In order to keep the Protek 3200 series RF Field Strength Analyzer continuously updated, information in this manual is subject to change without notice.

Please contact us, if you have any question about version.
Safety Term and symbols

**DANGER**

Danger statements identify condition or practices that could result in injury or loss of life.

**CAUTION**

Caution statements identify conditions or practices that could result in damage or fire.

**GROUND**

Ground statements identify conditions or practices that could connect protective conductor.
Caution for safety

- **Prohibiting to removal the cover**

Do not remove the instrument cover to access the internal components. Only GS Instruments' Service team or technician with knowledge of the instruments' condition and dangerous voltages can repair the instrument.

Instruments that appear damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.

- **Keep the clean on power insert**

Instrument’s power insert should remain dust free.

Clean the power insert regularly. Dust could result in damage to this instrument.

Continually clean the dust on input terminal of RF frequency counter.

Clean the input terminal regularly. Dust could result in damage to the instrument.

- **RF in/output rating**

Rating of RF input and output connector

Maximum DC voltage rating

RF input connector (socket): N type female, 50Ohms

Maximum RF input power: 5Vrms

Caution: Do not use over 5Vrms supplied and/or (-) power could result in damage to this instrument

Do not operate this instrument if there is any doubt it is functioning properly: if operating personnel feel the instrument is not operating properly, return this instrument to GS Instrument for service and repair to ensure the safety features are maintained.
• **DC Power**

The operating Personnel must use the DC adaptor supplied, combining this instrument. The other adaptor could result in damage to this instrument and it is the limitation of warranty. Exterior DC input connector should be matched with polar. DC connector tip must attach with (+) polar grounding.

The operating personnel must use grounded power.

• **Restore this instrument**

Do not attempt to operate this instrument for long durations and avoid restoring this instrument.

* Avoid direct light
* Keep away the heating system
* Avoid high temperature (Ex. Inside of the car during the summer time)
* Keep about from liquids
* Avoid high moisture and/or poor ventilation
* Keep away dust and/or smoke
* Avoid extremely low temperature

Keep away from hazard of return strokes
Protek 3200 Series Ni-MH battery is rechargeable. Battery is recharged based on the battery temperature. Charging is controlled from the power of the battery cell and the temperature of the battery. Ni-MH Rechargeable battery is going to increase temp slowly until the temperature is extremely higher. Battery charging is finished automatically by checking the degree of the temperature (dT/dt). For battery protection, when the power of Battery cell is increased, comparing regular temperature and/or exterior temperature degree of when the temperature increases over 50 degrees, battery charging will be finished automatically.

Operating personnel must use Ni-MH Rechargeable Battery and do not operate in an explosive atmosphere.

- The battery usage time can change due to the using term, environment and temperature.
- When battery consumption is large battery-running time will decrease.

**Operating personnel should phase in a new battery when battery-running time is less than half** (Warrant period is 6 month, after instrument use has begun.)

- Operating personnel should not use this instrument and/or keep the battery in place for long periods of time, which could result in discharge of the battery.
- To avoid damages to battery, when battery is low, this instrument will turn off automatically.
Limited Warranty. GS Instrument product is warranted against defects in material and workmanship for a period of one year from the date of shipment. During the warranty period, GS Instrument Company will, at its option, either repair or replace products that prove to be defective.

◎ Below is the limitation of warranty per this manual:
◎ Buyer misuse, unauthorized modification or repair of product
◎ Operating personnel use this instrument against specification.
◎ Defect resulting from improper or inadequate maintenance by buyers.
◎ Defect is Caused by the environment such as fire, flood or earthquake.
◎ Buyer installs substitute parts or performs any unauthorized circuit and/or consumption good substitution.
◎ Buyer operates instrument against the environmental specifications for this instrument.

With the exception of the above articles, GS Instruments product is warranted for initial purchaser.

If this instrument is resold the end-user, warranty is not transferred.

The foregoing warranty shall not apply to defects resulting from outside the environment and/or misuse.
Accessories

- Carrying case
- AC Adaptor
- Carrying Strap
- Coaxial Cable
- RS-232 Cable
- Power Cable
- Ear Phone
- N-BNC Adaptor
- Ni-MH (Rechargeable Battery) 6PCS
- User’s Manual / GUI Software Guide
- GUI Software CD
- Antenna

※ Standard Option
# Table of contents

1. Introduction
   Overview ........................................................................................................ 11

2. Features
   Main features .................................................................................................. 12

3. Functions
   RF Field Strength Analyzer ........................................................................ 13
   Frequency Counter .......................................................................................... 13
   Specifications .................................................................................................. 14

4. Instrument overview
   Front Panel .................................................................................................... 18
   Rear Panel ..................................................................................................... 20
   Side Panel ..................................................................................................... 21
   Top Panel ..................................................................................................... 22

5. Basic operation
   Before Power On .......................................................................................... 23
   Power On ...................................................................................................... 24
   Turn on Power of Instrument ........................................................................ 25
   Description of operation screen ................................................................... 26
   Reception Mode ............................................................................................. 32
   Sweep Mode .................................................................................................. 33
   Set up Span ................................................................................................... 34
   Frequency Input ............................................................................................. 35
   Adjust Screen Level ....................................................................................... 37
   Run - Scanning ............................................................................................... 38
   Marker ........................................................................................................... 39
   Power Meter .................................................................................................. 46
   Setting of attenuator ..................................................................................... 49
   LCD Light ...................................................................................................... 50
   LCD Contrast ................................................................................................. 51
   Buzzer ON/OFF ............................................................................................. 52
6. Description of key operating

Run [GHz] ................................................................. 73
Mode [MHz] ............................................................ 73
Sweep [kHz] ............................................................. 74
Marker [DEL] .......................................................... 74
No. 1 [Start/Stop] .................................................... 75
No. 2 [Span] ............................................................. 75
No. 3 [Level] ............................................................. 76
No. 4 [Single] .......................................................... 76
No. 5 [Multi] ............................................................. 77
No. 6 [UNIT] ............................................................. 77
No. 7 [LCD Light] ..................................................... 78
No. 8 [LCD CONT; LCD Contrast] ............................ 78
No. 9 [Attenuator] ................................................... 79
No. 0 [system] ......................................................... 79
Shift ................................................................. 80
Dot [Buzzer] .......................................................... 80
Menu [Load] .......................................................... 81
Enter [Save] .......................................................... 81
Up/Down Keys and Knob Key .................................... 82
Overview

The Protek 3200 Series is handheld RF Field Strength Analyzer and it is optimized to analyze a signal for the radio frequency equipment that is increased for the use of frequency, gradually high-speeded, and digitalized. The Protek 3200 Series has adopted synthesizer method and has a wideband reception range of 100 kHz to 2,900 MHz. The characteristic of frequency response of the Protek 3200 Series is calculated by memorized calculation data, and so it enables the Protek 3200 Series to measure accurate level and make easy analysis for wide range of frequency band.

