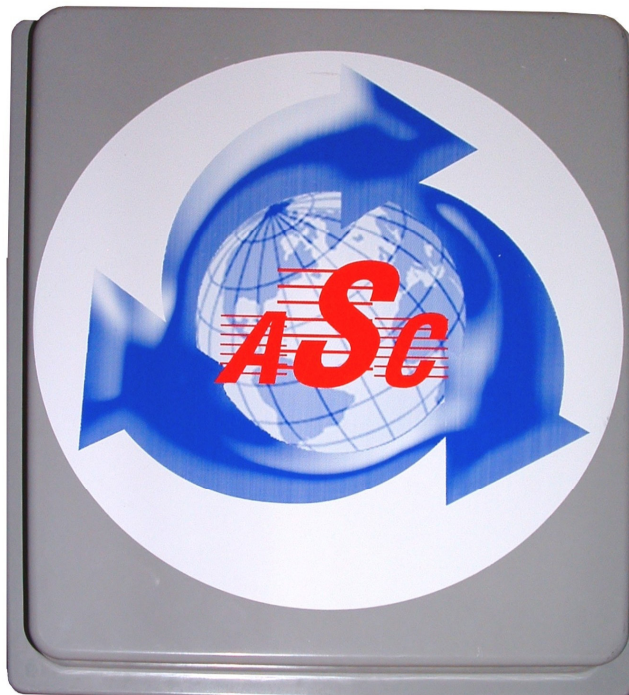


# RTU-2001-AC ISI SERIES INTERIOR SYSTEM INTERFACE

INSTALLATION, OPERATION, AND MAINTENANCE MANUAL



4801 West Woolworth Avenue  
Milwaukee, WI. 53218  
Phone (414) 358-8000 • Fax (414) 358-8008

# Table of Contents

<u>Description</u>		<u>Page</u>
<b>1. AMERICAN SIGNAL CORPORATION LIMITED WARRANTY</b>	3	
<b>2. GENERAL INFORMATION</b>		4
<b>A. ISI Description</b>		5
<b>B. ISI Specifications</b>		6
<b>C. ISI Connections</b>		7
<b>D. ISI Components</b>		8
<b>3. INSTALLATION</b>		
<b>A. Site Selection</b>		7
<b>B. Installation Information</b>		7
<b>4. PRE-OPERATION PROCEDURE</b>		7
<b>5. THEORY OF OPERATION</b>		
<b>A. General</b>		11
<b>B. RTU Logic Board Circuit</b>		11
<b>C. Power Supply And Charging Circuit</b>		12
<b>D. Radio P.A.</b>		13
<b>E. Custom Signaling (VIA RADIO)</b>		13
<b>6. MAINTENANCE</b>		
<b>A. Monthly Maintenance</b>		13
<b>7. TROUBLE SHOOTING GUIDE</b>		14
<b>8. DRAWINGS:</b>		
<b># 80-0105C</b> Compulert 3 RTU Logic PCB		15
<b># 80-0113A</b> Compulert 3 Front Panel PCB		16
<b># 80-0157A</b> RTU Power Supply PCB		17
<b># 80-0203A</b> 8 Channel I/O Expansion PCB (ISI Board)		18
<b># 72-0487</b> RTU-2001-AC w/ISI Board Wiring Interconnect Diagram		19

## 1. AMERICAN SIGNAL CORPORATION LIMITED WARRANTY

Rev. 08/06

AMERICAN SIGNAL CORPORATION warrants all electronic control equipment (except batteries) to be free from defects in materials and workmanship for a period of two (2) years for parts, two (2) year for in-house labor, from the date of shipment, provided such equipment is installed, operated, and maintained in accordance with the instructions, manuals, and/or recommendations supplied by American Signal Corporation. If within such period any such equipment shall be proved to American Signal Corporation's satisfaction to be defective, such equipment shall be repaired or replaced at American Signal Corporation's option. Notwithstanding the foregoing, American Signal Corporation makes no warranties on equipment manufactured by others and supplied by American Signal Corporation, but will extend to the purchaser any warranties associated with such equipment.

### EXCLUSIVE WARRANTY/REMEDY

The foregoing is American Signal Corporation's sole obligation and the buyer's exclusive remedy hereunder and shall be conditioned upon American Signal Corporation's receiving written notice of any alleged defect within 30 days after its discovery and, at American Signal Corporation's option, return of such equipment to American Signal Corporation, f.o.b. its factory in Milwaukee, Wisconsin. **THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER REPRESENTATIONS AND WARRANTIES, EXPRESS OR IMPLIED; AND AMERICAN SIGNAL CORPORATION EXPRESSLY DISCLAIMS AND EXCLUDES ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE.**

