A Dolby 2/4-Channel Receiver from Marantz

The Equipment: Marantz Model 4240, an AM/FM receiver with four-channel amplification (switchable for higher power in stereo), built-in stereo Dolby circuitry, and variable matrix decoding, in vinyl-clad (simulated wood) metal case. Dimensions: 17⅞ by 5⅜ inches (front panel); 14⅜ inches deep plus front-panel controls and back-panel connections and AM antenna. Price: $599.95; optional WC-22 wood case, $29.95; optional Model SQA-1 plug-in SQ decoder, $49.95; optional Model RC-4 remote-control unit, $39.95. Warranty: three years parts and labor, shipping paid one way. Manufacturer: Marantz Co., Inc., P.O. Box 99, Sun Valley, Calif. 91352.

Comment: Though this is a quadriphonic receiver, its most striking single feature is its built-in Dolby circuitry—by a wide margin the most versatile we have yet examined in a receiver of any description (with the exceptions of Marantz's own companion models, the 4300, 4270, and 4230). In other ways, as well, the 4240 is both individual and provocative. It gives ample evidence that somebody chez Marantz has given a lot of thought to the direction that high fidelity is taking and has drawn a number of arresting and perhaps even controversial conclusions.

To explain what we mean, we must first describe the unit. The tuning dial has a series of lighting indicators (stereo, AM, FM, phono, 4-channel, CD-4, tape 1, tape 2, Dolby) over it and is flanked by the usual two meters (signal strength for AM and FM, channel center for FM) and Marantz's horizontal tuning "flywheel." Below the meters is a series of buttons and knobs controlling Dolby functions. (We'll come back to them.) Below the flywheel is a similar series for high filter, loudness, FM muting, main speakers, remote speakers, and AC power. Between these two sets of buttons are three balance sliders: front left-to-right, front-to-back, and back left-to-right.

Below the dial portion of the front panel is a series of controls that begins (on the left) with buttons for tape/source and tape monitor 1/2. Next comes the Dolby control knob: Dolby FM, play, off, record mode 1, record mode 2. The selector has positions for AM, FM, phono, CD-4/aux, tape 1, and tape 2. The mode knob can be switched to mono, stereo, discrete, "vari-matrix," and SQ. The SQ decoder circuit board is not supplied with the receiver. The present optional model, the SQA-1 at $49.95, slips into the bottom of the receiver; without the decoder board the receiver produces no output in the SQ setting.

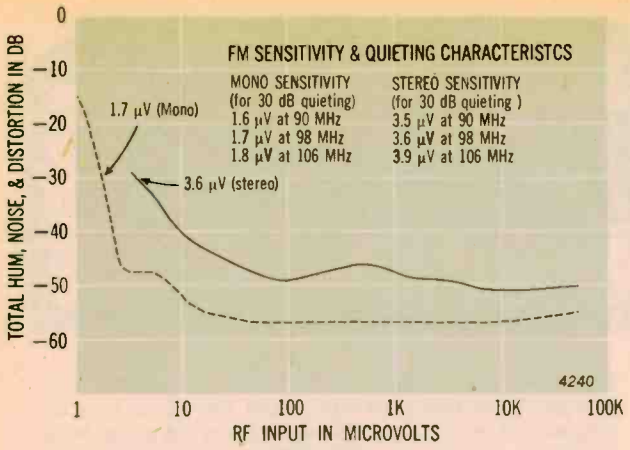
The vari-matrix can be used to produce a quadriphonic effect from any stereo or matrixed-quad program source. A "dimension" knob to the right of the mode switch varies the back-channel outputs. (The LF output reproduces the L signal, and the RF output the R signal, no matter what.) The dimension knob's center position duplicates the regular stereo mode position in that the two input signals are fed equally to front and back speakers on each side. Clockwise rotation progressively introduces, out of phase, the signal from the opposite side; at maximum rotation the LB speaker reproduces L-minus-R and the RB speaker reproduces R-minus-L (an out-of-phase differential hookup). This increases apparent back separation but emphasizes any high-frequency noise. Counterclockwise rotation progressively *adds* the opposite channel until both LB and RB reproduce L-plus-R. This produces a mellower sound at the back but reduces left-right separation there to nil.

