



POWERWARE[®] MODBUS[®] CARD

User's Guide

www.powerware.com

Class A EMC Statements

FCC Part 15

NOTE This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

ICES-003

This Class A Interference Causing Equipment meets all requirements of the Canadian Interference Causing Equipment Regulations ICES-003.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

EN50091-2

Some configurations are classified under EN50091-2 as "Class-A UPS for Unrestricted Sales Distribution." For these configurations, the following applies:

WARNING This is a Class A-UPS Product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take additional measures.

Requesting a Declaration of Conformity

Units that are labeled with a CE mark comply with the following harmonized standards and EU directives:

- Harmonized Standards: EN 50091-1-1 and EN 50091-2; IEC 950 Second Edition, Amendments A1, A2, A3, and A4
- EU Directives: 73/23/EEC, Council Directive on equipment designed for use within certain voltage limits
93/68/EEC, Amending Directive 73/23/EEC
89/336/EEC, Council Directive relating to electromagnetic compatibility
92/31/EEC, Amending Directive 89/336/EEC relating to EMC

The EC Declaration of Conformity is available upon request for products with a CE mark. For copies of the EC Declaration of Conformity, contact:

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CHAPTER 1

INTRODUCTION

The Powerware® Modbus® Card is an X-Slot™ connectivity device that allows you to continuously and reliably monitor the UPSs in your Building Management System (BMS). The card uses the Modbus protocol to integrate data from the UPS into your Building Management Software, such as Wonderware®.

The Modbus Card, shown in Figure 1, has the following features:

- RS-485 communication through an isolated DB-9 port or isolated terminal strip
- Selectable termination and polarity resistance
- RS-232 communication through a DB-9 port
- Supports Modbus READ INPUT STATUS and READ INPUT REGISTER commands
- Two-wire or four-wire communication topology
- LEDs showing communication activity
- A utility is supplied that generates a Modbus register map for easy integration into your building management software
- X-Slot design for UPSs with an internal X-Slot or installed in the Expansion Chassis for UPSs that do not have internal X-Slots

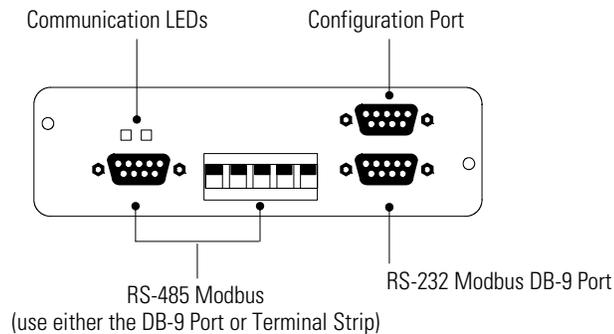


Figure 1. The Modbus Card

Figure 2 shows a Powerware UPS added to an existing network by connecting the terminal strip on the Modbus Card to the RS-485 terminals on another device.

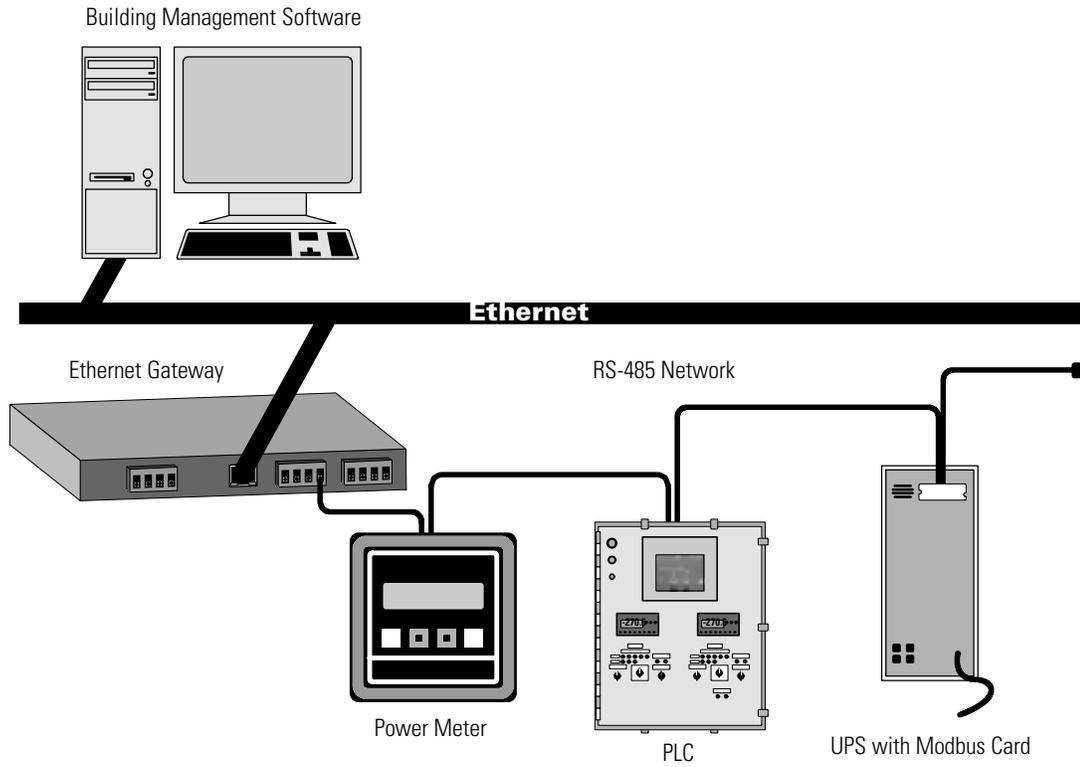


Figure 2. UPS Integrated with RS-485 Network



CHAPTER 2

INSTALLING THE MODBUS CARD

The Modbus Card is available:

