



Hitachi

H Series

Overview

Maple Systems' OIT Family Operator Interface Terminals (Maple OITs) communicate with Hitachi Programmable Logic Controllers (PLCs) using the Procedure-1 One-way protocol. The Maple OIT is the master in a point-to-point single master, single slave format.

Compatible PLCs	
Family	Model
H Series	EH150, H20, H40, H64, H200, H250, H252, H300, H302, H700, H702, H1000, H1002, H2000, H4010

Communications Cable

The Maple OIT should be connected to the communications modules included: COMH, REM-LH or OREM-LH. Connection to the PLC is accomplished through 1) the board-type PLC's programming/peripheral port located on the PLC's front left side, 2) the CPU's programming/peripheral port, or 3) the Communication module's RS-232 port. 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 at www.maple-systems.com/cables.htm

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

RS-232 port (mode 2; RS-232 switches: 1,7=OFF 2,3,4,5,6,8=ON)

Accessible PLC Memory

Register Memory

The following table lists the PLC's 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 register memory is displayable in 16-bit or 32-bit formats on the Maple OIT.

PLC Register Address	PLC Register Description
WX 000.0 to 49F.7	Ext. Input - Word
WY 000.0 to 49F.7	Ext. Output - Word
WR 0 to 43FF, F000 to F1FF	Int. Output - Word
WL 0 to 3FF, 1000 to 13FF	Link Area - Word
WM 0 to 3FF	Data Area - Word
TC 0 to 511	Timer/Counter Current - Word

Discrete Memory

The following table lists the PLC's 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 memory is displayable in single-bit or bank formats on the Maple OIT.

PLC Bit Address	PLC Bit Description
X 0.0 to 49F.95	Ext. Input - Bit
Y 0.0 to 49F.95	Ext. Output - Bit
R 0.0 to 7F.F	Int. Output - Bit
L 0.0 to 3FF.F	Link Area - Bit
L 1000.0 to 13FF.F	Link Area - Bit
M 0.0 to 3FF.F	Data Area - Bit
TD 0 to 511	Timer/Counter Device - Bit
CL 0 to 511	Timer/Counter Clear - Bit

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 setting. Use the fastest baud rate supported by both.
Parity	Even	Even, Odd, None, Mark, Space	Must match the PLC port setting.
Data Bits	7	7, 8	Must match the PLC port setting.
Stop Bits	1	1, 2	Must match the PLC port setting.
Status Coils	MFC.0	M0.0 to M3FF.0	Must be within the PLC's supported memory range.
Address 1	1	0 to 31	Must match the PLC address.
Address 2	2	0 to 31	Must match the PLC address.
Address 3	3	0 to 31	Must match the PLC address.
Password	N/A		
Message Request Register	WMFD	WM0 to WM3FF	Must be within the PLC's supported memory range.
Current Message Register (optional)	WMFF	WM0 to WM3FF	Must be within the PLC's supported memory range.
Function Key Coils (optional)	MFA.0	M0.0 to M3FF.0	Must be within the PLC's supported memory range.
Screen Dependent Function Key Coils (optional)	MF7.0	M0.0 to M3FF.0	Must be within the PLC's supported memory range. Applies to OITs with Screen Dependent Function Keys.
Control Key Coils (optional)	MF8.0	M0.0 to M3FF.0	Must be within the PLC's supported memory range.
Status LED Coils (optional)	MF9.0	M0.0 to M3FF.0	Must be within the PLC's supported memory range. Applies to OITs with Status LEDs.
Function Key LED Coils (optional)	MFA.0	M0.0 to M3FF.0	Must be within the PLC's supported memory range. Applies to OITs with Function Key LEDs.

Important PLC Memory Considerations

The OIT will report an error if an attempt is made to write a bit to a non-bit register.

To access “double word registers” (DX, DY, DR, DL and DM), use the word registers (WX, WY, WR, WL and WM, respectfully) with the Long or 8 Digit BCD formats.

Because the Rising Edge Detected (DIF) and Falling Edge Detected (DFN) registers cannot be properly monitored due to how quickly their values change, they are not supported.

It is possible to select read/write access on a PLC register that may be intended by the PLC manufacturer to be read only or write only. For example, a certain PLC register may be used by the PLC to record the scan time, as a fault table, or for diagnostics purposes. Since unpredictable operation of the PLC may result from writing a value to a read only PLC register, it is the responsibility of the OIT programmer to ensure that the read/write access is used properly.

