

## Exchanging failed nodes on SST-ASI-SLC

The SST-ASI-SLC fits directly into the rack of the SLC500 PLC from Allen Bradley. Replacement cards can be purchased from Pepperl+Fuchs. Every card includes a programming cable, manual and AS-Interface card. Old cards had an RS232 port but new cards have a USB port and a USB VIRTUAL COM driver. Programming these cards is virtually the same.

Normally on AS-Interface the scanner card itself automatically addresses a single failed node. If more then one fail, then a handheld programmer can be used to set the address manually. The model numbers for the programmer and cable are:

- [VBP-HH1-V3.0-110V](#) handheld programmer
- [VAZ-PK-1.5M-V1-G](#) programming cable
- [VBP-HH1-V3.0-KIT-110V](#) programmer, case and four cables

Replacing failed nodes are easy if the node configuration of the new node is the same as the old configuration. The node configuration, AS-i profile, consists of the IO code, ID code, ID1 code, and ID2 code. The list of node addresses and their corresponding profiles are stored in the AS-i scanner. When a node is put on the network the profile is checked and if the new nodes profile matches what the AS-Interface scanner card expects then the node will run. If the profile is different the configuration won't match and the node won't work at all.

If the node is very old or the AS-i master is version M0 then ID1 and ID2 codes won't be used. In that case they are considered to have value F and only the ID and IO must be matched. Write down the configuration of the old and the new nodes here for use later. These values can be found on the datasheet, read by the handheld programmer, or read by the scanner card.

	Old	New
IO code		
ID Code		
ID1 Code		
ID 2 Code		

## Step 1 (How is the card setup)

The first thing to check is the current mode of the SST-ASI-SLC card. This can be found in the G file of the RSLOGIX 500 project. The G-File can only be read offline. It can be opened by going to IO Configuration > OTHER I/O Module – ID Code = 13635 > Click on Adv Config. > Click on Edit G Data

The screenshot shows the RSLogix 500 software interface. The main window is titled "MO AND M1 FILE ACCESS FOR SST\_ASI\_SLC.RSS". The "IO Configuration" window is open, showing a rack configuration with three slots. Slot 1 is a "1746-A7 7-Slot Rack". The "Current Cards Available" list includes various modules, with "OTHER I/O Module - ID Code = 13635" selected. The "Advanced I/O Configuration" window is also open, showing the "Setup" section with the following values:

Slot #:	1	OTHER I/O Module - ID Code = 13635
Maximum Input Words:	32	
Maximum Output Words:	32	
Scanned Input Words:	32	
Scanned Output Words:	32	
Interrupt Service Routine (ISR) #:	0	
M0 Length:	40	
M1 Length:	40	
G File Length:	64	

The "G File Data" window is also open, showing a table of data points:

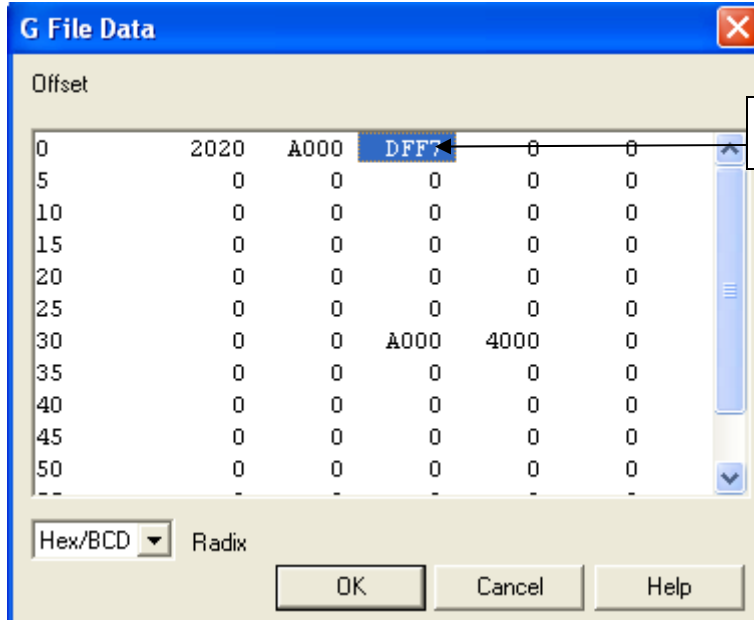
Offset	0	1	2	3	4	5
10	0	0	0	0	0	0
15	0	0	0	0	0	0
20	0	0	0	0	0	0
25	0	0	0	0	0	0
30	0	0	A000	4000	0	0
35	0	0	0	0	0	0
40	0	0	0	0	0	0
45	0	0	0	0	0	0
50	0	0	0	0	0	0
55	0	0	0	0	0	0
60	0	0	0	0	3543	0

