ICP PANEL-TEC

MICROBRIDGE INSTALLATION AND OPERATION GUIDE

MODBUS/TCP TO SIEMENS G150/W150(CP) PROFIBUS APPLICATION

Revision History

Revision	Date	Author	Comments
000	4 February 2010	Keira Majors	Initial release.
001	11 February 2010	David Walker	• Changed "W150/W150CP" to "G150/W150(CP)" • Fixed scaling on Register table • Added requirement to set P0918 (Profibus Address) to 126
002	12 February 2010	David Walker	• Changed requirement to set Profibus Address via switch
003	15 February 2010	Keira Majors	• Changed Serial Port Description
004	19 February 2010	David Walker	• Corrected units for registers 60 & 63 • Corrected description of registers 23 & 24
005	4 March 2010	David Walker	• Corrected configuration cable • Changed configuration port from 'Local' to 'Network'

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INTRODUCTION

The Modbus/TCP to G150/W150(CP) Profibus version of the MicroBridge connects one G150 or W150(CP) Profibus drive to a Modbus/TCP Network via Ethernet. A pre-defined set of Modbus registers in the Modbus/TCP client are provided to allow access to the most common drive parameters, monitor values, setpoint values, and control points for the drive.

The MicroBridge device is a light-weight DIN Rail Mountable unit with 2 serial ports, an Ethernet port, and 6 LED indicators. It is powered with a DC supply providing any voltage between 7 and 28 volts.

The MicroBridge has a built-in configuration utility. The configuration screens are accessed through any terminal communication program such as HyperTerminal.

Serial Port Overview

The MicroBridge has two DB9 serial ports. Both ports can be used in either RS232 mode or 2-Wire RS485 mode. The RS485 signals are located on the same pins on both ports. They are placed on pins that are not generally used for RS232 communications so off-the-shelf RS232 cables can be used when operating in RS232 mode.

The female DB9 port is referred to as the Local port (LCL), and is used to communicate with Siemens drive via Profibus. The RS485 signals on the port are used for connection to Profibus. The port will operate at Profibus baud rates of 9.6K, 19.2K, 31.25K, 45.45K, 93.75K, 187.5K, 500K, or 1.5M. An LED indicator is used to reflect the status of the Profibus connection.

The male DB9 port is referred to as the Network port (NET), and is used to configure the MicroBridge using the built-in configuration utility. The RS232 signals on the Network port use a DTE configuration, requiring a null-modem cable to be used during configuration mode. An LED indicator is used to reflect transmit/receive activity on this port.

Ethernet Port Overview

The MicroBridge also has a single Ethernet port, implemented using an ©XPort module (information on the XPort can be found at www.gridconnect.com/gc-xport-mbtcp.html). The Ethernet port supports both 10 and 100 Mbit/sec communications, and is used to connect the MicroBridge to a Modbus/TCP network. An LED indicator is used to reflect transmit/receive activity of Modbus messages on this port.

Ordering Information

The MicroBridge product is sold with several different software applications. To ensure that the correct version of the MicroBridge is procured, please include the correct part number when ordering. Part numbers for the MicroBridge, power supply and cables for the Modbus/TCP to G150/W150(CP) application are as follows:

