

1. RE 2100

3.10.1 HOW TO SELECT A SERVICE PROGRAMME

In order to help the operator, and the service engineer during installation or repair, the RE2100 has some

built-in service programmes.

The RE2100 has a service mode, which is activated by pressing the keyboard buttons 1 and 0 simultaneously. The display of the RE2100 will now show 'SP-'.

The various service programmes can now be selected by keying-in a three digit number. The display of

the RE2100 will then show 'SP-XX-X'.

A new service programme may be chosen after the keyboard button ENT has been pressed once. The display shows 'SP-' again, and a new three digit number can be keyed-in.

In order to return to normal operation mode, press the keyboard button TUNE/CLARIF.

3.10.2 DESCRIPTION OF SERVICE PROGRAMMES

SP-00-X TEST OF PROCESSOR, KEYBOARD AND DISPLAY MODULE

When 00 has been keyed-in, the RX display shows 'SP-00-', and the programmes 0 to 3 and 8 may be selected.

SP-00-0 READ OUT OF SOFTWARE VERSION NUMBER

In the TX display a 4 digit number will be read out, possibly followed by a letter. The number indicates S. P. Radio's internal software number and the letter indicates the software release.

Ex. 1085E => C-number C1085 and rel. E.

SP-00-1 READS OUT WHICH ITU FREQUENCY TABLE IS USED

When P-91 is read out, an earlier ITU table is used. When A-91 is read out, the ITU table in force from 1st June 1991 is used.

When keying-in the digit 0 or 1, the read out will be changed from A-91 to P-91 or P-91 to A-91 respectively.

SP-00-2 STARTS TEST OF THE DISPLAY

This test programme is used in the performance check, section 3.5.1.1.

When pressing <ENT> during the test, the test procedure stops. When pressing <ENT> again, the programme steps forward. When pressing <0>, the programme continues again automatically.

3 SERVICE RE2100

PAGE 3-61

SP-00-3 TEST OF SP-BUS

This test programme is used in the performance check, section 3.5.1.1.

The processor sends a byte to itself via the serial SCI communication port. Each time an error is received,

the display reads-out an 'E'. If there is no error, a bar '-' runs through the TX display.

SP-00-8 TEST OF KEYBOARD

This test programme is used to test all the keyboard buttons. When the programme is selected, press the

keyboard from the top of the right corner down to the left corner. E.g. 1,2,3,4,5,6,-FREQ

DOWN,.....0,,ENT. When the buttons are pressed, the display reads-out the number of the button (ref. chapter 5.6. KEYBOARD UNIT). If the button does not work, the display reads-out the number of the

button with a letter "E", when the next button is pressed.

SP-04-X TEST OF FRONTEND, RECEIVER AND SYNTHESIZER MODULE

When 04 has been keyed in, the RX display shows 'SP-04-', and the programmes 0 to 7 may be selected.

SP-04-0 ADJUSTMENT OF 70 MHz RECEIVER FILTER

This test programme is used in the adjustment procedure, sections 3.7.1.1. and 3.7.1.2, where it sets up

the synthesizer, frontend, and receiver module for adjustment of the 70 MHz intermediate filter.

SP-04-1 ADJUSTMENT OF 70 MHz RECEIVER FILTER

This test programme is used in the adjustment procedure, section 3.7.1.1., where it sets up the synthesizer, frontend, and receiver module for adjustment of the 70 MHz intermediate filter.

SP-04-2 ADJUSTMENT OF SSB/AM RECEIVER FILTER

This test programme is used in the adjustment procedure, section 3.7.1.3., where it sets up the synthesizer, frontend, and receiver module for adjustment of the 10.7 MHz SSB/AM intermediate filter.

SP-04-3 ADJUSTMENT OF EARPIECE LEVEL

This test programme is used in the adjustment procedure, section 3.7.1.6., where it sets up the synthesizer, frontend, and receiver module for adjustment of the earpiece level.

SP-04-4 ADJUSTMENT OF API VOLTAGE

This test programme is used in the adjustment procedure, section 3.7.2.2., where it sets up the synthesizer, frontend, and receiver module for adjustment of the API sideband level.

