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Find the *Instek GSP-810* at our website: *Click HERE*

Spectrum Analyzer

GSP-810

Operation Manual

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GW Part No: 82SP-81000MB

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Due to continuous improvements in the GSP-810 Spectrum Analyzer, information contained in this Manual is subject to change without notice.

Contact GW, for revisions and corrections.

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EC Declaration of Conformity

We

GOOD WILL INSTRUMENT CO., LTD.

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(2) Plot 522, Lorong Perusahaan Baru 3, Prai Industrial Estate, 13600 Prai, Penang, Malaysia

declare, that the below mentioned product

GSP-810

are herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Law of Member States relating to Electromagnetic Compatibility (89/366/EEC, 92/31/EEC, 93/68/EEC) and Low Voltage Equipment Directive (73/23/EEC).
For the evaluation regarding the Electromagnetic Compatibility and Low Voltage Equipment Directive, the following standards were applied:

EN 61326-1: Electrical equipment for measurement, control and laboratory use — EMC requirements **(1997+A1: 1998)**	
Conducted and Radiated Emissions EN 55011 class A: 1991	Electrostatic Discharge EN 61000-4-2: 1995
Current Harmonic EN 61000-3-2: 1995	Radiated Immunity EN 61000-4-3: 1996
Voltage Fluctuation EN 61000-3-3: 1995	Electrical Fast Transients EN 61000-4-4: 1995
	Surge Immunity EN 61000-4-5: 1995
	Conducted Susceptibility EN 61000-4-6: 1996
	Power Frequency Magnetic field EN 61000-4-8: 1993
	Voltage Dips/ Interrupts EN 61000-4-11: 1994

Low Voltage Equipment Directive 73/23/EEC & amended by 93/68/EEC
Safety Requirements IEC 61010-1: 1990+A1: 1992+A2: 1995 EN 61010: 1990+A1: 1992+A2: 1995

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1.0 General Description and Features

The GSP-810 is designed for minimal set-up and adjustment. The user interface allows fast and accurate measurements. The fully synthesized design of the GSP-810 permits stable operation down to 2 kHz / division.

2.0 Usage Precautions and Recommendations

The following precautions are recommended to insure your safety and to provide the best condition of the GSP-810.

Safety Terms and Symbols

These terms may appear in this manual or on the product:



WARNING: Warning 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 to this product or other property.

The following symbols may appear in this manual or on the product:



DANGER
High Voltage



ATTENTION
refer to Manual



Protective Conductor Terminal



Earth (ground) Terminal

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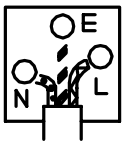
FOR UNITED KINGDOM ONLY

NOTE: This lead / appliance must only be wired by competent persons

WARNING: THIS APPLIANCE MUST BE EARTHED

IMPORTANT: The wires in this lead are coloured in accordance with the following code:

Green/ Yellow:	Earth
Blue:	Neutral
Brown:	Live (Phase)



As the colours of the wires in main leads may not correspond with the colours marking identified in your plug/appliance, proceed as follows:

The wire which is coloured Green & Yellow must be connected to the Earth terminal marked with the letter E or by the earth symbol ⏚ or coloured Green or Green & Yellow.

The wire which is coloured Blue must be connected to the terminal which is marked with the letter N or coloured Blue or Black.

The wire which is coloured Brown must be connected to the terminal marked with the letter L or P or coloured Brown or Red.

If in doubt, consult the instructions provided with the equipment or contact the supplier.

This cable/appliance should be protected by a suitably rated and approved HBC mains fuse: refer to the rating information on the equipment and/or user instructions for details. As a guide, cable of 0.75mm^2 should be protected by a 3A or 5A fuse. Larger conductors would normally require 13A types, depending on the connection method used.

Any moulded mains connector that requires removal /replacement must be destroyed by removal of any fuse & fuse carrier and disposed of immediately, as a plug with bared wires is hazardous if a engaged in live socket. Any re-wiring must be carried out in accordance with the information detailed on this lable.

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Use and Wear

CAUTION

- Do not exceed +30 dBm into the RF INPUT or +30 dBm reverse power into the **TG OUTPUT.**
- Do not place any heavy object on the instrument.
- Avoid severe impacts or rough handling that could damage the GSP-810.
- Use electrostatic discharge precautions while handling and making connections to the GSP-810.
- Do not place wires into the connectors of the GSP-810, only mating connectors and adapters.
- Do not block or obstruct cooling fan vent opening on side panels or on the rear panel of unit.

