

Thank you for buying the Radix DA-1600 Distribution Am.

Description

The DA-1600 is a professional-quality rack-mount two-in by sixteen-out 600-Ohm audio balanced-line driver. It contains thirty-four individual low noise, low-distortion, high-output op-amps to supply a high quality, high level output signal. Coupling transformers are not required because of the high input common mode rejection and high output drive capability of the op-amps. All audio connections are made with removable screw-clamp plugs to facilitate cable terminating and signal routing.

The DA-1600 can be used in one of three modes:

Mode 1 - A single stereo input/eight stereo output line driver.

Mode 2 - Two separate mono input channels each driving eight outputs with high inter-channel isolation.

Mode 3 - A single mono input driving sixteen identical outputs. (If signal phase is unimportant, each half of each balanced output can be used to drive a total of thirty-two unbalanced loads. (300 Ohms minimum each.)

Each input channel will accept either a balanced or an unbalanced audio line with selectable 600 Ohm or 10,000 Ohm input loading. A selectable input pad supplies two gain ranges for low or high line levels. Radio frequency interference suppression is included.

Each output channel has a front panel accessible level adjustment and will drive a 600-Ohm balanced line to +26 dbm (15.5 Vrms) or an unbalanced line to +20 dbm (7.8 Vrms).

A conservatively-rated 117 VAC power supply (jumperable for 234 VAC) and tolerating a $\pm 10\%$ line voltage variation and individual op-amps

Installation

The DA1600 fits a 19 inch rack requiring 1.75 inch height. Once the setup is completed, the DA-1600 requires no attention so it may be mounted out of the way. Other power handling equipment mounted close to this unit may be a source of excessive heat or 60 Hz hum fields.

Input and output connections

Connections should preferably be balanced. This will reduce common mode noise (hum and RFI) pickup. Use a shielded two conductor cable connecting the shield to the "G" (ground) terminal (the center terminal) and the positive wire to the "+" terminal (the right hand terminal). The "+" output follows the "+" input in phase so there is no phase inversion unless one pair of input/output wires is reversed. For unbalanced lines, connect the signal lead to the "+" input/output terminals and connect the "-" input to the "G" terminal (to avoid noise pickup). Do Not ground any unused outputs as this will overload and possibly destroy the associated op-amp.

Stereo Mode 1 or separate mono systems Mode 2 :

Connect the stereo left channel (mono 1) to the A input and the right channel (mono 2) to the B INPUT and take the left channel (mono 1) outputs from the A OUTPUT 1 thru 8 and the right channel (mono 2) outputs from the B OUTPUT 1 thru 8.

One-In/Sixteen-Out system (Mode 3)

Parallel the DA-1600 "A" and "B" inputs with a short piece of cable and route the input cable to either the A INPUT or B INPUT in parallel with this shorting link ... maintaining color codes to insure proper phasing. Identical outputs are taken from all sixteen output connectors.

Input loading (see schematic for loading/gain selector diagram)

If the device driving the DA-1600 is capable of driving 600 Ohms and the DA-1600 is its only load, set the INPUT LOAD selector to the LO-Z position for each channel in use. If the DA-1600 is in parallel with other devices, the total effective load impedance should be not less than approximately 600 Ohms, but should be close to reduce noise pickup. For a high impedance driving source, set the INPUT LOAD selector to HI-Z to supply 10<000 Ohms loading. For a one-in/sixteen out system, set both input loading selectors to the HI-Z position for 5000 Ohm total input loading, or only one to LO-Z and the other to HI-Z for 600 Ohm input loading.

Circuit Function

To locate items referred to, see schematic.

The amplifier utilizes thirty-four NE5534 op-amps, a widely used, very low noise, low distortion, high output drive, high slew rate, device with output overload protection and good heat dissipation.

Each of the two input amplifiers uses one NE5534 in a differential-input configuration. R2, when connected across the input, supplies approximately 600 Ohm input loading. When disconnected, the input impedance is approximately 10K Ohms. R5, when jumpered into the circuit, reduces effective input stage gain by -15 dB, to -9 dB (X0.35). When disconnected, the stage gain is +6.5 dB (X2.1). C1/C2 supply some RFI suppression and C3/C4 block any DC voltage fed into the input. C5/C6 decrease high-frequency gain, increasing stability, and supply some additional RFI suppression. R6/R7 supply a DC ground reference for C3/C4. R3/R8 and R10 set the maximum input stage gain.

Each of the sixteen balanced output stages use two NE5534's and has a LEVEL SET potentiometer R12. R13/R14 set the output stage gain to +16 dB (X6.5). C9 aids high-frequency stability, and R15 reduces output DC offset. R16/R17 sets the inverting amplifier gain to X1 and C12 aids stability. R19/R20 supply some protection from external overloads and C15/C16 supply some high-frequency loading and RFI suppression to the output cable.

