



CrystalFontz America, Incorporated

SPECIFICATIONS



Data Sheet Release Date 2014-02-07
for the [CFA-RS232 Serial Converter Board](#)
Hardware Revision: v1.0

CrystalFontz America, Incorporated

12412 East Saltese Avenue
Spokane Valley, WA 99216-0357

Phone: 888-206-9720

Fax: 509-892-1203

Email: support@crystalfontz.com

URL: www.crystalfontz.com



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REVISION INFORMATION

Data Sheet Revision History

Data Sheet Release Date: 2014-02-07
Clarified specifications in [DC Characteristics \(Pg. 8\)](#) and made minor changes in wording.

Data Sheet Release Date: 2013-12-19
New Data Sheet for CFA-RS232 Serial Converter Board, hardware v1.0.

The CFA-RS232 has not changed since 2005. Until now, information about the CFA-RS232 was included in compatible Intelligent LCD Module Data Sheets. Because we've added to our line of compatible Intelligent LCD Modules, we decided that it made sense to publish information about the CFA-RS232 in its own Data Sheet.

CFA-RS232 Hardware Revisions

For information about hardware revisions, see Part Change Notifications (PCNs) and Product Update Notices (PUNs) under the Notices tab on the website page for the CFA-RS232.

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

NOTICES

About Volatility

The CFA-RS232 has nonvolatile memory.



Additional Fine Print

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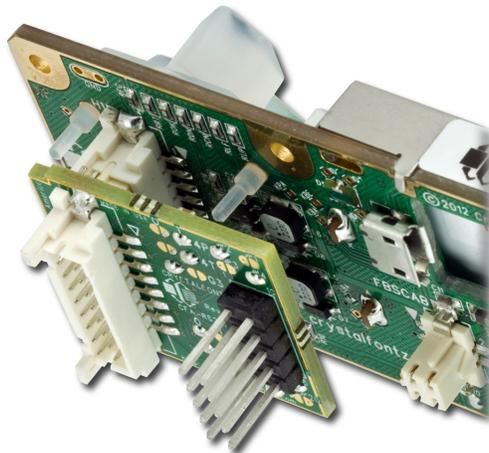


Figure 1. Photo Of CFA-RS232 Mounted On A Compatible Intelligent LCD Module (CFA735)

The bidirectional [CFA-RS232 Serial Converter Board](#) is a small printed circuit assembly that can be mounted on a compatible LCD Intelligent Module. It has a 16-pin female connector “J3” that mates with the male 16-pin connector “H1” on the back of compatible modules.

Less than one inch high and a little over one inch wide, the CFA-RS232 is an easy way to add “full swing” RS232 serial interface for compatible modules. This add-on peripheral converts compatible modules that have “logic level, inverted” serial interface to “full swing” RS232 serial interface.

- Overall dimensions are 28.45 (W) mm x 25.15 (H) mm (1.10” (W) x 0.99”)
- Weight is 6 grams.
- The CFA-RS232 has an Sipex SP3220EEY-L driver/receiver pair.



DIFFERENCE BETWEEN “FULL SWING” RS232 AND “LOGIC LEVEL, INVERTED” SERIAL

Both of the two serial interfaces used in our compatible LCD Intelligent Modules have firmware that bring the two UART pins (Tx & Rx) of the module’s microcontroller to its “H1” connector. The CFA-RS232 converts the 0v to +5v (logic level, inverted) Rx and Tx signals from the module’s microcontroller to RS232 levels.

“Full Swing” RS232 Serial

Bidirectional 9600 / 19200 / 115200 baud ESD protected RS232 serial interface is provided by the CFA-RS232 mounted on a compatible module. This interface is the correct choice if your embedded controller or host system has a RS232 serial port (-5v to +5v “full swing” serial interface, typically through a UART).

“Logic Level, Inverted” Serial

Module’s with this interface expose the UART Tx & Rx (“logic level, inverted”, 0v to +3.3v Tx nominal, 0v to +5.0v Rx nominal) signals on pin 1 and pin 2 of the module's connector “H1”. If your embedded processor is close to the module, you can cable its UART Rx and Tx pins directly to the module’s Tx and Rx pins. No RS232 level translators are required on either end.

CFA-RS232 SHIPPED INSTALLED ON COMPATIBLE INTELLIGENT LCD MODULES

The CFA-RS232 is preinstalled when you order a CFA635-xxx-KS or CFA735-xxx-KT Intelligent LCD Module. When you order a CFA835 Intelligent LCD Module on our website, you can order a CFA-RS232 in the “Customize and Add to Cart” feature.

