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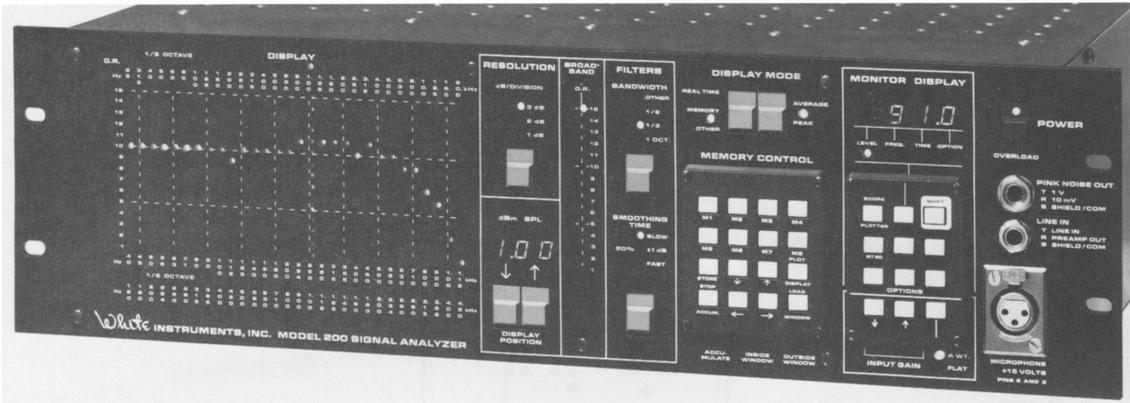
System 200 Signal Analyzer

(Brochure)

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System 200 Signal Analyzer - Brochure



Dear Audio Professional:

How do you describe a microprocessor controlled real time analysis system which took almost three years to create and is still evolving?

Features and functions of this revolutionary new tool are SOFTWARE DEPENDENT. That is, it does its work by executing a COMPUTER PROGRAM, as opposed to being HARDWIRED to accomplish the task.

This approach to the control of the analyzer offers its owner two very important benefits. First, accessories and options, which will be offered in the future as SMART plug-in cards, can be accommodated with little or no change in existing hardware. This makes the System 200 Signal Analyzer truly EXPANDABLE in its features and functions at economically realistic prices. Second, as the technology in our rapidly changing industry evolves, the System 200's personality can be changed by modifying its software to keep it STATE OF THE ART for the foreseeable future.

In this folder you will find features and functions of current production System 200 Signal Analyzers highlighted. For those of you who would like to get into the real nitty-gritty of the analyzer, we would like to offer a copy of the actual user's manual which includes information far beyond the scope of this information package. The price of this manual is \$25.00 and is completely refundable upon purchase of a new System 200 Signal Analyzer.

In the meantime, if I may answer any question or otherwise be of service, please do not hesitate to call on me.

Sincerely,

WHITE INSTRUMENTS, INC.

FEATURES

MICROPROCESSOR CONTROL

Features and functions of the SYSTEM 200 SIGNAL ANALYZER are SOFTWARE DEPENDENT. Everything the analyzer now does, or will do in the future, is the result of running a COMPUTER PROGRAM, as opposed to being hardwired to do the work. The SYSTEM 200 SIGNAL ANALYZER has a built-in hedge against obsolescence, since its personality can be changed to accommodate the rapidly changing technology of our industry.

MODULAR IN CONCEPT

Most of the SYSTEM 200 SIGNAL ANALYZER plugs together with connectors. The advantage of this architecture is that modules can be quickly extracted from the mainframe for service. Exchanging modules with the factory minimizes downtime and makes system updating simple and inexpensive.

EXPANDABLE

The SYSTEM 200 SIGNAL ANALYZER'S mainframe contains three unused card slots. These positions are reserved for future options which will simply plug into the analyzer and expand its capabilities.

INTERCHANGEABLE PLUG-IN FILTER SETS

FILTERS are the HEART of a real time analyzer. The SYSTEM 200 SIGNAL ANALYZER'S filters are supplied on cards which can be quickly installed in the MAINFRAME. Currently Octave Band, One-Third Octave and One-Sixth Octave filter sets are offered. Custom filter sets for unique applications can be discussed. The SYSTEM 200 SIGNAL ANALYZER need never become obsolete due to changes in resolution standards.

8 (EIGHT) NONVOLATILE MEMORIES

The inclusion of 8 MEMORIES in the basic SYSTEM 200 SIGNAL ANALYZER was not superfluous overkill. They add considerable SPEED and CONVENIENCE to the everyday use of the analyzer. When you turn off the power, a NICKEL-CADMIUM battery keeps the memories ALIVE for future reference.

