

Chapter 1

General Information

Introduction

This chapter provides a description, performance specifications, optional accessories, preventive maintenance, and calibration requirements for the Site Master models S113C, S114C, S331C, and S332C. Throughout this manual, the term Site Master will refer to the models S113C, S114C, S331C, and S332C.



| <u>Model</u> | <u>Frequency Range</u> |
|--------------|---|
| S113C | 2 to 1600 MHz |
| S114C | 2 to 1600 MHz, 100 kHz to 1600 MHz Spectrum Analysis |
| S331C | 25 to 4000 MHz |
| S332C | 25 to 4000 MHz, 100 kHz to 3000 MHz Spectrum Analysis |

Description

The Site Master is a hand held SWR/RL (standing wave ratio/return loss), and Distance-To-Fault (DTF) measurement instrument that includes a built-in synthesized signal source. All models include a keypad to enter data and a liquid crystal display (LCD) to provide graphic indications of SWR or RL over the selected frequency range and selected distance. The Site Master is capable of up to 2.5 hours of continuous operation from a fully charged field-replaceable battery and can be operated from a 12.5 dc source. Built-in energy conservation features can be used to extend battery life over an eight-hour work day.

The Site Master is designed for measuring SWR, return loss, or cable insertion loss and locating faulty RF components in antenna systems. Power monitoring is available as an option. Site Master models S114C and S332C include spectrum analysis capability. The displayed trace can be scaled or enhanced with frequency markers or limit lines. A menu option provides for an audible “beep” when the limit value is exceeded. To permit use in low-light environments, the LCD can be back lit using a front panel key.

Standard Accessories

The Software Tools PC-based software program provides a database record for storing measurement data. Site Master Software Tools can also convert the Site Master display to a Microsoft Windows™ 95/98/NT4/2000/ME/XP workstation graphic. Measurements stored in the Site Master internal memory can be downloaded to the PC using the included null-modem serial cable. Once stored, the graphic trace can be displayed, scaled, or enhanced with markers and limit lines. Historical graphs can be overlaid with current data, and underlying data can be extracted and used in spreadsheets or for other analytical tasks.

The Site Master Software Tools program can display all of the measurements made with the Site Master (SWR, return loss, cable loss, distance-to-fault) as well as providing other functions, such as converting display modes and Smith charts. Refer to Chapter 7, Software Tools, for more information.

The following items are supplied with the basic hardware.

- Soft Carrying Case
- AC-DC Adapter
- Automotive Cigarette Lighter 12 Volt DC Adapter,
- CDROM disk containing the Software Tools program. This program contains Fault Location (DTF) and Smith Chart functions
- Serial Interface Cable (null modem type)
- One year Warranty (includes battery, firmware, and software)
- User's Guide

Options

- Option 5 — Add Power Monitor
- RF Detector, 1 to 3000 MHz, N(m) input connector, 50 Ohms, Part No. 5400-71N50
- RF Detector, 0.01 to 20 GHz, N(m) input connector, 50 Ohms, Part No. 560-7N50B

Printers

- 2000-766 HP DeskJet Printer, with Interface Cable, Black Print Cartridge, and U.S. Power Cable
- 2000-1206 Black Print Cartridge for HP350 DeskJet
- 2000-1207 Rechargeable Battery Pack for HP 350 DeskJet
- 2000-753 Serial-to-Parallel Converter Cable
- 2000-663 Power Cable (Europe) for DeskJet Printer
- 2000-664 Power Cable (Australia) for DeskJet Printer
- 2000-665 Power Cable (U.K.) for DeskJet Printer
- 2000-667 Power Cable (So. Africa) for DeskJet Printer
- 2000-1008 Seiko DPU-414-30BU Thermal Printer with Internal Battery, Thermal Printer Paper, Serial Cable, Power Cable
- 2000-755 Five rolls of Thermal Paper
- 2000-1002 U.S. Adapter for Seiko DPU-414-30B
- 2000-1003 Euro Adapter for Seiko DPU-414-30B
- 2000-1194 Japan Adapter for Seiko DPU-414-30B
- 2000-1004 Battery Pack Adapter for Seiko DPU-414-30B
- 2000-1012 Serial 9-pin male to 9-pin female cable for Seiko DPU-414-30B
- 2000-1046 Serial-to-parallel Converter Cable w/ DIP switch labeling, 36-pin female Centronics to DB25 female

