

DataLink GW1000-DHPM Modbus to DH+

The GW1000, in addition to having connectivity to Allen-Bradley's DH+, and the RS232/422/485/USB capabilities, offers a 10/100 Base-T Ethernet connection. The ability to power the GW1000 from the USB communication link is also present, removing the sometimes cumbersome procedure of locating a DC power supply when using laptops or PC's in the field.

The GW1000 has two communication ports. Channel A is designed to connect to your industrial Allen-Bradley DH+ network. Channel B is used to connect to your serial or USB device, the protocol depends on which model of the GW1000 you have ordered. Channel B has the capabilities of RS232C, RS422, RS485 and USB 2.0.

Configuration of the operating parameters is done quickly and easily via the Web Browser based Ethernet interface. Operational Firmware is also easily upgraded over the Ethernet interface. This allows for quick changes if you need to change your protocol.

Currently there are five standard GW1000 products available to allow access to Allen-Bradley's DH+ network.

- GW1000-DHP1 (DF1 to DH+)
- GW1000-DHPM (modbus to DH+)
- GW1000-ABEIP (Allen Bradley Ethernet and Ethernet/IP to DH+)
- GW1000-modTCP (modbus TCP to DH+)
- GW1000-DHPA (ASCII to DH+)

Custom serial protocols can be implemented easily on the GW1000 to allow anyone access to your existing DH+ network.

Contact DataLink Technologies to see if the GW1000 is the correct device for your communication needs.

Additional documentation is available in the GW1000 User's Manual on the CD.

GW1000-DHPM. – Modbus to DH+ Gateway

The GW1000-DHPM model contains two modes of operation, Modbus Master and Modbus Slave, which are selectable by the web screens as per below.

Master or Slave mode?

The GW1000-DHPM can be configured into either Modbus Master or Modbus Slave modes. They correspond to the mode the GW1000 is going to be on the Modbus Network, and which side DH+ or Modbus the commands will be initiated on.

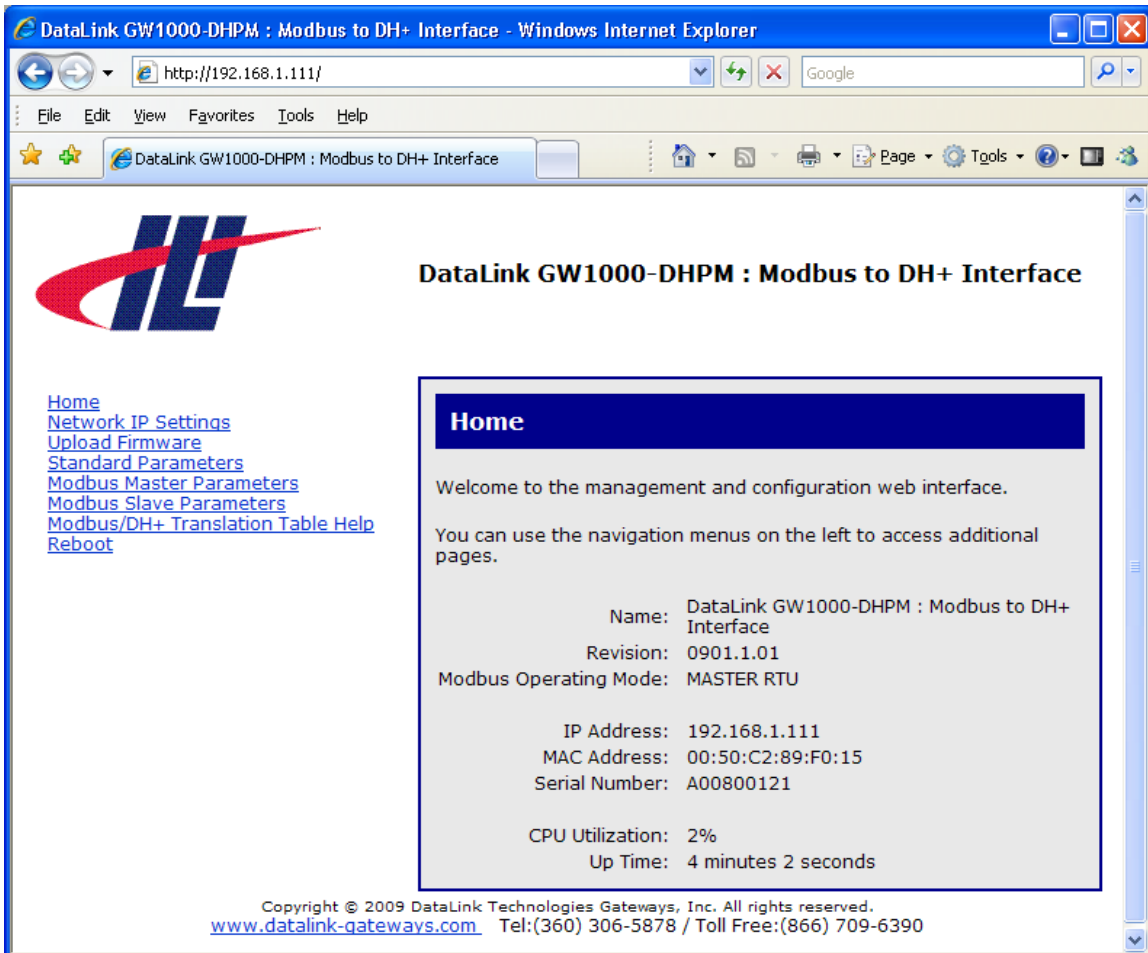
Master mode is used when a device on the DH+ network is going to initiate all communications with one or many Modbus slave devices.