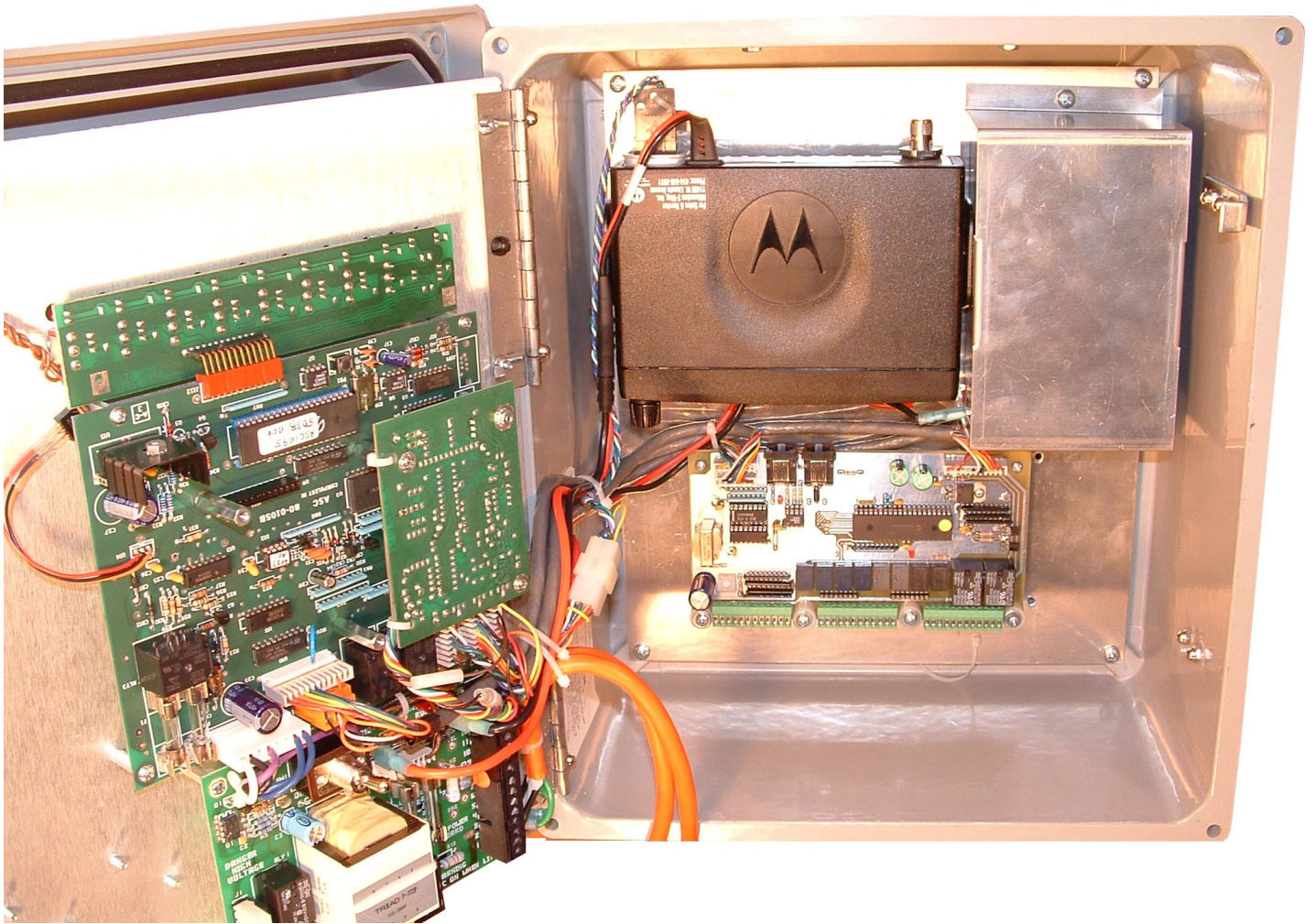
This warranty does not apply to any equipment which in American Signal Corporation's judgment has been subject to misuse, neglect or accident or damage due to local utility power surges, abuse, alteration, improper installation or application, or negligence in use, storage, transportation or handling, acts of god or nature, or repair by anyone other than American Signal Corporation and its authorized service centers. This warranty does not cover any costs related to transportation for return of equipment or reshipment of any repaired or replaced equipment, or costs associated with installation, removal, or reinstallation of equipment.

### LIMITATION OF LIABILITY

Except as otherwise agreed in writing, American Signal Corporation's liability with respect to the equipment and/or services sold hereunder shall be limited to the warranty provided above, and, with respect to other performance of the sales/service contract, shall be limited to the contract price. **AMERICAN SIGNAL CORPORATION SHALL NOT BE SUBJECT TO ANY OTHER OBLIGATIONS OR LIABILITIES, WHETHER ARISING OUT OF BREACH OF CONTRACT, WARRANTY, TORT (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR OTHER THEORIES OF LAW, WITH RESPECT TO EQUIPMENT SOLD OR SERVICES RENDERED BY AMERICAN SIGNAL CORPORATION, OR ANY UNDERTAKINGS, ACTS OR OMISSIONS RELATING THERETO.** Without limiting the generality of the foregoing, American Signal Corporation specifically disclaims any liability for property or personal injury damages, penalties, special or punitive damages, damages for lost profits or revenues, loss of use of equipment or any associated equipment, cost of capital, cost of substitute equipment, facilities or services, down-time, shut-down or slow-down costs, or for any other types of economic loss, or for claims of buyer's customers or any third party for any such damages. **AMERICAN SIGNAL CORPORATION SHALL NOT BE LIABLE FOR AND DISCLAIMS ALL CONSEQUENTIAL, INCIDENTAL AND CONTINGENT DAMAGES WHATSOEVER.**

## 2. GENERAL INFORMATION

American Signal Corporation's ISI Series are battery operated electronic control devices. The ISI system is capable of generating multiple warning signals, playing pre-recorded messages and providing Public Address capabilities to Building controls that require Radio Control extension capabilities. With it's flexible 8 Inputs and Outputs, it can also activate messages within the building Control and repeat building control status information back to the Giant Voice Command Computer.



**Figure 1**

## 2. GENERAL INFORMATION

### A. ISI CONTROL DESCRIPTION

American Signal electronic controls provide a standard set of ten signals (Table 1) , a Public Address feature and an optional pre-recorded message board.

