



Toshiba Serial Driver

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Toshiba Serial Driver

Help version 1.016

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Overview

The Toshiba Serial Driver provides a reliable way to connect Toshiba Serial devices to OPC Client applications, including HMI, SCADA, Historian, MES, ERP and countless custom applications. It uses the Toshiba ASCII Computer Link protocol to communicate with the PLC. Before attempting to use the driver in an OPC server software project, users should understand the different data types and the addressing scheme. For more information, refer to [Data Types Description](#) and [Address Descriptions](#).

Device Setup

Supported Devices

EX100
EX200
T1
T1 Super
T2 PLCs
T3 PLCs

Communication Protocol

Toshiba ASCII Computer Link Protocol

Supported Communication Parameters

Baud Rate: 1200, 2400, 9600, 19200, or 38400
Parity: None, Even, or Odd
Data Bits: 5, 6, 7 or 8
Stop Bits: 1 or 2

Device IDs

EX100: Up to 16 devices numbered from 0 to 15.
EX200: Up to 10 devices numbered from 0 to 9.
T1 and T2: Up to 32 devices numbered from 1 to 32.
T3 and T3H: Up to 64 devices numbered from 1 to 64.

Flow Control

When using an RS232/RS485 converter, the type of flow control that is required depends on the needs of the converter. Some converters do not require any flow control whereas others require RTS flow. Consult the converter's documentation to determine its flow requirements. An RS485 converter that provides automatic flow control is recommended.

Note: When using T1 devices, **RTS Always** should be specified.

Ethernet Encapsulation

This driver supports Ethernet Encapsulation, which allows the driver to communicate with serial devices attached to an Ethernet network using a terminal server or device server. It may be invoked through the COM ID dialog in Channel Properties. For more information, refer to the OPC Server help file.

Cable Connections

The T1 can be directly connected to the PC COM port using RS232 communications. The EX100, EX200 and T2 can be linked to the PC's RS232 interface through a RS232/RS422 converter. For connection information between the PLC and a RS232/RS422 converter, refer to the PLC manual.

Modem Setup

This driver supports modem functionality. For more information, please refer to the topic "Modem Support" in the OPC Server Help documentation.

Data Types Description

Data Type	Description
Boolean	Single bit
Word	Unsigned 16 bit value bit 0 is the least significant bit bit 15 the most significant bit
Short	Signed 16 bit value bit 0 is the least significant bit bit 14 the most significant bit bit 15 is the sign bit
DWord	Unsigned 32 bit value bit 0 is the least significant bit bit 31 the most significant bit
Long	Signed 32 bit value bit 0 is the least significant bit bit 30 the most significant bit bit 31 is the sign bit
Float	32 bit floating point value. The driver interprets two consecutive registers as a floating point value by making the second register the high word and the first register the low word.
String	Null terminated ASCII string This is supported on all models and includes HiLo LoHi byte order selection.

Address Descriptions

Address specifications vary depending on the model in use. Select a link from the following list to obtain specific address information for the model of interest.

[EX100](#)

[EX200](#)

[EX500](#)

[T1, T1Super](#)

[T2](#)

[T3, T3H](#)

EX100 Addressing

The default data types are shown in **bold**.

Address Type	Range	Data Type	Access
Input Devices	X00...X0F-X310...X31F	Boolean	Read/Write
Output Devices	Y00...Y0F-Y310...Y31F	Boolean	Read/Write
Input Registers	XW0-XW63	Word , Short	Read/Write
	XW0-XW62	DWord, Long, Float	
Output Registers	YW0-YW63	Word , Short	Read/Write
	YW0-YW62	DWord, Long, Float	
Auxiliary Devices	R00...R0F-R630...R63F	Boolean	Read/Write
Auxiliary Registers	RW0-RW63	Word , Short	Read/Write
	RW0-RW62	DWord, Long, Float	
Link Register Relays	Z00...Z0F-Z310...Z31F	Boolean	Read/Write
Link Registers	ZW0-ZW31	Word , Short	Read/Write
	ZW0-ZW30	DWord, Long, Float	
Counter Registers	C0-C95	Word , Short	Read/Write
Timer Registers	T0-T127	Word , Short	Read/Write
Data Memory	D0-D1535	Word , Short	Read/Write
	D0-D1534	DWord, Long, Float	
Data Memory As String with HiLo Byte Order	D0.2H-D1535.64H .Bit is string length, range 2 to 64 bytes.	String	Read/Write
Data Memory As String with LoHi Byte Order	D0.2L-D1535.64L .Bit is string length, range 2 to 64 bytes.	String	Read/Write

