



Beckhoff

BC9000

Overview

Maple Systems' **Silver Series Plus** Operator Interface Terminals (Maple OITs) communicate with the Beckhoff BC9000 using the Modbus TCP/IP protocol. The Silver Series Plus uses **MODBUS TCP/IP** protocol driver, to allow the Maple OIT to act as a master in a **multiple master, multiple slave format**.

The MODBUS TCP/IP protocol driver in EZware also has the following features:

- Ability to communicate over Ethernet for 100m
- Ability to communicate over Ethernet at 10/100 Mbps
- Ability to read/write to individual bits in 3x and 4x memory

Communications Cable

The Maple OIT should be connected to the BC9000's Modbus TCP/IP Ethernet port.

A crossover 10baseT Ethernet cable should be used between the OIT and the Beckhoff BC9000. A list of cables offered by Maple Systems as well as cable assembly instructions to assist you in assembling your own Ethernet cable are available on our website.

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

Controller Settings

The Ethernet port on the Controller must be set to Modbus TCP/IP Slave mode in order to properly communicate with the OIT.

Accessible Memory

Register Memory

The user must set up “PLC Variables” in the Beckhoff PLC program, which are accessible from the fieldbus and PLC program. See Beckhoff Application Note: APP-NOTE 500057 “Connecting a BC9000 to an Operator Interface using Modbus TCP” for more information on setting up PLC Variables and referencing them from the fieldbus and PLC program.

The following table lists the controller’s register memory ranges that the Maple OITs are able to access. The following register memory can be displayed in 16, 32, or 64 bit format on the Maple OIT.

Controller Register Type	Controller Register Description
30001 - 39999	Input Registers, Read Only (%QB128=30001)
42049 - 49999	Holding / Output Registers (%IB128=42049)

Note: The 5x memory designator under **Device Type** is used for 32-bit representation. This memory area ‘swaps’ the most significant word and least significant word.

Discrete Memory

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

Controller Bit Type	Controller Bit Description
00001-065535	Discrete Coils / Outputs
10001-165535	Discrete Inputs
3x_Bit (see note)	Bits within Input Registers, Read Only
4x_Bit (see note)	Bits within Holding/Output Registers

NOTE: The 3x_Bit and 4x_Bit memory area is used to read/write to individual bits in the 3x and 4x memory area. To use this feature, select the 3x_Bit or 4x_Bit as **Device Type** for bit-type objects such as Bit Lamps. Under **Device Address**, use the format nnnbb to enter the word memory area followed by the two digit bit reference. For example, to target the 3rd bit of 42049, enter “204902” into the Device Address, (nnnn=2049, bb=02).

EZware Settings

The following table lists the communications settings that must be configured in EZware. These settings can be found in the Edit-Set System Parameters menu under the Device tab. Please note:

- the **Recommended Settings** column provides the recommended setting based upon default settings most commonly use in the Beckhoff.
- the **Options** column lists EZware's options; your controller may not support every option

Name	Recommended Settings	Options	Important Notes
Name:	Modbus TCP/IP		Description label
HMI or PLC	PLC		
Location	Local	Local, Remote	Select local if PLC directly connected to OIT, remote if PLC connected thru another OIT
PLC type:	Modbus TCP/IP		
PLC I/F:	Ethernet	RS232, RS485 default, RS485 4W, RS485 2W, Ethernet	Using Modbus TCP/IP requires the use of the Ethernet port.
PLC default station no.:	1	0-255	Must match the default station no. assigned to the PLC.
Settings: IP address:	User defined		Must match the IP address assigned to the PLC
Settings: Port no.:	User defined		Must match the Port No assigned to the PLC
Settings: COM:	COM1	COM1-COM3	Serial port of OIT connected to PLC
Settings: Baud rate	n/a	9600,19200, 38400,57600, 115200	Does not apply to this protocol.
Settings: Data bits	n/a	7 or 8	Does not apply to this protocol.
Settings: Stop bits:	n/a	1 or 2	Does not apply to this protocol.
Settings: Parity:	n/a	Even, Odd, None	Does not apply to this protocol.
Settings: Timeout (sec)	1	0.1-25.5	Adjust if longer timeout is required
Settings: Turn around delay (ms)	0	0-1000	Timeout period between OIT polls
Settings: Reserved 1:	0		Not Applicable

Name	Recommended Settings	Options	Important Notes
Settings: Reserved 2:	0		Not Applicable
Settings: Reserved 3:	0		Not Applicable
Settings: Reserved 4:	0		Not Applicable
Interval of block pack (words):	5	0-512	<i>See Silver Series Plus Installation and Operations Manual</i>
Max. read-command size (words):	120		Not Adjustable
Max. write command size (words):	120		Not Adjustable