The Protek 3200 Series provides various functions and user-friendly interface which makes it easy for the user to check the location of the antenna with simple handling. The Spectrum Analyzer is ideal for user to test, install and maintain Mobile Telecommunications Systems, Cellular and Cordless Phone, CB Paging, Paging Systems, Cable and Satellite TV Systems as well as antenna site measurements and maintenance. The Protek 3200 Series supports RS 232C serial communication and has separate GUI software. So, user can control the Protek 3200 Series easily after connecting the Protek 3200 Series with his personal computer, and can utilize the analyzed data variously after converting or saving numerical value or graph.
Main features

- 100 kHz to 2,900 MHz measurement range (3201N:2,000MHz)
- Frequency Spectrum Analyzing Function and Frequency Counter Function
- Measure and demodulates N-FM, W-FM, AM, SSB signals
- Built-in 2,900MHz Frequency Counter (3201N:2,000MHz)
- Accurate Signal Level Measurement
- Marker/delta Marker/Squelch Adjustment Function
- PLL tuning system for precise frequency tuning
- Built-in Speaker
- 192 Pixels X 192 Pixels Back Light LCD
- Menu selection method for Function selection
- RS-232C Interface
- User-friendly Icon Display
- Maintenance of Wireless Telecommunications Equipments
- General Usage for Installation and Maintenance of telecommunications Equipments
- Installation and Maintenance of Cable
- RFID Tag RF Strength Measurement
- Jammer (for hospital, theater and military) Performance Test
- Installation and Maintenance of Satellite Antenna
- Detection of Tapping and Hidden Camera
RF Field Strength Analyzer

- Spectrum: Peak Search, Marker to Center, Channel Power Function
- Internal Attn.: The input range can be extended by internal Max 10 dB Attn. function.
- Sweep Mode: Single Run, Free Run, Squelch Run Selectable
- Squelch Function: The Squelch Level may be adjusted to any value from the reference level to Full Scale.
- Copy Function: The Copy Set mode allows the contents of the Channels edit Setup and Data memories to be copied to an external device. Data may also be written into these memories from external device.

Frequency Counter

- Frequency range: 35 MHz to 2,900 MHz (3201N:2,000MHz)
- No. of digits: 7 digits
- Resolution: 1 kHz
## Specifications

### Frequency

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency Range</strong></td>
<td>100 kHz to 2,900 MHz (3201N: 2,000 MHz)</td>
</tr>
<tr>
<td><strong>Resolution</strong></td>
<td>Min. 6.25 kHz</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>TXO: ± 3 PPM / Display: ± 1.5 PPM</td>
</tr>
<tr>
<td><strong>W-FM / N-FM / AM / SSB</strong></td>
<td>Wide FM: Approx. 180 kHz @ -6 dB</td>
</tr>
<tr>
<td></td>
<td>Narrow FM: Approx. 12.5 kHz @ -6 dB</td>
</tr>
<tr>
<td></td>
<td>AM/SSB: Approx. 2.4 kHz @ -6 dB</td>
</tr>
<tr>
<td><strong>Step Range</strong></td>
<td>AM, SSB, Narrow FM: 6.25kHz, 12.5kHz</td>
</tr>
<tr>
<td></td>
<td>Wide FM: 6.25~125kHz (Multiple of 6.25 kHz)</td>
</tr>
<tr>
<td></td>
<td>125~2500kHz (Multiple of 125 kHz)</td>
</tr>
<tr>
<td><strong>Span Range</strong></td>
<td>AM, SSB, Narrow FM: 1MHz, 2MHz</td>
</tr>
<tr>
<td></td>
<td>Wide FM: 1~20MHz (Multiple of 1 MHz)</td>
</tr>
<tr>
<td></td>
<td>20~400MHz (Multiple of 20 MHz)</td>
</tr>
<tr>
<td><strong>Selection Mode</strong></td>
<td>Center, Start/Stop, Span</td>
</tr>
</tbody>
</table>

### Measurement Range (Internal atten. 10dB)

<table>
<thead>
<tr>
<th>Model</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>3201N, 3290N</td>
<td>-45dBm to -110dBm / NFM</td>
</tr>
<tr>
<td></td>
<td>-45dBm to -100dBm / WFM, AM, SSB</td>
</tr>
<tr>
<td>3290C</td>
<td>-55dBm to -120dBm / NFM</td>
</tr>
<tr>
<td></td>
<td>-55dBm to -110dBm / WFM, AM, SSB</td>
</tr>
</tbody>
</table>

### Average noise level

<table>
<thead>
<tr>
<th>Model</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>3201N, 3290N</td>
<td>Wide FM: -100dBm Min.</td>
</tr>
<tr>
<td></td>
<td>Narrow FM: -110dBm Min.</td>
</tr>
<tr>
<td></td>
<td>AM/SSB: -100dBm Min.</td>
</tr>
<tr>
<td>3290C</td>
<td>WFM: -110dBm Min.</td>
</tr>
<tr>
<td></td>
<td>NFM: -120dBm Min.</td>
</tr>
<tr>
<td></td>
<td>AM/SSB: -110dBm Min.</td>
</tr>
</tbody>
</table>

### Amplitude Units

<table>
<thead>
<tr>
<th>Units</th>
<th>dBm, dBmV, dBuV</th>
</tr>
</thead>
</table>

### Reference Level Accuracy

<table>
<thead>
<tr>
<th>Model</th>
<th>Typical Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>3201N, 3290N</td>
<td>±2.0 dB (@20~30 °C/W-FM)</td>
</tr>
<tr>
<td>3290C</td>
<td>±2.0 dB (@25 °C/N-FM/AM/SSB)</td>
</tr>
</tbody>
</table>

### Reference Level Range

<table>
<thead>
<tr>
<th>Range</th>
<th>0 dBm to -80 dBm</th>
</tr>
</thead>
</table>

### Log Scale

<table>
<thead>
<tr>
<th>Scale</th>
<th>0.2 dB/DIV min, in 0.25 dB Span (5 Display Division)</th>
</tr>
</thead>
</table>

### Internal Attn

<table>
<thead>
<tr>
<th>Attn</th>
<th>10 dB</th>
</tr>
</thead>
</table>

### Internal Attn Accuracy

<table>
<thead>
<tr>
<th>Accuracy</th>
<th>±1.0 dB (@25 °C)</th>
</tr>
</thead>
</table>
## Specifications

### Sweep

<table>
<thead>
<tr>
<th></th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trigger Source</td>
<td>Narrow FM / Wide FM / AM / SSB</td>
</tr>
<tr>
<td>Trigger Mode</td>
<td>Free Run / Single Run / Continuous Wave / Squelch Run</td>
</tr>
<tr>
<td>Trigger Level</td>
<td>TTL Level</td>
</tr>
<tr>
<td>Marker Mode</td>
<td>Maker / Delta Maker</td>
</tr>
</tbody>
</table>

### Memory

| Trace & Setup Storage | Max 100 Waveforms and 100 States |

### Display

<table>
<thead>
<tr>
<th>Type</th>
<th>Mono STN LCD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display Resolution</td>
<td>192 Pixels X 192 Pixels</td>
</tr>
<tr>
<td>LCD Light</td>
<td>On / Off</td>
</tr>
</tbody>
</table>

### Frequency Counter

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>35 MHz to 2,900 MHz (3201N:35~2,000MHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>7 Digits</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±50 PPM ±1 COUNT</td>
</tr>
<tr>
<td>Sampling Time</td>
<td>1 sec</td>
</tr>
<tr>
<td>Input Sensitivity</td>
<td>35 MHz to 2,000 MHz : 150 mVrms</td>
</tr>
<tr>
<td></td>
<td>20 MHz to 1,000 MHz : 100 mVrms</td>
</tr>
<tr>
<td></td>
<td>2,000 MHz to 2,900 MHz : 400 mVrms</td>
</tr>
<tr>
<td></td>
<td>(for 3290N)</td>
</tr>
<tr>
<td>Input Impedance</td>
<td>50 Ohms</td>
</tr>
<tr>
<td>Max. Input Voltage</td>
<td>5 Vrms Max.</td>
</tr>
</tbody>
</table>
### Specifications