- as a separate card for use with UPSs that have an X-Slot
- factory-installed in a Powerware Expansion Chassis

Use the following sequence for installing the Modbus Card:

1. For four-wire networks only, change the jumper on the Modbus Card (see “Four-Wire Communication” on page 4).
2. If the Modbus Card will be the last device installed in the network chain, termination needs to be enabled (see “Termination” on page 11).
3. Install the card with the UPS (see the *Powerware Expansion Chassis User’s Guide* or “Installing the Modbus Card into an X-Slot” on page 6).
4. Wire the card to your network (see Chapter 3, “Wiring the Modbus Card” on page 7).
5. Configure the card (see Chapter 4, “Configuring the Modbus Card” on page 13).
6. Run the Profiler tool to integrate the UPS data with the building management software (see Chapter 5, “Integrating the UPS” on page 17).

Inspecting the Equipment

If any equipment has been damaged during shipment, keep the shipping cartons and packing materials for the carrier or place of purchase and file a claim for shipping damage. If you discover damage after acceptance, file a claim for concealed damage.

To file a claim for shipping damage or concealed damage: 1) File with the carrier within 15 days of receipt of the equipment; 2) Send a copy of the damage claim within 15 days to your service representative.

Four-Wire Communication

The factory-default setting for the Modbus Card is for two-wire communication. To change the default setting, adjust the jumpers on the Modbus Card.



CAUTION

To prevent electrostatic discharge (ESD), place one hand on an unpainted metal surface such as the UPS rear panel.

1. If you are installing the Modbus Card into an X-Slot, complete Step 3 only.
If you are installing the Expansion Chassis with your UPS, complete Steps 2 through 4.
2. Remove the card from the slot. Retain the screws (see Figure 3).

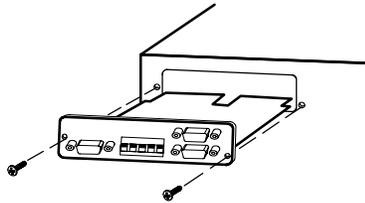


Figure 3. Removing the Modbus Card

3. Change the jumpers to the desired setting as shown in Figure 4.

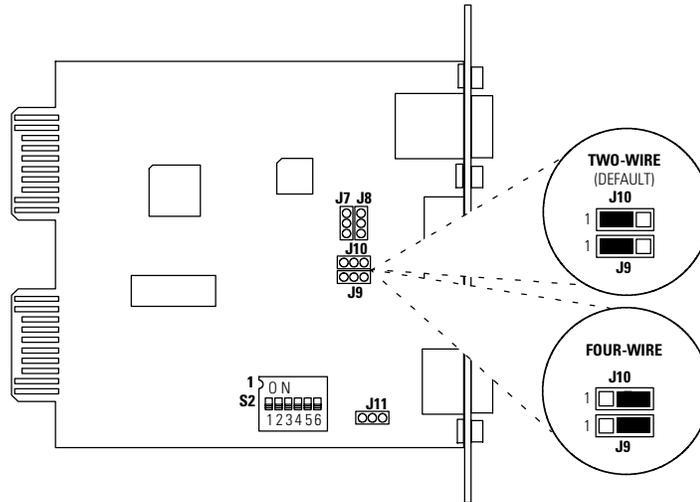


Figure 4. Four-Wire Jumpers

4. Reinstall the Modbus Card into the Expansion Chassis.
Align the Modbus Card with the slot guides and slide the card into the slot until it is firmly seated.
Secure the Modbus Card with the screws removed in Step 2.

Installing the Modbus Card into an X-Slot



CAUTION

To prevent electrostatic discharge (ESD), place one hand on an unpainted metal surface such as the UPS rear panel.

1. Remove the X-Slot cover (or existing X-Slot module) on the UPS rear panel. Retain the screws (see Figure 5).



NOTE Some UPSs may have another X-Slot module already installed (such as the Powerware 9125 UPS). If there is a communication cable attached to this module, disconnect the cable and then remove the X-Slot module.

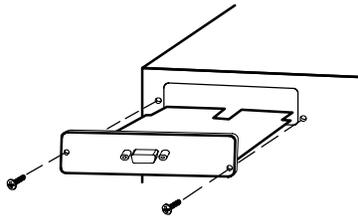


Figure 5. Removing the Single-Port Module

2. Install the Modbus Card into the X-Slot on the UPS.
Align the Modbus Card with the slot guides and slide the card into the slot until it is firmly seated.
Secure the Modbus Card with the screws removed in Step 1.



CHAPTER 3

WIRING THE MODBUS CARD

The Modbus Card provides an easy path for integrating a Powerware UPS into an RS-485 Modbus network and also provides isolation of the communication between the UPS and the RS-485 Modbus network.

