

The
*AirWave*TM



Broadcast Console

Operations
&
Technical
Manual

PR&E 75-37

Revision D • 4/99

The AirWave Broadcast Console

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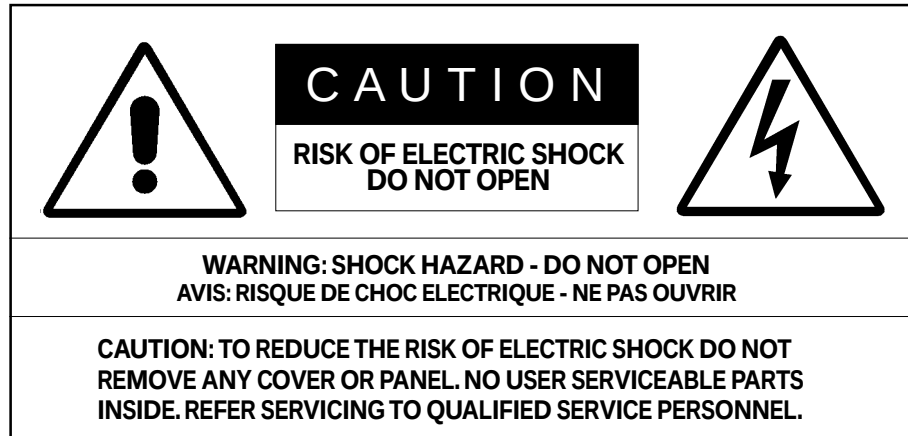
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Safety Instructions

1. **Read All Instructions.** All safety and operating instructions must be read before operating the product.
2. **Retain All Instructions.** All safety and operating instructions must be retained for future reference.
3. **Heed All Warnings.** All warnings on the product and those listed in the operating instructions must be adhered to.
4. **Follow All Instructions.** All operating and product usage instructions must be followed.
5. **Heat.** This product must be situated away from any heat sources such as radiators, heat registers, stoves, or other products (including power amplifiers) that produce heat.
6. **Ventilation.** Slots and openings in the product are provided for ventilation. They ensure reliable operation of the product, keeping it from overheating. These openings must not be blocked nor covered during operation. This product should not be placed into a rack unless proper ventilation is provided through following the manufacturer's recommended installation procedures.
7. **Water and Moisture.** Do not use this product near water—for example, near a bath tub, wash bowl, kitchen sink or laundry tub; in a wet basement; or near a swimming pool or the like.
8. **Attachments.** Do not use any attachments not recommended by the product manufacturer as they may cause hazards.
9. **Power Sources.** This product must be operated from the type of power source indicated on the marking label and in the installation instructions. If you are not sure of the type of power supply to your facility, consult your local power company.
10. **Grounding and Polarization.** This product is equipped with a polarized AC plug with integral safety ground pin. Do not defeat the safety ground in any manner.
11. **Power Cord Protection.** Power supply cords must be routed so that they are not likely to be walked on or pinched by items placed upon or against them. Pay particular attention to the cords at AC wall plugs and convenience receptacles, and at the point where the cord plugs into the product.
12. **Lightning.** For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the AC wall outlet. This will prevent damage to the product due to lightning and power line surges.
13. **Overloading.** Do not overload AC wall outlets, extension cords, or integral convenience outlets as this can result in a fire or electric shock hazard.
14. **Object and Liquid Entry.** Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.
15. **Accessories.** Do not place this product on an unstable cart, stand, tripod, bracket, or table. The product may fall, causing serious damage to a child or adult, and serious damage to the product. Any mounting of the product needs to follow manufacturer's installation instructions.
16. **A Product and Cart Combination** should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the product and the cart combination to overturn.
17. **Servicing.** Refer all servicing to qualified servicing personnel.
18. **Damage Requiring Service.** Unplug this product from the wall AC outlet and refer servicing to qualified service personnel under the following conditions:
 - a. When the AC cord or plug is damaged.
 - b. If liquid has been spilled or objects have fallen into the product.
 - c. If the product has been exposed to rain or water.
 - d. If the product does not operate normally (following operating instructions).
 - e. If the product has been dropped or damaged in any way.
 - f. When the product exhibits a distinct change in performance. This indicates a need for service.
19. **Replacement Parts.** When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or that have the same characteristics as the original parts. Unauthorized substitutions may result in fire, electric shock, or other hazards.
20. **Safety Check.** Upon completion of any repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper operating condition.
21. **Cleaning.** Do not use liquid cleaners or aerosol cleaners. Use only a damp cloth for cleaning.

Hazard / Warning Label Identification



**WARNING: TO REDUCE THE RISK OF FIRE OR
ELECTRIC SHOCK, DO NOT EXPOSE THE POWER
SUPPLY OR CONSOLE TO RAIN OR MOISTURE.**



The **Exclamation Point symbol**, within an equilateral triangle, alerts the user to the presence of important operating and maintenance (servicing) instructions in product literature and instruction manuals.



The **Lightning Flash With Arrowhead symbol**, within an equilateral triangle, alerts the user to the presence of uninsulated dangerous voltage within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

WARNING—This equipment generates, uses and can radiate radio frequency energy. If not installed and used in accordance with the instructions in this manual it may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device (pursuant to Subpart J of Part 15 FCC Rules), which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

Manual Revisions

This page provides a quick reference of the current document pages and their revision level. When a revision to this document is received from PR&E, replace the old manual pages with the new ones. Discard the old pages and post the new Manual Revisions page in place of this page.

Revision	Affected pages	Comments
A	All pages	3/97 Product Release
B	Ch. 2, 4 & 5	3/97 Added Power Supply information. Added connection illustrations.
B.1	Front stuff, Ch. 2 & 6	4/97 Changed installation section. Added schematics.
C	All pages	10/97 Page formatting changed, updated drawings and clarified installation information.
C.1	Ch.5, pg 2	4/98 Corrected part number for Switchboard
D	Ch.1, Ch. 4, and Ch. 5, all Ch. 6, pg 1, 31, 32, 33	4/99 Some specifications are changed with AW Universal Power Supply. Added main-frame wiring diagram and schematics for AW Universal Power Supply. Changed all references from ± 18 VDC to ± 16 VDC.

General Information

Thanks for joining the growing ranks of broadcasters employing Pacific Research & Engineering (PR&E) consoles. PR&E supplies audio products and systems to the world's leading broadcast facilities. Our mission is to provide the finest quality products, systems, documentation, and after-sale support. We invite comments and suggestions for improvements to this documentation, and to all of our services.

The AirWave is a very sophisticated console with an extensive range of features contained in a compact design. To obtain maximum benefit from the console's capabilities, read the *Installation*, *Operation* and *Equipment Description* chapters prior to product installation.

PRODUCT OVERVIEW

Each Airwave mainframe comes standard with one each of these modules: Timer Control, Monitor, Output Amplifier, Microphone Preamplifier and Remote Line Selector. These are installed into standard positions in the mainframe along with two blank panels covering the left-hand accessory positions. Additional Input modules, the Telco module or blank panels that were ordered are then installed to fill up the Input positions.

The AirWave's motherboard and module area is completely contained within a welded steel chassis for strength and RFI immunity. The meter panel is hinged at the rear, locking down over the upper face of the modules, covering the audio and logic connectors and the Logic Settings switches. Beneath the meter panel the chassis bottom is open for easy cable access.

Module Descriptions

Microphone Preamplifier

Contains five preamplifiers with individual gain controls under a security cover. Phantom power is selectable for each input. The preamplifier outputs are +4 dBu balanced for connection directly to an Input module or to outboard mic processing equipment. One module is supplied standard, but multiple Mic Preamplifier modules can be installed.

Input

Provides on/off control, fader level control, cue control and output selection for two balanced stereo audio inputs (A and B). Faceplate channel trim controls allow input levels of -10 dBu to +4 dBu. The two inputs are electronically switched following the faceplate A/B Input selection. External logic wiring connects to a 24-pin logic connector on the faceplate. Logic and module function options for the A or the B input are set through a ten-position faceplate DIP switch.

Output Amplifier

Contains the stereo line amplifiers and meter drivers for the Program-1 (Pgm-1) and Program-2 (Pgm-2) outputs. A monaural line amplifier is

also included to output a mono sum of either Pgm-1 or Pgm-2 (operator-selected). Each console output is set for a nominal level of +4 dBu, balanced.

Telco Input/Output

An optional module to provide the connections for a telephone hybrid and a two-channel recorder. The Feed to Caller can be selected manually between the Pgm-1, Pgm-2 or Off-Line mix buses. An Autofeed function automatically switches the Feed to Caller between Off-Line mix and the assigned Program bus as the Telco module is turned off and on.

Monitor

A double-width module containing the monitoring and communication controls for the control room (C/R) and a separate studio or voice booth. Volume controls for C/R and studio speaker volume, C/R headphone, and cue are included along with independent source selection for each room (between four external inputs, Pgm-1, Pgm-2, and Telco). The module includes a C/R to Studio Talkback System with built-in electret talkback mic.

Timer Control

Provides manual or automatic control over the digital timer located in the meter panel. This module also routes power to the clock/timer assembly and provides an external reset for a studio mounted timer. It also provides for a battery-supplied backup voltage which holds the console's logic settings in case of momentary power outage.

Remote Line Selector

A 7x2 selector for balanced, line-level mono or stereo signals. Two banks of seven switches provide manual exclusive source selection among the seven common external input signals. One module is

supplied standard. Additional RLS modules can be installed.

Power Supply

The separately packaged rack mount power supply is fully regulated and protected by internal fuses and electronic safeguards against excessive current and line voltage fluctuations.

The power supply provides five regulated output voltages. Two of these outputs (± 16 volts) are used to power the audio circuitry. The third output (+5 volts) is used to power the logic control circuitry. The fourth output (+12 volts) powers lamps and the clock/timer assembly. The fifth output (+45 volts) supplies phantom powering of condenser microphones connected to the Microphone Preamplifier module.

SPECIFICATIONS

The AirWave specifications are significantly more complete, and the related test conditions more defined, than those usually shown for consoles in this class. Be sure to follow the test conditions and measure in the units as stated.

The specifications are taken from an AirWave-20 mainframe with a full compliment of modules installed.

Test Conditions:

Specifications are for the basic signal paths, per channel, with 600 ohm loads connected to the program outputs. 0 dBu corresponds to an amplitude of 0.775 volts RMS regardless of the impedance of the circuit and is the same voltage value as 0 dBm measured into a 600 ohm circuit. This enables convenient level measurement with meters calibrated for 600 ohm circuits. Noise specifications are based upon a 22 kHz measurement bandwidth. The use of a meter with 30 kHz bandwidth will result in a noise measurement increase of approximately 1.7 dB.

Microphone Preamplifiers

Source Impedance: 150 ohms

Input Impedance: 5 k ohms minimum, balanced

Input Level Range: Adjustable, -70 to -30 dBu

Input Headroom: >20 dB above nominal input

Output Source Impedance: 220 ohms balanced

Nominal Output Level: +4 dBu, balanced

Output Load Impedance: 2.5 k ohms minimum

Line Inputs

Source Impedance: 600 ohms or less

Input Impedance: >20 k ohms, balanced

Input Level Range: Adjustable, -10 to +4 dBu

Input Headroom: >21 dB above nominal input

Main Outputs

Output Source Impedance: 80 ohms balanced

Output Load Impedance: 600 ohms minimum

Nominal Output Levels:

Program/Monaural Outputs: adj. +4 dBu

Telephone Mix-Minus: set at +4 dBu

Telephone Recorder Mix Feed: +4 dBu

Maximum Output Levels:

Program and Monaural: +26 dBm

Telco Mix-Minus: +26 dBm

Telco Recorder Mix Feed: +26 dBm

All measured with 600 ohm loads

Monitor Outputs

Output Source Impedance: 400 ohms, balanced

Output Load Impedance: 2.5 k ohms or greater

Output Level: +4 dBu nominal, +28 dBu max.

Console Headphone Output: 0 dBu, >8 ohm load

External Headphone Amplifier Output:

Source Impedance: 400 ohms

Load Impedance: 2.5 k ohms or greater

Output Level: +4 dBu nom. +26 dBu max.

Frequency Response

Microphone or Line Input to Program Output:

+0 dB/-0.5 dB from 20 Hz to 20 kHz

Noise

Microphone Preamplifier: -127 dBu equivalent input noise, 150 ohm source

Line Input Amplifier: -95 dBu equivalent input noise, 600 ohm source

Output Noise (one Mic On, unity fader gain, -50 dBu input): 75 dB below output reference of +4 dBu, 150 ohm source, input sensitivity at +4 dBu

Output Noise (one Line On, unity fader gain, +4 dBu input): 94 dB below output reference of +4 dBu, 600 ohm source, input sensitivity at +4 dBu

Output Noise (with no inputs On): 102 dB below output reference of +4 dB

Total Harmonic Distortion

Mic Input to Program Output: ≤0.01%, 20 Hz to 20 kHz, -38 dBu input, +18 dBm output, 600 ohm load, 80 kHz meter bandwidth

Line Input to Program Output: ≤0.007%, 20 Hz to 20 kHz (typically <0.003% @ 1 kHz), +18 dBu input, +18 dBm output into a 600 ohm load, 80 kHz meter bandwidth

Inter-Modulation Distortion

Mic Input to Program Output: ≤0.02%, -38 dBu input, +18 dBm output, 600 ohm load

Line Input to Program Output: ≤0.01%, +18 dBu input, +18 dBm output, 600 ohm load

Bus Crosstalk

Pgm-1 to Pgm-2 & Pgm-2 to Pgm-1: ≤ -80 dB at 16 kHz

Stereo Separation

Program Outputs: ≤ 68 dB at 16 kHz

Console Power Requirements

Fully configured AirWave-12: 150 watts @ 115 VAC, ±8%, 50/60 Hz

Fully configured AirWave-20: 200 watts @ 115 VAC, ±8%, 50/60 Hz

Power Supply Main fuse rating: 1.0 amp @ 230 VAC (IEC), 2.25 amps @ 115 VAC (UL)

Power Supply Output voltages

Phantom power: +45 VDC @ 0.100 Amp

Audio power: ±16 VDC @ 1.00 Amp (each leg)

Logic power: +5.25 VDC @ 6.5 Amps and +12 VDC @ 4.0 Amps

Power Supply Ground

Chassis grounded through AC cord. DC voltages floating from chassis.

Power Supply Connection

AC input: 6 foot IEC cord

DC output: single keyed multi-pin connector

Pacific Research & Engineering Corporation reserves the right to change specifications without notice or obligation.

WARRANTY

The AirWave carries a manufacturer's warranty which is subject to the following guidelines and limitations:

A) Except as expressly excluded herein, Pacific Research & Engineering Corporation ("Seller") warrants equipment of its own manufacture against faulty workmanship or the use of defective materials for a period of one (1) year from date of shipment to Buyer. The liability of the Seller under this Warranty is limited to replacing, repairing or issuing credit (at the Seller's discretion) for any equipment, provided that Seller is promptly notified in writing within five (5) days upon discovery of such defects by Buyer, and Seller's examination of such equipment shall disclose to its satisfaction that such defects existed at the time shipment was originally made by Seller, and Buyer returns the defective equipment to Seller's place of business in Carlsbad, California, packaging and transportation prepaid, with return packaging and transport guaranteed.

B) Equipment furnished by Seller, but manufactured by another, shall be warranted only to the extent provided by the other manufacturer.

C) Thermal filament devices (such as lamps and fuses) are expressly excluded from this warranty.

D) The warranty period on equipment or parts repaired or replaced under warranty shall expire upon the expiration date of the original warranty.

E) This Warranty is void for equipment which has been subject to abuse, improper installation, improper operation, improper or omitted maintenance, alteration, accident, negligence (in use, storage, transportation or handling), operation not in accordance with Seller's operation and service instructions, or operation outside of the environmental conditions specified by Seller.

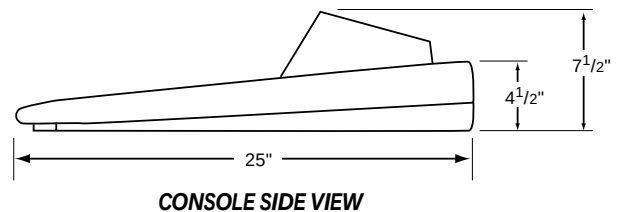
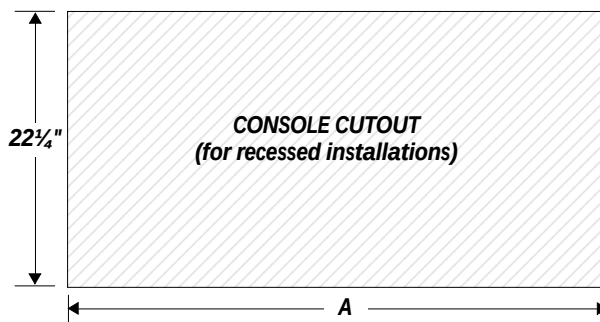
F) This Warranty is the only warranty made by Seller, and is in lieu of all other warranties, including merchantability and fitness for a particular purpose, whether expressed or implied, except as to title and to the expressed specifications contained in this manual. Seller's sole liability for any equipment failure or any breach of this Warranty is as set forth in subparagraph A) above; Seller shall not be liable or responsible for any business loss or interruption, or other consequential damages of any nature whatsoever, resulting from any equipment failure or breach of this warranty.

Installation

The AirWave mainframe can sit on top of, or be recessed into, the studio furniture countertop. There must be at least 13½ inches of vertical clearance so the meter panel can be fully opened into its service position. Only two inches of rear clearance is required behind the mainframe.

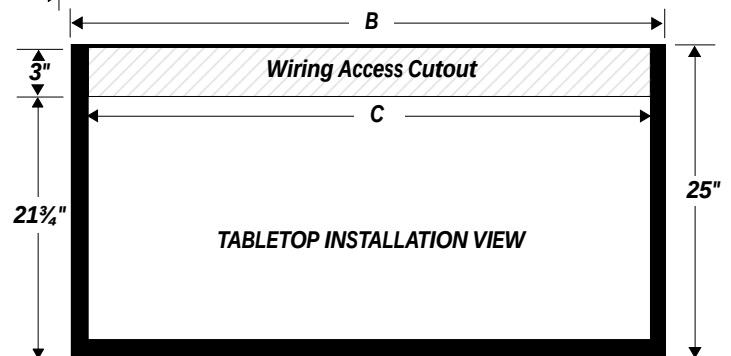
Your AirWave console shipment consists of:

- The 12- or 20-input Mainframe, with two blank panels and one each of these modules installed: Monitor, Timer Control, Output Amplifier, Microphone Preamp and Remote Line Selector (RLS).
- Additional modules (Inputs, Telco, etc.) and blank panels purchased, installed into the mainframe.
- Rack-mount power supply.
- AirWave Tool kit (AA batteries, AMP MOD IV Crimp Tool, AMP MOD IV contact removal tool, hex driver, pot knob removal tool and clock set magnet tool).
- Audio and Logic connector kits, each containing AMP MOD IV connector housings and receptacle contacts for each module ordered.



Dimension Table			
Mainframe	A	B	C
AirWave-12	32"	33"	28 ½"
AirWave-20	44"	45"	40 ½"

All dimension tolerances are +¼", -0". Typical front setback is 12". Allow clearances of 2" behind mainframe and 13½" above meter panel.



To simplify AirWave installation, logic cable wiring diagrams for specific peripheral equipment are available from PR&E. Custom engraving for the button caps and colored fader knobs are also available. See Chapter 7, *Accessories*, for details.

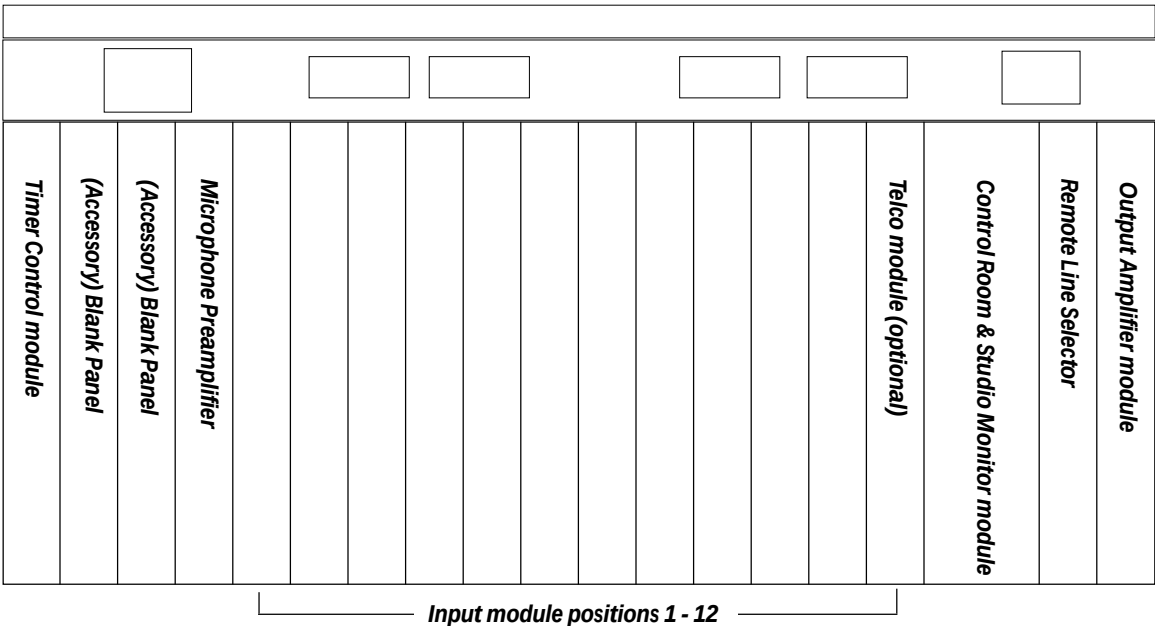
INSTALLATION NOTE: Do not locate the console near intense electromagnetic hum fields, such as those produced by large power transformers and by audio amplifiers which use inexpensive power transformers operating in or near saturation. Strong electromagnetic fields may impair the performance of the AirWave and neighboring equipment. Audio cables must also be routed to achieve maximum practical distance from all AC power mains wiring.

Module Placement

AirWave’s motherboard design allows any module type to be installed into almost any module position. The exceptions are the Timer Control and Output Amplifier modules, at the extreme left and right ends respectively, which contain the latch slots for the meter panel.

There are two mainframe sizes available: AirWave-12, with twelve input module positions and AirWave-20, with twenty input module positions. Both mainframe sizes also have two Accessory positions available. These can be used for installing additional Mic Preamp modules, Input modules, RLS modules, the optional Telco module or custom remote control panels.

AirWave-12 Module Configuration



Note: The AirWave-20 mainframe has eight additional Input module positions.

MAINFRAME CONFIGURATION

The AirWave continues PR&E’s design philosophy of positioning the input modules in the physical center of the mainframe. This gives the operator equal reach to peripheral equipment located to the sides of the console.

The Meter Panel

Two sets of level meters, calibrated in Volume Units, provide simultaneous monitoring of the Program-1 and Program-2 outputs. Also located on the panel are the cue/talkback speaker, the Clock and the Event Timer.

CONNECTOR ACCESS

The meter panel is set into its service position to access the module connectors. To move the meter panel to its service position, simultaneously press on the latch buttons, located on the ends of the meter panel, while lifting and rotating the panel rearward.

Note: When opened to its service position, exercise caution to ensure the panel does not accidentally fall closed.

To ease initial wiring, the meter panel can be completely removed from the mainframe chassis. Set the panel to its service position and unplug all meter panel cabling (speaker, meters and clock/timer). With another person holding the meter panel, unlatch the two hinges to free the meter panel. To unlatch each hinge, move the two release pins into their detent positions. To reinstall the meter panel, first align the hinge parts together and then release the pins out of their detents.

POWER SUPPLY

The power supply is typically rack mounted in the console cabinetry below and to the left or right of the supporting countertop. The power supply must be installed so that the ten-foot DC power cable, that is fastened to the right end of the mainframe motherboard, is not under tension.

DC GROUNDING NOTE: The DC outputs of the power supply are not referenced to the power supply chassis and, therefore, are floating from the AC safety ground. *Do Not Connect* audio or logic supply ground wiring to the chassis of the power supply.

AC GROUNDING NOTE: Do not defeat the safety ground in any way. Doing so may provide a potentially dangerous condition to the operator.

Refer to the *Power Supply Technical Manual* (PR&E # 75-38) for complete power supply installation details.

GROUNDING & SHIELDING

The broadcast facility's *technical ground* should only connect to the mainframe chassis ground stud. The stud is located next to the DC power supply cable entry point into the chassis. Terminate the facility's technical ground wire in a crimped lug.

Connect the audio shields at both the AirWave and the peripheral device when all system components share a common ground potential, and are using isolated ground AC outlets tied individually back to the main technical ground.

If isolated ground AC outlets are not available, connect the cable shields at the console end only. The shields should be floated (left unconnected) at the peripheral equipment end. Ensure the peripheral devices connect to a clean ground through their power cords, or through separate ground wires to the facility's technical ground.

POWER SUPPLY GROUNDING NOTE: The power supply chassis is connected to the safety or "U" ground wire in the AC mains supply cable. Audio signals are not referenced to this ground in any way by the console.

AUDIO GROUND NOISES: Buzz pickup is generally electrostatic—such as capacitive coupling between an audio line and a power line. Do not route audio lines in the same wireway as an AC power line.

INSTALLING BACKUP BATTERIES

Two AA batteries are supplied in the Installation Tool Kit. They supply a “Keep Alive” voltage that holds each module’s logic state during momentary power outages. They mount in battery clips on the Timer Control module circuit board. Observe the correct polarity (marked on the circuit board) when installing the batteries.

Note: Replace batteries yearly to ensure continuous backup protection. Remove one or both batteries to prolong battery life when the console will be unpowered for an extended period.

SETTING THE CLOCK

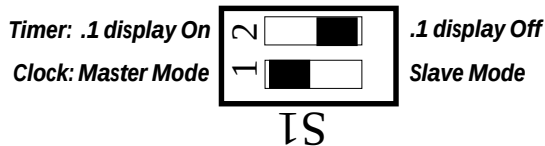
The digital clock can be set to run in master or slave mode. In master mode, the factory preset, clock timing is derived from a temperature-controlled quartz crystal oscillator. In slave mode, clock timing is derived from an external ESE master clock reference signal.

Master clocks are available from:
ESE
142 Sierra St.
El Segundo, CA 90245.
Telephone: 310.322.2136
www.e-se-web.com

The operating mode is set by switch S1, #1 on the clock/timer circuit board. To access the clock/timer board, open the meter panel to its service position. The clock/timer board is mounted behind the clock/timer display on the meter panel.

With the clock set to master mode, it’s necessary to manually set the clock once power is ap-

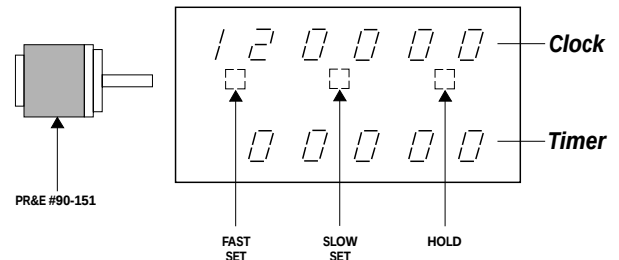
Clock/Timer Option Switches



Switch S1, on the Clock/Timer printed circuit board, as viewed with the meter panel in its service position. Factory default settings shown.

plied to the console. Three magnetically-activated Hall-effect sensors are used to adjust or hold the time. They are positioned below and between each pair of 7-segment displays, just behind the display face. Clock set magnet tool (PR&E # 90-151) is used to activate the Hall-effect sensors.

Setting the Clock



Note: The plastic clock/timer bezel may be scratched if the tool is moved while in contact with the lens.

To set the time, place the end of the magnet tool directly against the plastic face over the appropriate sensor. Use *Fast Set* to quickly advance the time and *Slow Set* to slowly advance the time. To synchronize the clock display to real time, set the clock a few seconds ahead and use *Hold* to freeze the display. To start the clock, move the tool away from *Hold*.

When an ESE time code signal is connected to BNC connector, J3, on the clock/timer circuit board, and slave mode is selected (S1, #1, is set to the right), the clock does not need to be set. Should the ESE time code signal fail, the clock automatically defaults to its internal crystal reference oscillator, blinking an LED below the clock display to indicate the loss of time code.

Timer Display

The Event Timer displays time in minutes, seconds and tenths of seconds. The tenths of seconds display is normally turned off while the timer runs. It can be turned on while running by moving clock/

timer circuit board switch S1, #2, to the left. The tenths of seconds are always displayed while the timer is in the Stop or Hold modes, regardless of the setting of switch S1, #2.

Cabling & Wiring

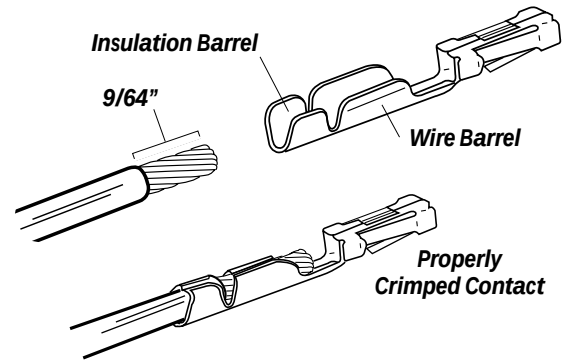
Before beginning the installation, draw a facility wiring plan listing the console interconnections with peripheral devices. Identify and create tags for all audio and logic cabling. List each connection in a master facility wiring logbook to facilitate wiring installation, future system wiring changes, equipment updates and system troubleshooting. Refer to *Module Connections*, on pages 16 through 22 later in this chapter, for the audio and logic connector pin-out definitions.

All AirWave audio inputs and outputs are balanced. Two-conductor cabling using stranded and insulated wires completely covered by a foil-shield with a separate shield drain wire, equivalent to Belden 8451, 9451 or 8761, should be used on all console connections.

Logic control cables are made using stranded, 22 AWG, multiple conductor, non-shielded, jacketed cable equivalent to Belden 9423, 8457 or 9421. The number of conductors needed is determined by the application. Even though each Input module logic connector has 24 pins, there are only 18 distinct signals on the connector, of which only a handful may actually be used for any given application. Typically five and eight wire cables are most often used for constructing logic cables.

WIRE PREPARATION

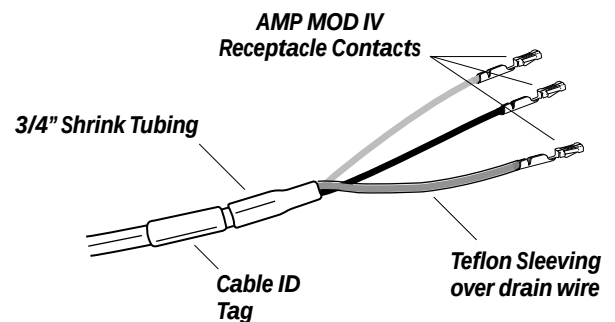
All AirWave audio and logic wiring terminates in AMP MOD IV receptacle contacts at the console. Stranded wire of 22 to 26 AWG, with insulation diameters of .040 to .060 inch, can be used with the AMP MOD IV receptacle contacts.



AMP MOD IV Receptacle Contacts

Follow these steps for audio wire preparation:

1. Strip the cable insulation jacket and foil shield back 1½ inches.
2. Remove the foil shield and sleeve the drain wire with 20 AWG Teflon sleeving, leaving 9/64 inch of the drain wire exposed.
3. Cover the cut end of the jacket with 3/4 inch of heat-shrink tubing, centered on the cut. Shrink this tubing to hold the drain wire sleeving in place.
4. Strip the signal wire insulation back 9/64 inch.
5. Crimp the receptacle contacts onto the wire and insulation.



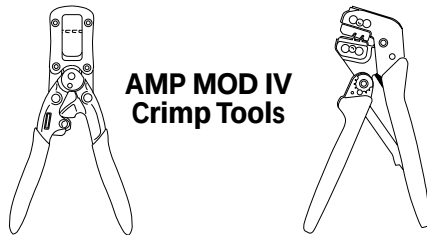
Audio Wire Preparation

Audio Cable Shield Note: To ensure your installation follows recommended grounding procedures, you must sleeve all drain wires with Teflon sleeving and put heat shrink tubing over all cable jacket cut ends to insulate the shield wire.

Logic control cables are fabricated in a similar manner to the audio wiring. Strip the jacket insulation back 1½ inches, sleeve the cut end with ¾ inch of shrink tubing and strip the insulation from each wire 9/64 inch.

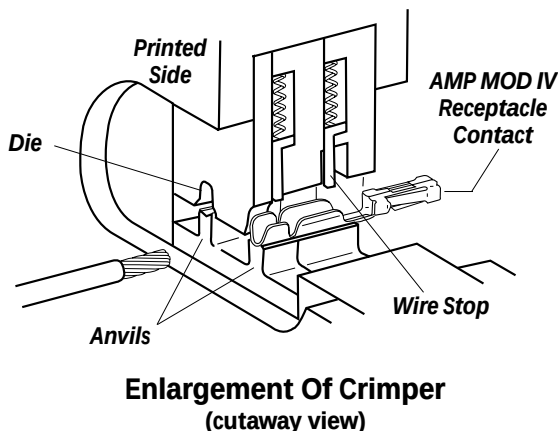
CRIMP TOOL OPERATION

One of two types of ratcheting hand crimpers is included in your tool kit. Each tool crimps both the insulation and wire barrels on the AMP MOD IV receptacle contacts in one crimp action.



These instructions are for both types of ratcheting crimp tool.

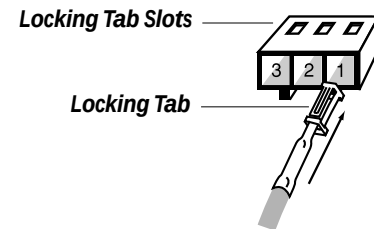
1. Hold the crimp tool with the printed side up. Insert the contact from the opposite side, with the barrel openings up, until the insulation barrel end is flush to the opening of the die. Close the tool only until the anvil holds the contact in place. Refer to the close-up view.
2. Insert the stripped wire into the contact until it hits the tool's wire stop. Hold the wire in



place while squeezing the tool handles to crimp the contact onto the wire. The tool handles automatically release and spring open after the crimp cycle is complete.

A properly crimped contact receptacle is inserted and locked into the appropriate connector housing following the pin-out diagrams found in the *Module Connections* section (pages 16 to 22). Note that the receptacle contact must be inserted with its locking tab side facing the locking tab slots on the side of the connector housing. A light “click” will be felt as the contact’s locking tab engages the locking tab slot.

Receptacle Contact Insertion

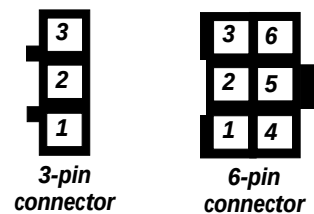


A Contact Removal Tool (PR&E 70-129) is used to depress the locking tab if the contact and wire need to be pulled out of the connector.

AUDIO CONNECTIONS

The AirWave audio connector pin assignments take visual advantage of the three-pins-per-row design of the three-pin and six-pin AMP MOD IV connectors.

Audio Connector Pin Numbering



Pin numbering shown from the wire entry end, oriented from the board operator's perspective.

When plugged into a module, the audio shields are connected to the pins closest to the console operator, the audio low wires to the middle pins and the audio high wires to the back pins. For stereo, the left channel cable is connected to the left column of pins and the right channel to the right-hand column of pins (from the operator's perspective).

Microphone Inputs

Pin Signal Description

1	Shield (connects directly to the chassis)
2	Low (- input)
3	High (+ input)

Two-Channel Line Inputs and Outputs

Pin Signal Description

1	Shield for left channel or signal 1
2	Low (- input), left channel or signal 1
3	High (+ input), left channel or signal 1
4	Shield for right channel or signal 2
5	Low (- input), right channel or signal 2
6	High (+ input), right channel or signal 2

AirWave has no interstage patch points within its input or output modules. To use a patch bay, connect the line level outputs from the peripheral devices directly to the patch bay and normal these to the appropriate Input modules. Likewise, the AirWave outputs may also be routed through a patch bay normalled to standard peripherals such as the On-Air processing gear, recorder, telephone hybrid, etc.

