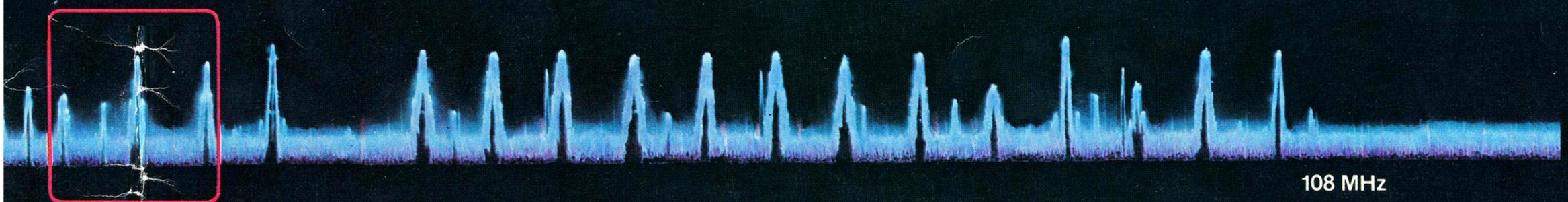
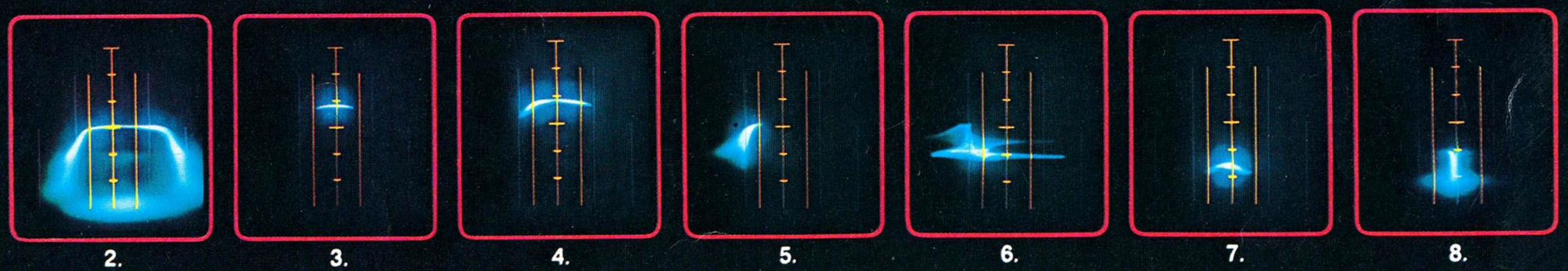
To appreciate the SEQUERRA forget everything you know or assume about tuners.



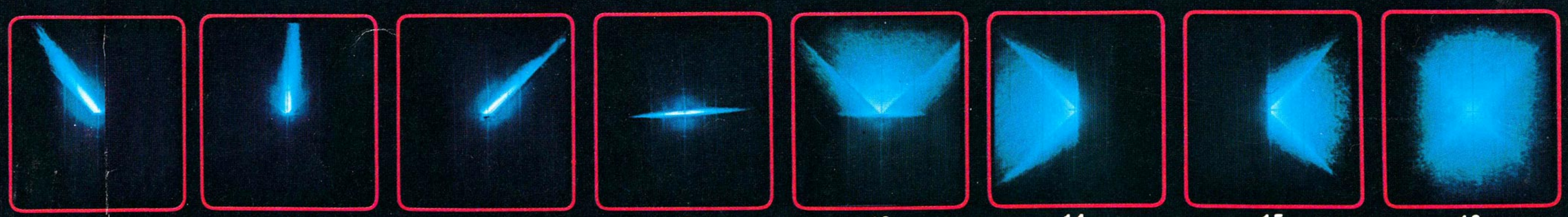
108 MHz

PANORAMIC SPECTRUM ANALYSIS

. A horizontal 2 MHz-wide panoramic display of all signals (shown as "bips"), including FM stations located 1 MHz above and below center-tuned station.



2. 3. 4. 5. 6. 7. 8.



9. 10. 11. 12. 13. 14. 15. 16.

When you understand the SEQUERRA you will appreciate why "the ultimate tuner" doesn't quite describe it.

Anyone seriously interested in the Sequerra broadcast monitor/FM tuner has probably had a long acquaintance with high-fidelity components—and already owns a fine FM tuner. What's more, unless reception conditions are unusually difficult, or a favorite station is not satisfactorily received, the performance of that tuner is probably quite acceptable.

