Emerson Process Management

ROC Plus SIO Driver

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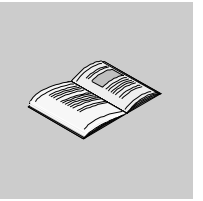
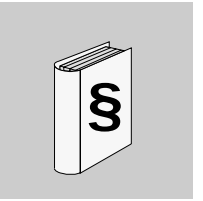


Safety Information



Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a Danger safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result in** death or serious injury.

⚠ CAUTION
CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate injury.

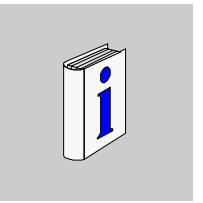
NOTICE
NOTICE is used to address practices not related to physical injury.

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

About the Book



At a Glance

Document Scope

This manual describes the device driver communication settings in the Vijeo Designer screen editing software. Vijeo Designer enables you to design Magelis target machines that communicate with PLCs, drives, field devices, and other equipment.

For more information about Vijeo Designer and Magelis target machines, please refer to Vijeo Designer user documentation.

Validity Note

The data and illustrations found in this book are not binding. We reserve the right to modify our products in line with our policy of continuous product development. The information in this document is subject to change without notice and should not be construed as a commitment by Schneider Electric.

Documentation Conventions

Target Machine: Human-Machine Interface (HMI) that runs user applications designed in Vijeo Designer screen editing software. A target machine is also known as a terminal.

Product Related Information

⚠ WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.*
- Each implementation of a Magelis XBTGT, HMISTO, HMISTU, HMIGTO, XBTGH, XBTGK, XBTGC, iPC, and XBTGTW must be individually and thoroughly tested for proper operation before being placed into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

* For additional information, refer to NEMA ICS 1.1 (latest edition), “Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control.“

User Comments

We welcome your comments about this document. You can reach us by e-mail at techcomm@schneider-electric.com.

ROC Plus SIO Driver

1

Subject of this Chapter

This chapter explains Emerson Process Management's ROC Plus SIO driver.

What's in this Chapter?

This chapter contains the following topics:

System Structure

Overview

The following table describes the basic system setup for connecting Emerson Process Management's external devices to the Vijeo Designer target machines.

Note:

- All Vijeo Designer target machines support the ROC Plus SIO driver, except for the XBTGT1100 and XBTGT1130.

Connection

You can use the COM1 port to connect the target machine with the external device.

Series	CPU	Link I/F	Comm.	Diagram
ROC	ROC 300	LOI Port, EIA-232 (optional expansion module	RS-232C	*Cable Diagram 1*
		EIA-485 / RS-485 (optional expansion module)	RS-422/485	*Cable Diagram 4*
	ROC 800 (809, 827)	LOI RS-232D Port	RS-232C	*Cable Diagram 2*
		EIA-485 / RS-485 (optional expansion module)	RS-422/485	*Cable Diagram 4*
	DL8000	LOI Port. EIA-232	RS-232C	*Cable Diagram 2*
		Built-In EIA-232	RS-232C	*Cable Diagram 1*
		Optional EIA-232	RS-232C	*Cable Diagram 1*
		EIA-422 / 485 2-Wire	RS-422/485	*Cable Diagram 5*
		EIA-422 / 485 4-Wire	RS-422/485	*Cable Diagram 6*
ROCPAC	ROCPAC 306 ROCPAC 312 ROCPAC 364	LOI Port, EIA-232 (optional expansion module)	RS-232C	*Cable Diagram 1*
		EIA-485 / RS-485 (optional expansion module)	RS-422/485	*Cable Diagram 4*

Series	CPU	Link I/F	Comm.	Diagram
Rosemount	Rosemount 3095FC	LOI Port, EIA-232 (optional expansion module)	RS-232C	*Cable Diagram 2*
		EIA-485 / RS-485 (optional expansion module)	RS-422/485	*Cable Diagram 4*
FloBoss	FB103 FB107	LOI Port, EIA-232	RS-232C	*Cable Diagram 1*
		EIA-485 / RS-485	RS-422/485	*Cable Diagram 4*
	FB407 FB503 FB504	LOI Operator Interface Cable	RS-232C	*Cable Diagram 3*
		EIA-485 / RS-485 (optional expansion module)	RS-422/485	*Cable Diagram 4*

For any other ROC Plus equipment, refer to the manufacturer's documentation to determine the pin layout.

