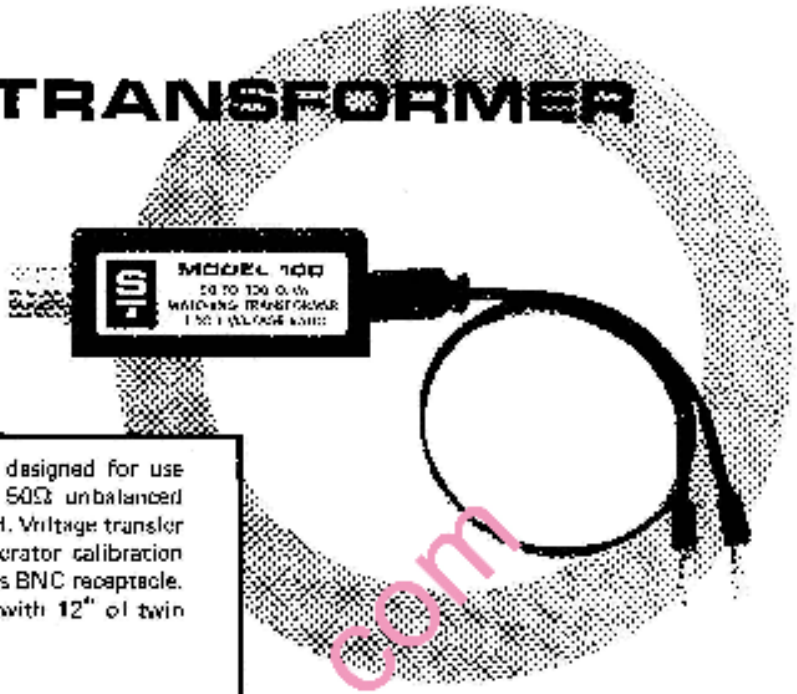
Model 100
MATCHING TRANSFORMER



The Model 100 Matching Transformer, designed for use from 54 MHz to 216 MHz, converts a 50Ω unbalanced signal generator output to 300Ω balanced. Voltage transfer ratio is 1:1 ± 10%, retaining signal generator calibration into a 300Ω load. 50Ω input connector is BNC receptacle. Detachable 300Ω output plug is wired with 12" of twin lead terminated in spade lugs.

Price: Model 100, $38.00

Additional unwired 300Ω plugs, stock number 421-1677, $1.50 each.

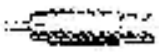
50Ω RG58C/U cable terminated with a BNC plug at each end. Four feet long.

Price: stk. no. 310-1040, $5.00 each.

Adapter, BNC receptacle to banana plugs on 3/4" centers.

Price: stk. no. 380-1010, $4.25 each.

Adapter, BNC receptacle to phono plug.



Price: stk. no. 380-1020, $4.75 each.

Recommended kit for use with the 1000A FM Alignment Generator:

1 ea. Model 100 Matching Transformer
2 ea. 421-1677 unwired 300Ω Plugs
4 ea. 310-1040 Cables
2 ea. 380-1010 Adapters
1 ea. 380-1020 Adapter

Price: Kit stk. no. 381-1000, $68.00

SOUND TECHNOLOGY
1CED SOUTH SARATOGA-SUNNYVALE ROAD
CUPERTINO, CALIFORNIA 95014
(408) 257-1174

An open letter
to
FM Receiver Manufacturers, Engineers, and Service Groups
from
Sound Technology

Gentlemen:

Because of our position as suppliers of quality test instruments to you in the FM receiver industry, we have become aware of a common misconception regarding receiver distortion.

We hope you will find this letter to be an aid in clarifying this misconception and thus a contribution to the industry.

ABOUT DISTORTION

In the usual "minimum distortion" type alignment, the illusion often occurs that the receiver distortion is much lower than it really is. This illusion arises from the fact that the measuring equipment reads far *below the receiver's actual distortion*.

Such a false indication occurs because the equipment is measuring not just one distortion. *It is measuring the receiver distortion combined with the alignment generator distortion.* The alignment process actually adjusts receiver distortion to be as nearly as possible equal and opposite to that of the generator. These two distortions then tend to cancel one another in the measurement.

Therefore, *the alignment process causes receiver distortion to be at least as large as* that of the generator—with each of [illegible] phase.

These effects can easily cause a receiver capable of 0.1% distortion *to end up with more than 2% even though the measuring equipment may read less than 0.1%.*

That's why it's important that alignment generator distortion be low. It's why we have taken great care to keep distortion in the Sound Technology Model 1000A Alignment Generator below [illegible]. It's the reason why the Model 1000A is used by more than 30 factories as well as scores of servicing dealers.

And it's why the Model 1000A is the only generator that permits proper alignment of today's quality receivers.