Slave mode is used when a Master device on Modbus network is going to initiate all communications with one or many SLC's, PLC's or other DH+ devices.

The application notes generally assume that a PLC, SLC or other DH+ device can originate commands to Modbus via a GW1000 in master mode, or responding to Modbus commands via a GW1000 in slave mode. Only devices capable of transmitting DH+ message commands in PLC5 (or PLC3) format and able to receive DH+ message commands in PLC5 format can be used with the GW1000-DHPM including SLC's, MicroLogix's, ControlLogix's, HMIs and other intelligent devices. Due to differences between DH+ and Modbus protocols and the universal design of the GW1000 there are differences between the lengths of messages, error handling and addressing which have to be carefully considered by the Systems Designer, Programmer and Installer.

NOTES:

1. The unit that you have received can be configured to operate as either a Modbus Master or Modbus Slave device. Ensure that you understand and carefully follow the specific configuration procedures for the different modes of operation.
2. There are significant differences between the configuration, programming and operational requirements of Modbus Master and Modbus Slave modes.
3. If you configure the GW1000 for Modbus Master Operation it must be the only master on the Modbus network. A station on DH+ originates commands to the GW1000 and then the Modbus Master request is formatted and transmitted over Modbus to a Modbus Slave device. Other intelligent DH+ devices capable of initiating DH+ messages in PLC5 (or PLC3) format and able to receive PLC5 message commands could also be used as the DH+ "master".
4. Be sure to fully test the hardware and software off-line to ensure that you understand its configuration and operation. Prior to putting the GW1000 on-line in a production process, the operation of the complete system should be fully tested on-line in a safe "test" environment.
5. Due to differences between DH+ and Modbus protocols there are differences between the lengths of messages, error handling and addressing which have to be carefully considered by the Systems Designer, Programmer and Installer.
6. Additional literature regarding DH+, Modbus and PLC products can be obtained from Modicon and A-B.



DataLink GW1000-DHPM : Modbus to DH+ Interface

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Home

Welcome to the management and configuration web interface.

You can use the navigation menus on the left to access additional pages.