Target Machine Serial Interface

Use the following serial interface diagrams in combination with the cable diagrams in Section 3 to wire connections between the target machine and external equipment.

Magelis XBTGK, XBTGC2000, XBTGH2000, and XBTGT2000 Series or higher

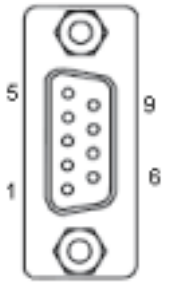
All XBTGK and XBTGT2000 Series and higher target machines have two COM ports: COM1 and COM2. The XBTGC2000 Series has one COM port: COM1. XBTGH2000 Series (Junction Box) has one COM port: COM1.

COM1 is a 9-pin D-Sub male connector and COM2 is an RJ45 socket. The following tables illustrate the pin layout for these target machines.

COM1 (9-pin D-Sub Plug)

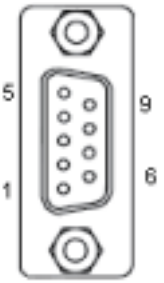
This COM port can act as either an RS-232C or RS-422 interface.

RS-232C



Pin Number	Symbol	Description
1	CD	Carrier Detect
2	RD(RXD)	Receive Data
3	SD(TXD)	Transmit Data
4	ER(DTR)	Data Terminal Ready
5	GND	Common Ground
6	DR(DSR)	Data Set Ready
7	RS(RTS)	Request to Send
8	CS(CTS)	Send Possible
9	CI(RI)	Called status display or +5V ±5% output 0.25A

RS-422



Pin Number	Symbol	Description
1	RDA	Receive Data A
2	RDB	Receive Data B
3	SDA	Send Data A
4	ERA	Data Terminal Ready A
5	GND	Common Ground
6	CSB	Send Possible B
7	SDB	Send Data B
8	CSA	Send Possible A
9	ERB	Data Terminal Ready B

Note:

- When making your own connections, attach a loop back between pins 6 (CSB) and 9 (ERB), and between 4 (ERA) and 8 (CSA).
- To simplify the wiring, you can use the COM Port Conversion Adapter (Schneider Electric: XBTZGCOM) and Terminal Block Conversion Adapter (Schneider Electric: XBTZG949). These accessories allow access to the RS-422 signals using screw terminals. For information on the signals of the screw terminals, see the user manual for the XBTZG949.

COM2 (RJ45 Socket)

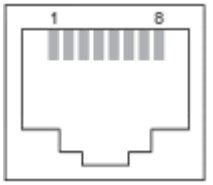
⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

When making your own connections, use shielded RJ45 connectors. The shielded connector provides isolation against electromagnetic interference and provides a more secure physical connection in the RJ45 socket. Use of an improper RJ45 connection could lead to insecure connections.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

COM2 supports RS-422/485 signals only.



Pin Number	Symbol	Description
1		
2		
3		
4	D1(+)	Send Data (Positive Signal)
5	D0(-)	Send Data (Negative Signal)
6		
7		
8	GND	Common Ground

Magelis HMIGTO Series

The HMIGTO target machines have two COM ports (COM1 and COM2), with the exception of the HMIGTO1310. The HMIGTO1310 has one COM port (COM1), which uses an RJ45 connector. For more information, see *Magelis XBTGT1000, XBTGT1005, HMIGTO1310, HMISTO, and HMISTU Series*.

COM1 is a 9-pin D-Sub male connector, and COM2 is an RJ45 socket. The following tables illustrate the pin layout for these target machines.

COM1 (9-pin D-Sub Plug)

This COM port can act as either an RS-232C or RS-422/RS-485 interface.