1) Disassembly of the Instrument

- Do not disassemble the instrument; refer the instrument to a factory approved service facility only.

2) AC Power Input

CAUTION

- AC input should be within the range of selected line voltage +/- 10%.
- Insure the correct fuse is installed prior to applying voltage for the first time -

90 V ~ 132 VAC input : T 1A / 250V

198 ~ 250 VAC input : T0.5A / 250V

- Check the line voltage setting on the rear panel. If the line voltage does not match input voltage, change as follows:
  a) Remove AC Power Cord;
  b) Open cover of AC socket with flat blade screwdriver;
  c) Remove selector Cam Drum and rotate to the correct voltage selection
  d) Replace Cam Drum.

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3) Grounding

WARNING

- To avoid electrical shock, the power cord protective grounding conductor must be connected to earth ground.

4) Fuse Replacement

WARNING

- For continued fire protection, replace the fuse with the specified type and rating only.
- Disconnect power cord before replacing fuse.
- If the fuse is blown, there is something wrong with the instrument. Repair the cause of fault before replacing fuse.

5) Cleaning

- Disconnect AC Power Cord from the instrument before cleaning.
- Use a soft cloth dampened in a solution of mild detergent and water. Do not spray any liquid into the unit.
- Do not use chemicals or cleaners containing benzene, toluene, xylene, acetone or other harsh chemicals.

6) Operating Environment

- The following conditions are recommended for optimum use of the instrument -

  Indoor Use Altitude < 2000 m Temperature 18° to 28° C Relative Humidity < 90%

  Dust Free No direct sunlight No strong magnetic fields
- Installation Category: II
- Pollution degree: 2

7) Storage Environment

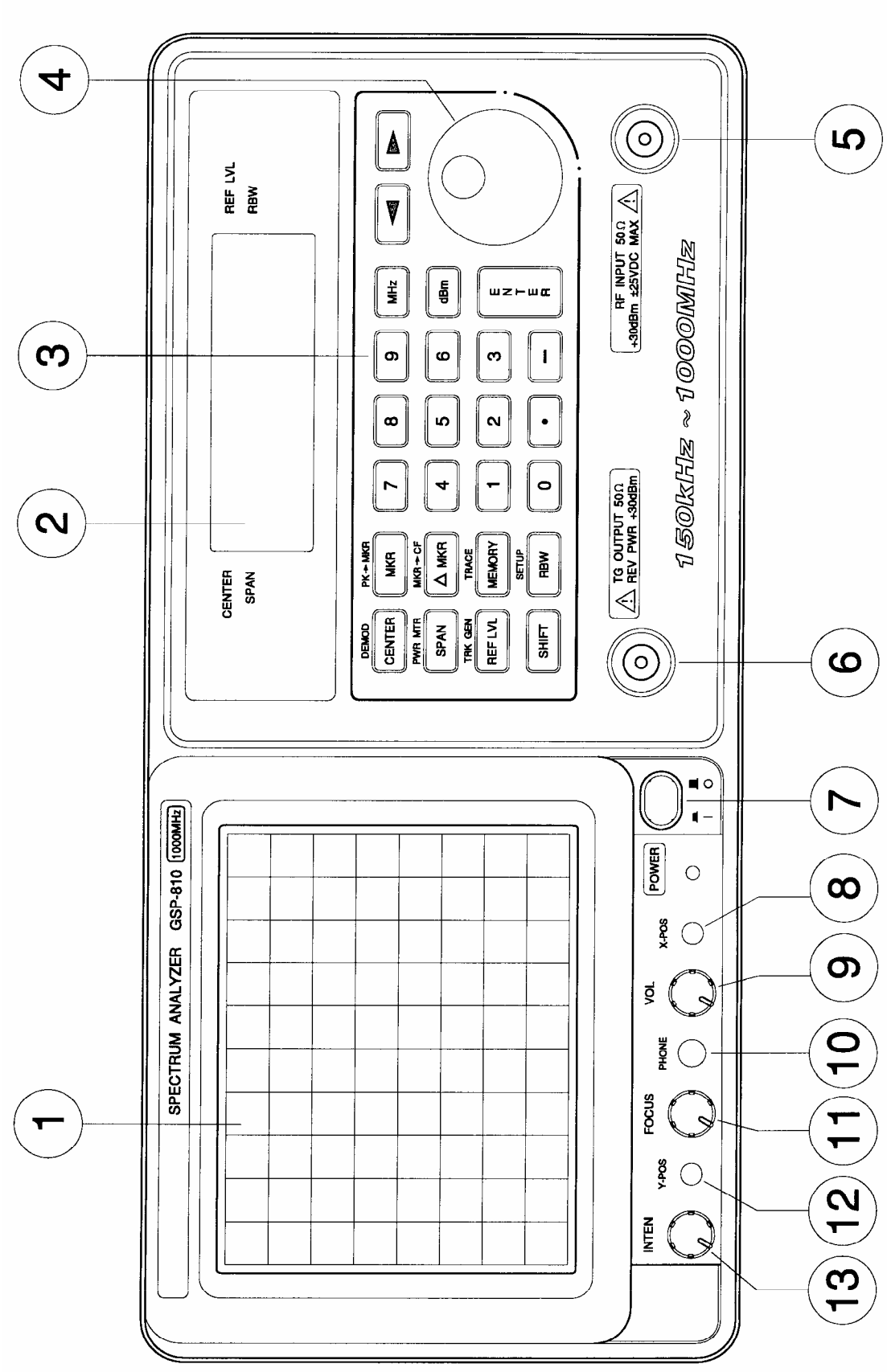
- The following conditions are recommended for optimum storage of the instrument -