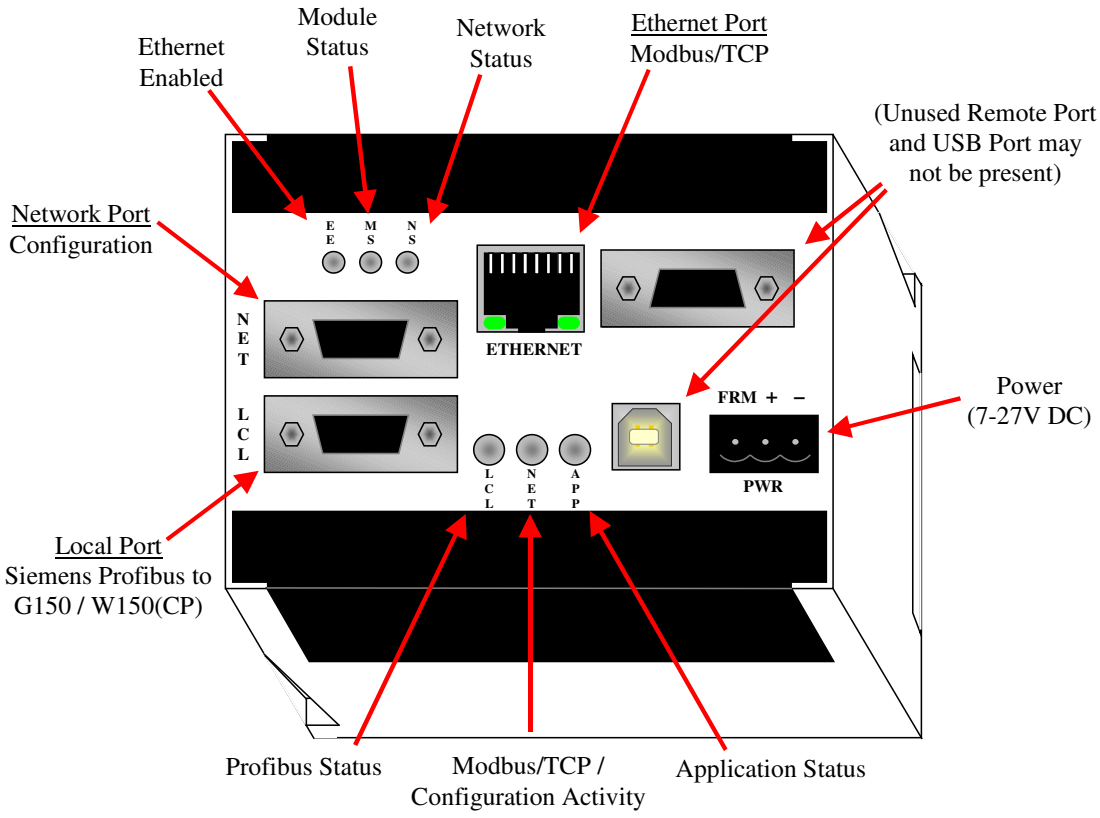
Table 1 - Part Numbers

Part Number	Description
5015-404-102	MicroBridge with Modbus/TCP to G150/W150(CP) Application
4000-0205	MicroBridge Power Supply
6000-0011	MicroBridge Local Port Profibus Drive Cable
6000-0010	MicroBridge Configuration Cable (Null Modem)

HARDWARE

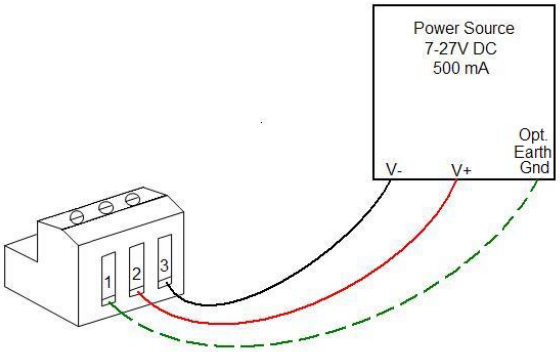
Dimensions

The MicroBridge is packaged in a 10cm x 7.5cm x 11cm plastic box, with a din-rail mounting on the bottom. The serial and Ethernet ports, leds, and power connector are on the top of the unit.



Power Supply

The MicroBridge requires a power supply of 7-24V DC at 500 mA. A 3-position pluggable terminal block is used to connect the power supply. The following diagram shows the wiring of the power supply.



Serial Port Pinouts

The pin configuration for the two DB9 serial ports are shown in the table below.

Table 2 - Serial Port Pinouts

Local: DB9-Female		
Pin	**Label**	**Description**
1	485+	RS485 D+
2	TXD	RS232 TxD
3	RXD	RS232 RxD
4	DTR	RS232 DTR
5	GND	Reference Ground
6	485-	RS485 D-
7	RTS	RS232 RTS
8	CTS	RS232 CTS
9	VCC	+5VDC Input

Network: DB9-Male		
Pin	**Label**	**Description**
1	485+	RS485 D+
2	RXD	RS232 RxD
3	TXD	RS232 TxD
4	-	No Connect
5	GND	Reference Ground
6	485-	RS485 D-
7	CTS	RS232 CTS
8	RTS	RS232 RTS
9	-	No Connect

Ethernet Port Pinout

The pin configuration of the Ethernet port is shown in the table below.

1 2 3 4 5 6 7 8

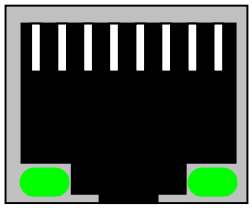


Table 3 - Ethernet Port Pinout

Ethernet: RJ45 Socket		
Pin	**Label**	**Description**
1	TD+	Transmit Data+
2	TD-	Transmit Data-
3	RD+	Receive Data+
4	-	no connection
5	-	no connection
6	RD-	Receive Data-
7	-	no connection
8	-	no connection

Siemens Profibus Drive Cable (G150/W150(CP) CU320 Control Unit)

One end of the RS485 Siemens Profibus Drive cable (Part # 6000-0011) connects to the DB9 Female Local port on the MicroBridge. The other end of the cable connects to the DB9 Female Profibus connector on the CU320 module. Termination and Bias resistors are built into the cable on the Siemens Drive end.

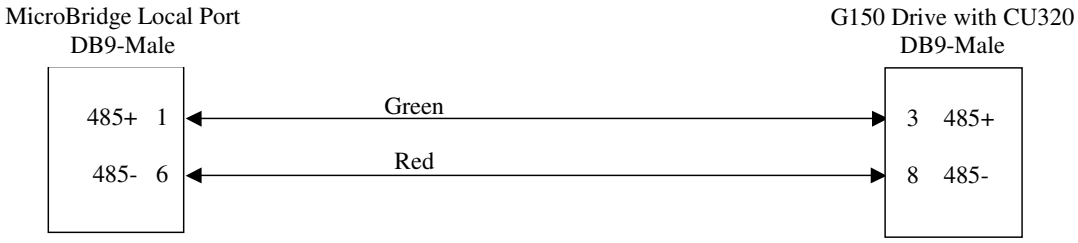


Figure 1 - G150/W150(CP) with CU320 Profibus Cable

Configuration Cable

One end of the MicroBridge Configuration cable (Part # 6000-0010) connects to the DB9 Male Network port on the MicroBridge during configuration mode. The other end connects to a serial port on a PC. A standard off-the-shelf null-modem DB9-F to DB9-F cable (pins 2 and 3 crossed) can be used as well.