The value of word 63 determines if you are using **LEGACY** mode or **3.0** mode. If word 63 is 13635 or 3543h then you are in Legacy mode. If the length of the G-File is not 64 and word 63 is not 13635(3543h) then you are using 3.0 mode.

## If in Legacy mode

Now check to see what kind of AS-i configuration you are using (G-File or Hyperterminal). If in Legacy mode, check word 2. If the most significant bit of word 2 is on then the AS-i card is taking the configuration from this G-File and all modifications/profile changes can be done here. If word 2 was setup using a G-File configuration the possible values would be 8xxxh, 9xxxh, Axxxh, Bxxxh, Cxxxh, Dxxxh,

Exxxh or Fxxxh. If bit 15 of word 2 is off then all configuration changes are done using Hyperterminal.



Example where Network 1 and 2 are configured and Network 1 is using a G file configuration. Address 1 is on the network with Parameter bits=F, ID code is F and IO code is 7

Here is the G-File layout by bit. You may have to use a calculator to convert the bits to hex numbers so they can be entered in the G-File.

G-File enable bit

**G File Layout Table**

Slave #	Word	Bits															
		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n/a	0	Reserved by SLC processor															
<b>Channel 1 slaves</b>																	
1	1	C	W	A	P	P <sub>3</sub>	P <sub>2</sub>	P <sub>1</sub>	P <sub>0</sub>	ID <sub>3</sub>	ID <sub>2</sub>	ID <sub>1</sub>	ID <sub>0</sub>	I/O <sub>3</sub>	I/O <sub>2</sub>	I/O <sub>1</sub>	I/O <sub>0</sub>
2	2	G	F	0	P	P <sub>3</sub>	P <sub>2</sub>	P <sub>1</sub>	P <sub>0</sub>	ID <sub>3</sub>	ID <sub>2</sub>	ID <sub>1</sub>	ID <sub>0</sub>	I/O <sub>3</sub>	I/O <sub>2</sub>	I/O <sub>1</sub>	I/O <sub>0</sub>
Slave numbers 3 - 30 use the same format as slave 31																	
31	31	0	0	0	P	P <sub>3</sub>	P <sub>2</sub>	P <sub>1</sub>	P <sub>0</sub>	ID <sub>3</sub>	ID <sub>2</sub>	ID <sub>1</sub>	ID <sub>0</sub>	I/O <sub>3</sub>	I/O <sub>2</sub>	I/O <sub>1</sub>	I/O <sub>0</sub>
<b>Channel 2 slaves</b>																	
1	32	C	W	A	P	P <sub>3</sub>	P <sub>2</sub>	P <sub>1</sub>	P <sub>0</sub>	ID <sub>3</sub>	ID <sub>2</sub>	ID <sub>1</sub>	ID <sub>0</sub>	I/O <sub>3</sub>	I/O <sub>2</sub>	I/O <sub>1</sub>	I/O <sub>0</sub>
2	33	G	F	0	P	P <sub>3</sub>	P <sub>2</sub>	P <sub>1</sub>	P <sub>0</sub>	ID <sub>3</sub>	ID <sub>2</sub>	ID <sub>1</sub>	ID <sub>0</sub>	I/O <sub>3</sub>	I/O <sub>2</sub>	I/O <sub>1</sub>	I/O <sub>0</sub>
Slave numbers 3 - 30 use the same format as slave 31																	