3 SMOOTHING TIME CONSTANTS

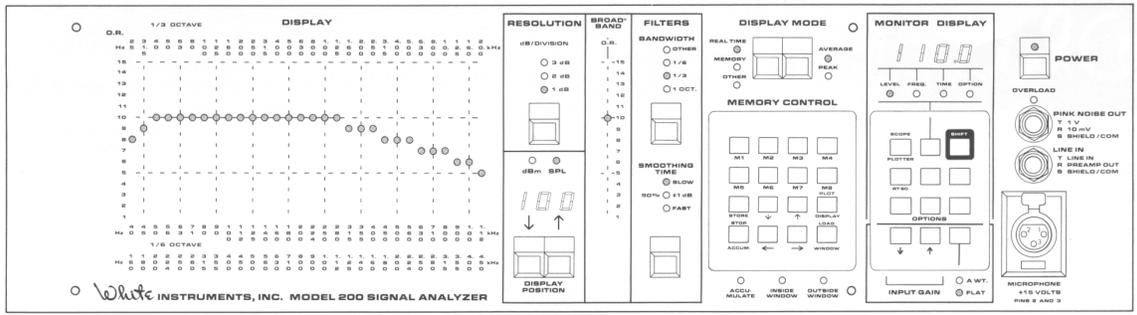
The user can apply either SLOW, 90% ± 1 db, or FAST smoothing rectifiers to the filters via front panel control to provide optimum measurements in a given room situation.

AVERAGE AND PEAK MODE PROCESSING

The SYSTEM 200 SIGNAL ANALYZER processes the incoming signal in AVERAGE and PEAK modes simultaneously. The user can switch between an average or peak display via front panel control – FREE OF TRANSIENTS or WAITING FOR THE FILTERS TO SETTLE. Memory functions are also executed in both modes. The user can display real time or memory data in both modes using a special DUAL DISPLAY feature.

RT-60 MEASUREMENTS

The SYSTEM 200 SIGNAL ANALYZER is programmed to simultaneously make THREE RT-60 EXTRAPOLATIONS based on the FIRST 15 dB, SECOND 15 dB and FIRST 30 dB of incoming signal decay. Successive measurements can be AUTOMATICALLY AVERAGED. Measurements can be made through ANY FILTER installed in the mainframe, or broadband, using any combination of AVERAGE or PEAK MODES, and SLQW, 90% ± 1 dB, or FAST SMOOTHING TIME CONSTANTS. Amplitude data in real time is available on the rear panel to drive a storage oscilloscope or a strip chart recorder.

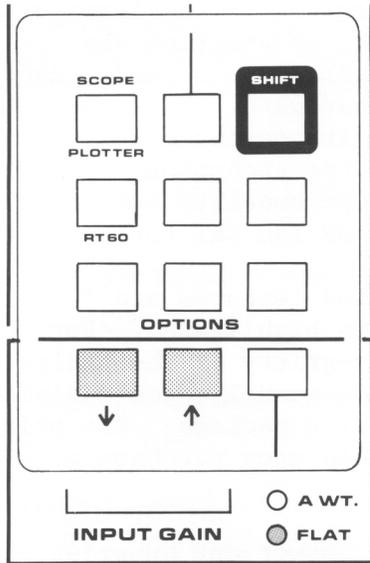


LEVELS AND DYNAMIC RANGE

The SYSTEM 200 SIGNAL ANALYZER processes 45 dB segments of dynamic range in AVERAGE and PEAK MODES simultaneously.

30 dB-spl through 140 dB-spl in 45 dB segments.

-70 dBm through +40 dBm in 45 dB segments.



The 45 dB processing segment of the analyzer's operating range is determined by the BASE LINE VALUE, which is selected by the INPUT GAIN KEYS located on the 12 KEY KEYBOARD. These keys step the BASE LINE VALUE up or down in 10 dB steps.

30, 40, 50, 60, 70, 80, 90, 100 dB-spl

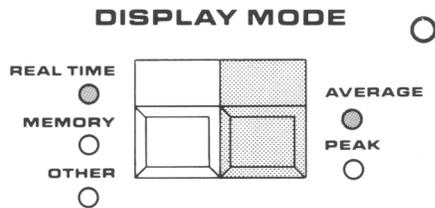
-70, -60, -50, -40, -30, -20, -10, 0 dBm

Any level less than the BASE LINE VALUE is UNDER-RANGE and is ignored by the analyzer.

Any level greater than the sum of the BASE LINE VALUE and 45 dB is OVER-RANGE and is ignored by the analyzer.

AVERAGE AND PEAK DETECTORS

The SYSTEM 200 SIGNAL ANALYZER processes simultaneously through both AVERAGE and PEAK detectors. Therefore memory functions, as well as real time, will be executed in both AVERAGE and PEAK MODES.



The AVERAGE MODE employs circuitry which smoothes the signal according to one of the three SMOOTHING TIME CONSTANTS selected.

The PEAK MODE allows the signal to rise almost instantly, followed by a slow decay similar to many peak program meters. The rate of decay is set by the SMOOTHING TIME CHANGE KEY from slow to fast.

Since processing in both modes is continuous, switching the display between them is transient free.