If conventional tuning and acceptable performance were all that the human ear required—or the mind desired—there would have been no need for a product such as the Sequerra. As will become evident, there was a need, and the Sequerra alone has filled it.

What makes the Sequerra unique is its ability to present the *wide range of signal analysis information needed to assure that its function as a tuner starts with the best possible signal.* No conventional tuner provides this information, and without it, it is difficult for any tuner to perform to its full potential.

Outside your tuner: an imperfect world.

Between the broadcast transmitter and your tuner, the FM signal can be degraded by a variety of circumstances. By stations that over-compress their audio signal so as to sound louder; that allow phase errors in their stereo modulator; that have interfering background-music subcarriers; that inadvertently broadcast in mono while continuing to transmit the stereo subcarrier which activates your tuner's "stereo" light.

Then there is noise: continuous and sporadic, natural and man-made. Multipath signal reflections that arrive micro-seconds after the direct signal. Other broadcasts in the same or adjacent channels, or even far removed in frequency. Sheer distance. Obstructions between the station and your antenna.

And at home there are poor antenna installations and orientation.

More than a tuner: a benchful of test instruments.

All tuners tell you a little something about the signal they're receiving, usually via the moving pointer of small meters. These, plus your ears, serve as your sole guide to accurate tuning and relative signal strength. Since they tell you little or nothing about the problems mentioned above, they provide no opportunity to deal with them. For that, a variety of technical instrumentation is required, which is precisely what the Sequerra broadcast monitor provides *as a necessary complement* to its functions as an FM tuner.

The instrument-grade oscilloscope display of the Sequerra provides instant and comprehensive performance checks on A) the characteristics of the signal being transmitted, B) the signal being delivered from your antenna and C) the signal as tuned. In addition to visual analyses of all the significant FM tuning and performance parameters, the Sequerra provides D) visual analysis of the audio signals—stereo and quadraphonic—being distributed in your system from other program sources as well: records, tapes, microphones.

For such reasons, the audiophile in his home is not the only serious listener to use the Sequerra. FM station broadcast engineers use the Sequerra to inform them of the characteristics of the signals they are transmitting. And in recording studios, the same type of visual analyzer is frequently used to preview optimum microphone placements before committing signals to tape.

Evaluations as "just" an FM tuner.

Almost any good tuner has impressive specifications and can perform well under ideal laboratory conditions. Hence those who have tested the Sequerra most rigorously are unanimous in their declarations that its specifications do not—and cannot—adequately define its performance. Reviews are studded with such statements as "Performance...so good it cannot be measured with standard laboratory instruments." *(Hi-Fi/Stereo Buyers' Guide).* And "the true figures...are just not obtainable with present-day equipment." *(Audio).* More to the point, perhaps, *Stereo Review* points out that "tuner measurement standards are not as useful as they might be for delineating the characteristics of a tuner with such markedly superior qualities..."

That the Sequerra's performance as a tuner alone sets new and superior standards, all agree.

But given the state of FM broadcast quality in the U.S., does the Model 1's remarkable performance yield any audible improvement—any real increase in listening pleasure?

For some comments in these respects, we turn again to the independent test labs. Note that the following quotes selected refer only to *difficult listening situations.* "...where other tuners suffer from background-noise modulation, distortion, or excessive hiss, the Model 1 generally delivers listenable and often full-fidelity sound...for fringe-area listeners...the Sequerra Model 1 may be a godsend, albeit an expensive one..." *(Stereo Review)*

"Both in its measurements and in its actual audible performance, the Sequerra Model 1 is at least a whole order of magnitude better than anything else around...even in the face of admittedly poor station and transmitter practices... we were able to find program sources that sounded better than we have ever heard FM reception before. Cleaner, quieter, more stable and more like what we had always believed FM radio was all about." *(Audio)*

"Could we hear the difference between the Sequerra and some of the other best tuners on the market? Yes. Not an earthshattering difference, but in the area of noise levels and stereo separation, I definitely found audible differences." *(Modern HiFi)*

"...the Sequerra beats the best with (capture ratio) something approaching 0.75 dB...so far as it is measurable." *(High Fidelity)*

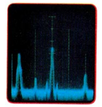
And again from Stereo Review: "If it won't do the job, nothing else will."

The information on the following pages is intended to help you decide if your requirements for FM listening can be fulfilled by anything less than the Sequerra.

Note: Complete reprints of all the reports published to date are available upon request.

The SEQUERRA Model 1...

As a panoramic spectrum analyzer.



