

Allen-Bradley Logix Series (DF1)

ControlLogix, CompactLogix, & FlexLogix

Overview

Maple Systems' **Silver Series Plus** Operator Interface Terminals (Maple OITs) communicate with Allen-Bradley Logix Family of Programmable Controllers using the [DF1] Full Duplex protocol using the programming port located on the front of the PLC. When configured with Maple configuration software, the Maple OIT is the master in a point-to-point single master, single slave format.

| Compatible PLCs | |
|---------------------|---|
| Family | Model(s) |
| ControlLogix Series | 1756-L55M12, M13, M14, M16, M22, M23, M24 1756-L63 |
| CompactLogix Series | 1769-L31x, 1769-L32x, 1769-L35x |
| FlexLogix Series | 1794-L33x, 1794-L34x |

Communications Cable

The Maple OIT should be connected directly to the 9 pin 'D' (RS-232) programming port located on the front of the Logix controller. A standard 9-pin D straight through extension (M-F) communication cable should work, or use the Maple Systems cable.

A list of communications cables offered by Maple Systems as well as cable assembly instructions to assist you in assembling your own communications cable are available on our website.

WARNING: If your communications cable is not wired exactly as shown in our cable assembly instructions, damage to the OIT or loss of communications can result.



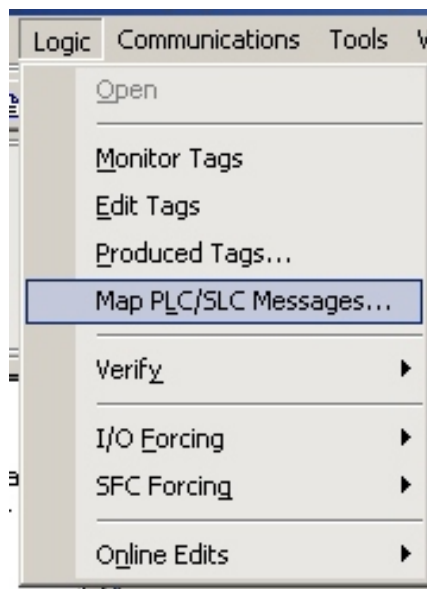
PLC Controller Settings

| |
|--|
| No hardware handshaking must be set. |
| Error Detection should be set to BCC. |
| Set Station Address to 1 |
| System Protocol should be set to “DF1 Point to Point.” |

Accessing PLC Memory

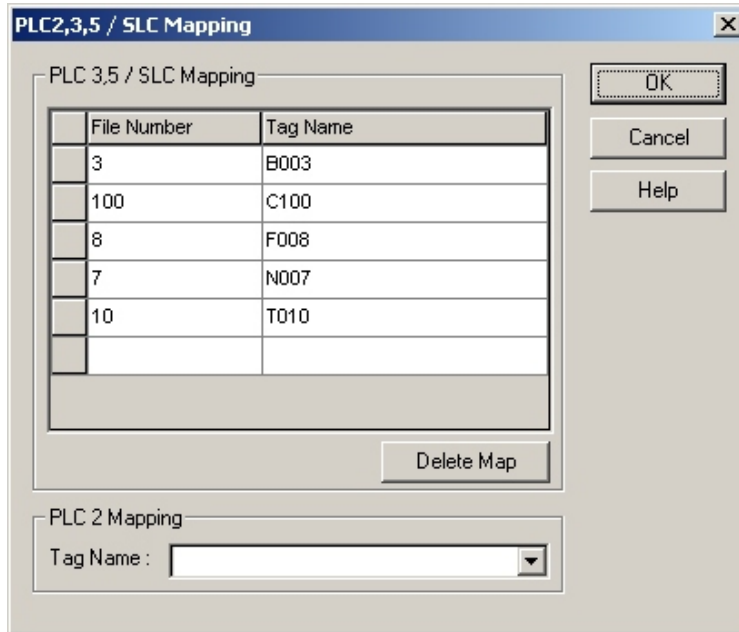
RSLogix 5000 configuration:

The Logix family of controllers (Control, Compact & Flex) uses variable names to access data. Since the Silver Series Plus refers to register data in data file references such as N7:0, B3:0.00, etc, some element mapping is required to communicate between the OIT and the PLC. Tags are mapped on the Logix menu of the RSLogix5000 software.



