IEEE 488/GPIB BUS INTERFACES

4802

GPIB ⟷ I²C Interface Board

- Controls I²C devices, parallel logic and serial devices.
- I²C Master controls I2C and SMB Bus devices with clock rates up to 1 MHz.
- Easily configured Parallel Bus port to drive external logic.
- Asynchronous serial port with TTL levels.
- Easy to program with SCPI commands.
- Full integration as part of your system or instrument.
- Lock feature protects your configuration and IDN message.
- Accepts 5 to 15 Vdc power for easy integration in test chassis.
- Designed with the OEM in mind.

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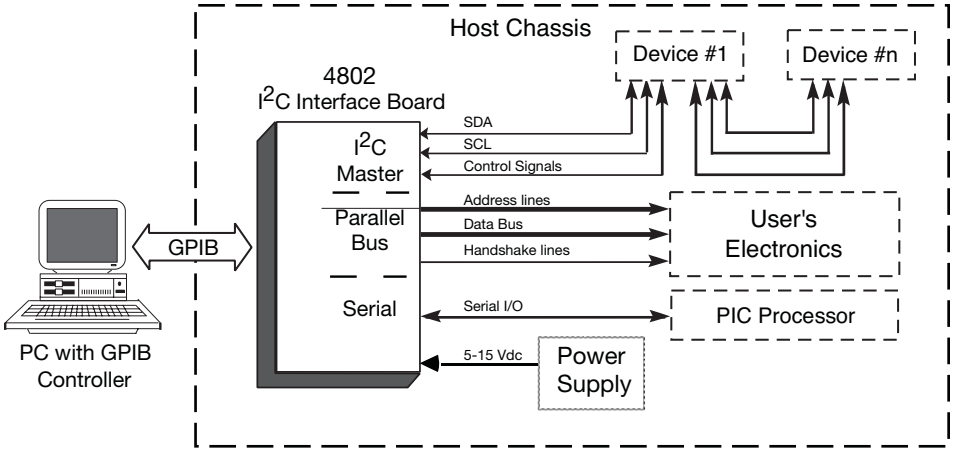
DESCRIPTION

The I²C Bus lets users distribute control of devices in large test chassis by sending serial data to individual latches and processors. This lets a single interface board like ICS's Model 4802 control more devices than can be done with boards with large parallel interfaces and at the same time reduce the wiring complexity. Small, inexpensive satellite boards with an I²C latch or PIC processor can be used to control devices such as relays, RF switches, etc. Board-to-board wiring can be twisted pair wiring, small flat-ribbon cables or even inexpensive CAT 5 cables with RJ45 connectors. Component replacement is just a matter of unplugging a defective board and inserting a new board and device into the system.



The Figure on the right shows how a 4802 could operate in a GPIB controlled test chassis. The I²C Bus is daisy-chained from device-to-device to control relays, switches, sensors etc. The Parallel Bus can be used to write 8-bit data out to latches or other logic devices and to read digital values from other logic elements. The serial port can be used to operate devices that are controlled serially or to communicate with a slave processor that may be operating front panel controls, reading keyboard inputs or updating a display.

The 4802 is ideal for OEM applications. The designer can personalize the 4802's IDN message to report his company's identification. All of the configuration settings can be locked and hidden from the end user so they cannot be changed.

☑ RoHS Compliant

ICS ELECTRONICS
division of Systems West Inc.

7034 Commerce Circle
Pleasanton, CA 94588
Phone: 925.416.1000
Fax: 925.416.0105
Web: www.icselect.com

Versatile Interfaces

The Model 4802 GPIB <-> I²C Interface Board is a multifunction board that provides an I²C port, an 8-bit Parallel Bus and a 3-wire asynchronous Serial Port. The I²C signals comply with the I²C Specification and can also be used to control high-power SMB devices when used in the Standard mode with 100 kHz bit rates. The Parallel Bus can read and write 8-bit data as bytes or bits to the external logic. The Serial Port can operate with signal rates up to 57,600 baud.

I²C Port

Each read or write command lets the user specify the I²C device address as a 7 or 10-bit address and read or write one or more bytes of data. The 4802 normally operates as a single master but can be used in a slave mode. The I²C port includes extra signals for controlling power to external devices, to enable front panel controls, to provide feedback and an interrupt that can be used to generate SRQs.