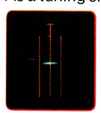
Provides a visual display of all FM stations which are broadcasting a signal above the ambient interstation noise level, represented by the base line. When tuned to a particular frequency, the station will be centered on the oscilloscope screen. The height of the vertical pips indicates relative signal strengths.

Alternate channel stations are shown at 400 kHz intervals off center frequency; adjacent channel stations, at 200 kHz intervals off center frequency.

This circuit section helps you orient your antenna for greatest signal strength and provides a variety of visual indications of the station's broadcasting characteristics in any area of the FM band. *Stereo Review* confirmed that: "Interference... from other radio stations or from electrical devices can also be spotted readily and often identified."

Audio magazine stated that: "It can provide more useful information regarding a station's radiated signal than any other single piece of FM equipment...The FCC ought to equip monitoring units with a Sequerra (for) policing of...abuses in broadcasting practices...it wouldn't be a bad idea if every FM station in the country were equipped with this tuner too..."

As a tuning signal analyzer.



This provides the most precise tuning of the FM signal as well as an indication of the station's R.F. signal strength and percentage of modulation (or overmodulation) by the broadcaster. For antenna orientation, this display lets you select (if need be) the best compromise of antenna position with respect to multipath and signal strength.

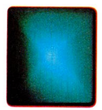
Audio magazine commented: "Readable with incredible accuracy over a range of greater than 90 dB—from a few microvolts to close to a volt. We were able to perfectly center-tune any desired station, gauge station modulation levels... and detect even the barest traces of multi-path distortion."

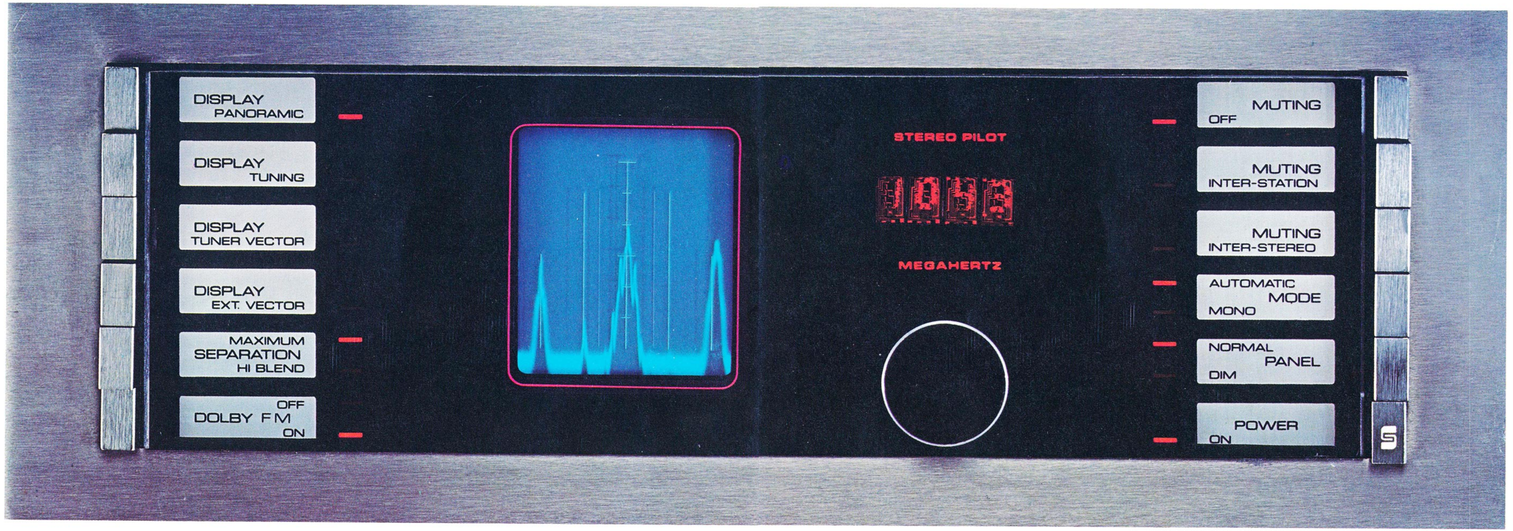
As an internal vector separation analyzer.

Exhibits the instantaneous peak deviation of the right and left stereo channel information with right-front vector at 45°, left-front vector at 135°. Used in analyzing the separation, balance and phase characteristics of stereo program material. The wider the angle, the greater the separation; the higher the trace, the stronger the signal. A vertical line indicates absence of separation (as a centrally positioned announcer or monophonic transmission). Base line widening or horizontal displacement indicates phase relationships at center of X axis.

