



ENGINEERING DATA EVR 4X4 FOUR-CHANNEL RECEIVER

DESCRIPTION

The EVR 4X4 receiver is the heart of a complete 4-channel system. Combined in one handsome unit are an AM tuner, stereo FM tuner, complete control facilities, and four power amplifiers. Also included is the new Electro-Voice universal matrix decoder (U.S. Patent No. 3,632,886) which provides correct decoding of all encoded 4-channel material and substantially improves the subjective effect of 2-channel program material.

Both 2-channel and 4-channel tape machines may be used with the EVR 4X4. Tape output jacks are provided to record from 2-channel sources such as phono or FM stereo tuner.

Controls are provided to compensate for any listening situation. A master volume control adjusts all four channels simultaneously, while separate balance controls permit adjustment of the left-right and front-back balance independently. Bass and treble controls provide independent adjustment of front- and back-channel frequency response to compensate for differences in program material, room acoustics, or speaker performance.

SPECIFICATIONS

AMPLIFIER SECTION

OUTPUT POWER (8Ω),

IHF Total: 70 watts
 RMS Total, all channels driven: 40 watts

THD: Less than 1.0% at full output (1 kHz)

Power Bandwidth: 20 - 20,000 Hz

Frequency Response: 20 - 20,000 Hz ±1 dB

INPUT SENSITIVITY,

Magnetic Phono: 1.5 mV
 Auxiliary/Tape: 110 mV
 Tape Monitor: 110 mV

HUM AND NOISE,

Phono: Better than -54 dB
 Auxiliary/Tape: -70 dB

TONE CONTROL,

Bass: ±10 dB @ 100 Hz
 Treble: ±10 dB @ 10,000 Hz
 Loudness: +8 dB @ 100 Hz

TUNER SECTION

AM SECTION,

Tuning Range: 535 - 1605 kHz
 Sensitivity: 150 uV/Meter
 Image Rejection: 45 dB @ 600 kHz,
 38 dB @ 1400 kHz
 IF Rejection: 40 dB

FM SECTION,

Tuning Range: 88 - 108 MHz
 Sensitivity: 2.5 uV IHF
 Signal-to-Noise Ratio: 65 dB
 Capture Ratio: 3 dB
 THD: Less than 0.5% (at 1 kHz, 100% mod.)
 Spurious Response Rejection: 70 dB

MULTIPLEX SECTION

Stereo Separation: 30 dB (at 1 kHz, 100% mod.)
 19 & 38 kHz Rejection: 30 dB
 67 kHz Rejection: 50 dB

GENERAL

Power Consumption: 120V AC 50-60 Hz, 80 watts max.
 Dimensions: 4¾" h., 16-3/8" w., 11½" d.
 AM antenna - 2½" at rear when extended.

CONTROL FUNCTIONS

ROTARY CONTROLS

SELECTOR SWITCH

Selects desired input signal in conjunction with the Tape

Monitor switch. The program source selected by the Selector switch also is fed to the Tape Out jacks on the rear panel. The Selector switch inputs are all 2-channel. The AM tuner output is connected to both channels.

VOLUME/POWER OFF

The AC power switch operates at the full counterclockwise position of the Volume Control. It turns on the receiver as well as any equipment connected to the switched AC outlet on the rear panel. The power switch should be *off* whenever any wiring changes are made in the system.

Volume of all four channels is changed simultaneously when the Volume Control is rotated. When listening to a 2-channel source without decoding, sound will come from only the two front speakers.

BASS AND TREBLE CONTROLS

Provide adjustment of low-frequency and high-frequency response, respectively. The front part of each knob (with the bar) adjusts response of the two front channels simultaneously. The back part of each knob (aluminum) adjusts the response of the back channels. Normal or flat response is obtained with all controls in the center of their range, the "12 o'clock" position.

BALANCE CONTROLS

The front section of the Balance Control (with the bar) controls the front-to-back balance in the room. As the control is turned counterclockwise, the two back speakers are turned down and the balance point moves forward in the room. As the knob is turned clockwise, the two front speakers are turned down and the back speakers become subjectively louder.

Acoustic balance in the room from left to right is controlled by the rear section of the Balance Control (aluminum). As the control is turned counterclockwise, the two speakers on the left side of the room become relatively louder. Conversely, turning the knob clockwise makes the right side of the 4-channel system louder.