SP-04-5 TEST OF LO1 AND LO2 SIGNALS TO EXCITER

This test programme is used in the module performance check, section 3.6.1.5., where it sets up the synthesizer, exciter, and frontend module, in order to control that the local oscillator signals are present at the exciter module.

SP-04-6 TEST OF ATTACK AND DECAY TIME FOR AGC IN SSB MODE

This test programme is used in the module performance check, section 3.6.1.5., and performance check, section 3.5.2.5., where it sets up the synthesizer, frontend, and receiver module, in order to control that the SSB AGC attack and decay times are inside the limits.

SP-04-7 TEST OF ATTACK AND DECAY TIME FOR AGC IN AM MODE

This test programme is used in the module performance check, section 3.6.1.5., and performance check, section 3.5.2.5., where it sets up the synthesizer, frontend, and receiver module, in order to control that the AM AGC attack and decay time are inside the limits.

SP-05-X TEST OF EXCITER AND POWER MODULE

When the RE2100 is not connected with a transmitter T2130, it is not possible to activate the exciter module. It is therefore necessary to activate a test programme to get the exciter to work. When 05 has been keyed-in, the RX display shows 'SP-05-', and the test programmes 0 to 6 may be selected.

SP-05-0 EXCITER ACTIVATED IN TUNE MODE

The exciter output frequency is set to fTX = 22000.0 kHz, the tune tones can be activated by the handset key, and the transmit mode is J3E. Exciter step attenuator is set to max. output power.
3 SERVICE RE2100

SP-05-1 EXCITER ACTIVATED IN TELEPHONY MODE

The exciter output frequency is set to fTX = 22000.0 kHz, LF signal generator can be connected to testbox terminal AF to Telex, and the handset key is valid. Mode shift is possible, but the modulation is turned off in H3E mode. Exciter step attenuator is set to max. output power.

SP-05-2 TEST OF EXCITER STEP ATTENUATOR

The exciter output frequency is set to fTX = 22000.0 kHz, and the step attenuator is incremented with 1 step every 700 uS, until step 63 is reached. Then the attenuator is reset to step 0.

The test programme is used in the performance check, section 3.5.3.4., module performance check, section 3.6.4.6., and module adjustment, section 3.7.3.6.

SP-05-3 TEST OF EXCITER 70 MHz FILTER

This test programme is used in the module performance check, section 3.6.4.7., and in module adjustment, section 3.7.3.7., where it sets up the synthesizer and exciter to control the 70 MHz intermediate filter.

SP-05-4 EXCITER ACTIVATED IN TELEPHONY MODE

The exciter is activated as in test programme SP-05-1, but the exciter output frequency is changed to 28000.0 kHz.

SP-05-5 EXCITER ACTIVATED IN TELEPHONY MODE

The exciter is activated as in test programme SP-05-1, but the exciter output frequency is changed to 14900.0 kHz.

SP-05-6 EXCITER ACTIVATED IN TELEPHONY MODE

The exciter is activated as in test programme SP-05-1, but the exciter output frequency is changed to 1600.0 kHz and modulation is possible in H3E mode

T2130

3.9 SERVICE PROGRAMMES

In the following it is assumed that the Service Programme jumper is inserted in the RE2100.

In general, if the RE2100 displays 'Err.0' in a Service Programme, the selected SP does not exist.

Example:

Operator: Key: 20-7 <ENT>

RE2100: Displays: 'SP-20-7'
' Err.0'

Legend: Err.0 = The entered service programme does not exist.

3.9.1 SERVICE PROGRAMMES IN T2130

SP-20-0

Displays the latest measured Vbattery voltage.

Example:

Operator: Key: 20-0 <ENT>

RE2100: Displays: 'SP-20-0'
' 25.3'

Legend: Measured in Volt

SP-20-1

Measures and displays the present Vbattery voltage.

Example:

Operator: Key: 20-1 <ENT>

RE2100: Displays: 'SP-20-1'
' 26.2'

Legend: Measured in Volt.

SP-21-0

Displays the state of the temperature protection.

Example:

Operator: Key: 21-0 <ENT>

RE2100: Displays: 'SP-21-0'
' 00.1'

Legend: 00.0 There has been no reduction of Vforward due to high temperature.