You can use the DB-9 port or terminal strip on the Modbus Card to wire into a two-wire or four-wire network.

Two-Wire Networks

The Modbus Card's default configuration is for two-wire, half-duplex, RS-485 networks. Figure 6 shows a detailed view of two-wire connections using the Modbus Card terminal strip.

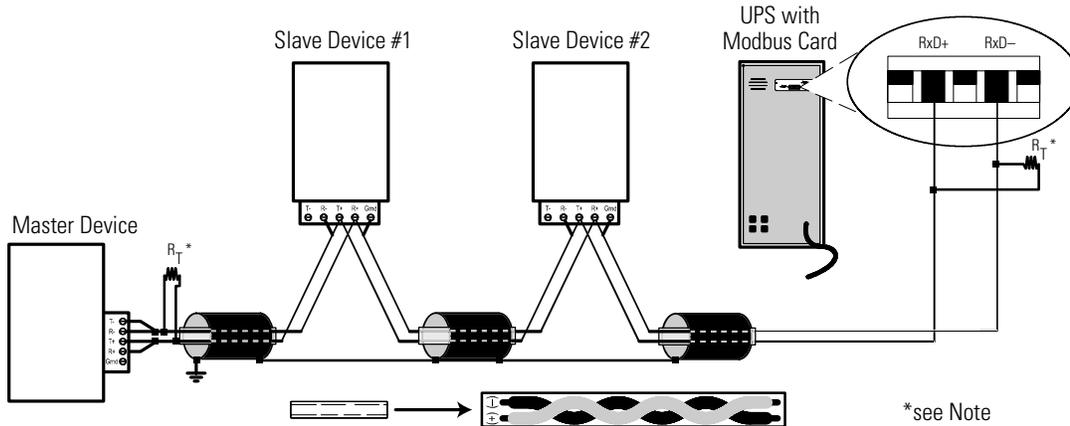


Figure 6. Two-Wire RS-485 Modbus Network



NOTE Only one transmission pair is used. It is not necessary to jumper the unused pair together (this connection is made internally). Belden 9841 or equivalent cabling (a single twisted-pair shielded cable with ground) is recommended.

NOTE If the Modbus Card is the last device installed in the chain, termination needs to be enabled (see page 11).

Four-Wire Networks

The Modbus Card also supports four-wire, half-duplex, RS-485 networks. Figure 7 shows a detailed view of four-wire connections using the Modbus Card terminal strip.

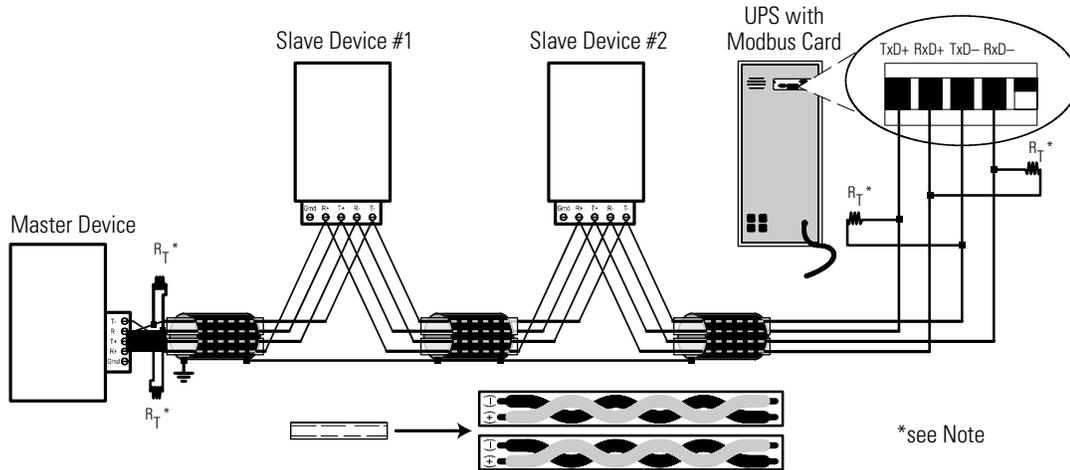


Figure 7. Four-Wire RS-485 Modbus Network



NOTE Belden 9842 or equivalent cabling (a dual twisted-pair shielded cable with ground) is recommended.

NOTE If the Modbus Card is the last device installed in the chain, termination needs to be enabled (see page 11).

RS-485 Terminal Strip

The RS-485 five-position terminal strip provides an alternate interface to attach the RS-485 transmission lines. This connector also allows external resistors to be applied to terminate the network.

Before connecting the RS-485 network to the Modbus Card, remove the detachable plug from the 5-pin terminal strip connector. The RS-485 signal names are shown just above the connector (see Figure 8).

For two-wire networks. Connect the RS-485 network signal TxD(+) to the RxD(+) input signal on the Modbus Card terminal strip. Connect the RS-485 network signal TxD(–) to the RxD(–) input signal on the Modbus Card terminal strip. The Modbus Card factory-default jumper setting for J9 and J10 is two-wire communication.

For four-wire networks. All four RS-485 network signals including TxD(+), RxD(+), TxD(–), and RxD(–) must be connected to the terminal strip as illustrated in Table 1. Verify that the Modbus Card J9 and J10 jumpers are set to the four-wire option (see “Four-Wire Communication” on page 4).

