CONTROLLER INFORMATION SHEET

Allen-Bradley SLC500 Series

Overview

Maple Systems' MAP Family & OIT Family Operator Interface Terminals (Maple OITs) communicate with Allen-Bradley SLC500 Series of Programmable Logic Controllers (PLCs) using the DF1 Full Duplex protocol in a point-to-point single master, single slave format.

Compatible PLCs	
PLC Family	**PLC Model**
Allen-Bradley SLC500 Series	SLC 5/01, 5/02, 5/03, 5/04, 5/05

Communications Cable

The Maple OIT should be connected to the DF1 communication port. The SLC5/03, SLC5/04 and SLC5/05 CPUs have a built-in serial port on the CPU which supports the DF1 protocol. Connection to the SLC5/01 and 5/02 members requires a communications module such as the 1770-KF3 or 1747-KE module. Refer to Technical Note 1061 for information on communication cable part numbers and cable assembly instructions. If you will be assembling your own communications cable, cable assembly instructions are also available on our web site at www.maple-systems.com.

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

PLC Settings

Full duplex operation must be set in the PLC.
No Hardware Handshaking must be set in the PLC.
The Checksum must match the setting used in the PLC. Some SLC500 modules (such as SLC 5/03 and SLC5/04) default to using CRC checksum when initially configured.
The Source Address and Destination Address must match the setting used in the PLC.
Registers S2:0 to S2:163 access the status files of the PLC. Randomly changing data files may have unpredictable results. Use caution.

Accessible PLC Memory

PLC Register Memory

The following table lists the PLC register memory ranges that Maple's OITs are able to access. Please note that your PLC's memory range may be ***smaller*** or ***larger*** than that supported by Maple's OITs. The following PLC register memory is displayable in 16-bit or 32-bit formats on the Maple OIT.

PLC Register Address	PLC Register Description
S2:0 to S2:163	Data File 2 - Status Files
T3:0 to T255:255	Timer Files, Preset and Accumulator Only (Default is T4:0 to T4:255)
C3:0 to C255:255	Counter Files, Preset and Accumulator Only (Default is C5:0 to C5:255)
R3:0 to R255:255	Control Files, Length and Position Only (Default is R6:0 to R6:255)
N3:0 to N255:255	Integer Files (Default is N7:0 to N7:255)

PLC Discrete Memory

The following table lists the PLC discrete memory ranges that Maple's OITs are able to access. Please note that your PLC's memory range may be ***smaller*** or ***larger*** than that supported by Maple's OITs. The following discrete PLC memory is displayable in single-bit and bank formats on the Maple OIT.

PLC Bit Address	PLC Bit Description
B3:0 to B255:255	Bit or Binary Files (Default is B3:0 to B3:255)

OITware-200 Settings

The following table lists the communications settings that must be configured in OITware-200. Please note:

- the Default column lists OITware-200's default setting; your PLC's default may be different
- the Options column lists OITware-200's options; your PLC may not support every option

Name	Default	Options	Important Notes
Baud Rate	19200	19200, 9600, 4800, 2400, 1200, 600, 300	Must match the PLC port settings. Use the fastest baud rate supported by both.
Parity	None	Even, Odd, None, Mark, Space	Must match the PLC port settings.
Data Bits	8	7, 8	Must match the PLC port settings.
Stop Bits	1	1, 2	Must match the PLC port settings.
Status Coils	B3:0	B3:0 to B255:255	Must be within the PLC's supported memory range.
Address	N/A		
Source Address	0	0 to 31	Must match the address assigned to the DF1 port.
Destination Address	1	0 to 31	Must match the node address assigned on the Data Highway network.
Password	N/A		
Message Request Register	N7:0	N3:0 to N255:255	Must be within the PLC's supported memory range.
Current Message Register (optional)	N7:2	N3:0 to N255:255	Must be within the PLC's supported memory range.
Function Key Coils (optional)	B3:2	B3:0 to B255:255	Must be within the PLC's supported memory range.
Screen Dependent Function Key Coils (optional)	B3:1	B3:0 to B255:255	Must be within the PLC's supported memory range. Applies to OITs with Screen Dependent Function Keys.
Control Key Coils (optional)	B3:4	B3:0 to B255:255	Must be within the PLC's supported memory range.
Status LED Coils (optional)	B3:0	B3:0 to B255:255	Must be within the PLC's supported memory range. Applies to OITs with Status LEDs.
Function Key LED Coils (optional)	B3:3	B3:0 to B255:255	Must be within the PLC's supported memory range. Applies to OITs with Function Key LEDs.

MAPware-100 Settings

The following table lists the communications settings that must be configured in MAPware-100. Please note:

- the Default column lists MAPware-100's default setting; your PLC's default may be different
- the Options column lists MAPware-100's options; your PLC may not support every option

Name	Default	Options	Important Notes
Baud Rate	19200	19200, 9600, 4800, 2400, 1200, 600, 300	Must match the PLC port settings. Use the fastest baud rate supported by both.
Parity	None	Even, Odd, None, Mark, Space	Must match the PLC port settings.
Data Bits	8	7, 8	Must match the PLC port settings.
Stop Bits	1	1, 2	Must match the PLC port settings.
Status Coils	B3:0	B3:0 to B3:255	Must be within the PLC's supported memory range.
Address	N/A		
Source Address	0	0 to 31	Must match the address assigned to the DF1 port.
Destination Address	1	0 to 31	Must match the node address assigned on the Data Highway network.
Password	N/A		
Message Request Register	N7:0	N7:0 to N7:255	Must be within the PLC's supported memory range.
Function Key Coils (optional)	B3:2	B3:0 to B3:255	Must be within the PLC's supported memory range.

