

Application Note 003
Version 002
10 July 2009

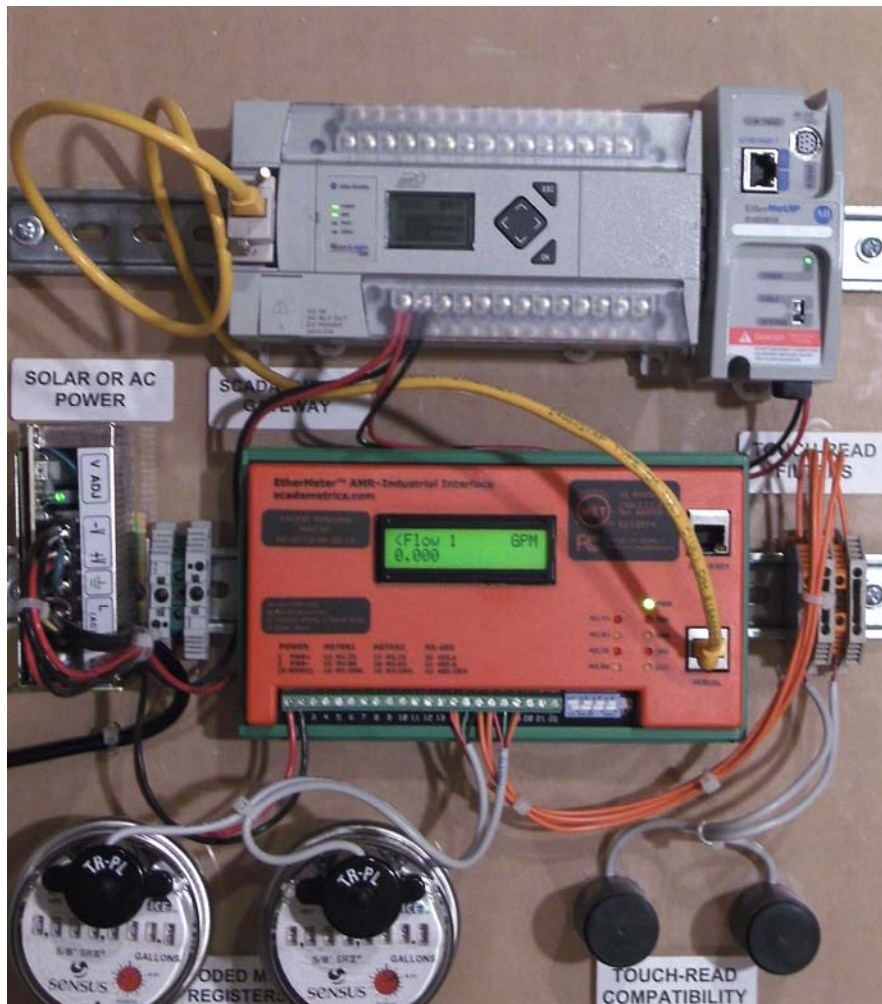
Configuring EtherMeter™-MicroLogix Communications Using DF1.

(Note: This document also applies to EtherMeter-SLC/5xx Communications.)

The purpose of this document is to provide assistance to the Allen Bradley MicroLogix PLC user who wishes to connect to an EtherMeter using the DF1 protocol. It is important to note that the EtherMeter supports DF1-FullDuplex and DF1-RadioModem, but does not support DF1-HalfDuplex. This document assumes that the user is well-versed in Allen Bradley PLC's, DF1, and the RsLogix Programming Environment.

1. Wiring Configuration.

In this example, the serial ports of the MicroLogix and EtherMeter are wired directly to each other using a serial cable. For reference, the wiring and hardware configuration is illustrated in Figure 1.



**Figure 1. EtherNet/IP™ Communication Demonstration Panel.
MicroLogix 1400 / EtherMeter Hardware and Wiring Configuration.**

* EtherNet/IP™ is a trademark of ControlNet International.

2. EtherMeter Configuration.

When creating a DF1 master/slave serial connection between an EtherMeter™ (slave) and a MicroLogix PLC (master), a few setup commands are required within the EtherMeter's Setup Menu. See Figure 2.

- a. SET PROTOCOL DF1-FD (Note: alternatively, DF1-RM could be selected.)
- b. SET BAUD 19200
- c. SET SIMULATION ON (Optional – Recommended for troubleshooting.)