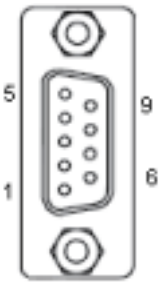
⚠ CAUTION

LOSS OF COMMUNICATION

- All connections to the communication ports must not put excessive stress on the ports.
- Securely attach communication cables to the panel wall or cabinet.
- Use only D-Sub 9-pin cables with a locking tab in good condition.

Failure to follow these instructions can result in injury or equipment damage.

RS-232C



Pin Number	Symbol	Description
1	CD	Carrier Detect
2	RD(RXD)	Receive Data
3	SD(TXD)	Transmit Data
4	ER(DTR)	Data Terminal Ready
5	SG	Signal Ground
6	DR(DSR)	Data Set Ready
7	RS(RTS)	Request to Send
8	CS(CTS)	Send Possible
9	CI(RI/VCC)	Called status display or +5V ±5% output 0.25A
Shell	FG	Frame Ground (Common with SG)

Note:

- You can switch pin 9 between RI and VCC via software. The VCC output is not protected against overcurrent. To prevent damage or a unit malfunction, use only the rated current.
- You can use the Cable Connector (Omron Corporation: XMD-0901), Cable Cover (Omron Corporation: XM2S-0913), and Jack Screw #4-40 UNC (Omron Corporation: XM2Z-0073).

COM2 (RJ45 Socket)

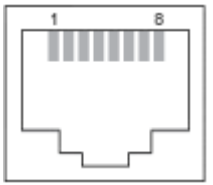
⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

When making your own connections, use shielded RJ45 connectors. The shielded connector provides isolation against electromagnetic interference and provides a more secure physical connection in the RJ45 socket. Use of an improper RJ45 connection could lead to insecure connections.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

COM2 supports RS-422/485 signals only.



Pin Number	Symbol	Description
1	NC	–
2	NC	–
3	NC	–
4	Line A	Transfer Data (RS-485)
5	Line B	Transfer Data (RS-485)
6	RS(RTS)	Request to Send
7	NC	–
8	SG	Signal Ground

DANGER

ELECTRIC SHOCK

The serial port is not isolated. The SG (signal ground) and FG (frame ground) terminals are connected inside the unit.

When using the SG terminal to connect an external device to the panel:

- Verify that a short-circuit loop is not created when you set up the system.
- Connect the #8 SG terminal to remote equipment when the host (PLC) unit is not isolated. Connect the #8 SG terminal to a known reliable ground connection to reduce the risk of damaging the circuit.

Failure to follow these instructions can result in death or serious injury.

Magelis XBTGT1000, XBTGT1005, HMIGTO1310, HMISTO, and HMISTU Series

XBTGT1000, XBTGT1005, HMIGTO1310, HMISTO, and HMISTU Series machines come with one COM port which uses an RJ45 connector. The RJ45 socket closest to the power connector is the COM1 port. This COM port can act as an RS-422/485 interface.

COM1 (RJ45 Socket)

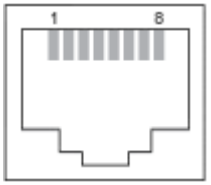
⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

When making your own connections, use shielded RJ45 connectors. The shielded connector provides isolation against electromagnetic interference and provides a more secure physical connection in the RJ45 socket. Use of an improper RJ45 connection could lead to insecure connections.

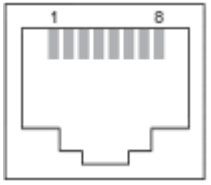
Failure to follow these instructions can result in death, serious injury, or equipment damage.

RS-232C



Pin Number	Symbol	Description
1	RD(RXD)	Receive Data
2	SD(TXD)	Transmit Data
3		
4		
5		
6		
7		
8	GND	Common Ground

RS-422/485 (2-wire)



Pin Number	Symbol	Description
1		
2		
3		
4	D1(+)	Send Data (Positive Signal)
5	D0(-)	Send Data (Negative Signal)
6		
7		
8	GND	Common Ground