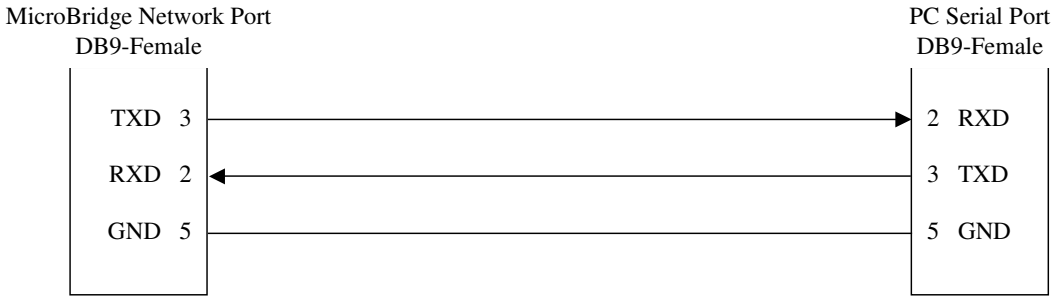


Figure 4 - Configuration Cable (null-modem)

LED Indicators

There are a total of 6 Bi-color LED indicators on the MicroBridge. The LCL, NET, and APP LEDs are located next to the Local Port on the MicroBridge. The LCL LED displays the Profibus Status on the Local Profibus (Siemens drive) port. The NET LED displays communications activity on the Network (Configuration) port during configuration mode, or on the Ethernet port during run mode. The APP LED displays the overall status of the MicroBridge application. During normal operations, the NET LED will quickly alternate red and green flashes, making it look almost amber. This is normal. The LCL LED should be solid green while in Data Exchange mode with the drive.

The other three LEDs are located next to the Ethernet port on the MicroBridge. The NS LED (closest to the Ethernet Port) displays the network status of the MicroBridge. The MS LED (the middle of the three) displays the module status of the MicroBridge. The ETH LED (farthest from the Ethernet port) indicates whether the Ethernet port is enabled on the MicroBridge.

Table 4 - MicroBridge General Application Status LED (APP)

For this state:	LED is:	To indicate:
No Power	Off	There is no power applied to the device.
Run Mode	Flashing Green (250ms On, 250ms Off)	The MicroBridge is operating normally in RUN Mode.
Configuration Mode	Flashing Green (1.5 sec On, 1.5 sec Off)	The MicroBridge is in Configuration Mode.
Fatal Error	Flashing Yellow (250ms On, 250ms Off)	The MicroBridge has experienced a fatal error, and has halted communications.

Table 5 - Network Port Communications Activity LED (NET)

For this state:	LED is:	To indicate:
Receive Data	Red	The MicroBridge is receiving data from the XPort.
Transmit Data	Green	The MicroBridge is transmitting data to the XPort.

Table 6 - Local Port Profibus Status LED (LCL)

For this state:	LED is:	To indicate:
No Comm	Off	The MicroBridge is not exchanging data with the Siemens Drive.
Data Exchange	Green	The MicroBridge is exchanging data with the Siemens Drive.
Profibus Error	Red	The MicroBridge has encountered a Profibus error while attempting to establish communications with the Siemens Drive.

Table 7 - Network Status LED (NS)

For this state:	LED is:	To indicate:
Inactive	Off	The MicroBridge is not connected to a Modbus/TCP client (host).
Transmit Data	Green	The MicroBridge is connected to a Modbus/TCP client (host).

Table 8 - Module Status LED (MS)

For this state:	LED is:	To indicate:
No Power	Off	There is no power applied to the device.
Run Mode	Green	The MicroBridge is operating normally in RUN Mode.

Table 9 - Ethernet Enabled LED (ETH)

For this state:	LED is:	To indicate:
Disabled	Red	The Ethernet Port is not enabled on the MicroBridge.
Enabled	Green	The Ethernet Port is enabled on the MicroBridge.

MICROBRIDGE CONFIGURATION

Default Configuration

Modbus/TCP communications is implemented using an XPort module, which converts Modbus/TCP requests to internal Modbus/RTU requests for processing. The internal Modbus communications settings are fixed on the MicroBridge, and must be matched by the XPort. The settings are as follows:

Table 10 - Required Modbus Settings for XPort

Parameter	Setting
Protocol	Modbus/RTU
Port Mode	Slave
Port Type	RS232
Modbus ID	2
Baud Rate	115200 bps
Data Bits	8
Parity	Even
Stop Bits	1

The Local Port on the MicroBridge is configured for communications with a Siemens drive using Profibus. The configuration parameters that may be changed are shown in the following table:

Table 11 - G150/W150(CP) Port Configuration Options

Parameter	Options	Default
Profibus Baud Rate	9.6K bps 19.2K bps 31.25K bps 45.45K bps 93.75K bps 187.5K bps 500K bps 1.5M bps	1.5M bps