A special dual display feature of the analyzer allows the user to simultaneously view both modes. This feature may be used in either the REAL TIME or

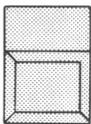
MEMORY MODES.

The SYSTEM 200 SIGNAL ANALYZER'S mainframe will accommodate a total of thirteen filter cards. This will allow the analyzer to hold a complete set of one-third octave filters (switchable to octave band) plus a set of one-sixth octave filters.

FILTERS

BANDWIDTH

- OTHER
- 1/6
- 1/3
- 1 OCT.



The user may select between his filter sets, when installed, via the BANDWIDTH CHANGE KEY.

Currently three sets of filters are offered for the SYSTEM 200.

200-01-00

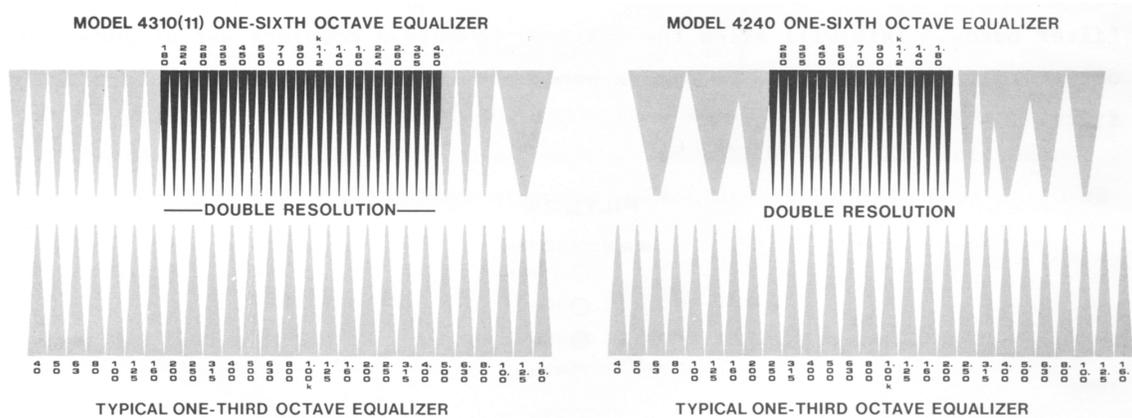
Thirty, ONE-THIRD octave, three-pole filters on standard I.S.O. Centers from 25 Hz through 20 kHz (ANSI S1.11, 1971, Class III). SWITCHABLE to ten, OCTAVE BAND, three-pole filters on I.S.O. Centers from 31.5 Hz through 16 kHz (ANSI S1.11, 1971, Class II). (8 cards)

The octave band filters ARE NOT derived from summing three, one-third octave filters.

200-02-00

Thirty, ONE-SIXTH octave, two-pole filters on standard I.S.O. One-Sixth Octave Centers from 40 Hz through 1120 Hz. (5 cards)

This set of filters is used in conjunction with the one-third octave filter set to tune Models 4301 6 4303 One-Sixth Octave Equalizers.



200-03-00

Thirty, ONE-SIXTH Octave, two-pole filters on standard I.S.O. One-Sixth Octave Centers from 160 Hz through 4500 Hz. (5 cards)

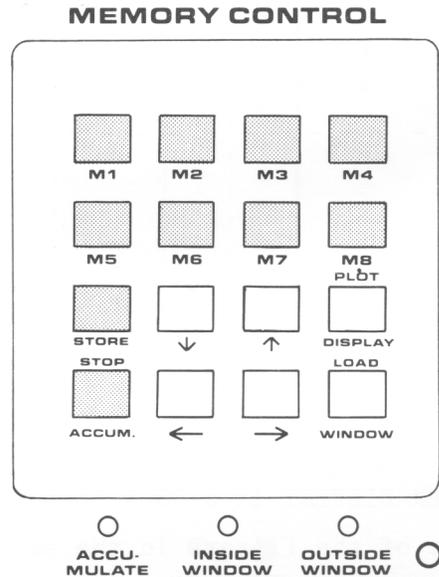
This set of filters is used in conjunction with the one-third octave filter set to tune Models 4240, 4310, & 4311 One-Sixth Octave Equalizers.

Three of the five cards composing each of the one-sixth octave filter sets are the same (160 Hz through 1120 Hz). Thus, in either case, adding two cards will give the user full capability to tune EVERY one-sixth octave equalizer currently manufactured by White Instruments, Inc. (Please refer to your One-Sixth Octave Equalizer Bulletin.)

An important feature of the SYSTEM 200 is that it switches between its one-third and one-sixth octave filters without transients. Since both filter sets are continuously processing the incoming signal, there is no waiting for the filters to settle after switching.

The SYSTEM 200 SIGNAL ANALYZER has 8 NONVOLATILE MEMORIES

When the power is turned off, a nickel-cadmium battery keeps the memories alive for future reference.



A memory is addressed by a key (M1-M8) located on the 16 KEY KEYBOARD.

