

Tejas V Master Protocol

Connector Configuration Parameters

Max ABE/COS Points

This value sets the maximum count of RBX points that may be read in with an ABE/COS Dump poll.

RTS ON DelayX10ms

Enter a number from 0 to 255 (0 to 2.55 seconds) to delay sending a message after turning on Request To Send (RTS). Commonly used with modem communication to allow additional time for the modems to synchronize.

RTS OFF DelayX10ms

Enter a number from 0 to 255 (0 to 2.55 seconds) to keep RTS on after a message has been sent. Commonly used to keep a radio on for a short period of time at the end of a message.

Handshake Option

If Full Handshake is selected the Omnii-Comm will assert RTS and wait for CTS before sending a message. RTS will be turned off after the message has been sent. If Constant Carrier is selected the Omnii-Comm will assert RTS when it sends its first message and leave it asserted. It will wait for CTS before sending. If Ignore CTS is selected, RTS will be asserted before sending a message and removed at the end of the message. The CTS input will be ignored. If No Handshake is selected, RTS will be asserted when the Omnii-Comm sends its first message. RTS will not be turned off at the end of the message. The CTS input will be ignored. If Activity Monitor is selected, the Omnii-Comm will check the DCD input before sending a message. If DCD is ON, the Omnii-Comm will delay sending the message.

Retry Count

The number of communication attempts that will be sent before declaring the RTU offline and the data bad.

Option Bit Parameters

Use Radio Key

If checked, Bit 0 in a register specified by the "Radio Key Address" on the Header configuration screen will be turned ON before a message is sent and turned OFF after the message has been completed.

Use Time-Tagged COS

The Omnii-Comm can automatically insert COS and ABE dump messages to an RTU if a ABE Count Request poll returns non-zero counts. This feature is Enabled/Disabled by the Use ABE/COS count option. The COS Queue Dump can be either a standard request (FC 10) or a request for a Time Tagged COS Queue Dump (FC 30). If this option is checked, a Time Tagged COS Queue Dump will be use to read COS data.

Use ABE/COS Counts

While it is expected that the user will most often want to use the Report by Exception features of the Tejas protocol, there are three ways that the analog and status information may be gathered from the RTU. 1. The ABE/COS counts may be totally ignored. All data can be read with scan commands using standard poll tables. 2. Automatically insert COS and ABE Dump messages when an ABE Count Request poll returns non zero counts. 3. Automatically run Analog and Status Scan polls when an ABE Count Request poll returns non zero counts. Check this box if the Omnii-Comm will automatically send COS and ABE dump messages when a ABE Count Request Poll (FC 14) returns non-zero counts (method 2 above). Clear this box if you do not want the Omnii-Comm to insert the messages. Data returned by the dump messages will be stored at the Data Type and Starting Offset fields specified in the ABE Count Requet Poll. The first word stored will be the number of entries in the dump message. The user must process the change dumps to update his database.

ABE/COS Sends Polls

An alternative method for collecting Analog and Digital data from a Tejas RTU is to simply issue Analog and Status Scan polls to read all the points in the RTU when the counts returned in an ABE Count Request poll are non zero (method 3 above). This method has the advantage that the Master does not have to process the Dump messages. Check this option if you want the Omnii-Comm to queue Analog and Status Scan messages if the counts returned in an ABE Count Request poll are non zero.

CRC/LRC Select

Check this box to Select CRC for error checking. Clear the box for BCC error checking.

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Protocol Extension Table Parameters

The Protocol extension table is used to define additional parameters required for Tejas Master operation. Click on the box to enable the Protocol Extension Table. Click on the button to bring up the specific options as detailed below.

The Tejas Master operation was significantly enhanced in Rev48.11. This revision was completed in December, 2012. The enhancements were specifically implemented for Eugene Water & Electric Board (EWEB) Eugene, OR. to allow controls to be sent to a Tejas RTU using a Modbus Master or any other protocol that the Omnii-Comm supports.