BUY CFA-RS232 SEPARATELY FOR OTHER USES

The CFA-RS232 can also be used with other 3.0 to 5.0 volt devices. Sold as a separate item, the CFA-RS232 can interface between your host (any microcontroller) and your device with a compatible connectors.

Fully assembled, the CFA-RS232 comes ready to connect with all three headers preinstalled. The connectors are widely available.

Note: Be sure to align pins correctly before pushing the board into the socket.



ILLUSTRATIONS

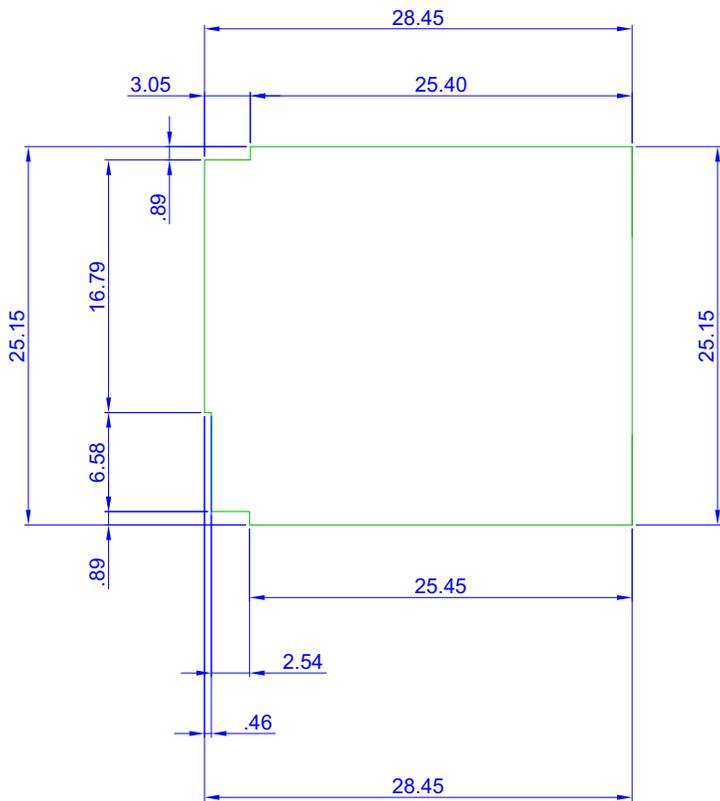
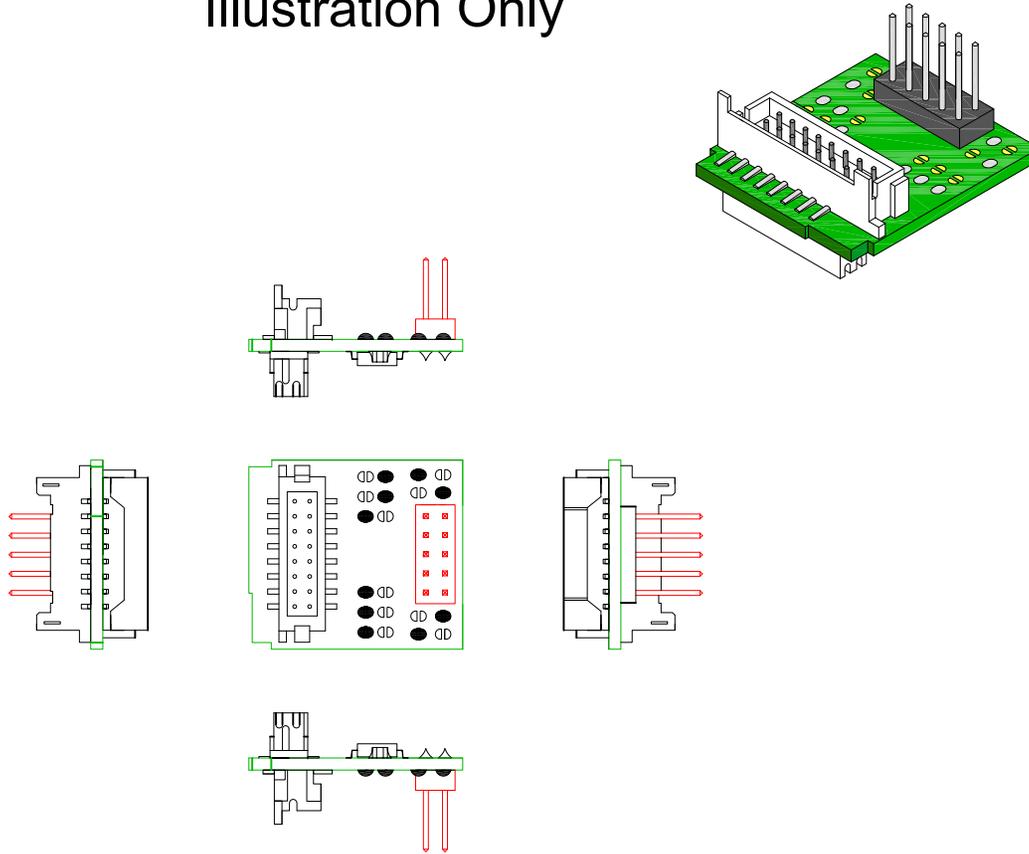