Sincerely,

SOUND TECHNOLOGY

Robert A. Andersen, president

Lawrence A. Maguire, vice-president

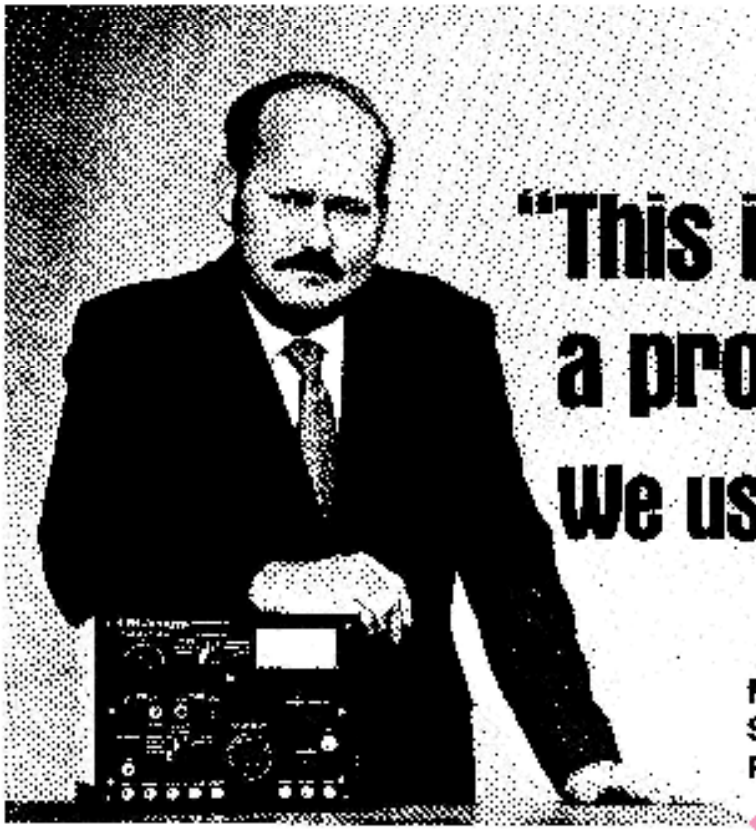
To: SOUND TECHNOLOGY
10881 So. Saratoga-Sunnyvale Rd.
Cupertino, CA. 95014

Please send me more information about:

☐ Your low-distortion alignment generator
☐ Your FM receiver-demonstrating system
☐ Your 50-to-300 ohm Matching Transformer with special 1:1 voltage ratio. 88-216 MHz. $30.00.

Lease plan available nationwide.

Name, position ______
Firm ______
Street ______
City, State, Zip ______
Phone ______



"This instrument is a profit-maker. We use ~~13~~ 14 of them."

Mr. Jerry Philipp
Service Manager,
Pacific Stereo

Mr. Philipp bears the responsibility for profitable service operations in Pacific Stereo's California store chain. You can be sure he pays attention to new profit-making methods.

Mr. Philipp uses the new Sound Technology Alignment Generator *in all of his stores*. That's because this revolutionary new instrument saves time. Makes money. And does a much better aligning job.

It uses a new technique that lets *your technician inspect alignment without even removing the receiver from its cabinet*. He (or you) can show the customer on the spot if alignment is needed.

HELPS YOU SELL

The Sound Technology 1000A helps you sell, too. It gives your salesmen the *confidence needed to sell* because they *know*—they can see—that they have strong service backing.

You can sell with fast-moving rf clinics that won't clog with annoyed, waiting people.

You can sell servicing because the customer can *see* when his receiver needs alignment/repair.

DON'T BE CAUGHT SHORT

The Sound Technology generator is revolutionary. Patented. It's already in use by at least 12 receiver manufacturers because it's the only generator that can test the improved new receivers.

It is sure to have a profound—repeat, profound — effect on servicing. Don't let this technological advance catch you unaware.

Call or write today for information. TODAY, man. Because making money hurts a lot less than being sorry.

"It is very nearly a single unit FM/stereo-FM test laboratory."
Hirsch-Houck Labs report in April, 1971 *ELECTRONICS WORLD*

SOUND TECHNOLOGY
1000 SOUTH SARATOGA-SUNNYVALE ROAD
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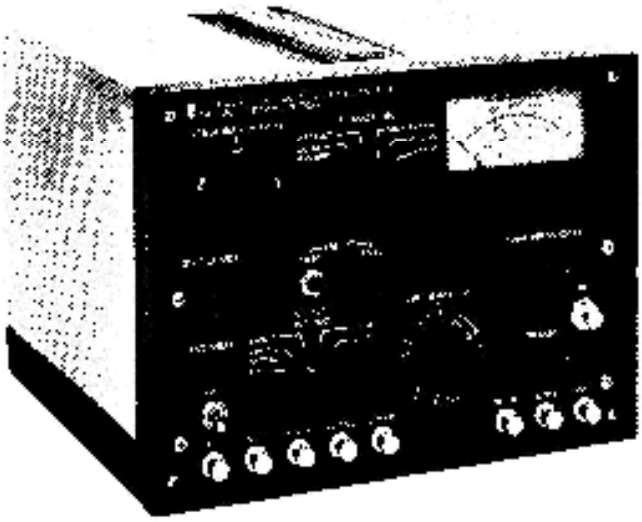
HI-FI PRODUCT REPORT

EW LAB TESTED

by Hirsch-Houck Labs



A basic requirement for any measurements on FM tuners, either mono or stereo, is an FM signal generator. There are several well-established companies manufacturing laboratory-grade FM signal generators, but until recently there has been no single instrument whose performance parameters matched or surpassed those of a modern FM tuner and whose operating functions met the needs of an equipment manufacturer or a hi-fi specialist's service department.