### If in 3.0 mode

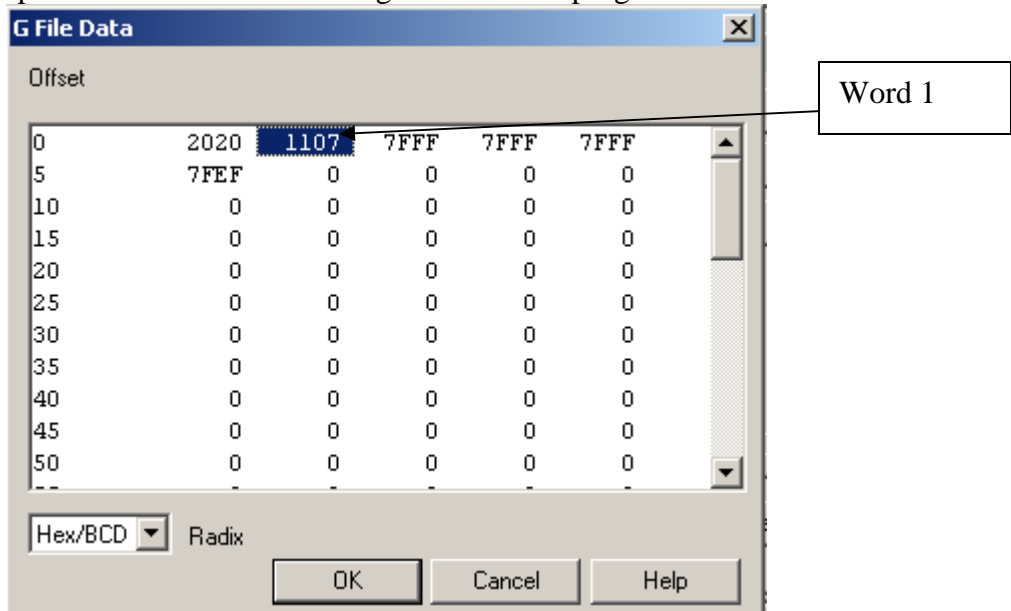
In 3.0 mode the bit layout is a little different. If word 63 is not 13635 then look at word 1 for the G-File bit. If bit 12 of word 1 is on then a G-File configuration is being used and this file will be used to adjust the configuration. If bit 12 of word one is off then a Hyperterminal configuration is being used. Word would could then have a hex value of 1xxxh, 3xxxh, 7xxxh

G-File configuration bit

Table 2: G File Layout Table

Slave#	Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	0	Reserved by SLC processor															
		Channel 1 Slaves															
	1		cG	PG	G				F		mLPF	mSDL	mLAS	W	Auto	Ext	C
1	2	IO_1			ID_1			ID2_1			ID1_1						
2	3	IO_2			ID_2			ID2_2			ID1_2						
62	63	IO_31B			ID_31B			ID2_31B			ID1_31B						
	64	Param_3			Param_2			Param_1									
	65	Param_7			Param_6			Param_5			Param_4						
	66	Param_11			Param_10			Param_9			Param_8						
	67	Param_15			Param_14			Param_13			Param_12						

Here is an example of a SLC500 Gfile configured SLC500 program



In this setup a G-File configuration is being used in 3.0 mode. There are 4 nodes on the network each with profile 7FFF, 7FFF, 7FFF, 7FEF

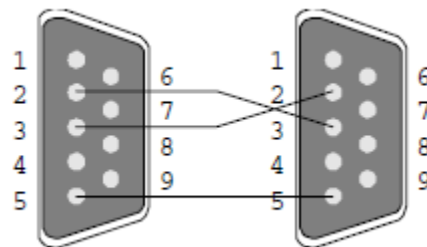
## Which configuration do you have?

- Legacy mode using Hyperterminal
- Legacy mode using G-File
- 3.0 mode using Hyperterminal
- 3.0 mode using G-File

## Step 2 (Put the new node into the configuration)

### *Legacy mode using Hyperterminal*

In this mode the G-File is still used but just to configure the networks and not to setup the individual nodes. You will need an RS232 NULL modem cable to connect the SST-ASI-SLC scanner card to an external PC. The PC must have an RS232 port or an RS232 to USB adapter must be purchased. New cards in Legacy mode actually have a USB port. Install the USB virtual COM driver on your PC and use Hyperterminal as described here. You can check control panel > System > hardware tab > device manager > Ports to see what COM port number was assigned to your virtual com port driver(SST card).



