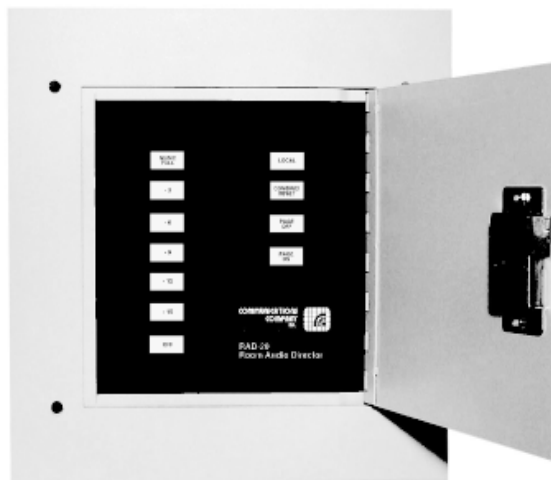
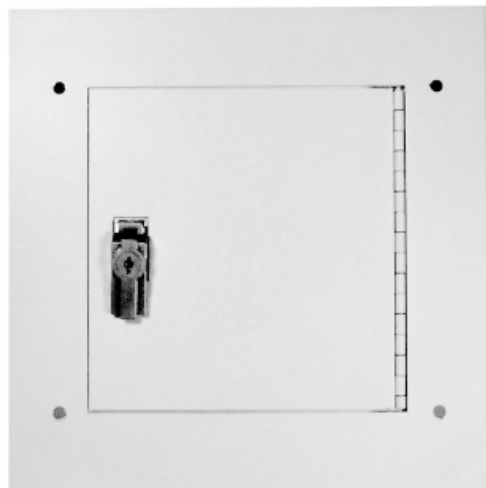


Room Audio Director



The model RAD-20 Room Audio Director provides expandable meeting room facilities (up to three [3] rooms) with the ultimate control for combining these audio areas using local in-wall or rack-mounted amplifiers. See **NOTE 1**.

The Room Audio Director furnishes an audio and visual status control at the touch of a button in each meeting room.

The RAD-20's single combine buss allows control of three (3) meeting rooms in any combination, or, from three (3) individual systems to one large system. (See Figure 1.) Each area has the option of background music or paging as desired.

The RAD-20's user controls and electronics are located in each meeting room with the in-wall amplifier. When a decision is made, immediate results can be observed. The standard user decisions, or options, are:

1. Background Music
2. Local program (1 room)
3. Combine (up to three [3] rooms)
4. Page option (when in the "ON" position provides page precedence over any other choice selected.)

Figure 1: RAD-20 possible operating combinations:

MEETING ROOMS		
<u>A Local</u>	<u>B Local</u>	<u>C Local</u>
A +	B	C Local
A Local	B +	C
A +	C	B Local
A +	B +	C

The RAD-20 control panel is designed with a lockable door and can be flush-mounted in the wall of each room. Power for each panel is by an AC adapter located at each wall amplifier AC outlet. Each control panel requires a RAD-20-PS power supply.

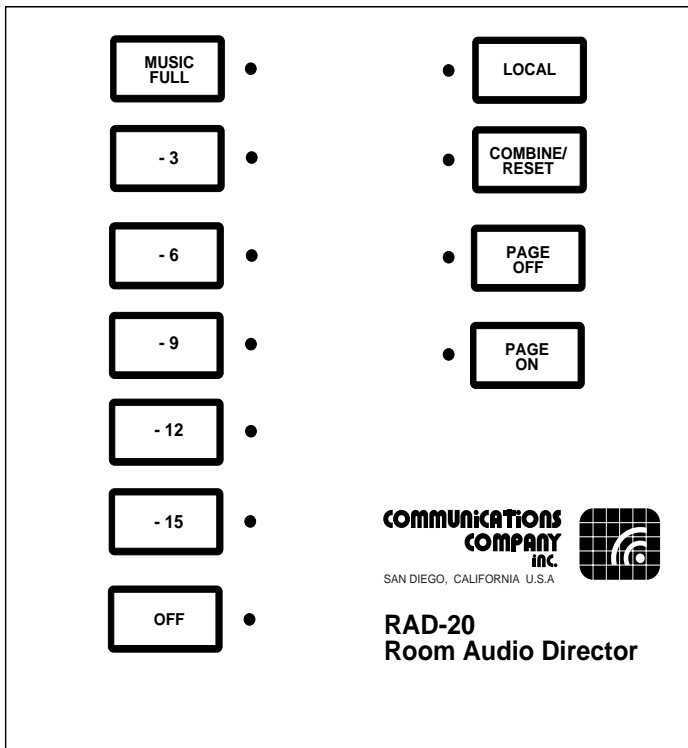
Operation of the system can be better understood by describing the room control panel.

There are four (4) momentary control buttons on the right side of the panel. Their functions are as labeled:

- Local** (not combined)
- Combine/Reset** (available for combining on Audio Buss)

Page ON
Page OFF





Music volume is controlled by the seven (7) push buttons located on the left side of the panel. When any push button is selected, the LED adjacent to that push button is lit, indicating the mode selected.

The Room Audio Director places the “combine” decision in the room where used, eliminating the possibility of hotel personnel error when setting up the meeting rooms.

