BROADCAST tools INC

PROBLEM SOLVED

Installation and Operation Manual

GPI-16

Sixteen input General Purpose Interface

Firmware version: 1.10 or greater
Manual update: 06/10/11
If you need a firmware upgrade, contact Broadcast Tools®

NOTE: We recommend the use of Chrome, Firefox or Safari as your browser.

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

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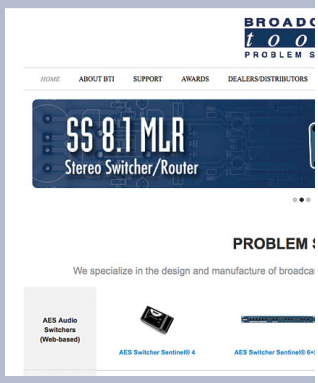

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INTRODUCTION

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

SAFETY INFORMATION

Only qualified technical personnel should install Broadcast Tools products. Any attempt to install this device by a person who is not technically qualified could result in a hazardous condition to the installer or other personnel or damage Broadcast Tools product or other equipment. Please ensure that proper safety precautions have been taken before installing this device. If you are unfamiliar with this type of equipment, please contact a properly qualified engineer to handle the installation and setup of the Broadcast Tools product.

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:

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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.

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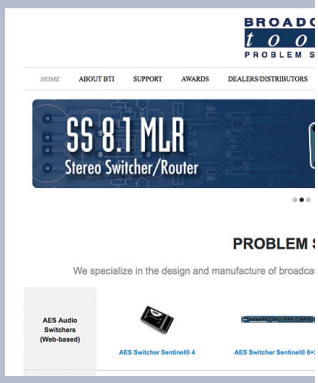

Product Overview

The GPI-16 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 is used on most of our audio switchers, while the AT-1616 format is used on one of our popular serial GPIO interfaces used by a number of radio automation suppliers. Additional features include; Plug-in euroblock screw terminals; 17 LED indicators for power and each input status. The GPI-16 is supplied with a Smart USB to RS-232 adapter cable, DB-9 male-female straight-through serial cable and wall power supply. The GPI-16 is powered by a surge protected internal power supply. Up to four GPI-16's may be rack mounted on one RA-1, 1-RU rack shelf.

Inspection

Please examine your GPI-16 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, 7.5–9.0V DC @ 800 ma wall power supply, Smart USB to RS-232 adapter cable, 7-foot DB-9 male-female straight-thru serial cable and product/manual CD. Product manuals are also available on our web site.

Installation

RFI and surge suppression suggestions

CAUTION! Installation of the GPI-16 in high RF environments should be performed with care. It is recommended that all cables connected to the GPI-16 be looped through ferrite cores to suppress RF. Surge protection with RF filtering is also suggested for the power supply. Shielded cable is suggested for all input connections. The shields and station ground should be tied to one of the screw lugs on the unit's female DB-9 connector. For lightning protection devices, check out www.polyphaser.com and www.itwlinx.com.

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.

NOTE: All connections and indicators are noted on the top cover label.

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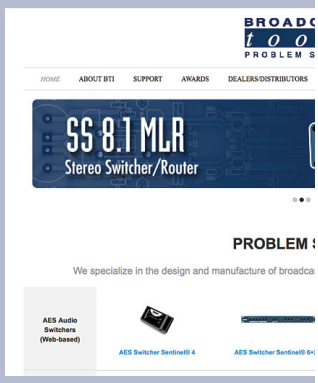

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Installation

DB-9 Female Serial connector:

The female DB-9 connector labeled "PC" may be used to attach the provided 7-foot DB-9 male-female straight-thru serial cable to the PC's COM port or to attach the provide USB to RS-232 adapter cable to the PC's USB port. Connector pin out: Pin 2 = Xmit, Pin 3 = Rec, Pin 5 = Ground. Pins 4 & 6 are tied-together and pins 7 & 8 are also tied together.

