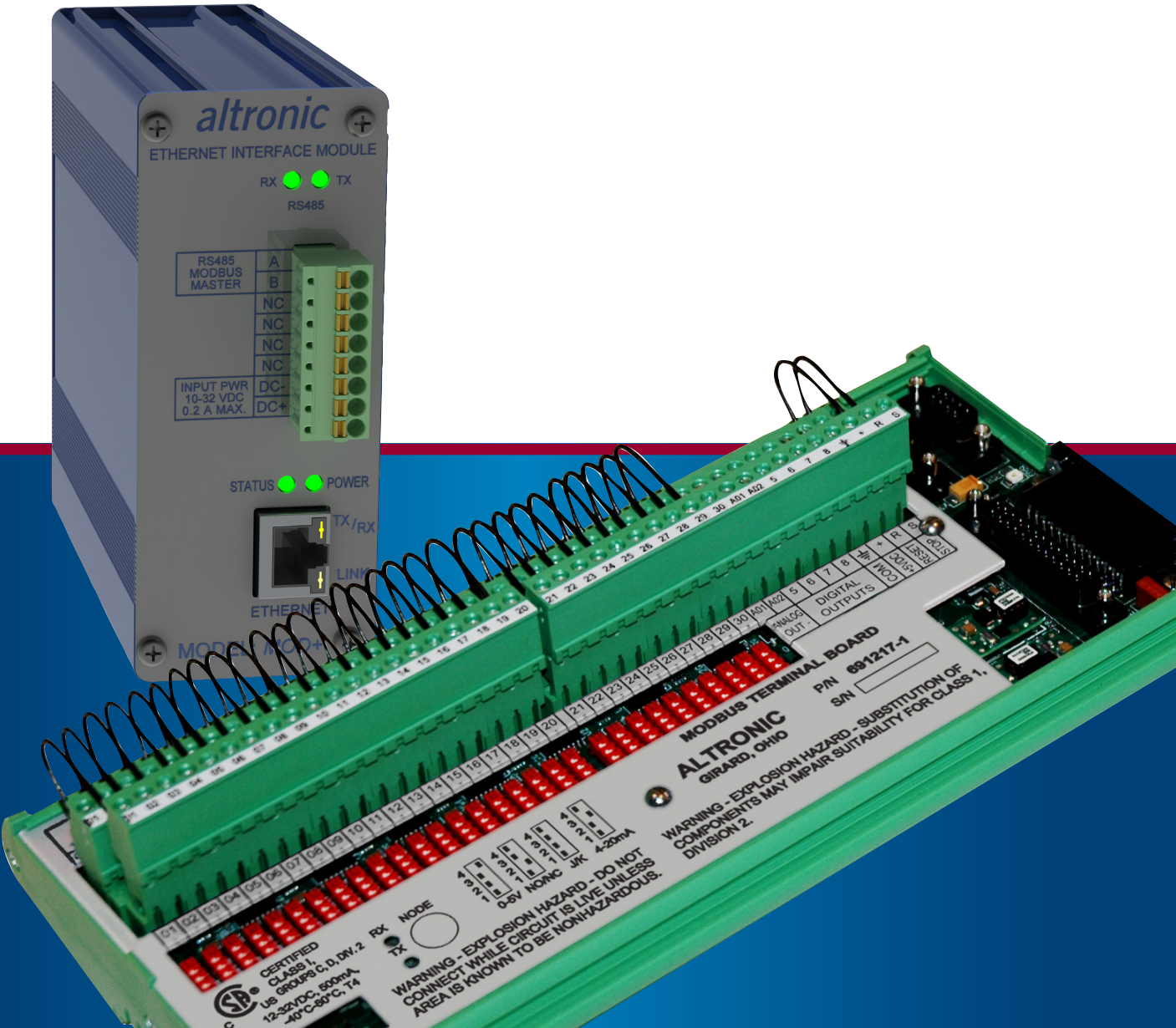


MOD+ Supplement: Modbus Terminal Board (MTB)

