

AMPLITUDE SCALE Selects log (dB/DIV) or linear vertical scale calibration. REFERENCE LEVEL remains constant at top graticule line (except for INP-B → A operation).

ANALOG DSPL Conventional (non-digital, short persistence) CRT obtained with both STORE BLANK keys depressed. Does not display control readouts or messages on CRT screen.

AUTO STABILIZER Analyzer is automatically stabilized for narrow frequency spans (≤ 100 kHz/DIV). In stabilized mode, light is on and only FINE tuning should be used. Pushbutton switch (when depressed) disables AUTO STABILIZER to allow coarse tuning in narrow spans.

CAL OUTPUT An internal 100 MHz, -10 dBm (+97 dB μ V) calibration signal.

CLEAR/RESET Clears trace data in WRITE and MAX HOLD operation and resets sweep. Resets DGTL AVG to begin average of subsequent sweeps. Aborts plot in PLOT mode. Returns HP-IB display interface to local control.

DGTL AVG Digitally averages trace data over successive sweeps. Maximum averaging achieved after 64 sweeps. Sample detection mode automatically selected.

EXT MIXER Input/output port for use with external mixers for waveguide measurements above 14.5 GHz. Adjust BIAS to maximize signal amplitude.

FREQUENCY Displays the tuned center frequency of analyzer in PER DIV and ZERO SPAN. In full band modes, displays frequency of the tuning marker.

FREQUENCY BAND Selects frequency range.

FREQ CAL Adjusts the FREQUENCY readout to a known frequency reference.

FREQUENCY SPAN/DIV Selects CRT horizontal axis frequency calibration in PER DIV mode.

FREQUENCY SPAN MODE Selects desired span mode.

- **ZERO SPAN** Analyzer operates as a manually-tuned receiver to display detector output in the time domain.

- **PER DIV** Allows FREQUENCY SPAN/DIV control to select desired frequency span.

- **FULL BAND** Spans the entire FREQUENCY BAND selected. A tuning marker is available and 3 MHz RESOLUTION BW and .003 VIDEO FILTER are automatically selected.

- **1.7-22 GHz SPAN** Analyzer spans 1.7-22 GHz in one sweep. A tuning marker is available and 3 MHz RESOLUTION BW and .003 VIDEO FILTER are automatically selected.

FRONT PANEL ADJUSTMENTS

PRE-ADJUSTMENT SETTINGS

1. Set Normal Settings on analyzer.
2. Set FREQUENCY BAND to .01-1.8 GHz.
3. Set FREQUENCY SPAN/DIV to .2 MHz (200 kHz).
4. Set INPUT ATTEN to 10 dB.
5. Set REFERENCE LEVEL to -10 dBm and REF LEVEL FINE to 0.
6. Set AMPLITUDE SCALE to LIN.

DISPLAY ADJUSTMENTS

1. Adjust FOCUS for clearest control readout characters.
2. Press and hold in the PLOT GRAT button and then press CLEAR/RESET to bring up the Display Adjust line at top of screen.
3. Adjust TRACE ALIGN so that the displayed line is parallel to top graticule line.
4. Adjust VERT POSN to place display line on top graticule line (Reference Level).

FREQUENCY ADJUSTMENT

1. Connect 100 MHz CAL OUTPUT signal to INPUT.
2. Center signal on CRT with TUNING control.
3. Adjust FREQ CAL to indicate .100 GHz on FREQUENCY readout.

AMPLITUDE ADJUSTMENT

1. Set AMPLITUDE SCALE to 1 dB/DIV.
2. Adjust REF LEVEL CAL to position the peak of the signal on the REFERENCE LEVEL (top graticule line) of the CRT.
3. Reset AMPLITUDE SCALE to 10 dB/DIV.

HP-IB CLEAR Returns HP-IB display interface to local control. Aborts plot in PLOT MODE. See CLEAR/RESET.

INTEN Adjusts brightness of CRT trace and characters. Set to the blue region for CRT photographs.

INP-B → A Subtracts trace stored in TRACE B from input signal and displays results in TRACE A. Normalized trace is at either the center or top graticule line (See Operations Manual, Section III to change position) when input signal is equal to stored TRACE B. Reference level readout changes to dB for relative measurements.

INPUT ATTEN Push and turn to select desired RF input attenuation indicated by blue numbers. A reminder light indicates ZERO dB input attenuation. 10 dB or more of input attenuation provides best input match and maximum input protection.

PLOT Provides control of HP-IB plotter set for Listen Only mode. Display information is held unchanged on screen during plot. Use CLEAR/RESET to abort plot and return to local control.

- **GRAT** Plots graticule.
- **CHAR** Plots CRT control readouts or HP-IB entered message.
- **TRACE** Plots displayed trace(s).

PRESELECTOR PEAK Adjusts tracking of internal YIG preselector. Normally centered in green area for best broadband performance from 1.7 to 22 GHz. Used to maximize signal amplitude for more accurate amplitude measurements.

REFERENCE LEVEL Controls power level represented by top graticule line of CRT. Adjustable in calibrated 10 dB steps with continuous calibrated 0 to -12 dB FINE vernier. Display readout can be set to either dBm or dB μ V with internal switch (See Operations Manual, Section III).

REF LEVEL CAL Adjusts REFERENCE LEVEL to a known amplitude reference.

RESOLUTION BW Selects analyzer 3 dB IF bandwidth. Convenient resolution bandwidth for any frequency span automatically selected when markers are aligned (▶◀) and controls pushed in to couple.

SAMPLE Selects sample detection mode for measurements such as random noise levels.

SCALE INTEN Adjusts background illumination for photography. Set to blue area for CRT photographs. Operational in digital display mode only.

