

PURPOSE

The purpose of this document is to provide the reader with an application note interfacing a PLC with Modbus Plus communications to a WI-GTWY-9-M+1 module.

BACKGROUND

Modbus Plus is a local area network system designed for industrial control and monitoring applications. The network enables programmable controllers, host computers and other devices to communicate throughout plants and substations.

The WI-GTWY-9-M+1 Modbus Plus module communicates according to the Modbus Plus Protocol. This means that it can communicate with all Modbus Plus nodes that comply with this protocol, but it does not necessarily mean that all services available in the Modbus Plus protocol are supported.

The WI-GTWY-9-M+1 Modbus Plus module has 4300 x 16bit radio I/O registers and an addressable Field-Bus database for Modbus Plus interfacing. This field bus interface incorporates an IN area and an OUT area with a memory space of up to 2048 bytes each. 32 words in each area maybe configured for fast cyclic I/O data exchange also called 'Global Data Transfer' in the both IN/OUT areas. The WI-GTWY-9-M+1 Modbus Plus supports Point to Point data exchange or Specific data transfer also, however it cannot initiate these commands and only acts as a slave.

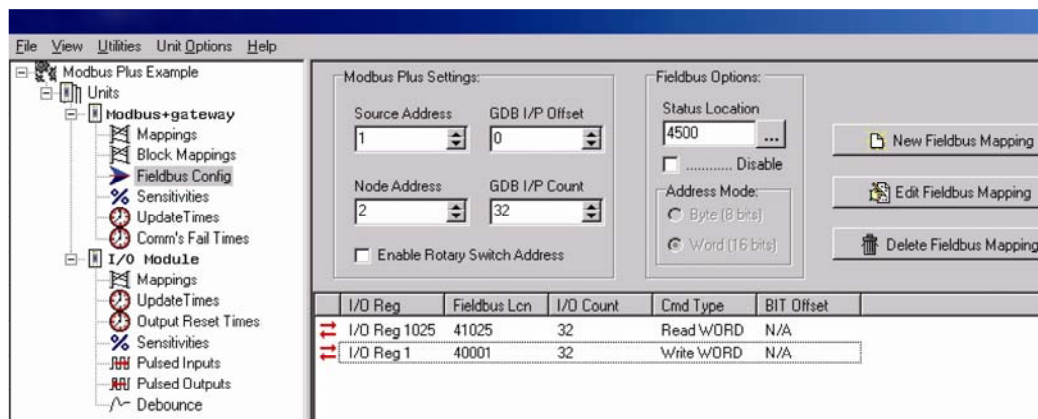
MATERIALS

The materials used for this application were,
Schneider Electric, Momentum PLC with programming cable,
ProWORX 32 programming software (version 1.0),
WI-GTWY-9-M+1,
W-Series Configuration Utility (Build 161 or higher),
RS232 DB9 serial cable.

APPLICATION

This application should be read in conjunction with user manuals detailing connections, powering and programming the WI-GTWY-9-M+1 Radio's. The reader would also have a firm understanding of programming Schneider PLC's with the ProWORX software.

I/O data from either the radio network or local I/O is made available to the Modbus + network via fieldbus mappings in W-Series configuration software. Details of configuring this section can be found in WI-GTWY-9-xxx users manual.



Node Address: The Modbus Plus Address of the WI-GTWY-9-M+1 Module

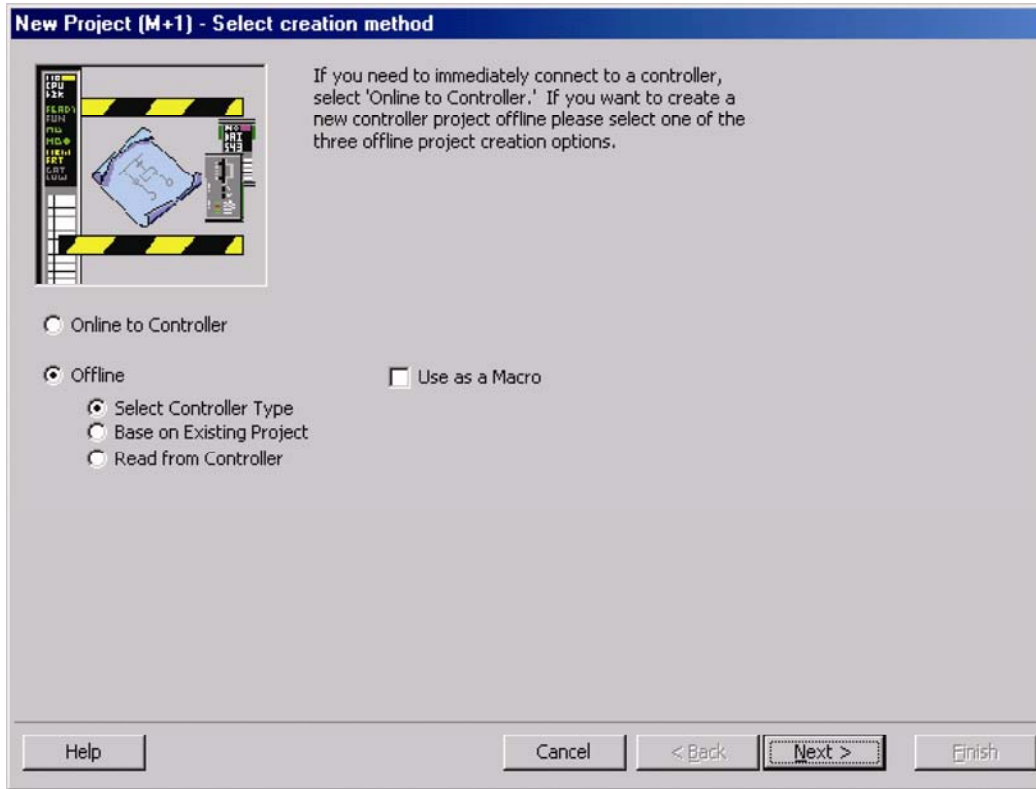
Source Address: This is the Modbus Plus Address of another Node on the Network that the WI-GTWY-9-M+1 will receive Global Data From.