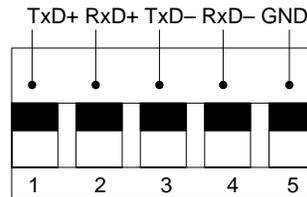


Figure 8. RS-485 Terminal Strip

Table 1. RS-485 Terminal Strip Pin Assignments

Five-Pin Terminal Strip	Modbus Card Signal Name	RS-485 Network Signals Master Signal Name
1	TxD(+)	RxD(+)
2	RxD(+)	TxD(+)
3	TxD(–)	RxD(–)
4	RxD(–)	TxD(–)
5	Signal common	Signal common

RS-485 Modbus Port

For two-wire networks. Connect the RS-485 network signal TxD(+) to the Modbus RxD(+) input signal (DB-9 Pin 1). Connect the RS-485 network signal TxD(–) to the Modbus RxD(–) input signal (DB-9 Pin 6). The Modbus Card factory-default jumper setting for J9 and J10 is two-wire communication.

For four-wire networks. All four RS-485 network signals including TxD(+), RxD(+), TxD(–), and RxD(–) must be connected to the pin assignments on the DB-9 connector as illustrated in Table 2. Verify that the Modbus Card J9 and J10 jumpers are set to the four-wire option (see “Four-Wire Communication” on page 4).

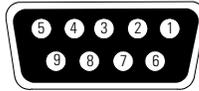


Figure 9. RS-485 DB-9 Pin Numbers

Table 2. RS-485 DB-9 Pin Assignments

Pin Number	Modbus Card Signal Name	RS-485 Network Signals Master Signal Name
1	RxD(+)	TxD(+)
2	TxD(+)	RxD(+)
3	Signal common	Signal common
4	Reserved	—
5	Reserved	—
6	RxD(–)	TxD(–)
7	TxD(–)	RxD(–)
8	Reserved	—
9	Reserved	—

Termination



CAUTION

Termination resistors should be placed only at the extreme ends of the RS-485 network. No more than two termination points should be used in the RS-485 network.

Termination is not required unless the Modbus Card is located at the end of the RS-485 network and the length of the network cable is excessive.

If receive termination is required, an on-board 120 ohm termination resistor may be selected by setting S2-3 to the ON position. A 120 ohm resistor will be placed in parallel with the RxD(+) and RxD(-) lines (see Figure 10).

If transmit termination (four-wire networks) is required, an on-board 120 ohm termination resistor may be selected by setting S2-4 to the ON position. A 120 ohm resistor will be placed in parallel with the TxD(+) and TxD(-) lines (see Figure 10).

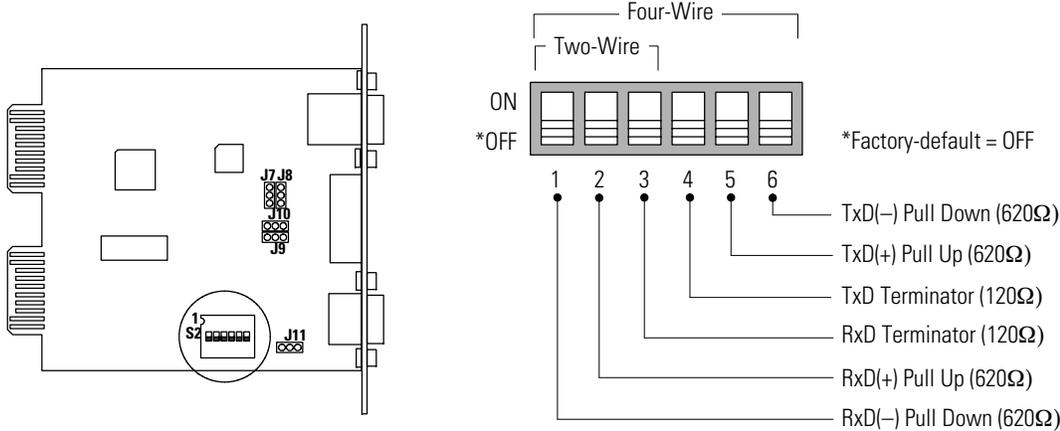


Figure 10. S2 Termination Configuration

If a value other than the on-board 120 ohm termination is required, then S2-3 and S2-4 should be set to the OFF position. The terminal strip, located on the Modbus Card faceplate, provides easy access to attach external termination resistors across the TxD(+), TxD(-), RxD(+), and RxD(-) RS-485 network lines.

Biasing Resistors



CAUTION

Biasing resistors should be used at only one point in the RS-485 network.

Biasing resistors are used to ensure that the idle voltage sensed across the receiver does not create false data bits. The factory-default for S2 (1–6) is OFF.

Two on-board 620 ohm biasing resistors may be selected by placing S2-1 and S2-2 in the ON position. If biasing is set at the master terminal unit, then S2-1, S2-2, S2-5, and S2-6 should be set to the OFF position.

RS-232 Modbus Port

It is also possible to use the RS-232 Modbus port for connecting to your network.

