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PROBLEM SOLVED

Installation and Operation Manual



GPI-16 Plus

Sixteen Input General Purpose Interface with USB/RS-232

Firmware version: 1.01 or greater

Manual Revised 09/02/2014

If you need a firmware upgrade, contact Broadcast Tools[®]

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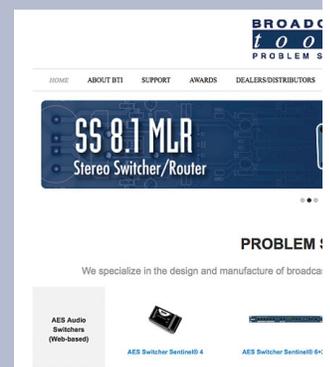
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INTRODUCTION

Thank you for your purchase of a Broadcast Tools® GPI-16 Plus, sixteen input general purpose interface (referred to as the GPI-16 Plus throughout this manual). 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 Broadcast Tools® GPI-16 Plus.

SAFETY INFORMATION

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

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:

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

Product Overview

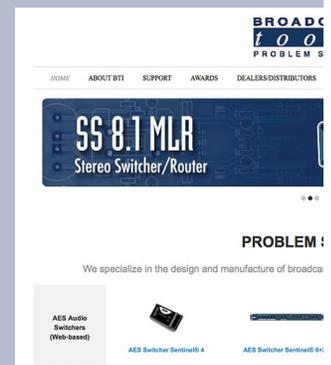
The GPI-16 Plus interfaces 16 general purpose logic inputs to users PC COM or USB port. The user may select from two pre-programmed serial formats; the “PIP” GPI format which is used on most of our audio switchers, or the legacy AT-1616 format. Additional features include; Plug-in euroblock screw terminals; 17 LED indicators for power and each input status.

Features/Benefits

- Four user selectable unit ID's: 0 (default), 1,2, and 3.
- Four user selectable baud rates: 9600 (default), 4800, 19200, and 38400.
- PIP or AT1616 data format.
- USB and RS-232 interface for connection to PC.
- LED indicators for all 16 inputs, power.
- GPI connections are on removable euro-block screw terminal connector to simplify wiring and service, mating plugs are supplied.
- Fully RFI proofed.
- Surge protected internal power supply, universal switching power adapter with domestic connectors supplied.
- Up to four GPI-16 Plus's may be rack mounted on one RA-1, 1-RU rack shelf.

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Inspection

Please examine your GPI-16 Plus carefully for any damage that may have been sustained during shipping. If any is noted, please notify the shipper immediately and retain the packaging for inspection by the shipper. The package contains the GPI-16 Plus, a USB type A/B cable, a modular cable with 9-pin “S9” female D-sub adapter and a 9.0 VDC universal wall power supply with domestic connector. Manuals may be downloaded from our web site.

Installation

Input connections

The sixteen general purpose inputs may be activated by either pulling the input to ground or releasing the input to a high state. A valid input must be 15ms in duration or greater. External sources can be contact closures, open collectors or 5 to 24 volt logic level sources. The impedance of each input is 22K ohms.

Input connections are via a single 18-position plug-in euroblock screw terminal that is labeled “Inputs” 1 thru 16 with ground connections on terminals 17 and 18. To install, remove the plug from the header, strip 1/8” of insulation from the wire. Insert the wire in to the desired terminal and tighten the set screw. When finished, reinsert the plug into the header.

Power

2.1mm coaxial DC power jack, 7.5 - 12 VDC, center positive.

USB Port

This type B USB port is used to connect the GPI-16 Plus to a computer’s USB port using the included USB A/B cable. When you first plug the GPI-16 Plus into your PC, it should automatically install the correct FTDI USB Serial “Virtual COM port” driver which will allow you to access the GPI-16 Plus on a COM port. If the GPI is being used for RS-232 serial operation this will remain disconnected and the drivers are not necessary.

