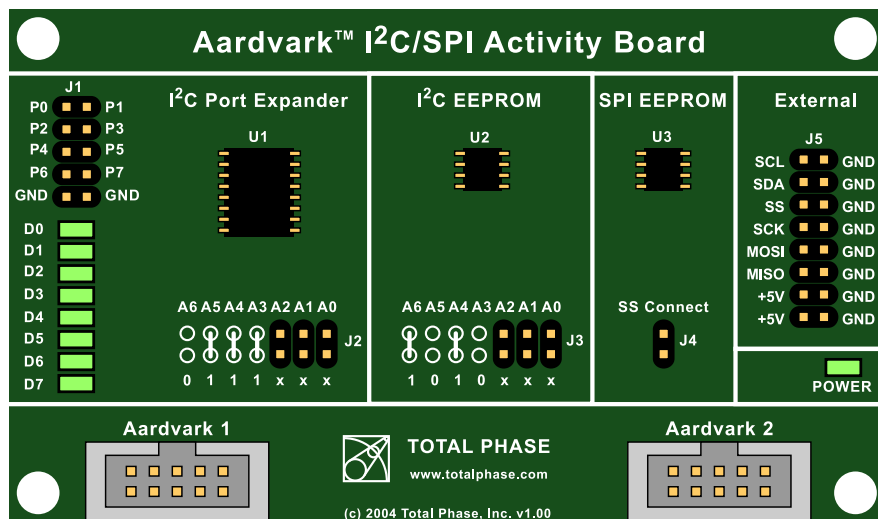




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Aardvark I²C/SPI
Embedded Systems Interface

Activity Board User's Manual

v1.00

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Summary

The Aardvark I²C/SPI Activity Board is a great tool to help with embedded systems development. This activity board provides working slave devices to aid developers in the debugging of their systems and interface software.



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1. Targets

The Aardvark I²C/SPI Activity Board features three different targets for testing and development. Specifications for each target device can be found on the manufacturer's websites. Below you will find the part numbers and a link to online resources for each part.

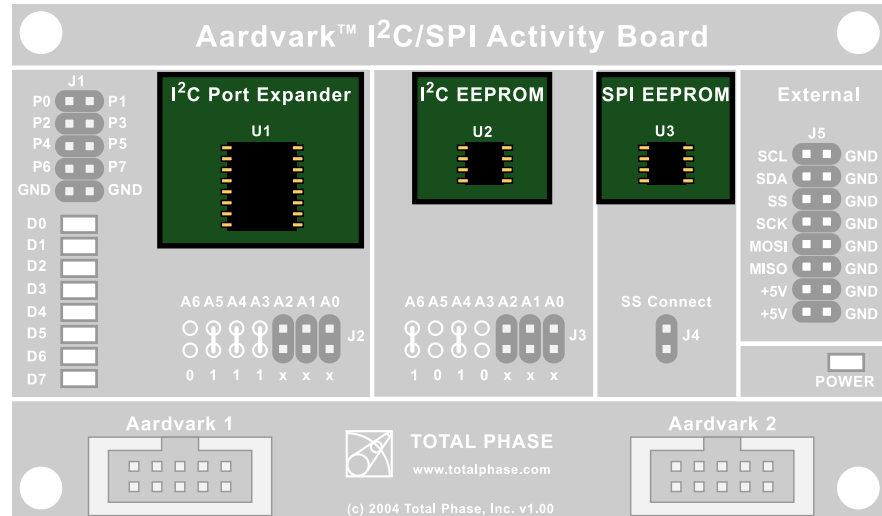


Figure 1: Aardvark I²C/SPI Activity Board Targets

Please note that these links may become outdated and Total Phase cannot guarantee that they will function. For the latest information about these targets, please visit our website: <http://www.totalphase.com/>

I²C Port Expander (U1)

PCA9554AD - 8-bit I²C and SMBus I/O Port with Interrupts (Philips)

<http://www.semiconductors.philips.com/pip/PCA9554AD.html>

I²C EEPROM (U2)

AT24C02 – 2-Wire Bus Serial EEPROM (Atmel)

256 bytes / 2 kilobit - 8 bytes / page

http://www.atmel.com/dyn/products/product_card.asp?family_id=647&family_name=Serial+EEPROM&part_id=2805

SPI EEPROM (U3)

AT25080A – SPI Bus Serial EEPROM, High Speed, supports SPI Mode 0 and 3. (Atmel)

1 kilobit / 8 kilobytes - 32 bytes / page

http://www.atmel.com/dyn/products/product_card.asp?family_id=647&family_name=Serial+EEPROM&part_id=3020



2. Connectors

There are multiple connectors on the Aardvark I²C/SPI Activity Board.