The Microphone Preamplifier module's line-level outputs (+4 dBu, nominal, balanced) can also be routed through a patch bay normalled to an Input module. If mic processing is required, the Preamplifier module's outputs may be routed through line-level mic processing equipment and then to an Input module. When mic-level input capable processors are used, the microphone

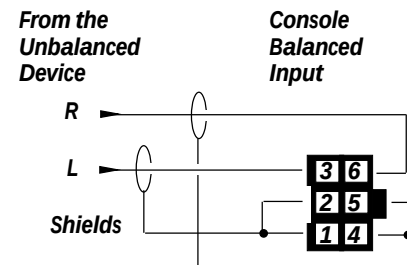
should be connected to the mic processor with the processor's line-level output directly connected to an Input module.

UNBALANCED CONNECTIONS

Even though AirWave uses active balanced inputs and outputs, unbalanced consumer or "semi-pro" equipment can be connected. For best results unbalanced devices should connect to the console through an IHF-PRO match box.

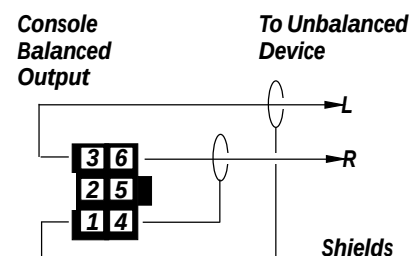
If a match box is not available, connect unbalanced signals per the following illustration. Keep unbalanced cable lengths as short as possible.

Connecting an Unbalanced Device to an AirWave Input



When an unbalanced device must be connected to an AirWave balanced output, and an IHF-PRO match box is not available, do not tie the low (-) and shield pins together to "unbalance" the signal. The low pin must always be left "floating," as shown in the following illustration, when unbalancing an AirWave output.

Connecting an Unbalanced Device to an AirWave Output



AIRWAVE LOGIC CONNECTIONS

Each Input module has a 24-pin connector for logic control of peripheral devices and for microphone remote control panel interfacing.

When a peripheral device is connected, one of the main functions of the logic interface is to start the peripheral at module on. The peripheral device logic can, in turn, control the Input module functions; turning the module audio off at the end of an event and controlling the Off lamp illumination to indicate the peripheral device status.

To interface a mic remote panel, there are logic control outputs for tallys and control inputs for the remote On, Off, Cough and Talkback buttons.

THE LOGIC INTERFACE

A simplified schematic for the Input module logic interface is shown below. Logic outputs (right side of the illustration) are isolated from peripheral

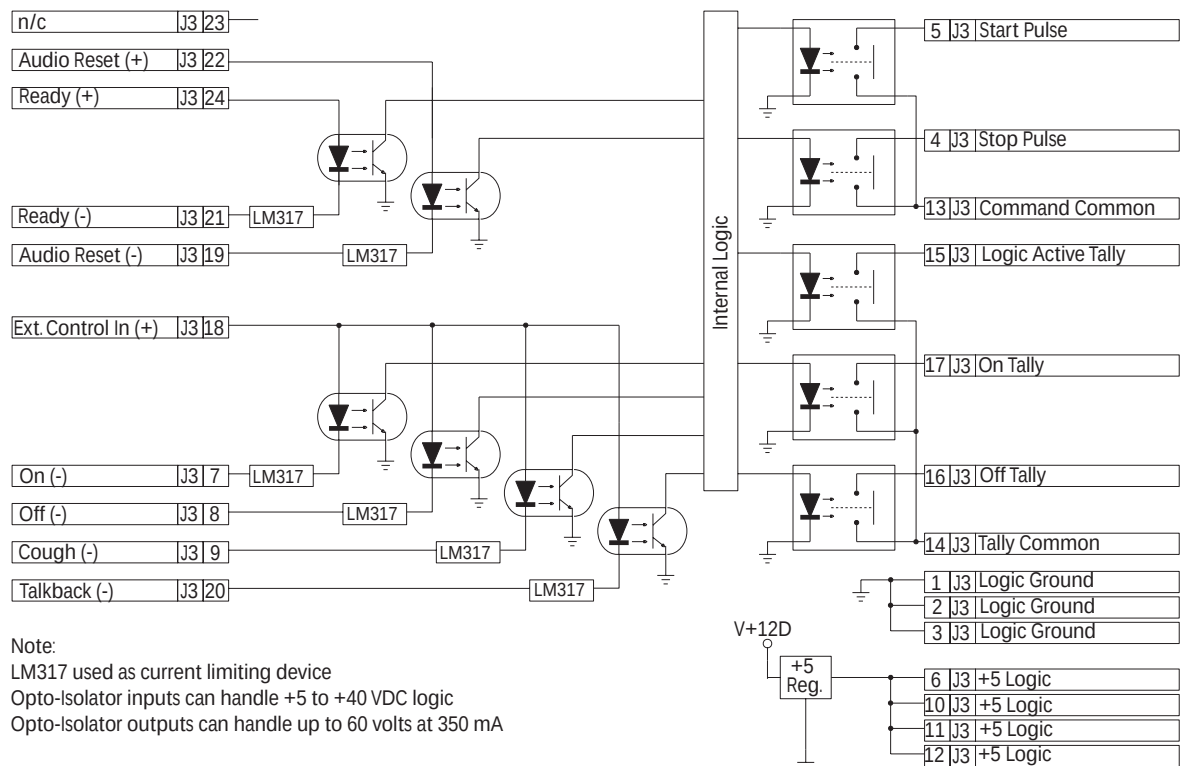
devices by five solid-state devices that function like single-pole mechanical relays. The “relay contacts” can switch external voltages of up to 60 volts at 350 mA.

The top two relays use momentary logic to create a 220 ms Start Pulse at module On and a 220 ms Stop Pulse at module Off. Their “C” or common contacts tie together at the Command Common output. The other three relays, Logic Active Tally, On Tally and Off Tally, are also “commoned” together at the Tally Common output.

The six logic inputs (left side of the illustration) are opto-isolated and current limited so any logic voltage from +5 to +40 VDC can be used.

The On, Off, Cough and Talkback inputs allow remote mic panel switches to control the Input module through active low logic signals (pull to ground). The External Control In (+) connection enables these inputs when tied to +VDC.

Simplified Schematic, Input Module Logic Interface



The Audio Reset and Ready inputs can be set to use either active low logic or active high logic (pull up to +VDC) from peripheral devices. With active high logic, Ready (-) and Audio Reset (-) are tied to logic ground on the peripheral device. Ready (+) and Audio Reset (+) then connect to the appropriate logic outputs on the peripheral device.

When active low logic is used by the peripheral, Ready (+) and Audio Reset (+) connect to the logic supply voltage on the peripheral, and Ready (-) and Audio Reset (-) connect to the appropriate logic outputs on the peripheral device.

AirWave Quick Logic Guides

The fold-outs on pages 12 through 15 offer quick guides to configuring the AirWave logic. Page 12 contains an AirWave Logic Interface Glossary, Logic Settings switch definitions and a copy of the simplified logic schematic from the previous page. Pages 13, 14 and 15 show connection diagrams for a remote microphone control panel, a CD player and a digital delivery system, respectively.

Note: To completely isolate the AirWave from a peripheral device, use only the control input and output connections. These are decoupled from the console's ground and power supply through optoisolator devices.

The Logic Ground and +5 Logic connections are referenced to the console's logic power supply and ground. Connect these only to a peripheral device with isolated logic connections or to a remote control panel. Connecting these to a non-isolated peripheral device can result in a ground loop between the AirWave and the peripheral.

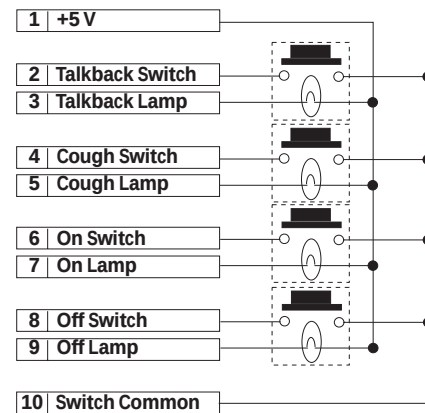
Input Module Logic and Microphones

The two main functions of microphone logic are to automatically mute the monitor speakers in the room with the "hot" mic and to command the appropriate hot mic warning light.

The warning commands come from the Monitor module, but it is the first four Logic Settings switches on each Input module that tell the monitor module whether the A and/or B input is a control room or studio microphone.

Page 13 summarizes how to set up an Input module for a microphone. To activate the microphone remote control panel logic functions, turn on Logic Settings switch 7 and set switch 8 for the appropriate A or B input. To enable the remote control inputs On, Off, Cough, Talkback, jumper External Control In (+) to +5 Logic on the logic connector.

Mic Control Panel, Simplified Schematic for 99-949-x



Single pole, single throw momentary switches are used to construct a remote mic control panel like that shown above. Connect one side of each control panel switch to the appropriate logic connector pin. Common the other side of each switch (Switch Common on the control panel illustration) to Logic Ground.

The Logic Active Tally output controls the lamps for the Cough and Talkback switches. The On Tally and Off Tally outputs control the On and Off switch lamps. The other side of each lamp (+5 V) connects to +5 Logic. Use 6.3 volt lamps, with less than 50 mA current draw, for all AirWave remote panels that are supplied by the console.

Input Module Logic and Peripheral Devices

Peripheral devices are controlled through the Start, Stop and Command Common logic outputs.

In the connection example on page 14, active low logic is used, thus Command Common is connected to the logic ground on the peripheral device (labeled command common by Denon).

In the example on page 15, active high logic is required, thus Command Common is connected to +5 Logic. Note that this voltage is more typically supplied directly by the peripheral device to prevent ground loops.

Peripheral devices control the module through the Audio Reset and Ready logic inputs. On page 14, only the Ready function is shown being used. Ready performs an Audio Reset, to turn off the module without generating a Stop Pulse, in addition to then controlling the Off lamp illumination.

On page 15, Audio Reset (+) and Ready (+) connect to +5 Logic on the module. The Ready (-) command and the Audio Reset (-) command are pulled low by the active low logic relay outputs on the peripheral device, which all tie to the module's Logic Ground (pin 1).

For peripheral devices that require a steady On or Off signal, the On and Off tallies can be used. When the Off Tally is used in this manner, Logic Settings switch #9 (Lamp Bypass) must be set to the left (On) so that the Off lamp is not controlled by the Ready logic.

ADDITIONAL LOGIC CONNECTIONS

There are two additional logic connections in the AirWave on the Monitor module and the Timer Control module.

An 8-pin connector on the Monitor module carries the logic control outputs for the Control Room and Studio warning light interfaces. The Monitor module logic connection and description are in the *Monitor Module Logic* section on page 11.

A 3-pin connector on the Timer Control module carries the remote timer reset logic. The Timer Control module logic connection and description are in the *Timer Module Remote Connection* section on page 22.

Monitor Module Logic

There is one 8-pin logic connector for the “hot mic” logic command outputs for the Control Room and Studio on-air warning lamp systems.

Each logic command output is isolated using a solid-state relay with a pair of normally open “dry-contacts.” These *relay contacts* can switch external voltages of up to 60 volts at 350 mA for direct interface to most lamp control devices.

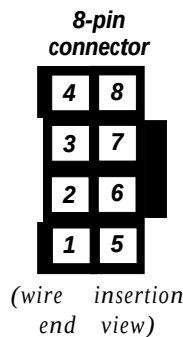
If an external five volt lamp relay is used, one side of the interface relay can be jumpered to +5 Volts (pins 2 and 6) or to Logic Ground (pins 1 and 5) to create an active high or active low output, respectively.

The simplified schematic shows the logic outputs for the Control Room and Studio warning lamp interface externally jumpered to yield an active high output from the relay.

When an active low logic output is needed on the Control Room, jumper pins 1 and 3 together and use pin 4 as the Control Room warning output. Jumper pins 5 and 7 together and use pin 8 when the Studio warning output requires an active low logic output.

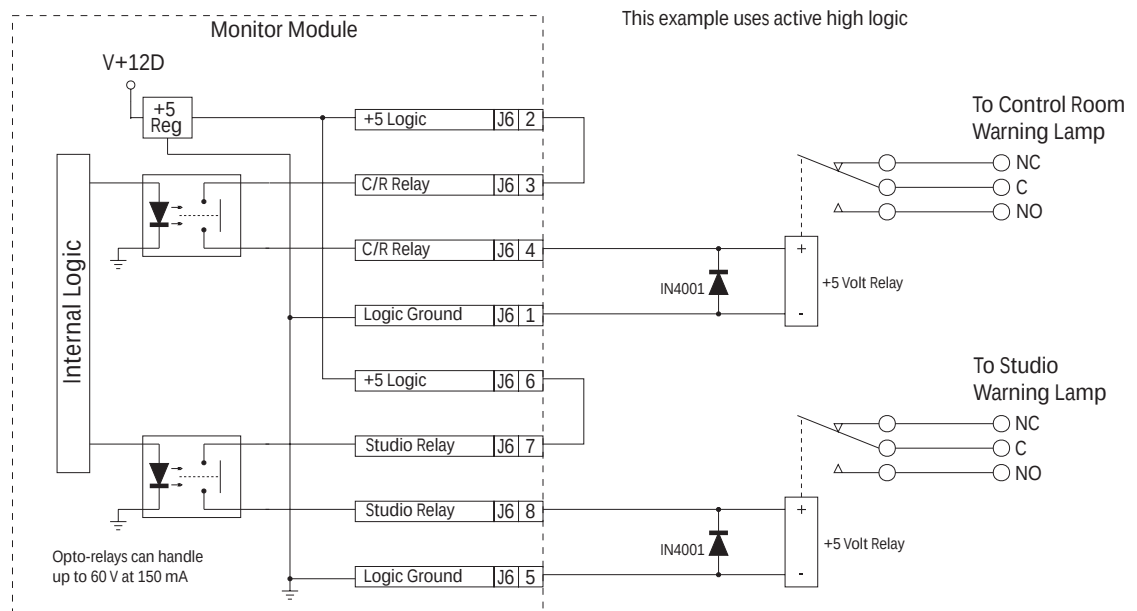
Note: Jumpering the solid-state relay to either +5 Volts or Logic Ground defeats ground isolation between the console and the warning lamp interface.

Warning Lamp Connector Pin Definitions



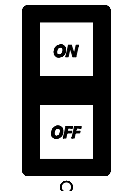
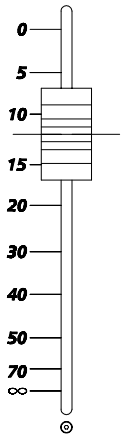
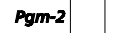
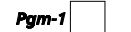
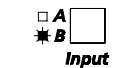
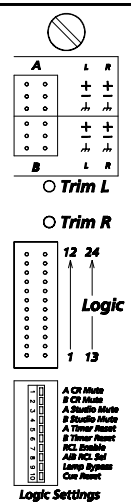
PIN	SIGNAL	FUNCTION
1	Logic Ground	Console logic ground
2	+5 Logic	+5 volt supply
3	C/R Relay	Control Room Warning Lamp Interface “N/O relay contact”
4	C/R Relay	Control Room Warning Lamp Interface “C relay contact”
5	Logic Ground	Console logic ground
6	+5 Logic	+5 volt supply
7	Studio Relay	Studio Warning Lamp Interface “N/O relay contact”
8	Studio Relay	Studio Warning Lamp Interface “C relay contact”

Simplified Schematic for the Warning Lamp Interface



Note: Do not use the solid-state relay “contacts” to directly switch the AC line voltage to a lamp.

Quick Reference Guide to AirWave Logic Input Module Connections

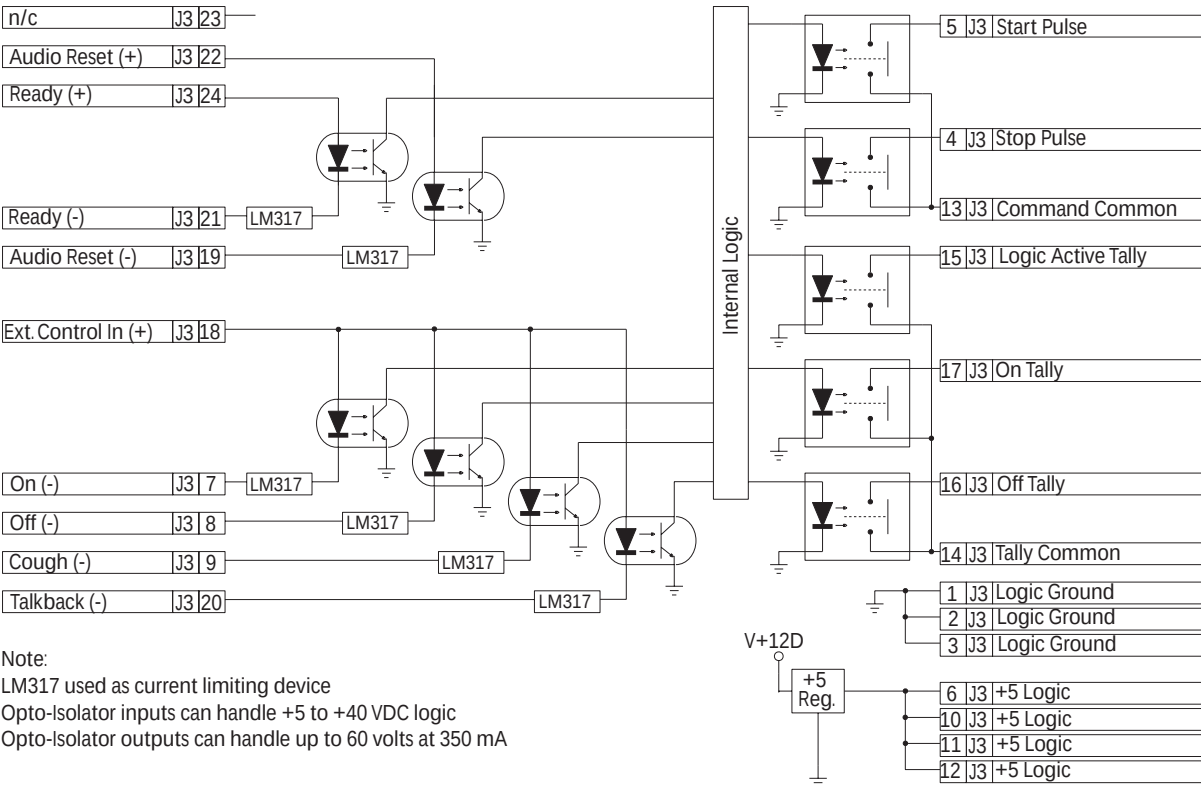


Logic Settings Switch Definitions

#	Switch Name	ON Function (set to operator's left)	OFF Function (set to right)
1	A CR Mute *	Input A mutes C/R speakers at module On	No monitor muting
2	B CR Mute *	Input B mutes C/R speakers at module On	No monitor muting
3	A Studio Mute *	Input A mutes studio spkrs. at module On	No monitor muting
4	B Studio Mute *	Input B mutes studio spkrs. at module On	No monitor muting
5	A Timer Reset +	Input A resets timer at module On	No timer reset
6	B Timer Reset +	Input B resets timer at module On	No timer reset
7	RCL Enable	Remote control logic is active (the active Input set by switch 8)	Logic inactive
8	A/B RCL Set #	Logic active only on input A	Logic active only on input B
9	Lamp Bypass	Off lamp turns on at module Off	Off lamp follows ready logic
10	Cue Reset	Cue cancelled at module On	No cue reset at module On

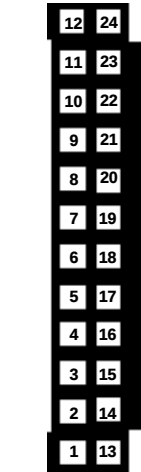
- Notes:
- RCL Remote control logic
 - * Both inputs can mute either or both rooms.
 - + Both inputs can reset the timer. Timer reset only occurs when auto is active on the timer control module.
 - # Only one input, either A or B, can be set to use the Ext. Control Inputs, Ready and Audio Reset logic.

Simplified Remote Control Logic Interface



Note:
LM317 used as current limiting device
Opto-Isolator inputs can handle +5 to +40 VDC logic
Opto-Isolator outputs can handle up to 60 volts at 350 mA

AirWave Logic Interface Glossary



(Contact insertion end view)

REMOTE SIGNAL (connector pin #)	FUNCTIONAL DESCRIPTION OF CONNECTION
START PULSE (pin 5)	Normally Open (n/o) relay contact output. A momentary "contact closure" of 220 ms is generated each time the module is changed from Off to On. The Common (C) relay contact is the Command Common output. Typically connects to the Remote Start logic input on the peripheral device.
STOP PULSE (pin 4)	Normally Open (n/o) relay contact output. A momentary "contact closure" of 220 ms is generated each time the module is changed from On to Off. The Common (C) relay contact is the Command Common output. Typically connects to the Remote Stop or Pause logic input on the peripheral device.
COMMAND COMMON (pin 13)	The Common (C) relay contact output for the Start and Stop Pulse relays. For an active high logic on the pulse outputs, connect Command Common to the logic supply voltage on the peripheral device. For an active low logic on the pulse outputs, connect this pin to logic ground on the peripheral device.
EXT. CONTROL IN (+) (pin 18)	Connecting +5 to +40 VDC to this input enables the active low external control inputs (On, Off, Cough, Talkback). If the control inputs are isolated from other devices (e.g., on a remote mic control panel), the +VDC can come from +5 Logic (jumper pin 18 to pin 6 on the Logic Connector).
ON (-) (pin 7)	From an external On switch. Turns the module On from Off, generating a Start Pulse when pulled low. Input is ignored if the module is already On.
OFF (-) (pin 8)	From an external Off switch. Turns the module Off from On, generating a Stop Pulse, when pulled low. Input is ignored if the module is already Off.
COUGH (-) (pin 9)	From an external Cough switch. The module audio is muted from all assigned buses for as long as the Cough switch is pressed, pulling this pin low.
TALKBACK (-) (pin 20)	From an external Talkback switch. The module audio is routed to the Talkback bus, and muted from all assigned buses, for as long as the Talkback switch is pressed, pulling this pin low.
TALLYs	Tally outputs are n/o "dry contact" outputs. Typically used to drive indicator lamps, the outputs can sink or source up to 60 volts at 350 mA. The "C" contact for all the tally relays is the Tally Common output.
OFF TALLY (pin 16)	While the module is Off, the Off Tally output is connected to the Tally Common output if the Lamp Bypass is set to off (Logic Settings switch # 9). If Lamp Bypass is on, then the Off Tally illumination is controlled by the Ready input logic while the module is Off.
ON TALLY (pin 17)	While the module is On, the On Tally output is connected to Tally Common.
LOGIC ACTIVE TALLY (pin 15)	Anytime the logic is enabled (Logic Settings switch # 7 is on and switch # 8 is true), the Logic Active Tally output is connected to Tally Common.
TALLY COMMON (pin 14)	The "C" relay contact for the Off Tally, On Tally and Logic Active Tally relays. Typically, the tally lamps are commoned together to ground and Tally Common is connected to the lamp supply voltage (up to 60 volts). If the tallys use +6.3 volt lamps, and are isolated from peripheral devices as in a remote mic control panel, then the Tally Common can be jumpered to +5 Logic.
READY (+) & (-) AUDIO RESET (+) & (-)	These complementary logic inputs require +5 to +40 VDC on the (+) input and ground on the (-) input for activation. This can be done by connecting an active high logic to the (+) input and grounding the (-) input, or by supplying +5 to +40 VDC to the (+) input and an active low logic to the (-) input.
READY (pins 21 & 24)	With active high logic, the (+) input is the logic input and the (-) input is tied to the peripheral device ground. With active low logic, the (-) input is the logic input and the (+) input connects to +VDC from the peripheral device. When Ready is activated while the module is On, the module is turned Off without generating a Stop Pulse. While the module is Off (and Logic Settings switch # 7 is On and # 9 is Off), the Ready logic controls the Off lamp illumination to indicate device status. Typically, lamp off indicates the peripheral is not ready to play, lamp on indicates the device is ready, and a flashing lamp indicates the device has already played or is not cued.
AUDIO RESET (pins 19 & 22)	When activated with the module On, turns the module Off without generating a Stop Pulse. Input is ignored if the module is already Off.
+5 LOGIC (pins 6, 10, 11, 12)	Module logic voltage output source that can deliver up to 200 mA of current. Pins 6, 10 and 12 are opposite likely termination pins to minimize jumper lengths. Pin 11 can be used to power remote control panel tally lamps.
LOGIC GND (pins 1, 2, 3)	Module logic ground. Pins 1 and 2 are opposite likely termination pins to minimize jumper lengths. Pin 3 is the ground connection for remote microphone control panels.

Quick Reference Guide to AirWave Logic

Mic Remote Control Connection Example

Trim L

Trim R

Logic

A CR Mute

B CR Mute

A Studio Mute

B Studio Mute

A Timer Reset

B Timer Reset

RCL Enable

A/B RCL Sel

Lamp Bypass

Cue Reset

A

B

Pgm-1

Pgm-2

Off-Line

Cue

0

5

10

15

20

30

40

50

60

70

80

90

100

ON

OFF

Logic Connector Signal Table

PIN #	SIGNAL	FUNCTION
1	LOGIC GND	Console logic ground
2	LOGIC GND	Console logic ground
3	LOGIC GND	Console logic ground
4	STOP PULSE	Stop command output. "N/O relay contact."
5	START PULSE	Start command output. "N/O relay contact."
6	+5 LOGIC	5 volt source.
7	ON (-)	Remote On switch input (active low).
8	OFF (-)	Remote Off switch input (active low).
9	COUGH (-)	Remote Cough switch input (active low).
10	+5 LOGIC	5 volt source.
11	+5 LOGIC	5 volt source.
12	+5 LOGIC	5 volt source.
13	COMMAND COMMON	Start & Stop commands common. "C relay contact."
14	TALLY COMMON	Tally relays common connection. "C relay contact."
15	LOGIC ACTIVE TALLY	Logic active tally output. "N/O relay contact."
16	OFF TALLY	Off tally output. "N/O relay contact."
17	ON TALLY	On tally output. "N/O relay contact."
18	EXT. CONTROL IN (+)	+VDC to enable external inputs On, Off, Cough, Talkback.
19	AUDIO RESET (-)	Remote Audio Off input (active low).
20	TALKBACK (-)	Remote Talkback input (active low).
21	READY (-)	Remote Ready input (active low).
22	AUDIO RESET (+)	+VDC to enable Audio Reset function (audio off control).
23	spare	no connection
24	READY (+)	+VDC to enable the Ready function (Off lamp control).

Notes: +VDC is between +5 and +40 VDC.
Output relays can switch voltages up to +60 VDC
Bold indicates connection used in this example

Typical Switch Positions for a CR Microphone on the A Input

On - Off

1 2 3 4 5 6 7 8 9 10

A CR Mute

B CR Mute

A Studio Mute

B Studio Mute

A Timer Reset

B Timer Reset

RCL Enable

A/B RCL Sel

Lamp Bypass

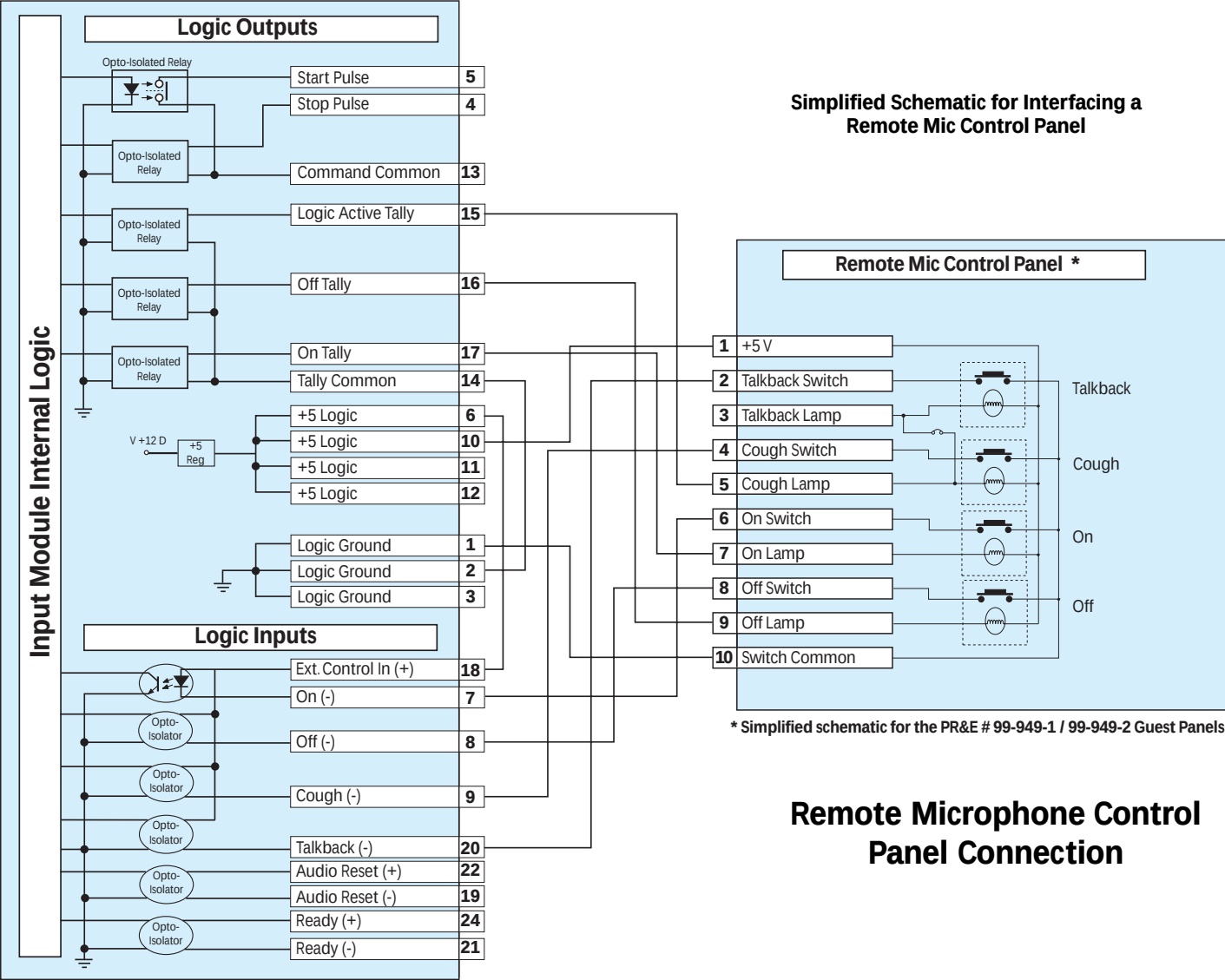
Cue Reset

Logic Settings

Logic Settings Switch Definitions

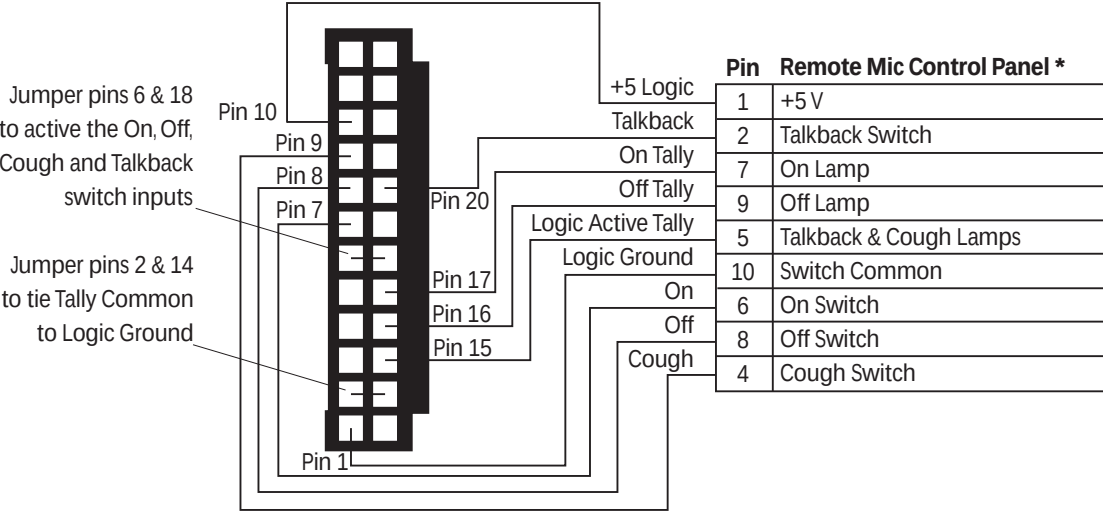
#	SWITCH	ON FUNCTION (to left)	OFF FUNCTION (to right)
1	A CR Mute	Input A mutes C/R speakers at On	No monitor muting
2	B CR Mute	Input B mutes C/R speakers at On	No monitor muting
3	A Studio Mute	Input A mutes studio spkrs. at On	No monitor muting
4	B Studio Mute	Input B mutes studio spkrs. at On	No monitor muting
5	A Timer Reset	Input A resets timer at On	No timer reset
6	B Timer Reset	Input B resets timer at On	No timer reset
7	RCL Enable	Logic active (input set by switch 8)	Logic inactive
8	A/B RCL Set	Logic active on Input A	Logic active on Input B
9	Lamp Bypass	Off lamp follows module On/Off	Off lamp follows Ready
10	Cue Reset	Module On cancels cue function	No cue reset function

Notes: RCL = Remote Control Logic
Bold indicates switch setting used in this example



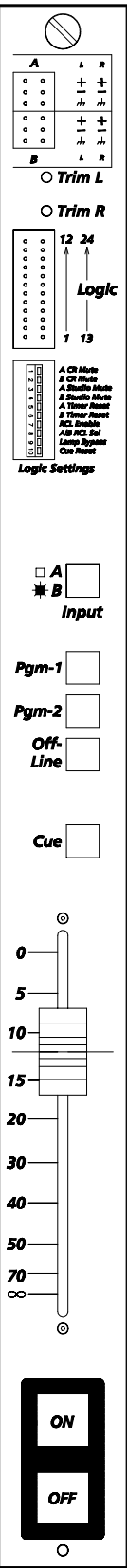
Remote Microphone Control Panel Connection

Wiring Diagram for a Remote Mic Control Panel



Quick Reference Guide to AirWave Logic

Basic Logic Connection Example



Logic Connector Signal Table

PIN #	SIGNAL	FUNCTION
1	LOGIC GND	Console logic ground
2	LOGIC GND	Console logic ground
3	LOGIC GND	Console logic ground
4	STOP PULSE	Stop command output. "N/O relay contact."
5	START PULSE	Start command output. "N/O relay contact."
6	+5 LOGIC	5 volt source.
7	ON (-)	Remote On switch input (active low).
8	OFF (-)	Remote Off switch input (active low).
9	COUGH (-)	Remote Cough switch input (active low).
10	+5 LOGIC	5 volt source.
11	+5 LOGIC	5 volt source.
12	+5 LOGIC	5 volt source.
13	COMMAND COMMON	Start & Stop commands common. "C relay contact."
14	TALLY COMMON	Tally relays common connection. "C relay contact."
15	LOGIC ACTIVE TALLY	Logic active tally output. "N/O relay contact."
16	OFF TALLY	Off tally output. "N/O relay contact."
17	ON TALLY	On tally output. "N/O relay contact."
18	EXT. CONTROL IN (+)	+VDC to enable external inputs On, Off, Cough, Talkback.
19	AUDIO RESET (-)	Remote Audio Off input (active low).
20	TALKBACK (-)	Remote Talkback input (active low).
21	READY (-)	Remote Ready input (active low).
22	AUDIO RESET (+)	+VDC to enable Audio Reset function (audio off control).
23	spare	no connection
24	READY (+)	+VDC to enable the Ready function (Off lamp control).