A unique feature of the RAD-20 is the use of the “Combine/Reset” button to create a “master” control panel. For example: All three (3) rooms are in the combine mode and the meeting attendees wish to take a break. Room A pushes the “Combine/Reset” push button and then adjusts the music volume level. When the meeting is ready to restart, Room B or C can become the “master” control by simply pushing the “Combine/Reset” and making the desired selection. This eliminates the problem of resetting each panel or having to return to Room A to reset the panel for the desired mode.

Each room section is controlled by its own, dedicated RAD-20 room panel. To combine rooms, the “combine/reset” button must be selected in each room to be combined.

Another feature of the RAD-20 is that all microphone inputs follow the room program assignments automatically.

For example: If each of three (3) meeting rooms have four (4) microphone outlets, when the local program option is selected, any of the four (4) microphone outlets can be used within that room. When the Combine “buss” is selected, any room that is on the Combine buss will receive program from any other room that is on the buss, as well as program from its own four (4) microphone inputs for a new total of eight (8) microphone inputs. The process continues for a total of twelve (12) inputs in the fully combined system.

RAD-20 Specifications

Type: Room Combining Amplifier Control Panel to be located in each room.

Frequency response: 40 Hz to 15kHz \pm 1dB

Gain: Unity

Inputs: One balanced transformer input from mixer/amplifier;

One music balanced differential input;

One page balanced differential input.

Input impedance: 15k Ohm bridging

Input level controls: Continuously variable potentiometers for music and page input level.

Input level: -10 dBv nominal

Outputs: One balanced output to mixer/amplifier.

Output source impedance: 600 Ohms

Maximum output: +14 dBm into 600 Ohms

Total harmonic distortion: .01% THD @1kHz ‘0’ dBm

Signal to noise: 72 dB

Logic circuitry: Solid state CMOS logic

Connectors: Barrier type screw terminals

Power required: \pm 15 Vdc, unregulated 200 mA

Switching: Membrane type

Switching logic: Solid state CMOS logic

Dimensions: 12” x 12” front panel.

Wall mounting requirements:

H 10 1/2”, W 10”, D 4”

Color: Textured off-white flush mount lockable panel

Weight: 4.5 lb.

Wiring Information

The RAD-20 will require the following wiring:

- a) Three (3) pair individually shielded between RAD-20 units: One (1) pair shielded for music, one (1) pair shielded for page, and one (1) pair shielded combine buss.
- b) Two (2) pair individually shielded to each mixer/amplifier either located at the rack or in the wall.
- c) One (1) pair shielded to the bipolar power supply located at the rack or at each wall amplifier.

Refer to Figures 2 and 3 for wiring examples.

Note 1:

Most in-wall amplifiers have low mixer output to power amplifier input levels, typically -20dB. The RAD-20 is offered two ways: 1.) The RAD-20-20 (-20dB input/output) for most wall amplifiers; and 2.) the RAD-20-0 (0dB input/output) for use with rack-mounted commercial mixers and amplifiers at remote locations. Please denote the proper operating level desired when ordering.