The traditional laboratory-grade FM signal generator is a general-purpose instrument. It covers a wide range of frequencies, with a calibrated tuning dial, and its metered and calibrated output level is adjustable down to a fraction of a microvolt, usually with an accuracy of ±10% or ±1 dB. Often the generator is equipped for other modes of modulation such as AM or pulse. Its versatility is reflected in its price, typically from almost $1000 to over $6000, yet it still requires the use of an external multiplex generator ($500 to $1000 for an instrument of comparable quality) and a low-distortion audio generator in order to make measurements on a stereo-FM tuner.

Even with such an impressive and costly array of equipment, it is not possible to make meaningful distortion measurements on most FM tuners. The inherent distortion of the signal generator's own modulating circuits is about 0.3% at best (at 75 kHz deviation), and even this level cannot be guaranteed except over a limited frequency range. Most tuner and receiver manufacturers claim distortion levels under 0.2% for their products. Measurement or verification of these specifications heretofore has required a specially modified and calibrated signal generator.

A new company, *Sound Technology* of Cupertino, California, has recently introduced a unique instrument designed specifically for the hi-fi FM receiver manufacturer or service organization. Its Model 1000A FM alignment generator represents a radical departure in features and performance from any previous commercial FM test equipment we have seen.

Features and Specifications

The Model 1000A is a multipurpose instrument. It is an FM signal generator, covering 88 to 108 MHz, with an output attenuator calibrated from 0.5 microvolt to 30 millivolts. The frequency dial is calibrated only at the ends and middle of the FM band (88, 98, and 108 MHz), but its smooth planetary drive permits a tuning resolution of 10 kHz. The output level, into 50 ohms, has a rated accuracy of ±2.5 dB and its shielding is adequate for making accurate measurements down to 0.5 microvolt.

A unique feature of the Model 1000A is its wide-band linear modulator. Deviations up to ±300 kHz are possible and, with 100% modulation (=75 kHz deviation) at 1 kHz, the generator harmonic distortion is less than 0.1%. There is a built-in 1-kHz low-distortion (less than 0.1%) source and an external modulating signal can be used for modulation over the full range of 50 Hz to 15 kHz (flat within ±0.5 dB). One-hundred-percent modulation requires a signal of 0.4 volt r.m.s. at the 10k-ohm input connector. With modulation removed (CW mode), the residual FM noise level is at least 70 dB below 100% modulation. Modulation level, either from internal or external sources, is adjustable and is read directly on a meter scale calibrated from 0 to 150%, with 100% corresponding to ±75-kHz deviation.

The instrument also contains a stereo multiplex generator capable of delivering a standard composite modulating signal from the 1-kHz internal oscillator, or from an external source. A selector switch connects the internal signal source to provide L, R, L+R (mono), or L–R modulation modes. Separate input connectors for external L and R signals can be switched into the circuit. The 19-kHz pilot carrier level is read on the meter by pushing a button, which expands the meter scale by a factor of ten. The pilot carrier may then be set accurately, within the standard 8% to 10% modulation limits, since the meter reads 15% full scale. Three connectors on the front panel carry out the 19-kHz pilot signal, the internal 1-kHz modulating signal, and the composite stereo modulating signal, for scope synchronization or for checking a multiplex demodulator unit. All connectors are type BNC.

The function selector switch has positions for Stereo, Mono, CW, SCA, and Dual Sweep. In the SCA position, external modulation is removed and an internal 67-kHz signal is applied to the modulator, for checking or aligning SCA traps in stereo tuners and receivers.

The Dual Sweep function is a unique feature of the generator. It provides a means for aligning an FM tuner rapidly, with a constant display of over-all distortion on an oscilloscope as the alignment is performed. The Dual-Sweep technique in effect plots the *slope* of the discriminator S-curve over a wide and adjustable deviation range. The generator frequency is swept by a 60-Hz signal, on which is superimposed a small deviation at a 10-kHz rate. The sweep width is adjustable from 0 to 600 kHz, and is indicated on the meter.

The audio output from the tuner is returned to the instrument where the 60-Hz component is filtered out and a clean 10-kHz signal is extracted. The amplitude of the 10-kHz component is proportional at all times to the slope of the tuner's discriminator characteristic. With a perfectly linear discriminator, it would have a constant level as the 60-Hz sweep moves the generator frequency across the tuner passband.

Two output connectors on the generator supply vertical (10 kHz) and horizontal (60 Hz) deflection signals to an external oscilloscope. Any variation in the vertical dimension

Sound Technology 1000A FM Generator

of the swept display indicates a nonlinearity in the tuner. The i.f. and discriminator circuits are aligned to produce the smoothest, widest, and most uniform display possible. As a final check, the sweep width can be reduced to 150 kHz, corresponding to 100% modulation, and the vertical scale of the oscilloscope expanded to reveal the smallest departure from flatness. The amplitude of any irregularity, expressed as a percentage of the total vertical amplitude, is a direct measure of IM distortion. The rated peak nonlinearity of the generator in the Dual-Sweep mode is less than +0.3% over a 150-kHz bandwidth.

Clearly, the Model 1000A is an uncommonly versatile instrument. It was designed for a manufacturer's final-test or quality-assurance departments, or for the service specialist dealing in the highest caliber of home receiving equipment. This unit makes more use of up-to-date components and techniques than any comparable laboratory instrument we have seen. For example, its design employs 8 linear IC operational amplifiers, an IC power-supply voltage regulator, and two digital IC's serving flip-flop and gating functions. In addition, there are 22 transistors (5 of them FET's) and 13 diodes.