(Contact insertion end view)

Notes: +VDC is between +5 and +40 VDC.
Output relays can switch voltages up to +60 VDC
Bold indicates connection used in this example

Typical Switch Positions for a Peripheral Device on the A Input

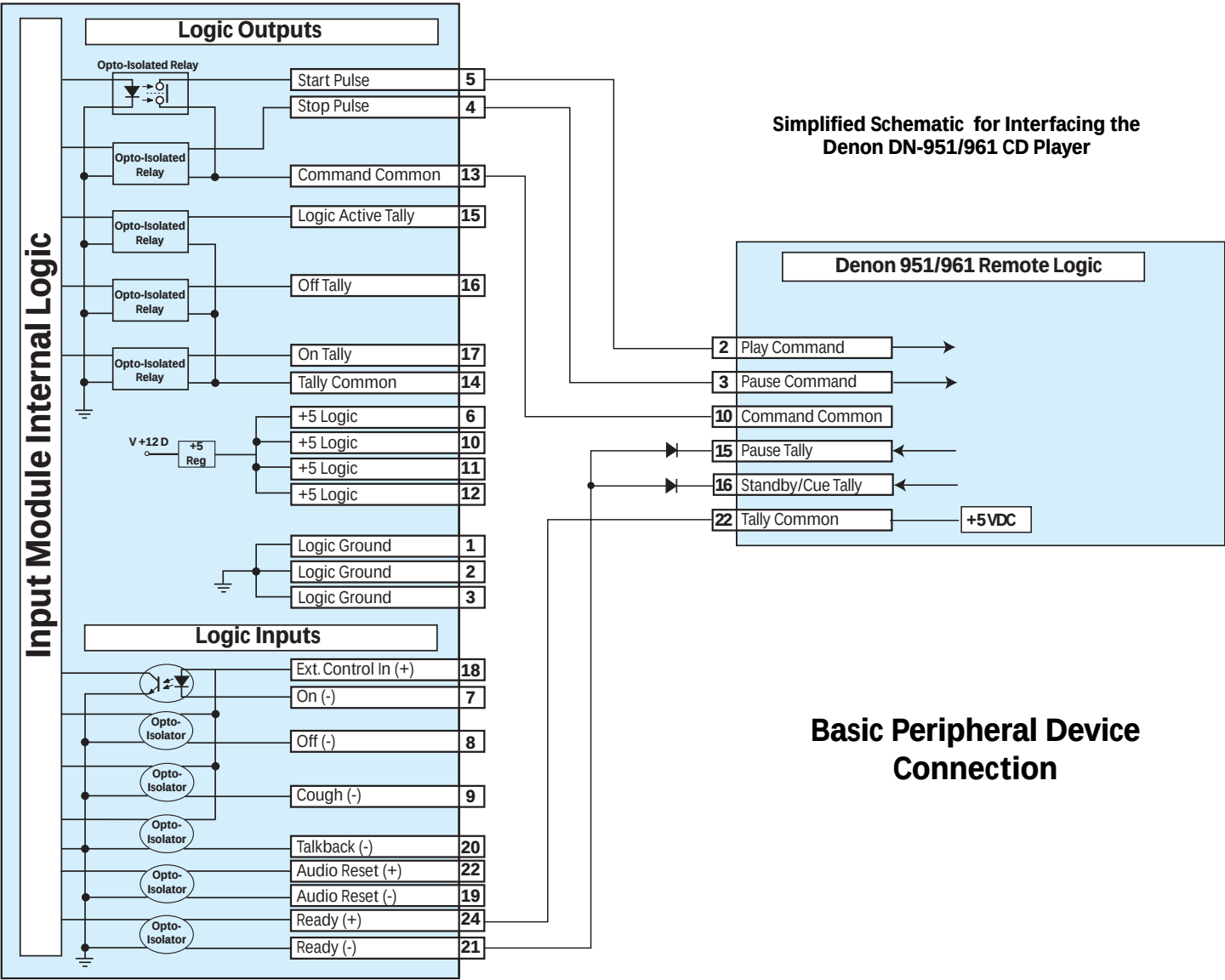
On - Off	
1	A CR Mute
2	B CR Mute
3	A Studio Mute
4	B Studio Mute
5	A Timer Reset
6	B Timer Reset
7	RCL Enable
8	A/B RCL Sel
9	Lamp Bypass
10	Cue Reset

Logic Settings

Logic Settings Switch Definitions

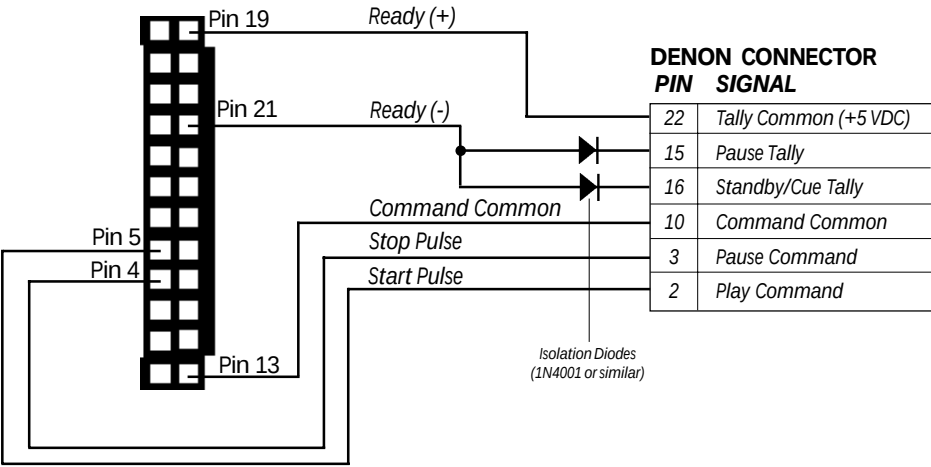
#	SWITCH	ON FUNCTION (to left)	OFF FUNCTION (to right)
1	A CR Mute	Input A mutes C/R speakers at On	No monitor muting
2	B CR Mute	Input B mutes C/R speakers at On	No monitor muting
3	A Studio Mute	Input A mutes studio spkrs. at On	No monitor muting
4	B Studio Mute	Input B mutes studio spkrs. at On	No monitor muting
5	A Timer Reset	Input A resets timer at On	No timer reset
6	B Timer Reset	Input B resets timer at On	No timer reset
7	RCL Enable	Logic active (input set by switch 8)	Logic inactive
8	A/B RCL Set	Logic active on input A	Logic active on input B
9	Lamp Bypass	Off lamp follows module On/Off	Off lamp follows ready
10	Cue Reset	Module On cancels cue function	No cue reset function

Notes: RCL = Remote Control Logic
Bold indicates switch setting used in this example



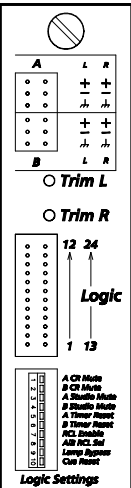
Basic Peripheral Device Connection

Logic Wiring Diagram for Denon DN-951/961



Quick Reference Guide to AirWave Logic

Complex Logic Connection Example



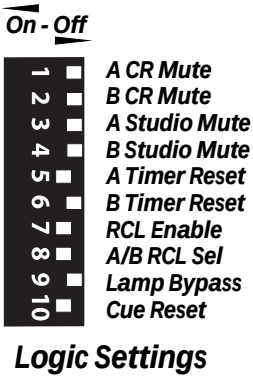
Logic Connector Signal Table

PIN #	SIGNAL	FUNCTION
1	LOGIC GND	Console logic ground
2	LOGIC GND	Console logic ground
3	LOGIC GND	Console logic ground
4	STOP PULSE	Stop command output. "N/O relay contact."
5	START PULSE	Start command output. "N/O relay contact."
6	+5 LOGIC	5 volt source.
7	ON (-)	Remote On switch input (active low).
8	OFF (-)	Remote Off switch input (active low).
9	COUGH (-)	Remote Cough switch input (active low).
10	+5 LOGIC	5 volt source.
11	+5 LOGIC	5 volt source.
12	+5 LOGIC	5 volt source.
13	COMMAND COMMON	Start & Stop commands common. "C relay contact."
14	TALLY COMMON	Tally relays common connection. "C relay contact."
15	LOGIC ACTIVE TALLY	Logic active tally output. "N/O relay contact."
16	OFF TALLY	Off tally output. "N/O relay contact."
17	ON TALLY	On tally output. "N/O relay contact."
18	EXT. CONTROL IN (+)	+VDC to enable external inputs On, Off, Cough, Talkback.
19	AUDIO RESET (-)	Remote Audio Off input (active low).
20	TALKBACK (-)	Remote Talkback input (active low).
21	READY (-)	Remote Ready input (active low).
22	AUDIO RESET (+)	+VDC to enable Audio Reset function (audio off control).
23	spare	no connection
24	READY (+)	+VDC to enable the Ready function (Off lamp control).

(Contact insertion end view)

Notes: +VDC is between +5 and +40 VDC.
Output relays can switch voltages up to +60 VDC
Bold indicates connection used in this example

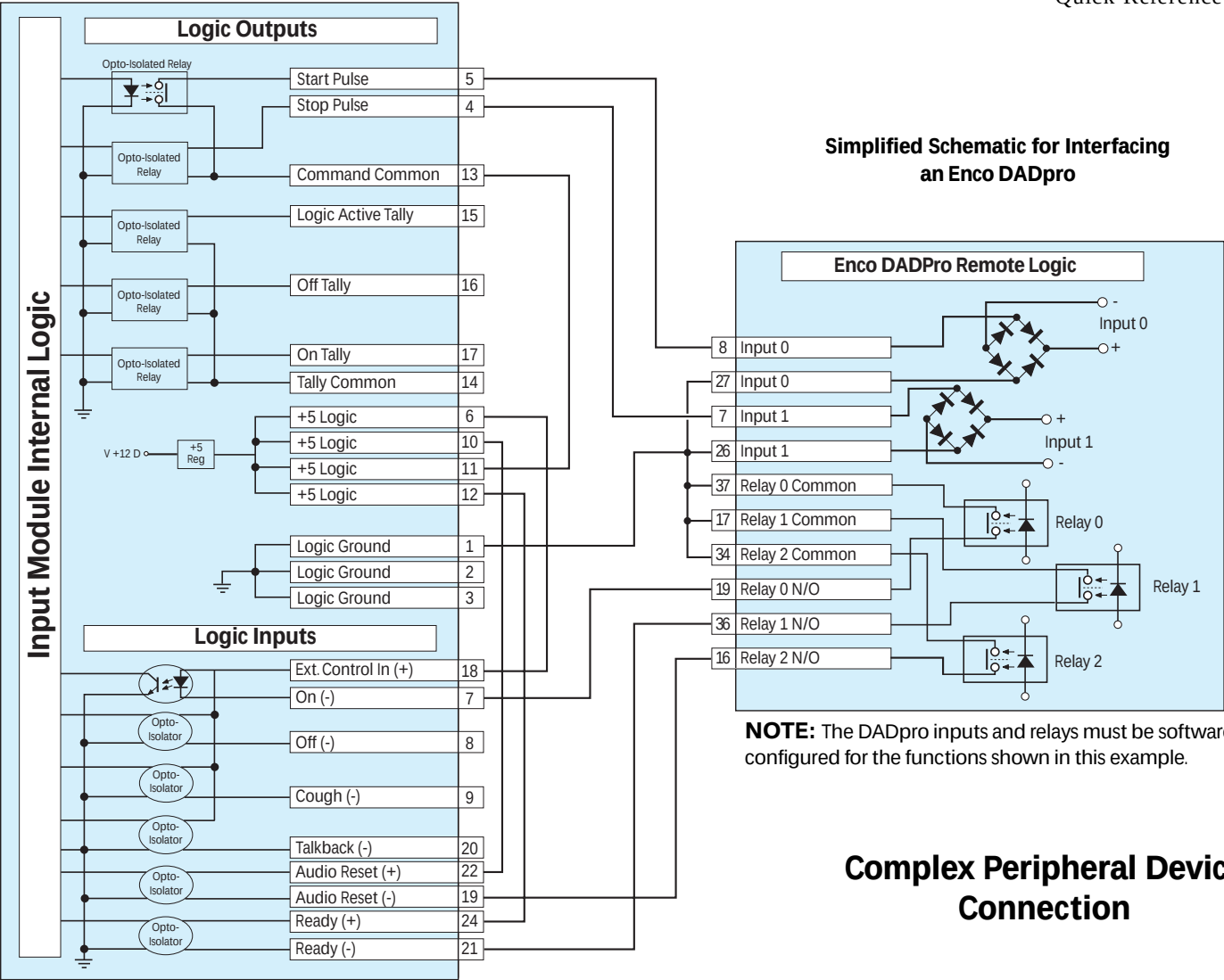
Typical Switch Positions for a Peripheral Device on the A Input



Logic Settings Switch Definitions

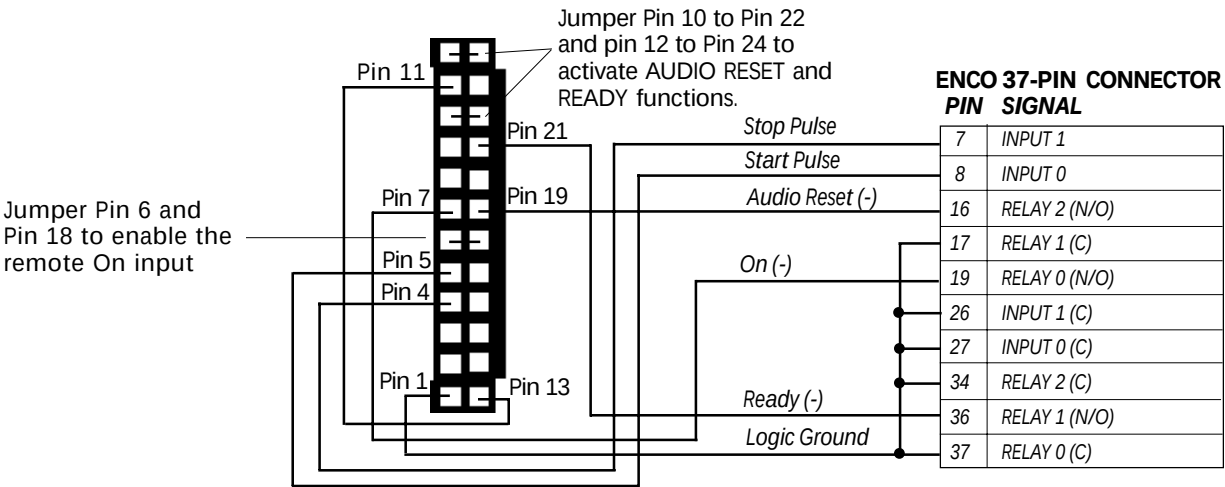
#	SWITCH	ON FUNCTION (to left)	OFF FUNCTION (to right)
1	A CR Mute	Input A mutes C/R speakers at On	No monitor muting
2	B CR Mute	Input B mutes C/R speakers at On	No monitor muting
3	A Studio Mute	Input A mutes studio spkrs. at On	No monitor muting
4	B Studio Mute	Input B mutes studio spkrs. at On	No monitor muting
5	A Timer Reset	Input A resets timer at On	No timer reset
6	B Timer Reset	Input B resets timer at On	No timer reset
7	RCL Enable	Logic Active (input set by switch 8)	Logic inactive
8	A/B RCL Set	Logic active on Input A	Logic active on input B
9	Lamp Bypass	Off lamp follows module On/Off	Off lamp follows Ready
10	Cue Reset	Module On cancels cue function	No cue reset function

Notes: RCL = Remote Control Logic
Bold indicates switch setting used in this example



Complex Peripheral Device Connection

Logic Wiring Diagram for Enco DADpro



Module Connections

Each module’s connections are covered on a separate page in this section.

MICROPHONE PREAMPLIFIER MODULE CONNECTION

There are five 3-pin microphone input connectors on the Microphone preamplifier module. Connect only low impedance, balanced, dynamic or condenser microphones, with nominal mic output levels of -70 to -30 dBu, to these inputs.

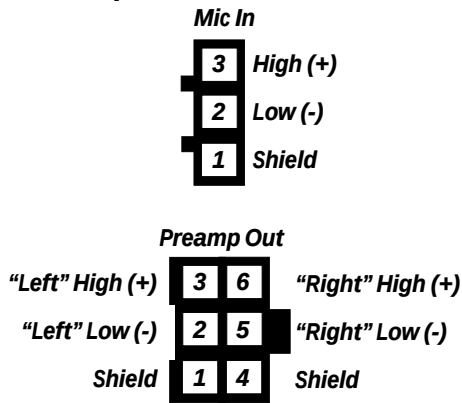
Each input connects to a separate mic preamp driving its own line-level balanced output connector. The 6-pin output connectors are wired in parallel using the standard pin-out sequence.

The Preamp output signal level is +4 dBu. The outputs are normally jumpered to an Input module’s A or B input using a short patch cable. Alternatively, the Preamp out-

put can be routed through external patching and/or mic processing gear before feeding an Input module.

See Chapter 3 *Microphone Preamplifier Module* for a feature description of the Microphone Preamp module.

Mic Preamp Connector Pin Definitions



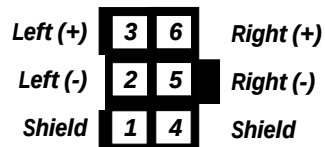
INPUT MODULE CONNECTION

There are three connectors on each Input module: two 6-pin stereo audio input connectors and one 24-pin logic interface connector.

The balanced audio inputs, labeled A and B, can handle signal input levels of -10 dBu to +4 dBu. Front panel left and right input trim controls set the input reference level. Refer back to page 7 for connection information on using unbalanced devices with an Input module.

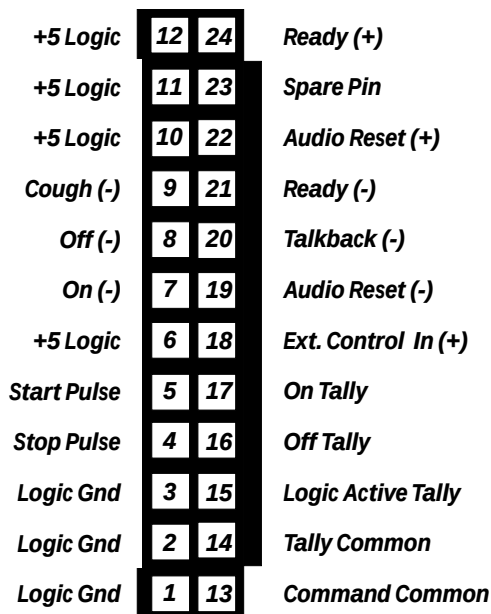
Typical logic connections are shown on fold-out pages 13, 14 and 15. See Chapter 3 *Input Module* for a description of the logic functions and audio controls.

Line Level Input Connector

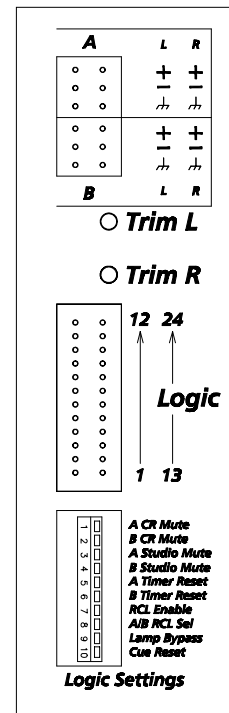


(wire insertion end view)

Logic Connector



(wire insertion end view)

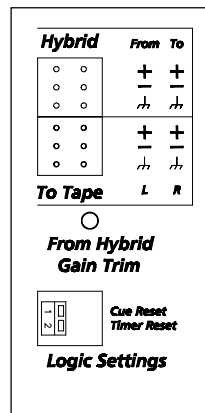


The Input module connectors, Logic Settings switches and Input Trim Controls are hidden under the meter panel in normal operation.

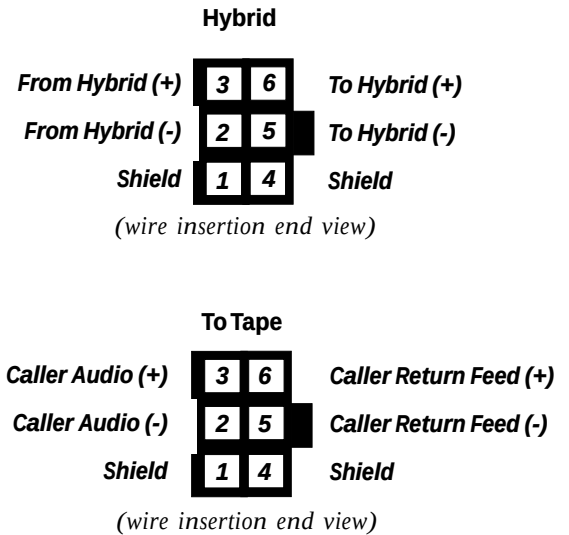
TELCO MODULE CONNECTION

There are two 6-pin connectors on this module. The top connector (*Hybrid*) connects the audio coming from the telephone hybrid unit to the left-hand pins (1, 2, 3) and the mix-minus audio returning to the hybrid on the right-hand pins (4, 5, 6). The lower connector (*To Tape*) contains a two-channel connection for a recording device (caller only on left and return feed to caller on right). Both connectors use the standard 6-pin audio connector pin-out sequence.

See Chapter 3 *Telco Input/Output Module* for a feature description of the controls and Logic Settings switches.

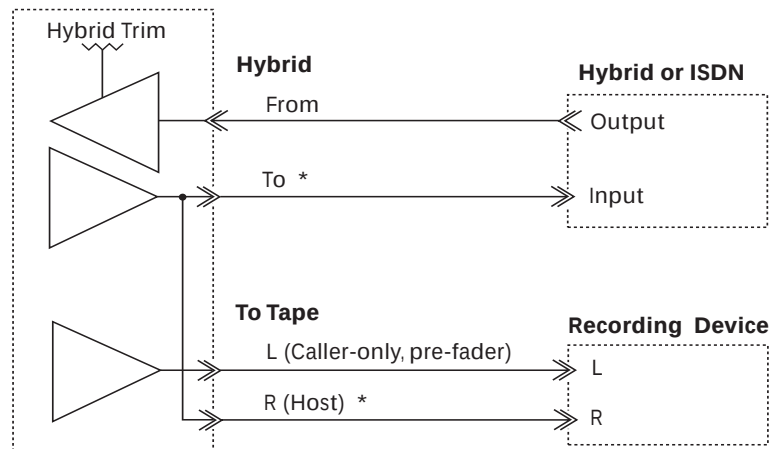


Telco Input/Output Module Connectors, Trim Control and Logic Settings Switches



Hybrid and Recorder Connection

Telco Input/Output Module



* Contains the caller Mix-Minus Feed, which follows the Pgm-1, Pgm-2, Offline status of the Telco module.

OUTPUT AMPLIFIER MODULE CONNECTION

The Main and Auxiliary connections for Pgm-1 and Pgm-2 use the AirWave standard 6-pin stereo pin-out sequence. The two mono outputs (Main and Aux) are combined on one 6-pin connector.

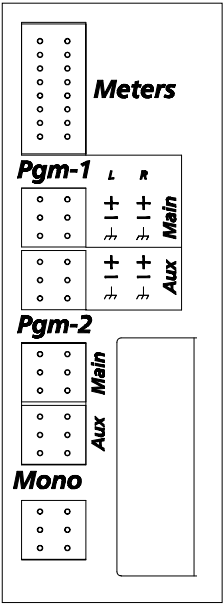
Pgm-1 Main is the main on-air output signal summed from the Program-1 bus. The Pgm-1 Aux output is a separate isolated output of the Program-1 bus.

Pgm-2 Main is an audition or secondary main output signal summed from the Program-2 bus. The Pgm-2 Aux output is a separate isolated output of the Program-2 bus.

The left-hand pins (1,2,3) on the Mono connector carry the Main Mono audio output. The right-hand pins (4,5,6) carry an isolated Aux Mono audio output. A faceplate button selects between the mono-summed Pgm-1 or Pgm-2 signals.

The Meters connector is prewired to the audio level meters on the meter panel.

See Chapter 3 *Output Amplifier Module* for a functional description of the controls.



Output Amplifier Module Connectors

Main Output (Pgm-1 and Pgm-2) Aux Output (Pgm-1 and Pgm-2)

Left (+)	3	6	Right (+)
Left (-)	2	5	Right (-)
Shield	1	4	Shield

Mono Output

Main Mono (+)	3	6	Aux Mono (+)
Main Mono (-)	2	5	Aux Mono (-)
Shield	1	4	Shield

Meters

VU Meter Lamps		VU Meter Signals
+12 VDC (Pgm-2, R)	8 16	Pgm-2, R +
GND	7 15	Pgm-2, R -
+12 VDC (Pgm-2, L)	6 14	Pgm-2, L +
GND	5 13	Pgm-2, L -
+12 VDC (Pgm-1, R)	4 12	Pgm-1, R +
GND	3 11	Pgm-1, R -
+12 VDC (Pgm-1, L)	2 10	Pgm-1, L +
GND	1 9	Pgm-1, L -

(wire insertion end view on all connector drawings)

MONITOR MODULE CONNECTION

Ten 6-pin connectors, using the AirWave standard audio pin-out sequence, are on this module. The 3-pin *Cue Spkr* output is pre-wired to the Cue Speaker. Two direct (fixed level, non-muting) outputs are available: *C/R Direct* follows the control room monitor selector and *Studio Direct* follows the studio selector. These can drive guest headphone amplifiers.

The *Cntrl Rm Main* output feeds the amplifier for the control room monitor speakers. This output is controlled by the control room monitor level control and the control room mute logic. The *Cntrl Rm H/P* output may be used to drive an outboard headphone amplifier.

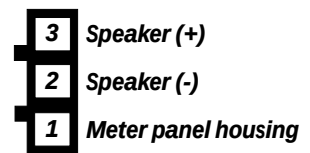
The *Studio Main* output feeds the amplifier for the studio monitor speakers. The *Studio H/P* output may be used to drive an outboard headphone amplifier with level control. The Studio Main output is level controlled by the stu-

dio monitor control and muted by the studio mute logic coming from the Input modules.

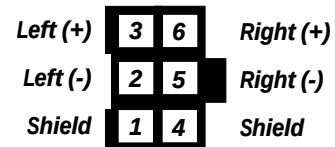
The 8-pin *C/R & Studio Warning* connector drives the appropriate warning/On-Air light controller through solid-state relay contacts. See page 11 for logic connection information.

See Chapter 3 *Monitor Module* for functional descriptions and operational information.

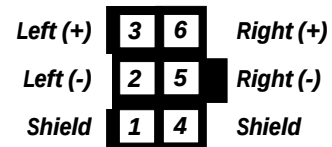
Cue Speaker output



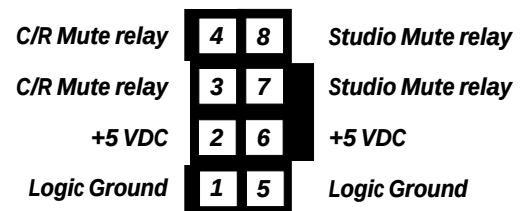
All External Inputs



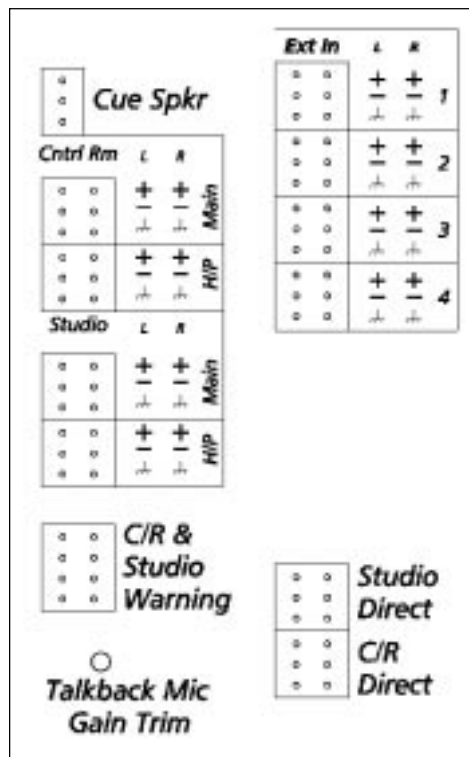
All Outputs (Cntrl Rm, Studio, Studio Direct, C/R Direct)



C/R & Studio Warning connector



(wire insertion end view
on all connector drawings)



**Monitor Module Connectors with
Talkback Mic Gain Trim Control**

REMOTE LINE SELECTOR (RLS) MODULE CONNECTION

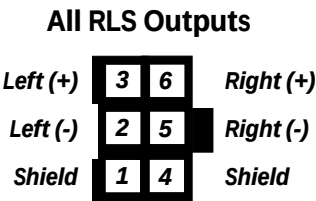
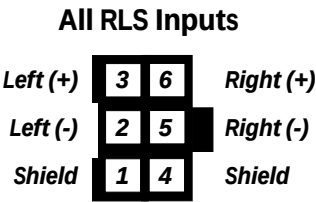
The nine 6-pin connectors follow the AirWave standard stereo audio pinout sequence. The RLS inputs can come from any balanced or unbalanced line-level devices using reference levels from -10 dBu to +4 dBu. Refer back to page 7 for unbalanced device connection information.

The RLS outputs will be at the same reference level as the inputs (-10 dBu up to +4 dBu). They are typically connected to an Input module or a recording device.

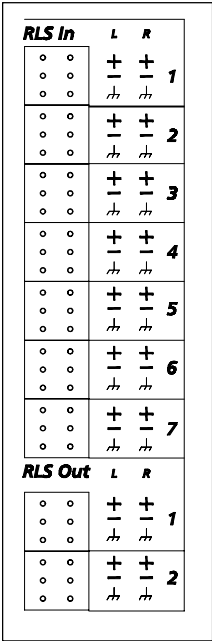
Note: There are no level adjustments on the RLS module, therefore all sources connecting to an RLS must use the same reference level. The RLS is an active device, therefore, the inputs and outputs *cannot* be swapped to make a 2 x 7 device.

The Remote Line Selector module’s buttons are spaced so that a Brother P-Touch™ or similar labelling machine can be used to identify the input sources. The lines next to each RLS button are spaced 1/2 inch apart so that either 3/8 inch or 1/2 inch label tape with two lines of type can be used.

See Chapter 3 *Remote Line Selector (RLS) Module* for more operational information.



(wire insertion end view on both connector drawings)

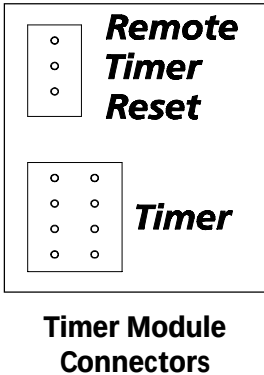


Remote Line Selector Module Connectors

TIMER MODULE REMOTE CONNECTION

There are two connectors on the Timer module. The 8-pin connector is pre-wired to the internal Clock/Timer Assembly. A 3-pin connector is available for resetting and starting a remote timer.

Two normally-open “relay contacts” are used to connect to the Timer. Typically the relay contacts connect to the reset and ground connections on the timer as shown in the examples below. See Chapter 3 *Timer Control Module* for more information.



Remote Timer Reset

	SIGNAL	FUNCTION
3	Relay	Contact "C"
2	spare	---
1	Relay	Contact "N/O"

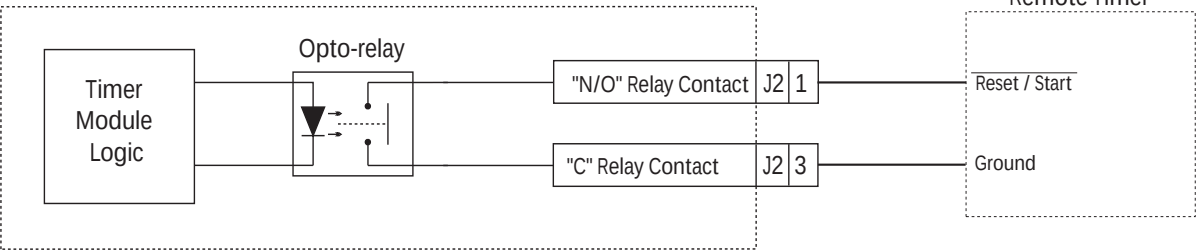
Timer (pre-wired)

PIN	SIGNAL	FUNCTION
1	Logic GND	Logic ground
2	+12 D	+12 volt supply
3	Start	Start command
4	Stop	Stop command
5	Reset	Reset command
6	Hold	Hold command
7	spare	---
8	spare	---

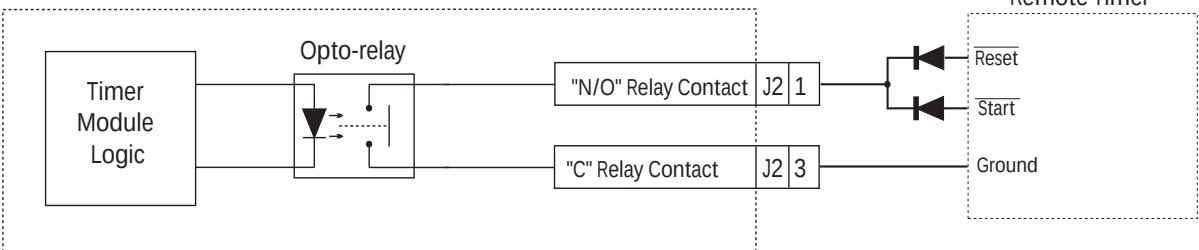
(wire insertion end view on all connector drawings)

Typical Timer Reset Connections

Connection When Timer Resets and Auto Starts With a Single Reset Pulse



Connection When Timer Has Separate Reset and Start Logic Inputs



Operation

This chapter covers the operating functions for each module and component in the AirWave console.

INPUT MODULES

AirWave has four types of input modules: Microphone Preamplifier, line-level Input, Telco Input/Output and RLS. Multiple Input, Microphone Preamp and RLS modules may be installed but only one Telco module can be installed in an AirWave mainframe.

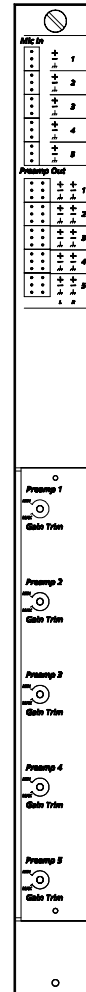
MICROPHONE PREAMPLIFIER MODULE

The Microphone Preamplifier module amplifies from one to five low-level microphone signals to line-level. The +4 dBu output of each preamplifier can be jumpered directly to an Input module, an RLS input, routed to a patch bay or connected to an external line-level signal processor.

The module contains five high-performance transformerless microphone preamplifiers with a board-mounted DIP switch (DS1) for switching phantom power to any input. In the illustration inputs 2 and 4 are shown switched on.

Five faceplate-accessible gain trim controls set the preamp gain as required for the application.

Multiple Microphone Preamplifier modules may be used in the AirWave mainframe.

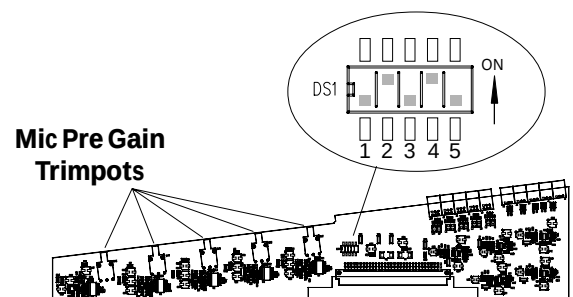


Microphone Inputs 1 - 5

Preamplifier Outputs 1 - 5 Mic signal paralleled to left and right outputs.

Trim pots for Inputs 1 - 5 Normally hidden behind a security cover, allows nominal microphone signal levels of -70 dBu to -30 dBu.

Phantom Power Selection



LINE INPUT MODULE

The Line Input module controls preamplified microphone inputs or line-level sources.

A/B Inputs Two balanced stereo line-level inputs (A & B).

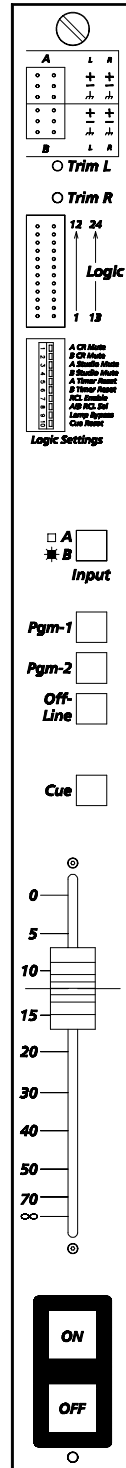
Logic Connector Connects a mic remote control panel or a peripheral device for remote control of the device and the module. Refer to the *Input Module Connections Quick Reference* (page 12 of the *Installation chapter*) for more information on the control functions..

A/B Input Selector Selects the active input (A or B). The button is lit when the B input is selected.

Off-Line When active (button lit), the pre-fader and pre-On/Off audio is sent to the Telco module's off-line telephone foldback system.

Fader 100 mm infinite resolution level control. Set the fader to the reference line (-12 dB) to achieve 0 VU on the program output meters with a nominal +4 dBu input signal (and properly adjusted input level trimpots).

Yellow Off Button Turns module off, removing the module's audio from all program buses. May also initiate the logic control commands Stop Pulse and Off Tally following the *Logic Settings* switch positions.



Input Level Trimpots Individual gain adjustment of the module's left and right channels (after the A/B selection switch).

Logic Settings switches Sets the module's logic control functions for the A and B inputs. Refer to the *Input Module Connections Quick Reference* (page 12 of the *Installation chapter*) for more information on the switch functions.

