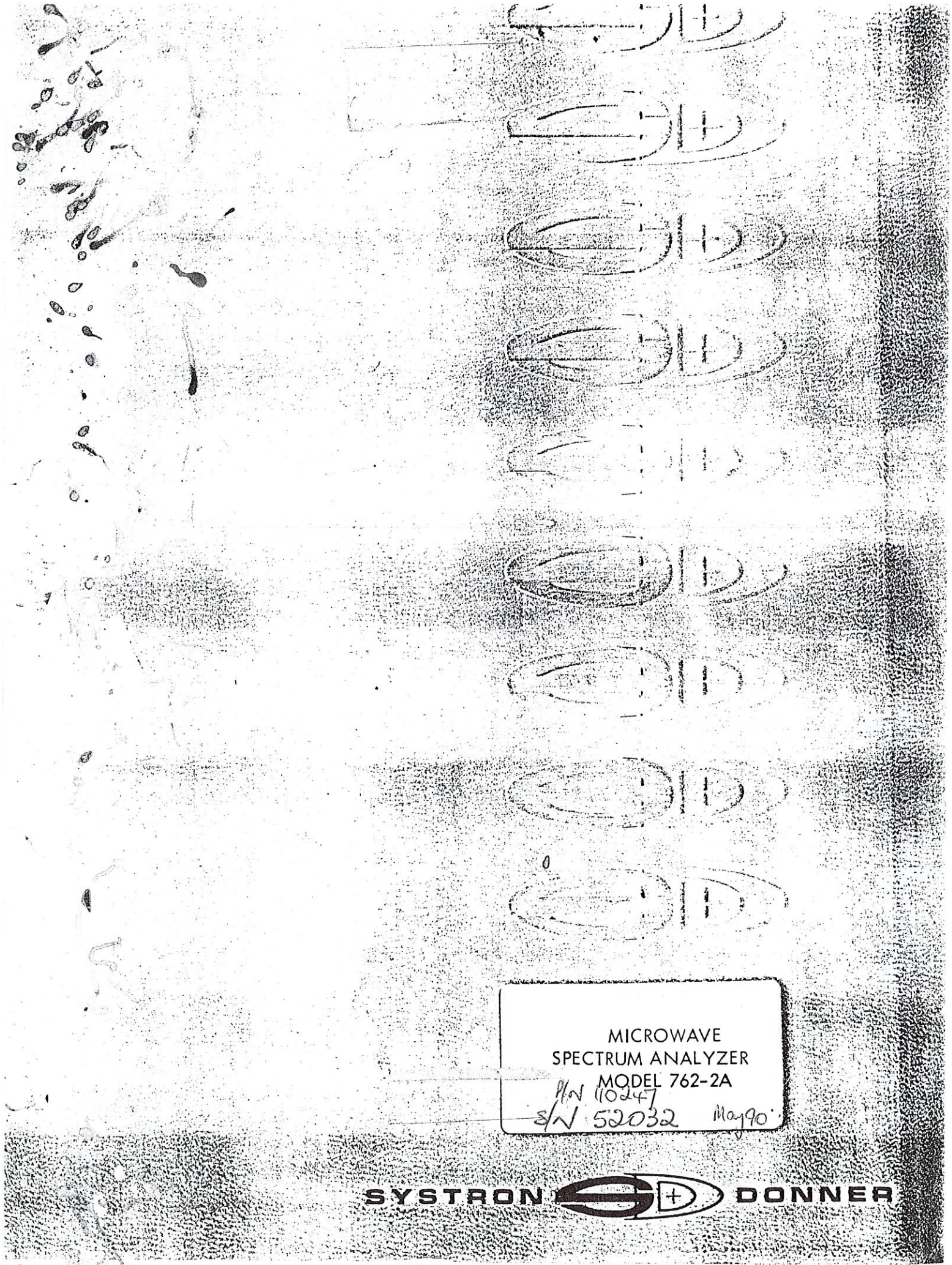

MICROWAVE
SPECTRUM ANALYZER
MODEL 762-2A

P/N 110247
S/N 52032 May 90

SYSTRON DONNER

OPERATION AND SERVICE MANUAL

MICROWAVE SPECTRUM ANALYZER

SYSTRON-DONNER MODEL 762-2A

MICROWAVE
SPECTRUM ANALYZER
MODEL 762-2A

SYSTRON DONNER CORPORATION

Manual Part No. 110578

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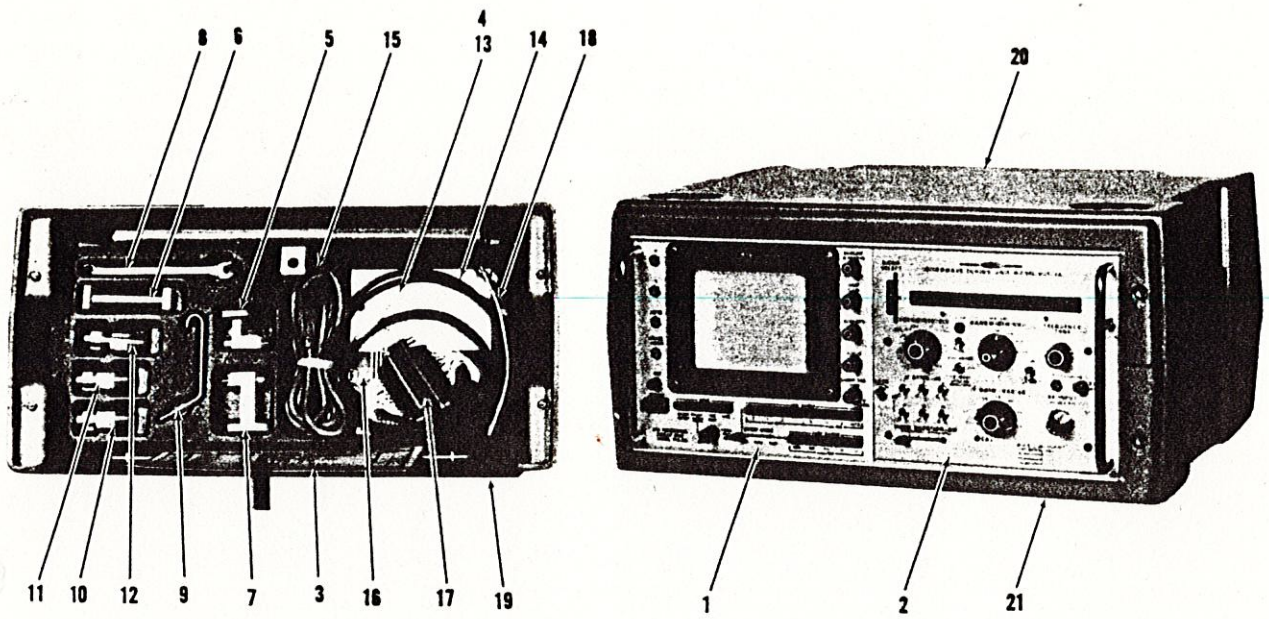

1. STANDARD PERSISTENCE DISPLAY UNIT, MODEL 712-2A
2. MICROWAVE TUNING UNIT, MODEL 809-2A
3. LAMINATED PARTS LIST
4. LABEL, 230V FUSE
5. MIXER, MODEL 7123A
6. TRANSITION, 26.5 - 40.0 GHz
7. MIXER, KU BAND, MODEL 7120A
8. WRENCH
9. BOARD EXTRACTOR TOOL
10. ATTENUATOR, FIXED RES N-PAD 10 dB
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Figure 1-1. Systron-Donner Model 762-2A
Microwave Spectrum Analyzer

SECTION I

INTRODUCTION AND DESCRIPTION

1-1. SCOPE

1-2. This manual contains general description, installation data, operating instructions, theory of operation, performance check and calibration procedures, and diagrams for the Systron-Donner Model 762-2A Microwave Spectrum Analyzer (Figure 1-1). The manual is organized into the following sections:

Section I: Introduction and Description. This section contains general descriptive data and performance specifications for the Model 762-2A.

Section II: Installation and Setup. This section contains installation instructions and data for the Model 762-2A.

Section III: Operation. This section describes the operating controls and indicators, and contains general operating procedures for the Model 762-2A.

Section IV: Theory of Operation. This section contains a block diagram level functional description of the Model 762-2A.

Section V: Maintenance. This section contains instructions for servicing and repair of the Model 762-2A.

Section VI: Performance Checks. This section contains complete performance check procedures for the Model 762-2A providing verification that the instrument is operating within its performance specifications.

