



- Included with:
  - Padded nylon carrying case.
  - Mains battery charger.
  - Car cigarette lighter charger lead.
  - Quick reference card.
  - RS232 interface socket.

## **Operators Manual For Spectrum Analyser SA97**

- Features of the SA97 Spectrum Analyser

The SA97 Spectrum Analyser has been specifically designed as a portable instrument for use by major cable operators, CATV and large MATV Systems.

Spectrum analysers allow quick and accurate setting up and maintenance of cable systems; allowing the complete spectrum under test to be viewed. Being able to simultaneously see all the television vision and sound carriers on a cable network not only saves a great deal of time, it also results in better diagnosis of system problems and more accurate system alignment.

Spectrum analysers are generally designed primarily as laboratory or workshop instruments. These units are heavy and not rugged enough for regular field use and their large power consumption has also been a major consideration. The high cost of these instruments has also been a source of much concern.

The SA97 has been designed to overcome these problems. It has a back lit, liquid crystal display, which has low power consumption and much reduced weight, compared to cathode ray tubes. In addition the unit shows carrier level and frequency simultaneously on screen, so giving an unambiguous display.

Using built in software correction, each SA97 is individually corrected for frequency response, to give accuracies better than  $\pm 0.6$  dB from 10 to 1000 MHz and  $\pm 1$  dB from 1000 to 2150 MHz. Extreme ambient temperature variations are also taken into account by the processor, removing the need for look-up tables or correction charts.

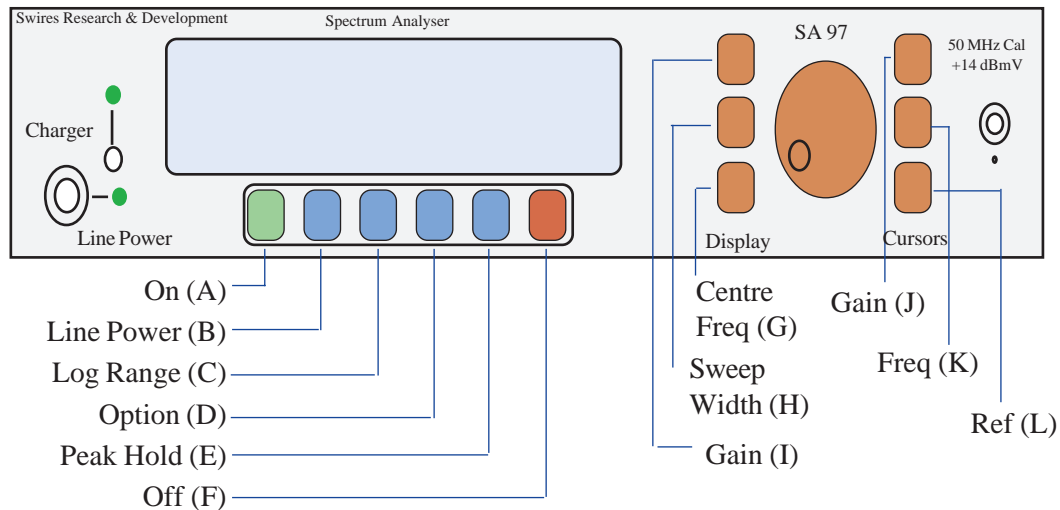
The front panel contains all the controls for the unit. Using a single rotary optical encoder and a set of tough membrane keys, the instrument has few mechanical controls, ensuring reliability and weather proofing.

All control functions are transferred by the main processor via the direct digital synthesiser to the screen in real time, allowing the screen to be updated without delay.

A built in peak hold position enables low duty cycle and suppressed sync signals to be accurately measured.

The internal rechargeable batteries provide 10 hours of continuous operation, excluding any power used to power the LNB, and can then be recharged from the mains or a car.

The construction of the instrument is to the very highest standards and for quality assurance all units are temperature cycled and vibration tested at 2G in tests to military specifications.



## SA97 Front End

- Operating Instructions

- Switching On and Off.

Switch the machine on with the "On" key (A). A start up menu will be displayed for a moment while the instrument runs self checks. The instrument is switched off with the "Off" key (F).

- Controlling what is shown.

- The three "Display" keys (G, H, I) control which part of the spectrum is shown;
  - Centre Freq (G) controls which part of the spectrum is selected.
  - Sweep Width (H) controls the amount of the spectrum that is viewed.
  - Gain (I) controls the gain of the instrument.
- The three "Cursors" keys (J, K, L) move the measurement cursors;
  - Gain (J) moves the gain cursor vertically
  - Freq (K) moves the frequency cursor horizontally
  - Ref (L) moves a second horizontal cursor, which is always relative to the Gain cursor. Pressing the key again removes it.

To move the display or cursor, first press the key of the marker to be moved and then move the rotary switch. For example, to measure the frequency of a peak, press the Freq (K) key and move the cursor with the rotary switch, until it is over the peak.

An indicator appears on the LCD on pressing one of the six keys G, H, I, J, K & L, i.e. "CnFreq", "Width", and "Gain" for the Display buttons and "GnCur", "FrCur" and "ReCur" for the three Cursor buttons.

- Changing the Log Range

The instrument has two display ranges; 19 dB and 38 dB. These are switched between using the Log Range key (C). Either "LR38" or "LR19" is displayed on the LCD, to indicate the instrument's setting. The range does not affect the reading, as it is automatically compensated for in the software.

- Peak Hold

When looking for transient signals, such as radar interference, press the Peak Hold key (E). Peak Hold stores and displays the maximum readings, until the key is pressed again. When Peak Hold is activated a small arrow (↑) appears in the display, next to the log range indicator, for example "LR19↑".