GDB I/P Count: This is the total Amount of Global Input Data (Data from Network) the WI-GTWY-9-M+1 will receive.

GDB I/P Offset: This is used if only a certain part of the 32 words available from the Source Address is needed. The Total of the Offset and Count must not exceed 32. For example if you only wanted to receive words 23 to 32 of the Global Data from the Source Address you would enter in an Offset of 22 and a Count of 10.

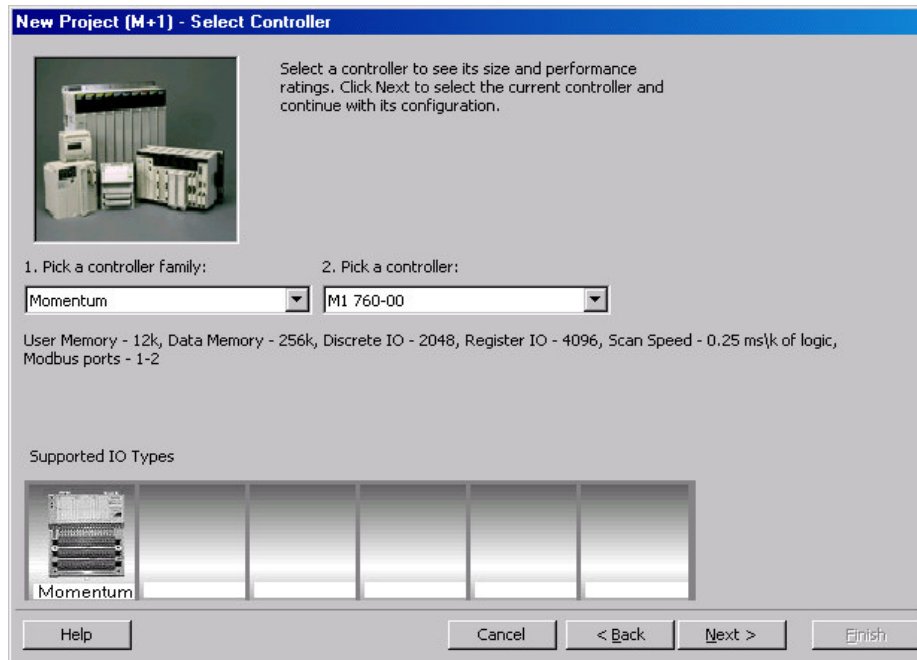
Enable Rotary Switch Address: When Selected the Node address is obtained by dip switches on front of module. GDB Offset and Count can not be used if using this method.

Status Location: A register location to give indication if the Modbus Plus link has failed, i.e Cable Removed/ Broken, PLC off line. To enable this uncheck the Disable box. From here you can map the register location over the radio if needbe or to a local Digital output.