Optional Accessories

| <u>Part Number</u> | <u>Description</u> |
|--------------------|---|
| 10580-00061 | S113C, S114C, S331C, S332C Programming Manual (on disk only) |
| 10580-00062 | S113C/S331C Maintenance Manual |
| 10580-00068 | S114C/S332C Maintenance Manual |
| 760-215A | Transit Case for Site Master |
| 633-27 | Rechargeable Battery, NiMH |
| 2000-1029 | Battery Charger with universal power supply, NiMH only |
| 48258 | Soft Carrying Case |
| 40-115 | AC Adaptor Power Supply |
| 806-62 | Cable Assy, Cig Plug, Female |
| 800-441 | Serial Interface Cable Assy |
| 551-1691 | USB Adapter Cable |
| 2300-347 | Software Tools CD |
| ICN50 | InstaCal™ Calibration Module, 50 Ohm, 2 MHz to 4.0 GHz, N (m) |
| OSLN50LF | Anritsu Precision N (m) Open/Short/Load, 42 dB |
| OSLNF50LF | Anritsu Precision N (f) Open/Short/Load, 42 dB |
| 22N50 | Anritsu Precision N (m) Short/Open |
| 22NF50 | Anritsu Precision N (f) Short/Open |
| SM/PL | Site Master Precision N (m) Load, 42 dB |
| SM/PLNF | Site Master Precision N (f) Load, 42 dB |
| 2000-767 | 7/16 (m) Precision Open/Short/Load |
| 2000-768 | 7/16 (f) Precision Open/Short/Load |
| 34NN50A | Adapter, Precision N (m) to N (m) |
| 34NFNF50 | Adapter, Precision N (f) to N (f) |
| 510-90 | Adapter, 7/16 (f) to N (m) |
| 510-91 | Adapter, 7/16 (f) to N (f) |
| 510-92 | Adapter, 7/16 (m) to N (m) |
| 510-93 | Adapter, 7/16 (m) to N (f) |
| 510-96 | Adapter, 7/16 DIN (m) to 7/16 DIN (m) |
| 510-97 | Adapter, 7/16 DIN (f) to 7/16 DIN (f) |
| 15NNF50-1.5C | Armored Test Port Extension Cable, 1.5 meter, N (m) to N (f) |
| 15NNF50-3.0C | Armored Test Port Extension Cable, 3.0 meter, N (m) to N (f) |
| 15NNF50-5.0C | Armored Test Port Extension Cable, 5.0 meter, N (m) to N (f) |
| 15NN50-1.5C | Armored Test Port Extension Cable, 1.5 meter, N (m) to N (m) |
| 15NN50-3.0C | Armored Test Port Extension Cable, 3.0 meter, N (m) to N (m) |
| 15NN50-5.0C | Armored Test Port Extension Cable, 5.0 meter, N (m) to N (m) |
| 15NDF50-1.5C | Armored Test Port Extension Cable, 1.5 meter, N (m) to 7/16 DIN (f) |
| 15ND50-1.5C | Armored Test Port Extension Cable, 1.5 meter, N (m) to 7/16 DIN (m) |
| 12N50-75B | Matching Pad, converts 75 Ω to 50 Ω, 7.5 dB loss, DC to 3,000 MHz, 50 Ω N(m) to 75 Ω N(f) |
| 2000-1030 | Antenna SMA (m), 50 Ω, 1.71 to 1.88 GHz |
| 2000-1031 | Antenna SMA (m), 50 Ω, 1.85 to 1.99 GHz |
| 2000-1032 | Antenna SMA (m), 50 Ω, 2.4 to 2.5 GHz |
| 2000-1035 | Antenna SMA (m), 50 Ω, 896 to 941 MHz |
| 2000-1200 | Antenna SMA (m), 50 Ω, 806-869MHz |

Performance Specifications

Performance specifications are provided in Table 1-1, on the following page.

Table 1-1. Performance Specifications (1 of 2)

Specifications are valid when the unit is calibrated at ambient temperature after a five minute warmup. Typical values are provided for reference only and are not guaranteed.