With both sections of the balance control at the normal or "12 o'clock" position, all four amplifier channels are running at equal gain. Adjustment of the Balance Control sections permits compensation for listening position in the room, variations in equipment, or variations in the program material itself.

PUSHBUTTONS

DECODE SWITCH

When the Decode switch is *out*, the EVR 4X4 is functioning as four separate amplifiers. A discrete 4-channel tape should be played with the Decode switch *out*. If a 2-channel program is played with the Decode switch *out*, the full stereo program will come through the two front speakers only.

When the Decode switch is pushed *in*, 2-channel inputs are directed to the patented STEREO-4 Integrated Circuit Decoder. If the program source is encoded 4-channel information, the decoder will reconstruct the four channels and send them along to the amplifiers and speakers. If the program source is *not* encoded but *is* stereo, the decoder will extract certain information from the stereo signal and

direct it to the rear speakers. Unlike the results with encoded 4-channel material, the placement of stereo information is variable, depending upon the original recording and mix-down. The effect ranges from subtle to startling, with some stereo records decoding as well as encoded records.

The decoder will also operate with a tape input. If, for example, a Q-8 4-channel tape player is connected to the EVR 4X4, the decoder can be used when 2-channel tapes are played.

TAPE MONITOR

When the Tape Monitor switch is *out*, the program heard is determined by the Selector switch at the left of the front panel. When the Tape Monitor switch is pushed *in*, equipment connected to the Tape In jacks on the back panel becomes the program source. There are four tape input jacks, permitting use of either 2-channel or 4-channel tape equipment.

MONO SWITCH

Leave *out* for normal operation in all functions. When this button is pushed *in*, any of the 2-channel program sources at the Selector switch are combined, causing the signals at the Tape Out jacks to be mono also. The Mono switch has no effect on tape input signals.

If the Mono button is pushed while decoding a 2-channel source, the sound level of the back speakers will drop substantially.

LOUDNESS SWITCH

To obtain normal or "flat" response at normal listening volume, this button should be *out*. However, at reduced volume settings, the ear is less sensitive to low-frequency sounds. Pushing this button *in* will provide a compensating boost in all four channels without disturbing the regular tone control settings.

REMOTE SPEAKERS

When this switch is *out*, speakers connected to the Main Speaker terminals will operate. When the Remote Speaker switch is pushed *in*, the main speakers are disconnected and the remote speakers then play.

HEADPHONE JACKS

Standard headphone jacks for both front and back channels are provided on the EVR 4X4. Two-channel headphones may be plugged into either jack, although normally the front jack would be used. Normal stereo will be heard with the Decode switch *out*. When a plug is inserted in the front headphone jack, front speakers are turned off. A plug inserted in the back phone jack will turn off the back speakers also.

TUNER CONTROLS

TUNING KNOB

Tunes both AM and FM stations with the selected frequency indicated by the dial pointer. Observe the Tuning Meter to the left of the knob for best tuning.

TUNING METER

Best FM tuning is with the needle centered between the arrows on the face of the meter. When the AM tuner is selected, the meter needle will deflect from the center to the right side of the scale. How far it deflects indicates the

relative strength of the station. AM tuning should be adjusted for maximum meter deflection to the right.

STEREO INDICATOR

The Stereo light at the left end of the tuning dial indicates when an FM station is broadcasting stereo multiplex. Encoded 4-channel material may also be received when the Stereo light is on.

FM MUTE SWITCH

The EVR 4X4 includes special circuitry to eliminate noise when tuning between FM stations. However, there may be occasion to listen to very weak stations which are also suppressed by the mute circuitry. At the top of the receiver back panel is a slide switch which defeats the muting function, allowing noise and weak stations to be heard. Under most circumstances the Mute switch should be left in the Normal position so that the speakers are quiet between stations.

SPEAKER CONNECTIONS

Four speaker terminal strips are provided; two for the four main speakers, and two strips for a set of four remote speakers.

