

105U/905U-G-MD1 (DF1) & Allen Bradley MicroLogix 1500 PLC

PURPOSE

The purpose of this document is to provide the reader with an application note using a MicroLogix PLC with DF1 communications to a 105/905U-G-MD1 module.

BACKGROUND

The 105/905G DF1 Driver allows the 105/905G to communicate with Allen-Bradley devices supporting the DF1 protocol. Supported commands allow communication with 500 CPU devices (SLC-500 & Micrologix) and with PLC2 series devices. The 105/905G will only support the full-duplex operation this is the default DF1 mode of 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 105/905G can act as both a command initiator and a command responder.

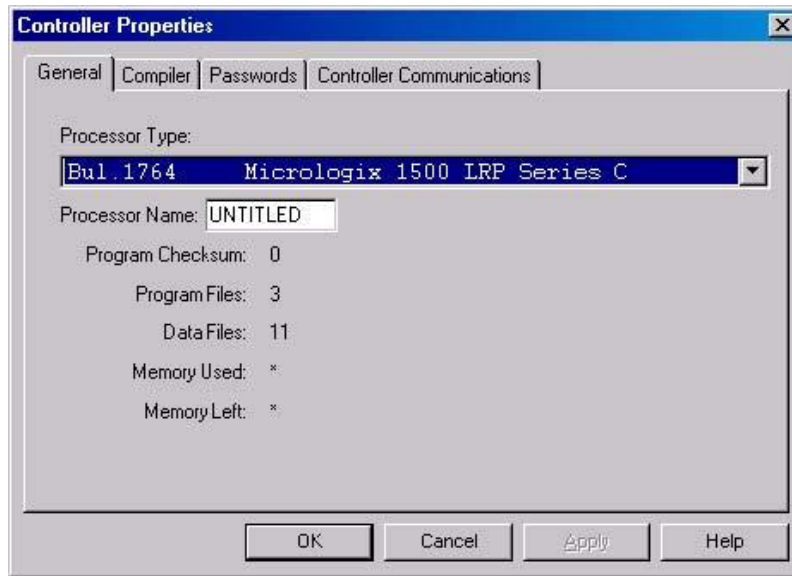
MATERIALS

The materials used for this application were,
Allen Bradley Micrologix 1500 PLC with programming cable,
RSLogix 500,
RSLinx,
105/905U-G-MD1,
E-Series Configuration Utility (Build 148 or higher),
RS232 DB9 serial cable.

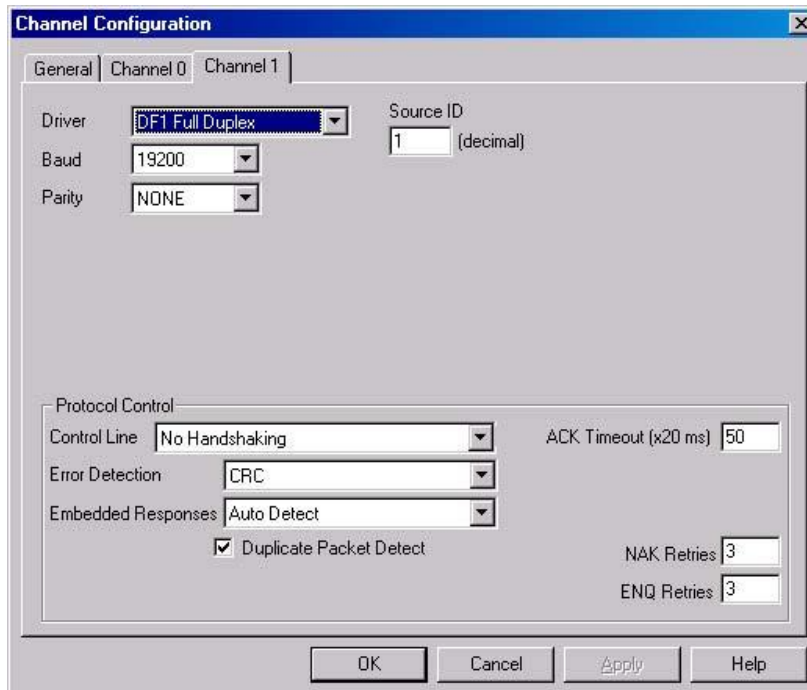
APPLICATION

This application should be read in conjunction with user manuals for details on powering and programming the 105/905U Radio's. The reader would also have a firm understanding of programming Allen-Bradley MicroLogix PLC's with the RS Logix software tool. The time base used for this application note should not be treated as absolute and if using the S: 4 Free Running Clock in the PLC refer to the time base for each PLC model, as the Cycle time does vary between models. Creating a time base too fast can lead to excessive resources being used in the gateway.

