



**GAI-TRONICS® CORPORATION**  
A HUBBELL COMPANY

# **Model IDA1000A**

## **DC Remote Adapter**

### **Installation and Service Manual**

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## TABLE OF CONTENTS

<i>Foreword</i> .....	4
Confidentiality Notice .....	4
Computer Software Copyrights.....	4
Scope of Manual.....	4
Nomenclature .....	4
FCC Interference Warning.....	4
Safe Handling of CMOS Integrated Circuit Devices .....	5
<i>Description</i> .....	6
Features and Benefits .....	6
Physical Description.....	6
Front Panel .....	7
Programming Switches .....	7
Front Panel LEDs.....	7
Line Level Adjustments.....	7
TX Adjustment.....	7
Line DRV Adjustment .....	7
BAL Adjustment.....	7
Rear Panel.....	7
<i>Operation</i> .....	8
Operational Description .....	8
Front Panel LED Operation .....	8
PWR LED .....	8
PTT LED.....	8
MON LED .....	8
F2 LED.....	8
F1 LED.....	8
<i>Installation</i> .....	9
Planning the Installation .....	9
Mechanical Receipt Inspection .....	9
Mounting.....	9
FCC Interference Warnings .....	9
Equipment Required .....	9

<b>Cable Installation Safety Considerations.....</b>	<b>10</b>
<b>Telephone Line Lightning and Over-voltage Protection.....</b>	<b>10</b>
<b>Power Connections.....</b>	<b>10</b>
<b>Radio Connections .....</b>	<b>11</b>
Receive Audio—P1-11, Audio Ground; P1-3, to de-emphasized RX audio source.....	11
Mic High and Mic Low—P1-12, Hi; P1-4, Low .....	11
Duplex Control—P1-2 .....	11
F1—P1-8.....	11
PTT Output—P1-13 Active High; P1-6 Active Low.....	11
Monitor—P1-14 Active High; P1-7 Active Low.....	11
F2—P1-15 .....	11
<b>Accessory Connections .....</b>	<b>12</b>
<b>Line Connections.....</b>	<b>12</b>
<b>SW1 Switch Positions .....</b>	<b>14</b>
<b>Jumper Positions.....</b>	<b>15</b>
<b>Line Input Gain Select Switches .....</b>	<b>15</b>
<b>Level Settings and Adjustments.....</b>	<b>16</b>
Line Drive Level .....	16
Transmit Level .....	16
DC Threshold Calibration.....	16
Balance Adjustment .....	16
<b><i>Theory of Operation.....</i></b>	<b><i>17</i></b>
<b>Power Supply.....</b>	<b>17</b>
<b>DC Control Current Detection .....</b>	<b>17</b>
<b>Audio Circuit.....</b>	<b>17</b>
<b><i>Maintenance.....</i></b>	<b><i>18</i></b>
<b>Troubleshooting the Model IDA1000A DC Remote Adapter .....</b>	<b>18</b>
<b>Fuse Replacement .....</b>	<b>19</b>
<b>Service and Repair.....</b>	<b>19</b>
<b>Ordering Replacement Parts .....</b>	<b>19</b>
<b>Accessories.....</b>	<b>19</b>
<b><i>Specifications .....</i></b>	<b><i>20</i></b>
<b><i>Definitions and Acronyms .....</i></b>	<b><i>20</i></b>
<b><i>Main Circuit Board.....</i></b>	<b><i>21</i></b>
<b><i>Schematics .....</i></b>	<b><i>22</i></b>



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## TABLE OF CONTENTS

### Foreword

#### Confidentiality Notice

This manual is provided solely as an installation, operation, and maintenance guide and contains sensitive business and technical information that is confidential and proprietary to GAI-Tronics. GAI-Tronics retains all intellectual property and other rights in or to the information contained herein, and such information may only be used in connection with the operation of your GAI-Tronics product or system. This manual may not be disclosed in any form, in whole or in part, directly or indirectly, to any third party.

#### Computer Software Copyrights

This product contains copyrighted computer programs stored in semiconductor memory. These programs are copyrighted by GAI-Tronics Corporation and may not be reproduced in any form without express written permission from GAI-Tronics.

#### Scope of Manual

This manual offers descriptive data and service information for the Model IDA1000A DC Remote Adapter. Service diagrams and printed circuit board details are a part of this service manual.

#### Nomenclature

The model number, located on the nameplate on the bottom of the unit, specifically identifies GAI-Tronics equipment. If additional options are ordered, the option will be identified on the circuit board.

#### FCC Interference Warning

The FCC requires that manuals pertaining to Class A and Class B computing devices must contain warnings about possible interference with local residential radio and TV reception. This warning reads as follows:

**NOTE:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

## Safe Handling of CMOS Integrated Circuit Devices

Many of the integrated circuit devices used in communications equipment are of the Complementary Metal Oxide Semiconductor (CMOS) type. Because of their high open circuit impedance, CMOS integrated circuits are vulnerable to damage from static charges. Care must be taken handling, shipping, and servicing them and the assemblies in which they are used.

Even though protection devices are provided in CMOS integrated circuit inputs, the protection is effective only against overvoltage in the hundreds of volts range such as is encountered in an operating system. In a system, circuit elements distribute static charges and load the CMOS circuits, decreasing the chance of damage. However, CMOS circuits can be damaged by improper handling of the modules, even in a system.

To avoid damage to circuits, observe the following handling, shipping, and servicing precautions:

- Prior to and while servicing a circuit module, particularly after moving within the service area, momentarily touch both hands to a bare metal, earth-grounded surface. This will discharge any static charge that may have accumulated on the person doing the servicing.

**NOTE:** Wearing a conductive wrist strap will minimize static build-up during servicing.

- Whenever possible, avoid touching any electrically conductive parts of the circuit module with your hands.
- Power down the unit before installing or removing the circuit module.
- When servicing a circuit module, avoid carpeted areas, dry environments, and certain types of clothing (silk, nylon, etc.) because they contribute to static build-up. Similarly, disconnect the test probe prior to removing the ground lead.
- All electrically powered test equipment should be grounded. Apply the ground lead from the test equipment to the circuit module before connecting the test probe.
- If a circuit module is removed from the system, it is desirable to lay it on a conductive surface (such as a sheet of aluminum foil) which is connected to ground through 100K of resistance.
- When soldering, be sure the soldering iron is grounded and has a grounded tip.
- Prior to connecting jumpers, replacing circuit components, or touching CMOS pins (if this becomes necessary in the replacement of an integrated circuit device), be sure to discharge any static build-up as described in procedure 1. Since voltage differences can exist across the human body, it is recommended that only one hand be used if it is necessary to touch pins on the CMOS device and associated board wiring.
- When replacing a CMOS integrated circuit device, leave the device in its conductive rail container or conductive foam until it is to be inserted into the printed circuit module.
- All low impedance test equipment (such as pulse generators, etc.) should be connected to CMOS device inputs after power is applied to the CMOS circuitry. Similarly, such low impedance equipment should be disconnected before power is turned off.