**NULL modem cable pinouts, female on both sides, old cards with DB9 connector on front of card**

Figure 6: USB Port

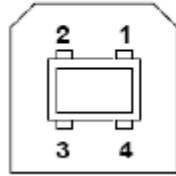
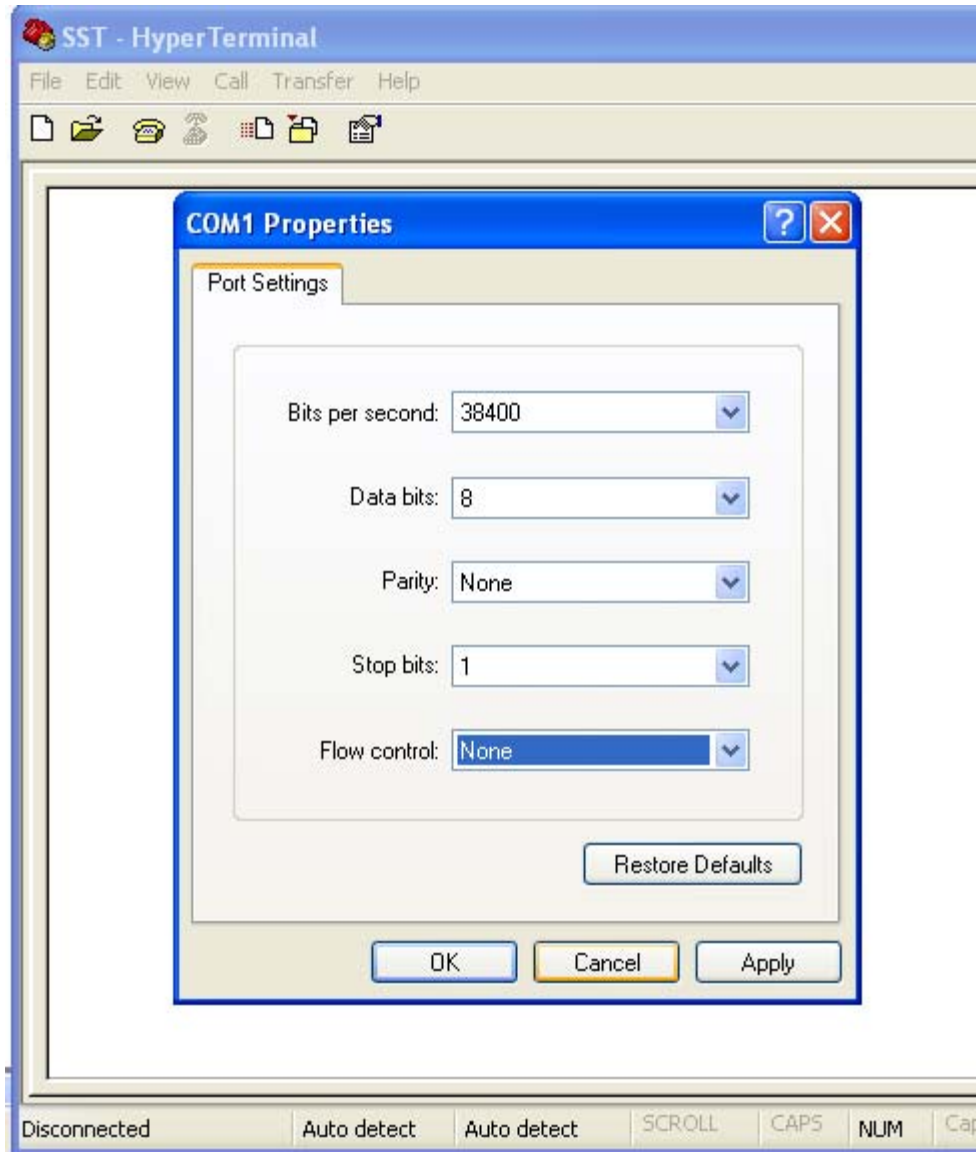


Table 1: Pin Names and Descriptions

Pin #	Pin Name	Description
1	+5	USB Power. Not Used
2	-Data	Data pin.
3	+Data	Data pin.
4	GND	USB ground.

