The HP 3577A Network Analyzer provides cost-effective, high performance network measurements from 5 Hz to 200 MHz for higher productivity in design and production. The companion HP 35677A/B S-Parameter Test Sets and full line of accessories ensure a complete measurement solution. Innovative analog and digital design are combined for superb accuracy, resolution and operational simplicity.

Convenient soft-key selection of measurement functions allows you to quickly measure transfer functions, magnitude/phase, insertion loss/gain, attenuation, electrical length and gain compression. In addition, measurement of phase distortion parameters such as group delay and deviation from linear phase can be made with high resolution. With the HP 3577A’s flexible receiver input impedances, you can measure in either 50-Ω or high impedance (1 MΩ) environments. Use the HP 35677A or HP 35677B S-Parameter Test Sets with the HP 3577A to make reflection measurements such as return loss, reflection coefficient and impedance in 50-Ω or 75-Ω systems, while simultaneously displaying transmission parameters.

Measurement Versatility
User-Defined Vector Math functions operate on measured data, constants and functions to present measurement results in the form you need. Multiple Display Formats with electronic graticules provide accurate display in rectangular, polar or Smith chart coordinates. Frequency Sweep (Logarithmic, Linear or Alternate) and Amplitude Sweep capabilities meet measurement needs in a wide range of applications. Accessories such as S-Parameter Test Sets, Power Splitters, Minimum Loss Pad, Cables, Calibration Kits, Transistor Fixtures, Adapters, and Current and Voltage Probes ensure a complete solution to your measurement needs.

HP-IB Programmability
The full measurement capability of the HP 3577A is programmable over the Hewlett-Packard Interface Bus (HP-IB). Automatic measurements are easy with the HP 3577A’s simple programming codes that minimize software development time. Quickly access a single point or an entire trace of 401 data points in either fast binary or ASCII modes. Customize the CRT display via the HP-IB using the built-in graphics display capability to draw test limit lines, operator instructions or connection diagrams.

Built-in Accuracy Enhancements
Normalization enhances measurement accuracy by removing frequency response and other errors quickly with the push of a button. Vector Error Corrections are used to remove the effects of directivity, frequency response and source match for high accuracy reflection measurements. Vector Noise Averaging of both magnitude and phase reduces noise, making high resolution group delay and accurate low level measurements easy.
3577A Specifications

Source
Frequency Range: 5 Hz to 200 MHz
Frequency Resolution: 0.001 Hz
Stability: ±5x10^-4/day, 0 to 55°C
Level Range: +15 dBm to -49 dBm (1.26 Vrms to 793 µVrms; 2 dBV to -62 dBV) into a 50 Ω load
Resolution: 0.1 dB
Accuracy: ±1 dB at +15 dBm and 100 kHz. Below +15 dBm, add the greater of ± 0.02 dB/dB or 0.2 dB
Flatness: 1.5 dB/p-p from 5 Hz to 200 MHz
Impedance: 50 Ω; > 20 dB return loss at all levels
RF Output Connector: 50 Ω Type N female
Sweep Types: Linear, alternate, cw and log frequency; log amplitude
Sweep Time: 100 ms/span to 200 ms span for frequency sweep; 10 ms/step to 16 s/step for amplitude sweep
Sweep Modes: Continuous, single, manual.
Trigger Modes: Free run, immediate, line, external.

Receiver
Input Characteristics
Frequency Range: 5 Hz to 200 MHz.
Inputs: Three receiver inputs (A, B and R).
Input Impedance: Selectable 50 Ω with >25 dB return loss, or 1 MΩ in parallel with approximately 30 pF.
Input Connectors: 50 Ω Type N female.
Resolution Bandwidth: Selectable 1 kHz, 100 Hz, 10 Hz, or 1 Hz
Sensitivity (Due to noise and internal crosstalk between source and receiver inputs):

