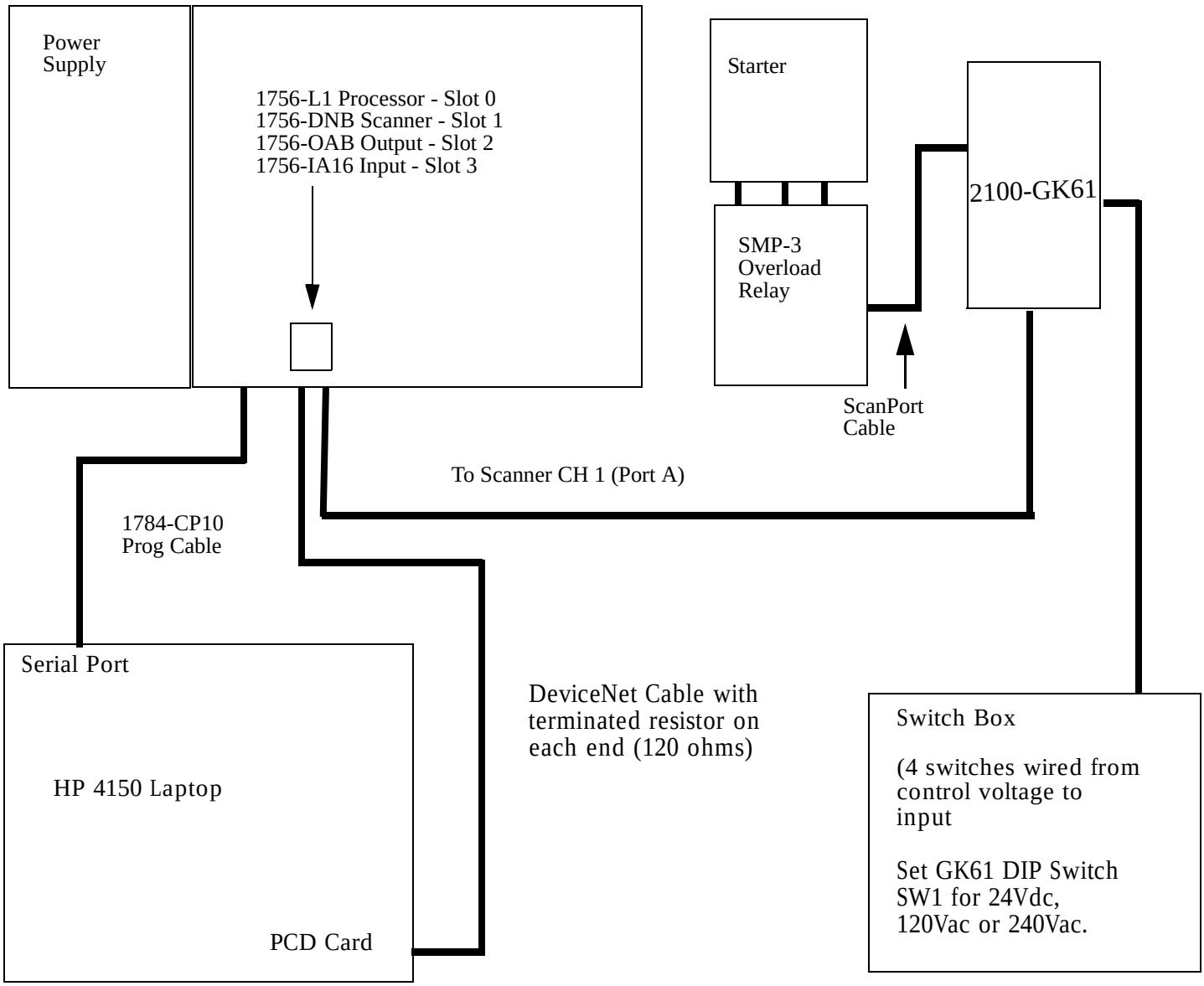
Reading 2100-GK61 Inputs in I/O Stream using ControlLogix, 2100-GK61 Firmware 2.001

The inputs for the 2100-GK61 can be read as part of the I/O stream using a polled, change-of-state (COS), or cyclic method. An explicit messaging technique can also be used to read the inputs if desired. Input bits are located at the beginning of the Input Scan List and the monitoring technique is the same as it would be for any PLC discrete device. The input word size changes from 4 bytes to 6 bytes. The output word size remains at 4 bytes.

Figure 0.1 Hardware configuration for program example.