Replacement modules shipped separately from the factory will be packaged in a conductive material. Any modules being transported from one area to another should be wrapped in a similar material (aluminum foil may be used). Never use non-conductive material for packaging these modules.

## Description

### Features and Benefits

Feature	Benefit
multiple dc remote support	system flexibility and productivity are enhanced when several desk sets are connected
two-channel control	The Model IDA1000A can be used to change channels and other functions on certain radios.
monitor	allows user to hear co-channel activity; CTCSS/CDCSS is disabled
full-duplex capable	when used with a capable desk set, provides full-duplex operation for use with most full-duplex and trunking radio systems
adjustable receive input sensitivity and transmit output level	Interfaces to most radio systems and line conditions.
selectable input/output logic control	The Model IDA1000A is flexible for many radio systems. Outputs can be individually selected to go active high or to ground, depending on the radio.
accessory port	easily connects other devices such as a local desk set and telephone interconnect
modular phone line connection on back	provides easy-to-install phone line cable connection
ac or dc capable	uses power from radio or ac source (using optional wall transformer Part. No. 40419-008)

### Physical Description

The Model IDA1000A adapts a remote desk set or console dc control to most radio systems with features that exploit maximum functionality.

Adjustable input and output functions, such as line input, transmit output level, and selectable input/output logic control, provide flexibility. Easy connections and support of multiple desk sets make this dc adapter the ideal choice for simple or complex desk set arrangements. One dc remote adapter can interface several dc remote desk sets to the base station, depending on system design.

## Front Panel

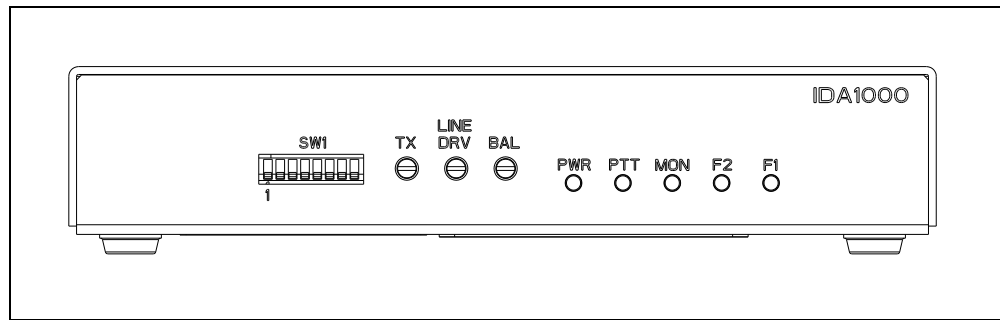


Figure 1. Front View of the Model IDA1000A DC Remote Adapter

### Programming Switches

The programming switches (SW1) are used to set up and interface with the radio system. They are numbered from left to right when viewed from the front.

### Front Panel LEDs

The PWR LED indicates the remote adapter is on. The PTT LED illuminates when a valid transmit request has been decoded. The MON (timed or constant monitor) LED illuminates when the Model IDA1000A is in monitor mode. The F1 and F2 LEDs indicate current frequency and/or other functions.

## Line Level Adjustments

### TX Adjustment

The TX adjustment pot sets the level of the transmit audio to that required to properly modulate the base station's transmitter (see the [Transmit Level](#) section for adjustment instructions).

### Line DRV Adjustment

The LINE DRV adjustment is used to set the telephone (audio) line level or "drive" to the remote desk set or console (see the [Line Drive Level](#) section for adjustment instructions).

### BAL Adjustment

The balance potentiometer (BAL) allows optimizing the hybrid RX to TX isolation of the internal hybrid (see the [Balance Adjustment](#) section for adjustment instructions).

## Rear Panel

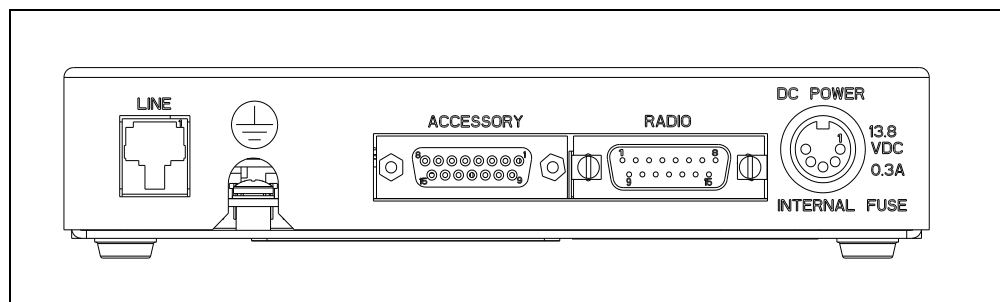


Figure 2. Rear View of the Model IDA1000A DC Remote Adapter

# Operation

## Operational Description

The Model IDA1000A DC Remote Adapter is for use with base stations or repeaters controlled from a remote desk set or console by dc line currents. One adapter can interface up to ten dc remote desk sets to the base station or repeater, depending on the system design.

The Model IDA1000A incorporates all necessary circuit interfacing to translate single-frequency (5.5 mA) transmit and monitor (-2.5 mA) commands into signals to control base station operation. Where applicable, F2 transmit (12.5 mA) commands are also supported when used with a two-frequency base station. Frequency outputs are jumper-selectable for open collector, 5 V pull up, or pull down. The Model IDA1000A can be programmed to revert to F1 or F2 receive after transmit (see [Table 3](#)).

Monitor operation can be either latching or non-latching. The adapter routes audio signals between the wire line and base station circuitry. Transmit audio from the wire line is amplified before being input to the station. Receiver audio from the base station is amplified before being output to the wire line.

Five LED function indicators are included on the front panel. When illuminated, they indicate wire line push-to-talk command, a monitor command, and presence of 5 V dc power. Two LEDs indicate detection of line current levels of 5.5 mA (F1) or 12.5 mA (F2).

## Front Panel LED Operation

The operation of the IDA1000A DC Remote Adapter front panel LEDs is as follows:

### **PWR LED**

The PWR LED illuminates to indicate that the IDA1000A DC Remote Adapter dc power is on.

### **PTT LED**

The push-to-talk LED, labeled PTT, illuminates when a valid transmit request has been decoded.

### **MON LED**

The timed or constant monitor LED, labeled MON, illuminates when the IDA1000A is in the monitor mode, and indicates detection of a line current level of -2.5 mA.

### **F2 LED**

The front panel F2 LED indicates detection of line current level of 12.5 mA (F2). It illuminates to indicate that the unit is programmed to use the F2 transmit (12.5 mA) command, which is supported when used with a two-frequency base station.

### **F1 LED**

The front panel F1 LED illuminates to indicate that the unit is programmed to translate the single-frequency (5.5 mA) transmit command into signals to control base station operation. The IDA1000A may be programmed to revert to F1 or F2 receive after transmit.



