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OPERATING INFORMATION

86602B
RF SECTION
1-1300 MHz

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

KEEP WITH INSTRUMENT

HEWLETT PACKARD

Printed: AUGUST 1981

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MODEL 86602B



Figure 1-1. HP Model 86602B RF Section (Option 002 Shown)

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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 86602B RF Section plug-in, hereinafter referred to as the RF Section. For information concerning related equipment, such as the Hewlett-Packard Model 8660-series mainframes or the Model 11661 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 replacement parts and assemblies.

g. SECTION VII, MANUAL CHANGES, provides information to document all serial number prefixes listed on the title page.

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 Option 002 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 photoduplicates 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. 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.

1-12. MANUAL CHANGE SUPPLEMENTS

1-13. 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

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Table 1-1. Models 86602B/11661 Specifications (1 of 3)

SPECIFICATIONS

FREQUENCY CHARACTERISTICS

Range: 1.0 to 1299.999999 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[1]: CW frequency accuracy and long term stability are determined by the aging rate of the time base (internal or external) and its sensitivity to changes in temperature and line voltage. Internal reference oscillator accuracy = ± aging rate ± 3 x 10^{-10}/°C ± 3 x 10^{-10}/1% change in line voltage.

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	Error at:	
	1 ms	1 ms
1 Hz 10 Hz	<1 Hz	<1 Hz
100 Hz	<100 Hz	<1 Hz
1 kHz 10 kHz	<500 Hz	<10 Hz
100 kHz 1 MHz	<500 Hz	<50 Hz
10 MHz	<500 Hz	<50 Hz
100 MHz, 1 GHz	Undefined	<50 Hz

Typical 86602B/11661
Frequency Switching Characteristics

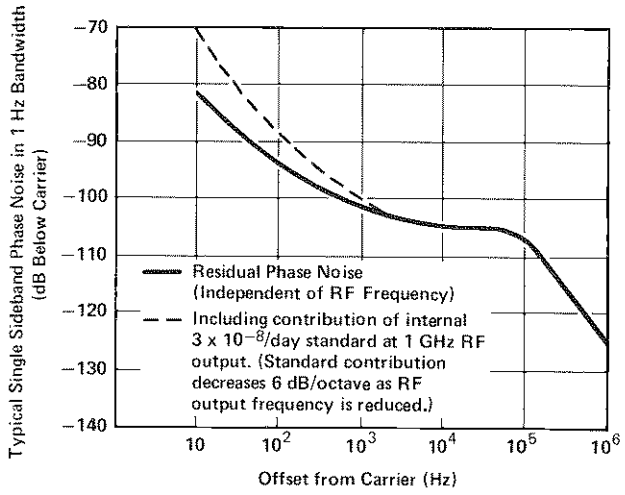
Harmonic Signals:
All harmonically related signals are at least 30 dB below the desired output signal for output levels ≤+3 dBm. (25 dB down for output levels above +3 dBm.)

Spurious Signals (CW, AM, and φM only):
80 dB down from carrier at frequencies <700 MHz
80 dB down from carrier within 45 MHz of the carrier at frequencies ≥700 MHz
70 dB down from carrier >45 MHz from carrier at frequencies ≥700 MHz
50 dB down from carrier on the +10 dBm range.

All Power Line Related spurious signals are 70 dB down from carrier.

Signal-to-Phase Noise Ratio (CW, AM, and φM only):
Greater than 45 dB in a 30 kHz band centered on the carrier and excluding a 1 Hz band centered on the carrier.

Typical SSB Phase Noise Curve:



Typical 86602B Phase Noise

Signal-to-AM Noise Ratio: Greater than 65 dB down in a 30 kHz bandwidth centered on the carrier and excluding a 1 Hz band centered on the carrier

[1] Aging rate for the time base of standard mainframes is 3 x 10^{-8}/day; for option 001 mainframes, 3 x 10^{-9}/day.