The end result is a compact instrument, 6⅜" high by 17⅜" wide by 11¾" deep and weighing only 12 pounds. It is very nearly a single unit FM/stereo-FM test laboratory, whose functions could only be partially duplicated by a clumsy and expensive array of separate instruments.

Tests and Evaluation

Our tests of an instrument such as this had to be done indirectly, by comparison with other instruments whose performance was in some respects inferior to the unit we were "testing." Nevertheless, we were able to satisfy ourselves that this instrument does what is claimed for it, and then some.

Our own FM signal generator, a *Boonton* Model 202B, has a residual distortion of about 0.5% at 75-kHz deviation. We used it to measure the IHF usable sensitivity, distortion, signal-to-noise ratio, and stereo crosstalk of a new FM receiver, and similar measurements (except for crosstalk) on an older mono-FM tuner of high quality. A *Scott* Model 830 multiplex generator was used to develop the composite modulating signal for the stereo measurements. The same measurements were then repeated using only the *Sound Technology* Model 1000A.

With our own equipment, the IHF sensitivity of the receiver measured 3.0 microvolts; with the Model 1000A it was 2.9 microvolts—remarkably close in view of its relatively loose output-level specifications. The distortion measured 0.54% with our equipment, and a remarkable 0.07% with the Model 1000A. The two sets of stereo-crosstalk measurements agreed within 3 dB at all frequencies. The signal-to-noise ratio was 72 dB with our equipment, 73 dB with the Model 1000A.

With the mono tuner, our equipment showed an IHF sensitivity of 2.1 microvolts, while the Model 1000A gave a reading of 2.6 microvolts—still within specification limits. Distortion with our generator was 0.53%; with the Model 1000A it was 0.19%. The signal-to-noise ratios were, respectively, 70 dB and 73 dB.

We then used the Dual-Sweep mode to align the mono receiver. It was interesting to note how easily rather large irregularities from 100 kHz to 300 kHz away from the center frequency could be produced by conventional alignment methods. With a little practice, the Dual-Sweep technique allowed a modest reduction in distortion, but with an improved symmetry over a wide bandwidth which makes the receiver easier to tune for low distortion.

In effect, Dual Sweep replaces the rapid, but purely *qualitative* sweep alignment of a discriminator by visual display of its S-curve with an equally fast, but precise and *quantitative* indication of the tuner's IM distortion.

Our only criticism of the generator is the choice of 1 kHz as its internal modulating frequency. The IHF standard on FM tuner measurements specifies a 400-Hz modulating frequency and this frequency has long been a part of other standard measurement practices for home FM receivers. The principal reason for this, we believe, is that harmonics of 400 Hz appear in the correct amplitude relationship to the fundamental, even the third harmonic is reduced by only about 1 dB by the tuner's de-emphasis circuits. On the other hand, the second harmonic of a 1-kHz modulating signal is reduced by 1.9 dB, and the third harmonic is down 3.8 dB, relative to the 1000-Hz level, since de-emphasis begins just below 1000 Hz. This can give misleadingly optimistic readings of tuner distortion. Of course, 400 Hz can be used with the Model 1000A, from an external source (which we did), but it should be internally available, either instead of or in addition to the 1-kHz signal.

(Editor's Note: The manufacturer will supply the instrument with a 400-Hz modulating frequency if desired at no extra cost. However, this means that separation will have to be measured at 400 Hz rather than 1 kHz. Both frequencies are available at the flick of a switch as an extra-charge option.)

All in all, the *Sound Technology* Model 1000A is a fine instrument, which we wouldn't mind having in our own laboratory. Its price is $1250. ▲

REPRINTED FROM

Electronics World

THE MAGAZINE FOR THE ELECTRONICS PROFESSIONAL

April, 1971

MODEL 1000A

FM ALIGNMENT GENERATOR

COMPLETE RECEIVER ALIGNMENT — A MINIATURE LOW DISTORTION FM TRANSMITTER PLUS FAST, ACCURATE DUAL SWEEP ALIGNMENT

Five instruments in one!

1. Dual sweep alignment.
2. Complete stereo generator.
3. Monophonic FM generator.
4. Clean CW signal.
5. SCA modulation.

DESCRIPTION

The all solid state 1000A FM ALIGNMENT GENERATOR is designed specifically to permit fast, accurate adjustment of monaural and stereo FM systems. DUAL SWEEP, a refinement of conventional sweep alignment techniques, provides a unique visual display of receiver performance. An operator need only connect the 1000A RF output to the receiver antenna terminals and feed the receiver audio output to the 1000A's built-in filter. Distortion and tuning characteristics will then be displayed — even on an inexpensive scope — without probing inside the receiver.

The 1000A offers much more than DUAL SWEEP capability. With a highly linear modulator, it produces complete, high quality, monaural and stereo signals exceeding FCC specs. An internal RF oscillator is tuneable across the fm band and provides an output continuously adjustable in level from 0.5 to 30,000 μv.

