Index

Notes:

Safety notices

Every effort has been made to make this manual correct and up to date. Due to continuous development of the product and by error or omission, anomalies may be found and this is acknowledged.

Level of risk

As the SR2000 is powered from 12V DC, there is little chance of serious injury as long as common sense is applied.

Observe the polarity of connections if the supplied AC power unit is not being used. DC input is a nominal 12V DC wired centre positive. Reverse polarity connection will damage the SR2000 and potentially could lead to the risk of fire or explosion under severe circumstances.

Carefully handle the AC plug of the supplied AC power unit to prevent touching the terminals when inserting or removing from the AC socket. NEVER connect the SR2000 directly to the AC supply.

SAFETY NOTICE – Always disconnect the power supply from the AC socket when not in use.

Handling the SR2000

Use a soft, dry cloth to gently wipe the SR2000 clean, never use abrasive cleaners or organic solvents which may damage certain parts. Treat the unit with care, avoid spillage or leakage of liquids into the cabinet and power supply. Special care should be taken to avoid liquid entering around the keys, main dial or via the connection sockets. Never push or knock the TFT LCD display screen which is very fragile and sensitive to shock.

Special remarks

Do not use or leave the SR2000 in direct sunlight (especially the TFT display). It is best to avoid locations where excessive heat, humidity, dust and vibration are expected. Always keep the SR2000 free from dust and moisture.

AC adaptor (power unit)

The SR2000 may be provided with a suitable AC / DC power unit. The SR2000 is designed for operation from a nominal 12V DC regulated power supply (12 to 16V is acceptable), which should be capable of supplying a minimum of 1,4A continuous, ideally a 2A unit should be employed.
Never connect the SR2000 directly to an AC supply.

Other warnings

There are no internal operator adjustments. In the unlikely event of servicing being required, please contact your dealer for technical assistance.

Should the SR2000 appear to behave strangly, normal operation may easily be regained by resetting the microprocessor. Please refer to section “6. Configuration” for further information.

Allthough carefully designed, the SR2000 (like all receivers) suffers from a degree of internal noises known as spurii. They are a product of the receiver circuitry and do not represent a fault.
The reception might be affected by interferences produced by nearby electrical appliances such as television, PC, walkie-talkies, etc... The reception might be strongly affected by powerful transmissions if the receiver or the antenna are located nearby a transmitter (such as TV broadcasting transmitter).
Digital transmissions or encrypted content cannot be decoded by this receiver.
Specification is typical but not guaranteed, subject to change without notice due to continuous development of the product.

Introduction

Thank you for purchasing the SR2000 FREQUENCY MONITOR. To get the best possible results, we recommend that you read this manual to fully familiarise yourself with the SR2000.

Major features of the SR2000

The SR2000 is a DSP powered spectrum display unit with high quality RF front-end, for professional users. The IF signal originating from the RF front-end is digitally processed, analyzed by high-speed FFT (Fast Fourier Transform), to allow a 10 MHz bandwidth wide spectrum to be displayed in real time.

The RF front-end covers a wide range from 25MHz to 3GHz with triple conversion superheterodyne. Thanks to a well designed RFU, the generated IF signal of 10.7 MHz is of high linearity. Moreover, the demodulated signal is amplified to a high-definition audio (AF) signal, which can be output to an external speaker for superb sound.

A wide variety of monitoring modes are available with the convenience of opearators in mind. These include:

Step resolution mode suited to monitor specific signals across a known relatively wide defined band where signals are allocated with a certain stepping size, for example VHF airband.
Channel scope mode which allows to monitor a known narrow channelised band of frequencies such as VHF or UHF amateur band. Channel scope mode can emulate almost a real-time band scope between the start and end frequency with defined stepping size.

In addition to providing **Average, Peak Hold and Peak** value readings which are downloadable to the PC via a communi-cations port, it also incorporates a **Waterfall facility** (as commercial grade spectrum analyzers do), to display the changing conditions of signal spectrum with varying colours in a form of waterfall.

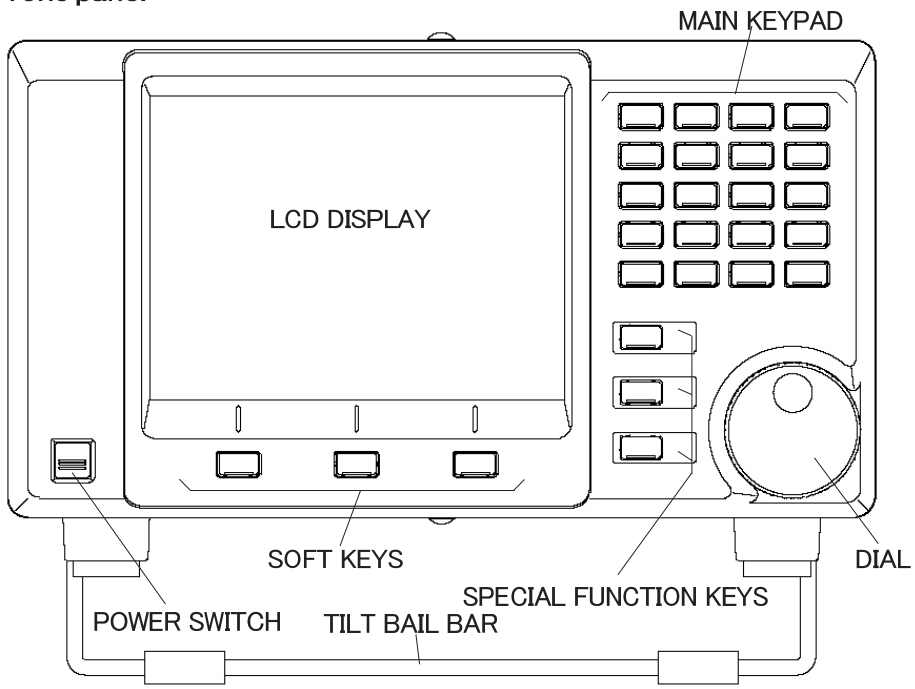
Supplied accessories

1x	SR2000 main unit
1x	BNC coaxial cable
1x	DB9 D-type serial cable
1x	DC cable
1x	This handbook
1x	AC power supply

Note: PC connection cable not supplied. The PC software for screen capture and receiver control is not supplied as it is still under development, but might be available in the future. The command list to enable you to create your own control software is detailed in chapter 11.

1.Control and Descriptions

1-1. Front panel



LCD

The large high resolution 5 inch colour TFT display provides all operational information and spectrum display.

Power switch

Press once to latch the switch in, switching on the SR2000. To switch off the SR2000, press the switch a second time, the switch latches outward.

Tilt bail bar

A tilt bail bar is provided under the front panel (on the bottom case shelf) so that the SR2000 may be tilted upward at the front to improve visibility in certain installations.

Soft function keys

Each one of these three "soft keys" has multiple roles as indicated on the LCD screen depending on the circumstances in operation.

Special function keys

These are to be used solely for setting the center frequency, squelch level and volume (AF output).

Dial

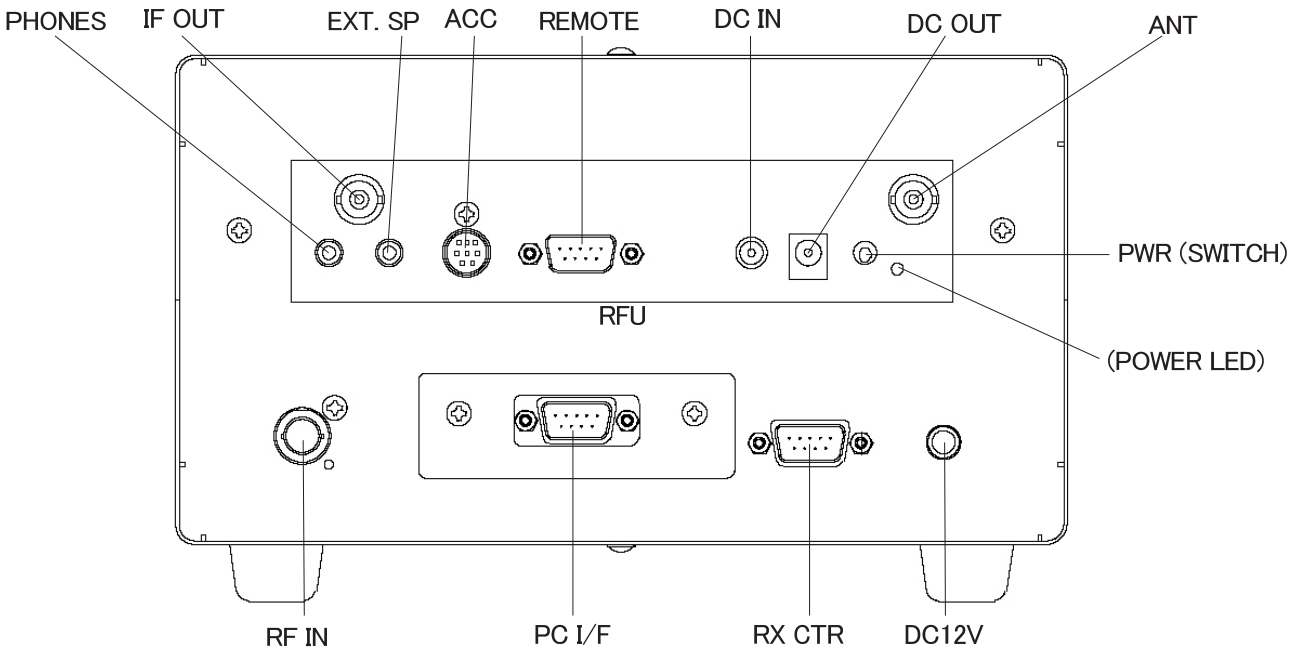
The DIAL is a rotary control and is used to move the cursor, to make a selection, to move the marker/centre frequency and to tune to the desired frequency.

Main keypad

Used to enter numeric information, frequencies and to setup specific functions.

1-2. Rear panel

The real panel of the SR2000 contains a lower half of sockets described on this page below the graphic, and the upper half (RFU) of sockets which are described on the next page.
Please beware that 3 bypass cables have to be connected between the upper (RFU) part and the lower part to allow the SR2000 to function.



RF IN
RF INPUT SOCKET: Connect it to "IF OUT" with the supplied BNC coaxial cable.

PC I/F
PC I/F SOCKET: A controlling PC may be connected to this RS-232C type of socket, to transfer monitoring data and screen shots to the PC. The necessary control software is not supplied.

RX CTR
RX CONNECTOR SOCKET: Connect it to "REMOTE" using the supplied "D-type" serial cable.

DC 12V
12V DC "SLAVE" INPUT SOCKET: Connect it to "DC OUT" with the supplied DC cable.

Rack mount
There are four screw holes (unused), two on each side of the cabinet. They are a provision for rack mount application. Size of the screw is M4x8.

PHONES

Headphone socket (3.5mm mono jack): A pair of headphones or earphones may be connected. When this headphone socket is used, any external speaker connected to the "EXT.SP" socket will be automatically disconnected.

EXT.SP

EXTERNAL SPEAKER SOCKET: This 3.5mm mono jack socket provides audio ouput to drive an external speaker unit. This unit should have a nominal 8OHM impedance and power handling of 2 WATTS or greater.

IF OUT

I.F. OUTPUT 10.7 MHz: This BNC socket provides the output to drive the spectrum display part of the SR2000 and has to be connected to "RF IN" with the supplied BNC coaxial cable.

ACC

ACCESSORY SOCKET: Provides output for audio and discriminator.

REMOTE

RFU COMMUNICATION SOCKET: Connect it to "RX CTR" using the supplied "D-type" serial cable.

DC IN

12V DC INPUT SOCKET: The supplied power unit is terminated with a centre positive (+) polarity.

DC OUT

12V DC "SLAVE OUTPUT SOCKET" Connect it to "DC12V" with the supplied DC cable.

PWR

MASTER POWER SWITCH: Unless this switch is "on" (upper position), the SR2000 can not be turned on with the front panel power switch. Please keep this switch always in the upper position.

POWER LED

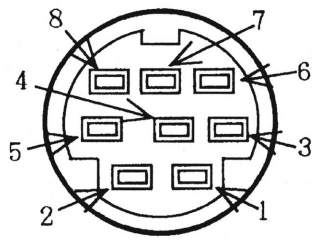
Lights on when both the front panel and back panel power switches are in the "on" position.

ANT

ANTENNA SOCKET: This is the aerial input for the SR2000. The socket is of BNC type. Use 50 Ohm cable to connect your antenna.

ACC SOCKET PIN ALLOCATION

This socket provides output for audio and discriminator, or for other applications you might create thanks to the pin allocation indicated in the chart on the right.



PIN NUMBER	CONNECTION
1	5V DC@30mA MAX
2	Discriminator out, 500mVp-p
3	No connection
4	No connection
5	No connection
6	AF out (H),120mV@600 Ohm
7	AF out (L), 60mV@600 Ohm
8	Ground

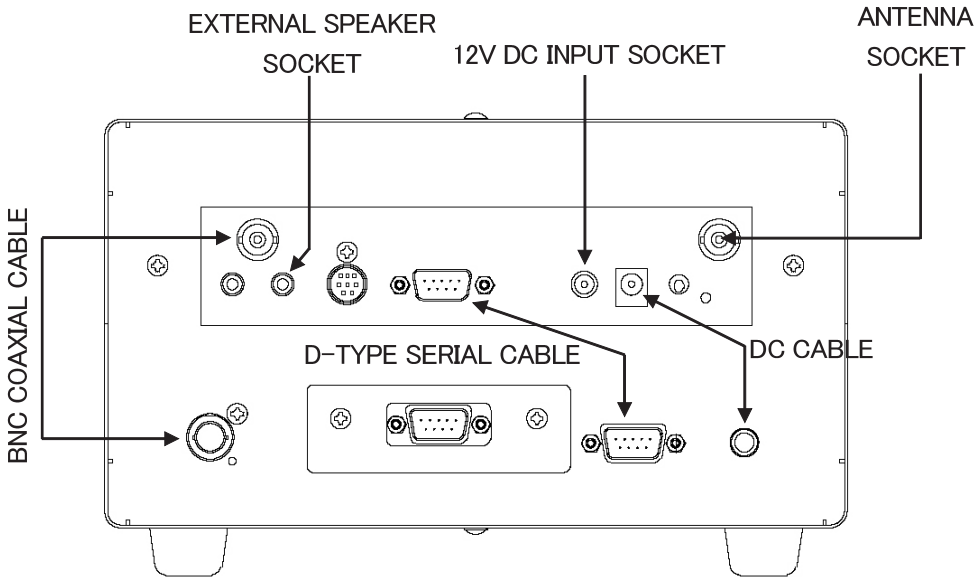
Values for pins 2,6,7 are for a FM 3kHz deviation at antenna input level.

2. Connection

2 -1. Rear panel wire connection

The following table and graph show the correct connection of each supplied cable with the rear panel sockets.

RFU SOCKETS	LOWER PANEL SOCKETS	CONNECTION CABLE
IF OUT	IF IN	BNC coaxial cable
REMOTE	RX CTR	DB9 D-type serial cable
DC OUT	DC 12V	DC cable



In addition, connect your antenna to the socket labelled "ANT", and an external speaker, if requiered, to the socket labelled "EXT.SP". The speaker should have a power handling of 2 WATTS or greater.

2－2． Connection with the power supply

Where possible, use the supplied AC/DC power unit. The input voltage of this device will be appropriate for the specific market place. Make sure the master power switch (“PWR” on the back panel, lower position) and the front panel power switch (latched outward) are set to OFF, before connecting the power supply. Connect the supplied power unit to the wall socket and its DC cable to the “DC IN” socket on the rear panel. Be careful not to confuse this socket with the “DC12V” slave socket.

3. Power switches

The SR2000 has two power switches, the master power switch and the front panel power switch.

MASTER POWER SWITCH

This switch controls the power for the entire device. When this switch is on the upper position, the power is ON (default position is ON). If for any reason you would like to power down the entire device, toggle the switch to the lower position.

FRONT PANEL POWER SWITCH

To switch on the SR2000, press once to latch the switch in. Beware that unless the back panel master power switch is ON, the power can not be turned on by the front panel power switch. In this manual, this front panel power switch is called POWER SWITCH.