Illustration Only





ABSOLUTE MAXIMUM RATINGS

ABSOLUTE MAXIMUM RATINGS	SYMBOL	MINIMUM	MAXIMUM
Operating Temperature	T _{OP}	-20°C	+70°C
Storage Temperature	T _{ST}	-30°C	+80°C
Humidity Range (Noncondensing)	RH	10%	90%
RS232 Input Pin	V _{RX}	-25v	+25v
RS232 Output Pin	V _{TX}	-13v	+13v
<p><u>Notes:</u> These are stress ratings only. Extended exposure to the absolute maximum ratings listed above may affect device reliability or cause permanent damage.</p> <p>Changes in temperature can result in changes in contrast.</p>			

DC CHARACTERISTICS

See photo [CFA-RS232 Top and Bottom View of Connectors \(Pg. 9\)](#) for location of J1 and J3.

SPECIFICATION	SYMBOL	MINIMUM	TYPICAL	MAXIMUM
J1: Pin3 Input Voltage Range (Rx)	V _{IH}	-25v		+25v
J3: Pin1, Pin2 Input High Voltage	V _{IH}		+1.8v	+2.4v
J3: Pin1, Pin2 Input Low Voltage	V _{OL}	+0.8v	+1.5v	
J1: Pin2 Output Voltage Swing (Tx)	V _{OL}	±5.0v	±5.4v	

INPUT SUPPLY VOLTAGES

Supply voltage for CFA-RS232: +3.3v minimum to +5.5v maximum. *Do not exceed +5.5v maximum.*



ESD (ELECTRO-STATIC DISCHARGE)

Tx and Rx pins:

- +15 kV Human Body Model
- +15 kV IEC1000-4-2 Air Discharge
- +8 kV IEC1000-4-2 Contact Discharge

The remainder of 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.

CONNECTION INFORMATION

Connector Locations

The top side of the CFA-RS232 has the CrystalFontz logo silk-screened onto it and has male two connectors. The bottom side of the CFA-RS232 does not have the CrystalFontz logo and has one female connector.

The “J1” and “J2” connectors are on the top side of the mounted CFA-RS232, facing away from the module. The “J3” connector is on the bottom of the mounted CFA-RS232, facing towards the module.

