

Communications between DF1 Wireless Gateway (105U-G / 905U-G) and Allen-Bradley PLC's

The purpose of this document is to show the application of using DF1 communications with the 105U/905U-G-MD1 module.

All references in this document to the 905U-G also apply to the 105U-G.

BACKGROUND

The 905G DF1 Driver allows the 905G to communicate with Allen-Bradley devices supporting the DF1 protocol. Supported commands allow communication with 500 CPU devices (SLC and Micrologix) and with PLC2 series devices. The 905G will only support the full-duplex operation - this is the default DF1 mode on most equipment. DF1 full duplex is a "peer-to-peer" protocol. Both DF1 devices can initiate commands to the other device, and both devices will respond to commands from the other device. The 905G can act as both a command initiator and a command responder.

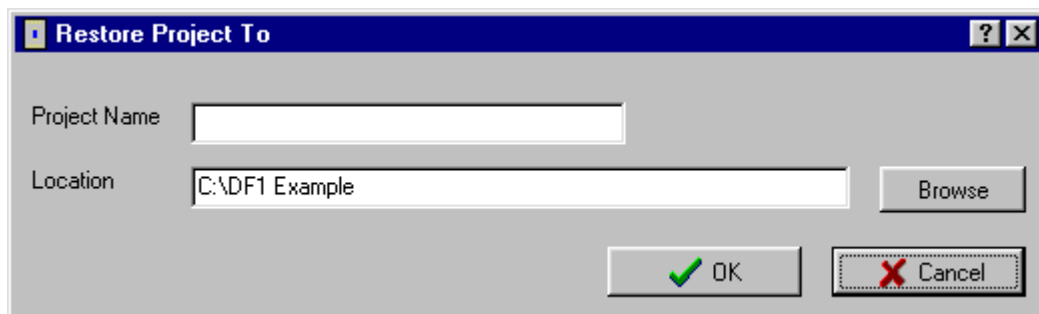
MATERIALS

The materials used for this application were,
Allen Bradley Micrologix 1500 PLC with programming cable,
RSLogix 500,
RSLinx,
905U-G-MD1,
905U-1,
E-Series Configuration Utility (Build 148 or higher),
RS232 DB9 serial cable.

