



Toshiba T Series

Overview

Maple Systems' MAP Family & OIT Family Operator Interface Terminals (Maple OITs) communicate with Toshiba T Series Programmable Logic Controllers (PLC) using Toshiba protocol in a point-to-point single master, single slave format.

Compatible PLCs	
PLC Family	PLC Model
Toshiba T Series	T1, T2, T2E, T2N, T3, T3H

Communications Cable

The Maple OIT should be connected to the Toshiba T-Series programming port.

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.

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
XW0 to XW511	Ext. Input Register
YW0 to YW511	Ext. Output Register
W0 to W2047	T. S20/Aux Register
LW0 to LW255	T.F10/Aux Register
RW0 to RW999	Aux. Relay Register
SW0 to SW255	Special Register
T0 to T999	Timer Register
C0 to C511	Counter Register
D0 to D8191	Data Register
F0 to F32767	File Register

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
X00 to X511F	Ext. Input Device
Y00 to Y511F	Ext. Output Device
Z00 to Z999F	T.S20/Aux Device
L00 to L255F	T.F10/Aux Device
R00 to R999F	Aux. Relay Device
S00 to S255F	Special Device

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	9600	19200, 9600, 4800, 2400, 1200, 600, 300	Must match the PLC port settings. Use the fastest baud rate supported by both.
Parity	Odd	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	RW58	RW0 to 999	Must be within the PLC's supported memory range.
Address, Source Address, Destination Address	N/A		
Password	N/A		
Message Request Register	D1021	D0 to D8191	Must be within the PLC's supported memory range.
Current Message Register (optional)	D1023	D0 to D8191	Must be within the PLC's supported memory range.
Function Key Coils (optional)	R57	R00 to R999F	Must be within the PLC's supported memory range.
Screen Dependent Function Key Coils (optional)	R61	R00 to R999F	Must be within the PLC's supported memory range. Applies to OITs with Screen Dependent Function Keys.
Control Key Coils (optional)	RW62	RW0 to RW999	Must be within the PLC's supported memory range.
Status LED Coils (optional)	R59	R00 to R999F	Must be within the PLC's supported memory range. Applies to OITs with Status LEDs.
Function Key LED Coils (optional)	R60	R00 to R999F	Must be within the PLC's supported memory range. Applies to OITs with Function Key LEDs.

Important PLC Memory Considerations

Notes about using various memory ranges

General Information: When programming the OIT to monitor registers in the Toshiba T Series PLCs, the following restrictions apply:

- The X, Y, R, S, L and Z devices share the same memory locations as their respective registers XW, YW, RW, SW, LW and W. For program clarity, device types (X, Y, R, S, L and Z) should use 1-bit formats (1/0 Coil, On/Off Coil, ASCII String) and register types (XW, YW, RW, SW, LW and @) should use the other formats. Otherwise the OIT's protocol driver will automatically select the device or register by the format selected (i.e. RW3 with 1/0 Coil format actually accesses the R30 device; R33 with decimal format actually accesses the RW3 register). Also, T, C, D, and F registers do not have device equivalents, so using these with 1-bit formats will generate an error.
- The timer device (T.), counter device (C.) and index registers (I,J,K) can only be addressed indirectly. Use an accessible device register to access these types, using ladder logic to link them.
- When programming the OIT to monitor PLC registers, 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.

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 0-15, 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 address used must start on a byte 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 Word Register...”

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

“PLC: No Connection 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...”

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: Busy...”

“PLC: Format Error...”

“PLC: Password Protect Error...”

“PLC: Register Address Over Error...”

“PLC: Mode Mismatch Error...”

“PLC: Register Number Size Error...”

“PLC: Memory Protect Error...”

“PLC: Status Error...”

“PLC: WACK Processing Error...”

“PLC: Halted Error...”

“PLC: Hold Error...”

“PLC: (Mode) Error...”

“PLC: Down Load Error”

“PLC: Scan Time Error”

“PLC: Computer Link Error...”

“PLC: TL-F10 Error...”

“PLC: TL-S20 Error...”

“PLC: Undocumented Error...”

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

“PLC: Invalid Command...”,

“PLC: Invalid Register...”,

“PLC: Invalid Address...”,

“PLC: Invalid Data Pointer...”,

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

“PLC: ETB Character Detected Error...”

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