# Installation

## Planning the Installation

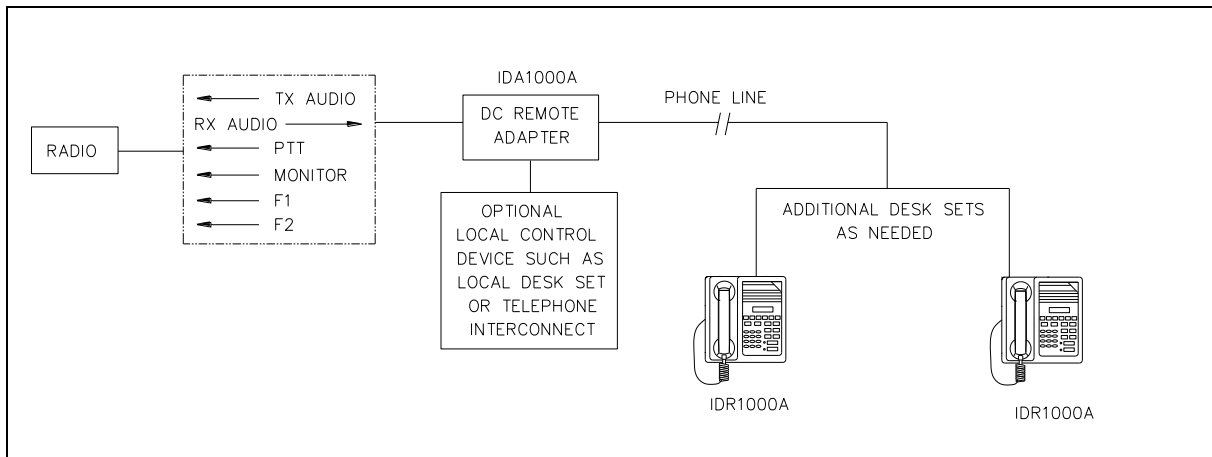


Figure 3. Sample Installation Diagram—Shown connected in parallel within one building.

## Mechanical Receipt Inspection

The Model IDA1000A DC Remote Adapter is shipped in a cardboard container with inserts. Thoroughly inspect it as soon as possible after delivery. In-transit damage should be immediately reported to the transportation company.

## Mounting

The Model IDA1000A can be installed in a custom-supplied rack or cabinet (with XAC0005A Rack-Mount Kit) or can be placed on a desk for convenience when used with accessories.

## FCC Interference Warnings

The FCC requires that manuals pertaining to Class A and Class B computing devices contain warnings about possible interference with local and residential radio and TV reception. Please read these warnings and all safety information in the Foreword section of this manual.

## Equipment Required

### Test Equipment

- RF service monitor
- AC voltmeter with dB ranges for measuring audio levels
- #1 Phillips screwdriver
- 1/8-inch flat blade screwdriver

### Documentation

- base station's tone remote adapter manual
- these installation instructions

## Cable Installation Safety Considerations

Interconnecting, communications and Class 2 dc power cables should be separated from electrical light or other Class I circuits by at least 2 inches. The exception is where Class I wiring or power circuits are run in a raceway, metal-sheathed, metal-clad, or are permanently separated from the conductors of the other circuitry by a continuous and firmly fixed nonconductor such as porcelain tubes or flexible tubing in addition to the insulation on the wire. Communications cables and in-building wiring should be listed and marked for the purpose according to NEC Article 800.

## Telephone Line Lightning and Over-voltage Protection

For maximum surge and lightning protection, building primary (over-voltage) protectors should be installed at the point where the phone lines enter the radio equipment building. Primary protectors are usually required by local codes and should be provided by your local exchange carrier.

The Model IDA1000A has an over-current phone line fuse F2 that protects against occasional extreme fault conditions that may get past the primary protectors. An example of such a fault condition is a power line cross. If the fuse requires replacement, replace it with the same type Bussmann C515S 1.25A SB fuse.

## Power Connections

Connections should be made to a 10.5 to 16 V dc source capable of supplying up to 300 mA. An optional 120 V ac wall transformer (Part No. 40419-008) should be used if a suitable dc source is not available.

The Model IDA1000A provides active low outputs referenced to system ground (negative ground system). To interface with a positive ground radio station, or a radio needing active high signals, requires relays or opto-isolators that translate the adapter outputs.

Table 1. Power Connection Pin-out

Pins	Position
Pins 3 and 5	+IN
Pins 1 and 4	-IN
Pin 2	Battery +

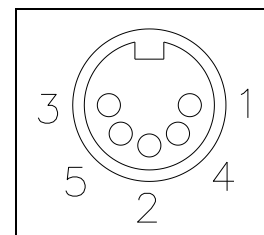


Figure 4. Optional 5-Pin DIN Power Supply

## Radio Connections

Radio connections are made via P1 (see [Figure 5](#)). The supplied radio cable can be removed if not needed, and a connector or terminal appropriate for the station can be installed.

### Receive Audio—P1-11, Audio Ground; P1-3, to de-emphasized RX audio source

This input uses dc blocking capacitors on each side; reference level input at 2/3 radio system modulation is 600 mV ac. Receive *audio in* can be configured for balanced or single-ended audio.

- If balanced, both pins should be connected. If single-ended audio is used, P1-11 should be grounded to the audio or chassis ground.
- Receive input audio can be configured for 32 to 150 mV ac, 150 to 400 mV ac, 400 mV ac to 1.7 V ac, or 1.7 V ac to 4.5 V ac using SW1-3 and JU3 (see the [Table 4](#)).
- To determine the correct setting, measure the receive audio output with 2/3 maximum deviation applied where pins P1-11 and P1-3 will be connected.

### Mic High and Mic Low—P1-12, Hi; P1-4, Low

This output uses a dc blocking capacitor. P1-12 goes to the capacitor's + side and is connected to the station transmit audio. Common mode noise is detected by internal circuitry, correcting the mic high signal.

- The return, P1-4, should connect to mic low or station audio ground.
- The reference output is 80 mV ac into 560  $\Omega$ .

### Duplex Control—P1-2

This is an input that routes radio supervisory talk permit and button-acknowledge tones to the adapter. Connect to RX audio enable high/disable low output from the radio.

### F1—P1-8

In a multi-frequency radio, connect to the F1 oscillator ground or enable. In single-channel radios, this input is normally not connected. This uncommitted collector transistor switch is capable of driving 100 mA, and is Zener-protected to +5 V.

### PTT Output—P1-13 Active High; P1-6 Active Low

Connect to radio station PTT (TX) input. These are uncommitted collector transistor switches, capable of driving 100 mA maximum and Zener-protected to +15 V.

### Monitor—P1-14 Active High; P1-7 Active Low

This uncommitted collector transistor switch is capable of driving 100 mA maximum and Zener-protected to +15 V.

- Connect P1-7 to radio station monitor input if GND is required for monitor.
- Connect P1-14 if high is requested.

### F2—P1-15

In a multi-frequency radio, connect to the F2 oscillator ground or enable. This is an uncommitted collector transistor switch, capable of driving 100 mA maximum and Zener-protected to +5 V.

