

ClockMatrix

SPI Connections to ClockMatrix Evaluation Board

Abstract

This document explains how to connect the FTDI or Aardvark cards to the 8A340xx (ClockMatrix) EVB for SPI access.

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1. Introduction

The 8A340xx evaluation boards, by default, were designed to function in I²C mode using the on-board FTDI chip. However, they have an option for I²C/SPI support using either an external FTDI dongle or an Aardvark Total Phase I²C card. Timing Commander natively supports the FTDI dongle for both I²C and SPI. It also supports the Aardvark I²C card for I²C only. For Aardvark access via SPI, instead of using Timing Commander, use the Total Phase GUI.

For more information on I²C hardware options for Timing Commander, see the [Timing Commander Hardware Interfaces User Guide](#).

2. Ordering Information

Hardware	Description	Link
FTDI Dongle 	FTDI C232HM-DDHSL-0 Cable	www.digikey.com/short/pzbfwf
Aardvark I2C Card 	Total Phase Aardvark card	http://www.totalphase.com/products/aardvark-i2cspi/ https://www.totalphase.com/products/grabber-cable/

3. Evaluation Board I²C Mode selection

Depending on the evaluation board (EVB), the GPIO9 setting may need to be changed as follows:

1. If you are using the **144BGA EVB**, do nothing. The default setting for GPIO9 is in the middle position. That sets the main serial port to I²C and the Aux Serial port to SPI. In section 4, the FTDI cables are connected to the Auxiliary port by changing the position of the jumpers on J12 to J15. The following figure shows how the default settings appear.



2. If using the **72QFN EVB**, set GPIO9 **Low** and **Power Cycle** the board. This ClockMatrix variant only has one serial port. When GPIO9 floats (center position), it is high and the default mode is I²C. In section 4, the FTDI cable is connected to the Main port, so that means that the GPIO9 setting must be updated so that the port runs in SPI mode. The power-cycle is necessary to re-latch the GPIO9 and switch to SPI mode.

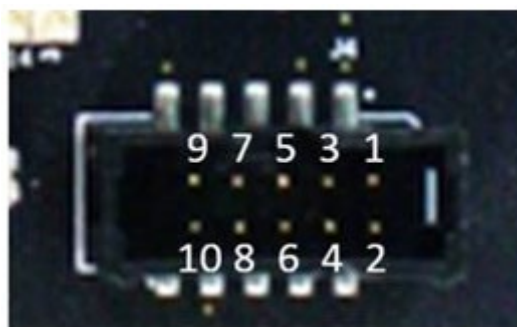


4. FTDI Dongle Hardware Connection

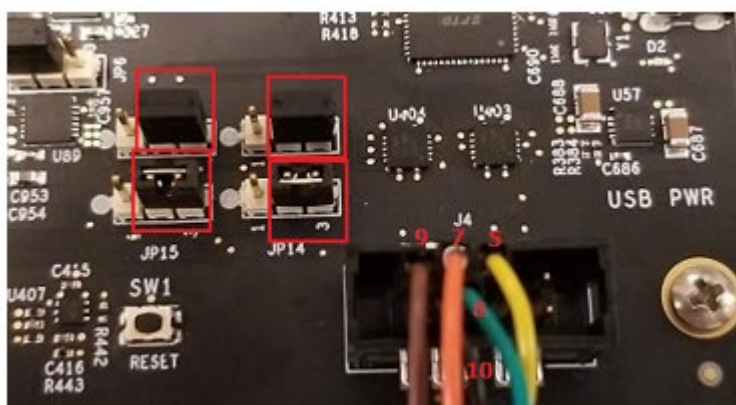
Connect the FTDI cable to the evaluation board as follows:

1. Connect the wires as follows to J4. This applies whether you are using the 144BGA or the 72QFN EVB.

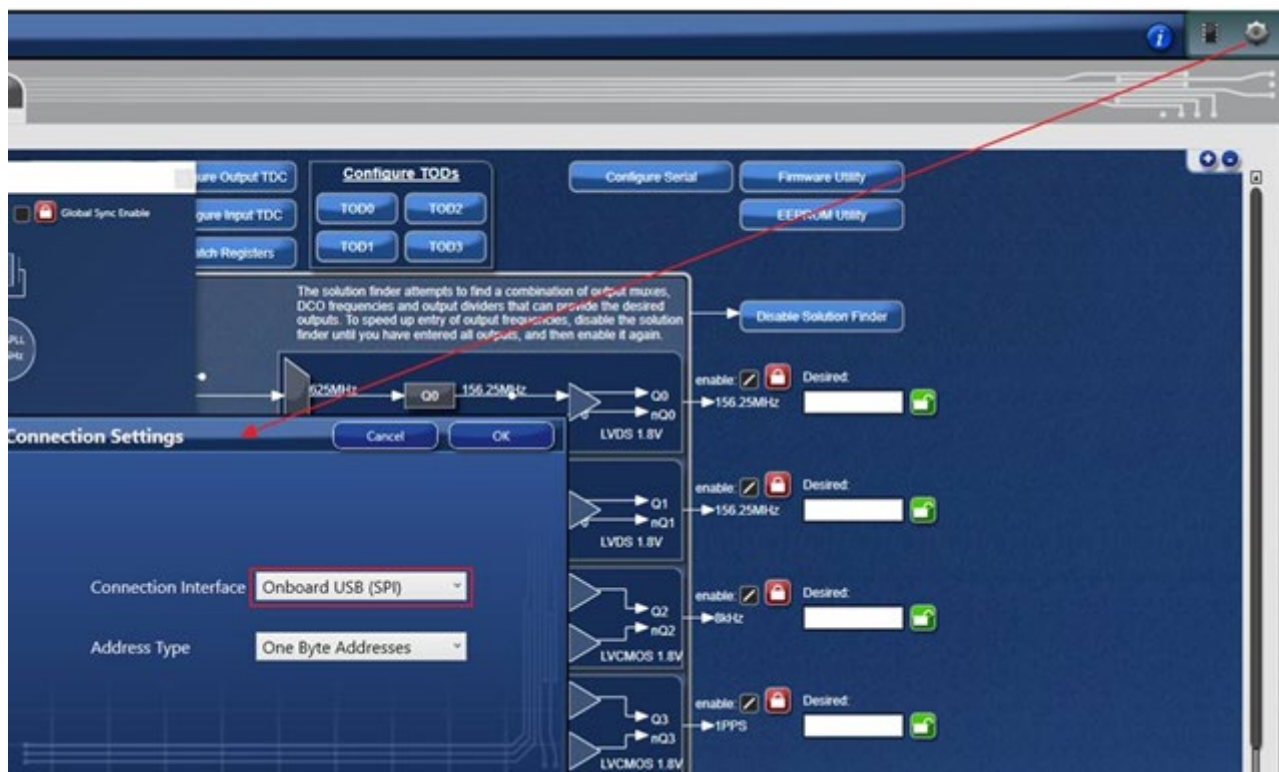
5 = Yellow
6 = No connect
7 = Orange
8 = Green
9 = Brown
10 = Black



2. Set the jumpers for J12, J13, J14, and J15 to connect pins 2 and 3, as shown in the following figure.



3. In the GUI, change the connection to “Onboard USB (SPI)” and connect to the evaluation board.



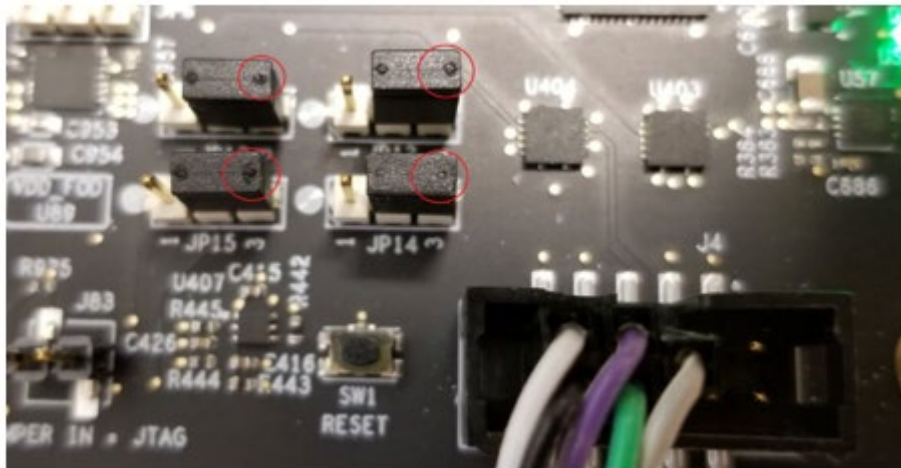
5. Aardvark Card Hardware Connection

1. Connect the wires as follows to J4. This applies whether you are using the 144BGA or the 72QFN EVB.

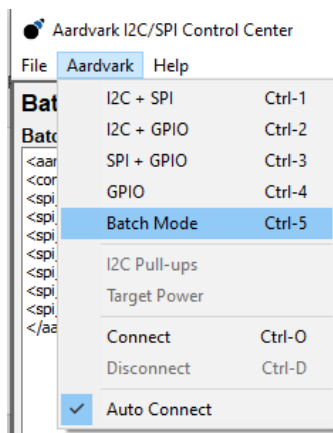
5 = Grey
6 = No connect
7 = Purple
8 = Green
9 = White
10 = Black



- Set the jumpers for J12, J13, J14, and J15 to connect pins 2 and 3, as shown in the following figure.



