

## IEEE 488/GPIB Bus Interface

# 4899A

## GPIB<->MODBUS INTERFACE

### DESCRIPTION

ICS's 4899A GPIB<->Modbus Interface is an IEEE 488.2/GPIB to Serial Interface that adapts Modbus slave devices to the GPIB or HP-IB bus. The 4899A lets the user send simple read-write messages on the GPIB bus to control and query slave Modbus devices. The 4899A does all of the Modbus packet formatting and handles the response packets. The 4899A 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 4899A firmware has an expanded Modbus command set and now includes 32-bit floating point commands so it can control newer temperature controllers. The 4899A is fully backward compatible with the earlier 4899.

The 4899A is packaged in ICS's small Minibox™ case that can be rack mounted in a 1 U high space. Connections to the GPIB bus and the Modbus are made via standard IEEE 488 and a 25-pin serial connectors on the 4899A's rear panel.

### Operation

The user sends simple commands to the 4899A that sets the Modbus device address, specifies the Modbus device register to be read or written to and the data value. The 4899A converts these commands into the 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 4899A is next addressed to talk.



4899A Modbus Interface

Modbus communication faults, exception messages and other errors are reported to the user through a Modbus error register in the 4899A's 488.2 Status Structure. The user can set up the 4899A'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 4899A to control a Modbus device and includes an example Visual Basic control program.

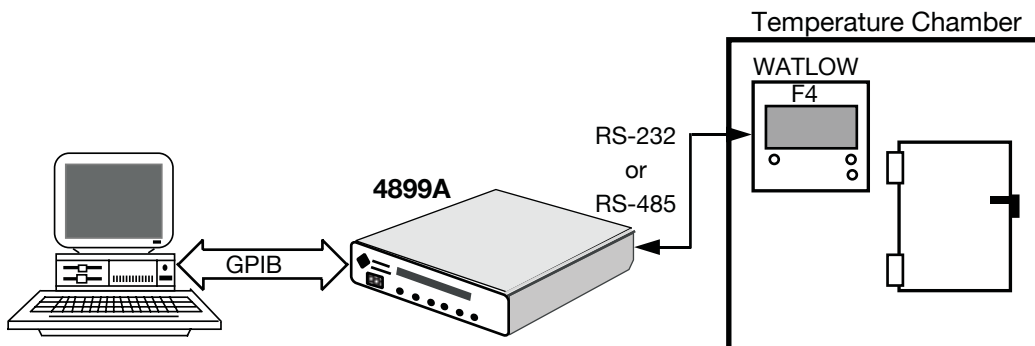
### Configuring

The 4899A's SCPI command parser lets the user configure and query the 4899A's interface settings with SCPI commands. This includes the serial communication settings, GPIB Address, Status Structure Register settings, data format and Modbus timeout. The user can also enter an IDN message to personalize the 4899A 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 4899A 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 and serial interface settings in nonvolatile memory.  
*Configures unit without having to remove the cover.*
- Front panel LEDs show address and status.  
*Visual indication of operation and test status*
- Small 1 U high, metal box design has CE approval  
*Rugged case with full EMI/RFI protection.*

CE Approved

RoHS Compliant



Using a 4899A to connect a Temperature Chamber to the GPIB Bus

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## 4899A: SPECIFICATIONS

### IEEE 488 Bus Interface

The 4899A'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 4899A 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

### 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 4899A. RS-485 half-duplex operation enabled with a SCPI command.

RS-232 Signals	TxD,RxD,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 4899A. Integer and register values from 0 to 65,535. Floating Point per IEEE-754.

Cmd	Code	Function
C n	-	Sets Device Address
RC? reg, n	0x01	Reads coils <i>n</i> from register <i>reg</i>
RI? reg, n	0x02	Reads Discrete Inputs <i>n</i> from register <i>reg</i>
R? reg, n	0x03	Reads <i>n</i> words starting with 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 starting with 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 word <i>w</i> 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	0x10	Writes a floating point value <i>n</i> 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, F4T (serial), 96, SD and EZ Zone series  
Cincinnati SubZero EZT550

### Controls and Indicators

#### CONTROLS

Power Front-panel switch

#### LEDs

PWR	On when power applied
RDY	On when self test passed
TALK	On when addressed to talk
LSTN	On when addressed to listen
SRQ	On when asserting SRQ
ERR	On when ESR error bits set

### Physical

#### Size

7.45" L x 5.57" W x 1.52" H  
(18.92cm L x 14.15cm W x 3.86cm H)

#### Weight

3lbs. (1.4kg.) including adapter

#### Temperature

Operating -10 °C to +55 °C  
Storage -20 °C to + 70 °C

#### Humidity

0-90% RH without condensation

#### Shock/Vibration

Normal handling only

#### Construction

All metal case

#### Power

9 to 32 Vdc @ 3.5 VA

### Included Accessories

#### Instruction Manual

3.5 in Configuration Program Disk  
UL/CSA/VDE approved AC power

Adapters provided for:

US - 115±10% Vac, 60 Hz (std)  
-U option is a universal adapter for  
115/230±10% Vac, 50/60 Hz with plugs for  
US, UK, Europe, Australia/China and Japan

### Included Accessories

#### Instruction Manual

Configuration Disk with menu driven configuration programs for ICS, NI and compatible GPIB Controller Cards and sample programs.

## ORDERING INFORMATION

GPIB - Modbus Interface (includes Manual and Configuration Disk)

Part Number

4899A

GPIB - Modbus Interface with 115/230 VAC adapter.

4899A-U

GPIB - Modbus Interface (unit only)

114932