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## Accessory Connections

Accessory connections are made to the 15-pin accessory connector, located on the rear of the unit. Numeric designations and functions are parallel to the radio pin numbers and functions as described above. Input and output signals are opposite those of the radio connections.

## Line Connections

The landline RJ11/RJ14 connector to J1 is polarity sensitive. Wire the modular connector as follows:

**NOTE:** RJ11 pins are labeled 2 through 5. Pin 2 is on the right-hand side looking into the modular connector.

- Pin 3 (dc control negative) and 4 (dc control positive) for TX/RX operation.
- Pins 2 and 5 are not used on the RJ11 connector.

Radio connections are made via P1-1 to P1-15. J3-1 to J3-15 accessory connections correspond numerically and functionally.

Table 2. Radio and Accessory Connection Chart

Pin #	Wire Color	Description	Input/ Output		Range	Nominal
			Radio	Acc.		Default
1	Blk/Wht	dc+ (not used)	JU12		power input	B+ V dc
2	Blu/Wht	duplex control	JU10 I	I	enable high (+5 V dc) disable low (0 V dc) RX audio	0 V dc
3	Green	RX audio +	I	O	range 1: 32 mV–400 mV <sub>RMS</sub> range 2: 400 mV–4.5 V <sub>RMS</sub> (see Table 4)	300 mV <sub>RMS</sub>
4	Black	Mic low (AGND)				0 V dc
5	Wht/Blk	not used				
6	White	PTT (push-to-talk)	O	I	active low (GND) (B+ unkeyed)	0 V dc
7	Orange	monitor	O	I	active low (GND) (B+ unkeyed)	0 V dc
8	Red	F1	O	I JU15	low (0 V dc) or high (+5 V dc)	0 V dc
9	Red/Wht	dc – (not used)	JU13		power input	0 V dc
10	Grn/Wht	not used				
11	Grn/Blk	RX audio –	I	O		
12	Blue	TX audio (Mic Hi)	O	I	32 mV–800 mV <sub>RMS</sub> 560 Ω	80 mV <sub>RMS</sub>
13	Blu/Blk	PTT (push-to-talk)	O	I	active high (B+) (GND unkeyed)	B+ V dc
14	Org/Blk	monitor	JU11 O	I	active high (B+) (GND unkeyed)	B+ V dc
15	Rd/Blk	F2	O	I JU14	low (0 V dc) or high (+5 V dc)	0 V dc

\*NOTE: Colors apply to the supplied GAI-Tronics cable.

Possible accessories include external speaker, telephone interconnect, local desk set, tone remote adapter, or paging encoder.

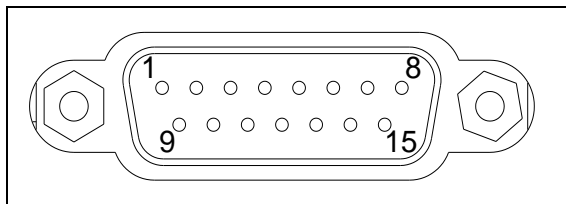


Figure 5. P1 Radio Connector Mating Side Pin Contacts

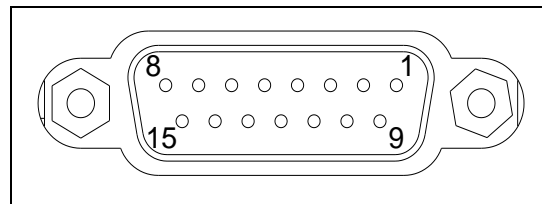


Figure 6. J3 Accessory Connector Mating Side Socket Contacts

## SW1 Switch Positions

There are eight section switches (SW1) on the front panel of the Model IDA1000A housing (see [Figure 1](#)). A switch is closed when in the down position, and open in the up position. Refer to the following table for switch position and function information.

Table 3. SW1 Switch Settings Table

SW1 Section	Position	Function
1	Down Up	duplex hybrid enabled duplex hybrid disabled (default)
2	Up Down	transmit output range -15 dBm to 0 dBm transmit output range -25 dBm to -15 dBm (default)
3	Up with JU3 Out Down with JU3 Out Up with JU3 In Down with JU3 In	Line input range: 32 mV ac to 150 mV ac Line input range: 150 mV ac to 400 mV ac (default) Line input range: 400 mV ac to 1.7 V ac Line input range: 1.7 V ac to 4.5 V ac
4	Down Up	monitor function enabled only for duration of monitor command (default) monitor function remains enabled after receiving a monitor command and until a transmit command is received
5 & 6	5 & 6 down 5 & 6 up 5 down 6 down	special application: neither frequency is selected during receive condition (default) radio remains on whatever frequency the last transmission occurred radio reverts to frequency F1 after every transmission regardless of frequency of previous broadcast (when SW1 section 6 is up) radio reverts to frequency F2 after every transmission regardless of frequency of previous broadcast (when SW1 section 5 is up)
7	Down Up	provides line termination for incoming signals (default) does not terminate line
8	Down Up	half-duplex operation (default) allows remote user to hear supervisory talk permit and button acknowledge tone from the radio (requires SW1 section 1 to be down and appropriate adjustment of Pot 3)

## Jumper Positions

The IDA circuit board contains nine jumpers, JU1 through JU5, and JU10 through JU13 (see [Figure 7](#)). The default setting provides normal operation. It should be changed only for special applications.

Table 4. Jumper Position Table

Jumper	Position	Function
JU1	3 1*	line driver disable line driver enable
JU2	Out In*	4-wire (not available) 2-wire
JU3	Out*  In	SW1-3 Up—line input range: 32 mV ac to 150 mV ac SW1-3 Down—line input range: 150 mV ac to 400 mV ac SW1-3 Up—line input range: 400 mV ac to 1.7 V ac SW1-3 Down—line input range: 1.7 V ac to 4.5 V ac
JU4	A B*	high output for F1 low output for F1
JU5	A B*	high output for F2 low output for F2
JU10-13	Out*	special applications only

\*Indicates the default positions.

## Line Input Gain Select Switches

For SW1 sections 2 and 3, the default setting is down. These should be changed only if one of the remote units has wire line losses of 10 dB or more. Select a gain setting to compensate for the unit with the most loss. Adjust all other units to give identical transmit levels. To make adjustments:

1. Apply a 1000 Hz tone at the desired line level, e.g. 0 dBm at the remote end of the wire line to be tested.

 **CAUTION**  —Do not exceed the recommended operating level of the line. Consult the line provider for this information.

2. Measure and record the level at the remote adapter end with the adapter connected to the line. Do this for each line attached.
3. Select the gain that best compensates for the line with the most loss. Start with the desk set that has the most line loss and use the recommended mic input level from the desk set adjustment instructions. Adjust the line driver on each desk set to obtain a 2/3 system deviation (nominally 80 to 165 mV ac).

