

BOARD LEVEL PRODUCTS

4809A

GPIB<->MODBUS INTERFACE BOARD

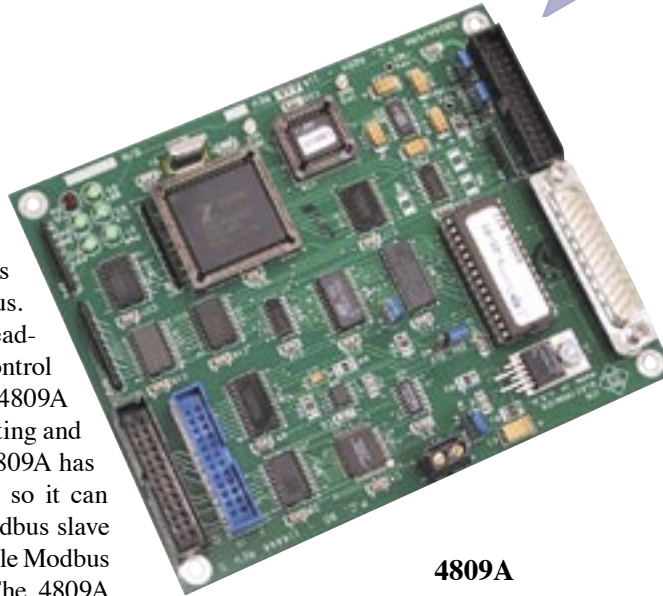
DESCRIPTION

ICS's 4809A GPIB<->Modbus Interface is an IEEE 488.2/GPIB to Serial Interface that easily adapts Modbus slave devices to the GPIB or HP-IB bus. The 4809A lets the user send simple read-write messages on the GPIB bus to control and query slave Modbus devices. The 4809A does all of the Modbus packet formatting and handles the response packets. The 4809A has both RS-232 and RS-485 interfaces so it can be connected directly to a single Modbus slave device or it can be connected to multiple Modbus devices via an RS-485 network. The 4809A firmware has an expanded Modbus command set and now includes 32-bit floating point commands so it can control newer temperature controllers. The 4809A is fully backward compatible with the earlier 4809.

The 4809A is a small 4.5 x 5.5 inch board that is normally mounted inside the host chassis with the Modbus device. The 4809A is powered by +5 to +15 volts so, in most cases, it can be connected an existing power supply. GPIB signal connections are made with flat ribbon cables that plug into headers on the 4809A. One header is for direct connection to a panel mounted GPIB connector and a second header is for ICS's GPIB Connector/Address Switch Assemblies. The GPIB Connector/Address Switch Assemblies mount to the host's rear panel and have an 8-bit rocker switch for externally setting the 4809A's GPIB address. Serial connections can be done with a flat ribbon cable to a 26-pin header or by plugging into a DB-25P connector.

Operation

The user sends commands to the 4809A that sets the Modbus device address, specifies the register to be read or written to and the data value. The 4809A converts these commands into the



4809A

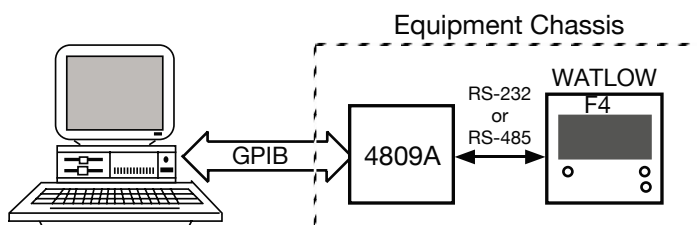
Modbus RTU format, adds the CRC checksum and transmits the messages to the Modbus device. Received messages are checked and the responses to queries are outputted to the GPIB bus when the 4809A is next addressed to talk.

Modbus communication faults, exception messages and other errors are reported to the user through a Modbus error register in the 4809A's 488.2 Status Structure. The user can set up the 4809A's Status Structure to generate a SRQ on an error or simply read the Modbus Error register if a problem occurs. Application Note, AB48-25 describes how to use the 4809A to control a Modbus device and includes a example Visual Basic control program.