Select Map PLC/SLC Messages, and the following dialog is displayed.

In the next picture, the dialog is shown with a few tags already mapped:



To create multiple elements within a tag, create the tag as an array. Each member of the array corresponds to an element within the mapped tag. For example, if N007 is created as an array of 256 elements, then N007[0] corresponds to N7:0; and N007[255] corresponds to N7:255.

Note that only Controller tags can be mapped to File Numbers. Tag names to be mapped must follow the <File Type> <File Number> convention. The following File Types are supported:

- B Binary
- C Counter
- F Real (or Float)
- N Int
- T Timer

The OIT will be unable to communicate to the PLC unless this format is strictly followed:

The File Number in the tag name *must match the file number that the tag is being mapped to*, and the File Number *must be specified to 3 digits*. For example, the typical SLC500 data files would be mapped as follows:

| File | Tag Name | Mapped to File |
|------|----------|----------------|
| B3 | B003 | 3 |
| T4 | T004 | 4 |
| C5 | C005 | 5 |
| N7 | N007 | 7 |
| F8 | F008 | 8 |

Tags that are to be mapped to ‘bits’ must be created as integer arrays (an array of 16-bit integers). Each member of that array corresponds to an element in the mapped ‘bit’ file and each bit of the element corresponds to the bit number.

| P | Tag Name | Alias For | Base Tag | Type | △ | Style | Description |
|---|-------------|-----------|----------|---------|---|---------|-------------|
| | [-B003 | | | INT[16] | | Decimal | |
| | [-B003[0] | | | INT | | Decimal | |
| | -B003[0].0 | | | BOOL | | Decimal | |
| | -B003[0].1 | | | BOOL | | Decimal | |
| | -B003[0].2 | | | BOOL | | Decimal | |
| | -B003[0].3 | | | BOOL | | Decimal | |
| | -B003[0].4 | | | BOOL | | Decimal | |
| | -B003[0].5 | | | BOOL | | Decimal | |
| | -B003[0].6 | | | BOOL | | Decimal | |
| | -B003[0].7 | | | BOOL | | Decimal | |
| | -B003[0].8 | | | BOOL | | Decimal | |
| | -B003[0].9 | | | BOOL | | Decimal | |
| | -B003[0].10 | | | BOOL | | Decimal | |
| | -B003[0].11 | | | BOOL | | Decimal | |
| | -B003[0].12 | | | BOOL | | Decimal | |
| | -B003[0].13 | | | BOOL | | Decimal | |
| | -B003[0].14 | | | BOOL | | Decimal | |
| | -B003[0].15 | | | BOOL | | Decimal | |
| | [-B003[1] | | | INT | | Decimal | |
| | -B003[1].0 | | | BOOL | | Decimal | |
| | -B003[1].1 | | | BOOL | | Decimal | |
| | -B003[1].2 | | | BOOL | | Decimal | |

Supported Register Memory:

| PLC Register Types supported | Size | Format | Address Range | PLC Register Description |
|------------------------------|------|--------|--|--|
| Tx.ACC | DW | fffddd | File # fff: 004, 010-064 Element # ddd: 000-255 | Timer Accumulated value. T64:208.ACC would be 064208. Leading zeros for File and Element numbers are required. Set number of words to 2. |
| Tx.PRE | DW | fffddd | File # fff: 004, 010-064 Element # ddd: 000-255 | Timer Preset value. T15:101.PRE would be 015101. Leading zeros for File and Element numbers are required. Set number of words to 2. |
| Nx_INT | W | fffddd | File # fff: 000-064 Element # ddd: 000-255 | Integer Value. N50:198 would be 050198. Leading zeros for File and Element numbers are required. |
| Bx_INT | W | fffddd | File # fff: 003, 010-064 Element # ddd: 000-255 | Bit data as a 16-bit word. B12:57 would be 012057. Leading zeros for File and Element numbers are required |
| Cx.ACC | DW | fffddd | File # fff: 005, 010-064 Element # ddd: 000-255 | Counter Accumulated value. C26:109.ACC would be 026109. Leading zeros for File and Element numbers are required. Set number of words to 2. |
| Cx.PRE | DW | fffddd | File # fff: 005, 010-064 Element # ddd: 000-255 | Counter Preset value. C5:14.PRE would be 005014. Leading zeros for File and Element numbers are required. Set number of words to 2. |
| F8_REAL | DW | ddd | Element # ddd: 000-255 | Floating Point Value. F8:240 would be 240. Only file F8 is supported. Set number of words to 2. Set Numeric Display as "Single Float" |