COMPULERT 3 STANDARD TONE FORMATS		
Function	Frequency Of Operation	Sweep Rate
<b>ALERT</b>	Steady Tone, 670 Hz.	3 Minutes
<b>ATTACK</b>	Wailing Tone, Ramping Up and Down, 740 Hz. / 570 Hz.	6 sec. Up and 6 sec. Down for 3 Minutes
<b>HI/LO</b>	Alternating Tone, 740 Hz. / 570 Hz.	0.75 sec. Hi, 0.75 sec. Low for 3 Minutes
<b>AIR-HORN</b>	Alternating Tone, 740 Hz.	2 sec. On and 2 sec. Off for 3 Minutes
<b>FIRE</b>	Wailing Tone, Ramping Up and Down, 740 Hz. / 500 Hz.	16 sec. Up and 8 sec. Down for 1.5 Minutes
<b>HAZARD</b>	Alternating Tone, 500 Hz. ramping Up to 850 Hz in 1 sec.	3 Minutes
<b>CHIME</b>	Alternating Tone, 533 Hz. Tone	Tone Burst On at 2 sec. Intervals for 6 Cycles
<b>SCREAM</b>	Wailing Tone, 500 Hz. to 850 Hz.	0.8 sec. Up and 0.2 sec. Down for 3 Minutes
<b>WAIL</b>	Wailing Tone, 850 Hz. to 500 Hz.	0.8 sec. Up and 0.2 sec. Down for 3 Minutes
<b>SILENT TEST</b>	12.5 KHz Tone, (Non-Audible)	3 Seconds

**TABLE 1**

The optional local **PUBLIC ADDRESS (PA)** microphone allows the user to broadcast voice through the ISI to issue instructions during time of emergency. A noise cancelling microphone and volume control is available as an option for use on each control unit.

A **RADIO PA** signal is used in a public address mode that is operated via a radio control decoder package (see Theory of Operation). This allows the user to operate the PA mode from a central dispatch location for systems comprised of one or more ISI units.

**CUSTOM SIGNALING-** Using the radio input and / or RS232 it is possible to program up to 5 custom Tones. Additional Tones can be provided by the addition of a message board. Contact American Signal with your signal requirements or application.

**PRE-RECORDED MESSAGES-** There are two message board options. The first option supports up to 30 messages. A repeat counter and special sentence structure where common phrases are recorded only once can expand the 3 minute limit to well over 10 minutes. The second option supports up to 128 messages and is only limited by the size of the Compact Flash card.

## 2. GENERAL INFORMATION

### B. ISI SPECIFICATIONS

#### ENVIRONMENTAL PARAMETERS

Operating	-40° F to +140° F/ -40°C to +60°C
Storage	-85° F to +257° F/ -65°C to +125°C
Humidity	0 to 100% non-condensing

#### ELECTRICAL

##### Power Requirements

AC Input:	120VAC +/- 10%, less than 20 Watts **
Backup Battery:	12VDC, 7.5AH
Battery Charging current	250mA
Maximum Radio Standby current	1.5 Amps
Maximum Radio Transmit current	12 Amps

##### Audio Output:

Output Level	Adjustable from 20 mV to 2 volts RMS into 600 Ohms
Minimum Load Impedance	600 Ohms

##### Output Contact ratings:

8 Auxiliary outputs	Isolated N.O. or N.C., 30v max, 1A/output
1 Audio Control Relay	Isolated N.O. and N.C. 7A, 30VDC or 250VAC
1 Strobe Control Relay	Isolated N.O. and N.C. 7A, 30VDC or 250VAC

##### Status Inputs:

Input impedance	10,000 Ohms
Input voltage for Logic 0	<7 volts DC only
Input voltage for Logic 1	>9 volts DC only
Maximum safe operating range	0 to 55 volts DC
Maximum protected range	480 volts AC/DC

#### PHYSICAL CHARACTERISTICS:

- **ISI Control Cabinet (H x W x D):** 14 x 12 x 6 Inches/ 35.56 x 30.48 x 15.24 Centimeters
- **ISI Control Weight:** 38 Lbs. / 17.27 Kg. (w/ Backup Battery)

\*\* The wattage of the RTU without Radio is less than 5 watts. The total power required depends on the selected Radio. Typically, the entire RTU will draw less than 10 watts.

## 2. GENERAL INFORMATION

### C. ISI CONNECTIONS

#### RTU Power Supply Card (ASC Part # 080-0157)

<u>Terminal</u>	<u>Description</u>	<u>Details</u>
J4-01	120Vac-Line (Hot)	Incoming Power
J4-02	120Vac-Line (Neutral)	
J4-02	Fused Auxiliary (Neutral)	120 Vac @ 2 Amps
J4-04	Fused Auxiliary (Hot)	
J4-05	not used	N.O. Relay output for control circuit
J4-06	not used	N.O. Relay input for control circuit
J4-07	RTU Feedback Input	Input for switched 12Vdc to determine if RTU is or has been operating
J4-08	not-used	
J4-09	Door Loop	Non-Supervised closed loop for cabinet intrusion detection and reporting
J4-10	Door Loop	
J4-11	not-used	
J4-12	+12	Unregulated Battery voltage output
J4-13	not-used	
J4-14	Ground (Battery -)	
J4-15	Standby Battery -	
J4-16	Standby Battery +	

#### Auxiliary I/O Card (ASC Part # 080-0203)

<u>Terminal</u>	<u>Description</u>	<u>Details</u>
J301-01	Audio I/O	Transformer Isolated I/O Terminal 1
J301-02	Audio I/O	Transformer Isolated I/O Terminal 2
J301-03	Auxiliary +12 volts	Common output to drive Digital inputs. Common ground - Aux Inputs (Analog Mode)
J301-04	Auxiliary Ground	
J301-05	Input 1	Digital Input Only.
J301-06	Input 2	Analog/Digital Input 2
J301-07	Input 3	Analog/Digital Input 3
J301-08	Input 4	Analog/Digital Input 4
J301-09	Input 5	Analog/Digital Input 5
J301-10	Input 6	Analog/Digital Input 6
J301-11	Input 7	Analog/Digital Input 7
J301-12	Input 8	Analog/Digital Input 8