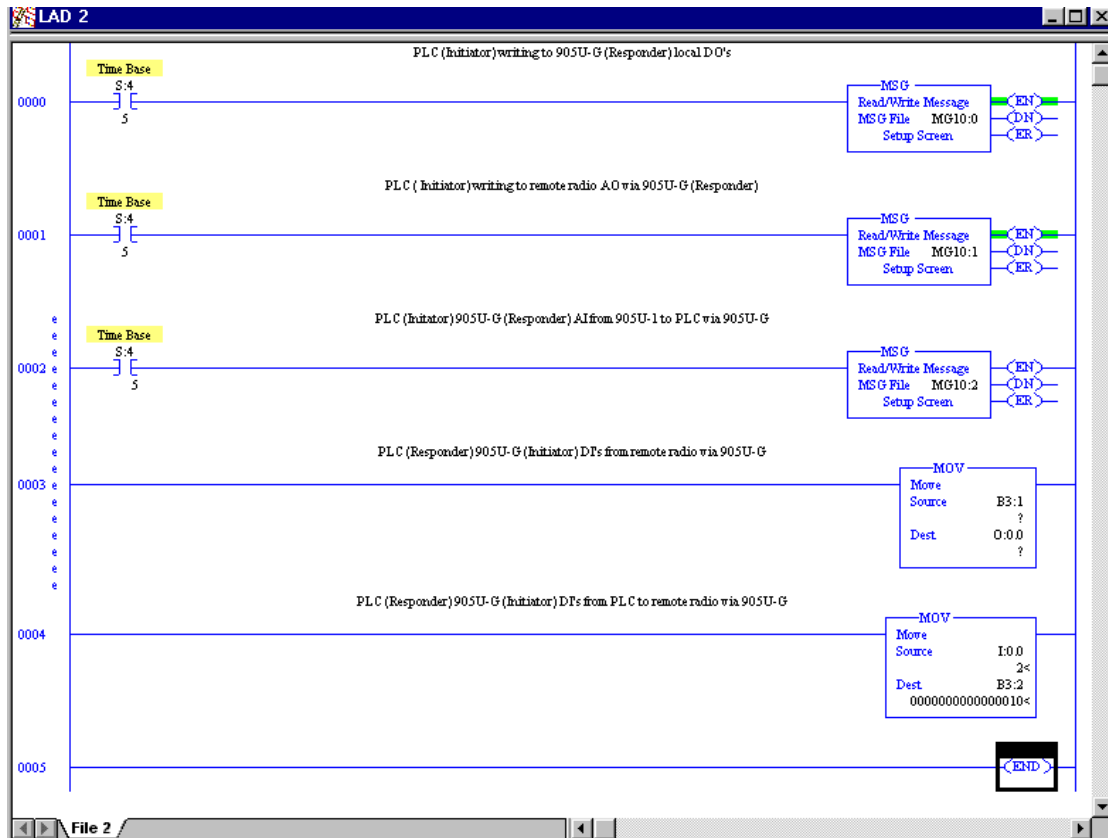
APPLICATION

This application should be read in conjunction with the user manual for details on powering and programming the 905U Radio's. The reader would also have a firm understanding of programming Allen-Bradley PLC's using RSLogix.

To view the Elpro configuration save the zip file ***DF1 e-series config example*** to a folder on your PC. Open up E-series configuration utility build 148 or higher, select file/ restore project and locate the zip file saved on PC and select ok leaving Project Name blank. This will extract the files into this folder and load the configuration into the utility program.

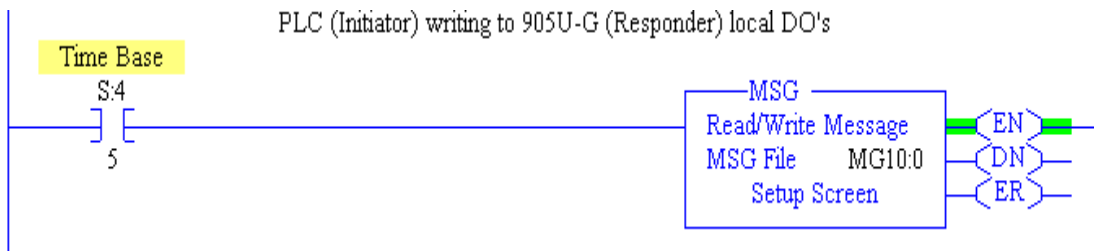


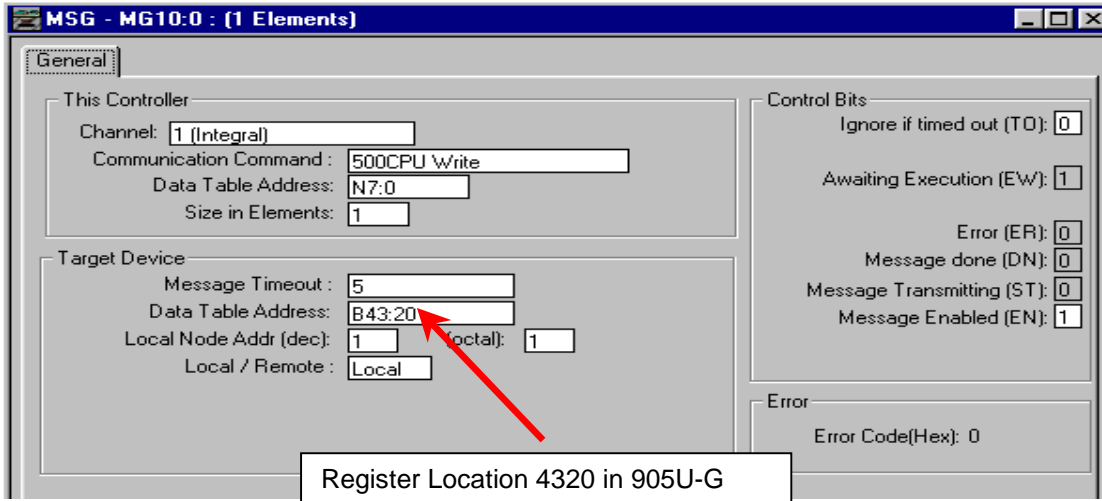
To view the PLC configuration save the file *DF1 Initiator and Responder example* to same folder as mentioned above on PC and using RS Logix open up this file