In a 4-channel system, the speakers are normally arranged in a square or rectangle, with two speakers in front of the normal listening position (as in the case of a stereo system) and two speakers roughly behind or to the sides of the main listening area. Just as the fenders of a car are identified from the driver's seat, the speaker locations are named while facing the "front" of the 4-channel system. Thus the left back speaker will be on your left side and behind you. It may help to place the speakers in the room approximately where they will be used, attach the speaker wires to the speakers, and identify the other end of each speaker wire ("left back") by writing on a piece of masking tape attached to the wires. If remote speakers are also used, each cable should be further identified as "main" or "remote."

In addition to identifying the location of each speaker, it is important that the speakers be connected "in phase." Virtually every speaker has the positive terminal indicated in some way. Normal markings include a plus sign, T1, or red marking. The speaker common terminal (marked "C," minus, T2, or black) should be connected to the common terminals on the receiver terminal strips.

No. 18 stranded zip cord (SPT-1) is recommended for speaker wiring. Normally one of the two conductors will be coded in some way to simplify the proper phase connection. Such cable usually has a rib molded on the outside of one conductor, colored thread inside with the wire strands, or wire strands of two different colors. Once one of these indicators is selected to be connected to the "positive" terminal of the speaker, its use should be continued throughout the whole system.

Take care to keep the speaker wires from touching each other either at the amplifier or speaker terminals. Although no harm will be done to the amplifier, a short circuit in the amplifier output will require the unnecessary and bothersome replacing of fuses.

Make certain that each speaker has an impedance of 4 ohms or greater. If two speakers are ever connected to an

amplifier channel at the same time, each speaker must have an impedance rating of 8 ohms or greater to avoid blowing fuses.

PHONO CONNECTIONS

The phono input on the EVR 4X4 is designed for use with a magnetic cartridge. Audio cables from the record changer or turntable should be connected to the Phono inputs on the receiver, observing the left and right channel markings.

Normally a separate ground wire is required between an amplifier and a record player to reduce hum and comes supplied with the record player. This wire should be connected to the System Ground terminal near the bottom of the rear panel.

TAPE CONNECTIONS

FOUR-CHANNEL TAPE

A 4-channel discrete open reel or cartridge machine may be connected to play through all four amplifier channels without decoding. Connect the four output jacks of the tape machine to the Tape In jacks of the EVR 4X4, observing the channel markings on both the tape machine and the receiver. When the 4 channel tape machine is properly connected, it will be possible to play 2-channel tapes as regular stereo or decode them. If the 4-channel tape machine is a recorder, the 2-channel Tape Out jacks on the EVR 4X4 should be connected to the front line inputs on the recorder. This will permit 2-channel recording from sources selected by the receiver's Selector switch.

TWO-CHANNEL TAPE

If a 4-channel tape machine is not used in the system, a 2-channel tape machine should be connected to the Front Tape In jacks on the receiver. The receiver's Tape Out jacks should be connected to the line inputs on the 2-channel recorder. This will permit monitoring off the tape with a recorder which provides separate record and playback electronics.

A 2-channel tape machine may also be connected to the auxiliary inputs on the EVR 4X4. In this case, tape playback is selected by switching to Auxiliary input, rather than using the Tape Monitor switch. This arrangement does not permit monitoring off the tape with a machine so equipped, but does not affect the operation of a "2-head" machine in any way. The recorder line inputs should be connected to the receiver's Tape Out jacks.

AC OUTLET

For convenience, an AC outlet is provided on the rear panel. Auxiliary equipment may be connected to this outlet as long as its power consumption does not exceed 150 watts. The outlet is controlled by the receiver's on/off switch. Normally a mechanical device, such as a record player or tape machine, should be connected to an "unswitched" outlet so that it cannot be turned off at the receiver with its mechanism engaged.

ANTENNAS

An FM antenna employing 300-ohm twin lead should be connected to the two screws on the antenna terminal strip marked "300 ohms." If 75-ohm coax cable is used, the center conductor of the cable should go to the second

screw from the left, and the shield braid should go to the "ground" screw next to it.

In areas where FM stations are located within 20 to 25 miles, an FM dipole antenna made of ordinary TV twin lead will usually provide satisfactory reception. Since it is flexible, it may be concealed easily in or behind cabinets, along the back of shelving, etc. If FM reception is weak or noisy, this indicates that a better FM antenna is required. Because stereo FM requires considerably more signal strength than mono, the best possible antenna system should be used to gain the full performance of your system.