Because some models of the PLC series may have a smaller range of PLC memory than other models, the OIT may be programmed to access PLC memory which is out of range. Unpredictable results may occur to the PLC or the OIT if this is attempted. Always ensure that only PLC registers that fall within the memory range of the PLC you are using are monitored by the OIT.

The protocol provides extensive networking capabilities which have not been fully tested using the OITs. Therefore, if you experience problems connecting an OIT using the network features, contact Maple Systems at (425) 486-4477 for support. Please provide an exact configuration of your network.

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. For Bank 8, if using coils 0-15 (or 16-bit register 0), the 0 is the least significant bit displayed in the right-most position and 15 is the most significant bit displayed in the left-most position.

The same applies for Bank 16, with the edition of coils 16 to 31 (or 16-bit register 1). The address used must start on a word boundary when using these formats.

PLC Error Messages

The following error messages are related to the PLC protocol (indicated by “PLC:”):

“PLC: Invalid Access of Bit Register...”

Attempted to write access a word (16-bit) register in a bit-wise fashion. Using OITWARE-200, correct the screen register’s format or read/write access.

“PLC: No Connection Error...”

“PLC: CTS Timeout Exceeded Error.”

The OIT cannot communicate with the PLC during initialization. This is most likely due to a bad connection (cable, connector, or attachment faulty) or loss of proper power to the PLC. Remote possibilities include severe noise, a faulty PLC or faulty OIT.

“PLC: No Response Error...”

“PLC: Data Reception Error...”

“PLC: BCC Checksum Error...”

“PLC: (NAK) Parity Error.”

“PLC: (NAK) Check Sum Error.”

“PLC: (NAK) Framing Error.”

“PLC: (NAK) Over-run Error.”

“PLC: (NAK) Protocol Error.”

“PLC: (NAK) ASCII Error.”

“PLC: (NAK) Receive Buffer Error.”

“PLC: (NAK) Receive Time-out Error.”

The OIT cannot communicate properly with the PLC after initialization. This is most likely due to noise, a bad connection (cable, connector or attachment faulty) or loss of proper power to the PLC. Remote possibilities include a faulty PLC or faulty OIT.

“PLC: Timed out while receiving EOTs.”

The PLC is not responding with the requested data within the time limit (approximately 5 minutes). This is probably due to the PLC or network being too busy or not working.

“PLC: Invalid Address...”

“PLC: Invalid Number of Steps/Words...”

“PLC: Invalid I/O Code...”

“PLC: Invalid I/P Number...”

The OIT has requested information outside the specific PLC’s capability. Using OITWARE-200, correct the screen register’s type, address or format.

“PLC: Undocumented Error...”

“PLC: Task Code Undefined...”

“PLC: (NAK) Error Undocumented.”

The PLC responded with an undocumented error. Contact Maple Systems technical support.

“PLC: (NAK) Dummy Error.”

“PLC: Invalid Command...”

“PLC: Invalid Register...”

“PLC: Invalid Address...”

“PLC: Invalid Data Pointer...”

“PLC: Procedure/Data Internal Error...”

An internal error occurred in the OIT. Contact Maple Systems technical support.

“PLC: Task Code Error.”
“PLC: Function Selection Code Undefined...”
“PLC: Write Data Exceeds Memory Capacity...”
“PLC: Memory Size Exceeded...”
“PLC: Monitor in Process but Not Occupied...”
“PLC: ROM Memory Error...”
“PLC: Parameter Area Error...”
“PLC: Read Occupation Code Mismatch...”
“PLC: Write Occupation Code Mismatch...”
“PLC: Access During Debugging Error...”
“PLC: Four Stations Read Occupied Error...”
“PLC: Own Station Not Occupying Error...”
“PLC: Occupied by Another Station Error...”
“PLC: RAM Memory Error...”
“PLC: CPU Running Error...”
“PLC: Operation Error...”
“PLC: Program Doesn’t Exist...”
“PLC: Task Code Combination Error...”
“PLC: Illogical Program...”
“PLC: CPU Busy...”
“PLC: Network Error...”
“PLC: Invalid PLC Address.”

The PLC reported an error. For further information, refer to the Hitachi documentation.