Section VII: Calibration Procedures. This section contains procedures for adjusting and calibrating the Model 762-2A.

Section VIII: Parts List. This section contains the list of replaceable parts for the Model 762-2A.

Section IX: Diagrams. This section contains interconnection and schematic diagrams for the Model 762-2A.

1-3. DESCRIPTION OF EQUIPMENT

1-4. The Model 762-2A Microwave Spectrum Analyzer, hereinafter referred to as the analyzer, is a self-contained field and laboratory spectrum analyzer which operates in the frequency range for 10 MHz to 40 GHz. The analyzer consists of two modules, the Model 712-2A Standard Persistence Display Unit and the Model 809-2A Microwave Tuning Unit, in an enclosure with a removable cover. Accessories and tools stored in the enclosure removable cover include the following:

Mixer, Part No. 110571
Mixer, Model 7120A, KU Band, Part No. 109334
Transition, 26.5-40.0 GHz, Part No. 110572

Fuse 1/2A, SB, 250V, Part No. 107592
Warning Tag for Fuse, Part No. 109278
Attenuator, Fixed Res N-Pad 10 DB, Part No. 108326
Attenuator, Fixed Res N-Pad 20 DB, Part No. 108327
Attenuator, Fixed Res N-Pad 40 DD, Part No. 108328
External Mixer Cable, Part No. 110567
Power Line Cable, Part No. 107089
Extender Card Assembly, Part No. 10961701
Tuning Unit Extender Cable, Part No. 109618
IF Rack Extender Cable, Part No. 109620
Coax Fitting Wrench, Part No. 109623
Board Extractor Tool, Part No. 109241
An Operation and Service Manual, Part No. 110578, is also supplied with each instrument

1-5. CAPABILITIES AND PERFORMANCE

1-6. The Model 762-2A microwave spectrum analyzer is intended for multiple laboratory or field uses in connection with communications and surveillance equipment. Detailed performance specifications for the Model 762-2A are given in table 1-1. Salient features of the system are summarized in the following paragraphs.

1-7. EXTERNAL POWER REQUIREMENTS. The Model 762-2A is capable of operating on AC line voltage of 115/230 ±10% volts, 50 to 60/400 Hz, single phase. Power dissipation is approximately 52 watts.

