

# HP 3577B Network Analyzer Specifications

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## Source Characteristics

### ■ Frequency Characteristics

**Frequency Range:** 5 Hz to 200 MHz.

**Frequency Resolution:** 0.001 Hz.

**Stability:** for Option 001,  $\pm 5 \times 10^{-8}$ /day, 0 to 55° C  
(Applicable for instrument on continuously  $\geq 48$  hours.)

### ■ Output Characteristics

**Level Range:** +15 dBm to -49 dBm  
(1.26 Vrms to 793  $\mu$ Vrms; 2 dBV to -62 dBV) into a 50 $\Omega$  load.

**Resolution:** 0.1 dB.

**Entry Units:** dBm, dBV, V.

**Accuracy:**  $\pm 1$  dB at +15 dBm and 100 kHz.  
Below +15 dBm, add the greater of  $\pm 0.02$  dB/dB or 0.2 dB.

**Flatness:** 1.5 dBpp from 5 Hz to 200 MHz.

**Impedance:** 50 $\Omega$ ; > 20 dB return loss at all levels.

**RF Output Connector:** 50 $\Omega$  Type N female.

#### **Spectral Purity:**

**Phase Noise (in 1 Hz Bandwidth):**  
< -70 dBc at offset frequencies from carrier of 100 Hz to 20 kHz.

**Harmonics:** < -30 dBc.

**Non-Harmonic Spurious Signals:**  
< -50 dBc or -70 dBm whichever is greater.

**Reverse Power Protection:** Output is automatically opened at a signal level of approximately +22 dBm (50 $\Omega$ ), or  $\pm 4$  Vdc, or greater applied to the source output. Source output is reconnected with the Clear Trip function.

### ■ Sweep Characteristics

#### **Linear Frequency:**

Range: 5 Hz to 200 MHz.

Entry: Start/stop or center/span frequencies.

Span: 0 Hz or 0.01 Hz to 200 MHz, phase continuous.

Sweep Time: 100 ms/span to 6553 s/span.

Direction: Increasing or decreasing frequency.

#### **Log Frequency (segmented linear approximation):**

Range: 5 Hz to 200 MHz.

Entry: Start/stop frequencies.

Span: 0.01 Hz to 200 MHz, phase continuous.

Log Accuracy: 2%.

Sweep Time: 200 ms/span to 6553 s/span.

Sweep Direction: Increasing frequency.

**Alternate Frequency:** Sweep alternates between two separate start/stop frequencies using linear sweep only.

**CW:** Frequency is fixed. Data is updated with a selectable sample time from 1 ms to 16 s.

**Discrete:** From 2 to 51 discrete frequencies at points of interest. Resolution bandwidth and settling time are individually settable. The minimum measurement time for each frequency is typically 10 ms. The discrete sweep table becomes part of the instrument state.

Sweep Direction: Increasing or decreasing frequency.

#### **Log Amplitude (fixed frequency):**

Range: +15 dBm to -49 dBm.

Entry: Start/stop level in dBm or dBV.

Sweep Time: 1 ms/step to 16 s/step. Total sweep time/span depends upon total number of steps and time/step.

**Sweep Modes:** Continuous, single, manual.

**Trigger Modes:** Free run, immediate, line, external.

## Receiver Characteristics

### Input Characteristics

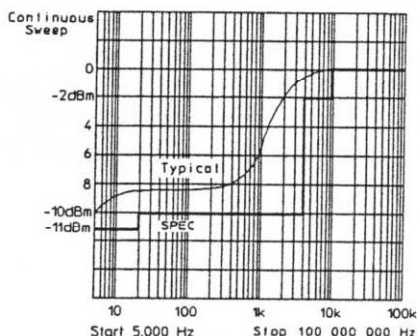
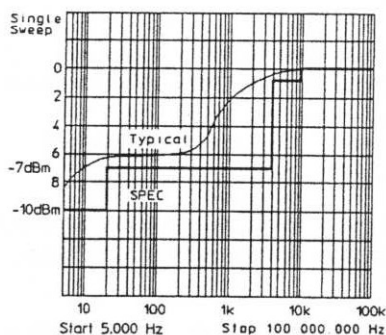
**Frequency Range:** 5 Hz to 200 MHz.

**Inputs:** Two receiver inputs (A and R). Option 002 provides input B.

**Input Impedance:** Selectable 50Ω with > 25 dB return loss, or 1 MΩ in parallel with approximately 30 pF.

**Full Scale Input Level:**

Input Impedance	Input Attenuation	
	0 dB	20 dB
50Ω	-20 dBm	0 dBm
1 MΩ	-33 dBV (22.4 mV)	-13 dBV (224 mV)



**Input Damage Level (approximate):**

50Ω: +30 dBm or 25 Vdc

1 MΩ: +16.9 dBV (7 Vrms) or 25 Vdc. The 50Ω input impedance automatically switches to 1 MΩ at approximately +20 dBm, and can be reset with the clear trip function.