As an external vector separation analyzer.

Displays audio information—from external sources (phono, tape or microphone)—in mono, stereo, or quadraphonic. With four-channel information, left-rear vector is shown below the base line at 225°, right-rear vector at 315°. Thus, you can analyze the performance of your entire system, from any program source through preamplifier, amplifier to speaker, and observe the total result on the four-channel vector display. As *Audio* magazine reported: "We have just seen a four-quadrant oscilloscope capable of visually depicting stereo and quadraphonic signal separation and phase relationship."





Separation: maximum/hi-blend.

Controls separation of the high frequencies in stereo broadcasts. Maximum position provides best spatial and directional definition of listening material; hi-blend position eliminates some high frequency noise under difficult listening conditions. Full frequency response is maintained, but high frequencies of left and right channels are blended.

High Fidelity magazine reported: "Not only does the Sequerra not roll off the highs, but its demodulator yields so much channel separation that the Model 1 can blend away a lot and still leave more than is in most stations' signals to begin with as well as more than many other tuners operating without blend."

Digital frequency readout.

Four-digit frequency counter, independent of the tuner's RF section, responds to local oscillator frequency with accuracy to within 100 kHz of station's frequency. Readout distinguishes signals in a continuous sweep of the entire FM band. When used in conjunction with the spectrum analyzer, the readout can assist in identifying unknown signals.

[The Sequerra system differs from frequency-synthesized or binary methods used in other digital tuners which permit tuning only to predetermined steps of 100 or 200 kHz. As described by England's *HiFi News & Record Review*, "The prime disadvantage of this (synthesized) arrangement, particularly when the steps are 200 kHz, is that the front-end is not exactly tuned when the required station happens to have a frequency that does not end with exactly 100 or 200 kHz."]

Other features:

■ *Dolby:* Interposes or removes a specially modified Dolby type-B decoder in the audio output lines. ■ *Muting (variable):* Provision for setting threshold of signal below which weak signals or noise will be suppressed. ■ *Interstation muting:* Mutes undesired noise (beneath preset muting level) when tuning between stations. ■ *Inter-stereo muting:* Additionally mutes monophonic broadcasts. ■ *Mode: Automatic/mono:* Senses when received signal is monophonic and switches audio automatically to monophonic operation to suppress stereo noise. ■ *Panel dimmer:* Decreases intensity of cathode tube trace.

*Dolby is a trademark of Dolby Laboratories, Inc.

Some thoughts to help you decide whether to acquire the SEQUERRA.

At this point, we hope you understand exactly what the Sequerra Model 1 actually is: five discrete instruments on a single chassis. Four of these instruments are signal analyzers: —panoramic spectrum, tuning signal, internal vector operation and external vector amplitude, separation and phase.

They have as their combined purpose to make it possible for the fifth instrument—the FM tuner—to receive the best possible signal from a given FM broadcast, at a given location, at a given time*

Further, the signal-analyzing capability can be used to monitor the performance of the rest of your system. In short, the Sequerra can be thought of as a unique intelligence-gathering system with the instrumentation and controls to utilize that intelligence to the optimum.

As for the tuner itself, we have already cited the findings and the conclusions of every major independent test laboratory. Typical is this comment from *High Fidelity:* "...the functional design is so encompassing and the over-all performance so superlative that the Sequerra can, with justice, be called 'best'." Also, "with its unique scope system...still is the ultimate tuner."

And as *Audio* Magazine concluded: "in the last analysis, a good FM tuner is for listening... ultimately, it is with the dedicated FM listener who demands perfection that the Sequerra Model 1 is sure to make its mark for years to come."

With all this, it is still reasonable for one to ask whether the multi-functional capabilities and the resulting performance of the Sequerra are sufficient to explain its considerable price. Not completely. What remains to be understood is the manner in which the Sequerra has been designed and how each unit is actually produced.

*Although the subject of antennas is beyond the scope of this brochure, it should be noted that for the Sequerra to provide the best possible signal to the amplifier it must be equipped with the right antenna for its location and the FM stations to be received. The antenna requirements may be met by a simple rabbit-ears TV-type antenna, or a roof-mounted type with rotator and carefully selected cables, coupling transformers, filters, etc. Only the tuning signal analyzer of your Sequerra will tell you which type of antenna you need—and then how to get the most out of it.

