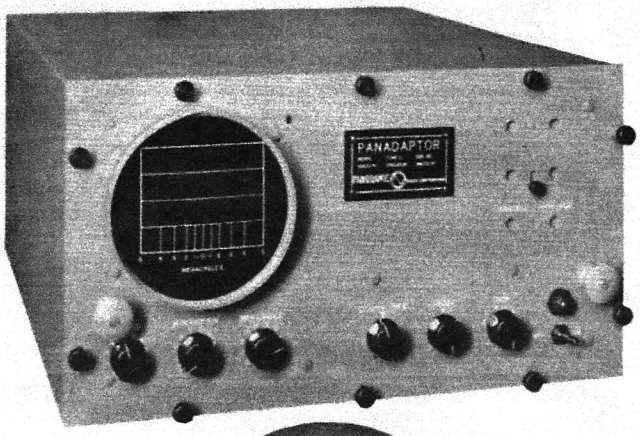
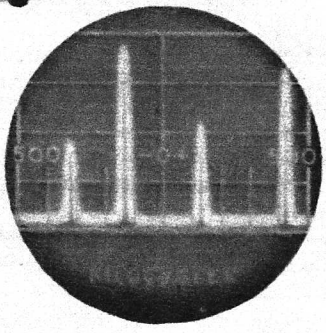
PANALYZOR — Series SB-3 SB-6

PANADAPTOR — Series SA-3 SA-6





VISUAL PRESENTATION OF R.F. SPECTRUM FOR SIMPLE RAPID ANALYSIS

Both PANALYZOR and PANADAPTOR are automatic scanning superheterodyne instruments designed to enable panoramic analysis of signals in the R.F. spectrum. Each signal within a band is displayed on the screen of a cathode-ray tube as an inverted V whose amplitude and position along a horizontal calibrated axis are indicative of signal level and frequency, respectively.

The presentation is unique in that it enables observation of many signals at one time. A given signal can be made to appear at the center of the screen while other signals of lower or higher frequency will cause deflections to the left or right of center.

These instruments provide the utmost in simplicity for observing such things as the effects of power supply fluctuations, thermal changes, humidity, component variations, shock, vibration and load changes upon frequency. Both magnitude and direction of frequency drift are indicated. Parasitic oscillations which normally may pass unnoticed can quickly be detected and identified. Spurious modulation by supersonics, hum and noise are readily spotted.

Because of their panoramic presentations both instruments are invaluable for monitoring a frequency band for the appearance, disappearance and shift of signals. Highly useful graphic displays of Bessel function distributions of FM signals can be obtained.

Since only the simplest operational procedures and deflection interpretations are required, the PANALYZOR and PANADAPTOR can be readily used on production lines. Although critically designed for laboratory work of research and development calibre, these instruments can be used profitably by students for experimental or demonstration purposes.

ADVANTAGES

- Provides visual spectrograph of radio frequencies
- Shows instantaneous changes in signal frequencies and amplitudes
- Identifies signals and their spurious radiations
- Simple operation
- Quick easy interpretations

USE IN

- Research laboratories
- Maintenance shops
- Universities
- Communications centers
- Airports
- Production lines
- Broadcast stations

USE FOR

- Analyzing transmitters
- Calibrating FM deviations
- Testing industrial R.F. equipment
- Analyzing oscillators
- Checking Piezo-electric crystals
- Monitoring communications frequencies
- Spotting spurious oscillations
- Telemetering
- Monitoring diathermy and electro-surgical instruments

PANORAMIC RADIO PRODUCTS, INC.
10 SOUTH SECOND AVENUE
MOUNT VERNON, NEW YORK

VARIABLE SCANNING WIDTH FACILITATES ANALYSIS OF CLOSELY ADJACENT SIGNALS

Deflections which tend to merge together, due to the fact that their corresponding signals are closely adjacent in frequency, are separable by means of a front panel control. This control, provided in all standard PANALYZOR and PANADAPTOR models covering maximum sweepwidths from 50 KC to 20 mc, allows continuous adjustment of the scanning width from maximum down to zero.

As the sweepwidth (scanning width) is reduced, the center deflection broadens. The side deflections also broaden, but those farthermost from center progressively move off both sides of the screen as they fall outside the scanning range. Reduction in sweepwidth causes the intersection points of merged pips or deflection to appear farther down on the skirts and thus they are better resolved for individual analysis.