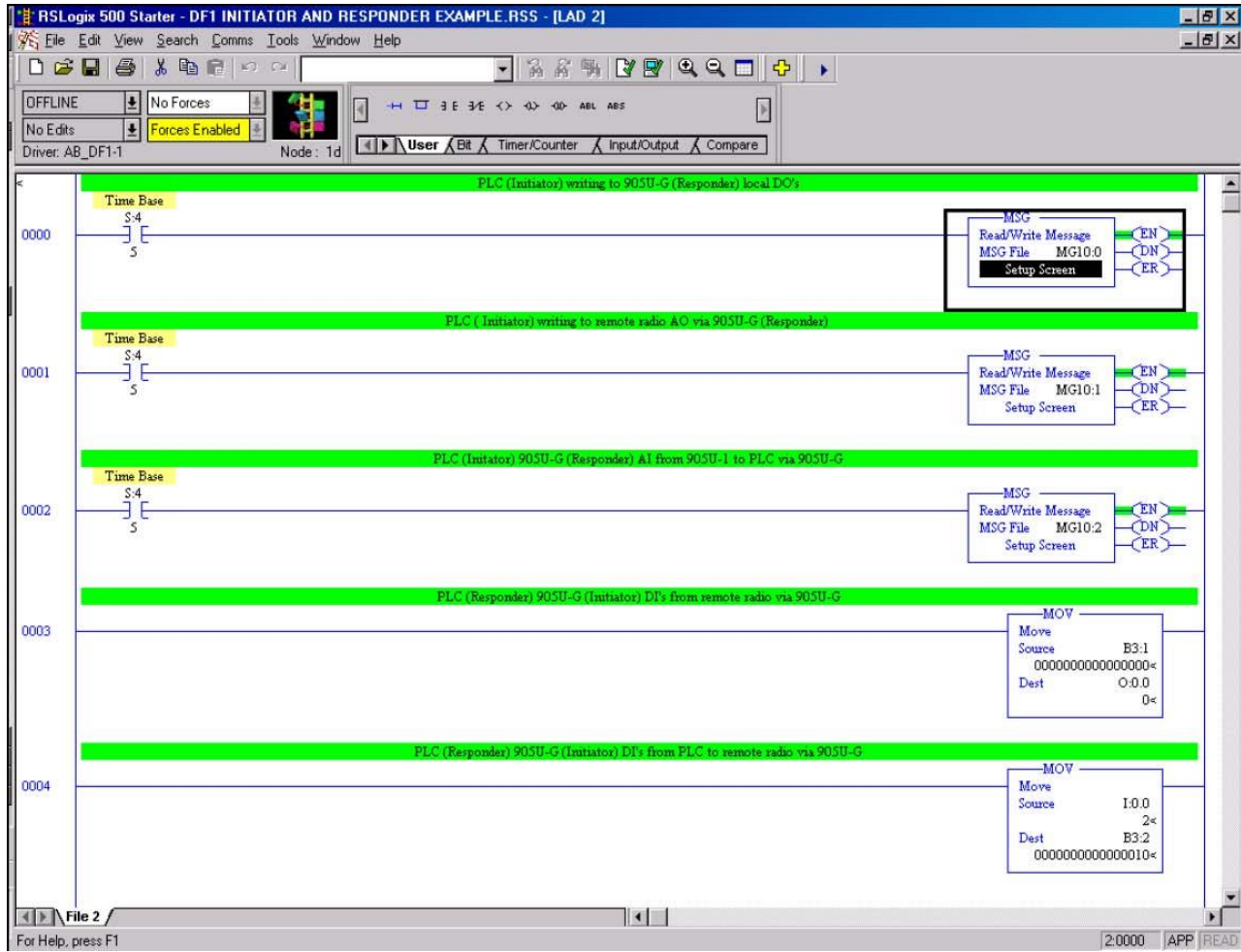
In this application the Micrologix PLC is referenced and select under “Controller Properties” as a Bul. 1764 Micrologix 1500 LRP Series C.



