33424

OPERATING INFORMATION

RF SECTION
1-1300 MHz
86602A

DUPLICATE OF SECTIONS 1 THRU 3
OF YOUR OPERATING AND SERVICE MANUAL

KEEP WITH INSTRUMENT

SEPTEMBER 1974

HEWLETT hp PACKARD

HP 86602A

MODEL 86602A

Figure 1-1. HP Model 86602A RF Section

SECTION I
GENERAL INFORMATION

1-1. INTRODUCTION

1-2. This manual contains all information required to install, operate, test, adjust and service the Hewlett-Packard Model 86602A RF Section plug-in, hereinafter referred to as the 86602A. For information concerning related equipment, such as the Hewlett-Packard Models 8660A and 8660B Synthesized Signal Generator mainframes or the Model 11661A Frequency Extension Module, refer to the appropriate manual or manuals.

1-3. This manual is divided into eight sections which provide information as follows:

a. SECTION I, GENERAL INFORMATION, contains the instrument description and specifications as well as the accessory and recommended test equipment list.

b. SECTION II, INSTALLATION, contains information relative to receiving inspection, preparation for use, mounting, packing, and shipping.

c. SECTION III, OPERATION, contains operating instructions for the instrument.

d. SECTION IV, PERFORMANCE TESTS, contains information required to verify that instrument performance is in accordance with published specifications.

e. SECTION V, ADJUSTMENTS, contains information required to properly adjust and align the instrument after repair.

f. SECTION VI, REPLACEABLE PARTS, contains information required to order all parts and assemblies or effect exchange of assemblies.

g. SECTION VII, MANUAL CHANGES, contains backdating information to make documentation in this manual applicable to all earlier versions of this instrument.

h. SECTION VIII, SERVICE, contains descriptions of the circuits, schematic diagrams, parts location diagrams, and troubleshooting procedures to aid the user in maintaining the instrument.

1-4. Figure 1-1 shows the HP Model 86602A RF Section.

1-5. Packaged with this manual is an Operating Information Supplement. This is simply a copy of the first three sections of this manual. This supplement should stay with the instrument for use by the operator. Additional copies of the Operating Information Supplement may be ordered separately through your nearest Hewlett-Packard office. The part number is listed on the title page of this manual.

1-6. On the title page of this manual, below the manual part number, is a "Microfiche" part number. This number may be used to order 4 x 6-inch microfilm transparencies of the manual. Each microfiche contains up to 60 photo-duplicates of the manual pages. The microfiche package also includes the latest Manual Changes supplement as well as all pertinent Service Notes.

1-7. SPECIFICATIONS

1-8. Instrument specifications are listed in Table 1-1. These specifications are the performance standards, or limits against which the instrument may be tested.

1-9. INSTRUMENTS COVERED BY MANUAL

1-10. This instrument has a two-part serial number. The first four digits and the letter comprise the serial number prefix. The last five digits form the sequential suffix that is unique to each instrument. The contents of this manual apply directly to instruments having the same serial number prefix(es) as listed under SERIAL NUMBERS on the title page.

1-11. An instrument manufactured after the printing of this manual may have a serial prefix that is not listed on the title page. This unlisted serial prefix indicates that the instrument is different from those documented in this manual. The manual for this instrument is supplied with a yellow Manual Changes supplement that contains "change information" that documents the differences.

Table 1-1. Models 86602A/11661 Specifications (1 of 2)

SPECIFICATIONS

FREQUENCY CHARACTERISTICS

Range: 1.0 to 1299.999 999 MHz. Selectable in 1 Hz steps. Frequencies from 200 kHz to 1 MHz may also be selected with some degradation in specifications.

Accuracy and Stability: CW frequency accuracy and long term stability are determined by reference oscillator in 8660-series Mainframe (3×10^{-8}/24 hours) or by external reference if used.

Switching Time:

6 ms to be within 50 Hz of any new frequency selected.

100 ms to be within 5 Hz of any new frequency selected.

Largest Digit Changed	1 Hz 10 Hz	100 Hz	1 kHz, 10 kHz	100 kHz, 1 MHz	10 MHz	100 MHz, 1 GHz
Error at 1 msec	<1 Hz	<100 Hz	< 500 Hz	<500 Hz	<500 Hz	Undefined
5 msec	<1 Hz	<1 Hz	<10 Hz	<50 Hz	< 50 Hz	<50 Hz

Typical 86602A/11661
Frequency Switching Characteristics

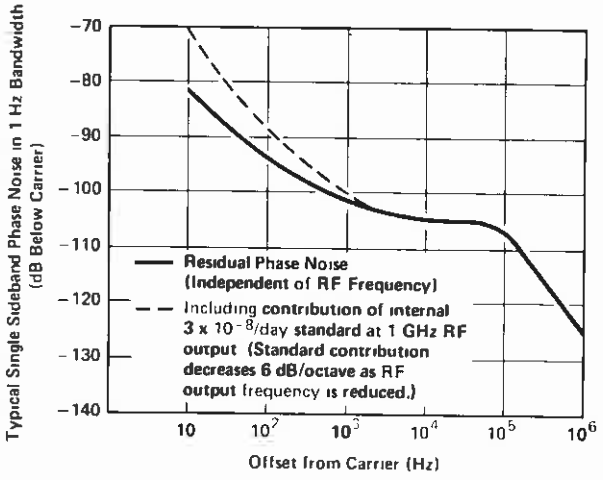
Harmonic Signals: All harmonically related signals are at least 30 dB below the desired output signal for output levels below +3 dBm. (−25 dB for output levels above +3 dBm.)