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Table 1-1. Models 86602B/11661 Specifications (2 of 3)

OUTPUT CHARACTERISTICS

Level: Continuously adjustable from +10 to −146 dBm (0.7 Vrms to 0.01 μVrms) into a 50Ω resistive load. Output attenuator calibrated in 10 dB steps from 1.0V full scale (+10 dBm range) to 0.03 μVrms full scale (−140 dBm range). 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 to −76 dBm; ± 2.0 dB to −146 dBm at meter readings between +3 and −6 dB.

Flatness: Output level variation with frequency is less than ±1.0 dB from 1−1300 MHz at meter readings between +3 and −6 dB.

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

Impedance: 50Ω.

VSWR: <2.0 on +10 and 0 dBm range; <1.3 on −10 dBm range and below.

MODULATION CHARACTERISTICS

(With compatible Modulation Sections)

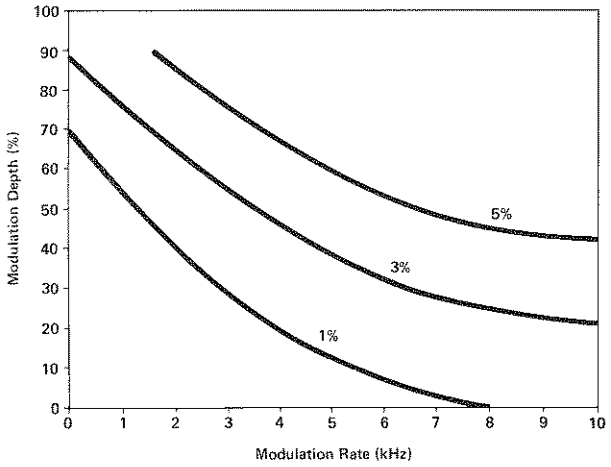
Amplitude Modulation:

Depth: 0 - 90% for RF output level meter readings from +3 to −6 dB and only at +3 dBm and below.

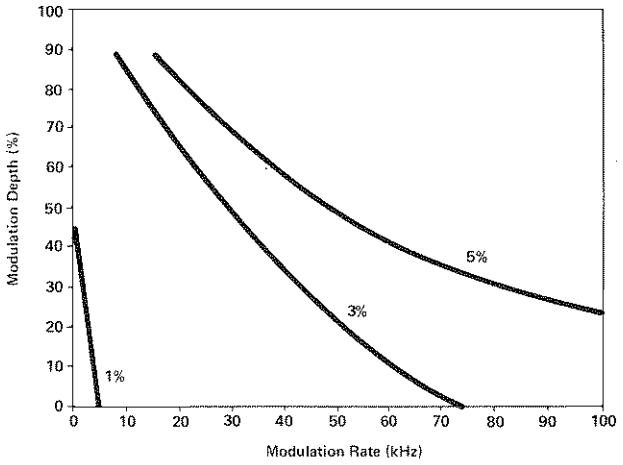
AM 3 dB Bandwidth:

Center Frequency	AM 3 dB Bandwidth		
	0 to 30% AM	0 to 70% AM	0 to 90% AM
<10 MHz	10 kHz	6 kHz	5 kHz
≥10 MHz	100 kHz	60 kHz	50 kHz

AM Total Harmonic Distortion[2]		
AT 30% AM	AT 70% AM	AT 90% AM
<1%	<3%	<5%



Typical AM Distortion (Center Frequency <10 MHz)



Typical AM Distortion (Center Frequency ≥10 MHz)

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

Incidental FM: Less than 0.2 times the frequency of modulation (Hz) at 30% AM.

[2] Applies only at 400 Hz and 1 kHz rates with the RF Section front panel meter indicating from 0 to +3 dBm. At a meter indication of −6 dB the distortion approximately doubles. The modulating signal distortion must be <0.3% for the system performance to meet these specifications.