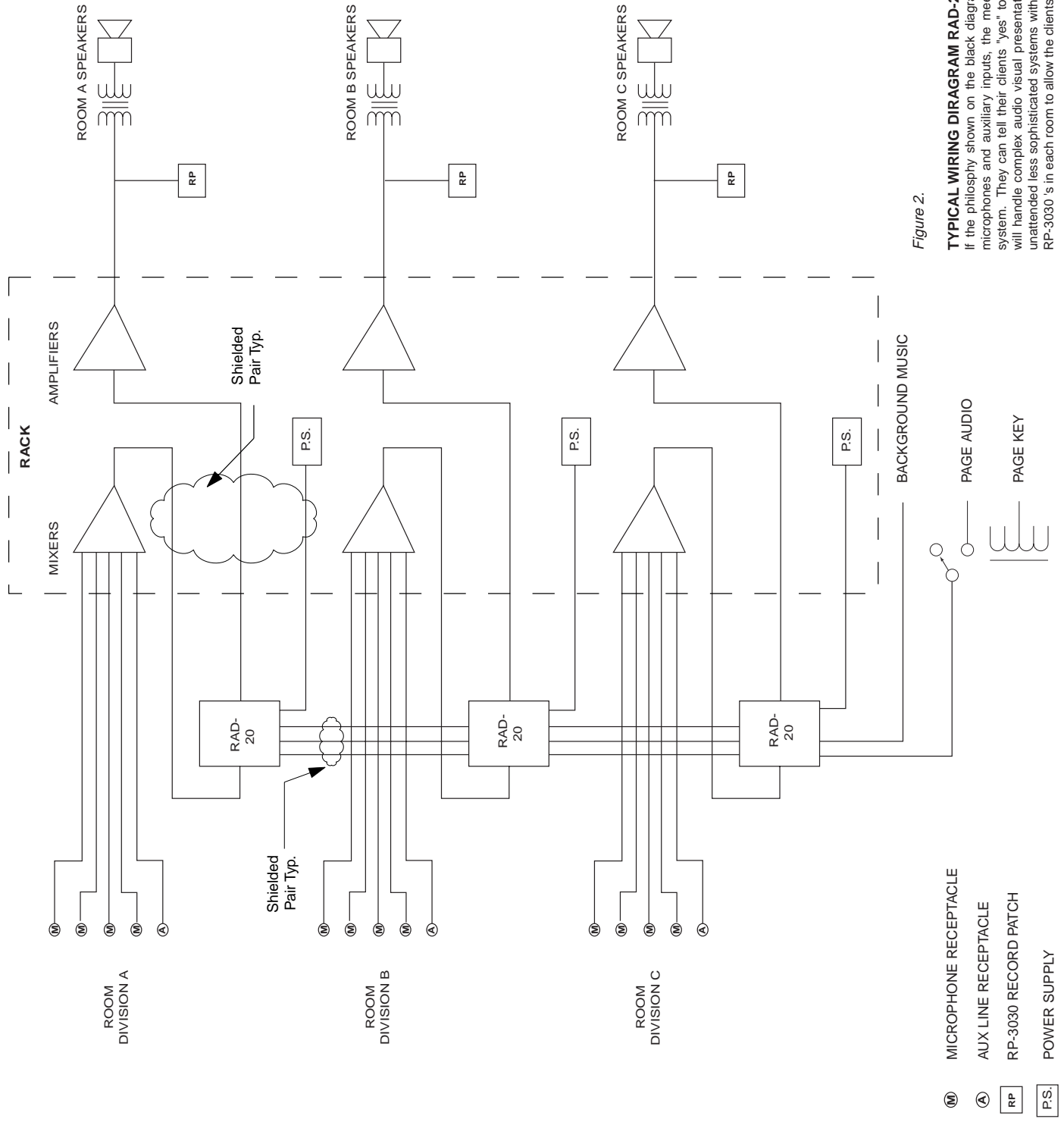


Figure 2.

TYPICAL WIRING DIAGRAM RAD-20 WITH RACK MOUNTED AMPLIFIERS
 If the philosophy shown on the block diagram is followed concerning the location of both microphones and auxiliary inputs, the meeting planners and catering staff will love your system. They can tell their clients "yes" to almost anything with confidence. This system will handle complex audio visual presentations using outside vendors with operators and unattended less sophisticated systems with equal success. We recommend the installation of RP-3030's in each room to allow the clients recording capability.

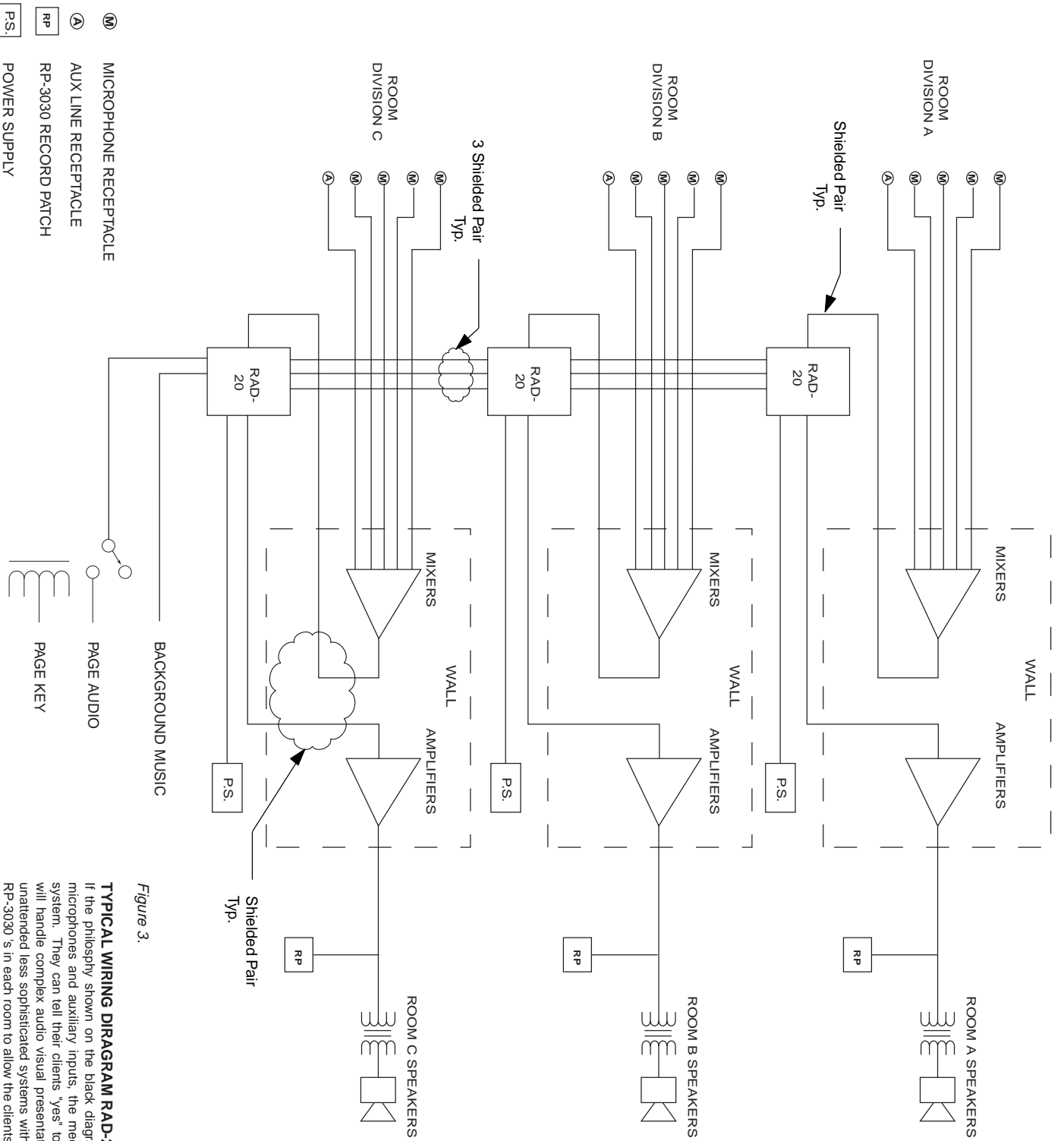


Figure 3.