Sharpest resolution is obtained in those models having the narrowest maximum sweepwidths. Refer to specifications.

The PANADAPTOR and PANALYZOR furnish identical presentations, but each has special features which, besides resolution and maximum sweepwidth considerations, determine the choice of instrument for particular applications.

PANADAPTOR SPECIAL FEATURES

(a) PANADAPTOR units operate in conjunction with receivers having an I.F. equal to the PANADAPTOR input frequency. (Refer to specifications.) Interconnection is made at the output of the receiver converter. By receiver action observation of local or remote signals is possible.

(b) Total frequency coverage is equal to the range of the receiver.

(c) Center deflection corresponds to the signal to which the receiver is tuned.

(d) Flatness of amplitude response is the product of receiver selectivity, at the output of the converter, and the fixed bandpass characteristic of the PANADAPTOR. Inasmuch as receiver selectivity will vary not only from set to set, but also throughout the tuning range, overall flatness of response will not be fixed. Therefore the relative amplitudes of signal deflections distributed across the screen may not correspond with actual relative signal levels.

(e) Presentation of images is mainly a function of the image rejection characteristics of the receiver. Moreover, images can be identified since, as the receiver is tuned, the image deflections move in a direction opposite to that of regular signals.

PANALYZOR SPECIAL FEATURES

(a) PANALYZOR equipments operate with an external signal generator which is attached to one of two input connectors. The signal or signals to be examined are coupled directly from their source through a coaxial cable to the other input connector.

(b) Range coverage is from 200 mc down to the input center frequency of the PANALYZOR selected. (Refer to specifications.)

(c) The signal will cause a centered deflection when the generator is set at a frequency equal to the signal frequency $\pm$ the PANALYZOR input center frequency.

(d) Flatness of amplitude response is dependent solely upon the bandpass characteristics of the PANALYZOR and is therefore fixed within the limits indicated in the specifications.

(e) Image presentation is a function of the image rejection characteristics of the PANALYZOR.

USES

The uses detailed below represent but a few of the many applications of PANALYZOR and PANADAPTOR. Inquiries are invited regarding the application of these instruments to particular requirements.

PANALYZOR and PANADAPTOR offer far superior means of examining oscillator performance, especially in the VHF regions where small changes in circuit constants, both physical and electrical, produce large frequency variations. Oscillators can be checked against standards for determining frequency and the effects of load changes, component variations, shock, and humidity and thermal changes upon frequency stability. Parasitic oscillations are easily spotted and identified.

Diathermy units, dielectric and induction heaters, and other industrial RF equipments can be easily analyzed and monitored for off-frequency operation by PANALYZOR or PANADAPTOR. Either two separate crystal controlled oscillators or a single modulated crystal oscillator may be used as standards which produce marker pips indicating the permissible frequency limits of operation.

PANADAPTOR equipments are uniquely suited for monitoring communications frequencies at airports and communication centers for possible off-frequency transmissions. The immediate appearance of such signals can be detected instantaneously and tuned to quickly with absolute minimum chances of message loss.

Both instruments are invaluable in universities and technical schools for their graphic indications of various R.F. phenomena, making them easy to understand and simple to remember.

Unlike any other instrument the PANALYZOR shows pictorially the static and dynamic operating characteristics of FM sources. All components of an FM signal, the carrier and its associated sidebands, are instantaneously displayed in terms of frequency and amplitude, enabling analysis of energy distribution, frequency deviation, carrier shift and linearity of modulation. Static deviations may be calculated by noting the zero levels of either the carrier or adjacent sidebands.

Piezo-electric crystal blanks and crystals in the process of being ground, can be compared against a standard for frequency and activity. Horizontal displacement of the deflection of the test crystal from the standard deflection indicates the direction and magnitude of frequency difference. Small differences in frequency may be made more prominent by reducing the scanning width. Thus tedious frequency checks by heterodyne beating are eliminated.

DESCRIPTION

In many respects the PANALYZOR and PANADAPTOR resemble a highly efficient superheterodyne receiver in operation. The circuits consist of an R.F. amplifier, converter, local sweeping oscillator, I.F. amplifier, detector, video amplifier, cathode ray tube indicator and associated sweep circuits.

The main difference between PANALYZOR and PANADAPTOR lies in the input stage. The input of the PANALYZOR is an aperiodic mixer in which the test signals are mixed with the output of the external signal generator. The mixed difference frequencies are then amplified by a bandpass stage, the output voltages of which are applied to a second converter and are in the same ratio as the original signal strengths.