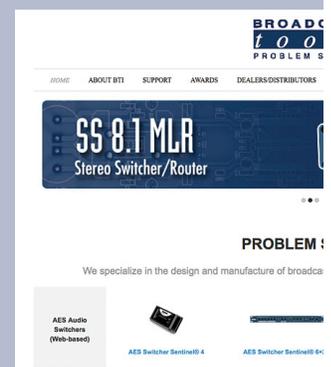
NOTE: If the GPI-16 Plus’s FTDI USB Serial “Virtual COM port” drivers do not automatically install they may be downloaded by clicking on the “setup executable” link found here: <http://www.ftdichip.com/Drivers/VCP.htm>



Installation of the GPI-16 Plus in high RF environments should be performed with care. It is recommended that all cables connected to the GPI-16 Plus be looped through ferrite cores to suppress RF. Surge protection with RF filtering is also suggested for the power supply. For lightning protection devices, check out www.polyphaser.com and www.itwlinx.com.

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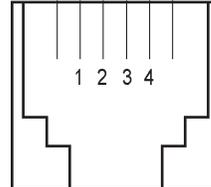
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RS-232 Serial Connector:

This RJ-11 port is used to connect the GPI-16 Plus to a computer's COM port for RS-232 serial operation using the included reverse modular cable with 9-pin "S9" female D-sub adapter. If the GPI is being used for USB operation this will remain disconnected.

RJ-11 Adapter Pin	DB-9 D-SUB Pin #	Product's point of view Function Name.
4	3	RS-232 Receive
3	2	RS-232 Transmit
2	5	Ground



Modular connector's point of view.

Configuration

The GPI-16 Plus can be connected to your computer by one of two interfaces; USB, or RS-232 serial. Below are connection and configuration instructions for each interface.

NOTE: Step by step “COM” port HyperTerminal setup instructions are available on-line at www.broadcasttools.com under “Downloads”.

Configuration via the USB Port.

1. Connect the supplied USB A/B cable from the “USB” jack on the GPI-16 Plus to an available USB port on your PC. When you first plug the GPI-16 Plus into your PC, it should automatically install the correct FTDI USB Serial “Virtual COM port” driver which will allow you to access the GPI-16 Plus on a COM port. Once you've installed the driver, the GPI-16 Plus will be listed as “USB Serial Port” in device manager.

NOTE: If the GPI-16 Plus’s FTDI USB Serial “Virtual COM port” drivers do not automatically install they may be downloaded by clicking on the “setup executable” link found here: <http://www.ftdichip.com/Drivers/VCP.htm>

2. Start a serial terminal application like Tera Term, PuTTY or HyperTerminal configured for the USB COM port the GPI-16 Plus is assigned to at 9600 baud ,8,N,1, flow control to NONE, Emulation set to ANSI, and local character echo enabled.
3. Connect the supplied 9 VDC power supply connector in to the GPI-16 Plus’s power jack labeled “7.5-12VDC”, then plug the power supply in to a power source of 120vac 60Hz. Verify that the green “PWR/HB” led is blinking. The unit information should be displayed on your monitor if things are setup and/or working properly.

Configuration via the RS-232 Serial Port.

1. Connect the supplied reverse modular cable with 9-pin “S9” female D-sub adapter from the “RS-232” jack on the GPI to a RS-232 serial COM port on your PC.
2. Start a serial terminal application like Tera Term, PuTTY, or HyperTerminal configured for the COM port the GPI-16 Plus is connected to at 9600 baud ,8,N,1 flow control to NONE, Emulation set to ANSI, and local character echo enabled.
3. Connect the supplied 9 VDC power supply connector in to the GPI-16 Plus’s power jack labeled “7.5-12VDC”, then plug the power supply in to a power source of 120vac 60Hz. Verify that the green “PWR/HB” led is blinking. The unit information should be displayed on your monitor if things are setup and/or working properly.

Configuration Commands

If you plan on using the default settings disregard this page of the manual. If you require changes to the default settings, follow the steps below to configure the GPI-16 Plus from your computer.

To modify the default configuration, execute the following command:

*uSUxyz where “u” is the current unit ID, “x” is configuration item 1, “y” is configuration item 2, and “z” is configuration item 3. No carriage return or line feed is required. NOT case sensitive.

Command example: *0SU030 would set the unit ID to zero, baud rate to 38400 and serial format to PIP.

To query the current configuration, execute the following command:

*ASU? No carriage return or line feed is required. NOT case sensitive.

Command example: *ASU?

Response example: *ASU? where the A would respond to the current configured Unit ID, then the three current configuration characters xyz.