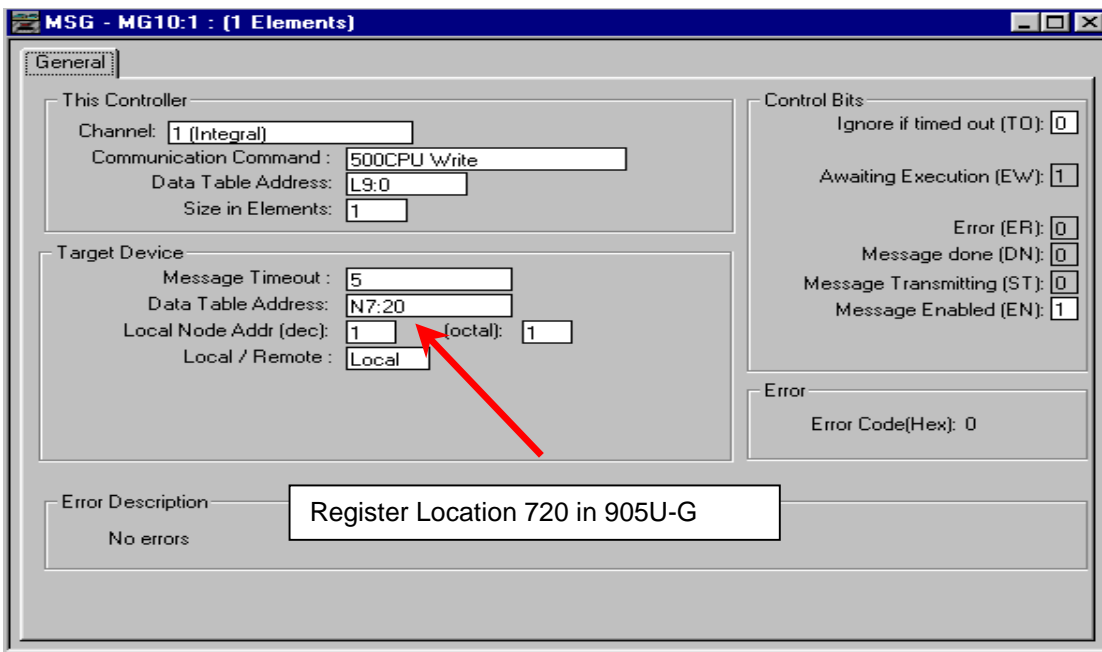
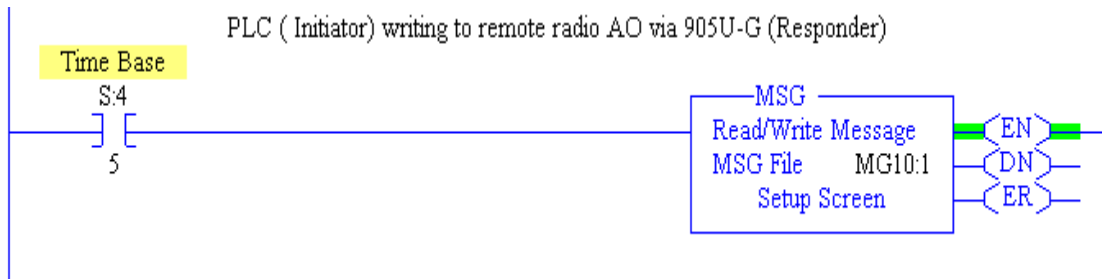
From the above example the first 3 rungs show the PLC being the initiator and 905U-G being the responder. The last 2 rungs show the PLC being the responder. The functions of each rung are as follows,

The first rung shows the PLC writing values from Integer file N7: 0 to the local digital outputs on the 905U-G. The PLC is set up to do the polling by using the time base clock from status register S: 2. A message command is used to transfer the data from PLC to 905U-G. The location B43: 20 is register 4320 in the 905U-G.