START-UP

After connecting the AC/DC power unit, switch on the back panel master power switch (if it was not already in the upper position). Next, push the power switch, after which the opening screen will briefly display the AOR logo, model number, firmware version and make a short “beep” sound. This start-up sequence is a factory default and can not be altered.

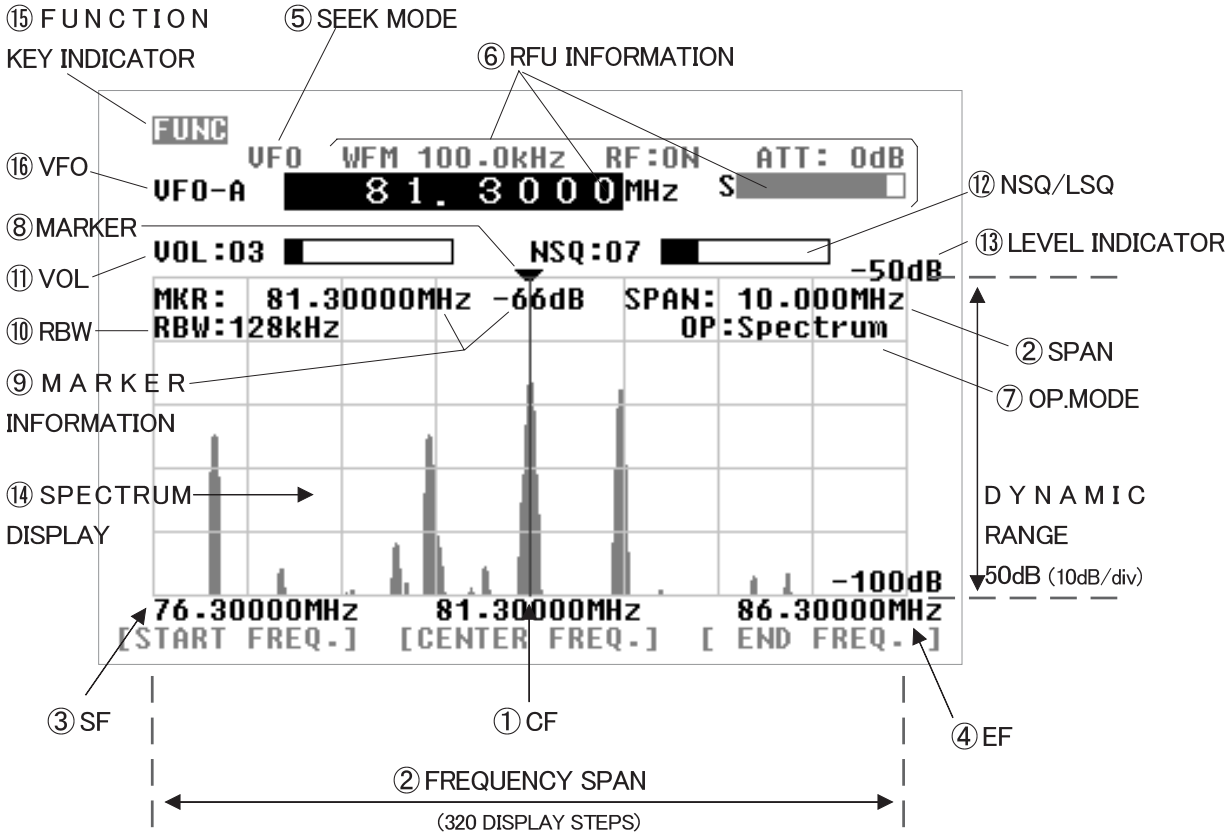
POWERING DOWN

To switch off the SR2000, press the power switch a second time, the switch latches outward and the unit will power down. During the powering down process, please make sure not to switch off the master power switch or to unplug the AC/DC power unit at the same time. Interfering with the regular powering down process might dammage the SR2000.

4. Display & key operation

4-1. Display screen sample

This section explains what you can expect to see on the SR2000 monitor screen using the VFO seek mode, in the spectrum operation mode.



① CENTER FREQUENCY (CF)

The centre frequency reading is shown in MHz, providing a minimum resolution of up to 10Hz.

② FREQUENCY SPAN (SPAN)

The total frequency spread from the left through centre to the right is referred to as the total SPAN. The maximum is 10MHz and minimum is 0.160MHz (160kHz). The horizontal scale is divided into 320 increments (steps).

③ START FREQUENCY (SF) ④ END FREQUENCY (EF)

Displays the start/end frequency for calibration purposes. Usually these frequencies are calculated based on the centre frequency and bandwidth selected, but in certain menus can be direcly programmed.

⑤ SEEK MODE

Displays the SEEK mode. In this case: VFO mode. Other modes are: MEMORY READ, MEMORY SCAN, SEARCH and FFT SEARCH.

⑥ RFU INFORMATION

Displays the following RFU information: Monitored frequency, receive mode, frequency step size, signal intensity, RF amplification state, and attenuation level.

⑦ OP.MODE (OPERATION MODE)

Displays the opearation mode of the spectrum display. There are 3 modes:

Spectrum : Spectrum analyzer mode
StepReso. : Step resolution mode
Channel : Channel scope mode

⑧ MARKER ⑨MARKER INFORMATION

The marker (8) is a vertical line drawn on the LCD which can be moved accross the horizontal axis. The marker is capable of providing the instantaneous reading of information where the marker is placed such as frequency or signal strength of marker location. In the marker menu, in addition to the instantaneous reading of marker information, the peak search facility is provided. Any signals which are out of scale cannot be read. It is necessary to adjust the gain for input signal level.

⑩ RBW (RESOLUTION BANDWIDTH)

The sampling filters may be selected from four bandwidths of 4kHz, 32kHz, 64kHz and 128kHz.

⑪ VOL (VOLUME AT AF LEVEL)

Volume level indicator which represents the audio output through the rear panel external speaker and headphones sockets. When turned clockwise the volume can be set from level 0 to72 (maximum). Beware of excessive volume level when using the headphones.

⑫ NSQ/LSQ

Displays the squelch setup. NSQ stands for noise squelch and LSQ for level squelch. Levels range from 00 to 72.

⑬ LEVEL INDICATOR ⑭SPECTRUM DISPLAY

The X-axis (horizontal line) indicates frequency and Y-axis (vertical line) the signal strength, so the frequency spectrum of the received signal is indicated on the screen. The Y-axis is split into five segments with each segment representing 10dB. The level indicator reads the input sensitivity which is shown along the Y-xis and the level is adjustable in six levels by altering the built-in amplifier (amplitude). The X-axis is split into eight segments indicating the frequency span (bandwidth) in use. The marker is designed to move across one segment by ONE full rotation of the main dial.

⑮ FUNCTION KEY INDICATOR

"FUNC" appears when the FUNC key is pressed. This key enables activation of the second function keys.

⑯ VFO

The SR2000 has a NINE VFO system being identified from VFO-A to VFO-I. Displayed on the left page example is VFO-A.

RELATIONSHIP BETWEEN FREQUENCY SPAN AND FREQUENCY STEP

The LCD provides high resolution of 320 steps from the left to right edges of the screen X-axis. A frequency bandwidth represented by one step is calculated as SPAN÷320. This is done automatically by the SR2000 in the Spectrum Analyzer and Step Resolution modes. This bandwidth differs from the frequency step size displayed in the ⑥ RFU information!

RESOLUTION BANDWIDTH

The sampling filters may be selected from four bandwidth between 4kHz and 128kHz. The smaller bandwidths will provide greater detail of individual signals but wanted transmissions are easier to initially identify using a wider filter.

4-2. Key commands

The SR2000 allows user friendly operation through 20 main keys, 3 basic operation keys and 3 soft keys. The selected functions are displayed on the LCD screen. The table below describes the functions allocated to each of the main keys and the basic operation keys.

KEYS	FUNCTIONS
1～9, 0, .(period)	As entered
FUNC + 1	[FFT] FTT search
FUNC + 2	[SRCH] search mode
FUNC + 2 press	[SRCH] search bank input, settings
FUNC + 3	[SCAN] memory channel mode, memory scan
FUNC + 3 press	[SCAN] memory channel input, settings
FUNC + 4	[VFO] VFO mode, VFO switch
FUNC + 5	[S SCAN] select scan
FUNC + 6	[S SET] select memory set
FUNC + 7	[PRIO] monitoring priorities
FUNC + 7 press	[PRIO] monitoring priorities settings
FUNC + 8	[DEL] deletion of memory channels and search banks
FUNC + 9	[CONFIG] SR2000's overall configuration
FUNC + .	[OFFSET] monitoring offset settings
FUNC + . Press	[OFFSET] offset frequency settings
FUNC + 0	[OBS] operation mode selection
MODE	[MODE] receiving mode selection
FUNC + MODE	[PASS] pass frequency settings
FUNC + MODE press	[PASS] pass frequency browser
STEP	[STEP] step frequency settings
FUNC + STEP	[SPN/STP] frequency span, frequency step settings
ATT	[ATT] attenuator settings
FUNC + ATT	[WATER] waterfall display
RBW	[RBS] resolution bandwidth input
FUNC + RBW	[OPE] calculation facility
CLR	[CLR] clear, back space key
FUNC + CLR	[A.CLR] all clear, erase a sequence
MK.F	[MK.F] marker selection, CF settings
FUNC + MK.F	[MKR] marker mode selection
kHz	[kHz] to validate in kHz
FUNC + kHz	[AMP] input sensitivity (amplitude) settings
MHz	[MHz] to validate in MHz, "enter" key
MHz press	Input in memory channel
VOL/MUTE	Select the dial as a volume knob
VOL/MUTE press	Mute the sound (AF level)
FUNC + VOL/MUTE	Mute the sound (AF level)
SQUELCH/MONI	Select the dial as a squelch knob
SQUELCH/MONI press	Open the squelch
FUNC + SQUELCH/MONI	Open the squelch
FREQ./MKR	Select the dial as a frequency tuning knob
FREQ./MKR press	Select the dial as a marker tuning knob
FUNC + FREQ./MKR	Select the dial as a marker tuning knob

5. Monitoring modes

5-1. Basic operations - VFO mode (manual mode)

This describes the SR2000 in the most commonly used VFO mode. This mode allows manual input of the center frequency.

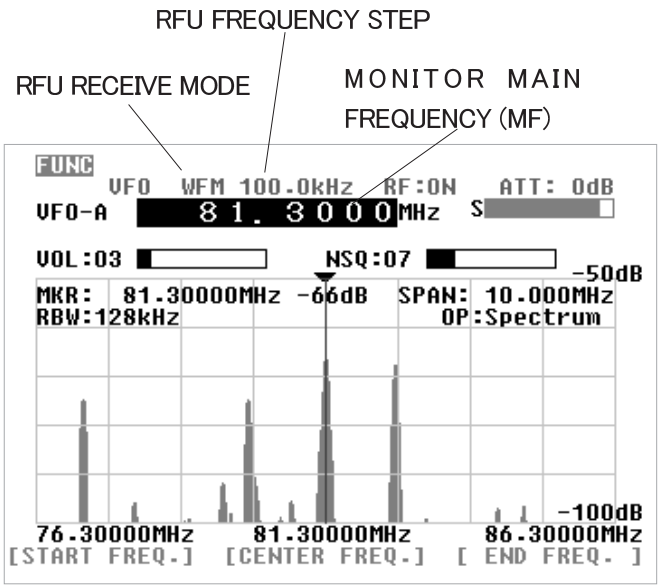
5-1-1. Setting up the monitoring frequency

The SR2000 follows the rule:

Monitor main frequency (MF)= Center Frequency (CF)

In the Spectrum Analyzer or Step Resolution modes, you can input the frequency directly through the keypad, followed by the MHz key to complete the sequence.

In addition, the receiver may be tuned using the rotary dial. In the plot below (with the frequency selected in reverse contrast), the frequency step size applying is the RFU FREQUENCY STEP.



By pushing the soft key below [CENTER FREQ.] on the LCD, the center frequency is selected and can be adjusted using the rotary dial.

Ten-key input of the main frequency:
Input the frequency in MHz format using the numeric pad, then push the

MHz key to validate.

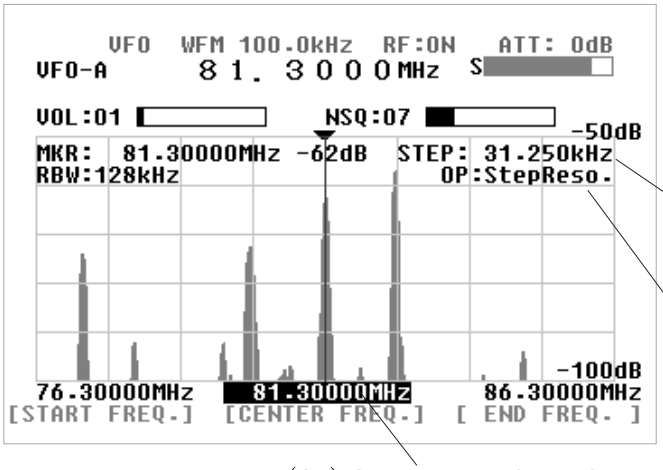
Rotary dial frequency step size.
Once the frequency on the LCD is selected, the frequency step applying is the RFU FREQUENCY STEP.

If the [CENTER FREQ.] is selected, the frequency step applying is the display step.

In the plot on the left, the frequency step would be 31.250kHz.
(10MHz ÷ 320 = 31.250kHz)
This value is not displayed in the Spectrum Analyzer Mode.

Rotating the dial clockwise increases the frequency, rotating it anti-clockwise decreases it.

In the diagram below, the Step Resolution Mode is active. The center frequency being selected (in reverse contrast), the dial does now control the display step.



DISPLAY STEP SIZE

STEP RESOLUTION MODE

(CF) CENTER FREQUENCY IN REVERSE CONTRAST

When the center frequency (CF) is selected and controlled with the dial, the monitor main frequency (MF) stays the same on display. In this case:

MF ≠ CF.

Press the FREQ key to reassign the frequency control to the dial.

START AND END FREQUENCY INPUT

Press the soft key below [START FREQ.] or [END FREQ.] to make the frequency display read-out appear in reverse contrast. Enter the desired start and end frequencies via the ten-keys followed by the MHz key. Although the center frequency is automatically adjusted at this time, the RFU frequency diplayed on the monitor stays the same.

SELECTING THE RFU TUNING STEP

In VFO Mode the STEP key enables the step size for tuning the receiver to be customised. Pressing the STEP key will select the tuning step in reverse contrast. Then rotate the dial to select a new step size. Validate by pressing the MHz key.

There are 13 pre-programmed step sizes as follows: 0.1, 0.5, 1.0, 2.0, 5.0, 6.25, 8.33, 9.0, 10.0, 12.5, 25, 50.0, 100.0kHz.

In addition, unusual step sizes may be entered using the numerical keypad in 0.1kHz increments. Acceptable input range is 0.1kHz to 100kHz.

To input the main frequency:

Push FREQ which will select the frequency in reverse contrast.

To input the RFU tuning step, push the STEP key,

select a new step using the dial,

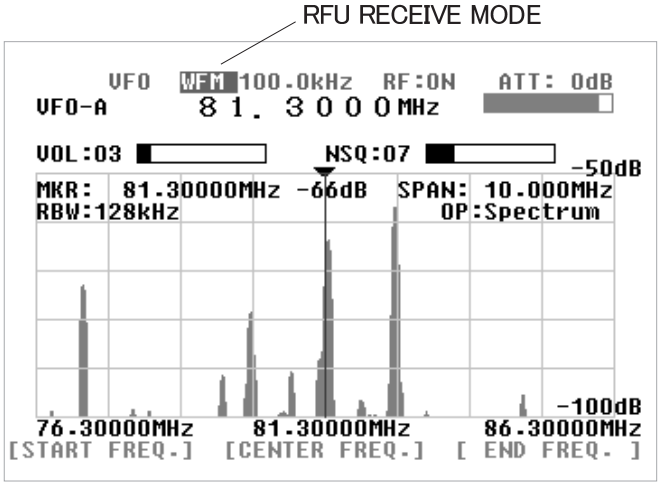
validate with the MHz key.

