# Chapter 1. General Information

## INTRODUCTION

The purpose of this manual is to enable you to use your HP 85630 scalar test set efficiently and confidently. To use the HP 85630 to perform a specific function (without reading the entire manual), follow the directions in "Using the HP 85630".

This chapter (1) outlines how to begin using the HP 85630 as quickly as possible, (2) describes what instruments are covered by this manual, (3) describes the test set itself, (4) mentions operating precautions, safety considerations and warranty restrictions, (5) lists the additional equipment required and (6) defines and lists the instrument's specifications.

## USING THE HP 85630

The HP 85630 has been designed to operate specifically with the HP 859x series spectrum analyzers with tracking generator option and the HP 85714A scalar measurements personality.

- To install the test set: turn to chapter 2, "Installation"
- To check the proper operation of the HP 85630, see the Operator's Check in chapter 3, "Operation"
- To verify that the test set meets its published specifications, turn to chapter 4, "Performance Tests"
- To troubleshoot the HP 85630, turn to chapter 8, "Service"
- To operate the test set, refer to the "HP 85714A Scalar Measurements Personality Operating Guide."

## TEST SETS COVERED BY MANUAL

This manual covers the test set it was shipped with. The manual also covers earlier versions of the test set (usually without modification). Significant differences, if any, between early and current test sets are documented in the "Instrument History" chapter.

You will find a two-part serial number on the rear panel of the test set. The first four digits and the letter are the serial number prefix. The last five digits are the sequential suffix which is unique to each test set. The contents of this manual apply directly to test sets with the serial number prefix printed on the title page under the heading SERIAL NUMBERS.

## DESCRIPTION AND OPERATING CHARACTERISTICS OF THE TEST SET

The HP 85630 scalar test set has been designed to operate with the HP 859x series spectrum analyzers listed in table 1-2. The HP 85630 provides a convenient means of measuring forward reflection and transmission coefficients (scattering parameters, S11, S21) of one-port or two-port devices operating within the frequency range of 300 kHz to 2.9 GHz. Optionally it can also adjust the signal level to the DUT (device under test).

Table 1-1 lists the operating specifications and characteristics of the HP 85630. The test set is illustrated on the cover of this manual and shown in a typical measurement setup in Figure 3-1.

## OPTIONS

**Option 910** provides a duplicate of this manual and the HP 85714A operating guide at time of order. Otherwise, use the manual part number (on title page).

**Option 001** enables the test set to vary the power level to the DUT by 70 dB in 10 dB steps.

**Option W30** adds two additional years of return-to-HP support to the standard one year warranty (for a total of three years of return-to-HP support).

## ACCESSORIES

### Accessories Supplied

Figure 1-1 shows the HP 85630 with the accessories supplied:

- Two type-N RF semi-rigid connecting cables
- Aux Interface cable
- Two stacking shoes

### Accessories Available

**Calibration and Accessory Kits** contain the components required to characterize the systematic errors of various measurement systems. The components also allow adaptation of devices to various measurement systems.

The accessory kits listed contain the components generally required to measure devices with the types of connectors indicated. Additional information is included in the spectrum analyzer manual and the data sheet.

| Connector Type | Calibration Kit | Accessory Kit |
|---|---|---|
| Type-N 50 ohm | HP 85032B | HP 11853A* |
| 3.5 mm (SMA) | HP 85033C | (HP 85033A) |
| 7 mm | HP 85031B | |
| BNC 50 ohm | | HP 11854A* |

*use with HP 85032B type-N 50 ohm calibration kit

**Cable Sets** extend the test ports (ports 1 and 2) of the HP 85630. Typically the HP 11500B (or C or D) 50 ohm type-N test port return cable set is used. Additional information is included in the HP spectrum analyzer manual.

**Transistor fixtures** (listed below) are available to measure the S11 and S21 parameters of transistors with the HP 85630. To bias transistors, use a device such as the HP 11590B external bias network.

- HP 11600B* tests TO-18/TO-72 type transistors
- HP 11602B* tests TO-5/TO-12 type transistors
- HP 11608A tests 50Ω stripline transistors

*use with HP 11858A transistor fixture adapter

## OPERATING AND SAFETY PRECAUTIONS

### Operating

**WARNING**

**Turn off the spectrum analyzer before connecting or disconnecting the test set AUX INTERFACE cable. Failure to do so may damage the instruments.**

Otherwise, you need observe only normal precautions in handling and operating the HP 85630. Do not exceed the operating levels listed in Table 1-1.