String Support

The Toshiba Serial Driver supports reading and writing Data registers as an ASCII string. When using Data registers for string data, each register will contain two bytes of ASCII data. The order of the ASCII data within a given register can be selected when the string is defined. The length of the string can be from 2 to 64 bytes and is entered in place of a bit number. The length must be entered as an even number. The byte order is specified by appending either a "H" or "L" to the address.

Examples

1. To address a string starting at D200 with a length of 50 bytes and HiLo byte order, enter:
D200.50H

2. To address a string starting at D500 with a length of 38 bytes and LoHi byte order, enter:
D500.38L

EX200 Addressing

The default data types are shown in **bold**.

Address Type	Range	Data Type	Access
Input Devices	X00...X0F-X310...X31F	Boolean	Read/Write
Output Devices	Y00...Y0F-Y310...Y31F	Boolean	Read/Write
Input Registers	XW0-XW63 XW0-XW62	Word , Short DWord, Long, Float	Read/Write
Output Registers	YW0-YW63 YW0-YW62	Word , Short DWord, Long, Float	Read/Write
Auxiliary Devices	R00...R0F-R630...R63F	Boolean	Read/Write
Auxiliary Registers	RW0-RW63 RW0-RW62	Word , Short DWord, Long, Float	Read/Write
Link Register Relays	Z00...Z0F-Z310...Z31F	Boolean	Read/Write
Link Registers	ZW0-ZW31 ZW0-ZW30	Word , Short DWord, Long, Float	Read/Write
Counter Registers	C0-C95	Word , Short	Read/Write
Timer Registers	T0-T127	Word , Short	Read/Write
Data Memory	D0-D1535 D0-D1534	Word , Short DWord, Long, Float	Read/Write
Data Memory As String with HiLo Byte Order	D0.2H-D1535.64H .Bit is string length, range 2 to 64 bytes.	String	Read/Write
Data Memory As String with	D0.2L-D1535.64L	String	Read/Write

LoHi Byte Order	.Bit is string length, range 2 to 64 bytes.		
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String Support

The Toshiba Serial Driver supports reading and writing Data registers as an ASCII string. When using Data registers for string data, each register will contain two bytes of ASCII data. The order of the ASCII data within a given register can be selected when the string is defined. The length of the string can be from 2 to 64 bytes and is entered in place of a bit number. The length must be entered as an even number. The byte order is specified by appending either a "H" or "L" to the address.

Examples

1. To address a string starting at D200 with a length of 50 bytes and HiLo byte order, enter:
D200.50H
2. To address a string starting at D500 with a length of 38 bytes and LoHi byte order, enter:
D500.38L

EX500 Addressing

The default data types are shown in **bold**.

Address Type	Range	Data Type	Access
Input Devices	X00...X0F-X310...X31F	Boolean	Read/Write
Output Devices	Y00...Y0F-Y310...Y31F	Boolean	Read/Write
Input Registers	XW0-XW63 XW0-XW62	Word , Short DWord, Long, Float	Read/Write
Output Registers	YW0-YW63 YW0-YW62	Word , Short DWord, Long, Float	Read/Write
Auxiliary Devices	R00...R0F-R630...R63F	Boolean	Read/Write
Auxiliary Registers	RW0-RW63 RW0-RW62	Word , Short DWord, Long, Float	Read/Write
Link Register Relays	Z00...Z0F-Z310...Z31F	Boolean	Read/Write
Link Registers	ZW0-ZW31 ZW0-ZW30	Word , Short DWord, Long, Float	Read/Write
Counter Registers	C0-C95	Word , Short	Read/Write
Timer Registers	T0-T127	Word , Short	Read/Write
Data Memory	D0-D1535 D0-D1534	Word , Short DWord, Long, Float	Read/Write
Data Memory As String with HiLo Byte Order	D0.2H-D1535.64H	String	Read/Write

	.Bit is string length, range 2 to 64 bytes.		
Data Memory As String with LoHi Byte Order	D0.2L-D1535.64L .Bit is string length, range 2 to 64 bytes.	String	Read/Write

String Support

The Toshiba Serial Driver supports reading and writing Data registers as an ASCII string. When using Data registers for string data, each register will contain two bytes of ASCII data. The order of the ASCII data within a given register can be selected when the string is defined. The length of the string can be from 2 to 64 bytes and is entered in place of a bit number. The length must be entered as an even number. The byte order is specified by appending either a "H" or "L" to the address.

