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Configuring Prolinx 4201-DFNT-MCM Gateway
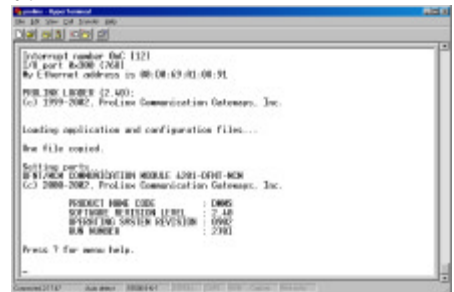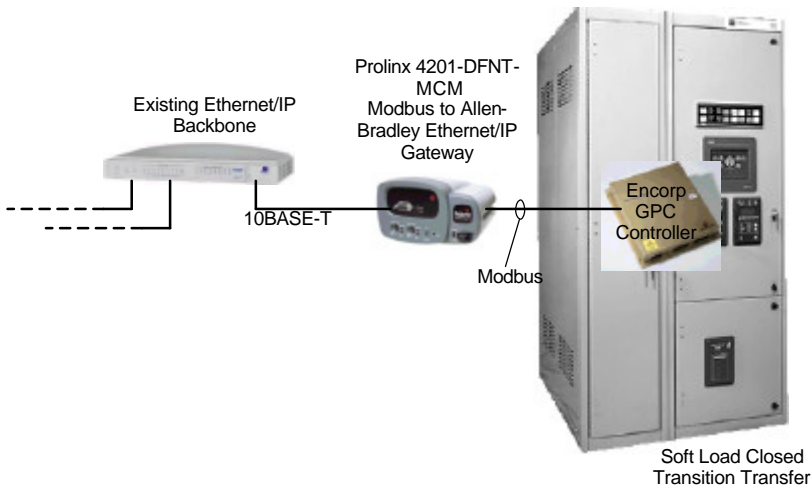
Application Note

General Description

The Prolinx Gateway model 4201-DFNT-MCM is used to connect an Allen-Bradley Ethernet/IP network to a Modbus device.

In this application, we will connect the Gateway to a Cutler-Hammer Soft-Load Closed Transition Transfer Switch that utilizes the Encorp GPC control. The Encorp GPC control includes one Modbus slave port, configured for 9600 baud, no parity, 8 data bits and one stop bit. The default slave address is set to 002 for the main logic (a second address ,001, is used for the internal PLC, not used in this example). Note: the default Modbus slave addresses can be changed by the user through either the Modbus port (by writing register 40018 with a new address) or through the Lonworks port (cLNOMdBSlv_is the SNVT to write).

Setup

1. This Prolinx has been preconfigured to read Encorp Modbus registers 30300-30309 and 40300-40309 and place this into internal registers 300-309 and 1300-1309. Refer to http://www.ch.cutler-hammer.com/unsecure/cms1/TD1502TE_TRANSFER_SWITCH_COMMUNICATIONS.PDF for a explanation of these Modbus addresses

2. Connect DIN to 9-pin male adapter cable to the DEBUG DIN port on the Prolinx. This cable is supplied with the Prolinx.

