



## *Installation and Operation Manual*



### **VAD - 2** *Voice/Pager Alarm Auto Dialer with Integrated Stereo Silence Sensor*

Firmware version 1.09 and above

Manual update 07/13/2011

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## INTRODUCTION

Thank you for your purchase of the tiny TOOLS™ VAD-2, Voice/Pager Alarm Auto Dialer with Integrated Stereo Silence Sensor, which we will refer to through out the manual as the VAD-2. We're confident 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 product.

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### **Broadcast Tools, Inc.**

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***THANK YOU FOR CHOOSING  
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### **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.

## PRODUCT DESCRIPTION

The tiny TOOLS™ VAD-2 is a user programmable two-input multi-number voice/pager auto dialer with integrated stereo silence sensor, designed for dial out paging and/or voice message notification. The VAD-2 is equipped with two dry contact inputs and stereo silence sensor, which, when tripped, will sequentially dial a pager and/or up to four different phone numbers and play back a user recorded message corresponding to the tripped input. The VAD-2 is also provided with two SPST one amp relays for the control of external equipment.

The VAD-2 can store up to four 32 digit phone numbers and one 32 digit pager phone number which may be associated with any of the two inputs and/or stereo silence sensor.

The VAD-2 is capable of remote or local configuration and message recording with a total recording time of 16 seconds. The two SPST relays may be programmed for momentary, latching or tone duration operation. \* An additional feature of relay K2, is the ability to be programmed for normal operation or configured to close when an alarm is activated.

### Features:

- Two user programmable normally open or closed status inputs
- Stereo Silence Sensor with programmable alarm time delay.
- Two SPST one amp relays with momentary, latching or tone duration operation
- Local and remote programming and recording
- Remote security and program access codes
- Stores up to four 32 digit phone numbers and one 32 digit pager number with up to 32 digits of pager data
- 16 seconds of message record time
- Pager compatible
- CPC (WINK/COD) detection
- Non-Volatile Memory
- User programmable independent message repeat and global lap counter
- User programmable ring delay
- Phone line and power supply built-in surge protection
- 120 VAC (optional 220V CE) wall transformer
- Custom applications on request

## APPLICATIONS

Silence Monitor III. DMS III and/or LOV II alarm notification, Tower Light malfunction and/or operation, Transmitter, Translator and/or LPFM site and Studio security/burglar/fire/equipment alarm notification, Inexpensive remote control system and/or remote reset of file server computers. **Back-up program switching and/or PC alarm logging with optional customized firmware and hardware.**

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### DESCRIPTION

### INSPECTION

Please examine your VAD-2 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 should contain the VAD-2, this manual, 7 foot modular telephone cable and the 12 VAC @ 500 ma or 1 amp wall transformer.

### PROGRAMMING

Local Programming of the VAD-2, follow the steps below:

- 1 - Locate the front panel modular RJ-11 jack labeled “Phone Pgm” and plug in a standard TT telephone
- 2 - Press in the front panel recessed “PGM” button, the front panel “PGM” led should start flashing
- 3 - Enter the command code of the desired operation, followed by the data to be stored or the message to be recorded. **Note: Refer to pages 6, 7 and 8.**
- 4 - Press in the front panel recessed “PGM” button when finished. The “PGM” led should extinguish.

#### EXAMPLE

To program a dial out number of 8540808 in the dial out number 1 slot: Press in the front panel recessed “**PGM**” button. When the program button is pressed, the RED “**PGM**” led will flash to confirm that it has been placed in program mode. Enter 118540808 and then press the “**PGM**” button again.

The VAD-2 may also be remotely programmed using the access code. All features can be programmed remotely with the exception of the access code itself, so that it can not be inadvertently changed and lock you out.