Or use directly the numerical keypad, then validate with the kHz key.

MODE

5-1-2. Setting up the receive mode

To change the receive mode, press the [MODE] key. The RFU RECEIVE MODE legend will be selected (in reverse contrast) on the LCD to confirm that the mode select menu has been activated. The following four modes are available: NFM, WFM, SFM, AM.



RFU receive mode set-up:

MODE Push the mode key

Select the mode with the dial

MHz Validate by pushing the MHz key.

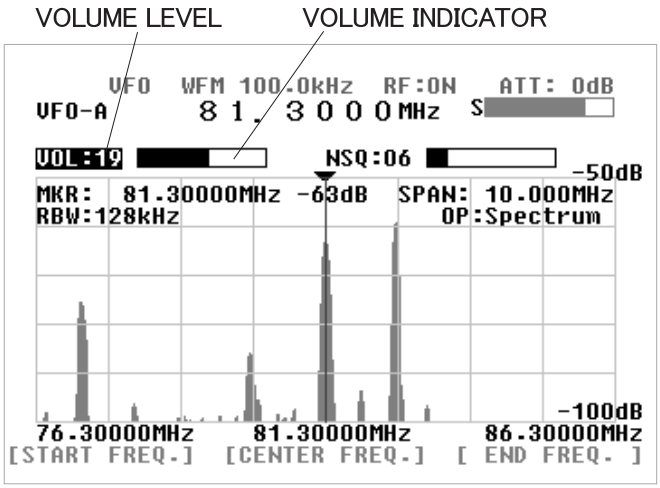
Filter bandwidth for each receiving mode:

RECEIVE MODE	IF FILTER
WFM	300 KHz
NFM	15 KHz
SFM	6 KHz
AM	6 KHz

VOL

5-1-3. AF gain (volume level) control

Pushing the [VOL] key will select the volume indictor on the LCD (in reverse contrast). Your can then adjust the AF gain by rotating the dial.



AF gain (volume level) control:

VOL Push the volume key

Adjust with the dial

The volume can be set from level 00 to 72.
To mute the sound, push FUNC and VOL, or press VOL for one second. To undo the mute, repeat the same operation.

SQUELCH

5-1-4. Squelch control

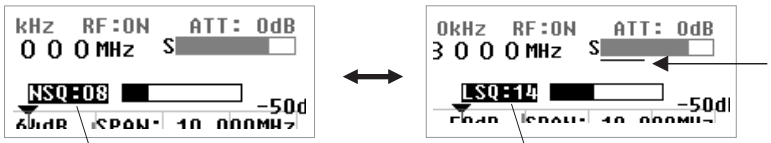
The SR2000 has two squelch types, NSQ and LSQ. NSQ stands for noise squelch and LSQ for level squelch. Pushing the [SQUELCH] key allows you to select one or the other。 Then adjust the squelch level with the dial, from level 00 to 72.。

To control the squelch level:

SQUELCH

Push the squelch key,

adjust the squelch level with the dial.



NSQ selected in reverse contrast

LSQ selected in reverse contrast

When LSQ is selected, a white line under the S-meter represents the squelch level compared to signal strength.

In both squelch modes, an "S" mark is displayed on the left side of the S-meter, whenever the squelch is OPEN.

ATT

5-1-5. RF attenuator and preamplifier settings

The [ATT] key selects the antenna attenuation level (by reverse contrast). Using the dial, you can choose between 0dB, 10dB, 20dB. Validate your choice by pushing the [MHz] key.

By selecting 10dB or 20dB of attenuation and since the attenuation occurs at antenna input level, the S-meter level amplitude will decrease proportionally, whereas the spectrum display will add that attenuated amount on screen.

The RF preamplifier can be toggled on and off by pressing the [ATT] key for one second. The change is reflected on screen by RF:ON and RF:OFF.

To change the RF attenuator settings:

ATT Push the ATT key,

adjust the setting with the dial,

MHz validate with the MHz key.

Depending on the attenuator setting, general noise floor level on display may increase.

To toggle the RF preamplifier on and off, press ATT for one second.

MUTE

5-1-6. Mute volume and squelch

Muting the sound at AF level can be done in two ways. Either by pushing the [FUNC] key followed by the [VOL] key, or by pressing the [VOL] key for one second. In both cases, the volume level display turns red to indicate that the sound is muted. To undo the mute, repeat the same operation.

To mute the volume:

FUNC + VOL MUTE

or

VOL MUTE Press for one second.

The squelch can also be muted by pushing the [FUNC] key followed by the [SQUELCH] key. When muted the squelch display turns red. To undo the mute, repeat the same operation.

To mute the squelch:

FUNC + SQUELCH MONI

AMP

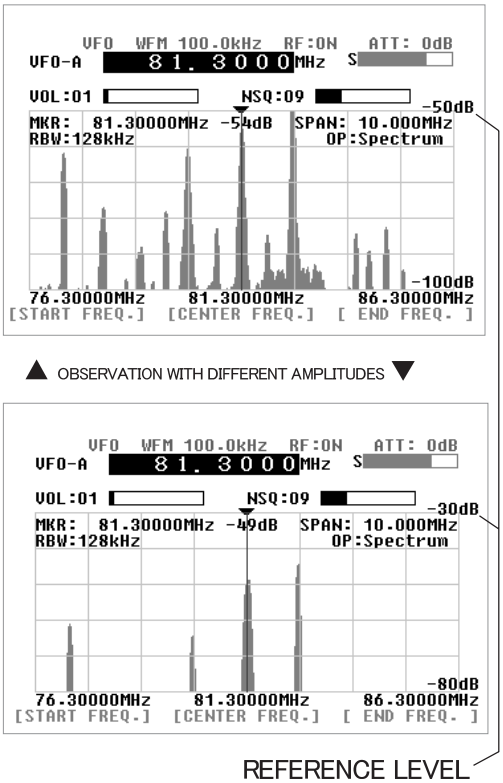
5-1-7. Input sensitivity (amplitude)

This feature refers to the setup of the input sensitivity level of the SR2000. There are 6 different levels of input sensitivity between 0dBm and -50dBm in 10dB steps. Press the [FUNC] key followed by the [kHz] key to highlight the reference level (in reverse contrast). Either adjust the level with the dial and validate with the [MHz] key, or enter the value with the numerical keys as in the example below for a reference level of -30dBm.

[FUNC] + [kHz]
[3]
[MHz]

You can ignore zeros "0" following 3 in this instance.

Any invalid entry will be alerted with a beep, and the nearest value will be automatically selected instead.



RBW

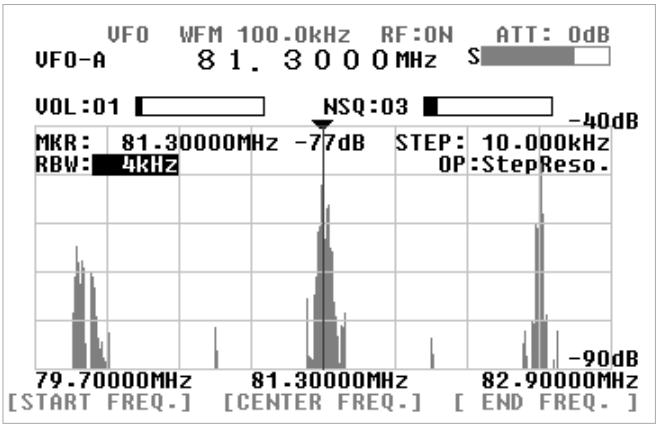
5-1-8. Resolution bandwidth （RBW）

The sampling filters may be selected from four different band-widths of 4kHz, 32kHz, 64kHz and 128kHz.

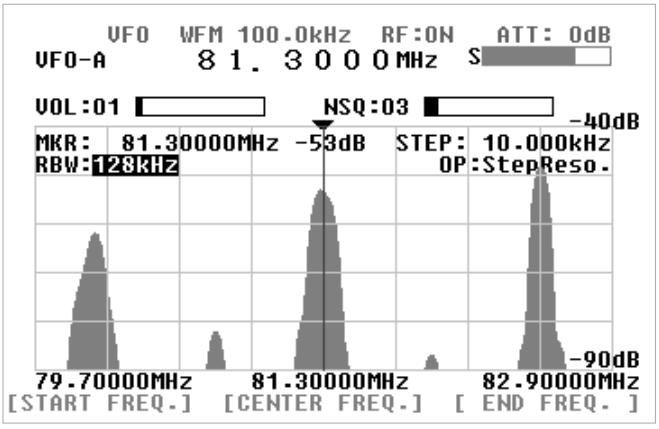
Press the [RBW] key to make the RBW display appear in reverse contrast. Rotate the main dial to select the desired value followed by [MHz] to complete the selection sequence.

The two plots here show the results from monitoring the same signal (81.3MHz WFM) but using 4kHz and 128kHz RBW bandwidths respectively. With the narrower RBW, the finer signal signal activity can be observed. With the wider RBW bandwidth the resolution becomes coarse but it can be more suited for signals with wide bandwidth such as FM broadcast signals.

RBW = 4kHz



RBW = 128kHz



To setup the resolution bandwidth (RWB):

、 RBW Push the RWB key,

make your selection with the dial,

MHz validate with the MHz key.

The RBW should be chosen as appropriate for different monitoring requirements.
As the SR2000 employs modern DSP/FFT techniques, there is no difference in screen update speed irrespective of which RBW has been selected. However, selection of RBW may affect displayed signal strength.

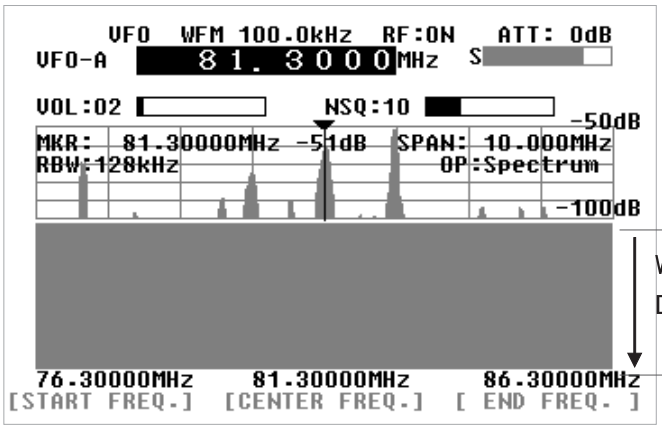
When a signal is displayed which is much wider in bandwidth than the currently selected RBW filter (for ex. WFM or digital transmissions), there will be some inaccuracy in the signal strength displayed. This is because the wider signal will loose some of its energy after passing through a narrower RWB filter.

WATER

5-1-9. Waterfall display facility

The SR2000 is equipped with a waterfall facility which can display the variation of signal strengths in conjunction with the time lapsed (as sweeps progress). Sixteen different colours are employed dependant on signal strength, in the shape of a watwerfall. Press the [FUNC] key followed by the [ATT] key to start the waterfall display. To exit the waterfall display, repeat the key sequence [FUNC]+[ATT] or press the [CLR] key.

This function can only be used in the VFO and memory read modes.



To start the waterfall display:

WATER

FUNC + ATT

Signal strength corresponds to the height of each signal in the vertical scale. Therefore the color will vary when the input sensitivity (amplitude) has been altered in the course of monitoring.

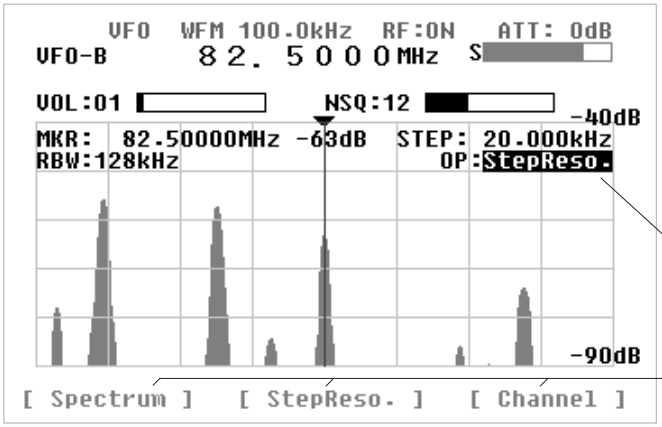
red
yellow
green
light blue

Waterfall colour corresponds to the vertical height.

Signal display is scrolling downward as the time progresses.

5-1-10. Selecting the operation modes

The SR2000 has 3 different operation modes which can be selected by pushing the [FUNC] key followed by the [0] key. The soft keys give below the screen give you access to each corresponding mode. The channel scope mode is only available in the VFO seek mode.



To select the operation mode menu:

OBS

FUNC + 0

Then select one of the three modes by pushing the corresponding soft key.

OPERATION MODE TYPES:

- Spectrum analyzer (Spectrum)
- Step resolution (StepReso)
- Channel scope (Channel)

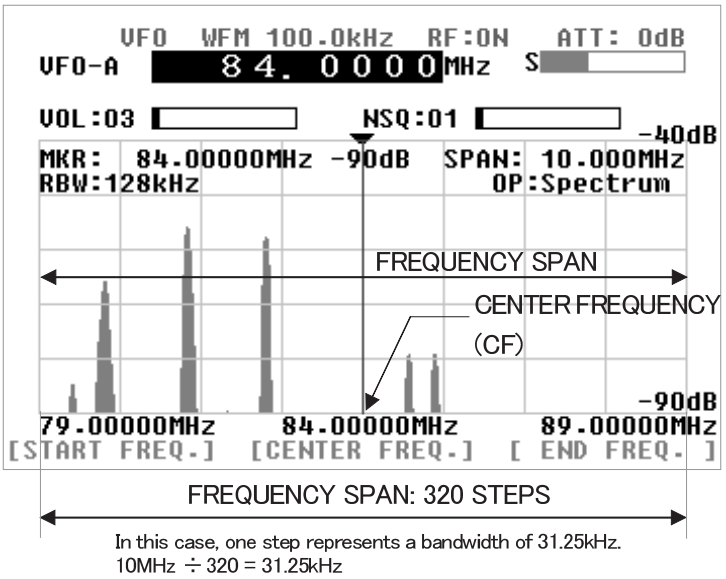
5-2. Three different operation modes

The SR2000 has three operation modes to generate a spectrum display: The Spectrum Analyzer mode, the Step Resolution Mode and the Channel Scope mode.

5-2-1. Spectrum analyzer mode

The plot on the right pictures the following signal data:

Center frequency (CF)=84.0MHz
Frequency span= 10.0MHz
Start frequency= 79.0MHz
End frequency= 89.0MHz
Step bandwidth= 31.25kHz
(the step bandwidth is not displayed)



Center frequency (CF)

Press the [CENTER FREQ.] soft key to make the center frequency display read-out appear in reverse contrast. Enter a desired frequency via the ten-keys followed by the MHz key, this is now the center frequency.

SPN/

Frequency span (SPAN)

Press [FUNC] followed by [STEP] to reverse the contrast of the SPAN numeric display. Enter the frequency span over which you wish to monitor, using the ten-keys followed by the kHz or MHz key to confirm the entry. The display step will be automatically calculated but the value is not displayed on the LCD.

Start and end frequencies

The START and END frequency can be entered in the same manner as the centre frequency entry using the assigned soft keys, ten-keys and [MHz] key. The main dial is not valid for the entry.

The CF = MF principle

In the spectrum analyzer and step resolution modes,

Main frequency = Center frequency

When the center frequency is altered using the ten-keys or the dial, the main frequency is changed accordingly.The center frequency becomes the main frequency.

Step bandwidth

In the spectrum analyzer mode, the bandwidth value per step is not displayed on the LCD.

