

Installation and Operation Manual

AT-1616L *Universal Serial I/O Controller*

Manual update 9/09/05

Due to the dynamic nature of product design, the information contained in this document is subject to change without notice. Broadcast Tools, Inc., assumes no responsibility for errors and/or omissions contained in this document. Revisions of this information or new editions may be issued to incorporate such changes.

*Broadcast Tools® is a registered trademark of Broadcast Tools, Inc.
Copyright, 1989 - 2005 by Broadcast Tools, Inc. All rights reserved.
No part of this document may be reproduced or distributed without permission.*

Visit www.broadcasttools.com for important product update information.

INTRODUCTION

Thank you for your purchase of a Broadcast Tools, Inc., AT-1616L Universal Serial I/O Controller. We're confident that this product will give you many years of dependable service. This manual is intended to give you all the information needed to install and operate the unit.

SAFETY INFORMATION

Only qualified personnel should install Broadcast Tools® products. Incorrect or inappropriate use and/or installation could result in a hazardous condition.

Broadcast Tools, Inc., is unable to support NON-Broadcast Tools software, hardware or NON-Broadcast Tools computer/hardware/software problems. If you experience these problems, please research your hardware/software instruction manuals or contact the manufacturers technical support department.

WHO TO CONTACT FOR HELP

If you have any questions regarding your product or you need assistance, please contact your distributor from whom you purchased this equipment.

If you would like more information about Broadcast Tools® products, you may reach us at:

Broadcast Tools, Inc.

131 State Street
Sedro-Woolley, WA 98284-1540 USA
Voice: 360 . 854 . 9559
Fax: 360 . 854 . 9479

Internet Home Page: www.broadcasttools.com
E-mail: support@broadcasttools.com

**THANK YOU FOR CHOOSING
BROADCAST TOOLS® BRAND PRODUCTS!**

Broadcast Tools is a Veteran Owned Business



Designed, Assembled and Supported in WA State, USA



CAUTION!

Broadcast Tools® Products, as with any electronic device, can fail without warning. Do not use this product in applications where a life threatening condition could result due to failure.

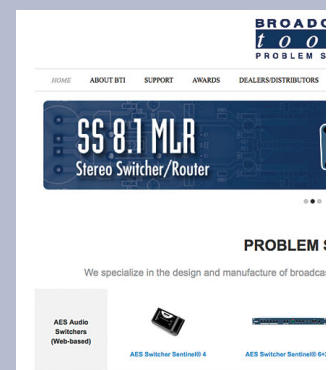


NOTE:

This manual should be read thoroughly before installation and operation.

WEBSITE:

Visit our web site for product updates and additional information



Description

The AT-1616L is designed for general I/O control applications. The AT-1616L is equipped with 16 form C relays with LED indicators. The AT-1616L provides 16 - 5 to 24 volt opto-isolated inputs with LED status and may be configured for wet or dry applications. The AT-1616L is equipped with both a RS-232 and RS-485 serial port at baud rate from 600 to 115k and allowing up to 32 - AT-1616L's to be controlled over a single twisted pair cable 4000 feet from the host computer in the RS-485 mode. The default serial protocol is: RS-232, 9600, 8N1

Input and output connections are via clamp style wire captive terminal. The AT-1616L is equipped with a switching type regulator, providing a wide range of power supply voltages.

The AT-1616L is supplied with this manual, 7-foot, six conductor modular cable, RJ-14 modular to DB-9 female adapter and a 12vac, 500-ma wall transformer.

Two AT-1616Ls may be rack mounted with the optional RM-3 rack mount shelf (1 RU's).

Refer to the layout sheets provided at the end of this manual, for configuration Information.