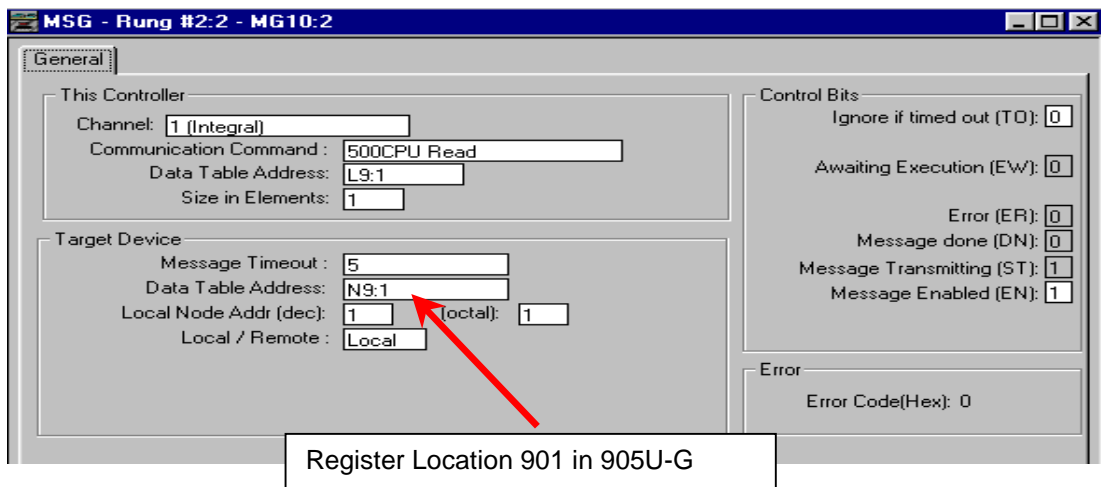
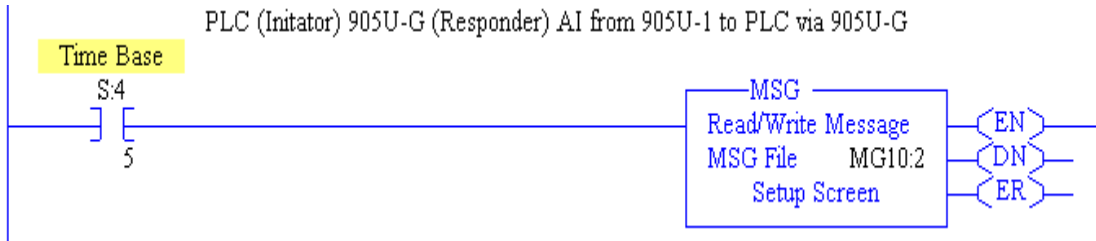




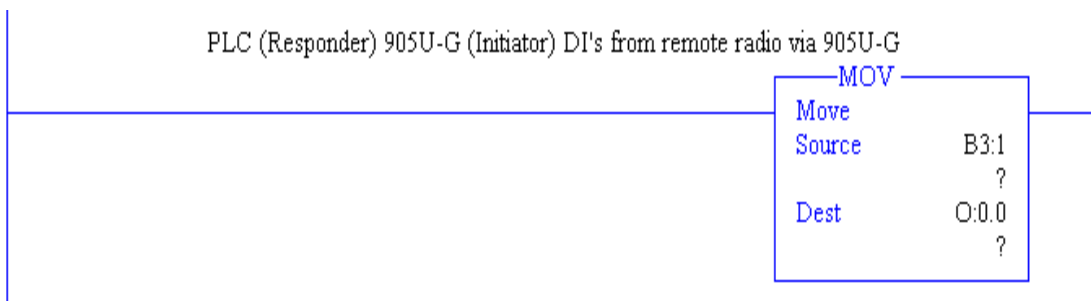
The second rung shows a message command sending an Integer value as an Analogue 4-20ma-output signal to the 905U-1. Since the PLC uses signed integers (-32768 to 32767) and the Elpro radios use unsigned integers (0 to 65535), for Analogue inputs and outputs if you use the long integer file, the Elpro radio will ignore the upper 16 bits of this file and give a corrected 16 bit output.

