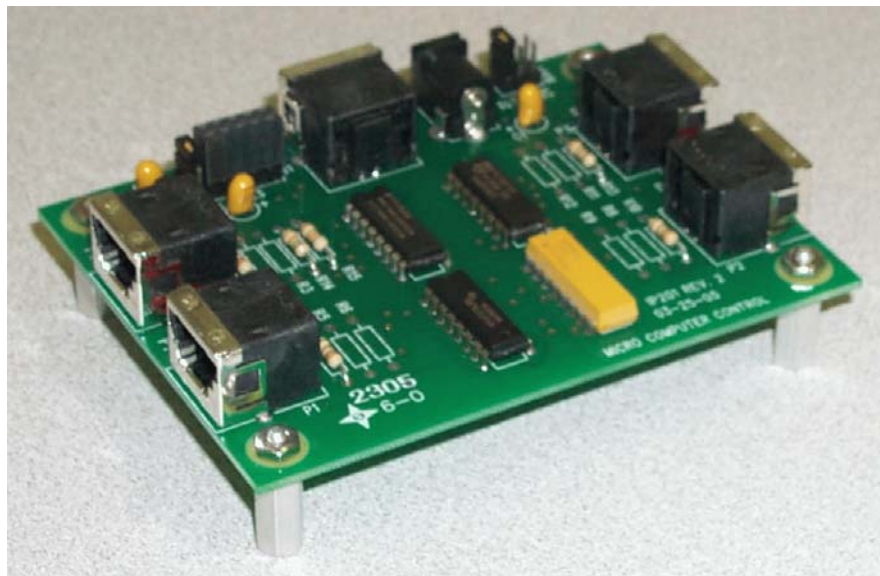


User's Guide

IP-201 I²C Bus Multiplexer Board Revision 2



www.mcc-us.com

Introduction

The MCC IP-201 is a four channel I²C Bus Multiplexer Board that provides an easy way to connect multiple I²C Buses to a common I²C Bus port. The IP-201 lets you connect to multiple I²C based products from a common I²C Bus port while avoiding I²C Bus Address conflicts.

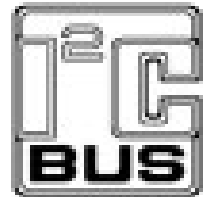
This user's guide describes the setup and operation of the IP-201 I²C Bus Multiplexer Board.

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 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."

I²C is a trademark of Philips Corporation.



09-JAN-07

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WARNING - Life Support Applications: MCC products are not designed for use in life support appliances, devices, or systems where the malfunction of the product can reasonably be expected to result in a personal injury.

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

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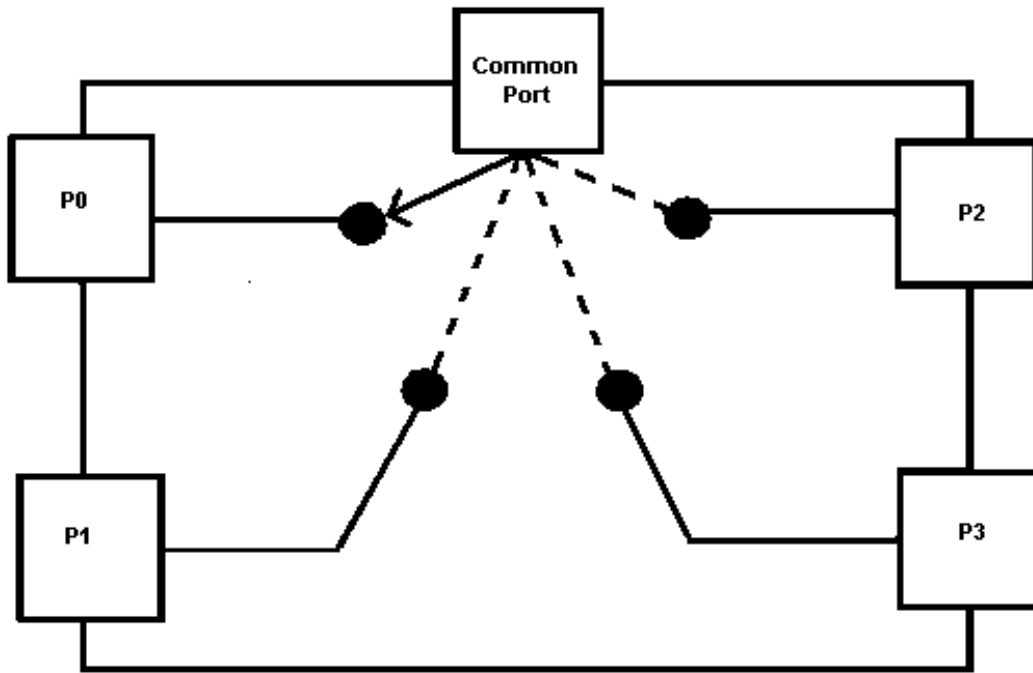
I²C Multiplexer Board