1-8. FREQUENCY RANGE. The Model 762-2A uses fundamental and harmonic mixing to cover the frequency range from 10 MHz to 40 GHz. This frequency range is covered in seven bands, with band selection accomplished by a front panel control. The frequency reading is indicated on a slide rule dial which is accurate to within 1% of dial reading ±2 MHz.

1-9. HORIZONTAL DISPLAY. The frequency scan width on the horizontal (frequency) display is adjustable with 17 calibrated fixed positions of the scanwidth control between 10 kHz (1 kHz/division) and 2 GHz (200 MHz/division) full scale. A zero dispersion mode is also provided. The sweep time is selectable in seven calibrated steps between 30 seconds (3 seconds per division) to 30 milliseconds (3 msec per division). In the fast sweep mode, five calibrated sweep speeds are provided from 10 milliseconds (1000 microseconds per division) to 100 microseconds (10 microseconds per division). The sweep can be internal free-running, synchronized to the video trigger, to the AC power line, or initiated by a single sweep pushbutton on the front panel. Manual sweep (controlled by a single-turn-potentiometer on the front panel) can also be selected.

1-10. VERTICAL DISPLAY. Either a linear or logarithmic amplitude may be selected. In the linear display mode, the display amplitude is proportional to the signal voltage. In the logarithmic display mode, the display amplitude is compressed according to a logarithmic function.

1-11. STABILIZATION. The first local oscillator is stabilized automatically at scanwidth settings at and below 500 kHz/division. Stabilized operation of the first local oscillator is indicated by a light on the front panel. A front panel control switch disables the stabilization circuitry when selected.

1-12. IF BANDWIDTH. Five IF bandwidths of 300 Hz, 1 kHz, 10 kHz, 100 kHz, and 1000 kHz are provided to permit selection of optimum resolution for the spectrum analysis of signals of interest.

1-13. IF GAIN AND ATTENUATION. IF attenuation, in 1 dB steps up to 51 dB, can be used to adjust overall gain of the analyzer. The IF gain is continuously adjustable from 0 to 60 dB.

1-14. CAMERA RECORDING. A bezel adapter for camera recording may be applied to the analyzer as an option. Illumination of the edge-lighted graticule is controllable from a front panel potentiometer.

1-15. EXTERNAL MIXERS. Two external waveguide mixers, Part No. 109334 and 110571, a waveguide transition, Part No. 110572, and an external mixer cable, Part No. 110567 are supplied for processing signals in the KU, K, and KA bands. For the KU-band (12.4 - 18.0 GHz) use Part No. 109334 mixer, Model 7120A. For the K-band (18.0 - 26.5 GHz), use Part No. 110571 mixer. For the KA-band (26.5 - 40.0 GHz), use Part No. 110571 mixer and Part No. 110572 transition.

Table 1-1. Performance Specifications

Item	Parameter	Specification
1	Frequency Range:	10 MHz to 40 GHz
2	Center Frequency:	Continuously tunable from 10 MHz to 40 GHz in 7 overlapping bands.
3	Tuning Accuracy:	Nx (±1% of dial reading ±2 MHz) where N is mixing mode.
4	Fine Tuning:	A fine tuning control is mounted on the front panel with the main tuning control.
5	Signal Identifier:	A front panel spring loaded toggle switch is provided for signal identification.
6	Local Oscillator:	
6.1	Frequency:	2 to 4.3 GHz
6.2	Residual FM:	Less than 15 kHz at 1 - mixing not phase locked; less than 300 Hz when phase locked.
7	Phase Lock:	For scanwidths of 5 MHz full screen or less, first LO phase locked to an internal 1 MHz reference signal. Front panel light indicates when first LO is stabilized. An override switch allows operator to disable phase lock circuitry.

Table 1-1. Performance Specifications (cont)

Item	Parameter	Specification
8	Scanwidth:	Selectable from 10 kHz to 2 GHz full screen in 1, 2, 5, 10 sequence by an 18 position front panel rotary switch. Combined scanwidth and linearity accuracy is better than ±10%.
9	Zero Scan:	The scanwidth control has a zero scan position. In this setting, the analyzer becomes a tuned receiver with center frequency determined by the main tuning dial. Amplitude variations of the input RF versus time can be displayed on the CRT.
10	Full Scan:	Front panel toggle switch overrides scanwidth setting and main tuning dial sets up full scan of band selected.
11	Sweep Speed:	Standard, Fast and Manual sweeps provided, selected by front panel switch. Standard sweep selectable from 3 msec/div. to 3 sec/div. in 1, 3, 10 sequence. In AUTO optimum sweep time selected. Fast sweep selectable from 10 usec/div to 1 msec/div in 1, 3, 10 sequence. Manual sweep allows horizontal positioning of spot by means of front panel control or external voltage.
12	Synchronization:	Three modes available: Single Sweep (initiated by front panel push button), Free Run (sweep free runs at internal rate), Line (sweep synchronized to frequency of power line).
13	Resolution:	IF bandwidth of 300 Hz, 1 kHz, 10 kHz, 100 kHz, 1 MHz and AUTO selected by front panel switch. Accuracy is ±20% measured at 3 dB points. In AUTO, optimum resolution selected by setting of scanwidth control.
14	Optimum Resolution:	When Resolution control is set to AUTO, IF bandwidth automatically selected by setting of Scanwidth control for optimum resolution.