TYPICAL WIRING DIRAGRAM RAD-20 WITH IN-WALL AMPLIFIERS

If the philosophy shown on the black diagram is followed concerning the location of both microphones and auxiliary inputs, the meeting planners and catering staff will love your system. They can tell their clients "yes" to almost anything with confidence. This system will handle complex audio visual presentations using outside vendors with operators and unattended less sophisticated systems with equal success. We recommend the installation of RP-3030's in each room to allow the clients recording capability.

INSTALLATION

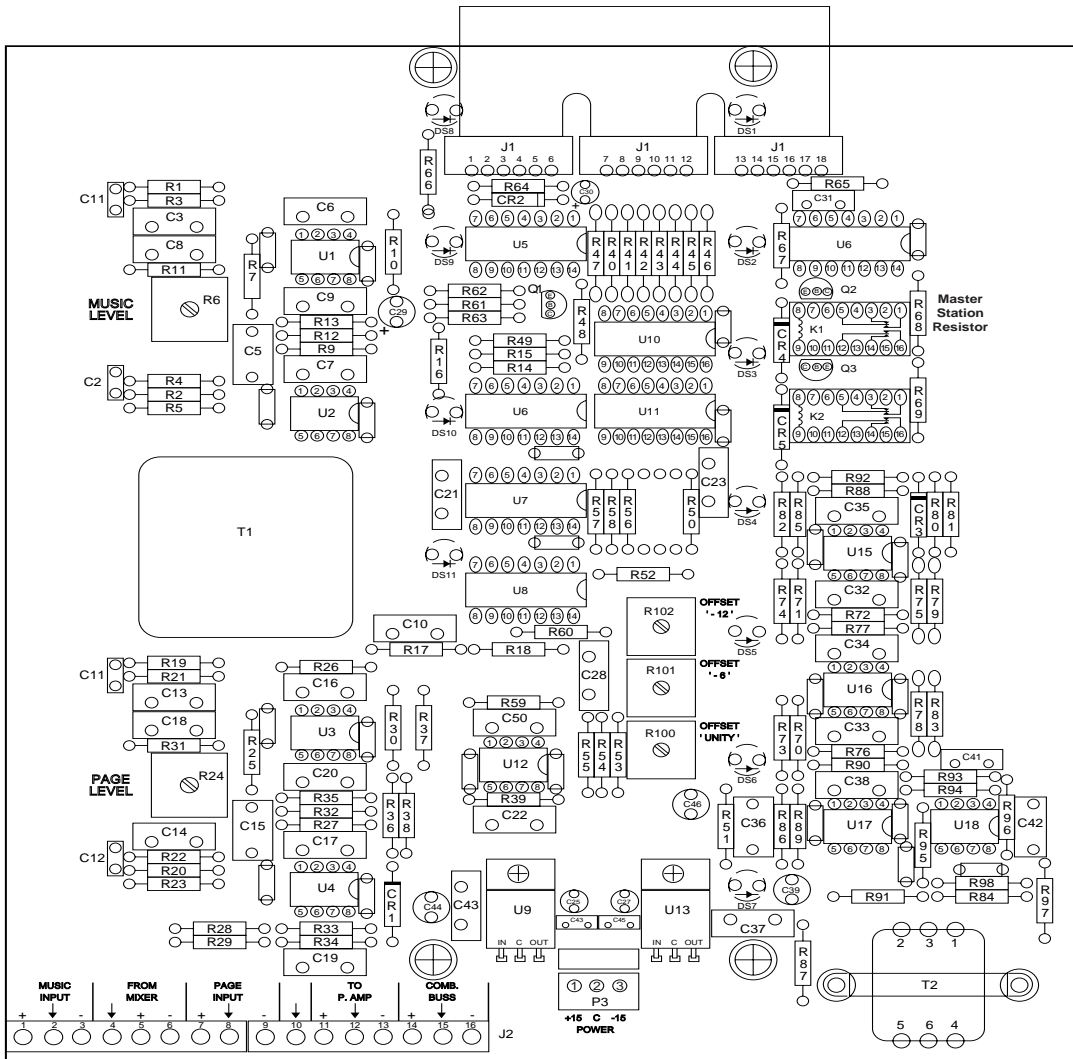


FIGURE 4

INSTALLATION

The RAD-20 is designed to be installed in the meeting room next to an in-wall amplifier. The RAD-20 can also be used with rack mounted mixers and power amplifiers by extending the input/output wiring from each RAD-20 panel to the rack mixers and amplifiers. Figure 4 illustrates the rear of the RAD-20 and the location of the wiring terminal strip on the bottom left corner. Figure 5 illustrates a close-up of the wiring terminal strip and the labeling for reference as we cover the wiring hook up.

The first three terminals on the left are connections for the background music input to the RAD-20. This is a bridging 15K ohm balanced differential input with ground located between the + and - inputs. Normal telescoping shield practice should be observed on all inputs to prevent ground loops. Connect the

shield to the ground terminal with the opposite end left floating. Refer to Figure 6 for the music and page input wiring.

Terminals 4, 5 and 6 (from the mixer) are 15k ohm balanced bridging audio inputs to the RAD-20, telescoping shield practice should also be observed, unless the mixer is unbalanced. This input is designed to accept any output from a microphone mixer. Even if your mixer is unbalanced, connect its output on the (+) and (-) terminals accordingly, do not connect anything to the ground terminal. Refer to Figure 7 and 8 for connections to balanced and unbalanced sources.