**USB port on new SST cards. Recommended USB cable is USB-A-B Cable M/M, USB A Male and USB B Male**

Connect cable and open Hyperterminal. Make sure the hyperterminal configuration is 38400, 8 data bits, 1 stop bit and no flow control. Also make sure you select the COM port that you are connected to via the NULL modem or USB cable



**COM port Properties with the proper settings**

Press the \*\*\*\*\* (shift 8) key a number of times until the AS-i network configuration screen comes up. The PLC MUST be in program mode. If you do this correctly the following screen will come up. Choose the network that you are using, 1 or 2 and type list.

```
***** Slave Configuration Activated *****
```

```
SST-ASI-SLC Module  
Firmware version 1.21
```

```
Which Channel do you want to configure? (1 or 2) 1
```

```
Configuring Channel 1
```

```
Commands: Address, Parameter, List, Save, Exit, Help
```

```
Config :>
```

```
Config :> list
```

Slave	ID	IO	P	PID	PIO
01				F	3
02	F	7	F	F	3
03	F	7	F		
04	B	7	F		
05	B	0	F		
06	F	7	F		
07	F	7	F		
08	F	7	F		
09	0	3	F		
10	0	3	F		
11	0	3	F		
12	0	3	F		
13	0	3	F		
14	0	3	F		
15	0	3	F		

The ID and IO columns are for nodes that are detected and the PID and PIO columns will be filled in for configured nodes or nodes that should be on the network. ID should match PID and IO should match PIO. If not a configuration error will occur. To get them to match type "save". To verify you can do another list



```
Config :> list
```

Slave	ID	IO	P	PID	PIO
02	F	7	F	F	7
03	F	7	F	F	7
04	B	7	F	B	7
05	B	0	F	B	0
06	F	7	F	F	7
07	F	7	F	F	7
08	F	7	F	F	7
09	0	3	F	0	3
10	0	3	F	0	3
11	0	3	F	0	3
12	0	3	F	0	3
13	0	3	F	0	3
14	0	3	F	0	3
15	0	3	F	0	3
16	0	3	F	0	3
17	0	3	F	0	3

Verify that the node list is correct! If you take nodes off the network and type save the configuration will be saved with the missing nodes removed. The SST card would be happy but your machine probably won't run. **Be careful!** Once you are satisfied the node list is correct type "save".

To leave the configuration screen, now type "exit." If you do this correctly the LEDs on the SST card will stop blinking.

If the other network also needs to be modified then hit the \*\*\*\* key again and repeat the above steps but now for the other network, 1 or 2.

Done

**Note:** Verify that if the ID code is A both the data bit D3 and parameter bit P3 are set correctly. Check **Appendix A** for detail.

### **Legacy mode using G-File**

If it was determined that a G-File configuration is being used then an edit or modification of the G-File is required. The ID and IO codes of the new products must be known. Check the datasheet for details on what the new ID and IO codes are. The ID1 and ID2 codes won't be used.

**Note:** Verify that if the ID code is A the data bits D3 and parameter bits P3 are set correctly. Check **Appendix A** for detail.

Programming instructions	
Profile	S-7.0
IO code	7
ID code	0
ID1 code	F
ID2 code	E

Configuration from Data sheet

If the G-file configuration is being used the lower 13 bits of each word are used to configure the AS-I network. One word for each node address

Word 1      Node 1  
 Word 2      Node 2  
 ...  
 Word 32     Node 1 Network 2  
 Word 33     Node 2 Network 2

If that word is being used on the AS-I network bit 12 is turned on and then the parameter byte, ID and IO codes are written into that word.