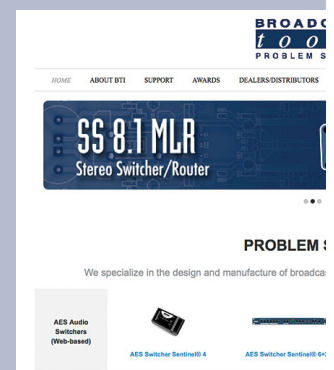


NOTE:

Removing JP-19 sets the AT-1616L into the NEW (Non-Polling serial) AT-1616L command format (Wire Ready users only).

WEBSITE:

Visit our web site for product updates and additional information



Input and Output Pin-outs

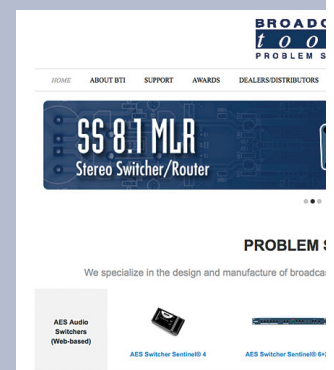
1 - Input 1 +	33 - Relay 1 N.O.
2 - Input 1 -	34 - Relay 1 Com
3 - Input 2 +	35 - Relay 1 N.C.
4 - Input 2 -	36 - Relay 2 N.O.
5 - Input 3 +	37 - Relay 2 Com
6 - Input 3 -	38 - Relay 2 N.C.
7 - Input 4 +	39 - Relay 3 N.O.
8 - Input 4 -	40 - Relay 3 Com
9 - Input 5 -	41 - Relay 3 N.C.
10 - Input 5 +	42 - Relay 4 N.O.
11 - Input 6 -	43 - Relay 4 Com
12 - Input 6 +	44 - Relay 4 N.C.
13 - Input 7 -	45 - Relay 5 N.O.
14 - Input 7 +	46 - Relay 5 Com
15 - Input 8 -	47 - Relay 5 N.C.
16 - Input 8 +	48 - Relay 6 N.O.
	49 - Relay 6 Com
	50 - Relay 6 N.C.
	51 - Relay 7 N.O.
	52 - Relay 7 Com
	53 - Relay 7 N.C.
17 - Input 9 +	54 - Relay 8 N.O.
18 - Input 9 -	55 - Relay 8 Com
19 - Input 10 +	56 - Relay 8 N.C.
20 - Input 10 -	57 - Relay 9 N.O.
21 - Input 11 +	58 - Relay 9 Com
22 - Input 11 -	59 - Relay 9 N.C.
23 - Input 12 +	60 - Relay 10 N.O.
24 - Input 12 -	61 - Relay 10 Com
25 - Input 13 -	62 - Relay 10 N.C.
26 - Input 13 +	63 - Relay 11 N.O.
27 - Input 14 -	64 - Relay 11 Com
28 - Input 14 +	65 - Relay 11 N.C.
29 - Input 15 -	66 - Relay 12 N.O.
30 - Input 15 +	67 - Relay 12 Com
31 - Input 16 -	68 - Relay 12 N.C.
32 - Input 16 +	69 - Relay 13 N.O.
	70 - Relay 13 Com
	71 - Relay 13 N.C.
	72 - Relay 14 N.O.
	73 - Relay 14 Com
	74 - Relay 14 N.C.
	75 - Relay 15 N.O.
	76 - Relay 15 Com
	77 - Relay 15 N.C.
	78 - Relay 16 N.O.
	79 - Relay 16 Com
	80 - Relay 16 N.C.

DB-9 Connection:

- 2 - Send data to Computer.
- 3 - Rec data from Computer.
- 5 - Ground.

WEBSITE:

Visit our web site for product updates and additional information



SECTION TITLE

LIMITED WARRANTY

The term “Buyer” as used in this document refers to and includes both (but only) (a) any person or entity who acquires such an item for the purpose of resale to others (i.e., a dealer or distributor of an item), and (b) the first person or entity who acquires such an item for such person’s or entity’s own use.

Broadcast Tools warrants to each Buyer of any item manufactured by Broadcast Tools that the item will be free from defects in materials and workmanship at the time it is shipped by Broadcast Tools if the item is properly installed, used and maintained.