**Input Connectors:** 50Ω 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:**

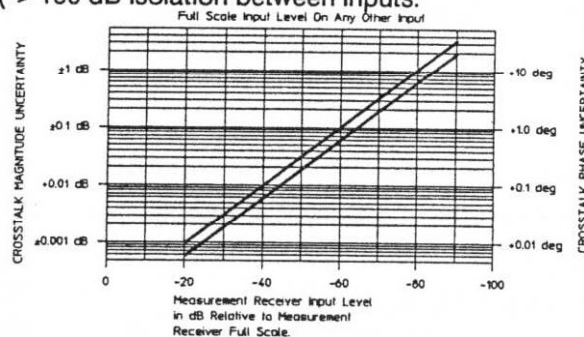
Sensitivity*					
Resolution Bandwidth	Minimum Freq.	Min. Freq. - 30 kHz (50 Ω) Min. Freq. - 300 kHz (1 MΩ)		30 kHz - 200 MHz (50Ω) 300 kHz - 20 MHz (1 MΩ)	
		Full Scale Input		Full Scale Input	
		0 dBm -13 dBm (20 dB Atten)	-20 dBm -33 dBV (0 dB Atten)	0 dBm -13 dBV (20dB Atten)	-20 dBm -33 dBV (0 dB Atten)
1 Hz	100 Hz	-110 dBm	-130 dBm	-110 dBm	-130 dBm
10 Hz	100 Hz	-100 dBm	-120 dBm	-110 dBm	-130 dBm
100 Hz	500 Hz	-90 dBm	-110 dBm	-105 dBm	-125 dBm
1 kHz	5 kHz	-80 dBm	-100 dBm	-95 dBm	-115 dBm

\*For 1 MΩ inputs, add 5 dB to the table.

**Residual Responses:** > 100 dB below full scale input, except for crosstalk error limits, L.O. feedthrough, and ac line and fan related spurious signals.

**Crosstalk Error Limits:**

(> 100 dB isolation between inputs.



**L.O. Feedthrough:** < -33 dB below maximum input level.

**AC Line and Fan Related Spurious Signals:**

< -100 dBm, frequency < 1 kHz.

**Electrical Length/Reference Plane Extension:**

Provides equivalent electrical line length, or delay at inputs A, R, and B (B for Option002 only).

**Range:**  $-3 \times 10^8$  m to  $+3 \times 10^8$  m, or +1 s to -1 s.

**Resolution:** 5 digits or 0.1 cm (3.3 ps) whichever is greater.

Accuracy:  $\pm 0.1$  cm or  $\pm 0.02\%$  whichever is greater.

## ■ Magnitude Characteristics

**Range:** Full Scale 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);  
 $10^{-10}$ /div to  $10^{20}$ /div (linear ratio).

**Display Units:** dB, dBm, dBV, V, and linear ratio.

**Accuracy (at 100 kHz, 25° C, and Full Scale Input):**

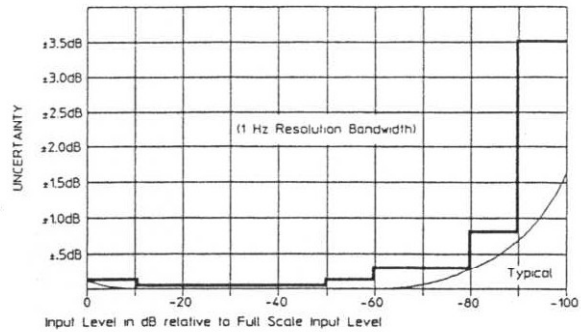
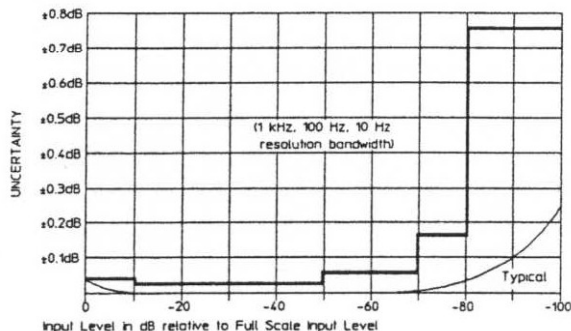
Absolute (A,B,R):  $\pm 0.2$  dB.

Ratio (A/R,B/R,A/B):  $\pm 0.15$  dB (50 $\Omega$ );  $\pm 0.2$  dB (1 M $\Omega$ ).

Accuracy and frequency response errors, and effects of different input attenuation can be calibrated out with normalization.