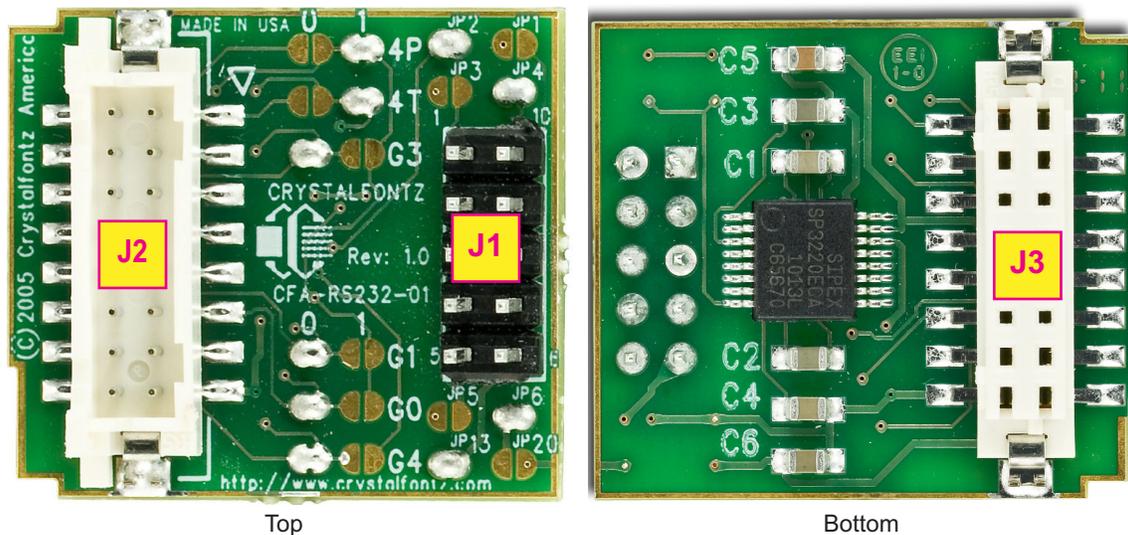


Figure 2. CFA-RS232 Top and Bottom View of Connectors

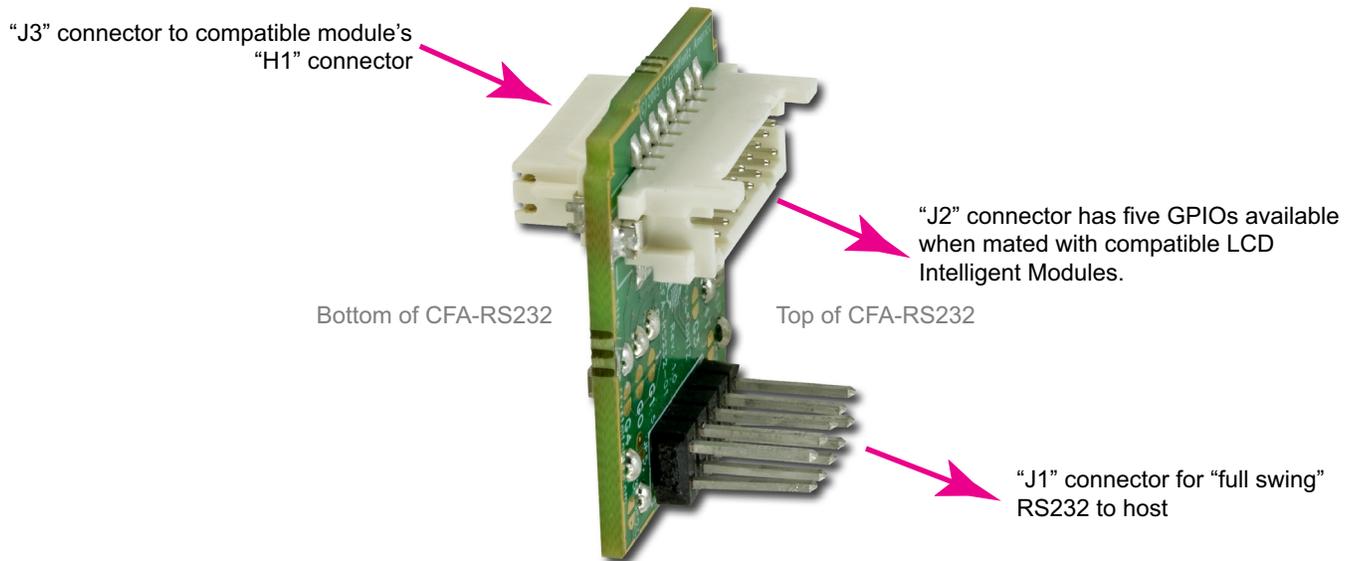


Figure 3. CFA-RS232 Side View of Connectors

1. "J1" is the male 10-pin (0.1" center) RS232 host communications connector on the top side.
2. "J2" is the male 16-pin 2 mm "pass through" connector on the top side, passing through to the "J3" female 16-pin 2 mm connector on the bottom side of the board.
3. "J3" is the female 16-pin 2 mm connector on the bottom side that mates with "H1" male 16-pin 2 mm connector on the compatible module.