3. Connect a computer to this adapter cable using a 9-pin female to 9-pin female null modem cable.

4. Start Hyperterminal and configure for 57600 baud, 8 data bits, no parity, 1 stop bit.

Existing Ethernet/IP Backbone

Prolinx 4201-DFNT-MCM
Modbus to Allen-Bradley Ethernet/IP Gateway

10BASE-T

Modbus

Encorp GPC Controller

Soft Load Closed Transition Transfer

```
# DFNTMCM.CFG
#
# This file contains the configuration for the DFNT/MCM communication
# module.
#
# LOCATION      : ProLinx Communication Gateways, Inc.
# DATE          :
#
# This section is used to define the configuration for the Module level
# data.
#
[Module]
Module Name : 4201-DFNT-MCM

# This section is used to define the configuration for the master device
# simulated on network port
#
[DFNT Client 0]
Minimum Command Delay   : 0      #Minimum number of msec's between commands
Response Timeout        : 1000   #Response messgage timeout (0-65535 mSec)
Retry Count             : 3      #Response failure retry count

[DFNT Client 0 Commands]
#
# The file contains examples for a ControlLogix processor with the N7 file
# configured.  This example uses SLC and PLC5 commands.
#
#  1     2      3      4    5  6                    7    8     9    10   11    12
#        DB    Poll        Swap                         Func  File File Elm   Sub
#Enab  Addr  Delay Count   Code   Node IP Address Slot Code  Type  #    #     Elm
START
END


[DFNT Client 1]
Minimum Command Delay   : 50     #Minimum number of msec's between commands
Response Timeout        : 1000   #Response messgage timeout (0-65535 mSec)
Retry Count             : 3      #Response failure retry count

[DFNT Client 1 Commands]
#
#        DB    Poll        Swap                         Func  File  Elm  Sub
#Enab  Addr  Delay Count   Code   Node IP Address Slot Code   #    #   Elm
START
         1    50      0    10     0  192.168.0.101    -1  101    7    0   -1
END


#This is an example of a Master port using Modbus RTU protocol

[Modbus Port 0]

# Settings required by both Master and Slave
Enabled                  :    Yes #Port enable flag Y=Yes, N=No
Type                     : Master #Port type M=Master, S=Slave

Float Flag               :     No #Use floating data type Y=Yes, N=No
Float Start              :   7000 #Register offset in message for floats
Float Offset             :   2000 #Internal Address for floats

Protocol                 :    RTU #Modbus Protocol R=RTU, A=ASCII
Baud Rate                :   9600 #Baud rate for port
Parity                   :   None #N=None,O=Odd,E=Even
Data Bits                :      8 #5 to 8 data bits for messages
Stop Bits                :      1 #1 or 2 stop bits for messages
RTS On                   :      0 #Delay after RTS set before message sent (mSec)
RTS Off                  :      0 #Delay after message before RTS dropped(mSec)
Minimum Response Delay   :      1 #Number of mSec to delay before respose
Use CTS Line             :     No #Monitor CTS modem line (Y/N)
Response Timeout         :   1000 #mSec for response timeout of command
Retry Count              :      2 #retry count for failed requests

# Settings required for Slave Driver
Internal Slave ID        :      1 #Modbus Node address for this port on network
Bit Input Offset         :      0 #Internal DB offset to bit input data
Word Input Offset        :      0 #Internal DB offset to word input data
Output Offset            :      0 #Internal DB offset to bit output data
Holding Register Offset  :      0 #Internal DB offset to holding reg data
Use Guard Band Timer     :     No #Use packet gap timeout for messages
Guard Band Timeout       :      0 #0=Use default for baudrate, or set timeout

# Settings required for Master Driver
Minimum Command Delay    :      0 #mSec delay between commands
Error Delay Counter      :    100 #0-65535 Command cycle count if error
```

(Continued from previous page)

```
[Modbus Port 0 Commands]
#           Internal    Poll    Reg  Swap    Node  Modbus  MB Address
# Enable    Address   Interval  Count Code  Address   Func   in Device
START
      1       300         0      10    0        2      2        300
      1      1300         0      10    0        2      3        300
END


# This section is used to define e-mail reports to be sent from the module
# to a specified e-mail server/user account based on the value of selected
# user register/value combinations.  When the specified register value contains
# the value defined, the e-mail file will be sent from the module.

[E-MAIL]
#   DB    Trigger    Mail          TO
#   Reg    Value     Server IP     Name          E-Mail File Name
START
      0       1      192.168.0.61  Test          test
END


# This section is used to move data within the database to concentrate information
# for simpler data requests and control.  The From Address specifies the start
# database location to copy the number of registers set by Register Count to
# the specified To Address (destination of data).  When the data is copied,
# the order of the bytes can be altered using the Swap Code field as follows:
#
#  SWAP CODE    DEFINITION
#     0        Bytes left in original order   (1234 -> 1234)
#     1        Words are swapped              (1234 -> 3412)
#     2        Words and bytes are swapped    (1234 -> 4321)
#     3        Bytes in each word are swapped (1234 -> 2143)

[DATA MAP]
#   From      To     Register   Swap    Delay
#Address   Address     Count    Code    Preset
#START
#    4000    1000         9       0      2000
#    4020    1010        10       0      2001
#    4400    1020        10       0      1002
#    7900    1060        20       0      1003
#    8100    1080        20       0      1004
#    8900    1100        80       0      1005
#END
```

Changing Configuration

Note that a configuration file is downloaded to the module by rebooting the module (cycling power, pressing ESC from a top level menu and answering 'Y' to the prompt.