Under “Channel Configuration”, Channel 1 is used and setup as follows.

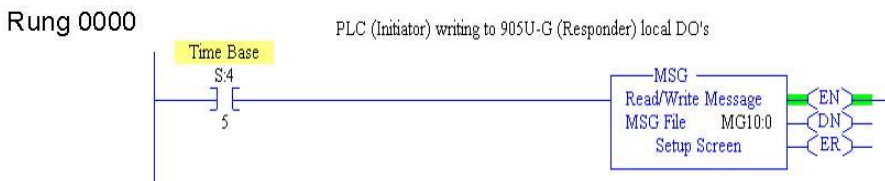


The following RS Logix rung logic was used in this application.

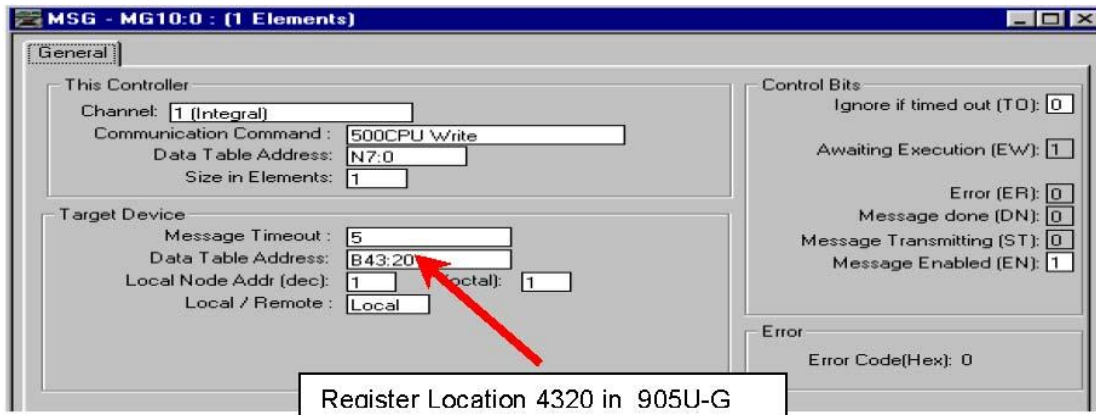


From the above example the first 3 rungs show the PLC being the initiator and 105/905U-G being the responder. The last 2 rungs show the PLC being the responder. The functions of each rung are as follows,

Rung 0000 below show's PLC logic, writing values from Integer file N7: 0 to local digital outputs on the 105/905U-G. The PLC logic is setup to trigger a MSG command using S:2/5 (time clock status bit) on transitions from low to high. A MSG (message command) is used to transfer the data from PLC to 105/905U-G. The location B43:20 is I/O register 4320 in the 105/905U-G.