For example if a network is using a G-file configuration and I want to change a node address 1 from VAA-4EA-KF-ZE/R to new VAA-4E4A-KE-ZE/R then see example below:

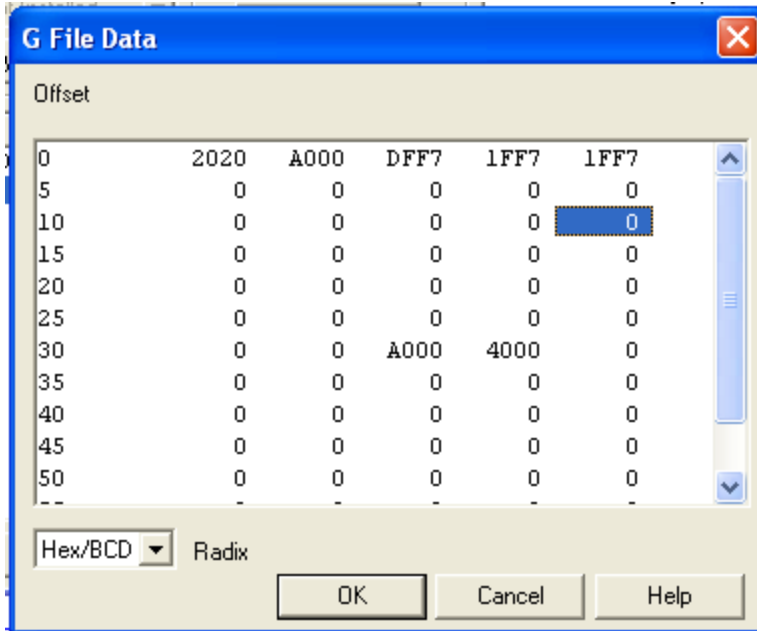
Old node VAA-4EA-KF-ZE/R

Programming instructions	
Profile	S-7.F
IO code	7
ID code	F

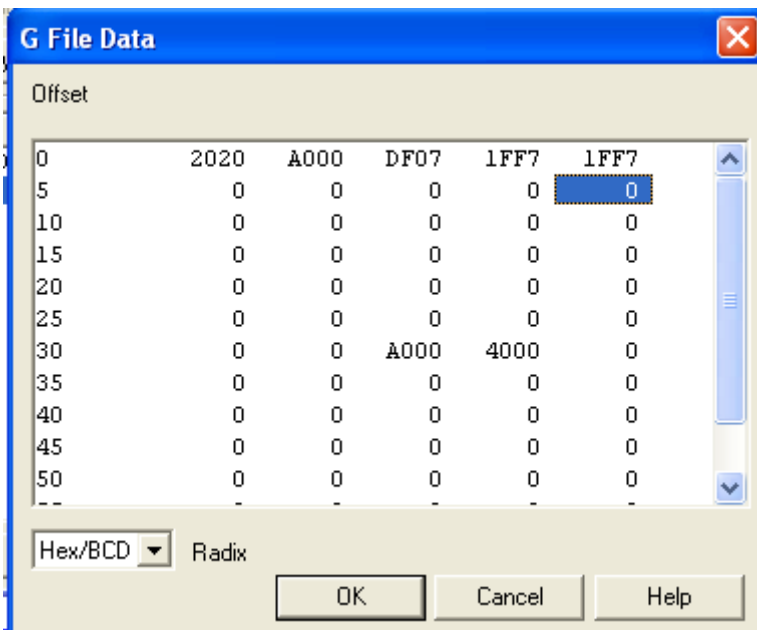
New node VAA-4E4A-KE-ZE/R

Programming instructions	
Profile	S-7.0
IO code	7
ID code	0
ID1 code	F
ID2 code	E

This would be the old G-File



Old G-File address 1, word 1 = F7



New G-File address 1, word 1 = 07

Download the changes to the PLC and verify proper running of the network

### **3.0 mode using Hyperterminal and USB cable**

Coming soon

### 3.0 mode using G-File

coming soon

### Appendix A

Checking to make sure parameters are correct. New 2.1 or 4in/3out 3.0 nodes can be used on old networks as long as the parameters and output data bits are set correctly.

P3 bit must always be 1

D3 output bit must always be 0

This requirement is for all nodes that have an ID code of A. The ID code of A means that the node has extended addressing capabilities. When setting node addresses for extended address capable nodes make sure to only use the A address.