Equipment used for example program:

ControlLogix 4-slot chassis with:

- Slot 0 – ControlLogix Processor 1756-L1
- Slot 1 – 1756-DNB Scanner
- Slot 2 – 1756-OA8 Output Card
- Slot 3 - 1756-IA16 Input Card
- 1756-PA72 Power supply module

2100-GK61 DeviceNet to SCANport Communication Module with Digital Inputs

24V dc power supply

SMP-3 electronic overload relay

Laptop PC (HP 4150) with:

- 1784-PCD DeviceNet card
- PLC programming cable
- RSLinx software (communications drivers)
- RSNetworx for DeviceNet software (for configuring 2100-GK61 and scanner)
- RSLogix 5000 software (for programming ControlLogix)

DeviceNet cable and 5 position connectors (for linking scanner, 2100-GK61 and PCD card)

ScanPort cable (for connecting 2100-GK61 and SMP-3) Part # 40121-487-02(A)

120 ohm terminating resistors (one at each end of cable across blue and white wires)

References:

Pub 2100-UM001A-US-P DeviceNet to SCANport Communication Module with Digital Inputs

- Ch 4 – Configuring a Scanner to Communicate with the 2100-GK61 using RSNetworx for DeviceNet.
- Ch 5 – Ladder Logic Programming. Focus is on Logic Control Data and Status Data.

Pub 193-5.0 Bulletin 193/592 SMP-3 Solid-state Overload Relay User Manual

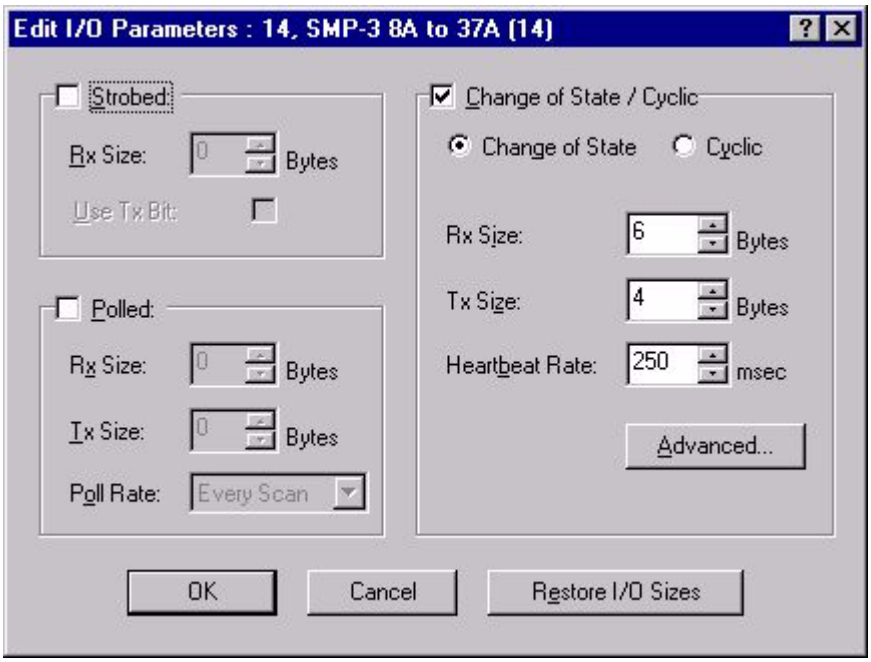
- Chapter 6 – Serial Communication – information on Logic Control Data and Status Data

ControlLogix Publications

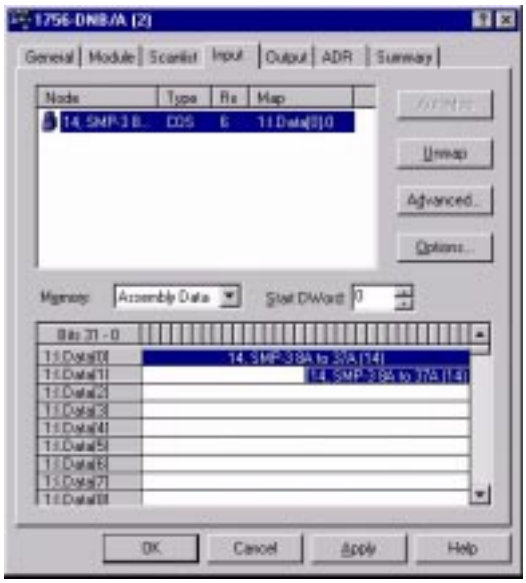
- Logix5000 Controllers User Manual 1756-6.5.12
- Logix5000 Controllers General Instruction Set Reference Manual 1756-6.4.1
- DeviceNet Communication Module 1756-DNB - Configuration Manual 1756-6.5.15