EXCLUSIVE REMEDIES

If Broadcast Tools is notified, in writing, of a failure of any item manufactured by Broadcast Tools to conform to the foregoing Limited Warranty within one (1) year following the date of the Buyer’s acquisition of the item, and if the item is returned in to Broadcast Tools in accordance with Broadcast Tools’ instructions for confirmation by inspection of the defect (which at Broadcast Tools’ election may include, without limitation, a requirement that the Buyer first obtain a Return Authorization number from Broadcast Tools, that the Buyer furnish proof of purchase in the form of an invoice and/or receipt, and that the Buyer prepay all freight charges associated with any return of the item to Broadcast Tools using such freight service as Broadcast Tools reasonably may specify), Broadcast Tools will repair or replace the defective item, or will refund the purchase price paid by the Buyer for the item. Broadcast Tools shall have the exclusive right to choose between these alternative remedies.

NO OTHER WARRANTIES OR REMEDIES

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, BROADCAST TOOLS AND ITS SUPPLIERS DISCLAIM ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE; AND THE FOREGOING ALTERNATIVE REMEDIES SHALL BE EXCLUSIVE OF ALL OTHER REMEDIES. THIS LIMITED WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS. YOU MAY HAVE OTHER RIGHTS, WHICH VARY FROM STATE/JURISDICTION TO STATE/JURISDICTION.

NO LIABILITY FOR CONSEQUENTIAL DAMAGES

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, NEITHER BROADCAST TOOLS NOR ANY OF ITS SUPPLIERS SHALL HAVE ANY LIABILITY FOR ANY SPECIAL, INCIDENTAL, INDIRECT, CONSEQUENTIAL OR PUNITIVE DAMAGES WHATSOEVER (INCLUDING, WITHOUT LIMITATION, ANY DAMAGES FOR LOST PROFITS, BUSINESS INTERRUPTION, LOSS OF DATA OR INFORMATION, COST OF CAPITAL, CLAIMS OF CUSTOMERS, OR ANY OTHER PECUNIARY LOSS) ARISING OUT OF THE USE OF OR THE INABILITY TO USE ANY ITEM SUPPLIED BY BROADCAST TOOLS), EVEN IF BROADCAST TOOLS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES HAVE ANY LIABILITY FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL, EXEMPLARY OR PUNITIVE DAMAGES. THIS LIMITATION OF LIABILITY APPLIES WHETHER A CLAIM IS ONE ALLEGING BREACH OF A CONTRACT OR WARRANTY, NEGLIGENCE OR OTHER TORT, FOR THE VIOLATION OF ANY STATUTORY DUTY, THE FAILURE OF ANY LIMITED OR EXCLUSIVE REMEDY TO ACHIEVE ITS ESSENTIAL PURPOSE, OR ANY OTHER CLAIM OF ANY NATURE. BECAUSE SOME STATES AND JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, THIS LIMITATION MAY NOT APPLY TO YOU.

Broadcast Tools, Inc.