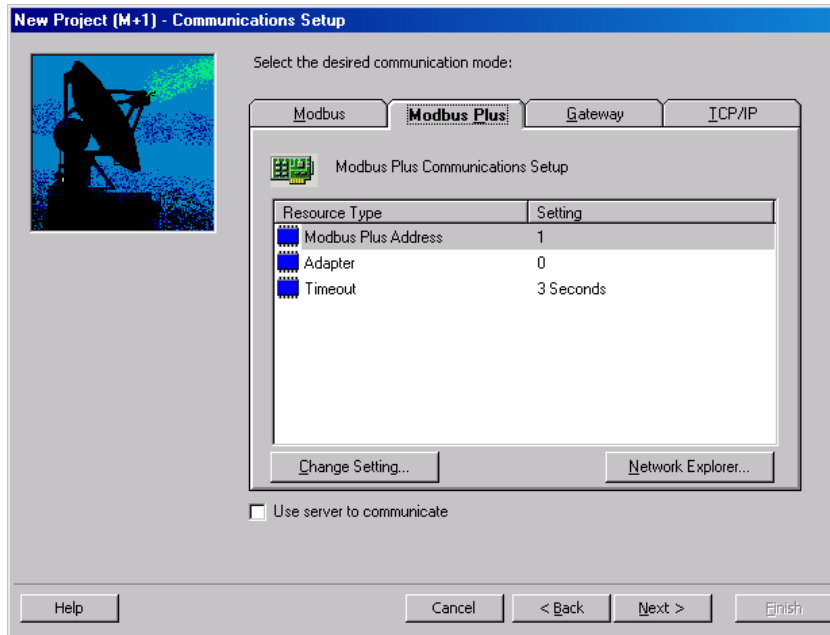


Enable ProWORX programming software New Project, name project M+1, select Offline and Controller Type.

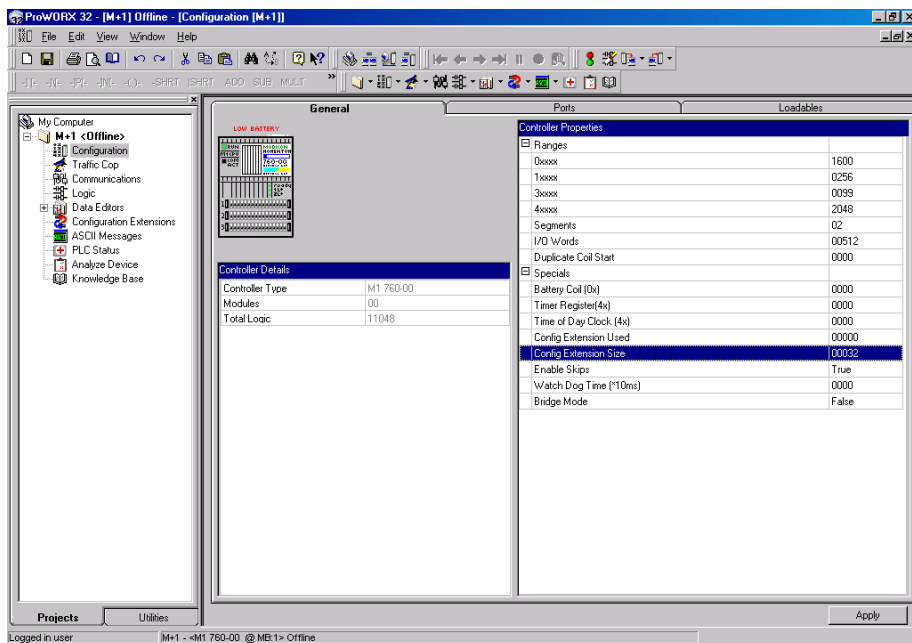
For this application a Momentum M1 760-00 is selected below.



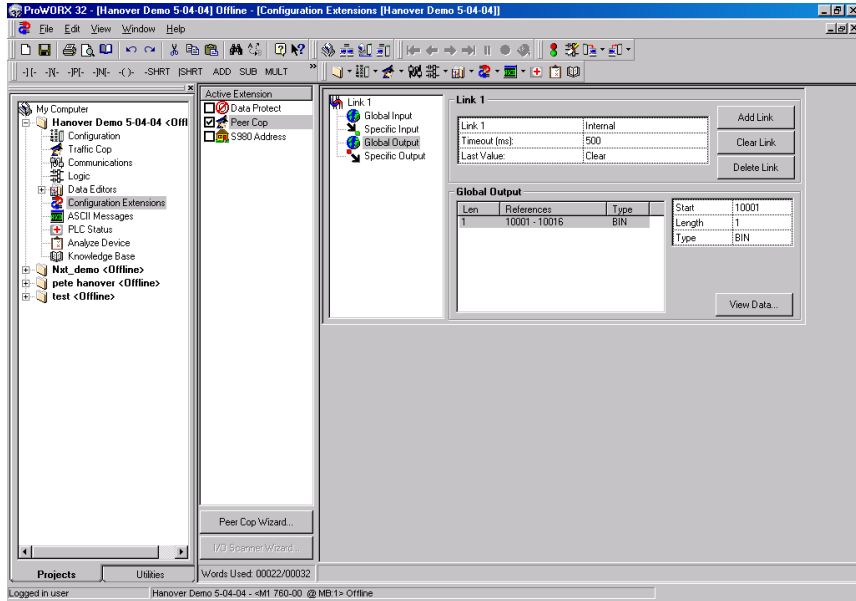
A Communication Setup menu will appear, use setting below for Modbus Plus settings.