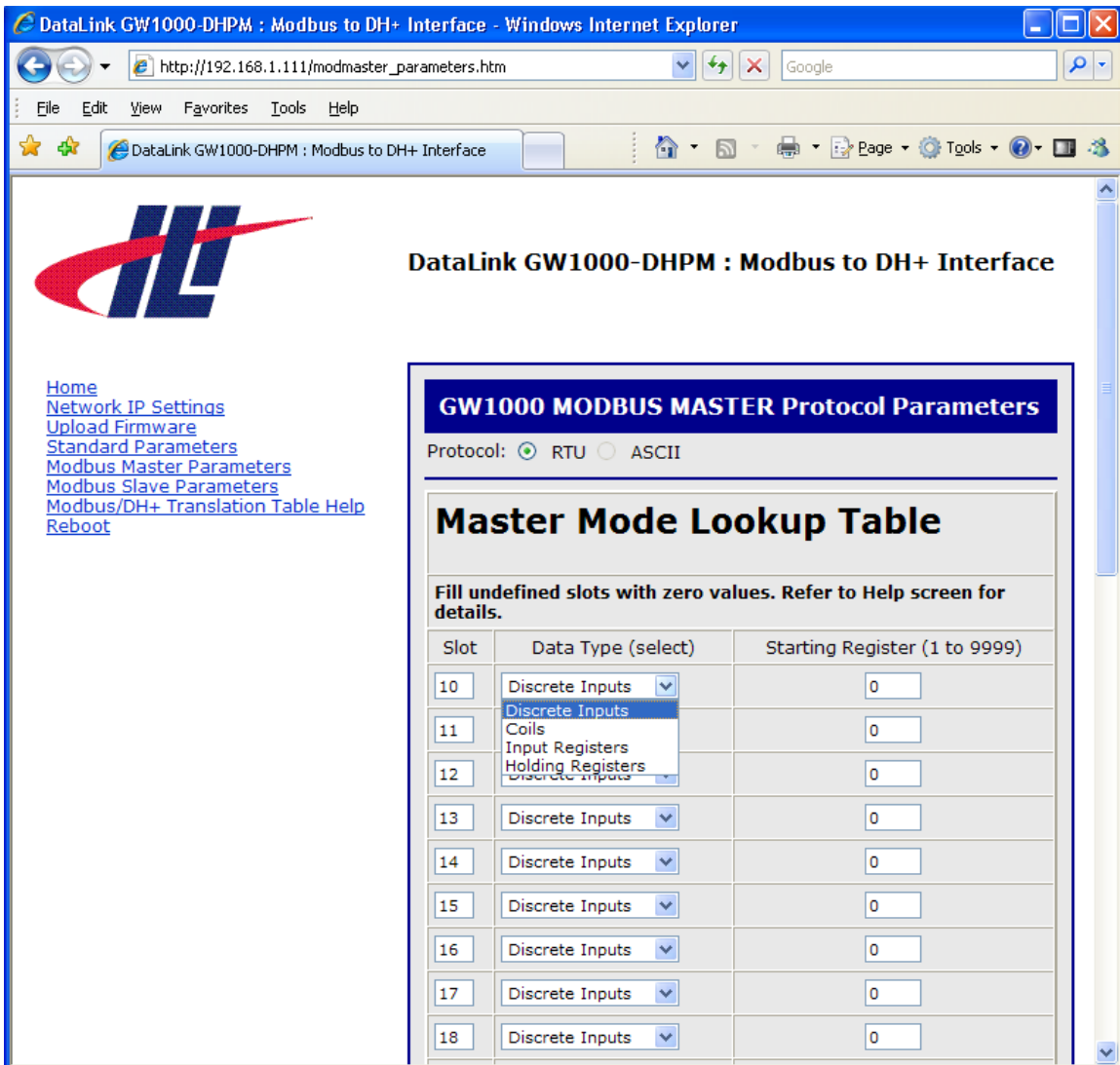
Name: DataLink GW1000-DHPM : Modbus to DH+ Interface
Revision: 0901.1.01
Modbus Operating Mode: MASTER RTU

IP Address: 192.168.1.111
MAC Address: 00:50:C2:89:F0:15
Serial Number: A00800121

CPU Utilization: 2%
Up Time: 4 minutes 2 seconds

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GW1000 MODBUS MASTER Protocol Parameters