Cable Diagrams

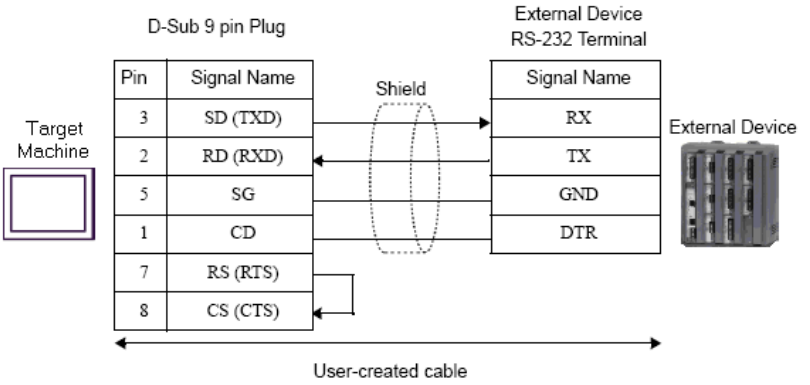
The illustrated cable diagrams and those recommended by Emerson Process Management may differ. However, Schneider Electric recommends using the following connections.

When creating your own cables, to identify which pins to connect on the target machine, see *Target Machine Serial Interface*.

- Ensure that the equipment is properly grounded as indicated in the user manual and follows all applicable country standards.