Model IP-201

Rev. 2

Overview

The IP-201 is a four channel I²C Bus Multiplexer Board that provides an easy way to connect multiple I²C Buses to a common I²C Bus port. The IP-201 lets you connect to multiple I²C based products from a common I²C Bus port while avoiding I²C Bus Address conflicts.



Key Features

- Connect a Common I²C Port to one of four (4) separate I²C Buses.
- Able to disconnect from ALL attached Buses.
- LED indicators show selected Bus.
- Bus selection controlled directly over the I²C Bus. No extra Hardware required.
- Jumper selectable Pull-up Voltage (3.3V or 5V) (*New for Rev. 2*)
- Jumper selectable I²C Slave Address (40...4E).
- Use multiple IP-201 Multiplexers for up to 32 I²C Buses.
- Based on the MCC's iPack Stackable Board Format.
- Supports Stacked or Remote board configurations.

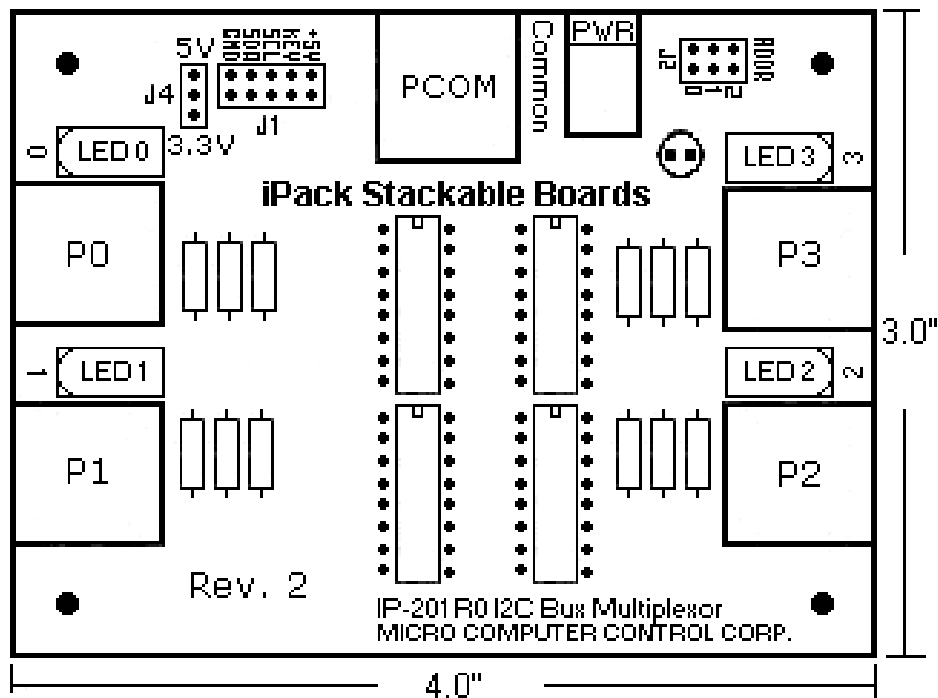
Packing Slip

The IP-201 I²C Multiplexer package includes the following items:

- The IP-201 I²C Multiplexer Board.
- I²C Interface Cable.
- User's Guide (This document).

