OPERATOR INTERFACE PRODUCTS APPLICATION NOTE

Subject: GP Modbus Master (RTU) with Automation Direct DL06 Slaves AN# 1117
Date: 1/14/2004
Name: Carl Roth

Description:

Using GP-Pro with a GP70 Series or GP77R Series as a Modbus Master (RTU) connected to multiple Automation Direct DL06 slaves. No communication instructions in ladder are needed. This Application Note is not intended for GP2000 series units. Caution: This solution uses a driver that is not an official release and has not been fully tested.

Solution:

Install additional driver files in your GP-Pro software for Modbus Master.

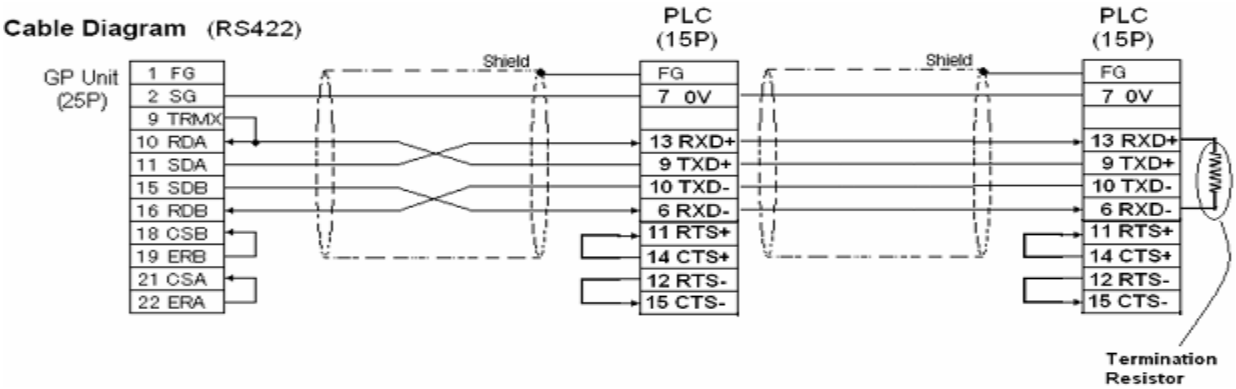
Testing was done using GP-Pro v6.23 with the following limited support driver:

Driver: Modbus Master RTU 1:32 OR (v3.50e) 05/17/2000
PLC 32 Modbus RTU Slaves (Holding Register)
Software requirements: GP-Pro v3.0 or newer.
Manual: manual not available. Limited support available.

Driver update instructions:

- Copy the Modicon.apn, Modicon.epn and Modicon.hpn files into the [ProPBWin] "\Protocol" directory.
- Copy the Modicon.tbl file into the [ProPBWin] "\PlcTbl" directory.

Cabling:



Addressing PLC Variables:

The GP-Pro Modbus driver will only address complete words. The driver does not have the ability to read and write bits. To translate the addresses from the DL06 PLC to GP-Pro Modbus Master Driver refer to the following table:

PLC Program Address	PLC Memory Map	PLC Modbus Station ID	Modbus Address (585/984 Mode)	GP-Pro Address	Notes
V7707	V7707	2	44040	20R04040	The same register is read and write
C20 - C37	V40601	2	416770	20R16770	The entire block of bits C20 - C37 is accessed
C40 - C57	V40602	2	416771	20R16771	The entire block of bits C40 - C47 is accessed.
V1210	V1210	3	40649	30R00649	
V2011	V2011	3	41034	30R01034	

The PLC Program Address is the address as it appears in the PLC program.

The PLC Memory Map address is derived from the table on page 29 of the DL06 Micro PLC User Manual; 1st edition, page 4-29. The table gives PLC system V memory equivalents of other types of registers. This method of addressing allows access other types of variables in the PLC. When reading or writing to discrete memory areas of the PLC, the Modbus Master driver will access 16 consecutive discrete registers (as shown in the table). Use caution to prevent writing to discrete bits unintentionally when writing to PLC discrete memory areas.

PLC Modbus Station ID is Station Number configured in the PLC software for Port 2.

The Modbus Address is from the Modbus/Koyo address conversion utility. GP-Pro uses the Modicon 584/984 addressing mode. For an automated MODBUS/Koyo address conversion utility, download the file "modbus_conversion.xls" from the **www.automationdirect.com** website. Follow the instructions on the spreadsheet "Directions" tab first.

The GP-Pro Address is entered by clicking on the Address Keypad within GP-Pro. Click on the down arrow. The list consists of the station number followed by "0R". (Examples: 20R is station 2. 120R is station 12.) Next, in the right hand field, enter the Modbus address less the left-hand digit (4). (Examples: Modbus address 44040 is entered as 4040. Modbus address 416770 is entered as 16770.)