## Level Settings and Adjustments

### Line Drive Level

Set the line drive level as follows:

1. With a service monitor connected to the receiver with maximum allowable system deviation, measure the audio across P1-11 and P1-3.
2. Set jumper JU3 and switch SW1-3 for the level indicated (see the Table 4).
3. While measuring the input to the line J1-3 and J1-4, adjust Pot 1, the adapter LINE DRV level pot, for the desired level of drive, but no greater than the maximum allowable.

### Transmit Level

Setting the transmit level compensates for any losses in the audio control line. The transmit level is set as follows:

1. Apply a 1000 Hz signal to the mic circuit of the remote desk set. This signal should be enough to provide the desired reference level across the audio control line at the desk set end, normally -10 dBm.
2. Adjust Pot 2, the adapter TX level pot, to obtain 2/3 system deviation from the base station transmitter. If it is not possible to obtain the correct level near the center of the control's travel, use the opposite position for Gain Select, SW1-2.

### DC Threshold Calibration

The dc threshold level is factory set and should not require adjustment unless field service is required. If field service is necessary, complete the following steps:

1. Apply a -2.5 mA source to the control line.
2. Slowly adjust Pot 4, the calibration pot, to illuminate the MON LED.
3. Remove the -2.5 mA current. The MON LED should extinguish.

### Balance Adjustment

The hybrid adjustment is factory-set and should not require adjustment. If field service is necessary, complete the following steps:

1. Set switch SW1-8 up and SW1-1 down.
2. Adjust Pot 4 to full clockwise position.
3. Apply a 1000 Hz signal to P1-3/P1-11.
4. Measure the audio across P1-12/P1-4 and adjust Pot 3, the adapter BAL pot, to null (minimum).



# Theory of Operation

## Power Supply

The power supply for the remote adapter operates in the linear serial-pass mode. Programmable Zener U4 serves as reference for the 5 V digital power supply. The reference voltage is 5.00 V dc, +/- 0.1 V dc measured at emitter Q5. Op-amp U1a controls the series pass element Q5 to provide 5 V dc at the 5 V source point and the power LED provides indication of this voltage level. The reference voltage from U4 is scaled and isolated through U1b to provide a 2.5 V source.

## DC Control Current Detection

Audio and dc control line currents are input to the circuit board through pins 3 and 4 of modular connector J1. AC current is shunted across the transformer secondary by C1, and dc current is developed across R1. The dc current is translated to a voltage (referenced to 6 V) by amplifier U5 and fed to U6a, b, c, and associated components.

If the translated voltage is produced by a line current greater than or equal to 4.4 mA (indicating a transmit command), then U6-1 will output a high level voltage; if the translated voltage is produced by a line current greater than or equal to 9 mA, then U6-7 will output a high level voltage. If the translated voltage is produced by a line current of negative polarity that is greater than or equal to 2 mA, indicating a monitor command, then U6-14 will output a high level voltage.

A high signal on U6-1 forces a low at U7-1 (illuminating LED 2) and U8-1, resulting in a high at U7-4 (after a delay through R71 and C20, C52) which then opens the audio path from the wire lines to the station, drives Q1(Q6) and thus forces transmission on F1 (in a multi-frequency station), and forces Q3(Q8) to output an active low (high) on the push-to-talk line. The low at U7-1 disables the receive audio path from the station when SW1 section 8 is down.

In a 2-frequency station, a high on U6-7 drives Q2(Q7) through NOR gates U9b and U9c and thus forces transmission on F2. The circuitry consisting of latch U8b and U8c, U8a, U8d, U9 guarantees that the F1 line will be disabled in the event of an F2 command. Switch SW1-5 may be pushed down (with SW1-6 up) to cause the transmit frequency to revert to F1 subsequent to every transmit command; switch SW1-6 may be pushed down (with SW1-5 up) to cause the transmit frequency to revert to F2 subsequent to every transmit command.

A high signal on U6-14 forces U7-10 low (illuminating LED 3) and U7-13 high, thus enabling transistor Q4(Q9) to output an active low on the monitor line. If switch SW1-4 is up, the monitor function will remain enable subsequent to a monitor command and until a transmit command is received. This function is accomplished by the latch configuration of U7c and U7d.

A low on U9-4 (indicating detection of a line current greater than or equal to 9 mA) illuminates LED 4; a low on U9-13 (indicating detection of a line current greater than or equal to 4.4 mA) illuminates LED 5.

## Audio Circuit

Receiver audio to be output on the control lines at J1 is input to the circuit board on P1-11, 3. These signals are scaled through amplifier U2a, U10b and fed through the line audio adjustment, pot 1. The resulting signal is gated to the line driver U11, U10a, and associated components.

Transmitter audio is input to the remote adapter through J1-3, 4, routed through transformer T1, and scaled through U1c, U1a, U2c, and associated components. The line output gain may be set by proper configuration of switch SW1-2.

The signal exiting U2c is fed through the line output adjustment, pot 2 and gated through U3a to the mic hi input to the base station on P1-12.



## Maintenance

### Troubleshooting the Model IDA1000A DC Remote Adapter

The following is a list of potential problems you may encounter and possible solutions.

<b>Problem</b>	<b>Possible Solution</b>
general problems	Ensure that there is a valid circuit line path from the desk set to the dc remote adapter.
	Check for a blown fuse and ensure that the dc remote adapter is connected to a properly functioning dc power source (if using a dc power supply option).
IDA1000A will not key the radio	Ensure that one of the IDA1000A PTT outputs is connected to the radio.
	Check the telephone line continuity from the desk set to the remote adapter.
	Reversed phone line pins 3 and 4.
	Ensure that the telephone line is generating a current that the IDA1000A uses for keying the radio.
radio keyed constantly while the IDA1000A is connected	Ensure that the PTT is in the proper active state: P1-6 Ground keying P1-13 B+ keying
RX audio low or distorted	Ensure that the IDA1000A receive sensitivity is set properly.
	Ensure that there is no more than 20 dB loss in the telephone line.
constant white noise in RX audio	Obtain RX audio from a muted source in the station and not 'raw detector/disc. audio. See radio manuals.
no RX audio	Check fuse F2
	Check radio cable connections to radio's RX audio source.
no TX audio	Verify that the radio is being keyed when transmitting to the IDA1000A from a dc remote.
	Verify that the IDA1000A output level is properly set and there is not more than 20 dB of loss in the telephone line.
	Open fuse F2. (See fuse replacement information below.)
TX audio distorted	Verify that the dc adapter transmit audio output is not set too high for the radio's expected input level. Adjust the TX audio level pot for proper setting.
	TX level is set too high or SW1-2 is set to wrong position.
IDA1000A does not transmit or receive	Ensure that there is a telephone line audio path from the IDA1000A to the dc desk set.

## Fuse Replacement

 **CAUTION**  —For continued safe operation, replace fuses with the same type:

- F1 is a Bussmann® 0.5A Type GMA, FB fuse.
- F2 is a Bussmann® C515S 1.25A 2AG SB.

## Service and Repair

Inoperative or malfunctioning equipment should be returned to the factory for repair. Please call **1-800-492-1212** to obtain a Return Authorization number, published repair prices, and shipping instructions.