The remaining three knobs are for bass and treble (each with friction-ganged front and back knob elements) and volume. At the extreme right are a pair (front and back) of stereo headphone jacks, which are live for all speaker selector settings.

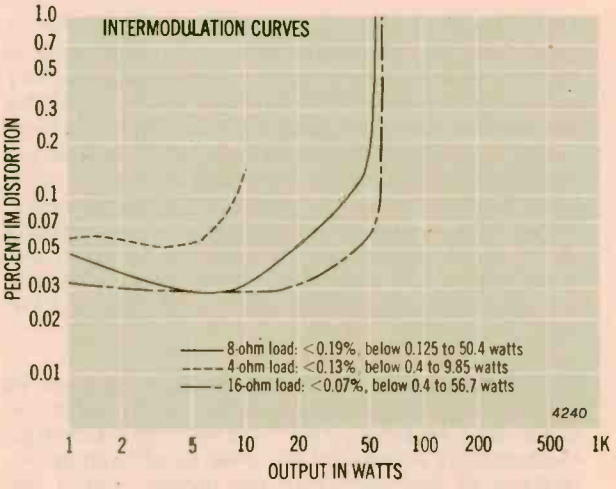
The back-panel pin-jack inputs and outputs all are quadriphonic sets except for the stereo phono input. There is provision for one aux input, which doubles for CD-4 (requiring an outboard demodulator) and whose selector setting lights the CD-4 indicator. In addition there are sets for input and output for both tape 1 and tape 2. There also is a single pin jack for the (unequalized) output from the FM detector, to be used for an adapter should a discrete-quadriphonic broadcast method be approved. The power output connections, for two quadriphonic sets of speakers, are color-coded spring clips that accept bared wires. Knurled binding posts that work best with small spade lugs are used for antenna connections: 300- or 75-ohm FM lead-in plus long-wire AM as a supplement to the familiar ferrite rod attached to the back panel.

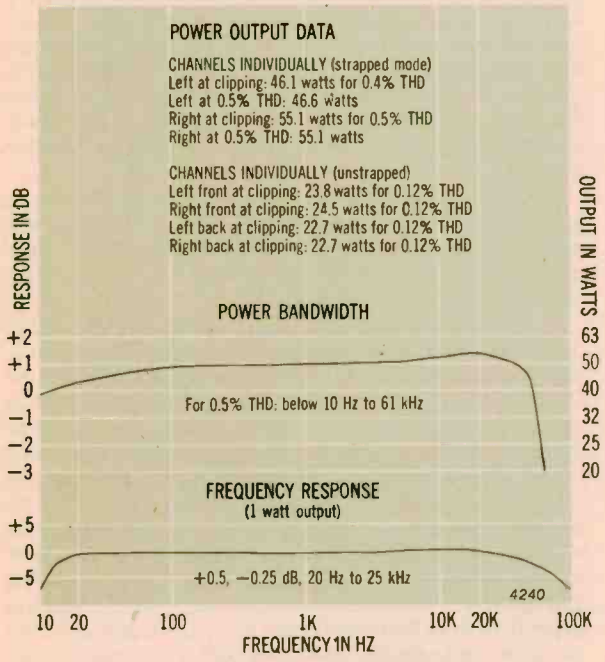
In addition to two AC convenience outlets, one of which is controlled by the front-panel AC switch, there are a number of other features on the back panel. A binding post near the phono connections grounds ancillary equipment. A multipin jack accepts an accessory remote-control unit (volume, balance, and loudness); a nearby switch selects either remote or local (the corresponding front-panel controls) operation. Another switch chooses either quad amplification ("17W x 4") or stereo ("40W x 2"). Still another changes FM de-emphasis from the (U.S.) standard of 75 microseconds to the 25-microsecond equalization that has been proposed for use with Dolby-encoded broadcasts. (See "News & Views," HF, February 1973.) Next to this switch are a pair of screwdriver controls adjusted at the factory for correct Dolby tracking of encoded broadcasts.