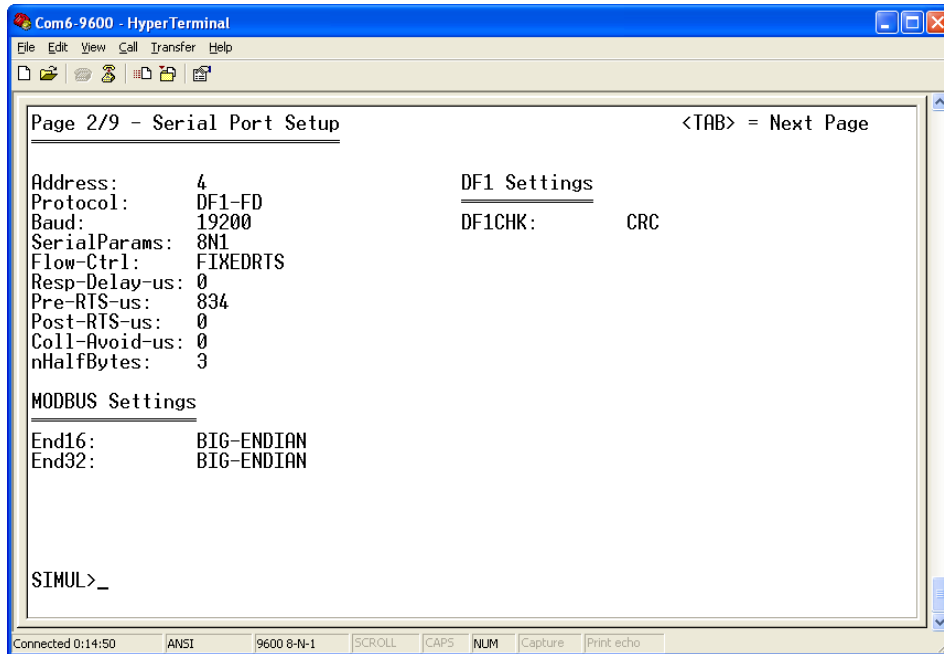


Figure 2. EtherMeter Setup Menu: Page 2 of 9.

3. MicroLogix Serial Port (Port 2) Configuration.

Within a MicroLogix (or other Allen Bradley) PLC, communication setup is performed within the RsLogix Programming Environment. Figure 3 displays a screen snapshot of a simple ladder logic program that is designed to poll the two (2) totalization and two (2) flow-rate registers of an EtherMeter, deposit the data into the N7:xx integer (16-bit) registers, and then copy the data into the L12:xx long integer (32-bit) registers:

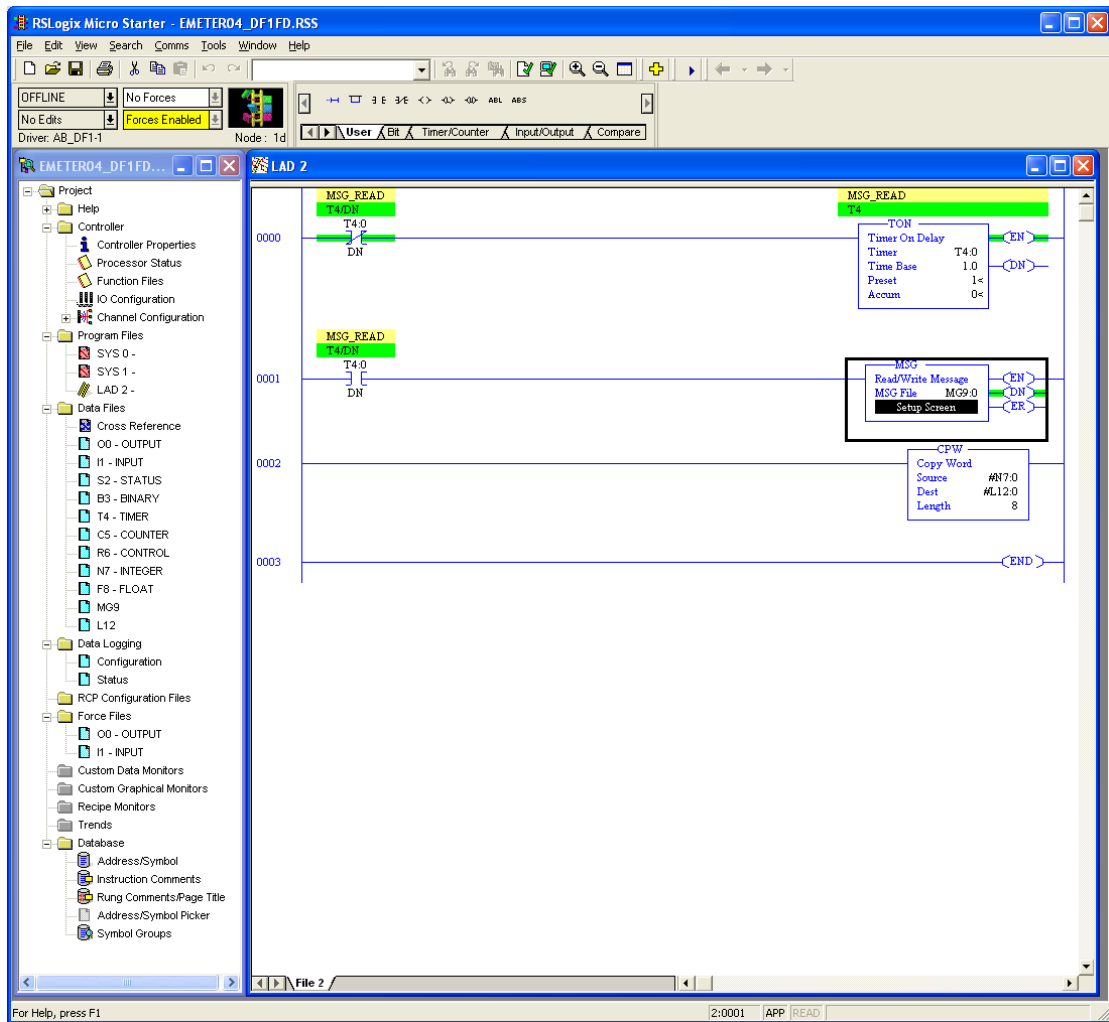


Figure 3. RsLogix Programming Environment.

To begin the setup, a new programming project should be initialized In RsLogix using the appropriate selections for processor type, version, serial port setup, etc.. For brevity, the details of these steps have been omitted.

In order to configure the MicroLogix's Ethernet port, double-left-click the "Channel Configuration" icon in the Project (leftmost) Frame. The "Channel Configuration" window will appear. Select the "Channel 2" tab, and enter the setup parameters as shown in Figure 4.

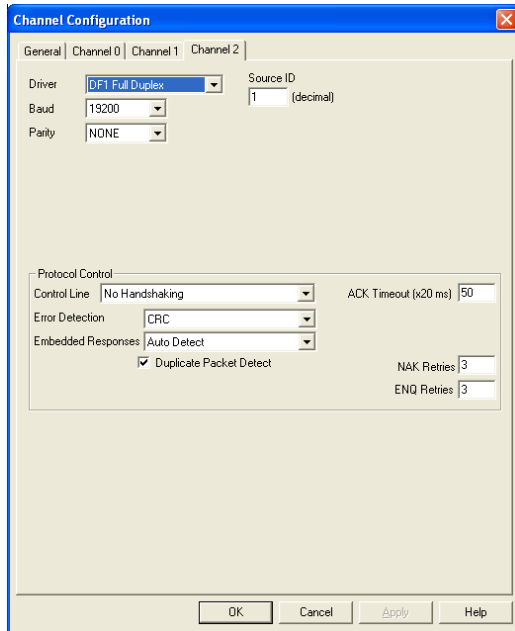


Figure 4. Channel 2 (Serial Port) Configuration Window.

4. Ladder Logic.

In Rung 0, a self-resetting, one-second timer is created to set up the polling interval, although a shorter or longer polling interval could be selected, depending upon the application.

In Rung 1, the one-second timer is used to trigger the message instruction to the EtherMeter. A double-left-click on the “Setup Screen” button of the MSG Block causes a popup window to appear, as shown in Figure 5. The setup parameters should be entered as shown in the figure.

Within the popup window, first the “General” tab should be selected, and the parameters on its page should be entered as instructed below. The General tab is shown in Figure 5.