00.1 There has been a reduction of Vforward due to high temperature.

00.2 The Power Amplifier has been blocked due to very high temperature.

⁹³¹⁵ PAGE 3-27

3 SERVICE T2130

SP-22-0

Displays the latest measured Vforward voltage.

The voltage is only valid after the transmitter has been keyed.

Example:

Operator: Key: 22-0 <ENT>

RE2100: Displays: 'SP-22-0'
' 10.7'

Legend: Measured in Volt

SP-22-1

Measures and displays the present Vforward.

Example:

Operator: Key: 22-1 <ENT>

RE2100: Displays: 'SP-22-0'
' 10.9'

Legend: Measured in Volt.

SP-22-2

Displays the latest measured Vforward maximum voltage.

The voltage is only valid after the transmitter has been keyed.

Example:

Operator: Key: 22-2 <ENT>

RE2100: Displays: 'SP-22-0'
' 11.2'

Legend: Measured in Volt.

SP-23-0

Displays the latest measured SWR.

Example:

Operator: Key: 23-0 <ENT>

RE2100: Displays: 'SP-23-0'

' 1.6'

SP-23-2

Displays the measured SWR when the tuning has finished.

Example:

Operator: Key: 23-2 <ENT>

RE2100: Displays: 'SP-23-0'

' 1.7'

PAGE 3-28 ⁹³¹⁵

3 SERVICE T2130

SP-24-0

Tests the EEPROM's for write and read.

Example:

Operator: Key: 24-0 <ENT>

RE2100: Displays: 'SP-24-0'

RE2100: Displays: 'SP-24-0'

' A. '

Legend: A. = No errors found

Err.1 = Error found in U11

Err.2 = Error found in U12.

NOTE! the duration of the test is approx. 8 seconds.

SP-24-1

Deletes all stored Retune Data from the EEPROM's.

Example:

Operator: Key: 24-1 <ENT>

RE2100: Displays: 'SP-24-1'

RE2100: Displays: 'SP-24-1'

A.

Legend: A. = Deleting finished

SP-24-2

Initializes EEPROM's from scratch. Stores standard data in the EEPROM.

Example:

Operator: Key: 24-2 <ENT>

RE2100. Displays: 'SP-24-2'

RE2100: Displays: 'SP-24-1'

A.

Legend: A. = Initializing finished.

NOTE! The T2130 must be turned off and on after the execution of this Service Programme. The T2130

MUST be calibrated after this Service Programme.

SP-25

Calibrates the T2130.

Example:

Operator: Connect an oscilloscope to the internal Dummy Load in the T2130.

Operator: Connect a Voltmeter to the battery supply pins at the Connection Board (6) in the bottom of the T2130.

⁹³¹⁵ PAGE 3-29

3 SERVICE T2130

Operator: Key: 25

RE2100: Displays: 'SP-25-'

' CAL. '

RE2100: Delivers a two-tone RF-signal continuously (same as tune tones).

TX-frequency: 1600.0 kHz.

T2130: Opens and closes for the two-tone RF-signal. Open for 2 seconds and closed for 2 seconds.

Operator: Ensure continuously that the battery voltage is 24.0 Volt in the open period.

Operator: Adjust the RF-level of the two-tones by using the keys <FREQ UP> and <FREQ DOWN> until the RF-signal on the oscilloscope is just not distorted.

Operator: Key: 1 <ENT>

RE2100: Displays: 'SP-25-1'
'A.'

Legend: A. = Accepted. T2130 is calibrated.

Err. 1 = Battery voltage is high. Please check.

Err. 2 = Battery voltage is low. Please check.

Err. 3 = Forward Voltage is high. See the description of Error Message 72.

Err. 4 = Forward Voltage low. See the description of Error Message 71.

Err. 5 = Bad SWR in the internal dummy load.

Note! If any 'Err.' comes up the T2130 is **NOT** calibrated.

UNINTENTIONAL CALL OF SP-25

If the operator unintentionally has keyed '25' it is possible to leave Service Programme 25 without calibrating the T2130 in the following way:

Operator: Key: <ENT> or <TUNE>

SP-25 may also be left by switching off the power on the RE2100.

SP-26-0

Displays the maximum step of the Step Attenuator in the RE2100 Exciter.