I²C Connections

The I²C signals are on a 10-pin keyed header with the following signals:

SDA	I²C Data
SCL	I²C Clock
VCC	3.3 or 5 V power
GND	
Interrupt	4802 EDR2 Input
Stable	True when initialized
Remote	True when in Remote
Reset	Pulsed when Device Clear received
StatusA	Status A input
StatusB	Status B input

Parallel Data Bus

The user can transfer data over the 8-bit parallel bus as single or multiple bytes or to toggle bits. Each command lets the user set the bus address and read or write one or more bytes. The parallel bus includes 8 address lines, a data direction line, address stable signal, read and write strobes. The user can configure the signal polarities to match the external logic. Extra signals include a user selectable signal and an interrupt input for generating SRQs.

Parallel Bus Connections

The Parallel Bus Signals are on a 24-pin keyed header. The Parallel Bus includes the following signals:

Addr[7:0]	Address lines
Data[7:0]	Bidirectional Bus
AddrSet	True when address is stable
BusIn	True for input data
WrtStb	Write pulse
RdStb	Read pulse
VCC	5 Vdc
GND	
Interrupt	EDR1 Input
Spare	Selectable as Trigger, Clear, StatusA or an External Reset input

Serial Port

The 4802's 3-wire asynchronous serial port is similar to a PC COM port but uses TTL levels since the serial lines are short and many serial devices and small popular processors do not include RS-232 transceivers. The user can select standard baud rates up to 57,600 baud.

Serial Connections

The Serial Port signals are on a 3-pin header with a lock clip to prevent accidental removal. The signals are:

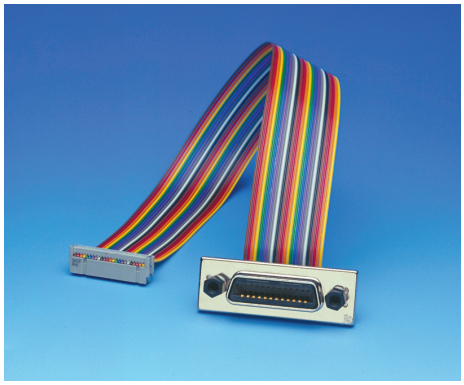
TX	Transmit data out
RX	Receive data in
Gnd	Signal ground

Easy Programming

The 4802 firmware includes a SCPI command parser so the 4802 can be programmed with industry standard SCPI commands or with ICS's short form commands. Calibrate Commands let the user personalize the 4802 with his own IDN string, lock settings to prevent changes and to reset the interface to the factory settings. The setup configuration is saved in nonvolatile flash and becomes the power turn-on configuration.

GPIB Connections

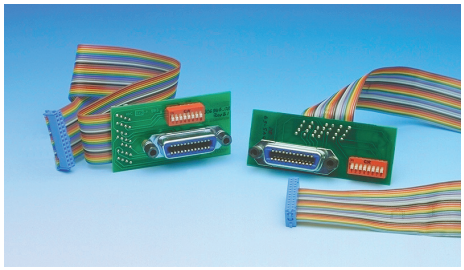
The 4802 has two GPIB headers to give the user the option of mounting just a GPIB connector on the rear panel (and use the internal GPIB address) or mount an Address Switch and GPIB Connector on the rear panel of the host chassis.



114439-L GPIB Cable Assembly

Connector J1 is a 24-pin header that is designed for direct connection to a GPIB bus connector. Use a flat ribbon cable like ICS's P/N 114439-L that has a 24-pin plug on one end and a GPIB connector on the other end. Punch a 'D' hole on the rear panel with two mounting holes. Use the included metric lock studs to mount the GPIB connector to the rear panel.

Connector J2 is a 26-pin header that contains the address switch input signals and the GPIB bus signals. When enabled, the 4802 reads the rear panel switch at power-on time. Connector J2 mates with ICS's GPIB Connector/Address Switch Board Assemblies that mount a GPIB connector and an 8-bit Address rocker switch on the rear panel of a chassis. The assemblies are available in two layout styles as shown in the following picture. Refer to ICS's GPIB Connector/Address Switch data sheet for the GPIB Connector/Address Switch styles, mounting dimensions and cable lengths.



Vertical and Horizontal GPIB Connector/Address Switch Assemblies

Remote LED Connections

The 4802 has a 7-pin header with LED drive signals to drive a remote set of LEDs. The LED drive signals are low true and can sink 3 mA.