**NOTE:** A purchase order or credit card number is required prior to processing non-warranty repairs.

## Ordering Replacement Parts

Please include the complete identification number when ordering replacement parts or requesting equipment information. This applies to all components, kits, and chassis. If the component part number is not known, the order should include the number of the chassis or kit of which it is a part and sufficient description of the desired component to identify it. Order parts from:

### Customer Service

GAI-Tronics Corporation

3030 Kutztown Road

Reading, PA 19605

US: 800-492-1212

Outside US: 610-777-1374

## Accessories

Description	Part No.
AC Wall Transformer	40419-008
Rack-Mount Kit (Standard 19-inch W × 1.75-inch H)	XAC0005A

## Specifications

Color .....	black
Physical size.....	1.35 H × 7.02 W × 5.3 L in
Weight.....	4 lb
Temperature range .....	-30 °C to 70 °C
Humidity .....	95% at 50 °C (non-condensing)
Power input.....	10.5 to 16 V dc at 300 mA maximum
Hum and noise .....	less than -45 dB below rated output
Audio distortion .....	less than 3% THD
RX input.....	32 mV ac to 4.5 V ac (nominal 300 mV ac)
TX input.....	32 mV ac to 800 mV ac in 560 Ω (nominal 80 mV ac)
Line input.....	-25 to 0 dB ALC to reference (nominal -10 dBm)
Line output.....	-15 to +10 dBm adjustable into 560 Ω (nominal -10 dBm)
Maximum desk sets supported.....	10 maximum (per system design)
DC current defaults:	
F1: .....	5.5 mA
F2: .....	12.5 mA
Monitor: .....	-2.5 mA

## Definitions and Acronyms

<b>Term</b>	<b>Definition</b>
<b>CSQ</b>	carrier squelch
<b>CTCSS</b>	a means of grouping users of a common radio channel—Subaudible tones are transmitted with audio; a particular radio's speaker (or the speakers of a group of radios) will unmute to broadcast a transmission only if the associated subaudible tone identifies it as belonging to the radio's user group.
<b>CDCSS</b>	a system analogous to CTCSS but using low speed digital signaling instead of subaudible tones
<b>HLGT</b>	high level guard tone
<b>LLGT</b>	low level guard tone
<b>PTT</b>	push-to-talk