Terminals 7, 8 and 9 are for the page source input to the RAD-20. These input terminals should be wired the same way as the music input.

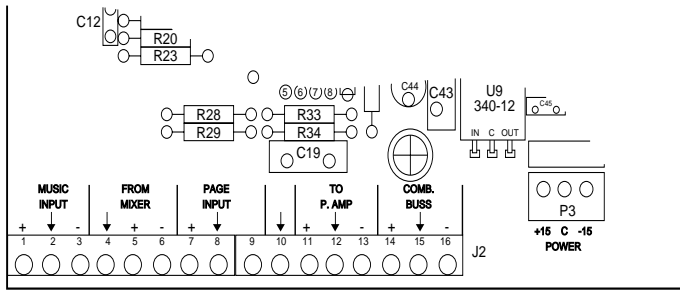


Figure 5

The Page Audio input source should be driven from a keyed relay located at the page source. The relay should provide a shorted line to the RAD-20 when no page is present to keep spurious noise from entering the RAD-20 system. The RAD-20 mutes the background music during a page when the page level reaches at least -18dB into the RAD-20. Refer to Figure 9.

Terminals 11, 12, and 13 (to P. Amp) are the 600-ohm transformer balanced outputs of the RAD-20 to the power amplifier input. The telescoping shield practice should also be used for this connection. Connect the shield to ground at the balanced input of the power amplifier and let the shield float at the RAD-20 end. Even if your power amplifier is unbalanced, connect the output to the (+) and (-) terminal accordingly, but do not connect anything to the ground terminal. Refer to figures 7 and 8.

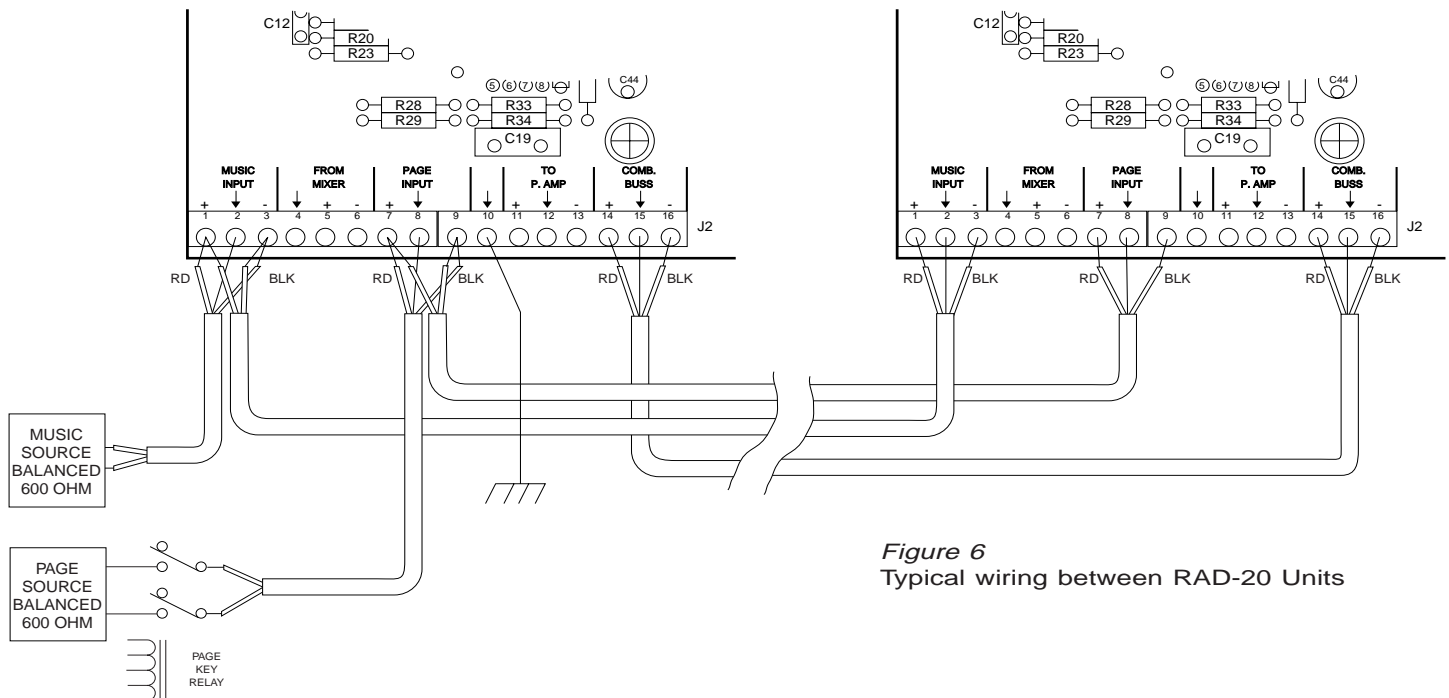


Figure 6
Typical wiring between RAD-20 Units

Terminals 14, 15, and 16 are the combine buss connections. Connect a pair shielded cable between RAD-20's in the following manner: Red (+) Black (-) Shield (ground). The shield drain wire connection is necessary for proper logic information to be transmitted between the RAD-20 units.