Spurious Signals:

Below 700 MHz, −80 dB.
Above 700 MHz, −80 dB within 45 MHz of carrier. −70 dB greater than 45 MHz from carrier (−50 dB on 1V range).
Power Line Related: −70 dB.

Signal-to-Phase Noise Ratio: Greater than 45 dB in a 30 kHz band centered on the signal excluding a 1 Hz band centered on the carrier.

Typical SSB Phase Noise Curve:



Typical 86602A Phase Noise

Residual FM: <1.5 Hz rms in a 2 kHz bandwidth centered on the carrier (CW, AM only).

Signal-to-AM Noise Ratio: Greater than 65 dB in a 30 kHz bandwidth centered on the carrier at output level of +10 dBm

OUTPUT CHARACTERISTICS

Level: Continuously adjustable from +10 to −146 dBm (0.7V to 0.01 μV rms) into 50 ohm resistive load; output attenuator calibrated in 10 dB steps from 1.0V (+13 dBm) full scale to 0.03 μV (−137 dBm) full scale; vernier provides continuous adjustment between attenuator ranges; output level indicated on output level meter calibrated in volts and dBm into 50 ohms.

Accuracy: (Local and remote modes)
±1.5 dB +10 dBm to −76 dBm.
±2.0 dB −77 dBm to −146 dBm.

Flatness: Output level variation with frequency is less than ±1.0 dB across entire frequency range. (Typically ±0.5 dB 100 MHz to 1300 MHz.)

Level Switching Time: Any level change may be accomplished in less than 50 ms. Any change to another level on the same attenuator range may be accomplished in 5 ms in REMOTE mode.

Impedance: 50Ω. SWR <2.0 on 1 volt and 0.3 volt ranges. SWR <1.3 on 0.1 volt range and below.

Table 1-1. Models 86602A/11661 Specifications (2 of 2)

MODULATION CHARACTERISTICS
(With 86632A and 86633A AM-FM Modulation Sections)

Amplitude Modulation:

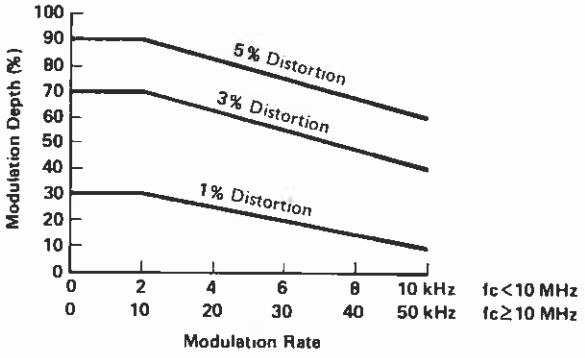
Depth: 0 — 90% on 0.3 volt range and below. (Modulation is possible on 1V range depending on setting of vernier.)

AM 3 dB Bandwidth:

Center Frequency	0 to 30% AM	70% AM	90% AM
Fc <10 MHz	10 kHz	6 kHz	5 kHz
Fc ≥10 MHz	100 kHz	60 kHz	50 kHz

AM Distortion: (at 400 Hz and 1 kHz rates)[1]

Frequency Range	30%	70%	90%
1—1300 MHz	<1%	<3%	<5%



Typical 86602A AM distortion curves

Indicated AM Accuracy: (400 Hz and 1 kHz rates using internal meter) ±5% of full scale.

Incidental PM: Less than 0.2 radians peak at 30% AM.

Incidental FM: 0.2 x f_{mod} at 30% AM.

Frequency Modulation: [2]

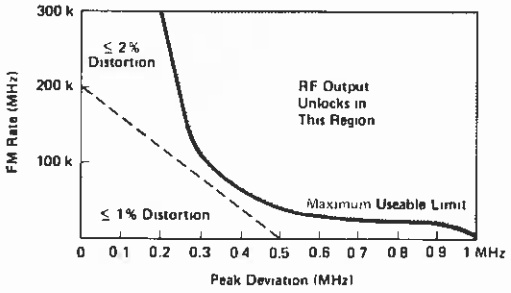
Rate: DC to 200 kHz with 86632A
DC to 100 kHz with 86633A

Max. Deviation: DC to 200 kHz with 86632A
DC to 100 kHz with 86633A

Indicated FM Accuracy: ±5% of full scale up to 20 kHz rates.

Incidental AM: With 75 kHz peak deviation at a 1 kHz rate, AM modulation sidebands are <—60 dB.

FM Distortion: (at rates up to 20 kHz) <1% for deviations up to 200 kHz.



Typical 86602A FM distortion curves

PULSE MODULATION
(With the 86631B Auxiliary Section)

Source: External.

ON/OFF Ratio: At least 40 dB (with modulation level control at max.)

Rise/Fall Time: 50 ns.

Input Level Required: 0 to —10V negative voltage turns RF on.

REMOTE PROGRAMMING
(Through the 8660-series mainframes)

Frequency: Programmable in 1 Hz steps over full output range.

Output Level: Programmable in 1 dB steps from +10 to —146 dBm.