MOD+/MTB

Form MOD+ SUP_MTB 8-13



1.0 Overview

- 1.1 MOD+/MTB Combination
The MOD+/MTB product combination allows the MTB board data to easily interface to popular PLCs, SCADA systems and computers over Ethernet. The MOD+/MTB has two user-selectable communication protocols available, EtherNet/IP and Modbus/TCP.
- 1.2 The MOD+/MTB combination allows integrators to read multi-channel analog and digital data using the MTB Board and communicate that data to Allen Bradley ControlLogix and CompactLogix, and other PLC's via the MOD+ Module.
- 1.3 This document gives an overview of the MOD+ and the MTB. It also lists the Ethernet/IP Object Model Data for the MOD+/MTB combination. For detailed Installation, Operation, and application information for each product, please refer to the following documents:

Ethernet Interface Module – MOD+ IOM, Installation & Operating Manual
Modbus Terminal Board – MTB IOI, Installation & Operating Instructions

These, and other manuals, can be found on our website, www.altronic-llc.com.

2.0 Description

- 2.0 Ethernet Interface Module (MOD+)
The Altronic MOD+ Ethernet Interface Module is a protocol converter designed to convert Modbus RTU register data from the connected product into either Ethernet/IP or Modbus/ TCP formats. The MOD+ has one RS485 Modbus Master port to allow it to be connected to one Modbus RTU slave device. It has an integral standard RJ45 Ethernet communications port used to output Ethernet/IP or Modbus TCP. Ethernet/IP is meant to talk to Allen Bradley ControlLogix and CompactLogix PLC's. Modbus/TCP is meant to communicate to PLC's and PC's.
- 2.1 Modbus Terminal Board (MTB)
The Modbus Terminal Board is an RS-485, MODBUS RTU slave board capable of reading 33 channels. The first 30 channels can be any combination of digital inputs (N/O or N/C), thermocouples (J or K), pressure inputs, 4-20mA inputs, or read any sensor within the range of 0-5VDC. Channels 31 and 32 can only be used for digital inputs (N/O or N/C). There is also a pickup input. Additionally, there are 8 digital outputs which are capable of sinking 60V at 500mA. Each can drive a relay, horn or other related device. There are also two 4-20mA outputs. All of the outputs are directly controlled by Modbus commands. The RS-485 slave communications configuration is 38.4k baud, 8, N, 1.
- 2.2 Personality Profile
In Ethernet/IP mode the MOD+ uses a personality profile configuration file to convert the data into the Ethernet/IP protocol. The personality profile consists of two files that get loaded into the MOD+ via the Ethernet port, a cip.lib file and an EDS file. The connected product data is then available via I/O data assemblies in the producer/consumer connection over Ethernet/IP. When the configuration files are loaded into the MOD+ it is then married to that specific product. Only one configuration file can be loaded into the MOD+ at a time. The configuration Object Model data for the MOD+/MTB combination is listed below.

3.0 EtherNet/IP Object Models

- 3.1 The data for EtherNet/IP is arranged as a collection of objects. Objects divide the functionality of a device into logically related subsets. This collection of related data values and common elements of the device make up its object model.
- 3.2 The following Objects are used in the MOD+/MTB.

OBJECT (ID)	TYPE
Identity (01h)	Required
Message Router (02h)	Required
Assembly (04h)	Device-specific
Connection Manager (06h)*	Required
TCP Object (F5h)*	Required
Ethernet Link Object (F6h)*	Required
QoS (48h)*	Pre-defined

* See form MOD+ IOM for description.

3.3 Identity Object (01h – 1 instance)

The identity object provides identification of, and general information about, the MOD+/MTB.

ATTR ID	NAME	DATA TYPE	DATA VALUE	Access RULE
Class Attributes				
1	Revision	UINT	1	GET
Instance Attributes				
1	Vendor Number	UINT	1250 _{DEC}	GET
2	Device Type, Generic	UINT	2b _{HEX}	GET
3	Product Code Number	UINT	283D _{HEX}	GET
4	Product Major Revision Product Minor Revision	USINT USINT	02 30	GET
5	Status Word (see definition below)	WORD	See Below	GET
6	Product Serial Number (unit mac address)	UDINT	Unique 32 Bit Val	GET
7	Product Name Structure of: Product Name Size Product Name String	USINT USINT[0-32]	3 "MTB"	GET
Status Word				
Bit	Bit = 0	Bit = 1		
0	No I/O Connection	I/O Connection Allocated		
1-15	Unused	Unused		

CHART CONTINUES...