## 2. GENERAL INFORMATION

### C. ISI CONNECTIONS

#### Auxiliary I/O Card (ASC Part # 080-0203)

<u>Terminal</u>	<u>Description</u>	<u>Details</u>
J302-01	Auxiliary Output Relay 1	1 Amp NO or NC contact
J302-02	Auxiliary Output Relay 1	
J302-03	Auxiliary Output Relay 2	1 Amp NO or NC contact
J302-04	Auxiliary Output Relay 2	
J302-05	Auxiliary Output Relay 3	1 Amp NO or NC contact
J302-06	Auxiliary Output Relay 3	
J302-07	Auxiliary Output Relay 4	1 Amp NO or NC contact
J302-08	Auxiliary Output Relay 4	
J302-09	Auxiliary Output Relay 5	1 Amp NO or NC contact
J302-10	Auxiliary Output Relay 5	
J302-11	Auxiliary Output Relay 6	1 Amp NO or NC contact
J302-12	Auxiliary Output Relay 6	

<u>Terminal</u>	<u>Description</u>	<u>Details</u>
J303-01	Auxiliary Output Relay 7	1 Amp NO or NC contact
J303-02	Auxiliary Output Relay 7	
J303-03	Auxiliary Output Relay 8	1 Amp NO or NC contact
J303-04	Auxiliary Output Relay 8	
J303-05	Audio Control Relay	N.O. Contact
J303-06	Audio Control Relay	Common
J303-07	Audio Control Relay	N.C. Contact
J303-08	Strobe/Aux Control Relay	N.O. Contact
J303-09	Strobe/Aux Control Relay	Common
J303-10	Strobe/Aux Control Relay	N.C. Contact
J303-11	Chassis Ground	
J303-12	Chassis Ground	



## GENERAL INFORMATION

### D. ISI COMPONENTS

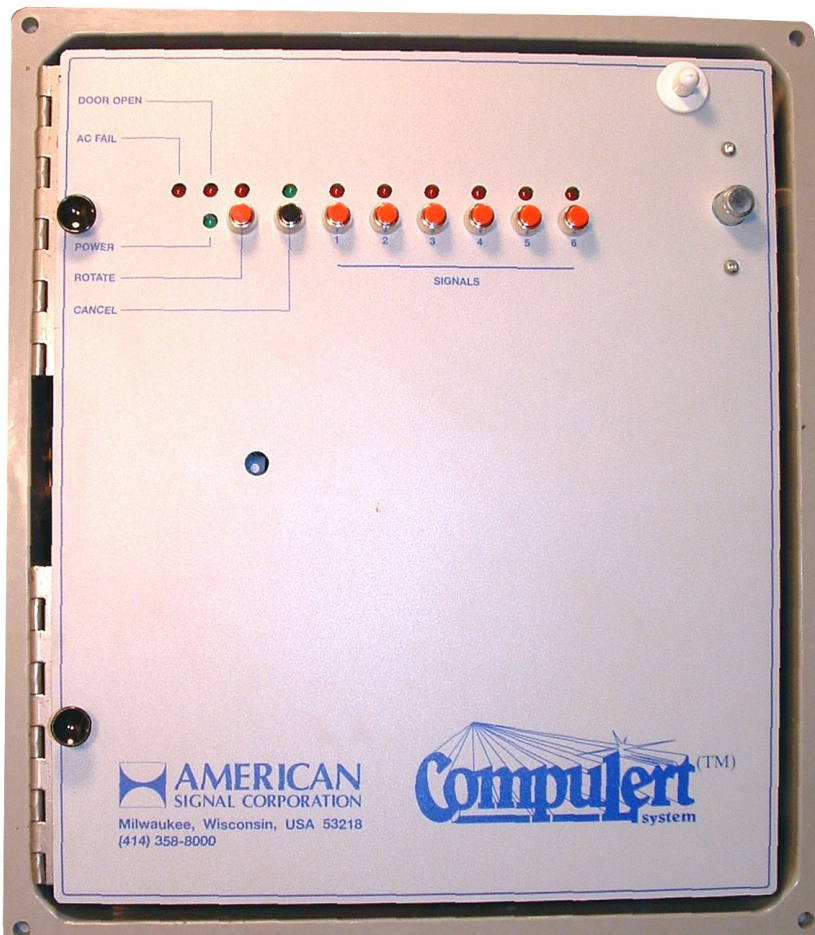
#### CONTROL ENCLOSURE:

The Interior System Interface is a factory-assembled unit ready for installation at the site. It can be mounted indoors or outdoors.

The cabinet contains the Compulert 3 Main Logic Board, RTU Power Supply Board, FSK Format Daughter Board, and Radio / Landline Interface Card with its manual control panel and all terminations to the building controls. The cabinet is a NEMA 4 rated (12" H x 12" W x 8" D) enclosure for a fiberglass enclosure providing a weather resistant environment for the control.

The RTU Power Supply Board w/ battery backup provides the primary power for the operation of the decoder. ***The Interior System Interface is designed to operate in the event of an AC power failure*** for extended periods of time. If the battery equipment is properly maintained, the ISI will remain ready for operation for up to eight hours without outside power to charge the battery.

The Interior System Interface is furnished with a manual control panel for up to 5 functions, a silent test feature, a Cancel button and a manual Strobe test button. It also has Power, AC Fail, and Door Open indicator LED's. The Interior System Interface also features LED's above each local button, which can be used to diagnose the current condition of the RTU.



### **3. INSTALLATION**

#### **A. SITE SELECTION AND TYPES OF MOUNTING**

Careful consideration must be given in selecting a location that is close to an exterior building surface, to limit the length of the antenna coax, as well as close proximity to the target building systems to facilitate testing.