The power connections to the RAD-20 are provided by a Molex 3-pin termination located to the right of the terminal strip. The pins are labeled left to right: +15, common, -15. The RAD-20 is powered with a bipolar 15-volt supply. Permanent damage can occur if the polarity is reversed; therefore, polarity of the power supply must be observed.

If all wiring practices were followed as described, the RAD-20 system would work free of hum and noise. Should hum occur, ground the system at one location only, refer to Figure 6. Some wall amplifiers have very high impedance power amplifier inputs which may be susceptible to noise. In this case, terminate the RAD-20 (to P. Amp terminals) with a 600 ohm resistor. Should any problems occur, contact the factory for further assistance.

If three RAD-20 units are ordered you will receive one unit labeled "Master". Install this unit in the center room, as this unit contains the load resistor for the Combine buss and will reflect this load both directions equally to the other two RAD-20 units.

Check-out and Operation

When the RAD-20 is first powered up, the Music OFF, Local and Page OFF LED indicators will be lit. Push "Combine/Reset" then "Local" buttons on all RAD-20 panels before proceeding with the checkout.

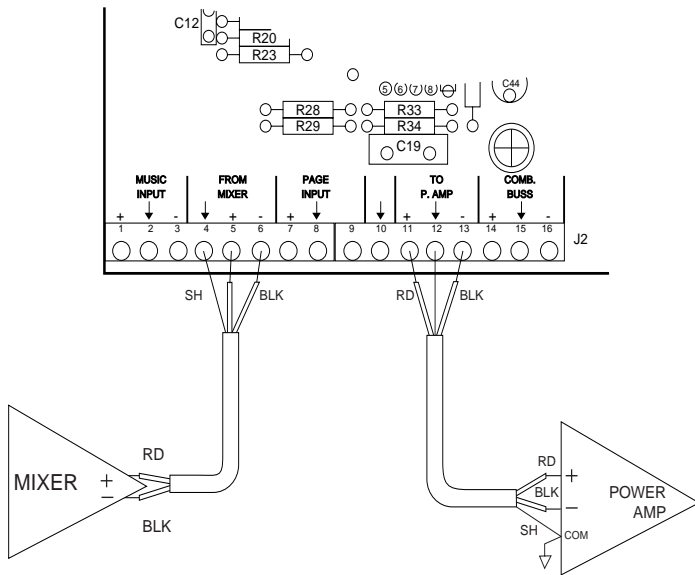


Figure 7
Typical wiring of RAD-20 to balanced output of mixer and balanced input of power amplifier.

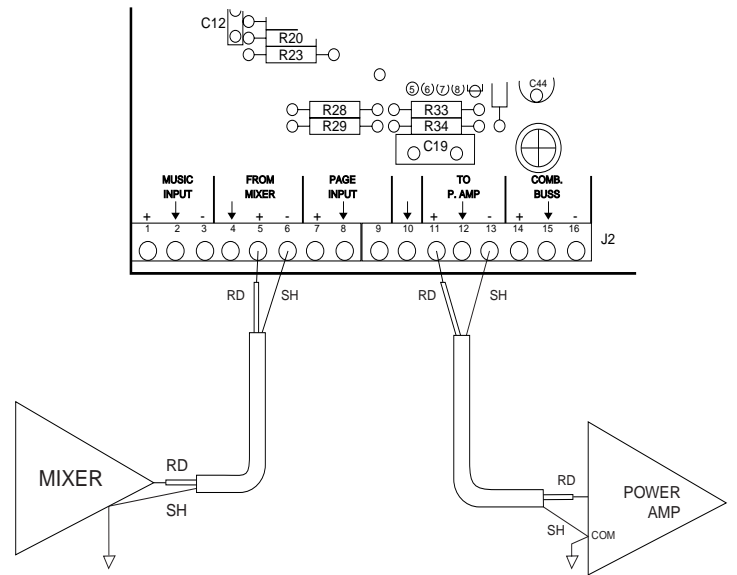


Figure 8
Typical wiring of RAD-20 to unbalanced output of mixer and balanced input of power amplifier.

Background Music

Turn on all mixer/amplifier units and set all microphone and auxillary input level controls to "OFF". With a nominal "0" dBm music program level input into the RAD-20, select the music "Full" pushbutton. Adjust the music level trimpot (refer to Figure 4) for adequate music volume in the "Full" up status. Now select each succeeding level pushbutton to check the music volume range. Proceed to all other RAD-20 panels and adjust the music level trimpot to be the same as the first RAD-20.

Page

With a nominal "0" dBm page source and the "Page On" pushbutton selected, adjust the page level trimpot (refer to Figure 4) for an adequate level in the room. Proceed to all other RAD-20 panels and adjust the page level trimpot to be the same as the first RAD-20.

Program Audio and Combining

Adjust the first room mixer inputs to normal operating levels and connect a microphone into the system. Select the RAD-20 to the "Local" position. The microphone should be live in the first room only. Proceed to the remaining rooms and check the microphone outlets for each room in the "Local" position. Now select the "Combine/Reset". The microphone audio should be the same level in all rooms. Connect the microphone

to each of the room systems and check that the audio is still present in all areas.

With the system still combined together press the "Combine/Reset" pushbutton in the nearest room. This panel is now the master panel for music and page. Select a music level position and see that all the rooms combined together now have music controlled by that last RAD-20 panel. If the "Page On" option is selected, it will be heard in all rooms combined. As you go to each of the other rooms, notice that the "Music Level" and "Page ON" pushbuttons are inactive until "Combine/Reset" is pressed; then, that room controls music and page to all others combined.