<table>
<thead>
<tr>
<th>Spectrum input Port</th>
<th>RF Input Connector</th>
<th>N type Female, 50 Ohms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Max Input Level</td>
<td>Max. +10 dBm, 5Vrms</td>
</tr>
<tr>
<td>Operation Environment</td>
<td>Operating Temperature</td>
<td>0 °C to 40 °C</td>
</tr>
<tr>
<td></td>
<td>Humidity</td>
<td>35 RH to 85 RH</td>
</tr>
<tr>
<td></td>
<td>Storage Temp.</td>
<td>10 °C to 50 °C</td>
</tr>
<tr>
<td>Power Source</td>
<td>Battery Power Source</td>
<td>AA Type Ni-MH Rechargeable Battery × 6 PCS</td>
</tr>
<tr>
<td></td>
<td>Battery Specification</td>
<td>AA Type 1.2 V, 2,700 mAh Rechargeable Nickel Metal Hydride Battery</td>
</tr>
<tr>
<td></td>
<td>Adapter</td>
<td>SMPS Type AC Adapter (DC 12 V Output) Car-Adapter (DC 12 V Output)</td>
</tr>
<tr>
<td></td>
<td>Auto Power On/Off</td>
<td>Off/ 5 min./ 10 min./ 20 min./30 min.</td>
</tr>
</tbody>
</table>

The Protek 3200 Series can be quickly recharged using a Ni-MH Rechargeable Battery. The Recharged method of Ni-MH Battery is controlled by the voltage of Battery Cell and the temperature of Battery. The external temperature of Ni-MH Rechargeable Battery is gradually increased and then quickly increased in some point of time. The Protek 3200 Series closes charging quickly after checking the increased amount (dT/dt) of external temperature of Battery for a unit time. Also, for Battery protection, the recharging is compulsory closed by built-in temperature sensor in case that the voltage of Battery Cell will be increased to more than some specified level or the external temperature of Battery will be going up to over 50 °C. For safe usage, it is strongly recommended to use Ni-MH Rechargeable battery, and please do not use in the place with high temperature or high humidity during recharging.
## Specifications

<table>
<thead>
<tr>
<th>Physical Specifications</th>
<th>Dimension</th>
<th>4” (W) × 9” (H) × 1.8” (D)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weight</td>
<td>Approx. 0.66 Kg (1.45 lbm)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(including Antenna, except Battery)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Standard Accessories</th>
<th>Antenna (Receive Only), SMPS Type AC Adapter, Fuji-AA type NI-MH Rechargeable Battery (6 PCS, 1.2 V 2,700 mAh), Manual, Coaxial Cable, Earphone, Carrying Case, Carrying Belt, RS-232C Cable, Adapter (N-BNC), Software for PC Application</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Optional Accessories</th>
<th>Matching Pad (75 Ohms to 50 Ohms), F-BNC Adapter, Car Adapter, Block Voltage Unit</th>
</tr>
</thead>
</table>
Front Panel

The LCD screen can display the signal input level, frequency and amplitude values, and the relative system data.

- **Power Key**
  Key to turn ON/OFF the system

- **Run / Mode / Sweep / Marker Key**

- **Run**
  Key to run the Scanning or input the GHz unit for frequency value input
Front Panel

- **Mode**
  Key to set up the Reception Mode or input the MHz unit for frequency value input

- **Sweep**
  Key to set up the Sweep Mode or input the kHz unit for frequency value input

- **Marker**
  Key to select the Marker Function:
  Marker, Delta Marker, Squelch Marker, Peak Search, Marker to Center, and Channel Power

- **Numeric Key**
  Key to input the frequency value

- **Menu Key**
  Key to set up the required functions of system

- **Up/Down Key**
  Key to select the Menu or Frequency Value

- **Knob Key**
  The function of Knob key is same as the Up/Down keys
Rear Panel

**Belt Clip**
User can yoke the Protek 3200 Series on a belt.

**Speaker**
User can use the speaker to output the modulated audio from RF signal level.

**Reset Key**
User can use this Reset key from system’s malfunction or memory reset.

**Battery**
Note the polarity of batteries at inserted battery compartment. And user must use the AA type Ni-MH Rechargeable batteries for battery charging.
- **DC Input Jack**
  
  User can use this DC input jack for power supply and battery charging with SMPS type AC/DC Adapter or Car Adapter.

- **RS-232C Connector (8 pin mini DIN connector)**
  
  User can use this RS-232C connector for PC communication with serial cable.
Top Panel

Top Figure

- **Input Connector for Signal Level**
  User can connect the antenna or coaxial cable to this connector on the system. The maximum input voltage is 5 Vrms.

- **Input Connector for Frequency Counter**
  User can connect the signal source to be measured to this connector. The maximum input voltage is 5 Vrms.

- **Volume Control**
  User can control the volume of audio output. To increase the volume of audio output, turn the Volume Control to clockwise direction.

- **Earphone Jack**
Before Power ON

How to insert and charge the AA Type Ni-MH rechargeable batteries?
For the insertion of batteries, please release the screw on the battery cover on the bottom of the instrument. And put in AA Type Ni-MH rechargeable batteries (Total 6 PCS).

To charge the batteries after inserting batteries, connect the DC cable plug of SMPS type adaptor to DC jack of system (DC output: 12V).
Battery charging will begin after DC cable in connected.
At this time, if user turns on the power of system, the battery icon on the display window is displayed and blinking. And if the charging of batteries is finished, the blanking of battery icon will stop and only be displayed.

To measure the input level of RF signal, connect the antenna or coaxial cable to N-type connector of system (marked ANT)

- **Input Connector for RF Signal Level:**
  User can connect the antenna or coaxial cable to this connector on the system. The maximum input voltage is 5 Vrms

- **Input Connector for Frequency Counter:**
  User can connect the signal source to be measured to this connector. The maximum input voltage is 5 Vrms.
Power ON

To turn on the system power, Press the Power key.
The system power is ON. The last displayed screen from the previous usage will be displayed (Previous setup status).

This system supports the simple manipulation with frequently used function keys. To use this simple manipulation, push the Shift key and push the numerical key. The frequently used function is marked on the numerical key below.
The upper right icons are the basic 3200 3201 mode and the Shift mode.
User can select the shift mode or basic 3200 3201 mode by pressing the Shift key.

If the LCD screen is not readily visible, user can adjust the LCD contrast to see LCD screen.

To adjust the LCD contrast, push the Shift key. And push the No. 8 (LCD Contrast) 8 key. Until user’s desired LCD contrast is adjusted, use the Up/Down keys and Knob key.

To turn on the LCD light, push the Shift key. And push the No. 7 (LCD Light) 7 key. Then the LCD light is turned on.
And to turn off the LCD light, push the Shift key. And push the No. 7 (LCD Light) 7 key (Toggle ON/OFF).

For the LCD display, refer to below figure.
Turn on power of instrument

STEP 1
- Push the \textbf{Power} Key.

STEP 2 (Adjust to LCD Contrast)
- Push the \textbf{Miscellaneous} Key.
- Push the \textbf{LCD CONTRAST (No.8)} \(8\) Key.
- Adjust to desired \textbf{LCD Contrast} using the \textbf{Up/Down} \(\uparrow\downarrow\) Keys or \textbf{Knob} \(\Theta\) Key.

STEP 3
- Push the \textbf{Dot} \(\cdot\) Key and will be taken out of Menu.