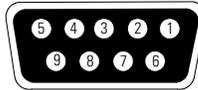


Figure 11. RS-232 DB-9 Pin Numbers

Table 3. RS-232 DB-9 Pin Assignments

Pin Number	Function	Direction from the Modbus Card
1	No connection	—
2	RS-232 transmit data	Out
3	RS-232 receive data	In
4	No connection	—
5	Signal common	—
6	No connection	—
7	No connection	—
8	No connection	—
9	No connection	—



CHAPTER 4

MODBUS CARD CONFIGURATION

The Modbus Card has an RS-232 configuration port that you can access with a terminal or a computer equipped with a terminal emulation program.

To use the configuration screens for the Modbus Card, you need:

- A serial communication cable.
- A terminal with a serial communication port, or a PC with a terminal emulation program such as HyperTerminal®

The serial line should be set to 9600 baud, No parity, 8 bits, 1 stop bit, and no hardware shaking. The configuration port always runs at these settings.

Configuring the Modbus Card



NOTE The Modbus Card is already configured for communication at 9600 baud and the Network ID is set to 29. If you do not need to change these settings, continue to Chapter 5, “Integrating the UPS” on page 17 to incorporate the UPS data into your Modbus software.

To connect the card to the PC and start the terminal emulation program:

1. Connect the supplied serial cable to the Configuration port on the Modbus Card.

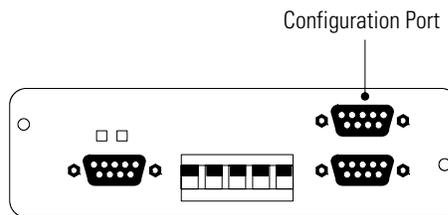


Figure 12. Configuration Port

2. Connect the other end of the cable to an available communication port on your computer or terminal.

3. Press [Enter]. The Configuration screen appears (see Figure 13).

```

Powerware Modbus Card
Version 1.00 (1-16-02)

Current Configuration:

Baud Rate:      9600
Slave Address:  29
-----

Valid Commands:

AD Change Slave Address, usage AD n,
   where n is the new slave address for the card (1 - 247 valid).
BD Change Modbus Baud Rate, usage BD n,
   where n is the new baud rate (1200, 2400, 4800, 9600, 19200).
SA Save Configuration
-----

```

Figure 13. Configuration Screen

If the Configuration screen does not appear, press [Enter] one more time.

If you still do not see the Configuration screen, check the following conditions:

- The communication settings of the terminal should be 9600 baud, No parity, 8 bits, 1 stop bit, and no hardware shaking.
 - If the serial configuration is correct, check the cabling to be sure all connections are secure.
 - Verify that your terminal program is on the correct communication port for serial communication.
 - Verify that the UPS has input power and is turned on.
4. To configure the Modbus Card baud rate, type **BD** followed by a space and the baud rate (1200, 2400, 4800, 9600, or 19200) and press [Enter]. The default is 9600 baud. This setting affects both RS-232 and RS-485 Modbus connections.
 5. To configure the slave address, type **ID** followed by a space and node (1 through 247) and press [Enter]. The default is 29. This setting affects both RS-232 and RS-485 Modbus connections.

6. To save and exit, type SA and press [Enter] to permanently save the new configuration changes.
7. The card is now configured. Shut down the terminal program and disconnect the serial cable from the Modbus Card.
8. Continue to Chapter 5, “Integrating the UPS” on page 17.



CHAPTER 5

INTEGRATING THE UPS

Powerware provides a software tool named Profiler that creates a Modbus register map specifically for your Powerware UPS. See the Master Modbus Register Map (*reg_map.pdf*) on the supplied Powerware diskette for a complete list of the Status, Alarm, and Meter data for all Powerware UPS equipment.

You need the following system requirements to install the Profiler tool:

- Microsoft® Windows® 9x, NT, 2000, or XP operating system
- 100 KB of free hard drive space
- 100 KB of free RAM
- An open RS-232 communication port on your computer

Generating Modbus Data

To generate Modbus data that your building management software needs to poll UPS information:

1. Connect the supplied serial cable from the Configuration port on the Modbus Card to an available RS-232 communication port on your computer.

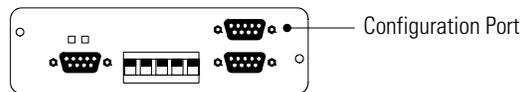


Figure 14. The Configuration Port

2. Copy the *profiler.exe*, *profiler.ini*, *InputStatus.txt*, and *InputRegisters.txt* files from the supplied Powerware diskette to your PC.
3. From the command prompt, run *profiler comX 9600*, where X is the communication port number on your PC and 9600 is the baud rate for communication with the UPS.

Alternately, if you run *profiler* (without the parameters), it defaults to COM1 and 9600 baud.

4. Profiler creates an output file named *profiler.csv* in the directory where the Profiler tool is located.

Before the program exits, you are prompted to view the data.

The comma delimited file can be easily imported into Microsoft Excel for viewing of the Modbus data. This data is used to create the necessary template files on your Building Management System for polling the desired UPS information.

Example Profiler Output Files

The following tables are sample Profiler output files. For a complete Master Modbus Register Map, refer to the *reg_map.pdf* file on the Powerware diskette.