Configuration Item 1 (unit ID = x): Enter the desired unit ID number:

- 0 = (NON-Polling). (default)
- 1 = Polling
- 2 = Polling
- 3 = Polling

Configuration Item 2 (baud rate = y): Enter the desired baud rate number:

- 0 = 9600 (default)
- 1 = 19200
- 2 = 4800
- 3 = 38400

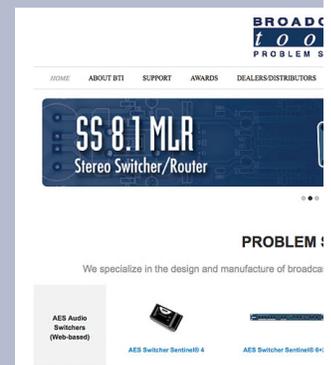
Configuration Item 3 (serial format mode = z): Enter the desired serial format number:

- 0 = PIP format (default)
- 1 = AT1616 format

NOTE: To reset the GPI-16 Plus to factory defaults. Pull input 16 low TWO to THREE times within 5 seconds during repowering the unit. The PWR/HB will flash rapidly indicating the defaults have been loaded.

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AT1616 Information Retrieval Commands

In AT1616 format mode the GPI-16 Plus sends a response string in AT1616 format each time an input changes state. In AT1616 format mode the unit ID is setting is ignored and the baud rate is fixed at 9600.

Each string consists of a dash (-) followed by 8 bytes. The first 4 bytes are ASCII hex representations of the 16 outputs which are not included in the GPI-16 Plus, but are issued as all zeros.

The last four bytes represent the 16 inputs in ASCII hex format with four bytes: 16,15,14,13 12,11,10,9 8,7,6,5 4,3,2,1. If inputs 1,4,7,8,9,10,14,16 are all ON (pulled to ground), then these four bytes would appear as: A3C9. In the above example, the complete string would be -0000A3C9

Additional response examples:

Response string example for input 1 pulled low: -00000001
Response string example for input 1 returning high: -00000000

Response string example for input 2 pulled low: -00000002
Response string example for input 2 returning high: -00000000

Response string example for input 3 pulled low: -00000004
Response string example for input 3 returning high: -00000000

Response string example for input 4 pulled low: -00000008
Response string example for input 4 returning high: -00000000

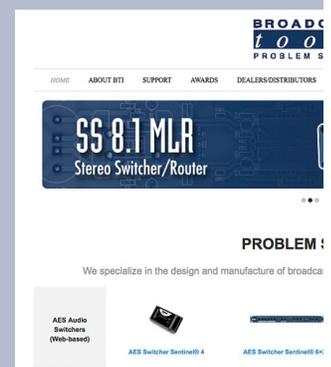
Response string example for input 16 pulled low: -00008000
Response string example for input 16 returning high: -00000000

Response string example for inputs 1 thru 8 pulled low: -00000055
Response string example for input 1 thru 8 returning high: -00000000

Response string example for inputs 9 thru 16 pulled low: -00005500
Response string example for input 9 thru 16 returning high: -00000000

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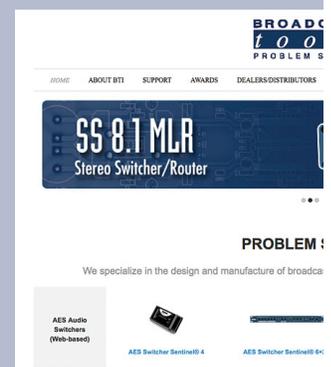


Specifications:

GPI Inputs	The sixteen general purpose inputs may be activated either by pulling the input to ground or releasing the input to a high state. A valid input must be greater than 15ms in duration. External sources can be contact closures, open collectors or 5 to 24 volt logic level sources. Input impedance is 22K ohms (contact current per input 0.250 ma at 5 volts DC).
GPI Indicators	Sixteen green LED's indicating when an input is on or off. When the LED is illuminated, the input is grounded.
Input Interfacing	18-position plug-in euroblock screw terminals. Plug supplied.
USB Port:	USB type B connector. FTDI USB-to-serial chipset, 4800, 9600, 19200, 38400 baud, 8 data bits, no parity, 1 stop bit. Handshaking disabled.
RS-232 Serial Port	RJ11 connector. 4800, 9600, 19200, 38400 baud, 8 data bits, no parity, 1 stop bit. Handshaking disabled. A modular cable with 9-pin "S9" female D-sub adapter is included.
Logic	Flash Microprocessor w/non-volatile memory
Power	9 VDC @ 670 ma / 120 Vac 50-60 Hz, domestic power supply supplied. Total product power requirement < 100ma.
Power Indicator	Green LED, indicator will blink indicating proper operation.
Mechanical	6.10" x 3.75" x 1.60" (DWH)
Weight	2 pounds
Options	RA-1, 1-RU rack shelf. Up to four units may be accommodated.