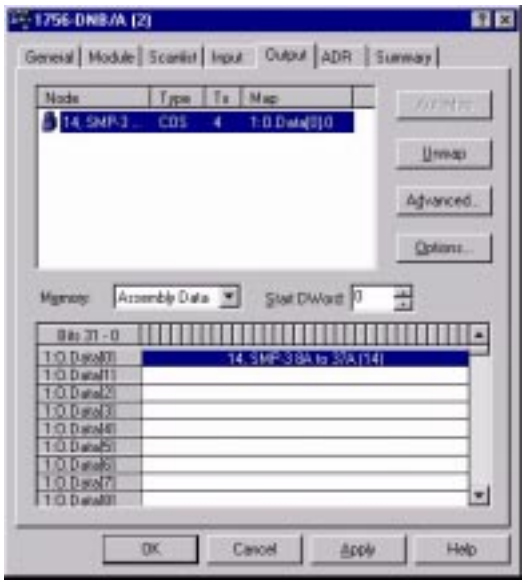
Setting Scan List Word Size:

Using RSNetworx, click on Scanner, select “Edit I/O Parameters” and set Rx size to 6 Bytes and Tx size to 4 Bytes. Change of State is shown.



Input and Output Scan Lists are illustrated below. 2100-GK61 inputs are 1st 4 bits of 1:I.Data(0)