USB-RS-232 Adapter Cable:

The Smart USB to RS-232 adapter cable is provided for customers needing to use the USB port supplied with their PC. Remove the Smart USB to RS-232 adapter cable from the packaging and follow the installation instructions provided with the adapter cable. When the Smart USB to RS-232 adapter is attached to the PC's USB port and is functioning properly, connect the male DB-9 connector to the GPI-16's female DB-9 connector.

Programming

If you plan on using the default settings (listed on the next page), disregard the following steps. If you require changes to the default settings, follow the steps below to configure the GPI-16:

HyperTerminal set up and startup

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

1 - Start HyperTerminal (or your favorite com program) configured for: com port x, 9600,8,N, 1, flow control to NONE, Emulation set to ANSI.

2 - Connect the supplied power supply connector in to the GPI-16's power jack labeled "Power 7.5VDC", 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.

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

Operational configuration and Commands

To modify the default configuration, execute the following command:

*uSUxyz 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 = Emulate PIP (default)
1 = Emulate AT1616

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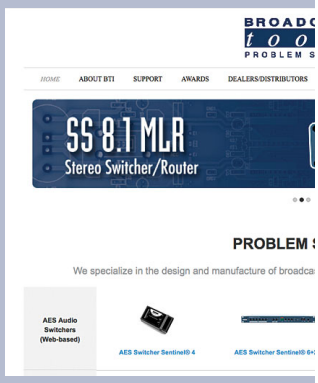

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Operational configuration and Commands (cont)

The GPI-16 may be configured to emulate either the PIP or AT1616 (input only) serial formats. The PIP serial format (default) is listed below and requires the use of the unit ID to request input status (polling) or with a unit ID of zero, (non-polling) issues the serial string each time an input changes state.

When the unit is restarted (power-up), unit information is issued in either mode.

When a unit information request (*uU) is issued in either mode, unit information is issued.

PIP Information Retrieval Commands

PIP serial format: The (*) asterisk is the beginning of string, next is the unit ID, then the command. No carriage return or line feed is required. Commands are NOT case sensitive.

*uSPii - Request status for a single input 01 thru 16.

Command Example: Request status of input 01: *0SP01 No carriage return or line feed required. Commands are NOT case sensitive.

Response Example: S0P,01,x <cr><lf> where x is 0 if the corresponding input is high, 1 otherwise.

*uSPA - Request status for ALL inputs

Command Example: *0SPA No carriage return or line feed required. Commands are NOT case sensitive.

Response Examples: S0P,A,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x<cr><lf>
S0P,A,1,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0<cr><lf> When input 01 is pulled low.
S0P,A,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0<cr><lf> When input 01 is released back high.

Input 01 is the first character, while input 16 is the last character. x is 0 if the corresponding input is high, 1 otherwise.

*uU - Send Unit Information :<product name(GPI-16)><version n.nn><cr><lf>

Command example: *0U No carriage return or line feed required. Commands are NOT case sensitive.

Response Example: GPI-16_ver_1.10<cr><lf>

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AT1616 Information Retrieval Commands

The AT1616 response string is returned each time an input changes state. The unit ID is ignored and baud rate is fixed at 9600.

The 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, 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. Example: 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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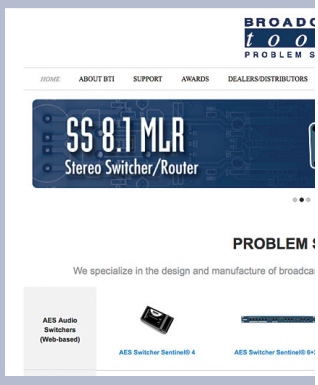

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Specifications:

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.
RS-232 Serial Port	4800, 9600, 19200, 38400 baud, 8 data bits, no parity, 1 stop bit. Handshaking disabled. Other baud rates may be requested as a special order. 7-foot DB-9 male-female straight-thru serial cable and Smart USB to RS-232 adapter cable supplied.
Logic	Flash Microprocessor w/non-volatile memory
Power	7.5–9.0V DC @ 800 ma / 120 Vac 50-60 Hz, domestic power supply supplied. Total product 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. CE, Universal 100-240 Vac 50-60 Hz 7.5 to 9.0 vdc power supply.