Table 4. Read Input Status - Modbus Function Code 02 (Inputs Start at 10000)

Register	Name	Example Value	Format	Unit
1	On Battery	0	BOOL	Status
2	Output Overload	0	BOOL	Status
3	Rectifier Overload	0	BOOL	Status
4	Inverter Ramping Up	0	BOOL	Status
5	Syncing to Bypass	0	BOOL	Status
6	Rectifier Ramping	0	BOOL	Status
7	On Buck	0	BOOL	Status
8	On Boost	0	BOOL	Status
9	On Double Boost	0	BOOL	Status
10	On Bypass	0	BOOL	Status
11	System Normal	1	BOOL	Status
12	Load On Inverter	0	BOOL	Status
13	UPS On	1	BOOL	Status
14	Outlet Switch Open	0	BOOL	Status
15	Outlet Breaker Open	0	BOOL	Status
16	UPS Off	0	BOOL	Status
145	Inverter AC under voltage	0	BOOL	Status

Register	Name	Example Value	Format	Unit
147	Bypass AC over voltage	0	BOOL	Status
148	Bypass AC under voltage	0	BOOL	Status
149	Bypass under or over frequency	0	BOOL	Status
150	Input AC over voltage	0	BOOL	Status
151	Input AC under voltage	0	BOOL	Status
152	Input under or over frequency	0	BOOL	Status
153	Output AC over voltage	0	BOOL	Status
154	Output AC under voltage	0	BOOL	Status
155	Output under or over frequency	0	BOOL	Status
160	Building Alarm 4	0	BOOL	Status
161	Building Alarm 3	0	BOOL	Status
162	Building Alarm 2	0	BOOL	Status
163	Building Alarm 1	0	BOOL	Status
164	Static switch over temperature	0	BOOL	Status
167	Charger over voltage or current	0	BOOL	Status
168	Inverter over temperature	0	BOOL	Status
169	Output overload	0	BOOL	Status
171	Inverter output over current	0	BOOL	Status
172	DC link over voltage	0	BOOL	Status
173	DC link under voltage	0	BOOL	Status
174	Rectifier failed	0	BOOL	Status
175	Inverter fault	0	BOOL	Status
176	Battery contactor fail	0	BOOL	Status
177	Bypass breaker fail	0	BOOL	Status
178	Charger failure	0	BOOL	Status
180	Static switch failure	0	BOOL	Status
182	Bypass uncalibrated	0	BOOL	Status
185	Inverter uncalibrated	0	BOOL	Status

Register	Name	Example Value	Format	Unit
191	Battery current limit	0	BOOL	Status
192	Inverter failure (3 attempts)	0	BOOL	Status
194	Output current over 100%	0	BOOL	Status
197	Non-Volatile RAM failure	0	BOOL	Status
199	Shutdown imminent	0	BOOL	Status
200	Battery low	0	BOOL	Status
201	Utility fail	0	BOOL	Status
212	Battery DC over voltage	0	BOOL	Status
214	Power supply failure	0	BOOL	Status
229	Network not responding	0	BOOL	Status
234	Input phase rotation error	0	BOOL	Status
249	Bypass not available	0	BOOL	Status
251	Battery contactor open	0	BOOL	Status
252	Inverter contactor open	0	BOOL	Status
263	Bypass phase rotation	0	BOOL	Status
285	Bypass on	0	BOOL	Status
293	Check battery flag	0	BOOL	Status
312	UPS On Battery	0	BOOL	Status
313	UPS On Bypass	0	BOOL	Status
314	Load Dumped (Load Power Off)	0	BOOL	Status
321	Inverter Temperature Sensor Failed	0	BOOL	Status
333	Auto OFF Command Executed	0	BOOL	Status
350	Automatic Shutdown Pending	0	BOOL	Status
353	Startup Failed - Check EPO Reset	0	BOOL	Status
354	Automatic Startup Pending	0	BOOL	Status
355	Modem failed	0	BOOL	Status
356	Incoming Modem Call Started	0	BOOL	Status
357	Outgoing Modem Call Started	0	BOOL	Status

Register	Name	Example Value	Format	Unit
358	Modem Connection Established	0	BOOL	Status
360	Modem Call Completion Failed	0	BOOL	Status
361	Input Breaker Failed	0	BOOL	Status
362	System Initialization In Progress	0	BOOL	Status

Table 5. Read Input Registers - Modbus Function Code 04 (Input Registers Start at 30000)

Register	Name	Scale Factor	Units
1	OUTPUT VOLTS AB	/10	Volts
2	OUTPUT VOLTS BC	/10	Volts
3	OUTPUT VOLTS CA	/10	Volts
4	INPUT VOLTS AB	/10	Volts
5	INPUT VOLTS BC	/10	Volts
6	INPUT VOLTS CA	/10	Volts
10	BYPASS VOLTS AB	/10	Volts
11	BYPASS VOLTS BC	/10	Volts
12	BYPASS VOLTS CA	/10	Volts
13	MAIN LOGIC POWER	/10	Volts
16	INVERTER AVG CURRENT PHASE A	/10	Amps
17	INVERTER AVG CURRENT PHASE B	/10	Amps
18	INVERTER AVG CURRENT PHASE C	/10	Amps
19	INPUT CURRENT PHASE A	/10	Amps
20	INPUT CURRENT PHASE B	/10	Amps
21	INPUT CURRENT PHASE C	/10	Amps
22	OUTPUT WATTS	/10	KW
23	INPUT WATTS	/10	KW
24	OUTPUT VA	/10	KVA
25	INPUT VA	/10	KVA
26	OUTPUT POWER FACTOR	/100	--