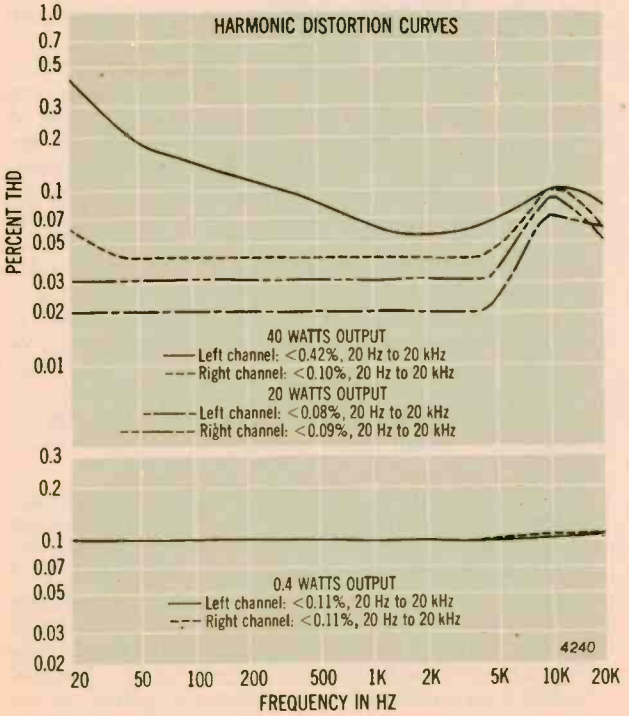
And that brings us back to the subject of Marantz's unique Dolby controls. Below the front-panel meters are what appear to be six buttons. When the main Dolby selector below them is switched to any position but "off," the signal-strength meter is converted to read audio levels and can be used for Dolby calibration. (In listening to or recording from FM the channel-center meter continues to function as a check on correct tuning.) The left-hand button switches the signal meter to read either the



Square-wave response







Marantz 4240 Receiver Additional Data

Tuner Section

Capture ratio		1.3 dB	
Alternate-channel selectivity		60 dB	
S/N ratio		65 dB	
THD	Mono	L ch	R ch
80 Hz	0.13%	0.41%	0.45%
1 kHz	0.16%	0.36%	0.38%
10 kHz	0.46%	0.85%	0.75%
IM distortion		0.20%	
19-kHz pilot		−59 dB	
38-kHz subcarrier		−68 dB	
Frequency response			
mono	+2, −1.5 dB, 20 Hz to 15 kHz		
L ch	+3, −0 dB, 20 Hz to 15 kHz		
R ch	+2.75, −0.25 dB, 20 Hz to 15 kHz		
Channel separation	>40 dB, 85 Hz to 1.2 kHz		
	>30 dB, 37 Hz to 12.5 kHz		

Amplifier Section

Damping factor	36	
Input characteristics (for 40 watts output)	Sensitivity	S/N ratio
phono	1.65 mV	70 dB
aux (CD-4)	110 mV	81 dB
tape 1 & 2	110 mV	81.5 dB

RIAA equalization accuracy +0.25, −0.5 dB, 20 Hz to 20 kHz

left channel or the right; the right-hand button switches a 400-Hz reference-tone oscillator in and out. The remaining four "buttons" in the group actually are small knobs for left- and right-channel calibration in recording and playback.

It should be fairly obvious from the description so far that the Dolby circuitry is *stereo*: It affects the front channels only in discrete-quadriphonic operation. Of course it can be used for undecoded matrixed quad as well; and it remains to be seen how, if at all, Dolby noise reduction will work with whatever quadriphonic FM broadcasting system may be adopted.