Table 1-1. Performance Specifications (cont)

Item	Parameter	Specification
15	Sensitivity:	Typical CW sensitivity (defined as $\frac{S+N}{N} = 2$)

Band	Frequency Range GHz	Res. BW = 100 KHz Sensitivity dBm	1 KHz
1	0.01 to 2.0	-85	-105
2	2.1 to 5	-80	-100
3	4.75 to 9.25	-75	-95
4	9 to 12.4	-70	-90
5	12.4 to 18	-70	-90
6	18 to 26	-60	-80
7	26 to 40	-50	-70

16	Frequency Response:	(with 10 dB EXT attenuation) Maximum amplitude variation is ±3 dB or less over any 100 MHz portion of the spectrum up to 12.4 GHz. Above 12.4 GHz the maximum amplitude variation is ±6 dB or less over any 100 MHz portion of the spectrum.
17	Amplitude Display:	Logarithmic 10 dB per major or Linear: selected by front panel switch. Display accuracy ±2 dB/step in Log.
18	Video Duration:	Front panel switch selects peak detector to enhance display of short duration or low PRF pulses. Three positions provided: LONG, SHORT and OFF.
19	Video Filter:	1 kHz low pass filter selected by front panel switch.
20	Dynamic Range:	Display dynamic range >70 dB.
21	Input Impedance:	50 ohm nominal, Type N connector.
22	RF Attenuation:	External attenuators of 10, 20, 40 dB provided. Maximum power input:

Ext. Attenuation	Max. Input
0	+15 dBm
10	+25 dBm
20 - 40	+33 dBm

Table 1-1. Performance Specifications (cont)

Item	Parameter	Specification
23	IF Gain and Attenuation:	Attenuation of 0 to 51 dB in 1, 2, 4, 8, 16, 20 sequence, accuracy ±0.1 dB per dB. A 0 to 60 dB gain control is provided for adjusting IF gain.
24	Display:	8 x 10 cm, Rectangular, flat face CRT with 3 KV acceleration potential, magnetically shielded, P-31 phosphor. Front panel controls for base line blanking, graticule illumination, intensity, focus, trace alignment, astigmatism and horizontal/vertical position.
25	Graticule:	Divided in 10 horizontal and 8 vertical divisions. Horizontal base line and center vertical line divides into 5 increments per division. Left edge calibrated from 1 to 8 for Linear operation, right edge calibrated from 0 to 70 dB for Log.
26	Power:	115/230 VAC, rms, ±10%; 50 to 60/400 Hz; approximately 52 Watts.
27	Size:	7" H x 16-3/4" W x 19-1/2" D not including front panel cover. Shipping Container 16" x 24" x 28"; cardboard complies with Spec PPP+B-836C. Weight 50 lbs (Max.)
28	Service Conditions:	Equipment meets performance specifications of MIL-T-28800 for Type III, Class 3. (Except transit drop test height is six inches.)