<table>
<thead>
<tr>
<th>Resolution Bandwidth</th>
<th>Minimum Freq. - 30 kHz</th>
<th>30 kHz - 200 MHz (50 Ω)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maximum Input Level</td>
<td>Maximum Input Level</td>
</tr>
<tr>
<td>1 kHz</td>
<td>-13 dB (20 dB attenu)</td>
<td>-13 dB (20 dB attenu)</td>
</tr>
<tr>
<td>10 Hz</td>
<td>-10 dB (120 dB attenu)</td>
<td>-10 dB (120 dB attenu)</td>
</tr>
<tr>
<td>100 Hz</td>
<td>-9 dB (150 dB attenu)</td>
<td>-9 dB (150 dB attenu)</td>
</tr>
<tr>
<td>1 kHz</td>
<td>-80 dB (100 dB attenu)</td>
<td>-80 dB (100 dB attenu)</td>
</tr>
</tbody>
</table>

Crosstalk: >100dB isolation between inputs.

Electrical Length/Reference Plane Extension: Provides equivalent electrical line length, or delay at inputs A, B and R. Range: -3 x 10^9 m to +3 x 10^9 m, or +1 s to -1 s.
Resolution: 5 digits or 0.1 cm (3.3 ps) whichever is greater.
Accuracy: ±0.1 cm or ±0.02% whichever is greater.

Magnitude Characteristics
Range: Maximum Input Level to Sensitivity.
Resolution
Marker: 0.001 dB (log); 5 digits (linear).
Display: 0.01 dB/div to 20 dB/div (log absolute); 0.01 dB/div to 200 dB/div (log ratio); 0.1 nV/div to 10 V/div (linear absolute); 10^-10^9 div to 10^10^9 div (linear ratio).
Display Units: dB, dBm, dBV, V, and linear ratio.
Accuracy (at 100 kHz, 25°C, and Maximum Input Level)
Absolute (A,B,R): ±0.2 dB.
Ratio (A/R, B/R, A/B): ±0.15 dB (50 Ω); ±0.2 dB (1 MΩ).

Dynamic Accuracy:

<table>
<thead>
<tr>
<th>Error</th>
<th>Input Level Relative to Maximum Allowable</th>
</tr>
</thead>
<tbody>
<tr>
<td>±0.04 dB</td>
<td>0 dB to -10 dB</td>
</tr>
<tr>
<td>±0.02 dB</td>
<td>-10 dB to -50 dB</td>
</tr>
<tr>
<td>±0.05 dB</td>
<td>-50 dB to -60 dB</td>
</tr>
<tr>
<td>±0.15 dB</td>
<td>-60 dB to -80 dB</td>
</tr>
<tr>
<td>±0.75 dB</td>
<td>-80 dB to -90 dB</td>
</tr>
<tr>
<td>±0.75 dB</td>
<td>-90 dB to -100 dB</td>
</tr>
</tbody>
</table>

Frequency Response (when driven from a 50 Ω source and with 50 Ω receiver input impedance)
Absolute (A,B,R): 0.3 dBpp from 20 Hz to 20 MHz; 0.6 dBpp from 5 Hz to 200 MHz.
Ratio (A/R, B/R, A/B): 0.3 dBpp from 20 Hz to 20 MHz; 0.4 dB from 5 Hz to 200 MHz.

Reference Level
Range: -207 dBm to -33 dBm (-220 dBV to +20 dBV) (log absolute); -400 dB to +400 dB (log ratio); 0 V to 10 V (linear absolute); 0 to 10^10 (linear ratio).
Resolution: 0.001 dB (log); 5 digits (linear).

Stability
Temperature: Typically <±0.02 dB/°C.
Time: Typically <±0.05 dB/hour at 25°C.

Phase Characteristics (A/R, B/R, A/B)
Range: ±180 deg.
Resolution
Marker: 0.005 deg (0.0001 rad)
Display: 0.01 deg/div to 200 deg/div (0.00018 rad/div to 3.49 rad/div).
Accuracy (at 100 kHz, 25°C, and Maximum Input Level):
±2.0°.
Dynamic Accuracy:

<table>
<thead>
<tr>
<th>Error*</th>
<th>Input Level Relative to Maximum Allowable</th>
</tr>
</thead>
<tbody>
<tr>
<td>± .4 deg</td>
<td>0 dB to -10 dB</td>
</tr>
<tr>
<td>± .2 deg</td>
<td>-10 dB to -50 dB</td>
</tr>
<tr>
<td>± .5 deg</td>
<td>-50 dB to -60 dB</td>
</tr>
<tr>
<td>± 1.5 deg</td>
<td>-60 dB to -80 dB</td>
</tr>
<tr>
<td>± 7.5 deg</td>
<td>-80 dB to -100 dB</td>
</tr>
</tbody>
</table>

*Specifications do not apply below -80 dB in 1 Hz Resolution Bandwidth

Resolution: 0.01°.
Stability
Temperature: Typically <±0.05 deg/°C.
Time: Typically <±0.05°/hour at 25°C.

Polar Characteristics
Range, Resolution, Display Units, Dynamic Accuracy, Frequency Response, Uncertainty, Crosstalk, Reference Level, and Stability specifications are the same as the corresponding magnitude and phase characteristics.

Full Scale Magnitude Range
Absolute (A,B,R): 0.1 nV to 10 V
Ratio (A/R, B/R, A/B): 10⁻¹⁰ to 10³⁰

Real Imaginary Characteristics
Range, Dynamic Accuracy, Frequency Response, Uncertainty, Crosstalk, Stability specifications are the same as the corresponding magnitude and phase characteristics.

Reference Level
Range: ± 10 V for absolute: ±10³⁰ for ratio
Resolution: 5 digits

Delay Characteristics
Normalized Accuracy:
Dynamic Phase Accuracy
360 x Aperture [Hz] ± 2 ns

Programming Characteristics
Capability: Remote programming is via the Hewlett-Packard Interface Bus (HP-IB). The HP 35677A/B S-Parameter Test Sets are programmable through the HP 3577A interface only.
Interface Functions: SH1, AH1, T5, TE0, L4, LE0, SR1, RL1, PP1, DC1, DT1, C0, E1. For more on these codes refer to the HP-IB section of this catalog.
Output Data Transfer Time: 401 data points (single parameter) can be transferred directly to an HP 200 series computer in Basic language as follows: ASCII mode: Typically 1500 ms.
Binary floating point mode: Typically 160 ms.
Graphics Capabilities: 12 lines of text with 40 alphanumeric characters per line, and high resolution line vectors can be displayed through HP-IB commands.
General Characteristics

External Reference Frequency Input
Frequency: 10 MHz/N. N is an integer from 1 to 100.
Level: 0 dBm ± 10 dB, nominal.
Impedance: 50 Ω, nominal.
Connector: BNC female, rear panel.

Reference Frequency Output
Frequency: 10 MHz.
Level: Typically 0 dBm.
Impedance: 50 Ω, nominal.
Connector: BNC female, rear panel.

External Trigger
Triggers on negative TTL transition or contact closure to ground.
Connector: BNC female, rear panel.

Plotter Control
Directly compatible with HP-IB graphics plotters that use Hewlett-Packard Graphics Language (HP-GL) with listeners only capability. HP 7470A, HP 7475A, HP 7550A, HP 7090A

Save/Recall
Front panel setups can be stored in non-volatile memory locations 1 through 5. Last state is saved when power is removed.

Operating Conditions
Temperature: 0°C to +55°C.
Relative Humidity: <95% at 40°C.
Altitude: <4,572 m (15,000 ft).

Non-Operating Conditions
Temperature: -40°C to +75°C.
Altitude: <15,240 m (50,000 ft).
Power: 115V ±10%, -25% (47 Hz to 440 Hz), or 230 V ±10%, -15% (47 Hz to 66 Hz), 450 VA maximum.
Weight: 31 kg (67 lb) net; 41 kg (90 lb) shipping.
Dimensions: 222 mm H x 426 mm W x 578 mm D (8.75 in. x 16.75 in. x 22.75 in.).

Test Port Reciprocity:
Transmission (S_{21}, S_{12}): typically < ±0.5 dB magnitude and < ±5° phase.
Reflection (S_{11}, S_{22}): Typically < ±0.5 dB magnitude and < ±5° phase.
Incident Power Ratio (Test Port 1 to Test Port 2): Typically < ±1.5 dB.
RF Input Maximum Operating Level: +25 dBm or ±30 Vdc.
RF Input Damage Level: +27 dBm or ±30 Vdc.
Port 1 or 2 Damage Level: +27 dBm or ±30 Vdc.