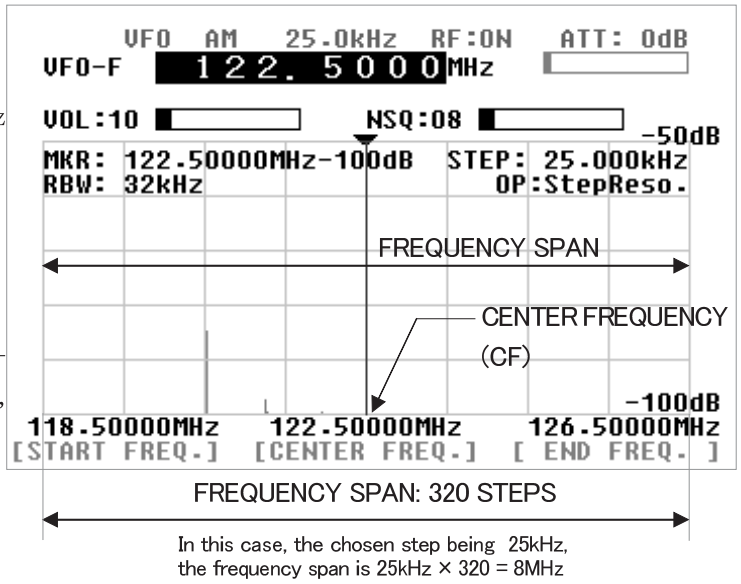
Display frequency span(MHz) is obtained by the following formulae:
CF ± (frequency span ÷ 2)
=84 ±(10 ÷ 2)
=84MHz ± 5MHz

5-2-2. Step resolution mode

The plot on the right pictures the following signal data:

Center frequency (CF)= 122.5.0MHz
Step bandwidth= 25.0kHz
Start frequency= 118.5MHz
End frequency= 126.5MHz
Frequency span= 8MHz

The frequency span value is automatically calculated by the display step, but does not appear on the screen.



Center frequency (CF)

Press the [CENTER FREQ.] soft key to make the center frequency display read-out appear in reverse contrast. Enter a desired frequency via the ten-keys followed by the MHz key, this is now the center frequency.

/STP

Display step

Press [FUNC] followed by [STEP] to reverse the contrast of the STEP numeric display. Enter the frequency step size, using the ten-keys followed by the kHz or MHz key to confirm the entry. The display step will automatically calculate the SPAN but the value is not displayed on the LCD.

Start and end frequencies

The START and END frequency can be entered in the same manner as the centre frequency entry using the assigned soft keys, ten-keys and [MHz] key. The main dial is not valid for the entry.

Effective frequency coverage

The center frequency (CF) must be within the frequency coverage of the SR2000 (25MHz-3000MHz). If exceeded, monitoring will be impossible.

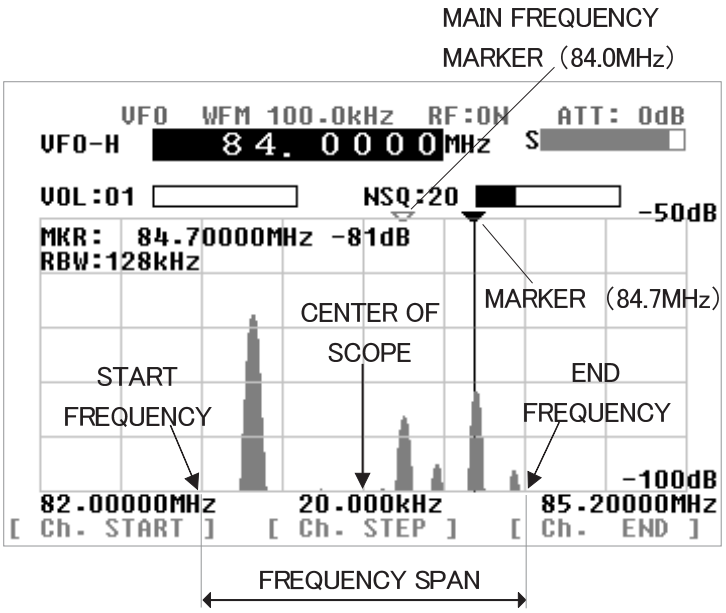
Display frequency span(MHz) is obtained by the following formulae:
CF ± (display stepx160)
=122.5 ±(25x160)
=122.5MHz ± 4MHz

5-2-3. Channel scope mode

The plot on the right pictures the following signal data:

Start frequency= 82.0MHz
Display step= 20.0kHz
End frequency= 85.2MHz
Frequency span= 3.2MHz
Marker frequency= 84.7MHz
Main frequency marker= 84.0MHz

In this mode, neither the frequency span nor the center frequency values appear on the screen.



Start frequency (Ch. START)

Press the [Ch. START] soft key (leftiest key below the LCD) to make the start frequency read-out display appear in reverse contrast. Enter a desired frequency using the ten-keys, which is the lowest of the frequency spread you wish to monitor, followed by [MHz] to confirm.

Step frequency (Ch, STEP)

Press the [Ch. STEP] soft key (middle key below the LCD) to make the step frequency display read-out appear in reverse contrast. Enter the desired step frequency using the ten-keys, followed by [kHz] or [MHz] to confirm.

End frequency (Ch. END)

Press the [Ch. END] soft key (rightiest key below the LCD) to make the end frequency read-out display appear in reverse contrast. Enter a desired frequency using the ten-keys, which is the highest of the frequency spread you wish to monitor, followed by [MHz] to confirm.

MKR **Marker and main frequency marker operation**

When the channel scope mode is activated, monitoring begins on the start frequency. Push the [FUNC] key followed by the [FREQ.] key and rotate the dial to move the white marker onto the signal of your interest, then press the [MK.F] key. The yellow receive marker moves to the nominated position and the SR2000 monitors the wanted frequency.

The channel scope mode functions only in VFO mode. Moreover, if the VFO is switched, setting information will be lost and the operation mode will change to spectrum analyzer mode.

The end frequency (Ch. END) is confined by the formulae:

(Ch.START) + [(CH.STEP) × 160] or
(Ch.START) + 5MHz
(Ch.START) + >0.16MHz

For this reason, if you do not enter an END frequency, the SR2000 will automatically select an appropriate end point.

Invalid entry for the end frequency will be alerted with a beep and the closest possible valid frequency will be automatically chosen by the SR2000. The same happens with any invalid entry of frequency.

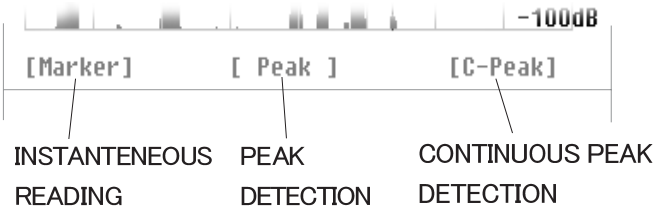
MKR

5-3. Marker – 3 functions

The SR2000 has a marker facility. The marker is often used to obtain the reading of the frequency of interest. In addition to the instantaneous reading, it provides the peak detection and continuous peak detection. Press the [FUNC] key followed by the [MK.F] key to place the SR2000 in to marker mode operation.

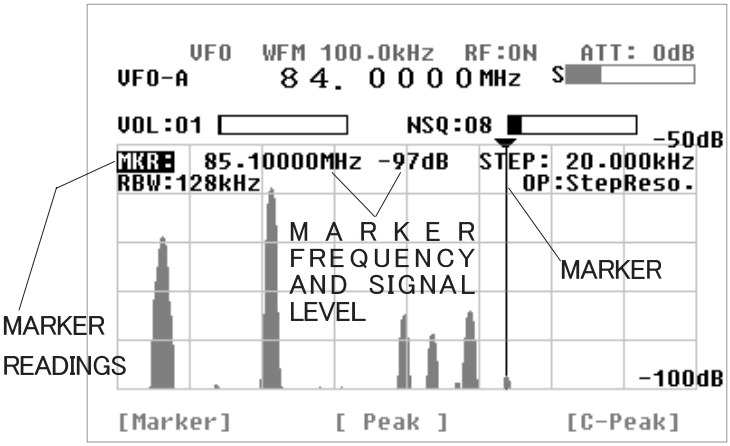
Instanteneous reading: Marker
Peak detection: Peak
Continuous peak detection: C-peak

Soft key allocations in the marker mode



Instantaneous reading (Marker: MKR)

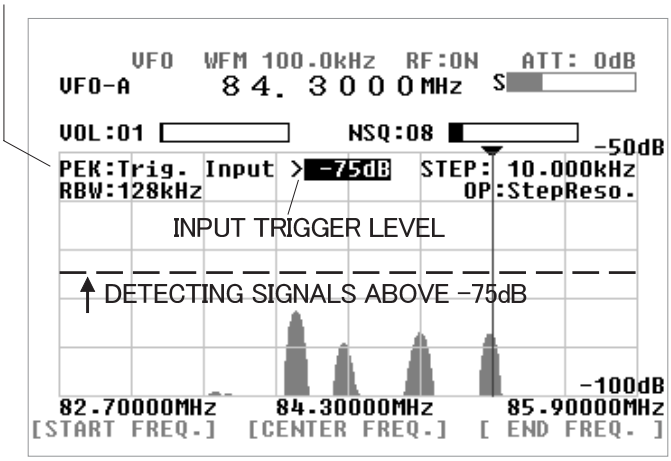
This feature is useful for many applications. The marker can be moved sideways by rotating the main dial. The LCD displays the frequency and signal strength reading where the marker is positioned.



Peak detection (Peak: PEK)

This feature is used to detect the most powerful signal while sweeping the frequency spread.

Press the [PEAK] soft key, which in turn requests a trigger level, you need to specify what level is required. Enter the trigger level via ten-keys. Only signals which are stronger than the trigger level you specified will then be subject to the peak detection. The marker will be forced to the position of the strongest signal detected and end its sweep sequence.



While no signal above the trigger level is detected, [Trig.wait...] is displayed.

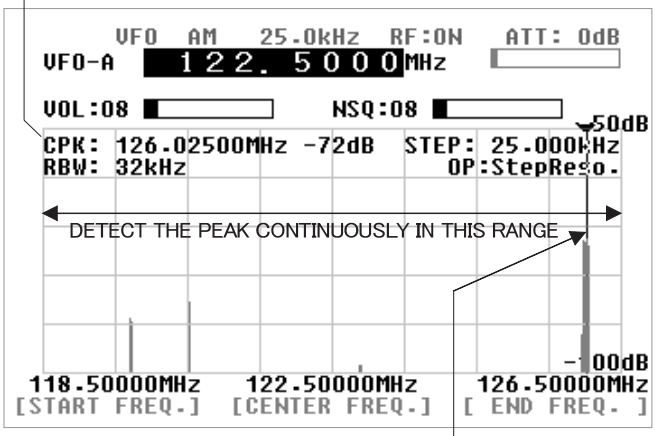
Continuous peak detection
(C-Peak : CPK)

This facility is designed to continue the peak signal detection process one sweep after another.

Press the [C-Peak] soft key to activate the facility.

There is no trigger level setup in the process.

DISPLAY OF CONTINUOUS PEAK DETECTION



THE MARKER MOVES CONTINUOUSLY TO WHERE THE PEAK HAS BEEN DETECTED, IN REAL TIME.

MK.F

Marker receiver (MK.F)

This facility is designed to force the SR2000 to receive the signal where the marker is positioned on the screen. There are slight variations in functionality monitoring mode-by-mode.

Push the [MK.F] key to access this facility.

MK → CF

In the spectrum analyzer mode and step resolution mode the key works as MK → CF (marker to center frequency) which forces the marker frequency to become the center frequency.

MK → MF

In the channel scope mode the key works as MK > MF (marker to main frequency) where the SR2000 receives the marker frequency. The start frequency, channel step and end frequency are unaffected, so will continue monitoring in the channel scope mode as configured.

[MK.F] key functions:

In the spectrum analyzer and step resolution mode, pushing the [MK.F] key does force the marker frequency to become the center frequency.

In the channel scope mode, pushing the [MK.F] key will move the marker to the strongest signal detected in the sweep process.

OPE

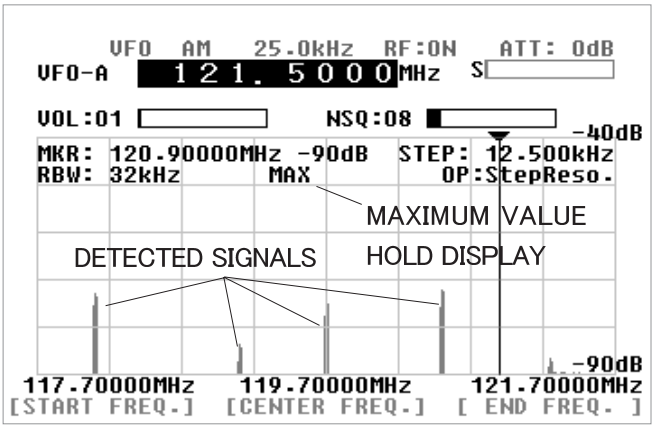
5-4. Calculation facility

Pushing the [FUNC] key followed by the [RBW] allows you to access to three calculation facilities: maximum value hold (MAX), average value (AVR) and median (MED). Each facility is then accessible through the corresponding soft key below the LCD.

Maximum value hold (MAX)

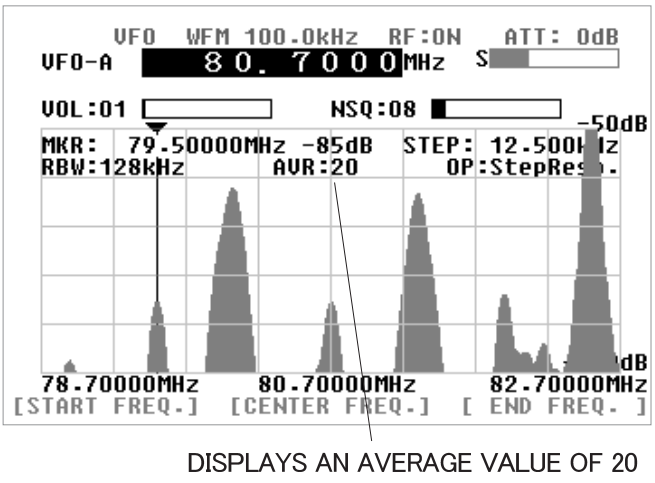
Push the [MAX] soft key to access this feature, the legend MAX will be displayed. Press the [CLR] key to exit from max hold.

With the MAX feature in use, each sweep will be retained as data and built-up until the process ends. This is particularly useful to detect intermittent signals which come and go over a period of time.



Averaged value
(AVR range: 2-31)

Push the [AVR] soft key to access this feature, the legend AVR will be displayed. You are required to enter a sampling cycle between 2 and 31 to produce averaged results.
Press the [CLR] key to exit.
This facility is designed to provide the plot pattern obtained by averaging the signals received over the sampling cycle.
A stable signal pattern is produced even if the signal is fluctuating in strength.



Median
(MED range: 2-4)

Push the [MED] soft key to access this feature, the legend MED will be displayed. The plot is designed to provide signal pattern based over a sampling cycle of between 2 and 4 and is useful to plot impulse noise. The sampling cycle can be entered via the ten-keys followed by [MHz].
Press the [CLR] key to exit.

Example:
For a display step = 10khz, a median = 2, and a frequency of 50MHz:
50MHz-10kHz = 49990kHz
50MHz+10kHz = 50010kHz
The value showed on the dB axis at 50MHz will be the average of the three values for the 3 frequencies.

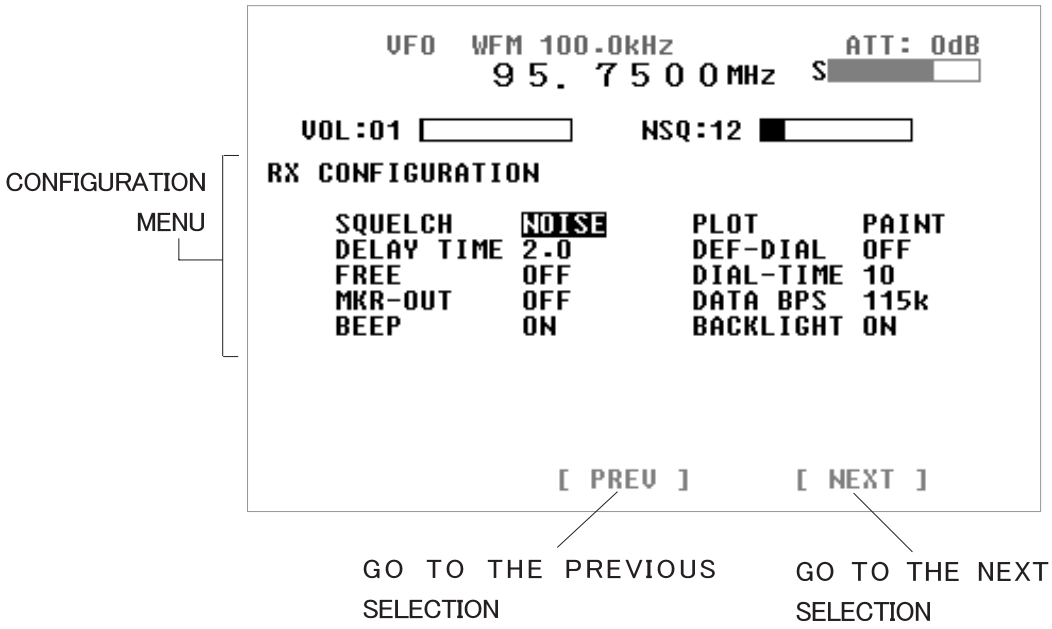
CONFIG

6. Configuration

Clicking on the [FUNC] key followed by the [9] key allows you to access the SR2000's configuration menu. This menu is used to set fundamental operating parameters.