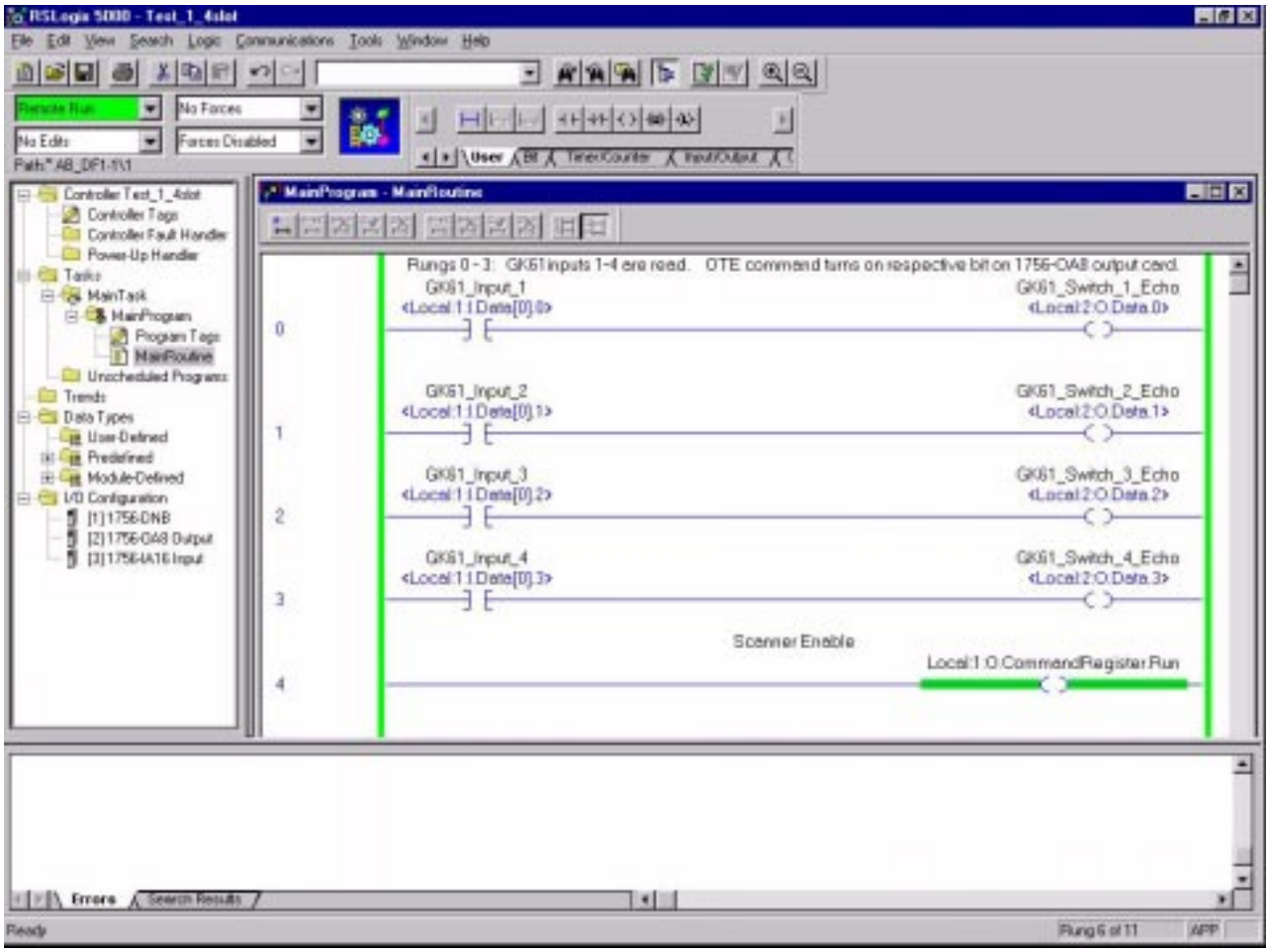


Programming Example:

Unlike PLC and SLC programs, the ControlLogix utilizes a tag-based technique. For additional information, see ControlLogix reference documentation listed on page 2.

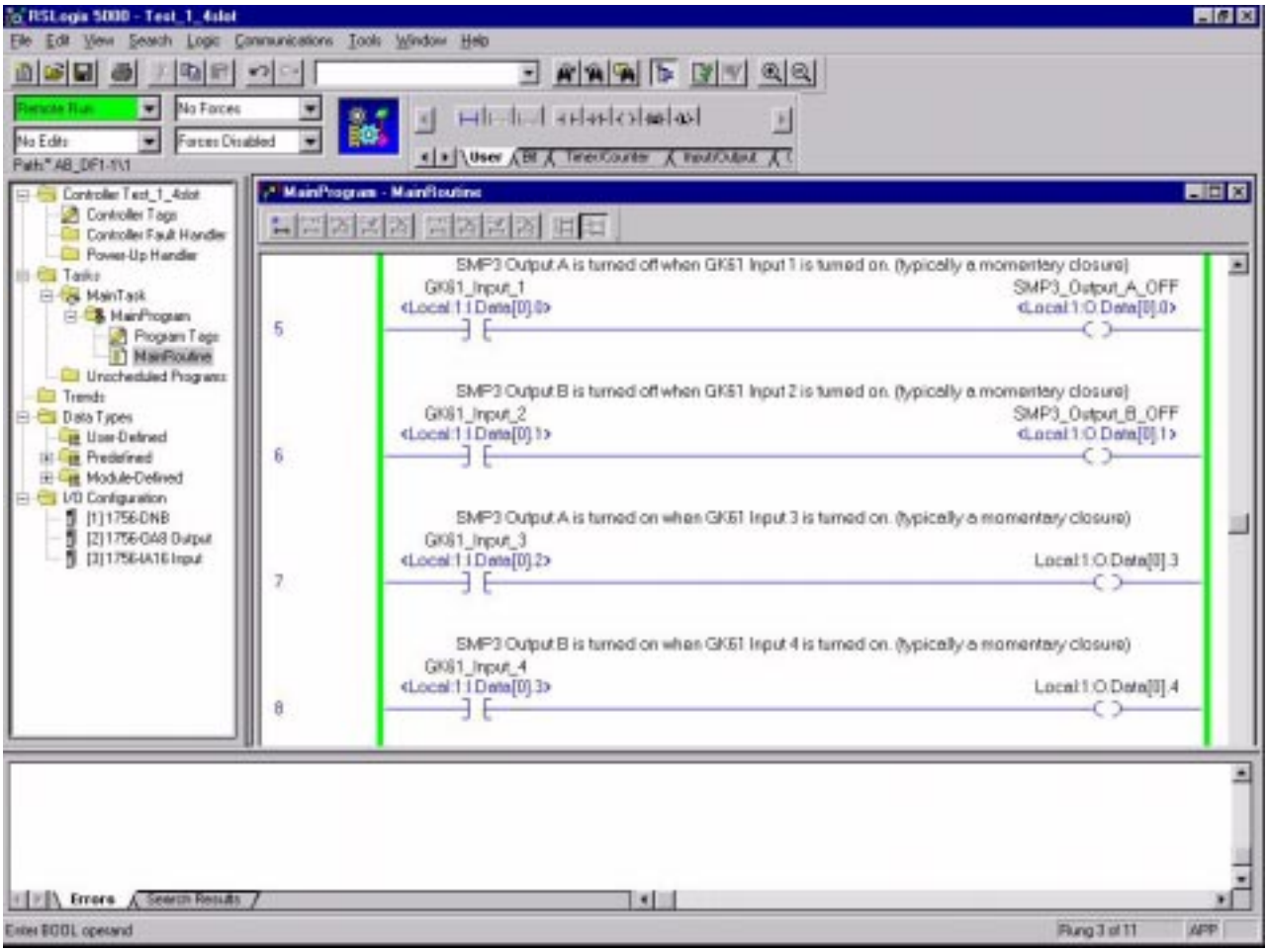
Rungs 0 through 3 illustrate XIC (Examine if Closed) input instructions. Each 2100-GK61 input can be read by examining Scanner in slot 1. Therefore first input is Local:1:I.Data[0].0. The second input is located at Local:1:I.Data[0].1. In this example, status of each 2100-GK61 input is annunciated by first four bits of output card in slot 2. The first output is addressed as Local:2:O.Data.0.