Pgm-1 & Pgm-2 Assigns the module to any combination of the Program 1 and Program 2 output buses. The buttons are lit when assigned to a bus.

Cue Sends the pre-fader audio to the console's cue speaker and to the console operator's headphones. The button is lit while Cue is active.

Red On Button Turns module on, applying the module's audio to the selected program buses. It may also initiate logic control commands Start Pulse, Timer Reset, On Tally, Cue Off following the *Logic Settings* switch positions.

TELCO INPUT/OUTPUT MODULE

The optional Telco Input/Output module interfaces a telephone hybrid with the console. The module also provides a host/caller recorder connection.

Hybrid From connects the caller audio from the telephone hybrid and To sends the selected console mix-minus audio back to the hybrid.

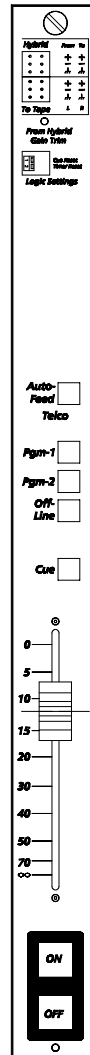
From Hybrid Gain Trim Sets the level of the incoming caller audio from the hybrid.

Autofeed When lit, the module performs automatic switching as described under Telco Operation, below.

Off-Line When lit sends the Off-Line mix to the caller when the module is Off.

Fader 100 mm infinite resolution level control. Set the fader at the reference line (-12 dB) to achieve 0 VU on the program output meters with a properly adjusted hybrid input level.

Yellow Off Button Turns module Off, removing the caller's audio from the selected program bus and changing the caller Feed to the Off-Line bus when Autofeed is active.



To Tape Connects the caller audio to the left channel, and the mix-minus audio (either Off-line or the PGM assignment mix-minus) to the right channel of a call recorder.

Logic Settings Independently sets whether the Cue and Timer functions are reset when the module is turned On.

Pgm-1 & Pgm-2 When lit and the module is On, assigns caller audio to the Pgm-1 or Pgm-2 buses and assigns the associated mix-minus feed to caller. Functions are described under Telco Operation, below.

Cue When lit sends the pre-fader, pre-On/Off audio to the console-mounted cue speaker and to the console operator's headphones.

Red On Button Turns module On, applying the caller's audio to the selected program bus and changing the caller Feed to Pgm-1 when Autofeed is active..

Telco Operation

Manual Mode: The Autofeed button is unlit. One Feed source can be selected (Off-Line, Pgm-1 or Pgm-2).

When Off-Line is selected, the caller Feed is the Off-Line mix bus regardless of module On/Off. The caller is not assigned to either program bus, thus the caller does *not* go on-air if the module is turned On.

When Pgm-1 or -2 is selected, and the module is On, the caller Feed is the program bus mix-minus. Turning the module Off removes the caller from the program bus but does not change the caller's Feed.

Autofeed Mode: The Autofeed button is lit. Either Pgm-1 or Pgm-2 can be selected.

When the module is On, the caller Feed is the mix-minus of the selected program bus.

When the module is turned Off, the caller Feed changes to the Off-Line bus and the Off-line button is lit. The selected Pgm button **winks** to indicate the assigned program bus. If neither bus is assigned, both Pgm buttons **alternately flash** to indicate the caller will *not* go on-air when the module is turned on.

REMOTE LINE SELECTOR (RLS) MODULE

The RLS module contains two stereo line level electronic switches which share seven common inputs to create a 7 x 2 switcher. The seven sources are independently selectable between the two outputs. There are no signal level trim adjustments on this module.

RLS In The seven stereo line-level inputs. Inputs must be at equivalent reference input levels from -10 dBu up to +4 dBu.

Selector-1 The seven buttons select the input assigned to RLS Out 1. Only one button can be selected at a time.

RLS Out The line-level outputs from Selector-1 and Selector-2. The RLS is a unity gain device, thus the output reference level is equal to the selected input's reference level.

Selector-2 The seven buttons select the input assigned to RLS Out 2. Only one button can be selected at a time.



RLS In		L	R	
•	•	+	+	1
•	•	+	+	2
•	•	+	+	3
•	•	+	+	4
•	•	+	+	5
•	•	+	+	6
•	•	+	+	7

RLS Out		L	R	
•	•	+	+	1
•	•	+	+	2

_____ ☐

_____ ☐

_____ ☐

_____ ☐

_____ ☐

_____ ☐

_____ ☐

Selector-1

_____ ☐

_____ ☐

_____ ☐

_____ ☐

_____ ☐

_____ ☐

_____ ☐

Selector-2



4

P A C I F I C R E S E A R C H & E N G I N E E R I N G

Revision C • 11/97

OUTPUT AMPLIFIER MODULE

The Output Amplifier module has the bus summing and line output amplifiers for the two stereo Program buses (Pgm-1 and Pgm-2), the four level meter amplifiers and the monaural line output amplifier.

Meters *Signal and power connection for the four Program level meters (pre-wired).*

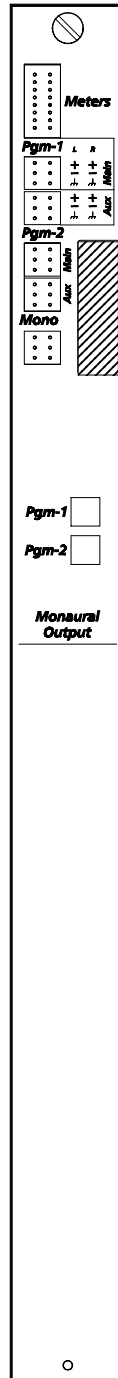
Pgm-2 *Main and isolated auxiliary Program-2 outputs.*

Mono *The Main Mono Output and an isolated Auxiliary Mono output.*

Pgm-1 *Main and isolated auxiliary Program-1 outputs.*

Meter Panel Latch *opening.*

Pgm-1 & Pgm-2 *Selects the monaural output source. Only one source (either Program-1 or Program-2) can be selected. The stereo source bus is then passively summed to mono before being amplified for the active balanced Mono output.*



MONITOR MODULE

The Monitor module contains source selection, monitor control, and Talkback facilities for the control room and one studio.

Cue Spkr *Cue bus amplifier output. Prewired to the meter panel Cue Speaker.*

Cntrl Rm *The Control Room Source Selector output. Main connects to an external amplifier for the Control Room speakers. H/P connects to an external headphone amplifier.*

C/R & Studio Warning *Logic output to the Control Room and Studio warning light interfaces.*

Talkback Mic Gain Trim *Sets the level of the Talkback mic into the studio outputs.*

Talkback Mic *Allows communication to the studio while the Talkback button is pressed.*

Monitor *Controls the Studio Main output.*

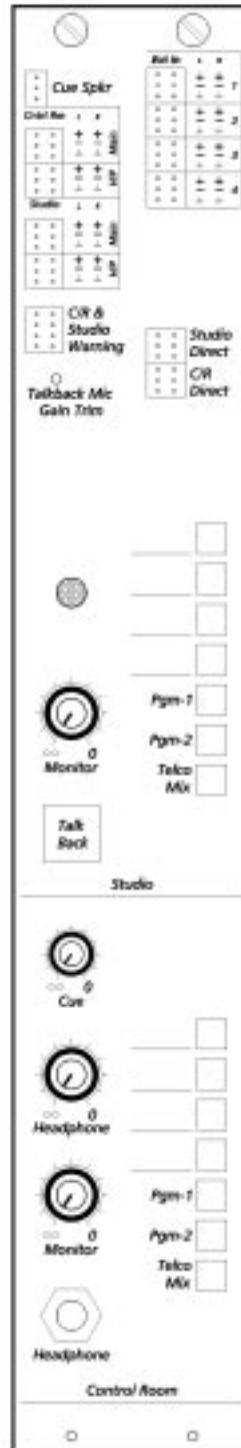
Talkback *Sends the Talkback mic to the studio outputs while pressed.*

Cue *Controls the level of the Cue Spkr output.*

Headphone *Controls the volume of the headphone audio sent to the headphone jack and to the Cntrl Rm H/P output.*

Monitor *Controls the Cntrl Rm Main output.*

Headphone *Low- or high-impedance stereo headphones can be plugged into this jack. To prevent headphone or hearing damage, always turn the Headphone control fully counterclockwise before plugging in headphones.*



Ext In *External line level inputs that feed the top four buttons on each Source Selector.*

Studio *The selected outputs from the Studio Monitor Source Selector. Main connects to an external amplifier for the Studio monitor speakers. H/P connects to an external headphone amplifier for the Studio headphones.*

Studio Direct *Fixed volume output of the Studio Source Selector.*

C/R Direct *Fixed volume output of the Control Room Monitor Source Selector.*

Studio Monitor Source Selector *Selects the audio sent to the Studio outputs from the four external audio inputs, Pgm-1, Pgm-2 and the Telco Mix (the Off-Line mix bus). Multiple sources can be selected for simultaneous monitoring.*

C/R Monitor Source Selector *Selects the audio for the control room outputs and the headphone jack from the four external audio inputs, Pgm-1, Pgm-2 and the Telco Mix (the Off-Line mix bus). Multiple sources can be selected for simultaneous monitoring.*

TIMER CONTROL MODULE

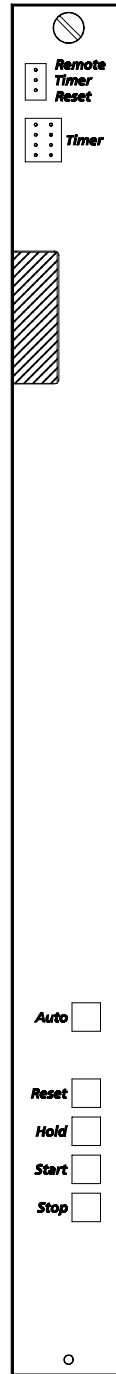
The Timer Control module is pre-wired to the Clock/Timer circuit board mounted in the meter panel. The Timer can be manually controlled using the Timer Control module buttons or automatically controlled using the Timer reset control logic from the Input modules.

Remote Timer Reset *Logic output to reset a remote timer.*

Meter Panel Latch *opening.*

Reset *Resets the timer to 00:00.00. If the timer was already counting, the timer will then continue to count up from 00:00.00. Reset pressed while the timer is stopped simply returns the time display to 00:00.00.*

Start *Immediately starts the timer from the displayed time.*



Timer *Supplies power and logic control to the clock/timer.*

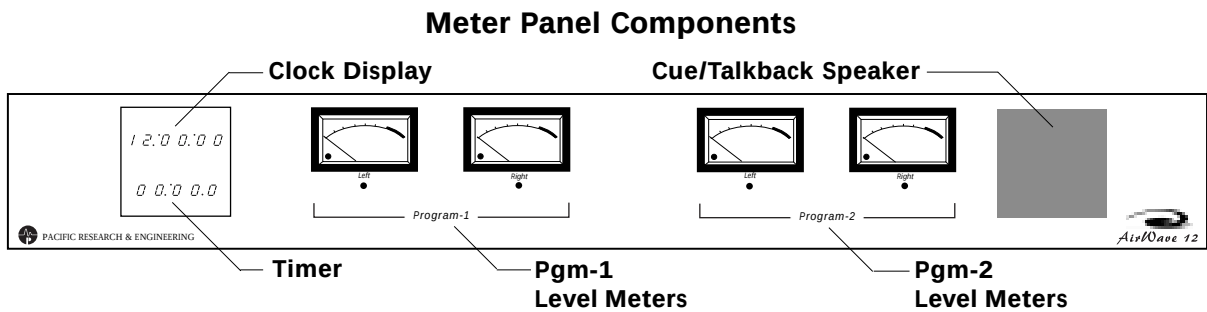
Auto *When Active (lit), the timer automatically resets to 00:00.00 and immediately starts counting whenever an Input module, with its timer reset function enabled, is turned On. When the Auto button is not lit, the timer is disabled from automatic Input module control.*

Hold *When pressed and held, freezes the timer's display (showing the present time) even though the timer continues to run. Releasing Hold jumps the time display to the current run time.*

Stop *Immediately stops the timer, leaving the stopped time displayed.*

METER PANEL

The meter panel contains the Clock/Timer module, the level meters and the Cue/Talkback speaker. The clock has no external controls. Clock time setting requires the use of the Clock Setting Magnet Tool when the clock is run in master mode. In slave mode (timing derived from an ESE time code signal) the clock does not need to be set. See Chapter 2, *Setting the Clock*, for information on setting the time.



The meter movements have individual meter calibrations directly below each meter for setting the “mechanical zero” pointer position. Refer to Chapter 5, *Meter Panel Assembly*, for the alignment instructions.

The meters’ electronic calibration is performed using trimpots in the meter driver circuitry on the Output module. See Chapter 5, *Output Amplifier Module*, for the alignment instructions.

The Cue/Talkback speaker’s impedance is 45 ohms with a 3-watt power-handling capacity. The speaker volume is controlled by the Cue volume control on the Monitor module. A 3-watt amplifier IC on the Monitor module drives the speaker. See Chapter 5, *Meter Panel Assembly*, for speaker replacement procedures.

Equipment Description

This chapter has technical descriptions of each AirWave module, the mainframe, the clock/timer assembly and the power supply.

MAINFRAME

The AirWave mainframe consists of a welded all-steel bottom chassis with a hinged overbridge-style meter panel. The modules' metal faceplates complete the mainframe enclosure by fastening to the chassis through a knurled fastener at the top of the faceplate and a hex-head faceplate screw at the bottom.

Each module has one 96-pin gold-plated Euroconnector that plugs into the universal motherboard from the top. The motherboard consists of two connectorized sections in the AirWave-12 and three sections in the AirWave-20. The motherboard sections fasten to formed metal supports on the bottom of the chassis. The steel motherboard supports run the width of the mainframe for rigidity.

To ensure high RFI shielding, all wiring shields ground directly to the chassis through the faceplate and knurled fastener right at the input connectors. A ground screw near the DC power cable entry point ties the mainframe chassis to the technical ground reference.

The ten-foot DC power cable is soldered to the right end of the right-hand motherboard section. A keyed AMP connector fastens the power cable to the rack-mount AirWave Power Supply.

MICROPHONE PREAMP MODULE

For this section refer to the three Microphone Preamplifier module schematic pages in Chapter 6.

Each of the five balanced microphone inputs feed a SSM2017, a precision surface-mount microphone preamplifier IC. It unbalances and amplifies the mic signals up to -10 dBu. The preamp ICs are protected against switching transients and DC voltage surges by the Zener diodes, resistors and coupling capacitors found between the input connector and the preamp IC.

DIP switch DS1 has five switches to turn phantom power on or off to the five microphone inputs. The switches are shipped from the factory set in the off position. Only those individual inputs that are powering condenser microphones should be set for phantom power on. The +45 volts is then coupled to the inputs via a pair of 6.81 k resistors.

Faceplate-accessible trim pots (RV1 - RV5) set the preamp gain for a nominal output signal level of +4 dBu.

TP1 - TP5 allow the internal nominal -10 dBu signal level to be monitored. Dual OP275 opamps boost and balance the -10 dBu signals to +4 dBu at the mic preamp output.

6-pin output connectors simplify connection to Input modules, paralleling the left and right channels.

Polyswitch resettable fuses, F1 and F2, protect against board component short circuits. Once the over-current is removed, the fuses automatically reset. Test point TP6 is the -16 VDC check point. TP9 is the +16 VDC check point. TP8 is the +45 VDC phantom supply check point. The ground reference test point is TP7.

INPUT MODULE

For this section refer to the three Input Module schematic pages in Chapter 6.

Two identical balanced inputs (A and B) are unbalanced and amplified by OP275 dual differential opamps. Four single-pole single-throw (SPST) solid-state analog switches work together to select between the two stereo inputs, following the setting of the faceplate A/B button.

The selected stereo input is buffered by one-half of U3 and U4 and gain trimmed by the faceplate trimpots, RV1 and RV2. These set the left and right channel gains, respectively.

The buffered output of the gain trim stage connects to the dual-channel fader and to the “B” inputs on switch assignment ICs U22 and U29. The fader output goes through an amplifier/buffer and then to the other inputs (“A” and “C”) on switch assignment ICs U22 and U29.

The U29 switches follow the front panel Cue and Pgm-1 buttons. When Cue is active, the pre-fader audio is connected to the Cue summing bus. When Pgm-1 select is active, fader-controlled audio is connected to the Program-1 main bus.

The U22 switches follow the front panel Off-line and Pgm-2 buttons. When Off-line is active, pre-fader audio is connected to the O/L summing bus. When Pgm-2 is active, fader-controlled audio is connected to the Program-2 main bus. U22 and U29 switch control comes from the U19 FPGA (logic gate array chip).

The faceplate output assignment switches are all on a single plug-in circuit card in a SIMM memory chip socket. Each is a momentary SPST switch with an integral LED indicator. Transistor LED drivers (Q1 - Q5) are used for the assignment switch LEDs. The module On and Off switches are also momentary, with incandescent lamp indicators Q6 and Q7.

The ten-position Logic Settings DIP switch (DS1) is used to tell the FPGA whether logic con-

trol is to be used on the A or B input along with what type of logic signals to use. Either the A or the B input can be selected to use the logic control features. Five logic control outputs and six logic control inputs connect to the FPGA.

All control inputs (U13 - U18) and outputs (U8 - U12) are optically coupled to prevent ground loops. The control inputs are also current limited by U23 - U28 (LM317 regulators) so that any logic voltage from +5 to +40VDC can be accommodated.

Polyswitch resettable fuses, F1, F2 and F3, protect the +16, -16 and +5VDC connections against short circuit damage. TP9, TP10 and TP11 are available for checking the +16, -16 and +5 volt supplies, respectively.

TELCO INPUT/OUTPUT MODULE

For this section refer to the two Telco Input/Output Module schematic pages in Chapter 6.

The optional Telco Input/Output module handles the console-to-telephone hybrid interfacing. All of the caller mix-minus audio control and caller audio program assignment is built into this module.

The balanced From Hybrid input is unbalanced and gain controlled through the two halves of opamp U1. The hybrid input gain is set by faceplate trimpot, RV1.

The output of the second half of the opamp is connected to a single element fader, to the left channel To Tape output (through buffer opamps), and to the Cue assignment switch (the “B” input of switch U11). The front panel Cue button controls this switch. The left channel of the To Tape output contains only the caller audio.

The fader-controlled caller audio is amplified by U2 before going to the Program-1 and Program-2 assignment switches, which are controlled by the front panel Pgm-1 and Pgm-2 buttons. The switched caller audio goes to the output module for final mixing with the Program buses. The mix-

ing occurs after the program bus mix-minus signals for the Telco module are created.

The Off-line mix bus (O/L Sum Bus) terminates in this module. The bus is summed by U3 and applied to the Telco Output assignment switch, U12. U11 and U12 select the caller's return audio source (To Hybrid) from the Pgm-1, Pgm-2 and the Off-line bus audio.

When Auto-Feed is active, the module status (On or Off) affects the switching. When the module is On, the Pgm-1 or Pgm-2 output (whichever is active) is automatically sent to the caller. When the module is turned Off, the Off-line bus audio is automatically switched to the caller.

When Auto-Feed is not active the selected source (Pgm-1, Pgm-2 or Off-line) is sent to the caller when the module is On and Off.

The To Hybrid audio is buffered by one-half of opamp U3 and balanced by one-half of opamp U6 and U7. The balanced audio is resistively coupled back to the hybrid (*To Hybrid*) and to the right channel of the To Tape output (Mix-Minus). These outputs contain the program mix-minus or the Off-line mix audio, which is typically just the talent's voice while recording off-air.

The output assignment switchboard plugs into a SIMM memory socket. Each assignment switch is a momentary type with an LED indicator driven by Q1 - Q5. The module On and Off switches are also momentary with incandescent lamp illumination driven by Q6 and Q7.

DIP switch DS1 has two switches labeled 1 and 2. When on, Switch 1 allows the Telco module to reset the Timer when the module is turned On. When Switch 2 is on, the Cue function is turned off when the Telco module is turned On.

Polyswitch resettable fuses, F1, F2 and F3, are used on the +16, -16 and +5 VDC connections to protect against short circuit damage. TP7 and TP8 can be used to check the -16 and +5 volt supplies, respectively.

OUTPUT AMPLIFIER MODULE

For this section refer to the four Output Amplifier module schematic pages in Chapter 6.

The Output Amplifier module has four main program output amplifiers for the left and right channels of each output, four meter driver amplifiers, a mono source selector and a mono output amplifier. Only the Program-1 circuitry is described. Program-2 is identical.

The Pgm-1 buses on the motherboard terminate in the Output Amplifier module. They are summed through two opamps. The outputs of the opamp summers (at TP1 and TP3) are fed to the Telco module to generate the Program-1 mix-minus feed to the caller. They are then summed with the caller audio from the Telco Input/Output module after a buffer stage to create the Program-1 main signal (at TP2 and TP4).

The program output level is trimmed at this point. The trimmed audio feeds the main output amplifiers as well as the mono output assignment switch (U21). The main output amplifiers also create balanced output signals (Pgm-1 Main Left and Pgm-1 Main Right). Resistors isolate the left and right Aux Out signals from the left and right main Pgm-1 outputs.

An electronic switch (U21), controlled by faceplate switches Pgm-1 and Pgm-2, selects between the two program bus signals. The momentary switches with LED indicators are on a plug-in SIMM circuit card. The switches select which program output feeds the mono amplifier through buffer U9. RV5 trims the buffer's gain, setting the mono output signal level. Opamps U18 and U19 amplify and balance the Mono output signal. Resistors isolate the Aux output from the Main output.

The four meter drivers use identical circuits. The inputs for the meter drivers come directly from the main Program output connectors so there will never be meter readings without a console output

signal. The meter driver dual opamps (U5 - U8) create balanced drive signals for the meter movements. Two LEDs per meter (D1 - D8) limit meter movement on very hot signals. Each meter circuit has a trimpot (RV6 - RV9) to align the meters to 0 VU with a +4 dBu signal output.

Polyswitch resettable fuses, F1, F2, F3 and F4, protect against short circuit damage. TP9, TP10, TP12 and TP16 are used to check the +16, -16, +5 and +12 volt supplies, respectively.

MONITOR MODULE

For this section refer to the nine Monitor module schematic pages in Chapter 6.

The Monitor module is a double-width module containing two independent circuit boards that plug into two motherboard positions. The left hand circuit board is the Monitor 1 board. Its circuitry is found on first four schematic pages. It contains the monitor controls (Cue, Monitor, Headphone levels) for the Control Room, the Talkback to the Studio mic and control circuits, and the master level control for the Studio monitor speakers.

The right hand circuit board is the Monitor 2 board. It is the same circuit board used for the Remote Line Selector module. When used as a Monitor 2 board, a different FPGA chip is installed and several additional parts are stuffed into the board for logic control of the Monitor module. The circuit description is covered in the Remote Line Selector section.

The Monitor 1 board can be divided between the Control Room functions and the Studio functions.

Control Room Functions

The CR Select Input comes from the Monitor 2 board seven-button Control Room monitor source selector. Being a balanced signal, the left and right channels are unbalanced by the two halves of opamp U1 and capacitively coupled to both the

CR Monitor Pot and to the CR headphone signal assignment switcher U8.

The output of the CR monitor pot goes through mute switch U5 (controlled by the CR Mute logic bus) before being buffered and balanced for output by U2 and U3. This creates the main CR Monitor Output.

Studio Functions

The Studio Select Input comes from the Monitor 2 board seven-button Studio monitor source selector. The balanced signals are unbalanced by opamp U9 and capacitively coupled to both the Studio Monitor Pot and to the Talent headphone circuit (switcher U39 and opamps U15 and U16).

Talkback is inserted into the studio monitor signal by U10 under control of the ST Talkback command. U11 and U12 amplify and balance the signal for the ST Monitor Output.

Cue/Talkback

The Cue/Talkback audio is summed by one-half of opamp U4 and capacitively coupled to the Cue pot and to the headphone signal assignment switcher. The output of the Cue pot connects to the Cue speaker amplifier IC (U23) which is muted by Q1. Q1 is controlled by the Cue Mute logic signal that comes from U35 (Monitor 2 FPGA).

A built-in electret Talkback microphone is amplified and buffered by opamp U13. Trimpot (RV1) sets the mic volume for the monitor and headphone feed. The Talkback mic audio is switched into the Studio Monitor Output and the Talent H/P audio by switcher ICs U10 and U39 in response to the Talkback button being depressed and held.

CR Headphone

The CR headphone audio is either the selected source monitor or the Cue/Talk bus. When the Cue/Talk logic signal (from U35, the Monitor 2 FPGA) goes high, the monitor audio is cut off and

Cue/Talk audio is fed to the console headphones. The CR Headphone Level control sets the level to the headphone amplifier U22 (for the module headphone jack) and to the balanced CR Headphone Output driver circuit (opamps U7 and U14).

Polyswitch resettable fuses, F1, F2 and F3, are used on the +5, +16 and -16 VDC connections to protect against short circuit damage. TP3, TP9 and TP8 can be used to check the +5, -16 and +16 volt supplies, respectively.

REMOTE LINE SELECTOR MODULE

For this section refer to the five Remote Line Selector module schematic pages in Chapter 6.

The Remote Line Selector module has seven line-level buffering and switching circuits with two outputs in a 7 x 2 matrix.

The line-level signals (RLS 1 - RLS 7) are AC coupled into the module. Opamps (U1 - U7) unbalance the left and right signals, which are capacitively coupled to the solid-state assignment switches (U20 - U33). Pressing a front panel Ext. 1 - 7 button routes the External input audio through the switches to U11 - U14, which buffer and rebalance the audio for the outputs (RLS 1 and RLS 2).

Each front panel selector switch bank is on a plug-in assignment switch board. Each RLS select switch is a momentary type with an LED indicator driven by Q1 - Q14.

Polyswitch resettable fuses, F1, F2 and F3, are used on the +5, +16 and -16 VDC connections to protect against short circuit damage. TP1, TP9 and TP8 can be used to check the +5, +16 and -16 volt supplies, respectively.

TIMER CONTROL MODULE

For this section refer to the timer control module schematic page in Chapter 6.

The timer control module routes power and timer control to the clock/timer assembly through

the timer connector. A remote timer reset command is also output through the remote timer reset connector.

The module holds the logic-state backup batteries used in case of momentary power outage. Two AA batteries ensure the console powers back up in the same logic state when power fails momentarily.

The faceplate timer control switches (Start, Stop, Reset, Hold) manually control the timer section of the clock/timer assembly. The Auto button controls whether the timer reset bus logic is connected to the timer. When Auto is active (button lit) the timer automatically resets at module On for any module with the Timer Reset logic function turned on (Logic Settings switches 5 or 6 set to the operator's left).

CLOCK/TIMER ASSEMBLY

For this section refer to the clock/timer schematic page in Chapter 6.

The clock/timer consists of a clock/timer display and a main clock/timer circuit board. A ribbon cable connects the display board to the main clock/timer circuit board.

The display board has the eleven 7-segment displays for the clock and timer and three Hall-effect switches. The Hall-effect switches are used for setting the time when the clock is run in manual mode.

The clock/timer is built around a microcontroller IC (U1). The microcontroller handles both the timer and clock display functions. For a 12-hour clock display a PR&E # 21-122-1 microcontroller is used (standard with the AirWave). For a 24-hour clock display a PR&E # 21-122-2 microcontroller can be substituted.

The +12 volt supply, from the timer control module, is regulated on-board to generate the +5 volt and +8 volt supplies. The +8 volts is used exclusively by the clock oscillator circuit.

The clock oscillator (U2, Q21, U10) controls the clock timing when the Master/Slave switch (S1, #1) is in Master mode. In Slave mode, the clock timing signal comes from an ESE time code signal input on BNC connector J3. The time code signal is buffered (U9, Q23, U3) and applied to the microcontroller. If ESE time code is lost, the microcontroller will revert to using the internal oscillator as the timekeeping reference (flashing LED CR3 to indicate time code loss).

The timer can be controlled through the console's timer reset bus (when the Auto function is active) and manually through the timer control module buttons.

S1, #2 controls whether the tenths of seconds display is turned on while the timer is running. The tenths of seconds are always displayed when the timer is stopped.

AIRWAVE POWER SUPPLY

For this section refer to the two power supply schematic pages in Chapter 6. For a more complete discussion of the Power Supply refer to the *Power Supply Technical Manual* (PR&E # 75-38).

The AirWave Power Supply (APS) consists of a power transformer, selectable for 115 VAC or 230 VAC operation, chassis-mounted rectifiers and filter capacitors and a regulator circuit board mounted to a heat sink.

The power supply is protected by a replaceable AC mains fuse located in the power entry module, thermal circuit breakers (auto-reset type) within the transformer primary, internal fuses on the transformer's critical secondary outputs and self-protected current-limiting regulators.

The power transformer has four secondary windings. Three are wired to bridge rectifiers and filter caps mounted on the chassis floor, while the fourth is connected to a bridge rectifier (CR6) and filter cap on the regulator circuit card. All voltage regulators fasten to the heat sinks.

The power supply has five output voltages:

- +5 volts @ 6.5 A for the console's logic circuitry
- +12 volts @ 4.0 A for the clock/timer and VU meter lamps
- ± 16 volts @ 1.0 A each for the audio circuitry
- +45 volts phantom @ 0.10 A for condenser microphones.

The +5 volt (U2) and +12 volt (U1) regulator circuitry is identical with only their divider resistor values being different. The ± 16 volt regulator circuitry (U3 and U4) employs a dual voltage tracking device (U5) that monitors the regulated voltage outputs. If either voltage drops, the other will follow to keep the two voltages equal.

The phantom supply uses a pass-transistor design (Q1, Q2, CR5). Zener diode CR5 clamps the base voltage of Q1 and the collector of Q2 to a maximum of +47 volts. Q1 and Q2 automatically adjust the current to keep the supply voltage constant. The nominal output voltage will typically be +45 volts.

Maintenance & Alignment

For troubleshooting, the AirWave module extender (PR&E # 99-975) allows easy access to any module's circuit board test points. Note that two module extenders are required for the Monitor module.

Parts and Repair Services

All of the switches, button caps and faders are easily field replaceable. Although schematics are included for field troubleshooting purposes, it is recommended that modules be returned to PR&E for circuit board service due to their surface mount construction.

PARTS ORDERING & REPAIR INFORMATION

Spare parts, accessories and additional modules can be purchased through a sales representative or through PR&E's Customer Service Department. To expedite the ordering process, and ensure the correct parts are ordered, have the PR&E part numbers at hand when ordering.

Most repair parts are shipped the same day. Modules and other assemblies may have lead times exceeding two weeks, so order accordingly.

Parts returned to PR&E for service, exchange, or credit must have an RMA (Return Material Authorization) tracking number assigned to them by the Customer Service Department. Parts or

components returned without an RMA number written on the outside of the packaging may be subject to customer return or to an additional handling fee.

To order parts or request an RMA, contact PR&E by phone, fax, e-mail or post:

Pacific Research & Engineering
Attention: Customer Service Department
2070 Las Palmas Drive
Carlsbad, CA 92009 USA

Phone: 760.438.3911, 8:00 to 5:00 Pacific Time
Fax: 760.438.9277
E-mail: support@pre.com

All parts orders and serviced parts are shipped FOB Carlsbad, via UPS Groundtrak in the USA. If specified by the client at the time of order, Federal Express or UPS 2-day, overnight or Next day A.M. delivery is also available for most items. Orders must be made before 2:00 PM PT with the shipping method specified at time of order.

Parts orders and repair services can be charged to AMEX, VISA or Mastercard, or shipped COD, if not on account with PR&E. Contact your sales representative for account information.

SPARE & REPLACEMENT PARTS INFORMATION

PR&E parts are categorized using a two digit prefix, a dash, and a three or four digit part ID number (a second dash and a suffix number may be used to identify part variations). The AirWave Replacement Parts table on the next page lists the AirWave parts typically subject to wear and tear. It is recommended that one or more of each of these be kept in the on-site spares stock.

AirWave Replacement Parts

PR&E #	Description or Use
11-53	Bridge Rectifier #
12-95	On, Off, Talkback switch lamp
12-96	VU meter lamp
20-106	Voltage Regulator, adjustable #
20-107	Voltage Regulator, adjustable #
24-98	Cue Pot
24-100	CR and Studio Monitor, Headphone Pot
25-853	Pgm and A/B select switch *
25-854	Autofeed switch *
25-855	Cue switch *
25-856	Off/Line switch *
25-858	Module On switch **
25-859	Module Off switch **
25-860	Talkback switch **
25-870	White button cap ***
25-871	Red button cap ***
25-872	Yellow button cap ***
90-1074	Telco module fader
90-1075	Input module fader

Supplied in 76-728 Spare Parts Kit.
 * Used on the 95-968-1, -2, -3 and -4 switchboards.
 ** Used on the 95-969-1 and -2 switchboards.
 *** Blank button cap numbers. Also used for custom button engraving. Add a -1 suffix for standard engraving (Talkback, On, Off).

The AirWave Assemblies & Modules table lists the modules and assemblies available for field servicing of the AirWave console.

INSTALLATION KIT PARTS

Various installation kits (Tool Kit, Mainframe Connector Kit, Input Module Connector Kit and Telco Module Connector Kit) and a Spare Parts Kit are shipped with each new console. The kit contents and quantities are listed in the Connector & Tool Kit Components table below.

Connector and Tool Kit Components

PR&E #	Description or Use	Qty.
76-726	Mainframe Connector Kit	—
14-482	3-pin AMP connector	7
14-484	6-pin AMP connector	30
14-486	8-pin AMP connector	2
15-938-1	Receptacle contacts	217
50-5	AA Lithium battery	2
76-726-1	Input Connector Kit	—
14-484	6-pin AMP connector	2
14-513	24-pin AMP connector	1
15-938-1	Receptacle contacts	36
76-726-2	Telco Connector Kit	—
14-484	6-pin AMP connector	2
15-938-1	Receptacle contacts	12
76-727	AirWave Tool Kit	—
70-44	Sifam knob removal tool	1
70-90	Hex Wrench	1
70-126	Crimp Tool	1
70-129	Contact Removal Tool	1
90-151	Clock Magnet Tool	1

AirWave Assemblies & Modules

PR&E #	Description or Use	PR&E #	Description or Use
23-1	Electret microphone	95-973	Mid-Motherboard (AirWave-20)
23-2	Cue speaker	95-974	Motherboard Interconnect
46-21	VU Meter assembly	95-895-1	Clock/timer Assembly (12 hour)
80-1551	Blank Panel (one module space)	95-895-2	Clock/timer Assembly (24 hour)
95-968-1	Output Assignment switchboard	99-955-1	Power Supply Assembly
95-968-2	Timer Control switchboard	99-960	Timer Control module
95-968-3	Telco switchboard	99-961	Microphone preamp module
95-968-4	Mon 2 & RLS switchboard	99-962	Line Input module
95-968-5	Line Input switchboard	99-963	Telco Input/Output module
95-969-1	On/Off switchboard	99-965	Monitor module
95-969-2	Talkback switchboard	99-966	Remote Line Selector module
95-971	Right-end Motherboard (with power cable)	99-967	Output Amplifier module
95-972	Left-end Motherboard	99-975	Extender Card

Module Servicing

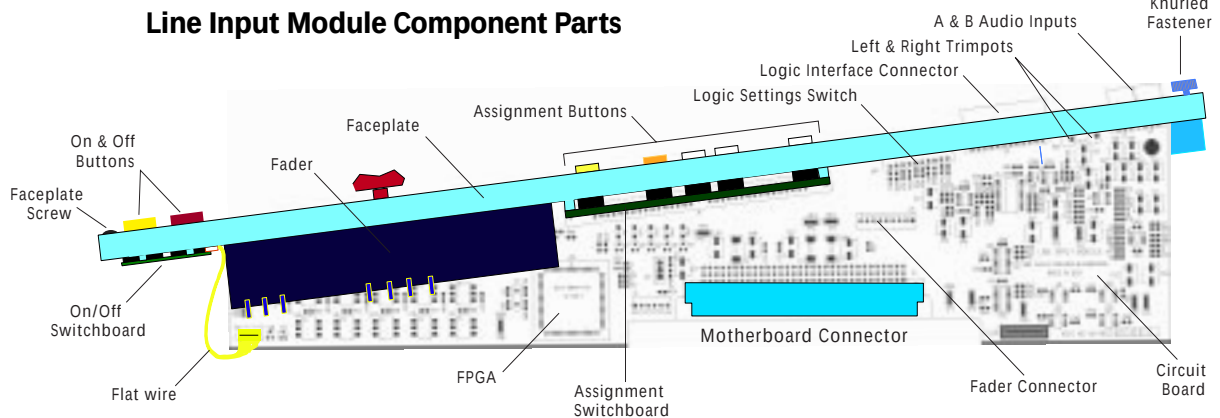
Input modules can be removed and installed with the console powered and on-air without causing audio interruption or noises in the program audio. When first plugged in, or when the console is first turned on, Input modules come up in their default turn-on state—no bus assignments active, the module in the Off state.