The input stage of the PANADAPTOR is connected through an isolating element to the output of the receiver converter. This stage has bandpass characteristics which compensate for receiver selectivity at the point of connection so as to obtain a relatively flat response at its output which is fed to a converter.

A portion of the converter functions as the local oscillator whose frequency is periodically varied between established limits. In the course of these frequency excursions, the oscillator successively beats with each of the signals present in the converter, producing a series of signals of the proper intermediate frequency to be amplified by the sharply tuned or narrow-band I.F. amplifier which follows: These successive I.F. pulses, separated from each other by time, are then fed to a diode detector and applied to the vertical plates of the cathode ray tube through a DC coupled video amplifier.

REACTANCE-TUBE CIRCUIT

The frequency modulation of the oscillator is produced by the reactance-tube method. Changes in oscillator frequency depend upon the potential applied to the reactor grid. The source of modulating voltage for the reactor grid is a sawtooth oscillator of the blocking-tube variety.

THE SAWTOOTH GENERATOR

The sawtooth generator performs two functions simultaneously. First, it varies the voltage applied to the grid of the reactor. Second, through an amplifier it sweeps the electron beam of the CRT horizontally across the face of the tube.

The sawtooth frequency is generally synchronized to one-half the line frequency, i.e., 30 cycles per second. This means that the local oscillator completes 30 excursions during each second and that the beam sweeps horizontally 30 times in each second. The voltage pulses produced by the successively heterodyne signals are detected, amplified, and fed to the vertical CRT deflection plates, producing pips of different amplitudes which are proportional to the corresponding voltages.

As these deflections appear, the horizontal motion of the electron beam causes each one to appear at its own position on the screen. The repetitive action of the sawtooth generator, synchronized with the sweeping of the oscillator and the beam of the CRT, permits each deflection to appear in the same place 30 times in each second. Persistence of vision and fluorescence create the illusion of constant, steady indications.

The direct-coupled video amplifier is used in order to examine the carrier for hum, noise, etc. Also it eliminates DC reinsertion problems in reproducing each "pip."

SPECIFICATIONS CHART
PANADAPTOR

	MODEL SA-3 Types							MODEL SA-6 Types			
	T-50	T-100	T-200	T-1000	T-1000	T-3000	T-6000	T-1000	T-5000	T-10000	T-20000
Max. Sweepwidth	50 KC	100 KC	200 KC	1 MC	1 MC	3 MC	6 MC	1 MC	5 MC	10 MC	20 MC
Input Center Freq. Range Factory Aligned to	450-470 KC 455 KC	450-470 KC 455 KC	450-470 KC 455 KC	5.25 MC	10.2 MC	30 MC	30 MC	5.25 MC	16 MC	30 MC	30 MC
Resolution (at max. sweepwidth)	2.5 KC	3.4 KC	4.4 KC	11.0 KC	11.0 KC	*25 KC	*150 KC	11.0 KC	70	†75 KC	†100 KC
Resolution (at 20% of max. sweepwidth)	1.9 KC	2.7 KC	4 KC	9 KC	9 KC	*20 KC	*40 KC	7.5 KC	60	65 KC	75 KC
Sensitivity for ¼"	200 μV	200 μV	200 μV	200 μV	200 μV	1 m V	10 m V	100 μV	75 μV	15 μV	60 μV
Bandpass Characteristic: Amplitude Ratio of Side Peaks to Center Valley	6:1	8:1	30:1	5:1	3:1	4:1	4:1	5:1	20:1	Four Peak Bandpass	Four Peak Bandpass
Coupled to Receiver through	Cond. 5 mmf.	Cond. 5 mmf.	Cond. 10 mmf.	Cond. 10 mmf.	Cond. 10 mmf.	.005 mfd. cond. in series with 27,000 res.	.005 mfd. cond. in series with 27,000 res.	Cond. 10 mmf.	Cond. 25 mmf.	Cathode Follower in Receiver	Cathode Follower in Receiver
R.F. Input Cable	RG-11/U										
Power Source Req.	115/230V., 50-60 cycle										
Power Consumption	55w.	55w.	55w.	55w.	55w.	55w.	55w.	100w.	100w.	105w.	105w.
TUBE SIZE DIMENSIONS NET WEIGHT	3" CRT 13¾" x 7¼" x 13" 44 LBS.							5" CRT 18⅛" x 9⁵⁄₁₆" x 17⅝" 71 LBS.			