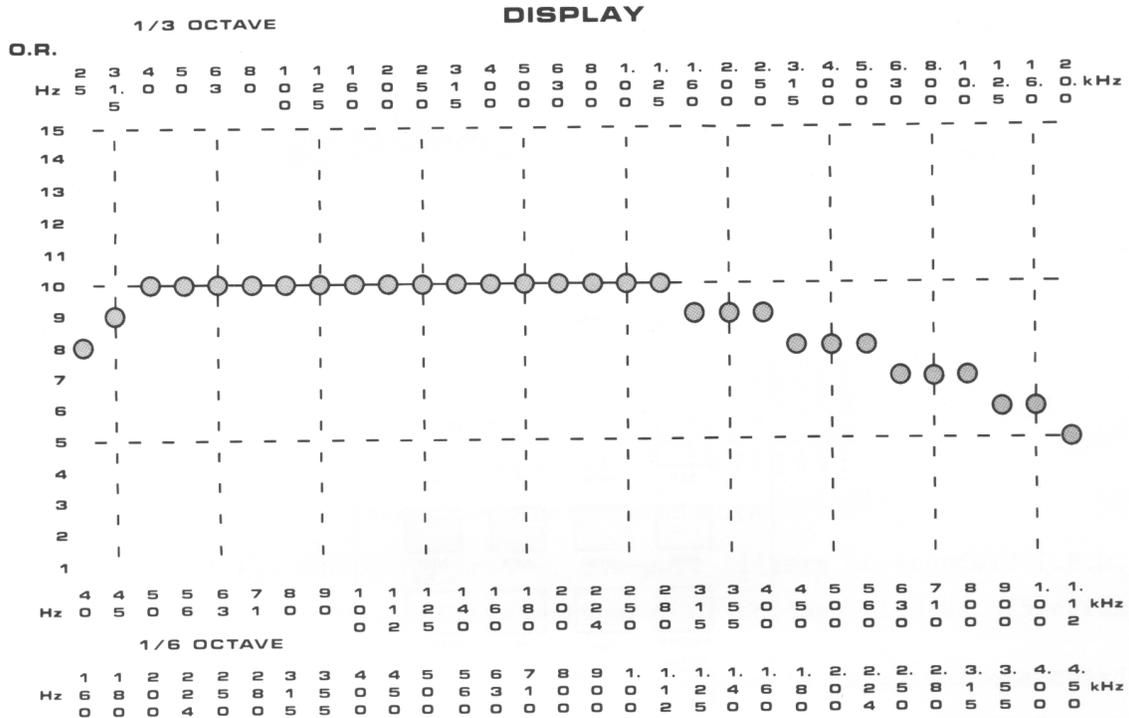
STORE IN MEMORY FUNCTION

Store in memory takes a "snapshot" of real time. This "snapshot" is made with the prevailing FILTER SET, SMOOTHING TIME, WEIGHTING, and GAIN status of the analyzer. Forty-five dB of dynamic range is stored in both AVERAGE and PEAK MODES, along with the analyzer's status. Once stored, the response can be viewed on the FILTER DISPLAY, output to an X-Y plotter or oscilloscope, and interrogated with the VERTICAL CURSOR.

Up to THREE memories may be displayed simultaneously on the FILTER DISPLAY or on an oscilloscope. This is a timesaving, convenient feature when comparing multiple microphone locations or left-center-right speakers. AVERAGE or PEAK responses are selected for display by the DISPLAY NODE CHANGE KEY. A special mode exists for simultaneous display of BOTH the AVERAGE and PEAK RESPONSE.

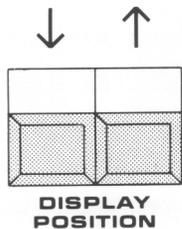
ACCUMULATE IN MEMORY FUNCTION

The ACCUMULATE FUNCTION is similar to the STORE FUNCTION. Maximum levels are accumulated. Two accumulations may take place simultaneously and can progress in background while the user is displaying real time or the contents of a memory, including the memories involved in the accumulations. The user may stop the accumulations at any time with the STOP KEY.