IEEE 488 Bus Interface

The 4802's 488 Bus interface meets IEEE STD 488.1-1987 and has the following capabilities:

SH1, AH1, T6, L4, SR1, PP0, DC1, RL0, DT1, C0 and E2 drivers.

Address Capability
Primary address range: 0-30.

SRQ Generation
SRQs are generated if the unit is not a talker, if SRQs are enabled and if an Enabled Event Status Register bit or an monitored digital input change occurs. Digital inputs monitored by the Questionable registers.

488.2 Common Commands
*CLS, *ESE, *ESE?, *ESR?, *IDN?, *OPC, *OPC?, *RCL, *RST, *SAV, *SRE, *SRE?, *STB, TST? and *WAI

SCPI Commands
Used to set and query all programmable functions. The 4802 conforms to SCPI 1994.0 Specification.

I²C Bus

4802 operates as an I²C master and supports 7 and 10-bit addresses.

I2C	SDA, SCL, VCC, GND 3.3 V signals with 150/1100 Ω pullups for standard, fast and fast plus clocks
TTL	High = > +2.0 V @ ±10 µA
Logic	Max High = 5.5 V
Levels	Low = <0.8 V @ 250 µA with 33 Kohm pullup to +5 Vdc for sensing contacts.
Remote	TTL output asserted when in the remote state
Reset	TTL output pulse when the 4802 receives a *RST or Device Clear.
Stable	TTL output asserted when the saved ports have been configured.
Interrupt	TTL input signal sets EDR2
StatusA	TTL input
StatusB	TTL input

Parallel Bus

A bidirectional 8-bit data bus with TTL levels. User selectable logic polarities.

Input	High = > +2.0 V @ ±10 µA Max High = 5.5 V
Output	High = >3 V with 3 mA source
Logic	High =>2 V with 24 mA source
Levels	Low = 0.0 to +0.55 Vdc, 48 mA sink
Timing	Address lines and data direction lines set before AddrSet signal goes true. Data stable before write strobe.
BusIn	True for input data direction
AddrSet	True when address stable
Wrt Stb	Output, 5 µs pulse
Rd Stb	Output, 0.2 µs pulse,
Interrupt	Input signal sets EDR1
Spare	User selectable signal as: Reset: 40 µs pulse for *RST and Device Clear. 70 ms pulse when 4802 is reset or powered on. Trigger: 5 µs pulse for *TRG or GPIB Device Trigger (GET) Status A: Input signal External Reset: 4802 reset signal.

Serial Port

Three-wire asynchronous serial port for communicating with serial devices.

Signals	TX, RX and Ground
Levels	TTL, high for mark
Baud	300 to 57,600 baud in standard steps. Default is 9600 baud.
Format	8 data bits, 1 stop bit, no parity
Buffers	256 characters for RX and TX

Diagnostic Indicators

Six LEDs with drive signals on the DIN connector for remote LEDs: PWR, RDY, TALK, LSTN, SRQ and ERR

Output	High = >3 V with no load
Logic	Low = 0.0 to +0.55 Vdc,
Levels	3 mA sink max.

Physical

Size, L x W x H
127. x 114.3 x 14.3 mm
(5.0 x 4.5 x 0.562 inches)

Connectors and Headers

GPIB:	24-pin male hdr.
GPIB/Addr:	26-pin male hdr.
I2C:	10-pin, male hdr.
Parallel Bus:	24-pin male hdr.
LEDs:	7-pin header.
Serial:	3-pin header

Temperature

Operation	-10° C to +70° C
Storage	-20° C to +85° C

Humidity
0-90% RH without condensation

Power
+5 ± 0.2 Vdc or +5.5 to 15 Vdc unregulated. 400 mA max.

Included Accessories

Instruction Manual
Support CD with sample programs
3-wire serial plug

Available Accessories

GPIB flat ribbon cable 90 cm max., P/N 114439-90.
GPIB Connector/Address Switch Assy with flat ribbon cable, 90 cm max., P/N 113640-90 or P/N 113642-90. See the GPIB Conn/Addr Sw datasheet for more details.

ORDERING INFORMATION

	Part Number
IEEE 488.2 to Parallel Digital Interface Board (Includes Instruction Manual and Configuration Disk)	4802
IEEE 488.2 to Parallel Digital Interface Board (Board only)	115962
GPIB Connector/Address Switch Assemblies	see separate data sheet
GPIB Flat Ribbon Cables	see separate data sheet