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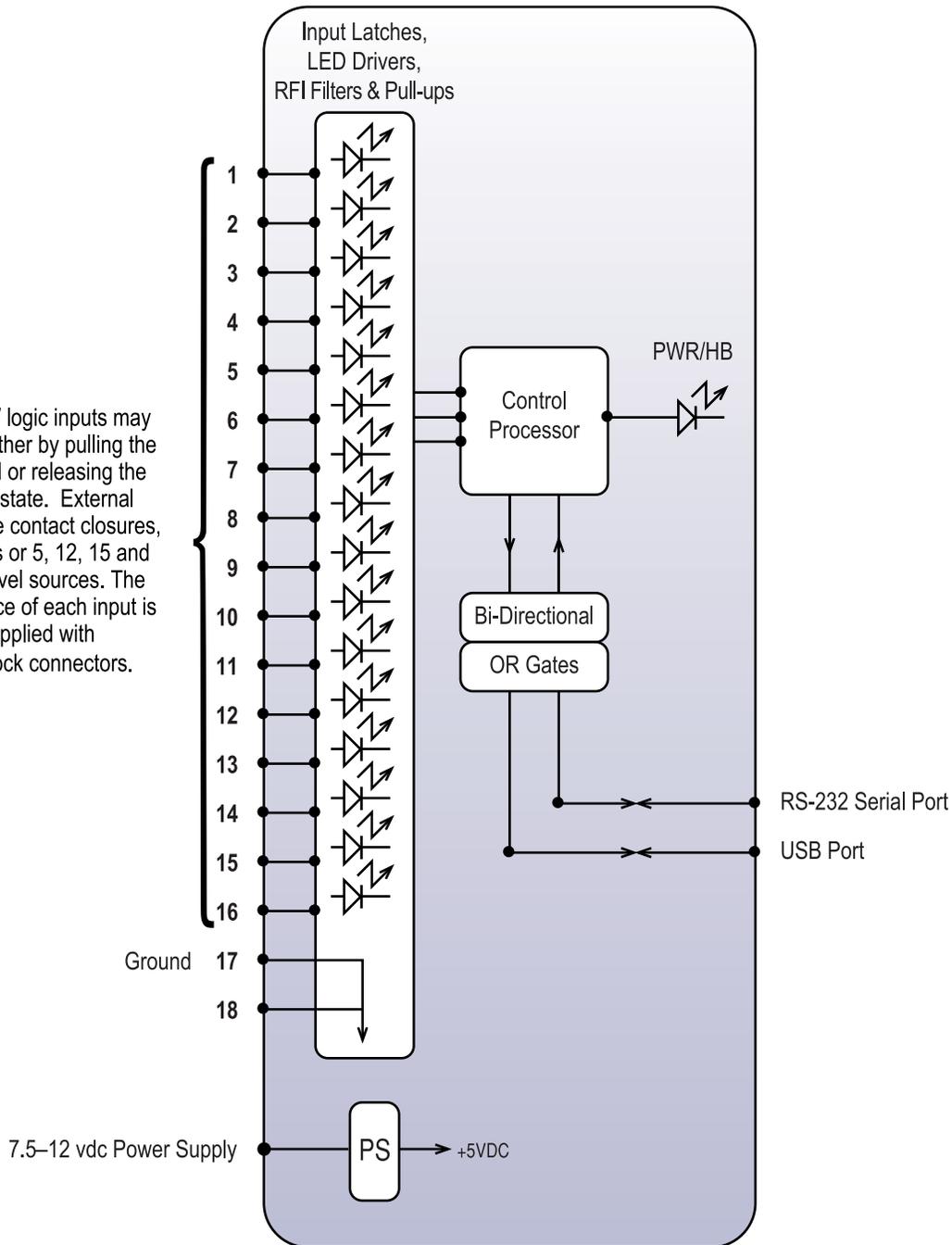
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