Note: Prior to removing any module from the motherboard, turn off all bus assignments and unplug all input, output and logic cables.

- Once the connectors start to mate, press straight down on the module's faceplate above the motherboard connector area to seat the module. Do not press on buttons or connectors while seating the module.

MODULE DISASSEMBLY & REASSEMBLY

A module consists of a faceplate (the silk-screened metal panel) and a circuit board. There are two circuit boards on the double-width Monitor module. There may also be one or more switch-



To remove a module from the mainframe:

- Loosen the knurled fastener at the top of the module.
- Remove the 4-40 button head faceplate screw at the bottom of the module. The Air-Wave Tool kit includes the hex driver.
- Use the knurled fastener to unplug the module from the motherboard and remove it from the mainframe.

To install a module:

- Set the module's faceplate on the front chassis module mounting tab.
- Lower the module into the mainframe and align the module's connector with the motherboard connector.

boards and a fader, as on the Input and Telco modules, or several potentiometers, as on the Monitor module, plugged into the circuit board.

Circuit boards fasten to the faceplate using flat head Phillips screws. Faders fasten to the faceplate using 1/16 inch button head screws and plug into a circuit board connector. Pots mount to the faceplate using lock washers and nuts and plug into circuit board connectors. The On and Off switches mount on the On/Off switchboard. The Talkback switch mounts on the Talkback switchboard. Both switchboards use a flat wire and circuit board connectors. The Assignment switchboards mount in a SIMM (Single In-line Memory Module) socket on the circuit board.

Circuit Board Removal

To remove the circuit board from the faceplate:

1. Unplug all faders, pots and switchboards, as applicable.
2. Remove the Assignment switchboard support screws.
3. Remove the circuit board mounting screws.
4. Separate the circuit board from the faceplate.

Reassemble in reverse fashion, ensuring that the switchboard buttons and connectors protrude through the faceplate without binding.

Assignment Switchboard Removal

1. Remove the circuit board from the faceplate per the previous instructions.
2. Using antistatic material, set the circuit board trace side down.
3. Press out on the two metal switchboard locking clips while lightly pressing on the solder-side of the switchboard. The board will tilt out of the locking clips toward the switch side.
4. Lift and remove the switchboard from the SIMM socket.

Assignment Switchboard Installation

1. Using antistatic material, set the circuit board trace side down.
2. Insert the switchboard edge contacts into the SIMM socket at about a 45° angle, with the switches angled down. The board is keyed so it will only mount in the correct orientation.
3. Press the switchboard into the socket while moving it to a vertical position. The locking clips will snap and hold the board in place.

When correctly positioned, the switchboard will be vertical to the circuit board and the two white SIMM socket alignment tabs will be sitting in matching holes on the switchboard.

On/Off or Talkback switchboard Removal

1. Remove the circuit board from the faceplate, per the previous instructions.
2. Remove the #1 Phillips screws, lock washers and washers from the switchboard to remove it from the faceplate. There are two screws on the Talkback switchboard and four screws on the On/Off switchboard.
3. Unplug the flat wire cable from the switchboard connector. Note its orientation.

MONITOR MODULE

The Monitor module has two circuit boards on one faceplate. Prior to removing the Monitor module, unplug the headphones from the module and turn off the external amplifiers for the Control Room and Studio monitors and headphones. This prevents possible transient noise damage to the loudspeakers and headphones.

The Monitor 1 circuit board must be removed in order to remove the Monitor 2 circuit board. All of the faceplate components—pots, headphone jack, Talkback mic, and the Monitor 2 circuit board, plug into the Monitor 1 board.

AirWave uses sealed pots that do not require “cleaning.” If it becomes necessary to replace a pot, remove the Monitor 1 circuit board from the faceplate by unplugging all cabling and removing the three mounting screws. Remove the colored end cap from the knob by prying it loose. Use the 70-44 Sifam Knob Removal Tool to loosen the lock nut so the knob can be removed from the pot shaft. Use a 7/16 inch nutdriver to remove the shaft nuts.

FADER SERVICING

There are no replaceable nor rebuildable parts on the two AirWave fader assemblies. Fader service is comprised of cleaning and lubricating. A stereo fader (PR&E # 90-1075) is used on the Input module. A mono fader (PR&E # 90-1074) is used on the Telco Input/Output module.

If the fader movement is rough, either the lubricant on the glide rails has evaporated or some liquid has spilled into the fader. Dow Corning 510 is the preferred glide rail lubricant as it will not migrate to the contact fingers like other lubricating oils.

Fader Disassembly and Cleaning

1. Remove the module from the mainframe.
2. Remove the circuit board from the faceplate, per the previous instructions.
3. Remove the fader knob and the two fader mounting screws, and the fader from the faceplate.
4. Remove the snap-on fader assembly cover. It is held in place by round stamped bosses at each end. With the fader sitting label up and the connector pins to the front, a pry-point is on the right end of the fader cover.
5. Clean the fader using only a dry cotton swab, or a cotton swab wet with distilled water.

Note: The use of chemical cleaners on the conductive plastic will substantially shorten fader life. Never touch the fader slider contact fingers while cleaning the fader parts.

Use only a dry cotton swab, or a cotton swab wet with distilled water, to clean the fader parts. Always use a clean dry swab to dry off the conductive plastic tracks after cleaning. If the fader rails are noticeably dirty, wipe them off using a dry cotton swab before lubricating the top rail with Dow Corning 510.

If coffee, soft drink or other liquid has been spilled into the fader, remove it from the module as soon as possible and remove the top cover of the fader. Hold the fader under hot running water while moving the fader slider back and forth to dissolve the sugars and other chemicals. Thoroughly dry the rails and conductive plastic using dry cotton swabs and then lubricate the top fader rail with Dow Corning 510.

Lubricating the Glide Rail

Move the fader slider to the middle of its travel and place one drop of Dow Corning 510 lubricant on either side of the top fader slider bushings. Move the slider through its full travel to distribute the lubricant. Wipe off any excess lubricant from the rubber stops at each end of the glide rail. Normally only the top rail (the one the fader slider bushings glide on) requires lubricant.

MICROPHONE PREAMP MODULE

The microphone trimpots are under a faceplate security cover. They are set at the factory for a +4 dBu output level with a -55 dBu, 1 kHz input. In the field, each trimpot can be adjusted for the specific microphone being used on that preamplifier.

LINE INPUT MODULE

There are two faceplate-accessible trimpots (RV1 and RV2) for setting the left and right channel gain, respectively.

To adjust these trimpots:

1. Apply a +4 dBu, 1 kHz balanced signal to the left and right input connector. Either the A or B input can be used, since the adjustment point is after the A/B switch.
2. Set the fader to nominal (the -12 dB mark).
3. If the Output amplifier module has been calibrated, use the program meters to adjust the trimpots for 0 VU. If the Output amplifier calibration is unknown, then the Input module must be placed on an extender card so that TP5, TP6 and TP7 can be accessed. Connect the probe ground to TP7. The left channel is monitored at TP5 and the right channel at TP6.
4. Adjust the trimpots for a -2 dBu signal at these test points.

TELCO INPUT/OUTPUT MODULE

There is one trimpot adjustment on the Telco module. The trimpot (RV1) is used to set the input level from the hybrid so that a nominal +4 dBu output is available at the left To Tape output connector.

To set RV1:

1. Connect a balanced +4 dBu, 1 kHz signal to the From Hybrid connector.
2. Monitor the To Tape Left output.
3. Adjust RV1 for a +4 dBu output.

OUTPUT AMPLIFIER MODULE

To access the Output amplifier trimpots, the module can be placed on an extender card or it can be temporarily moved to another position on the motherboard. There are trimpots to adjust the signal output levels *and* the VU meters.

Note: The meter trimpots are adjusted only *after* the signal level trimpots are properly set and the meter zero calibration has been performed. Refer to the *Meter Zero Adjustment* section later in this chapter.

Before adjusting the program output levels, one Input module must first be set up as a “standard” so that a known input level is feeding the Output module amplifiers.

1. Place the Input module on an extender card, or remove the adjacent modules, so that test points TP5, TP6 and TP7 can be probed.
2. Connect a +4 dBu, 1 kHz balanced signal to the left and right inputs on the A Input.
3. Set the fader to the nominal -12 dB mark. Select A Input and both the Pgm-1 and Pgm-2 buses.
4. Connect the probe ground to TP7. Monitor the left channel with an AC voltmeter calibrated for dBu at TP5.
5. Adjust RV1 for a -2 dBu signal.
6. Monitor the right channel at TP6 while adjusting RV2 for a -2 dBu signal.

Do not change the standard module settings until after the Output module adjustments are completed. If an extender card is used, take care not to change the fader setting when placing the module back into the mainframe.

To set the Output module:

1. Place the Output module on an extender card or move it to a position that allows easy access to the component side of the board.
2. Turn off all other Input and Telco modules, leaving only the “standard” Input module On, feeding the Pgm-1 and Pgm-2 buses with the 1 kHz input at nominal level.
3. Plug an AC Voltmeter into the Pgm-1 left output. Adjust RV1 for +4 dBu.
4. Move the AC Voltmeter to the Pgm-1 right output. Adjust RV2 for +4 dBu.
5. Move the AC Voltmeter to the Pgm-2 left output. Adjust RV3 for +4 dBu.
6. Move the AC Voltmeter to the Pgm-2 right output. Adjust RV4 for +4 dBu.
7. Select Pgm-1 for the Monaural Output.
8. Move the AC Voltmeter to the Mono output connector. Adjust RV5 for +4 dBu.
9. Select Pgm-2 and verify +4 dBu level.
10. Use RV8 to adjust the Program-1 left channel meter for 100%, 0 VU.
11. Use RV7 to adjust the Program-1 right channel meter for 100%, 0 VU.
12. Use RV6 to adjust the Program-2 left channel meter for 100%, 0 VU.
13. Use RV9 to adjust the Program-2 right channel meter for 100%, 0 VU.

MONITOR MODULE

The only trimpot (RV1) on the Monitor 1 circuit board sets the built-in Talkback microphone’s output level. It is adjusted through the front panel. There are no adjustments on the Monitor 2 board.

REMOTE LINE SELECTOR MODULE

There are no adjustments on the RLS circuit board.

CLOCK/TIMER ASSEMBLY

There is one frequency adjustment (C2) on the board. Allow at least one hour of powered operation to stabilize the internal oscillator before adjusting the frequency. To adjust the master clock oscillator, monitor the CLK test point using a x10 probe with a high-frequency counter. Adjust C2 for exactly 3.276800 MHz.

Clock/Timer Troubleshooting

Red LED flashing below clock

The clock is set for Slave mode and there is no ESE time code on J3. Change switch S1, #1 from Off to On if ESE is not being used. Test ESE system if time code is feeding J3.

No Clock nor Timer display

Check for +12 volts on J1 or J2, pin 5. Check for +8 volts at the output of U5 (lead closest to the edge of the PCA). Check for +5 volts on U4 (lead closest to U3). Check for clock signal at CLK test point.

Clock Frozen:

Shorted U8 Hall-Effect switch (Hold).

Clock rapidly incrementing:

Shorted U6 Hall-Effect switch (Fast).

Clock runs very fast:

Shorted U7 Hall-Effect switch (Slow).

Cannot set the clock:

Hall-Effect switches (U6, U7, U8) open. Clock magnet polarity is possibly reversed, try reversing the magnet in the holder.

Timer doesn't work in manual mode:

Shorted Reset or Hold switch or open Start switch. Check switches with an ohmmeter.

Timer doesn't work in Auto mode:

Auto switch not turned on. Make sure the Timer Reset switches on the Input modules

are set On and the correct input (A or B) is selected. Defective Timer Control board or cabling to Clock/Timer Assembly.

One or more segments out:

Each numeric character is an independent seven-segment display mounted in a socket. Each display is identical, so substitution can identify if it is the display or if it is the driver transistor circuit that is defective.

Note: Some of the seven-segment displays are mounted upside down to form the upper dot in the H:M:S divider colons.

TIMER CONTROL MODULE

The Keep Alive voltage is generated by two Lithium AA batteries on the Timer Control Panel. These batteries power the gate arrays during power outages so the console powers back up in the same state it was in when power was lost. There are no adjustments or DIP switches on this board.

METER PANEL ASSEMBLY

The only adjustments on the meter panel assembly are the four zero calibration screws on the meters. These are located directly below each meter and are adjusted using a small flatblade screwdriver or trimpot tweaker.

Meter Zero Adjustment

Before doing any meter adjustments, ensure the mainframe is set in its normal operating location on the countertop or recessed into the countertop. Turn off power to the meters during this procedure by unplugging the Meters cable from the Output module. Latch the meter panel into its normal operating position before proceeding.

The purpose of the zero calibration is to align the meter pointer with the "0%" indication on the meter face. To do this, first move the meter pointer slightly below the "0%" indication. Turn the adjustment screw counterclockwise, if necessary. Do

the final meter pointer “0%” alignment in a clockwise direction by moving the pointer “up” to align with the “0%” indication. Plug the meters back into the Output module when done. Refer to the earlier *Output Amplifier Module* section in this chapter for adjusting the 100%, 0VU reference levels.

VU METER LAMP REPLACEMENT

To replace a VU meter lamp (PR&E #12-96), open the meter panel to its service position and remove the two #1 Phillips screws from the plastic lamp housing on the back of the meter. The meter lamp clips into a fuse-type holder.

CUE SPEAKER REPLACEMENT

The Cue speaker is a 45 ohm/3 watt speaker. To test the speaker, remove the speaker leads and check the impedance with an ohmmeter.

To replace the speaker, open the meter panel to its service position and remove the four mounting nuts, lock washers and washers from the speaker. The speaker must be angled out on its mounting screws to clear the lip on the meter panel.

AIRWAVE POWER SUPPLY

The only power supply maintenance requirements is to periodically check that the vent openings on the top of the chassis are not blocked and that there is no dust buildup on the heat sink fins.

Refer to the AirWave Power Supply manual (PR&E 75-38) for servicing information.



Caution: To reduce the risk of electric shock, do not perform any servicing other than the fuse replacement listed below unless you are qualified to do so. Refer all servicing to qualified service personnel.

Fuse Replacement

The rear-panel AC line fuse is the only user-replaceable component in the power supply. It is inside the power entry module.

Unplug the AC cord from the power entry module to access the fuse. Use a small flatblade screwdriver to pry open the top of the power entry module coverplate. The coverplate will hinge down to reveal the red fuse holder (labeled PRSR). Note the orientation of the fuse holder (115V or 230V) before removing it.

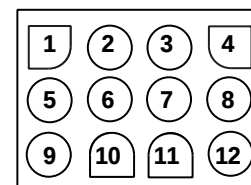
For 115 VAC systems, use only a 2.25 amp slo-blo 3AG 250 volt UL-type fuse. For 230 VAC systems, use only a 1.0 amp slo-blo 250 volt IEC-approved fuse.

Reinstall the fuse holder in the same orientation as removed. Verify that the correct AC mains voltage appears in the cutout after the coverplate is snapped back into place.

If the fuse immediately blows again, switch the power supply off and unplug the console DC power cable.

Replace the fuse and switch the power supply on. If this fuse blows, a serious problem is indicated within the power supply. If the fuse does not blow, then a problem likely exists within the main-frame assembly. In either case, refer servicing to qualified service personnel.

Molex Power Supply Connector

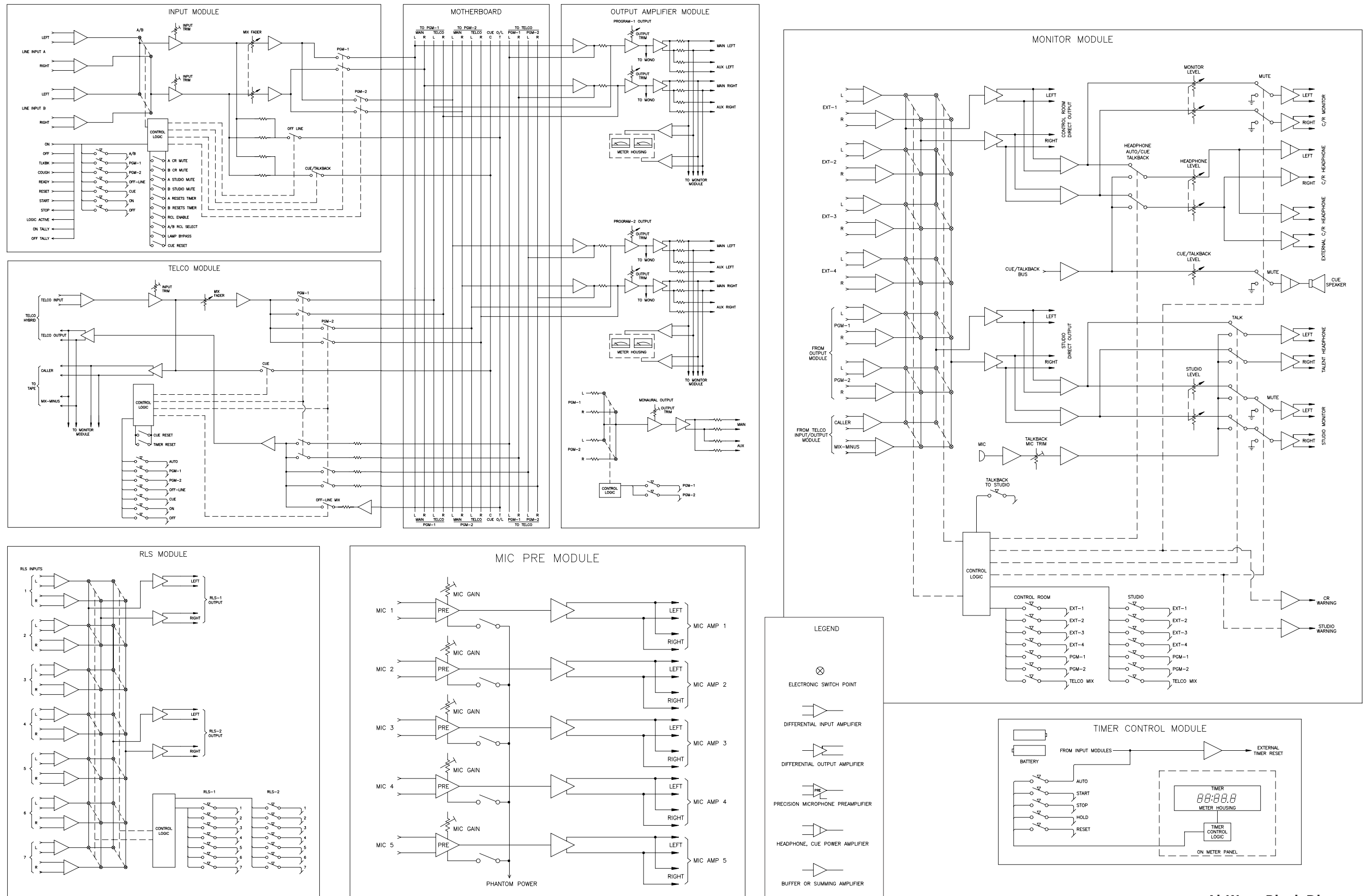


PIN	SIGNAL	WIRE COLOR
1	+45 V, phantom	Green/Black
2	+16 V, audio	Red
3	Phantom GND	Green
4	Audio GND	Black
5	Audio GND	White
6	-16 V, audio	White/Black
7	+12 V, Lamps	Red/Black
8	+5 V, Logic	Orange
9	Logic GND	Blue
10	No Connection	
11	No Connection	
12	No Connection	

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*** Note:** When the AirWave Universal Power Supply (PR&E # 90-1015) is used, the audio supply voltages are ± 16 VDC instead of ± 18 VDC as in the original AirWave power supply (PR&E # 99-955-1). Therefore, ± 18 VDC, as indicated on some schematics, will instead measure ± 16 VDC with the 90-1015 supply. The microphone phantom supply voltage is +45 VDC although it may be listed as +48 VDC on some schematics. The 99-1015 supply schematics are on pages 31 and 32. The original 99-955-1 schematics are on pages 29 and 30.



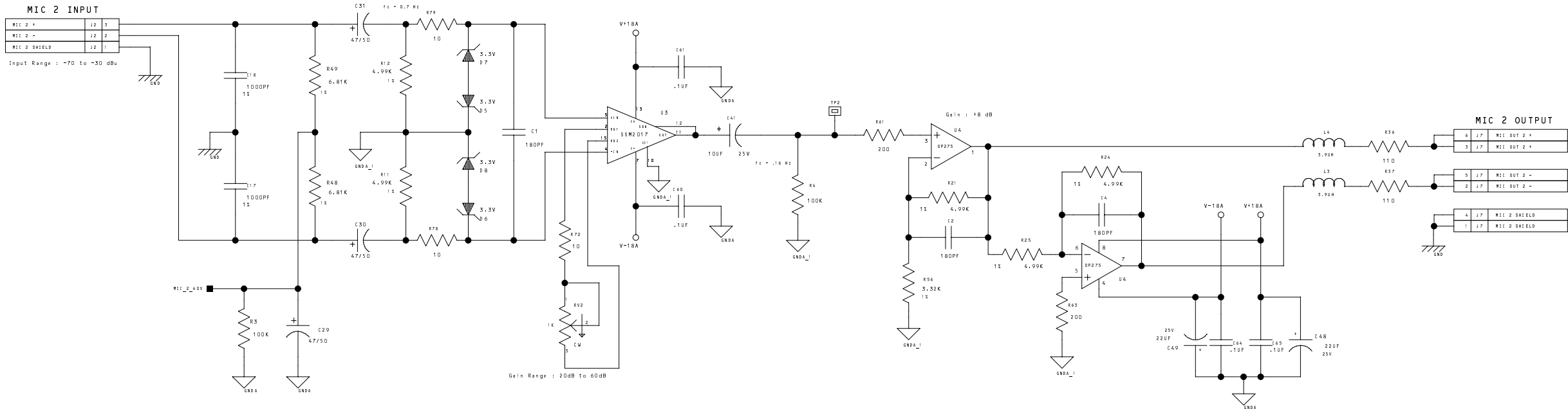
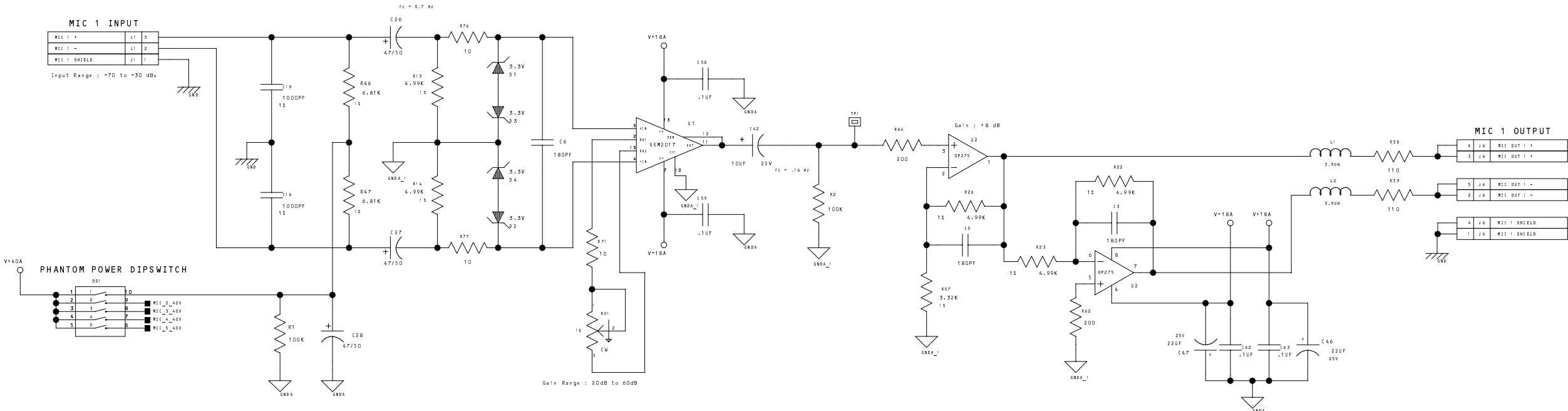
AirWave Block Diagram

		A		B		C		D				
								REVISIONS				
								REV	ECO #			
								DESCRIPTION				
								DATE				
								APPROVAL				
1	1	PGM1 MAIN L	P1 1	1	P2	PGM1 MAIN L	2	1	P6	PGM1 MAIN L	2	PGM1_MAIN_L
		PGM1 TELLO L	P1 2	2	P2	PGM1 TELLO L	2	2	P6	PGM1 TELLO L	2	PGM1_TELLO_L
		PGM2 MAIN L	P1 3	3	P2	PGM2 MAIN L	3	3	P6	PGM2 MAIN L	3	PGM2_MAIN_L
		PGM2 TELLO L	P1 4	4	P2	PGM2 TELLO L	4	4	P6	PGM2 TELLO L	4	PGM2_TELLO_L
		D/L SUM BUS	P1 5	5	P2	D/L SUM BUS	5	5	P6	D/L SUM BUS	5	TELLO_D/L_MX1
		AUDIO GND	P1 6	6	P2	AUDIO GND	6	6	P6	AUDIO GND	6	AUDIO_GND
		AUDIO GND	P1 7	7	P2	AUDIO GND	7	7	P6	AUDIO GND	7	AUDIO_GND
		AUDIO GND	P1 8	8	P2	AUDIO GND	8	8	P6	AUDIO GND	8	AUDIO_GND
		AUDIO GND	P1 9	9	P2	AUDIO GND	9	9	P6	AUDIO GND	9	AUDIO_GND
		+48V PHANTOM	P1 10	10	P2	+48V PHANTOM	10	10	P6	+48V PHANTOM	10	+48V_PHANTOM
		+18V AUDIO	P1 11	11	P2	+18V AUDIO	11	11	P6	+18V AUDIO	11	+18V_AUDIO
		+18V AUDIO	P1 12	12	P2	+18V AUDIO	12	12	P6	+18V AUDIO	12	+18V_AUDIO
		-18V AUDIO	P1 13	13	P2	-18V AUDIO	13	13	P6	-18V AUDIO	13	-18V_AUDIO
		-18V AUDIO	P1 14	14	P2	-18V AUDIO	14	14	P6	-18V AUDIO	14	-18V_AUDIO
		PGM1/TELLO L	P1 15	15	P2	PGM1/TELLO L	15	15	P6	PGM1/TELLO L	15	PGM1_TELLO_L
		PGM2/TELLO L	P1 16	16	P2	PGM2/TELLO L	16	16	P6	PGM2/TELLO L	16	PGM2_TELLO_L
			P1 17	17	P2		17	17	P6		17	AUDIO_GND
			P1 18	18	P2		18	18	P6		18	AUDIO_GND
			P1 19	19	P2		19	19	P6		19	AUDIO_GND
			P1 20	20	P2		20	20	P6		20	AUDIO_GND
2	2		P1 21	21	P2		21	21	P6		21	AUDIO_GND
			P1 22	22	P2		22	22	P6		22	AUDIO_GND
		LOGIC GND	P1 23	23	P2	LOGIC GND	23	23	P6	LOGIC GND	23	LOGIC_GND
		LOGIC GND	P1 24	24	P2	LOGIC GND	24	24	P6	LOGIC GND	24	LOGIC_GND
		LOGIC GND	P1 25	25	P2	LOGIC GND	25	25	P6	LOGIC GND	25	LOGIC_GND
		+5V LOGIC	P1 26	26	P2	+5V LOGIC	26	26	P6	+5V LOGIC	26	+5V_LOGIC
		+5V LOGIC	P1 27	27	P2	+5V LOGIC	27	27	P6	+5V LOGIC	27	+5V_LOGIC
		+5V LOGIC	P1 28	28	P2	+5V LOGIC	28	28	P6	+5V LOGIC	28	+5V_LOGIC
		+12V LAMP	P1 29	29	P2	+12V LAMP	29	29	P6	+12V LAMP	29	+12V_LAMP
		KEEP ALIVE	P1 30	30	P2	KEEP ALIVE	30	30	P6	KEEP ALIVE	30	KEEP_ALIVE
		CR WARNING	P1 31	31	P2	CR WARNING	31	31	P6	CR WARNING	31	CR_WARNING
		ST WARNING	P1 32	32	P2	ST WARNING	32	32	P6	ST WARNING	32	ST_WARNING
			P1 33	33	P2		33	33	P6		33	
			P1 34	34	P2		34	34	P6		34	
			P1 35	35	P2		35	35	P6		35	
			P1 36	36	P2		36	36	P6		36	
			P1 37	37	P2		37	37	P6		37	
		AUDIO GND	P1 38	38	P2	AUDIO GND	38	38	P6	AUDIO GND	38	AUDIO_GND
		AUDIO GND	P1 39	39	P2	AUDIO GND	39	39	P6	AUDIO GND	39	AUDIO_GND
		AUDIO GND	P1 40	40	P2	AUDIO GND	40	40	P6	AUDIO GND	40	AUDIO_GND
3	3	AUDIO GND	P1 41	41	P2	AUDIO GND	41	41	P6	AUDIO GND	41	AUDIO_GND
		+48V PHANTOM	P1 42	42	P2	+48V PHANTOM	42	42	P6	+48V PHANTOM	42	+48V_PHANTOM
		+18V AUDIO	P1 43	43	P2	+18V AUDIO	43	43	P6	+18V AUDIO	43	+18V_AUDIO
		+18V AUDIO	P1 44	44	P2	+18V AUDIO	44	44	P6	+18V AUDIO	44	+18V_AUDIO
		-18V AUDIO	P1 45	45	P2	-18V AUDIO	45	45	P6	-18V AUDIO	45	-18V_AUDIO
		-18V AUDIO	P1 46	46	P2	-18V AUDIO	46	46	P6	-18V AUDIO	46	-18V_AUDIO
			P1 47	47	P2		47	47	P6		47	
			P1 48	48	P2		48	48	P6		48	
		PGM1 OUT L -	P1 49	49	P2	PGM1 OUT L -	49	49	P6	PGM1 OUT L -	49	PGM1_OUT_L_-
		PGM2 OUT L -	P1 50	50	P2	PGM2 OUT L -	50	50	P6	PGM2 OUT L -	50	PGM2_OUT_L_-
		PGM1 OUT R -	P1 51	51	P2	PGM1 OUT R -	51	51	P6	PGM1 OUT R -	51	PGM1_OUT_R_-
		PGM2 OUT R -	P1 52	52	P2	PGM2 OUT R -	52	52	P6	PGM2 OUT R -	52	PGM2_OUT_R_-
		SEND/CALLER -	P1 53	53	P2	SEND/CALLER -	53	53	P6	SEND/CALLER -	53	SEND_CALLER_-
		CALL AUDIO -	P1 54	54	P2	CALL AUDIO -	54	54	P6	CALL AUDIO -	54	CALL_AUDIO_-
		LOGIC GND	P1 55	55	P2	LOGIC GND	55	55	P6	LOGIC GND	55	LOGIC_GND
		LOGIC GND	P1 56	56	P2	LOGIC GND	56	56	P6	LOGIC GND	56	LOGIC_GND
		LOGIC GND	P1 57	57	P2	LOGIC GND	57	57	P6	LOGIC GND	57	LOGIC_GND
		+5V LOGIC	P1 58	58	P2	+5V LOGIC	58	58	P6	+5V LOGIC	58	+5V_LOGIC
		+5V LOGIC	P1 59	59	P2	+5V LOGIC	59	59	P6	+5V LOGIC	59	+5V_LOGIC
		+5V LOGIC	P1 60	60	P2	+5V LOGIC	60	60	P6	+5V LOGIC	60	+5V_LOGIC
4	4	+12V LAMP	P1 61	61	P2	+12V LAMP	61	61	P6	+12V LAMP	61	+12V_LAMP
		TIMER RESET	P1 62	62	P2	TIMER RESET	62	62	P6	TIMER RESET	62	TIMER_RESET
		CR MUTE BUS	P1 63	63	P2	CR MUTE BUS	63	63	P6	CR MUTE BUS	63	CR_MUTE_BUS
		ST MUTE BUS	P1 64	64	P2	ST MUTE BUS	64	64	P6	ST MUTE BUS	64	ST_MUTE_BUS
		PGM1 MAIN R	P1 65	65	P2	PGM1 MAIN R	65	65	P6	PGM1 MAIN R	65	PGM1_MAIN_R
		PGM1 TELLO R	P1 66	66	P2	PGM1 TELLO R	66	66	P6	PGM1 TELLO R	66	PGM1_TELLO_R
		PGM2 MAIN R	P1 67	67	P2	PGM2 MAIN R	67	67	P6	PGM2 MAIN R	67	PGM2_MAIN_R
		PGM2 TELLO R	P1 68	68	P2	PGM2 TELLO R	68	68	P6	PGM2 TELLO R	68	PGM2_TELLO_R
		CR SUM BUS	P1 69	69	P2	CR SUM BUS	69	69	P6	CR SUM BUS	69	CR_SUM_BUS
		AUDIO GND	P1 70	70	P2	AUDIO GND	70	70	P6	AUDIO GND	70	AUDIO_GND
		AUDIO GND	P1 71	71	P2	AUDIO GND	71	71	P6	AUDIO GND	71	AUDIO_GND
		AUDIO GND	P1 72	72	P2	AUDIO GND	72	72	P6	AUDIO GND	72	AUDIO_GND
		AUDIO GND	P1 73	73	P2	AUDIO GND	73	73	P6	AUDIO GND	73	AUDIO_GND
		+48V PHANTOM	P1 74	74	P2	+48V PHANTOM	74	74	P6	+48V PHANTOM	74	+48V_PHANTOM
		+18V AUDIO	P1 75	75	P2	+18V AUDIO	75	75	P6	+18V AUDIO	75	+18V_AUDIO
		+18V AUDIO	P1 76	76	P2	+18V AUDIO	76	76	P6	+18V AUDIO	76	+18V_AUDIO
		-18V AUDIO	P1 77	77	P2	-18V AUDIO	77	77	P6	-18V AUDIO	77	-18V_AUDIO
		-18V AUDIO	P1 78	78	P2	-18V AUDIO	78	78	P6	-18V AUDIO	78	-18V_AUDIO
	PGM1/TELLO R	P1 79	79	P2	PGM1/TELLO R	79	79	P6	PGM1/TELLO R	79	PGM1_TELLO_R	
PGM2/TELLO R	P1 80	80	P2	PGM2/TELLO R	80	80	P6	PGM2/TELLO R	80	PGM2_TELLO_R		
PGM1 OUT L +	P1 81	81	P2	PGM1 OUT L +	81	81	P6	PGM1 OUT L +	81	PGM1_OUT_L_+		
PGM2 OUT L +	P1 82	82	P2	PGM2 OUT L +	82	82	P6	PGM2 OUT L +	82	PGM2_OUT_L_+		
PGM1 OUT R +	P1 83	83	P2	PGM1 OUT R +	83	83	P6	PGM1 OUT R +	83	PGM1_OUT_R_+		
PGM2 OUT R +	P1 84	84	P2	PGM2 OUT R +	84	84	P6	PGM2 OUT R +	84	PGM2_OUT_R_+		
SEND/CALLER +	P1 85	85	P2	SEND/CALLER +	85	85	P6	SEND/CALLER +	85	SEND_CALLER_+		
CALL AUDIO +	P1 86	86	P2	CALL AUDIO +	86	86	P6	CALL AUDIO +	86	CALL_AUDIO_+		
LOGIC GND	P1 87	87	P2	LOGIC GND	87	87	P6	LOGIC GND	87	LOGIC_GND		
LOGIC GND	P1 88	88	P2	LOGIC GND	88	88	P6	LOGIC GND	88	LOGIC_GND		
LOGIC GND	P1 89	89	P2	LOGIC GND	89	89	P6	LOGIC GND	89	LOGIC_GND		
+5V LOGIC	P1 90	90	P2	+5V LOGIC	90	90	P6	+5V LOGIC	90	+5V_LOGIC		
+5V LOGIC	P1 91	91	P2	+5V LOGIC	91	91	P6	+5V LOGIC	91	+5V_LOGIC		
+5V LOGIC	P1 92	92	P2	+5V LOGIC	92	92	P6	+5V LOGIC	92	+5V_LOGIC		
+12V LAMP	P1 93	93	P2	+12V LAMP	93	93	P6	+12V LAMP	93	+12V_LAMP		
CR/TALK CR	P1 94	94	P2	CR/TALK CR	94	94	P6	CR/TALK CR	94	CR_TALK_CR		
CR MIC D/L	P1 95	95	P2	CR MIC D/L	95	95	P6	CR MIC D/L	95	CR_MIC_D/L		
ST MIC D/L	P1 96	96	P2	ST MIC D/L	96	96	P6	ST MIC D/L	96	ST_MIC_D/L		
		A		B		C		D				