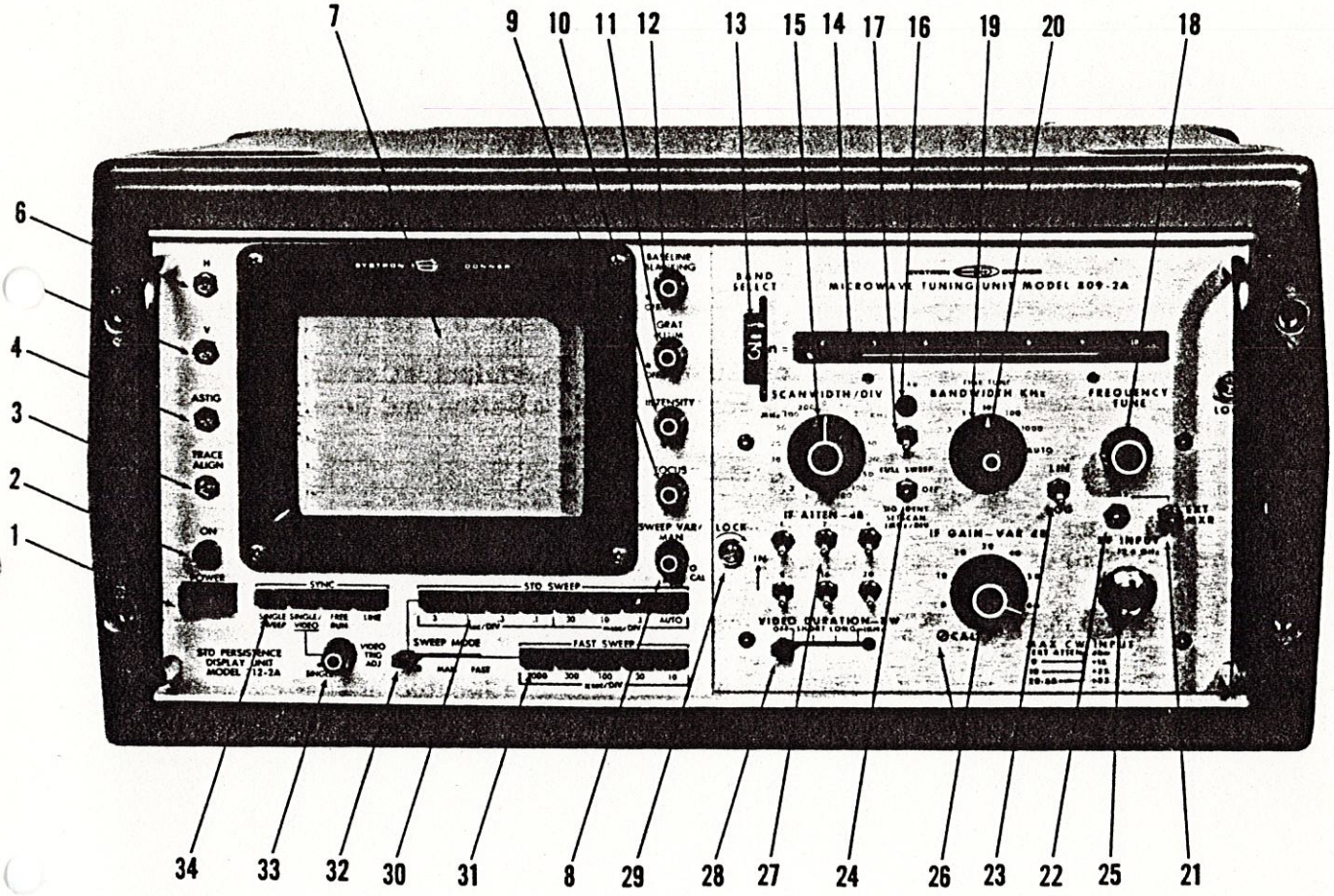


Figure 3-1. Front Panel Controls and Indicators

Table 3-1. Front Panel Controls and Indicators

Index No. (Fig. 3-1)	Front Panel Name and Description	Function
1	POWER pushbutton	Press to turn power on; press to turn off. When set to ON, the type of power connected at LINE INPUT connector on rear panel is applied to the system.
2	ON pilot light	Illuminates when POWER pushbutton is set to ON.
3	TRACE ALIGN screwdriver adjustment	Aligns the horizontal CRT trace with the horizontal line on the graticule.
4	ASTIG screwdriver adjustment	Adjusts the shape of the CRT spot to circular form.
5	V screwdriver adjustment	Sets the vertical position of the CRT trace.
6	H screwdriver adjustment	Sets the horizontal position of the CRT trace.
7	Cathode ray tube display	8 x 10-division graticule over P-31 phosphor. The 8-division vertical axis represents signal amplitude, and the 10-division horizontal axis represents frequency. Graticule divisions have sub-division marks, 4 per division. The left hand scale of the vertical axis is calibrated for linear display operation, where each division represents 1/8 of full scale, where full scale is 8. The right hand scale of the vertical axis is calibrated for logarithmic display operation, in which each division represents 10 dB, and full scale is 0 dB. The horizontal scale 5-division point (CF) corresponds to the center frequency setting on the frequency scale (14). The frequency count per division is determined by the SCANWIDTH/DIV control (15).
8	SWEEP VAR/MAN control	In extreme clockwise (CAL) position, the sweep is calibrated. Turning this control positions the spot horizontally on the CRT when SWEEP MODE control (index 32) is in the MAN position. When SWEEP MODE control is in either STD or FAST position, turning this control varies the sweep rate.
9	FOCUS adjustment	Adjusts the focus of the spot on the CRT.

Table 3-1. Front Panel Controls and Indicators (Cont)

Index No. (Fig. 3-1)	Front Panel Name and Description	Function
10	INTENSITY control	Potentiometer control adjusts the display brightness from cutoff to maximum intensity. Intensity is increased as control is turned clockwise.
11	GRAT ILLUM control	Potentiometer control adjusts the brightness of engraved lines on the edge-lighted graticule. Brightness is increased as control is turned clockwise; the extreme counterclockwise position is a positive OFF.
12	BASELINE BLANKING control	Potentiometer control permits variable amplitude blanking of the display to eliminate the bright horizontal baseline and noise appearing at higher levels. Turning the control clockwise blanks the display from the bottom up, until the lower half has been cut off. The extreme counterclockwise position is a positive OFF, and the control should be left in this position unless blanking is desired.
13	BAND SELECT thumb control	Selects one of seven frequency bands for calibrated signal analysis.
14	Frequency scale	Rotating drum frequency dial, having seven separate frequency scales to cover the range from 10 MHz to 40 GHz.
15	SCANWIDTH/DIV selector switch	This 18-position switch sets the width of the frequency display on the CRT. The scanwidth of the display, in kHz/division or MHz/division, is indicated for each calibrated position of the scanwidth switch. In the zero scanwidth position, the analyzer has the capability as a tuned receiver to display signals in amplitude-versus-time coordinates.
16	STAB indicator light	This light illuminates when the first local oscillator is stabilized.
17	STAB/OFF toggle switch	When in OFF position, the stabilization circuitry is disabled.

Table 3-1. Front Panel Controls and Indicators (Cont)

Index No. (Fig. 3-1)	Front Panel Name and Description	Function
18	FREQUENCY TUNE control	This 10-turn control tunes the analyzer center frequency over the range indicated on the frequency scale. The pointer on the frequency scale indicates the center frequency, which corresponds to the frequency of the signal appearing on the 5th division on the horizontal scale of the CRT display.
19	BANDWIDTH KHz	Selects the IF bandwidth resolution for the display. Six positions: 0.3, 1, 10, 100, 1000 kHz and AUTO.
20	FINE TUNE control	Located concentric with the bandwidth switch. Dual-range potentiometer permits fine and superfine adjustment of display frequency.
21	EXT MXR connector	Connector for external mixer cable assembly, accepts inputs in the 12.4 - 40.0 GHz range, using external wave guide mixers.
22	BIAS screwdriver adjustment	Adjusts external mixer input for optimum sensitivity and frequency response.
23	LIN/LOG toggle switch	Selects the response mode of the video signal. When set to LIN, signal amplitude is linear and left hand graticule scale applies. When set to LOG, amplitude is logarithmic and right hand scale in dB applies.
24	SIG IDENT momentary contact toggle switch	If the correct band has been selected, the signal displayed will move 2 divisions to the left and reduce in amplitude approximately 6 dB on alternate sweeps when this control is placed in SIG IDENT position. When placed in FULL SWEEP position, the full local oscillator range is swept, overriding the SCANWIDTH and FREQUENCY TUNE controls.
25	RF INPUT	This type N RF receptacle accepts the input signal to the analyzer.