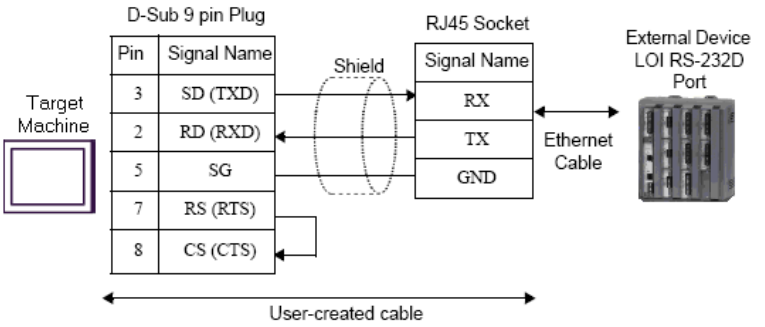
Cable Diagram 1

RS-232C Cable Connection



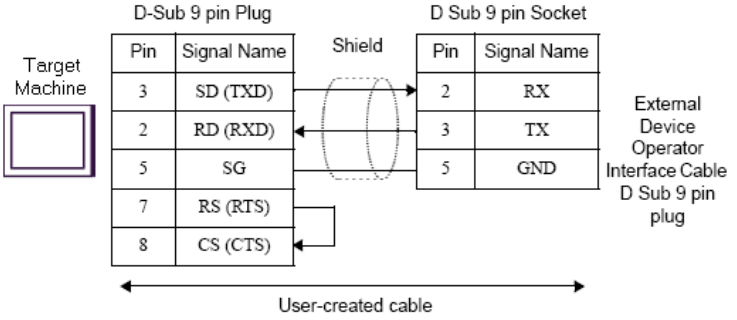
Cable Diagram 2

RS-232C to LOI RS-232D Terminal Connection



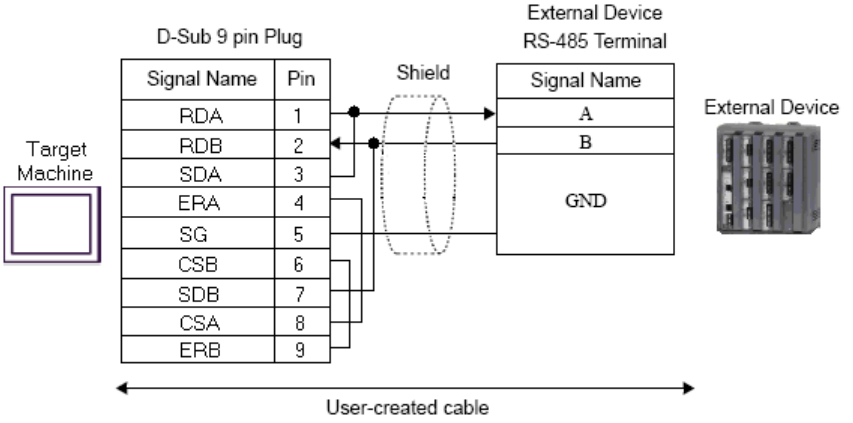
Cable Diagram 3

RS-232C to FB407 LOI Operator Interface Cable Connection



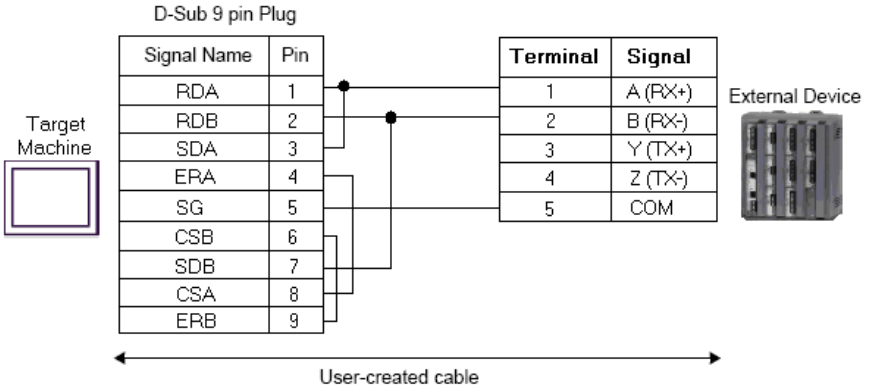
Cable Diagram 4

RS-485 Cable Connection



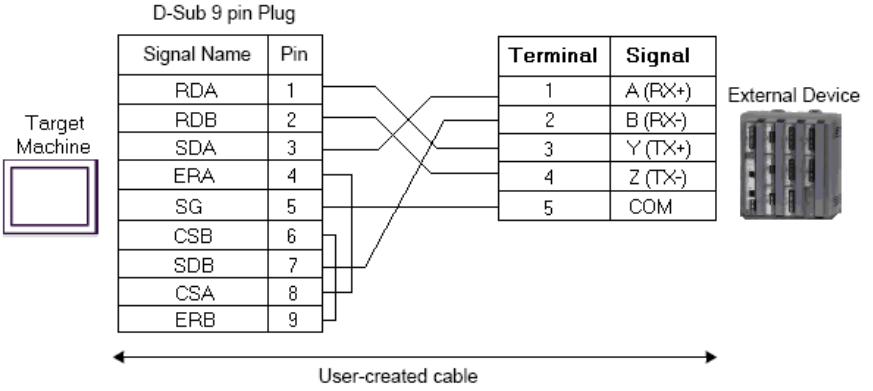
Cable Diagram 5

RS-422, 2-Wire / RS485 (DB9) Cable Connection



Cable Diagram 6

RS-422, 4-Wire (DB9) Cable Connection



Supported Devices

Overview

The entire range of Type, Logical, Parameter (TLP) settings are supported for all Emerson Process Management models/series listed in this manual.

In the following example for the TLP address `[PLC1]92,0,3:UINT8`, the address components are described in the table below.

TLP Component		Description
92	=	Point Type value for 92 Logon Parameters (LOGON)
0	=	Logical (location) value for 1
3	=	Parameter value for keypad Security Level - Write Enabled
UINT8	=	Data type

You can find details on each TLP in the ROC user manuals and the ROC Plus Protocol Reference from Emerson Process Management.

Custom TLPs are also supported for point types and parameters outside the standard set.