Common Services

SVC CODE	IMPLEMENTED FOR		SERVICE NAME
	CLASS LEVEL	INSTANCE LEVEL	
0E _{HEX}	Yes	Yes	Get_Attribute_Single
05 _{HEX}	No	Yes	Reset

Reset Service Code

SVC CODE	CLASS	INSTANCE	ATTRIBUTE	DESCRIPTION
05h	01h	01h	00h ³	Force software reset.
05h	01h	01h	01h ³	Reload factory settings and reset.

3.4 **Message Router Object (02h)**

The message router object provides a messaging connection point through which a client may address a service to any object class or instance residing in the MOD+/MTB. The MOD+/MTB has no supported attributes.

3.5 **Assembly Object (04h)**

The Assembly Object binds attributes of multiple objects, which allows data to or from each object to be sent or received over a single connection. Assembly objects can be used to bind input data or output data. The terms "input" and "output" are defined from the network's point of view. An input will produce data on the network and an output will consume data from the network.

ATTR ID	NAME	DATA TYPE	DATA VALUE	ACCESS RULE
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Class Attributes

1	Revision	UINT	1	GET
2	Max Instance	UINT	255	GET

Instance 64H Attributes (Input Instance 1)

3	Input Data (T->O)	INT[14]	See below	GET
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Instance 65H Attributes (Output Instance 1)

3	Output Data (O->T)	INT[52]	See below	SET
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Configuration Assembly

	Output Data (CONFIG)	SINT[70]	See below	SET
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Instance FDH Attributes (Output Only Instance)

This instance allows clients to produce output data without monitoring the input data.

Instance FEH Attributes (Input only Instance)

This instance allows clients to control the input without providing output data.

Instance FFH Attributes (Heartbeat Instance – Listen Only)

This instance allows clients to monitor input data without providing output data.

Common Services

SVC CODE	IMPLEMENTED FOR		SERVICE NAME
	CLASS LEVEL	INSTANCE LEVEL	
0E _{HEX}	Yes	Yes	Get_Attribute_Single
05 _{HEX}	No	Yes	Reset

3.6 Input Assembly Data “Target to Originator” (T->O)

INDEX	NAME	EQUIV MODBUS REGISTER
0	Digital Out Echo	40769
1	Analog Out 1 Echo	40769
2	Analog Out 2 Echo	40769
3	Status Register	***
4	Channel 1	30101
5		30102
6	Channel 2	30103
7		30104
8	Channel 3	30105
9		30106
10	Channel 4	30107
11		30108
12	Channel 5	30109
13		30110
14	Channel 6	30111
15		30112
16	Channel 7	30113
17		30114
18	Channel 8	30115
19		30116
20	Channel 9	30117
21		30118
22	Channel 10	30119
23		30120
24	Channel 11	30121
25		30122
26	Channel 12	30123
27		30124
28	Channel 13	30125
29		30126
30	Channel 14	30127
31		30128
32	Channel 15	30129
33		30130
34	Channel 16	30131
35		30132
36	Channel 17	30133
37		30134
38	Channel 18	30135
39		30136

CHART CONTINUES...

INDEX	NAME	EQUIV MODBUS REGISTER
40	Channel 19	30137
41		30138
42	Channel 20	30139
43		30140
44	Channel 21	30141
45		30142
46	Channel 22	30143
47		30144
48	Channel 23	30145
49		30146
50	Channel 24	30147
51		30148
52	Channel 25	30149
53		30150
54	Channel 26	30151
55		30152
56	Channel 27	30153
57		30154
58	Channel 28	30155
59		30156
60	Channel 29	30157
61		30158
62	Channel 30	30159
63		30160
64	Speed	30161
65		30162
66	Ambient Temperature (°K*10)	30063
67	Digital In 1	30064
68	Digital In 2	30065

Note: Channels are REAL and occupy 2 INTS. These can be directly copied.