Changing the Configuration

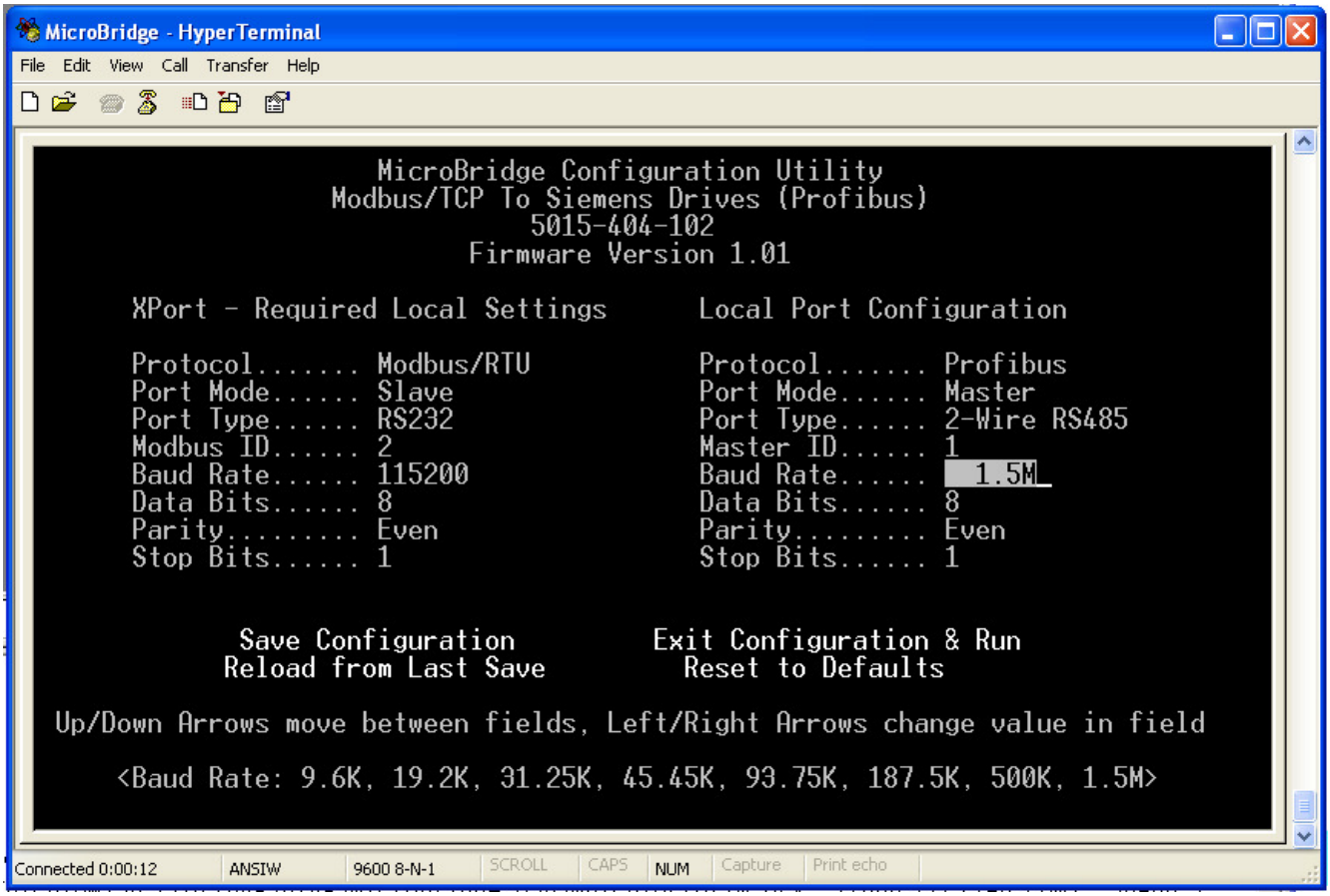
The configuration stored in the MicroBridge may be changed from the default configuration by entering Configuration Mode. The following steps are required to enter Configuration Mode.

1. Attach a configuration cable between the Network port on the MicroBridge and a serial port on a PC.
2. Start a terminal program, such as HyperTerminal, on the PC, and connect using the following settings:
   - Baud = 9600 bps
   - Data bits = 8
   - Parity = None
   - Stop Bits = 1
   - Flow Control = None
   - Terminal Emulation = ANSI
   - Local Echo = Off
3. Apply power to the MicroBridge, and send a carriage return (press the **Enter** key) within 5 seconds of startup.

Once the MicroBridge is in Configuration Mode, it will send its current configuration information to the terminal program.

Use the **up** and **down** arrows on your keyboard to navigate to the field you want to change, then use the **left** and **right** arrows to change the value in that field. When you are finished, navigate to "Save Configuration" and press the **Enter** key to save the configuration information to the MicroBridge.

Once the configuration has been saved, remove power from the MicroBridge and remove the configuration cable.



XPORT CONFIGURATION

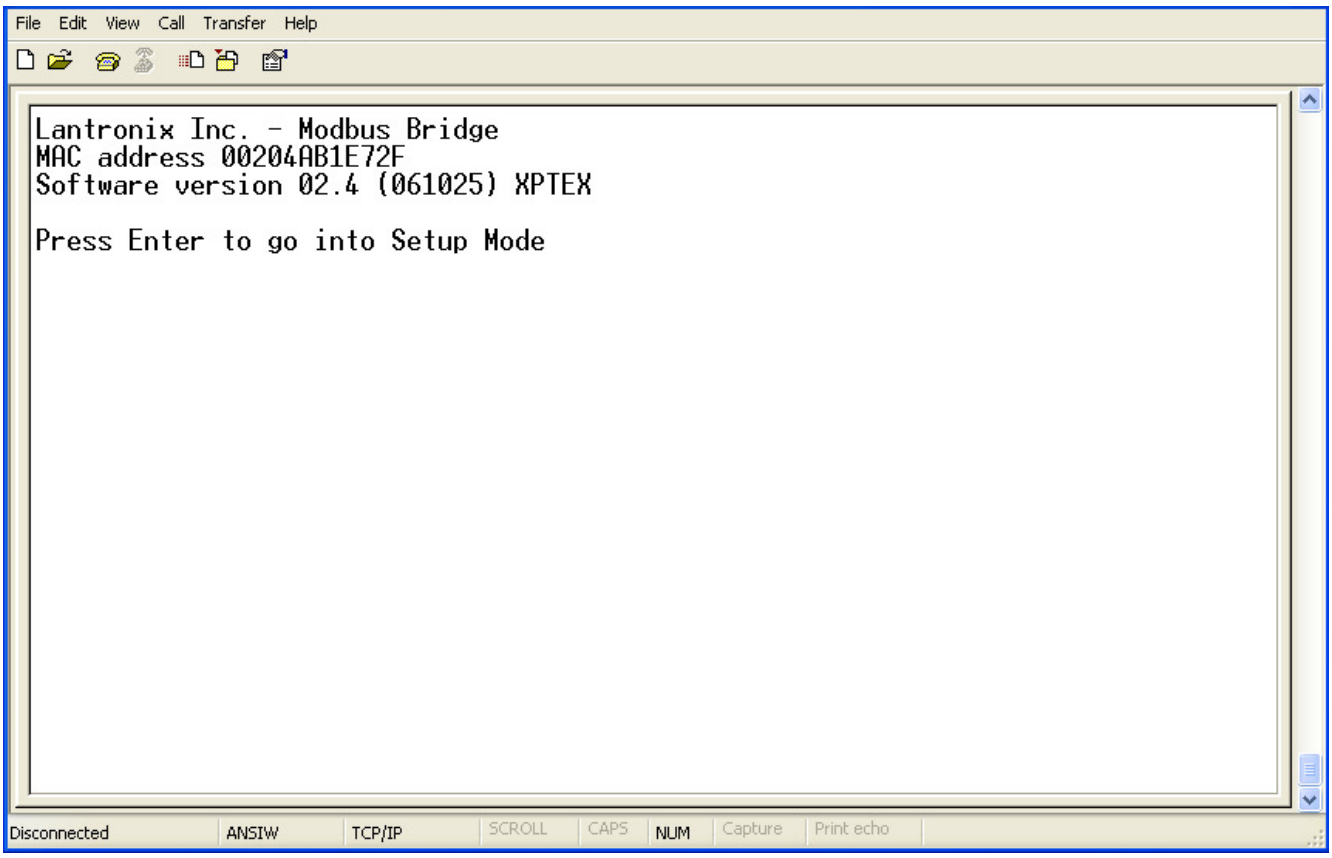
The XPort module may be configured via Ethernet using Telnet (any terminal program which supports the Telnet protocol (such as HyperTerminal) may be used to configure the XPort. The XPort must be configured with a valid (and unique) IP address and SubNet mask for the local network before using it on that network.