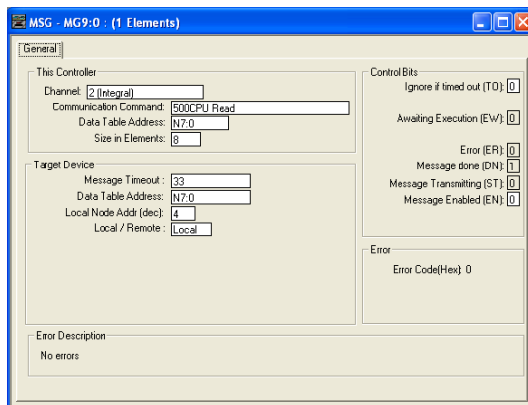


Figure 5. Message Configuration Window (General Tab).

Under the “This Controller” heading, note that the selected Channel is “Channel 2 (Integral)”, which corresponds to the DB-9M serial port of the MicroLogix 1400. The selected “Communication Command” is “500CPU Read”, as the EtherMeter emulates a SLC/500. The selected target data table address within the MicroLogix is N7:0, although a different memory location could be chosen. The “Size in Elements” is entered as “8” (8 x 16-bit words), because in this example four 32-bit words are requested from the EtherMeter (Total1, Total2, Flow1, Flow2).

Under the “Target Device” heading, note that the “Data Table Address” is entered as N7:0, as this is the desired beginning memory location within the EtherMeter. For the complete memory map of the EtherMeter, please refer to the User Manual or Setup Menu. For “Local/Remote”, “Local” should be selected.

In Rung 2, the eight 16-bit words contained in the N7 registers are copied into the L12 registers, which are used for holding long (32-bit) integers.

5. Results.

After the Ethernet port is configured and the ladder logic is written, the program should be downloaded into the MicroLogix; and the PLC should be placed into “Run Mode”.

In this example, the EtherMeter is reading two encoder meter registers. As documented in the EtherMeter User Manual, the totalization register contents are never scaled by the EXPn multiplier, so as to eliminate the possibility of 32-bit overflow conditions. The following meter data is applicable to this example:

Meter 1 Total:	1.9 GAL	(Register Contents: 19)
Meter 2 Total:	9999999.2 GAL	(Register Contents: 99999992)
Meter 1 Flow Rate:	0 GPM	(Register Contents: 0)
Meter 2 Flow Rate:	0 GPM	(Register Contents: 0)

Figure 6 displays screen snapshots of the N7 and L12 register contents. Note that the large value for Meter 2 (99999992) spans two 16-bit registers (N7:2-3), so this value is only rendered correctly in the context of a single, 32-bit register in L12:1.

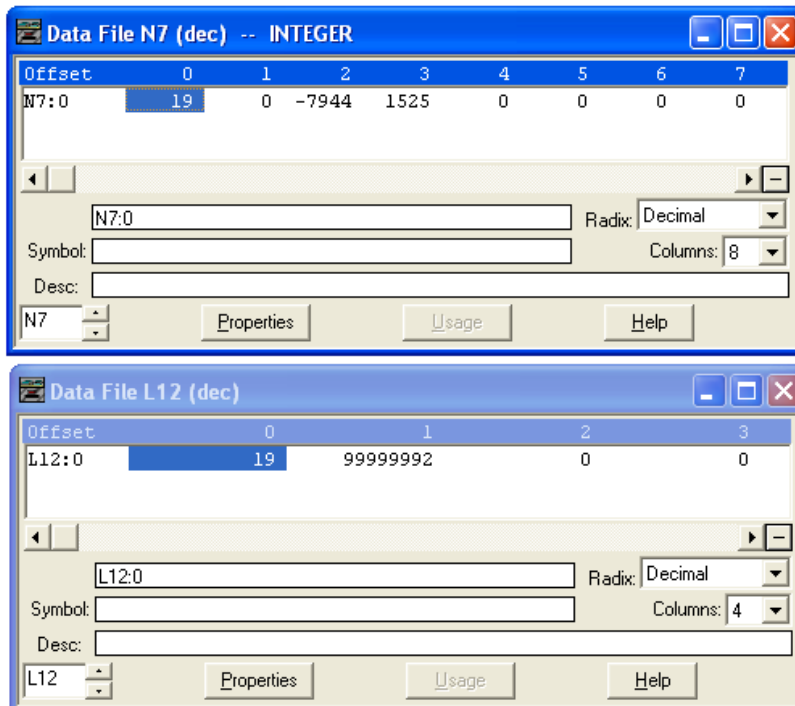


Figure 6. Register Display Windows (Realtime).