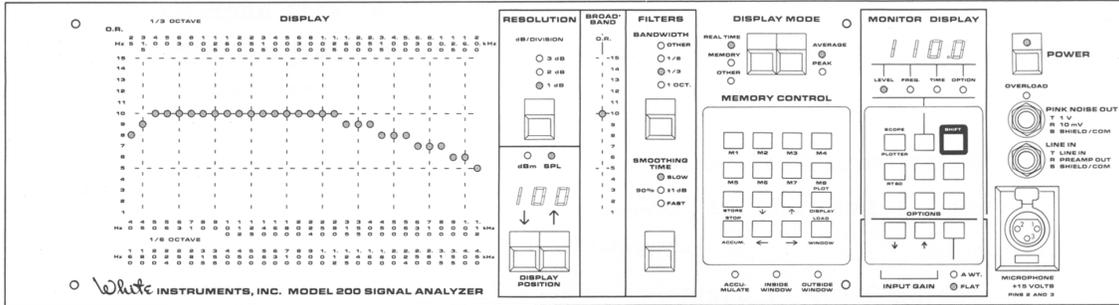


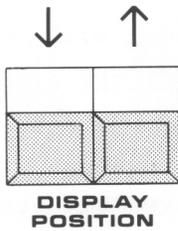
FILTER DISPLAY

The FILTER DISPLAY is a 30 x 16 matrix of high intensity LEDs. Each column relates to one of the filters in the selected filter set. The 16th row of lights is the over-range row. If the RESOLUTION selected for display is 3 dB/LIGHT, the dynamic range of the FILTER DISPLAY is 45 dB plus over-range. If a resolution of 2 dB/LIGHT or 1 dB/LIGHT is selected, the dynamic range of the FILTER DISPLAY is 30 dB or 15 dB respectively.



When 2 dB/LIGHT or 1 dB/LIGHT RESOLUTION is selected, the FILTER DISPLAY may be rolled down or up with the DISPLAY POSITION KEYS. In this way, the user may view the entire 45 dB dynamic range of the analyzer at higher resolution.





POSITION DISPLAY

Currently the POSITION DISPLAY serves two purposes:

1. When the VERTICAL CURSOR is used, it indicates the frequency of the octave band or one-third octave filter being pointed to by the VERTICAL CURSOR. If the one-sixth octave filter set is selected, the POSITION DISPLAY will indicate the channel number, rather than the frequency, of the filter to which the VERTICAL CURSOR is pointing.
2. Without the VERTICAL CURSOR, the POSITION DISPLAY will indicate the BASE LINE VALUE of the FILTER DISPLAY and the BROADBAND COLUMN in dB-spl or dBm.

Example:

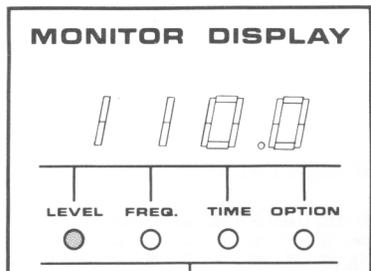
POSITION DISPLAY indicates "60". RESOLUTION indicates "3 dB", dB-spl indicator is "on".

-Then-

The ZERO row of lights on the FILTER DISPLAY or BROADBAND COLUMN would have a value of 60 dB-spl. (The ZERO row of lights is an imaginary row of lights at the bottom of the FILTER DISPLAY.) The first light would have a value of 63 dB-spl, the second light a value of 66 dB-spl, etc., etc.

When the FILTER DISPLAY is rolled down and up, the POSITION DISPLAY will always indicate the proper BASE LINE VALUE, regardless of the RESOLUTION selected.

MONITOR DISPLAY



Currently the MONITOR DISPLAY serves two purposes:

1. It indicates the BROADBAND level to the nearest 0.5 dB. When the VERTICAL CURSOR is pointing to a FILTER CHANNEL, the MONITOR DISPLAY will indicate the level of that filter to the nearest 0.5 dB. During this function, the MONITOR DISPLAY INDICATORS will indicate LEVEL.
2. When the RT-60 MODE is entered, the MONITOR DISPLAY displays the selected RT-60 EXTRAPOLATION in seconds to the nearest 0.001 second. The MONITOR DISPLAY INDICATORS will indicate TIME in the RT-60 MODE.

INDICATORS

High intensity LED indicators monitor the various status and analyzer modes.

One set of indicators, the RESOLUTION INDICATORS, has two functions. (See RT-60)

RT-60 MEASUREMENTS

The SYSTEM 200 SIGNAL ANALYZER is programmed to execute RT-60 measurements and allow the user a great deal of versatility with some rather unique features.

FILTERS

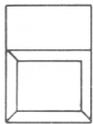
BANDWIDTH

OTHER

1/6

1/3

1 OCT.



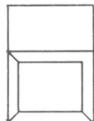
1. RT-60 measurements can be made either BROADBAND or through ANY FILTER installed in the analyzer.