Modulation: See specifications for modulation section installed.

GENERAL

Leakage: Meets radiated and conducted limits of MIL-I-6181D.

86602A:

Size: Plug-in to fit 8660-series mainframe.

Weight: Net, 9 lb (4,1 kg).

11661:

Size: Module installs internally in 8660-series mainframe.

Weight: Net, 4 lb (1, 8 kg)

[1] This is for RF output meter set at 0 dB or above. At —6 dB setting, distortion is approximately doubled.

[2] In the FM mode (86632A only), carrier frequency stability is determined by a free-running modulation oscillator. The oscillator can be phase-locked momentarily to remove drift by depressing the FM-CF CAL button. Oscillator drift is typically less than 200 Hz/hour after 6-hour mainframe warmup and 30 minutes operation in FM mode.

1-12. In addition to change information, the supplement may contain information for correcting errors in the manual. To keep this manual as current and accurate as possible, Hewlett-Packard recommends that you periodically request the latest Manual Changes supplement. The supplement for this manual is keyed to this manual's print date and part number, both of which appear on the title page. Complimentary copies of the supplement are available from Hewlett-Packard.

1-13. For information concerning a serial number prefix not listed on the title page or in the Manual Changes supplement, contact your nearest Hewlett-Packard office.

1-14. DESCRIPTION

1-15. The HP Model 86602A RF Section is one of several RF Sections available for use in an 8660-series Synthesized Signal Generator System. The HP Model 86602A RF Section plug-in is used with a Synthesized Signal Generator mainframe that has a Frequency Extension Module installed. The 86602A provides precisely tuned RF output frequencies over the 1 MHz to 1.3 GHz range with a 1 Hz frequency resolution (100 Hz for option 004 mainframe). Frequencies from 200 kHz to 1 MHz can also be generated with some degradation in the amplitude leveling and related specifications of the instrument.

1-16. The output power can be set to any level between +10 and −146 dBm by means of the front panel VERNIER and calibrated OUTPUT RANGE controls. A front panel-mounted meter indicates the output power and voltage levels delivered by the RF Section to any external load having a characteristic impedance of 50 ohms. Output power levels are maintained within ±1 dB of selected values through internal leveling of the output signal over the full frequency range of the instrument.

1-17. AM, FM, or pulse modulation of the RF OUTPUT signal can be accomplished within the 86602A by using the appropriate HP plug-in (Auxiliary Section or AM-FM Modulation Section) in the system.

1-18. External programming, inherent with the 86602A and associated HP equipment, permits remote selection of the output signal frequency in 1 Hz steps (100 Hz for option 004 mainframe) and the output power level in 1 dB steps over the full operating range of the instrument. External programming is effected via the mainframe computer-compatible interface and digital control unit circuits.

1-19. OPTION 001

1-20. Option 001 has no RF output attenuator. Output ranges selectable with OUTPUT RANGE switch are 0 and +10 dBm only.

1-21. EQUIPMENT REQUIRED BUT NOT SUPPLIED

1-22. System Mainframe

1-23. The mainframe uses phase-locked loops to accurately generate clock, reference, and tuning signals required for operation of the Synthesized Signal Generator System. Front panel-mounted mainframe controls are used to digitally tune two phase-locked loops in the Frequency Extension Module which, in turn, produce two high-frequency output signals that are applied to the RF Section. The RF Section mixes the two signals and presents their frequency difference at the front panel OUTPUT jack. The output frequency is either the value selected by the mainframe front panel controls or externally programmed.

1-24. The mainframe power supply provides all dc operating voltages required by the 86602A, Frequency Extension Module, and AM-FM Modulation Section plug-ins. Remote programming of the plug-ins is accomplished via the mainframe interface and digital control unit circuits.

1-25. Frequency Extension Module

1-26. The Frequency Extension Module plug-in extends the output frequency range of the mainframe to meet the input requirements of the 86602A. The Frequency Extension Module plug-in contains two high-frequency phase-locked loops which receive digital tuning signals, variable synthesized signals, and fixed synthesized signals from the mainframe. The phase-locked loops use the mainframe signals, in conjunction with the output frequency from a 4.43 GHz oscillator that is common to both loops, to produce two high-frequency output signals that are supplied to the 86602A. One output signal is generated by a phase-locked loop using a Voltage Controlled Oscillator (VCO) that is tuneable in 1 Hz steps (100 Hz steps for option 004 mainframe) over the

Table 1-2. Test Equipment and Accessories List (1 of 2)