### Service

The voltages in this test set do not warrant more than normal caution for operator safety. Nevertheless, service should be performed only by qualified personnel.

## ADDITIONAL EQUIPMENT REQUIRED

Table 1-2 lists additional equipment and accessories required for use with the HP 85630. The table notes which items are required to verify the performance of the test set and which are required to operate it. Other equipment may be substituted if its specifications meet or exceed the specifications listed in the critical specifications column.

## SPECIFICATIONS

### Definitions

The specifications listed in Table 1-1 range from those guaranteed by Hewlett-Packard to those typical of most HP 85630 instruments but not guaranteed. Codes in the far right column of Table 1-1 reference a specification definition listed below. These definitions are intended to clarify the extent to which Hewlett-Packard supports the specified performance of the HP 85630.

S: This performance parameter is field verifiable using performance tests documented in the service manual.

T: Typical but non-warranted performance characteristics intended to provide information useful in applying the instrument. Typical characteristics are representative of most instruments, though not necessarily tested in each unit and not field tested.

*Table 1-1. Specifications*

| Parameter | Specification<br>Return Loss (SWR) | Definition |
|---|---|---|
| **Port Match** | | |
| RF Input | | |
| 300 kHz to 1.2 GHz | >25 dB (1.1) | S |
| 1.2 GHz to 2.9 GHz | >22 dB (1.2) | S |
| RF Output | | |
| 300 kHz to 1.2 GHz | >24 dB (1.1) | S |
| 1.2 GHz to 2.9 GHz | >18 dB (1.3) | S |
| Port 1 | | |
| 300 kHz to 1.2 GHz | >19 dB (1.3) | S |
| 1.2 GHz to 2.9 GHz | >18 dB (1.3) | S |
| Port 2 | | |
| 300 kHz to 1.2 GHz | >14 dB (1.5) | S |
| 1.2 GHz to 2.9 GHz | >11 dB (1.8) | S |
| **Insertion Loss** | | |
| 300 kHz to 2.9 GHz | | |
| RF Input to Port 1 | 6.5 to 10 dB | S |
| RF Output to Port 2 | 6.5 to 10 dB | S |
| **Directivity** | | |
| RF Input | | |
| 300 kHz to 1.2 GHz | >34 dB | S |
| 1.2 GHz to 2.9 GHz | >30 dB | S |
| **Isolation** | | |
| RF Input to RF Output | | |
| 300 kHz to 1.2 GHz | >97 dB | S |
| 1.2 GHz to 2.9 GHz | >94 dB | S |
| Operating level:<br>(do not exceed) | Input: +30 dBm (1 watt) CW<br>Port 1: 25 VDC, +20 dBm (0.1 W)<br>Port 2: 30 VDC, +30 dBm (1 W) | T<br>T<br>T |
| Power: | from spectrum analyzer | |
| Dimensions (H, W, L): | 115 mm x 325 mm x 430 mm (4.5 x 12.8 x 19.9 inches), not including feet | |
| Weight: | 6.1 kg (13.5 lb) net; 8.4 kg (18.5 lb) shipping | |

*Table 1-2. Recommended Test Equipment*

| Instrument | Critical Specifications | Recommended Model or p/n | Use* |
|---|---|---|---|
| Spectrum analyzer with option 010 | no substitute | HP 8590B<br>HP 8591A<br>HP 8593A<br>HP 8594A<br>HP 8595A | O, P, T |
| Scalar measurement personality | no substitute | HP 85714A | O, P, T |
| RF cable set, two cables | 50 ohm type-N, DC to 3 GHz | HP 11500B | O, P, T |
| Network analyzer | no substitute | HP 8753A<br>HP 8753B<br>HP 8753C | P, T |
| S-parameter test set | no substitute | HP 85046A<br>HP 85047A | P, T |
| 50 Ohm load | Type-N | 85032-60004 | P, T |
| Adapter | Type-N (f) to (f) | 1250-1472 | P, T |
| Calibration kit | no substitute | HP 85032B | P |
| Multimeter | range: DC to 50V | HP 3456A | T |
| Oscilloscope | 100 MHz bandwidth | HP 54501A | T |

*O=operation; P=performance test; T=troubleshooting