Rung 4 enables the Scanner.

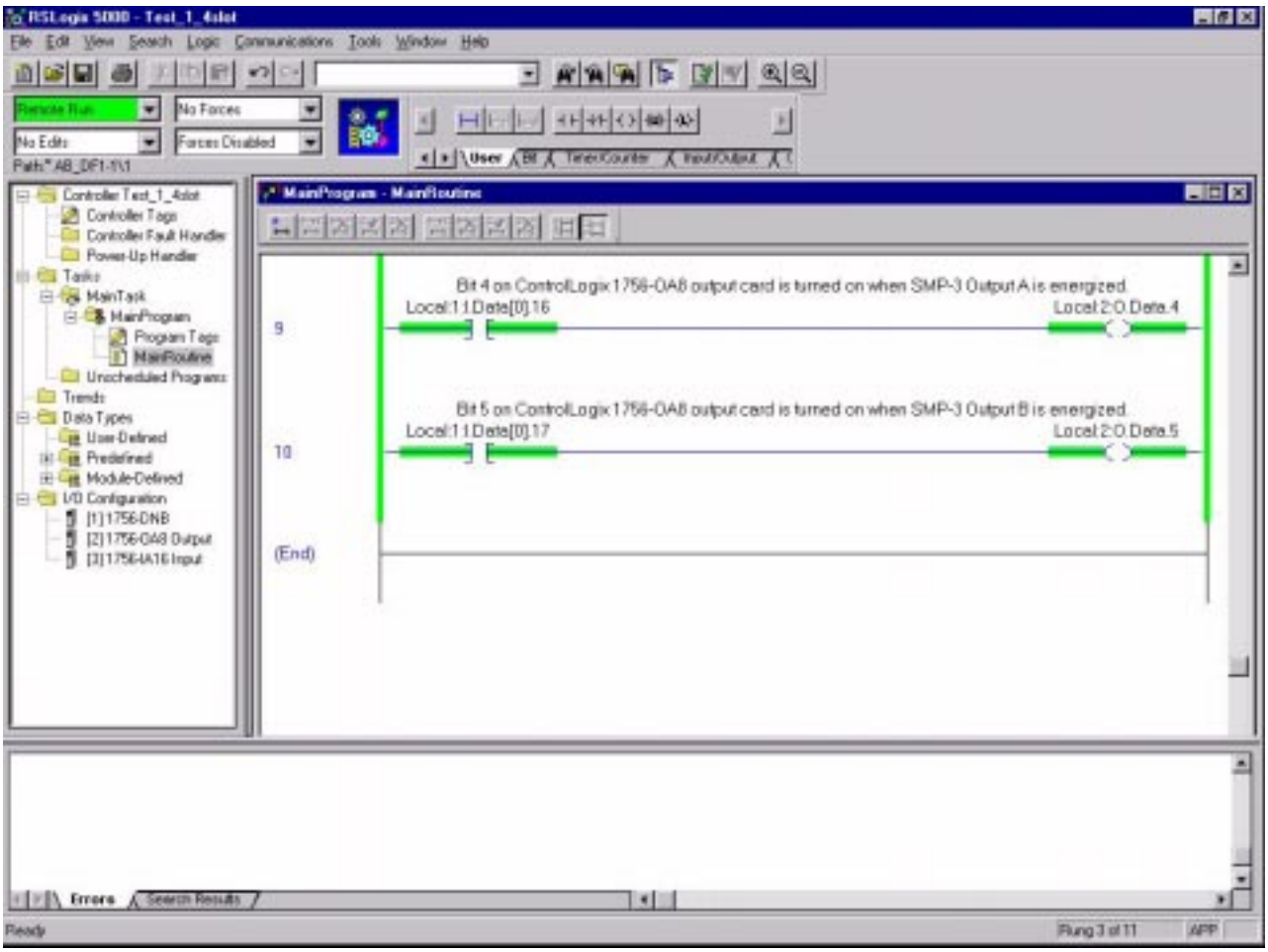


Rungs 5 through 8 also read 2100-GK61 inputs. In this case, however, control information is being sent to area of Scanner where SMP-3 Command Word is located. Commands pass through ScanPort to SMP-3 where Outputs A and B are turned on or off. For example, when 2100-GK61 input 3 is momentarily turned on in rung 7, SMP-3 Output A is energized via Local:1:0:Data[0].3

See Logic Control Data and Status Data tables from SMP-3 manual on last page of this Tech Note.