Device Address Configuration

Overview

⚠WARNING

UNINTENDED EQUIPMENT OPERATION

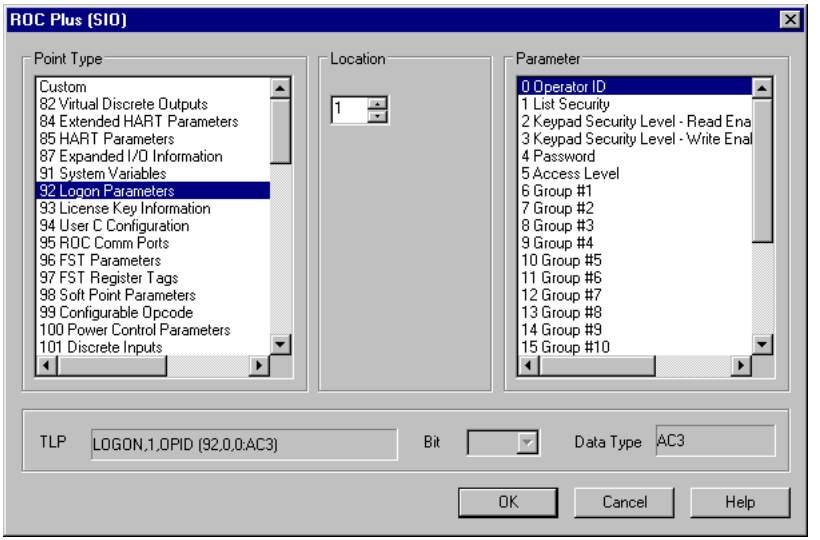
Read and understand the instructions in this section to ensure data is properly transferred. If you do not follow these instructions, incorrect data could be written to the PLC and the target machine.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

To set up a PLC variable, use Input Address Settings or Custom Input Address Settings.

Input Address Settings

To enter the device address, in the [Variable Properties] dialog box, select the ROC driver in the ScanGroup property. Then click the ellipsis beside the Device Address text box to open the following address settings dialog box.

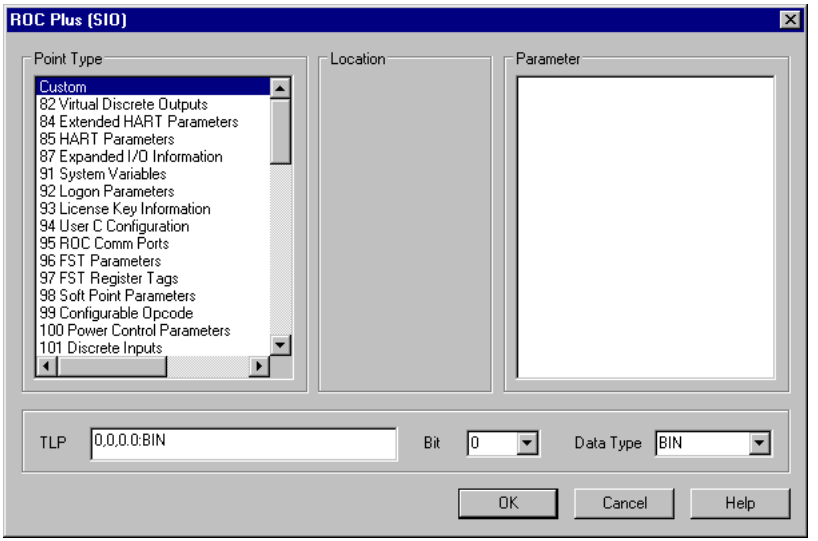


Screen Description

Area		Description
Point Type		A list that contains the point types available from the ROC database. Select a point type from the list.
Location		A point type location. Enter an integer from 0 to 255.
	Slot	The slot number for the physical point type. This property displays only if you selected a physical slot type. Enter an integer from 0 to 255.
	Channel	The channel number for the physical point type. This property displays only if you selected a physical slot type. Enter an integer from 0 to 255.
Parameter		Select a parameter for the point type. Parameters vary depending on the point type selected.
TLP		The TLP address string that corresponds to the selections above.The TLP property is read only.
Bit		This property is available if you selected BOOL for the variable type and only for certain point types. Select a value from the drop-down list box.
Data Type		This property indicates the data type of the parameter selected above and is read only.

Custom Input Address Settings

You can also set up custom TLP addresses by entering the numeric TLP data in the Device Address property in the [Variable Properties] dialog box. Or you can click the ellipsis beside the Device Address text box to open the following address settings dialog box and then selecting the Custom point type.