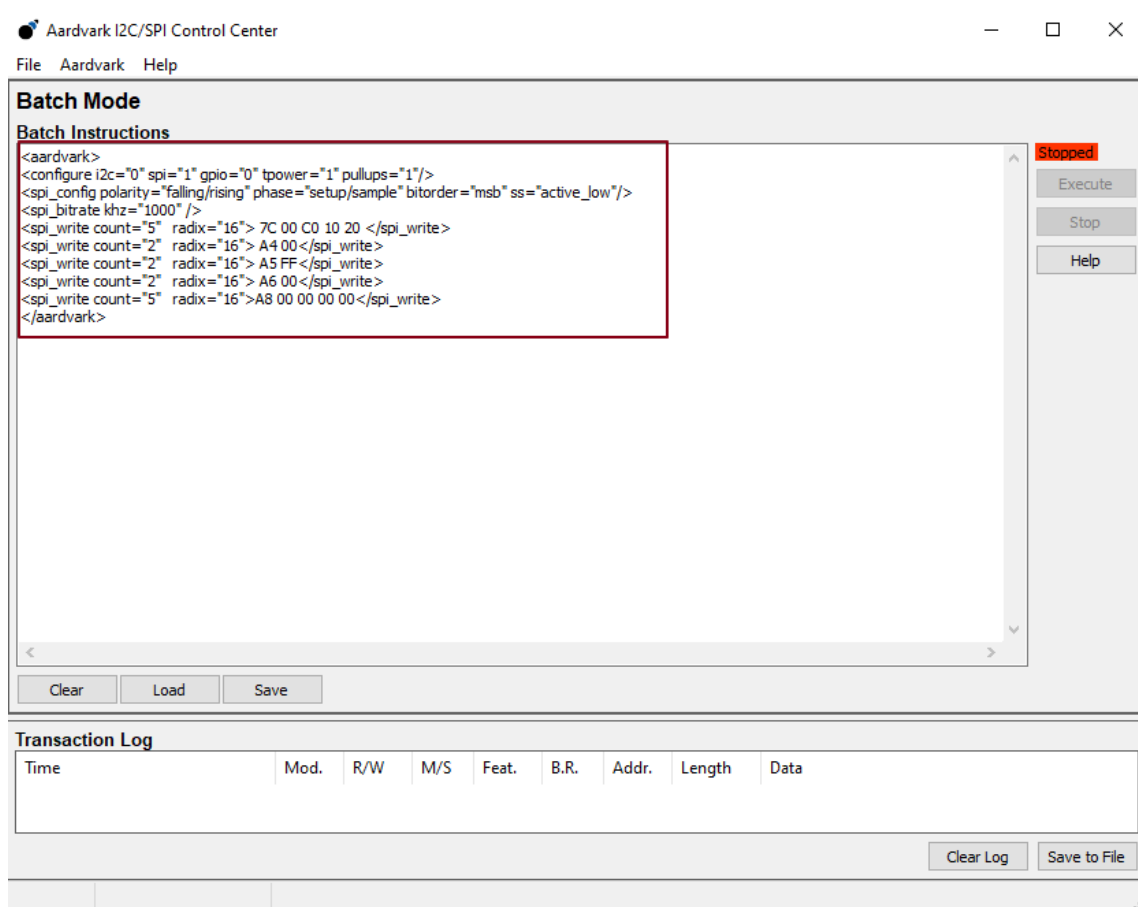
- Install and start the Total Phase GUI. The Windows GUI can be downloaded [here](#). The Windows drivers can be downloaded [here](#). For more information, see the [Total Phase Aardvark Quick Start User Guide](#).
 - Open the GUI.
 - Switch to Batch Mode.



- Connect the Aardvark card.
- Copy the following code into the GUI and execute it. It will read back the firmware version (major, minor, hotfix, and pipeline):

```
<aardvark>
<configure i2c="0" spi="1" gpio="0" tpower="1" pullups="1"/>
<spi_config polarity="falling/rising" phase="setup/sample" bitorder="msb"
ss="active_low"/>
<spi_bitrate khz="1000" />
<spi_write count="5" radix="16"> 7C 00 C0 10 20 </spi_write>
<spi_write count="2" radix="16"> A4 00</spi_write>
<spi_write count="2" radix="16"> A5 FF</spi_write>
<spi_write count="2" radix="16"> A6 00</spi_write>
<spi_write count="5" radix="16">A8 00 00 00 00</spi_write>
</aardvark>
```

The following figure shows the Total Phase GUI batch mode:



6. Revision History

Revision	Date	Description
1.0	Dec.14.20	Initial release.

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