As you can see, the basic operation of the RAD-20 Room Audio Director system is simple. Hotel personnel can now be trained in a matter of minutes.

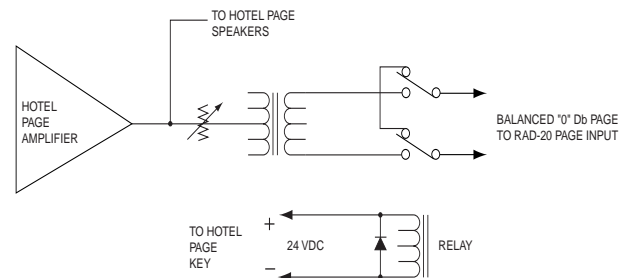
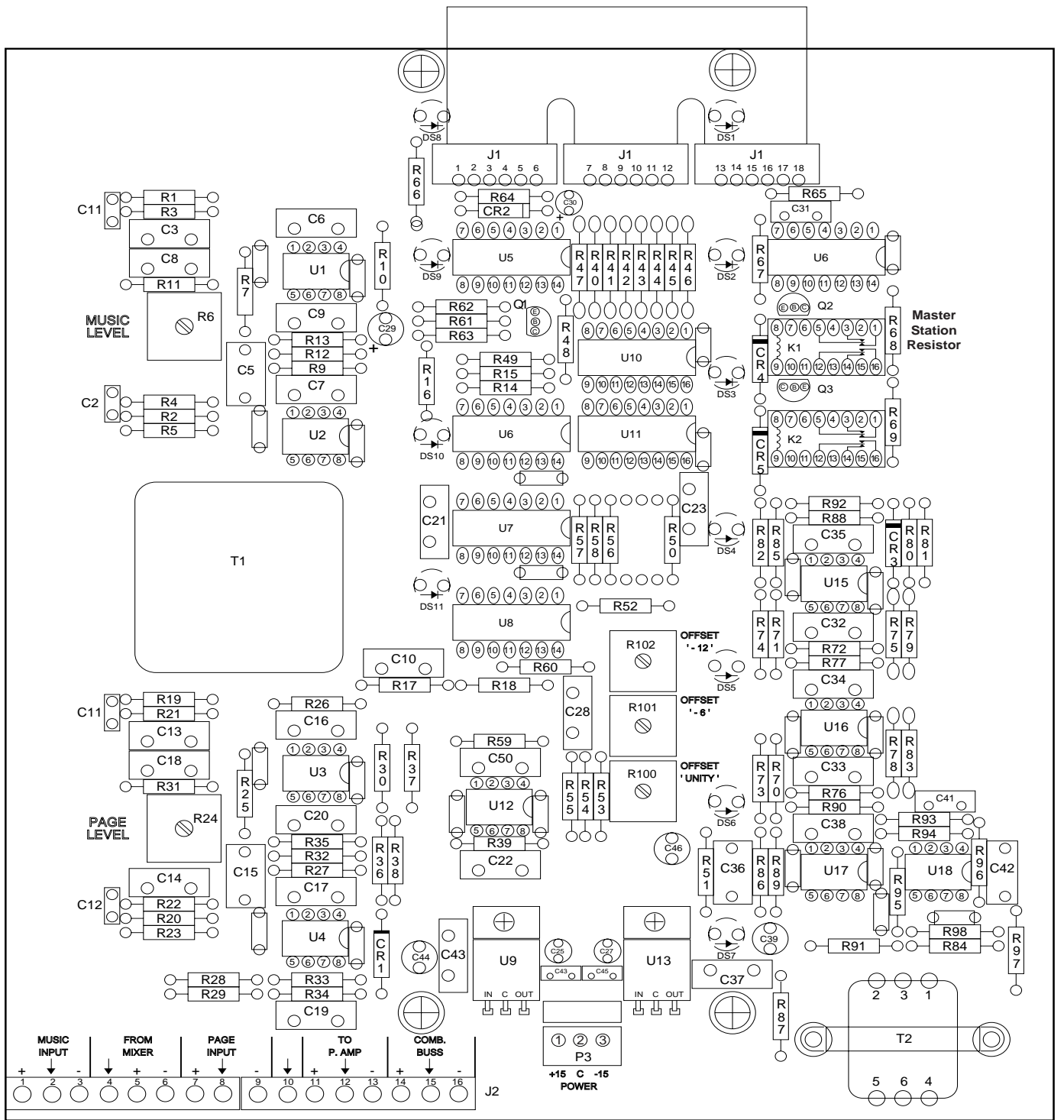


Figure 9
Typical wiring for Hotel page system to RAD-20.