### Dynamic Accuracy:

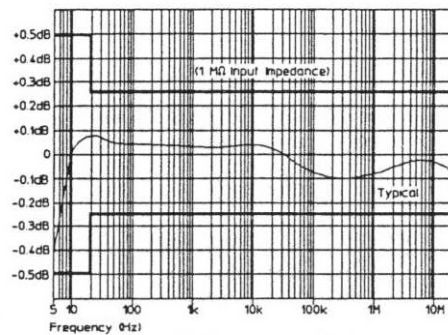
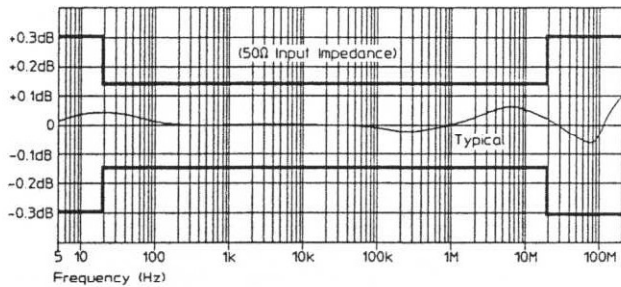
Error		Input Level Relative to Full Scale Input
Resolution Bandwidth		
1 kHz, 100 Hz, 10 Hz	1 Hz	
± .04 dB	± .04 dB	0 dB to − 10 dB
± .02 dB	± .02dB	− 10 dB to − 50 dB
± .05 dB	± .05 dB	− 50 dB to − 60 dB
± .15 dB	± .25 dB	− 60 dB to − 80 dB
± .75 dB	± .75 dB	− 80 dB to − 90 dB
± .75 dB	± 3.00 dB	− 90 dB to − 100 dB



**Frequency Response:** Specifications apply when inputs are driven from a 50 $\Omega$  source impedance.

### Absolute (A,B,R):

Frequency	Error	
	50 $\Omega$ Input	1 M $\Omega$ Input
20 Hz to 20 MHz	.3 dB pp	.5 dB pp
5 Hz to 200 MHz	.6 dB pp	—
5 Hz to 20 MHz	—	1 dB pp

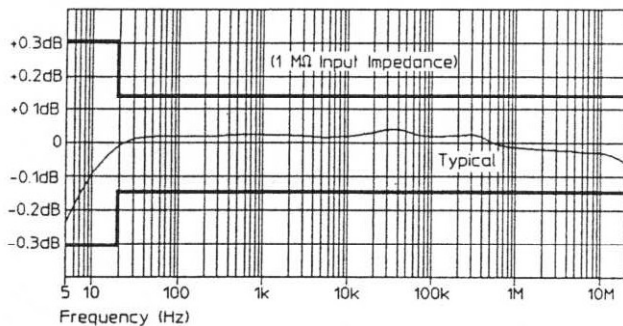
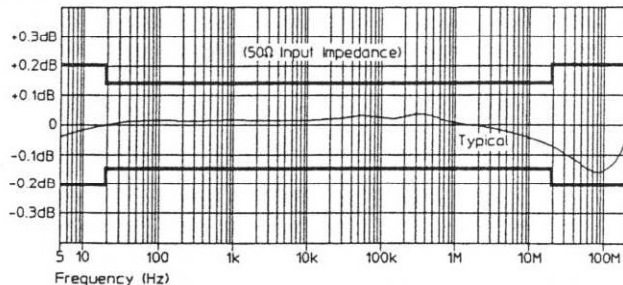


# HP 3577B Network Analyzer Specifications Source Characteristics

## Ratio (A/R,B/R,A/B):

Frequency	Error*	
	50 $\Omega$ Input	1 M $\Omega$ Input
20 Hz to 20 MHz	.3 dB pp	.3 dB pp
5 Hz to 200 MHz	.4 dB pp	—
5 Hz to 20 MHz	—	.6 dB pp

\*For unequal 50 $\Omega$  input attenuation add 0.15 dB pp (20 Hz to 20 MHz), 0.3 dB pp (5 Hz to 200 MHz). For unequal 1 M $\Omega$  input attenuation add 0.2 dB pp (20 Hz to 20 MHz), 0.4 dB pp (5 Hz to 20 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<sup>20</sup> (linear ratio).  
Resolution: 0.001 dB (log); 5 digits (linear).

## Stability:

Temperature: Typically <  $\pm 0.02$  dB/ $^{\circ}$ C.  
Time: Typically <  $\pm 0.05$  dB/hour at 25 $^{\circ}$ C.

## Phase Characteristics (A/R,B/R,A/B):

Range:  $\pm 180$  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).

Display Units: degrees, radians.

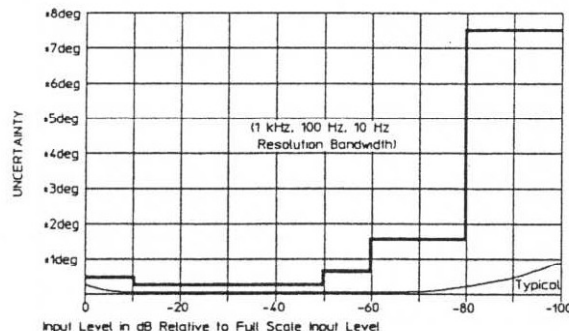
Accuracy (at 100 kHz, 25 $^{\circ}$ C, and Maximum Input Level):  $\pm 2.0$  deg.

Accuracy and frequency response errors, and effects of different input attenuation can be calibrated out with normalization.