Example:

Operator: Key: 26-0 <ENT>

RE2100: Displays: 'SP-26-0'
'14.'

SP-26-1

Displays the actual step of the Step Attenuator in the RE2100 Exciter.

Example:

Operator: Key: 26-1 <ENT>

RE2100: Displays: 'SP-26-1'
'18.'

PAGE 3-30 ⁹³¹⁵

3 SERVICE T2130

SP-27

Displays the version and the release of the software in the TX-processor (3) in the T2130.

Example:

Operator: Key: 27-0 <ENT>

RE2100: Displays: 'SP-27-0'
'1083.A'

Legend: '1083' is S. P. Radio's identification of the version of the software.

On the label of the

EEPROM is written: C1083A.

' ' = 1. release

'A' = 2. release

'B' = 3. release

etc.

SP-28

Sets RF-power level (reduced power).

Power levels: 0 = Normal, 250 W

1 = 150 W

2 = 125 W

3 = 100 W

Example:

Operator: Key: 28-(0-3)<ENT>

'SP-28-(0-3)'

RE2100: Displays: 'SP-28-2'

' 125. '

Legend: 125. = Set to 125 W.

SP-29

Trouble shooting service programme.

Example:

Operator: Key: 29

RE2100: Displays: 'SP-29-0'

' SE. '

RE2100: Delivers a two-tone RF-signal continuously (same as tune tones).

TX-frequency: 1600.0 kHz.

T2130: The corresponding lowpass filter is switched in and the transmitter is keyed.

It is advisable to connect a 50 ohm dummy load instead of the aerial coupler.

Operator: May now trouble shoot the transmitter without being disturbed by error messages etc.

Adjustment of the RF-level of the two-tones is done by using the keys <FREQ UP>

and <FREQ DOWN>. When the trouble shooting is finished:

Operator: Key: <ENT>

RE2100: Displays: 'SP-29-0'

' A. '

⁹³¹⁵ PAGE 3-31

3 SERVICE T2130

SP-33

Adjustment of the bias current in the power transistors in the Power Amplifier (1).

Example:

Operator: Key: 33

RE2100: Displays: 'SP-33-0'

' SE. '

T2130: The transmitter is keyed.

There are no RF-signals applied to the Power Amplifier (1).

Operator: May now adjust the bias current in accordance with the adjustment procedure.

When the adjustment is finished:

Operator: Key: <ENT>

RE2100: Displays: 'SP-33-0'

' A. '

3.9.2 SERVICE PROGRAMMES RELATED TO AT2110

SP-30

Activates AT2110 relays 1-9 one by one, and releases any relay.

Example:

Operator: Key: 30 - (0-9) <ENT>

RE2100: Displays: 'SP-30-(0-9)'

' A. '

Legend: 0 = No relays activated.

1-9 = Relays 1-9 activated.

A. = Accepted.

The T2130 activates the entered AT2110 relay no., other relays are released.

SP-31

Activates AT2110 relays 10-19 one by one.

Example:

Operator: Key: 31 - (0-9) <ENT>

RE2100: Displays: 'SP-31-(0-9)'

' A. '

Legend: 0-9 = Relays 10-19 activated.

A. = Accepted.

The T2130 activates the entered AT2110 relay no., other relays are released.

If the AT2110 is in the system (jumper 5 is inserted in the TX-processor) the following is displayed:

RE2100: Displays: 'SP-25 '

' Err.1 '

SP-32-0

Resets the AT2110 'Clock' line, 'Data' line and the 'Motor +' line to their normal state.

Example:

Operator: Key: 32 - 0 <ENT>

RE2100: Displays: 'SP-32-0'
' A. '

PAGE 3-32 ⁹³¹⁵
3 SERVICE T2130

SP-32-1

Sets the AT2110 clock line high.

Example:

Operator: Key: 32 - 1 <ENT>

RE2100: Displays: 'SP-32-1'
' A. '

SP-32-2

Sets the AT2110 data line high.

Example:

Operator: Key: 32-2 <ENT>

RE2100: Displays: 'SP-32-2'
' A. '

SP-32-3

Sets supply on the AT2110 'Motor +' line, (low speed).

Example:

Operator: Key: 32 - 3 <ENT>

RE2100: Displays: 'SP-32-3'