STEP 4 (LCD Light On/Off)
- Push the \textbf{Shift} \(\leftarrow\rightarrow\) Key

STEP 5
- Push the \textbf{No. 7 (LCD Light)} \(7\) Key
Description of operating screen

1. ICON window
2. Frequency Input window
3. Wavy pattern window
4. Squelch window
5. Marker window

1. ICON window
### Description of operating screen

#### (a) Shift State Indication
- **Normal state**
- **Shift Input state**
  - Icons are changed by shift key

#### (b) Reception Mode State Indication
- Wide Frequency Multi Mode
- Narrow Frequency Multi Mode
- Amplitude Modulation Mode
- Single side band Multi Mode
  - Icons are changed by Mode key

#### (c) Sweep Mode State Indication
- Free Run
- Squelch Run
- Single Run
  - Icons are changed by Sweep key

#### (d) Run-Scanning Run/Stop State Indication
- Running
- Stop
  - Icons are changed by Run key

#### (e) Marker State Indication
- Center Marker State
- Marker 1 State
- Delta Marker State Marker 1, 2
- Squelch Marker State
  - Icons are changed by Marker key
Description of operating screen

1. Buzzer On/off Indication
   - Buzzer Off
   - Buzzer On
   Icons are changed by Dot(Buzzer) key

2. Battery Residual Indication
   - Full
   - Empty

2. Frequency Input window

Frequency Value Indication
- Frequency Markers (MKR1, MKR2, FCNT)
- Frequency Value
- Level (LEVEL)
- Attenuation (ATTN)
- Decibels (dB, dBm, dBmV, dBmV)

Example:
- Frequency: 2000.000000 MHz
- Level: 0.00 dBm
- Attenuation: 0 dB
## Description of Operating Scene

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td><strong>Center Frequency Indication</strong></td>
<td><strong>NONE</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Maker 1 Frequency Indication</strong></td>
<td><strong>MP</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Maker 2 Frequency Indication</strong></td>
<td><strong>AP</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Frequency Counter Value Indication</strong></td>
<td><strong>FCNT</strong></td>
</tr>
<tr>
<td></td>
<td>- Indication of Frequency Value of each Mode</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td><strong>Level Value Indication</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Indication of Level Value of each Mode</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td><strong>Level Unit</strong></td>
<td><strong>dB dBmV dBuV</strong></td>
</tr>
<tr>
<td></td>
<td>Can be established in Menu.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[Please refer to Menu Level Unit establishment for further details]</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td><strong>Atten. Establish Value</strong></td>
<td><strong>dB</strong></td>
</tr>
<tr>
<td></td>
<td>Indicate established Atten. Value.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Internal + External Atten. Value)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[Please refer to Menu Level Unit establishment for further details]</td>
<td></td>
</tr>
<tr>
<td>e</td>
<td><strong>Frequency Unit</strong></td>
<td><strong>MHz</strong></td>
</tr>
<tr>
<td></td>
<td>Every Frequency Unit is indicated in MHz</td>
<td></td>
</tr>
</tbody>
</table>
Description of operating screen

3. Wavy pattern window

- Indication Reference Value of Screen Level Value
  - Indication to Vertical Level Value of Wavy pattern window.
  - [Please refer to Screen Level establishment in Basic operation Explanation for further details]

- Resolution of Screen Level Value

- Marker Indication
  - Center Marker
  - Marker 1
  - Marker 2
  - Every Marker can control the Up/Down keys or Knob Key.
### Description of operating screen

#### 4. Marker Window

![Display of operating screen]

- **CENT**: Center Frequency
- **SPAN**: Span Frequency
- **STEP**: Step Frequency

<table>
<thead>
<tr>
<th>MARKER</th>
<th>Description</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKR1</td>
<td>Marker 1 Frequency</td>
<td>MHz</td>
</tr>
<tr>
<td>LEV1</td>
<td>Marker 2 Level Value</td>
<td>dBm</td>
</tr>
<tr>
<td>DIFF</td>
<td>Marker1- Marker2 Level Value</td>
<td></td>
</tr>
</tbody>
</table>

- **CENT** display shows the center frequency (2000.00000 MHz).
- **SPAN** display shows the span frequency (20.00000 MHz).
- **STEP** display shows the step frequency (0.12500 MHz).

When Delta Marker

- **MKR1**: Marker 1 Frequency
- **LEV1**: Marker 2 Level Value
- **DIFF**: Marker1- Marker2 Level Value
## Reception Mode

Reception Mode is total (4) fourth mode as Demodulation when will receive.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wide-FM</strong></td>
<td>Wide Frequency Modulation</td>
</tr>
<tr>
<td>WFM</td>
<td>Wide FM RBW (Resolution Bandwidth) 180 kHz</td>
</tr>
<tr>
<td><strong>Narrow-FM</strong></td>
<td>Narrow Frequency Modulation</td>
</tr>
<tr>
<td>NFM</td>
<td>Narrow RBW (Resolution Bandwidth) 12.5 kHz</td>
</tr>
<tr>
<td><strong>AM</strong></td>
<td>Amplitude Modulation</td>
</tr>
<tr>
<td>AM</td>
<td>SSB /AM RBW (Resolution Bandwidth) 2.4 kHz</td>
</tr>
<tr>
<td><strong>SSB</strong></td>
<td>Single Side Band Modulation</td>
</tr>
<tr>
<td>SSB</td>
<td>SSB /AM RBW (Resolution Bandwidth) 2.4 kHz</td>
</tr>
</tbody>
</table>

Wide FM should be used to interpret a large Signal of Band width, Narrow FM should be used to interpret a narrow Bandwidth Signal. AM and SSB can used irrespective of Bandwidth.

Push Mode (MHz) Key to establish the reception mode and then the top-left ICON will be changed to WFM, NFM, AM, SSB order. When inputting Frequency like Start/Stop, Span etc, the Mode (MHz) Key is used.

RBW is fixed in each Mode as follows.

- **Wide FM RBW (Resolution Bandwidth)** 180 kHz
- **Narrow RBW (Resolution Bandwidth)** 12.5 kHz
- **SSB/AM RBW (Resolution Bandwidth)** 2.4 kHz

### STEP 1

- Push the Mode (MHz) Key.

### STEP 2

- Push the Mode (MHz) Key and the top left ICON will change to WFM, NFM, AM, and SSB order.
**Sweep Mode**

Sweep Mode is used to set up operation characters which interpret Input. Every each operation character is same as follows.

<table>
<thead>
<tr>
<th>Operation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free Run</td>
<td>Analyzing execution consecutively</td>
</tr>
<tr>
<td>Single Run</td>
<td>Only 1 time Execution</td>
</tr>
<tr>
<td>Squelch Run</td>
<td>Run by higher than Squelch level (Similar Trigger Mode of Oscilloscope)</td>
</tr>
</tbody>
</table>

Establish this mode by pushing the Sweep (kHz) Key and then the top left ICON will be changed to FREE Run, SQUELCH Run and SINGLE Run order. The Sweep (kHz) Key is used as input Start/Stop, Span and Input Frequency Unit into kHz Unit.

After input is finished Frequency, FREE Run continues to execute Run-Scanning operation automatically.

Squelch Run operation will stop Run-Scanning in case of Signal Level Value is getting higher than Squelch Level Value. But, If Signal Level is getting lower than Squelch Level, restart to Run-Scanning.

After input is finished Start/Stop Frequency, Single Run execute Run-Scanning just a once. In addition, if it is desired to Run-Scanning, push the Run (GHz) Key and then execute Run-Scanning once.

**STEP 1**
- Push the **Sweep (kHz)** Key

**STEP 2**
- Push the **Sweep (kHz)** Key, and the top-left ICON will be changed to FREE Run, SQUELCH Run and SINGLE Run order.
Set up Span

The span is able to be set 1MHz to 400MHz. It has two settings – 1MHz step up to 20MHz and 20MHz step from 20MHz to 400MHz. If other numeral keys than MHz unit key is pushed, the input unit will be set to the nearest times by rising automatically.

Ex 1) When span input is 9.25Mhz, span will be 10MHz.
Ex 2) When span input is 48MHz, span will be 60MHz.

First, push the **Shift** Key (Shift icon is upside-down) in order to set up Span. The top-left ICON is changed to **SHIFT**.

After that, push the No. Key. So then Frequency Input window changes the Span Input State.

Enter the Input Frequency and then input the Unit to use for this **Run (GHz)**, **Mode(MHz)** or **Sweep (kHz)** Key would be set up Span.

Regardless of Frequency Input State, upper Keys are only used the input units.