## Dynamic Accuracy:

Error*	Input Level Relative to Maximum Allowable
$\pm .4$ deg	0 dB to -10 dB
$\pm .2$ deg	-10 dB to -50 dB
$\pm .5$ deg	-50 dB to -60 dB
$\pm 1.5$ deg	-60 dB to -80 dB
$\pm 7.5$ deg	-80 dB to -100 dB

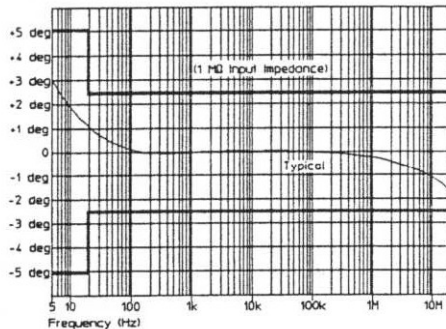
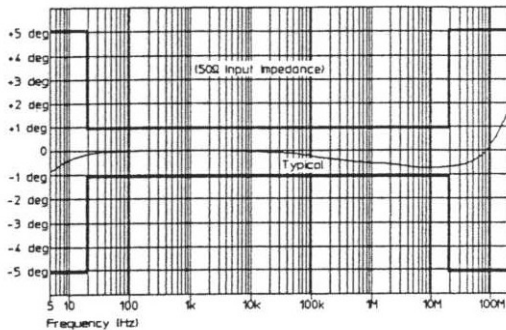
\*Specifications do not apply below -60 dB in a 1 Hz Resolution Bandwidth.



Frequency Response: Specifications apply when inputs are driven from a 50 $\Omega$  source impedance.

Frequency	Error *	
	50 $\Omega$ Input	1 M $\Omega$ Input
20 Hz to 20 MHz	2 deg pp	5 deg pp
5 Hz to 200 MHz	10 deg pp	—
5 Hz to 20 MHz	—	10 deg pp

\*For unequal input attenuation add 8 deg pp.



**Crosstalk:** Specified under Input Characteristics.

**Reference Level:**

Range: - 500 deg to + 500 deg (- 8.7 rad to + 8.7 rad)

Resolution: 0.01 deg.

**Stability:**

Temperature: Typically < ± 0.05 deg/° C.

Time: Typically ± 0.05 deg/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 10V

Ratio (A/R,B/R,A/B):  $10^{-10}$  to  $10^{20}$

■ **Real/Imaginary Characteristics**

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

**Resolution:**

Marker: 5 digits.

Display: 0.1 nV/div to 10 V/div for absolute;  $10^{-10}$  to  $10^{20}$  for ratio.

**Display Units:** V and linear ratio.

**Reference Level:**

Range: ± 10 V for absolute; ±  $10^{20}$  for ratio.

Resolution: 5 digits.

■ **Delay Characteristics**

(Linear Frequency Sweep and Discrete Sweep with equal frequency point spacing; A/R, B/R, A/B; 50Ω Input Impedance)

**Range:** Group delay is a computed parameter, defined by the equation  $t_g = -\frac{\Delta p}{2\pi \Delta f}$ .

**Minimum:** The minimum delay time is given by the expression

$$\frac{1.4 \times 10^{-5}}{\text{Aperture [Hz]}}$$

**Maximum:** The maximum delay is given by the expression  $\frac{N - 1}{2 \times \text{Span [Hz]}}$  where N = number of points per sweep (51, 101, 201, 401 for linear sweep; 3 to 51 for discrete sweep).

**Effective Range:** 1 ps to 20,000 s.

**Resolution:**

Marker: Same as minimum delay time or 5 digits, whichever is greater.

Display: 0.01 ns/div to 1000 s/div.

**Aperture:** Selectable 0.5%, 1%, 2%, 4%, 8%, 16% of frequency span for linear sweep. For discrete sweep, aperture is two times the spacing between the first two frequency points.

**Display Units:** seconds

$$\text{Accuracy: } \frac{.13 \text{ s}}{(\text{freq [Hz]})^2} \pm 2 \text{ ns or}$$

$$\frac{\text{Dynamic Phase Accuracy}}{360 \times \text{Aperture [Hz]}} \pm 2 \text{ ns whichever is greater.}$$

$$\text{The } \frac{.13 \text{ s}}{(\text{freq [Hz]})^2} \pm 2 \text{ ns}$$

term can be calibrated out with normalization.



HP 3577B Network Analyzer Specifications  
Source Characteristics

**Crosstalk:** Determined by the expression

$$\frac{\text{Phase Crosstalk}}{360 \times \text{Aperture [Hz]}}$$

**Reference Level:**

Range:  $\pm 10^3$  s.

Resolution: 5 digits.

**Stability:**

Temperature: Determined by the expression

$$\frac{\text{Phase Temperature Stability}}{360 \times \text{Aperture [Hz]}}$$

Time: Determined by the expression

$$\frac{\text{Phase Time Stability}}{360 \times \text{Aperture [Hz]}}$$

## Display Characteristics

**Annotation:** Start/stop, center/span or CW frequency, source level, scale/div, reference level, delay aperture, marker data, and soft key functions.