  Indoor Temperature 0° to 40° C Relative Humidity < 85%

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3.0 Panel Descriptions

Front Panel

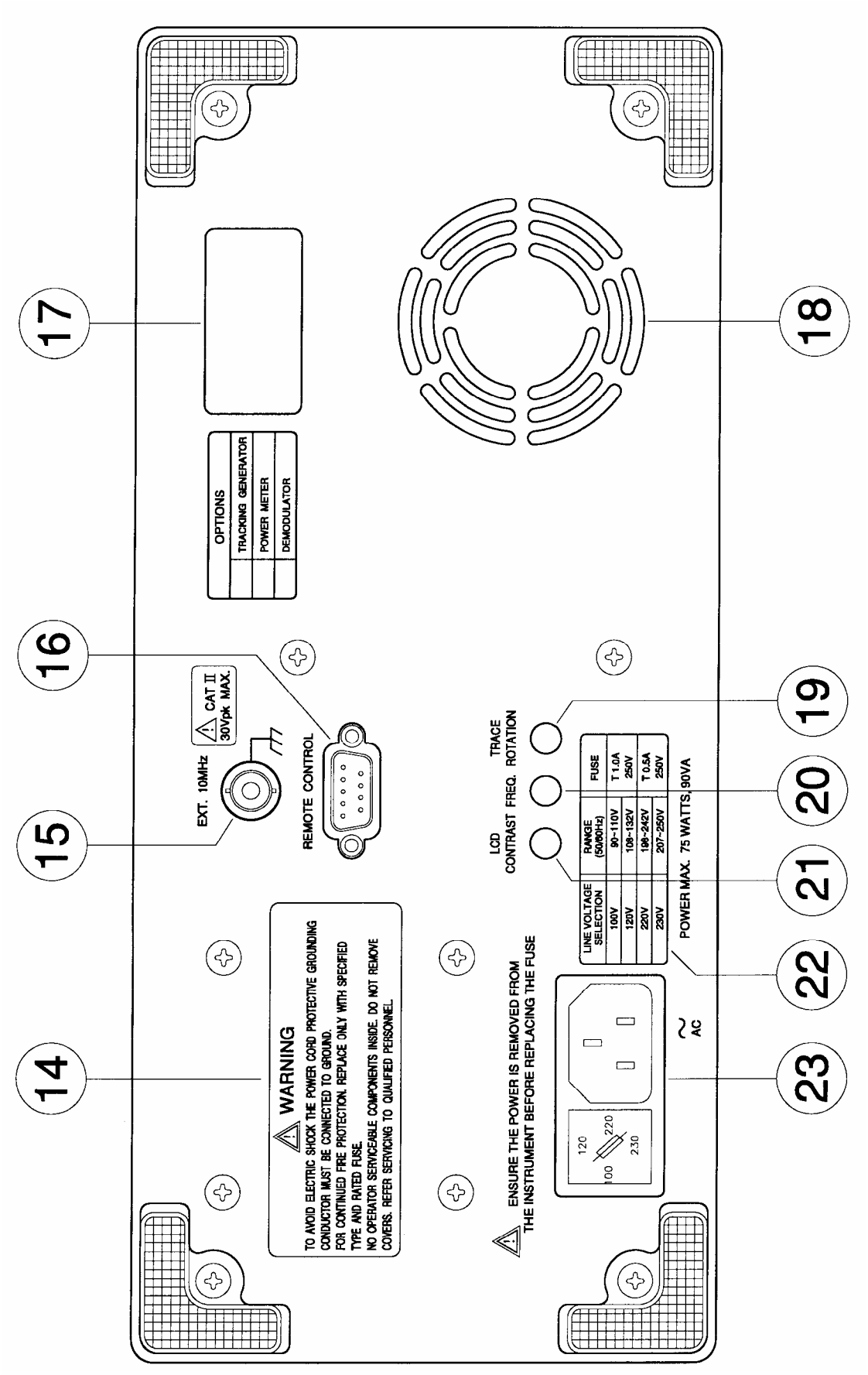


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Item	Description
1	Cathode Ray Tube (CRT) Display, 8 x 10 graticule, 5 inch
2	Liquid Crystal Display (LCD), 4 line x 20 character
3	Keypad, field selection and data entry
4	Spinner, field selection and data change
5	RF Input, Coaxial, Type N Female
6	Tracking Generator Output, Coaxial, Type N Female (optional)
7	Switch, Power ON / OFF
8	Adjustment, CRT Trace Rotation, potentiometer
9	Control Knob, Volume (optional demod receiver)
10	Phone Jack, head set output, (optional demod receiver)
11	Control Knob, CRT Focus
12	Adjustment, CRT Y-axis position, potentiometer
13	Control Knob, CRT Intensity

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Rear Panel



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Item	Description
14	Panel Label, Usage Warning
15	External Frequency Reference Input, BNC (optional)
16	Connector, DB9, Female, RS-232
17	Panel Label, Serial Number
18	Cooling Fan Vent
19	Adjustment, CRT Trace Rotation, potentiometer
20	Adjustment, Internal Frequency Reference , potentiometer
21	Adjustment, LCD Contrast, potentiometer
22	Panel Label, Input Voltage
23	AC Input, Connector, Voltage Select and Fuse

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4.0 Setup and Use

4.1 General Description

The RF input is used to connect to the device under test, or to an external circuit or antenna. The characteristic frequency and level of the signals received are detected displayed on the CRT.

4.2 Use