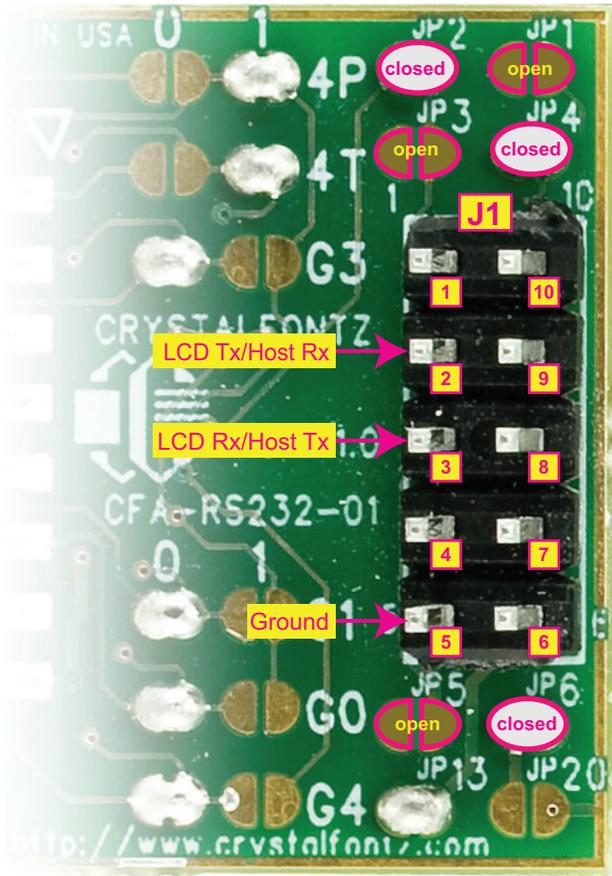
J1 Connector Pin Assignments (Default and Alternate)

The pin order of your motherboard's header will determine if the compatible LCD Intelligent Module's pin assignments ("full swing" RS232 serial) need to be "Default" or "Alternate", as described below.

Note

The [WR-232-Y22](#) cable, when connected to the "J1" of the CFA-RS232 Serial Converter, provides two connectors on its opposite end. The connector a few inches from the end has a "Default" pin assignment and the connector at the very end has an "Alternate" pin assignment. By using the WR-232-Y22 cable, you can avoid changing jumpers on the CFA-RS232 Serial Converter.





J1 Default Pin Assignments

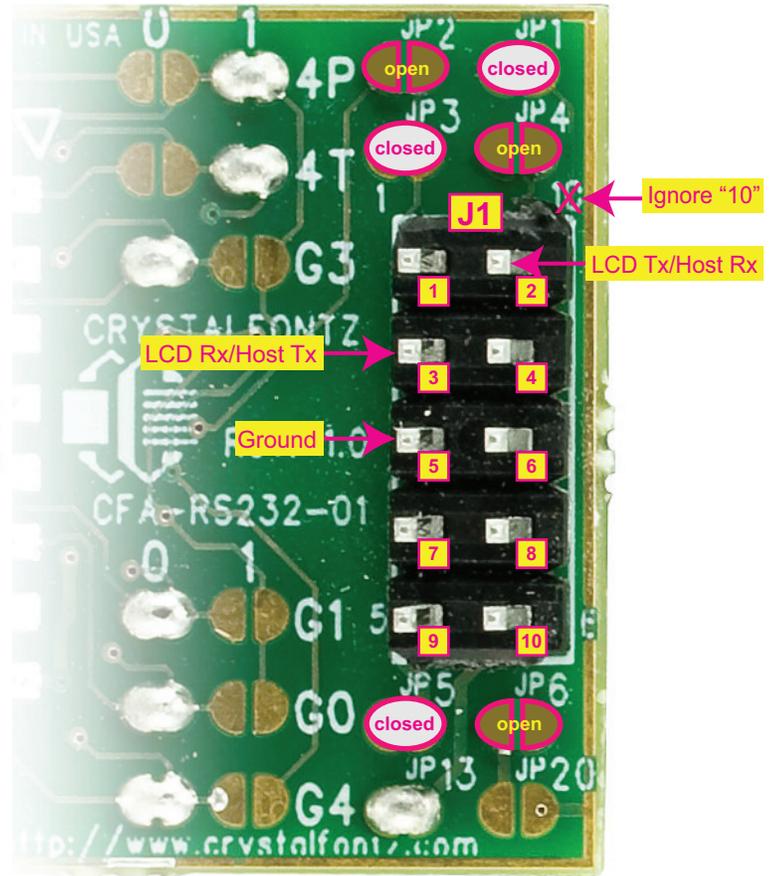
DEFAULT	STATE
JP1	open
JP2	closed
JP3	open
JP4	closed
JP5	open
JP6	closed

J1 Default Pin Assignments

The jumpers JP2, JP4, and JP6 are closed by default at the factory, selecting the “J1” connector “Default RS232 Pin Assignments”. This default pin assignment allows a low cost ribbon cable such as the [WR-232-Y08](#) to connect the compatible LCD Intelligent Module via “full swing” RS232 serial to a PC’s DB9 COM port.