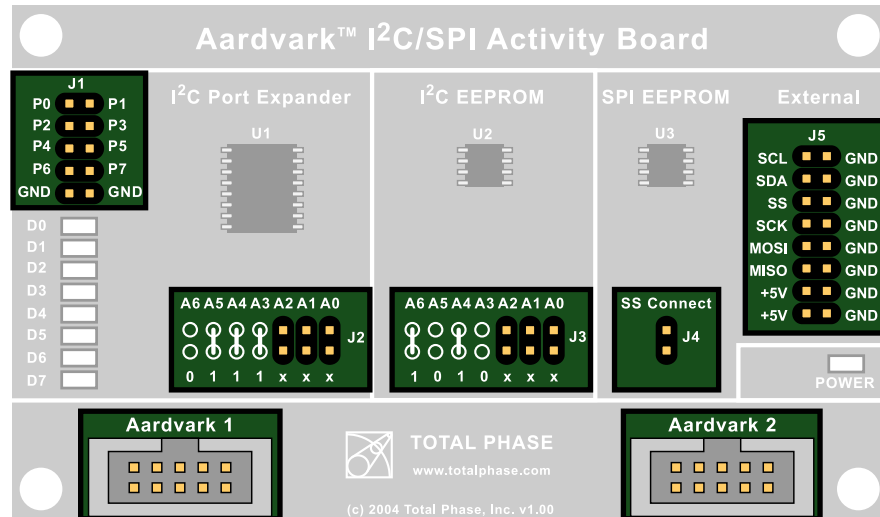


Figure 2: Aardvark I²C/SPI Activity Board Connectors

Port Expander (J1)

The pins of J1 are connected directly to the port expander IC. Signals can be connected to an external source through these pins.

The LEDs (D0-D7) are also tied to the pins of this connector (P0-P7).

I²C Port Expander configurable address (J2)

Additional jumpers may be used to set the slave address of the I²C Port Expander. These jumpers are not included with the board. For more information about how to set the address, please see section 2.1 *Configurable I2C Address*.

I²C EEPROM configurable address (J3)

Additional jumpers may be used to set the slave address of the I²C EEPROM. These jumpers are not included with the board. For more information about how to set the address, please see section 2.1 *Configurable I2C Address*.

SS Connect (J4)

When this jumper is bridged, both Aardvark adapters are connected to the SPI EEPROM slave select (SS) line. The slave select (SS) lines of the two Aardvark adapters are always connected to each other.

A jumper is included with the board to connect the Aardvark adapters to the SPI EEPROM.



External Monitor Connector (J5)

An external bus monitor or logic analyzer can be connected to these pins. Each pin of the J5 connector is labeled with the signal name.

I²C Pins

SCL

Serial Clock line – the signal used to synchronize communication between the master and the slave.

SDA

Serial Data line – the signal used to transfer data between the transmitter and the receiver.

SPI Pins

SS

Slave Select – control line that allows slaves to be turned on and off via hardware control.

SCK

Serial Clock – control line that is driven by the master and regulates the flow of the data bits.

MOSI

Master Out Slave In – this data line supplies output data from the master which is shifted into the slave.

MISO

Master In Slave Out – this data line supplies the output data from the slave to the input of the master.

Aardvark I²C/SPI Host Adapter connectors (Aardvark 1 & Aardvark 2)

Two connectors are provided for two Aardvark I²C/SPI Host Adapters. These two connectors are always connected together pin-for-pin.

Powering the Activity Board

To power the Activity Board, the Aardvark adapter must be configured to send target power to the board. This can be accomplished via the Rosetta Language Bindings or the Aardvark Control Center Software. When powered-on, the board's POWER LED will be lit.

Cross Connecting Aardvark Adapters

When cross connecting two Aardvark adapters, the board must be powered on. Otherwise, results can be totally unexpected. If you experience problems, please make sure that the Power LED on the board is lit.

Connecting Multiple Activity Boards

Multiple activity boards may be daisy-chained through these connectors using a standard 10-pin ribbon cable. However, the user must ensure that only one of the boards has its J4 (SS Connect) jumper connected to prevent SPI EEPROM output signal contention.



2.1. Configurable I²C Address

The I²C Port Expander and the I²C EEPROM have hardware configurable I²C addresses. You'll notice on the board the following diagram:

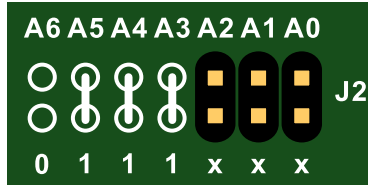


Figure 3: Default I²C Port Expander address.

This diagram gives the address of the I²C Port Expander. The “x” indicates a configurable value. If the connectors are bridged, the value is 1, otherwise the value is 0.

In its default state, the I²C Port Expander has a address of

$$0111000 == 0x38 == 56.$$

When a jumper is added in to A1,

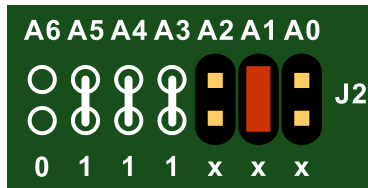


Figure 4: I²C Port Expander address has been configured using a jumper (red) on position A1. This effectively changes the target's address from 0x38 to 0x3a.

the address becomes

$$0111010 == 0x3a == 58$$

The jumpers for configuring the target addresses are not included with the board.



3. References

3.1. Examples

Example scripts which communicate with the target ICs are available for download on the Total Phase website: <http://www.totalphase.com/>

3.2. Technical Specifications

Detailed information about the Technical Specifications of the Aardvark I²C/SPI Host Adapter and the Aardvark I²C/SPI Activity Board can be found on the Total Phase website: <http://www.totalphase.com/>



4. Legal / Contact

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4.2. Contact Information

Total Phase can be found on the Internet at <http://www.totalphase.com/>. If you have Aardvark support-related questions, please email the product engineers at support@totalphase.com. For questions about Total Phase's corporate services, please send inquiries to info@totalphase.com.

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