#### **B. INSTALLATION INFORMATION**

Installation of the ISI series controls proceeds in the following steps:

1. Determine the mounting location of the ISI control enclosure. Find a solid unobstructed wall or similar place with a minimum of 2 feet by 2 feet area to mount the ISI unit.
2. With the control enclosure held in position, mount the control enclosure to the wall with the appropriate fasteners.
3. Attach a # 10 stranded copper ground wire to the ISI control enclosure at the ground terminal on the bottom of the mounting channel. Continue the connection of the ground wire to an adequate ground in compliance with national, state, and local codes.
4. If required run conduit for power, antenna coax and interconnection to the existing building controls.

### **4. PRE-OPERATION PROCEDURE**

Once installed, the ISI and accessories should be inspected and tested in accordance with the following procedure (Refer to the proper drawing for reference):

1. Install and connect the 12 volt battery to the Red and Black leads provided.
2. Inspect the 120 Vac incoming power connections to TB1. Ground should terminate to the ground lug located on TB1. Line "HOT" should terminate to TB1-Pin 1. Line "NEUTRAL" should terminate to TB1-Pin 2. The additional termination points are provided to allow easy installation of external devices to the power terminal. External devices must not exceed the ampacity of the input power circuit.
3. Place the control power toggle switch on the RTU Power supply to the ON position.
4. The green power lamp of the RTU Logic board will light on this application of power to the ISI control.

## 5. STARTUP PROCEDURE

1. Momentarily press one of the ISI signal buttons. The ISI control will operate the appropriate signal until the Cancel button is depressed.
2. Insert the hand held microphone male plug end into the audio input receptacle (If purchased). Operate the microphone by depressing the switch. The microphone is of the noise canceling type and should be held against your top lip when speaking into it. With the microphone switch held in the depressed position, speak clearly into the microphone and adjust the volume level to obtain the best operation.
3. For a two-way FSK system, run a Silent Test and/or a ISI signal for at least 15 seconds. Have the appropriate person Poll (interrogate) the ISI to check for the proper response. It should say that the control has activated Ok.
4. The information on the installation and operation of any control devices or accessories is not within the scope of this manual. Refer to the manual provided by the manufacturer of the accessory equipment.

## **6. THEORY OF OPERATION**

### **A. GENERAL**

The ISI's charging system is powered by 120 VAC service. The battery backup uses a sealed lead acid cell for the RTU and radio system.

The ISI's RTU is powered by the 120 VAC service and has battery backup, at all times, with the charging system providing cycling and/or float charging to the battery operating system.

When a local button is depressed, P.A. announcements are made; the RTU board makes a switched relay closure to operate an external device such as an existing siren or intercom P.A. system. The RTU board creates a fixed 8 ohm 3 volt audio output. Audio output from the RTU Main board is fed to the ISI board, where there is an adjustable 20mV to 2 Volt audio output at 600 ohm signal, depending upon the version of ISI control. The audio output signal is then available for connection to the customer's intercom P.A. system.

### **B. RTU LOGIC BOARD CIRCUIT**

ISI signals are operated via the local buttons or high going signals on the remote inputs of J102-1 through J102-Pin 8 (refer to drawing #080-0105C). J101-Pin 4 is a +12 Vdc connection. A momentary 1-second closure of J101-Pin 4 to the appropriate pin of J102 will provide one of several signals. The operation of a signal initiates an audio oscillator of proper frequency and duration to the signal selected.

The audio oscillator is fed to a dual tone offset oscillator to create a second frequency offset which follows the first oscillator to get approximately -150 Hz offset. The two audio oscillators provide these signals through an audio enable circuit to the preamplifier outputs of the RTU Logic board. The square wave produced in one of the two oscillators is output to the external building controls. The RTU Logic board also provides two switched closures. One to activate the external building control amplifiers and a second to provide power to optional Strobes.

In the P.A. mode or radio mode the audio enable circuit disables the tone generator and offset generator output. The voice audio supplies the preamplifier inputs and provides audio output to the power amplifier stage.

The voice input via the manual P.A. mode is adjustable by means of a volume control through the face of the RTU Logic board (VR1).

The RTU Logic Board is modular in design and can be easily removed via two (2) Nylatch connectors and four (4) wing nuts, which fasten the faceplate to the ISI control after removal of the board's connectors.

### **C. RADIO PA**

This signal is similar to PA above, but is controlled through the RTU. Sending a PA command will stop any Tone in progress to allow instructional information to be given.

### **D. CUSTOM SIGNALING (VIA RADIO)**

Using the radio input or interface, up to 5 custom signals can be activated. Contact American Signal field representatives with your application requirement.

## **7. MAINTENANCE**

The ISI control is designed to provide error free operation and ease in scheduled maintenance. Should repair become necessary, all components can be replaced in a modular fashion to eliminate costly labor and heavy lifting.

Scheduled maintenance is limited to inspection and tightening electrical connections, normal battery maintenance, and periodic testing of the ISI system to assure system readiness at all times.

Remote Diagnostic options greatly enhance the maintenance of the system and further reduce labor requirements to service the system.

The following is a recommended guideline to maintain ISI readiness.

### **MONTHLY MAINTENANCE**

On a monthly basis, American Signal recommends that the ISI control be tested at least once.

## 8. TROUBLE SHOOTING GUIDE

**Symptom:** The ISI does not operate remotely or locally, no lights on the RTU board.

**Cause/Remedy:** No AC power and/ or no DC power.  
Check fuse (2-amp) on Power Supply Board  
Check incoming AC power and DC power supply.  
Check power connections.