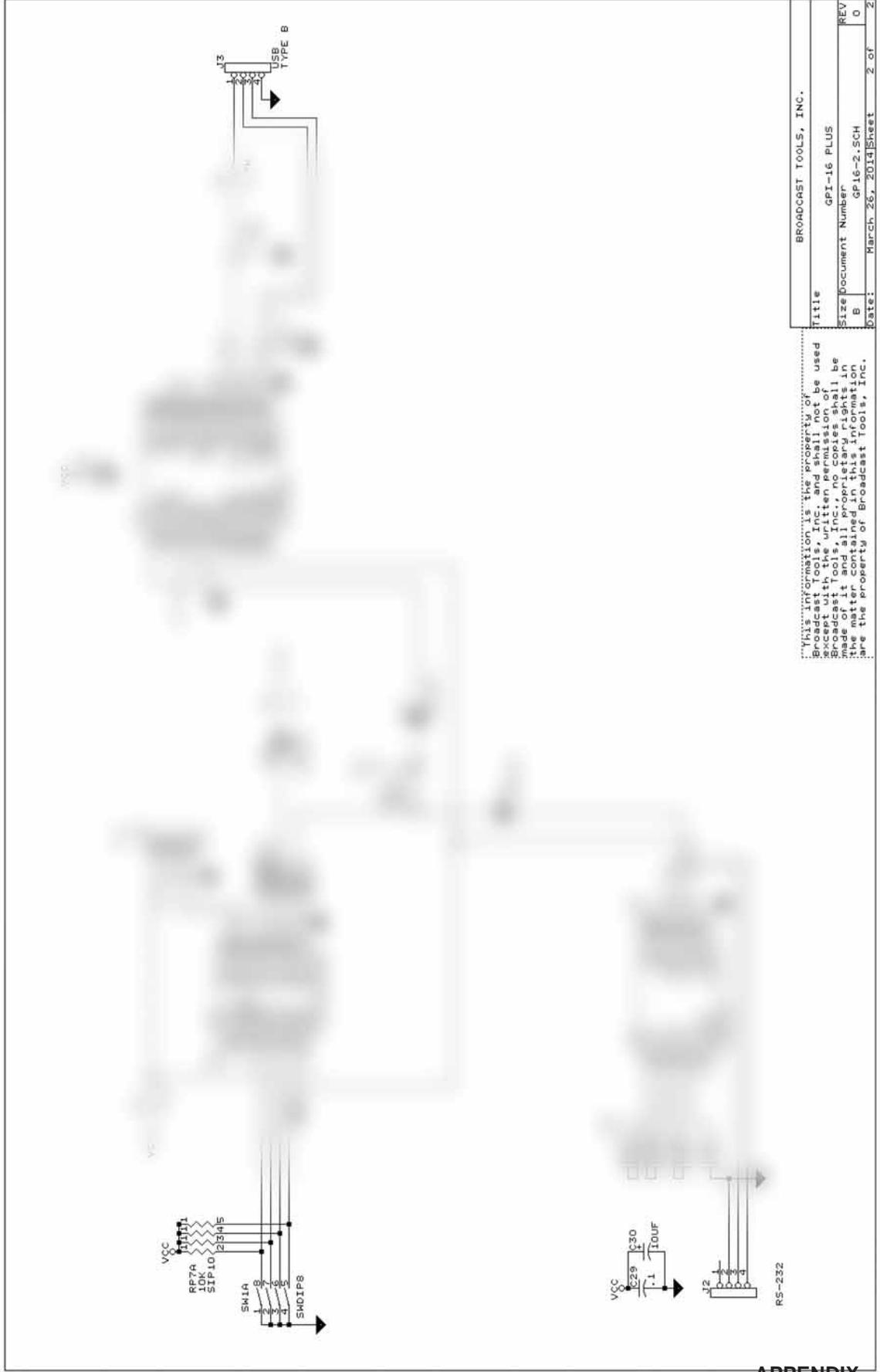
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Functional Diagram