**Graticules:** Rectangular logarithmic and linear, polar, and Smith. All graticules are electronically generated.

**Traces:** Two simultaneous traces may be present with a rectangular graticule. One trace with polar or Smith graticules.

**Markers:** Each trace has one main marker and an offset marker. Markers indicate data at corresponding trace coordinates in the same units as used to set the Reference Level. Markers can be used to modify certain display parameters. Marker resolution is the same as horizontal display resolution.

**Limit Lines:** Each trace can have separate limit lines made of up to 20 line segments. Upper and lower limit lines can be defined for each trace. The limit table for each trace becomes part of the instrument state. A Pass/Fail indicator shows the results of a limit test on the screen. Also, the FAIL line on the Programmable I/O Port is set low for a failure, or high for pass just before the EOS is pulsed low. Limit tests typically add between 10 and 120 msec delay between sweeps.

### Reference Line Position:

Rectangular Graticule: 0% to 100% full scale deflection in 0.05% increments.

Polar/Smith Chart Graticule:  $\pm 500$  deg in 0.001 deg increments.

**Data Storage:** Measured data can be stored in vector format in twelve non-volatile storage registers X1 through X8 and D1 through D4. Stored data can be displayed again later or operated on with Vector Math.

**Vector Math:** Input magnitude and phase data, stored data, a  $j\omega$  register, and user defined constants and functions can be mathematically combined into expressions which define displayed or stored data. Mathematical operations are: add, subtract, multiply, and divide.

### Calibration:

**Normalization:** Both traces can be normalized to measured data with full accuracy, and resolution. Scale factors can be changed after normalization without affecting calibration.

**Normalize (Short):** Compensates for frequency response errors. Requires a short termination.

**One Port Part Cal:** Compensates for directivity errors and frequency response errors. Requires open and load terminations.

**One Port Full Cal:** Compensates for directivity, frequency response and source match errors. Requires open, short, and load terminations.

### Noise Averaging:

**Type:** Exponentially weighted vector averaging on successive sweep data.

**Averaging Factor:** Selectable 1 (off), 4, 8, 16, 32, 64, 128, 256.

The current trace  $A_n$  is always displayed and updated at the sweep rate according to the expression

$$A_n = S_n/F + (F - 1)(A_{n-1})/F$$
, where  $S_n$  = current input signal,  $F$  = averaging factor,  $A_{n-1}$  = previously averaged trace.

Averaging Factor is fixed at 1 in alternate sweep.

### Linear Phase Slope Compensation:

Provides linear phase slope offset in deg/span.

**Range:**  $-72,000$  deg./span to  $+72,000$  deg./span ( $-1256$  rad/span to  $+1256$  rad/span).

**Resolution:** 5 digits or 0.001 deg whichever is greater.

**Accuracy:** 0.02%.

**Autoscale:** Automatically adjusts the reference level and scale/div. of the displayed measurement.

### Measured No. of Points per Sweep:

Logarithmic frequency: 401

Linear frequency: 51, 101, 201, 401

CW frequency: 1

Discrete Sweep: between 2 and 51

**Measured No. of Steps per Sweep:**

Logarithmic Amplitude Sweep:

5, 10, 20, 50, 100, 200, 400

**Display Resolution:** Horizontal and vertical.

Rectangular: 1600 points.

Polar: 1200 points.

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## Programming Characteristics

**HP-IB Capability:** Remote programming is via the Hewlett-Packard Interface Bus (HP-IB)\* for all HP 3577B front panel control functions except the ac line switch, display intensity, entry knob, HP-IB address and system controller on/off. The HP 35677A/B S-Parameter Test Sets are programmable through the HP 3577B interface only. The HP 3577B responds to all HP 3577A HP-IB programming commands.

**Interface Functions:** SH1,AH1,T6,TEØ, L4, LEØ,SR1,RL1,PP1,DC1,DT1,C1,C2,C3,C12,E1.

**Output Data Transfer Time:** 401 complex data points can be transferred directly to an HP 9000 Series 300 Computer in BASIC language as follows:

ASCII Mode: Typically 2800 ms.

Binary Floating Point Mode: Typically 310 ms.

**HP Instrument BASIC Capability (Option 1C2):** This option adds 640 kBytes of RAM to the HP 3577B and provides the capability to capture key sequences, customize parameter extractions, fully control the Programmable I/O Port, and control other HP-IB devices. Mass storage is accessed using a LIF or DOS disk in an external SS80 drive (subset of the CS80). One program can be in RAM at a time. Edit a program via an external controller. Load a program via an external disk drive or via HP-IB. 401 complex data points can be transferred to an HP Instrument BASIC program in 64-bit IEEE 754 binary floating-point mode in typically 130 msec.