**Symptom:** The ISI does not operate remotely or locally, light on RTU board lit.

**Cause/Remedy:** Faulty RTU board - replace.  
Blown fuses on power amps - replace.

**Symptom:** The ISI does not produce sound when activated, P.A. does not work either.

**Cause/Remedy:** Faulty RTU board - replace.

**Symptom:** The ISI does not sound when activated, P.A. is operational.

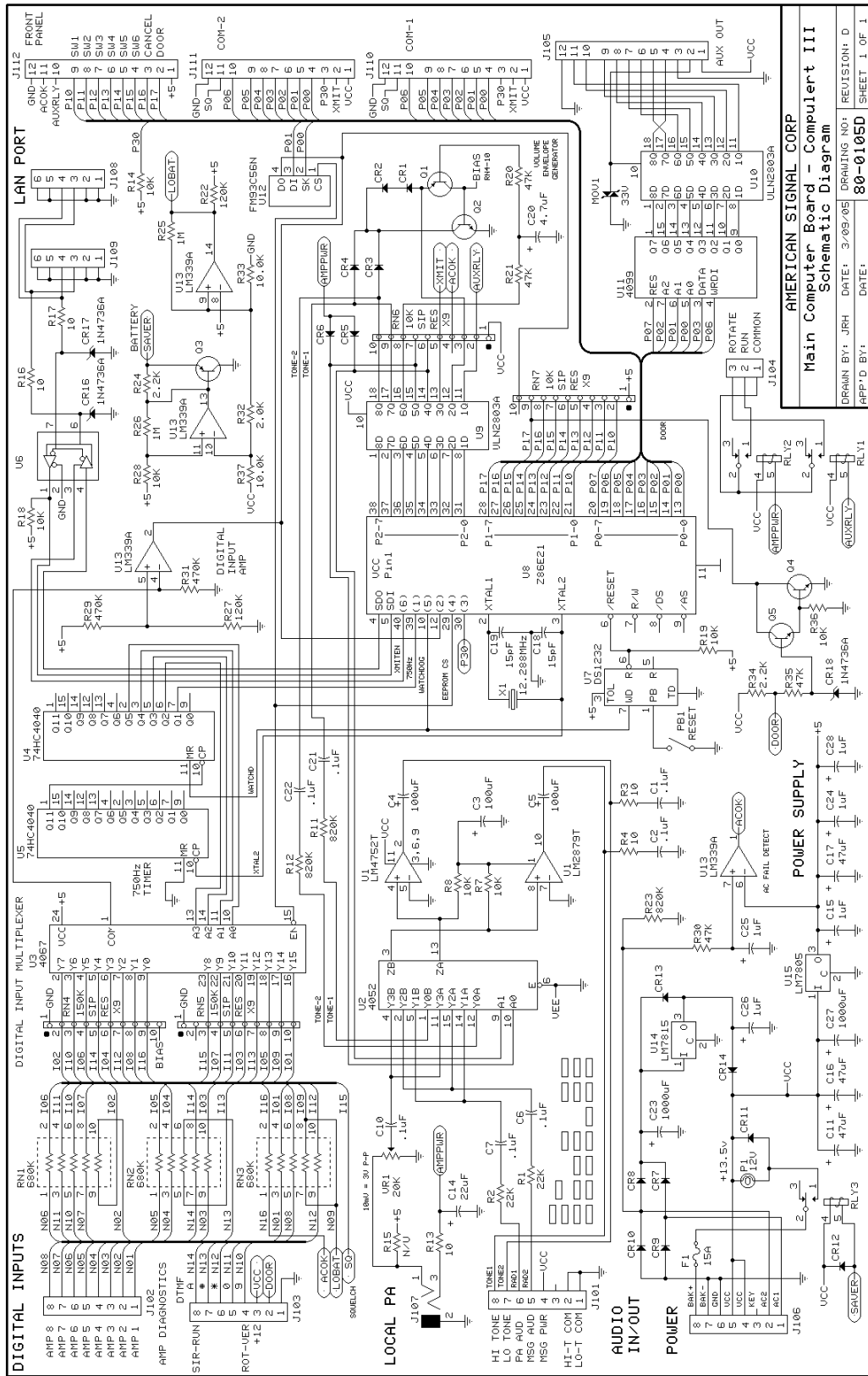
**Cause/Remedy:** Faulty RTU board - replace.

**Symptom:** The ISI sounds when activated, no P.A. operation.

**Cause/Remedy:** Faulty RTU board - replace.  
Faulty microphone - replace.

Each category describes the service to be performed and the procedure of that service.