The 16 status / logic inputs may be activated either by pulling the input to ground or releasing the input to a high state. External sources can be contact closures, open collectors or 5, 12, 15 and 24-volt logic-level sources. The input impedance of each input is 22 K ohms. Supplied with Plug-in euroblock connectors.

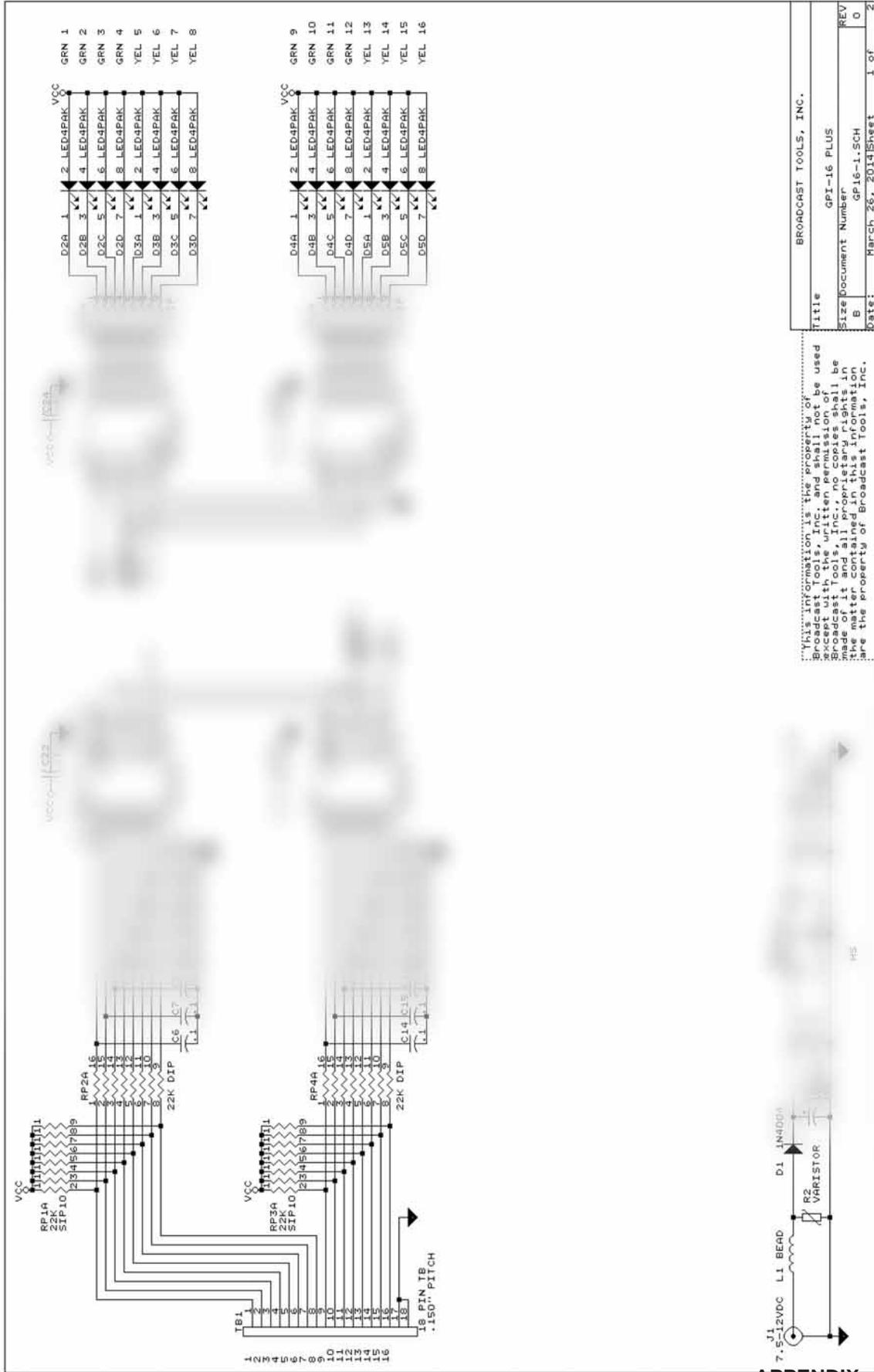


FRACTIONAL SCHEMATIC



APPENDIX

FRACTIONAL SCHEMATIC



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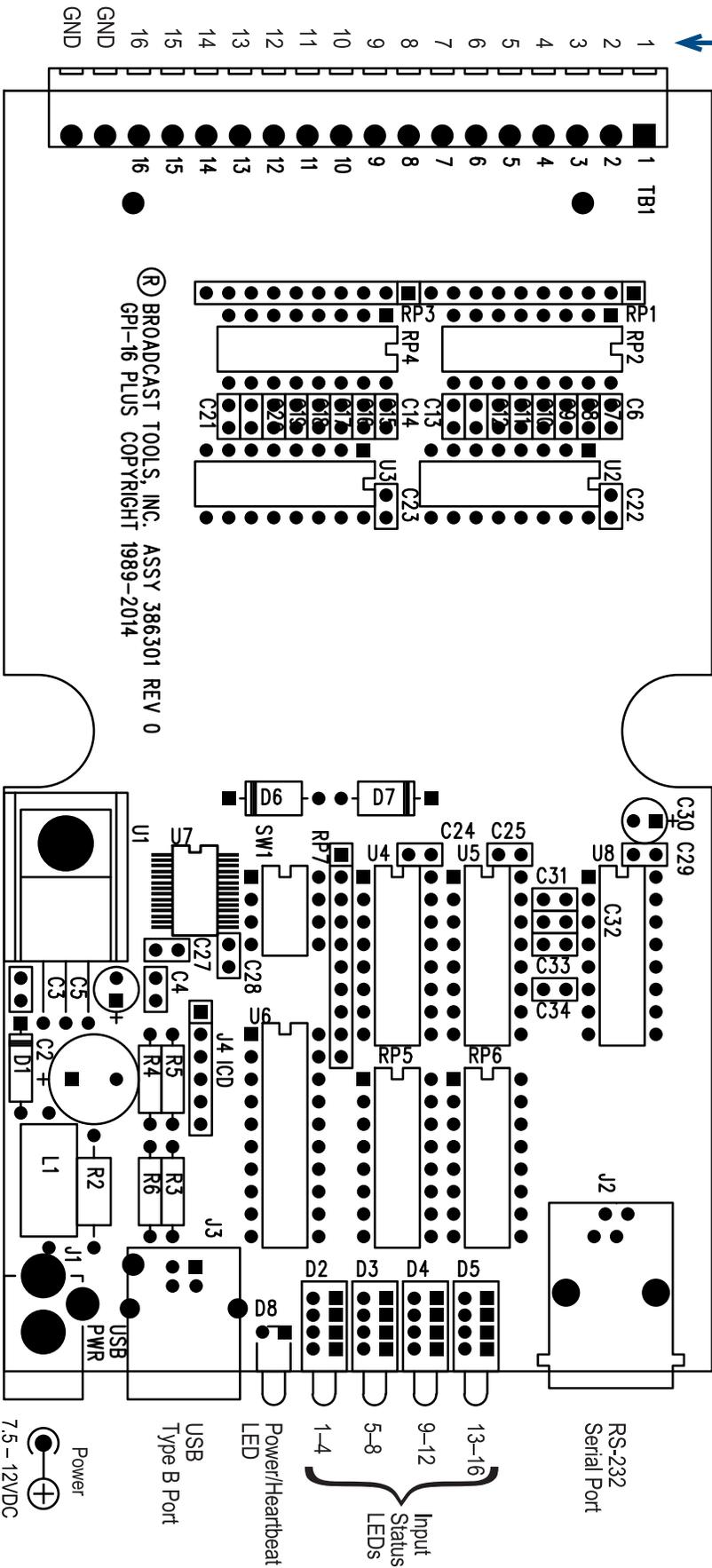
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Size	Document Number
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Date:	March 26, 2014
Sheet	1 of 2

APPENDIX

GPI-16 Plus Component Layout

Component Layout

The 16 status/logic inputs may be activated either by pulling the input to ground or releasing the input to a high state. External sources can be contact closures, open collectors or 5, 12, 15, and 24-volt logic-level sources. The input impedance of each input is 22 K ohms. Supplied with plug-in Eurolock connectors.



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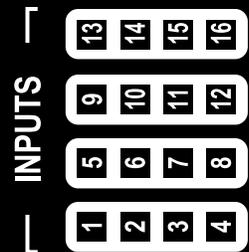
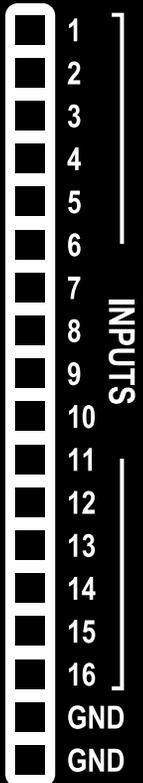
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t o o l s

GPI-16 Plus

16 Input General Purpose Input Interface

RS-232

PROBLEM SOLVED



PWR/HB

USB

7.5-12 VDC