3.7 Output Assembly Data “Originator to Target” (O->T)

INDEX	NAME	MIN	MAX	DEFAULT	EQUIV MODBUS REGISTER
0	Analog Out 1	0	4095	0	40770
1	Analog Out 2	0	4095	0	40771
2	Delta M Channel 1	-32767	32767	0	40331
3	Delta B Channel 1	-32767	32767	0	40332
4	Delta M Channel 2	-32767	32767	0	40333
5	Delta B Channel 2	-32767	32767	0	40334
6	Delta M Channel 3	-32767	32767	0	40335
7	Delta B Channel 3	-32767	32767	0	40336

INDEX	NAME	MIN	MAX	DEFAULT	EQUIV MODBUS REGISTER
8	Delta M Channel 4	-32767	32767	0	40337
9	Delta B Channel 4	-32767	32767	0	40338
10	Delta M Channel 5	-32767	32767	0	40339
11	Delta B Channel 5	-32767	32767	0	40340
12	Delta M Channel 6	-32767	32767	0	40341
13	Delta B Channel 6	-32767	32767	0	40342
14	Delta M Channel 7	-32767	32767	0	40343
15	Delta B Channel 7	-32767	32767	0	40344
16	Delta M Channel 8	-32767	32767	0	40345
17	Delta B Channel 8	-32767	32767	0	40346
18	Delta M Channel 9	-32767	32767	0	40347
19	Delta B Channel 9	-32767	32767	0	40348
20	Delta M Channel 10	-32767	32767	0	40349
21	Delta B Channel 10	-32767	32767	0	40350
22	Delta M Channel 11	-32767	32767	0	40351
23	Delta B Channel 11	-32767	32767	0	40352
24	Delta M Channel 12	-32767	32767	0	40353
25	Delta B Channel 12	-32767	32767	0	40354
26	Delta M Channel 13	-32767	32767	0	40355
27	Delta B Channel 13	-32767	32767	0	40356
28	Delta M Channel 14	-32767	32767	0	40357
29	Delta B Channel 14	-32767	32767	0	40358
30	Delta M Channel 15	-32767	32767	0	40359
31	Delta B Channel 15	-32767	32767	0	40360
32	Delta M Channel 16	-32767	32767	0	40361
33	Delta B Channel 16	-32767	32767	0	40362
34	Delta M Channel 17	-32767	32767	0	40363
35	Delta B Channel 17	-32767	32767	0	40364
36	Delta M Channel 18	-32767	32767	0	40365
37	Delta B Channel 18	-32767	32767	0	40366
38	Delta M Channel 19	-32767	32767	0	40367
39	Delta B Channel 19	-32767	32767	0	40368
40	Delta M Channel 20	-32767	32767	0	40369
41	Delta B Channel 20	-32767	32767	0	40370
42	Delta M Channel 21	-32767	32767	0	40371
43	Delta B Channel 21	-32767	32767	0	40372
44	Delta M Channel 22	-32767	32767	0	40373
45	Delta B Channel 22	-32767	32767	0	40374
46	Delta M Channel 23	-32767	32767	0	40375
47	Delta B Channel 23	-32767	32767	0	40376
48	Delta M Channel 24	-32767	32767	0	40377

CHART CONTINUES...

INDEX	NAME	MIN	MAX	DEFAULT	EQUIV MODBUS REGISTER
49	Delta B Channel 24	-32767	32767	0	40378
50	Delta M Channel 25	-32767	32767	0	40379
51	Delta B Channel 25	-32767	32767	0	40380
52	Delta M Channel 26	-32767	32767	0	40381
53	Delta B Channel 26	-32767	32767	0	40382
54	Delta M Channel 27	-32767	32767	0	40383
55	Delta B Channel 27	-32767	32767	0	40384
56	Delta M Channel 28	-32767	32767	0	40385
57	Delta B Channel 28	-32767	32767	0	40386
58	Delta M Channel 29	-32767	32767	0	40387
59	Delta B Channel 29	-32767	32767	0	40388
60	Delta M Channel 30	-32767	32767	0	40389
61	Delta B Channel 30	-32767	32767	0	40390
62	Status Control	-32767	32767	0	***
63.0	Digital Out 1	0	1	0	40769
63.1	Digital Out 2	0	1	0	40769
63.2	Digital Out 3	0	1	0	40769
63.3	Digital Out 4	0	1	0	40769
63.4	Digital Out 5	0	1	0	40769
63.5	Digital Out 6	0	1	0	40769
63.6	Digital Out 7	0	1	0	40769
63.7	Digital Out 8	0	1	0	40769
63.8	Reserved	0	1	0	40769
63.9	Reserved	0	1	0	40769
63.10	Reserved	0	1	0	40769
63.11	Reserved	0	1	0	40769
63.12	Reserved	0	1	0	40769
63.14	Reserved	0	1	0	40769
63.15	Reserved	0	1	0	40769
63.16	Fault Mode Enabled	0	1	0	40769