Protocol: RTU ASCII

Master Mode Lookup Table

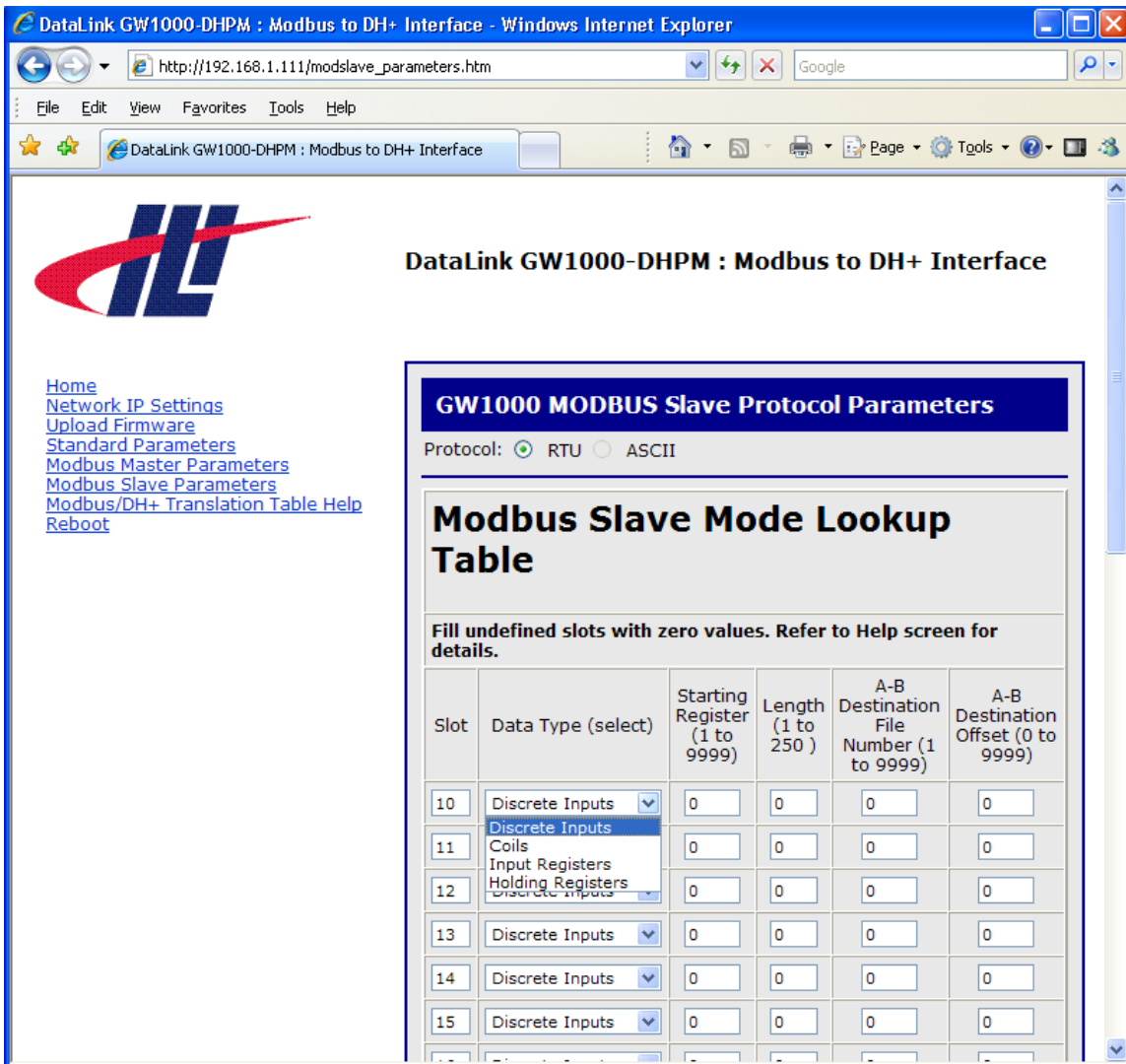
Fill undefined slots with zero values. Refer to Help screen for details.

Slot	Data Type (select)	Starting Register (1 to 9999)
10	Discrete Inputs	0
11	Discrete Inputs	0
12	Discrete Inputs	0
13	Discrete Inputs	0
14	Discrete Inputs	0
15	Discrete Inputs	0
16	Discrete Inputs	0
17	Discrete Inputs	0
18	Discrete Inputs	0

MODBUS MODE LOOKUP TABLE

Note: for each slot define (a non zero value in the starting register)select the modbus data type and starting register. For example, holding register initiate the modbus 03 read, and 16 write command.

The destination data table address in your PLC/SLC msg instruction defines the slot and Modbus slave address. See the help screen for more details.



GW1000 MODBUS Slave Protocol Parameters

Protocol: RTU ASCII

Modbus Slave Mode Lookup Table

Fill undefined slots with zero values. Refer to Help screen for details.