- The option key

The option key (D) changes less frequently used parameters. There are four option menus, each indicated in the display. Pressing the option key cycles in the order

"Clock" → "BrilC" → "BrilD" → "Bril"

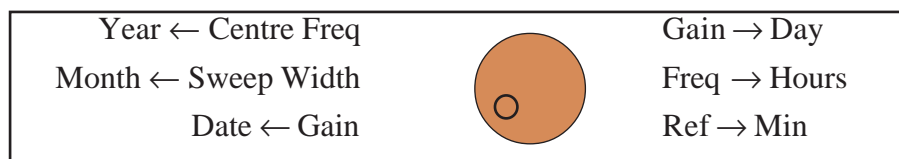
(BrilC and BrilD are for future expansion).

- Saving pages

To save the screen of instrument. Firstly press the option key so that "Clock" is displayed, then the Peak Hold key (E). The display will show "Saved Page" followed by the number of the saved page and then revert to the normal display.

- Setting the clock

Press the option key once, so "Clock" appears in the display. Each of the six orange keys is used to change one parameter;



A value is changed by pressing the corresponding button and using the rotary controller.

- Display units.

The instrument will display in either dBmV or dBµV. Pressing the Option key followed by the Log Range key (C), toggles between the units. The instrument measures the gain, taking into account the units being used. If the value has a plus or minus sign (+ or -), the reading is in dBmV, with no sign the units are dBµV.

- Brilliance

The brightness of the display can be altered by pressing the option key until BrilD, BrilC or Bril appear in the display, and then using the rotary controller.

To return to the measuring screen press any of the orange keys when Bril is displayed.

- Line Powering

The instrument will supply +14V @ 300mA max. to an LNB by pressing the Line Power key (B). "Wok On" will be displayed and the Line Power LED will be illuminated green. If the LED shows red there is AC line powering present on the incoming cable. The source must be removed immediately to prevent damage to the instrument. If the internal batteries do not have enough charge the line powering facility will automatically switch off until there is enough charge to power the LNB.

- Internal battery check and charging instruction

When the "Low Batt" indicator shows connect the AC or car charger to recharge the batteries. On connecting the charger the "Charger" LED should light. A 15 hour charge is required if the batteries are completely discharged, but usually an overnight charge will be sufficient. The internal constant voltage circuitry of the power unit prevents overcharging. When recharging from a car battery the internal batteries cannot be charged to a higher voltage than the car battery.

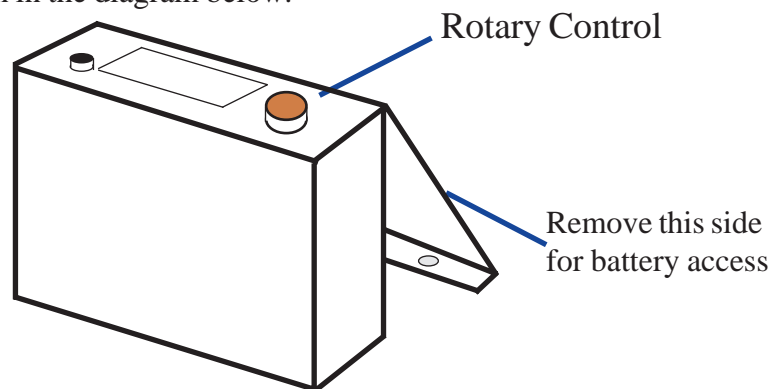
- AC battery charger

The state of the battery charger can be gauged from the charger's LED;

- When the batteries are at a low charge state the LED will be extinguished, indicating that the unit is taking a charge.
- When the batteries are over half charged the LED will flash on and off, indicating that the charger is giving the batteries a pulse charge alternatively at a high rate and then at a low rate.
- On connecting the charger, when the LED remains on the batteries are fully charged.
- When the charger is not connected the LED will be permanently on.

- SA97 Battery Access

To change the rechargeable cells, remove the unit from its case. Unscrew the top panel by removing the two M4x6 mm screws on the underside of the instrument. Slide off the side cover as shown in the diagram below.



**WARNING!**

- Be extremely careful not to short any terminals of the battery to the chassis of the instrument. Do not trap the battery leads under the new batteries, or under the clamp, when fitting them.

- SA97 Specifications:

- Frequency Range: 10 to 2150 MHz. sweep range.
- Display Range: 0 to 1400 MHz (Variable)
- Dynamic range: -28 dBmV to +52 dBmV.
- IF Bandwidth: 280 kHz, below 200 MHz sweep width.  
1 MHz, above 200 MHz sweep width.
- Calibration Oscillator: 50 MHz @ +14 dBmV  $\pm 0.25$  dB (-10 to +45 °C).
- Power Source: 2 \* Yuasda NP 2.6, 6 V, 2.8 Ah sealed lead acid giving approx. 10 hours continuous use.
- Measurement Accuracy:  $< \pm 0.6$  dB from 10 MHz to 1000 MHz.  
 $< \pm 1.0$  dB from 1000 MHz to 2150 MHz.
- Screen Response:  $\pm 0.3$  dB.
- Frequency Accuracy:  $< \pm 0.25$  MHz from 10 to 2150 MHz.
- Connectors: BNC type and 9 pin 'D' RS232 interface.
- Dimensions: 390 mm  $\times$  265 mm  $\times$  95 mm.
- Weight: 5.2 kg, including case and batteries.
- Operating Temperature: -10 to +45 °C.
- Optional Extras: +20 dB precision attenuator.