APPROVALS		DATE			PACIFIC RESEARCH & ENGINEERING CORPORATION	
J. DOMBROWSKI		2/24/97				
SCHEMATIC					10 SLOT POWER MOTHER BOARD	
SIZE						
D		DRAWING NUMBER		REV		
		92-971		A		
USED ON AirWave					SHEET 1 OF 2	

APPROVALS		DATE			PACIFIC RESEARCH & ENGINEERING CORPORATION	
J. DOMBROWSKI		2/24/97				
		SCHEMATIC				
		10 SLOT POWER MOTHER BOARD				
SIZE		DRAWING NUMBER			REV	
D		92-971			A	
USED ON		AirWave		SHEET 1 OF 2		

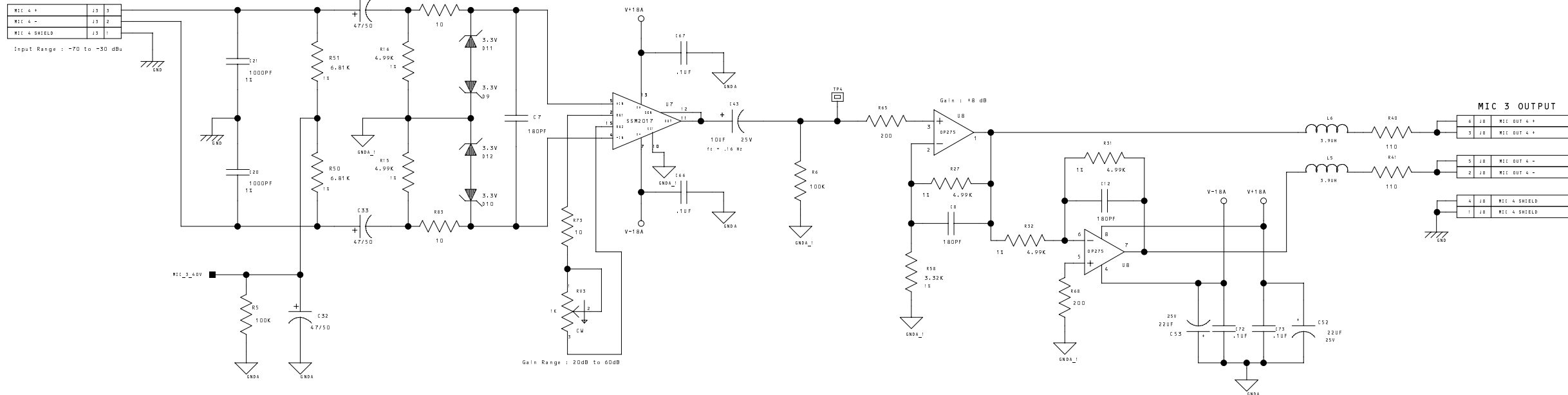
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1	104	230314 - 280319, 4-Phantom supp	3/7/97	T. STAYES



APPROVALS		DATE	PACIFIC RESEARCH & ENGINEERING CORPORATION	
J. DOMBROWSKI		2/24/97		
			SCHEMATIC	
			MIC PRE BOARD	
		SIZE	DRAWING NUMBER	REV
		D	92-961	B
USED ON		AirWave	3-10-1997_14:30	SHEET 1 OF 3

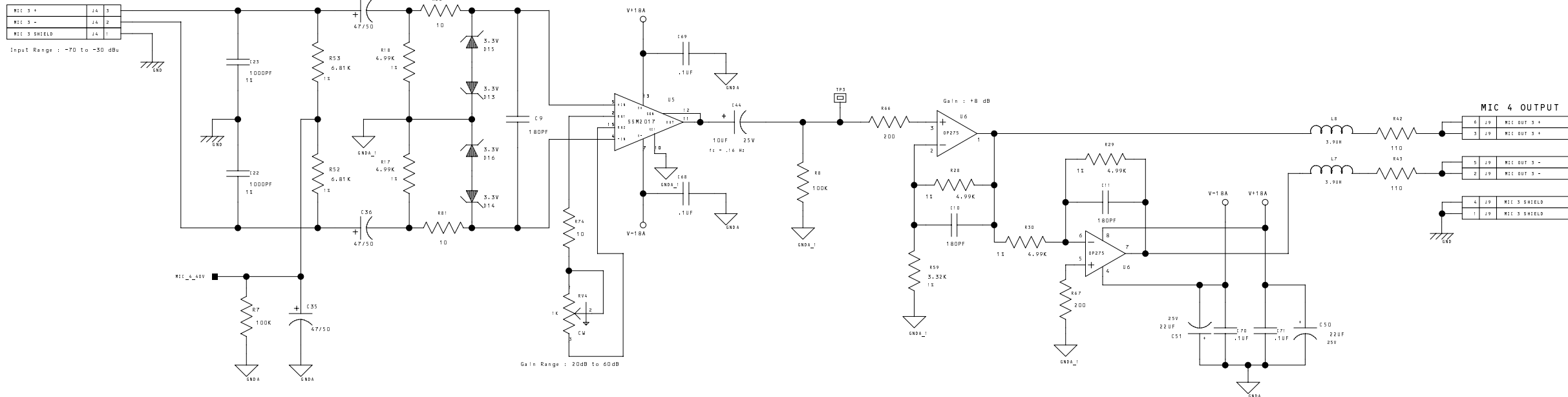
MIC 3 INPUT

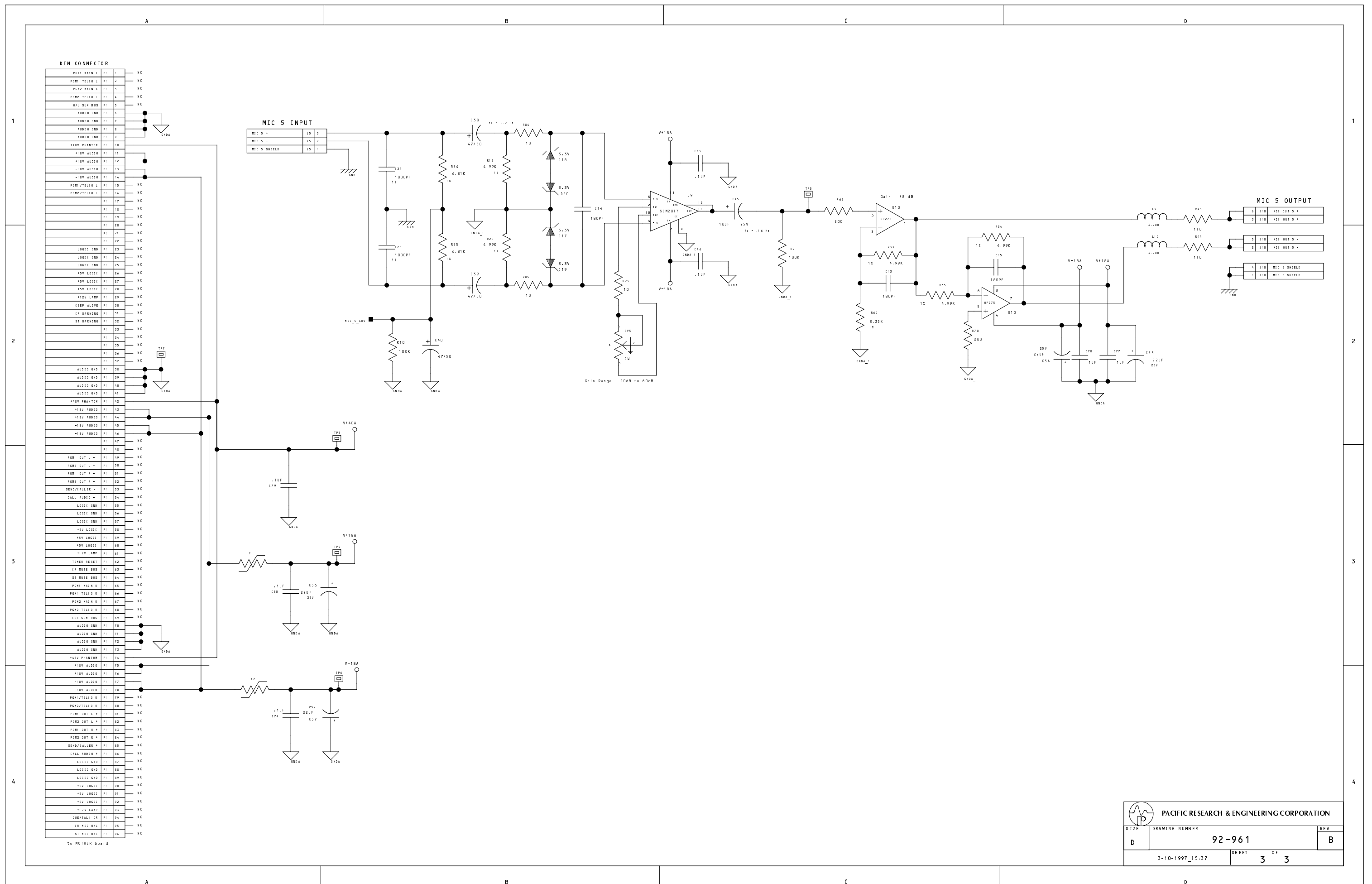
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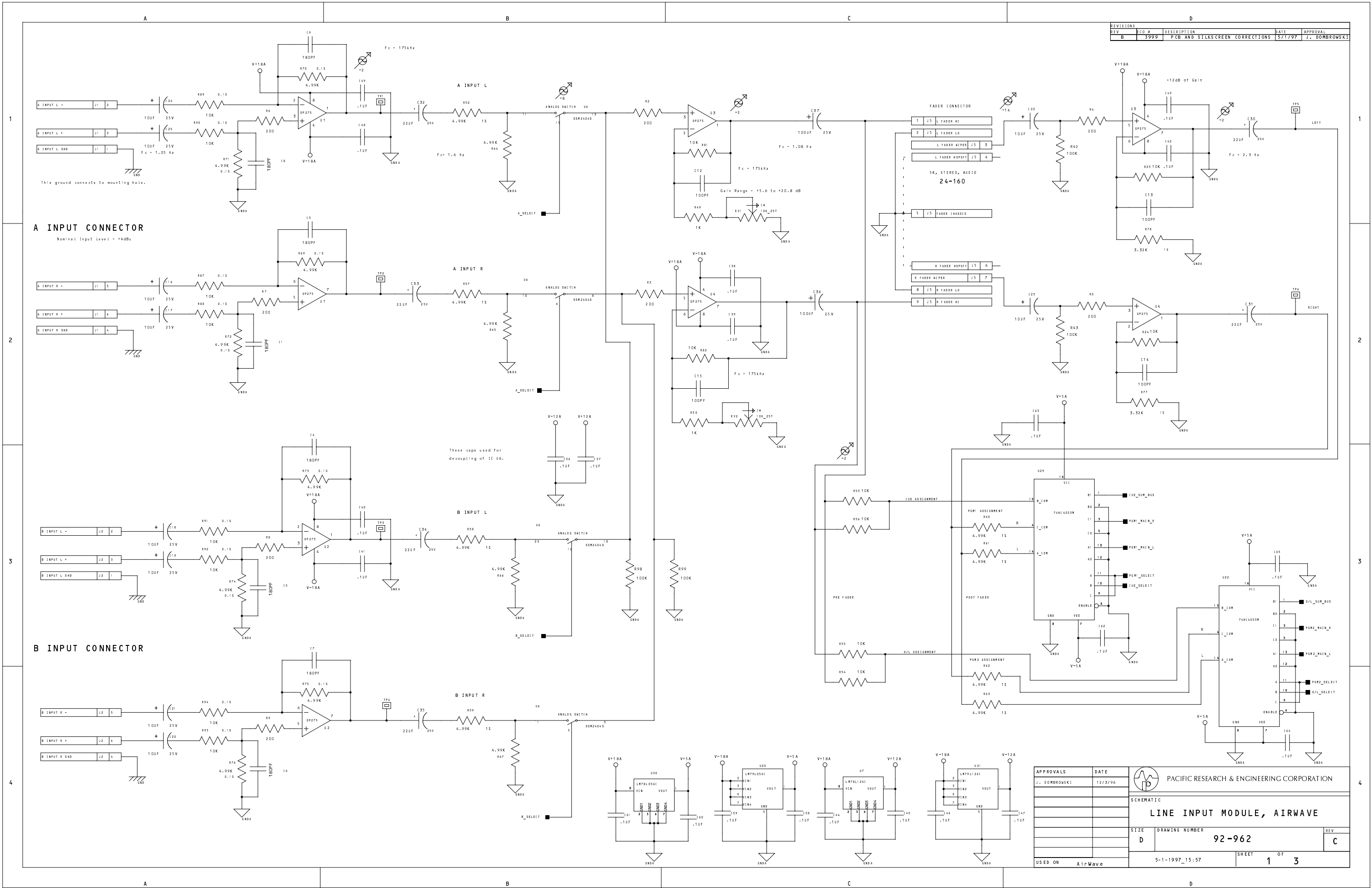


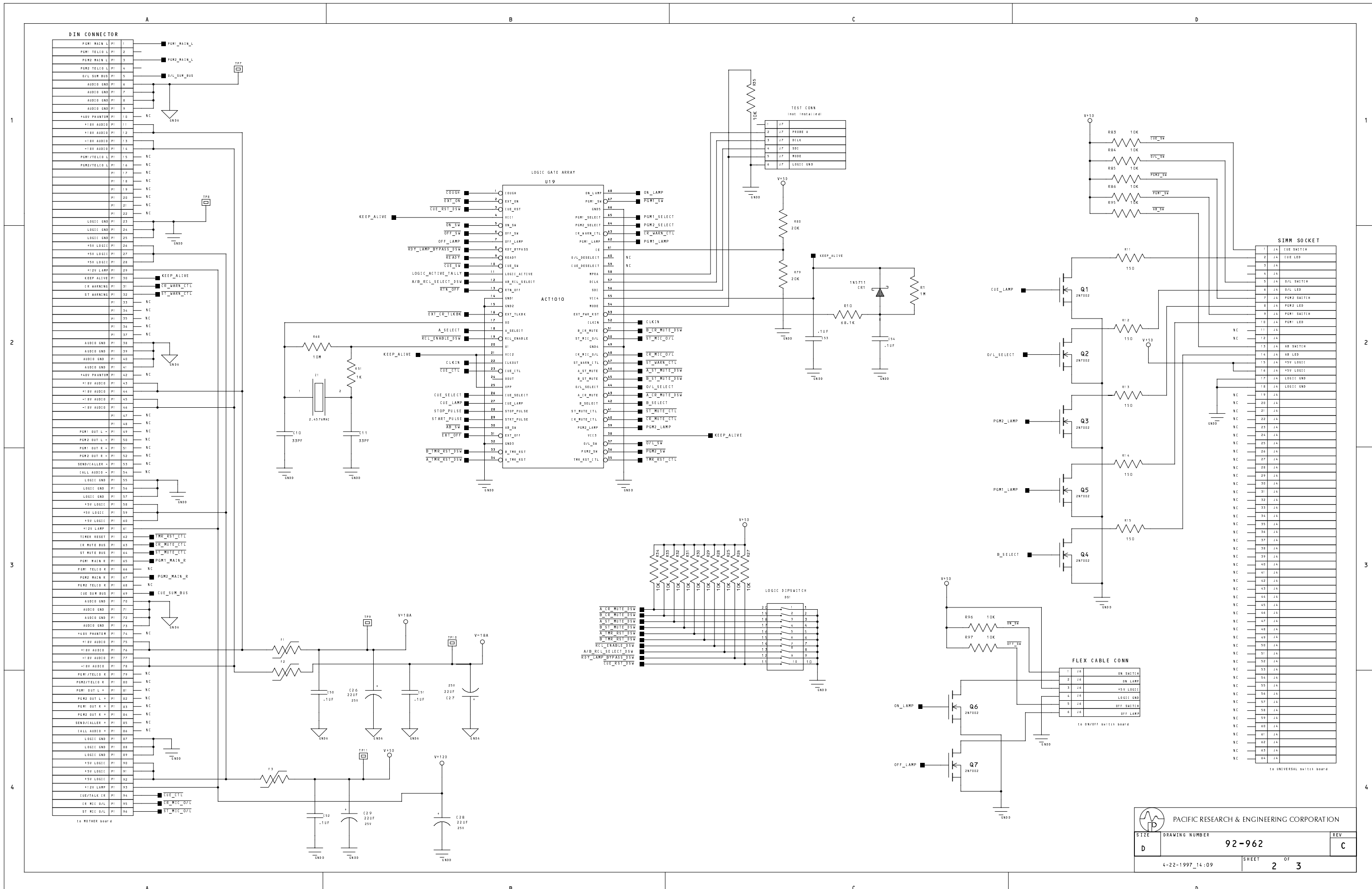
MIC 4 INPUT

Input Range : -70 to -30 dBu

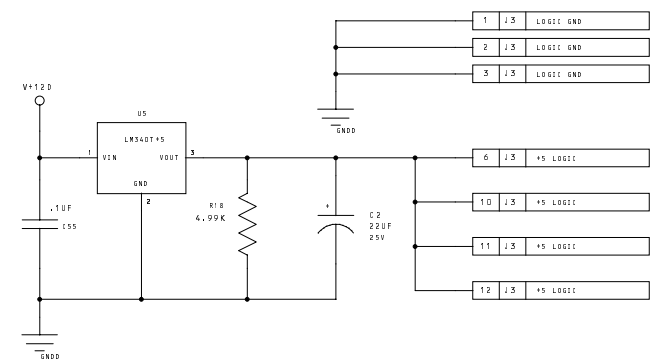
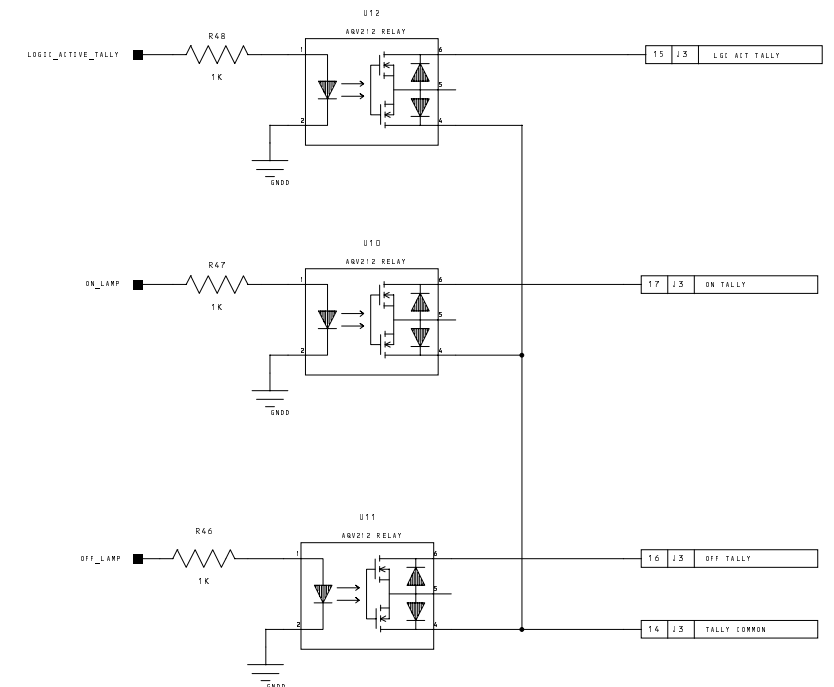
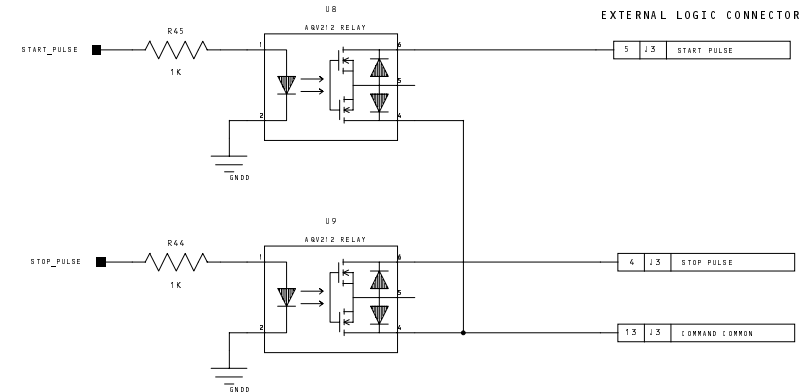
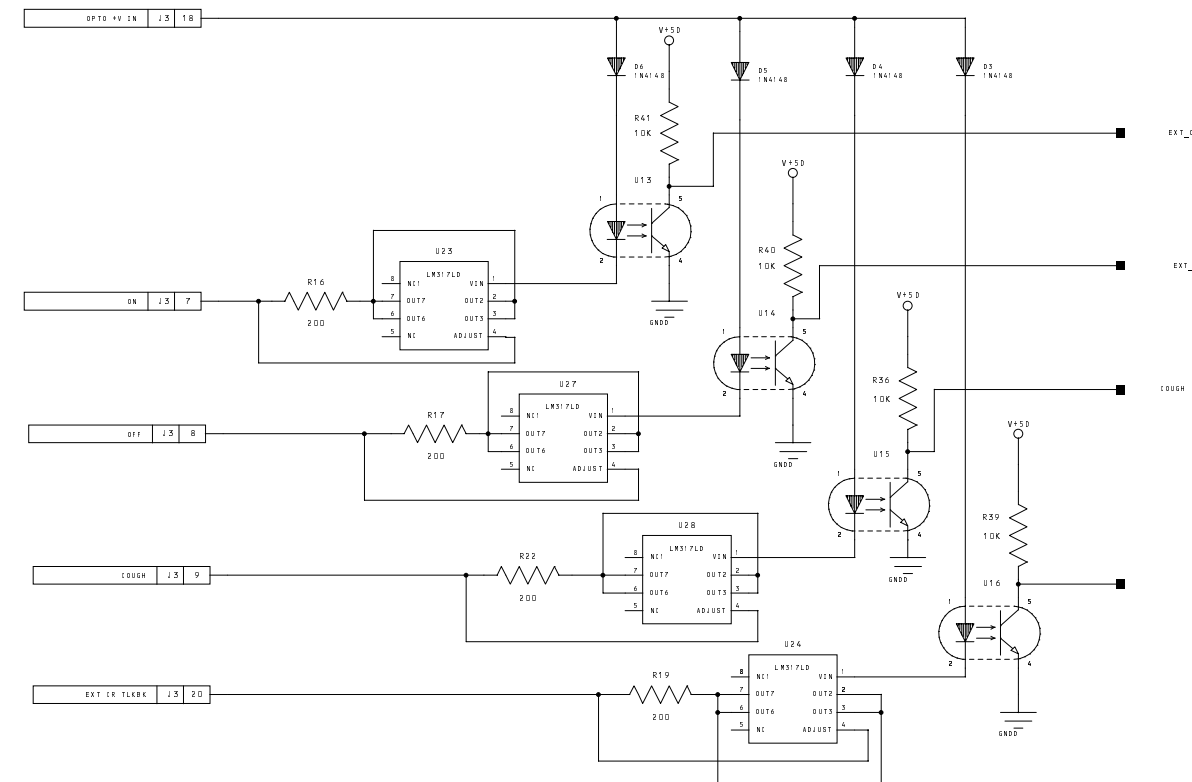
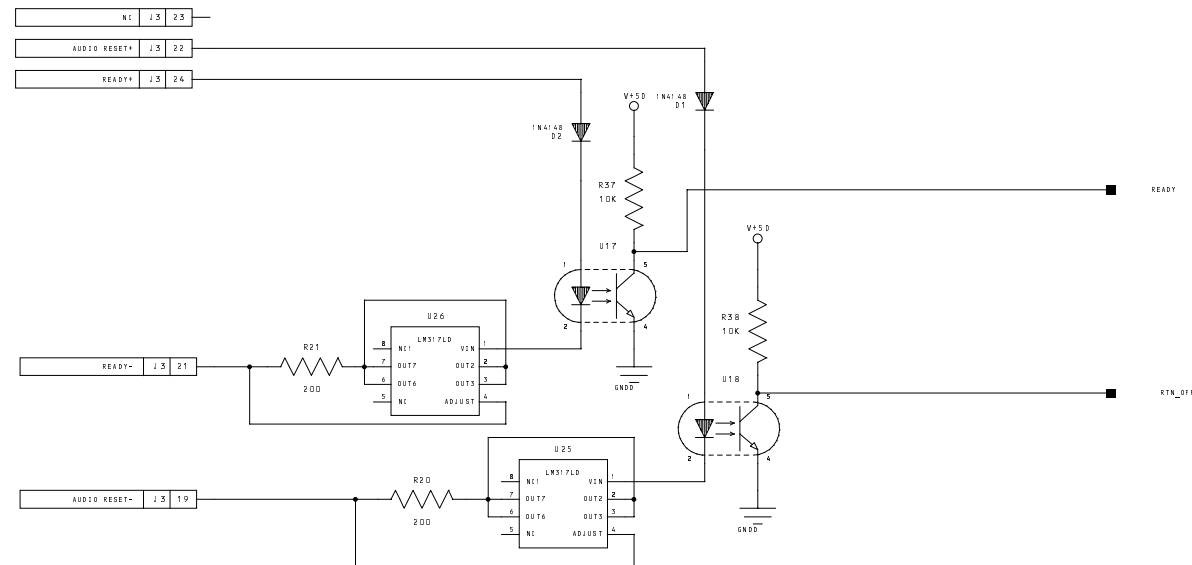


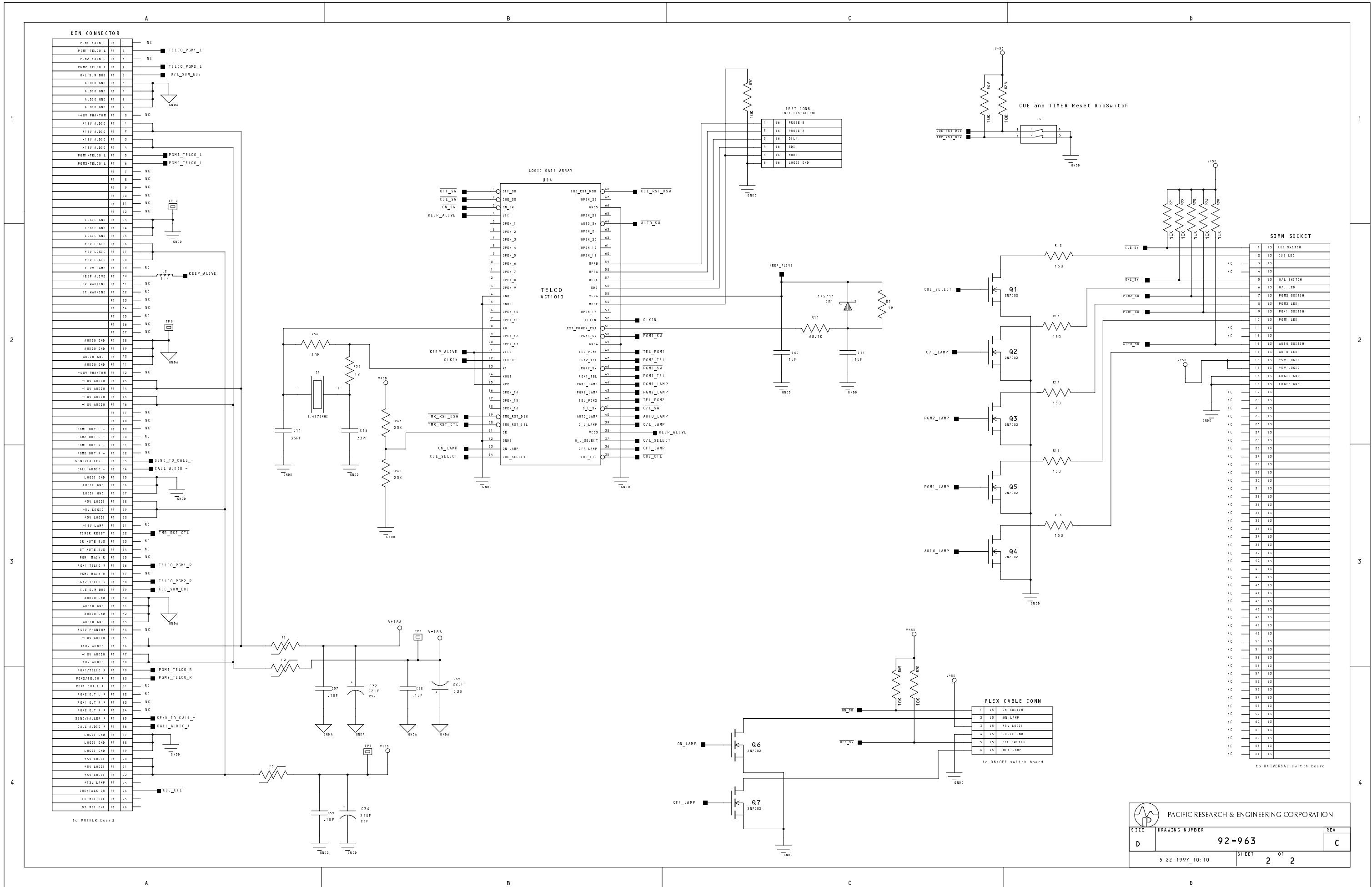




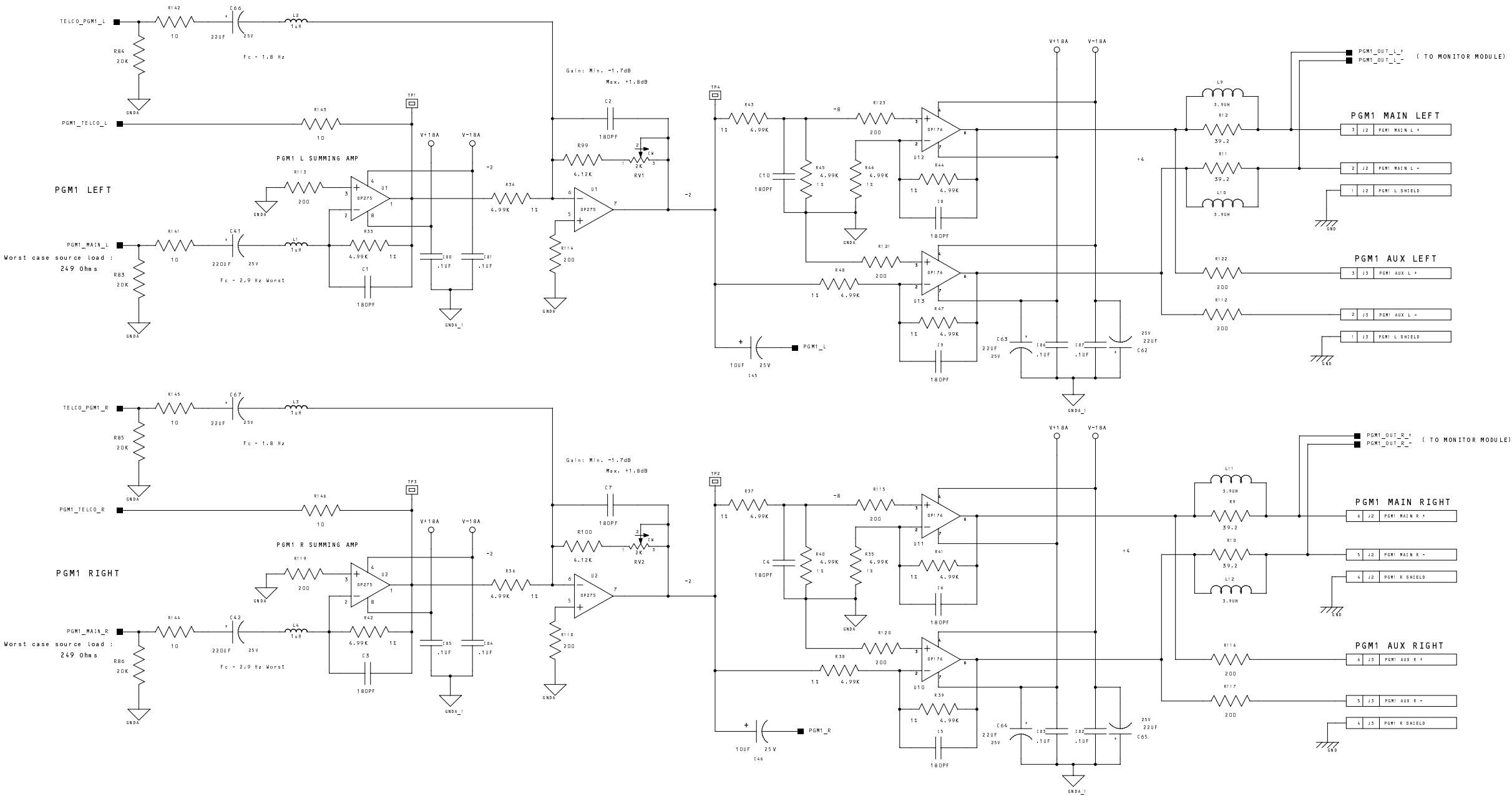


EXTERNAL LOGIC CONNECTOR



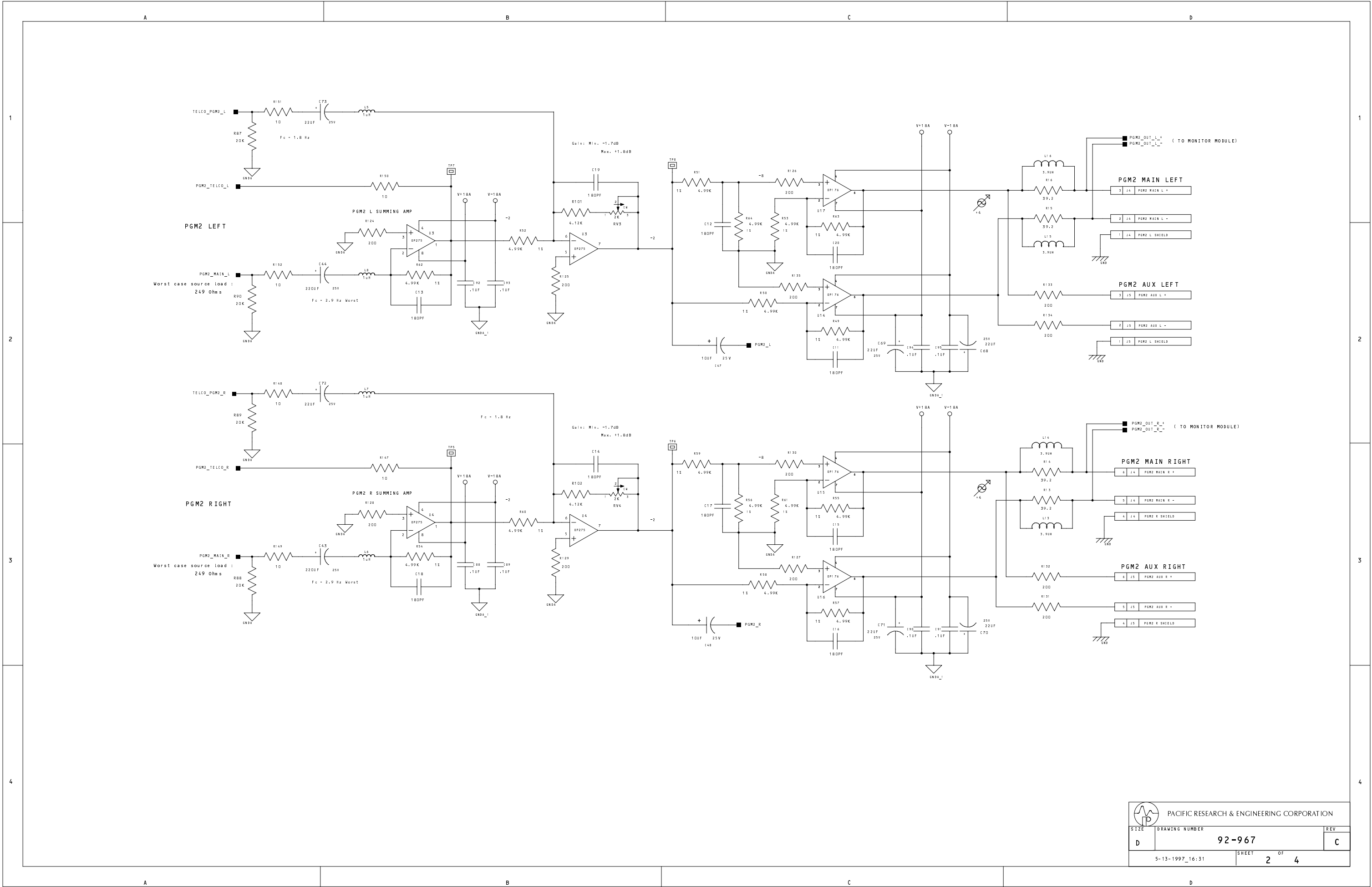


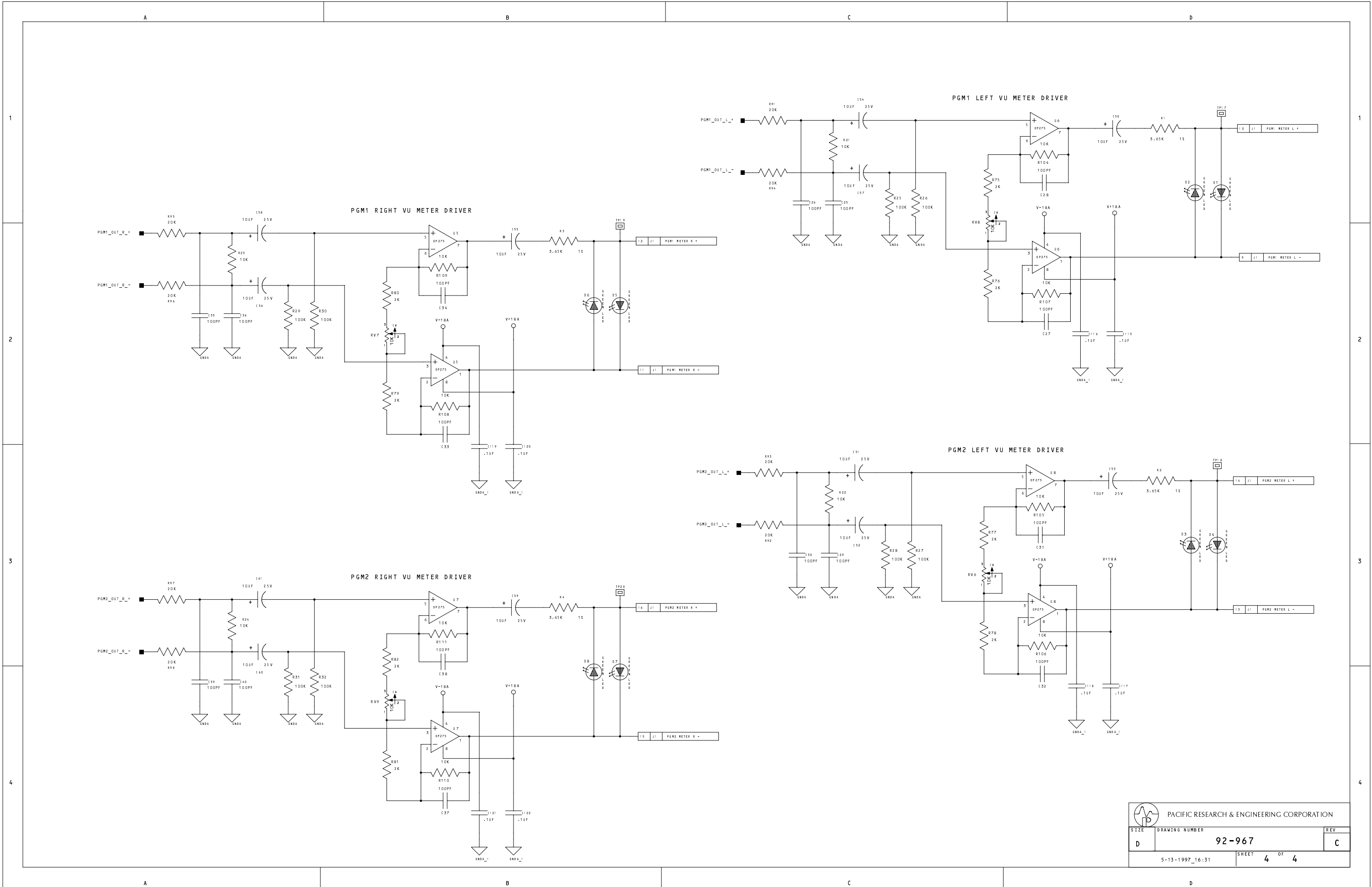
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REV	ECO #	DESCRIPTION	DATE
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B	3981	SCH CORRECTIONS	4/3/97
C	3994	PCB CHANGES	4/28/97