Register	Name	Scale Factor	Units
27	INPUT POWER FACTOR	/100	--
28	OUTPUT FREQUENCY	/10	Hz
29	INPUT FREQUENCY	/10	Hz
31	BYPASS FREQUENCY	/10	Hz
32	DC LINK VOLTS	/10	VDC
33	BATTERY CURRENT	/10	Amps
34	BATTERY VOLTAGE	/10	Volts
35	% BATTERY LEFT	/10	%
36	BATTERY TIME REMAINING	/10	Minutes
60	INVERTER VOLTS PHASE A	/10	Volts
61	INVERTER VOLTS PHASE B	/10	Volts
62	INVERTER VOLTS PHASE C	/10	Volts
63	AMBIENT TEMPERATURE	/10	C
64	HEATSINK TEMPERATURE	/10	C
65	POWER SUPPLY TEMPERATURE	/10	C
66	LOAD CURRENT PHASE A	/10	Amps
67	LOAD CURRENT PHASE B	/10	Amps
68	LOAD CURRENT PHASE C	/10	Amps
69	LOAD CURRENT PHASE A BAR CHART	/10	Amps
70	LOAD CURRENT PHASE B BAR CHART	/10	Amps
71	LOAD CURRENT PHASE C BAR CHART	/10	Amps
72	OUTPUT VA BAR CHART	/10	KVA
73	DATE	Always 0	--
74	TIME	Always 0	--
78	BATTERY TEMPERATURE	/10	C
79	OUTPUT VOLTS A	/10	Volts
80	OUTPUT VOLTS B	/10	Volts
81	OUTPUT VOLTS C	/10	Volts
82	NEUTRAL CURRENT	/10	Amps



CHAPTER 6

TROUBLESHOOTING

Problem	Possible Cause	Corrective Action
The Profiler tool does not generate the <i>profiler.cvs</i> file	The wrong communication port number was entered in the <i>profiler comX</i> command.	Verify the correct port number on your computer that is connected to the Modbus Card.
	The serial cable is not connected.	Verify the serial cable connections are secure.
Communication doesn't work	Incorrect communication parameters.	Verify that the communication parameters are set to the desired baud rate, 8 data bits, 1 stop bit, no parity, and no hardware handshaking.
	RS-485 communication lines are reversed.	Verify that the network TxD(-) is connected to the Modbus Card RxD(-) and the network TxD(+) is connected to the Modbus Card RxD(+). See Chapter 3, "Wiring the Modbus Card" on page 7 for more information.
	If the Modbus Card is the last device installed in the network chain, termination should be set.	Verify the termination settings (see "Termination" on page 11 for the correct settings).
	Jumpers could be in the incorrect position for your configuration.	Verify the jumpers are in the correct position (see Figure 15).

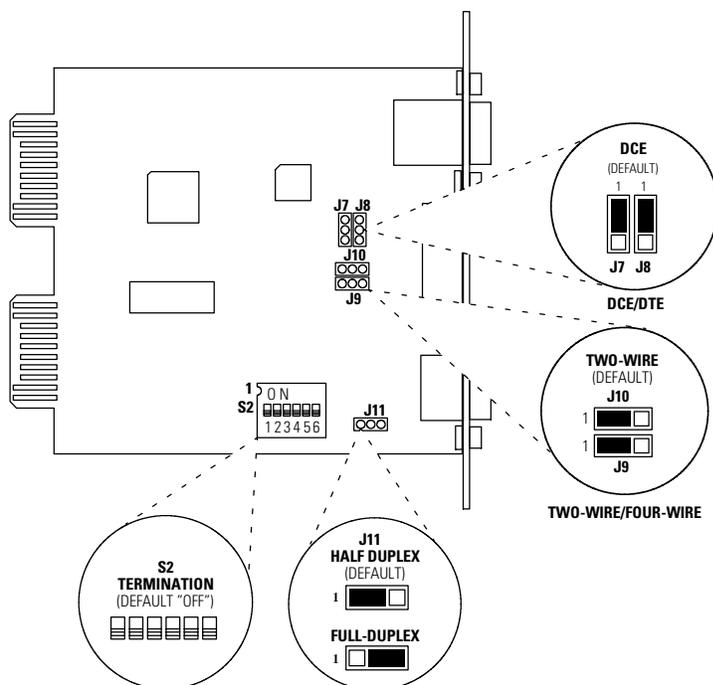


Figure 15. Modbus Card Default Jumper Settings

Service and Support

If you have any questions or problems with the Modbus Card, call your **Local Distributor** or the **Help Desk** at one of the following telephone numbers and ask for a Modbus Card technical representative.

In the United States: **1-800-365-4892** or **1-919-870-3149**
Europe, Middle East, Africa: **+44-17 53 608 700**
Asia: **+852-2830-3030**
Australia: **+61-3-9706-5022**

Please have the following information ready when you call the Help Desk:

- Model number
- Date of failure or problem
- Symptoms of failure or problem
- Customer return address and contact information

If repair is required, you will be given a Returned Material Authorization (RMA) Number. This number must appear on the outside of the package and on the Bill Of Lading (if applicable). Use the original packaging or request packaging from the Help Desk or distributor. Units damaged in shipment as a result of improper packaging are not covered under warranty. A replacement or repair unit will be shipped, freight prepaid for all warrantied units.