SMOOTHING TIME

SLOW

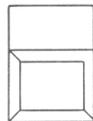
90% ± 1 dB

FAST



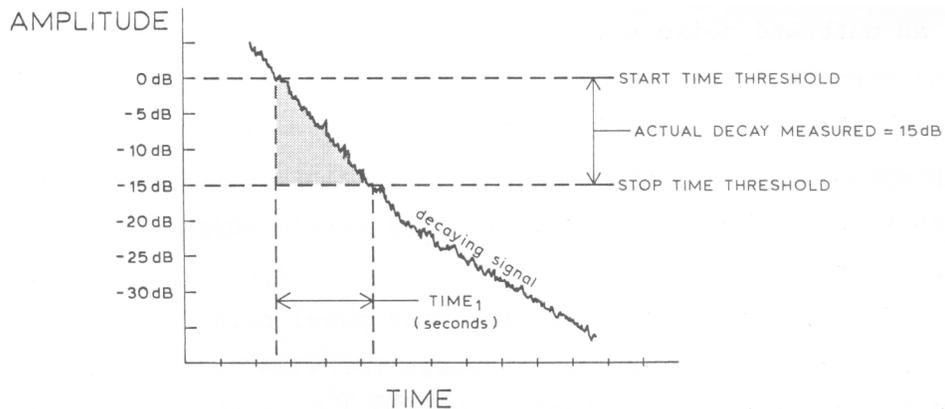
AVERAGE

PEAK

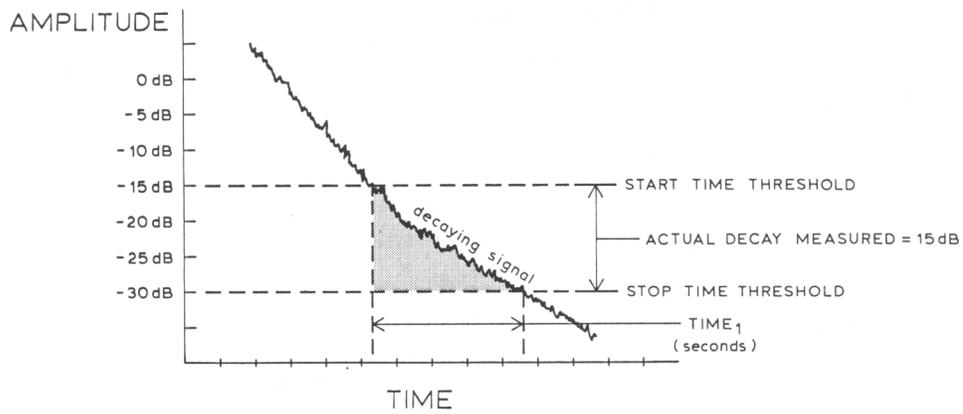


2. The user may apply either the AVERAGE or PEAK detector and his choice of SMOOTHING rectifiers (SLOW, 90% ± 1 dB, or FAST) to the filter for the measurement.

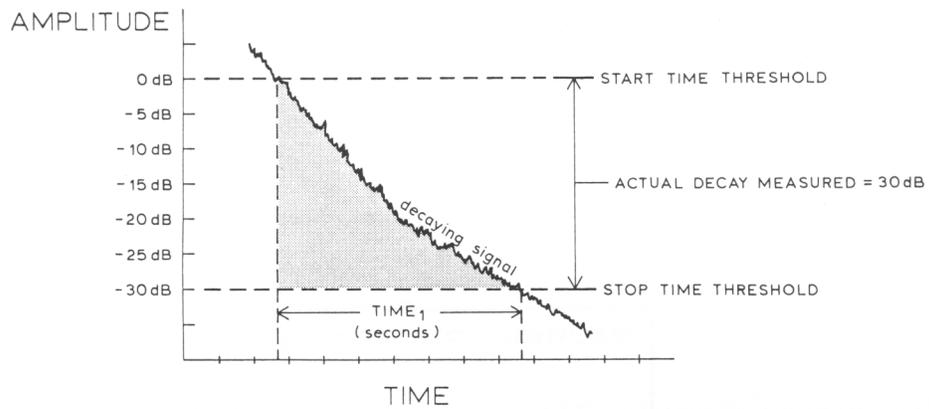
3. THREE RT-60 extrapolations are made SIMULTANEOUSLY:



A. Based on the FIRST 15 dB decay



B. Based on the SECOND 15 dB decay



C. Based on 30 dB decay

4. Successive measurements can be automatically averaged.



5. When the analyzer's built-in PINK NOISE GENERATOR is used to excite the room, it is automatically gated off at the beginning of the measurement.
6. When an outboard noise source is used to excite the room, the measurement begins when it is turned off. Impulse room excitation (balloons and pistols) also automatically begins the measurement.
7. The program will warn the user when a possible error exists (such as a sudden rise in the room's ambient noise level) which interferes with the measurement.
8. Amplitude data is available at the rear panel outputs to drive a strip chart recorder or storage oscilloscope for viewing the decay curve.
9. The REAL TIME MODE can be used as an aid in establishing appropriate excitation levels for the RT-60 measurements.

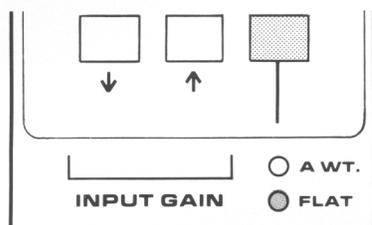
PLOTTER AND OSCILLOSCOPE OUTPUTS

The contents of any memory can be output through the back panel to an X-Y plotter. The program will scale the data, if the user desires, by drawing the X and Y axis complete with divisions, or the user may supply his own compatible paper. The resolution of the plot is 0.5 dB.