Table 3-1. Front Panel Controls and Indicators (Cont)

Index No. (Fig. 3-1)	Front Panel Name and Description	Function
26	IF GAIN - VAR dB and CAL screwdriver adjustment	This control permits the IF gain to be adjusted between 0 and 60 dB. The CAL screwdriver adjustment is used to calibrate the gain when a calibrated input signal is available.
27	IF ATTEN - dB toggle switches	These six toggle switches select IF attenuation in 1 dB steps from 0 to 51 dB.
28	VIDEO DURATION - BW slide control	This 4-position control selects either OFF or two ranges of video duration, SHORT and LONG, to enhance the display of short duration or low PRF pulse signals. The 1 KHz position provides a low pass of 1000 Hz to smooth out noise in the display.
29	Left hand Lock	Together with Right hand lock, secures the Model 809-2A tuning unit in the main frame. Turn fully clockwise to lock. Must be unlocked, using screwdriver, to remove tuning unit.
30	STD SWEEP pushbutton controls	Only one pushbutton can be depressed at a time, selecting (when SWEEP MODE is in STD position) sweep rates in seven values from 3 milliseconds/division to 3 seconds/division. An eighth position, AUTO, is also provided which selects an optimum sweep rate when used in conjunction with the AUTO setting of the BANDWIDTH control.
31	FAST SWEEP pushbutton controls	Only one pushbutton can be depressed at a time, selecting (when SWEEP MODE is in FAST position) sweep rates in five values from 10 microseconds/division to 1000 microseconds/division. This position of the SWEEP MODE switch is used for zero dispersion operation only.
32	SWEEP MODE slide control	This is a 3-position control. In STD position, the STD SWEEP pushbutton controls are activated for standard spectrum analyzer operation. In FAST position, the FAST SWEEP pushbutton controls are activated for zero dispersion operation only. In MAN position, the horizontal position of the CRT spot is controlled from left to right by varying the SWEEP VAR/MAN control (index 8). The horizontal position of the CRT spot is controlled by this input.

Table 3-1. Front Panel Controls and Indicators (Cont)

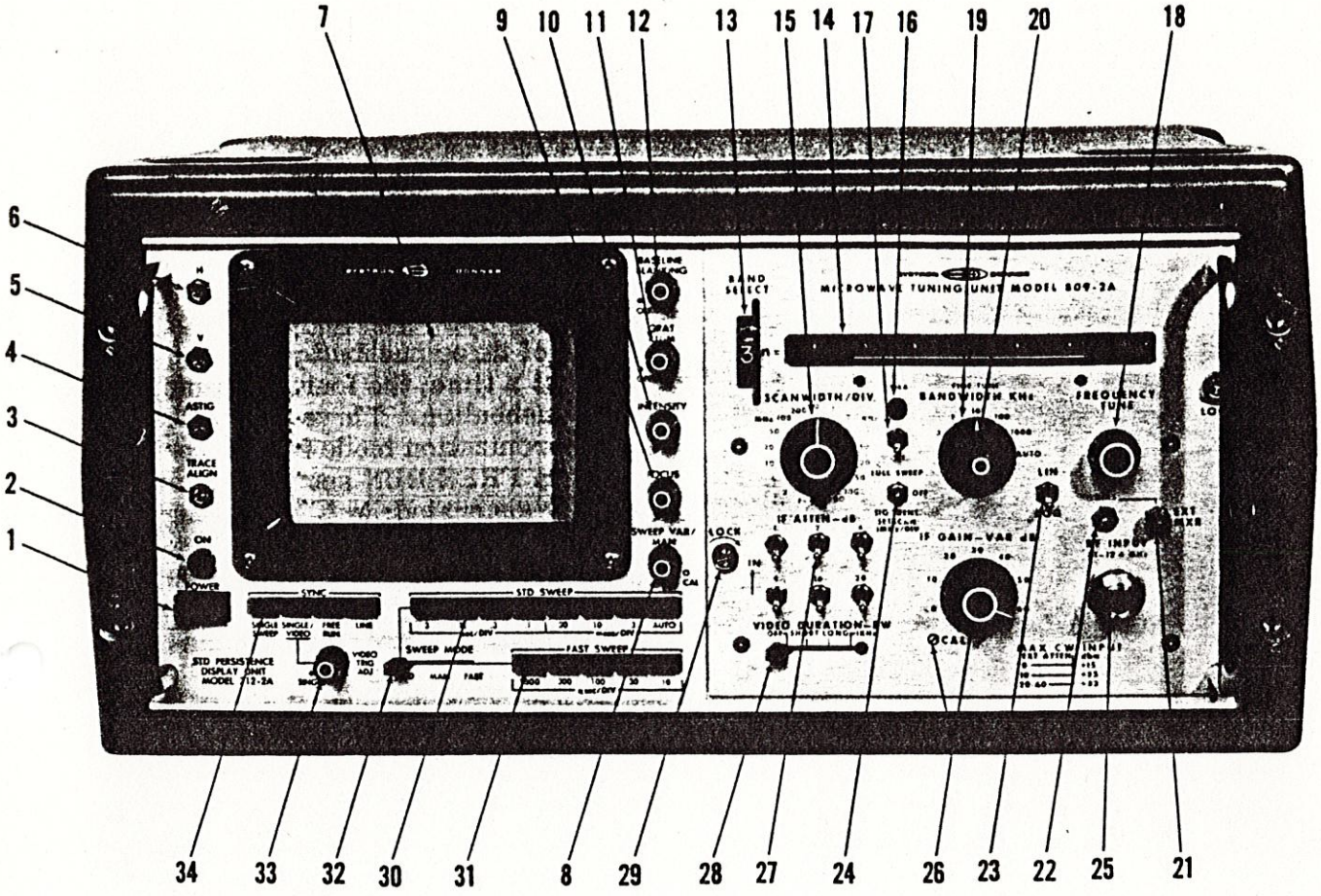
Index No. (Fig. 3-1)	Front Panel Name and Description	Function
33	VIDEO TRIG ADJ control	When rotated, this control adjusts sensitivity of sweep triggering on the video signal.
34	SYNC pushbutton control	Only one of three pushbuttons can be depressed at a time; the fourth is a momentary contact pushbutton. Three pushbuttons select the synchronization mode for the horizontal sweep. In FREE RUN setting, the sweep is internally generated; in LINE setting, the sweep is synchronized to the AC line frequency; in SINGLE VIDEO setting, the sweep is synchronized to the video signal (with the VIDEO TRIG ADJ control set to the desired triggering level). The SINGLE SWEEP momentary contact pushbutton initiates a single sweep each time it is depressed when the SINGLE VIDEO setting is selected and the VIDEO TRIG ADJ control (index 33) is in the SINGLE position.