Examples

1. To address a string starting at D200 with a length of 50 bytes and HiLo byte order, enter:
D200.50H

2. To address a string starting at D500 with a length of 38 bytes and LoHi byte order, enter:
D500.38L

T1, T1 Super Addressing

The default data types are shown in **bold**.

Address Type	Range	Data Type	Access
Input Devices	X00...X0F-X310...X31F	Boolean	Read/Write
Output Devices	Y00...Y0F-Y310...Y31F	Boolean	Read/Write
Input Registers	XW0-XW63 XW0-XW62	Word , Short DWord, Long, Float	Read/Write
Output Registers	YW0-YW63 YW0-YW62	Word , Short DWord, Long, Float	Read/Write
Auxiliary Devices	R00...R0F-R2550...R255F	Boolean	Read/Write
Auxiliary Registers	RW0-RW255 RW0-RW254	Word , Short DWord, Long, Float	Read/Write
Special Devices	S00...S0F-S630...S63F	Boolean	Read/Write
Special Registers	SW0-SW63 SW0-SW62	Word , Short DWord, Long, Float	Read Only
Counter Registers	C0-C255	Word , Short	Read/Write
Counter Devices	C.0-C.255	Boolean	Read Only
Timer Registers	T0-T63	Word , Short	Read/Write
Timer Devices	T.0-T.63	Boolean	Read Only
Data Memory	D0-D4095 D0-D4094	Word , Short DWord, Long, Float	Read/Write
Data Memory As String with HiLo Byte Order	D0.2H-D4095.64H	String	Read/Write

	.Bit is string length, range 2 to 64 bytes.		
Data Memory As String with LoHi Byte Order	D0.2L-D4095.64L .Bit is string length, range 2 to 64 bytes.	String	Read/Write

String Support

The Toshiba Serial Driver supports reading and writing Data registers as an ASCII string. When using Data registers for string data, each register will contain two bytes of ASCII data. The order of the ASCII data within a given register can be selected when the string is defined. The length of the string can be from 2 to 64 bytes and is entered in place of a bit number. The length must be entered as an even number. The byte order is specified by appending either a "H" or "L" to the address.

Examples

1. To address a string starting at D200 with a length of 50 bytes and HiLo byte order, enter:
D200.50H

2. To address a string starting at D500 with a length of 38 bytes and LoHi byte order, enter:
D500.38L

T2 Addressing

The default data types are shown in **bold**.

Address Type	Range	Data Type	Access
Input Devices	X00...X0F-X630...X63F	Boolean	Read/Write
Direct Input Devices	I00...I0F-I630...I63F	Boolean	Read Only
Output Devices	Y00...Y0F-Y630...Y63F	Boolean	Read/Write
Direct Output Devices	O00...O0F-O630...O63F	Boolean	Read/Write
Input Registers	XW0-XW63 XW0-XW62	Word , Short DWord, Long, Float	Read/Write
Direct Input Registers	IW0-IW63 IW0-IW62	Word , Short DWord, Long, Float	Read/Write
Output Registers	YW0-YW63 YW0-YW62	Word , Short DWord, Long, Float	Read/Write
Direct Output Registers	OW0-OW63 OW0-OW62	Word , Short DWord, Long, Float	Read/Write
Link Relays	L00...L0F-L2550...L255F	Boolean	Read/Write
Link Registers	LW0-LW255 LW0-LW254	Word , Short DWord, Long, Float	Read/Write
Link Registers	W0-W1023	Word , Short	Read/Write