An oscilloscope which can be externally triggered may be connected to the rear panel and will mimic the display on the FILTER DISPLAY and BROADBAND COLUMN.

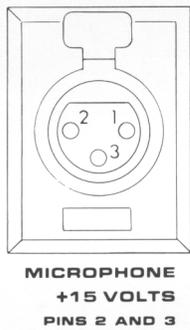
Since the analyzer provides separate outputs for AVERAGE and PEAK amplitude data, a dual trace oscilloscope will yield both displays simultaneously.

WEIGHTING FILTERS



The analyzer is equipped with a built-in "A" WEIGHTING filter. Other filters to be used in series with the analyzer's inputs may be ordered from White Instruments, Inc.

MICROPHONE INPUT AND POWER



Microphone input is via a front panel XLR connector. The input is transformer isolated and provides +15 volt power. The output of the MICROPHONE PREAMPLIFIER is available on both the front and rear panels to drive other instrumentation.

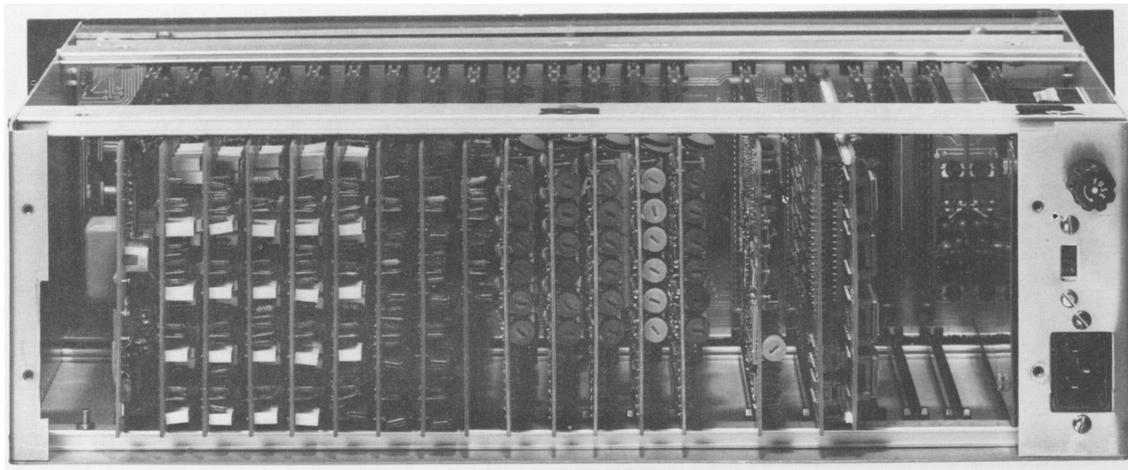
POWER REQUIREMENTS



A rear panel switch selects either 115 and 230 volts A.C. The analyzer will operate on either 60 or 50 Hertz current. Custom 100 volt models are currently available, and other special power requirements can be discussed.

PHYSICAL

Standard 19 inch rack mount. 5.25 inches high by 10.5 inches deep. Weight approximately 30 pounds.



SUGGESTED RETAIL PRICE LIST

August 1, 1985

MODEL	DESCRIPTION	RETAIL
200-00-00	SYSTEM 200 SIGNAL ANALYZER MAINFRAME: Includes all basic system software and RT-60 feature, 5.25" x19", 21 lbs.	3600.00
200-00-01	Front Panel Sub Assembly to 200-00-00 Mainframe.	950.00
200-00-02	Power Supply Sub Assembly to 200-00-00 Mainframe.	350.00
200-00-03	Preamplifier Card Sub Assembly to 200-00-00 Mainframe.	300.00
200-00-04	Interface Card Sub Assembly to 200-00-00 Mainframe.	325.00
200-00-05	Control Card Sub Assembly to 200-00-00 Mainframe.	900.00
200-01-00	ONE-THIRD OCTAVE/OCTAVE BAND FILTER SET: 30 one-third octave, three-pole filters from 25 Hz through 20 kHz on I.S.O. centers. Plus 10 octave band, three-pole filters from 31.5 Hz through 16 kHz on I.S.O. centers. (200-01-01 through 200-01-08 cards. Sold only as a complete set.)	3000.00
200-02-00	ONE-SIXTH OCTAVE FILTER SET: 30 one-sixth octave, two-pole filters from 40 Hz through 1120 Hz on I.S.O. centers. Analyzer filter set to match one-sixth octave sections of Models 4301, 4303 equalizers. Intended to be installed in System 200 Signal Analyzer Mainframe 200-00-00, above, separately or beside 200-01-00 one-third octave/octave band filter set. (200-02-02 through 200-02-06 cards.)	2000.00
200-02-01	ONE-SIXTH OCTAVE FILTER CARD: Six filters... 20, 22.4, 25, 28, 31.5, 35.5 Hz.	400.00
200-02-02	ONE-SIXTH OCTAVE FILTER CARD: Six filters, included in 200-02-00. 40, 45, 50, 56, 63, 71 Hz.	400.00
200-02-03	ONE-SIXTH OCTAVE FILTER CARD: Six filters, included in 200-02-00. 80, 90, 100, 112, 125, 140 Hz.	400.00
200-02-04	ONE-SIXTH OCTAVE FILTER CARD: Six filters, included in 200-02-00 and 200-03-00. 160, 180, 200, 224, 250, 280 Hz.	400.00
200-02-05	ONE-SIXTH OCTAVE FILTER CARD: Six filters, included in 200-02-00 and 200-03-00. 315, 355, 400, 450, 500, 560 Hz.	400.00
200-02-06	ONE-SIXTH OCTAVE FILTER CARD: Six filters, included in 200-02-00 and 200-03-00. 630, 710, 800, 900, 1.0 k, 1.12 kHz.	400.00
200-02-07	ONE-SIXTH OCTAVE FILTER CARD: Six filters, included in 200-03-00. 1.25 k, 1.4 k, 1.6 k, 1.8 k, 2.0 k, 2.24 kHz.	400.00
200-02-08	ONE-SIXTH OCTAVE FILTER CARD: Six filters, included in 200-03-00. 2.5 k, 2.8 k, 3.15 k, 3.55 k, 4.0 k, 4.5 kHz.	400.00
200-03-00	ONE-SIXTH OCTAVE FILTER SET: 30 one-sixth octave,	2000.00