3-9. HINTS AND PRECAUTIONS

3-10. Although a spectrum analyzer display is superficially similar to that of a conventional laboratory oscilloscope, this similarity could lead to incorrect use and misinterpretation of the display waveforms. For example, the problem of input overload is not encountered with laboratory oscilloscopes, but is a major concern when using a spectrum analyzer. Other unique problems arise because harmonic mixing is employed to achieve the wide frequency range of the instrument.

3-11. INPUT OVERLOAD PROBLEMS. Since the spectrum analyzer has no preselection capability, it is very susceptible to input overload, which can produce spurious signals and possible burnout of the crystal input mixer. (Replacement of the input mixer is a simple procedure. Refer to applicable instructions.)

3-12. Unlike the standard oscilloscope, the spectrum analyzer spreads out the input signal power on the horizontal axis, thus, at any given instant, the spectrum analyzer display is responding to only a small part of the total input signal power. The spectrum analyzer front end, however, is responding to the total input signal power at all frequencies. Input overload occurs whenever the strongest frequency component of the input signal exceeds full-scale deflection, or when the input signal power exceeds the dynamic range of the front end. Any attempt to increase the input signal level or to reduce the input attenuation in order to obtain a full-scale display of a small part of the input signal spectrum can result in serious overload. In addition, the dynamic range of the instrument is reduced when IF attenuation is introduced. When IF attenuation is introduced, and the input signal level is the increased so that the frequency component of interest produces full-scale deflection, input overload can result.



A. POWER TURN-ON

1. Depress POWER pushbutton 1 and observe that ON pilot light 2 illuminates.
2. Refer to instructions under DISPLAY ADJUSTMENTS, paragraph 3-4, and adjust the display for optimum position and clarity.

NOTE: Allow instrument to warm up for 30 minutes before making adjustments.

B. PRELIMINARY CONTROL SETTINGS

Display Controls

Control	Setting
SYNC (34)	FREE RUN
SWEEP MODE (32)	STD
STD SWEEP (30)	3 msec/DIV
SWEEP VAR/MAN (8)	CAL

Tuning Unit Controls

Control	Setting
SCANWIDTH/DIV (15)	200 MHz/DIV
BANDWIDTH KHZ (19)	AUTO
Selector LIN/LOG (23)	LOG
STAB/OFF toggle (17)	STAB
IF GAIN - VAR (26)	60 dB

Figure 3-2. Initial Operating Procedure
(Sheet 1 of 2)

C. TYPICAL SIGNAL ANALYSIS

Control	Setting
BAND SELECT (13)	Select to match input frequency range
FREQUENCY TUNE (18)	Set to input frequency
IF ATTEN - dB (27)	Set for desired display
IF GAIN - VAR dB (26)	Set for desired display

CAUTION: AVOID INPUT OVERLOAD. DO NOT APPLY EXTERNAL SIGNAL TO RF INPUT CONNECTOR (25) WHICH EXCEEDS LIMITS POSTED ON FRONT PANEL.

Connect signal to RF INPUT (25) . The resulting display is a WIDE DISPERSION display. Wide dispersion is used for harmonic distortion measurements and for examining the full range of a signal.

When examining low frequency modulation of an RF signal, or when comparing amplitude and frequency of two closely-spaced signals, a NARROW DISPERSION display is desirable. To obtain a narrow dispersion display:

Control	Setting
SCANWIDTH/DIV (15)	500 kHz/DIV or lower, for dispersion desired. Note that STAB indicator light 16 illuminates when scanwidths in the 1 to 500 kHz/DIV range are selected.
FREQUENCY TUNE (18)	Adjust to center the signal on screen.
BANDWIDTH KHZ (19)	Adjust for desired resolution.