J1 Alternate Pin Assignments

Note: As you can see in the above photo, the alternate pin sequence is different from the pin sequence of the default pin assignments.



J1 Alternate Pin Assignments

ALTERNATE	STATE
JP1	closed
JP2	open
JP3	closed
JP4	open
JP5	closed
JP6	open



By opening jumpers JP2, JP4, and JP6 and closing JP1, JP3, and JP5, you can select the “Alternate RS232 Pin Assignments”.

If there is a matching 0.1-inch center, 10-pin RS232 connector on your system's motherboard, then in most cases a simple straight-through ribbon cable such as [WR-232-Y22](#) cable can be used to connect from the compatible module (“full swing” RS232 serial) to a motherboard's 10-pin header.

J2 Connector Pin Assignments (Includes GPIO Connections)

The “H1” connector on compatible LCD Intelligent Modules has 5 pins that can be used for General Purpose Input or Output (GPIO). The CFA-RS232 mounted on the “H1” passes through the signals to the “J2” connector.

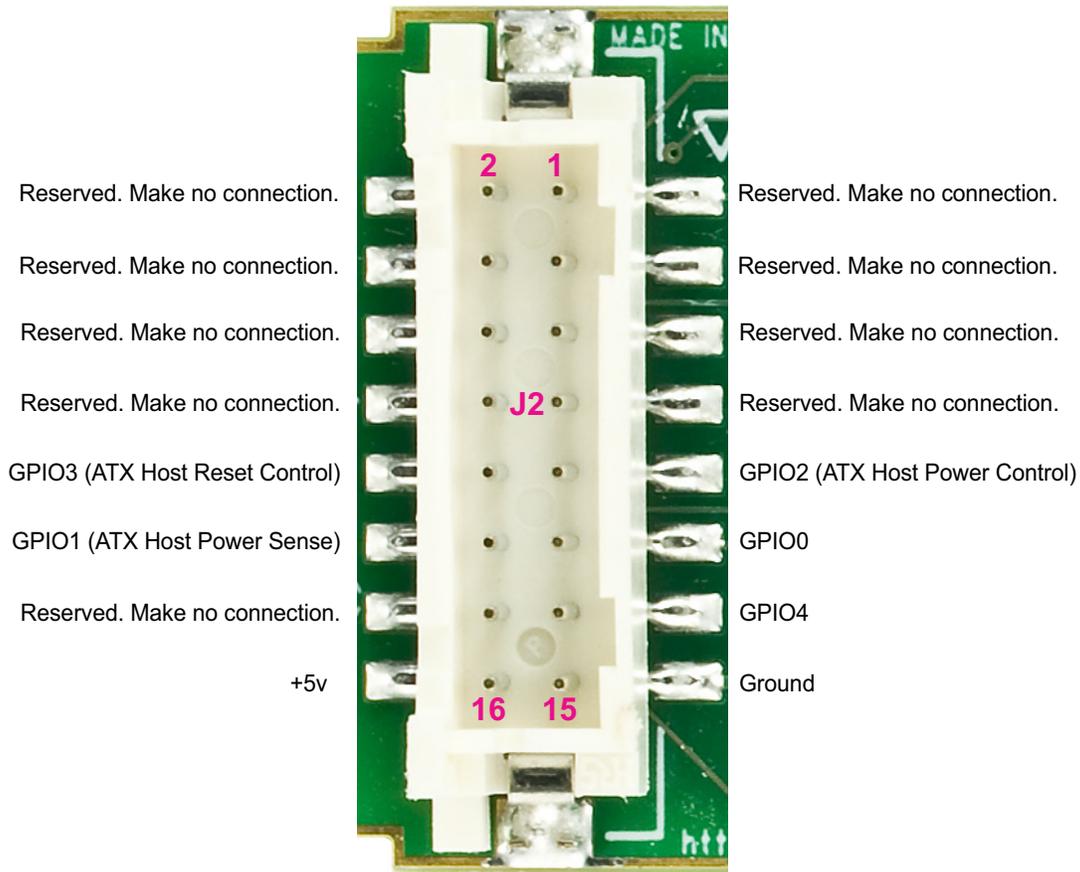
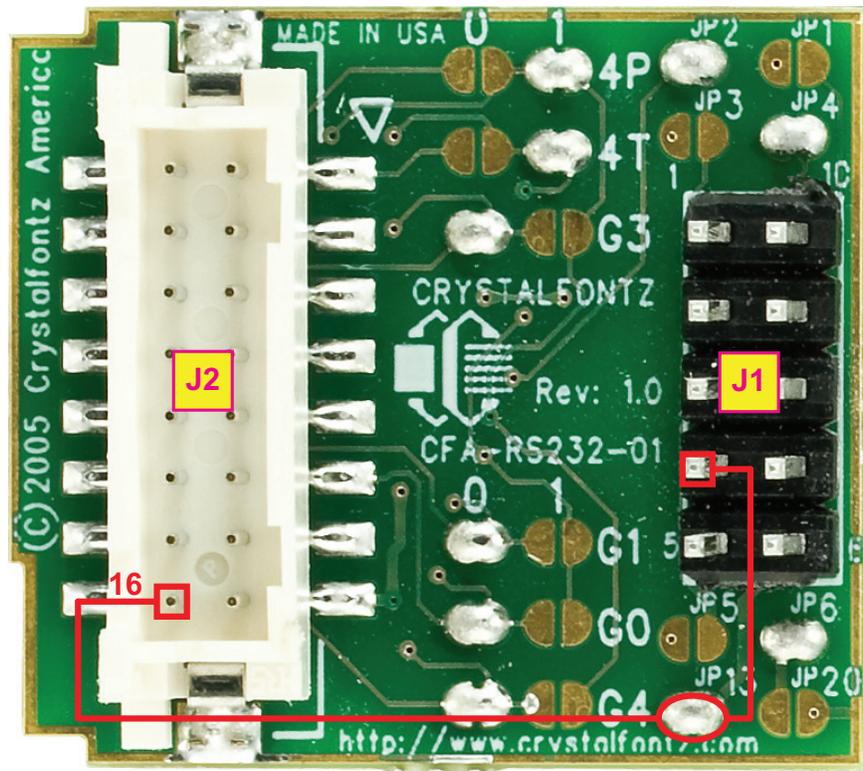