Configuring

The 4809A's SCPI command parser lets the user configure and query the 4809A's interface settings with SCPI commands. This includes the serial communication settings, GPIB Address, Status Structure Register settings, data format and Modbus timeout. The GPIB Address can be saved internally or read from an external address switch. The user can also enter his own IDN message to personalize the 4809A as part of his own system. The *SAV 0 command saves the current configuration setting and Modbus device address in a nonvolatile memory so it can be recalled when the 4809A is powered-on or reset.

- Converts simple ASCII commands into Modbus RTU messages.
Relieves user from having to generate and check RTU packets.
- Expanded Modbus RTU Command Set now includes Floating Point commands.
Controls a wider range of Modbus devices.
- Provides both single ended RS-232 and balanced RS-422/RS-485 serial signals.
Connects to single and multiple Modbus devices.
- GPIB Interface is IEEE-488.2 Compliant.
Meets latest GPIB Standards.
- Saves GPIB address, serial settings and user IDN message in nonvolatile memory.
Personalize the 4809 as part of your system.
- Diagnostic LEDs show address and status.
Visual indication of operation and test status.
- Operates on +5 to 15 volt power.
Uses existing power supplies in most cases.



Interfacing a Watlow Controller to the GPIB Bus



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

4809A: ORDERING GUIDE

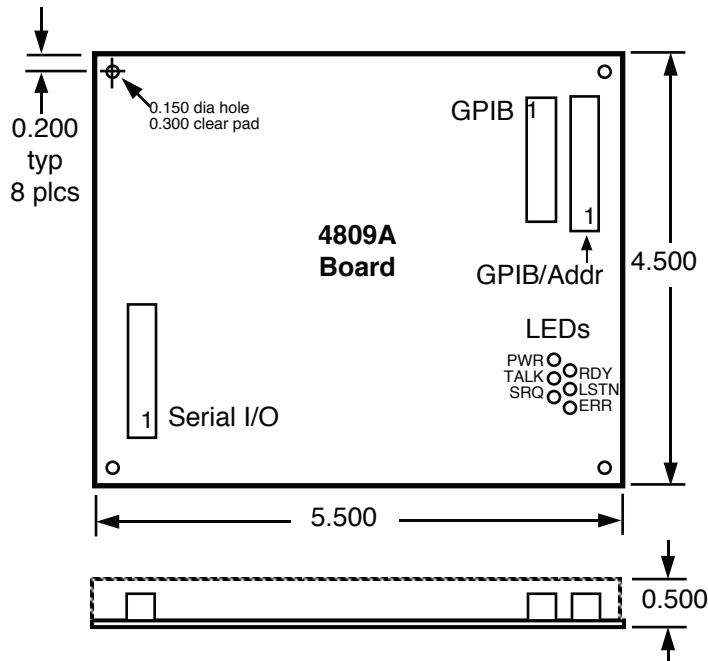
Start with the 4809A board and then pick your accessory items.

Part Selection	Qty	Part Number
Standard 4809A board	(1)	4809A
Select a GPIB Connector/Address Switch Assembly - Horizontal style or Select a GPIB Flat ribbon Interface Cable with metric studs	(1)	113640-L
	(1)	113642-L
Select an optional mating serial connector and hood - DB-25S connector or Select an optional 5 foot long open end serial cable for a Watlow 942 temperature controller or for another serial device.	(1)	902000
	(1)	902008
	(1)	114439-L
	(1)	115118

Notes:

-L is the cable length in cm. You can order any length from 10 to 90 cm.

Standard stocked lengths are: 30, 45, 60 and 90 cm. Select an appropriate length as it is best to not have extra cable coiled up in the chassis to minimize EMI pickup. See the GPIB Connector/Address Switch Assembly data sheet for more details.



4809A Outline Dimensions

4809A: SPECIFICATIONS

IEEE 488 Bus Interface

The 4809A's 488 Bus Interface meets IEEE STD 488.2-1987 and has the following capabilities:

SH1, AH1, T5, L3, SR1, PP0, DC1

RL0, DT0, C0 and E1/E2 drivers

Bus drivers incorporate power up/down protection to prevent glitching the bus during power turn-on.

Address Capability

Primary addresses 0-30.

Buffers

GPIB Input	2 Kbytes
GPIB Input	1 Kbytes
Serial Input/Output	256 bytes

Status Reporting Structure

IEEE-488.2 and SCPI Status Byte, ESR, Questionable and Operational Registers.

