

## QUICK START

Look around to make sure no one catches you reading this. You're aware this is the manual aren't you? Wow! Most people only get about this far in a manual, but there are a few important things you should know about the AVA 22d. So please keep reading. These few points are summarized in this Cliff Note version of the manual.

The first time you power the AVA 22d it is in **BYPASS**, and functions like an expensive wire. This is useful for initial troubleshooting and allows for convenient verification of signal flow. Punching the **BYPASS** buttons and extinguishing their LEDs will activate the Delays.

**ADJUSTING SENSITIVITY**—First apply a signal with nominal input level and adjust the **SENSITIVITY** controls so the red **CLIP** LEDs just light, then back off so the LEDs do not turn on, even with high signal peaks.

**SETTING DELAY**—Now that the input signal is calibrated, select **LINK** mode (**LINK LED** on) for stereo operation, or turn off **LINK** mode for dual mono operation. Adjust the up/down buttons until the LED display shows the desired Delay.

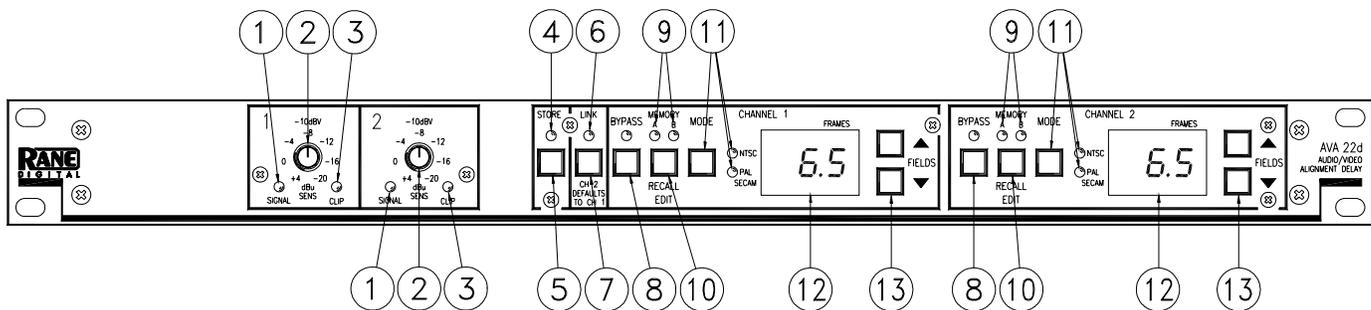
**STORING DELAY**—Press the **STORE** button (the **STORE LED** turns off). This stores the current Delay values into each Channel's current Memory (A or B). The current Memory is indicated by the lit **MEMORY LED** for each Channel. Both Channel's current Delay values are stored with each press of the **STORE** button. The broadcast Mode (NTSC or PAL/SECAM) is also stored with the Delay value.

**RECALLING DELAY**—To recall a stored Memory, press **RECALL**. Each press of this button alternately recalls stored Memories (A then B then A...).

*Never connect anything except an approved Rane power supply to the thing that looks like a telephone jack on the rear of the AVA 22d.* This is an AC input and requires special attention if you do not have a power supply exactly like the one originally packed with your unit. See the full explanation of the power supply requirements elsewhere in this manual.

