User's Guide

IP-201-CAB
I^2C Bus Multiplexer Cabinet

MCC
Micro Computer Control
Small Area Network Specialists

www.mcc-us.com

Introduction

The MCC IP-201-CAB is a multi-channel I²C Bus Multiplexer Cabinet that provides an easy way to connect multiple I²C Buses to a common host computer interface. The IP-201-CAB lets you communicate with multiple identical I²C based target devices while avoiding I²C Bus Address conflicts.

This user's guide describes the setup and operation of the IP-201-CAB I²C Bus Multiplexer Cabinet.

Are you new to I²C? Want to know more? We suggest you review "What is I²C?" at www.mcc-us.com/I2CBusTechnicalOverview.pdf.

MCC products use NXP (Philips) components and are licensed to use the I²C Bus.

"Purchase of Philips I²C components conveys a license under the Philips' I²C patent to use the components of the I²C system, provided the system conforms to the I²C specifications defined by Philips."

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31-MAR-10

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WARNING - Radio Frequency Emissions: This equipment can radiate levels of radio frequency energy that may cause interference to communications equipment. Operation of this equipment may cause interference with radio, television, or other communications equipment. The user is responsible for correcting such interference at the expense of the user.

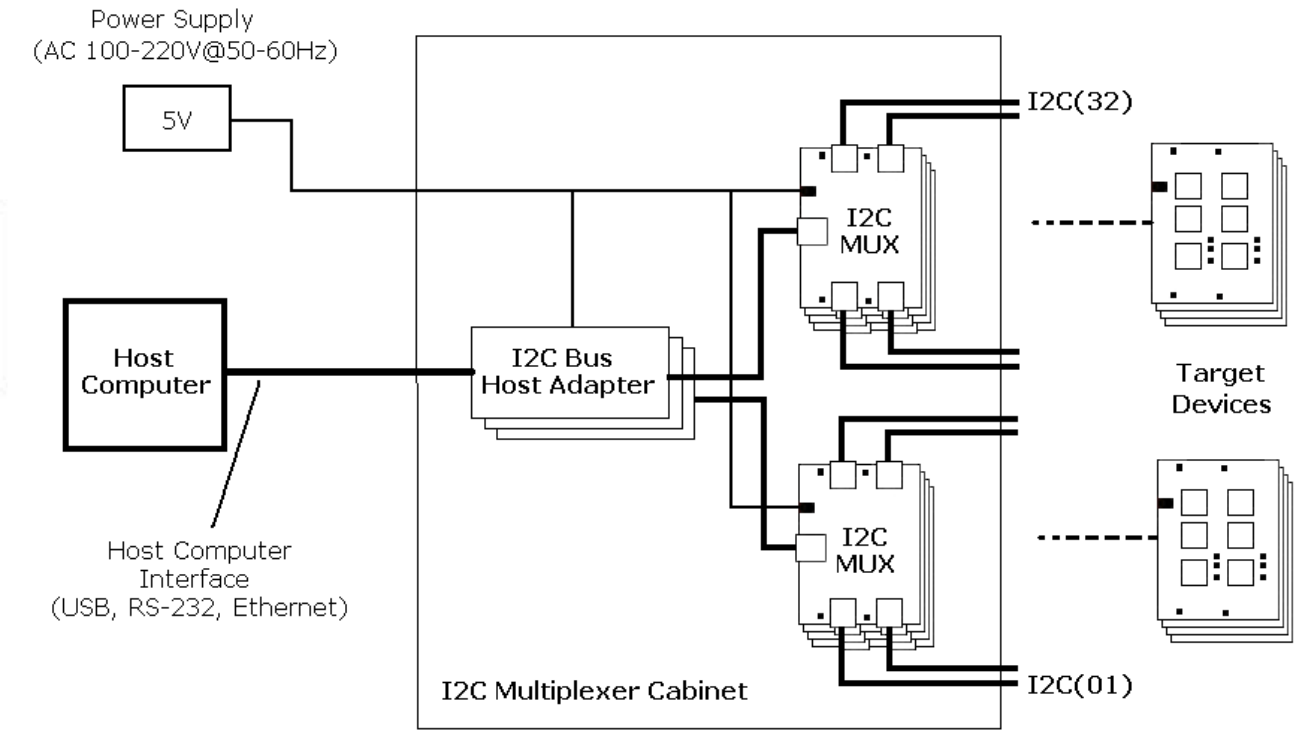
WARNING - Electrostatic Discharge (ESD) Precautions: Any damage caused by Electrostatic Discharge (ESD) through inadequate earth grounding is NOT covered under the warranty of this product. See the “Electrostatic (ESD) Precautions” section of this guide for more information.

Printed in the United States of America

Multi-Channel
I²C Bus Multiplexer Cabinet

Overview

The I²C Bus Multiplexer Cabinet is a multi-channel I²C Bus interface cabinet capable of delivering up to 32 independent and multiplexed I²C Bus channels to a host computer via a USB, RS-232, Ethernet, or Wireless-Ethernet interface. With the I²C Bus Multiplexer Cabinet, a single host computer can communicate with up to 32 identical I²C Bus slave devices, without slave address conflicts.