NOTE For critical applications, immediate replacement may be available. Call the **Help Desk** for the dealer or distributor nearest you.

Two-Year Limited Warranty (US and Canada Only)

Powerware Corporation warrants the electronics of the Modbus Card to be free from defects in material and workmanship for a period of two years from Date of Purchase. If, in Powerware Corporation's opinion, the electronics fails to meet its published specifications due to a defect in material and workmanship covered by this warranty, Powerware Corporation will repair or replace the warranted Unit at no cost to the customer for parts and labor.

Equipment supplied by Powerware Corporation, but not manufactured by Powerware Corporation, is warranted solely by the manufacturer of such equipment. Powerware Corporation does not warrant equipment not manufactured by Powerware Corporation.

This warranty does not apply to any Unit that has been subject to neglect, accident, abuse, misuse, misapplication, incorrect connection or that has been subject to repair or alteration not authorized in writing by Powerware Corporation's personnel. THIS WARRANTY IS THE PURCHASER'S (USER'S) SOLE REMEDY AND IS EXPRESSLY IN LIEU OF ANY OTHER WARRANTY, AND THERE ARE NO OTHER EXPRESSED OR IMPLIED GUARANTEES OR WARRANTIES (INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE). In no case will Powerware Corporation's liability under this contract exceed the value of the Unit furnished.

In no event shall Powerware Corporation be liable for any indirect, incidental, special or consequential damages. Powerware Corporation shall not be responsible for failure to provide service or parts due to causes beyond Powerware Corporation's reasonable control. THIS LIMITED WARRANTY IS VOID UNLESS USER RETURNS TO POWERWARE CORPORATION THE INCLUDED WARRANTY REGISTRATION CARD WITHIN THIRTY (30) DAYS OF DELIVERY.

Any advice furnished the Purchaser (User) before or after delivery in regard to use or application of Powerware Corporation equipment is furnished without charges and on the basis that it represents Powerware Corporation's best judgement under the circumstances. The use of any such advice by the Purchaser (User) is solely and entirely at his or her own risk.

This limited warranty applies only to equipment installed in the fifty United States of America and Canada. In other countries, consult your local distributor.

Extended Service Coverage

A full complement of warranty extensions and enhancements are available from Powerware Corporation for your UPS. Information pertaining to these services should be available in the shipping container along with this manual. If not, or if you would like more information, call the Powerware Corporation **Help Desk** and ask about warranty services.

International Limited Warranty

Powerware Corporation warrants the Modbus Card manufactured by Powerware Corporation (“Unit”) against defect in material or workmanship until the earlier of: (1) 18 months from date of shipment or (2) 12 months from date of initial start-up is performed by Powerware Corporation field personnel or field personnel authorized by Powerware Corporation to carry out such service efforts on its behalf and provided that, startup occurs no later than 6 months after shipment. If the unit does not function in accordance with its published specification, the user should give Powerware Corporation prompt notice thereof and if requested by Powerware Corporation, the user shall return the warranted Unit or parts thereof to the plant or service station designated by Powerware Corporation for inspection by Powerware Corporation. Any Unit which may require repair and/or replacement of parts as the result of defects in workmanship or material within the stated warranty period, will be replaced or repaired at Powerware Corporation’s option without charge for replacement parts. The cost of shipment, duties or all other expenses associated with shipment of repaired or replaced items is for the account of the user.

Powerware Corporation will not be responsible or liable for work done or expense incurred in connection with repair or replacement except as expressly authorized by Powerware Corporation, Raleigh, NC, USA in writing. If a service engineer is required, labor, at current published rates, and all travel and living expenses are for the account of the user.

Powerware Corporation does not warrant equipment not manufactured by Powerware Corporation. The manufacturer of all such equipment shall solely warrant that equipment and Powerware Corporation shall have no responsibility or liability thereof.

IT IS AGREED THAT POWERWARE CORPORATION, ITS PARENT COMPANY, OR ANY OF THEIR AFFILIATES, SHALL HAVE NO LIABILITY FOR INDIRECT, INCIDENTAL, SPECIAL, OR CONSEQUENTIAL DAMAGES, AND THAT THERE IS NO WARRANTY, EITHER EXPRESSED OR IMPLIED BY LAW OR THE PARTIES HERETO, OTHER THAN THOSE EXPRESSLY SET FORTH HEREIN. THIS WARRANTY DOES NOT COVER DAMAGE TO THE UNIT CAUSED BY MISUSE, ABUSE, NEGLIGENCE, UNAUTHORIZED MODIFICATIONS, IMPROPER MAINTENANCE, ACCIDENTS OR OTHER ABNORMAL CONDITIONS.

Force Majeure

Powerware Corporation shall not be liable for any delays or defaults hereunder by reason of fire, floods, acts of God, labor troubles, accidents to machinery, delays of carriers or suppliers, inability of suppliers to supply, the impositions of priorities, restrictions or other acts of government, or other causes beyond its reasonable control.

This Warranty shall be governed by the laws of the State of North Carolina, USA in all respects.