3.8 Configuration Assembly

INDEX	NAME	MIN	MAX	DEFAULT	EQUIV MODBUS REGISTER
0	Reserved	-32767	32767	0	***
1					
2	Pulses per Revolution / 2	0	32767	0	40209
3					
4	Channel Mode 1	0	16	0	40301
5					
6	Channel Mode 2	0	16	0	40302
7					
8	Channel Mode 3	0	16	0	40303
9					
10	Channel Mode 4	0	16	0	40304
11					
12	Channel Mode 5	0	16	0	40305
13					
14	Channel Mode 6	0	16	0	40306
15					
16	Channel Mode 7	0	16	0	40307
17					
18	Channel Mode 8	0	16	0	40308
19					
20	Channel Mode 9	0	16	0	40309
21					
22	Channel Mode 10	0	16	0	40310
23					
24	Channel Mode 11	0	16	0	40311
25					
26	Channel Mode 12	0	16	0	40312
27					
28	Channel Mode 13	0	16	0	40313
29					
30	Channel Mode 14	0	16	0	40314
31					
32	Channel Mode 15	0	16	0	40315
33					
34	Channel Mode 16	0	16	0	40316
35					
36	Channel Mode 17	0	16	0	40317
37					
38	Channel Mode 18	0	16	0	40318
39					
40	Channel Mode 19	0	16	0	40319
41					
42	Channel Mode 20	0	16	0	40320
43					
44	Channel Mode 21	0	16	0	40321
45					

CHART CONTINUES...

INDEX	NAME	MIN	MAX	DEFAULT	EQUIV MODBUS REGISTER
46	Channel Mode 22	0	16	0	40322
47					
48	Channel Mode 23	0	16	0	40323
49					
50	Channel Mode 24	0	16	0	40324
51					
52	Channel Mode 25	0	16	0	40325
53					
54	Channel Mode 26	0	16	0	40326
55					
56	Channel Mode 27	0	16	0	40327
57					
58	Channel Mode 28	0	16	0	40328
59					
60	Channel Mode 29	0	16	0	40329
61					
62	Channel Mode 30	0	16	0	40330
63					
64	Fault Mode Analog Out 1	0	4095	0	40067
65					
66	Fault Mode Analog Out 2	0	4095	0	40068
67					
68.0	Fault Mode Digital Out 1	0	1	0	40066
68.1	Fault Mode Digital Out 2	0	1	0	40066
68.2	Fault Mode Digital Out 3	0	1	0	40066
68.3	Fault Mode Digital Out 4	0	1	0	40066
68.4	Fault Mode Digital Out 5	0	1	0	40066
68.5	Fault Mode Digital Out 6	0	1	0	40066
68.6	Fault Mode Digital Out 7	0	1	0	40066
68.7	Fault Mode Digital Out 8	0	1	0	40066
69.0	Reserved	0	1	0	40066
69.1	Reserved	0	1	0	40066
69.2	Reserved	0	1	0	40066
69.3	Reserved	0	1	0	40066
69.4	Reserved	0	1	0	40066
69.5	Reserved	0	1	0	40066
69.6	Reserved	0	1	0	40066
69.7	Fault Mode on Comm Failure	0	1	0	40066

Note: Actual values are INT unless otherwise specified and can be copied to a corresponding UDT.