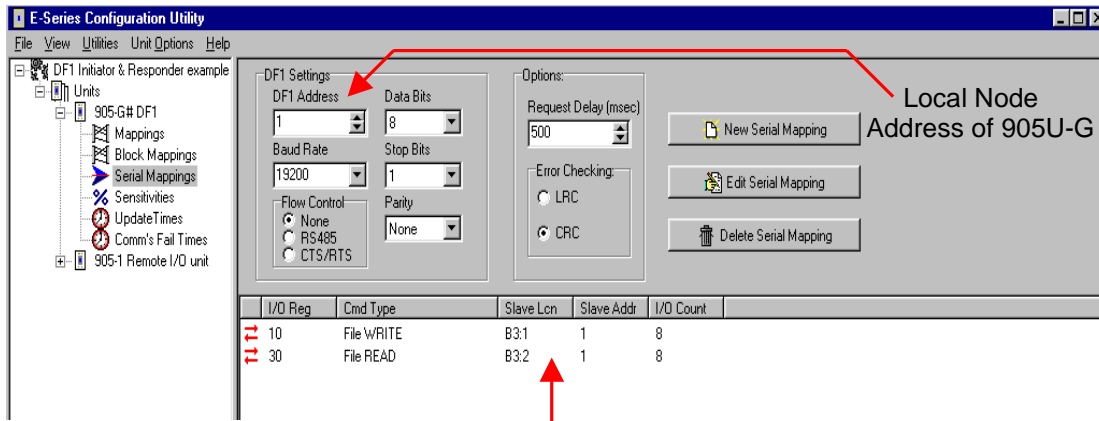


The third rung shows the PLC being the Initiator reading the Analogue input from the 905U-1. This is being read into a long file, as the Elpro radios are unsigned. From here this value can be masked if required to be a signed value.

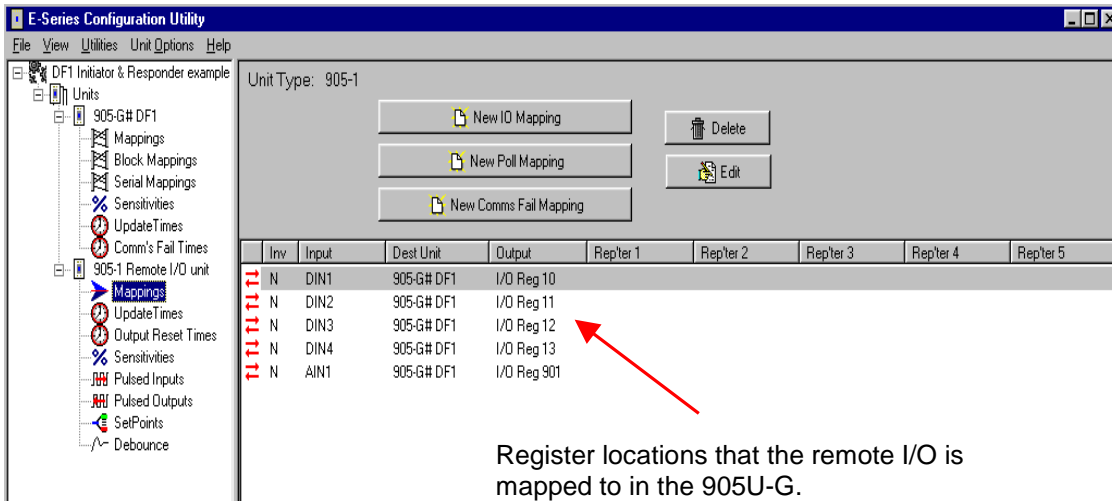


The fourth rung shows the PLC being the responder and in the E-series configuration under serial mapping's you will see the initiator command of a file write to PLC location B3: 1. The actual Digital inputs are from the 905U-1 under mapping's to registers 10 – 13 then under serial mapping's on the 905U-G a file write command is used from register 10 to PLC location B3: 1. The 905U-G does the polling to the PLC in this instance and is set up using the "request delay" time in the options section under serial mapping's. This is currently set to 500msec.