Interconnects

The IP-201 I²C Multiplexer Board includes the following interconnections:



1. +5VDC Power

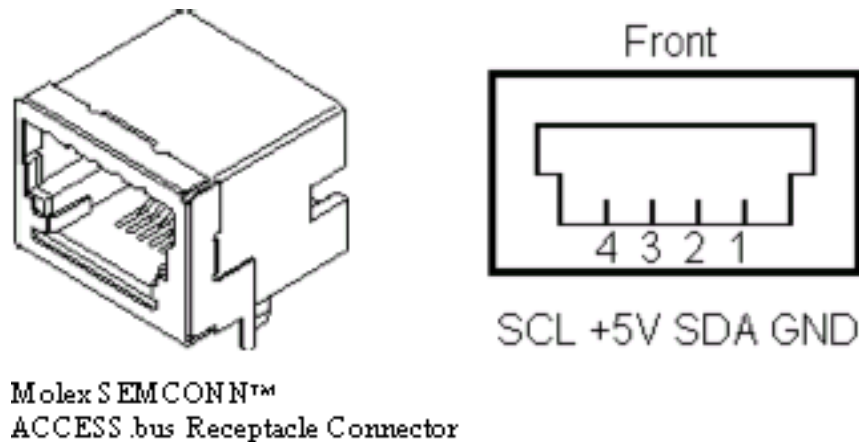
The IP-201 I²C Multiplexer Board can be powered in one of three ways:

- From the +5V pin in any I²C interface connector (PCOM, P0, P1, P2, P3).
- From the +5V pin in the iPack stacking connector (J1).
- From the power jack (J3).

If the unit is powered from the power jack (J3), a +5VDC Power Supply (MCC Part# MWT-5VAG) is required. Excess power is available in the +5V pin of the I²C interface connectors.

2. I²C Interface Connectors

The IP-201 I²C Multiplexer Board includes two common (PCOM and J1) and four



selectable (P0, P1, P2, P3) connectors for interfacing to external I²C Buses. Pins in these connectors include:

- I²C Clock (SCL = White)
- I²C Data (SDA = Green)
- Ground (Black)
- +5VDC (Red) (Optional)

An I²C Interface Cable is provided to connect to an external I²C Bus master device. Additional I²C Bus interface cables are available (See Appendix B).

3. Setting the IP-201 I²C Slave Address

The IP-201 Multiplexer Board includes an onboard Multiplexer Controller device with a selectable I²C Slave Address. Onboard jumpers are provided that allow the Multiplexer Controller device to be assigned to one of eight possible I²C slave addresses. To avoid addressing conflicts, the address selected slave address for the Multiplexer Controller device should not be the same as any I²C device on any connected of the I²C bus.

The IP-201 I²C Slave Address is controlled by positioning jumper blocks on header connector ADDR on the board as follows:

A2	A1	A0	Multiplexer Controller I ² C Slave Address
OFF	OFF	OFF	0x4E
OFF	OFF	ON	0x4C (Factory Default Setting)
OFF	ON	OFF	0x4A
OFF	ON	ON	0x48
ON	OFF	OFF	0x46
ON	OFF	ON	0x44
ON	ON	OFF	0x42
ON	ON	ON	0x40

4. Selecting the IP-201 Pull-Up Voltage

The IP-201 Multiplexer Board provides low current (15K ohm) pull-up resistors on all I2C Interface connectors. These pull-up resistors maintain signal integrity when an I2C Interface connector is not connected to external pull-ups.

The IP-201 Multiplexer Board (Rev. 2) provides jumper selection of the pull-up voltage applied by the pull-up resistors. Jumper block J4 voltage selection includes:

5V	3.3V	Pull-up Voltage
ON	OFF	5 volt
OFF	ON	3.3 volt

5. Selecting an I²C Bus Port

The IP-201 Multiplexer Board provides one common and four selectable I²C Bus ports. The IP-201 Multiplexer Board is always connected to the common port, as this port is usually connected to a bus master device. A selectable port is connected to the common port by writing a one byte I²C command to the IP-201 slave address.