Figure 4. CFA-RS232 “J2” Connector Pin Assignments



Jumper And Pins For Power



Jumper JP13 is closed by default at the factory. It allows power to be supplied to J1.

- J1 Default Pin Assignments – Pin 4
- J1 Alternate Pin Assignments – Pin 7
- J2 Pin Assignments – Pin 16

Logic Level GPIO +5 Volt Tolerant Pins

	DC CHARACTERISTICS	SYMBOL	MINIMUM	MAXIMUM
CONTROLLER AND BOARD	Input High Voltage	V_{IH}	$0.42 \cdot (V_{DD} - 2\text{v}) + 1\text{v}$ If $V_{DD} = +3.3\text{v}$ $= +1.55\text{v}$	+5.5v
	Input Low Voltage	V_{IL}	-0.3v	$0.32 \cdot (V_{DD} - 2\text{v}) + 0.75\text{v}$ If $V_{DD} = +3.3\text{v}$ $= +1.17\text{v}$
	Output High Voltage	V_{OH}	+2.4v	+3.3v
	Output Low Voltage	V_{OL}	+0.4v	+1.3v

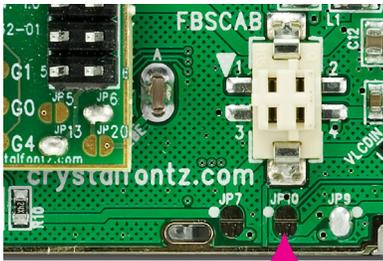


Typical GPIO Current Limits

TYPICAL GPIO CURRENT LIMITS	
Sink	8 mA
Source	8 mA

USB Interface With Power Through CFA-RS232

If You Want To Use USB Interface While Supplying Power Through J1 To A Module With Simultaneous Interfaces (CFA735 or CFA835 families of Intelligent LCD Modules)



Leave JP10 open for USB

JP10 on Intelligent LCD Modules with simultaneous interfaces (CFA735 and CFA835 families) may be closed or open by factory default. If you are going to use USB interface while supplying power through "H1", **you must open JP10 to prevent back-powering the USB.**



RECOMMENDED CABLES

Cables For RS-232 Communications Through J1 Connector To Host



WR-232-Y08

The [WR-232-Y08](#) cable is about 2 feet 2.55 inches long. Connect the cable's 0.1" 2x5 female connector to the CFA-RS232's "J1" 10-pin connector. Connect the cable's RS232 DB9 9-pin female connector to your host's external 9-pin serial port.