Important PLC Memory Considerations

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

Do not configure the Maple OIT to write to any PLC memory address which should only be written to by the PLC.

The Allen-Bradley SLC500 Series PLCs create PLC data registers dynamically based upon the ladder logic program that has been entered into the PLC. The PLC will allocate memory space for each data file when a particular register in the data file is being used in the ladder logic. If the OIT tries to read or write to a PLC data register that has not first been allocated some memory space in the PLC's ladder logic, an error message will be issued. Please note that this also applies to the registers being used by the OIT for the message request register, status registers, function key registers, etc.

On using Bank 8 or Bank 16 formats
When using these formats, each PLC coil (bit) is individually displayed in terms of 1 and 0, with the lowest addressed coil displayed in the right-most position in the field. Therefore, if using coils B3:0/0-B3:0/15, then B3:0/0 is the least significant bit displayed in the right-most position and B3:0/15 is the most significant bit displayed in the left-most position.

Accessing B3 coils
Allen Bradley allows bit or binary (B3) coils to be accessed as register address nomenclature or bit address nomenclature. OITware-200 always accesses the B3 coils using register addressing format and the PLC programmer must specify the 16-bit register address and bit location. The address field represents the 16-bit register location and the sub-element field represents the coil location. Similarly, the address fields used for the function key coils, status coils, and LED status coils in the Configuration Editor of OITware-200 represent the register address locations. The starting bit location used by these fields is always 0 and cannot be changed.

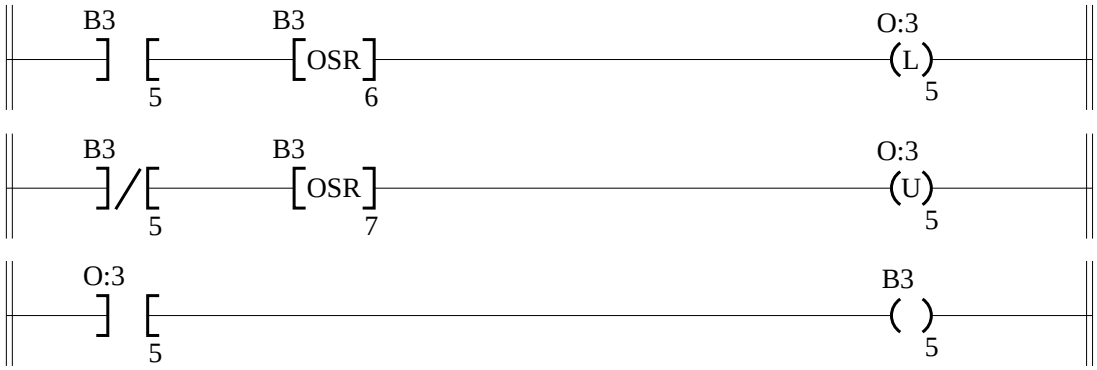
Accessing T4 and C5 accumulator/preset registers
Timer and counter registers are accessed as 3-word element addresses. Therefore, each register address represents three 16-bit words. Word 0 is the control word and cannot be accessed by the OIT. Word 1 stores the preset value (Example: T4:0.1 or T4:0.PRE) and can be accessed by the OIT using the PLC register editor in OITware-200 and specifying the register address or element number in the Address field and then entering the value [1] into the Sub-Element field. Word 2 stores the accumulated value (Example: T4:0.2 to T4:0.ACC) and can be accessed by the OIT using the PLC Register Editor in OITware-200 and specifying the register address or element number in the Address field and then entering the value [2] into the Sub-Element field.

Accessing R6 length or position registers
Control registers are accessed as 3-word element addresses. Therefore, each register address represents three 16-bit words. Word 0 is the status word and cannot be accessed by the OIT. Word 1 indicates the length of stored data (Example: R6:2.1 or R6:2.LEN) and can be accessed by the OIT using the PLC Register Editor in OITware-200 and specifying the register address or element number in the Address field and then entering the value [1] into the Sub-Element field. Word 2 indicates position (Example: R6:2.2 or R6:2.POS) and can be accessed by the OIT using the PLC Register Editor in OITware-200 and specifying the register address or element number in the Address field and then entering the value [2] into the Sub-Element field.

Accessing input (I) or output (O) registers

The Output Default File (File Number 0) and the Input Default File (File Number 1) are not directly available to the OIT. If you wish to monitor an input/output (I/O) coil using the OIT, then copy the I/O coil to a bit relay (B3) using ladder logic similar to what is shown below. Then monitor the status of the big relay (B3) by using a read-only monitor on the OIT:

If you wish to write to an output (O) coil using the OIT, then simply write the value stored in a big relay (B3) to an output (O) coil using ladder logic similar to what is shown below. Then use a read/write monitor to change the status of the bit relay (B3) on the OIT. This, in turn, will change the status of the output (O) coil:



Note: *The one-shots (OSR) are used to allow other segments of the PLC ladder logic to write to the output coil. The third line is necessary to ensure that the OIT is actually reading the current state of the output (O) coil.*

Accessing user-defined data files

Access to user-defined files is done by selecting file number 10-255 in OITware.