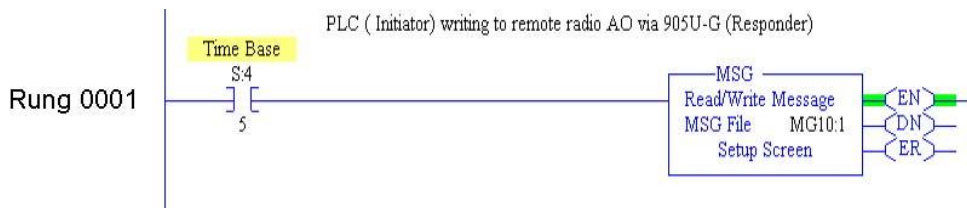


Rung 0000 MSG command - Setup Screen

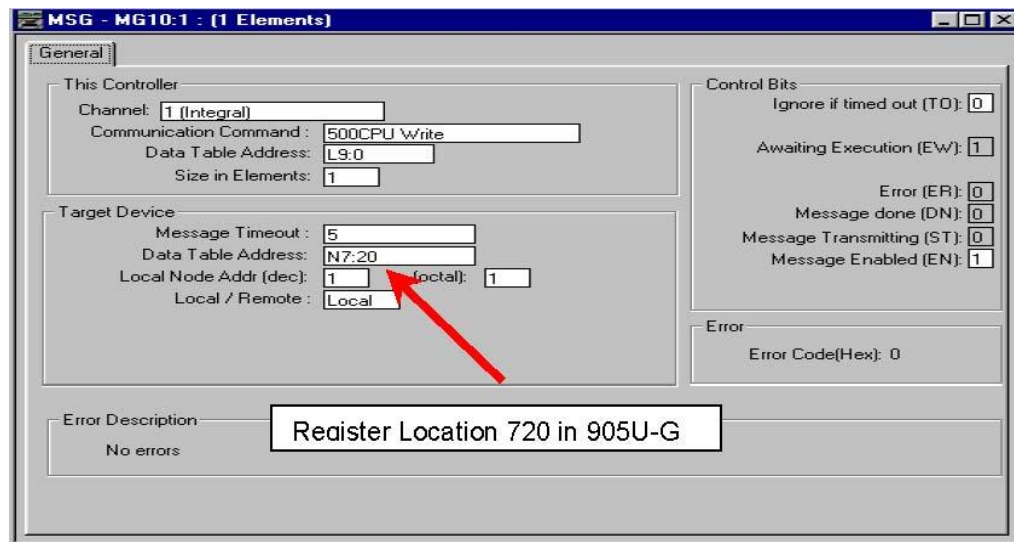


Rung 0001 below shows a MSG command writing an Integer to a 4-20mA. Since the Micrologix platform supports signed integers (-32768 to 32767) and the ELPRO radios support unsigned integers (0 to 65535). Use Long integer file types (32 bit) for Analogue inputs and outputs, the ELPRO radio will ignore the upper 16 bits of this file and give a correctly scaled output.

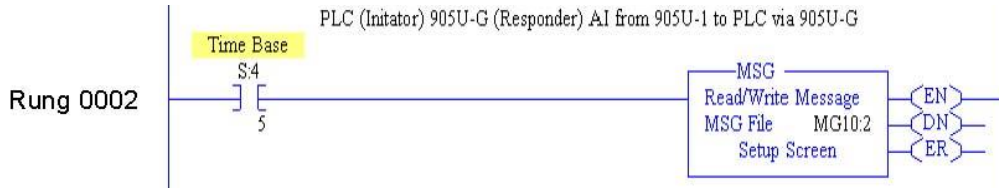
Note: Long Integers are supported by Micrologix 1500 only, for SLC-50/3 and above, conversion from 16 bit unsigned integers to Floating Point is required, reference application note SLC-500 Float point for details).