SRQ Generation

SRQs are generated per the IEEE-488.2 specification if the unit is not addressed to talk, if SRQs are enabled and if an enabled register bit occurs.

488.2 Common Commands

*CLS, *ESE, *ESE?, *ESR?, *IDN?, *OPC, *OPC?, *PSC, *RST, *SAV, *SRE, *SRE?, *STB, *TST?, AND *WAI.

SCPI Commands

The 4809A conforms to the SCPI 1994.0 Specification and uses SCPI commands to set:

GPIB Bus Address
External GPIB Address Enable
Baud rate select
Data bits 7 or 8
Stop bits 1 or 2
Parity Odd, Even or None
RS485 Half-Duplex operation
Talk Format HEXlist or ASCii

Included Accessories

Instruction Manual
Configuration Disk with menu driven configuration programs sample programs.

Serial Interface

Full duplex serial interface with single ended RS-232 and differential RS-422 (RS-485) signals. Signal selection made by jumpers on the 4809A. RS-485 half-duplex operation enabled with a SCPI command.

RS-232 Signals Tx/D, Rx/D, RTS, CTS, DSR and DTR

RS-422 Signals Tx and Rx pairs

Baud Rates: 300, 600, 1.2K, 2.4K, 4.8K, 9.6K, 19.2K and 38.4K baud

Data Bits 7 or 8 bits

Parity Odd, even or none

Stop Bits 1 or 2

Modbus Commands

Modbus commands accept ASCII decimal values or HEX values starting with #h. Code is the Modbus RTU command code produced by the 4809A. Integer and register values from 0 to 65,535. Floating Point per IEEE-754.

Cmd	Code	Function
C n	-	Sets Device Address
RI? reg, n	0x02	Reads Discrete Inputs from register <i>reg</i>
R? reg, n	0x03	Reads <i>n</i> words from register <i>reg</i>
RF? reg	0x03	Reads floating point value from register <i>reg</i> and <i>reg+1</i>
RR? reg,n	0x04	Reads <i>n</i> words from register <i>reg</i>
RE?	0x07	Reads Exception value
WC reg,b	0x05	Writes boolean <i>b</i> to coil
W reg, w	0x06	Writes to a single register <i>reg</i>
WB reg, n, w...w	0x10	Writes multiple words <i>n</i> to a single register <i>reg</i>
WF reg, n	0x16	Writes a floating point value to register <i>reg</i> and <i>reg+1</i>
L w	0x08	Performs loopback test
D time		Sets serial timeout in ms
E?		Queries Modbus Error Register

Compatible Controllers

The following is a partial list of compatible Modbus RTU Slave Controllers:

Watlow F4, 96, SD and EZ Zone series

Cincinnati SubZero EZT550

Physical

Size, L x W x H

139.7 x 114.3 x 12.7 mm
(5.5 x 4.5 x 0.5 inches)

Connectors:

Three flat ribbon headers

GPIB: 24-pin 3M 2524 male connector mates to panel mounted GPIB connector.

GPIB/Addr: 26-pin 3M 2526 male connector mates to ICS GPIB/Connector Switch Assemblies.

Serial: 26-pin 3M 2526 male connector mates to a DB-25 pin connector.

LED Indicators:

PWR, RDY, TALK, LSTN, SRQ and ERR

Temperature:

Operation -10° C to +55° C

Storage -20° C to +85° C

Humidity:

0-90% RH without condensation

Power: +5 to +15 Vdc
400 mA (typical)

Available Accessories

See the Ordering Guide on page 2 for a complete list of accessory items.

GPIB flat ribbon cable, 90 cm max.,
P/N 114439-90.

GPIB Connector/Addr Sw Assy with flat ribbon cable, 90 cm max.,
P/N 113640-90 or 113642-90.

ORDERING INFORMATION

	Part Number
GPIB - Serial Interface Board (includes Manual and Configuration Disk)	4809A
GPIB - Serial Interface Board (Board only)	114922
4809A Starter Kit includes 4809A Board, 488-LPCI GPIB Controller, Cables, Manual and CD-ROM	114923-01
4809A Starter Kit includes 4809A Board, 488-USB2 GPIB Controller, Cables, Manual and CD-ROM	114923-02