two-pole filters from 160 Hz through 4.5 kHz on I.S.O. centers. Analyzer filter set to match one-sixth octave sections of Models 4310, 4311, 4240 equalizers. Intended to be installed in System 200 Signal Analyzer Mainframe 200-00-00, above, separately or beside 200-01-00 one-third octave/octave band filter set. (200-02-04 through 200-02-08 cards.)

200-11-00	HEAVY DUTY FOAM-LINED FLIGHT CASE.	250.00
200-12-00	User's Manual for System 200.	50.00
200-13-00	Service Manual and Two Extender Cards for System 200.	125.00
200-16-00	Intelligent, Internal I/O Controller Option – Adds Nine Functions to the Basic Analyzer.	1000.00
200-17-00	Function Generator Option – 200-16-00 Is Prerequisite Generates: Pink Noise, White Noise; One-Third Octave Band Limited Noise; Sine, Square and Triangle on I.S.O. One-Third Octave Centers.	700.00

PLUG-IN OPTIONS

200-16-00 Option: INTELLIGENT INTERNAL IIO CONTROLLER

LOAD MEMORY:

A user generated, octave band, one-third octave, or one-sixth octave response may be loaded into any of the analyzer's eight memories to a resolution of 0.5 db.

CLEAR MEMORY:

The filter amplitude and broadband amplitude contents of any memory may be erased.

TRANSFER MEMORY:

The contents of any memory may be duplicated in any other memory.

DUAL DISPLAY – REALTIME AND MEMORY:

Real time is displayed simultaneously with up to two memories.

REALTIME \geq MEMORY:

Real time amplitudes are compared with those of a memory. Values, GREATER than or equal to the memory, are accumulated in a second memory. Both the reference memory and the accumulator memory may be displayed during the function.

REALTIME \leq MEMORY:

Same as above except amplitudes, LESS than or equal to the reference memory, are accumulated.

INSIDE WINDOW:

A window is the amplitude difference between two reference responses stored in memories. Real time amplitudes are compared with both references and those falling WITHIN the window are accumulated in a third memory. All three memories may be displayed during the function.

OUTSIDE WINDOWS:

Same as above except that real time amplitudes falling OUTSIDE the window are accumulated and viewed.

Hardware and software support for the optional 200-17-00 FUNCTION GENERATOR.

200-17-00 Option: FUNCTION GENERATOR

PREREQUISITE:

This option is dependent upon the program and memory circuitry of the 200-16-00 option: INTELLIGENT INTERNAL I/O CONTROLLER for control of the generator and interface with the rest of the analyzer.

ONE-THIRD OCTAVE BAND LIMITED NOISE:

Two-pole band limited noise on I.S.O. one-third octave centers from 25 Hz through 20 kHz.

SINE WAVE:

Generated on I.S.O. one-third octave centers from 25 Hz through 20 kHz.

SQUARE WAVE:

Generated on I.S.O. one-third octave centers from 25 Hz through 20 kHz.

TRIANGLE WAVE:

Generated on I.S.O. one-third octave centers from 25 Hz through 20 kHz.

PINK NOISE:

Same as standard equipment on System 200 Analyzer main frame.

WHITE NOISE:

Pinking filter is bypassed.

ON/OFF CONTROL:

Signals from the function generator may be turned on or off from the analyzer's front panel.

T60 PROGRAM INTERFACE:

The function generator is fully interfaced with the T60 software. Any of the six functions may be used for room excitation when making T60 measurements. The signal from the function generator will be automatically gated by the T60 program.