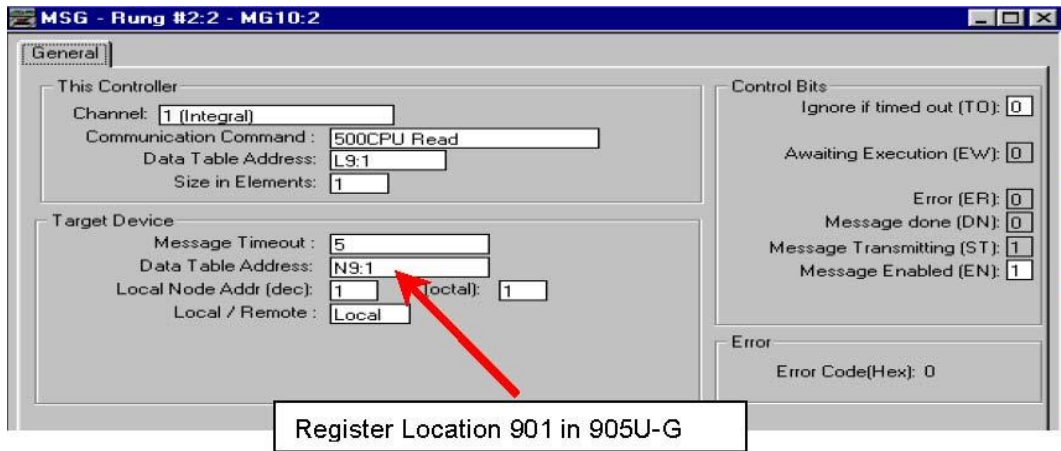
Rung 0001 MSG command - Setup Screen



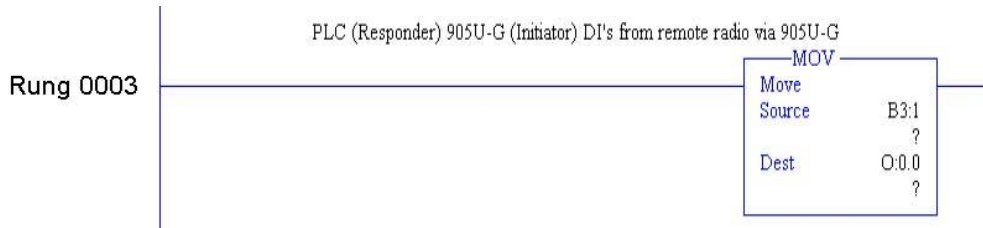
Rung 0002 show's the PLC as an Initiator reading (via the 105/905U-G-DF1) an analogue input. This is being read into a Long integer file type (32 bit), as the ELPRO radios are 16 bit unsigned integers.