**STEP 1**
- Push the **Shift** Key

**STEP 2**
- Push the **No. 2** Key
- When the **Sweep (kHz)** Key is pressed, the top-left ICON is changed to FREE Run, SQUELCH Run and SINGLE Run order.
**Frequency Input**

Chosen Reception Mode, Sweep Mode and Span are showed on the top center of LCD. At first, choose Reception Mode and Sweep Mode to get a sense of the Frequency Bandwidth and a specific feel for analyzing.

Choosing Frequency Value is a way to inputting Center and Start/Stop Frequency.
To order to input Center Frequency just pushes the numeral keys.
Press the key when Frequency Input Window is a CENT state.

Push the **Shift** Key to input Start/Stop Frequency.
Push the **Shift** Key to input Frequency you would like to analyze.
Push the **No. 1(Start/Stop)** Key, to inputted Start Frequency in Frequency Input Window.

Input Frequency by using the **No. 0** to **9** Keys, **Dot (Buzzer)** Key, **MARKER (DEL)** Key and **Run (GHz)** Key as Unit Input Key, **Mode (MHz)** Key and **SWEEP (kHz)** Key.

Execution will be done automatically, after inputting the last Unit in the Frequency, according to a given Sweep Mode of Run-Scanning Mode. If the mode is Single Run, push the **Run (GHz)** Key and then execute Run-Scanning again.

A wrong inputting content can be erased by using the **MARKER (DEL)** Key. The **MARKER (DEL)** Key operates like the Backspace on PC.

**Inputting Frequency in out of Frequency Input Mode:**

Frequencies can be deleted by pushing the **MARKER (DEL)** Key several times.
Erase inputted Frequency and then push the Marker (DEL) Key one more time, you are now out of Frequency Input Mode.
Frequency Input

**Start/Stop Frequency Input**

**STEP 1**
- Check the state of Frequency Input Window.
  You can input Center Frequency when state of Frequency Input Window is **CENT**.

**STEP 2**
- Input a desired Center Frequency

**STEP 3**
- Input Unit by using the **Run**, **Mode**, and **Sweep** Key

**STEP 1**
- Push the **Shift** Key

**STEP 2**
- Push the **No. 1** Key

**STEP 3**
- Change Frequency Input Window to Start Input Mode.
  Input a desired Frequency to use the numeral keys and the **Dot** Key

**STEP 4**
- Input Unit to use the **Run**, **Mode**, and **Sweep** Key

**STEP 5**
- Change Frequency Input Window to Stop Input Mode.
  Input a desired Frequency using the numeral keys and **Dot** Key.

**STEP 6**
- Input Unit to use the **Run**, **Mode**, and **Sweep** Key.
Adjust screen Level

Settle Top Level- Reference Level and Level Resolution to be Display on scene.

“RLEV” is an abbreviation of Reference Level.
Choose through the Up/Down Keys and establish to use the Enter Key. Top Level in verticality axis would be changed established Value.

“DIFF” is an abbreviation of Difference.
Choose through the Up/Down Keys and establish to use the Enter Key. Level Step in verticality axis would be changed established Value.

<table>
<thead>
<tr>
<th>RLEV</th>
<th>Choose through the Up/Down Keys and push the Enter Key.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIFF</td>
<td>Choose through the Up/Down Keys and push the Enter Key.</td>
</tr>
</tbody>
</table>
Run-Scanning

Run-Scanning is a process interpreting Frequency according to established Frequency Bandwidth and Span. And Run-scanning processes operate by establishing Sweep Mode.

Run-Scanning process would be accomplished by establishing Reception Mode and Sweep Mode (See above)
Marker

Protek 3200 Series has Center Marker, Marker 1, Delta Marker (Marker1 and Marker2) and Squelch Marker. Each Marker Mode can define a state of Marker ICON into the top-left Marker Mode ICON.

<table>
<thead>
<tr>
<th>Marker Mode ICON</th>
<th>Marker ICON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center Marker</td>
<td><img src="image" alt="No ICON" /></td>
</tr>
<tr>
<td>Marker 1</td>
<td><img src="image" alt="1" /></td>
</tr>
<tr>
<td>Marker 2</td>
<td><img src="image" alt="1 2" /></td>
</tr>
<tr>
<td>Squelch Marker</td>
<td><img src="image" alt="Squelch" /></td>
</tr>
</tbody>
</table>

You can settle Marker 1 in this state.

You can settle Marker 2 in this state.

Fix the volume when listening by making a multiple Signal to audible Frequency Bandwidth to use FM/AM/SSB and then fix Basic Signal of Squelch Run.
Center Marker is not a Mode the user will choose when using Mark Mode in Basic operation. When inputting Start Frequency and Stop Frequency, Center Frequency information will appear automatically.

The state is not indicated on the Mode ICON is Center Mode.

Frequency and Level on Center Frequency will be indicated on Frequency Input Window.
To use Marker 1, press the Marker(DEL) key in Center Marker status. When it turns to Marker 1 mode, Marker mode icon is changed to 1. And frequency input window is changed to Center Marker to Marker 1.

To move the Marker 1, use the Up/Down keys, or the Knob key. Then the frequency value and level value are displayed on frequency input window.

**STEP 1**
- Press the Marker (DEL) Key.
- Check the Marker 1 mode in display window

**STEP 2**
- To move the Marker 1 to wanted plot point, please use the Up/Down keys, or Knob key.
- Then the frequency value and level value are displayed in the frequency input window
Press the **Marker (DEL)** Key until the Marker mode icon is changed to Delta Marker in the display window. And in this case, Marker 2 is added.

The Marker mode is the total four modes. And the changed order of Marker mode is as below:

Center → Marker 1 → Delta Maker → Squelch Marker

### To handle the Marker 1, user can set up the marker 1 in Marker mode 1

### To handle the Marker 2, user can set up the marker 2 in Delta Marker

When user set up the Delta Marker, the frequency value and level value of Marker 2 are displayed in the frequency input window. The frequency value and level value of Marker 1, and the difference level value between Marker 1 and Marker 2 are displayed in the Marker window.
**Marker**

**STEP 1**
- Press the Marker (DEL) Key.
- Check the Delta Marker mode in the display window.

**STEP 2**
- To move the Marker 1 to wanted plot point, please use the Up/Down keys, or Knob key.
- Then, the frequency value and level value of Marker 2 are displayed in the frequency input window.
  The frequency value and level value of Marker 1, and the difference level value between Marker 1 and Marker 2 are displayed in the Marker window. Then the frequency value and level value are displayed in the frequency input window.
To know the magnitude of frequency, user can use the Squelch Marker. And the Squelch Marker is the right Marker on the vertical axis of the display window.

Also, user can set up the Squelch Marker for setting the Squelch Level of Sweep mode and speaker output for a larger signal than Squelch Level through modulation for audio frequency range. (Modulation: Frequency modulation, Amplitude modulation, and SSB Modulation)

User can hear the radio using upper method.

Press the **Marker** (DEL) Key until the Marker mode icon is changed to the Squelch Marker in the display window.
Marker

**STEP 1**
- Press the **Marker** key.
- Check the Squelch Marker mode.

**STEP 2**
- Move the Squelch Marker to wanted point using the **Up/Down** Keys or **Knob** Key.
- The squelch value is displayed in the lower right display window.

![Display showing SQL -85.00 dBm]
To use the Single Power Meter Function, at first push the **Shift** and then check the icon that is changed.

Please push the numeral 4(Single) key. After inputting the frequency to measure, input the unit.

**STEP 1**
- Push the **Shift** Key.

**STEP 2**
- Push the **NO.4(SINGLE) 4** Key.

**STEP 3**
- Input the frequency to measure.

**STEP 4**
- Input the units using **RUN Run**, **Mode Mode** and **Sweep Sweep** keys.
To use the Multi Power Meter Function, at first push the **Shift** key and then check the icon that is changed.

Please push the **No. 5(MULTI)** key. Assign any number of frequencies to measure within 1 to 9. After inputting the frequency to measure, input the unit.