A ferrite rod antenna for AM reception is mounted on the rear panel of the receiver. In use it should be swiveled away from the unit. Because this type of antenna is fairly directional, a reorientation of the receiver may be necessary to receive weak stations. A "long wire" antenna (10-feet or more of insulated wire) may be connected to the "AM" screw on the antenna terminal strip to improve the reception of weak AM stations.

TYPICAL OPERATION

TWO CHANNEL PROGRAM

Two-channel program sources are those normally found on the Selector switch inputs: a stereo phonograph cartridge, the stereo FM tuner, or a stereo tape machine connected to the auxiliary inputs.

Regular stereo program material benefits from the operation of the universal decoder. Although the subjective effect is not predictable, the distribution of music to all four speakers can produce sonic effects which range from pleasant improvement to astonishing spacial realism. Feel free to experiment with balance- and tone-control settings to find the most desirable effects.

If a 2-channel tape machine is plugged into the front tape input jacks, or if a 2-channel tape is being played on a 4-channel machine, the decoder may still be employed, because it comes after the Tape Monitor switch in the amplifier circuits. The operational comments above would apply to the Tape Monitor input as well.

ENCODED FOUR-CHANNEL PROGRAM

In addition to regular stereo programming, the Selector switch inputs may be used for the playback of encoded 4-channel material. For example, no special phonograph cartridge is required to play matrix encoded records, and the record itself is mechanically identical to a regular stereo record. Similarly, the operation of the stereo FM tuner in the receiver is exactly the same when receiving an encoded four-channel broadcast. All of these inputs are handled as normal stereo signals until they reach the universal decoder farther on in the receiver's circuitry.

An encoded program, whether on record, stereo FM, or tape, can be played as ordinary stereo through the two front speakers when the Decode switch is *out*. Pushing in the Decode switch places the patented Electro-Voice Universal Decoder in the circuit, and the encoded material is then "sorted out" into four channels. The electronic parameters of the integrated-circuit Decoder have been

selected to provide proper four-quadrant localization of all encoded material.

DISCRETE FOUR-CHANNEL PROGRAM

The four Tape jacks provide for connection of a discrete 4-channel program source. When the decode switch is *out*, the four channels will play directly through the four amplifiers. If the decode switch is pushed *in*, whatever information is on the two front channels from the discrete source will be decoded and sent on to the four amplifiers.

CAUTION NOTES

If connections have been made correctly, your receiver should now be reproducing sound with the utmost fidelity—and will continue to do so for years to come. Inherently stable design combines with completely reliable fusing to provide the most rugged and foolproof equipment available.

A 1½-amp standard 3AG fuse in each channel protects the speakers and output transistor stages from continued overload. This fuse provides maximum protection with a safety margin for any program material played through the speakers with 4 ohm or greater impedance. If additional speakers are desired, make certain that the combined impedance of all speakers connected to a channel is not less than 4 ohms. Effective load impedance lower than 4 ohms will cause excessive current flow and continual blowing of fuses. Do not use "slow-blow" fuses.

The AC primary circuit is protected by a fuse which should never blow unless component failure has occurred and the receiver requires servicing.

METHOD OF INSTALLATION

This receiver has been tested for proper operation at full power for extended periods. However, the heat generated at high power levels sets certain requirements for installation. Normal circulation of room temperature air is sufficient for proper cooling. The receiver should not be enclosed in a restricted space or adjacent to heat-generating devices. Damage caused by excessive heat is not covered by the warranty.

WARRANTY

Electro-Voice high fidelity electronics are guaranteed for three years from date of purchase against failures due to defects in workmanship and materials. If such failure occurs, unit will be repaired or replaced (at our option) if delivered to Electro-Voice or its service agency. There will be no charge for parts or return freight during the entire length of the warranty period; no charge for labor will be made during the first year of the warranty period. Warranty does not cover finishes or failures due to abuse or operation at other than specified conditions. Repair by other than Electro-Voice or its authorized service agencies will void this guarantee.

SHIPPING DAMAGE

Electro-Voice high fidelity electronics are packed to provide maximum protection—well in excess of the shipping requirements of the Interstate Commerce Commission. If shipping damage does occur, contact the carrier immediately, requesting inspection and instructions, or contact the dealer from whom the unit was purchased.