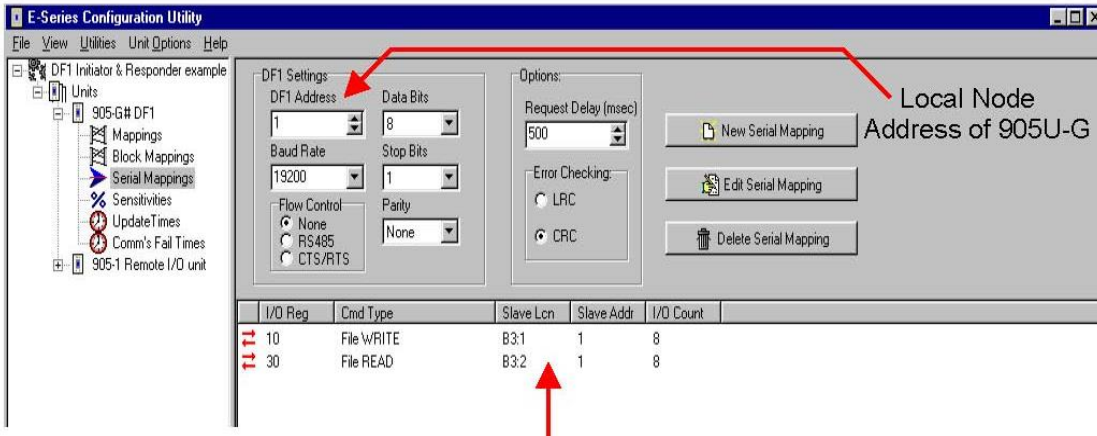


Rung 0002 MSG command - Setup Screen

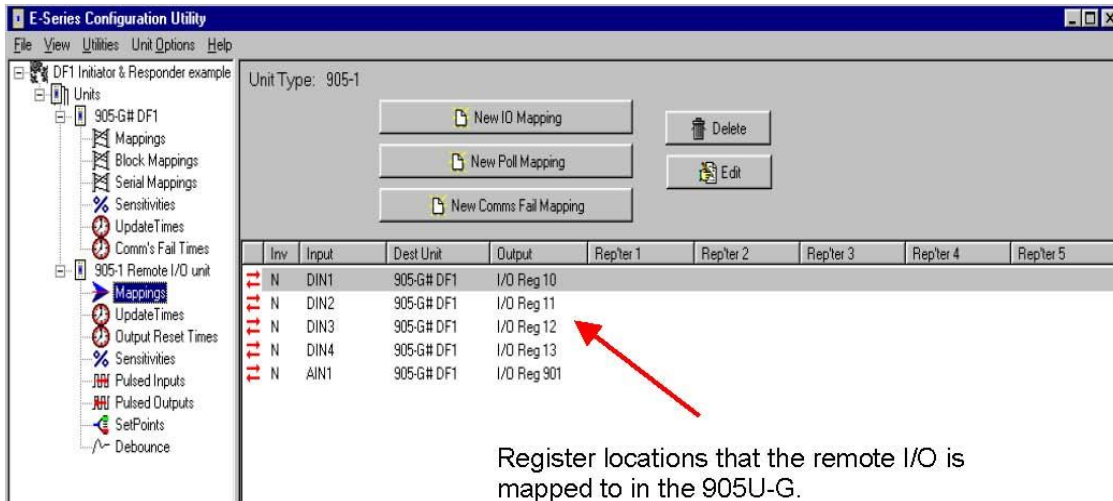


Rung 0003 shows the PLC being the responder in the E-series configuration under serial mapping's you will see the initiator command of a file write to PLC location B3: 1. Under serial mapping's on the 105/905U-G a file write command is used from register 10 to PLC location B3: 1. The 105/905U-G does the polling to the PLC in this instance and is set up using the "request delay" time in the options section under serial mappings. This is currently set to 500msec.