**STEP 1**
- Push the **Shift** Key.

**STEP 2**
- Push the **No.5 (MULTI)** key.

**STEP 3**
- Input a number within 1 to 9

**STEP 4**
- Input frequency to measure.

**STEP 5**
- Input the units using **RUN**, **Mode**, **Sweep** keys.
UNIT

UNIT Change Function

**STEPI**
- Push the Shift key.

**STEP 2**
- Push the No.6 (UNIT) key.

**STEP 3**
- Using the Up/Down Key or knob key, move to the measuring unit and then set up by Enter key.
Setting of Attenuator

Setting for Internal or External Attenuator

The internal attenuator is used for maximum input signal -45dBm with Menu function.

To set the internal attenuator, press the Shift key to change the upper right icon to SHIFT. And press the No. 9 (ATTN) key.

To adjust the value of internal attenuator, press the Up/Down Keys or rotate the Knob key. And Press the Enter key.

If the input signal is larger than -20dBm (ex. -10dBm, 0dBm, and etc), user can use the user’s external attenuator.

Setting of the EXT. ATTEN. is as below

Push the No. 9(ATTN) key.

INT. ATTEN in system is set up. Push the Dot key and then move the previous menu. After selecting the EXT ATTEN using the Up/Down Keys or rotate the Knob key, push the Enter key.

After selecting requested ATTEN using the Up/Down Keys or rotate the Knob key, push the Enter key.
**LCD Light**

The LCD Light is designed to ease the use of the instrument in a dark location.

Press the **Shift** key to change the upper right icon to ** SHIFT **

And press the **No. 7 (LCD Light) ** key.

*The Power ON/OFF of the LCD Light is toggle

**STEP 1**
- Press the **Shift** key

**STEP 2**
- Press the **No. 7 (LCD Light) ** key

**CAUTION**

If the LCD light is ON, the current of battery is relatively larger than when LCD light OFF. In other words using time of system is shorter.
The function of LCD contrast is to adjust the contrast for the remained battery capacity.

Push the **Shift** key to change the upper right icon to **SHIFT**.

And push the **No. 8 (LCD Contrast)** key.

The LCD contrast is adjusted by using the **Up/Down** keys or **Knob** key. And push the **Enter** key.

**STEP 1**
- Press the **Shift** key

**STEP 2**
- Press the **No. 8 (LCD Contrast)** key

**STEP 3**
- To adjust the LCD contrast, use the **Up/Down** keys or **Knob** key and press the **Enter** key
Buzzer ON/OFF

User can set the Buzzer ON/OFF (Toggle ON/OFF)

Push the Shift Key. Then the Icon \[ \text{3230, 3201} \] of left upper window is changed to shift icon \[ \text{SHIFT} \].

And press the Dot Key.

And press the Dot Key.

**STEP 1**

- Press the Shift key

**STEP 2**

- Press the Dot Key
Save/Load

The function of Save/Load is for the Waveform and Setup Statuses.

The function of Save is for concurrently saving the Waveform and Setup Status in memory.
And the saved Setup Status in memory includes the following information: Reception mode, Sweep mode, Frequency range, Step value, and Span value. User can use this with Menu or Multi key.

The function of Load is for loading the saved Waveform and Setup Status in memory.
If user only wants the Setup Status, please load the saved file for desired Setup Status. And press the Run key. Then this measuring instrument will complete the Run-scanning operation. User can only use this in Menu.

The function of Delete is for deleting the saved file. Also User can only use this in the Menu.
Save/Load

**STEP 1**
- Press the **Shift** key

**STEP 2**
- Press the **Enter** key

**STEP 3**
- To save the waveform or setup status, a name with at least 7 characters is required.
- To select the first character. Use the **Up/Down** keys. And press the **Enter** key
- If want to save the file name fewer than 10 characters, press the “END’ on stated inputted file name.

**STEP 4**
- To delete the character, press the **Marker** key

**STEP 5**
- When all 7 characters included blank are typed, press the **Enter** key. Then, output message for SAVE OK is displayed.
  “SAVE OK”
- If user does not type the all 7 characters included blank, the function of save is not completed

**STEP 6**
- To cancel the Save, press the **Marker** key until the first character is deleted. And additionally press the **Marker** key one time.
- Then the Save is canceled and the output message is displayed as below.
  “SAVE FAILED”
- The values to be saved are signal and system setting values. Buzzer, LCD contrast and LCD light states are not saved.
Save/Load

**STEP 1**
- Press the Shift key

**STEP 2**
- Press the Enter key

**STEP 3**
- To save the waveform or setup status, a name with at least 7 characters is required.
- To select the first character. Use the Up/Down keys. And press the Enter key

The function of Load is to load the saved waveform and setup status.
If user only wants to load only setup status, load the user’s saved data and press the Run key.
Then system will run in loading setup status. (Run-scanning)
Save/Load

STEP 1
- Press the Menu key

STEP 2
- To select the DELETE, use the Up/Down keys or Knob key and press the Enter key

STEP 3
- To delete the saved data, select the user’s saved data using the Up/Down keys or Knob key. And press the Enter key. Then the saved data will be deleted
Select the F.counter under Main Menu – function

The input connector for the frequency counter is BNC connector.

When the input level is inputted into the Frequency Counter, the measured frequency value is displayed in the frequency input window

**Input level is same as below.**

35 MHz to 2,000 MHz : 150m Vrms

20 MHz to 1,000 MHz : 100m Vrms

2,000 MHz to 2,900 MHz : 400m Vrms
Frequency Counter

STEP 1
- Press the Menu key

STEP 2
- To select the FUNCTION, use the Up/Down keys or Knob key and press the Enter key.
  - Then sub menu is opened.

STEP 3
- To select the F. COUNTER (Frequency Counter), use the Up/Down keys or Knob key and press the Enter key
  - The icon is displayed from the other icon.
    The FCNT is displayed in the frequency input window

STEP 4
- When the input level is inputted in the Frequency Counter using BNC connector, the measured frequency value is displayed in the frequency input window

STEP 5
- To change the Frequency Counter mode to Spectrum mode, run the upper Step 1 to Step 3. At this time, select the SPECTRUM not F. COUNTER in Step 3
Power Source

Checking for Battery

To check the battery’s remained capacity Battery, user can refer to the battery icon in the upper area of display window.

How to use and replace the battery

The power system of Protek 7830 uses the Ni-MH rechargeable batteries. Then, the power system supports fast charging. The charger for the Ni-MH batteries is controlled by the voltage and temperature of the battery cells.

The Ni-MH rechargeable batteries must be used for the safe and stable power source. And if the charging is required, please avoid the site with high temperature or high humidity.
Level Unit

Setting of the Unit

The setting for level unit can be set up in the Menu.
The level unit can be set up as below

- dBm
- dBuV
- dBmV

STEP 1

- Push the Menu key

STEP 2

- To select the LEVEL UNIT, use the Up/Down keys or Knob key and push the Enter key.
Then sub menu is opened.

STEP 3

- To select the user’s wanted level unit, use the Up/Down keys or Knob key and push the Enter key.
The function of Reset is for initializing the memory or system. The three kinds of resets are supported. And these resets are run through the Menu

- **Preset**
  System Reboot for initial setup status.
  (Center Frequency, Span Frequency, Marker and etc)

- **Memory CLR**
  The user’s saved data will be cleared. (Memory Cleared)

- **System INIT**
  The upper two resets (PRESET and MEMORY CLR) are run.
  Then, system reboot for initial setup status and the user’s saved data will be cleared

**STEP 1**
- Push the Menu key

**STEP 2**
- To select the RESET, use the Up/Down keys or Knob key and push the Enter key.
- Then, sub menu is opened.

**STEP 3**
- To run the wanted Reset, use the Up/Down keys or Knob key and push the Enter key.
- Then, the selected reset will be run
Baud Rate

The setting of the baud rate is for the transmission speed. The Baud Rate between PC and system is same as below.

