

QUICK START

Quickly 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 AD 22. So please keep reading. These few points are summarized in this Cliff Note version of the manual.

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, press the CHAN button until the CHAN LEDs indicate the Channel you want to set. We cover the special case of adjusting *both* Channels simultaneously later (both CHAN LEDs *on*). Adjust the up/down buttons until the LED display shows the desired Delay. To adjust the Delay of the other Channel press the CHAN button until the other Channel's LED is lit, and adjust the Delay as before.

STORING DELAY. Press the STORE button (the STORE LED stops flashing). 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 MEMORY LED lit when editing that Channel. Both Channel's current Delay values are stored with each press of the STORE button.

RECALLING DELAY. To recall a stored Memory, press RECALL. Each press of this button alternately recalls stored Memories (A then B then A...) for the selected Channel only.

A quick way to recall Memories into both Channels simultaneously, is to store both Channel's values into the same Memory. With *both* Channels selected (both CHAN LEDs *on*), press RECALL to restore *both* Channel's Memories at the same time.

SETTING TEMPERATURE. The AD 22 is factory set for 22°C/71.6°F. To change this, press and hold DISPLAY MODE and press one of the up/down buttons. Use the 1ms/COARSE buttons for degrees Celsius or the 10μs/FINE buttons for degrees Fahrenheit. The LED display shows the temperature setting. Further pressing of the up/down buttons adjusts the temperature setting. This temperature is used, with constant 30% humidity, to calculate the speed of sound for converting delay times into distance.

NEVER CONNECT ANYTHING EXCEPT AN APPROVED RANE POWER SUPPLY TO THE RED THING THAT LOOKS LIKE A TELEPHONE JACK ON THE REAR OF THE UNIT. 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.

Note: It is normal to hear harmless short bursts of stored data playback when recalling a memory. Also, powering up the AD 22 without input signal eliminates chirping that may occur when scrolling delay values.

AD 22 CONNECTION

When connecting the AD 22 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 AD 22 passes audio while it is unpowered by virtue of its fail safe bypass relays (when the AD 22 functions as a wire). *Turn the system volume down before plugging in the AD 22's power.*

INPUTS AND OUTPUTS

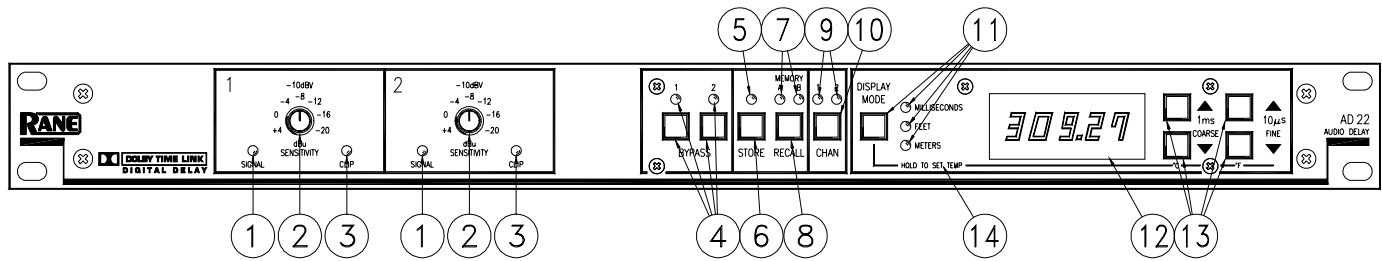
The AD 22's Inputs are electronically balanced. The screw terminals prefer #6 spade connectors. Stripped or tinned wire makes an unreliable union. Connect AD 22 shield

wires to the *signal ground* terminal, the *chassis ground* screw or *neither*. The AD 22's Outputs are balanced line drivers.

REMOTE RECALL TERMINALS

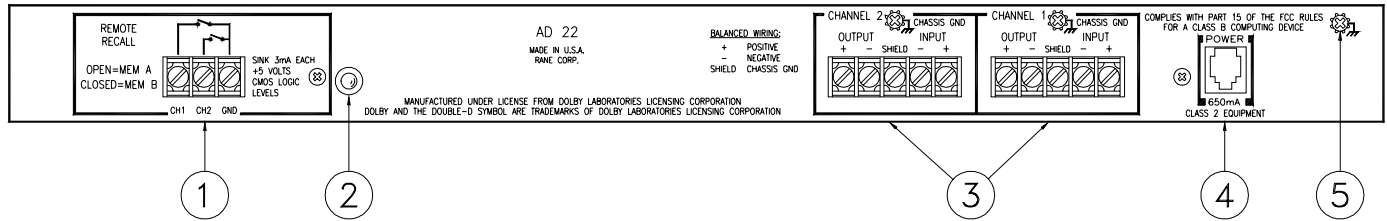
Each channel of the AD 22 has two nonvolatile Memories, "A" and "B". Connecting a switch between the GND and CH1 or CH2 terminals permits recalling the Memories remotely. Only a change in the switch position is sensed—when the switch closes, Memory B for the given Channel is recalled. When the switch opens, Memory A is recalled. Connecting the two Channel terminals (CH1 & CH2) together on one side of the same switch, permits stereo recall of Memories A and B.