W = Word (16-bit); DW = Double Word (32-bit)

Discrete Memory

| | | | | |
|--------|-----|----------|--|--|
| B_BOOL | Bit | ffdddabb | File # ff: 03, 10-64 Element # ddd: 000-255 Bit number bb: 00-15 | Bit data from B files. B64:101/6 would be 6410106. Leading zeros for File, Element, and Bit numbers are required. |
| N_BOOL | Bit | ffdddabb | File # ff: 03, 10-64 Element # ddd: 000-255 Bit number bb: 00-15 | Bit data from N files. N12:14/15 would be 1201415. Leading zeros for File, Element, and Bit numbers are required.. |

Important PLC Memory Considerations

If your PLC's memory range is smaller than the range supported by the Maple OITs, it is possible to configure the OIT to monitor a PLC memory address which does not exist. Since this can cause unpredictable results, when you configure the OIT please ensure that all selected PLC memory addresses are valid for your PLC model. Do not configure the OIT to write to any PLC memory address which should only be written to by the PLC.

Troubleshooting Notes:

If the OIT attempts to address an invalid register reference, the OIT may display "PLC No Response" or "PLC Response Error". Also, the AB PLC itself will set a "MINOR FAULT" error in its processor status and it will disable the serial port until the fault is cleared and the PLC controller is reset.

If communications are erratic, the Logix PLC may not be devoting enough time to the communication task.

- On the Advanced tab of the Controller Properties dialog, increase the System Overhead Time Slice percentage.
- For Periodic tasks, increase the Period setting and/or lower the Priority.

For more information, refer to the RSLinx documentation.

EZware Settings

The following table lists the communications settings that must be configured in EZware. These settings can be found in the Edit-Set System Parameters menu under the Device tab. Please note:

- the **Recommended Settings** column provides the recommended setting based upon default settings most commonly used in the Allen-Bradley Logix PLCs.
- the **Options** column lists EZware's options; your controller may not support every option

| Name | Recommended Settings | Options | Important Notes |
|----------------------------------|-------------------------------------|---------------------------------------|--|
| Name: | Allen-Bradley Logix Family (Serial) | | Description label |
| HMI or PLC | PLC | | |
| Location | Local | Local, Remote | Select local if PLC directly connected to OIT, remote if PLC connected thru another OIT |
| PLC type: | Allen-Bradley Logix Family (Serial) | | |
| PLC I/F: | RS232 | RS232 | Port on Logix PLC is RS-232 only |
| PLC default station no.: | 1 | 0-255 | Must match the node address assigned on the Data Highway network. |
| Settings: COM: | COM 1 | COM1-COM3 | Serial port of OIT connected to PLC |
| Settings: Baud rate: | 19200 | 4800,9600,19200, 38400, 57600, 115200 | Must match Logix PLC [DF1] programming port settings. Use the fastest baud rate supported. |
| Settings: Data bits | 8 | 7,8 | Must match Logix PLC [DF1] programming port settings. |
| Settings: Stop bits: | 1 | 1,2 | Must match Logix PLC [DF1] programming port settings. |
| Settings: Parity: | None | Even, Odd, None | Must match Logix PLC [DF1] programming port settings. |
| Settings: Timeout (sec) | 1.0 | 0.1 to 25.5 | Adjust if longer timeout is required |
| Settings: Turn around delay (ms) | 0 | 0-1000 | Timeout period between OIT polls |
| Settings: Reserved 1: | 0 | | Not Applicable |
| Settings: Reserved 2: | 0 | | Not Applicable |
| Settings: Reserved 2: | 0 | | Not Applicable |

| Name | Recommended Settings | Options | Important Notes |
|----------------------------------|----------------------|---------|---|
| Settings: Reserved 4: | 0 | | Not Applicable |
| Interval of block pack (words): | 5 | 0-512 | <i>see Silver Series Plus Installation and Operation Manual</i> |
| Max. read-command size (words): | 32 | | Not Adjustable |
| Max. write command size (words): | 32 | | Not Adjustable |