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Table 1-1. Models 86602B/11661 Specifications (3 of 3)

FREQUENCY MODULATION

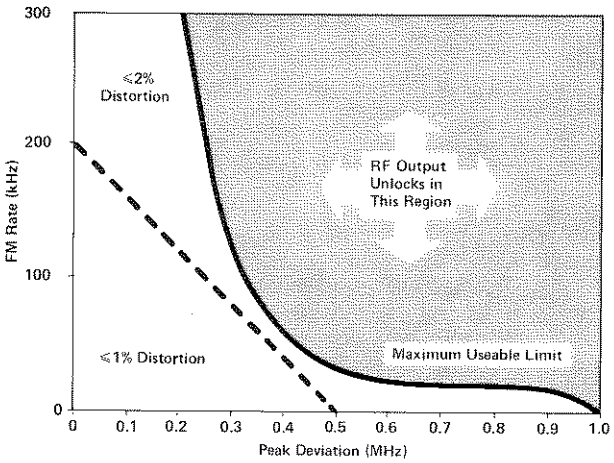
Rate: DC to 200 kHz with the 86632B and 86635A. 20 Hz to 100 kHz with the 86633B.

Maximum Deviation (peak):
200 kHz with the 86632B and 86635A
100 kHz with the 86633B

Incidental AM: AM sidebands are greater than 60 dB down from the carrier with 75 kHz peak deviation at a 1 kHz rate.

FM Total Harmonic Distortion (at rates up to 20 kHz): <1% up to 200 kHz deviation. (External modulating signal distoriton must be less than 0.3%.)

Residual FM: less than 10 Hz rms average in 300 Hz to 3 kHz, post-detection bandwidth, FM x 0.1 mode.



Typical FM Distortion Curve

PULSE MODULATION
(With the 86631B Auxiliary Section only)

Source: External

Rise/Fall Time: 50 ns.

ON/OFF Ratio: At least 40 dB.

Input Level Required: −10 ± 0.5 Vdc turns RF on.

PHASE MODULATION
(Option 002 Instruments only)

Rate:
with 86635A dc to 1 MHz
with 86634A
dc to 1 MHz at center frequencies less than 100 MHz
dc to 10 MHz at center frequencies greater or equal to 100 MHz.

Maximum Peak Deviation:
0 to 100 degrees peak. May be overdriven to 2 radians (115°) in the Modulation Section's external dc mode.

ϕM Distortion:
<5% up to 1 MHz rates
<7% up to 5 MHz rates
<15% up to 10 MHz rates

(External modulation signal distortion must be less than 0.3% to meet this specification.)

REMOTE PROGRAMMING
(Through the 8660-series mainframes)

Frequency: Programmable in 1 Hz steps.

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.

Size: Plug-in to fit 8660-series mainframe.
Weight: Net 9 lb (3.9 kg).

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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.

1-14. 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.

1-15. DESCRIPTION

1-16. The HP Model 86602B RF Section is one of several RF Sections available for use in an 8660-series Synthesized Signal Generator System. This RF Section plug-in is used with an option 100 8660-series mainframe (Frequency Extension Module installed). The RF Section provides precisely tuned RF output frequenices over the 1 to 1300 MHz range with 1 Hz frequency resolution (8660-series option 004 instruments have resolutions of 100 Hz.) Frequencies from 200 kHz to 1 MHz can also be generated with some degradation in the amplitude leveling and other related specifications.

1-17. 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 and the OUTPUT RANGE switch indicate 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.

1-18. Amplitude, frequency, phase, or pulse modulation of the RF OUTPUT signal can be accomplished within the RF Section by using the appropriate Auxiliary or Modulation Section plug-in.

1-19. External programming permits remote selection of the output signal frequency in 1 Hz steps (100 Hz for option 004 mainframes) and the output power in 1 dB steps over the full operating range of the instrument. External programming is accomplished via the mainframe computer-compatible interface and digital control unit circuits.

1-20. OPTIONS

1-21. This RF Section has two options available. They affect the instrument's RF output level, and phase modulation capabilities.

1-22. Option 001. The RF output attenuator is removed. This limits the RF output level range from +10 to −6 dBm.

1-23. Option 002. Circuits are added to provide the phase modulation capability. A compatible modulation section is required.

1-24. COMPATIBILITY

1-25. Except for Option 002 instruments, the Model 86602B is compatible with all 8660-series option 100 mainframes, all AM-FM Modulation Sections and the Auxiliary Section. This RF Section is partially compatible with the FM/ϕM Modulation Section.

CAUTION

Damage to the signal generator system may result if an option 002 RF Section is used with Model 8660A or 8660B mainframes with serial prefixes 1349A and below.