The IP-201 port selection command uses the following format:

Start	IP-201 Slave Address (0x40...0x4E Jumper Selectable)	Select Port Command Byte (0x00, 01, 02, 03, 04=None)	stoP

The IP-201 Multiplexer Board Port Command Byte value and the selected I²C Bus port is as follows:

Command Byte	I ² C Port Selected
0x00	P0
0x01	P1
0x02	P2
0x03	P3
0x04	None

Once a port is selected, all I²C messages sent to the common port will appear at the selected port. All I²C messages sent to the selected port will appear at the common port.

7. IP-201 Revision Report

This section defines revisions and changes made to the IP-201:

Revision: 1

1. Initial Release

Revision: 2

1. Add 5V/3.3V pull-up voltage selection jumper (J4).

8. Additional Information

For additional information on the I²C Bus, please refer to the following:

“What is I²C?”

www.mcc-us.com/I2CBusTechnicalOverview.pdf

“Frequently Asked Questions (FAQ)”

www.mcc-us.com/faq.htm

"The I²C and How to Use It"

www.mcc-us.com/i2chowto.htm

"80C51-Based 8-Bit Microcontroller" Data Handbook.

Philips Semiconductors, Tel. (800)227-1817

"I²C Peripherals for Microcontrollers" Data Handbook.

Philips Semiconductors, Tel. (800)227-1817

Appendix A - I²C Connector Information

Interface Connector and Plug Information

MCC uses two (2) different connectors and plug assemblies. We have found these parts to be compatible.

I²C Receptacle Connectors

Molex SEMCONN ACCESS.bus Receptacle Connector

Molex Part # 15-83-0064

AMP SDL (Shielded Data Link) Connectors for ACCESS.bus

AMP Part # 4-943197-1

I²C Plug Connectors

Molex SEMCONN ACCESS.bus Plug

Molex Part # 15-83-1564

AMP SDL (Shielded Data Link) Plug for ACCESS.bus

Bush	Amp Part # 520851-1
Ferrule	Amp Part # 520433-1
SDL (Shell)	Amp Part # 520461-1
SDL (Shell)	Amp Part # 520460-1
SDL	Amp Part # 4-520424-1

Appendix B - I²C Cable Information

The following I²C Cables are available from MCC:

MCC Part # CAB4	I ² C Interface Cable, 48inches (4ft)
MCC Part # CAB8	I ² C Interface Cable, 96 inches (8ft)
MCC Part # CAB16	I ² C Interface Cable, 192 inches (16ft)
MCC Part # CABCL	I ² C and SMBus Clip Lead Cable

Declaration of Conformity

This Declaration of Conformity is issued by the indicated company which is solely responsible for the declared compliance.

Product(s): I2C Bus Multiplexer Board

Product Part Number(s): IP-201

Product Description: 4-Channel I2C Bus Multiplexer Board

Applicable Directive(s): EC Directive 89/336/EEC

Compliant Standards:

EN 55022 : 1998

Emissions Standard

Conducted Emissions (Class B)

Radiated Emissions (Class B)

EN 55024 : 1998

Immunity Standard

Immunity to Radiated Electromagnetic Fields

Immunity to Fast Transient Bursts - AC Power Lines

Immunity to Conducted Field - AC Power Lines

Immunity to Voltage Dips - AC Power Lines

Immunity to Electrostatic Discharge

Test Laboratory Information:

Cass Industries Ltd., Blackbrook Trading Estate, Weybrook Road, Manchester M19 2QD, ENGLAND.

Test Report Number: CI02570c

Test Report Date: August 22nd, 2005

Technical file held by: Micro Computer Control Corporation, 17 Model Avenue / PO Box 275, Hopewell, New Jersey 08525 USA, or its applicable authorized distributor or representative.

Responsible Company: Micro Computer Control Corporation, 17 Model Avenue / PO Box 275, Hopewell, New Jersey 08525 USA, or its applicable authorized distributor or representative.

Signature of Authorized Representative:

Edward Thompson

Name: Edward Thompson

Title: President, Micro Computer Control Corporation

Date: 09-JAN-07