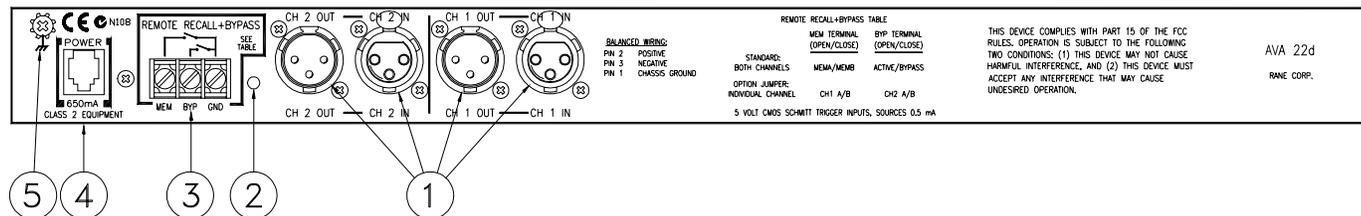
*600 ohm users see page Manual-4.*

## FRONT PANEL DESCRIPTION



- ① **SIGNAL indicators:** These green LEDs illuminate approximately 42 dB before actual clipping.
- ② **SENSITIVITY controls:** These rotary controls vary incoming signal levels to the A to D converter. The output signal is also adjusted so the AVA 22d always passes signal with unity gain into 600 ohm loads. (See operating instructions.)
- ③ **CLIP indicators:** These red LED indicators illuminate 4 dB before clipping at the A to D converter input.
- ④ **STORE indicator:** This flashing LED indicator alerts the user that the current configuration of the AVA 22d is different from the stored configuration. The STORE LED is off when the current configuration matches the stored configuration.
- ⑤ **STORE button:** This pushbutton stores both Channels' current Delay configurations into the given Channels' current Memory (A or B). The current Memory for each Channel is indicated by the lit MEMORY LED for that Channel.
- ⑥ **LINK indicator:** This green LED lights when the unit is in LINK mode. LINK mode allows stereo operation.
- ⑦ **LINK button:** This pushbutton toggles between LINK mode (stereo operation) and DUAL MONO operation. (See Operating Instructions.)
- ⑧ **BYPASS buttons and indicator:** These momentary push buttons toggle each Channel's hard-wired Bypass. If an LED is *on*, the given Channel is Bypassed and functions like a wire. If it is *off* the given Channel is active.
- ⑨ **MEMORY indicator:** These LEDs indicate the most recently recalled Memory, A or B, for the given Channel. They also indicate the Memory that is written to when the STORE button is pressed. The MEMORY LED flashes when the current Delay value for that Channel is different than the stored value for that Channel.
- ⑩ **RECALL buttons:** Pressing one of these pushbuttons alternately Recalls stored Memories A and B for the given Channel.
- ⑪ **MODE buttons and indicator:** These buttons toggle the broadcast mode for the given Channel, NTSC or PAL/SECAM. Each Channel contains LEDs indicating the current broadcast Mode.
- ⑫ **FRAMES displays:** These 2-digit displays indicate the current Delay value for the given Channel. On power up this display also shows the currently installed software revision level.
- ⑬ **UP/DOWN buttons:** Pressing these buttons increases/decreases the amount of Delay in the given Channel.

## REAR PANEL DESCRIPTION



- ① **XLR INPUT/OUTPUTS:** Nothing new here, balanced Ins and Outs. If you can tolerate unbalanced characteristics (like hum), you can also wire the AVA 22d in an unbalanced configuration. See RaneNote 110, “Sound System Interconnection” located elsewhere in this manual.
- ② **Front panel lockout switch:** Enables the Front Panel Lockout mode. In this mode all front panel controls, with the exception of the RECALL buttons, are disabled. Press a RECALL button while in LOCKOUT to temporarily display, but *not* Recall, the value of the other stored Memory for the given Channel. (See Operating Instructions for optional Bypass Lockout mode.)
- ③ **REMOTE RECALL & BYPASS terminals:** Wiring external configuration switches to these terminals allows remote stereo bypassing or stereo memory recalling of the two nonvolatile memories. These terminals use CMOS (+5 volt) logic levels and source only 0.5 mA (max) each.
- ④ **POWER connector:** No, this is not where commissioner Gordon plugs in his Bat-phone, in fact *it is not a telephone jack* at all. The AVA 22d uses an 18 volt AC center-tapped transformer only. *Use only a model RS 1, RAP 10 or other remote AC power supply approved by Rane.* The AVA 22d is supplied with a remote power supply suitable for connection to this jack. Consult the factory for replacement or substitution.
- ⑤ **Chassis ground point:** A #6-32 screw and toothed washer is provided for chassis ground. Since the AVA 22d does not get chassis ground through the AC cord, this point is provided if your system does not have another earth ground such as the rack rails.

### FCC NOTICE

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following:

1. Re-orient or relocate the receiving antenna.
2. Increase the separation between the equipment and the receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio/TV technician.

### CANADIAN EMC NOTICE

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet Appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

### CHASSIS GROUNDING

If after hooking up your system it exhibits excessive hum or buzzing, there is an incompatibility in the grounding configuration between units. Here are some things to try:

1. Try combinations of lifting grounds on units supplied with ground lift switches (or links).
2. Verify all chassis are tied to a good earth ground.
3. Some units with outboard power supplies do *not* ground the chassis through the line cord. Make sure these units are solidly grounded by tying the Chassis Ground Point to known earth ground. Use a star washer to guarantee proper contact.