WR-232-Y22

The [WR-232-Y22](#) cable is about 2 feet 1 inches long. Connect the cable's 0.1" 2x5 female connector to the CFA-RS232's "J1" 10-pin connector. Connect the cable's second 0.1" 2x5 female connector to your host's motherboard 10-pin connector. Choose standard or alternate pin assignments.



WR-232-Y23

The [WR-232-Y23](#) cable is about 2 feet 1.75 inches long. Connect the cable's 0.1" 2x5 female connector to the CFA-RS232's "J1" 10-pin connector. Connect the cable's RS232 DB9 9-pin female connector to your host's external 9-pin serial port. Choose standard or alternate pin assignments.

Cable For Power Through J2 Connector



WR-PWR-Y24

The [WR-PWR-Y24](#) cable is about 2 feet 2.55 inches long. Use this cable to supply power (*no communications*) to a compatible Intelligent LCD Module through the mounted CFA-RS232 serial converter from the host's power supply. Connect the cable's 16-pin female connector to the CFA-RS232's 16-pin male "J2" connector. Connect the cable's 4-pin male connector directly to your host's power supply connector.

Caution: *When using this cable with Intelligent LCD Modules with simultaneous interfaces (CFA735 and CFA835 families), be sure to open JP10 on the module. This will avoid back-powering the USB subsystem. See [USB Interface With Power Through CFA-RS232 \(Pg. 14\)](#).*

Make Your Own Cable To Connect To J1

The following parts may be used to make your own cable to connect to the CFA-RS232's "J2" connector:

- 16-position housing: Hirose DF11-16DS-2C / [Digi-Key H2025-ND](#).
- Crimping contact (tape & reel): Hirose DF11-2428SCF / [Digi-Key H1504TR-ND](#).
- Crimping contact (loose): Hirose DF11-2428SC / [Digi-Key H1504-ND](#).
- Pre-terminated interconnect wire: Hirose / [Digi-Key H3BBT-10112-B4-ND](#) is typical.



CARE AND HANDLING PRECAUTIONS

For optimum operation of the CFA-RS232 and to prolong its life, please follow the precautions described below.

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.
- Do not reverse polarity to the power supply connections. Reversing polarity will immediately ruin the CFA-RS232 and may ruin any device connected to it.

Avoid Shock, Impact, Torque, Or Tension

- Do not expose the CFA-RS232 to strong mechanical shock, impact, torque, or tension.
- Do not drop, toss, bend, or twist the module.
- Do not place weight or pressure on the module.

Caution

All electronics may contain harmful substances. Avoid contamination by using care to avoid damage during handling. If any residues, gases, powders, liquids, or broken fragments come in contact with your skin, eyes, mouth, or lungs, immediately contact your local poison control or emergency medical center.

Operation

- Your circuit should be designed to protect the CFA-RS232 from ESD and power supply transients.
- Observe the operating temperature limitations: a minimum of -20°C to a maximum of 70°C noncondensing with minimal fluctuation. Operation outside of these limits may shorten life and/or harm display.
- 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 -30°C minimum to +80°C non-condensing 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 modules while they are in storage.
- Please recycle your outdated Crystalfontz modules at an approved facility.



QUALITY ASSURANCE STANDARDS

Inspection Conditions

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

Acceptance Sampling

DEFECT TYPE	AQL*
Major	≤0.65%
Minor	≤1.00%
<i>*Acceptable Quality Level: maximum allowable error rate or variation from standard</i>	

Defects are defined as:

- Major Defect: results in failure or substantially reduces usability of unit for its intended purpose
- Minor Defect: deviates from standards but is not likely to reduce usability for its intended purpose

Acceptance Standards

#	DEFECT TYPE	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. <i>*Minor if display functions correctly. Major if the display fails.</i>	Minor
2	Soldering defects	1. Unmelted solder paste. 2. Cold solder joints, missing solder connections, or oxidation.* 3. Solder bridges causing short circuits.* 4. Solder balls. <i>*Minor if display functions correctly. Major if the display fails.</i>	Minor