To program the VAD-2 remotely, call it, after it answers, enter the access code (it will beep twice with a high tone) then enter any of the programming codes below, followed by the new data or voice message. When you have finished entering data, end the string with the “#” key (except for voice messages, which are timed). It will beep twice with a low tone. The “#” key becomes an enter key when using remote programming and cannot be used as part of a dial-out number. You can still use the “#” digit as part of a dialing string when programming locally. **NOTE: You must end a remote programming session by hanging up. You cannot perform any control or polling functions after entering program mode remotely.**



#### NOTE:

*The “\*” digit is used as a wait character. Each “\*” will cause the dial out or paging data to pause for three seconds before continuing.*



Input 1 Dial List	24nnnnnn	
<u>Example:</u>	24514 (When input 1 changes state, the VAD-2 will dial the pager number stored in location 15 followed by the paging data stored in 16, then dial out in sequence the phone number stored in location 11, then location 14)	
<u>Dial Out Numbers/Messages</u>		
Input 2 Dial List	25nnnnnn	<u>Keypad entry (Command code)</u>
<u>Example:</u>	251234 (When input 2 changes state, the VAD-2 will dial the number stored in location 11, then the numbers in 12, 13 and 14)	
Input 3 (Silence Sensor) Dial List	26nnnnnn	
<u>Example:</u>	261234 (When the Silence Sensor alarms, the VAD-2 will dial the number stored in location 11, then the numbers in 12, 13 and 14)	
Input 1 Description Seconds	51 (Record Input 1 Message)	3
<u>Example:</u>	51 "Satellite Receiver failure"	
Input 2 Description Seconds	52 (Record Input 2 Message)	3
<u>Example:</u>	52 "Power Failure"	
Input 3 (Silence Sensor) Description Seconds	53 (Record Input 3 Message)	3
<u>Example:</u>	53 "Silence Monitor failure"	
Greeting Message Seconds	54 (Record Greeting Message)	6
<u>Example:</u>	54 "WXYZ Transmitter site, enter your SECURITY code after the tone"	

### Restoring to factory defaults:

Remove the power plug. Hold in the front panel "PGM" button. Plug in the power connector and then release the "PGM" button a second or two later. You will hear 4 beeps in the programming telephone indicating the defaults have been restored. **NOTE: Factory recorded voice responses are not restored.**

## INSTALLATION

Installation of the VAD-2 in high RF environments should be performed with care. Shielded cable is suggested for all control and the audio output. All shields should be tied to the “CGND” terminals. The station ground should be connected to the chassis ground screw located on the far right side of the VAD-2 as viewed from the rear. It is recommended that all cables connected to the VAD-2 be looped through ferrite cores to suppress RF. Surge protection with RF filtering such as the Tripp Lite “ISOBAR 4 or 6” is also suggested for the wall transformer. The purchase of an inexpensive UPS will provide back-up power in case of a power outage.

### Connecting your equipment

The VAD-2 interfaces to your equipment through the rear panel screw terminals. Follow the legends for the desired relays, inputs and audio output connections, which appear on the lip of the printed circuit board and also on the layout drawing on the last page of this manual. Strip each conductor and insert the conductor into the terminal and screw down the capture screw. The terminals accommodate wire sizes from 18 - 28 AWG solid or stranded wire.

### Status Inputs

Connection for input 1 is made between the terminal labeled “IN-1” and Ground, while input 2 may be connected to the terminal labeled “IN-2” and the ground terminal.

### Silence Sensor inputs

These are stereo 10 k ohm unbalanced inputs and are summed together and monitored for silence. **BOTH** channels **MUST** go silent to trip an alarm. The alarm threshold is set at -20dbu. Connect your unbalanced source equipment to either or both inputs and tie the ground to the “AGND” terminal. If your source equipment is balanced, use the "+" and GND terminal from the source. **Do not connect the "-" terminal to ground of your source equipment.** Shields should be tied to the “CGND” terminals. The SS LED is illuminated when you have audio applied to the inputs. When the SS is in an alarm condition, the SS LED will flash. The time delay is user programmable for 10, 30, 60 (seconds) 1.5, 2, 2.5, 3, 4, & 5 minutes. Factory default is (0) OFF.

### Relays

Connection for relay one is between the K1-A and K1-B terminals. Relay two is between terminals K2-A and K2-B. Limit contact current to 1 amp at 30 vdc.

**Note: For safety, never connect 120 Vac circuits to these relays!**

### Telephone “CALLER” line level output

Balanced CALLER telephone line audio output is available between the Aud-A and Aud-B terminals.