# 9. DRAWINGS



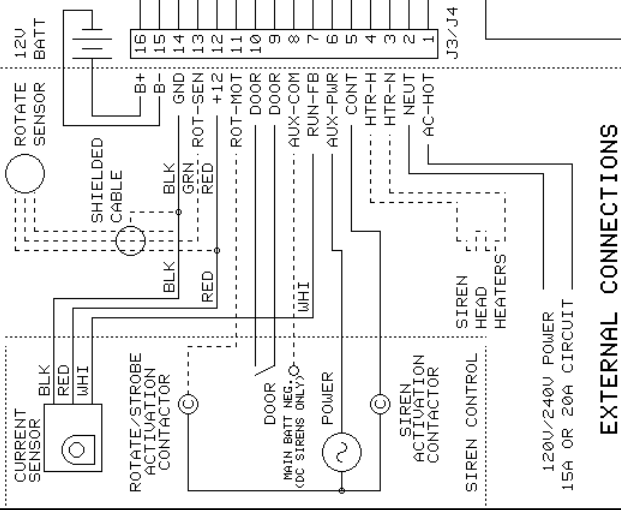
Computert 3 RTU Logic PCB



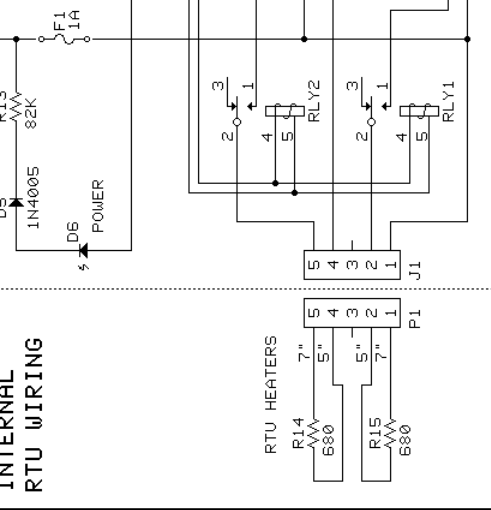


REV	ECO	DATE	DESCRIPTION
B		08/27/02	ADD CURRENT SENSOR TO CONNECTIONS

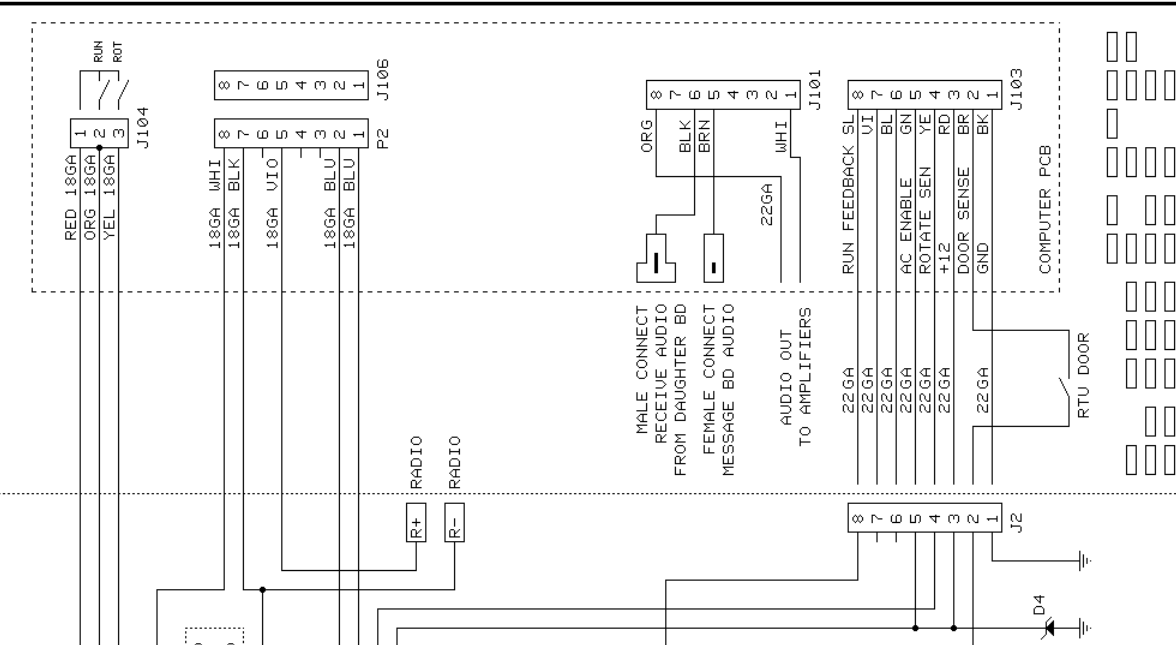
NOTE: RUN 1 MOTOR LEAD THROUGH OPENING OF CURRENT SENSOR



**EXTERNAL CONNECTIONS**



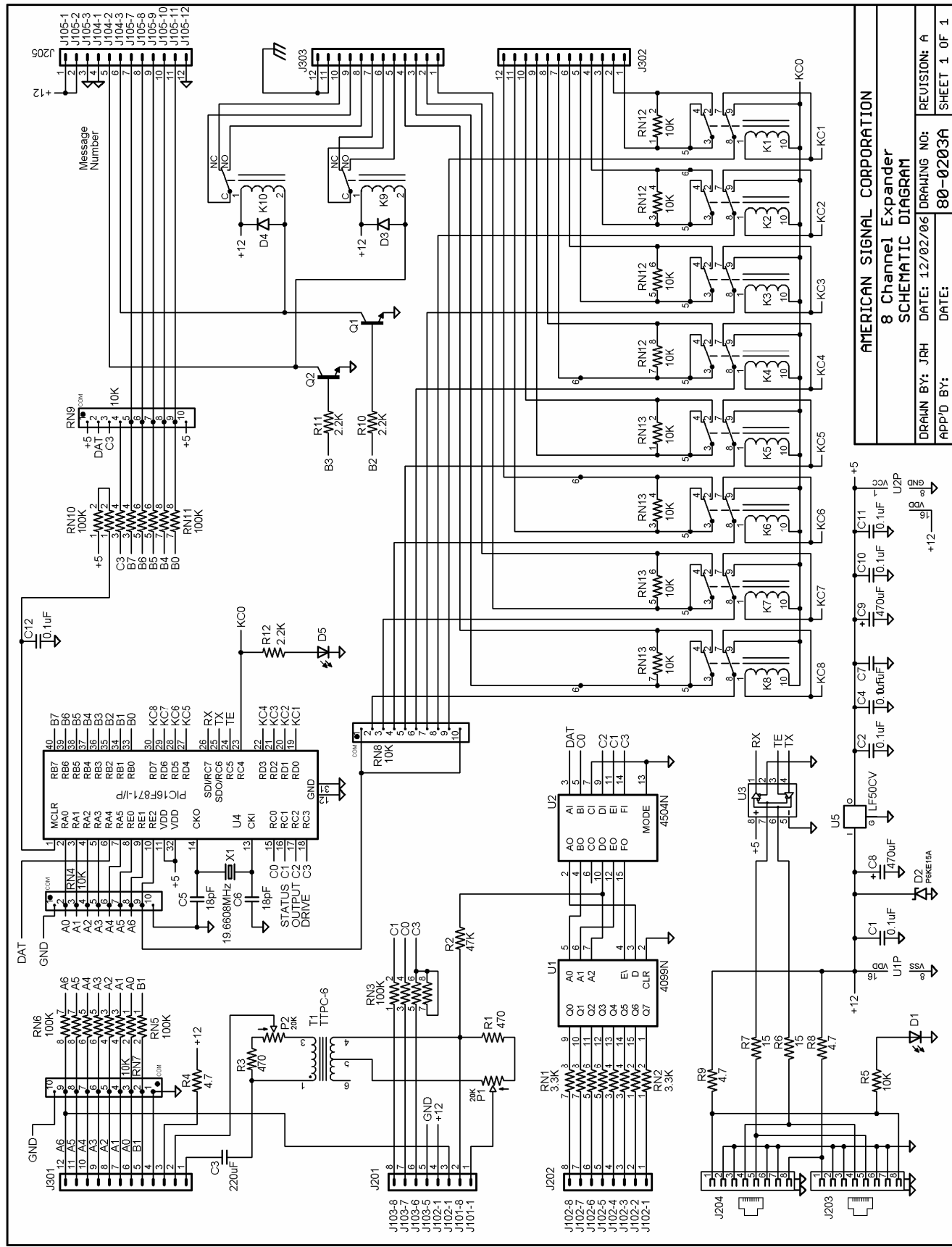