FRONT PANEL DESCRIPTION



- ① **SIGNAL LEDs:** illuminate green 34 dB before clipping.
- ② **SENSITIVITY controls:** vary incoming signal levels to the A to D converter. The output signal is also adjusted so the AD 22B always passes signal with unity gain. (*See operating instructions.*)
- ③ **CLIP LEDs:** illuminate red 4 dB before clipping at the A to D converter input.
- ④ **BYPASS buttons & LEDs:** 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.
- ⑤ **STORE LED:** flashes green when the current configuration of the AD 22B is different from the stored configuration. The STORE LED is *off* when the current configuration matches the stored configuration.
- ⑥ **STORE button:** Stores the current Delay configuration into both Channel's current Memory (A or B). The current Memory for each Channel is indicated by the MEMORY LED which is lit when editing that Channel.
- ⑦ **MEMORY LEDs:** indicate the most recently recalled Memory, A or B, for each Channel by illuminating yellow. 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 the selected Channel is *different* than the *stored* value for the selected Channel.
- ⑧ **RECALL button:** Pressing this pushbutton alternately Recalls stored Memories A and B, for the Channel(s) indicated by the green CHAN LEDs.
- ⑨ **CHANNEL LEDs:** indicate the Channel number whose value is currently being displayed in the LED display and whose current Delay value is editable by illuminating green. If *both* CHAN LEDs are *on*, both Channel's current Delay values are editable. In this edit BOTH mode, the LED display shows the *smaller* of the two current Delay values and the memory LEDs turn *off* if the two Channel's current Memories are not the same.
- ⑩ **CHANNEL button:** Pressing this button advances the Channel LEDs from CHAN 1 to CHAN 2 to BOTH. The current Delay value of the selected Channel is displayed in the LED display. (This button does nothing in Mono Mode.)
- ⑪ **DISPLAY MODE button & LEDs:** This button changes the units of displayed Delay values from Milliseconds to Feet to Meters. The LEDs indicate the current Display Mode: MILLISECONDS, FEET or METERS.
- ⑫ **5 digit LED display:** indicates the current Delay value for the selected Channel. When both Channels are selected, the *smaller* of the two Channel's current Delay values is displayed. This display also shows the current temperature setting when holding down the DISPLAY MODE button and pressing one of the up/down buttons. On power-up the current software revision level and internal Stereo/Mono (2CHAN/1CHAN) configuration are displayed.
- ⑬ **UP/DOWN buttons:** Pressing these buttons increases/decreases the amount of Delay in the selected Channel(s). The two buttons just to the right of the LED display change Delay *time* in 1 millisecond steps. The far right buttons provide 10 microsecond steps. For distance displays (feet and meters), these buttons are FINE and COARSE adjustments, since Delay increments are always in 1 msec and 10 μ sec steps, regardless of the DISPLAY MODE.
- ⑭ **TEMPERATURE setting:** Holding down DISPLAY MODE while pressing the up/down buttons displays the current temperature setting in degrees Celsius for the 1 msec/COARSE buttons and degrees Fahrenheit for the 10 μ sec/FINE buttons. Further up/down presses change the temperature setting. No matter which unit ($^{\circ}$ C or $^{\circ}$ F), adjustments are always in 1° C steps (or 1.8° F).