Item	Critical Specifications	Suggested Model	Use*
Digital Voltmeter	Accuracy: ±0.2% Range: .00 to 60 Volts	HP 34740A with HP 34702A	T
AC Voltmeter	1 Hz to 1 MHz 1 mVrms to 10 Vrms	HP 403A	P,A
Vector Voltmeter	10 to 100 MHz 0.1 to 1.0 Vrms	HP 8405A	P
Accessory Kit (Vector Voltmeter)	50Ω Load and Tee	HP 11570A	P
Oscilloscope	Vertical: Bandwidth 50 MHz with sensitivity of 5 mV/division minimum Horizontal: Sweep time 10 ns to 1 s Delayed sweep External triggering to 100 MHz	HP 180A with HP 1801A and HP 1821A plug-ins	P,T
10 ÷ 1 divider probes (two)	10:1 divider 10 Megohm 10 pF	HP 10004	
Spectrum Analyzer	Absolute Accuracy ±1.6 dB from 10 MHz to 1.3 GHz Measurement Accuracy ±2.6 dB from 10 MHz to 1.3 GHz	HP 8555A with HP 8552B and HP 140S	P,A,T
Test Oscillator	1 kHz to 20 kHz 0.2 to 2.0 Vrms into 50Ω	HP 651B	P,A
Synthesized Signal	±1 Hz from .01 MHz to 110 MHz ±2 dB from +10 to −90 dBm	HP 8660A with HP 86631B and HP 86602A plug-ins	P
Modulator Section	1 kHz FM with 1 MHz peak deviation	HP 86632A	P
Computing Counter	50 kHz to 50 MHz with a 1 ms gate time and external trigger; 1 Hz resolution	HP 5360A with HP 5365A plug-in	P
Wave Analyzer	20 Hz to 40 kHz	HP 302A	P
Crystal Detector	100 kHz to 100 MHz	HP 8471A	P
Power Supply	0 - 10 volts	HP 721	P
Marked Card Programmer	Capable of programming BCD or GPI bus data	HP 3260A Opt 001	P,A

*USE: P = Performance Tests; A = Adjustments; T = Troubleshooting

Table 1-2. Test Equipment and Accessories List (2 of 2)

Item	Critical Specifications	Suggested Model	Use*
Frequency Meter/ FM Discriminator	100 kHz to 10 MHz with 1 volt output sensitivity	HP 5210A	P
Variable Coaxial Attenuator	Calibrated at 30 MHz; refer to calibration curve	HP H38-355D (only)	P
Double Balanced Mixer	1 MHz to 110 MHz	HP 10514A	P
BNC Tee		UG 274 B/U	P,A
Variable Phase Generator	Distortion less than 3% Range: 1 kHz to 20 kHz Output level: 0.1 to 1.0 Vrms	HP 203A	P
15 kHz Lowpass Filters (two)	Special	(see Figure 1-3)	P
100 kHz Lowpass Filter	Special	(see Figure 1-4)	P
40 dB Amplifier	Special	(see Figure 1-5)	P
Service Kit	Interconnect cables, adaptors, coaxial cables compatible to 8660-series plugs and jacks	HP 11672A (see Operating Note for parts list)	A, T
Microwave Frequency Counter	Range: 0.2 - 1300 MHz Resolution: 1 Hz	HP 5340A	P
Power Meter	Range: 0 to +10 dBm from 10 MHz	HP 432A	P,A,T
Thermistor Mount	1 MHz - 1 GHz at SWR $\leq$ 1.3	HP H55-478A	P,A
Fixed Attenuator	3 dB	HP 8491A Opt. 003	P,A
Pulse Generator	Output -10 Vpk with $\geq$10 ns risetime	HP 8013A	P
Crystal Detector	Frequency response to 10 GHz	HP 420A	P
Low Pass Filter	Cutoff frequency: 2200 MHz	HP 360C	P
Termination, 50Ω Feedthru	50Ω	HP 11048C	P
Double Balanced Mixer	100 to 1300 MHz	Relcom MIA-11	P

*USE: P = Performance Tests; A = Adjustments; T = Troubleshooting

3.95 to 4.05 GHz range. The other output signal is generated by a phase-locked loop using a Yittrium-Iron-Garnet (YIG) oscillator that is tunable in 100 MHz steps over the 2.75 to 3.95 GHz range. The two outputs from the Frequency Extension Module plug-in are applied to the 86602A for mixing, amplification of the converted signal, and final output power level control.

1-27. Auxiliary Section

1-28. The Auxiliary Section plug-in provides a means of applying externally generated amplitude or pulse modulation drive signals to the 86602A for modulation of the generated output carrier.

1-29. Modulation Section Plug-ins

1-30. The Model 86630-series AM-FM Modulation Section plug-ins can accept externally generated signals or develop internal signals to be used for calibrated amplitude or frequency modulation of the output signal from the 86602A. The AM signals are supplied to the 86602A for modulation of the generated output carrier as previously described in the paragraph discussing the Auxiliary Section plug-in.

1-31. In the FM mode, the AM-FM Modulation Section plug-in supplies a 20 MHz frequency modulated signal to the reference input of a phase detector in the Frequency Extension Module phase-locked YIG loop. Thus, as the 20 MHz frequency modulated signal varies, the YIG loop output frequency varies accordingly. When the modulated YIG loop output is mixed in the 86602A with the VCO loop output, the resultant RF signal retains the FM characteristics provided by the AM-FM Modulation Section plug-in.

1-32. EQUIPMENT AVAILABLE

1-33. Three extender cables, HP Part Numbers 11672-60001, -60005, and -60006, are required to extend the 86602A plug-in for maintenance purposes. The extender cables are part of the HP 11672A Service Kit, but may be ordered separately.

1-34. Extender cards for use in servicing the 86602A and a type N to BNC adapter for use on the front panel RF OUTPUT connector are contained in the HP Rack Mount Kit, Part Number 08660-60070, that is supplied with the mainframe.