#### NOTE:

*NOTE: Some features may require the removing of the chassis cover. Caution should be observed. Hazardous voltages may be present on the printed circuit board.*

#### NOTE:

Both status inputs employ a 4 second debounce (response delay).

#### NOTE:

The 5-vdc TTL/CMOS compatible inputs are configured as a divider. A low input must be between 0 and + .6 vdc, while a high must be between + 4.00 and + 5.00 vdc. This should help in noisy (RF, etc) environments.

## Power

The 12 VAC power supply may be connected to the 2.1mm coaxial connector or between the “12 VAC” and the “DGND” terminals. We provide screw terminals for daisy-chaining multiple units (**4 max**) with the same power requirements or for a more secure power connection. Please observe the proper polarity.

## Telephone Line RJ-11 Jack

Connect your central office “Loop Start” ONLY POTS line here. **This line MUST be equipped with CPC (Calling Party Control, WINK or COD) to properly function.**

## Guard Time Setting

This feature allows you to set how fast the DTMF tones are detected. Factory default is set at Medium. The four-position timing header JP 3 selections:

**Fast – 50 ms**

**Medium – 100 ms**

**Slow – 150 ms**

## Mounting

The VAD-2 may be set on a desktop, mounted on a wall or as part of the new RA-1, “Rack-Able” mounting shelf. Four units may be installed on one RA-1. Filler panels are available.



### NOTE:

JP 3 can be found inside the VAD-2 behind the screw terminals.

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### OPERATION

#### Voice Dialing

When one of the two dry contact inputs configured for either normally open or normally closed operation have been triggered for at least 4 seconds and/or a silence sense, the VAD-2 will begin dialing the first telephone number programmed for that input. Five seconds after dialing a telephone number, the VAD-2 will begin repeating the recorded message associated with the tripped input. The message will be repeated for the “repeat counter” setup for that input. The VAD-2 is a voice alarm dialer that automatically reports changes detected on any one of its two digital inputs and/or silence sensor to a remote telephone, pager and/or \* logging computer. After speaking a greeting message that may identify the source of the call, the VAD-2 then speaks a unique message for each input change. Each message comes factory programmed, but may easily be re-recorded locally or remotely with your own customized messages.

**EXAMPLE:** If you want a pager to be called, when call number 1 on the dial out list for input 2:

Then program 51 into the input 2 - dial list. The pager will be called and then the first number will be called on the dial list. The alarm message will be played the number of times that is programmed into the “repeat” memory. If there is no acknowledgment (“\*”) the VAD-2 will go on to the next number and so on until all numbers stored in that Input’s dial list have been called. This process will then be repeated for the number of times stored in the “lap” memory. The lap memory is global and is the same for both inputs while the repeat memory is programmable by input.

After reporting, the VAD-2 is ready to receive commands after the security code is entered through your telephone keypad. Functions include telling the VAD-2 to report on the input state of any of the two digital inputs, commanding the VAD-2 to pulse any one of its two SPDT relays for 1 second and/or turning any one of the relays on or off. When a relay command is given, the VAD-2 will emit a high or low tone corresponding to the condition of the relay(s).

To acknowledge an input alarm, you must enter the “\*” key when called. You will hear an acknowledgement beep. Once an input has been acknowledged, a new alarm will be generated if that input goes back to its normal state for 5 seconds and returns to its alarm state. No new alarm will be generated if it stays in its alarm state. With multiple alarms, input 1 is resolved first, then two, then the silence sensor.

In addition to initiating a call out when any input changes, the VAD-2 monitors its telephone line to receive a call-in from a remote location. When a call is received, the VAD-2 speaks a greeting message, and is then ready to receive the security code and then execute commands to report on inputs, or changes to the two relays.

### Paging

Save your pager number in location 15, enter the data you want to be displayed in location 16. Use the "\*" key to program a wait period of 3 seconds. For example, if you want to call a pager with a number of 543-1234, wait 6 seconds after dialing and then send 1234 to identify the source of the page, press the program button, enter 155431234 and press the program button again. Next, press the program button and enter 16\*\*1234 and the program button again. The "\*" can be used in either the pager calling number or the pager data string. There is space for 32 characters for the pager number and pause characters and 32 characters for the pager data and pause characters. A "5" must be programmed in the Dial List in order to cause a pager to call out.

