

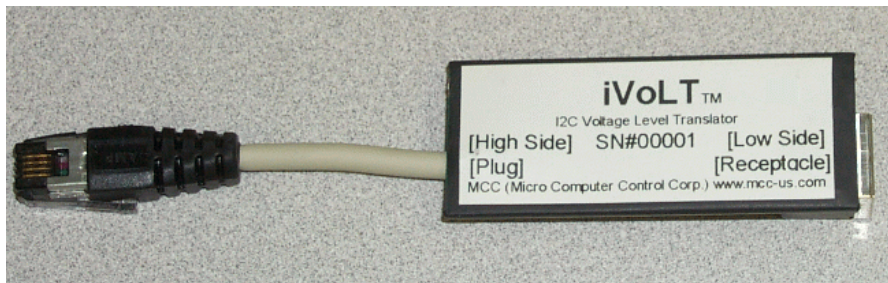
# User's Guide

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# iVoLT™

## I<sup>2</sup>C Bus/SMBus Voltage Level Translator

For 1.5 V to 5 V Applications



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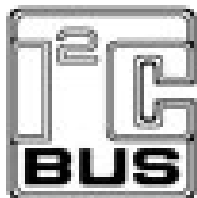
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Printed in the United States of America

MCC products are licensed to use the I<sup>2</sup>C Bus.

Purchase of Philips I<sup>2</sup>C components conveys a license under the Philips I<sup>2</sup>C patent to use the components of the I<sup>2</sup>C system, provided the system conforms to the I<sup>2</sup>C specifications defined by Philips.

I<sup>2</sup>C is a trademark of Philips Corporation.



09-JAN-07

# iVoLT

## I<sup>2</sup>C Bus/SMBus Voltage Level Translator

### Features

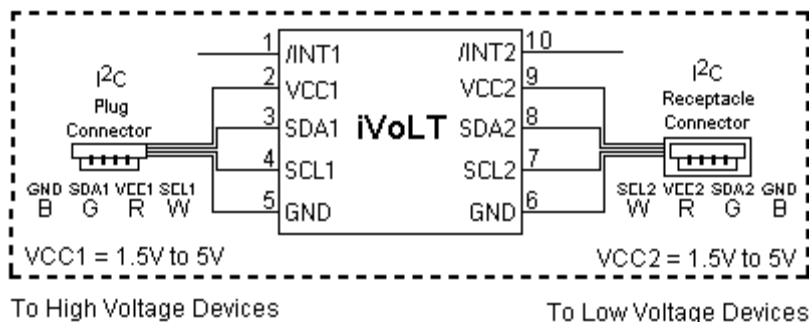
- Bi-directional I<sup>2</sup>C Bus/SMBus voltage translator.
- Inserts In-Line between I<sup>2</sup>C/SMBus devices.
- Supports SCL, SDA, and Interrupt signals.
- 5 Volt maximum high-side voltage.
- 1.5 Volt minimum low-side voltage.
- 1 Volt minimum differential voltage requirement.
- Compatible with bus speeds up to 400 kHz.
- Plug-Compatible with MCC I<sup>2</sup>C Host Adapters and Bus Monitor (#MIIC-101).

### Typical Applications

- Product development, manufacturing, system testing.
- Any application requiring bi-directional I<sup>2</sup>C/SMBus voltage level translation.

### Description

The iVoLT is an I<sup>2</sup>C/SMBus Voltage Level Translator device designed to interface standard I<sup>2</sup>C/SMBus devices operating at different open drain voltage levels. Based on a pair of Philips' GTL2002 Gunning Transceiver Logic-Transceiver Voltage Clamps, the iVoLT translates I<sup>2</sup>C/SMBus high voltage (1.5 V to 5 V) Clock, Data, and /INT signals to I<sup>2</sup>C/SMBus low voltage (at least 1 V below high side voltage) signals.



## Pin Configuration

Pin Number	Symbol	Description
1, 10	/INT	Interrupt Signal
2, 9	VCC	Voltage Reference
3, 8	SDA	Serial Data
4, 7	SCL	Serial Clock
5, 6	GND	Signal Ground

## Interconnects

### I<sup>2</sup>C Interface Connector

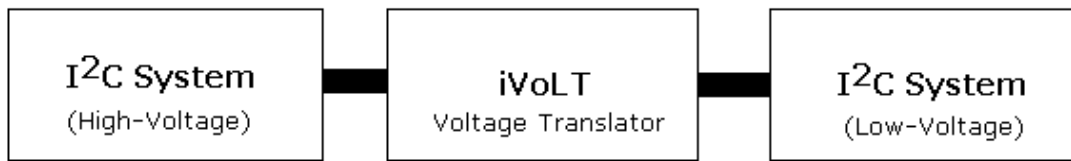
The iVoLT includes connectors for the high voltage side and the low voltage side. Both the high and the low side include connectors for the I<sup>2</sup>C/SMBus and the /INTerrupt signal (optional use).