Obtaining the IP Address

If the IP Address for the XPort is not known, it may be discovered using the Lantronix DeviceInstaller software (available at www.lantronix.com). Simply run DeviceInstaller, and click on Search. When the XPort appears in the list, use either the Assign IP button or Telnet button to assign an IP address to the XPort.

Entering Configuration Mode

To configure the XPort, connect the MicroBridge via Ethernet to the Telnet client (if you are using HyperTerminal on a PC, the PC is the client). The IP Address should be the current IP Address of the XPort, and the Port Number should be 9999. When the Telnet client is connected to the XPort, the following screen is displayed:



Changing the Configuration

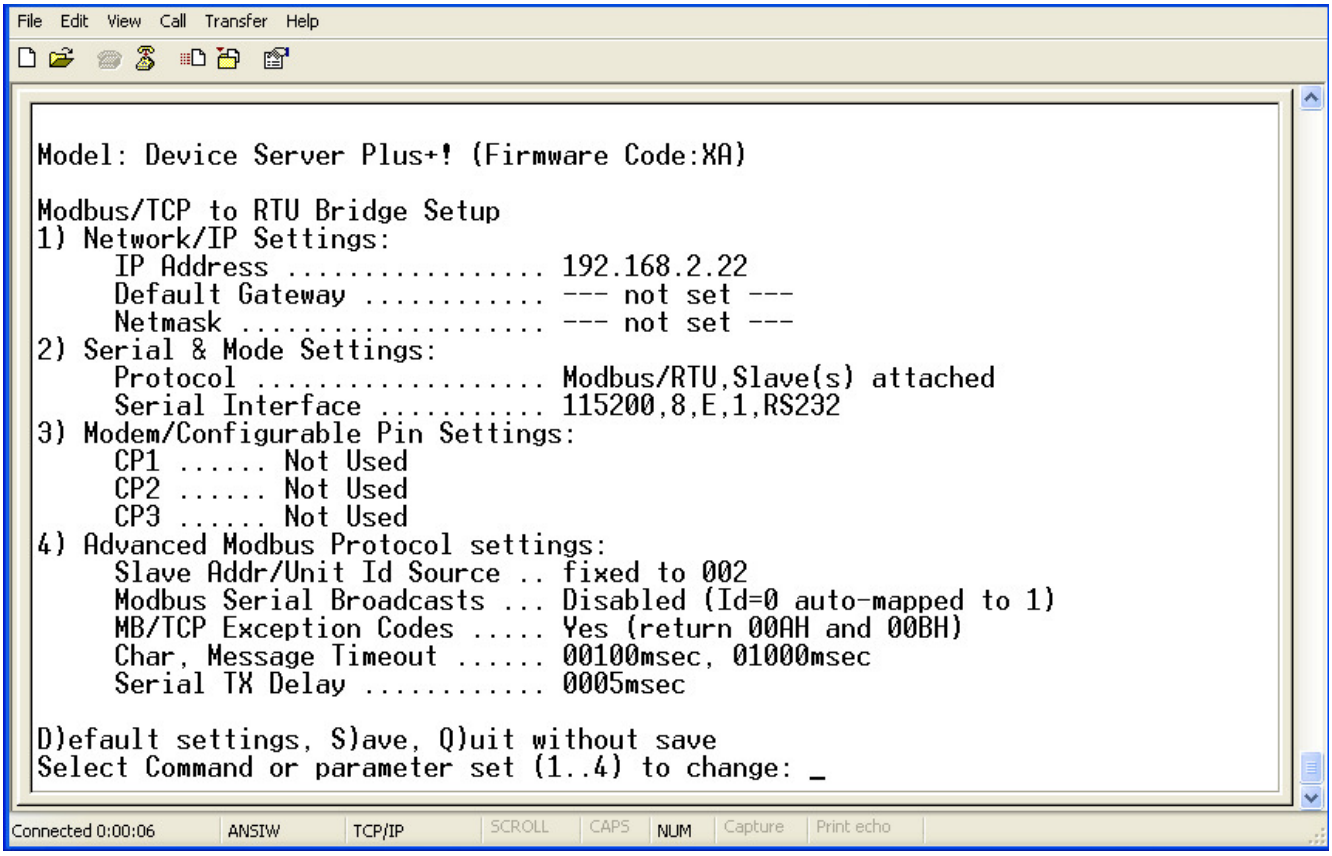
When the Enter key is pressed, the Device Server Plus+! screen is displayed.