The I²C Bus Multiplexer Cabinet consists of:

1. Up to eight internal I²C Bus 4 channel multiplexer boards.
2. One or more internal I²C Bus host adapters.
3. External 5 volt global power supply.
4. Front panel mounted power switch and lamp.
5. Front panel mounted I²C Bus channel indicator lamps.
6. Interconnecting I²C Bus cabling.
7. 19-inch 3U high rack mount cabinet.

During operation, a customer supplied host computer issues commands to the multiplexer cabinet that select a specific I²C Bus selectable channel, writes data to, or reads data from, a customer supplied target device connected to the selected channel.

I²C Bus Multiplexer Cabinet Configuration

I²C Bus Multiplexer Cabinet configuration includes:

- Enabling or disabling host adapter pull-ups.
- Multiplexer board stacking arrangement.
- Multiplexer board slave address assignment.
- Multiplexer board pull-up voltage jumper setup.

Multiplexer cabinets are pre-configured at the factory to meet customer requirements. A Configuration Worksheet is attached to this document. A Configuration Build Sheet is shipped with each multiplexer cabinet.

The I²C Bus multiplexer boards within the multiplexer cabinet use configuration jumpers and a command protocol documented in the I²C Bus Multiplexer Board User's Guide.

Multiplexer boards within a cabinet are arranged in groups, called stacks. Each stack can be made up of up to eight boards. The common port on boards within a stack are linked together with on-board stacking connectors or cables. Multiplexer boards within a stack share a common I²C Bus address space, so each multiplexer board within a stack must be assigned a different I²C Bus slave address.

Multiplexer Cabinet Installation

Power Supply

The I²C Bus Multiplexer Cabinet is shipped with an external 5 volt global power supply. A front-panel mounted switch controls power to internally mounted I²C Bus Host Adapter(s) (USB host adapters are USB bus powered), internally mounted I²C Bus multiplexer boards, and rear-panel mounted I²C Bus channels.

Host Computer Interface

A host computer interface provides a link between the host computer and the I²C Multiplexer Cabinet. The host computer interface connects directly to an internally mounted I²C Bus Host Adapter. Depending on the host adapter type, a software driver may need to be loaded the first time the host adapter is plugged into a host computer. Follow the driver installation instructions included in the I²C Bus Host Adapter User's Guide.

Connection to the Target Devices

I²C Bus interface cables are provided with the multiplexer cabinet. A modular connector is provided for connection to target device. If appropriate, the modular connector on one end of the interface cable can be replaced with one more suitable for the target device.

Host Computer Communications

Each multiplexer board within the multiplexer cabinet is controlled with messages sent to the board's common port via an I²C Bus link to its attached host adapter. Each multiplexer board has a jumper selectable I²C Bus slave address.

Host computer commands to select and communicate with a specific target device connected to the I²C Bus Multiplexer Cabinet use a command and response protocol documented in the I²C Bus Host Adapter User's Guide, the I²C Bus Multiplexer Board User's Guide, and the target device datasheet.

A typical host computer command sequence would include:

1. Select the communication port used by the I²C Bus Host Adapter.

2. Open a communication link to the I²C Bus Host Adapter. [See the I²C Bus Host Adapter User's Guide Open command for details.]

3. Set I²C Bus Host Adapter Destination Slave Address to the slave address assigned to a specific Multiplexer Board. [See the Multiplexer Board User's Guide for board slave address configuration, and the I²C Bus Host Adapter User's Guide Destination Slave Address command for details.]

4. Master transmit a Channel Selection command to the Multiplexer Board. This command will connect the Multiplexer Board common port to the selected channel. [See the Multiplexer Board User's Guide Channel Selection commands, and the I²C Bus Host Adapter User's Guide Master Transmit command for details.]

5. Set I²C Bus Host Adapter Destination Slave Address to the slave address of the target device. [See the target device datasheet, and the I²C Bus Host Adapter User's Guide Destination Slave Address command for details. NOTE: To avoid slave address conflicts, target device should not use slave addresses assigned to Multiplexer Boards.]

6. Master transmit (write) data to target device. [See the target device datasheet, and the I²C Bus Host Adapter User's Guide Master Transmit command for details.]

7. Master read data from the target device. [See the target device datasheet, and the I²C Bus Host Adapter User's Guide Master Read command for details.]

8. To communicate with multiple target devices with different slave addresses on the same selectable channel, repeat steps 5 through 7.

9. To communicate with multiple target devices on separate selectable channels of the same Multiplexer Board, repeat steps 3 through 8.

10. To deselect all channels on the current Multiplexer Board, repeat steps 3 and 4 and deselect all selectable channels on the current Multiplexer Board. [See the Multiplexer Board User's Guide for Channel Selection commands.]

11. To communicate with multiple target devices connected to multiple Multiplexer Boards, repeat steps 3 through 10.

12. To terminate communications with all target devices, close the communication port used by the I^2C Bus Host Adapter.

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I^2C Bus Multiplexer Cabinet
Configuration Worksheet

Host Computer Interface	Host Adapter Type	Host Adapter Pull-Ups	Multiplexer Stack Number	Multiplexer Board Number	Multiplexer Board Type	Multiplexer Pull-up Voltage	Multiplexer Board Slave Address	Special Notes