SIG IDENT Used to verify frequency of unknown signals. Especially useful in EXT MIXER bands.

SWEEP SOURCE Selects desired sweep source.

- **MNL** Provides real time display of signal amplitude at any frequency within displayed frequency span. Sweep controlled with MANUAL SWEEP knob. Digital traces are blanked during MNL operation.

- **EXT** Allows analyzer to be swept with external source.

- **INT** Analyzer sweeps repetitively with internal sweep source. Synchronization selected by SWEEP TRIGGER.

SWEEP TIME/DIV Selects time required to sweep one major horizontal division on CRT. AUTO position automatically selects fastest sweep time as a function of FREQUENCY SPAN/DIV, RESOLUTION BW, and VIDEO FILTER settings to maintain a calibrated amplitude display. Sweep times ≤ 1 msec/div are for ZERO SPAN operation.

SWEEP TRIGGER Selects trigger source for INT sweep.

- **FREE RUN** Sweep triggered repetitively by internal source.

- **LINE** Sweep triggered by AC line frequency.

- **VIDEO** Sweep internally triggered by detected waveform of RF signal.

- **EXT** sweep triggered by +1V external signal.

- **SINGLE** Sweep triggered by START/RESET pushbutton.

- **START/RESET** Dual function pushbutton can start a single sweep or reset any internal sweep back to left edge of CRT.

- **TRIGGER LEVEL** Adjusts trigger level in VIDEO or EXT trigger mode. DC coupled, positive slope triggering.

- **SWEEP** Light is on while analyzer is sweeping.

TRACE A,B Provides two independent digital traces in the following modes.

- **WRITE** Displays current input signal with each sweep.

- **MAX HOLD** Displays only the highest value of trace data over successive sweeps. Process restarted by pressing CLEAR/RESET button.

- **STORE VIEW** Stores current trace and displays it on CRT.

- **STORE BLANK** Stores current trace without displaying it on CRT.

TUNING Tunes center frequency of analyzer or positions tuning marker in full band mode.

VIDEO FILTER Selects post-detection, low-pass filters which smooth the trace by averaging random noise. The VIDEO FILTER bandwidth is equal to the RESOLUTION BW times the factor indicated on the control knob. The NOISE AVG position is a fixed 1 Hz low-pass filter used for noise measurements only.

NORMAL SETTINGS

The green colored functions preset the instrument to its normal operating mode.

| FUNCTIONS | SETTINGS |
|-----------------------------|--|
| TRACE A,B | <input checked="" type="checkbox"/> WRITE <input type="checkbox"/> NORMALLY OUT |
| SAMPLE, DGTL AVG, INP-B → A | <input type="checkbox"/> OPTIMUM <input checked="" type="checkbox"/> Push in (to couple) |
| FREQUENCY SPAN/DIV | <input checked="" type="checkbox"/> PER DIV |
| RESOLUTION BW | <input checked="" type="checkbox"/> 10 dB/DIV |
| FREQUENCY SPAN MODE | <input checked="" type="checkbox"/> OFF |
| AMPLITUDE SCALE | <input checked="" type="checkbox"/> INT |
| VIDEO FILTER | <input checked="" type="checkbox"/> FREE RUN |
| SWEEP SOURCE | <input checked="" type="checkbox"/> AUTO |
| SWEEP TRIGGER | <input checked="" type="checkbox"/> Center in green region |
| SWEEP TIME/DIV | |
| PRESELECTOR PEAK | |

With **NORMAL SETTINGS** preset, most measurements can be made using only the **TUNING**, **FREQUENCY SPAN/DIV** and **REFERENCE LEVEL** controls. The analyzer is calibrated for any combination of control settings as long as the **UNCAL** indicator is not displayed.

HP-IB DISPLAY INTERFACE CODES

| CONTROL SETTINGS | DM | Output SAMPLE state | |
|------------------|------------------------------------|---------------------|--------------------------|
| CS | Output control settings annotation | DG | Output DGTL AVG state |
| CF | Output Center Frequency | NS | Output INP-B → A state |
| SP | Output Frequency Span/Div | VF | Output Video Filter |
| RB | Output Resolution Bandwidth | LG | Output Amplitude Scale |
| RL | Output Reference Level | CRT MESSAGES | |
| AT | Output RF Input Attenuation | LU | Input upper line message |
| ST | Output Sweep Time/Div or AUTO flag | LL | Input lower line message |

| | | | |
|-----------------------|-------------------------------------|----|------------------------------------|
| AU | Display upper line control settings | IB | Input trace B integer values |
| AL | Display lower line control settings | AP | Output coordinates of trace A peak |
| TRACE DATA I/O | | BP | Output coordinates of trace B peak |

| SWEEP CONTROL | |
|----------------------|--------------------------------|
| TA | Output trace A integer values |
| TB | Output trace B integer values |
| BA | Output trace A byte values |
| BB | Output trace B byte values |
| IA | Input trace A integer values |
| TS | Take sweep |
| SF | Start sweep and set sweep flag |
| MS | Output value of sweep flag |

OPERATING PRECAUTIONS

WARNING:
This instrument, along with any device connected to it, must be connected to power line ground. Failure to ensure proper grounding may cause a shock hazard as well as damage to the instrument.

Do not exceed the following **ABSOLUTE MAXIMUM INPUT LEVELS:**

TOTAL RF POWER: +30 dBm (1 watt).

DC or AC ($<< 50\Omega$ source impedance): 0V with 0 dB INPUT ATTEN (< 1 amp), ± 7 V with ≥ 10 dB ATTEN (< 0.14 amp).

Peak Pulse Power: +50 dBm (< 10 μ sec pulse width, 0.01% duty cycle) with ≥ 20 dB INPUT ATTEN.