### Alarms

When an alarm is generated the VAD-2 will call the first number on the call out list, play the message and wait for a DTMF "\*" as an acknowledgment. If no "\*" is received it will hang up and call the other numbers on the calling list. Once an alarm has been acknowledged it will beep and remain off hook for relay control or input/output polling. If another alarm is generated while it is off hook, the VAD-2 will wait until the current session is finished and the call is disconnected and will then dial out the new alarm. The call will be disconnected after the calling party hangs up and the CPC (wink) is received from the central office or will hang up after two-minutes of inactivity.

### Controlling Relays

There are two relays that may be latched, pulsed or for the duration of the tone. Call the VAD-2, it will answer and play the greeting message. Enter your security code. You can now control relays, poll inputs and outputs and/or turn telephone audio on or off.

- 1 - To turn a relay on, enter the relay number, 1 or 2 followed by a (\*).
- 2 - To turn a relay off, enter the relay number 1 or 2 followed by a #.
- 3 - To trigger a relay with a momentary pulse (1 second) enter the relay number 1 or 2 followed by "0"
- 4 - To turn a relay on for the duration of a DTMF tone, enter the relay number 1 or 2 followed by "9". The relay will stay closed for as long as the "9" key is held.

**NOTE: K2 may be configured to close when an alarm is active. To configure K2 to close during an alarm, press the PGM button followed by entering 271 and then press the PGM button. To return to normal operation, enter a 270 in PGM mode.**

### Polling

**Relays:** Enter the relay number followed by "8". If the relay is "ON" a high tone will be heard. If the relay is "OFF" the tone will be low.

**Inputs:** Enter the input number followed by "7". The input message will be spoken, followed by a high tone if the input is in an active alarm state, a low tone will be output if the input is in its normal non-alarm state.

## Turning ON the Caller telephone audio

To turn the telephone CALLER audio ON, enter 3\*. The audio will be un-muted until the 3# code is entered.

## Status LED's

**HOOK** - Yellow Hook LED. Illuminated when the hook relay is activated (off-hook).

**PGM** - Red Program LED. Flashes when recording voice messages or configuration setup. Also used as a valid DTMF tone indicator, which will illuminate when valid DTMF tones are decoded.

**K1** - Green K1 LED. Illuminated when relay K1 is activated.

**K2** - Green K2 LED. Illuminated when relay K2 is activated.

**PWR** - Green Power LED. Illuminated when power is applied.

**SS** – Green (Red on some models) Stereo Silence Sensor. Illuminated with valid audio applied to the SI inputs. Flashes when the silence sensor is in an alarm condition.

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## SPECIFICATIONS

Control Logic:	Flash Microprocessor with non-volatile memory
Relays:	Two - SPST contacts, 30 Vdc @ 1 Amp. ! <b>NOTE: For safety, never connect 120 Vac circuits to these relays!</b>
Status inputs:	Two - Sustained trigger, 5-volt CMOS/TTL compatible inputs, open collector or contact closures to ground. <b>Note: 4-second delay before setting an alarm condition</b>
Stereo Silence Sensor:	Stereo, 10K ohm unbalanced. Trip level set at -35 dbu. Time delay is user programmable at 10, 30, 60 (seconds) 1.5, 2, 2.5, 3, 4, & 5 minutes. Factory default is (0) OFF.
Balanced caller audio output:	0 dbu @ 100 ohms. Note: Level may be changed with a resistor value substitution.
TT Telephone Line Connector:	RJ-11C. Cable supplied. Fused and surge protected
Programming TT Phone Connector:	RJ-11C.
Connectors:	Screw terminals.
FCC registration:	Complies with FCC parts 15 & 68. Reg # BRDUSA-36042-OT-T
Canadian registration:	Complies with Industry Canada CS-03 Part 1. Reg # 3929-11388A
Ringer equivalence:	0.4B
Power:	12 Vac @ 500 ma or 1 amp. 2.1mm, coaxial and screw terminals. Surge protected. Wall transformer supplied. CE 220 Vac optional.
Size:	4.20" x 6.00" x 1.55", Painted steel chassis w/ 4 – 6-32 mounting holes
Weight:	2.0 lb.
Options:	RA-1, Rack Shelf. 1 RU.