Screen Description

Area	Description
Point Type	A list that contains the point types available from the ROC database. Select Custom from the list.
Location	When Custom point type is selected, no Location properties display.
Parameter	When Custom point type is selected, no parameters are displayed.
TLP	The TLP address string that corresponds to the selections above. Enter the TLP in numeric format.
Bit	This property is available if you selected BOOL for the variable type and only for certain point types. Select a value from the drop-down list box.
Data Type	This property indicates the data type of the parameter. Select the data type from the drop-down list box.

Valid Formats for Custom Input Address Settings

In the TLP property, enter the TLP. The valid formats are:

- `[PLC1]TT,LL,PP:DATATYPE`
- `[PLC1]TT,LL,PP.BIT:DATATYPE`

The addresses represent the following components:

TLP Component		Description
[PLC1]	=	External device
TT	=	Point Type (range 0 to 255)
LL	=	Logical (range 0 to 255)
PP	=	Parameter (range 0 to 255)
BIT		Bit range 0-7, 0-15, or 0-31. Available only for the following data types: BIN, INT8, INT16, INT32, UINT8, UINT16, UINT32.
DATATYPE	=	Data type

Note:

- If you entered a custom TLP that matches a TLP in the Emerson database, the TLP will revert to the address and data type in the database.

The following table lists valid Data Type strings you can enter in the Device Address property.

Name	Description
AC1	ASCII 1 character
AC3	ASCII 3 characters
AC7	ASCII 7 characters
AC10	ASCII 10 characters
AC12	ASCII 12 characters
AC20	ASCII 20 characters
AC30	ASCII 30 characters
AC40	ASCII 40 characters
BIN	Binary 8 bit, or bit address 0-7*
FL	Floating Point
INT8	8 bit signed integer, or bit address 0-7*
INT16	16 bit signed integer, or bit address 0-15*
INT 32	32 bit signed integer, or bit address 0-31*

Name	Description
TIME	32 bit signed integer
TLP	24 bit integer in 32 bits
UINT8	8 bit unsigned integer, or bit address 0-7*
UINT16	16 bit unsigned integer, or bit address 0-15*
UINT32	32 bit unsigned integer, or bit address 0-31*

* Read-modify-write. When you write to one of these bit addresses, the target machine reads the entire word address, sets the defined bit, then returns the new value to the PLC. If the ladder program writes data to this word address during the bit read/write process, the resulting data may be incorrect.

I/O Manager Configuration

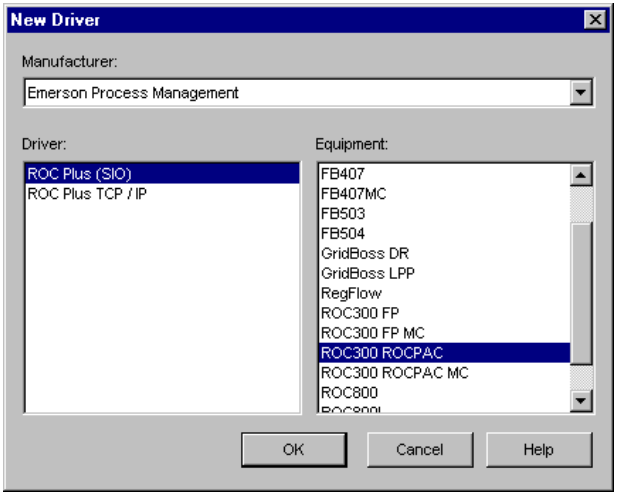
Overview

The driver and equipment, which enable communication between the target machine and the PLC, depends on the PLC type.

Note:

- For information on how to display the [New Driver] dialog box, see the Vijeo Designer Online Help.