1-26. Option 002 instruments are compatible with all instruments which are part of the Model 8660-series Synthesized Signal Generator System except early model 8660A and 8660B Mainframes. Refer to the paragraph entitled Modifications in Section II of this manual for further information.

1-27. EQUIPMENT REQUIRED BUT NOT SUPPLIED

1-28. System Mainframe

1-29. 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

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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 external programming.

1-30. The mainframe power supply provides all dc operating voltages required by the RF Section, Frequency Extension Module, and Modulation Section plug-ins. Remote programming of the plug-ins is accomplished via the mainframe interface and digital control unit circuits.

1-31. Frequency Extension Module

1-32. The Frequency Extension Module plug-in extends the output frequency range of the mainframe to meet the input requirements of the RF Section. 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 RF Section. 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 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 3.95 to 2.75 GHz range. The two outputs from the Frequency Extension Module plug-in are applied to the RF Section for mixing, amplification of the converted signal, and final output power level control.

1-33. Auxiliary Section

1-34. The Auxiliary Section plug-in provides a means of applying externally generated amplitude or pulse modulation drive signals to modulate the RF Section's output carrier.

1-35. Modulation Section Plug-ins

1-36. The Model 86630-series Modulation Section plug-ins can accept external modulation drive signals or generate internal drive signals to amplitude, frequency, phase or pulse modulate the RF Sections output signal.

1-37. EQUIPMENT AVAILABLE

1-38. Extender cables, coaxial adapters, and an adjustment tool are available for use in performance testing, adjusting, and maintaining the RF Section. Each piece may be ordered separately or as part of the 11672A Service Kit.

1-39. Extender cards for use in servicing the RF Section 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.

1-40. SAFETY CONSIDERATIONS

1-41. This instrument has been designed in accordance with international safety standards and has been supplied in safe condition.

1-42. 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.

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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 86602B 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 instructions. 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 RF Section is furnished by the mainframe. This RF Section requires approximately 40 volt-amperes.

2-8. Interconnections

2-9. Prior to installing the RF Section 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. Modifications

2-11. A power supply modification to older versions of Model 8660A and 8660B mainframes are required if they are to be used with the option 002 RF Section.

CAUTION

Damage to the synthesized signal generator system may result if an option 002 RF Section is used with an older 8660A or 8660B mainframe.

2-12. Due to the increased power consumption of the option 002 instrument, mainframes with serial prefixes 1349A and below must be modified by installing a Field Update Kit. For mainframe configurations other than option 003 (60 Hz line operation), order kit number 08660-60273. For option 003 mainframes (50 — 400 Hz line operation) order kit number 08660-60274.

NOTE

Verify that a new higher current fuse, HP Part Number 2110-0365, 4A Slow Blow, is used in mainframes with the power supply modification.

2-13. Operating Environment

2-14. The 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

2-15. 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 constitute a shock hazard.

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2-16. Insert the plug-in approximately half-way into the right cavity of the mainframe. Rotate the latch (lower right corner) to the left until it protrudes perpendicular to the front panel. Refer to Figure 2-1, which shows the 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 plug-in all the way into the mainframe cavity and then rotate the latch to the right until it snaps into position.

2-17. STORAGE AND SHIPMENT

2-18. Environment

2-19. The storage and shipping environment of the RF Section should not exceed the following limits:

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

2-20. Packaging

2-21. Original Type Packaging. Containers and materials identical to those used in factory packaging are available through 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.

2-22. 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.