Data File location and Address of PLC



The fifth rung also shows the PLC as the responder and the 905U-G reading the local I/O from the PLC and mapping them to the Digital outputs on the 905U-1. In the E-series configuration under serial mapping's the Initiator command of File Read from PLC location B3: 2 is used and values are placed into registers 30 and onwards. These registers are then mapped from the 905U-G under mapping's to the Digital outputs on the 905U-1.

PLC (Responder) 905U-G (Initiator) DI's from PLC to remote radio via 905U-G

```

MOV
Move
Source      I:0.0
           2<
Dest        B3:2
           0000000000000010<
    
```

Unit Type: 905-G

Inv	Input	Dest Unit	Output	Rept'1	Rept'2	Rept'3	Rept'4	Rept'5
N	I/O Reg 720	905-1 Remote L...	AOT1					
N	I/O Reg 30	905-1 Remote L...	DOT1					
N	I/O Reg 31	905-1 Remote L...	DOT2					
N	I/O Reg 32	905-1 Remote L...	DOT3					
N	I/O Reg 33	905-1 Remote L...	DOT4					

Registers from the File Read command, mapped to Digital outputs on 905U-1 remote I/O module

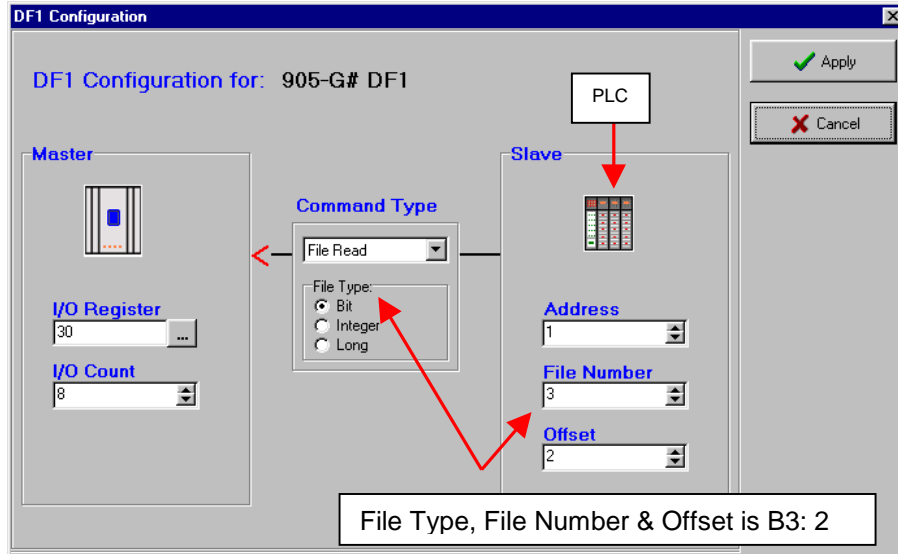
DF1 Settings

DF1 Address: 1, Data Bits: 8, Baud Rate: 19200, Stop Bits: 1, Parity: None

Options: Request Delay (msec): 500, Error Checking: LRC, CRC

I/O Reg	Cmd Type	Slave Lcn	Slave Addr	I/O Count
10	File WRITE	B3:1	1	8
30	File READ	B3:2	1	8

Register that values from PLC B3: 2 are written to



500 CPU (SLC and MicroLogix) file types and addressing

The 905G provides a linear address space of 10,000 data words. This is compatible with PLC2 addresses, but does not match the addressing used by the 500CPU modules (SLC and Micrologix). These address data by file number and file offset. To address an image location, L , in the 905G, set the file number to $L / 100$ and set the file offset to $L \% 100$. For example, to read image location 4320 in the 905G, read from file number 43, offset 20.

Amendment Register:

Issue No.	Date	Details of Amendment
1.0	05/01/04	Draft Issue