**Check for online parameter changes and verify that the parameters are set correctly.**

W bit for online parameter changes

Slave #	Word	Bits															
		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n/a	0	Reserved by SLC processor															
<b>Channel 1 slaves</b>																	
1	1	C	W	A	P	P <sub>3</sub>	P <sub>2</sub>	P <sub>1</sub>	P <sub>0</sub>	ID <sub>3</sub>	ID <sub>2</sub>	ID <sub>1</sub>	ID <sub>0</sub>	I/O <sub>3</sub>	I/O <sub>2</sub>	I/O <sub>1</sub>	I/O <sub>0</sub>
2	2	G	F	0	P	P <sub>3</sub>	P <sub>2</sub>	P <sub>1</sub>	P <sub>0</sub>	ID <sub>3</sub>	ID <sub>2</sub>	ID <sub>1</sub>	ID <sub>0</sub>	I/O <sub>3</sub>	I/O <sub>2</sub>	I/O <sub>1</sub>	I/O <sub>0</sub>
Slave numbers 3 - 30 use the same format as slave 31																	
31	31	0	0	0	P	P <sub>3</sub>	P <sub>2</sub>	P <sub>1</sub>	P <sub>0</sub>	ID <sub>3</sub>	ID <sub>2</sub>	ID <sub>1</sub>	ID <sub>0</sub>	I/O <sub>3</sub>	I/O <sub>2</sub>	I/O <sub>1</sub>	I/O <sub>0</sub>
<b>Channel 2 slaves</b>																	
1	32	C	W	A	P	P <sub>3</sub>	P <sub>2</sub>	P <sub>1</sub>	P <sub>0</sub>	ID <sub>3</sub>	ID <sub>2</sub>	ID <sub>1</sub>	ID <sub>0</sub>	I/O <sub>3</sub>	I/O <sub>2</sub>	I/O <sub>1</sub>	I/O <sub>0</sub>
2	33	G	F	0	P	P <sub>3</sub>	P <sub>2</sub>	P <sub>1</sub>	P <sub>0</sub>	ID <sub>3</sub>	ID <sub>2</sub>	ID <sub>1</sub>	ID <sub>0</sub>	I/O <sub>3</sub>	I/O <sub>2</sub>	I/O <sub>1</sub>	I/O <sub>0</sub>
Slave numbers 3 - 30 use the same format as slave 31																	
31	62	0	0	0	P	P <sub>3</sub>	P <sub>2</sub>	P <sub>1</sub>	P <sub>0</sub>	ID <sub>3</sub>	ID <sub>2</sub>	ID <sub>1</sub>	ID <sub>0</sub>	I/O <sub>3</sub>	I/O <sub>2</sub>	I/O <sub>1</sub>	I/O <sub>0</sub>

Scanner ID = 13635 decimal (3543h)

### G-File layout

If the W bit is set go to the Output data image and check for correct parameter assignment. Every slave has a four bit parameter assignment in the data table starting at word 16 up to 31. For example Node 1 of Network 1 has parameter bit P3 in word 16 bit 7. If the card was in slot one it would be addresses O:1.16/7.

P3 node 1

Bit Order	P <sub>3</sub>	P <sub>2</sub>	P <sub>1</sub>	P <sub>0</sub>	P <sub>3</sub>	P <sub>2</sub>	P <sub>1</sub>	P <sub>0</sub>	P <sub>3</sub>	P <sub>2</sub>	P <sub>1</sub>	P <sub>0</sub>	P <sub>3</sub>	P <sub>2</sub>	P <sub>1</sub>	P <sub>0</sub>
<b>Channel 1 Slaves Parameters</b>																
16	3			2			1			Undefined						
17	7			6			5			4						
18	11			10			9			8						
19	15			14			13			12						
20	19			18			17			16						
21	23			22			21			20						
22	27			26			25			24						
23	31			30			29			28						
<b>Channel 2 Slaves Parameters</b>																
24	3			2			1			Undefined						
25	7			6			5			4						
26	11			10			9			8						
27	15			14			13			12						
28	19			18			17			16						
29	23			22			21			20						
30	27			26			25			24						
31	31			30			29			28						

If using a G-File configuration in Legacy mode make sure that the Parameter bits P3 are set in the G-File for each node configured.