1-35. RECOMMENDED TEST EQUIPMENT

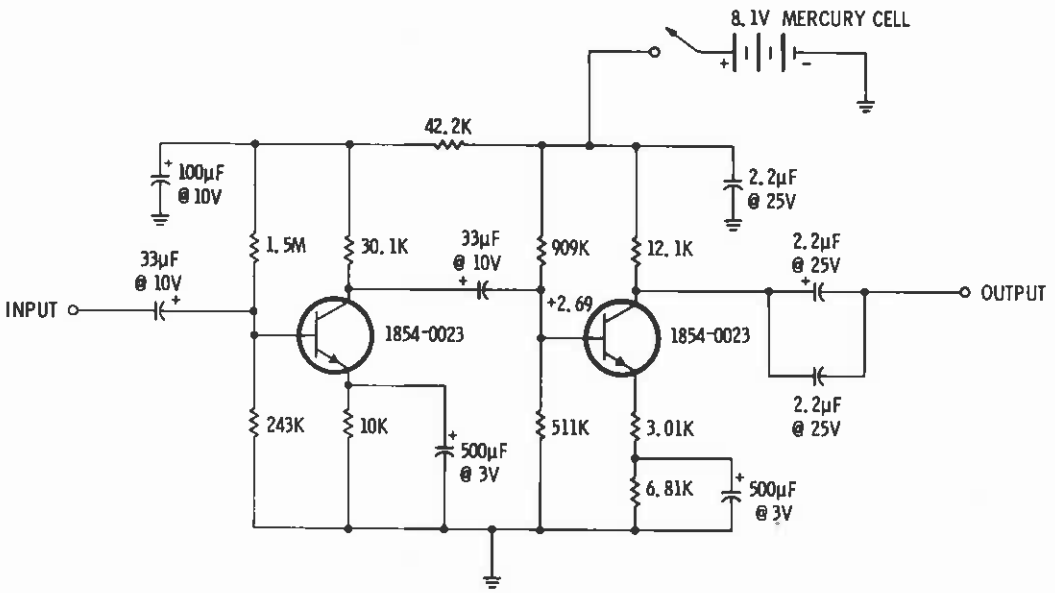
1-36. Table 1-2 lists the test equipment and accessories recommended for use in testing, adjusting, and servicing the 86602A. If any of the recommended test equipment is unavailable, instruments with equivalent specifications may be used.

1-37. SAFETY CONSIDERATIONS

1-38. This instrument has been designed in accordance with international safety standards and has been supplied in safe condition.

1-39. Although this instrument has been designed in accordance with international safety standards, this manual contains information, cautions, and warnings which must be followed to retain the instrument in safe condition. Be sure to read and follow the safety information in Sections II, III, V, and VIII.

40 dB TEST AMPLIFIER



Amplifier Specifications

Gain	44 dB at 25°C
Bandwidth	100 kHz (3 dB down)
Noise Bandwidth	157 kHz
Input Impedance	75 K Ohms
Output Impedance	12 K Ohms
Current Drain	260 Microamperes
Output (Maximum)	1 Volt
Dynamic Range	66 dB

Figure 1-2. 40 dB Test Amplifier

15 kHz LPF

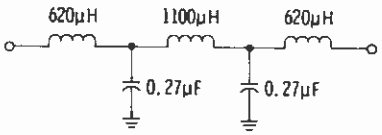


Figure 1-3. 15 kHz Low Pass Filter

100 kHz LPF

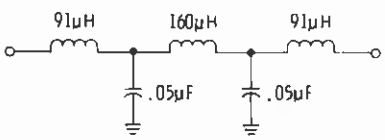


Figure 1-4. 100 kHz Low Pass Filter

SECTION II
INSTALLATION

2-1. INTRODUCTION

2-2. This section provides information relative to initial inspection, preparation for use, and storage and shipment of the Model 86602A RF Section plug-in. INITIAL INSPECTION provides instructions to be followed when an instrument is received in a damaged condition. PREPARATION FOR USE gives all necessary interconnection and installation instruction. STORAGE AND SHIPMENT provides instructions and environmental limitations pertaining to instrument storage; also provided are packing and packaging instructions which should be followed in preparing the instrument for shipment.

2-3. INITIAL INSPECTION

2-4. Inspect the shipping container for damage. If the shipping container or cushioning material is damaged, it should be kept until the contents of the shipment have been checked for completeness and the instrument has been checked mechanically and electrically. The contents of the shipment should be as shown in Figure 1-1, and procedures for checking electrical performance are given in Section IV. If the contents are incomplete, if there is mechanical damage or defect, or if the instrument does not pass the electrical performance test, notify the nearest Hewlett-Packard office. If the shipping container is damaged, or the cushioning material shows signs of stress, notify the carrier as well as the Hewlett-Packard office. Keep the shipping materials for carrier's inspection. The HP office will arrange for repair or replacement without waiting for claim settlement.

2-5. PREPARATION FOR USE

2-6. Power Requirements

2-7. All power required for operation of the 86602A is furnished by the mainframe. The 86602A requires approximately 70 volt-amperes.

2-8. Interconnections

2-9. Prior to installing the 86602A plug-in into the mainframe, verify that the Frequency Extension Module plug-in and interconnecting cable assemblies have been installed in accordance with the instructions contained in the Frequency Extension Module manual.