# Main Circuit Board

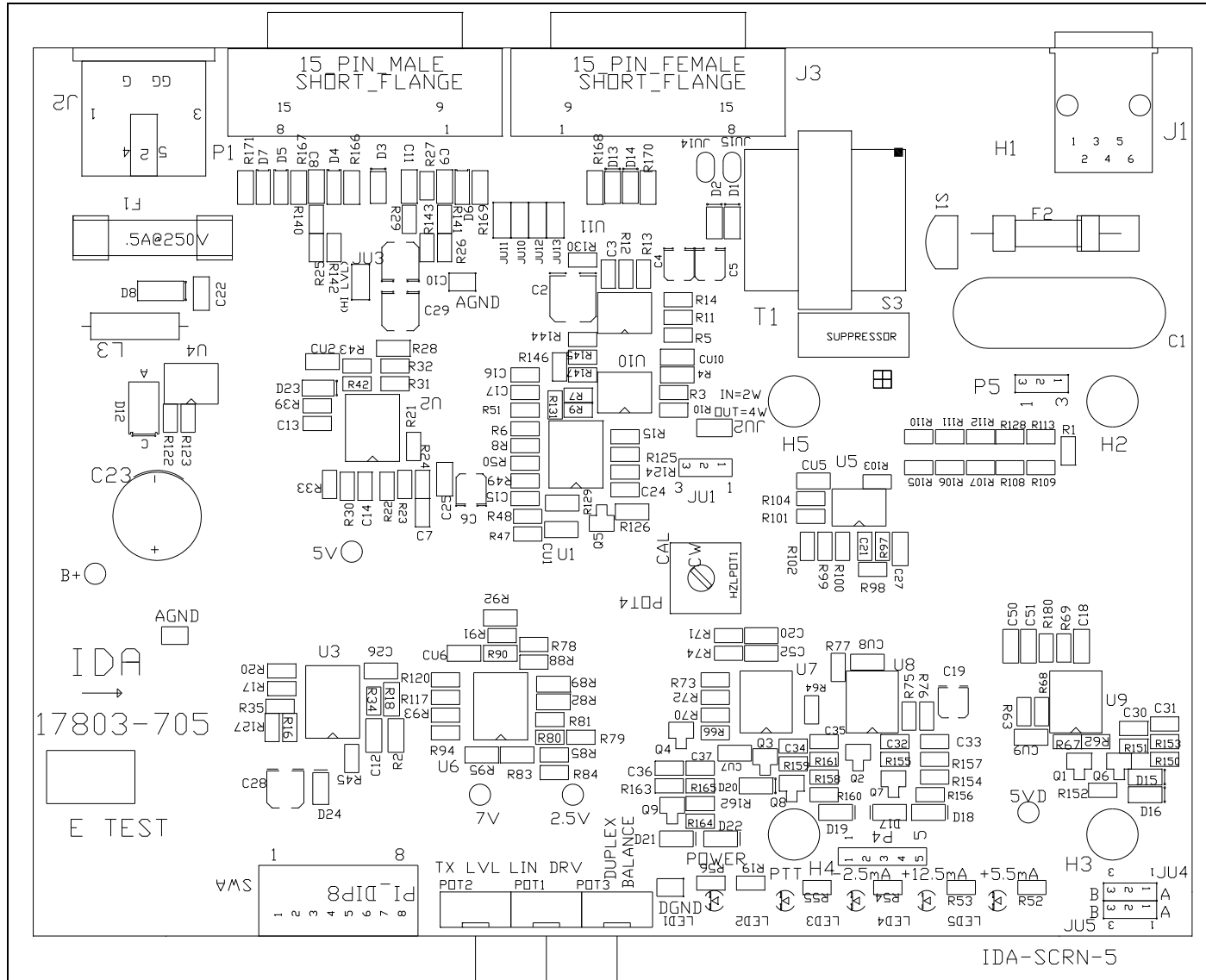


Figure 7. Main Circuit Board

# Schematics

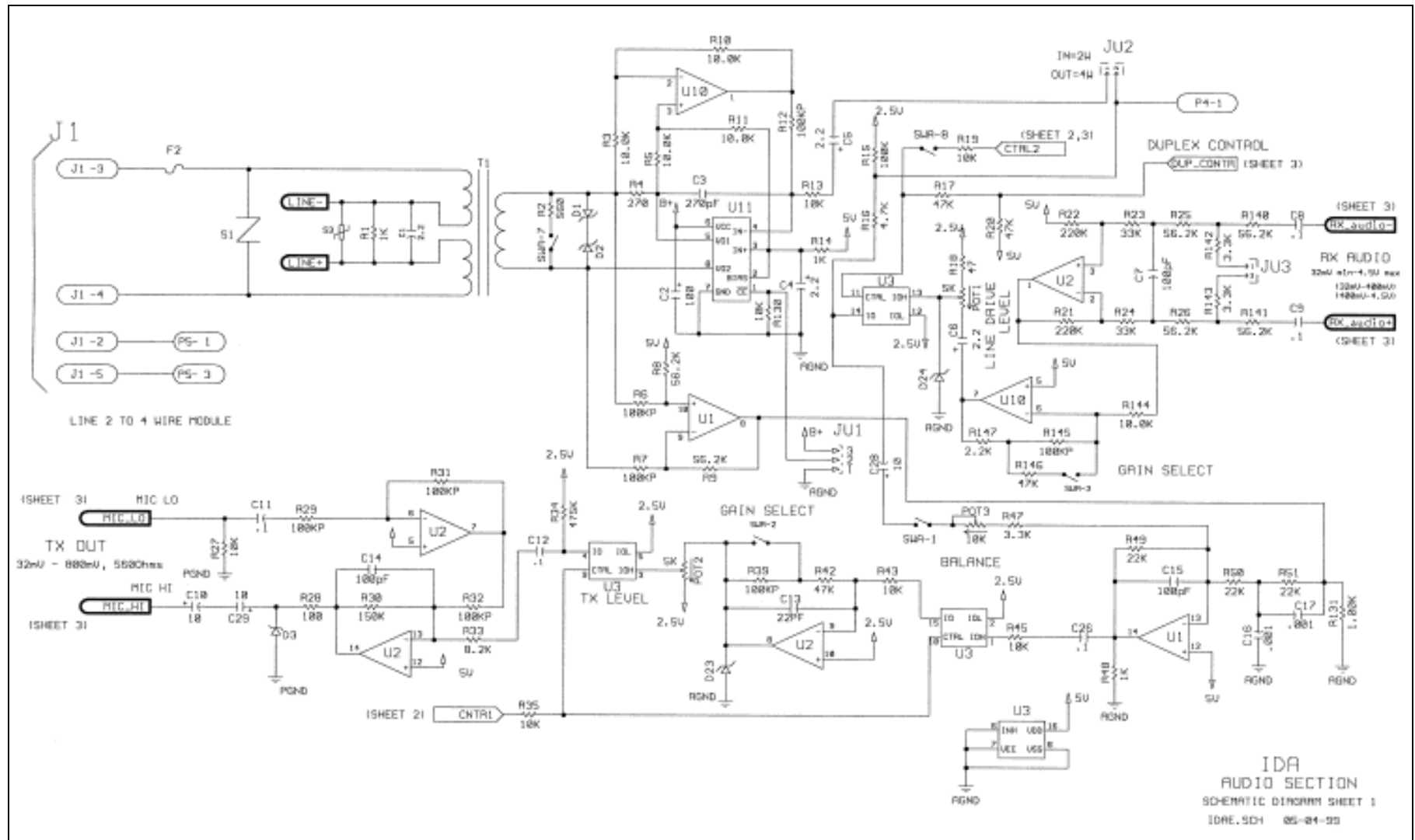


Figure 8. Schematic—Sheet 1

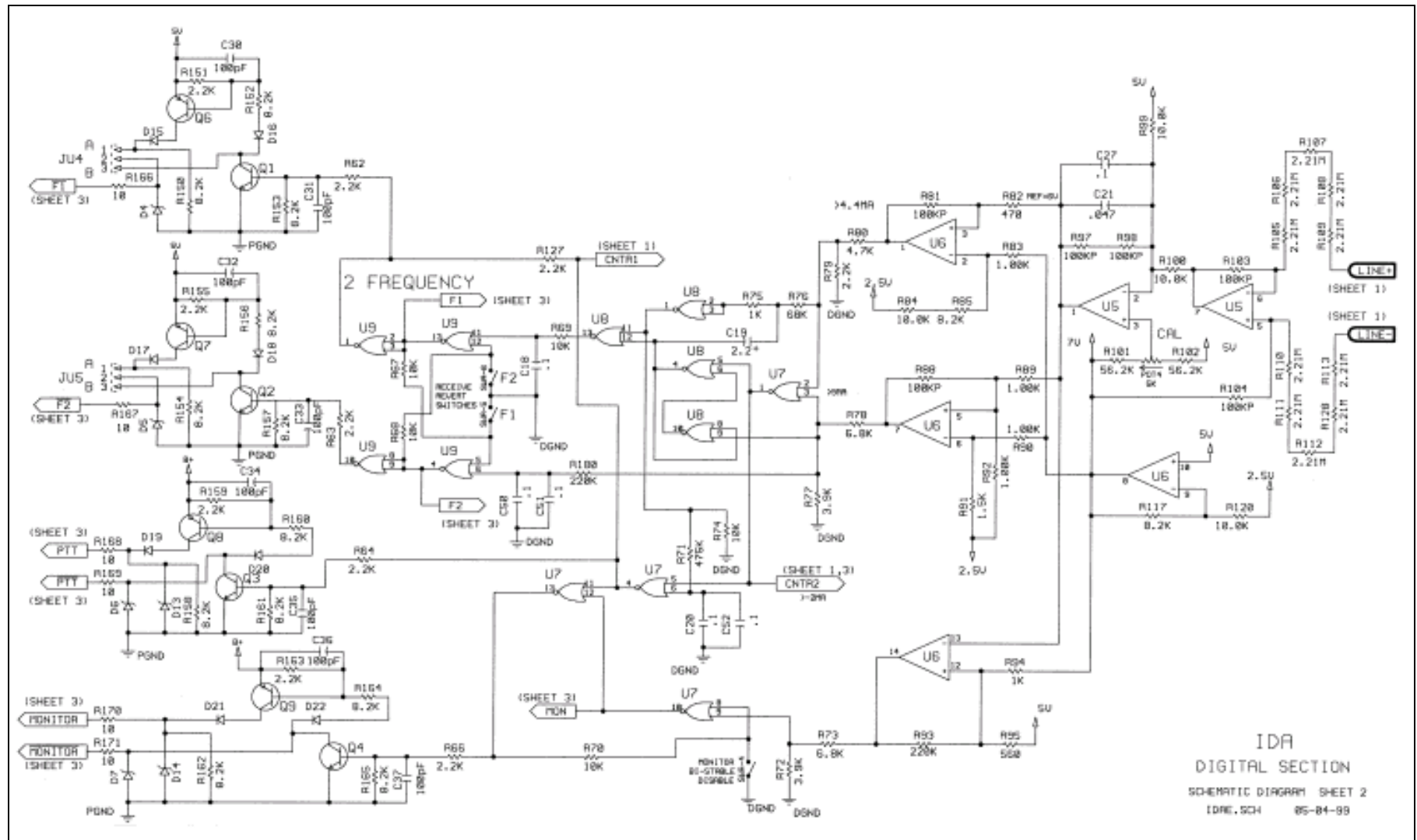


Figure 9. Schematic Diagram—Sheet 2

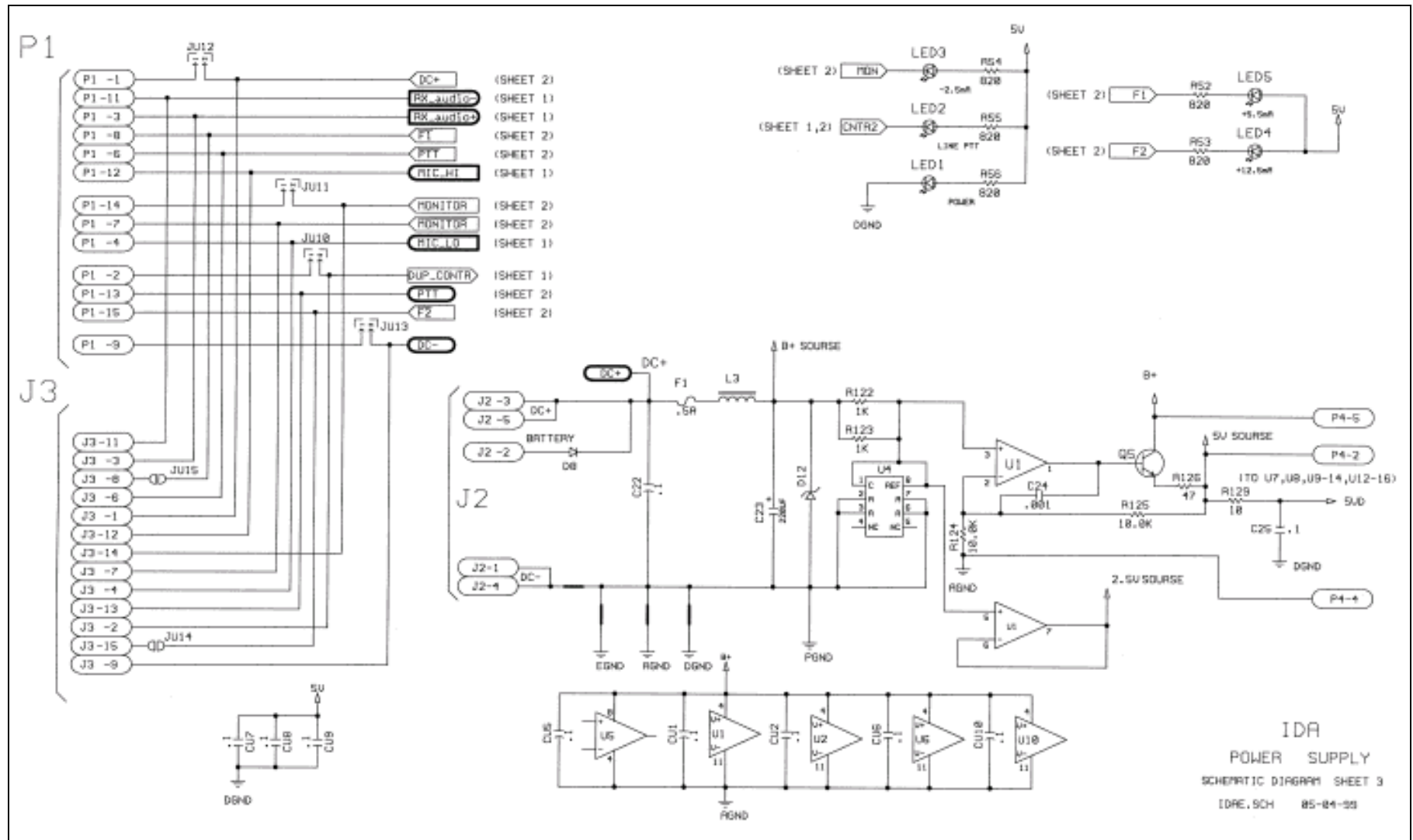


Figure 10. Schematic Diagram—Sheet 3



# Warranty

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Equipment. GAI-Tronics warrants for a period of one (1) year from the date of shipment, that any GAI-Tronics equipment supplied hereunder shall be free of defects in material and workmanship, shall comply with the then-current product specifications and product literature, and if applicable, shall be fit for the purpose specified in the agreed-upon quotation or proposal document. If (a) Seller's goods prove to be defective in workmanship and/or material under normal and proper usage, or unfit for the purpose specified and agreed upon, and (b) Buyer's claim is made within the warranty period set forth above, Buyer may return such goods to GAI-Tronics' nearest depot repair facility, freight prepaid, at which time they will be repaired or replaced, at Seller's option, without charge to Buyer. Repair or replacement shall be Buyer's sole and exclusive remedy. The warranty period on any repaired or replacement equipment shall be the greater of the ninety (90) day repair warranty or one (1) year from the date the original equipment was shipped. In no event shall GAI-Tronics warranty obligations with respect to equipment exceed 100% of the total cost of the equipment supplied hereunder. Buyer may also be entitled to the manufacturer's warranty on any third-party goods supplied by GAI-Tronics hereunder. The applicability of any such third-party warranty will be determined by GAI-Tronics.

Services. Any services GAI-Tronics provides hereunder, whether directly or through subcontractors, shall be performed in accordance with the standard of care with which such services are normally provided in the industry. If the services fail to meet the applicable industry standard, GAI-Tronics will re-perform such services at no cost to buyer to correct said deficiency to Company's satisfaction