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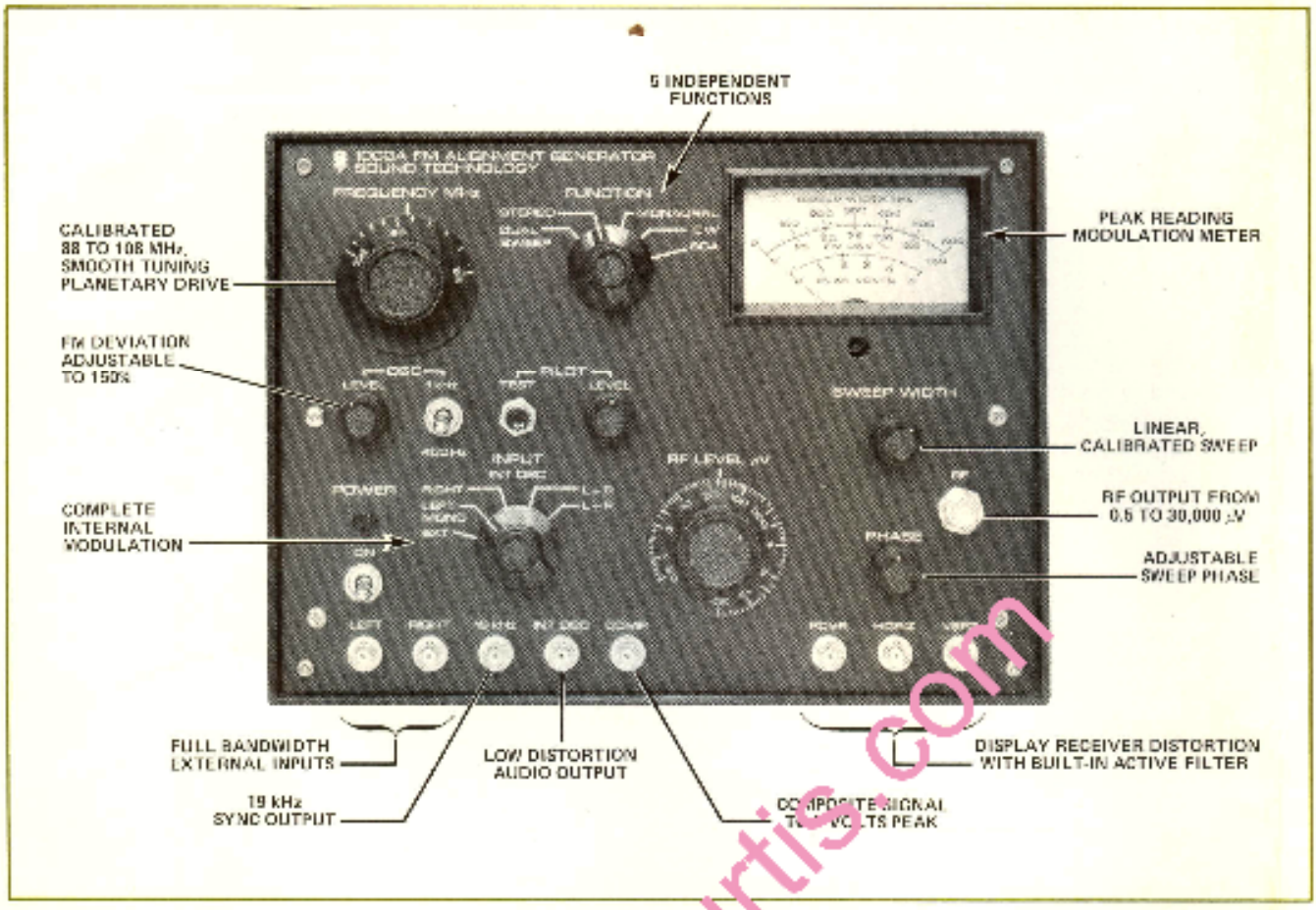

Features

- ★ Unique DUAL SWEEP function with a wide-band linear modulator and a built-in active filter lets you see at a glance the critical parameters, LINEARITY, BANDWIDTH, and TUNING SYMMETRY – without probing inside the receiver.
- ★ Conventional sweep alignment capability.
- ★ Linear, calibrated sweep permits direct determination of receiver bandwidth and tuning symmetry.
- ★ RF tuneable from 88 to 108 MHz. Modulation sensitivity held constant across the band.
- ★ Piston attenuator calibrated from 0.5 to 30,000 μV permits a quick look at receiver alignment vs RF level.
- ★ Precision stereo modulator utilizes crystal controlled digital circuits for precise phase relationships. Overall separation better than 50 dB at 1 kHz.
- ★ Low distortion MONAURAL function for over-all receiver distortion measurements.
- ★ CW function provides a signal with very low incidental FM for receiver quieting (signal-to-noise ratio) tests.
- ★ Internal SCA modulation for receiver SCA trap adjustments.
- ★ Sweep width, monaural and stereo modulation, pilot level (X10 scale on PILOT TEST), and composite output monitored on peak reading meter.
- ★ Metered COMPOSITE output for separate alignment and testing of stereo decoders.
- ★ Optional wideband modulation input.
- ★ Optional front panel switch selects 400 Hz or 1 kHz as internal oscillator frequency.

Applications

- ★ Development of stereo FM systems.
- ★ Rapid, accurate production alignment of stereo equipment.
- ★ Servicing FM tuners, receivers, and stereo adapters.
- ★ Fast determination of receiver performance without internal connections.
- ★ Manufacturer's final QA of receivers.
- ★ Development of SCA equipment.