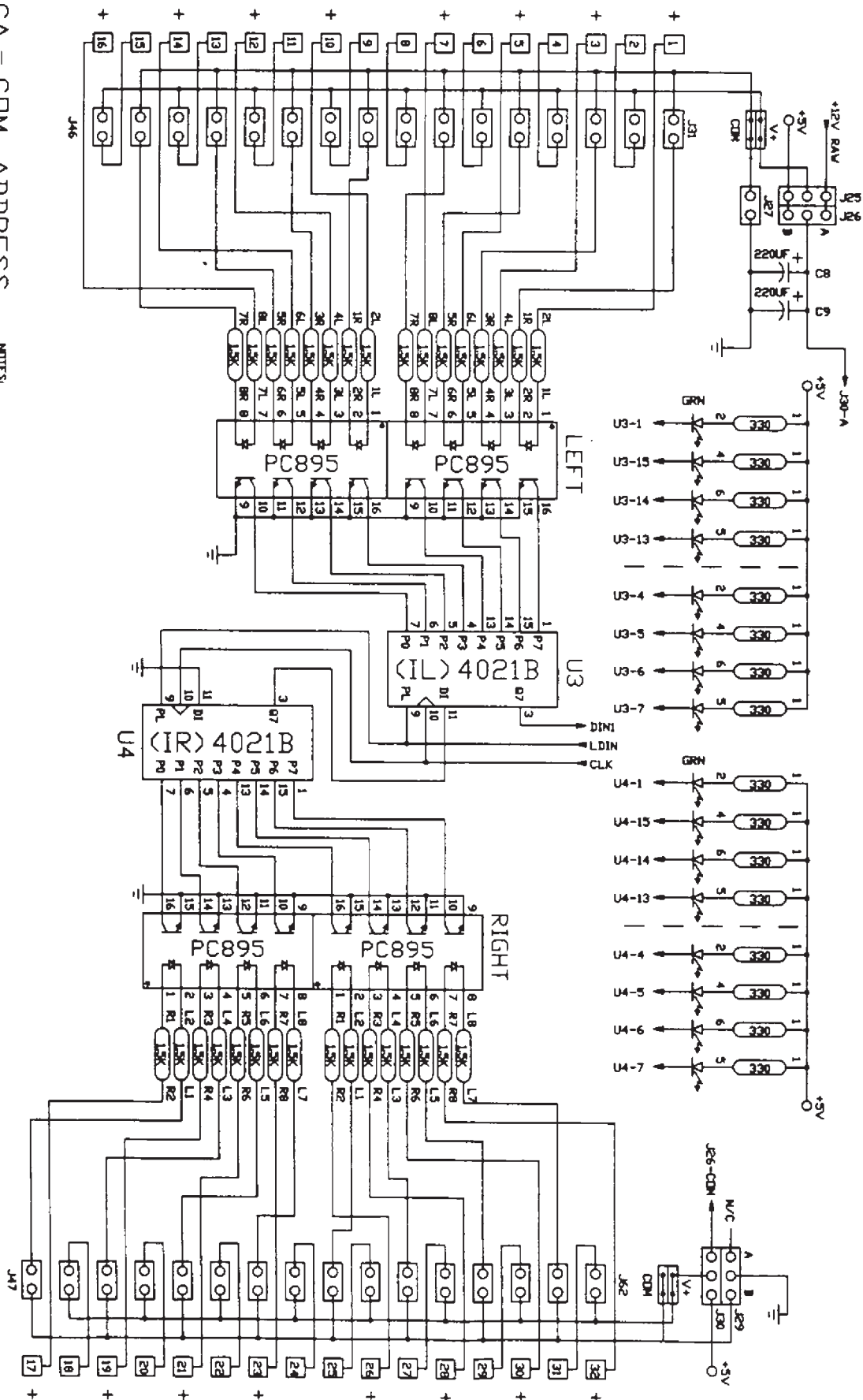
131 State Street
Sedro-Woolley, WA 98284 • USA