A block of "Trigger Registers" have been defined as the first 53 registers in Data Type 6. When a "Trigger Register" is changed to a value of 1, special code in the Omnii-Comm Change Detect program will set up the Command Data as required and set the appropriate CMD Bit to send a Command to the Tejas Slave. If the Command is successful, the value of the Trigger register will be changed from 1 to 256.

EWEB operation is enabled by defining a non-zero Tejas RTU address on Page 2 of the Protocol Extension Table for the Tejas Master connector.

Trigger Registers

Data Type 6	Modbus	Function
00-31	2001-2032	Control Output Select/Execute Points 00-31
32-47	2033-2048	Analog Output Select/Execute Points 00-15
48-52	2049-2053	Closed Loop Control Commands for Loops 1-5

Closed Loop Control Data

Twenty five additional registers in Data Type 6 are allocated to store parameters needed for sending Closed Loop Control commands to the Tejas RTU. Five registers are used per Control Loop.

Data Type 6	Modbus	Function
53	2054	High Limit (Eng. Value X10)
54	2055	Low Limit (Eng. Value X10)
55	2056	Analog Point (Input that will be used for Control)
56	2057	Control Relay (Output of Loop)
57	2058	Scale Factor (Used to Convert Eng. Units to Raw Count for Closed Loop Control Messages. Value is X10,000)
58-62	2059-2063	Values for Loop 2
63-67	2064-2068	Values for Loop 3
68-72	2069-2073	Values for Loop 4
73-77	2074-2078	Values for Loop 5

CMD Bits, Type and Offset

The first two entries specify the Data Type and Starting Offset that will be used for Command Trigger bits. The Omnii-Comm requires two words of Command Trigger bits. The low byte of each word is used to initiate a command when it transitions from OFF to ON. The upper byte of each word is used for command complete status information. There are 16 commands:

Word	Bit	Function
0	0	Analog Scan
0	1	Accumulator Scan
0	2	Status Scan
0	3	Control Select and Execute
0	4	Accumulator Freeze
0	5	Accumulator Reset
0	6	Accumulator Freeze and Reset
0	7	Status Clear
1	0	Configuration Request
1	1	Deadband Download
1	2	Analog Out Select and Execute
1	3	Analog Out Direct
1	4	Setpoint Scan
1	5	SOE Time Sync
1	6	Pulse Output, no reply
1	7	Pulse Output (Closed Loop Control Sequence Start for EWEB)

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CMD Data Data Type and Offset

The next two words are used to specify the Data Type and Starting Offset that will be used for Command Data. Command Data used to build the Command messages. It must be properly set up before the Command Trigger bit is set. This protocol requires 24 words of Command Data.

Word	Function
0	RTU Address
1	First Scan Point
2	Number to Scan (must be a multiple of 16)
3	Control Select/Execute Point
4	Control Select Timeout
5	Control Execute Time
6	First Accumulator to Scan
7	Number of Accumulators to Scan
8	Status Bits to Clear
9	Deadband Point Number
10	Deadband Value
11	Analog Output Point Number
12	Analog Output Value
13	Pulse Output Group
14	Pulse Output Time 1
15	Pulse Output FNC
16	Pulse Output Time 2
17	SOE Time Sync Value
18	Loop Number
19	High Limit
20	Low Limit
21	Analog Point
22	Control Point
23	Scale Factor

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Return Data Type and Offset

These fields are used to specify the Data Type and Starting Offset that will be used to store returned data from a Status Clear and a Configuration Request. The first 4 bytes will be filled from left to right with bytes 5, 6, 7 and 8 from a RTU Status Clear response. The next 4 bytes will be filled from left to right with # Analogs, # Status, # Accumulators, \$00 returned by a Configuration Request Command.

Analog Scan Command Type and Offset

These fields are used to specify the Data Type and Starting offset that will be used to store data returned from a Analog Scan Command.

