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## **PRELIMINARY INFORMATION**

**STAND ALONE OPERATION OF THE  
AT1616L RS485/RS232 SERIAL REMOTE I/O BOARD  
(Software Version 02.0B, April 28, 2001)**

### **INTRODUCTION**

The AT1616L Remote I/O Board has 16 OPTO-ISOLATED inputs and 16-Relay (Form C) outputs. The unit can be controlled by our simple/efficient command structure from a host computer (computer mode), such as a PC. Also, two units can be operated in a standalone mode (master/slave mode) to form a "Relay extension cord," with 16-channels of control in each direction, at distances of up to 4000 ft. or more. The unit can communicate using RS485 or RS232, at data rates up to 115.2K bits/second.

The AT1616L has an onboard switching regulator for 12VDC operation, LED indicators for all inputs and outputs, 18 jumpers for communications address, Baud rate, mode control, etc. Wago connectors are provided for ease of wire installation/removal. The RS485 serial port has built in transient protection and jumper selectable termination. LED indicators monitor the data flow of the serial port.

## Jumper Configuration Tables

Notes and abbreviations:

**I** = Install jumper (JX), **R** = Remove Jumper (JX), **XX** = don't care,  
**M/S** = Master or Slave Mode, **M** = Master Mode, **S** = Slave Mode,  
**TX** = Transmit, **RX** = Receive, **\*** = Factory Default Setting, **HW** = Hardware Setup.

**Table 1: RS232/RS485 Configuration**

JX	MODE	JUMPER FUNCTION AND NOTES
J1	<b>HW</b>	Serial Port DSR Function (RS-232)
J2	<b>HW</b>	RS-485 Pin 1 Common
J3	<b>HW</b>	RS-485 Pin 6 Common
J4	<b>HW</b>	RS-485 Termination (120 OHMS)
J5	<b>HW</b>	Processor Reset Select, Do Not Change!
J6	<b>HW</b>	<b>A</b> - Green Led RXEN, <b>B*</b> - Green Led RX Data Input
J7	<b>NA</b>	RESERVED
J8	<b>NA</b>	RESERVED

**Table 2: Master/Slave Jumper Setup**

JX	MODE	J9	J10	J11	TX retry time-out value
J9	M	I	I	I	1.0S retransmit delay
J10		I	I	R	0.5S retransmit delay
J11		I	R	I	100mS retransmit delay
		I*	R*	R*	10mS retransmit delay
		R	I	I	8mS retransmit delay
		R	I	R	4mS retransmit delay
		R	R	I	2mS retransmit delay
		R	R	R	1mS retransmit delay
J12	M/S	<b>J12</b>	<b>J13</b>	<b>J14</b>	<b>DATA INTEGRITY CONTROL</b>
J13		I	I	I	Data same for last 8 RX to change
J14		I	I	R	Data same for last 7 RX to change
		I	R	I	Data same for last 6 RX to change
		I	R	R	Data same for last 5 RX to change
		R	I	I	Data same for last 4 RX to change
		R	I	R	Data same for last 3 RX to change
		R*	R*	I*	Data same for last 2 RX to change
		R	R	R	Data updates outputs immediately
J15	XX	RESERVED			
J16	M/S	Master/Slave Selection, I* = MASTER, R = SLAVE			
J17	M/S	I* = EIGHT BIT DATA BETWEEN MASTER AND SLAVE, 3 BYTES FOR BOTH SIDES TO UPDATE R = NINE BIT DATA, 2 BYTES FOR BOTH SIDES TO UPDATE. <b>NOTE! (FUTURE ENHANCEMENT) 8BIT MODE ONLY</b>			
J18	M/S	J19	J18	DELAY	Programmable Relay dropout if communication loss. Disabled, 1, 2 or 5 seconds.
J19		R	R	No dropout	
		R	I	1 Sec.	
		I	R	2 Sec.	

		I*	I*	5 Sec.	
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**Table 3: RS-232 BAUD RATE SETUP**

Baud Rate Selection in any MODE (J20 - J23)					
Note: Sampled on power-up only!					
HEX	J20	J21	J22	J23	Baud
F	I*	I*	I*	I*	9600
E	I	I	I	R	115.2K
D	I	I	R	I	9600
C	I	I	R	R	57.6K
B	I	R	I	I	38.4K
A	I	R	I	R	28.8K
9	I	R	R	I	19.2K
8	I	R	R	R	14.4K
7	R	I	I	I	9600
6	R	I	I	R	4800
5	R	I	R	I	2400
4	R	I	R	R	1200
3	R	R	I	I	600
2	R	R	I	R	300
1	R	R	R	I	9600
0	R	R	R	R	9600

**Table 4: Jumpers J24-J30, Hardware Setup**

JX	MODE	JUMPER FUNCTION AND NOTES
J24	XX	Reserved
J25	HW	*I - Left Side V- Connected to Board Ground R - Left Side V- Isolated Supplied External
J26	HW	A - Left Side Supply V+ Connected to Board +12 *B - Left Side Supply V+ Connected to Board +5 R - Left Side Supply V+ Isolated Supplied External
J27	HW	*A - Right Side Supply +12, If J30-A B - Right Side Supply +5, If J30-A R - Right Side Supply External See J30
J28	HW	Reserved
J29	HW	A - Right Side V- Isolated Supplied External *B - Right Side V- Connected to Board Ground R - Right Side V- Isolated Supplied External
J30	HW	A - Right Side V+ Connected J27-A +12 or J27-B +5 *B - Right Side V+ Connected +5 R - Right Side V+ Isolated Supplied External

**Table 5: TABLE OF SPECIFICATIONS FOR COMMON COMMUNICATIONS STANDARDS:**

SPECIFICATIONS		RS232	RS423	RS422	RS485
Mode of Operation		SINGLE-ENDED	SINGLE-ENDED	DIFFERENTIAL	DIFFERENTIAL
Total Number of Drivers and Receivers on One Line		1 DRIVER 1 RECVR	1 DRIVER 10 RECVR	1 DRIVER 10 RECVR	1 DRIVER 32 RECVR
Maximum Cable Length		50 FT.	4000 FT.	4000 FT.	4000 FT.
Maximum Data Rate		20kb/s	100kb/s	10Mb/s	10Mb/s
Maximum Driver Output Voltage		+/-25V	+/-6V	-0.25V to +6V	-7V to +12V
Driver Output Signal Level (Loaded Min.), (Unloaded Max.)	Loaded	+/-5V to +/-15V	+/-3.6V	+/-2.0V	+/-1.5V
	Unloaded	+/-25V	+/-6V	+/-6V	+/-6V
Driver Load Impedance (Ohms)		3k to 7k	>=450	100	54
Max. Driver Output Current in High Impedance State	Power On	N/A	N/A	N/A	+/-100uA
	Power Off	+/-6mA @ +/-2v	+/-100uA	+/-100uA	+/-100uA
Slew Rate (Max.)		30V/uS	Adjustable	N/A	N/A
Receiver Input Voltage Range		+/-15V	+/-12V	-10V to +10V	-7V to +12V
Receiver Input Sensitivity		+/-3V	+/-200mV	+/-200mV	+/-200mV
Receiver Input Resistance (Ohms)		3k to 7k	4k min.	4k min.	>=12k