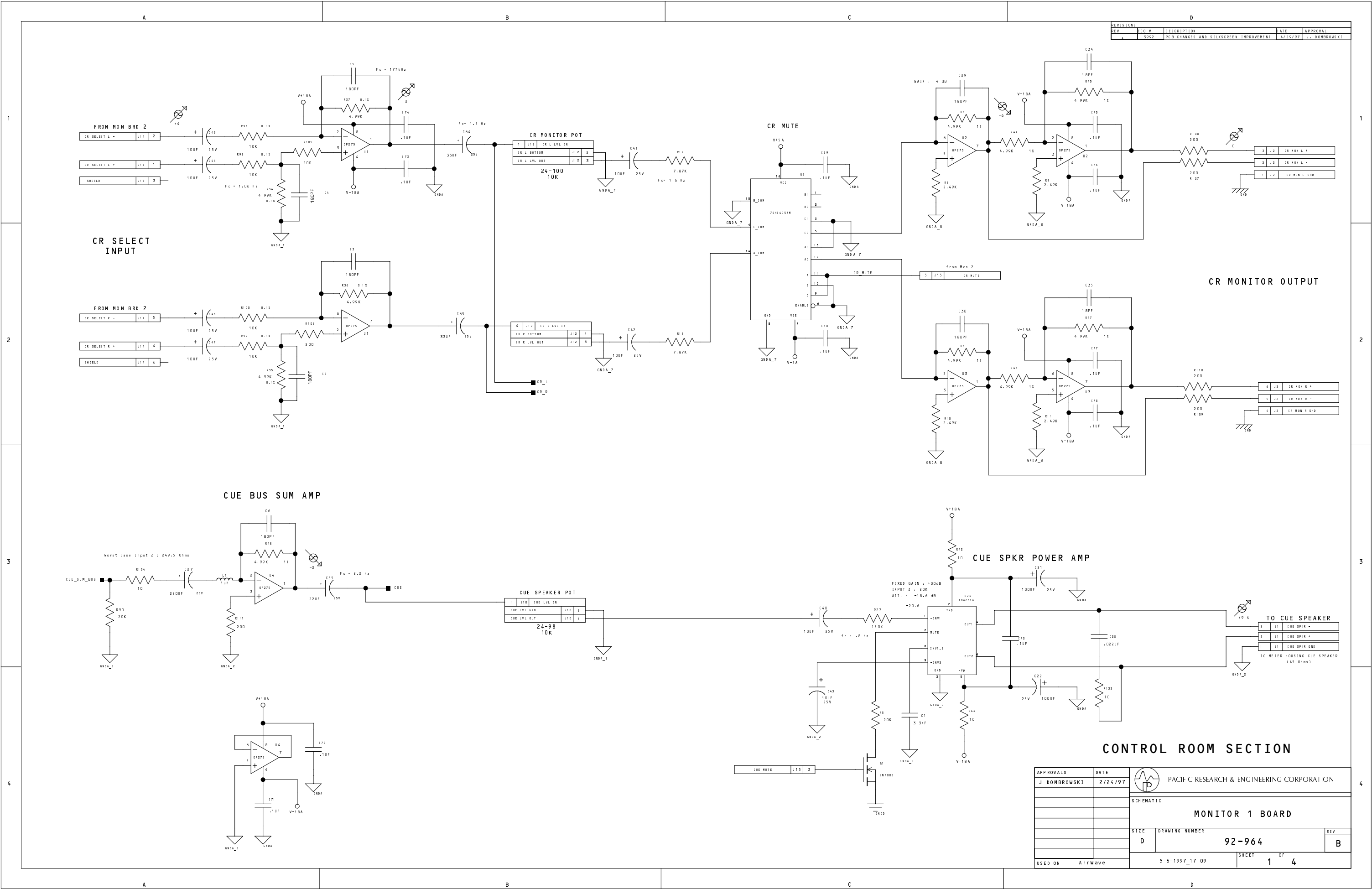


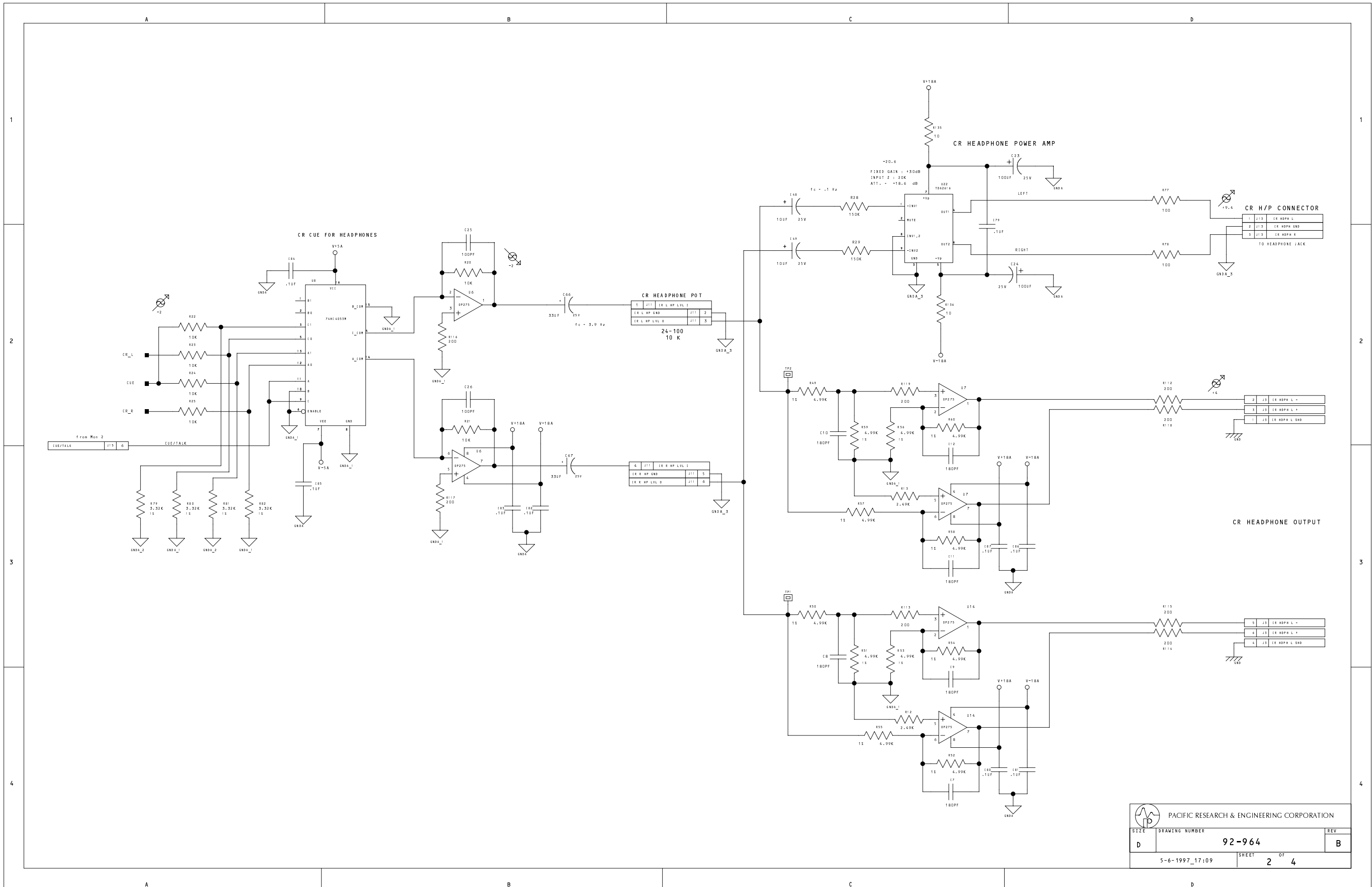
NOTES : GND NET WILL CONNECT TO
MOUNTING HOLE CLOSEST TO CONNECTOR.
DECOUPLING CAPS CONNECT TO COPPER POUR (GND_A_1).
ALL OTHER GND TRACES STAR GROUND TO P1.

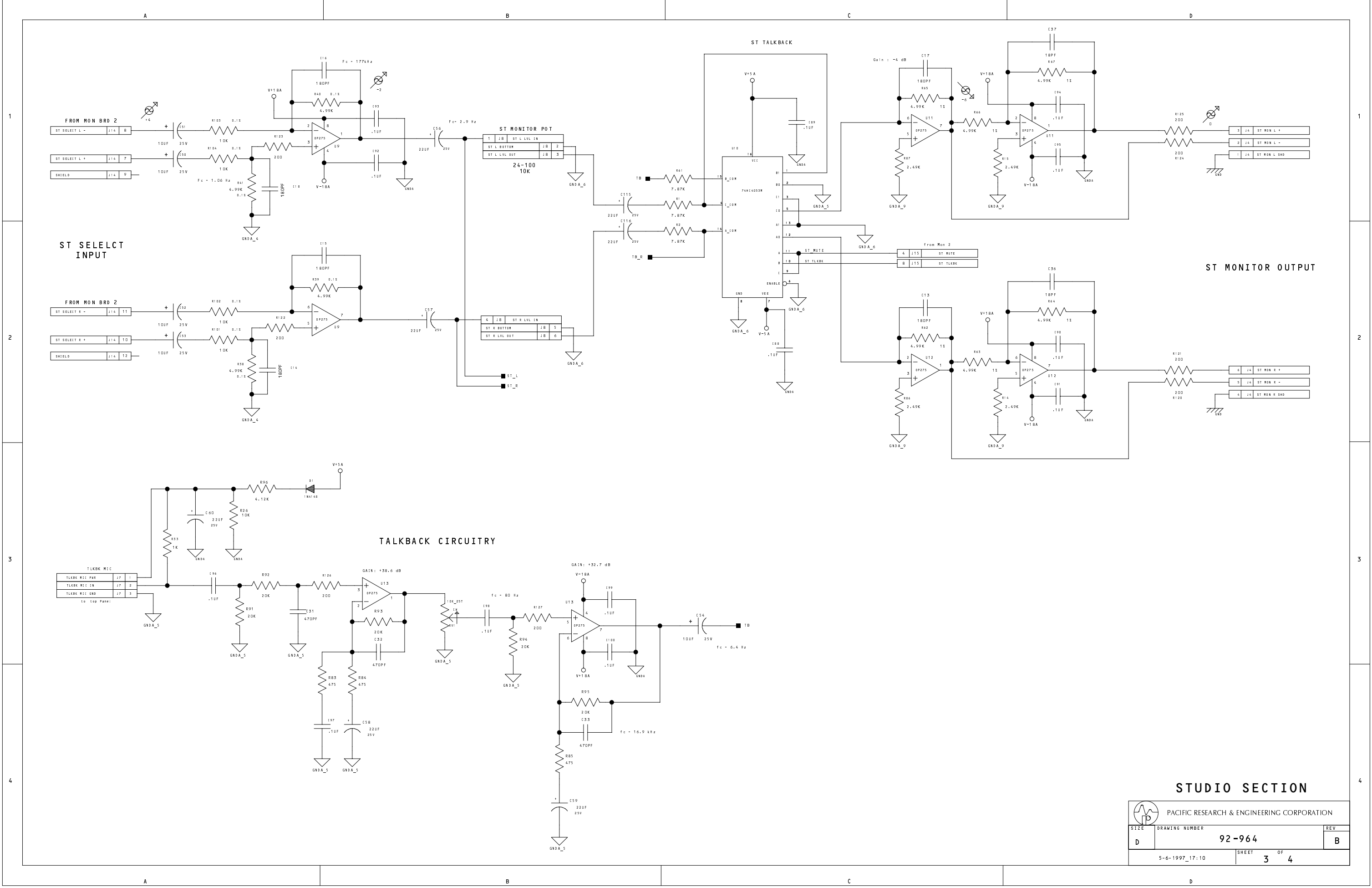
APPROVALS		DATE		 PACIFIC RESEARCH & ENGINEERING CORPORATION
DOMBROWSKI		6/18/95		
		SCHEMATIC		
		OUTPUT, AirWave		
SIZE		DRAWING NUMBER		REV
D		92-967		C
USED ON		AirWave		5-22-1997_8:27
				SHEET 1 OF 4

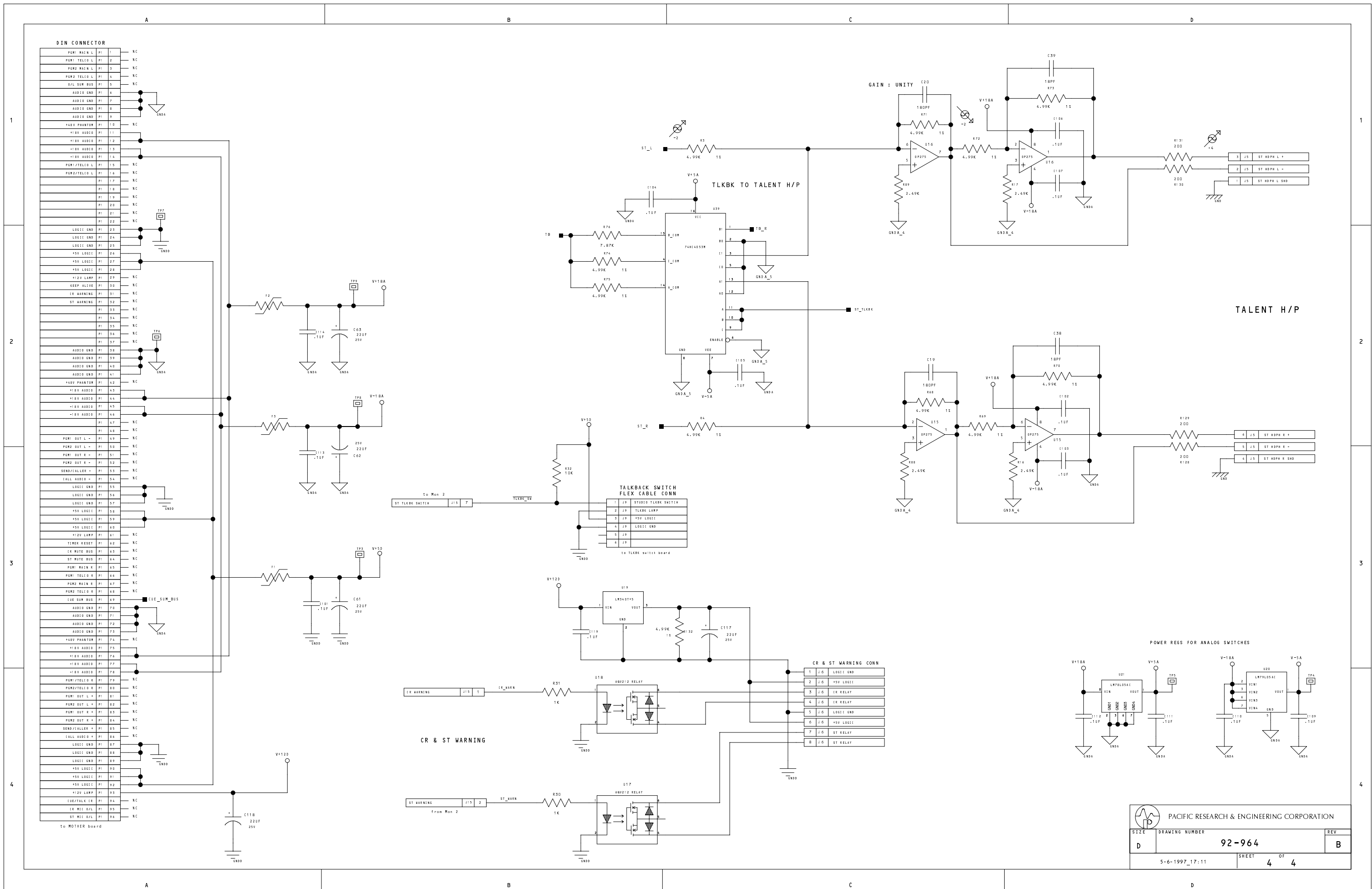


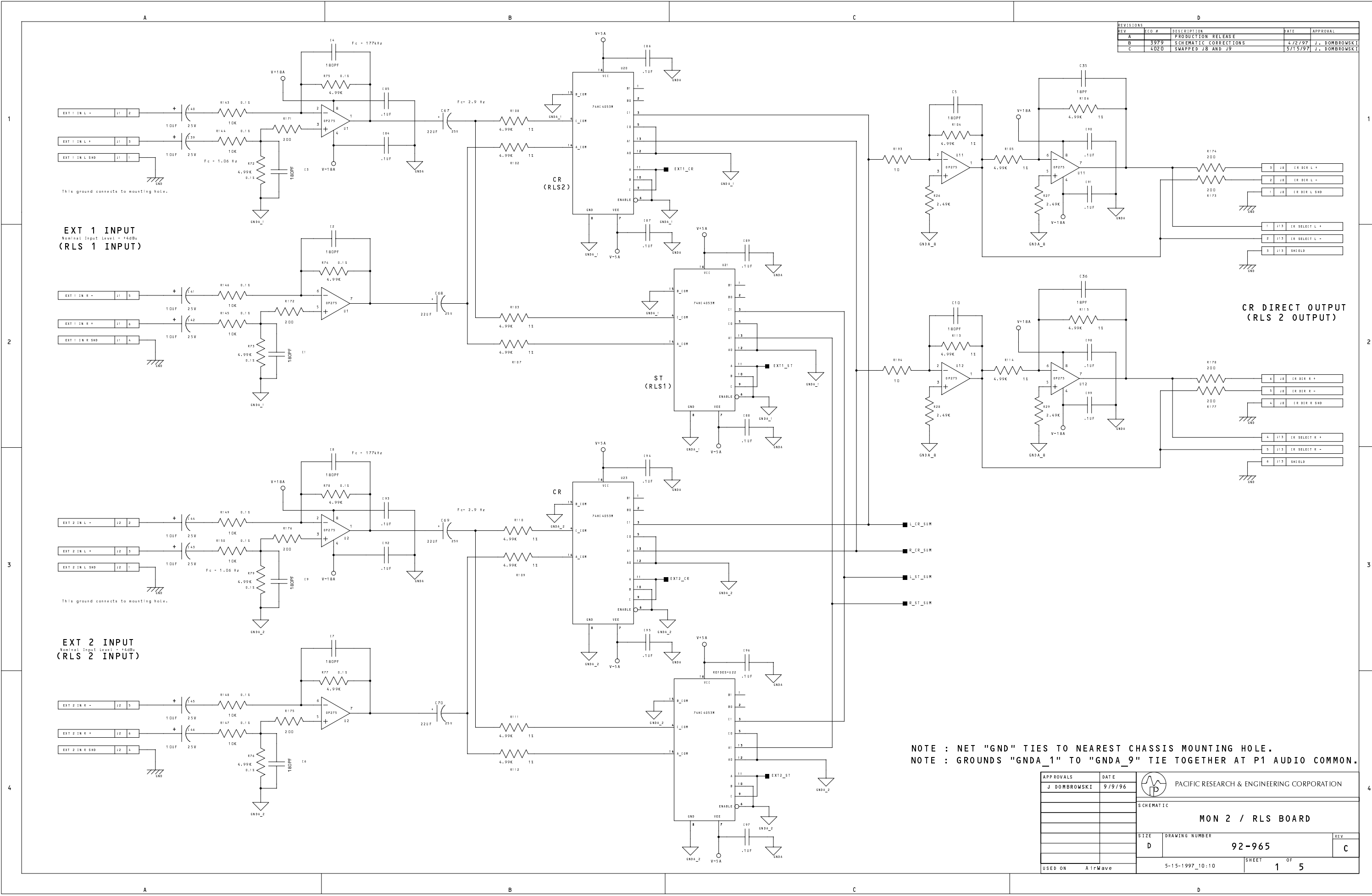






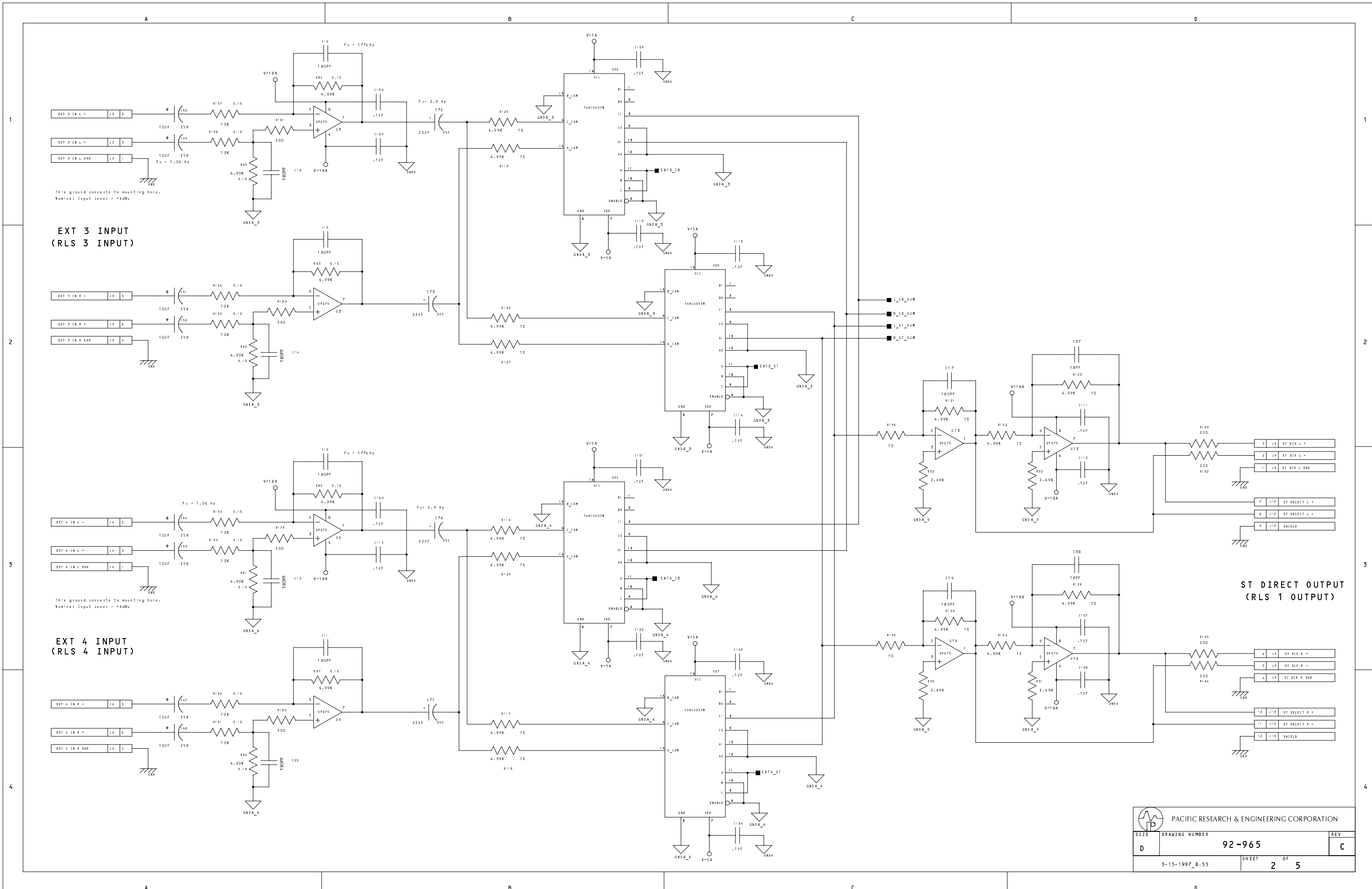


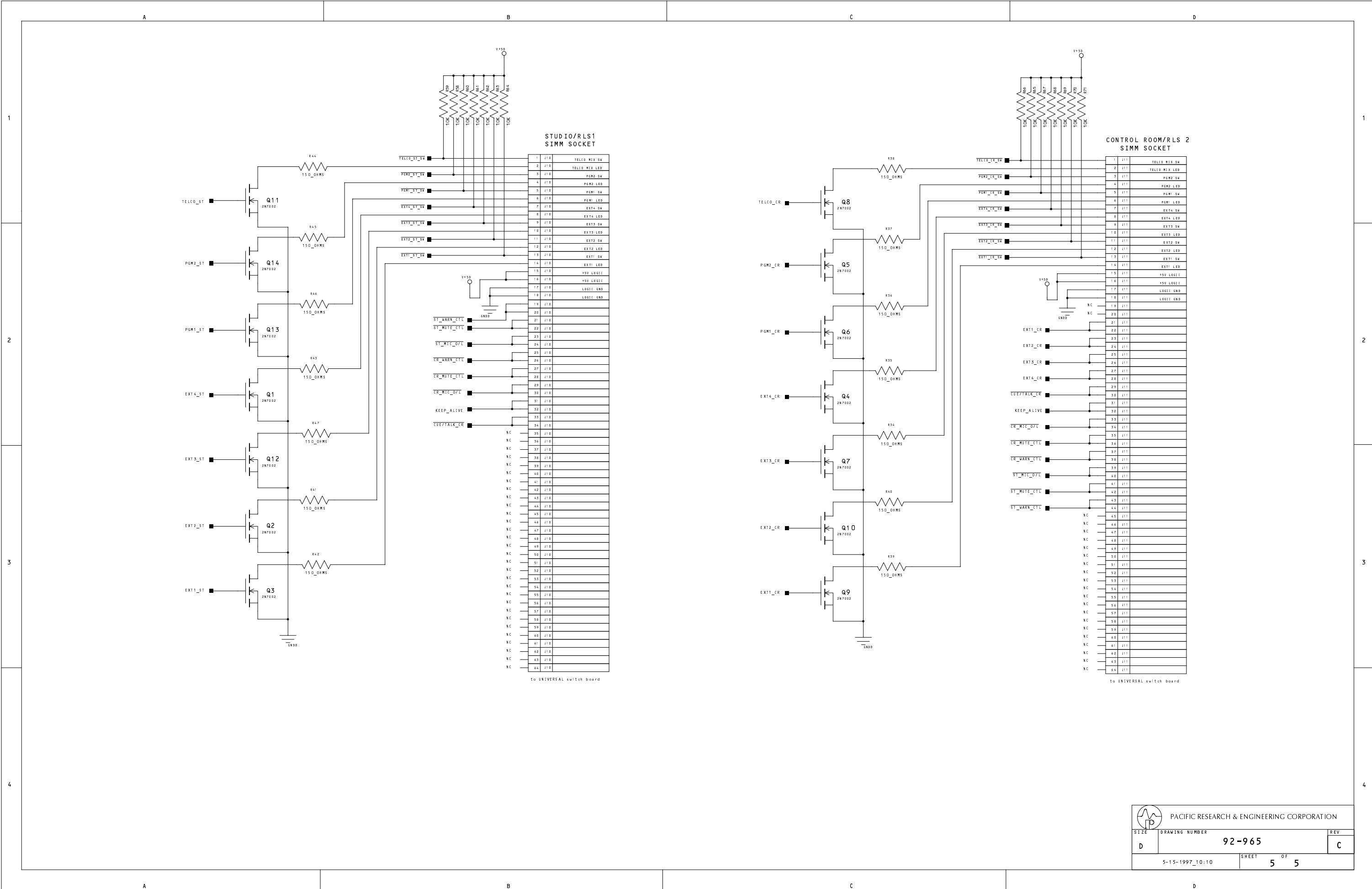


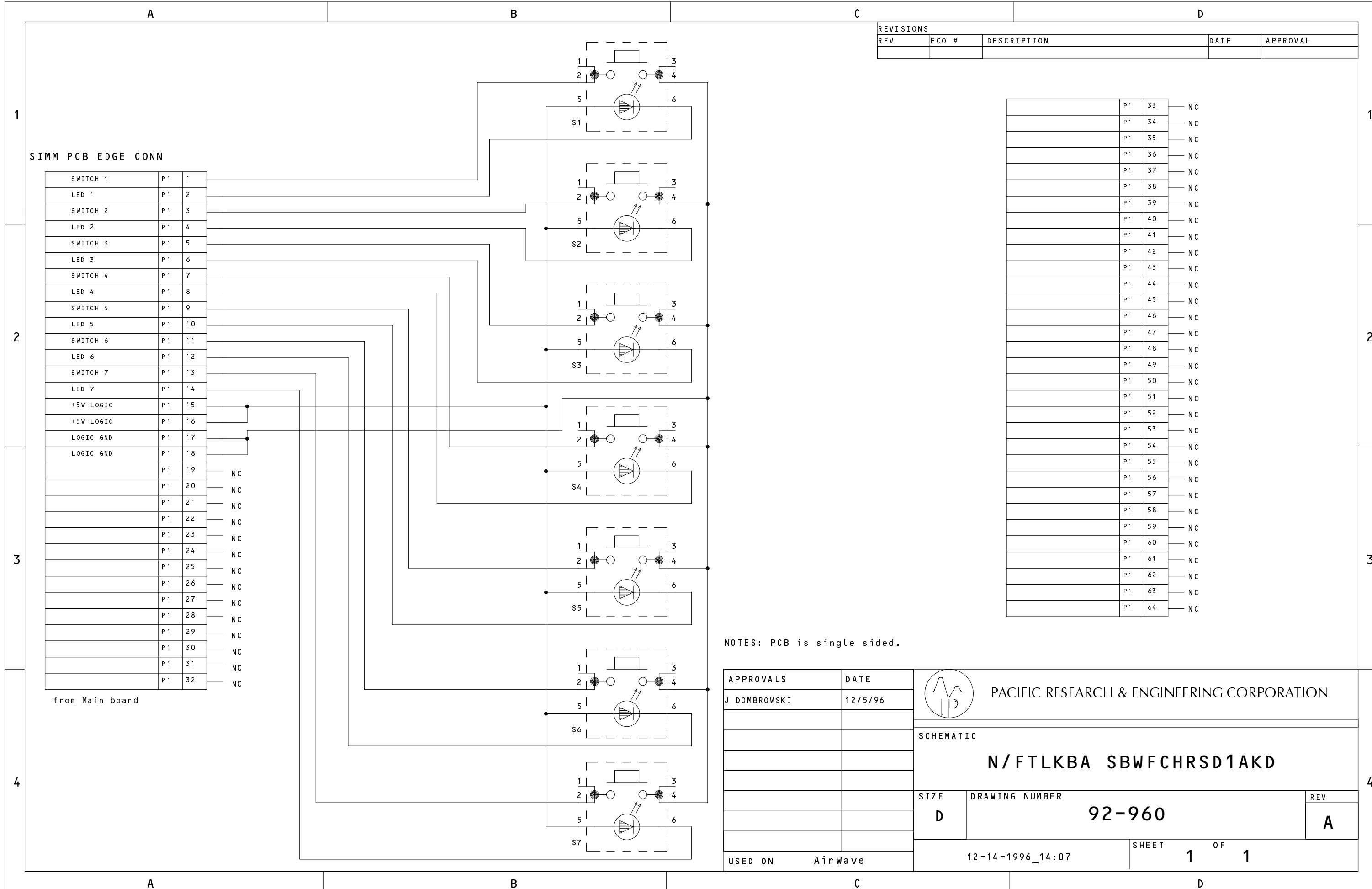


REVISIONS				
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A		PRODUCTION RELEASE		
B	3979	SCHEMATIC CORRECTIONS	4/2/97	J. DOMBROWSKI
C	4020	SWAPPED J8 AND J9	5/15/97	J. DOMBROWSKI

APPROVALS		DATE	 PACIFIC RESEARCH & ENGINEERING CORPORATION		
J DOMBROWSKI		9/9/96			
			SCHEMATIC		
			MON 2 / RLS BOARD		
			SIZE	DRAWING NUMBER	REV
			D	92-965	C
USED ON		AirWave	5-15-1997_10:10	SHEET	1 OF 5