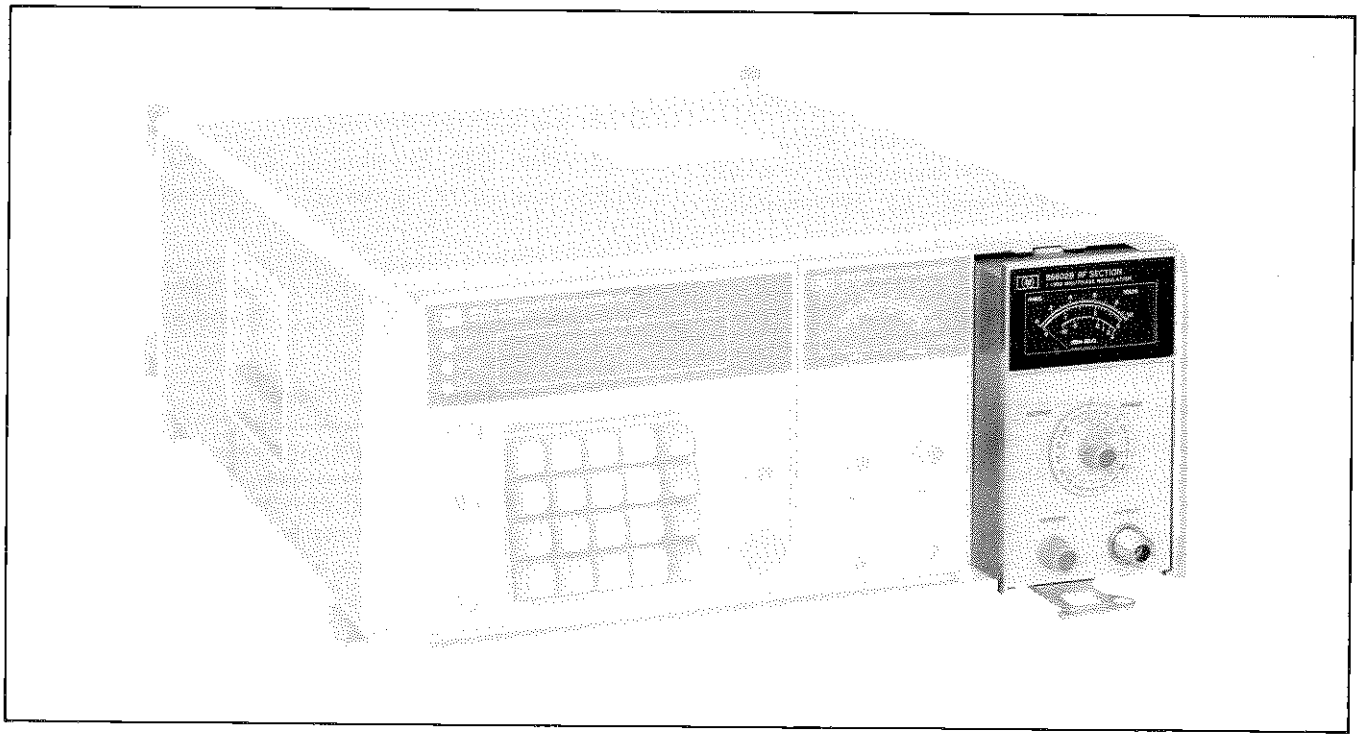


Figure 2-1. RF Section Partially Inserted into Mainframe

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SECTION III
OPERATION

3-1. INTRODUCTION

3-2. This section contains information which will enable the operator to learn to operate and quickly check for 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 and its options are described by Figure 3-1 and 3-2.

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 most other functions are within the RF Section, the actual checks are found in the manual of the instrument which controls that function.

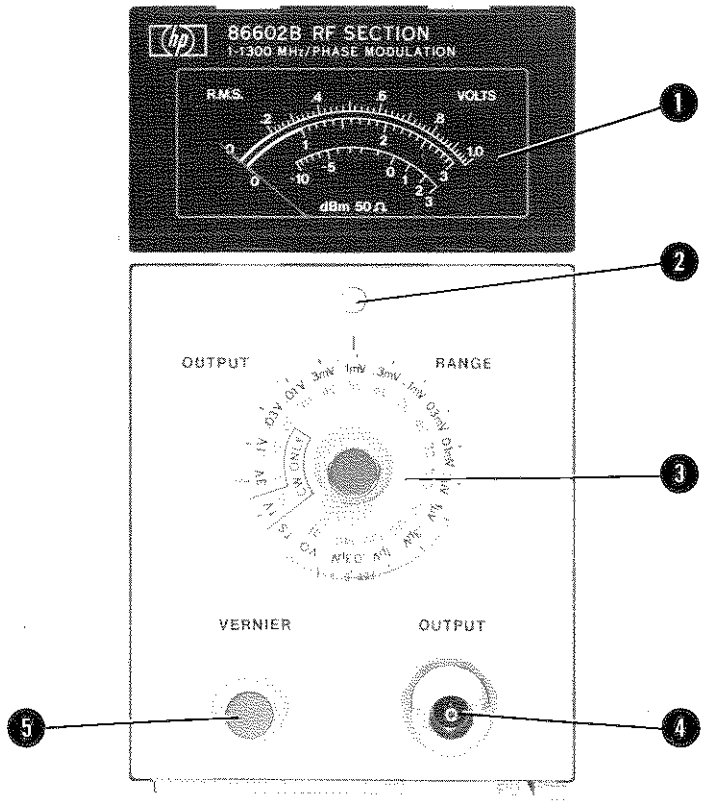
3-7. The Operator's Checks in this manual are intended to verify proper operation of the circuits which control and are controlled by the RF output level controls. This includes the meter, the VERNIER control, the OUTPUT RANGE switch, and the Output Range Attenuator when operating in the local mode.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