**INTERNAL RTU PANEL WIRING**



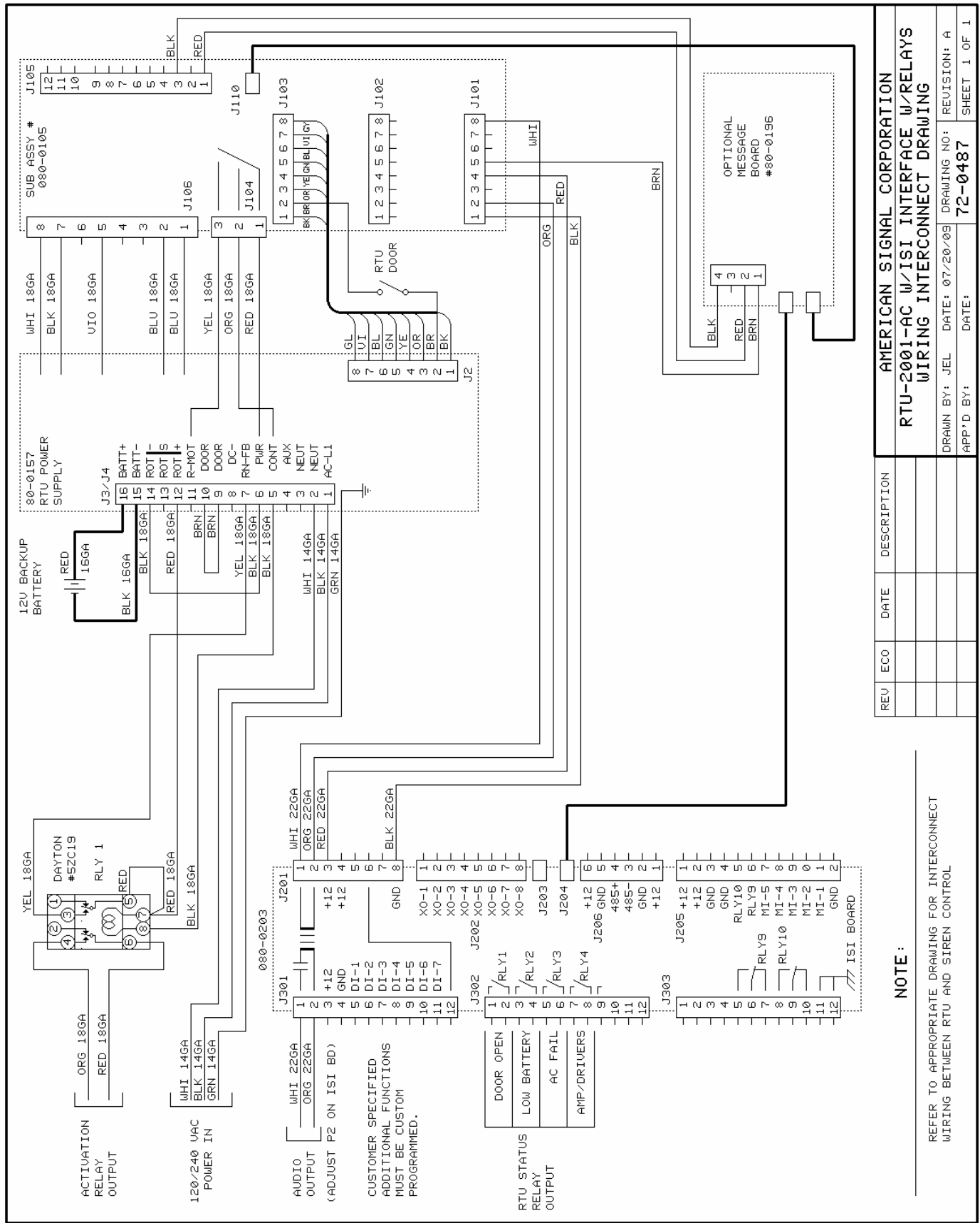
**AMERICAN SIGNAL CORPORATION**  
**RTU POWER SUPPLY 2**  
**Schematic Diagram**

DRAWN BY: JRH	DATE: 08/27/02	DRAWING NO:	REVISION: B
APP'D BY:	DATE:	80-0157A	SHEET 1 OF 1

**RTU Power Supply PCB**



8 Channel I/O Expansion Card



**RTU-2001-AC w/ ISI Board Wiring Interconnect Diagram**