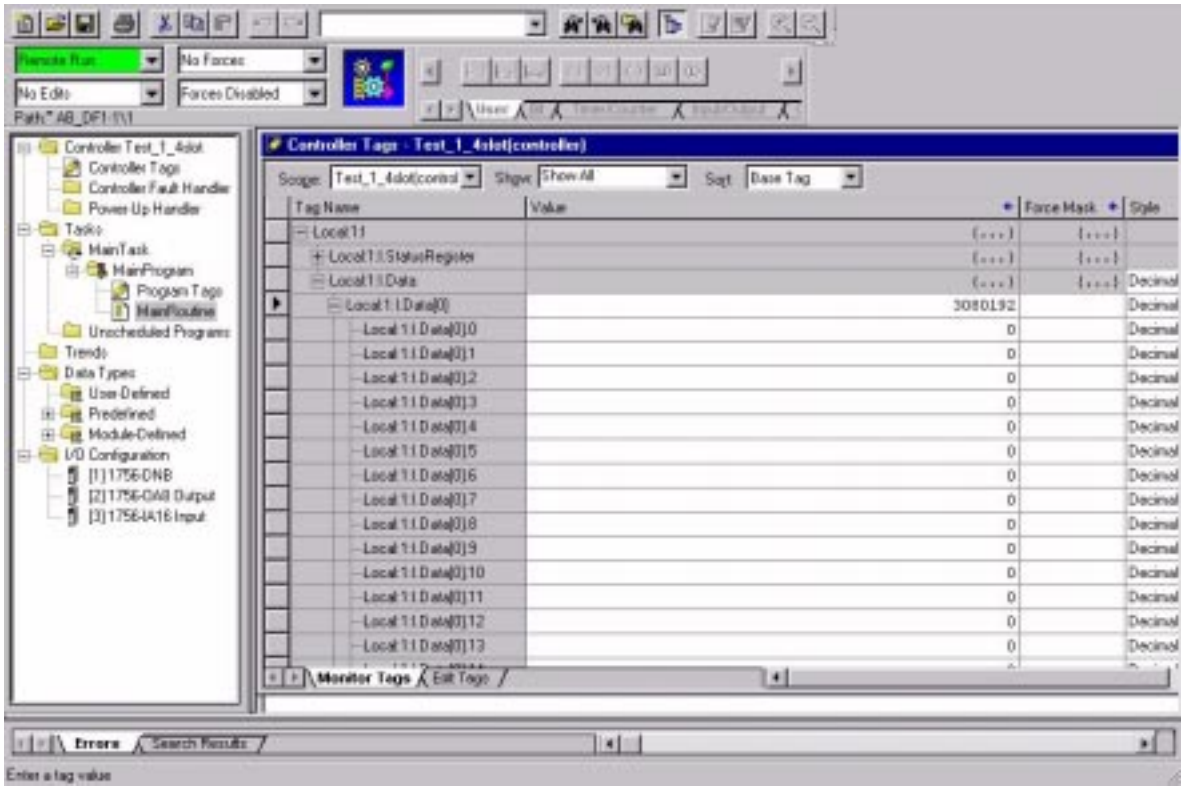


Rungs 9 and 10 show how SMP-3 Status Word information is read. Output card in slot 2 shows status at bits 4 and 5.