	W0-W1022	DWord, Long, Float	
Link Register Relays	Z00...Z0F-Z5110...Z511F	Boolean	Read/Write
File Registers	F0-F1023	Word , Short	Read/Write
	F0-F1022	DWord, Long, Float	
Auxiliary Devices	R00...R0F-R1270...R127F	Boolean	Read/Write
Auxiliary Registers	RW0-RW127	Word , Short	Read/Write
	RW0-RW126	DWord, Long, Float	
Special Devices	S00...S0F-S2550...S255F	Boolean	Read/Write
Special Registers	SW0-SW255	Word , Short	Read Only
	SW0-SW254	DWord, Long, Float	
Counter Registers	C0-C255	Word , Short	Read/Write
Counter Devices	C.0-C.255	Boolean	Read Only
Timer Registers	T0-T255	Word , Short	Read/Write
Timer Devices	T.0-T.255	Boolean	Read Only
Data Memory	D0-D4095	Word , Short	Read/Write
	D0-D4094	DWord, Long, Float	
Data Memory As String with HiLo Byte Order	D0.2H-D4095.64H .Bit is string length, range 2 to 64 bytes.	String	Read/Write
Data Memory As String with LoHi Byte Order	D0.2L-D4095.64L .Bit is string length, range 2 to 64 bytes.	String	Read/Write

String Support

The Toshiba Serial Driver supports reading and writing Data registers as an ASCII string. When using Data registers for string data, each register will contain two bytes of ASCII data. The order of the ASCII data within a given register can be selected when the string is defined. The length of the string can be from 2 to 64 bytes and is entered in place of a bit number. The length must be entered as an even number. The byte order is specified by appending either a "H" or "L" to the address.

Examples

1. To address a string starting at D200 with a length of 50 bytes and HiLo byte order, enter:
D200.50H
2. To address a string starting at D500 with a length of 38 bytes and LoHi byte order, enter:
D500.38L

T3, T3H Addressing

The default data types are shown in **bold**.

Address Type	Range	Data Type	Access
Input Devices	X00...X0F-X5110...X511F	Boolean	Read/Write
Direct Input Devices	I00...I0F-I5110...I511F	Boolean	Read Only
Output Devices	Y00...Y0F-Y5110...Y511F	Boolean	Read/Write
Direct Output Devices	O00...O0F-O5110...O511F	Boolean	Read/Write
Input Registers	XW0-XW511 XW0-XW510	Word , Short DWord, Long, Float	Read/Write
Direct Input Registers	IW0-IW511 IW0-IW510	Word , Short DWord, Long, Float	Read/Write
Output Registers	YW0-YW511 YW0-YW510	Word , Short DWord, Long, Float	Read/Write
Direct Output Registers	OW0-OW511 OW0-OW510	Word , Short DWord, Long, Float	Read/Write
Link Relays	L00...L0F-L2550...L255F	Boolean	Read/Write
Link Registers	LW0-LW255 LW0-LW254	Word , Short DWord, Long, Float	Read/Write
Link Registers	W0-W2047 W0-W2046	Word , Short DWord, Long, Float	Read/Write
Link Register Relays	Z00...Z0F-Z9990...Z999F	Boolean	Read/Write
File Registers	F0-F8191 F0-F8190	Word , Short DWord, Long, Float	Read/Write
Auxiliary Devices	R00...R0F-R9990...R999F	Boolean	Read/Write
Auxiliary Registers	RW0-RW999 RW0-RW998	Word , Short DWord, Long, Float	Read/Write
Special Devices	S00...S0F-S2550...S255F	Boolean	Read/Write
Special Registers	SW0-SW255 SW0-SW254	Word , Short DWord, Long, Float	Read Only
Counter Registers	C0-C511	Word , Short	Read/Write

Counter Devices	C.0-C.511	Boolean	Read Only
Timer Registers	T0-T999	Word , Short	Read/Write
Timer Devices	T.0-T.999	Boolean	Read Only
Data Memory	D0-D8191 D0-D8190	Word , Short DWord, Long, Float	Read/Write
Data Memory As String with HiLo Byte Order	D0.2H-D8191.64H .Bit is string length, range 2 to 64 bytes.	String	Read/Write
Data Memory As String with LoHi Byte Order	D0.2L-D8191.64L .Bit is string length, range 2 to 64 bytes.	String	Read/Write

String Support

The Toshiba Serial Driver supports reading and writing Data registers as an ASCII string. When using Data registers for string data, each register will contain two bytes of ASCII data. The order of the ASCII data within a given register can be selected when the string is defined. The length of the string can be from 2 to 64 bytes and is entered in place of a bit number. The length must be entered as an even number. The byte order is specified by appending either a "H" or "L" to the address.