## AVA 22d CONNECTION

When connecting the AVA 22d to other components in your system for the first time, *leave the power supply for last*. This gives you a chance to make mistakes and correct them before any damage is done to your fragile speakers, headphones, ears, or brains. The AVA 22d passes audio while it is unpowered by virtue of its fail safe bypass relays (when the AVA 22d functions as a wire). Turn the system volume down before plugging in the AVA 22d's power.

### INPUTS

The AVA 22d's Inputs are electronically balanced. Use only balanced wiring. Pin 2 is "hot" per AES standards.

### OUTPUTS

The AVA 22d's Outputs are balanced line drivers. Pin 2 is "hot" per AES standards.

### REMOTE RECALL TERMINALS

Each Channel of the AVA 22d has two nonvolatile Memories, "A" and "B". Connecting a switch between the GND and MEM terminals permits remote stereo recalling of the Memories. Only a change in the switch position is sensed. When the switch closes, both Channels' Memory B's are recalled. When the switch opens, both Memory A's are recalled. See Operating Instructions for more details or an option.



## 600 OHM USER INFORMATION

The AVA 22d's Inputs are specified for a nominal +4 dBu input, which is a voltage referenced level of 1.228 Volts RMS. (0 dBu = 0.7746 Volts). At this *voltage* level, the AVA 22d provides 16 dB of headroom. Users who wish to operate the AVA 22d in 600 ohm systems must provide their own 600 ohm input resistor across the input terminals. This enables the AVA 22d to accept a +4 dBm input and allows delivery of +4 dBm to a 600 ohm load. Confusion among 600 ohm users of the AVA 22d may occur if one assumes the input and output impedances of the AVA 22d are 600 ohms – they are not. Therefore, when evaluating the AVA 22D do not assume that +4 dBm equals +4 dBu unless you have ensured that all input and output impedances in your test setup are 600 ohms.

### Advantages of Hi-Z in/Lo-Z out systems:

(from *Audio System Design and Installation*, by Phillip Giddings, Howard W. Sams, 1990, pp. 129-130.)

1. Less distortion in output due to smaller output current needs.
2. Lower noise pickup by interconnecting lines due to lower source impedance.
3. Greater lengths of cable may be driven for a given high frequency roll-off.
4. Many pieces of equipment can be driven from one output without the use of distribution amplifiers and with no concern for matching or level changes.
5. Better reliability resulting from less heat generation due to less power drawn from the output stage.
6. Because of the AVA 22d's 200 ohm output impedance, the addition of a 600 ohm load termination drops the delivered voltage by about 2.5 dB.
7. Greater signal voltage swing as 6 dB of signal is not lost in the (600 ohm) source impedance.
8. Smaller currents reduce inductive coupling and crosstalk between cables.

### Frame-to-Millisecond Table

| AVA 22<br>Displayed<br>Frame Value | NTSC Delay<br>Time in<br>Milliseconds | PAL/SECAM<br>Delay Time in<br>Milliseconds |
|------------------------------------|---------------------------------------|--|
| 0.0                                | 0.00                                  | 0.00                                       |
| 0.5                                | 16.68                                 | 20.00                                      |
| 1.0                                | 33.37                                 | 40.00                                      |
| 1.5                                | 50.05                                 | 60.00                                      |
| 2.0                                | 66.73                                 | 80.00                                      |
| 2.5                                | 83.42                                 | 100.00                                     |
| 3.0                                | 100.10                                | 120.00                                     |
| 3.5                                | 116.78                                | 140.00                                     |
| 4.0                                | 133.47                                | 160.00                                     |
| 4.5                                | 150.15                                | 180.00                                     |
| 5.0                                | 166.83                                | 200.00                                     |
| 5.5                                | 183.52                                | 220.00                                     |
| 6.0                                | 200.20                                | 240.00                                     |
| 6.5                                | 216.88                                | 260.00                                     |
| 7.0                                | 233.57                                | 280.00                                     |
| 7.5                                | 250.25                                | 300.00                                     |
| 8.0                                | 266.93                                | 320.00                                     |
| 8.5                                | 283.62                                | 340.00                                     |
| 9                                  | 300.3                                 | 360.00                                     |
| 9.5                                | 316.98                                | 380.00                                     |