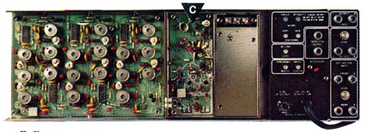
As you may know, the FM broadcast-band frequencies are located between channels 6 and 7 of the television band. Thus, FM transmissions are subject to the same problems of multipath (ghosts) as television. However, with television, you have a visual signal to help you fine-tune. You might think of this the next time you fine-tune your present FM tuner with only the use of your ears and the two meters.

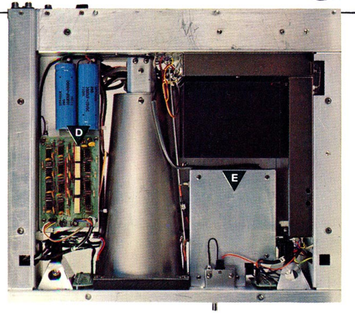
The Circuitry of the SEQUERRA Model 1

The Sequerra Model 1 is engineered like no other audio product in the world. Stereo Review appreciated its construction this way: "...Anyone familiar with high-grade laboratory instruments or military electronic equipment will appreciate the quality of the construction and the excellence of the parts used... the Model 1 is quite unlike most consumer products, even the very best, and its price can be justified on the basis of the overall mechanical and electronic quality of the instrument."

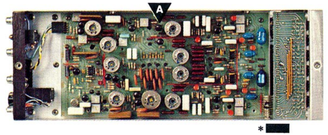
Each Sequerra Model 1 has nearly five thousand parts, each of which is rigorously inspected and/or tested before it is accepted in the production department. During the complex assembly period, there are hundreds of inspections. The sub-assemblies and the completed unit undergo more than one hundred separate tests and adjustments, and half the final tests take place after a period of accelerated life-test aging in an environmental chamber.

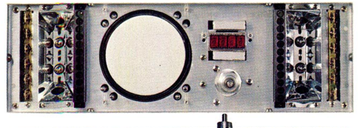
Eleven of the twenty-two circuit boards can be seen in the photographs on the opposite page. Modular construction allows each board to be exchanged for a new one if the state of the art should be improved. Thus, the Sequerra can be considered virtually obsolescence-proof, something to be considered along with its purchase price.

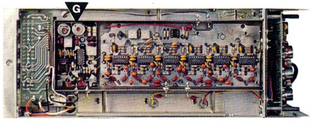




These are the six sides of the sequerra, showing eleven of the twenty-two circuit boards and other components such as the 4½ inch instrument grade oscilloscope tube. They indicate the density of the electronic packaging which explain why the Sequerra weighs forty-four pounds. More important, they also indicate the design philosophy of the Sequerra which runs counter to the trend toward miniaturization—notably integrated circuits—that typifies virtually all other electronic equipment today. We are not suggesting that integrated circuits are not capable of excellent performance, but only that they can not always provide for the tests and

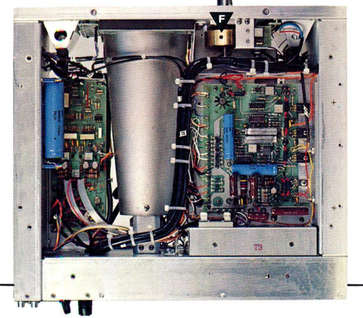






adjustments necessary to optimize the circuit parameters established for the Sequerra. Hence, although IC's are used in the Sequerra, a number of discrete circuit boards are used where required to achieve the necessary specifications. For example:

A. Multiplex switching decoder functions occupy most of this board. Twenty-five separate tests and adjustments are made during manufacturing and assembly to achieve the great separation—more than any tuner now available—achieved by the Sequerra. (The black rectangle at the lower right of this board represents, in scale, the IC used to provide multiplex decoding in many other tuners, including some very expensive ones.)



B. IF circuit—uses 18-pole Papoulis filters which provide for the twenty-two separate adjustments required to achieve the ultimate in selectivity and band-edge phase linearity at 10.7 MHz. (Some other tuners use ceramic filters and tuned IF transformers. Again, these are satisfactory, but simply don't allow for the adjustments required to yield the Sequerra performance.)

C. RF front end—Unique varactor tuning eliminates microphonics; balanced push pull stages of RF amplification and mixing provide spurious-free reception.

D. Analog computer (with automatic dimming circuitry) derives audio display voltages for one through four channels.

E. Computer-grade frequency counter with LED hexi-decimal readouts.

F. Tuning—a ten-turn high-resolution precision wire-wound potentiometer controlling a varactor is used instead of the usual string-linkage between knob and conventional gang-tuned capacitors.