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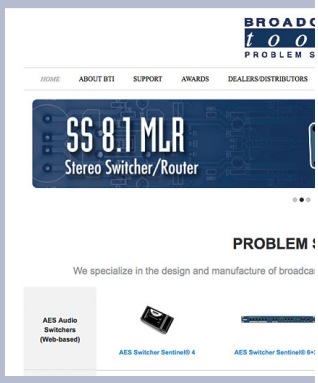

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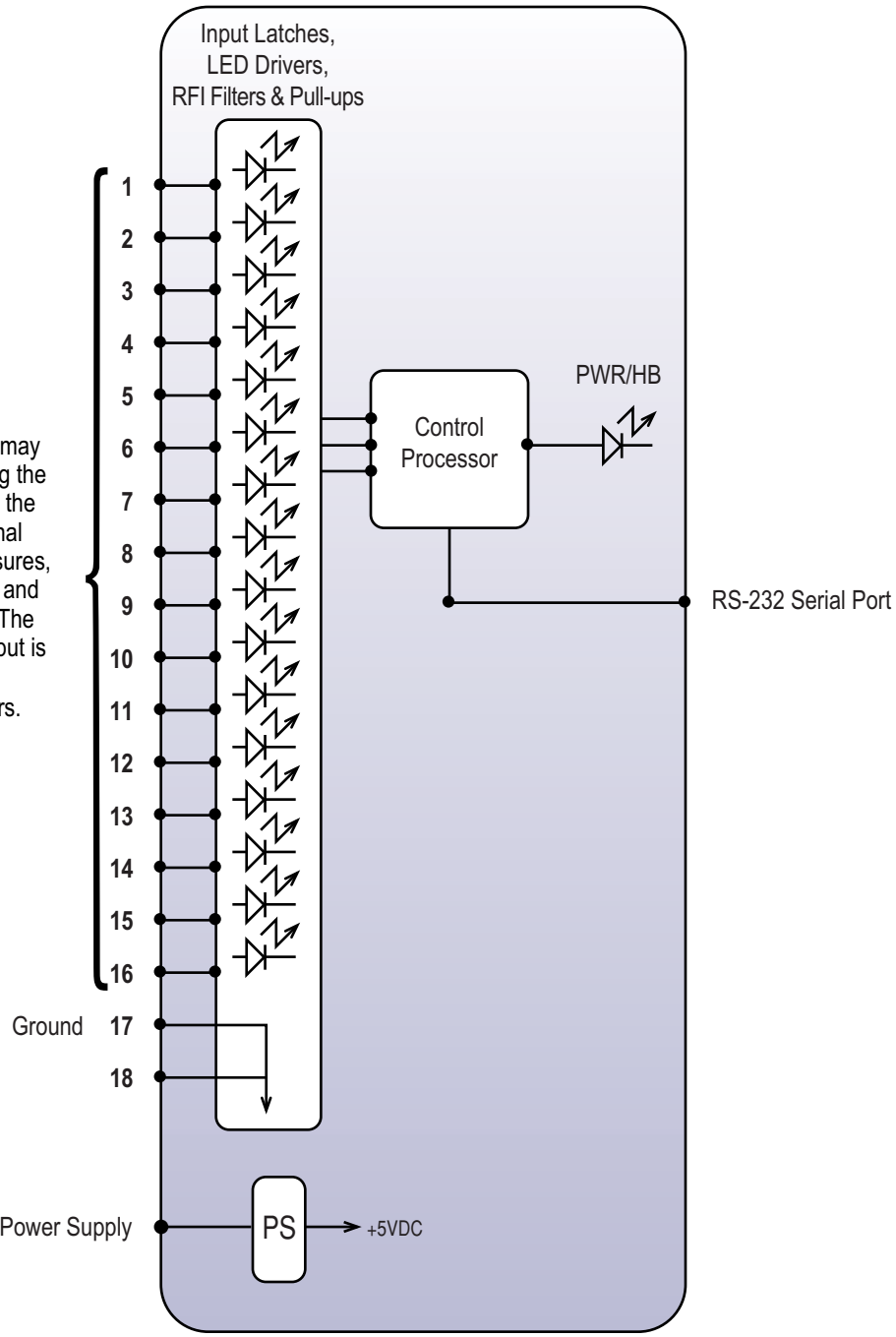
Functional Diagram

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.