To access the configuration menu:

FUNC + CONFIG 9



Use the [PREV] and [NEXT] soft-key to move from one selection to the other. Once the desired selection is appearing in reverse contrast, turn the dial to do any changes as needed, and push the [MHz] key to go to the next selection. Beware that your changes have not been saved so far! Once you have finished the desired configuration changes, press the [MHz] key for one second to save all your settings and to return to the previous screen you were at before entering the configuration.

Press the [CLR] key to escape from the configuration menu without saving your changes. You will return to the screen you used before entering the configuration.

Use the [PREV] and [NEXT] soft keys to go to the desired selection. Turn the dial to apply changes.

To go to the next selection, push the MHz key.

To save all your changes、 press the MHz key for one second.

To escape from the configuration without saving any changes, push the CLR key.

SQUELCH

Sets the default squelch type (noise squelch or level squelch) on display. Although default is NOISE, the squelch type can also be changed during normal operation.

DELAY TIME

Sets the delay in seconds, between squelch closing and scan restart. Default setting is 2. Setting possibilities are "OFF" (scan resumes immediately), a range from 0.1 ～ 9.9, and HOLD (does not continue scan).

FREE

Sets the delay in seconds, between the squelch opening and scan restarts. Default is OFF. Setting possibilities are OFF and 0.1 ～ 9.9.
This feature is rarely used and should be let to OFF.

MKR-OUT (marker data output)

The frequency and signal level which the marker is reading, can be output as data to the serial port. "ON" enables this feature. Default setting is OFF.

BEEP

The SR2000 emits confirmation "beeps" while the keypad is used. Default is beep ON.
Variable beep volume levels are not available.

PLOT (drawing mode setup)

Set to PAINT as default. The OUTLINE setting has the monitor only drawing the outline of the displayed wave.

DEF-DIAL (dial automatic return)
DIAL-TIME (dial return timing)

The dial is used to tune 4 main functions which are frequency (FREQ), marker (MKR), squelch (SQL) and AF gain (VOL). The DEF-DIAL selections allows to set one of the four functions as dial default, to which it returns after a given time. This time in seconds can be set with the DIAL-TIME selection, anywhere between 1 and 30 seconds. Default DEF-DIAL setting is OFF, therefore the dial always keeps the function you have assigned to it.

DATA BPS (data transfer speed)

Used to configure the RS232 computer control port speed. Following speeds are available: 115k、57.6k、38.4k、19.2k, 9600k. Default speed is 115k.

BACKLIGHT

Switches the LCD screen backlight on and off. Beware that setting it to off would render the screen unreadable and it is higly advised to keep the default ON position. The OFF feature is for some professional use of the SR2000.

During your access to the SR2000 configuration menu, the only ongoing receiving functions which can be altered at this time are the AF GAIN (volume) and SQUELCH.

FACTORY DEFAULT/RESET: If you wish to revert the SR2000 to default status, power-on the SR2000 via the front panel power switch while holding-in the 3 and 6 keys together until the opening message EEPROM initialized is displayed.

SCAN

7. Memory channels

The SR2000 features 1000 memory channels (100 channels in each of the 10 banks). Push the [FUNC] key followed by the [3] key to access the “memory read” mode.

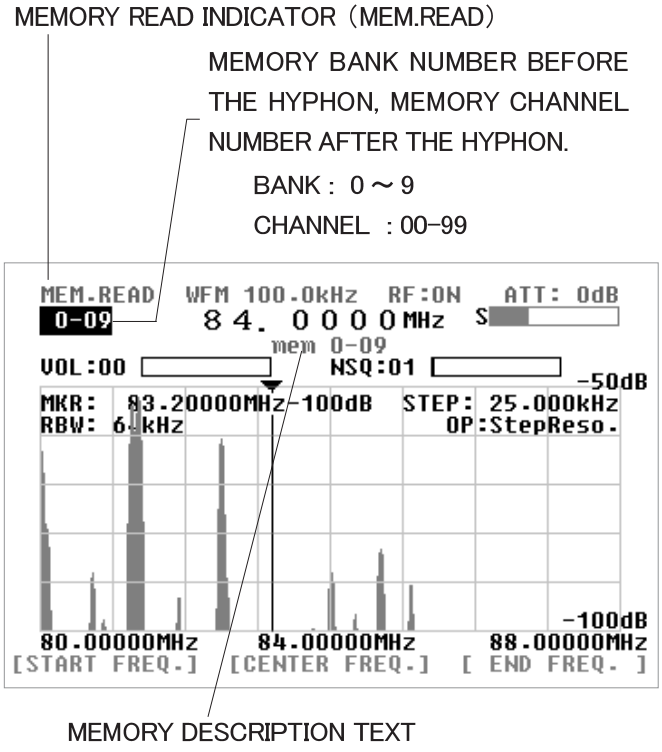
To access the Memory Read mode:

FUNC + SCAN 3

7-1. Memory read mode

Once you enter the “memory read” mode, the screen looks like the plot on the right. Beware that you can not enter in this mode unless at least one frequency has previously been stored in a memory channel. (As described in paragraph 7-3)

First, select the desired memory bank and channel using the numerical keys. The first single digit number will be the bank and the second 2 digit number will be the channel. If you enter an uncorrect parameter, an error beep will sound.



Alternatively you can use the dial to select the desired bank number and channel.
In case the memory bank/channel indicator is not selected by reverse contrast, push the [FREQ.] key to select it.

Bank switching like on a common scanner is not possible.

Input by ten-keys

For example you would like to recall the memory bank “0” with the memory channel “09”:
Push the keys [0] [0] [9].

By turning the dial, either left or right, browse through the existing memory banks/channels.

To select the memory bank/channel by reversed contrast:
Click the FREQ. key.

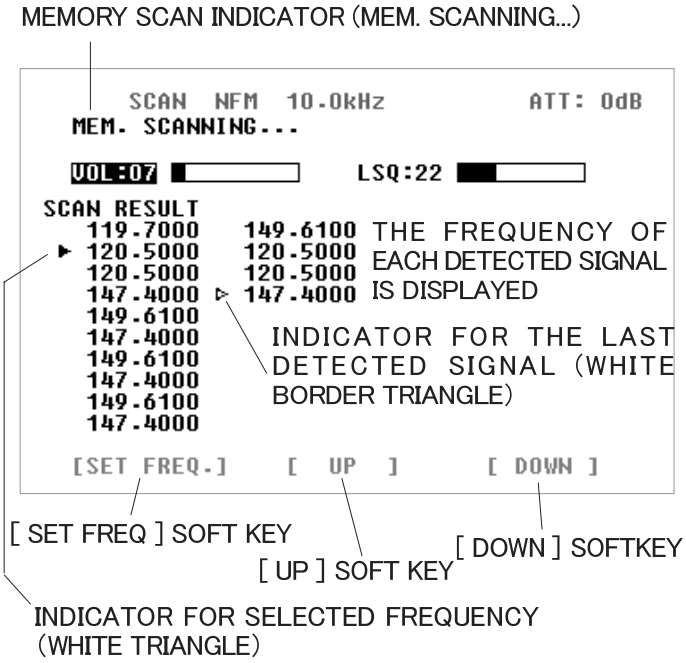
Concerning the display in the memory read mode:

In the memory read mode, the display type and available functions are those of the VFO mode. However when memory scan is activated (see below), the spectrum display is not active.

SCAN

7-2. Memory scan

To scan the frequencies which are stored in the bank/memory channels, push again the [FUNC] function key followed by the [3] key. As in the plot on the right, the frequencies of the detected signals (according to squelch settings) are listed up on the screen. Up to 40 frequencies can be displayed at once on the screen. The screen is overwritten from the 41th frequency. The displayed (max. 40) frequencies are stored until the operation mode is changed (such as VFO) or the screen is overwritten with new frequencies, or the power is switched off.



This memory scan behavior does depend on the squelch delaytime (between squelch closing and scan restart) set in the "configuration menu" in paragraph 6. If you wish to bypass the configured delay settings, press the [MHz] key to force detection to the next higher frequency, or [kHz] to the next lower frequency.

You can pick-up any of the detected freqencies and copy it to the VFO screen for live analysis. To do so, select the desired frequency with the white triangle by using the [UP] and [DOWN] soft keys, then push the [SET FREQ.] soft key . The VFO mode will be in the same state than just before you sentered the memory scan mode.

To force the next signal detection:

MHz Key for scanning UP.

kHz Key for scanning DOWN.

To copy a frequency to the VFO mode:

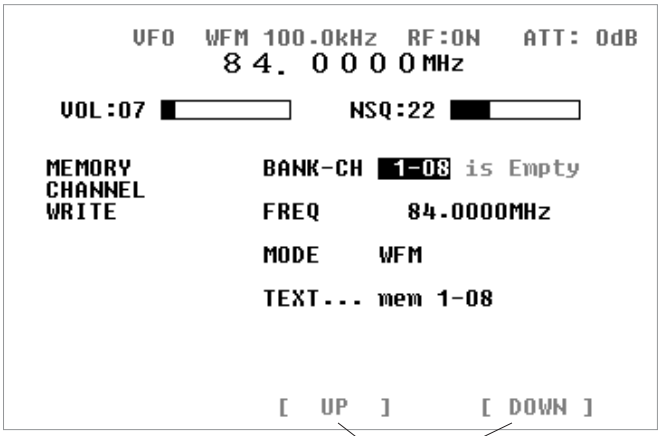
Select it with the [UP] or [DOWN] soft keys.
Push the [SET FREQ] soft key.

7-3. Programming the memory

To access the memory programming page, press the MHz key for two seconds.

In either the VFO mode or the Memory Read mode, access the memory programming page by pressing the [MHz] key for two seconds, or by pushing the [FUNC] key followed by the [3] key. Use the [UP] and [DOWN] soft keys to scroll through the page.

EXAMPLE OF THE MEMORY PROGRAMMING PAGE



TO SCROLL THROUGH THE PAGE

Bank channel (BANK-CH)

An available bank and memory channel are automatically selected (bank 0 by default, as long as there are available channels). It is possible to choose another bank/channel with the ten-keys.

Frequency (FREQ)

The frequency automatically displayed is the one which was active in your previous VFO mode. You can input any other frequency with the ten-keys followed by [MHz].

Select any frequency frequency with the ten-keys and validate with the [MHz]

Reception mode (MODE)

The automatically displayed Reception Mode is the one which was active in your previous VFO mode. You can choose another mode with the dial, followed by the [MHz] key.

To select the Receive Mode:

Turn the dial and validate your choice with the [MHz] key.

Memory text (TEXT)

If desired, a twelve characters text can be associated with your selected frequency. Consult the following paragraph 7-4 about how to input such a text.

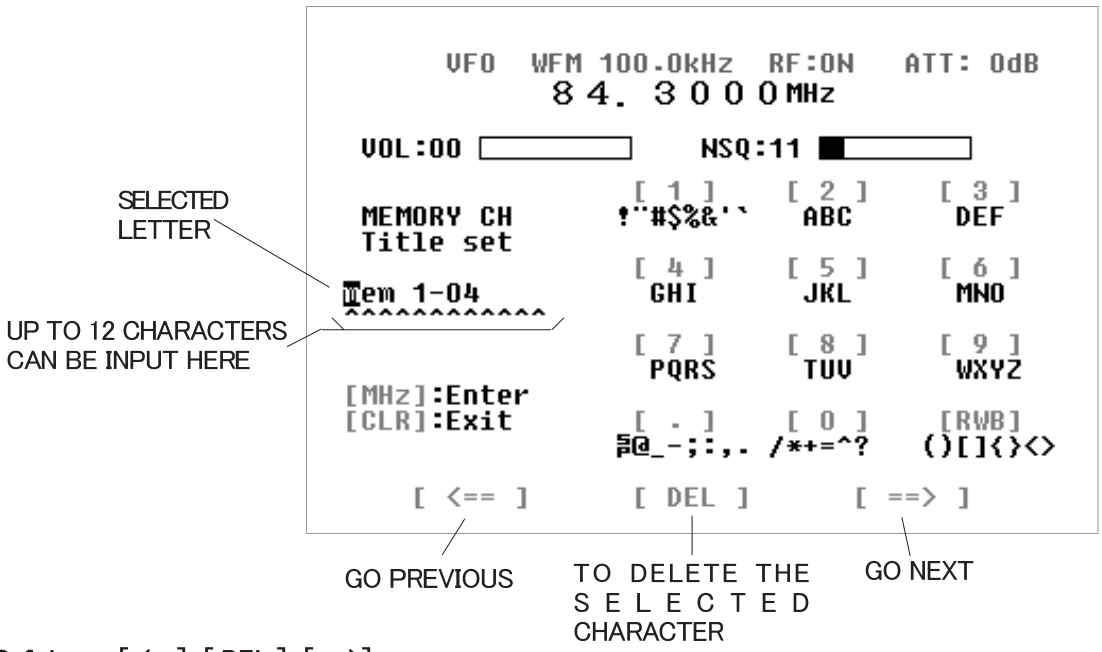
To save all your selections, press the MHz key for two seconds.

To leave this screen without saving any changes, push the CLR key.

7-4. Memory text input

A twelve characters text can be assigned to each memory channel. To access the memory text screen, push the [MHz] key when the "TEXT" line is selected by reverse contrast in the memory programming screen (as plotted in previous paragraph 7-3).

(▼) MEMORY TEXT INPUT SCREEN



Soft keys [<==] [DEL] [==>]

The soft keys [<==] and [==>] allow you to go to the previous/next character, while [DEL] does delete the selected character.

Character input

A set of characters is assigned to each ten-key, as displayed on the monitor. For example is you push the [2] key, the assigned characters come as follows: A→B→C→a→b→c→2→A→ ・・・

When a different key is pushed, the cursor goes automatically to the next next character.

The text input method of the SR2000 is very similar to the one of cell phones.

Saving your changes

To save your text input, push [MHz], which will bring you to the Memory Programming page (previous paragraph 7-3). Then do not forget to press again [MHz] for 2 seconds to save all your changes.

To save your text input, push the MHz key.

To leave this screen without saving any changes, press the CLR key for two seconds.

7-5. Selected memory scanning

The Selected Memory Scanning function allows you to scan only a selection of frequencies which were previously saved as memory channels. A maximum of 100 channels whithin a bank can be scanned.

S SET

Accessing a selection (S SET)

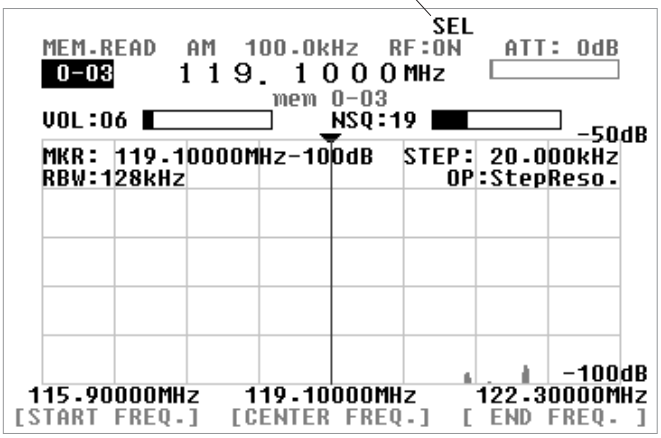
Once your are in the Memory Read mode screen as plotted on the right, the selected memory scanning mode can be accessed by pushing the [FUNC] key followed by the [6] key. "SEL" will appear on the top of the screen.