| <u>Description</u> | <u>Value</u> |
|---|--|
| Site Master: | Frequency Range: |
| S113C, S114C | 2 to 1600 MHz |
| S331C, S332C | 25 to 4000 MHz |
| Frequency Accuracy (RF Source Mode) | ≤75 parts per million @ 25°C* |
| Frequency Resolution: S113C, S114C | 10 kHz |
| S331C, S332C | 100 kHz |
| SWR: Range | 1.00 to 65.00 |
| Resolution | 0.01 |
| Return Loss: Range | 0.00 to 54.00 dB |
| Resolution | 0.01 dB |
| **Distance-To-Fault (DTF): | |
| Vertical Range Return Loss: | 0.00 to 54.00 dB |
| SWR: | 1.00 to 65.00 |
| Horizontal Range | 0 to ((# of data points – 1) × resolution) a maximum of 1000m (3281 ft.) with a maximum of 517 points resolution, # of data pts. = 130, 259, 517 |
| Horizontal Resolution for Coax (rectangular windowing) | $\frac{(1.5 \times 10^8)(V_p)}{\Delta F}$ Where V_p is the relative propagation velocity of the cable; dp is the number of data points (130, 259, 517); ΔF is the stop frequency minus the start frequency (Hz) |
| Horizontal Resolution for Waveguide | $\frac{1.5 \times 10^8 \sqrt{1 - (F_C / F_1)^2}}{\Delta F}$ Where F_C is the waveguide cutoff frequency (Hz); F_1 is the start frequency (Hz); ΔF is the stop frequency minus the start frequency (Hz) |
| RF Power Monitor: | |
| Display Range | –80.0 to +80 dBm or 10.0 pW to 100.0 kW |
| Detector Range | –50 dBm to +20 dBm, or 10 μW to 100 mW |
| Offset Range | 0 to +60.0 dB |
| Resolution | 0.1 dB or 0.1 W |
| Test Port Connector | Type N, 50Ω, female |
| ***Immunity to Interfering signals | on-channel on-frequency |
| up to the level of: S113C, S114C | +17 dBm +10 dBm |
| S331C, S332C | +17 dBm –6 dBm |
| Maximum Input without Damage: | |
| Test Port, Type N (f) | +20 dBm, 50Ω, +50 VDC |
| RF Power Detector | +20 dBm, 50Ω, +50 VDC |
| Measurement Accuracy: | |
| Measurement accuracy depends on calibration components. Precision calibration components have a directivity of 42 dB. | |
| Cable Insertion Loss: Range | 0.00 to 54.00 dB |
| Resolution | 0.01 dB |

Table 1-2. Performance Specifications (2 of 2)

| | | |
|---|--------------------------|---|
| Transmission Line Loss (one-port) | | |
| | Range | 0.00 to 20.00 dB |
| | Resolution | 0.01 dB |
| Spectrum Analyzer: | | |
| Frequency Range | S114C | 100 kHz to 1.6 GHz |
| | S332C | 100 kHz to 3.0 GHz |
| Frequency Reference | Aging | ±1 ppm/yr |
| | Accuracy | ±2 ppm |
| Frequency Span | S114C | 0 Hz (zero span) 100 kHz to 1.6 GHz |
| | S332C | 0 Hz (zero span) 100 kHz to 3.0 GHz |
| Sweep Time | | ≥6500 ms (full span) 500 ms (zero span) |
| Resolution Bandwidth | | 10 kHz, 30 kHz, 100 kHz, 1 MHz |
| | Accuracy | ± 20% typical |
| Video Bandwidth | | 100 Hz to 300 kHz in 1-3 sequence |
| SSB Phase Noise (1 GHz) @ 30 kHz offset | | ≤ -75 dBc/Hz |
| Spurious Responses, Input Related | | ≤ -45 dBc |
| Spurious Residual Responses | | ≤ 90 dBm @ ≥ 500 kHz |
| Note: 10 kHz resolution bandwidth, input terminated, no attenuation | | |
| Amplitude | | |
| Measurement Range | | -95 dBm to +20 dBm typical |
| Dynamic Range | | ≥ 65 dB typical |
| Maximum Safe Input Level | | +20 dBm, maximum measurable safe input +23 dBm, maximum input (damage) +23 dBm, peak pulse power ±50 Vdc |
| Displayed Average Noise Level: | | ≤ -80 dBm (<500 kHz typical) ≤ -95 dBm (≥500 kHz typical) |
| Display Range, Log Scale | | 2 to 15 dB/div. in 1 dB steps; 10 divisions displayed. |
| Frequency Response | | |
| RF Input VSWR | | 2.0:1 |
| Resolution (Ref. Level) | | 1.0 dB |
| Total Level Accuracy**** | | ±2 dB ≥ 500 kHz typical ±3 dB <500 kHz typical |
| General | | |
| Internal Memory: | | |
| | Trace Memory | 200 maximum |
| | Instrument Configuration | 10 setup locations |
| | RS-232 | 9 pin D-sub, three wire serial |
| Electromagnetic Compatibility | | Complies with European community requirements for CE marking |
| External DC Input | | +11 to +15 Vdc, 1250 mA max. |
| Temperature: | Storage | -20° C to 75° C |
| | Operating | 0° C to 50° C |
| Weight: | | 2.15 kg (4.76 pounds) |
| Dimensions: | | 25.4 x 17.8 x 6.1 cm (10 x 7 x 2.4 inches) |

* ±2 ppm/Δ°C from 25°C;

** Fault location is accomplished by inverse Fourier Transformation of data taken with the Site Master. Resolution and maximum range depend on the number of frequency data points, frequency sweep range and relative propagation velocity of the cable being tested;

*** Immunity measurement is made in CW mode with incoming interfering signal exactly at the same frequency (worst case situation). Typical immunity is better when swept frequency is used;

**** For input signal levels ≥ -60 dBm, accuracy at 50 MHz @ -30 dBm = ± 1dB.