Type "1" to modify the Network/IP Settings (parameter set 1). Parameter sets 2, 3, and 4 should not be changed, as those settings are necessary to ensure proper communications between the XPort and the MicroBridge.

Once the Network/IP Settings have been modified, press "S" to save the new settings. The XPort will automatically restart with the new settings.

Warning! Do not press "D" (Default Settings). The default XPort settings are not compatible with the MicroBridge. If "D" is pressed, press "Q" to quit without saving, then reconnect and try again.

If the settings are changed to the default settings, or if options 2, 3, or 4 are modified, it will be necessary to changed them back to the required settings for MicroBridge operation. Consult the following screen for the correct settings.



SIEMENS DRIVE SETUP

Siemens Drive Parameter Configuration

The Siemens drive must be configured before the MicroBridge will communicate properly with the drive. The MicroBridge communicates with the drive through the Profibus DP interface.

To setup the drive for communications with a MicroBridge, the Profibus DP Address must be set to 126 via the DIP Switch on the CU320, and the drive parameters in the following table must be configured with the values shown via the drive keypad or Starter software. Note: Set the highlighted parameters first, then check the others to see if they need to be set. Most or all of them should be set automatically once P0922 is set.

Table 12 - Siemens Drive Parameter Configuration

G150/S120 Parameter	Function	Set Value
P0003 (CU)	User Access Level	3 (Expert Setting)
P0922 (CU)	ProfiDrive Telegram	999 (Free Telegram Configuration with BICO)
P0922 (Vec)	ProfiDrive Telegram	1 (Standard Telegram 1, PZD 2/2) if controlling the drive via Fieldbus, or 999 (Free Telegram Configuration with BICO) otherwise.
P2038 (Vec)	ProfiDrive Mode	0 (Sinamics)
P0840[0] (Vec)	ON/OFF1 Cmd Source	r2090[0] if controlling the drive from FieldBus., otherwise: **no change**
P0844[0] (Vec)	OFF2 Command Source	r2090[1] if controlling the drive from FieldBus., otherwise: **no change**
P0848[0] (Vec)	OFF3 Command Source	r2090[2] if controlling the drive from FieldBus., otherwise: **no change**
P0852[0] (Vec)	Pulse Enable Source	r2090[3] if controlling the drive from FieldBus., otherwise: **no change**
P1140[0] (Vec)	RFG Enable Source	r2090[4] if controlling the drive from FieldBus., otherwise: **no change**
P1141[0] (Vec)	RFG Start Source	r2090[5] if controlling the drive from FieldBus., otherwise: **no change**
P1142[0] (Vec)	Setpoint Enable Source	r2090[6] if controlling the drive from FieldBus., otherwise: **no change**
P2103[0] (Vec)	Fault Acknowledge Source	r2090[7] if controlling the drive from FieldBus., otherwise: **no change**
P1035[0] (Vec)	MOP Up Source	r2090[13] if controlling the drive from FieldBus., otherwise: **no change**
P1036[0] (Vec)	MOP Down Source	r2090[14] if controlling the drive from FieldBus., otherwise: **no change**
P1070[0] (Vec)	Main Setpoint Source	r2050[1] if Setting the Speed from FieldBus. otherwise: **no change**
P2051[0] (Vec)	PZD1 Send Word	r2089[0] (Status Word 1)
P2051[1] (Vec)	PZD2 Send Word	r63[0] (Actual Speed Value)
P2080[0] (Vec)	Status Word 1, Bit0	r899.0 (Ready to power-up)
P2080[1] (Vec)	Status Word 1, Bit1	r899.1 (Ready)
P2080[2] (Vec)	Status Word 1, Bit2	r899.2 (Operation enabled)
P2080[3] (Vec)	Status Word 1, Bit3	r2139.3 (Fault present)
P2080[4] (Vec)	Status Word 1, Bit4	r899.4 (No coasting active)
P2080[5] (Vec)	Status Word 1, Bit5	r899.5 (No fast stop active)
P2080[6] (Vec)	Status Word 1, Bit6	r899.6 (Power-on inhibit active)
P2080[7] (Vec)	Status Word 1, Bit7	r2139.7 (Alarm present)
P2080[8] (Vec)	Status Word 1, Bit8	r2197.7 (Speed deviation)
P2080[9] (Vec)	Status Word 1, Bit9	r899.9 (Control requested)
P2080[10] (Vec)	Status Word 1, Bit10	r2199.1 (Comparison value reached)
P2080[11] (Vec)	Status Word 1, Bit11	0
P2080[12] (Vec)	Status Word 1, Bit12	r899.12 (Holding brake open)
P2080[13] (Vec)	Status Word 1, Bit13	r2135.14 (Motor temp Alarm)
P2080[14] (Vec)	Status Word 1, Bit14	r2197.3 (n_act >= 0)
P2080[15] (Vec)	Status Word 1, Bit15	r2135.15 (Power unit temp alarm)
P2088[0] (Vec)	Invert Status Word 1	A800

NOTE: The MicroBridge always uses Standard Telegram 1 (PZD 2/2) when establishing data exchange with the Siemens drive over Profibus DP, mapping STW and HSW to the first two PZD words sent from the MicroBridge to the drive, and ZSW and HIW to the first two PZD words send from the drive to the MicroBridge. If setting P0922 (Vec) to 999 (Free Telegram Configuration with BICO), the first two words of PZD data may be left unmapped, but should not be mapped to drive paramters other than those specified in Standard Telegram 1.