S SCAN

Activating a selection scanning (S SCAN)

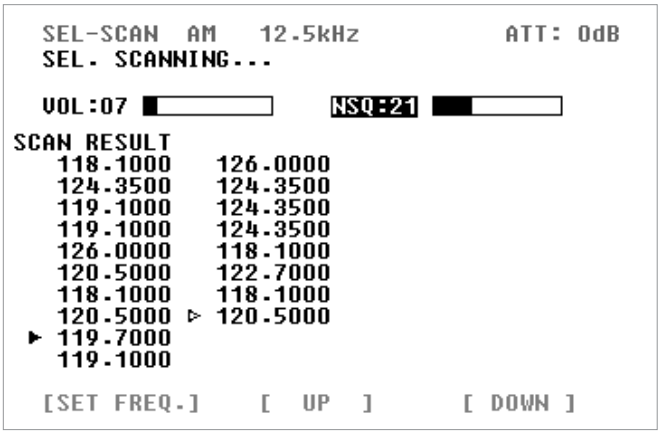
Push the [FUNC] key followed by the [5] key to activate the scanning of the selection you have previously accessed. There must be at least one channel in the memory bank, for the scanning to function.

SELECT MEMORY SCANNING INDICATOR



(▲) IN THIS EXAMPLE, MEMORY "mem 0-03" IS CHOSEN.

(▼) SELECTED SCANNING IN OPERATION



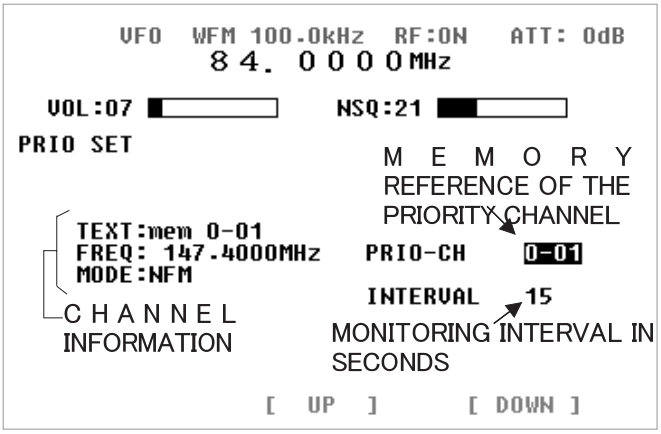
You can pick-up any of the detected freqencies and copy it to the VFO screen for live analysis. To do so, select the desired frequency with the white triangle by using the [UP] and [DOWN] soft keys, then push the [SET FREQ.] soft key.

To copy a frequency to the VFO mode screen:
Move the cursor with the [UP] or [DOWN] soft keys.
Push [SET FREQ].

PRIO

7-6. Priority monitor

The priority feature enables you to carry on scanning or monitoring while the SR2000 checks a selected frequency for activity.



(▲) EXAMPLE OF THE PRIORITY CHANNEL SETUP SCREEN

Priority set-up (PRIO)

You can access the Priority Mode set-up screen from either the VFO mode or memory read mode, by clicking the [FUNC] key, then press the [7] key for 2 seconds.

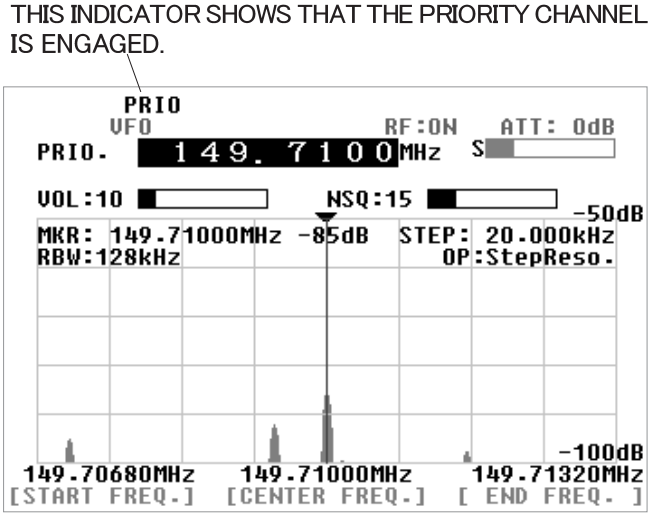
First select the memory bank/channel number (using the ten-keys) which contains the frequency you would like to be a priority channel. Then using the [DOWN] soft key, decide the interval (in seconds) at which this priority channel should be monitored. Possibilities are from 1-99 seconds. Press the [MHz] key for two seconds to save your settings, or [CLR] if you wish to leave without saving.

To save all your selections, press the MHz key for two seconds.

To leave this screen without saving any changes, push the CLR key.

Engaging the priority channel

Pushing the [FUNC] key followed by the [7] key allows you to engage the priority function. The legend "PRIO" appears on the top of the screen, indicating that the priority is "ON". The "INTERVAL" value determines how long the SR2000 will wait between the cycles before re-sampling the priority frequency for activity. If no activity is detected, the receiver returns to its previous state.



(▲) EXAMPLE OF THE PRIORITY CHANNEL DISPLAY

OFFSET

8. Frequency Offset

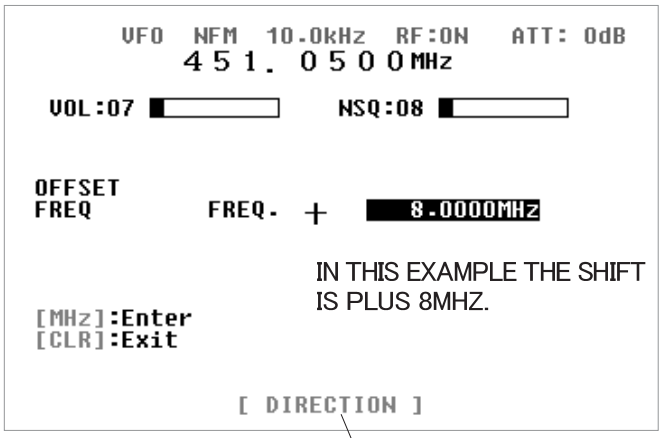
This facility enables the received frequency to be quickly shifted by pre-determined marging, which makes it easy to track duplex transmissions or check repeater inputs / outputs.

Setting up an Offset Frequency

The frequency offset menu can be accessed by pushing the [FUNC] key, followed by a two second press of the [.] key. Using the ten-keys, the offset frequency can be selected between 0 ～ 999.9999MHz.

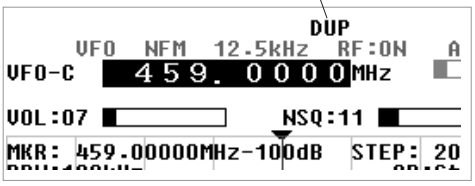
With the soft key [DIRECTION] specify whether the offset frequency is 「+」 or 「−」 the main frequency. To save your settings and to return to the previous screen, push the [MHz] key. If you wish to quit without saving, push the [CLR] key.

(▼) FREQUENCY OFFSET MENU



SWITCH BETWEEN + AND − THE VALUE.

FREQUENCY OFFSET INDICATOR



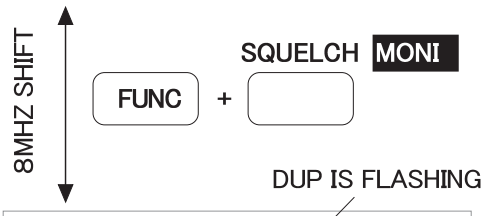
Activating frequency offset

Activation is possible only in the VFO and Memory Read modes. Push the [FUNC] key followed by the [.]. The legend "DUP" will be displayed on the top of the screen to confirm operation.

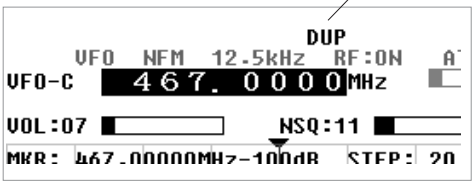
Monitoring the offset frequency

To access the offset frequency previously set, press the [SQUELCH] key for two seconds, or alternatively push the [FUNC] key followed by [SQUELCH] key.

A flashing "DUP" indicator will indicate that the offset frequency is being monitored.



DUP IS FLASHING



9. Normal & FFT Search

The SR2000 has 40 search banks (01-40) to which can be applied “normal search” as well as “FFT search”. In both cases the search bank usage is similar.

SRCH

9-1. Programming search banks

To access the search bank settings:

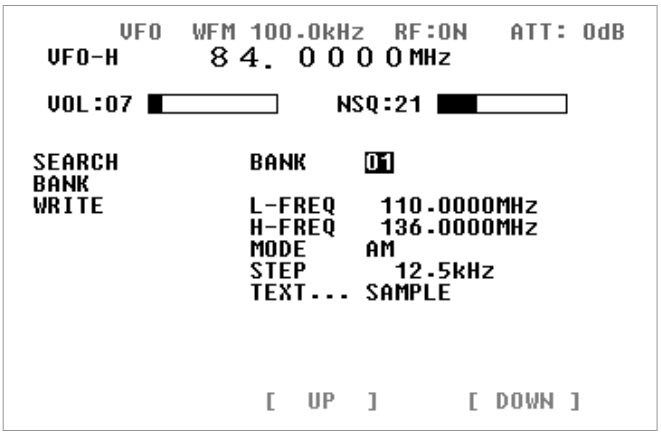
SRCH

FUNC + 2

(press for two seconds)

To access the Search Bank settings menu page, push the [FUNC] key then press the [2] key for two seconds.

Move the cursor to your desired selection with the [UP] and [DOWN] soft keys.



(▲) SEARCH BANK SETTINGS PAGE EXAMPLE

Search bank number (BANK)

Select a bank number between 01 and 40.

Lower frequency limit (L-FREQ)

Higher frequency limit (H-FREQ)

Input the search lower and upper frequency limit, validate each entry with the [MHz] key.

Reception mode (MODE)

Using the dial, select the desired reception mode, then validate with the [MHz] key.

Frequency step (STEP)

Choose here your desired frequency step in kHz with the dial, and validate your choice with the [kHz] key.

Bank text (TEXT)

You can name each search bank, as described in chapter 7-4.

To save all your selections, press the MHz key for two seconds.

To leave this screen without saving any changes, push the CLR key.

9-2. Normal search

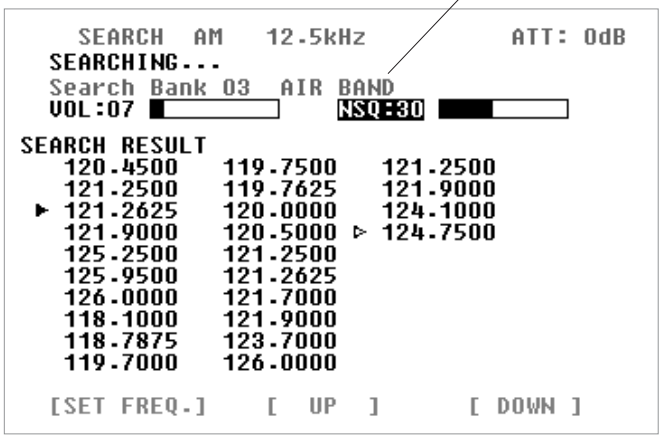
SRCH

Search (SRCH)

Activate the search with the [FUNC] key followed by the [2] key, and it will start searching in the frequency range you have specified in the search bank menu (chapter 9-1). The two digit bank channel can be changed on the fly, while search is active.

Search is resumed manually either with the [MHz] key to go up, or [kHz] key to go down the frequency range.

BANK TEXT DESCRIPTION



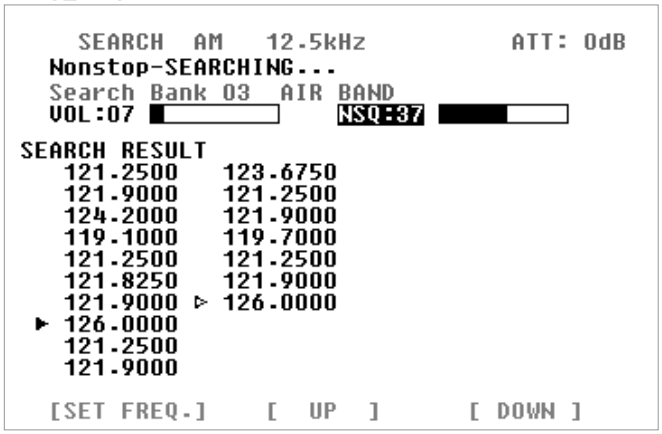
(▲) EXAMPLE OF SEARCH BANK 03 UNDER PROCESS

Nonstop search

If you push again the [FUNC] and [2] keys while the search is active (as plotted above), you will enter the "Nonstop Search" mode. The SR2000 will continuously search in the frequency range you have specified. You can exit that mode by repeating the same key strokes.

As the screen can only display 40 frequencies on one screen, new frequencies will overwrite the older ones.

(▼) SEARCH BANK 03 UNDER CONTINUOUS SEARCH



You can pick-up any of the detected freqencies and copy it to the VFO screen for live analysis. To do so, select the desired frequency with the white triangle by using the [UP] and [DOWN] soft keys, then push the [SET FREQ.] soft key .

To copy a frequency to the VFO mode screen:
Move the cursor with the [UP] or [DOWN] soft keys.
Push [SET FREQ].

9-3. Frequency pass setup

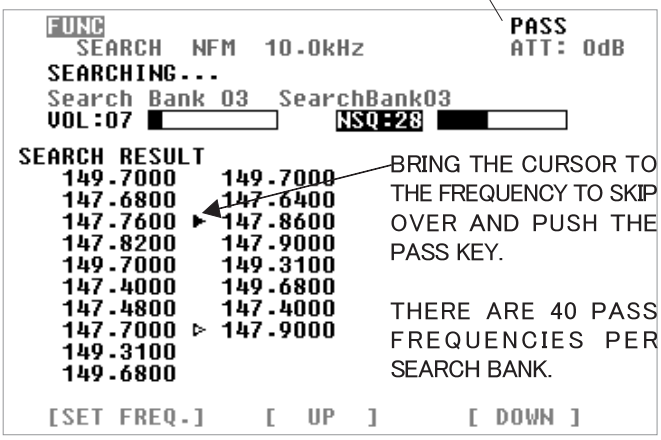
Frequency Pass allows individual frequencies to be passed so they will be skipped over when in normal search mode (including non-stop search). Each of the 40 search banks have 40 pass frequencies for a total of 1600.

While in Search Mode, push [FUNC] followed by [MODE] to access the PASS mode, then as in the plot on the right, the frequency 147.86MHz is selected from the search result list by the white triangle cursor (with the [UP] and [DOWN] soft keys), and set as a PASS FREQUENCY by pushing the [SET FREQ.] soft key.
Each bank accepts up to 40 pass frequencies. An error beep will sound if you try to register more than this maximum.。

Frequency Pass Browser Menu

In VFO mode or search mode, push the [FUNC] key followed by a two second [MODE] key press, to access the frequency Pass browser screen. There are listed all pass frequencies of the search bank number in two digits.

IF PASS FREQUENCIES ARE PRESENT IN THE SEARCH BANK, THIS "PASS" INDICATOR APPEARS.

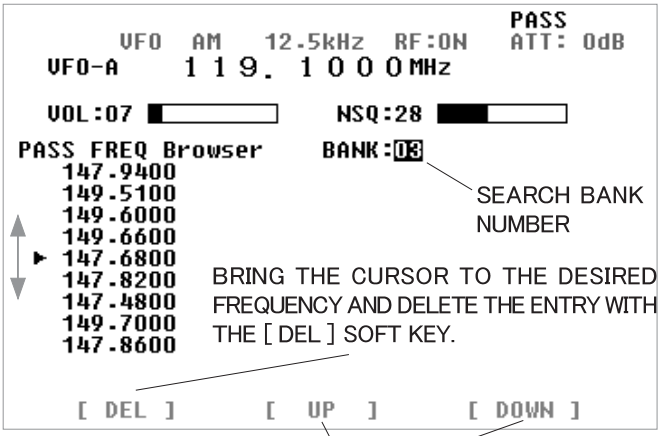


BRING THE CURSOR TO THE FREQUENCY TO SKIP OVER AND PUSH THE PASS KEY.