What Dual Sweep Does

Dual sweep permits receiver alignment with unexcelled rapidity and precision by providing an accurate scope display of linearity and distortion. A highly linear modulator driven by a dual frequency sweep signal yields far more resolution and accuracy than conventional sweep techniques. All the signals required for a display of receiver distortion, bandwidth, and tuning characteristics are provided by the 1000A. The text below describes how the dual frequency sweep method works.

How Dual Sweep Works

To understand the operation of DUAL SWEEP, consider the effect of a non-linear S-curve on a low level 10 kHz modulating signal. As shown in Figure 1, changing the carrier frequency from F1 to F2 shifts the demodulation region to a different portion of the S-curve and results in a change in the detected 10 kHz output voltage. The ideal S-curve would have a constant amplitude in the pass band.

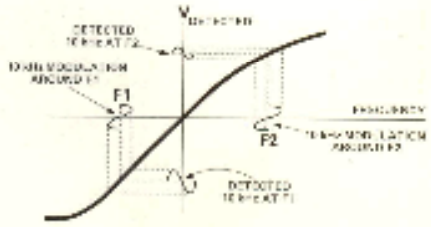

Figure 1.

10 kHz output level is actually a measure of S-curve slope over a very small region. As the carrier frequency is shifted over the receiver band, changes in the detected output are directly proportional to S-curve non-linearity and resulting receiver distortion. Receiver linearity could actually be measured by hand tuning an oscillator with 10 kHz low level FM and plotting receiver output voltage vs. carrier frequency (Figure 2) — a slow and cumbersome technique.

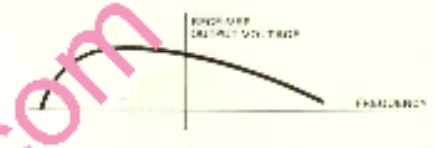

Figure 2.

The DUAL SWEEP signal eliminates the need for hand tuning by superimposing the 10 kHz on a 60 Hz sweep signal, permitting a scope display. Receiver output will be a 60 Hz waveform with 10 kHz superimposed on it. In order to determine the 10 kHz amplitude (our measure of linearity and thus distortion), the 60 Hz must be filtered out. The 1000A has a built-in filter to provide a clean 10 kHz signal. By using the 60 Hz modulation signal for horizontal deflection of a scope and the filtered detector output for vertical deflection, receiver linearity will be displayed as in Figure 3.

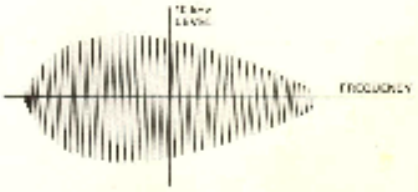

Figure 3.

Advantages of Dual Sweep

Because DUAL SWEEP measures the slope of the S-curve, it provides a display of receiver distortion which is far more sensitive than that obtained by conventional sweep methods. DUAL SWEEP has all the advantages of minimum distortion alignment (it is a direct measure of IM distortion) and yet retains the benefits of conventional sweep alignment. We all know that sweep alignment is highly desireable, not only because of the rapidity and ease of adjustment that goes with a scope display, but because of the information contained in the pattern we see. A conventional sweep display provides immediate information on the effect of receiver adjustments on tuning symmetry and bandwidth, but is not a sensitive measure of distortion. Alignment with a distortion analyzer can yield low distortion but may result in critical tuning characteristics. DUAL SWEEP combines the advantages of both techniques — and eliminates the disadvantages of each.

Not only can a receiver's distortion be measured over its full bandwidth using DUAL SWEEP, but the character of the distortion is displayed on the scope. Figure 4 shows a scope display of the DUAL SWEEP pattern for a receiver with even-order distortion.

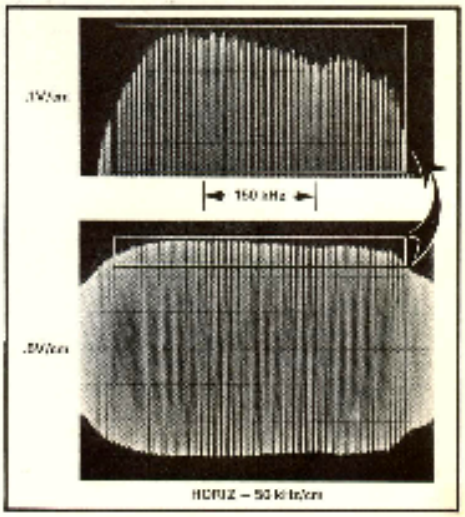

Figure 4. DUAL SWEEP pattern for 0.7% THD.

Specifications

FM RF OUTPUT

TUNING RANGE: 88 to 108 MHz, 6:1 planetary drive provides approx. 10 kHz tuning resolution.

RESIDUAL FM (CW MODE): <25 Hz, 20 Hz to 15 kHz (measures quieting to -70 dB).

DRIFT: <10 kHz/hr after 1 hour warm-up.

TOTAL HARMONIC DISTORTION: <0.1% at 1 kHz monaural, <0.2% stereo, 100% modulation.

RESIDUAL FM (MONO OR STEREO): <75 Hz, 20 Hz to 15 kHz.

RESIDUAL 38 kHz SUBCARRIER: <0.5%, applies to stereo only.

OUTPUT LEVEL: 0.5 to 30,000 μV into 50 ohm load, continuously adjustable. Accuracy is ±1 dB at 98 MHz. Sealed RF unit provides sufficiently low leakage to permit accurate measurements below 0.5 μV.