\* HP-IB is Hewlett-Packard's implementation of IEEE Standard 488.1



## Option 1C2: HP Instrument BASIC Commands

Front panel commands	Trigonometric operations	Graphics control	Clock and calendar
LIST	ACS()	GCLEAR	TIMEDATE
SECURE	ASN()		
Error	ATN()	Graphics	General
handling	COS()	plotting	device I/O
ERRL()	DEG	DRAW	ASSIGN
ERRLN()	RAD	MOVE	BEEP
ERRM\$	SIN()	Program	CRT
ERRN	TAN()	control	DATA
Memory	String	CALL	DISP
allocation	operations	CASE	ENTER
COM	&	CASE ELSE	IMAGE
DIM	CHR&()	CONT	INPUT
INTEGER	DVAL\$()	DEF FN	OUTPUT
REAL	DVAL()	ELSE	PRINT
SCRATCH	IVAL\$()	END	PRINTER IS
Relation	IVAL()	END IF	PRT
operators	LEN()	END LOOP	READ
<, <=, <>, >, =	LWC\$()	END SELECT	RESTORE
General	NUM()	END WHILE	TAB()
math	POS()	EXIT IF	TABXY()
x, +, -, /, ^	REV\$()	FN	Binary
ABS()	RPT\$()	FNEND	functions
DIV	TRIM\$()	FOR NEXT	BINAND()
DROUND()	UPC\$()	GOSUB	BINCMP()
EXP()	VAL\$()	GOTO	BINEOR()
FRACT()	VAL()	IF THEN	BINIOR()
INT()	HP-IB control	LOOP	BIT()
LET	ABORT	PAUSE	ROTATE()
LGT()	CLEAR	REPEAT	SHIFT()
LOG()	LOCAL	UNTIL	Event-initiate
MAX()	LOCAL	RETURN	branching
MAXREAL	LOCKOUT	RUN	DISABLE
MIN()	PASS	SELECT	DISABLE
MINREAL	CONTROL	STOP	INTR
MOD	REMOTE	SUB	ENABLE
MODULO	SPOLL()	SUBEND	ENABLE
PI	TRIGGER	SUBEXIT	INTR
PROUND()	Mass storage	WAIT	ON/OFF
RANDOMIZE	CAT	WHILE	ERROR
RND	COPY	Logical	ON/OFF INTR
SGN()	CREATE ASCII	operators	ON/OFF KEY
SQR()	CREATE BDAT	AND	ON/OFF
SQRT()	CREATE	EXOR	TIMEOUT
	(DOS FILE)	NOT	
	CREATE DIR	OR	
	(DOS FILE)		
	GET		
	INITIALIZE		
	MSI		
	PURGE		
	RE-SAVE		
	RENAME		
	SAVE		

## Graphics Capabilities:

Alphanumeric Characters: 12 lines of text with 40 characters per line can be displayed character set includes alphanumerics, special characters and line vectors.

Vector Display: Trace lines and alphanumeric characters can be drawn on the display between any two points with a resolution of 2048 points along the horizontal and vertical axes.

## General Characteristics

### Compatibility:

The HP 3577B (including Options 001 and 002) is form, fit and function compatible with the HP 3577A. The HP 3577B responds to all HP 3577A HP-IB commands.

### External Reference Frequency Input:

Frequency: 10 MHz/N (N is an integer from 1 to 100).  
Level: 0 dBm  $\pm$  10 dB, nominal.  
Impedance: 50 $\Omega$ , nominal.  
Connector: BNC female, rear panel.

### Reference Frequency Output:

Frequency: 10 MHz (nominal)  
Level: Typically 0 dBm  
Impedance: 50 $\Omega$ , nominal.  
Connector: BNC female, rear panel.

### External Trigger:

Triggers on negative TTL transition or contact closure to ground.  
Minimum Pulse Width: Typically 1  $\mu$ sec.  
Impedance: 50 $\Omega$ , nominal.  
Connector: BNC female, rear panel.

### Programmable Input/Output Connector:

Rear panel connector is a female D-SUB series D25. It has three dedicated outputs (EOS, EOM, and FAIL). The connector is intended to interface with non-HP-IB equipment or custom hardware. The eight input and output lines are accessible from HP Instrument BASIC or from external HP-IB control. Input and output are TTL levels. Inputs are pulled up with 10 K $\Omega$  and outputs can drive three standard LS TTL loads (typical 1 – 2 mA sink). They are accessible from HP Instrument BASIC or external HP-IB control.

### Plotter Control:

Directly compatible with HP-IB graphics plotters that use Hewlett-Packard Graphics Language (HP-GL). Plotter may be controlled by the HP 3577B through the HP-IB connector without an external computer. The plotter address can be set from the HP 3577B front panel. Plotted data includes trace 1, trace 2, graticule, and annotation. Additional markers can be plotted, and pen numbers, pen speed, and line type can also be selected.

### Display Adjustments:

Astigmatism, x-axis position, y-axis position, alignment, focus, and intensity.