The functions that can be performed with this combination of Dolby controls are so varied we can only give them a brief once-over. You can listen to Dolby-encoded broadcasts with correct Dolby "equalization" whether or not you're also recording them, whether or not you are retaining the Dolby encoding on the tapes, and whether or not you are monitoring the playback from a monitor-head recorder. If your tape equipment doesn't already have Dolby circuitry, you can make or play encoded tapes via the receiver. You can copy Dolby-encoded tapes, with or without the encoding, and monitor the results through the decoder.

With the 4240 alone you can set up any recorder to give you Dolby noise reduction, but not necessarily keyed to standard Dolby levels and therefore not necessarily interchangeable with other Dolby recorders. For such purposes—which would include the playing of commercial Dolby-encoded tapes—you need a Dolby calibration tape. (Marantz offers them in any of the three tape formats at $4.95.) And of course if you want to make Dolby cassettes from Dolby open reels you may find it necessary to use a nonstandard Dolby level (or use another Dolby unit for the more common decode/re-encode copying technique) to prevent overload of the cassette, whose headroom above standard Dolby reference level is far less than that on open-reel tapes.

The accompanying graphs and data show the 4240 to be fairly representative of a good receiver these days. In both the four-channel and the stereo mode, the amplifier meets its published specs handily. Distortion is low in the operating range and unusually low as output approaches rated power, though the curves do rise (presumably due to noise, rather than pure distortion) at extremely low outputs. These figures were measured in the two-channel ("strapped") mode, where distortion is somewhat higher than in four-channel operation in most designs. Strapping also can inhibit performance into 4-ohm speakers, and some manufacturers recommend that this combination be avoided; a glance at the IM curves will suggest that it should be avoided here.

In receiving mono signals, the receiver's quieting curve descends beyond the 50-dB mark for all inputs above 7.5 microvolts—which represents very fine performance. Stereo quieting comes close to the 50-dB mark from about 50 microvolts up, though it does not actually pass it until input signals are up in the millivolt range. While we might wish for better, relatively few receivers actually deliver it. And minimum (30-dB) stereo performance is unusually good at 3.6 microvolts.

What is most fascinating about the 4240—and the similarly designed models in the Marantz line—is the design concept itself. Marantz appears to have conceived its models as hedges against rapidly changing audio technology. Dolby B noise reduction has established itself in tape recording and has been adopted by a number of FM stations, raising a question about whether broadcast technology should be changed to optimize for Dolby. Hence Marantz gives you built-in Dolby that can be used with either the present or the proposed FM technology and that can be used with tape as well. Though quadriphonics appears to be the wave of the future, high fidelity today *is* stereo; and doubt remains about the most acceptable routes to quadriphonics. Marantz gives you a stereo receiver that also is a basic quadriphonic receiver and is pre-engineered to be adapted for any of the accepted quadriphonic routes you would like it to follow.

It doesn't actually *give* you SQ or CD-4, but it can quickly be converted for the first and is set up to accept the second. You say you would have to give up the only aux input if you add a CD-4 demodulator? Some demodulators have their own aux inputs that can be selected from the outboard unit. Marantz apparently expects that, if you need aux as well as CD-4, you will choose this sort of demodulator or use one of the tape inputs as an aux. (The separate selector—as opposed to monitor—switching is a help in this respect.)

The priorities that the design seems to assume are 1) good stereo performance including the latest (Dolby) in FM reception, 2) unusual flexibility for the recordist, and 3) quadriphonic reproduction (real or simulated from stereo sources) that can be adapted as time brings new refinements. The plug-in SQ decoder, for example, could be replaced by one of the ultra-logic designs now in the prototype stage if and when Marantz believes that both the design and the demand are sufficiently well established.

You may not altogether agree with the priorities that the 4240 seems to presuppose, but we think you must agree that Marantz has done an ingenious job of designing for them.