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.

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FRONT PANEL FEATURES



NOTE

The front panel of the option 002 instrument is shown. The standard instrument does not have the term PHASE MODULATION after 1–1300 MHz. The option 001 instrument has an OUTPUT RANGE switch which shows only the +10 and 0 dBm ranges.

1 **Meter.** Indicates the RF Output level in Vrms and dBm (50Ω) with the scale reference 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 output level range of all except option 001 instruments from +10 to −140 dBm (50Ω) in 10 dB steps. For option 001 instruments, +10 and 0 dBm ranges only.

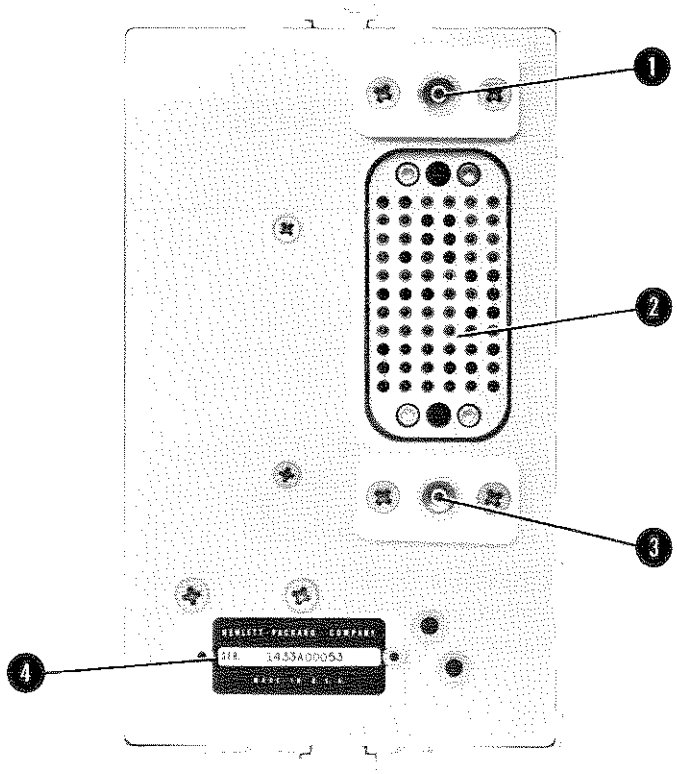
4 **OUTPUT Jack.** Type-N female coaxial connector. RF Output level +10 to −146 dBm (0.7 Vrms to 0.01 μVrms) into a 50Ω load. Frequency range is 1 to 1299.999 999 MHz in 1 Hz steps.

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

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

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REAR PANEL FEATURES



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

2 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.