Examples

1. To address a string starting at D200 with a length of 50 bytes and HiLo byte order, enter:
D200.50H

2. To address a string starting at D500 with a length of 38 bytes and LoHi byte order, enter:
D500.38L

Error Descriptions

The following error/warning messages may be generated. Click on the link for a description of the message.

Address Validation

[Missing address](#)

[Device address '<address>' contains a syntax error](#)

[Address '<address>' is out of range for the specified device or register](#)

[Device address '<address>' is not supported by model '<model name>'](#)

[Data Type '<type>' is not valid for device address '<address>'](#)

[Device address '<address>' is Read Only](#)

Serial Communications

[COMn does not exist](#)

[Error opening COMn](#)

[COMn is in use by another application](#)

[Unable to set comm properties on COMn](#)

[Communications error on '<channel name>' \[<error mask>\]](#)

Device Status Messages

[Device '<device name>' is not responding](#)

[Unable to write to '<address>' on device '<device name>'](#)

Missing address

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically has no length.

Solution:

Re-enter the address in the client application.

Device address '<address>' contains a syntax error

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically contains one or more invalid characters.

Solution:

Re-enter the address in the client application.

Address '<address>' is out of range for the specified device or register

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically references a location that is beyond the range of supported locations for the device.

Solution:

Verify the address is correct; if it is not, re-enter it in the client application.

Data Type '<type>' is not valid for device address '<address>'

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically has been assigned an invalid data type.

Solution:

Modify the requested data type in the client application.

Device address '<address>' is not supported by model '<model name>'

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically references a location that is valid for the communications protocol but not supported by the target device.

Solution:

Verify the address is correct; if it is not, re-enter it in the client application. Also verify the selected model name for the device is correct.

Device address '<address>' is Read Only

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically has a requested access mode that is not compatible with what the device supports for that address.

Solution:

Change the access mode in the client application.

COMn does not exist

Error Type:

Fatal

Possible Cause:

The specified COM port is not present on the target computer.

Solution:

Verify that the proper COM port has been selected.

Error opening COMn

Error Type:

Fatal

Possible Cause:

The specified COM port could not be opened due an internal hardware or software problem on the target computer.

Solution:

Verify that the COM port is functional and may be accessed by other Windows applications.

COMn is in use by another application

Error Type:

Fatal

Possible Cause:

The serial port assigned to a device is being used by another application.

Solution:

Verify that the correct port has been assigned to the channel.

Unable to set comm properties on COMn

Error Type:

Fatal

Possible Cause:

The serial properties for the specified COM port are not valid.

Solution:

Verify the serial properties and make any necessary changes.

Communications error on '<channel name>' [<error mask>]

Error Type:

Serious

Error Mask Definitions:

B = Hardware break detected.

F = Framing error.

E = I/O error.

O = Character buffer overrun.

R = RX buffer overrun.

P = Received byte parity error.

T = TX buffer full.

Possible Cause:

1. The serial connection between the device and the Host PC is bad.
2. The communications properties for the serial connection are incorrect.

Solution:

1. Verify the cabling between the PC and the PLC device.
2. Verify that the specified communications properties match those of the device.

Device '<device name>' is not responding

Error Type:

Serious

Possible Cause:

1. The named device may not be connected to the PLC network.
2. The named device may have been assigned an incorrect Network ID.
3. The response from the device took longer to receive than the amount of time specified in the "Request Timeout" device property.

Solution:

1. Check the PLC network connections.
2. Verify the Network ID given to the named device matches that of the actual device.
3. Increase the Request Timeout property so that the entire response can be handled.

Unable to write to address '<address>' on device '<device name>'

Error Type:

Serious

Possible Cause:

1. The serial connection between the device and the Host PC is broken.
2. The communications properties for the serial connection are incorrect.
3. The named device may have been assigned an incorrect Network ID.

Solution:

1. Verify the cabling between the PC and the PLC device.
2. Verify the specified communications properties match those of the device.
3. Verify that the Network ID given to the named device matches that of the actual device.

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