Verifying the Installation

After all necessary connections have been made, power up the drive and the MicroBridge, and wait approximately 5 seconds. If the MicroBridge has been installed correctly, the APP led will be flashing green, and the LCL led will be solid green to indicate Profibus Data Exchange is active.

To verify that the MicroBridge and drive are set up correctly, set all registers in the above table that are required to control the drive from the Modbus network. From the Modbus/TCP client (host), issue a Modbus write with a value of 1 to the Control from PLC register (40013) to enable drive remote control. Then, write a value of 2000 (50% of the maximum frequency) to the Main Setpoint register (40019), followed by a value of 1 to the appropriate Enable register(s). Write a value of 1 to the ON/OFF1 register (40003), and the drive should start running. Write a value of 0 to the ON/OFF1 register to stop the drive. The drive frequency can be changed at any time during this process by writing to the Main Setpoint register (40019).

MODBUS REGISTERS

The following table contains the list of all Modbus/TCP holding registers available on the MicroBridge. The Modbus/TCP client (host) may write to Registers 40001 through 40039. All other registers are read-only.

There is a scaling factor included for some of the registers. Because Modbus does not represent floating point numbers, all floating point values in the drive are converted to integer register values by applying a scaling (multiplication) factor. The scaling factors are in the range of 10 to 1000. For example: "Ramp Up Time" has a scaling factor of 100. If the drive contains a value of 20.50, then the "Ramp Up Time" register will contain a value of 2050.

STW and HSW refer to the 1st and 2nd words, respectively, of PZD data included in every poll sent from the MicroBridge to the drive via Profibus. ZSW and HIW refer to the 1st and 2nd words, respectively, of PZD data included in every poll response sent from the drive to the MicroBridge via Profibus. Registers mapped to PZD data are updated frequently.

All other parameters (except "Watchdog Action" and "Watchdog Time", which are handled internally in the MicroBridge) are mapped to parameters in the drive, and are updated cyclically. Registers mapped to *monitor* parameters – parameters such as "Actual Current", or "Output Power", whose values change automatically during normal operation of the drive, without the intervention of an operator – are updated at a rate of approximately once per second. Registers mapped to *setup* parameters – parameters such as "Ramp Up Time" or "Frequency MAX Limit", whose values typically change only via intervention by an operator – are updated at a rate of approximately once every 5 seconds.

Registers Mapped to Unsupported Parameters

If a particular parameter is not supported in the drive, then the corresponding Modbus register from the register map will not be supported unless it is noted as reserved. Attempts to read or write that register will result in an exception response. Attempts to read or write a block of register including one or more unsupported registers (not reserved registers which are ok) will result in an exception response. For example, if PID functionality is disabled in the drive, such that parameter r2260 is not supported, then attempts to read Modbus register 40090 will result in a Modbus exception response.

Modbus/TCP Watchdog Timer Setup

The MicroBridge includes a watchdog timer function for Modbus/TCP communications. When this function is enabled, the MicroBridge will stop the drive if it is running under Modbus/TCP control and the TCP connection is closed or Modbus/TCP communications are lost for the specified period of time. This Modbus/TCP client (host) controls the watchdog timer function via Modbus holding registers 40001 (Watchdog Time) and 40002 (Watchdog Action) on the MicroBridge. To activate the Modbus/TCP watchdog timeout function, the Modbus/TCP client should set the "Watchdog Time" register to the desired timeout period (in milliseconds), then set the "Watchdog Action" register to a value of 1. To disable the Modbus watchdog timeout function, the Modbus client (d) should set the "Watchdog Action" register to a value of 0.

Modbus Register Table

Register	Description	Units	Scaling Factor	1	0	Parameter Reference
				Range		
Watchdog Registers						
40001	Watchdog Time	ms	1	0…65535	--	
40002	Watchdog Action	--	--	Stop Drive	No Action	--
PZD Output Word 1 (Control Word 1/STW1)						
40003	ON/OFF1	--	--	ON	OFF1	STW1:0
40004	No OFF2	--	--	No OFF2	OFF2	STW1:1
40005	No OFF3	--	--	No OFF3	OFF3	STW1:2
40006	Pulse Enable	--	--	Enable	Off	STW1:3
40007	RFG Enable	--	--	Enable	Off	STW1:4
40008	RFG Start	--	--	Start	Off	STW1:5
40009	Setpoint Enable	--	--	Enable	Off	STW1:6
40010	Fault Acknowledge	--	--	Ack On	Off	STW1:7
40011	Reserved	--	--	---	---	STW1:8
40012	Reserved	--	--	---	---	STW1:9
40013	Control From PLC	--	--	Yes	No	STW1:10
40014	Reverse Command	--	--	Reverse	Forward	STW1:11
40015	Reserved	--	--	---	---	STW1:12
40016	MOP Up	--	--	Yes	No	STW1:13
40017	MOP Down	--	--	Yes	No	STW1:14
40018	Reserved	--	--	---	---	STW1:15
PZD Output Word 2 (HSW)						
40019	Main Setpoint	%	100	-200.00…200.00		HSW
Read/Write Parameters						
40020	Ramp Up Time	sec	100	0.00…650.00		P1120[0]
40021	Ramp Down Time	sec	100	0.00…650.00		P1121[0]
40022	Current Limit	A	10	0.0…6500.0		P0640[0]
40023	Speed Max Limit	RPM	1	0…65000		P1082[0]
40024	Speed Min Limit	RPM	1	0…19500		P1080[0]
40025	OFF3 Ramp Down Time	sec	100	0.00…600.00		P1135[0]
40026	PID Enable	--	--	Enable	No	P2200[0]
40027	PID Filter Time Constant	sec	100	0.00…60.00		P2265