THERE ARE 40 PASS FREQUENCIES PER SEARCH BANK.

(▲) HOW TO SETUP A PASS FREQUENCY FROM A SEARCH RESULT.

(▼) PASS FREQUENCIES LIST (PASS FREQ Browser)



SEARCH BANK NUMBER

BRING THE CURSOR TO THE DESIRED FREQUENCY AND DELETE THE ENTRY WITH THE [DEL] SOFT KEY.

TO MOVE THE CURSOR

Delete Pass Frequencies

Use the [UP] and [DOWN] soft keys to move your white cursor to the frequency you wish to erase, and push the [DEL] soft key to delete that entry.

To leave this screen without saving any changes, push the CLR key.

9-4. FFT search

FFT search differs from regular scanning methods (one frequency/step after the other) in that it provides a spectrum "image" up to 10MHz wide, sampled six times per second.

9-4-1. Search banks and FFT search

Although the search bank basic setup for normal search and FFT search are done the same way (for L-FREQ, H-FREQ and text), in FFT search, the following parameters have to be set additionally:

- FFT Frequency step
- Treshold bar (signal detection level)

FFT SEARCH SETUP

1. Lower frequency limit (L-FREQ)
2. Upper frequency limit (H-FREQ)
3. Descriptive text

1 ~ 3 is a basic search bank setup

4. FFT Frequency step
5. Treshold bar (signal level)

4 & 5 Exclusive to FFT search.

9-4-2. FFT search setup

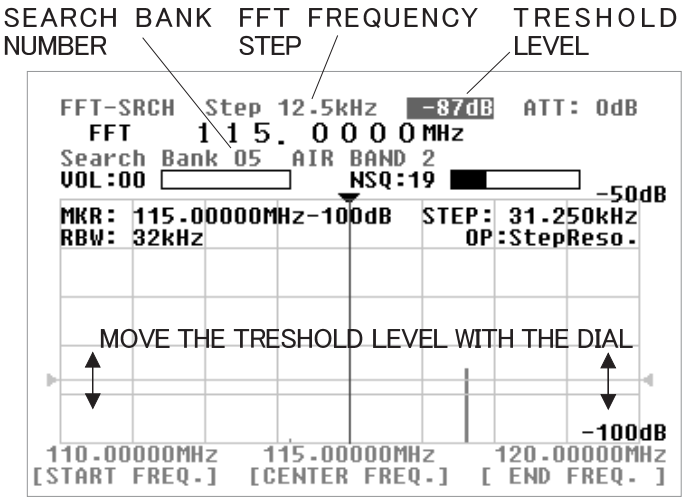
To access the FFT Search mode, push the [FUNC] key followed by the [1] key.

Search Bank Selection

First select a search bank (two digits) to access and validate with [MHz].

Frequency step selection

With the dial, select an appropriate frequency step, then validate with the [MHz] key.



(▲) FFT SEARCH SCREEN

Using the treshold level

Decide upon the treshold level with the dial. Only signals over this level will be detected by FFT Search. You can adjust this level by actually looking at the spectrum. Once the [MHz] key is pushed, the FFT search will start.

Validate your entries with the [MHz] key.

To quit without saving your changes, push the [CLR] key.

9-4-3. FFT search results

If FFT search detects a signal stronger than a given treshold level, then the search result frequencies are listed as on the example on the right.
Up to 40 frequencies can be listed on one screen, every following result will overwrite the older ones.

Color coded signal levels

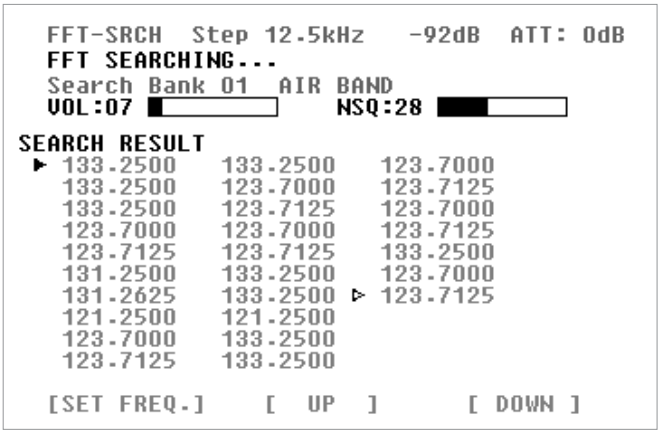
As the FFT Search operates at high speed, and to render the results more understandable, eight different colors are assigned to different signal intensities. Although this display information is limited to the frequency and signal level colors, the real power of the SR2000 is at its possibility to output all this data to a PC I/F port in a continuous data stream.

During the FFT Search, it is possible to copy any frequency from the search results to the VFO mode, for further analysis. To do so, use the [UP] and [DOWN soft keys to bring the white triangle cursor to the desired frequency, and push [SET FREQ.] to switch to VFO (you are therefore exiting the FFT Search mode).

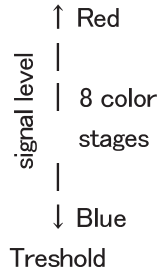
While the FFT Search results are being listed on the screen, you can switch banks by entering the two digit bank number (this will bring you to the FFT Search setup screen).

While the FFT Search results are being listed on the screen, by pushing the [CLR] key you can return to the FFT Search setup screen and modify parameters. The [CLR] key allows you to toggle through the parameters. Validate each change with [MHz].

（▼）FFT SEARCH RESULT SCREEN EXAMPLE



COLOR CODING FOR FOR SIGNALS EXCEEDING 50dB



Format of the I/F data output to PC:

DL-mm RFnn...
(mm: dB level, nn...: freq.[Hz])

Please refer to the command list about the data output form.

Copy any selected frequency to the VFO with the [SET FREQ] soft key.

Even when FFT Search is running, you can select a frequency with the [UP] and [DOWN] soft keys, and copy it to VFO mode with [SET FREQ].

Return to FFT Search setup screen with the [CLR] key.

【Warning】
When FFT Search is opearating, the resolution bandwidth (RBW) is automatically set to 4kHz.

DEL

10. Delete Menu

The SR2000 allows convenient deletion of search banks, memory banks, memory channels, pass banks and pass frequencies in one single “Delete Menu”.

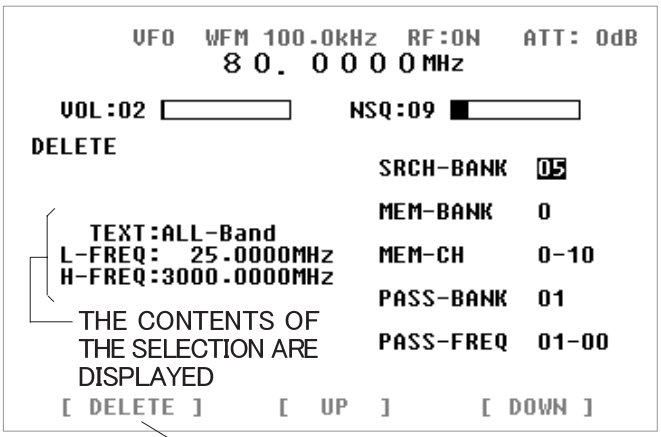
Access this Delete Menu by pushing the [FUNC] key followed by the [8] key. As in the plot on the right, move the cursor to the desired selection with the [UP] and [DOWN] soft keys, then push the [DELETE] soft key to delete your selection.

To access the Delete Menu:

DEL

FUNC + 8

（▼）DELETE MENU



PUSH TO DELETE

Search bank (SRCH-BANK)
Use the ten-keys to enter the two digit number of the search bank you wish to delete.

Memory bank (MEM-BANK)
Use the ten-keys to enter the one digit number of the memory bank you wish to delete. All frequencies in this bank will be deleted.

Memory channel (MEM-CH)
Use the ten-keys to enter the three digit number of the memory bank/channel you wish to delete. Only the frequency associated to this channel will be deleted.

Pass bank (PASS-BANK)
Use the ten-keys to enter the two digit number of the pass bank you wish to delete. All frequencies in this bank will be deleted.

Pass frequency (PASS-FREQ)
Use the ten-keys to enter the three digit number of the pass bank/frequency you wish to delete. Only the selected frequency will be deleted.
Each time you push [DELETE], the screen returns to the previous mode. To quit this Delete menu without applying changes, push the [CLR] key.

Delete entries with the [DELETE] soft-key.

CLR To quit without saving.

11. Command list

The SR2000 can be operated via PC using the RS232 port. The commands are as follows.

Connecting lead

The SR2000 and the PC should be connected using a straight cable between the PC I/F socket and the serial port of the PC.
Microsoft Windows Hyper Terminal may be used to control the SR2000, or you may write your own software.

Communication parameters

Baud rate	9.6k, 19.2k, 38.4k, 57.6k, 115kbps
Data length	8 bit
Parity	None
Stop bit	2 bit
Flow control	RTS/CTS

Delimiter

■ PC → SR2000
<CR> (0x0d)
or
<CR><LF> (0x0d 0x0a)
Note: <LF> will be ignored

■ SR2000 → PC
• "OK" response when the command has been correct:
<SP><CR><LF> (0x20 0x0d 0x0a)
• Response when the command has been incorrect:
? <CR><LF> (0x3f 0x0d 0x0a)
• Response to the read command:
Following the output of the parameter, the correct response should read:
<SP><CR><LF> (0x20 0x0d 0x0a)

Numerical parameter auto-correct

The SR2000 does correct the numerical command parameter to the digit format applying to the given parameter. In the following example, the DB command has to be followed by a 3-digit number.

Ex.: DB003 <CR>
The SR2000 will add one or two "0" in order to achieve three digits.
DB3<CR> ..... processed as DB003<CR>
DB03<CR> ..... processed as DB003<CR>

However be aware that for some commands like Memory Channel or Search Bank, if you input MQ33 for MQ303 (bank 3, channel 3), the SR2000 would mistakenly correct your entry to MQ033 which means bank 0, channel 33.

Format of the data output to PC at search and scan:

■ FFT Search
DL-mm RFnn...
mm: dB level, nn... : frequency [Hz]
Before "mm" be sure to add "-" (minus)!
■ Normal search and scan
Same format than for the RFU.

Command list

Below is the command list for the SR2000. Each command is explained on the following pages.

AG	AF GAIN	AM	RF AMP
AT	ATTENUATOR	AV	ARITHMETIC AVERAGE VALUE
BL	BACK LIGHT	BP	BEEP SOUND
CS	CHANNELSCOPE MODE	CF	CENTER FREQUENCY
CM	MARKER MODE	DB	LEVEL SQUELCH
DD	DELAY TIME	DI	DIAL'S AUTOMATIC RETURN PARAMETER
DM	CALCULATION FACILITY MODE	DS	SERIAL PORT SPEED
DT	DIAL'S AUTOMATIC RETURN	EF	END FREQUENCY
EX	REMOTE OFF	FD	HIGH SPEED DATA DOWNLOAD
FF	FFT SEARCH	FP	SPECTRUM FREQUENCY SPAN
FS	SPECTRUM DISPLAY STEP	GD	GRAPH DOWNLOAD
GN	SPECTRUM INPUT SENSIBILITY	GR	SELECT MEMORY LIST READ
IM	MONITOR IMAGE READ	LC	SIGNAL STRENGTH OUTPUT READ OUT
LM	SIGNAL STRENGTH READ OUT	MA	MEMORY CHANNEL DATA READ
MB	MEMORY BANK ERASE	MC	CHANGE MARKER FREQUENCY TO CF
MD	DEMODULATION MODE	ME	MEDIAN VALUE
MF	MARKER FREQUENCY	MI	MARKER LEVEL READ OUT
MO	MARKER DATA READ	MQ	MEMORY CHANNEL ERASE
MR	MEMORY READ MODE	MS	MEMORY SCAN MODE
MU	MUTE	MX	MEMORY DATA SETTING
OF	OFFSET	OL	OFFSET FREQUENCY
OM	OPERATION MODE	PD	PASS FREQUENCY ERASE
PM	SPECTRUM PLOT IMAGE	PP	PRIORITY MONITOR SETTING
PQ	PRIORITY FUNCTION SWITCH	PR	PASS FREQUENCY READ
PW	PASS FREQUENCY SETTING	QS	SEARCH BANK ERASE
RF	MONITOR (MAIN) FREQUENCY	RQ	NOISE SQUELCH
RS	RESET	RW	SPECTRUM FREQUENCY RESOLUTION STEP
RX	RFU STATUS READ	SC	SEARCH/SCAN STOP & NON STOP
SE	SEARCH BANK ENTRY & SETTING	SM	SELECT MEMORY SCAN
SP	FREE SCAN	SQ	SQUELCH
SR	SEARCH BANK READ OUT	SS	NORMAL SEARCH MODE
ST	FREQUENCY STEP (EXCEPT SEARCH)	SV	COPY SEARCH DATA TO VFO
TF	START FREQUENCY	TI	PRIORITY INTERVAL TIME
TL	SPECTRUM PEAK TRIGGER	TS	FFT FREQUENCY STEP
TT	FFT SIGNAL BAR LEVEL	VR	FIRMWARE VERSION
VX	VFO SELECTION & SETTING	WF	WATERFALL
GA	SELECT MEMORY		

Command details:

AG AF gain

Setup: AGn<CR>
nnn = 0 ～ 255
Initial value: 0
Acquisition: AG<CR>
Response value: AGnnn（fixed length)

AM RF amp

Setup: AMn<CR>
n = 0 (OFF), n = 1 （ON)
Initial value: 1
Acquisition: AM<CR>
Response value: AMn

AT attenuator

Setup: ATn<CR>
n = 0 (0dB), n = 1 （10dB)
n = 2 （20dB)
Initial value: 0
Acquisition: AT<CR>
Response value: ATn

AV arithmetic average value

Setup: AVn<CR>
nn = 2 ～ 31
Initial value: 31
Acquisition: AV<CR>
Response value: AVnn（fixed length)

BL back light

Setup: BLn
n = 0 (off), n = 1 （on)
Initial value:1
Acquisition: BL

BP beep sound

Setup: BPn<CR>
n = 0 (mute), n = 1 （on)
Initial value: 1
Acquisition: BP<CR>
Response value: BPn

CF center frequency

Setup: CFm.n<CR>
m = 25 ～ 3000[MHz]
n for 100Hz designated value.
Initial value: 88
Acquisition: CF<CR>
Response value:
CFmmmm.nnnn[MHz](fixed length)

CM marker mode

Setup: CMn<CR>
n = 0 （marker)
n = 1 （peak)
n = 2 （continuous peak)
Initial value: 0
Acquisition: CM<CR>
Response value: CMn

CS channel scope mode

Setup:
CS nnnn.nnnn mmm.mmm kkkk.kkkk<CR>
Values are as follows:
nnnn.nnnn, start frequency [MHz]
mmm.mmm, step frequency [kHz]
kkkk.kkkk, end frequency[MHz]
Acquisition: CS<CR>
Response value:
CS nnnn.nnnn mmm.mmm kkkk.kkkk

DB Level squelch

Setup: DBnnn <CR>

nnn = 0 ～ 72

Initial value: 0

Acquisition: DB<CR>

Response value: DBnnn (fixed length)

DD delay time

Setup: DDn.n<CR>

n.n = 0 ～ 9.9[sec]

Initial value: 2.0

Acquisition: DD<CR>

Response value: DDn.n (fixed length)

DI dial automatic return parameters

Setup: DIn<CR>

n = 0 (OFF)

n = 1 (FREQ)

n = 2 (MARKER)

n = 3 (SQUELCH)

n = 4 (VOLUME)

Initial value: 0

Acquisition: DI<CR>

Response value: DIn

DM calculation facility mode (spectrum)

Setup: DMn<CR>

n = 0 (None), n = 1 (AVR)

n = 2 (MAX), n = 3 (MED)

Initial value: 0

Acquisition: DM<CR>

Response value: DMn

Remarks: This command is also resetting the operation.