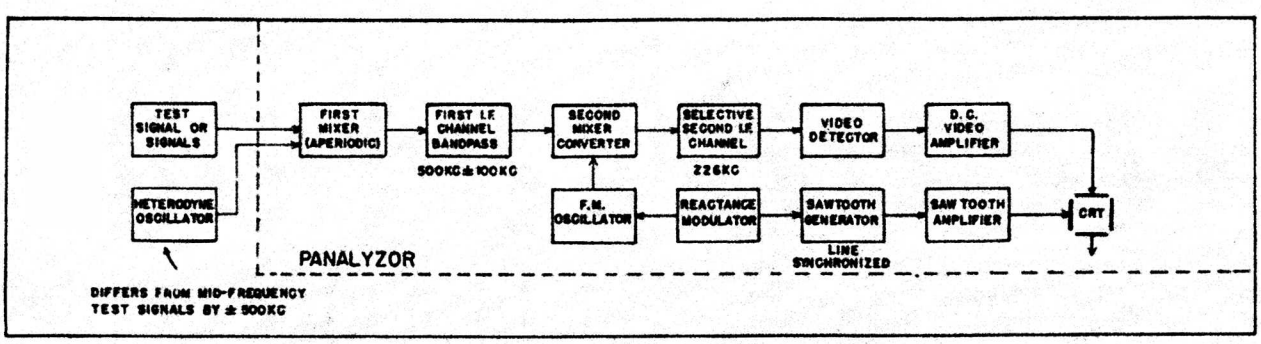
* Resolution varies with sensitivity.
† 250-500 KC resolution available for pulse signal analysis.

SPECIFICATION CHART

PANALYZOR

	MODEL SB-3				MODEL SB-6	
	Types				Types	
	T-50	T-200	T-1,000	T-6,000	T-10,000	T-20,000
Maximum Sweepwidth	50 KC	200 KC	1000 KC	6000 KC	10 MC	20 MC
Input Center Frequency	500 KC	500 KC	5 MC	30 MC	30 MC	30 MC
Bandpass Region	475 KC-525 KC	400 KC-600 KC	4.5 MC-5.5 MC	27 MC-33 MC	25 MC-35 MC	20 MC-40 MC
Bandpass Region Characteristic: Flat to	±5%	±5%	±7%	±12%	±10%	±10%
Image Rejection Ratio at input center frequency: Better than	2500:1	300:1	150:1	300:1	80:1	40:1
Spurious Response: No signal exclusive of images, of a frequency above the bandpass and less than .1V produces a deflection greater than	¼"	¼"	¼"	¼"	¼"	¼"
Direct Sensitivity: Maximum voltage at center frequency required for ¼" deflection	20 μV	20 μV	100 μV	2000 μV	200 μV	1000 μV
Product Sensitivity: Maximum product voltage of external oscillator and test signal required for ¼" deflection	10^{-4} V. — V.	10^{-4} V. — V.	$5x10^{-4}$ V. — V.	10^{-3} V. — V.	10^{-3} V. — V.	$2x10^{-3}$ V. — V.
Resolution: at maximum sweepwidth at 20% of maximum sweepwidth	2.5 KC	4.4 KC	11.0 KC	50 KC	75 KC	100 KC
	1.9 KC	3.8 KC	9 KC	40 KC	65 KC	75 KC
Input Impedance	50 ohms	50 ohms	50 ohms	50 ohms	75 ohms	75 ohms
R.F. Input Cable	RG-8/U	RG-8/U	RG-8/U	RG-8/U	RG-11/U	RG-11/U
Sweep Rate and Wave Form	30 cycle Sawtooth					
Power Source	115/230 V. 50-60 cycle, single phase.					
Power Consumption (Approx.)	60 Watts	60 Watts	60 Watts	60 Watts	100 Watts	100 Watts
TUBE SIZE	SB-3				SB-6	
DIMENSIONS	3" CRT				5" CRT	
NET WEIGHT	13¼" x 7¼" x 13"				18⅛" x 9$^{13}/_{16}$" x 17$^{7}/_{16}$"	
	44 LBS.				71 LBS.	

Resolution is the frequency separation of two signal deflections of equal amplitude which intersect 50% down from their peak amplitudes.



BLOCK DIAGRAM, PANALYZOR MODEL SB-3 TYPE T200