### 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 +70° C.  
Altitude: < 15,240 m (50,000 ft).

### Accessories Included:

3ea. Type N male to BNC female Adapter with standard. (HP Part No. 1250-0780)  
4 ea. with Option 002.  
1 ea. Operating Manual. (HP Part No. 03577-90029).  
1 ea. Service Manual. (HP Part No. 03577-90028).

### Option 1C2 Accessories:

1 ea. *Using HP Instrument BASIC with the HP 3577B* (03577-90030)  
1 ea. *HP Instrument BASIC User's Handbook* (E2083-90000)

### Hardware Options:

Option 001; Internal Oven Frequency Reference.  
Adds 10 MHz oven stabilized frequency reference.  
Stability:  $5 \times 10^{-8}$ /day, 0 to 55° C, after 48 hour warm-up period.

Option 002; Third Receiver.  
Adds third input receiver (input B).  
All receiver specifications apply.

Option 1C2; HP Instrument BASIC  
See description in the Programming Characteristics section.

**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 lbs) net. 41 kg (90 lbs) shipping.

**Dimensions:** 222 mm H × 426 mm W × 578 mm  
D (8.75 in × 16.75 in × 22.75 in). Add 1 1/8 inch to  
depth to include front panel controls and  
connectors.

## HP 35677A/B S-Parameter Test Set Specifications

All specifications apply without bias signals. Degrees are specified as deviation from linear phase. Frequency Response, Port Match, and Test Port Reciprocity specifications are equivalent values for ratio measurements, and errors can be calibrated out.

**Frequency Range:** 100 kHz to 200 MHz.

**Test Port Impedance:**

HP 35677A: 50 $\Omega$ .

HP 35677B: 75 $\Omega$ .

**Directivity:** > 40 dB.

**Frequency Response:**

Transmission ( $S_{21}$ ,  $S_{12}$ ):  $\pm 1$  dB,  $\pm 5$  deg.

Reflection ( $S_{11}$ ,  $S_{22}$ ):  $\pm 1$  dB,  $\pm 5$  deg.

**Port Match:**

Test Ports 1, 2: HP 35677A, > 26 dB;

HP 35677B, > 24 dB.

Test Ports 1, 2 Open/short ratio:

HP 35677A,  $\pm 0.75$  dB magnitude and  $\pm 5$  deg phase;

HP 35677B,  $\pm 1$  dB magnitude and  $\pm 7.5$  deg phase.

Input Port: > 20 dB return loss.

Output Ports A, B, and R: > 26 dB return loss.

**Test Port Isolation:** > 100 dB.

**Insertion Loss:**

RF Input to Test Port 1 or 2: HP 35677A, typically 13 dB; HP 35677B, typically 19 dB.

RF Input to Output Ports A, B, or R:

HP 35677A, typically 19 dB; HP 35677B, typically 31 dB.

**Test Port Reciprocity:**

Transmission ( $S_{21}$ ,  $S_{12}$ ): typically  $\pm 0.5$  dB magnitude and  $\pm 5$  deg phase.

Reflection ( $S_{21}$ ,  $S_{12}$ ): typically  $\pm 0.5$  dB magnitude and  $\pm 5$  deg phase.

Incident Power Ratio (Test Port 1 to Test Port 2): typically  $\pm 1.5$  dB.

**RF Input Maximum Operating Level:**

+ 25 dBm or  $\pm 30$  Vdc.

**RF Input Damage Level:** +27 dBm or  $\pm 30$  Vdc.

**Port 1 or 2 Damage Level:** +27 dBm or  $\pm 30$  Vdc.

**Connectors:**

Input Port and Output Ports A, B, and R: 50 $\Omega$  Type N female.

Test Ports 1 and 2: HP 35677A, 50 $\Omega$  Type N female; HP 35677B, 75 $\Omega$  Type N female.

DC Bias Inputs: BNC female, rear panel.

**DC Bias Range:** Typically  $\pm 30$  Vdc and  $\pm 20$  mA with some degradation of RF specifications; 200 mA damage level.

**Accessories Included:**

4 ea. 190 mm (7.5 in.) 50 $\Omega$  cables with Type N male connectors for connection to HP 3577B (HP Part No. 8120-4387).

1 ea. Test Set interconnect cable to HP 3577B (HP Part No. 35677-61620)

1 ea. Rear Panel Lock Foot Kit (HP Part No. 5061-0099).

1 ea. Service Manual (HP Part No. 35677-90010).\*

**Recommended Accessories:**

HP 35677A: 35678A 50 $\Omega$  Type N Calibration Kit;

35679A 50 $\Omega$  Type N Test Port Extension Cables.

HP 35677B: 35678B 75 $\Omega$  Type N Calibration Kit;

35679B 75 $\Omega$  Type N Test Port Extension Cables.