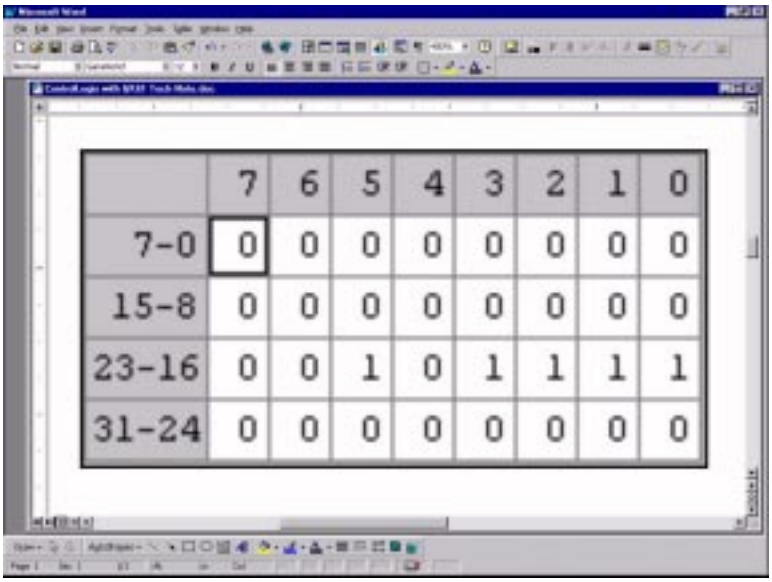


Next word after Status word is analog information from SMP-3. Average Current, Current Imbalance, Thermal Capacity Utilized and Full Load Current Setting can be monitored. Parameter to be monitored is selected by logic state of bits 13-15 in the Logix Control Word.

Input and Output states can be seen by selecting “Monitor Tag” Screen shown below.

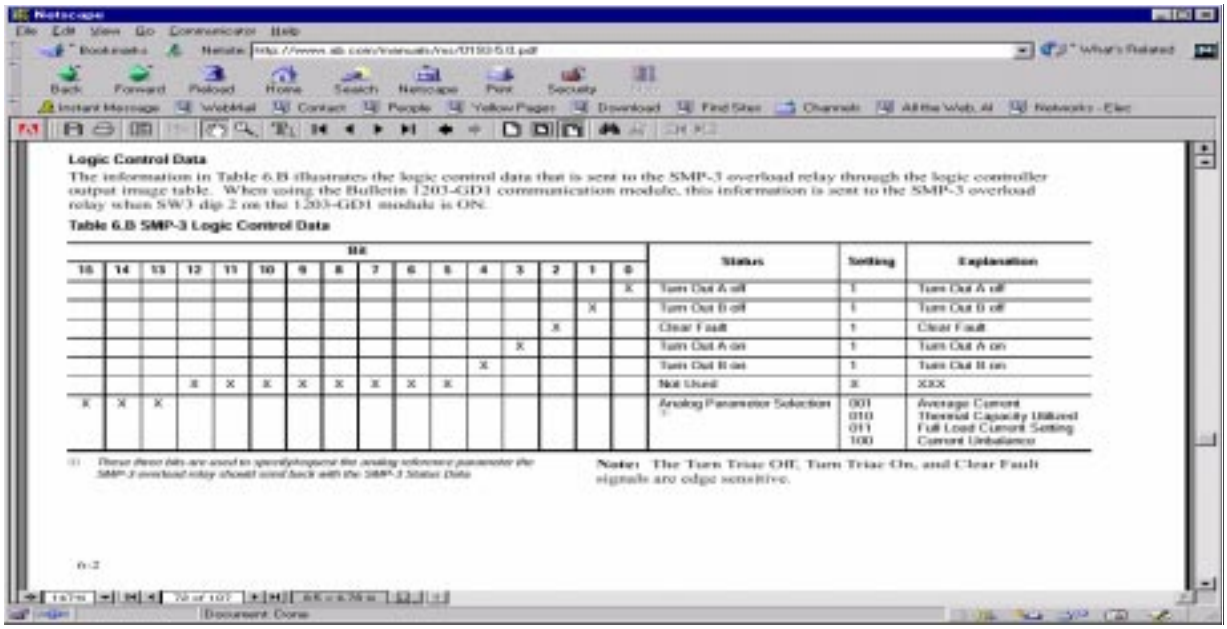


Clicking on the appropriate tag can provide additional bit-level data:



	7	6	5	4	3	2	1	0
7-0	0	0	0	0	0	0	0	0
15-8	0	0	0	0	0	0	0	0
23-16	0	0	1	0	1	1	1	1
31-24	0	0	0	0	0	0	0	0

Logix Control Data and Status Data Tables from SMP-3 Manual.