### NOTE:

For safety, never connect 120 Vac circuits to these relays!

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The screenshot shows a web browser window with the address <http://www.broadcasttools.com/>. The page features a circuit diagram at the top with components labeled SW9, SW10, SW11, SW12, SW13, SW14, C18, C17, R24, R23, R22, R19, R18, R17, R16, R15, R14, R13, R12, R11, R10, R9, R8, R7, R6, R5, R4, R3, R2, R1. Below the diagram is a navigation menu with 'Home', 'Products', and 'About B'. The main content area is titled 'BROADCAST TOOLS Innovative Problem' and includes a 'Product Listings' section with 'Hot New Products' (AVR-8 Alarm Voice Response, CDR Connected O' Pad, CDA-10 Connected O' Adapter, CDA-27 Connected O' Adapter), 'Important Updates' (Staticcode Will Retrace, Program, Provider, and Service Codes), and 'Updated Manual for AVR-8'. A 'News & Reviews' section offers to download a short form catalog. A footer section states 'Founded in 1987 and located in Sedro-Walugton, our products have a strong for durability and reliability and can be a top distributors across the United States worldwide.'

## SPECIFICATIONS

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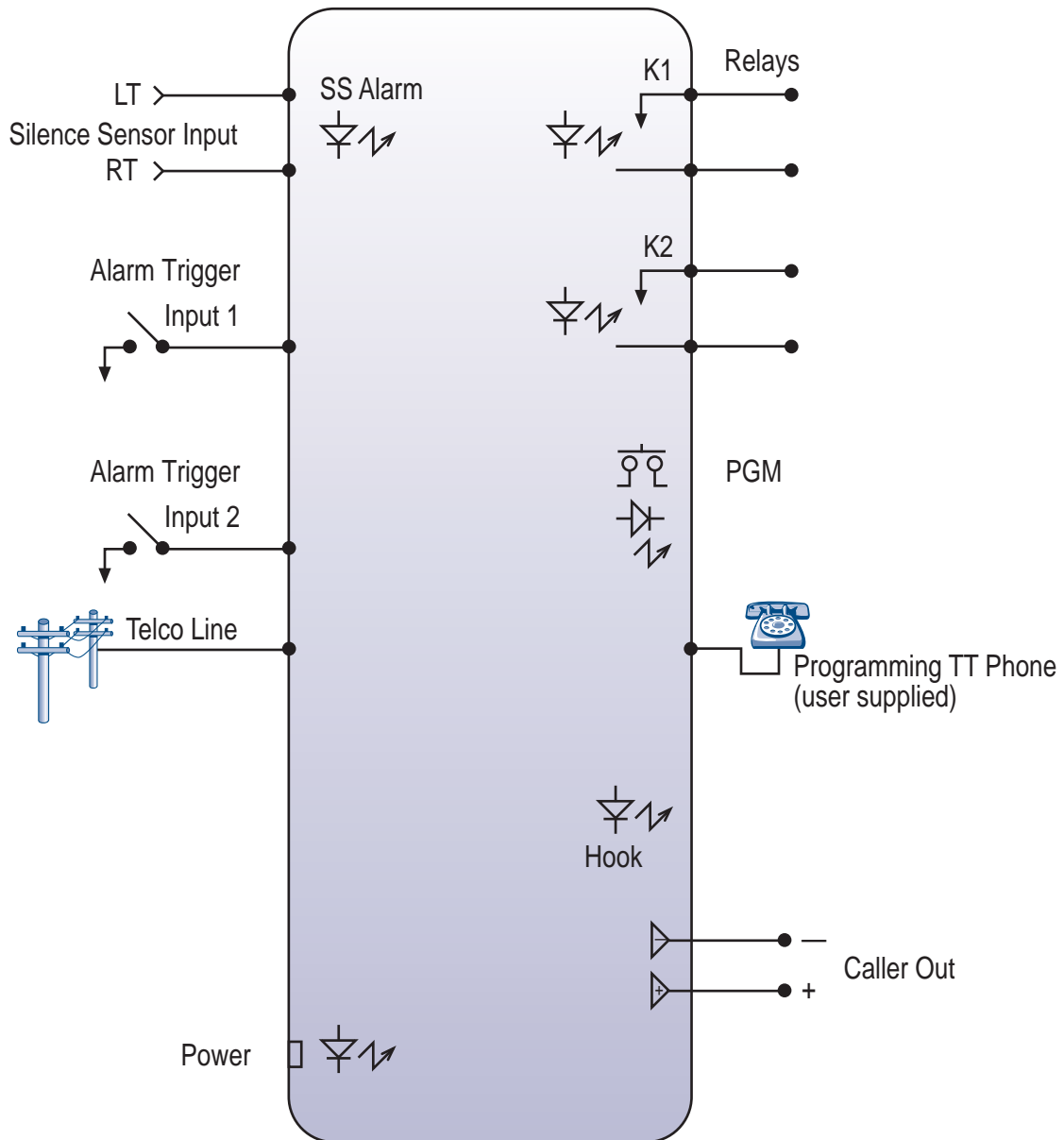
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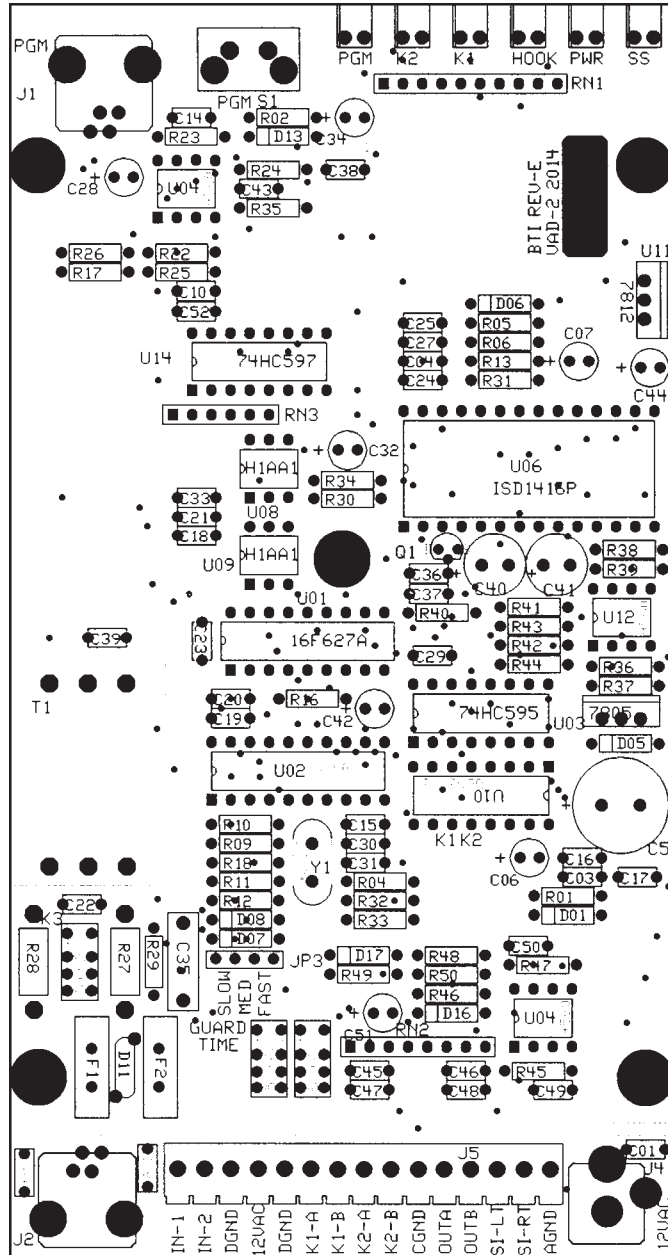
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APPENDIX A

Functional Diagram



APPENDIX B



# Broadcast Tools®

Connection suggestion when using listed\* equipment with DSL/Telco Phone Lines.