REAR PANEL DESCRIPTION



- ① **REMOTE RECALL terminals.** Wiring external configuration switches to these terminals allows remote recall of the two nonvolatile memories for each Channel. When the switch closes, Memory B for the given Channel is recalled. When the switch opens, Memory A is recalled. These terminals use CMOS (+5 volt) logic levels and sink only 3mA (max.) each.
- ② **Recessed lockout switch.** Enables the Front Panel Lockout mode. In this mode all front panel controls, with the exception of the CHAN and DISPLAY MODE buttons, are disabled. The Channel button remains active so the user may view the current Delay values without risk of changing them, and the display mode button allows display of Delay values in milliseconds, feet or meters. Press RECALL while in LOCKOUT to temporarily display, but not Recall, the value of the other stored Memory for the indicated Channel. (See *OPERATING INSTRUCTIONS for optional Bypass lockout mode, and MEMORY BUTTONS* on previous page.)
- ③ **INPUT/OUTPUT terminals.** Nothing new here, the AD 22 uses balanced terminal strip ins and outs. If you desire unbalanced characteristics (like hum), you can wire the AD 22 in an unbalanced configuration (see *SYSTEM CONNECTION* on the next page).
- ④ **POWER input connector.** No this is not where Commissioner Gordon plugs in his Bat-phone, in fact *it is not a telephone jack* at all. The AD 22 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 AD 22 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 AD 22 does not get chassis ground through the AC cord, this point is provided in case your system does not have another earth ground such as the rack rails. See the CHASSIS GROUNDING note below for details.

NOTES

FCC & VDE NOTICE

This equipment has been tested and found to comply with the limits for a Class A 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 commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio and other communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

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. Units with outboard power supplies like the AD 22 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.

OPERATING INSTRUCTIONS

Once you have properly connected the AD 22 to the system, turn on the power. When the AD 22 is first powered it displays the words “*RANE*” and “*Ad 22*”. During this time the unit is performing initialization and diagnostics routines. After initialization, two messages are briefly displayed. The first is the revision level of the software installed in the unit. The second message reports the internal Stereo/Mono configuration, “*2CHAN*” for Stereo, and “*1CHAN*” for Mono.

The first time you power the AD 22 it is in BYPASS, and functions like an expensive wire. This is useful for initial trouble shooting and allows for convenient verification of signal flow.

THE BASICS

The AD 22 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 so its indicator points to that level. Otherwise, set the SENSITIVITY control so high signal peaks just illuminate the CLIP indicator, then back it off just a little.

ADJUSTING CURRENT DELAY VALUE:

One Channel at a time: Press the CHAN button to select the desired Channel. The LED display shows the current Delay value of the selected Channel. Press the up/down buttons until the desired Delay value is reached. That’s it! Press the CHAN button until the other CHAN LED is lit and edit its current Delay value.

Both Channels simultaneously: If you’ve selected both Channels (both CHAN LEDs ON), the LED display shows the *smaller* of the two Channels current Delay values. Changing this value changes the other Channel’s value by the same relative amount. Check the other Channel’s current Delay value by selecting it with the CHAN button. There are two things to be careful of at this point: The first is to pay close attention to the CHAN LEDs that indicate the Channel you are viewing, it cycles from CHAN 1 to CHAN 2 to *both* and back again. (*both* always displays the *lower* of the two Channels current Delay values.) The second gotcha at this point is pressing the RECALL button. *This writes over the changes you’ve made if you have not stored them.*

STORING DELAYS

Press the STORE button. The STORE LED stops flashing. 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 MEMORY LED which is lit when editing that Channel. *Both Channel’s current Delay values 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 selected Channel *only*.

Tip: To recall Memories into both Channels simultaneously, store *both* Channel’s values into the *same* Memory—A or B. With *both* Channels selected (both CHAN LEDs *on*), pressing RECALL causes *both* Channels to Recall the same Memory.

REMOTE RECALLS

The rear REMOTE RECALL terminals are functionally equivalent to the front panel RECALL button. When the switch closes, Memory B is recalled. Memory A is recalled by opening the switch. These terminals *can not* be locked out. Only one switch at a time is read by the microcontroller. Thus, when both Channel’s terminals are wired with a single switch for Stereo operation, the switch/Channel that is read last is displayed.

Tip: *Note the weather forecast for your event’s time of day. Set up Memory A’s Delay value for your stack’s distance at one temperature, and Memory B’s value for a different temperature. Then during the warmer part of the day, recall Memories to suit the climate.*

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 Detail C on enclosed drawing 522-131.)

CONFIGURING FOR MONO OPERATION

Internal jumpers allow the AD 22 to be configured as a Mono device with twice the normal Delay, 655.34 milliseconds. Three internal jumpers must be moved to enable Mono mode. (See Detail D on enclosed drawing 522-131.) Do not use Channel 2’s I/O terminal connectors in Mono mode. Only the CHANNEL 1 Inputs and Outputs are active. The CHAN button is disabled, since there is no need to change Channels. Channel 2 is placed in Bypass and its BYPASS button is disabled.

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. The third hole plug is for use with the rear-mounted LOCKOUT switch.