The power supply section includes R1 which separates the chassis ground from the signal ground to reduce ground currents. The transformer T1 primary can be jumpered for 117/234 VAC line voltage. D1-D4 from a center tapped bridge secondary circuit supplying +25 VDC to the \pm VDC regulators VR1 and VR2. This \pm 15 VDC powers the output amplifiers directly and the input amplifiers through the R-C filters at approximately 0.2 VDC less. R23/R26 limit the indicator LED's current to about 3 mA.

Gain Select

A conservatively-rated 117 VAC power supply (jumperable for 234 VAC) and The average audio output level from the DA1600 should not exceed approximately +10 dBm (2.5 Vrms) from any output terminal to ground [+16 dBm]5 Vrms) balanced] to allow adequate headroom for high-level transients. (Do not connect an unbalanced-input AC powered voltmeter to a balanced line as it will ground one active output.) The DA-1600 has a net gain of one (1) with the "GAIN SEL" set to LO-GAIN and the "LEVEL SET" controls set to approximately mid position; use this configuration to produce an output level form zero up to +7 dB over the input level (depending on LEVEL SET). If the input level is considerably less than the desired output level, set the "GAIN SEL" to HI-GAIN; this gives an additional 15 dB of gain. (The SPECIFICATIONS listing in the manual gives maximum input levels before clipping occurs. Signal levels should never be allowed to exceed these limits to avoid severe distortion.)

Grounds and ground loops

The DA1600 chassis must be solidly connected to the power mains (earth) ground through the power cord and the rack frame. Ground loops (evidenced by 60-Hz hum on the audio line not traceable to the signal source itself or to magnetic hum fields close to the cables or amplifiers) are usually caused by 60 Hz currents in cable shields and circuit ground conductors due to several "grounds" not quite a zero potential, tied together. The DA-1600 has a 10 Ohm resistor between circuit ground and chassis to reduce ground currents, and a jumper (J1) near the power transformer, which can be cut (if absolutely necessary) to float the circuit allowing grounding at a perhaps 'quieter' place. If cable shields are grounded at one end only (usually the signal source end), ground currents through the shield are minimized. Ground loop problems may possibly be eliminated by insuring that all involved equipment is solidly grounded by power cords, rack frames and, if necessary, by heavy (12-gauge or heavier) copper bus screwed to the ground terminals of each unit and anchored to a solid earth ground

Two Year Guarantee

Radix warrants this equipment against defects in material or workmanship under normal service, for a period of two years. Motors, lamps and moving mechanisms are excepted, which carries a standard 6 month guarantee. This warranty is limited to repairing or replacing only defective electronic components and is not valid if the equipment has been tampered, misused or damaged.

Warranty Replacement/Return For Repair

If the need for a replacement unit or repair should arise, return authorization numbers must be obtained from Radix prior to returning merchandise. Please call (253) 565-2301 for an RA number. Upon receipt of authorization, the following procedure should be followed:

1. Package carefully.
2. Insure for full value.
3. Mark authorization number on the outside of the shipping container.
4. Ship to:

**Radix c/o BSW
2237 S 19th St Street
Tacoma, WA 98495**

5. Prepay shipping. Collect shipments will NOT be accepted

Replacement or Warranty Parts

These parts will be billed to the customer and credit will be issued upon receipt of the defective parts. When ordering parts/components, etc, it would be helpful to have the serial number(s) of the unit() in question along with the date of purchase.

Freight Claims and Damages

All claims for damaged merchandise must be made directly with the carrier within 5 days of receipt. Notify Radix within the same time frame. Freight companies and carriers are quite strict with reference to claims and if not notified within 5 days they may not honor your claim.

Model DA1600 Distribution Amplifier

Specifications

Maximum output level: +19.5 dBm (7.5 Vrms) single ended
+25.5 dBm (14.9 Vrms) balanced into 600 Ohms
@ $\pm 0.01\%$ THD

Maximum input level: LO-GAIN set: +30 dBm (24 Vrms)
HI-GAIN set: +15 dBm (4.4 Vrms) at input
stage clipping point, 28 dB (X25) bal-
anced

Gain continuously variable from zero to max.
Gain set to 0 dB (X 1) by factory when shipped

Input impedance: 10,000 Ohms or 600 Ohms selectable

Output impedance: 50 Ohms unbalanced, 100 Ohms balanced

Frequency response: ± 0.1 dB from 5 Hz to 25 KHz

Distortion: 0.01% or less up to maximum output

Common mode rejection: -60 dB min at 60 Hz

Hum/noise: -90 dBm weighted, < -76 dBm unweighted

Power requirements: 117 VAC, 60 - 60 Hz. 30 Watts maximum
Can be jumpered for 234 VAC

Dimensions: 1.75" x 19" panel, 7" deep.

Weight: 4.75 lbs.