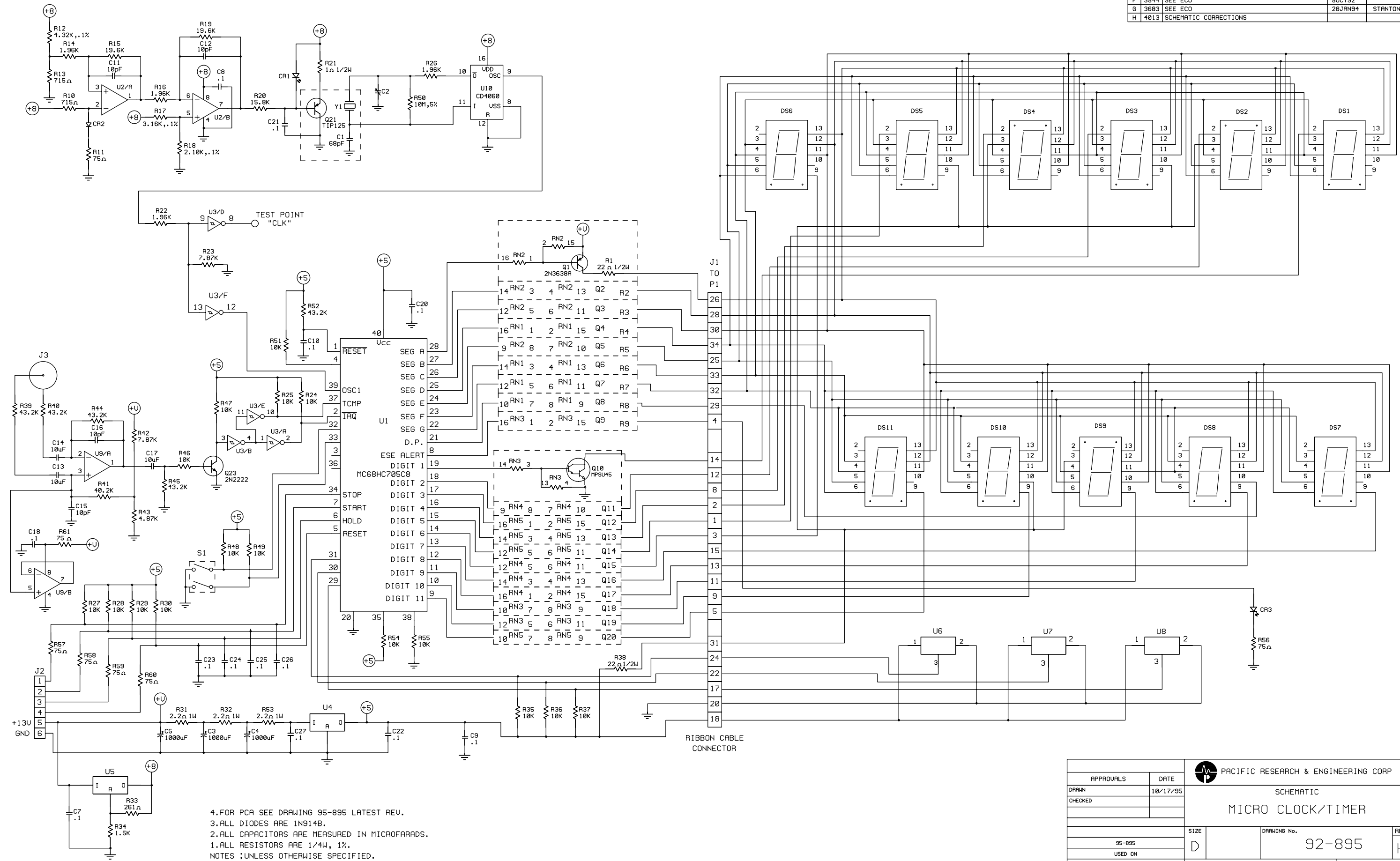


	P 1	33	NC
	P 1	34	NC
	P 1	35	NC
	P 1	36	NC
	P 1	37	NC
	P 1	38	NC
	P 1	39	NC
	P 1	40	NC
	P 1	41	NC
	P 1	42	NC
	P 1	43	NC
	P 1	44	NC
	P 1	45	NC
	P 1	46	NC
	P 1	47	NC
	P 1	48	NC
	P 1	49	NC
	P 1	50	NC
	P 1	51	NC
	P 1	52	NC
	P 1	53	NC
	P 1	54	NC
	P 1	55	NC
	P 1	56	NC
	P 1	57	NC
	P 1	58	NC
	P 1	59	NC
	P 1	60	NC
	P 1	61	NC
	P 1	62	NC
	P 1	63	NC
	P 1	64	NC

[illegible]

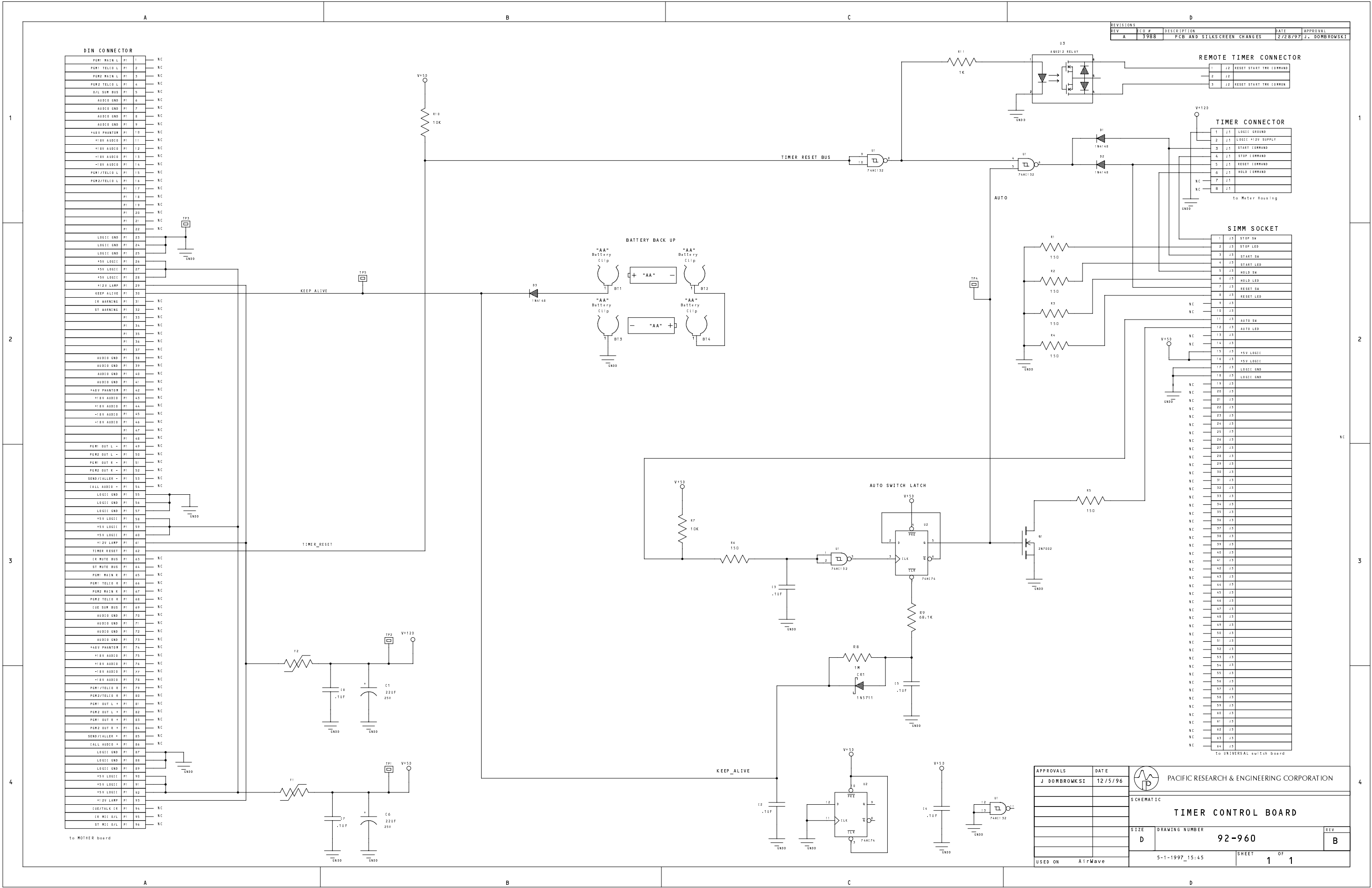
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SCHEMATIC		
N/FTLKBA SBWFCHRSD1AKD		
SIZE D	DRAWING NUMBER 92-960	REV A
12-14-1996_14:07	SHEET OF 1 1	

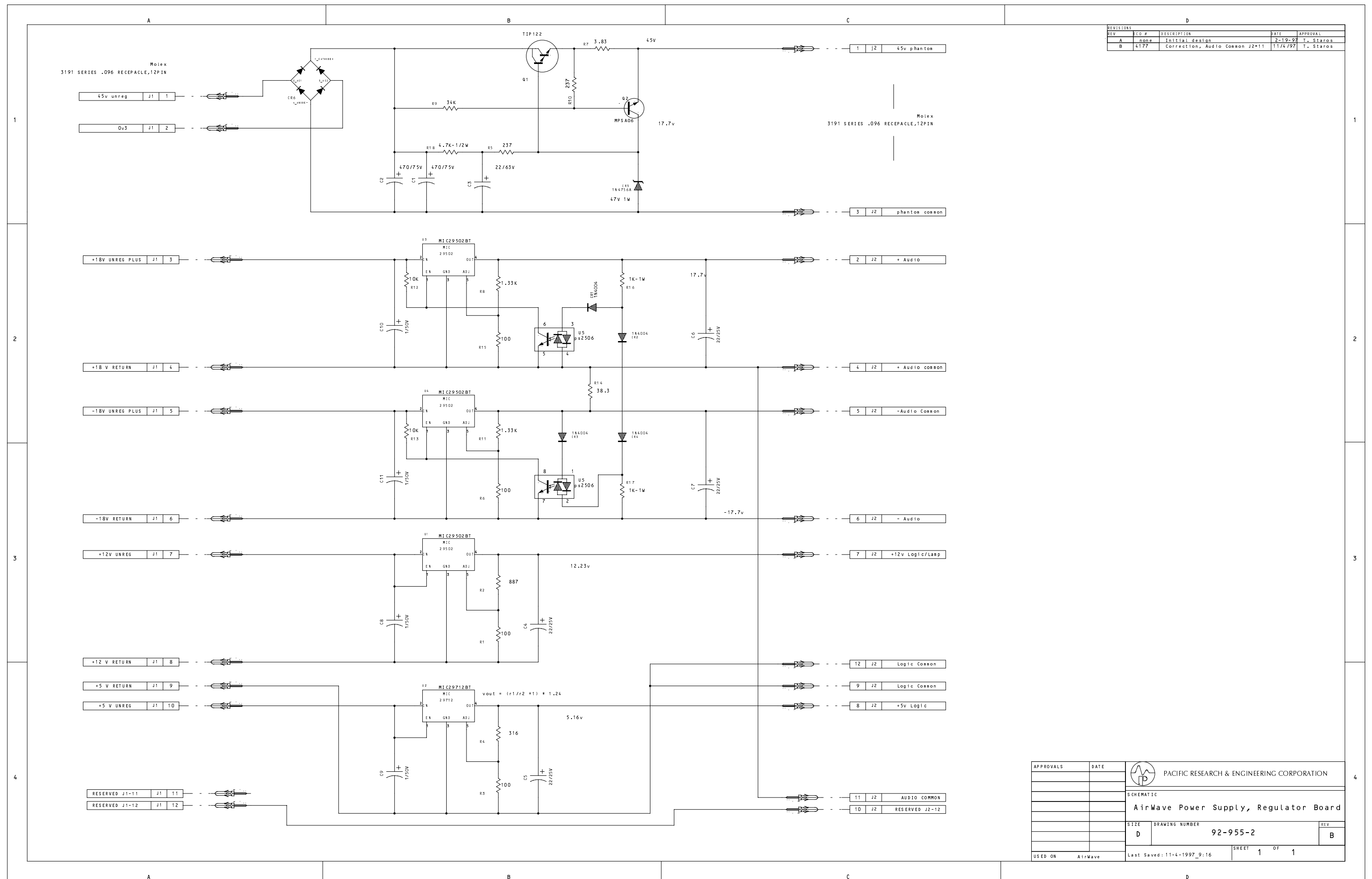
REVISIONS				
REV	ECO	DESCRIPTION	DATE	APPROVED
E	3303	REVISED AND REDRAWN	13MAR91	
F	3544	SEE ECO	5OCT92	
G	3683	SEE ECO	28JAN94	STANTON
H	4013	SCHEMATIC CORRECTIONS		



4.FOR PCA SEE DRAWING 95-895 LATEST REV.
 3.ALL DIODES ARE 1N914B.
 2.ALL CAPACITORS ARE MEASURED IN MICROFARADS.
 1.ALL RESISTORS ARE 1/4W, 1%.
 NOTES ;UNLESS OTHERWISE SPECIFIED.

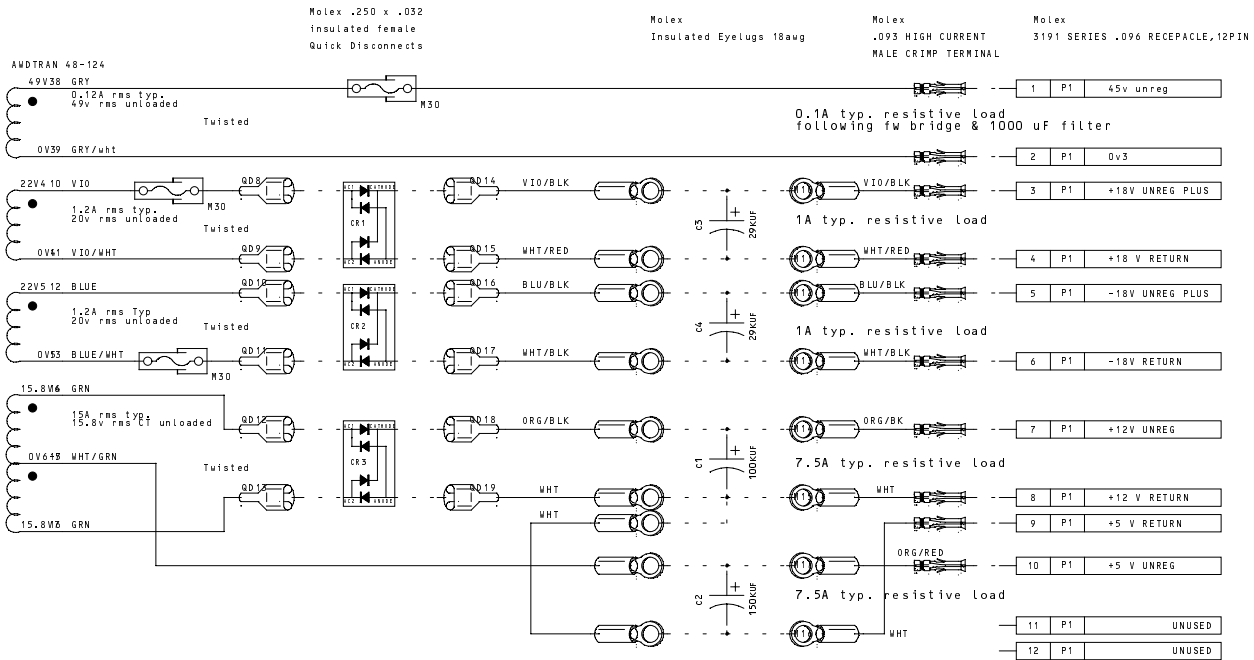
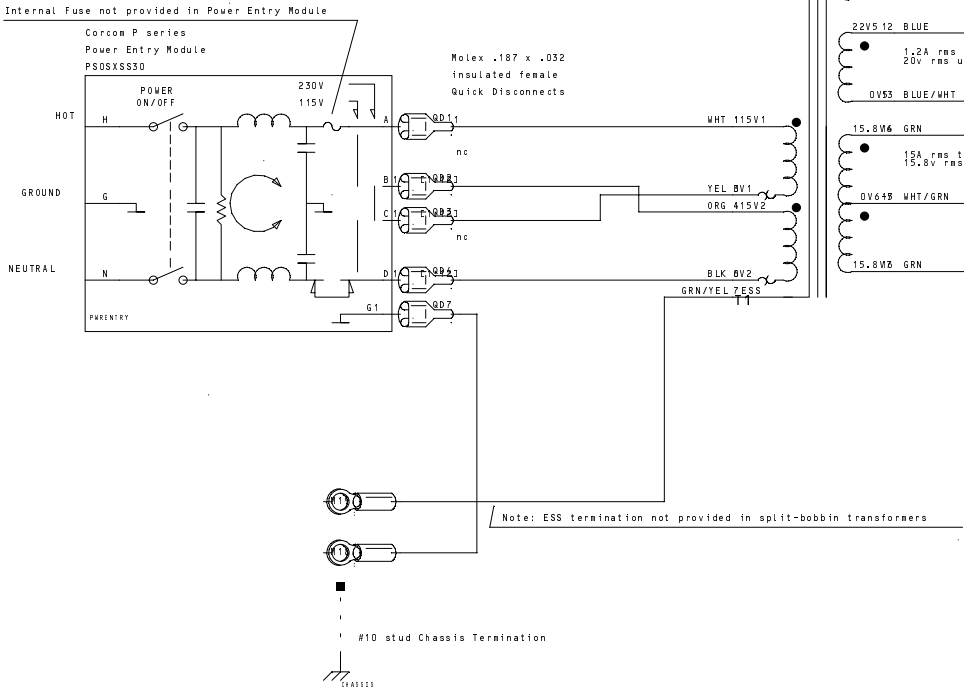
APPROVALS		DATE	PACIFIC RESEARCH & ENGINEERING CORP	
DRAWN		10/17/95	SCHEMATIC	
CHECKED			MICRO CLOCK/TIMER	
			SIZE	DRAWING No.
95-895			D	92-895
USED ON				H
APPLICATION				SHEET 1 OF 1





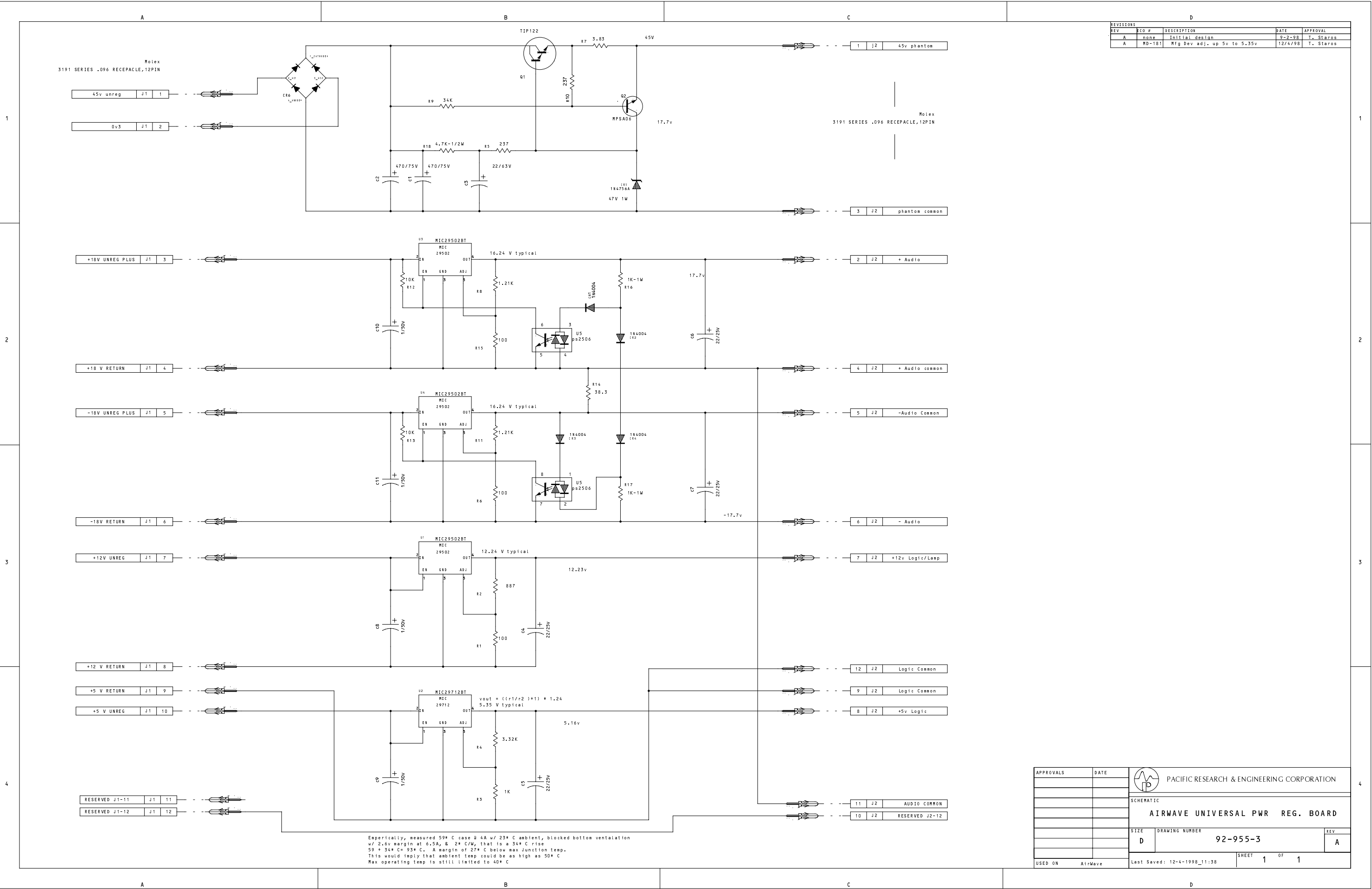
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A	none	initial schematic	2-19-97	T. Stamos

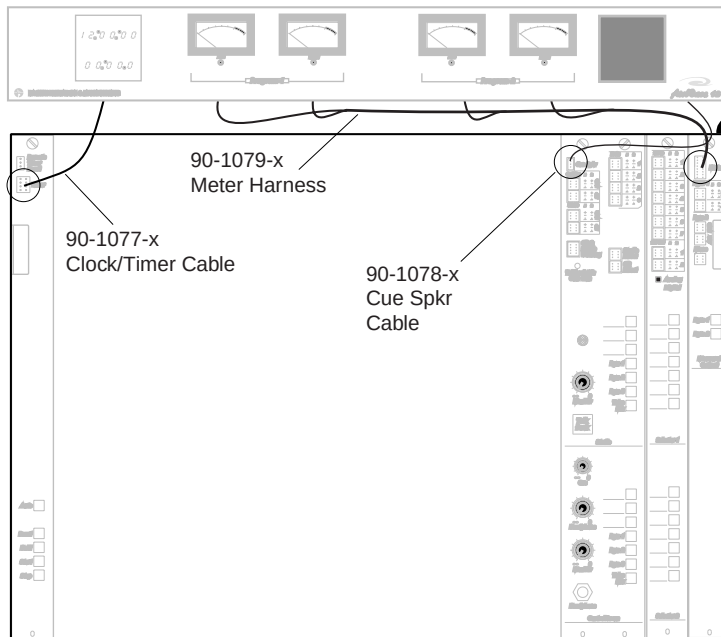
Assy # 95-955-3
AirWave Power Supply
Regulator Board
See Schematic 92-955-3



AirWave Power Supply
Chassis Wiring

APPROVALS		DATE			PACIFIC RESEARCH & ENGINEERING CORPORATION				
				SCHEMATIC					
				AIRWAVE UNIVERSAL PWR SUPPLY, CHASSIS					
				SIZE		DRAWING NUMBER		REV	
				D		92-1015		A	
USED ON		AirWave		Last Saved: 9-18-1998_10:16		SHEET 1 OF 1			





Mainframe Cable Identification

90-1076
DC Supply
Cable

Cable Part Numbers

AW-12	AW-20
90-1076	90-1076
90-1077-1	90-1077-2
90-1078-1	90-1078-2
90-1079-1	90-1079-2

90-1078-x, Cue Speaker Cable

AirWave Cue Output Signals	P1 Pin	Wire Color	Cue Speaker	
Cue + Output	3	RED	J1	Spkr +
Cue - Output	2	GRN	J2	Spkr -

No connection: P1, pin 1
J1 / J2: Solderless crimp connectors

90-1077-x, Clock/Timer Cable

AirWave Timer Logic Functions	P1 Pin	Wire Color	P2 Pin
Logic Ground	1	BLU / BLK	6
+12 volts	2	GRN / BLK	5
Start Command	3	RED / BLK	4
Stop Command	4	WHT / BLK	3
Reset Command	5	VIO	2
Hold Command	6	GRY	1

No connection: P1, pins 7, 8

90-1076, DC Power Supply Cable

AirWave Power Supply	P1 Pin	Wire Color	Motherboard Connections
+45 V (Phantom)	1	GRN / BLK	E3
+16 V (analog)	2	RED	E4
Phantom Gnd	3	GRN	J1
Audio Gnd	4	BLK	E1
Audio Gnd	5	WHT	E2
-16 V (analog)	6	WHT / BLK	E5
+12 V (lamps)	7	RED / BLK	E8
+5 V (logic)	8	ORG	E7
Logic/Lamp Gnd	9	BLU	E6

No connection: P1, pins 10, 11, 12
E1 - E8: Circuit board eyelets
J1: Ground lug fastened to Motherboard screw

90-1079-x, VU Meter Cable

Meter Output	P1&P2 Pin	Wire Color
GNDD	1	RED / WHT
+12 Volts	2	WHT / BLK
GNDD	3	RED / WHT
+12 Volts	4	WHT / BLK
GNDD	5	RED / WHT
+12 Volts	6	WHT / BLK
GNDD	7	RED / WHT
+12 Volts	8	WHT / BLK
PGM 1 L -	9	BLK
PGM 1 L +	10	WHT
PGM 1 R -	11	RED
PGM 1 R +	12	GRN
PGM 2 L -	13	BRN
PGM 2 L +	14	BLU
PGM 2 R -	15	ORG
PGM 2 R +	16	YEL

AIRWAVE CONSOLE WIRING

Accessories

PR&E has a full line of audio and logic cables specifically designed for use with the AirWave console and the PR&E *QuikBilt* Studio Furniture. *QuikBilt* cabinetry is the UPS-shippable rapid-assembly studio furniture designed for use with AirWave. Stand-up and sit-down styles, with several sizes and types of base cabinets, countertops and turrets, are available for creating individualized studio furniture packages.

PR&E's *PrimeLine* furniture line can also be used with AirWave. *PrimeLine* offers pre-assembled cabinet components, in stand-up or sit-down heights, with pre-cut console and wiring access holes. *PrimeLine* cabinets can also be factory pre-wired since the cabinets are shipped blanket-wrapped via van line.

BUTTON ENGRAVING

Input modules, and the optional Telco module, come standard with their red and yellow button caps engraved with "ON" and "OFF." Custom engraved button caps can be ordered at the time of purchase or engraved replacement button caps can be ordered at the time of installation once the input sources have been determined.

Each button cap can hold two lines of engraving with up to four alphanumeric characters and a ½ character punctuation divider (space, period, hyphen, slash, backslash, etc.) on each line.

Engraving is normally done on the yellow button cap to identify the A input source on the top line and the B input source on the bottom line.

Custom engraving is specified when a blank button cap is ordered. For a yellow button cap, order PR&E # 25-872. For a red button cap, order PR&E # 25-871. For a white button cap, as used for the Talkback button, order PR&E # 25-870.

FADER KNOBS

Input modules come standard with white fader knobs. The optional Telco module comes with a black knob. Various colored fader knobs are also available. The table identifies the PR&E part numbers by knob color and typical source.

PR&E #	Color	Source
32-710-1	black	Telco
32-712-1	red	Microphone
32-714-1	yellow	Cart decks
32-715-1	green	CD players / turntable
32-716-1	blue	Cassettes / reel-to-reels
32-719-1	white	Remotes
32-720-1	gray	Other Studios
32-721-1	orange	Multitrack channels

CONSOLE REMOTE CONTROL PANELS

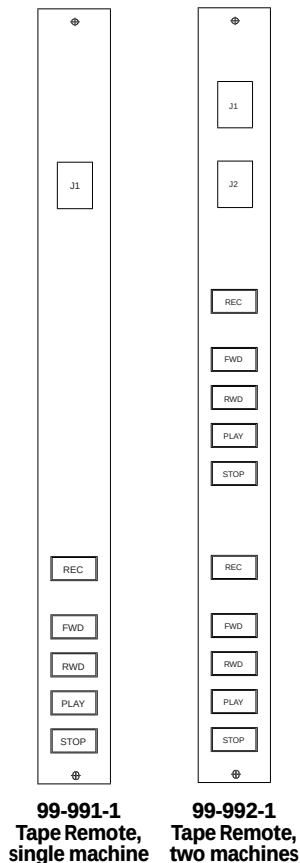
Any console position (excepting the two end positions) can be used to hold a remote control panel.

Tape Remote Panels

There are two tape remote panels available for AirWave: 99-991-1 and 99-992-1. Each uses a single module space in the console.

The 99-991-1 is a single tape machine remote featuring five control buttons (Play, Stop, Record, Forward and Reverse). A 24-pin Molex connector is located at the top of the panel for easy interfacing to a tape machine. The mating Molex connector and pins are included with the panel.

The 99-992-1 contains two separate five-button controllers in one panel. Two Molex connectors are located at the top of the panel for easy interfacing to two tape machines.



Custom Remote Control Panels

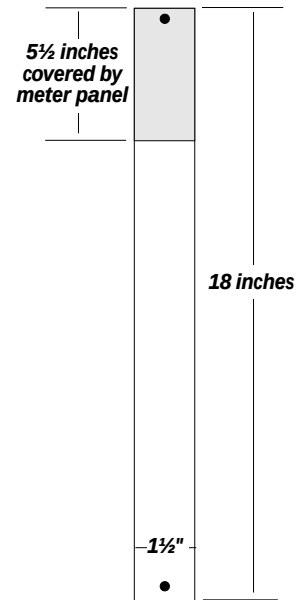
Blank module panels (PR&E # 80-1551) can be used to create custom control panels. The maximum width switch/button cap the panels can accommodate is 1-inch wide.

Because there are no bottom openings on the AirWave chassis, an opening must be punched at the top of the panel, in the area covered by the

meter panel, for the switch and lamp wiring to exit the mainframe. The use of a panel-mount connector is recommended.

Custom remote panels can also be fabricated by PR&E, contact a sales representative for more information.

Blank Panel Dimensions PR&E # 80-1551



GUEST PANELS

There are two Guest Panels available for the AirWave. PR&E # 99-949-1 is the cabinet mount version and 99-949-2 is the turret panel-mount version. Each panel has four engraved buttons (Talkback, Cough, On, Off) with integral lamps. The Guest Panel schematic and the cable drawing for the 99-716-CU cable are on pages 3 and 4, respectively.

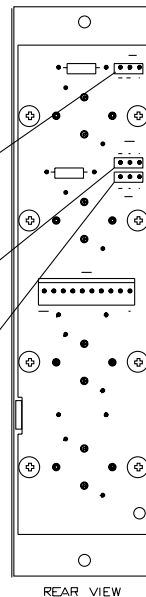
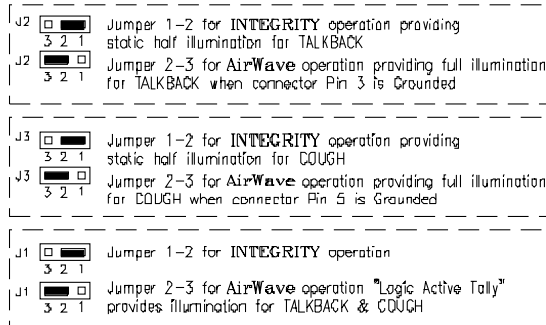
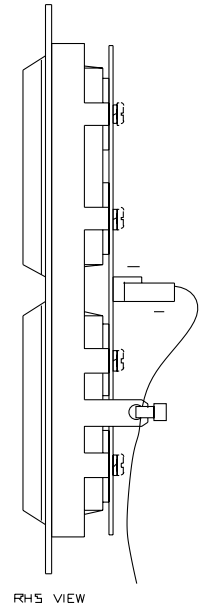
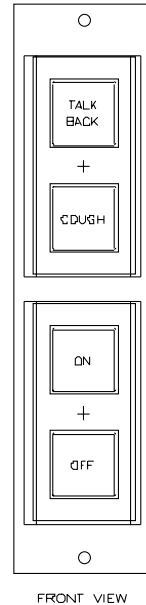
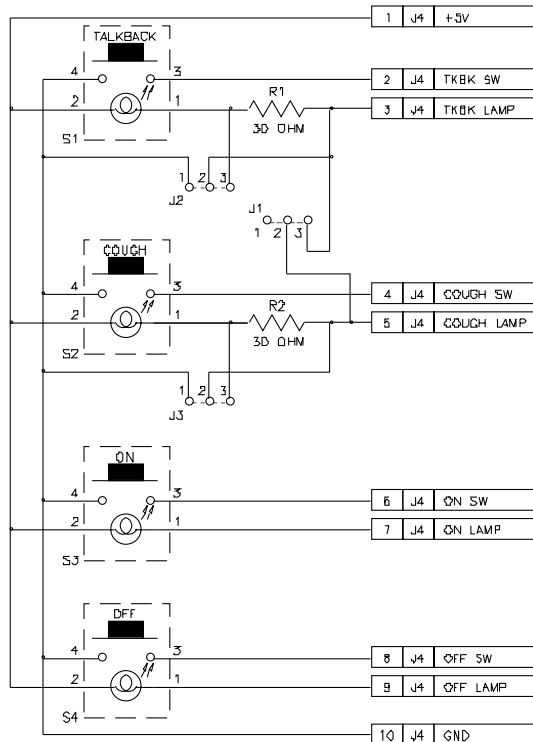
LOGIC CONTROL CABLES

To assist in logic cable design and construction, logic wiring diagrams for many popular peripheral devices are available from the PR&E Technical Support Department.

Contact a sales representative for information about PR&E pre-made peripheral logic cables.

J4: Housing, Wafer, 10 Pin Female, Locking, Molex #22-01-2107 (PR&E #15-524)
Terminals: Crimp, Gold, Female Molex #08-56-D110 (PR&E #15-8)

S1-S4 Switch: 17MM JAE #11LC17-0 (PR&E #25-873)
Lamp: JAE #11LB17-0 (PR&E #12-95)



99-949-2
GUEST PANEL
TURRET MOUNT
SHOWN

THIS DOCUMENT APPLIES TO 99-949-1
AND 99-949-2

GUEST PANEL, CABINET/TURRET MOUNT
INTEGRITY, AIRWAVE



PACIFIC RESEARCH
& ENGINEERING CORPORATION

SJQ

18JUN97

1 OF 1

71-949 B

J1: Housing, 24-Pin AMP Mod IV #2-87631-0 (PR&E #14-513)
 Terminals, Female AMP Mod IV HP #102128-1 (PR&E #15-938-1)

J2: Housing, Wafer, 10-Pin Female Locking, Molex #22-01-2107 (PR&E #15-524)
 Terminals, Gold Crimp, Female, Molex #08-56-0110 (PR&E #15-8)

Cable: 9 Cond Belden #9423 (PR&E #19-122) or equivalent

Wire: 26 AWG White Hookup, UL1429 (PR&E #19-94)

INPUT MODULE LOGIC FUNCTION	J1 PIN		J2 PIN	GUEST PANEL FUNCTION
+5VDC	10	BLK	1	TALLY +VDC
TALKBACK (-)	20	WHT	2	TALKBACK SWITCH
ON TALLY	17	RED	7	ON LAMP
OFF TALLY	16	GRN	9	OFF LAMP
LOGIC ACTIVE	15	BRN	5	TALKBACK/COUGH LAMP
LOGIC GND	1	BLU	10	SWITCH COMMON
ON (-)	7	ORN	6	ON SWITCH
OFF (-)	8	YEL	8	OFF SWITCH
COUGH (-)	9	VIO	4	COUGH SWITCH
+5VDC LOGIC	6	WHT		
EXT CTRL IN (+)	18			
LOGIC GND	2	WHT		
TALLY COMMON	14			

THIS DOCUMENT APPLIES TO 99-716-CU		TITLE CABLE, LOGIC, MIC INPUT MODULE TO GUEST PANEL (99-949-X), AIRWAVE			
 PACIFIC RESEARCH & ENGINEERING CORPORATION	DRAWN	SJQ	DATE	14AUG97	DWG. NO.
	SHEET	1 OF 1	APPROVED		71-716
					REV. C

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Note: Page numbers listed as Chapter-Page

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