Slave #	Word	Bits															
		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
n/a	0	Reserved by SLC processor															
<b>Channel 1 slaves</b>																	
1	1	C	W	A	P	P <sub>3</sub>	P <sub>2</sub>	P <sub>1</sub>	P <sub>0</sub>	ID <sub>3</sub>	ID <sub>2</sub>	ID <sub>1</sub>	ID <sub>0</sub>	I/O <sub>3</sub>	I/O <sub>2</sub>	I/O <sub>1</sub>	I/O <sub>0</sub>
2	2	G	F	0	P	P <sub>3</sub>	P <sub>2</sub>	P <sub>1</sub>	P <sub>0</sub>	ID <sub>3</sub>	ID <sub>2</sub>	ID <sub>1</sub>	ID <sub>0</sub>	I/O <sub>3</sub>	I/O <sub>2</sub>	I/O <sub>1</sub>	I/O <sub>0</sub>
Slave numbers 3 - 30 use the same format as slave 31																	
31	31	0	0	0	P	P <sub>3</sub>	P <sub>2</sub>	P <sub>1</sub>	P <sub>0</sub>	ID <sub>3</sub>	ID <sub>2</sub>	ID <sub>1</sub>	ID <sub>0</sub>	I/O <sub>3</sub>	I/O <sub>2</sub>	I/O <sub>1</sub>	I/O <sub>0</sub>
<b>Channel 2 slaves</b>																	
1	32	C	W	A	P	P <sub>3</sub>	P <sub>2</sub>	P <sub>1</sub>	P <sub>0</sub>	ID <sub>3</sub>	ID <sub>2</sub>	ID <sub>1</sub>	ID <sub>0</sub>	I/O <sub>3</sub>	I/O <sub>2</sub>	I/O <sub>1</sub>	I/O <sub>0</sub>
2	33	G	F	0	P	P <sub>3</sub>	P <sub>2</sub>	P <sub>1</sub>	P <sub>0</sub>	ID <sub>3</sub>	ID <sub>2</sub>	ID <sub>1</sub>	ID <sub>0</sub>	I/O <sub>3</sub>	I/O <sub>2</sub>	I/O <sub>1</sub>	I/O <sub>0</sub>
Slave numbers 3 - 30 use the same format as slave 31																	
31	62	0	0	0	P	P <sub>3</sub>	P <sub>2</sub>	P <sub>1</sub>	P <sub>0</sub>	ID <sub>3</sub>	ID <sub>2</sub>	ID <sub>1</sub>	ID <sub>0</sub>	I/O <sub>3</sub>	I/O <sub>2</sub>	I/O <sub>1</sub>	I/O <sub>0</sub>
Scanner ID = 13635 decimal (3543h)																	

If you are using a node which has ID code of A then also check to make sure the data bit D3 is always 0. So if the address being used is 1 and the card slot is 1 then make sure that O:1.0/7 is off.

		Bits															
Word ↓	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Bit Order	I/O <sub>3</sub>	I/O <sub>2</sub>	I/O <sub>1</sub>	I/O <sub>0</sub>	I/O <sub>3</sub>	I/O <sub>2</sub>	I/O <sub>1</sub>	I/O <sub>0</sub>	I/O <sub>3</sub>	I/O <sub>2</sub>	I/O <sub>1</sub>	I/O <sub>0</sub>	I/O <sub>3</sub>	I/O <sub>2</sub>	I/O <sub>1</sub>	I/O <sub>0</sub>	
<b>Channel 1 Slaves I/O data</b>																	
0	3			2			1			Fault acknowledge bits (in output file)/Undefined							
1	7			6			5			4							
2	11			10			9			8							
3	15			14			13			12							
4	19			18			17			16							
5	23			22			21			20							
6	27			26			25			24							
7	31			30			29			28							

Any questions please call our technical support hotline at

330-486-0001 ext. 1023