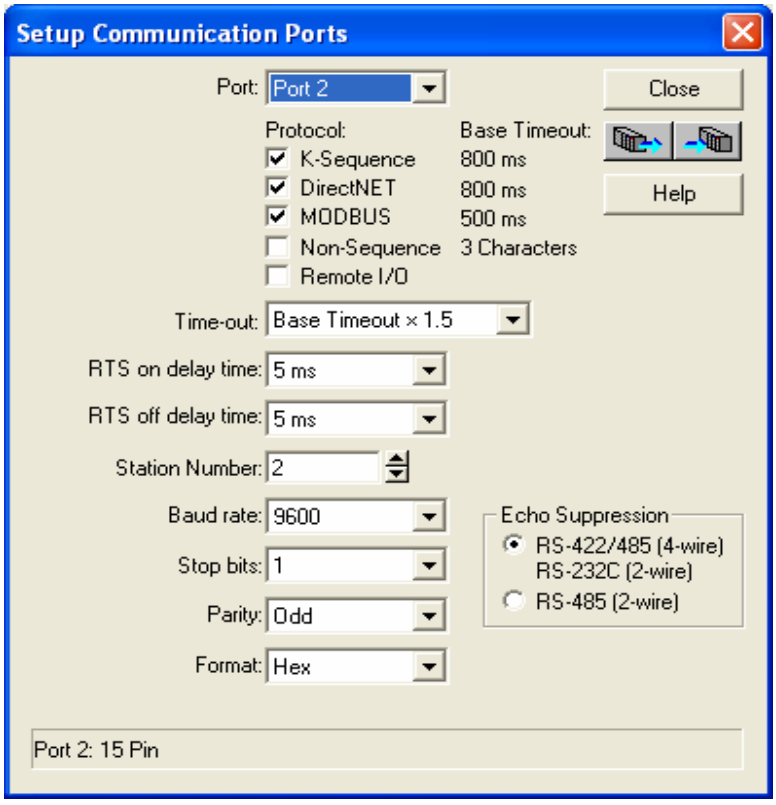
~~To address bit objects in GP-Pro such as indicator lights and push buttons, the objects are~~ assigned bit addresses in a word in LS Memory. For this test example the push buttons all have Function set to Momentary. The touch screen can only activate one of them at any time. So multiple momentary buttons can use the same word in LS Memory. Using D-Script this LS memory location is copied to a Modbus address that is written to the PLC.

The script is triggered by an GP internal timing signal value such as LS2038. Bit 5 from this address was used in the test program (LS2038 05). Changing the last digit to a lower value speeds up the response time. (Example: LS2038 04) Raising it to a higher value slows the response time.

The following expression in scripting copies a word from LS memory in the GP to the PLC.
[w:2OR16770]=[w:LS1200].
Referring to the PLC address table above note this address corresponds to PLC addresses C20 through C37. In our example when we press a button on the GP configured as LS1200 00 the PLC bit C20 goes high.

The following expression in scripting copies a word from the PLC to LS memory in the GP:
[w:LS1400]=[w:2OR16771]
When C40 in the PLC goes high LS1400 00 goes high. Bit objects such as indicator lights in GP-Pro are assigned bits of this LS word.

Environment Setup:
Configure the PLC port in DirectSoft as shown on the right. Set the Station Number to the appropriate value.



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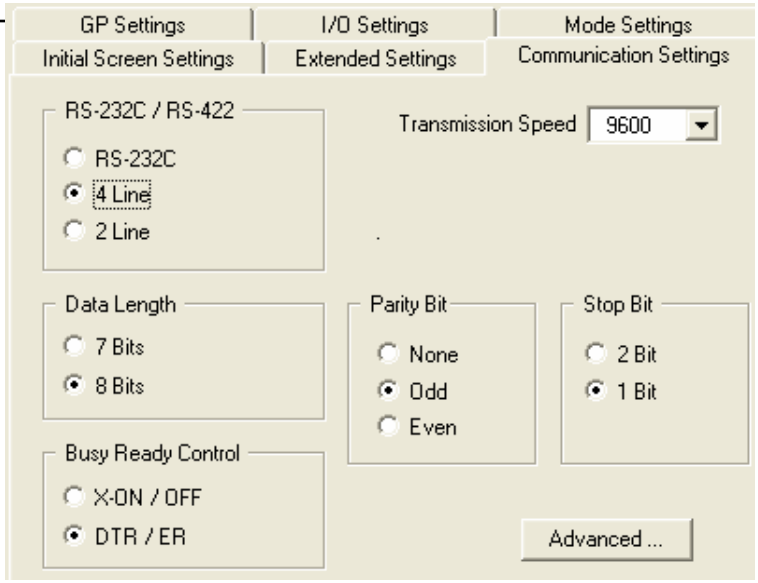
~~In GP-Pro select PLC type as Modicon~~ Modbus (MASTER). System start address is 400001 (default). The machine number is 1. (default) Read area size is 0. (default) Uncheck all System Area Settings. Verify that the Watch Dog word address is a valid address.

Configure the GP-Pro communication settings as shown in the figure on the right.



Note: This configuration was tested with a Proface GP37W2.

The Koyo Direct Logic PLC's tested were:
D0-06DR-D D0-06DD2.

The terminating resistor used on last PLC was 150 ohm.