Logic Control Data

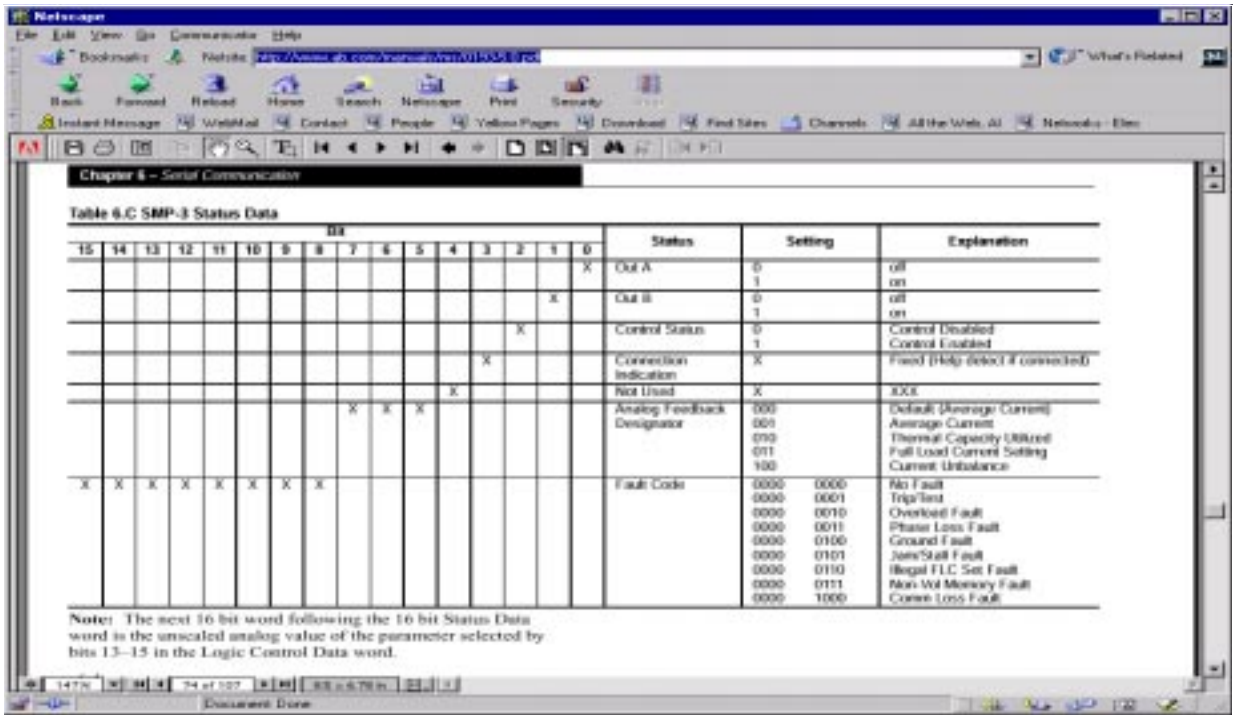
The information in Table 6.B illustrates the logic control data that is sent to the SMP-3 overload relay through the logic controller output image table. When using the Bulletin 1203-GD1 communication module, this information is sent to the SMP-3 overload relay when SW3 dip 2 on the 1203-GD1 module is ON.

Table 6.B SMP-3 Logic Control Data

Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Status	Setting	Explanation
															X	Turn Out A off	1	Turn Out A off
														X		Turn Out B off	1	Turn Out B off
													X			Clear Fault	1	Clear Fault
												X				Turn Out A on	1	Turn Out A on
											X					Turn Out B on	1	Turn Out B on
			X	X	X	X	X	X	X	X						Not Used	X	XXX
X	X	X														Analog Parameter Selection (1)	001 010 011 100	Average Current Thermal Capacity Utilized Full Load Current Setting Current Unbalance

(1) These three bits are used to specify/request the analog reference parameter the SMP-3 overload relay should send back with the SMP-3 Status Data.

Note: The Turn Triac Off, Turn Triac On, and Clear Fault signals are edge sensitive.



Chapter 6 – Serial Communication

Table 6.C SMP-3 Status Data

Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Status	Setting	Explanation
															X	Out A	0 1	off on
														X		Out B	0 1	off on
													X			Control Status	0 1	Control Disabled Control Enabled
												X				Connection Indication	X	Fixed (Help detect if connected)
											X					Not Used	X	XXX
								X	X	X						Analog Feedback Designator	000 001 010 011 100	Default (Average Current) Average Current Thermal Capacity Utilized Full Load Current Setting Current Unbalance
X	X	X	X	X	X	X	X									Fault Code	0000 0000 0000 0001 0000 0010 0000 0011 0000 0100 0000 0101 0000 0110 0000 0111 0000 1000	No Fault Trip/Test Overload Fault Phase Loss Fault Ground Fault Jam/Stall Fault Illegal FLC Set Fault Non-Vol Memory Fault Comm Loss Fault

Note: The next 16 bit word following the 16 bit Status Data word is the unscaled analog value of the parameter selected by bits 13–15 in the Logic Control Data word.

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Asia Pacific Headquarters, 27/F Citicorp Centre, 18 Whitfield Road, Causeway Bay, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

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