OUTPUT IMPEDANCE: 50Ω, VSWR <1.3, 200 Vdc isolation.

DUAL SWEEP

INCREMENTAL LINEARITY: ±0.3% for 150 kHz bandwidth. (Incremental linearity is the change in small signal FM deviation sensitivity over a stated bandwidth and is equivalent to peak intermodulation distortion).

SWEEP WIDTH: Adjustable and metered from 0 to 600 kHz.

SWEEP LINEARITY: ±3% of width.

RCVR INPUT: Impedance: >100KΩ at 10 kHz, >10MΩ at 60 Hz. Maximum input is 25 volts peak.

VERT OUTPUT: Impedance 10KΩ. RCVR input-to-VERT output gain ≈ 30 at 10 kHz. 10 kHz modulation in DUAL SWEEP ≈ 10%.

HORIZ OUTPUT: Impedance 20KΩ. Level ≈ 20 volts peak-to-peak.

SWEEP PHASE: Adjustable over 60° range at 60 Hz.

STEREO

SEPARATION: >50 dB at 1kHz. Specification includes mono/stereo subchannel separation and pilot phase accuracy and is applicable to composite or RF outputs.

PILOT: 19 kHz ±2 Hz, adjustable from 0 to 25%. PILOT TEST push-button removes external LEFT and RIGHT and INT OSC modulation and expands meter scale to 15% full scale.

EXTERNAL LEFT (MONO) AND RIGHT INPUTS

FREQUENCY RESPONSE: ±0.5 dB, 50 Hz to 15 kHz.

INPUT IMPEDANCE: 10KΩ.

LEVEL: ≈ 0.4V rms for 100% modulation (no damage at 15 volts peak).

19 kHz OUTPUT

WAVEFORM: 19 kHz ±2 Hz squarewave, ≈5 volts peak-to-peak.

OUTPUT IMPEDANCE: 3.3KΩ.

INT OSC OUTPUT

FREQUENCY: 1 kHz ±10%, 10 kHz with FUNCTION switch on DUAL SWEEP, 67 kHz on SCA.

TOTAL HARMONIC DISTORTION: <0.1% at 1 kHz.

LEVEL: ≈ 2 V rms.

OUTPUT IMPEDANCE: 1KΩ.

COMPOSITE OUTPUT

LEVEL: Adjustable and metered from 0 to 5 volts peak.

OUTPUT IMPEDANCE: <600Ω.

TOTAL HARMONIC DISTORTION: <0.2% at 5 volts peak.

RESIDUAL 38 kHz SUBCARRIER: >50 dB down from 5 volts peak. Applicable to stereo only.

RESIDUAL HUM AND NOISE: >60 dB down from 5 volts peak.

METERED FUNCTIONS

MONO AND STEREO: 0 to 150% peak reading.

DUAL SWEEP: 0 to 600 kHz sweep width.

PILOT: 0 to 15%.

COMPOSITE OUTPUT: 0 to 5 volts peak.

ACCURACY: ±7% of reading ±2% of full scale, 88 to 108 MHz.

OPTIONS

WIDEBAND AUXILIARY INPUT (Rear Panel BNC): This wideband modulation input may be used for SCA program material, intermodulation distortion tests, or for adding other complex modulation to the conventional stereo signals. Order M1.

INTERNAL OSCILLATOR: With your order you may specify a 400 Hz internal oscillator instead of the standard 1 kHz at no additional charge.

400Hz/1kHz INTERNAL OSCILLATOR: Front panel toggle switch allows choice of 400 Hz or 1 kHz internal oscillator frequency. Permits measurement of receiver distortion at 400 Hz, separation at 1 kHz as specified in IHF standards. Order M2.

BROADCAST QUALITY STEREO MODULATOR: When M3 is included, a more complex stereo filter is installed in the 1000A. This permits a separation specification of 50 dB from 50 Hz to 8 kHz decreasing to 40 dB at 15 kHz. Essential for receiver design and for receiver testing and evaluation at high audio frequencies. Order M3.

GENERAL

DIMENSIONS: 8-3/8" high x 11-1/8" wide x 11-3/4" deep.

POWER: 115V ±10%, 50 to 60 Hz, 12.5 W.

WEIGHT: 12 lbs.

SHIPPING WEIGHT: 18 lbs.

PRICE: $1450, M1 add $25, M2 add $75, M3 add $225.

All prices f.o.b. Cupertino, California — data subject to change without notice.

Printed in U.S.A. 8/72

MODEL 1100A/1000A

PRECISION FM TRANSMITTER

Demonstrate receiver or tuner performance with controlled listening tests

DESCRIPTION

The 1100A Signal Conditioner and the 1000A FM Alignment Generator combine to form a miniature precision fm transmitter. This system converts program material from a phonograph or tape recorder into an extremely high quality fm stereo signal anywhere in the broadcast band. With the 1100A/1000A system you can easily and effectively demonstrate fm receiver performance with listening tests.

INCREASE YOUR DOLLAR VOLUME IN RECEIVER SALES

Sell your customer up to a better receiver by letting him make comparative listening tests using music you select. Let him hear the difference and he will buy the better receiver. With the 1100A/1000A system, you can control your music source. You are no longer at the mercy of fm stations, their program material, multipath, nearby traffic problems, weak signals, competitor's commercials, limited 4-channel material, etc.