Press ? for menu help.

Press 'Y' key to confirm program exit!

If you don't press the 'Y' key, the Prolinx replies with:

Confirmation timedout!

Hold the L key down while tha module reboots and you will be given the loader screen
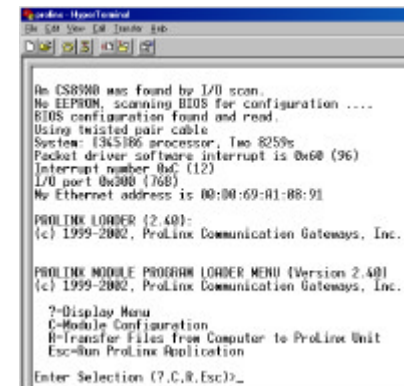
Select "R" to Transfer files from Computer to Prolinx Unit".

The system will ask if you want to download a new executable file.

Do you want to download a new program executable file (*.exe file) (Y/N)? _

Answer No.

The system will ask if you want to download a new configuration.

Do you want to download a new configuration file (*.cfg file) (Y/N)?
WARNING: CURRENT CONFIGURATION WILL BE LOST!

Do you want to overwrite the existing configuration file
(Prolinx.cfg) (Y/N)?

Answer Yes and select <u>T</u>ransfer / <u>S</u>end from the Hyperterminal menu

After the configuration has been downloaded, the system will then ask if you want download a new Ethernet configuration

Do you want to download a new WATTCP.CFG file (Y/N)? _

Answer No.

The module will then reboot and restart with the latest changed configuration.

Note that this configuration file is just a text file that is edited in a program such as Notepad. Refer to the *Prolinx* documentation for an explanation of the various sections of this configuration file.

One section that is not explained well in the Prolinx documentation is the [DATA MAP] section. You may not need this, and in fact, this section was commented out in the example configuration file listed on this and the previous page.

The DATA MAP section allows you to group registers from diverse Modbus messages into one table, making it easier for a block of data to be read from one Ethernet/IP message. The "Delay Preset" is in seconds and defines how often this table is updated (or consolidated).

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More Information

The Prolinx web site includes an FTP server with many required manuals. These manuals may be more up to date than the documentation supplied on the CD-ROM shipped with the Prolinx Gateway.

Also, Prolinx issued a mandatory upgrade notice that units must be updated to at least firmware V2.4. Refer to Prolinx technical support (www.prolinxgateways.com) for more information on accomplishing this upgrade. Plugging a computer into the DEBUG serial port (set to 57600 baud, 8, n, 1) and pressing ? will display a menu that will permit you to see the firmware version for your unit.

The upgrade from V2.x units to V2.4 is relatively easy and only requires a jumper to be moved temporarily, a flash file uploaded and the jumper returned to its original position.

Startup Guide:
ftp://ftp.prolinxgateways.com/ProLinx/Manuals2_2/05.PLNX.OOO.OO.01.EN.pdf

Modbus Protocol Manual:
ftp://ftp.prolinxgateways.com/ProLinx/Manuals2_2/06.PLNX.MCM.OO.01.EN.pdf

Allen-Bradley Ethernet/IP Protocol Manual:
ftp://ftp.prolinxgateways.com/ProLinx/Manuals2_2/06.PLNX.DFNT.OO.01.EN.pdf

Prolinx 4201-DFNT-MCM Datasheet:
ftp://ftp.prolinxgateways.com/ProLinx/Datasheets/4201.pdf

Sample Configuration File for the 4201-DFNT-MCM:
ftp://ftp.prolinxgateways.com/ProLinx/Config_files/4201-DFNT-MCM/dfntmcm.cfg