### Field/Frame Conversion Table

| FORMAT    | Number of Fields<br>per second | 1 Field Equals | Number of Frames<br>per second | 1 Frame Equals |
|-----------|--------------------------------|----------------|--------------------------------|----------------|
| NTSC      | 59.94                          | 16.68 msec     | 30                             | 33.33 msec     |
| PAL/SECAM | 50                             | 20 msec        | 25                             | 40 msec        |

**Note: There are 2 fields in a frame.  
The AVA 22d's maximum delay time is 380.00 msec.  
This provides up to 9.5 NTSC or PAL/SECAM Frames.**

## OPERATING INSTRUCTIONS

Once you've properly connected the AVA 22d to the system, turn on the power. When the AVA 22d is first powered, the revision level of the software is displayed.

### THE BASICS

The AVA 22d is a two Channel device. Each Channel has a current Delay value that is always active/heard. You can only edit the current Delay values. Additionally each Channel has two nonvolatile Memories, A and B. The current Delay values can be stored in one of these two Memories.

### SENSITIVITY SETUP

The first step is to apply signal and adjust the Sensitivity controls. If you know the nominal level, adjust the control indicator to that level. Otherwise, set the Sensitivity control so high signal peaks just illuminate the CLIP LED, then back off a little.

### ADJUSTING CURRENT DELAY VALUE

**One Channel at a time:** With the LINK LED *off*, press the up/down buttons for the Channel you want to adjust until the desired Delay value is reached. That's it!

**Both Channels simultaneously:** With the LINK LED *on*, changing either Delay value changes the other Channel's Delay value by the same relative amount. (The Delay values are linked.) BYPASS, RECALL and broadcast MODE are also linked together in LINK mode.

When entering LINK mode, Channel 2's current Bypass and Memory settings are stored and replaced with Channel 1's current Bypass and Memory settings. This may cause a Memory Recall to occur in Channel 2. This Recall may also include a change in broadcast Mode if the Recalled Memory's Mode is different. Channel 2's stored Delay value is not changed to match Channel 1's Delay value. (Channel 2's stored delays remain unchanged.) When leaving LINK mode, Channel 2's Bypass and Memory settings are restored to their *dual mono* settings. Again a Memory Recall may occur, thus restoring the stored Channel 2 value.

### STORING DELAYS

Press the STORE button. The STORE LED turns *off*. This Stores the current Delay values into each Channel's current Memory (A or B). The current Memory for each Channel is indicated by the lit MEMORY LED for that Channel. Both Channels' current Delay values and broadcast Modes are stored with each press of the STORE button.

### RECALLING DELAYS

Press the RECALL button. Each press of this button alternately Recalls stored Memories (A then B then A...) for the given Channel. Pressing RECALL while editing Delay values writes over the changes you've made if you have not stored them.

### REMOTE RECALLS

The rear REMOTE RECALL terminals are functionally equivalent to the front panel RECALL and BYPASS buttons while in LINK mode. When the switch closes, both Channels are Bypassed, or, for the other switch, both Memory B's are recalled. Both Channels are activated (or both Memory A's are recalled) by opening the switch. These terminals can not be locked out.

An internal jumper is provided to redefine the REMOTE RECALL function. (See W3 in the board layout diagram.) Moving this jumper from its default position redefines the Stereo Bypass Remote terminal as a Channel 2 Memory Recall terminal. The other terminal (defaulted as Stereo Memory Recall) becomes a Channel 1 Memory Recall terminal. This is convenient for mono video houses, allowing one equipment room to use Channel 1 and another room to use Channel 2 independently.

### INTERNAL BYPASS JUMPER SETTING

Internal jumpers enable or disable the BYPASS buttons while in Front Panel Lockout mode. The default setting of these jumpers disables the BYPASS buttons in Front Panel Lockout mode. (See W1 and W2 in the board layout diagram.)

### HOLE PLUGS

Once your system is properly configured, the Sensitivity knobs can be removed and the unit secured by replacing the knobs with the provided hole plugs.