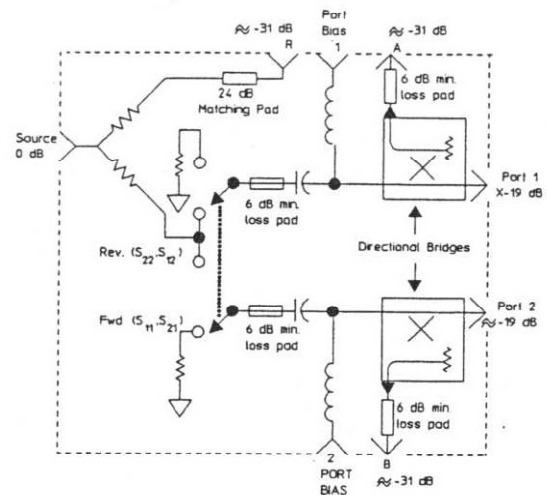
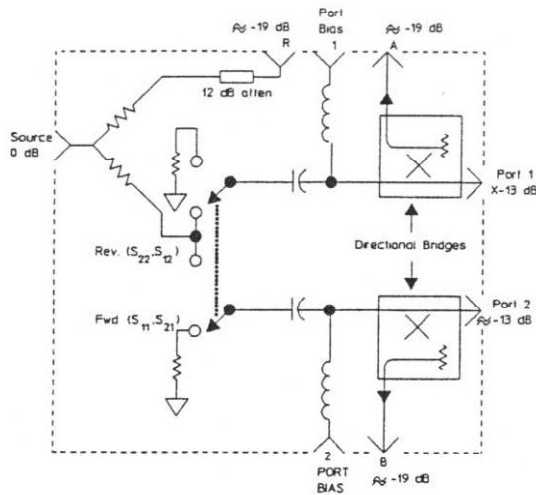
**Programming:** The HP 35677A/B are completely controlled through the HP 3577B using the HP 3577B interconnect cable. All programming is accomplished through the HP 3577B HP-IB interface.

**Power:** All power is obtained through the HP 3577B interconnect cable.

**Weight:** 6 kg (13 lbs) net; 12 kg (26 lbs) shipping.

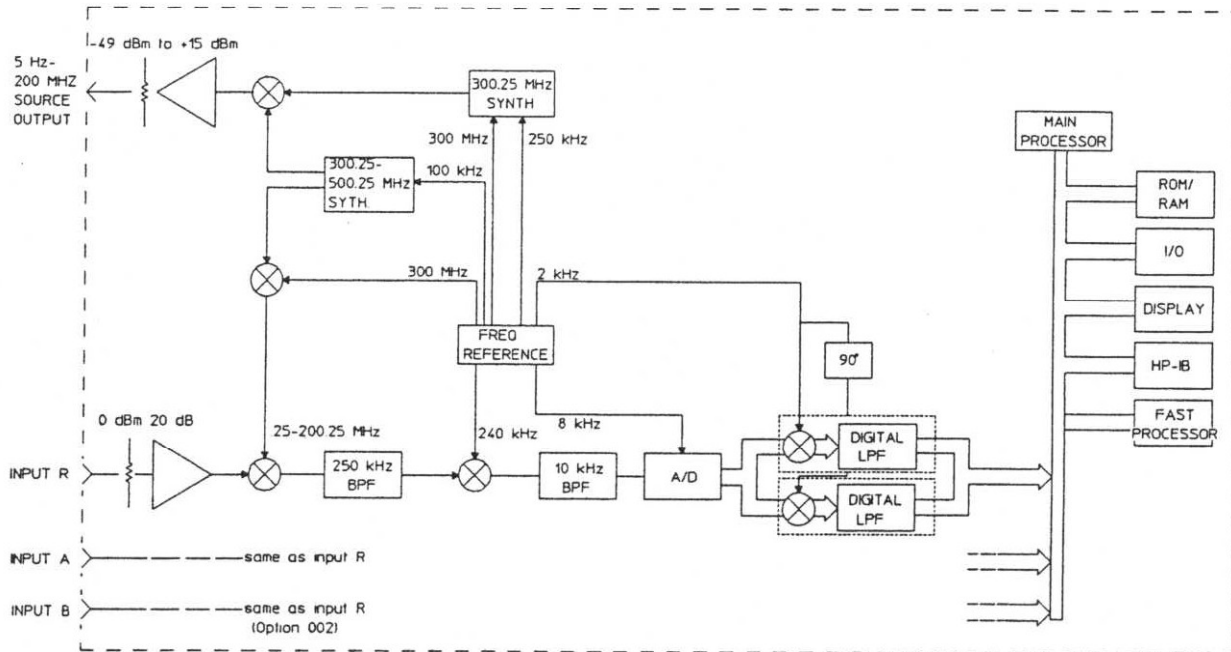
\* Note operation information included in HP 3577B Operation Manual. (HP Part No. 03577-90029).

**Dimensions:** 90 mm H x 426 mm W x 584 mm D  
(3.5 in x 16.75 in x 22.75 in). Add 1 1/8 inch to  
depth to include front panel connectors.



HP 35677A Block Diagram

HP 35677B Block Diagram



HP 3577B Block Diagram