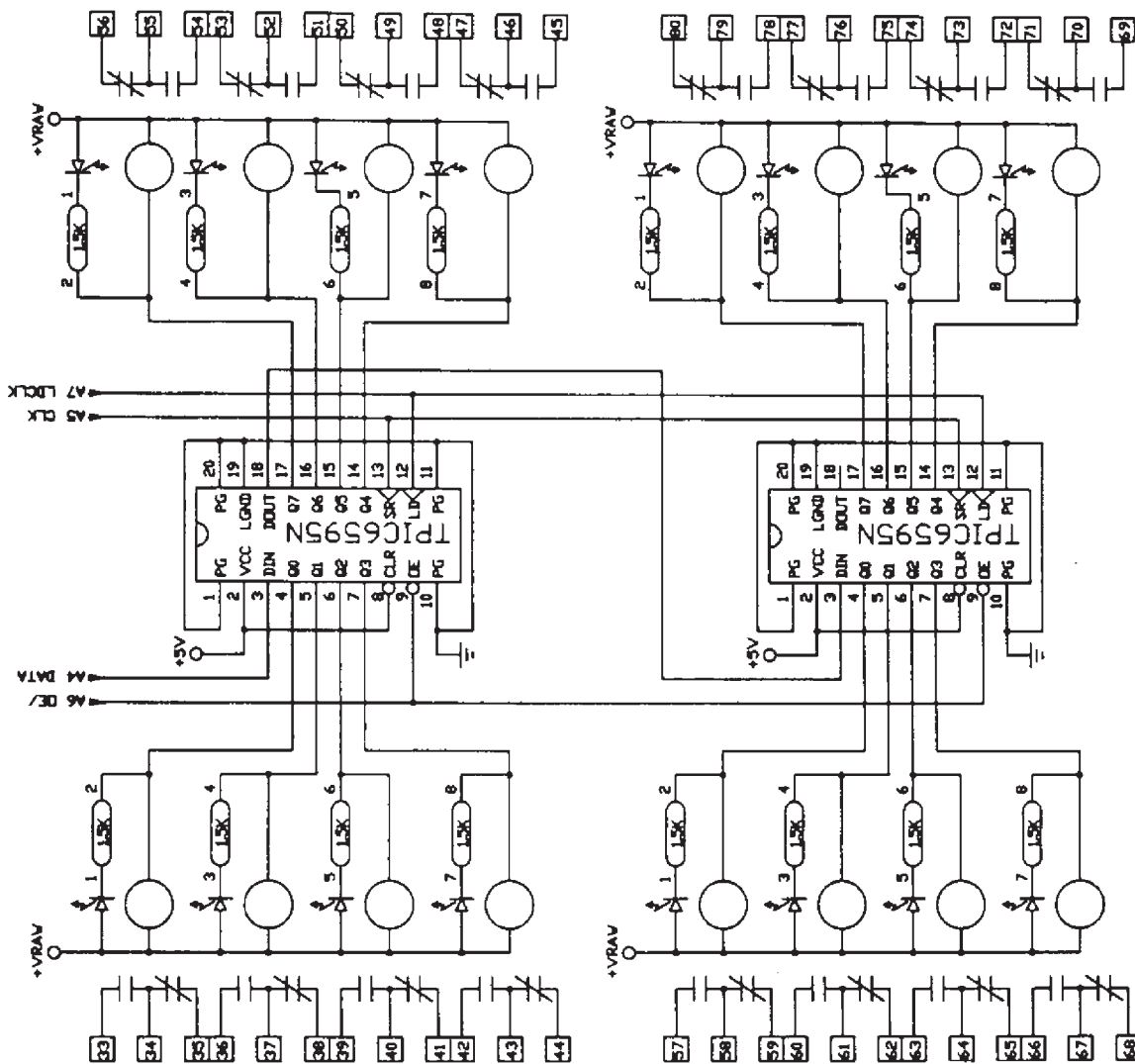
360.854.9559 **voice** • 866.783.1742 **fax**
support@broadcasttools.com **e-mail**
www.broadcasttools.com **website**

AT-1616L Installation and Operation Manual

CA = COM. ADDRESS
 ID = CONFIGURATION
 DL = OUTPUT LEFT
 DR = OUTPUT RIGHT
 IL = INPUT LEFT
 IR = INPUT RIGHT

- NOTES:
- 1) MIN ISOLATED INPUT CURRENT = 1.2MA
 - 2) MIN CURRENT TRANSFER RATIO = 20%
 - 3) MAX POWER @ RESISTORS = 0.25W
 - 4) R = 6800 X 2, 18-40V, 12-4.5MA
 - 5) R = 5100 X 2, 12-51V, 12-5.0MA
 - 6) R = 4700 X 2, 12-48V, 12-5.1MA
 - 7) R = 3300 X 2, 9-40V, 12-6.1MA
 - 8) R = 2200 X 2, 7-32V, 12-7.2MA(Std)
 - 9) R = 1500 X 2, 5-27V, 12-9.2MA
 - 10) R = 1000 X 2, 3.9-22V, 12-11.0MA