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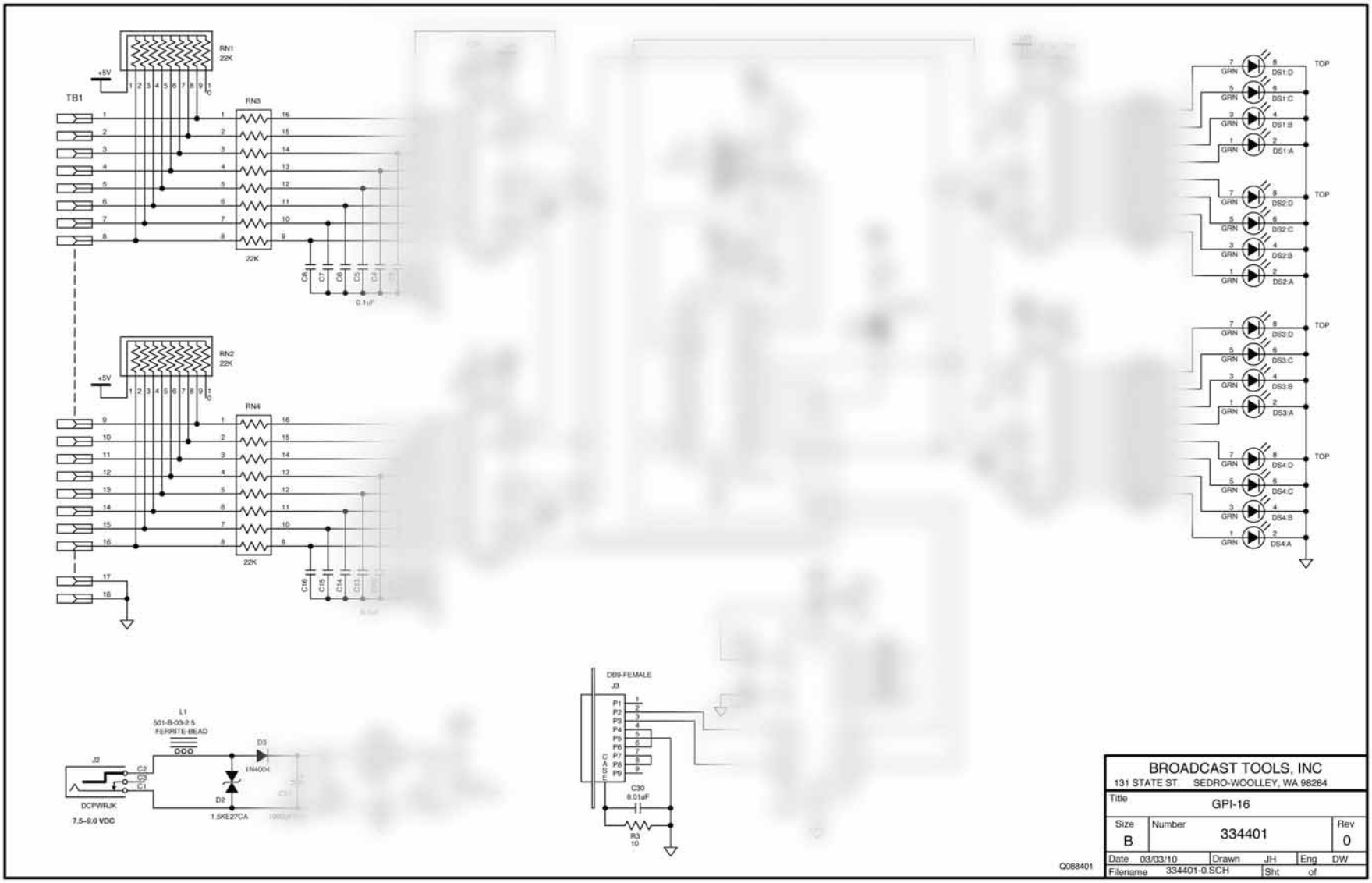
Fractional Schematic