provided any and all issues are identified prior to the demobilization of the Contractor's personnel from the work site. Re-performance of services shall be Buyer's sole and exclusive remedy, and in no event shall GAI-Tronics warranty obligations with respect to services exceed 100% of the total cost of the services provided hereunder.

Warranty Periods. Every claim by Buyer alleging a defect in the goods and/or services provided hereunder shall be deemed waived unless such claim is made in writing within the applicable warranty periods as set forth above. Provided, however, that if the defect complained of is latent and not discoverable within the above warranty periods, every claim arising on account of such latent defect shall be deemed waived unless it is made in writing within a reasonable time after such latent defect is or should have been discovered by Buyer.

Limitations / Exclusions. The warranties herein shall not apply to, and GAI-Tronics shall not be responsible for, any damage to the goods or failure of the services supplied hereunder, to the extent caused by Buyer's neglect, failure to follow operational and maintenance procedures provided with the equipment, or the use of technicians not specifically authorized by GAI-Tronics to maintain or service the equipment. **THE WARRANTIES AND REMEDIES CONTAINED HEREIN ARE IN LIEU OF AND EXCLUDE ALL OTHER WARRANTIES AND REMEDIES, WHETHER EXPRESS OR IMPLIED BY OPERATION OF LAW OR OTHERWISE, INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**

## Return Policy

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If the equipment requires service, contact your Regional Service Center for a return authorization number (RA#). Equipment should be shipped prepaid to GAI-Tronics with a return authorization number and a purchase order number. If the equipment is under warranty, repairs or a replacement will be made in accordance with the warranty policy set forth above. Please include a written explanation of all defects to assist our technicians in their troubleshooting efforts.

Call 800-492-1212 (inside the USA) or 610-777-1374 (outside the USA) for help identifying the Regional Service Center closest to you.