Register	Description	Units	Scaling Factor	1	0	Parameter Reference
				Range		
40028	PID D Gain	sec	1000	0.000…60.000		P2274
40029	PID P Gain	--	1000	0.000…65.000		P2280
40030	PID I Gain	sec	1000	0.000…60.000		P2285
40031	PID Up Limit	%	100	-200.00…200.00		P2291
40032	PID Down Limit	%	100	-200.00…200.00		P2292
(Reserved for future use)						
40033	Reserved	--		--		--
…..	…..	…..	…..	…..		…..
40039	Reserved	--		--		--
PZD Input Word 1 (Status Word 1/ZSW1)						
40040	Drive Ready	--		Drive ready	No	ZSW1:0
40041	Drive Ready to Run	--		Ready to run	No	ZSW1:1
40042	Drive Running	--		Running	No	ZSW1:2
40043	Drive Fault Active	--		Fault	Ok	ZSW1:3
40044	No OFF2 Active	--		No OFF2	OFF2	ZSW1:4
40045	No OFF3 Active	--		No OFF3	OFF3	ZSW1:5
40046	On Inhibit Active	--		Inhibited	Ok	ZSW1:6
40047	Drive Alarm Active	--		Alarm	Ok	ZSW1:7
40048	Speed Setpoint Deviation	--		No	Yes	ZSW1:8
40049	PZD Control	--		Yes	No	ZSW1:9
40050	At Max Frequency	--		At Max	No	ZSW1:10
40051	Reserved	--		--	--	ZSW1:11
40052	Holding Brake Active	--		Active	No	ZSW1:12
40053	Motor Overload	--		No	Overload	ZSW1:13
40054	Motor Runs Forward	--		Forward	Reverse	ZSW1:14
40055	Inverter Overload	--		No	Overload	ZSW1:15
PZD Input Word 2 (HIW)						
40056	Actual Frequency	%	100	-200.00…200.00		HIW
Read-only Parameters						
40057	Speed Setpoint	RPM	1	-32500…32500		r0020
40058	Output Frequency	Hz	10	-3250.0…3250.0		r0024
40059	Output Voltage	Vac	10	-3250.0…3250.0		r0025
40060	DC Link Voltage	Vdc	10	-3250.0…3250.0		r0026

Register	Description	Units	Scaling Factor	1	0	Parameter Reference
				Range		
40061	Actual Current	A	100	0.00…655.35		r0027
40062	Actual Torque	Nm	10	-3250.0…3250.0		r0031
40063	Output Power	kW	100	-325.00…325.00		r0032
40064	Motor Temperature	°C	100	0.00…200.00		r0035
40065	Power Unit Temperature	°C	100	0.00…200.00		r0037[0]
40066	Reserved	--	--	--		--
40067	CDS Eff (Local Mode)	--	1	0000…FFFF		r0050
40068	Status Monitoring 1	--	Bit Mask	0000…FFFF		r2197
40069	Control Word 1	--	Bit Mask	0000…FFFF		r2090
40070	Motor Speed (Encoder)	RPM	1	-32500…32500		r0061[0]
40071	TM31 Digital Inputs	--	Bit Mask	0000-FFFF		r4022
40072	TM31 Digital Outputs	--	Bit Mask	0000-FFFF		r4047
40073	TM31 Analog Input 1	V/ma	1000	-20.000…20.000		r4052[0]
40074	TM31 Analog Input 2	V/ma	1000	-20.000…20.000		r4052[1]
40075	TM31 Analog Output 1	V/ma	1000	-20.000…20.000		r4074[0]
40076	TM31 Analog Output 2	V/ma	1000	-20.000…20.000		r4074[1]
40077	Fault Code 1	--	1	0…65535		r0947[0]
40078	Fault Code 2	--	1	0…65535		r0947[1]
40079	Fault Code 3	--	1	0…65535		r0947[2]
40080	Fault Code 4	--	1	0…65535		r0947[3]
40081	Fault Code 5	--	1	0…65535		r0947[4]
40082	Fault Code 6	--	1	0…65535		r0947[5]
40083	Fault Code 7	--	1	0…65535		r0947[6]
40084	Fault Code 8	--	1	0…65535		r0947[7]
40085	Pulse Frequency	kHz	100	0.00…16.00		r1801
40086	Alarm Code 1	--	1	0…65535		r2110[0]
40087	Alarm Code 2	--	1	0…65535		r2110[1]
40088	Alarm Code 3	--	1	0…65535		r2110[2]
40089	Alarm Code 4	--	1	0…65535		r2110[3]
40090	PID Setpoint Output	%	100	-200.00…200.00		r2260
40091	PID Feedback	%	100	-200.00…200.00		r2266
40092	PID Output	%	100	-200.00…200.00		r2294

Register	Description	Units	Scaling Factor	1	0	Parameter Reference
				Range		
(Reserved for future use)						
40093	Reserved	--		--		--
…..	…..	…..	…..	…..		…..
40100	Reserved	--		--		--