### /INTerrupt Interface Connector

/INTerrupt is an optional signal used on some I<sup>2</sup>C Bus devices. It is primarily used on slave-only devices to get the attention of a bus master. MCC I<sup>2</sup>C products that support the /INTerrupt signal use a 0.090" (2.03mm) pin/receptacle connector. The iVoLT includes a pin to pin wire for connecting the /INTerrupt signal to external devices such as the iPort/AFM I<sup>2</sup>C adapter.

## Application

For proper bi-directional operation, SDA1, and SCL1 (high-side) must be connected to VCC1 (high-side) voltage through an external pull-up resistor. An optional SDA2, and SCL2 (low-side) pull-up resistor is required if the low-side to high-side to low-side voltage difference is less than 1.5 V. The pull-up resistor value needs to limit the current through the iVoLT when in the “on” state to a maximum of 3 mA (maximum allowed by the I<sup>2</sup>C Bus Specification). Minimum high-side to low-side voltage differential is 1 V.



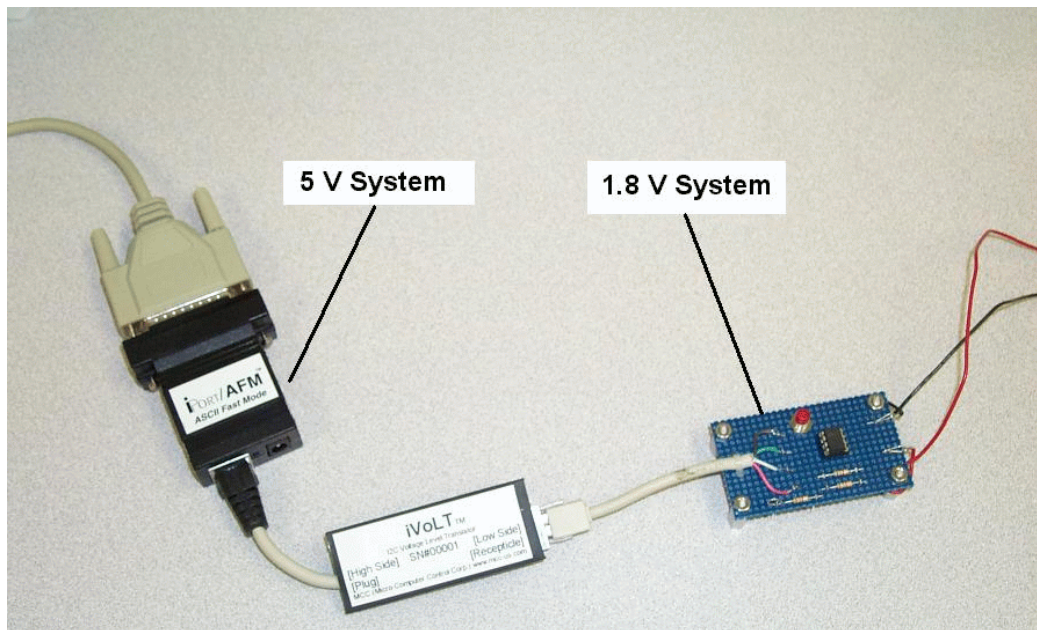
## Applications Notes:

1. Minimum high-side to low-side voltage differential is 1V.
2. Maximum high-side voltage is 5V.
3. Minimum low-side voltage is 1.5V.
4. High-side pull-up resistor required.
5. Low-Side pull-up required in voltage differential is less than 1.5V.

For additional information see the Philips Semiconductor “Bi-Directional Low Voltage Translators” application note AN10145-01.

## Installation

Insert the iVoLT into the I<sup>2</sup>C/SMBus cable between high-voltage and low-voltage I<sup>2</sup>C/SMBus devices. Optionally connect the /INTerrupt line if used.



Typical Application

## Appendix A - I<sup>2</sup>C Connector Information

### Interface Connector and Plug Information

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

#### I<sup>2</sup>C 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

#### I<sup>2</sup>C 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

The following I<sup>2</sup>C Cables are available from MCC

MCC Part # CAB4	I <sup>2</sup> C Interface Cable, 48inches (4ft)
MCC Part # CAB8	I <sup>2</sup> C Interface Cable, 96 inches (8ft)
MCC Part # CAB16	I <sup>2</sup> C Interface Cable, 192 inches (16ft)
MCC Part # CABCL	I <sup>2</sup> 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): iVoLT

Product Part Number(s): IVOLT

Product Description: I2C Bus Voltage Level Translator Module

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: CI02570b

Test Report Date: August 20th, 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