- 115,200 BPS (Default)
- 57,600 BPS
- 38,400 BPS
- 19,200 BPS
- 9,600 BPS
- 4,800 BPS

**STEP 1**
- Push the Menu key

**STEP 2**
- To select the BAUD RATE, use the Up/Down keys or Knob key and push the Enter key.

Then, sub menu is opened.

**STEP 3**
- To select the wanted baud rate value, use the Up/Down keys or Knob key and push the Enter key. 
**Connection for PC**

The function of CONNECT PC is for connecting to a PC. First, the GUI program is run on the PC. And the serial cable is connected between PC and Protek 7830. Next, run the REMOTE PC from Menu.

- NONE
- REMOTE PC

**STEP 1**
- Press the Menu key

**STEP 2**
- To select the CONNECT PC, use the Up/Down keys or Knob key and press the Enter key. Then, sub menu is opened.

**STEP 3**
- To select the REMOTE PC, use the Up/Down keys or Knob key and press the Enter key. Then, the connection between the PC and the system is running.
Auto Power

The Auto Power function should be used to conserve system power. When the power OFF time is enabled ("NONE" is not selected), the power source will be turned off automatically if the user does not use the system for the auto power OFF period of time.

The auto power OFF time is same as below

NONE
05MINUTES
10MINUTES
20MINUTES
30MINUTES

STEP 1
- Push the Menu key twice

STEP 2
- To select the AUTO POWER, use the Up/Down keys or Knob key and push the Enter key.
Then, sub menu is opened.

STEP 3
- To select the auto power time, use the Up/Down keys or Knob key and push the Enter key.
Offset

Level Offset compensates for any loss due to the cabling. Offset adds the value of +Offset to all values of measurement.

STEP 1
- Press the Menu key twice

STEP 2
- Move the cursor on PC Connect using the Up/Down or knob Key.

STEP 3
- Push the Enter Key and then move the submenu.
- Move the dB value of Offset.
- Push the Enter Key

STEP 4
- Push the Menu Key one more time to exit the System
There are two modes. One is Multi key function with the Shift Key and the other is to select other functions.

It can select the functions using multi key and in Menu.

The functions that could be selected in Menu mode is as blow

- Level Unit
- Reset
- Band Rate
- Connect PC

To exit from Menu or System, push the Menu Key or push the Dot key. These keys will move through the menu either lower or higher.
Menu

**STEP 1**
- Push the Menu key twice

**STEP 2**
- To select wanted function, use the Up/Down Keys or the Knob Key.

**STEP 3**
- Push the Enter Key

**STEP 4**
- After selecting function of lower item or On/Off, push the Enter Key

**STEP 5**
- Exit the Menu after pushing the Menu Key twice.
- When the Menu Key is pushed one time, you are in System
# Menu

<table>
<thead>
<tr>
<th>Function</th>
<th>Spectrum</th>
<th>Set up the functions of Spectrum and frequency counter.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency Counter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TEST Mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Single Power Meter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Multi Power Meter</td>
<td></td>
</tr>
<tr>
<td>Reception Mode</td>
<td>N-FM</td>
<td>Set up the Reception Mode.</td>
</tr>
<tr>
<td></td>
<td>W-FM</td>
<td>It's possible to set up with the Shift Key.</td>
</tr>
<tr>
<td></td>
<td>SSB</td>
<td>(Shift button is upside-down please check all buttons to confirm they are correct.)</td>
</tr>
<tr>
<td></td>
<td>AM</td>
<td></td>
</tr>
<tr>
<td>Sweep Mode</td>
<td>Free Run</td>
<td>Set up the Sweep Mode.</td>
</tr>
<tr>
<td></td>
<td>Squelch Run</td>
<td>It could be set up with the Shift Key.</td>
</tr>
<tr>
<td></td>
<td>Single Run</td>
<td></td>
</tr>
<tr>
<td>Marker</td>
<td>None</td>
<td>Marker or function using the Marker.</td>
</tr>
<tr>
<td></td>
<td>Marker</td>
<td>The mode can be set up with the Shift Key.</td>
</tr>
<tr>
<td></td>
<td>Delta MKR</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Squelch MKR</td>
<td></td>
</tr>
<tr>
<td>Save</td>
<td>Save Data</td>
<td>The mode can be set up with the Shift Key.</td>
</tr>
<tr>
<td>Load</td>
<td>Load Data</td>
<td>The mode can be set up with the Shift Key.</td>
</tr>
<tr>
<td>Level Unit</td>
<td>dBm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>dBuV</td>
<td></td>
</tr>
<tr>
<td></td>
<td>dBmV</td>
<td></td>
</tr>
</tbody>
</table>
### Menu

<table>
<thead>
<tr>
<th><strong>Reset</strong></th>
<th><strong>Pre Reset</strong></th>
<th>Restarting the System and clear all parameters for set up</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Memory CLR</strong></td>
<td>Delete the stored data</td>
</tr>
<tr>
<td></td>
<td><strong>System INI</strong></td>
<td>All Reset – restarting the system and delete the stored data</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Band Rate</strong></th>
<th><strong>115,200 BPS</strong></th>
<th>Select the speed of serial communication between the unit and PC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>57,600 BPS</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>38,400 BPS</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>19,200 BPS</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>9,600 BPS</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>4,800 BPS</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Connect PC</strong></th>
<th><strong>None</strong></th>
<th>Select the connection to PC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Remote PC</strong></td>
<td></td>
</tr>
</tbody>
</table>


System

There are modes that select the function of Multi key using the Shift Key and the other functions.

Functions can be selected using the multi key and the Menu.

The functions that can be selected in Menu mode are as blow.

To exit from Menu or System, push the Menu Key or push the Dot key, this will move you to lower menu items or to higher menu items.
System

**STEP 1**
- Press the **Menu** Key

**STEP 2**
- Press the **Menu** Key once more.

**STEP 3**
- To select desired function, use the **Up/Down** Keys or the **Knob** Key

**STEP 4**
- Press the **Enter** Key

**STEP 5**
- After selecting a lower item function or On/Off, push the **Enter** Key

**STEP 6**
- Push the **Menu** Key once to exit the System
## System

<table>
<thead>
<tr>
<th>Auto Power</th>
<th>None</th>
<th>05 Minutes</th>
<th>10 Minutes</th>
<th>20 Minutes</th>
<th>30 Minutes</th>
<th>Select auto power saving mode.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buzzer</td>
<td>ON</td>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
<td>Select Buzzer On/Off.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>It could be set up with the Shift Key (Shift Key Icon is upside down. Please check all icons to fix this.)</td>
</tr>
<tr>
<td>LCD Light</td>
<td>ON</td>
<td>OFF</td>
<td></td>
<td></td>
<td></td>
<td>Select LCD Light On/Off.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>It could be set up with the Shift Key.</td>
</tr>
<tr>
<td>LCD Contrast</td>
<td>1 to 10 Step</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INT. Atten.</td>
<td>0 dB</td>
<td>10 dB</td>
<td>20 dB</td>
<td>30 dB</td>
<td>35 dB</td>
<td></td>
</tr>
<tr>
<td>EXT. Atten.</td>
<td>0 dB to 90 dB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offset</td>
<td>-99.0 dB to 99.0 dB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Default save**
- **SAVE**
  - During booting, save default value to be applied.
  - When Saving the values, all values will be saved except Signal.
Description of key operating

Run [GHz]

- **Instruction to start scanning frequencies**
  
  After power on, this button will work as it did under the most recent setup, or when Squelch Run or Single Run functions are active.
  