Slot	Data Type (select)	Starting Register (1 to 9999)	Length (1 to 250)	A-B Destination File Number (1 to 9999)	A-B Destination Offset (0 to 9999)
10	Discrete Inputs	0	0	0	0
11	Discrete Inputs	0	0	0	0
12	Coils	0	0	0	0
13	Input Registers	0	0	0	0
14	Holding Registers	0	0	0	0
15	Discrete Inputs	0	0	0	0

SLAVE MODE LOOKUP TABLE

Note: for each slot define (a non zero value in the starting register)select the modbus data type and starting register. For example, holding register accept the modbus 03 read, and 16 write command.

All non zero slots are searched or receiving a modbus request from the master to format a corresponding DH+ request to a specific file/offset in your PLC/SLC. See the help screen for more details.

Modbus/DH+ Translation Table Help

GW1000-DHPM Operation

Master or Slave Mode?

Which mode to use? They correspond to the operation of the GW1000 on the modbus network and which device initiates the Modbus commands. In **Master mode** the DH+ device initiates a message instruction that is then translated by the GW1000 into a Modbus request to a particular slave device. In **Slave mode** another Modbus Master on the network (there can only be one) is going to initiate communication with one or many DH+ devices. There can only be a Modbus network of one master and a GW1000-DHPM in slave mode as the GW1000 occupies every address on the Modbus Link.

Master Mode

In **Master Mode** the GW1000-DHPM accepts PLC5 Type Read/Write commands and converts the Destination Data Table Address into a Modbus Master request.

The GW1000 must be the only master on the Modbus network and occupy a unique address on the DH+ network. Any PLC type device that can initiate a Read/Write request

can use the GW1000 as a gateway to the Modbus network and address any of the slaves stations (from 1-255) on that network. The Modbus slave device being addressed can

duplicate other DH+ node address numbers as the DH+ and Modbus networks are completely isolated.

Modbus is a half-duplex Master/Slave protocol so the GW1000 can only process one Modbus command at a time, but can buffer incoming DH+ requests.

The PLC programmer should ensure that a response is received before sending out the next request. The Gw1000 will respond with the appropriate error response if the modbus link has errors.

Also note that because of the size of the DH+ packets only **100** Holding Registers can be read from or written to in a single transaction.

Destination Data Table Address Decoding

The Destination Data Table Address in the message instruction, initiated by the PLC type device, is decoded using the **master lookup table** as follows:

Destination Data Table Address = **NX:Y**

Where:

X = Slot # in the Master Translation table (10-39)

If Slot = 8 a special diagnostic status Loopback command is used to test the link and will return the appropriate error code to the PLC if the slave is not present.

Y = Modbus Slave Address to send the master request to.

Master Translation Table usage

The Translation Table is used to find, for a specified slot, the modbus **Data Type** being accessed (selects the Modbus Command to use) and the starting register/coil number to read from or write to.

The GW1000-DHPM will support the following DF1/DH+ commands:

PLC5 Type Write and Read - 0x0F-0x67(0x68)

Protected Type logical read/write with 3 address fields - 0x0F-0xA2(0xAA)

Slave Mode

In **Slave Mode** the GW1000-DHPM allows communications between a single Modbus Master device and multiple DH+ PLC type nodes.

The modbus slave port on the GW1000 is transparent and accepts all master request to Modbus Slave addresses (1-63 decimal).

Note: Broadcast messaging is not supported as it uses modbus address 0, so neither is sending requests to a PLC Type device at DH+ address 0.

The PLC/SLC type device that is can process the requests from the GW1000 **MUST** not be "protected" and the full range off elements in a particular file muse have been previously created.

The Modbus read and write bit/coil commands are used with the A-B **Binary (B)** file type and word/register commands are used with the A-B **Integer (N)** file type.

The GW1000-DHPM accepts the following MODBUS Commands to address 1 to 63 decimal:

Coils - 01 and 05; Registers - 03,04,06,16; Inputs - 02

Slave Lookup Translation Table usage

The received Modbus Master request is examined against the configured slave lookup table.

The search is done starting with the Data Type in the slave request, based on the Modbus command, and then the register range is checked based on the Start register and size.

If the slot is a match then a DF1/DH+ Read/Write request is sent to the DH+ node corresponding to the Modbus slave address in the Master's Request.

The PLC File Number and Starting Offset in the table slot is then used to complete the DF1/DH+ Read/Write request to the PLC Type device.

The GW1000-DHPM in slave mode will issue the following DF1/DH+ commands to the PLC Type device:

PLC5 Type Write and Read - 0x0F-0x67(0x68)