Accumulator Scan Command Type and Offset

These fields are used to specify the Data Type and Starting offset that will be used to store data returned from a Accumulator Scan Command

Status Scan Command Type and Offset

These fields are used to specify the Data Type and Starting offset that will be used to store data returned from a Status Scan Command

Setpoint Scan Command Type and Offset

These fields are used to specify the Data Type and Starting offset that will be used to store data returned from a Setpoint Scan Command

Protocol Extension Table Page 2

A second page of Protocol Extension Table parameters was added when changes were made in Rev 48.11 for EWEB. This page has three entries:

EWEB Tejas RTU Address. Enter the RTU address of the Tejas RTU that will be connected to the Omnii-Comm. Any non zero address can be entered. EWEB options are enabled if this field is not zero.

EWEB Momentary Operate Time Enter the desired Control Operate time for all Control Outputs. The value will be the count entered times 50 msec.

EWEB Closed Loop Control (CLC) Sampling Rate The value entered in this field is normally used for all Closed Loop Control Data Type 4 messages. The Sampling Rate is forced to zero to disable a loop if the Analog Point defined for the loop is greater than 255.

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Poll Table Read Parameters

RTU Address

The Address of the RTU that will respond to this Read Request. Valid addresses are 0 to 255.

Function

The type of Read function to be performed. Valid selections are: Analog Scan, Accumulator Scan, Status Scan, ABE Count Request and Setpoint Scan. If ABE Count Request Read is performed and COS Count and/or ABE Count are non zero COS Queue Dump and ABE Change Dump reads are automatically sent (see below). If an Accumulator Scan is sent, a Freeze Accumulator command is sent first.

Start Scan Item

The starting point number for Analog, Accumulator, Status or Setpoint Reads.

of Bytes

The total number of bytes expected to be returned for Status, Analog, Accumulator or Setpoint Scans.

Poll # for Status

Optionally enter a Poll Number that will be queued if the COS field in an ABE Count Request poll is non zero. This poll should be configured to read all Status points. A COS Dump message will be automatically sent to clear the count. This poll tables should be placed immediately following the ABE Count Request poll.

Poll # for Analog

Optionally enter a Poll Number that will be queued if the ABE Count field in an ABE Count Request poll is non zero. This poll should be configured to read all Analog points. An ABE Dump message will be sent automatically to clear the count. This poll tables should be placed immediately following the ABE Count Request poll.

COS Dump Data Type

Enter the Data Type that will be used to receive the data from a COS Dump command. This command will be automatically sent if the COS count field in an ABE Count Request message is non zero. The first word in the returned data will be the point count.

COS Dump 1st Reg

The starting register in the data type for the COS data.

ABE Dump Data Type

Enter the Data Type that will be used to receive the data from a ABE Dump command. This command will be automatically sent if the ABE count field in an ABE Count Request message is non zero. The first word in the returned data will be the point count.

ABE Dump 1st Reg

The starting register in the data type for the ABE data.

Poll Table Write and Error Parameters

INVALID SELECTION. Can not Write to TEJAS port from the poll table. Use Commands to Write to the TEJAS Slave. Writes will automatically sent if a database point linked to TEJAS is changed.

Note: System Error Protocol Definitions are the same as Poll Table Write and Error Parameters

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Database Extension Table Parameters

Index	Name	Size:Max Length
0	Type 00	2:256
1	Type 01	2:256
2	Type 02	2:256
3	Type 03	2:256
4	Type 04	2:256
5	Type 05	2:256
6	Type 06	2:256
7	Type 07	2:32
8	Type 08	2:32
9	Type 09	2:32
10	Type 10	2:64
11	Type 11	2:32
12	Type 12	2:32
13	Type 13	2:32
14	Type 14	2:32
15	Type 15	2:32
16	Type 16	2:32
17	Type 17	2:32
18	Type 18	2:32
19	Type 19	2:32
20	Type 20	2:256
21	Type 21	2:256