NOTE: The sweep time setting on the display unit must also be slow enough to sweep narrow bandwidth settings without loss of amplitude or symmetry, especially if the scanwidth is considerably greater than the bandwidth. Adjust STD SWEEP (30) accordingly.

D. OTHER CONTROLS

1. Selector LIN/LOG (23) : In LOG position, signal amplitudes are compared in dB. the LOG position provides the advantage of wide dynamic range: signals with 60 dB difference in amplitude can be displayed. Amplitude differences less than 2 dB cannot be resolved in LOG mode. The LIN position enables comparison of fractional dB differences, as well as voltage comparisons.
2. SIG IDENT toggle (24) : Provides a means of distinguishing between the fundamental signal and its harmonics. When depressed, this control causes the fundamental signal to appear two divisions to the left at reduced amplitude on alternate scans, when SCANWIDTH/DIV (15) is set to 1 MHz/DIV.
3. FINE TUNE control (20) : Used to adjust centering of the display at narrow bandwidth settings.
4. VIDEO DURATION - BW control (28) : In 1 KHz position, provides video filter; in the SHORT or LONG positions, provides enhancement of short duration or low PRF displays.

Figure 3-2. Initial Operating Procedure
(Sheet 2 of 2)

3-13. To avoid the possibility of an input overload, particularly when the spectrum of the input signal is unknown, proceed as follows:

a. Set the SCANWIDTH/DIV control to 50 MHz, and set all IF ATTEN - dB switches to the down (out) position. Set IF GAIN - VAR control to 60 dB.

b. Set the amount of external RF input signal attenuation so that the strongest signal on the display is close to, but does not exceed full scale.

c. When closing in on a signal of interest, do not increase the input signal level above that established in step (b).

d. Do not increase the input signal level after introducing IF attenuation, or after reducing IF gain.

3-14. A good method for determining whether an input overload or nonlinear condition exists is to introduce 10 dB of external RF attenuation. The amplitude of the signal of interest should be reduced by 10 dB in the logarithmic display mode. If the amplitude changes by more or less than 10 dB, an input overload is present.

3-15. The maximum allowable input signal power that can be applied to the Model 762-2A is dependent upon the amount of external RF attenuation, but should never exceed +33 dBm. Table 3-2 lists the maximum safe input power level that can be applied to the RF INPUT connector. If the input power is allowed to exceed the levels specified in table 3-2, the crystal diode input mixer can be damaged.

Table 3-2. Maximum Safe Input Power Level

Ext. Attenuator Setting (dB)	Maximum CW Input (dBm)
0	+15
10	+25
20-40	+33

3-16. SWEEP RATE, SCANWIDTH, AND IF BANDWIDTH SELECTION

3-17. Because the spectrum analyzer is a swept instrument, the display range is affected by the display sweep rate and the IF bandwidth. Normally, the STD SWEEP control is set for the fastest rate consistent with the input signal characteristics, the setting of the SCANWIDTH switch, and the setting of the IF BANDWIDTH switch. If the sweep rate is increased above the optimum value, the IF response curve widens and loses its symmetry, causing the signal amplitude on the display to decrease. If the input signal level is then increased to restore full-scale deflection, input overload will result.

3-18. EXTERNAL MIXER BIAS ADJUSTMENT

3-19. When operating in band 5, 6, or 7, the front-panel BIAS screwdriver adjustment is adjusted to produce a peak response for the signal being analyzed.

3-20. EXTERNAL MIXER TERMINATOR

3-21. A 50-ohm terminator is provided for the EXT MIXER connector on the front panel. This terminator should always be installed, except when a signal input is connected to the EXT MIXER connector.

3-22. REFERENCE LEVEL CALIBRATION

3-23. The front panel CAL screwdriver adjustment can be used for reference level calibration. With a calibrated power level input connected to the RF INPUT or EXT MIXER, obtain a convenient display of the calibrated signal, with zero IF attenuation (IF ATTEN switches all set to the down position). Then, set the IF GAIN - VAR control to a convenient reference position, and adjust the CAL screwdriver adjustment to obtain deflection of the calibrated signal at the nearest major graticule line. Full-scale deflection now is the difference in dB (read along right edge of graticule) between the line selected (calibrated level) and the top line of graticule.
If the IF GAIN - VAR control is shifted from the reference position to introduce more or less gain, the reference level corresponding to full-scale deflection is shifted a corresponding amount (in dB). For example, if a -40 dBm calibrated input is applied, the IF GAIN - VAR control could be set to a reference position of 40 dB, and the CAL adjustment could be made to produce deflection of this signal at the -10 dB LOG reference line. With the IF attenuator at zero and the IF GAIN - VAR at 40, the full-scale deflection reference level would then be -30 dBm. Now if the IF GAIN - VAR control is set to 20 dB, the full-scale deflection reference level would be -10 dBm (-30 dBm +20 dB = -10 dBm). If the IF GAIN - VAR control is set to 60 dB, the full-scale deflection reference level would be -50 dBm (-30 dBm - 20 dB = -50 dBm). Introducing IF attenuation by means of the IF ATTEN switches produces a corresponding increase in the reference level established by the IF GAIN - VAR control setting. For example, if the reference level corresponding to full-scale deflection is established at -30 dBm by the setting of the IF GAIN - VAR control, introducing 30 dB of IF attenuation would increase the reference level to 0 dBm (-30 dBm + 30 dB = 0 dBm).