  [Please refer to the Scan in description of basic operation details if needed]

- **Units input function can be used to set up Start/Stop/Scan/Center frequencies.**
  
  After inputting the frequency values, push the k GHz key to view the units.

Mode [MHz]

- **Selecting Reception Mode**
  
  The following Reception Modes can be selected WFM, NFM, AM and SSB.
  
  [Please refer to the Reception Mode section for detailed description of basic operation.]

- **Units can be entered when setting up Start/Stop/Scan/Center frequencies.**
  
  Push the MHz key after inputting the frequencies to view the values.
Sweep [kHz]

- **Selecting Sweep Mode**

  This button selects the Sweep Mode such as FREE Run (F), SQUELCH Run (S) and SINGLE Run (L).

  [Please refer to the Sweep Mode section for a detailed description of basic operation.]

- **The units input function can be used to set up Start/Stop/Scan/Center frequencies.**

  After input the value of frequency, push the key of kHz for the units its.

Marker [DEL]

- **Selecting Marker functions.**

  After pushing this button, please select Marker functions such as Center Marker, Marker 1, Delta Marker and Squelch Marker.

  [Please refer to the Marker section for a description of basic operation for more detail.]

- **This is the Delete function when setting up Start/Stop/Scan/Center frequencies.**

  When inputting the frequency values, the Marker [DEL] Key can be used as the Delete Key.

This key functions as a backspace key on a PC.
No. 1 [Start/Stop]

- **Press the No. 1** \[1\] **key to input the value of 1.**

  To input the value of numeral 1 in the Start/Stop/Scan/Center frequencies, please use the **No. 1** \[1\] **Key.**

- **Pressing No. 1 key and the Shift** \[Shift\] **Key will active the Input function for Start/Stop Mode.**

  Select the Start/Stop Mode by pushing the **Shift** \[Shift\] **Key and then push the numeral** \[1\] **Key.**

  [Please refer to the **Frequency Input** section for a description of basic operation if more detail is needed.]

No. 2 [Span]

- **Press the No. 2** \[2\] **key to input the value of 2.**

  Input the value of numeral 2 in the Start/Stop/Scan/Center Mode by pressing the **No. 2** \[2\] **Key.**

- **Span Frequency Input function can be activated by pushing** \[Shift\] **Key**

  By pushing the **Shift** \[Shift\] **Key and than pushing the** **No. 2** \[2\] **Key, the Span Mode can be activated.**

  [Please refer to the **Span** section for a detailed description of basic operation if required.]
No. 3 [Level] 3

- **Push the No. 3 3 key to input the value of 3.**

In order to input the value of numeral 3 in the Start/Stop/Scan/Center frequencies, push the No. 3 3 Key.

- **Display Level Adjustment Function by pushing Shift Key.**

On pushing the Shift Key and then push the No. 3 3 Key, Basic Level of vertical axis and Level Step on display could be adjusted.

[Please refer to the Display Level Adjustment section for a detailed description of basic operation if need.]

No. 4 [SINGLE] 4

- **Push the No. 4 4 key to input the value of 4.**

In order to input the value of numeral 4 in the Start/Stop/Scan/Center frequencies, push the No. 4 4 Key.

- **Single Power Meter Adjustment Function by pushing Shift Key**

After pushing the Shift key on, if No. 4 4 key is pushed, Single Power Meter function will be selected.

[Please refer to the section for Single Power Meter using the Power Meter for detailed description of basic operation if needed.]
No. 5 [MULTI] 5

- Push the No. 5 5 key to input the value of 5.

Push the No. 5 5 Key to input the value of numeral 5 in the Start/Stop /Scan/ Center frequencies.

- Multi Power Meter Adjustment Function after pushing Shift Key

On pushing the Shift key and then pushing the No. 5 5 key is pushed, Multi Power Meter function can be selected.

[Please refer to the Multi Power Meter section for a details description for using the Power Meter if needed.]

No. 6 [UNIT] 6

- Push the No. 6 6 key to input the value of 6.

The No. 6 6 Key is used to input the value of numeral 6 in the Start/Stop/Scan/Center frequencies.

- Level Unit Adjustment Function after pushing Shift Key

By pushing the Shift key and then pushing No. 6 6 key, Level Unit function can be selected.

[Please refer to the Level Unit section for a detailed description of basic operation if needed.]
No. 7 [LCD Light]  

- **Push the No. 7 \( \text{7} \) key to input the value of 7.**

  When inputting the value of numeral 7 in the Start/Stop/Scan/Center frequencies, the **No. 7 \( \text{7} \) Key** is used.

- **LCD Light Function after pushing the Shift \( \text{Shift} \) Key**

  By pushing the **Shift \( \text{Shift} \) Key** and then pushing the **No. 7 \( \text{7} \) Key**, LCD Light function can be selected.

  [Please refer to the **LCD Light** section for details about basic operation if needed.]

---

No. 8 [LCD CONT; LCD Contrast]  

- **Push the No. 8 \( \text{8} \) key to input the value of 8.**

  To input the value of numeral 8 in the Start/Stop/Scan/Center frequencies, the **No. 8 \( \text{8} \) Key** is used.

- **LCD Contrast Function after pushing the Shift \( \text{Shift} \) Key**

  By pushing the **Shift \( \text{Shift} \) Key** and then pushing the **No. 8 \( \text{8} \) Key**, LCD Contrast function can be selected.

  [Please refer to the **LCD Contrast** section for details on basic operation.]
No. 9 [Attenuator]

- Push the No. 9 key to input the value of 9.

To input the value of numeral 9 in the Start/Stop/Scan/Center frequencies, the No. 9 Key is used.

- Attenuator Setup Function after pushing the Shift Key

By pushing the Shift key and then pushing the No. 9 Key, Attenuator function can be selected.

[Please refer to the Attenuator Setup section for details about basic operation.]

No. 0 [System]

- Push the No. 0 key to input the value of 0.

When inputting the value of numeral 0 in the Start/Stop/Scan/Center frequencies, the No. 0 Key is used.

- System Setup Function after pushing the Shift Key

By pushing the Shift key and then pushing the No. 0 Key, System Setup function can be selected.

[Please refer to the System Setup section for details about basic operation.]
Shift

- **Using the Function Key**

  The Shift Key does not perform any function by itself. The Shift Key can be used with functions printed below the numeral keys. If the shift key is pressed twice, CENT/SPAN located on bottom of display is changed to START/STOP.

Dot [Buzzer]

- **The Dot key should be used to input a decimal point**

  When input the value of Decimal Point in the Start/Stop/Scan/Center frequencies, this key is used.

- **Buzzer Setup Function after pushing the Shift Key**

  By pushing the Shift key and then pushing the Dot Key, Buzzer On or OFF can be selected.
  
  [Please refer to the Buzzer section for details on basic operation.]

- **Return Function on Menu and System**

  Return Function is used to return from lower Menu to higher Menu on Menu and System.
**Menu [Load]**

- **Menu Function**
  
  Various functions can be selected after entering Menu item. At the Menu item, pushing the **Menu** Key once more; will active the System item.

  [Refer the section of **Menu and System** of basic operation if need more detail]

- **Load Function after pushing the Shift Key.**
  
  By pushing the **Shift** key and then pushing the **Menu** Key, stored Data can be loaded.

  [Please refer to the **Store Mode** section for details of basic operation.]

**Enter [Save]**

- **Enter Function**
  
  The Enter Key is used to select Menu or System items.

- **Save/Load Function after pushing Shift Key**
  
  By pushing the **Shift** key and then pushing the **Menu** Key, Data can be saved.

  [Please refer to the **Save/Load** section for details about basic operation.]
Up/Down Keys and Knob Key

• **Up/Down Keys and Knob Key Functions**

  Movement of Marker, Menu items and System

  After setting the Span, the Span can be changed using the Up/Down key.

  After setting the Reference level, the Reference level can be changed using Up/Down key.