Connectors
Input Port and Output Ports A, B, and R: 50 Ω Type N female.
Test Ports 1 and 2: HP 35677A, 50 Ω Type N female; HP 35677B, 75 Ω Type N female.
DC Bias Inputs: BNC female, rear panel.
DC Bias Range: Typically ±30 Vdc and ±20 mA with some radiation of RF specifications; 200 mA damage level.

Accessories Supplied
4 ea. 190 mm (7.5 in.) 50 Ω cables with Type N male connectors for connection to HP 3577A (HP Part No. 8120-4387).
1 ea. Test Set interconnect cable to HP 3577A (HP Part No. 35777-61620).
1 ea. Rear Panel Lock Foot Kit (HP Part No. 5061-0099).

Recommended Accessories
HP 35677A/C: HP 35678A 50 Ω Type N Calibration Kit; HP 35679A 50 Ω Type N Test Port Extension Cables.
HP 35677B/C: HP 35678B 75 Ω Type N Calibration Kit; HP 35679B 75 Ω Type N Test Port Extension Cables.

Programming
The HP 35677A/B are completely controlled through the HP 3577A using the HP 3527A interconnect cable. All programming is accomplished through the HP 3577A HP-IB interface.

Power: All power is obtained through the HP 3577A interconnect cable.
Weight: 6 kg (13 lb) net; 12 kg (26 lb) shipping.
Dimensions: 90 mm H x 426 mm W x 384 mm D (3.5 in. x 16.75 in. x 22.75 in.). Add 1/4 inch to depth to include front panel connectors.

Accessories
HP 35678A/B Calibration Kits
The HP 35678A and HP 35678B are used with the HP 35677A/B to make vector error corrections for high accuracy reflection measurements in 50 Ω Type N and 75 Ω Type N connector systems, respectively. These standards and adapters are supplied with a convenient storage case.

HP 35679A/B Test Port Extension Cables
The HP 35679A and HP 35679B are used to extend test ports for measurement of devices having any two port geometry in either 50 or 75 Ω systems. The HP 35679A is used with the HP 35677A, HP 11850A/B and the HP 11677A. The HP 35679B is used with the HP 35677B. The HP 3577A is also compatible with most oscilloscope probes, the HP 1120 active probe, HP 11667A and HP 11850A/B power splitters, HP 11852A minimum loss pad, and the HP 11853A, HP 11854A, HP 11855A and HP 11856A accessory kits.

Ordering Information

<table>
<thead>
<tr>
<th>Model</th>
<th>Name</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP 3577A</td>
<td>Network Analyzer</td>
<td>$23,500</td>
</tr>
<tr>
<td>Option 907</td>
<td>Front handle kit</td>
<td>add $ 75</td>
</tr>
<tr>
<td>Option 908</td>
<td>Rack mount kit</td>
<td>add $ 40</td>
</tr>
<tr>
<td>Option 909</td>
<td>Rack mount and front handle kit</td>
<td>add $100</td>
</tr>
<tr>
<td>Option 910</td>
<td>Extra operating and service manuals</td>
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<tr>
<td>Service Accessory Kit</td>
<td></td>
<td>$250</td>
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<tr>
<td>HP 35677A</td>
<td>S-Parameter test set (50 Ω)</td>
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<tr>
<td>HP 35677B</td>
<td>S-Parameter test set (75 Ω)</td>
<td>$3,500</td>
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<tr>
<td>Option 907</td>
<td>Front handle kit</td>
<td>add $ 45</td>
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<td>Rack mount and front handle kit</td>
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<td>extra service manual</td>
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<tr>
<td>HP 35678A</td>
<td>50 Ω calibration kit</td>
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<tr>
<td>HP 35678B</td>
<td>75 Ω calibration kit</td>
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<tr>
<td>HP 35679B</td>
<td>75 Ω type N test port extension cables</td>
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