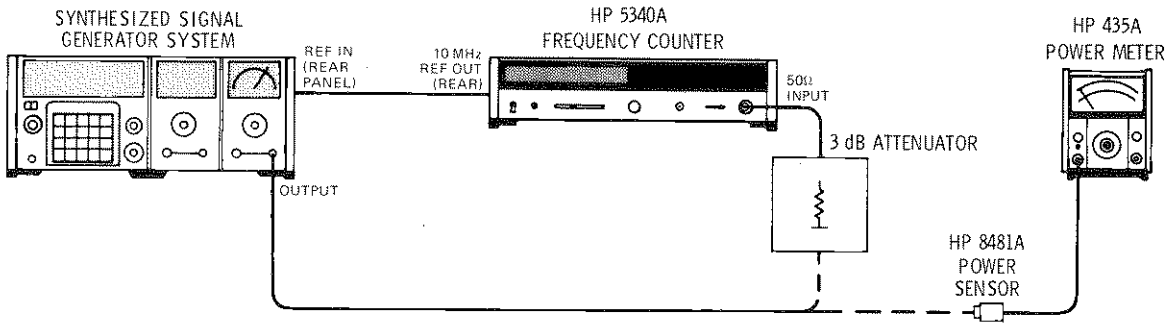
3 Coaxial Plug. Connects the 3.95 to 4.05 GHz LO Input signal to the RF Section plug-in from the Frequency Extension Module.

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

Figure 3-2. Rear Panel Connectors and Indicators

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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.

CAUTION

Damage to the signal generator system may occur if option 002 RF Sections are used with unmodified 8660A and 8660B mainframes with serial prefixes 1349A and below. See the paragraph entitled Modifications in Section II.

NOTE

Refer to Section II for RF Section Installation instructions.

1. Set the System controls as follows:

Mainframe
- LINE Switch . . . . . ON
- REFERENCE SELECTOR . . . . . EXT
- CENTER FREQUENCY . . . . . 500 MHz

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

RF Section plug-in
- OUTPUT RANGE Switch . . . . . 0 dBm
- VERNIER Control . . . . . +3 dB meter reading

Figure 3-3. Operator's Checks (1 of 2)

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OPERATOR'S CHECKS

2. Connect the RF Section OUTPUT to the power sensor input. Verify that the amplitude of the 500 MHz signal is approximately +3 dBm.

3. Set the OUTPUT RANGE Switch to +10 dBm and adjust the VERNIER control for a −3 dB meter reading. Verify that the output level is approximately +7 dBm.

4. Connect the RF Section OUTPUT to the frequency counter input through the 3 dB attenuator. Verify that the signal is accurate within ±1 Hz.

5. To check the remote control capabilities of the RF Section, connect a control unit to the mainframe. Repeat steps 1 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 BCD operation of this system. Application Note 164-2 "Calculator Control of the 8660A/B/C Synthesized Signal Generator" provides the information needed for calculator control of the system using the HP-IB (option 005). Section III of the mainframe manual contains the same information in abridged form.

Figure 3-3. Operator's Checks (2 of 2)

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Table 3-1. Operating Instructions (1 of 2)

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.

CAUTION

Damage to the signal generator system may occur if option 002 RF Sections are used with unmodified 8660A and 8660B mainframes with serial prefixes 1349A and below. See the paragraph entitled Modifications in Section II.

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. Wait for the mainframe "oven" indication to go out.

FREQUENCY SELECTION

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

RF OUTPUT LEVEL

3. dBm. Set the OUTPUT RANGE switch to within +3 and −6 dB of the desired output level. Adjust the VERNIER control for a meter reading which when added to the OUTPUT RANGE switch indication equals the desired output level.

4. VOLTS. To set the RF output level in rms volts, the OUTPUT RANGE switch selected the full scale meter reading and the VERNIER control is adjusted for the correct voltage reading on the meter. The voltage level for meter scale 1.0 should not be set below 0.32 of full scale. The voltage level should not be set below 1 when using the meter scale of 3.

NOTE

In order to achieve the output level accuracy specified, the level selected must be ⩽+10 dBm and the RF Section front panel meter reading must be as stated above.

5. 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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Table 3-1. Operating Instructions (2 of 2)

MODULATION SELECTION

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

REMOTE OPERATION

7. Application Note 164-1 "Programming the 8660A/B Synthesized Signal Generator" provides most of the information needed for remote BCD operation of this system. AN 164-2 "Calculator Control of the 8660A/B/C Synthesized Signal Generator" provides information for remote HP-IB operation of this system. In abridged form, Section III of the mainframe manuals contain the same information.

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