2-10. Operating Environment

2-11. The Model 86602A RF Section is designed to operate within the following environmental conditions:

Temperature	0° to +55°C
Humidity	less than 95%, relative
Altitude	less than 15,000 feet

2-12. Installation Instructions

WARNING

The multi-pin plug connector which provides interconnection from mainframe to RF Section, will be exposed with the RF Section removed from the right-hand mainframe cavity. With the Line (Mains) Voltage off and power cord disconnected, power supply voltages may still remain which, if contacted, may result in personal injury.

2-13. Insert the 86602A plug-in approximately half-way into the right cavity of the mainframe. Rotate the latch (lower right corner of 86602A front panel) to the left until it protrudes perpendicular to the front panel. Refer to Figure 2-1, which shows the 86602A plug-in partially inserted into the mainframe and the latch rotated to a position that is perpendicular to the plug-in front panel. Push the 86602A plug-in all the way into the mainframe drawer and then rotate the latch to the right until it snaps into position.

2-14. STORAGE AND SHIPMENT

2-15. Environment

2-16. The storage and shipping environment of the Model 86602A should not exceed the following limits:

Temperature	. . . 40° to +75°C
Humidity	. less than 95%, relative
Altitude	. . . less than 25,000 feet

2-17. Packaging

2-18. Original Type Packaging. Containers and materials identical to those used in factory packaging are available thorugh Hewlett-Packard offices. If the instrument is being returned to Hewlett-Packard for servicing, attach a tag indicating the type of service required, return address, model number, and full serial number. Also, mark the container FRAGILE to assure careful handling. In any correspondence, refer to the instrument by model number and full serial number.

2-19. Other Packaging. The following general instructions should be used for re-packaging with commercially available materials:

a. Wrap the instrument in heavy paper or plastic. (If shipping to a Hewlett-Packard office or service center, attach a tag indicating the type of service required, return address, model number, and full serial number.)

b. Use a strong shipping container. A double-wall carton made of 350-pound test material is adequate.

c. Use enough shock-absorbing material (3- to 4-inch layer) around all the sides of the instrument to provide firm cushion and prevent movement inside the container. Protect the control panel with cardboard.

d. Seal the shipping container securely.

e. Mark the shipping container FRAGILE to assure careful handling.

