE STANDARDS

Note

The quality standards listed below apply to the *CFA10057* mother board and the *CFA10036* SOM in this assembled product.

For the *CFAF480800T07-043T-TS* TFT, see the quality assurance standards in the Data Sheet under the [Doc/Files](#) tab on the display'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	<ol style="list-style-type: none">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. <p><i>*Minor if display functions correctly. Major if the display fails.</i></p>	Minor
2	Soldering defects	<ol style="list-style-type: none">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. <p><i>*Minor if display functions correctly. Major if the display fails.</i></p>	Minor

Eliminatory