USE 2 CHANNEL OR 4-CHANNEL PROGRAM MATERIAL

You needn't depend on local stations for program material. In addition to conventional stereo, you can transmit matrixed 4-channel material directly from a phonograph. Or connect your tape recorder through a matrix encoder to the Model 1100A to transmit discrete 4-channel tapes.

SOUND TECHNOLOGY

1050 SOUTH SARATOGA SUNNYVALE ROAD

CUPERTINO, CALIFORNIA 95014

(408) 257-8177

How to demonstrate receiver performance

The tests below are easy to perform with the 1100A/1000A system, and they are easy to explain to your customer, but they dramatically show up deficiencies in receiver performance.

Distortion: Play the program source through the 1100A/1000A system, then play it directly through the receiver's amplifiers, bypassing the fm section. If the receiver is top quality, you will hear no difference in sound. Distortion contributed by the 1100A/1000A system is insignificant — less than 0.1%.

Tuning Characteristics: With the receiver in stereo and a strong signal from the 1100A/1000A transmitter, tune the receiver for optimum indication on its meters. Is the receiver distortion free? Can you tune the receiver slightly to either side without hearing distortion? If not, the receiver bandwidth is too narrow, and it will have to be tuned by ear and continually readjusted as it drifts, an inconvenience at best.

Overmodulation: The FCC allows significant overmodulation, and some receivers can't handle it. Purposely overmodulate the 1100A/1000A system using the meter to tell where you are. Receivers with inadequate bandwidth will break up on loud, high notes. These last two tests are good ways to sell up. Expensive receivers usually have more non-distorting bandwidth and will stand out in these tests.

Sensitivity: Put the receiver in stereo and decrease the 1000A RF LEVEL until the receiver starts to sound noisy and distorted. Be sure the receiver is in stereo, because an insensitive receiver can sound good in mono but not in stereo. This test is much more revealing than an IHF sensitivity check.

Sensitivity to Pilot Level: If the pilot detection circuitry in a receiver is inadequate, the sensitivity test above will reveal the deficiency. Turning the PILOT LEVEL control on the 1000A will help tell if this is the problem when a receiver sounds bad. The FCC permits as little as 8% pilot, and good receivers should get stereo at much lower pilot levels. If a receiver requires a high pilot level, it will work in stereo only on very strong stations and separation and distortion will depend on signal strength.

Separation: Turn the STEREO BALANCE control on the 1100A to either extreme position to transmit only one channel of the music. Evaluate receiver separation with listening tests.

Make a profit on receiver service

The 1000A is a proven profit maker in service. It speeds up receiver alignment and troubleshooting by a factor of 3 to 5. It has shown that it can pay for itself on only one service job a day.

Use the 1100A/1000A system to show a customer how his receiver sounds after servicing. It will help convince him you've given him the best service he can get.

Model 1100A/1000A system specifications

FM RF OUTPUT

TUNING RANGE: 88 to 108 MHz, 6:1 planetary drive provides better than 10 KHz tuning resolution.

DRIFT: No adjustment required after station frequency is set following ½ hour warmup.

TOTAL HARMONIC DISTORTION: Less than 0.1% THD at 1 KHz, 100% modulation.

RESIDUAL FM: Less than 75 Hz, 10 Hz to 15 KHz.

RESIDUAL 38 KHz SUBCARRIER: Less than 0.5%.

OUTPUT LEVEL: 0.5 to 30,000 mV into 50 Ω load, continuously adjustable.

OUTPUT IMPEDANCE: 50 Ω, VSWR less than 1.3, 200 Vdc isolation.

STEREO SEPARATION: Greater than 50 dB at 1 KHz.

METERING

MODULATION LEVEL: 0 to 150%, peak reading.

PILOT: 0 to 15%.

ACCURACY: ±7% of reading ±2% of full scale, 88 to 108 MHz, for audio frequencies 20 Hz to 15 KHz.

AUDIO INPUTS

FREQUENCY RESPONSE (TAPE INPUT, PRE-EMPH IN): Pre-emphasis standard ±0.5 dB, 20 Hz to 15 KHz.

FREQUENCY RESPONSE (PHONO INPUT, PRE-EMPH IN): RIAA standard combined with pre-emphasis standard ±0.5 dB, 20 Hz to 15 KHz.

INPUT IMPEDANCE: 50 KΩ, PHONO or TAPE.

INPUT LEVEL FOR 100% MODULATION: 7 to 15 mVac at 1 KHz on PHONO, 0.8 to 1.8 Vac at 1 KHz on TAPE.

OPTIONS

MODEL 1000A: All Model 1000A options apply.

GENERAL

MODEL 1000A DIMENSIONS: 8-3/8 inches high x 11-1/8 inches wide x 11-3/4 inches deep.

MODEL 1100A DIMENSIONS: 8-3/8 inches high x 5-1/2 inches wide x 11-3/4 inches deep.

POWER: 115 or 220 V ±10%, 50 to 60 Hz. Model 1000A, 12.5 w, Model 1100A, 6.5 w.

WEIGHT: Model 1000A — 12 lbs. Model 1100A — 6 lbs.

SHIPPING WEIGHT: Model 1000A — 18 lbs. Model 1100A — 10 lbs.

PRICE: Model 1000A, see 1000A data sheet. Model 1100A — $285.

All prices FOB Cupertino, California — data subject to change without notice.

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