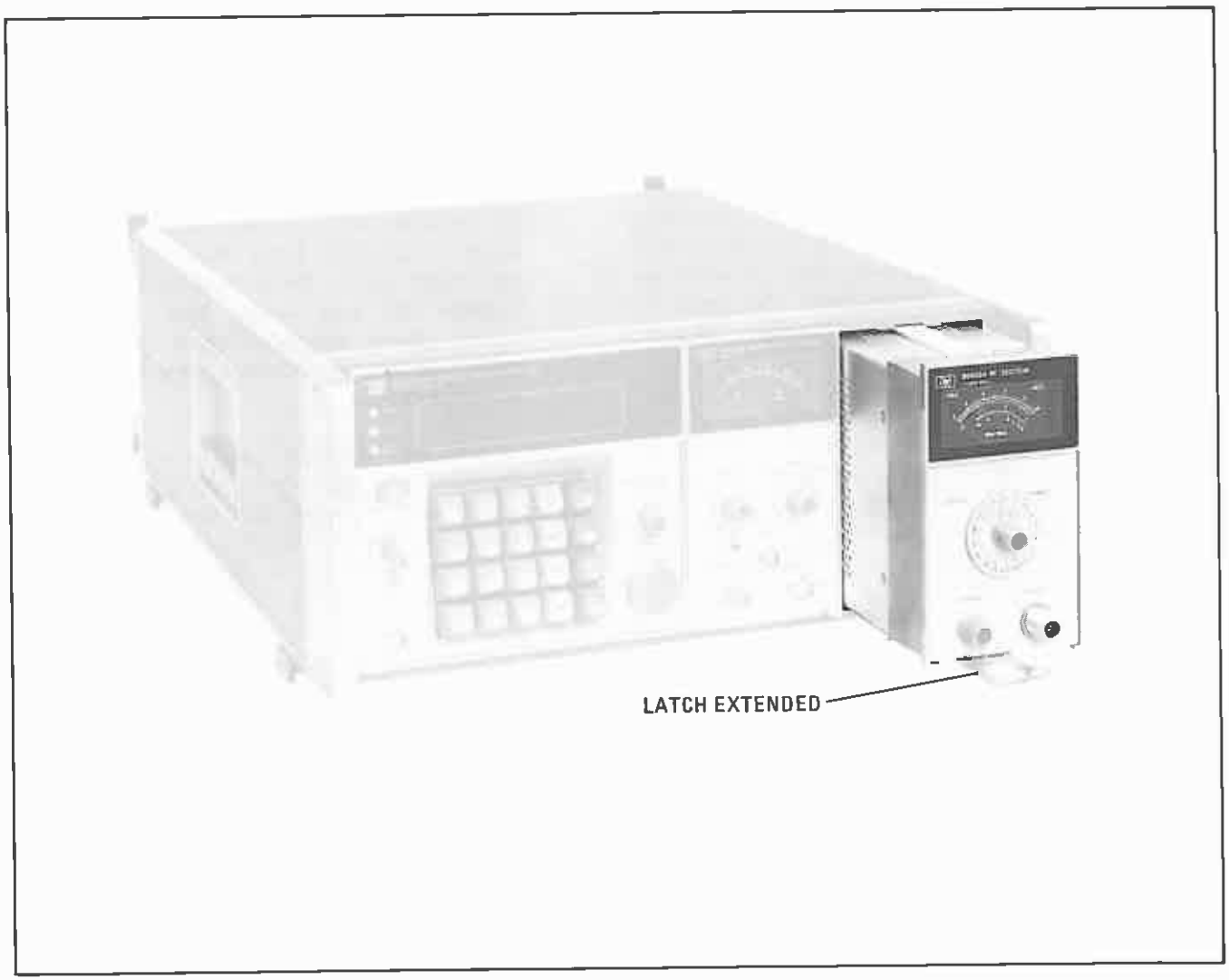


Figure 2-1. RF Section Partially Inserted into Mainframe

SECTION III
OPERATION

3-1. INTRODUCTION

3-2. This section contains information which will enable the operator to learn to operate and quickly check the proper operation of the RF Section plug-in as part of the Synthesized Signal Generator System.

3-3. PANEL FEATURES

3-4. The Front and Rear Panel Controls, Connectors, and Indicators of the RF Section are described by Figure 3-1.

3-5. OPERATOR'S CHECKS

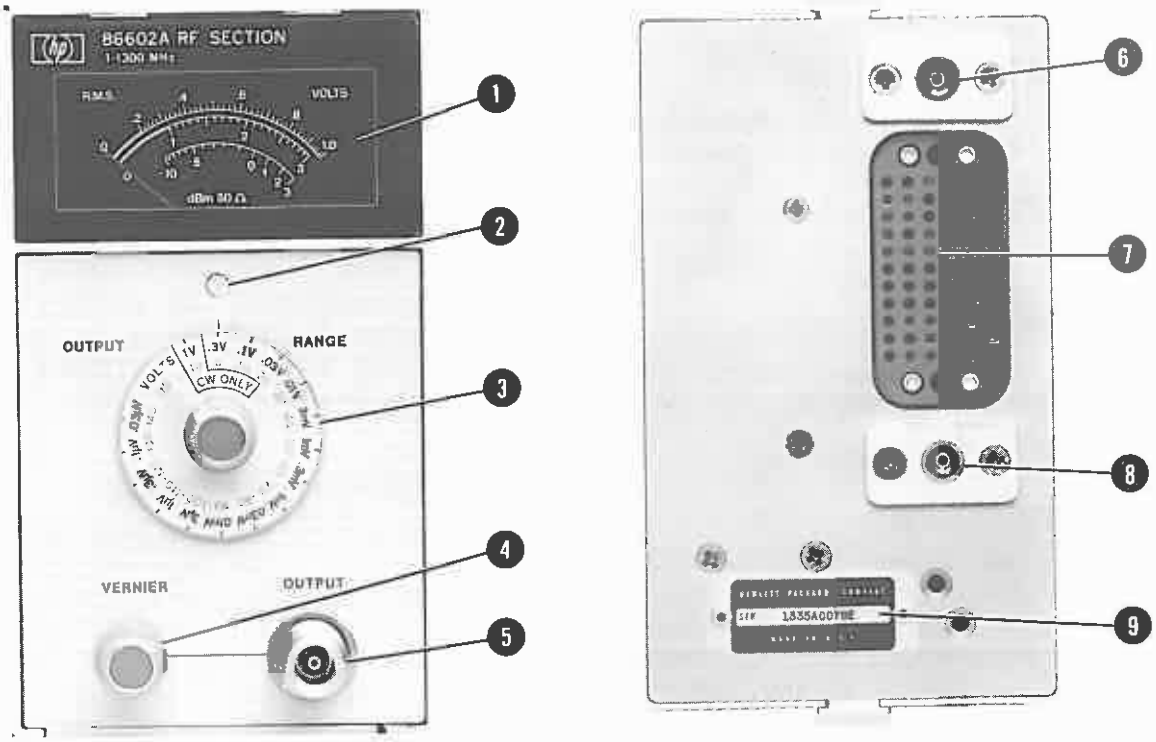
3-6. The RF Section, as part of the Synthesized Signal Generator System, accepts inputs from the rest of the system but controls only the RF Output level. Even though the controlled circuits for these functions are within the RF Section, the actual checks are found in the manual of the instrument which controls that function.

3-7. The Operator's Checks in this manual are intended to verify proper operation of the circuits which control and are controlled by the RF Output level controls. This includes the meter, VERNIER control, OUTPUT RANGE Switch, and the Output Range Attenuator when operating in the Local mode. When the system is being remotely controlled, the 1 dB and 10 dB remote step attenuators switches are checked in place of the VERNIER Control and OUTPUT RANGE Switch. Refer to Figure 3-2.

3-8. OPERATING INSTRUCTIONS

3-9. In this system, the mainframe and plug-ins contain the controls for frequency, modulation, and RF level selection. The mainframe controls frequency, the Modulation Section plug-in controls modulation type and level, and the RF Section plug-in controls RF output level. The Operating Instructions for the RF Section plug-in are included in Table 3-1.

FRONT AND REAR PANEL FEATURES



1 Meter. Indicates the RF Output level in Vrms and dBm (50Ω) referenced to the scale indicated by the OUTPUT RANGE Switch.

2 Mechanical Meter Zero Control. Sets the Panel Meter indicator to zero when the Mainframe LINE Switch is set to STBY.

3 OUTPUT RANGE Switch. Sets the RF Output level range from +10 to −140 dBm in 10 dB steps (1.0 Vrms to 0.03 μVrms full scale).