Screen Example of I/O Manager Configuration



Driver Configuration

Overview

⚠WARNING

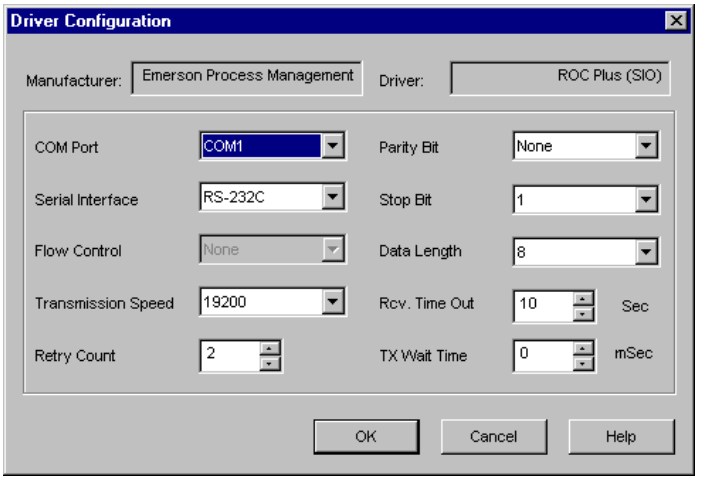
UNINTENDED EQUIPMENT OPERATION

Read and understand the instructions in this section to ensure data is properly transferred. If you do not follow these instructions, incorrect data could be written to the PLC and the target machine.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

To configure the communication settings of the serial driver in the target machine, use the [Driver Configuration] dialog box. Make sure the settings match those of the driver.

Screen Example of Driver Configuration



Screen Description

Area	Description
Manufacturer	Displays the name of the driver's manufacturer.
Driver	Displays the type of serial connection used to connect the target machine to the driver.
COM Port	Defines which COM port to use on the target machine to connect to the driver.
Serial Interface	Defines the serial connection. For details about the supported connections, see *Cable Diagrams*.
Flow Control	Defines the signals that control the data flow.
Transmission Speed	Sets the communication speed in bits per second. This setting must match the driver's baud rate.
Retry Count	Defines the number of times the driver tries to send or receive data when an error has been detected.
Parity Bit	Detects communication errors, which can be None, Even, or Odd.
Stop Bit	Defines the stop bit, which can be 1 or 2 bits.
Data Length	Defines the length of each unit of data, which can be 7 or 8 bits.
Rcv. Time Out	Defines the length of time (in seconds) the target machine waits for a response before it outputs a timeout error or sends another communication.
TX Wait Time	Defines the number of milliseconds that the target machine waits, after receiving a communication packet, before sending a response.

Equipment Configuration

Overview

⚠WARNING

UNINTENDED EQUIPMENT OPERATION

Read and understand the instructions in this section to ensure data is properly transferred. If you do not follow these instructions, incorrect data could be written to the driver and the target machine.

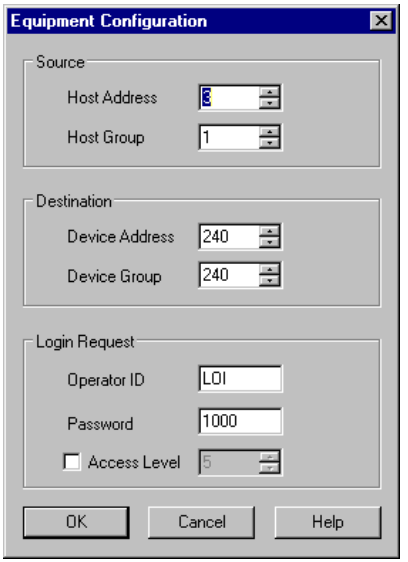
Failure to follow these instructions can result in death, serious injury, or equipment damage.

To set up details about the communication process between the target machine and the driver, use the [Equipment Configuration] dialog box.

Note:

- For information on how to display the [Equipment Configuration] dialog box, see the Vijeo Designer Online Help.

Screen Example of I/O Manager Configuration



Screen Description

Area	Description
Host Address	The communication address of the target machine. Enter a value from 1 to 255.
Host Group	The communication group of the target machine. Enter a value from 0 to 255.
Device Address	The communication address for the specific ROC. Enter a value from 1 to 255
Device Group	The communication group for the specific ROC. Enter a value from 0 to 255.
Operator ID*	The login ID defined for the ROC. Enter a maximum of 3 characters with no spaces.
Password*	The password defined for the ROC. Enter a value from 0-9999.
Access Level*	Select the check box to define the security access level for the operator. Select the access level, from 0 to 5, in the corresponding text box.

* Login Request settings (Operator ID, Password, and Access Level) must match the settings on the ROC. If the settings do not match, an error will display.