The settings and control for the GSP-810 are easily accessed from the keypad. The left column of keys are the field selections for Center Frequency (CENTER), Span (SPAN) and Reference Level (REF LVL). Pressing one of these keys selects the corresponding setting and screen edit field. The *BLUE* alternate function key is used to access the functions identified by the blue text above the respective key. For instance, pressing *BLUE* followed by MEMORY selects the TRACE functions.

The following table contains a list of the various data fields that may be controlled within the GSP-810, the selection for the field and the means to change or enter data into the field.

Field	Selection Key	Data Entry
Center Frequency	CENTER	0-9, "." to directly enter a value; ← and → *SPINNER* to scroll ENTER or MHz to complete
Frequency Span	SPAN	*SPINNER* to scroll
Reference Level	REF LVL	*SPINNER* to scroll
Markers	MKR	*SPINNER* to select #1 or #2; → to edit selected marker; ENTER or MHz to complete
Delta Marker	ΔMKR	ΔMARK to select Delta mode; MARK to end Delta Mode
Memory Storage / Recall	MEMORY	*SPINNER* select Recall or Save; → to edit Recall / Save number; *SPINNER* scrolls numbers; ENTER to complete

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Field	Selection Key	Data Entry
Resolution Bandwidth	RBW	*SPINNER* to scroll (SPAN OF **0 Hz / div** ONLY)
Demodulation (Optional Receiver)	*SHIFT*, DEMOD	*SPINNER* to select demod type
Power Meter (Optional)	*SHIFT*, PWR MTR	*SPINNER* selects change line; ← or → to select an item; *SPINNER* to scroll
Tracking Generator (Optional)	*SHIFT*, TRK GEN	*SPINNER* selects change line; ← or → to select an item; *SPINNER* to scroll
Marker to Peak	*SHIFT*, PK →MKR	No data to enter
Marker to Center Frequency	*SHIFT*, MKR →CF	No data to enter
Trace Functions	*SHIFT*, TRACE	*SPINNER* select trace item; ← or → change value or turn function ON / OFF
Setup Functions	*SHIFT*, SETUP	*SPINNER* select setup item; ← or → change value or turn function ON / OFF

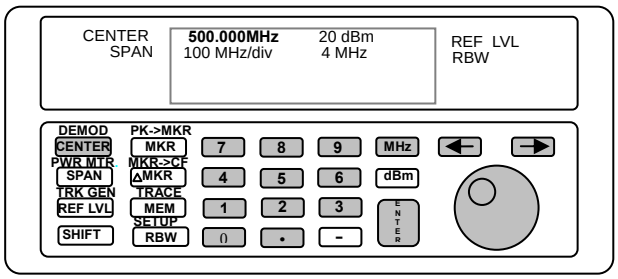
Table 1 - Data field selection and entry.