4 VERNIER Control. RF Output continuously variable within the useable 10 dB range (+3 to −6 dB) as indicated by the meter.

5 OUTPUT Jack. Type-N female coaxial connector. RF Output level +10 to −146 dBm (1.0 Vrms to 0.01 μVrms) across a 50Ω load.

6 Coaxial Plug. Connects the 2.75/3.95 GHz RF Input signal to the RF Section from the Frequency Extension Module.

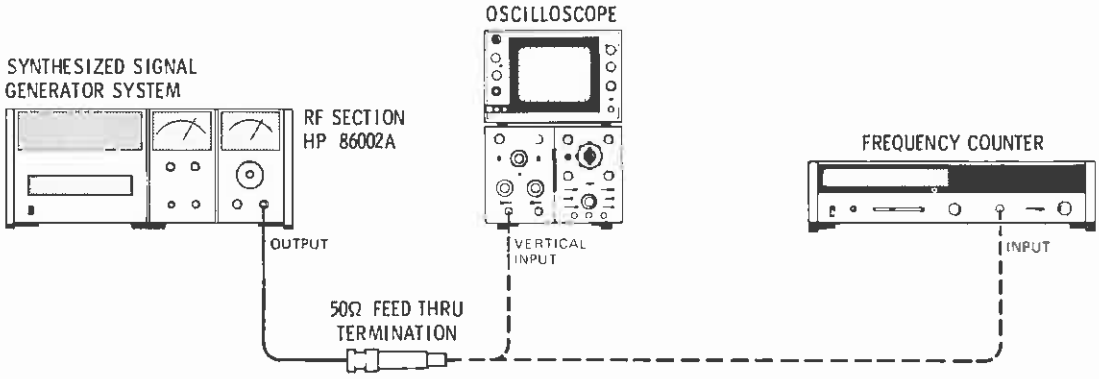
7 Interconnect Plug. Provides interconnection of power supply voltages, RF and control signals between the RF Section plug-in and the Mainframe, Frequency Extension Module, and Modulation Section plug-in.

8 Coaxial Plug. Connects the 3.95/4.05 GHz LO Input signal to the RF Section plug-in from the Frequency Extension Module.

9 Serial Number Plate. Metal plate with stamped serial number. Four-digit and letter for prefix. Suffix is unique to this instrument.

Figure 3-1. Front and Rear Panel Controls, Connectors, and Indicators

OPERATOR'S CHECKS



WARNING

BEFORE CONNECTING THIS SYSTEM TO LINE (MAINS) VOLTAGE, the safety and installation instructions found in Sections II and III of the mainframe manual should be followed.

NOTE

Refer to Section II for RF Section Installation instructions.

1. Set the system controls as follows:

Mainframe
- LINE Switch . . . . . ON
- REFERENCE SELECTOR (Using internal time base) INT
- CENTER FREQUENCY . . . . . 10 MHz

Modulation Section Plug-in
- MODE Switch . . . . . OFF

RF Section Plug-in
- OUTPUT RANGE Switch . . . . —10 dBm (0.1V)
- VERNIER Control (for a meter reading of +3 dB) —7 dBm (0.1 Vrms)

2. Connect the system's OUTPUT to the oscilloscope's vertical input (>10 MHz bandwidth) and then to the frequency counter's input through a 50Ω feed-thru termination. Verify that the amplitude of the 10 MHz signal is ≈280 mVp-p.

3. Set the OUTPUT RANGE Switch to the +10 dBm (1.0V) range. Verify that the output level is ≈2 Vp-p.

4. To check the remote control capabilities of the RF Section, connect a control unit to the mainframe. Repeat steps 2 through 4 while the system is remotely programmed from an external source. Application Note 164-1 "Programming the 8660A/B Synthesized Signal Generator" provides the information needed for remote operation of this system. Section III of the mainframe manual contains the same information in abridged form.

Figure 3-2. Operator's Checks

Table 3-1. Operating Instructions

OPERATING INSTRUCTIONS

TURN ON

WARNING

BEFORE CONNECTING THIS SYSTEM TO THE LINE (MAINS) VOLTAGE, the safety and installation instructions found in Sections II and III of the mainframe manual should be followed.

NOTE

Refer to Section II for RF Section Installation Instructions.

1. Set the mainframe's LINE Switch to ON and the rear panel REFERENCE SELECTOR Switch to INT.

FREQUENCY SELECTION

2. Refer to Section III of the mainframe operation and service manual for information on system frequency selection.

MODULATION SELECTION

3. Refer to Section III of the Modulation Section plug-in operating and service manual for information relating to selection of modulation type and level.

RF OUTPUT LEVEL

4. Set the OUTPUT RANGE Switch and the VERNIER Control for the desired output level. To ensure the accuracy of the output level and/or modulated output, the meter reading of output level should always be set between −6 and +3 dBm.

REMOTE OPERATION

5. Application Note 164-1 "Programming the 8660A/B Synthesized Signal Generator" provides the information needed for remote operation of this system. In abridged form, Section III of the mainframe manual contains the same information.

GENERAL

6. Connect the RF Output to the Device Under Test. The front panel meter reading of RF Output level will be correct only if the input impedance of the Device Under Test is 50Ω.

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