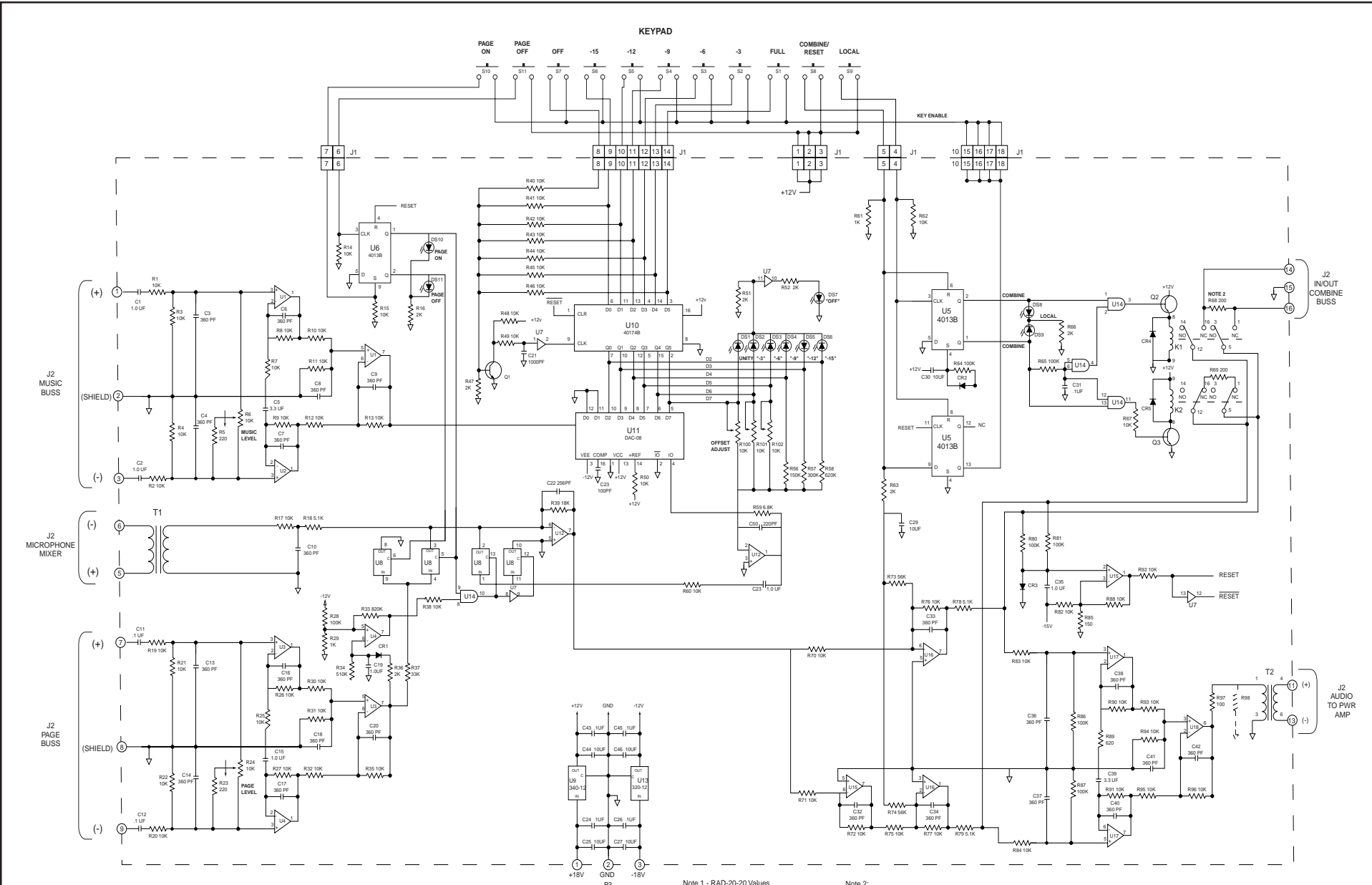
RAD-20 Room Audio Director
printed circuit board layout



DRAWN	WYCO	DATE	7-8-87
CHECKED		ENG.	DCJ

9181 Chesapeake Dr. San Diego, CA 92123
(858) 560-4162 Fax (858) 560-1923

NO: 12300156



RAD-20-0 Circuit Diagram

Note 1 - RAD-20 Values
 R37 - 330K
 R39 - 100K
 R59 - 4.7K
 R60 - 47K
 R37 - 3.3K
 R98 - 620

Note 2:
 R68 used only on one RAD-20 station per system



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DRAWN	WYCO	DATE	7-8-87
CHECKED		ENG.	DCJ

NO: 12300157

RAD-20

PARTS LIST

Transistors & Other Items

Address	Part Number	Address	Part Number
U1	LF353	Q1	PN3643
U2	LF353	Q2	PN3643
U3	LF353	Q3	PN3643
U4	LF353		
U5	CD4013B	CR1-5	1N914 DIODE
U6	CD4013B		
U7	CD40106B	T1	LARGE 28-T7730
U8	CD4066B	T2	SMALL 28-T5848
U9	LM7812		
U10	CD40174B	DS1-11	LM81cphI LED
U11	DAC-08		
U12	LF353	K1-2	Relay-12vDPDT
U13	LM7912		
U14	CD4093B		
U15	LF353		
U16	LF353		
U17	LF353		
U18	NE5534		

Resistors

Value	Address
100ohm	R97
150ohm	R85
200ohm	R68
220ohm	R5
620ohm	R89
1k	R29,61
2k	R16,36,47,51,52,63
5.1k	R18,78,79
6.8k	R59
10k	R1-4,7-15,17,19-23,25-27,30-32,35,38,40-46,48-50 60,62,66,67,70-72,75-77,82-84,88,90-96,100-102
10k trimpot	R6,24,100,101,102
18k	R39
33k	R37
56k	R73,74
100k	R28,64,65,80,81,86,87
150k	R56
300k	R57
510k	R34
620k	R58
820k	R33

Capacitors

Value	Address
220pf	C50
256pf	C22
360pf	C3,4,6,7,8,9,10,13,14,16,17,18,20,32,33,34,36,37,38,40,41,42
1000pf	C21
.1uf	C11,12,24,26,31,43,45
1.0uf	C1,2,15,19,23,35
3.3uf	C5,39
10uf	C25,27,29,30,44,46