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Broadcast Tools® GPI-16

RS-232, Power, LED and Connector Layout

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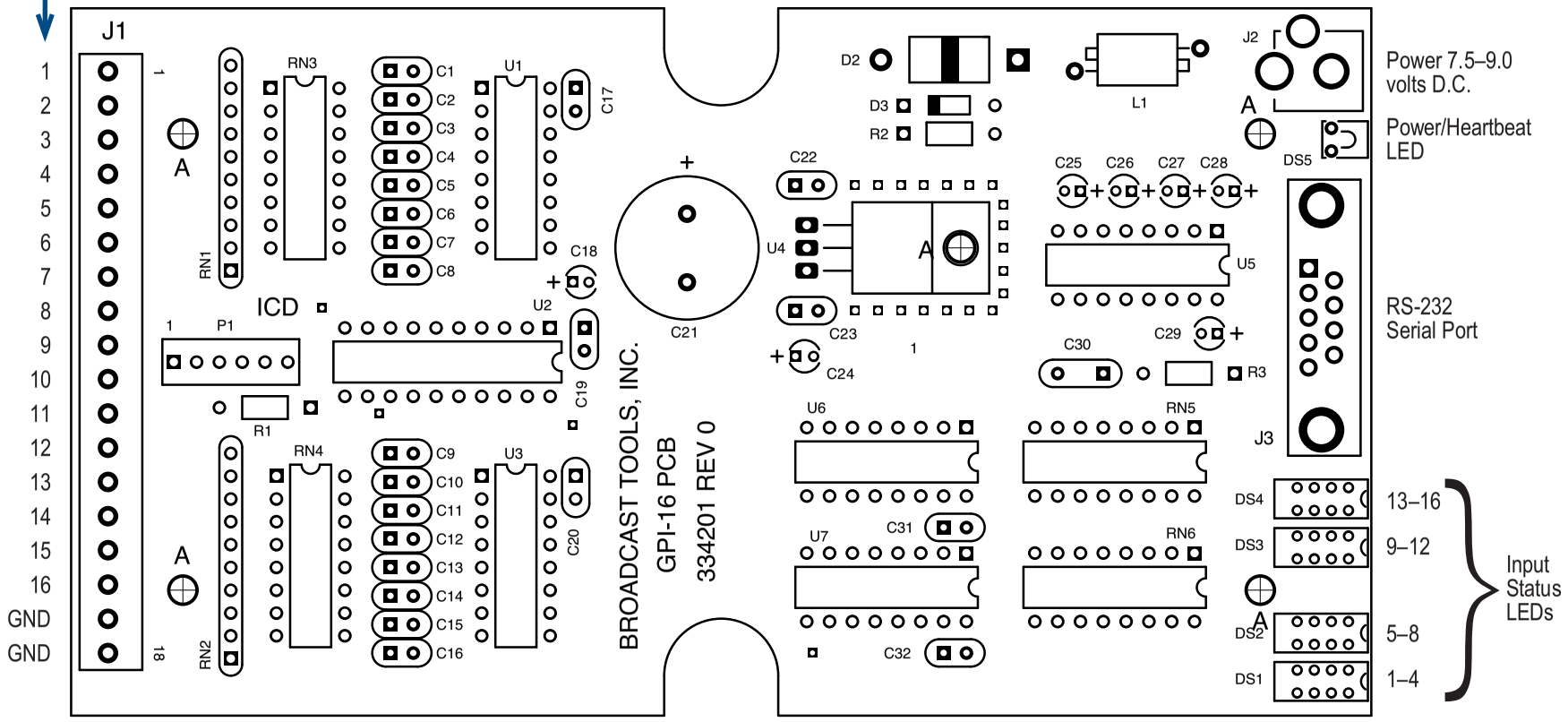