G. Wide-band ultra-linear 1.2 MHz-wide Travis Smith detector—the most costly made—for extremely low distortion.

TUNING SIGNAL ANALYSIS

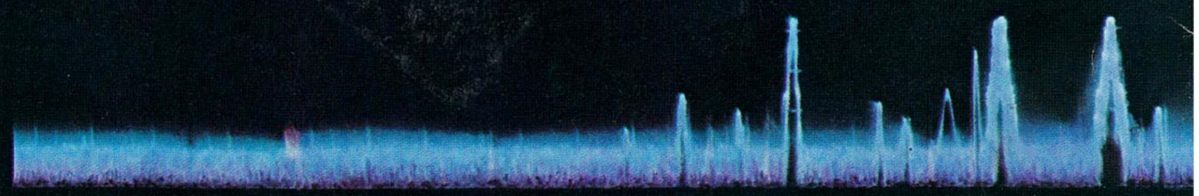
2. Typical "selectivity" response trace pattern displaying (A) band-width, (B) signal amplitude (C) threshold of noise level and (D) noise density.
3. Ideal trace—a thin straight, centered line—indicating maximum rejection of AM (due to multipath), instantaneous peak deviation, modulation and FM signal level.
4. Same as 3, except for broadcast overmodulation causing distortion on peak modulation.
5. Station not properly center-tuned.
6. Off-tuned station trace displaying SCA subcarrier signal level.
7. Distorted trace showing station with low signal level and visible AM product of multipath.
8. Severe multipath (echo) with resultant partial cancellation of signal. Result is high noise density and AM component products.

INTERNAL VECTOR ANALYSIS

9. Left front channel vector at 135° displaying instantaneous audio amplitude information. Center to corner (4.2 cm) indicates vector with full trace deflection, equivalent to 100% modulation.
10. Centered vector at 90° indicates either monophonic information or minimum stereo separation (such as centrally positioned soloist.)
11. Same as 9, except right front channel vector at 45°
12. Out-of-phase stereo broadcast. Left and right vectors cancel 180°
13. Maximum stereo distribution. Horizontal base line displacement indicates left-to-right phase relationships at center of X axis.

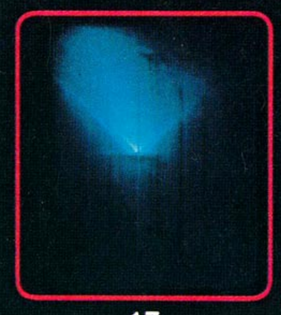
EXTERNAL VECTOR ANALYSIS

14. Spatial distribution of left front (135°) and left rear (225°) vectors in quadraphonic relationships. Base line vertical displacement indicates front-to-rear relationships at center of Y axis.
15. Same as 14, except right front (45°) and right rear (315°) quadraphonic mode information.
16. External vector separation and phase analysis of quadraphonic information. All channels "optically integrated" to display instantaneous quadraphonic field. (Not obtainable by conventional four-meter systems.) *Note: external vector analysis can be made at any point in music system with proper switching and interface connections (Deflection factor: 0.24 v/ cm)*
17. Minimum separation and unbalanced to left.
18. Minimum separation and unbalanced to right.
19. External left and right rear vectors. Indicates minimum separation in input signals (discrete or decoded.)
20. Same as 19, except left-front and right-front.
21. & 22. Imbalance of external left-rear and right-rear vectors.
23. Quadraphonic: minimum front channel vector separation with resultant low amplitude and separation of decoded rear channel vectors.
24. Test signal (from a source such as record, tape, signal generator or modulated carrier) inserted into total music system. Accumulated phase shift, if any, of signal through system can be visually displayed on horizontal axis.



Complete spectrum of FM stations broadcasting in New York City area as received by Sequerra Model 1 at one location.

88 MHz



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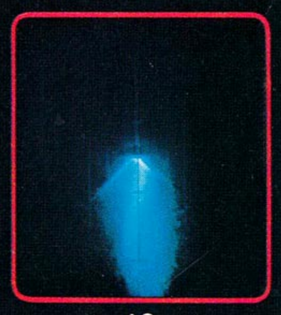

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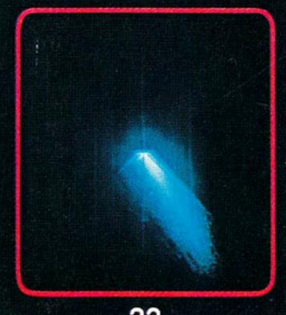

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