DS serial port speed

Setup: DSn <CR>

n = 0 (115200bps)

n = 1 (57600bps)

n = 2 (38400bps)

n = 3 (19200bps)

Initial value: 0

Acquisition: DS <CR>

Response value: DSn

DT dial automatic return

Setup: DTnn <CR>

nn = 1 ～ 30、 Initial value: 10

Acquisition: DT <CR>

Response value: DTnn (fixed length)

EF end frequency

Setup: EFmm.nn<CR>

m.n = 25.08 ～ 3005[MHz]

n for 100Hz designated value.

Initial value: 93

Acquisition: EF<CR>

Response value:

EFmmmm.nnnn[MHz] (fixed length)

Remarks: Depending on the center frequency and the spectrum frequency span, some values can not apply.

EX remote off

Setup: EX<CR>

Command valid only for setup.

FD high-speed data download

Acquisition: FD<CR>

Response value:

Same as the SDU5600 RIFD command.

FF FFT search

Setup: FFmm TSnn TT-nn<CR>

Values are as follows:

FFmm, mm = 01 ～ 40

(search bank number)

TSnn, nn refers to *TS*

TT-nn, -nn refers to *TT*

Command valid only for setup.

FP spectrum frequency span

Setup: FPm.n<CR>

m.n = 0.16 ～ 10[MHz]

n for 1kHz designated value.

Initial value: 10

Acquisition: FP<CR>

Response value: FPmm.nnn

(fixed length)

Remarks: Does not apply with FFT search.

FS spectrum display step

Setup: FSm.n<CR>

m.n = 0.5 ～ 31.25[kHz]

n for 10Hz designated value.

Initial value: 31.25

Acquisition: FS<CR>

Response value: FSmm.nnn

(fixed length)

Remarks: Does not apply with FFT search.

GD graph download

Acquisition: GD<CR>

Response value:

Same as the SDU5600 RIGD command.

GN spectrum input sensibility

Setup: GNn<CR>

n = 0 (0dBm)

n = 1 (-10dBm)

n = 2 (-20dBm)

n = 3 (-30dBm)

n = 4 (-40dBm)

n = 5 (-50dBm)

Initial value: 3

Acquisition: GN<CR>

Response value: GNn

GR select memory list read

Acquisition: GRnnn<CR>

nn = 00～99 (channel number)

nn=%% (all channels)

nn must be in two digits format.

IM monitor image read

Acquisition: IM<CR>

Response value:

Same as the SDU5600 RIIM command.

LC signal strength output read out

Setup: LCn<CR>

n = 0 (no output)

n = 1 (ouput open)

Initial value: 0

Acquisition: LC<CR>

Response value: LCn

LM signal strength read out

Acquisition: LM<CR>

The response value depends on squelch type NSQ or LSQ.
In the case of NSQ・・・
ATx AMy NSQm LMnnn
In the case of LSQ・・・
ATx AMy LSQm LMnnn

ATx x refers to command AT.
AMy y refers to command AM .
m = 0 (squelch closed)
m = 1 (squelch open)
nnn = 000 ～ 999

MA memory channel data read

Acquisition: MAmnn<CR>

m = 0 ～ 9 (bank number)
nn = 00～99 (channel number)

Response value as follows:
MXmnn GAn RFnnnnnnnnnn MDn ATn AMn TMxx...

MXmnn m = 0 ～ 9 (bank number)
nn = 00 ～ 99 (channel number)
GAn n refers to command GA.
RFnnnnnnnnnn nnnnnnnnnn[MHz]
MDn n refers to command MD.
ATn n refers to command AT.
AMn n refers to command AM.
TMxx... xx.... message of maximun 12 letters.

MXmnn represent blank channels.

MB memory bank erase

Setup: MBn<CR>

n = 0 ～ 9 (bank number)
Command valid only for setup.

MC change marker frequency to CF

Setup: MC<CR>

Command valid only for setup.

MD demodulation mode

Setup: MDn<CR>

n = 0 (NFM), n = 1 (WFM)
n = 2 (SFM), n = 3 (AM)
Initial value: 0

Acquisition: MD<CR>

Response value: MDn

ME median value

Setup: MEn<CR>

n = 2 ～ 4
Initial value: 4

Acquisition: ME<CR>

Response value: MEn

MF marker frequency

Setup: MFm.n<CR>

m = 20 ～ 3395[MHz]
n for100Hz designated value.

However, m.n will depend on the center frequency and frequency span. The initial value is as for CF.

Acquisition: MF<CR>

Response value:
MFmmmm.nnnn[MHz] (fixed length)

MI marker level read out

Acquisition: MI<CR>

Response value: MInnn

nnn = −99 ～ 0 [dB]

MO marker data read

Setup: MOn<CR>

n = 0 (no output)

n = 1 (output active)

Initial value: 0

Acquisition: MO<CR>

Response value: MOn

Remarks: When the spectrum is dis played, the commands MF, MI, and FD are sequentially executed every time the Spectrum data is updated.

MQ memory channel erase

Setup: MQmnn<CR>

m = 0 ～ 9 (bank number)

nn = 00～99 (channel number)

Command valid only for setup.

MR memory read mode

Setup: MRmnn<CR>

m = 0 ～ 9 (bank number)

nn = 00～99 (channel number)

Command valid only for setup.

MS memory scan mode

Setup: MSn<CR>

n = 0 ～ 9 (bank number)

Command valid only for setup.

MU mute

Setup: MUn<CR>

n = 0 (Mute OFF)

n = 1 (Mute ON)

Initial value: 0

Acquisition: MU<CR>

Response value: MUn

MX memory data setting

Setup:

MXmnn GAn RFnnnn.nnnn MDn ATn AMn TMxx...<CR>

Setup values as follows:

MXmnn, m = 0 ～ 9 (bank number)

nn = 00 ～ 99 (channel number)

GAn n refers to command GA.

It is possible to ommit it, in which case it is specified by GA0.

RFnnnn.nnnn[MHz]

MDn n refers to command MD.

ATn n refers to command AT.

It is possible to ommit it, in which case it is specified by AT0.

AMn n refers to the command AM.

It is possible to ommit it, in which case it is specified by AM0.

TMxx... xx.... message of maximun 12 letters. It is possible to ommit it.

Command only valid for setup.

OF offset

Setup: OFn<CR>
n = 0 (offset reception off)
n = 1 (offset reception on)
Initial value: 0
Acquisition: OF<CR>
Response value: OFn

OL offset frequency

Setup: OLxmmm.nnnn<CR>
x: + or −
The offset direction is therefore indicated.
mmm.nnnn = 0.0001 (100Hz) ～ 999.9999[MHz]
Initial value: +0
Acquisition: OL<CR>
Response value: OLxmmm.nnnn

OM operation mode

Setup: OMn<CR>
n = 0 (spectrum analyzer mode)
n = 1 (step resolution mode)
n = 2 (channel scope mode)
Initial value: 0
Acquisition: OM<CR>
Response value: OMn

PD pass frequency erase

Setup: PDmmnn<CR>
mm = 01 ～ 40 (search bank)
nn = 00 ～ 49 (channel)
Both bank and channels numbers have to be in two digit format.
Command valid only for setup.

PM spectrum plot image

Setup: PMn<CR>
n = 0 (Paint)
n = 1 (Outline)
Initial value: 0
Acquisition: PM<CR>
Response value: PMn

PP priority monitor setting

Setup: PPmnn<CR>
m = 0 ～ 9 (memory bank)
nn = 00 ～ 99 (memory channel)
Acquisition: PP<CR>
Response value: PPmnn

PQ priority function switch

Setup: PQn<CR>
n = 0 (off), n = 1 (on)
Acquisition: PQ<CR>
Response value: PQn

PR pass frequency read

Acquisition: PRmm<CR>
mm = 01 ～ 40 (search bank)
Response value:
If no frequency is registered in the PRmm nnnn.nnnn[MHz] list, the only response will be “OK”.

PW pass frequency setting

Setup: PWnnnn.nnnn<CR>
nnnn.nnnn[MHz]
If no frequency is specified, the present frequency will be chosen.
Command valid only for setup.

QS search bank erase

Setup: QSnn<CR>

nn = 01 ～ 40 (search bank).

Command valid only for setup.

Remarks: The pass frequencies inside the search bank will also be erased

RF monitor (main) frequency

Setup: RFnn.nn<CR>

nn.nn = 25 ～ 3000[MHz]

Acquisition: RF<CR>

Response value:

RFnnnn.nnnn[MHz] (fixed length)

RQ noise squelch

Setup: RQn<CR>

nnn = 0 ～ 72

Initial value: 0

Acquisition: RQ<CR>

Response value: RQnnn (fixed length)

RS reset

Setup: RS<CR>

Command valid only for setup.

RW spectrum frequency resolution step

Setup: RWn<CR>

n = 0 (4kHz), n = 1 (32kHz)

n = 2 (64kHz)

n = 3 (128 kHz)

Initial value: 0

Acquisition: RWn<CR>

Response value: RWn

RX RFU status read

Acquisition: RX<CR>

Response values are as follows:

In the memory channel mode:
MR MXmnn GAn RFnnnn.nnnn STnnnn.nnnn MDn ATn AMn TMxx...

In the memory scan mode:
MS MXmnn GAn RFnnnn.nnnn STnnnn.nnnn MDn ATn AMn TMxx...

In the select memory scan mode:
SM MXmnn GAn RFnnnn.nnnn STnnnn.nnnn MDn ATn AMn TMxx...

In the normal search mode:
SSnn RFnnnn.nnnn STnnnn.nnnn MDn ATn AMn TTxx...

In FFT search mode:
FFnn RFnnnn.nnnn FSnnnn.nnnn MDn ATn AMn TTxx...

In the VFO mode:
Vx RFnnnn.nnnn STnnnn.nnnn MDn ATn AMn

Refer to each command for details.

SC search / scan stop & non-stop

Setup: SCn<CR>
n = 0 (stop mode)
n = 1 (non-stop mode)
Initial value: 0
Acquisition: SC<CR>
Response value: SCn
Remarks: FFT search is always in non-stop mode.

SE search bank entry & setting

Setup:
SEnn SLnn... SUnn... STnn...
MDn ATn AMn TTxx...<CR>

Setup values are as follows:
SEnn, nn = 01 ~ 40
(Search bank number, always two digits)
SLnnnn.nnnn
(Search lower end [MHz])
SUnnnn.nnnn
(Search higher end [MHz])
STnnn.nn
(Search step frequency [kHz])
MDn, n refers to command MD.

ATn, n refers to command AT.
Can be ommitted, in which case AT0 is automatically applied.

AMn, n refers to command AM.
Can be ommitted, in which case AM0 is automatically applied.

TTxx..., xx... message of maximun 12 letters. It is possible to ommit it.
Each command has to be separated by a blank space.
Commands only valid for setup.

SM select memory scan

Setup: SM<CR>
Command only valid for setup.

SP free scan

Setup: SPn.n<CR>
n.n = 0.1 ~ 9.9[sec]
n.n = 0 For value zero, the free scan is OFF.
Initial value: 0
Acquisition: SP<CR>
Response value: SPn.n

SQ squelch

Setup: SQn<CR>
n = 0 (noise squelch)
n = 1 (level squelch)
Initial value: 0
Acquisition: SQ<CR>
Response value: SQn

SR search bank read out

Acquisition: SRnn<CR>
nn = 01 ~ 40
(search bank number)
Response value as follows:
SRnn SLnnnnnnnnnn SUnnnnnnnnnn
MDn ATn AMn TTxx....
Refer to the SE command for details.

SS normal search mode

Setup: SSmm<CR>
mm = 01 ~ 40
The search bank number must always have two digits.
Command only valid for setup.

ST frequency step (except search)

Setup: STnnn.nnn<CR>
nnn.nn = 0.1 ～ 100.0[kHz],
6.25[kHz], 8.33[kHz]
Initial value: 10
Acquisition: ST<CR>
Response value: STnnn.nnn

SV copy search data to vfo

Setup: SVn<CR>
n = 0 ～ 9, n = 0 (VFO-A),
n = 1 (VFO-B) , ・ ・ ・,
n = 9 (VFO-J)
Initial value: 0
Command only valid for setup.

TF start frequency

Setup: TFmm.nn<CR>
m.n = 20 ～ 2995[MHz]
n for 100Hz designated value.
Initial value: 83
Acquisition: TF<CR>
Response value:
TFnnnn.nnnn[MHz] (fixed length)
Remarks: Depending on the center frequency and the spectrum frequency span, some values can not apply.

TI priority interval time

Setup: TInn<CR>
nn = 1 ～ 99[sec]
nn = 0 For zero, the priority reception is OFF.
Initial value: 0
Acquisition: TI<CR>
Response value: TInn

TL spectrum peak trigger

Setup: TL-nn<CR>
nn = 0 ～ 99
Between TL and nn, the minus sign (-) is necessary.
Initial value: 0
Acquisition: TL<CR>
Response value: TL-nn

TS FFT frequency step

Setup: TSnn<CR>
nn = 0 ～ 10
n = 0 (1kHz)
n = 1 (2kHz)
n = 2 (5kHz)
n = 3 (6.25kHz)
n = 4 (8.33kHz)
n = 5 (9kHz)
n = 6 (10kHz)
n = 7 (12.5kHz)
n = 8 (25kHz)
n = 9 (50kHz)
n = 10 (100kHz)
Initial value: 6
Acquisition: TS<CR>
Response value: TS

TT FFT signal bar level

Setup: TT-nn<CR>
nn = 0 ～ 99[dB]
Between TT and nn, the minus sign (-) is necessary.
Acquisition: TT<CR>
Response value: TTnn

VR firmware version

Acquisition: VR<CR>

The response value corresponds to the version number.

VX VFO selection & setting

Selection: Vx<CR>

x = A ～ I, x = A (VFO-A)

x = B (VFO-B) , ・ ・ ・,

x = I (VFO-I)

Setup: Vxnnnn.nnnn<CR>

x = A ～ I,

nnnn.nnnn = 25.0000 ～ 3000.0000[MHz]

WF waterfall

Setup: WFn<CR>

n = 0 (OFF), n = 1 (ON)

Initial value: 0

Acquisition: WF<CR>

Response value: WFn

GA select memory

Setup: GAn<CR>

n = 0 (release) n = 1 (registration)

Initial value: 0

Acquisition: GA<CR>

Response value: GAn

Remarks: This command can not be used alone, it has to be associated with MA, MX or RX commands.

12. Specifications

Receiver coverage	25 – 3000MHz (no gap)			
Reception modes	AM / NFM / WFM / SFM			
Configuration	Triple conversion superheterodyne front end			
Signal output	10.7MHz			
Sensitivity	Band	Sensitivity	IP3 (dBm)	S/N (dB)
IP3	25M-225MHz	NFM: 0.35uV (12dB SINAD)	+1	40
S/N		AM: 0.6uV (10dB S/N)		
		WFM: 2.0uV (12dB SINAD)		
	225M-1.7GHz	NFM: 0.35V (12dB SINAD)	+1	35
		AM: 0.8uV (10dB S/N)		
		WFM: 2.0uV (12dB SINAD)		
	1.7GHz-2.7GHz	NFM: 0.6uV (12dB SINAD)	+1	32
	2.7GHz-3GHz	NFM: 1.5uV (12dB SINAD)	+1	30
Frequency stability	±1ppm(0～50℃)			
LCD display	5 inch (127mm) TFT color LCD			
Memory channels	1000 (@10 memory banks)			
Search banks	40			
Pass frequencies	1600 (40 per search bank)			
Priority channel	1 channel			
LCD monitoring mode	Spectrum / step resolution / channel scope			
Aerial connection	50Ω BNC			
Audio output	1200mW (8 OHMS) MAX@ 10% THD. Rear panel 3.5mm socket			
Audio distortion	5% (3kHz FM deviation)			
Internal speaker	None			
PC Control interface	RS-232C x1 (USB optional). Up to 115,000 bps.			
Power consumption	1.4A with 1W audio output, 12-16V DC			
Controls	26 keys & main dial			
Operation temperature	0 to 50 degrees Celsius			
Dimensions	220(W) x 120(H) x 195(D) mm			
Weight	3.3kg			

Specifications subject to change without notice.

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Notes:

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