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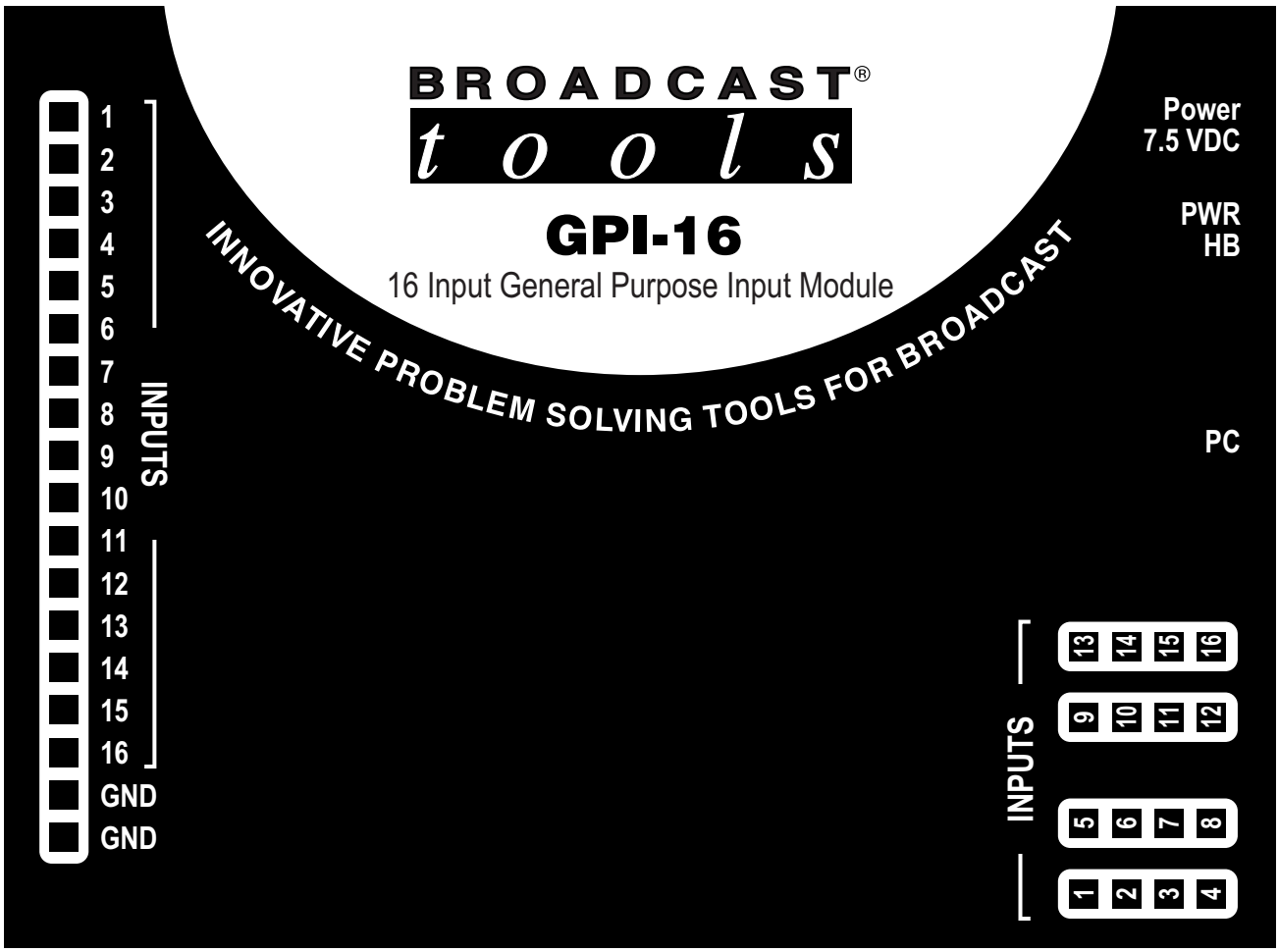

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