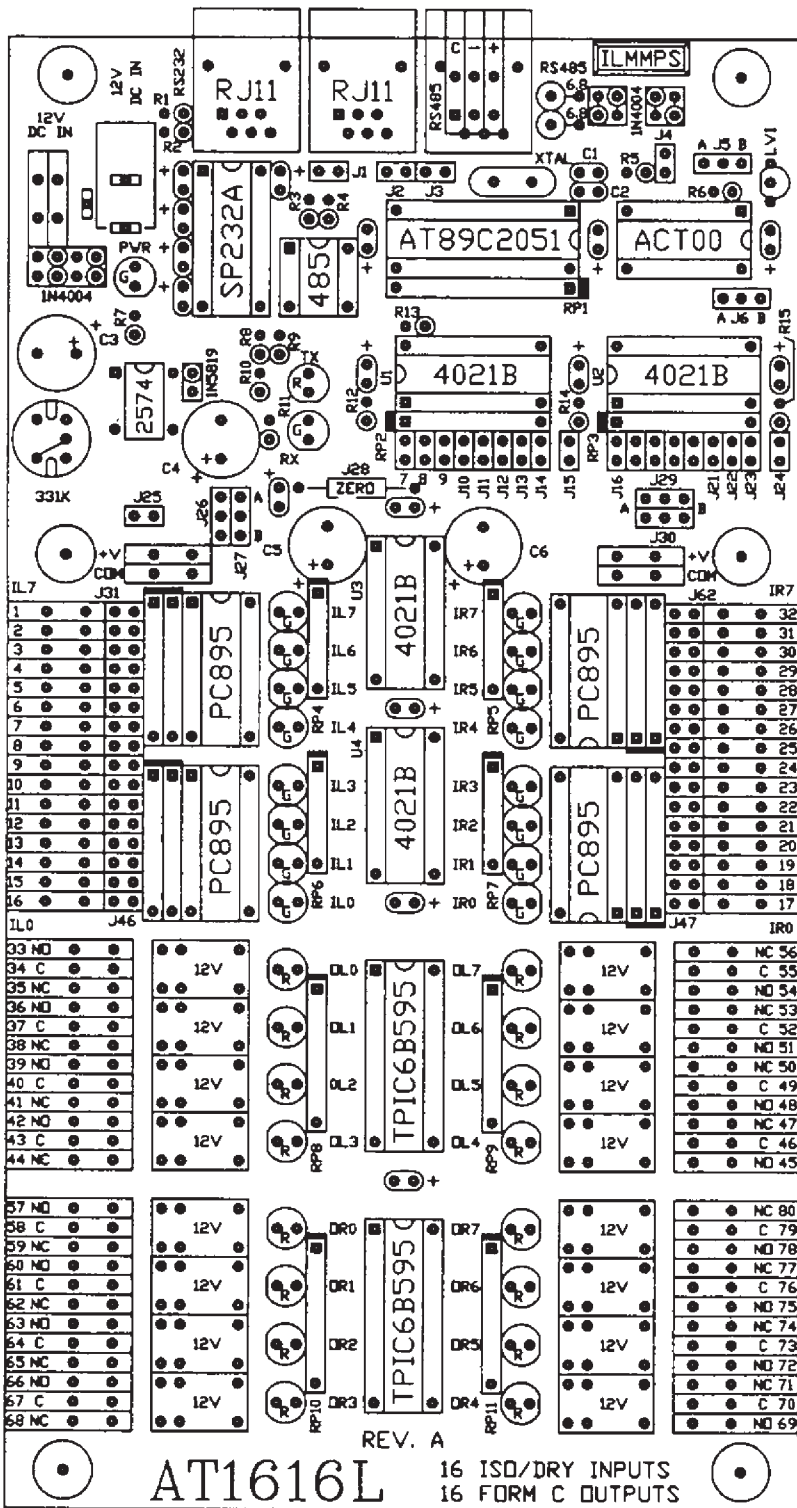




- NOTES:
- 1) MIN ISOLATED INPUT CURRENT = 12MA
 - 2) MIN CURRENT TRANSFER RATIO = 200
 - 3) MAX POWER (2 RESISTORS) = 0.25V
 - 4) R = 6800 X 2, 18-50V, 12-4.5MA
 - 5) R = 5100 X 2, 13-51V, 12-5.0MA
 - 6) R = 4700 X 2, 12-48V, 12-5.1MA
 - 7) R = 3300 X 2, 9-40V, 12-6.1MA
 - 8) R = 2200 X 2, 7-32V, 12-7.3MA(KSTLD)
 - 9) R = 1500 X 2, 5-27V, 12-9.0MA
 - 10) R = 1200 X 2, 4.5-26V, 12-10.2MA
 - 11) R = 1000 X 2, 3.8-22V, 12-11.0MA

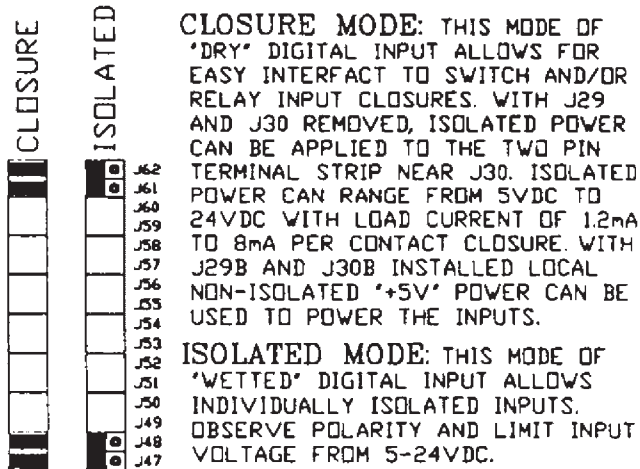
CA = COM. ADDRESS
 ID = CONFIGURATION
 OL = OUTPUT LEFT
 OR = OUTPUT RIGHT
 IL = INPUT LEFT
 IR = INPUT RIGHT

ACTUAL SIZE (1:1)



- J29 T.S. COMMON ISOLATED
A B
- J29 DIGITAL COMMON TO T.S.
- J30 'RAW' 9-35VDC TO T.S.
A B (IF J26A IS INSTALLED)
- J30 +5VDC TO T.S.

■ INDICATES JUMPER IS INSTALLED.



CLOSURE MODE: THIS MODE OF 'DRY' DIGITAL INPUT ALLOWS FOR EASY INTERFAC TO SWITCH AND/OR RELAY INPUT CLOSURES. WITH J29 AND J30 REMOVED, ISOLATED POWER CAN BE APPLIED TO THE TWO PIN TERMINAL STRIP NEAR J30. ISOLATED POWER CAN RANGE FROM 5VDC TO 24VDC WITH LOAD CURRENT OF 1.2mA TO 8mA PER CONTACT CLOSURE. WITH J29B AND J30B INSTALLED LOCAL NON-ISOLATED '+5V' POWER CAN BE USED TO POWER THE INPUTS.

ISOLATED MODE: THIS MODE OF 'WETTED' DIGITAL INPUT ALLOWS INDIVIDUALLY ISOLATED INPUTS. OBSERVE POLARITY AND LIMIT INPUT VOLTAGE FROM 5-24VDC.

WARNING! A VERTICAL JUMPER IN THIS LOCATION WILL CAUSE A POWER SUPPLY SHORT. ONLY USE VALID SETTINGS SHOWN ABOVE.