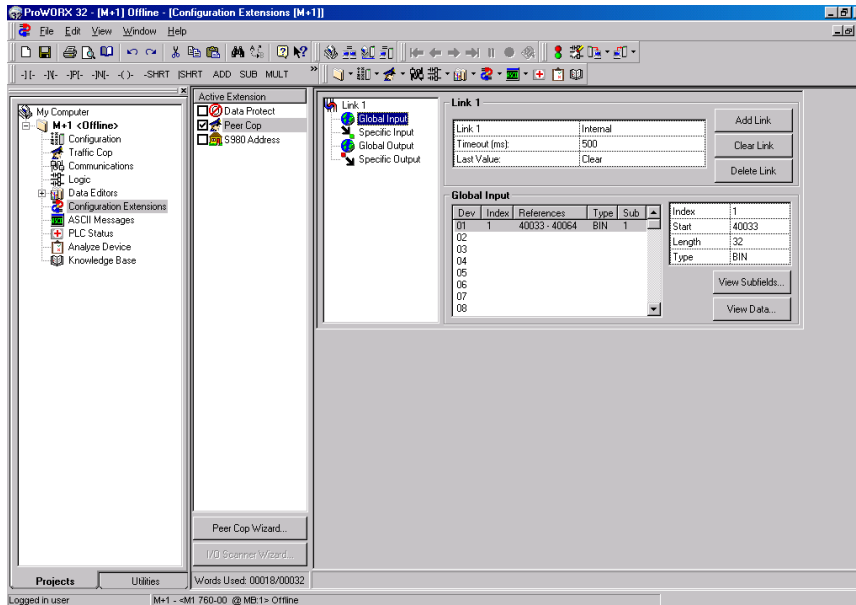
Select Configuration “General” change Register 4xxxx, to 2048, and Config Extension Size to 00032



Under “Configuration Extensions” both Global I/O and Specific I/O data can be setup. In this application only Global I/O is used and configured. In the window below Global Outputs is highlighted and configured to a length of 32 words (40001 – 40032) this is data is passed on a cyclic token request by the WI-GTWY-9-M+1 to register locations in the G’s Field bus database IN area, 41025 - 41056.



In the window below Global Inputs are highlighted and configured to a length of 32 words (40033 – 40064) this is data is passed on a cyclic token request by the WI-GTWY-9-M+1 to register locations in the G’s Field bus database OUT area, 40001 - 40032.



Once Downloaded to PLC you can use the View data field from the above screen to debug the I/O in between the PLC and WI-GTWY-9-M+1 module.

Modbus Plus Protocol & Supported Functions

Devices on a Modbus Plus network have two ways of exchanging data. One is through fast cyclic I/O data called Global Data, and one through a somewhat slower Modbus protocol for point-to-point parameter data transfer. The WI-GTWY-9-M+1 supports both Global Data and point-to-point data, however the module cannot initiate point-to-point commands but only respond to and accept point-to-point commands initiated by other nodes on the network.

Modbus Plus is a token bus network. This means that each device on the network will receive the token on a cyclic basis. When a device on the network receives the token it is able to broadcast up to 32 words of Global Data. All other devices on the network will 'see' this data, and depending on their configuration the user have the option to use some, or all, of the broadcast data.

Consequently, the WI-GTWY-9-M+1 Modbus Plus module supports up to 32 words of Global Outputs (i.e. Data To Network) and up to 32 words of Global Inputs (i.e. Data From Network).

The WI-GTWY-9-M+1 also supports point-to-point data, however the module cannot initiate point-to-point commands but only respond to and accept point-to-point commands.

The WI-GTWY-9-M+1 Modbus Plus supports only the following point-to-point operations on modbus 40000 (4X) registers:

- (0x03) Read holding Registers
- (0x06) Preset Single Register
- (0x10) Preset multiple Registers

The WI-GTWY-9-M+1 Modbus Plus supports the following exception responses:

- (0x01) Illegal function for the addressed slave
- (0x02) Illegal data address within the information field for the addressed slave
- (0x03) Illegal data value in the information field for the addressed slave

The WI-GTWY-9-M+1 Modbus Plus supports up to 1024 words of output data and 1024 words of input data.

Converting this to 40000 registers, the possible output registers (Data To Network) range is

40001 – 41024 of which the first 32 words (i.e. 40001 – 40032) are global output data. However all output registers, including the global output registers, may also be

read from the module using the point-to-point command Read Holding Registers (0x03).

The possible input registers (Data from Network) range is 41025 – 42048 of which the first 32 words (i.e. 41025 – 41056) is global input data (i.e. data extracted from another network device's global output data). Only data *not* assigned to global input data (i.e. 41057 – 42048) may be written by the point-to-point preset register commands.