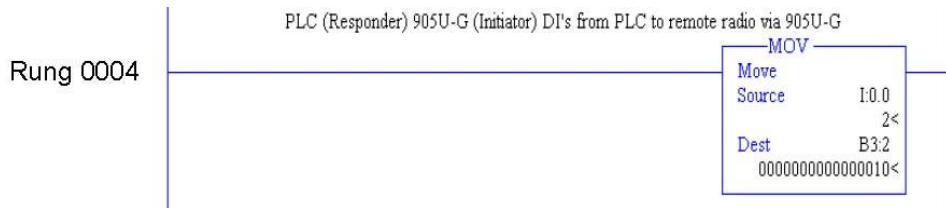


Data File location and address of PLC

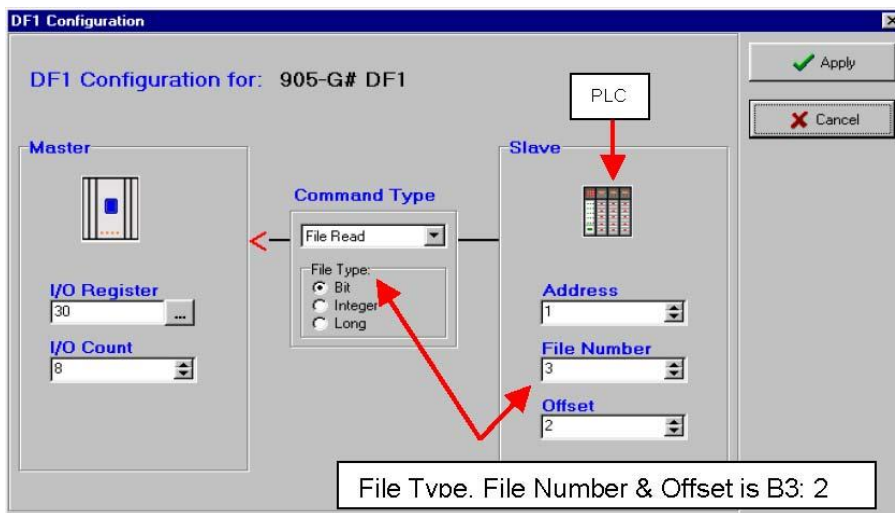
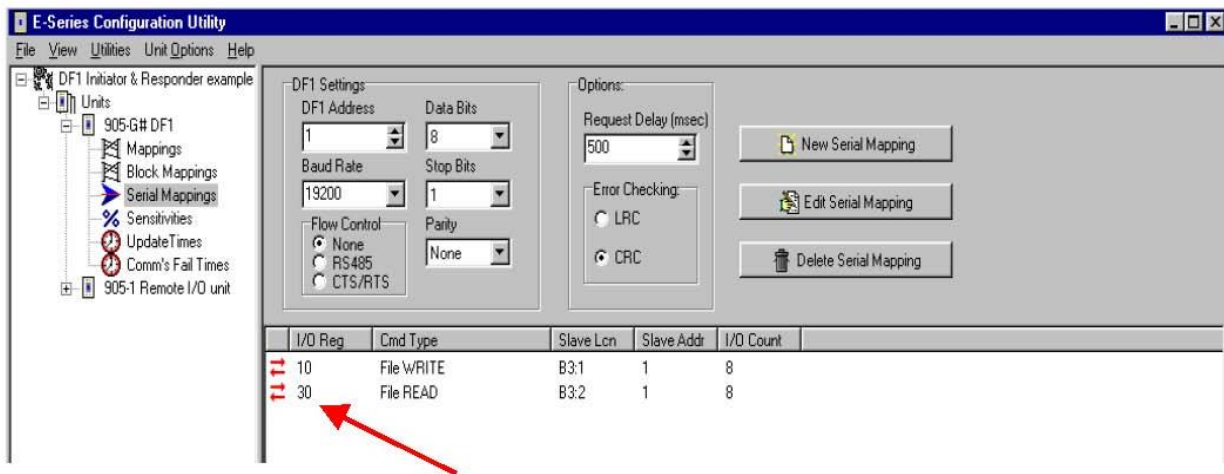
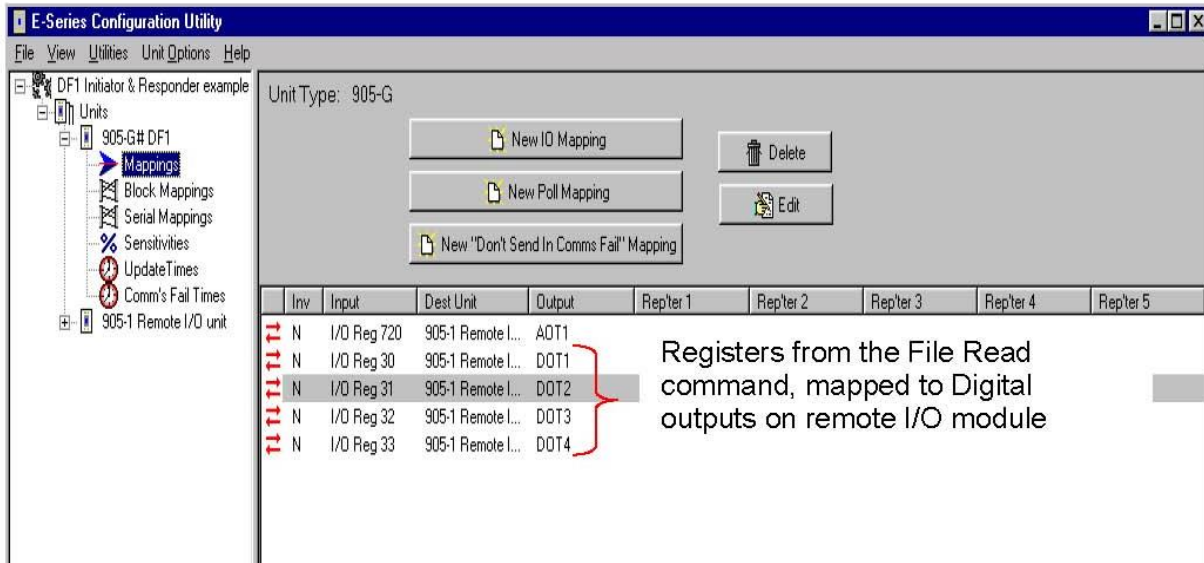


Register locations that the remote I/O is mapped to in the 905U-G.

Rung 0004 also show's the PLC as the responder and the 105/905U-G reading the local I/O from the PLC and mapping them to the Digital outputs on a remote unit. 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 105/905UG under mappings to the Digital outputs on a remote unit.



Register that values from PLC B3: 2 are written to



500 CPU – (SLC-500 & Micrologix) file types and addressing

The 105/905G 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-500 & MicroLogix). These address data by file number and file offset. To address an image location, L, in the 105/905G, 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
1.1	25/05/04	Second Issue
1.2	01/06/04	Config Changes
1.3	12/08/06	Combine 105U & 105/905U into one Application note
1.4	18/09/06	Page Formatting
1.5	23/02/10	Addition of time base differences between PLC models
1.6	11-02-19	Elpro Branding and formatting