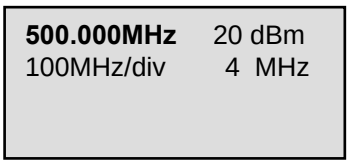
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CENTER FREQ

This field is the value for the frequency located at the mid-point (center screen) of the selected span. This frequency value may be changed by entering the digits, decimal point, followed by the ENTER or MHz key, or the ← and → keys can select a digit to increment or decrement using the *SPINNER*.

The range of valid entries is 0.010MHz to 1000.000MHz. Setting the Center Frequency may change the Span field if the span must be lowered to include the desired frequency. For example, if the Span is set to 100MHz/div and the Center Frequency is changed to 50MHz, the span will change from 100 MHz/div to 10 MHz/div.



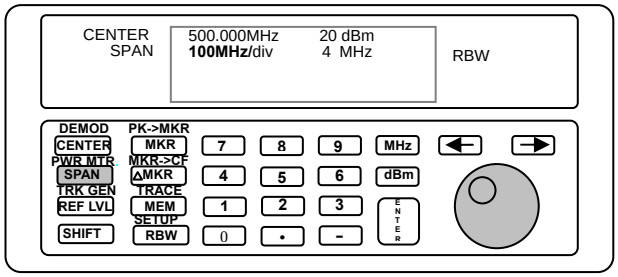


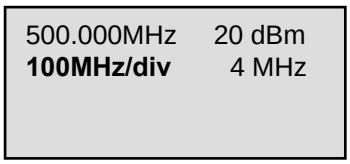
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SPAN

This field is the value for the frequency range covered by the GSP-810 as it sweeps its receiver. This span value may be changed by the *SPINNER* to roll through the list of valid spans.

The range of valid entries is 2 kHz / division through 100 MHz / division plus zero span (0 Hz / div). If changing SPAN will cause Center Frequency to change, the “Limt” message will appear on LCD. It means that the SPAN has exceeded the frequency range for Center Frequency setting. For example, if the Center Frequency is 25MHz and the Span is changed from 5MHz to 10MHz, a “Limt” will appear because the start frequency of span has exceeded the frequency range of GSP810.



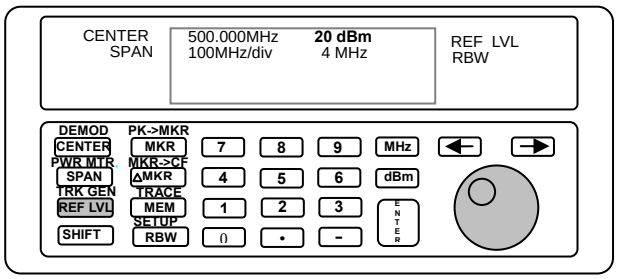


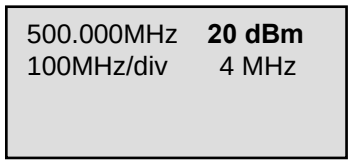
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REF LVL

This field is the value (on the top of screen) for the received input signal. This reference level value may be changed by the rotating the *SPINNER* to scroll through the list of valid reference levels.

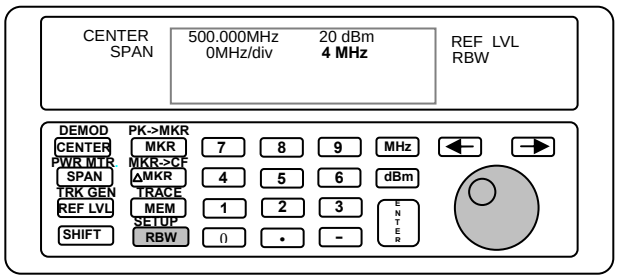
The range of valid entries is +20 dBm to -30 dBm in 10 dB steps.

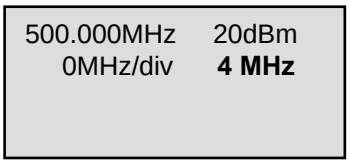




RBW

This field sets the Resolution Bandwidth. The RBW will be set to the optimum automatically every time when SPAN selection is changed. Afterward RBW can be set by rotating the SPINNER to scroll through the list of valid RBWs. It has been under “Amplitude Uncalibrated” status when the “ * ” sign is appeared in front of the RBW range.





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MARKERS

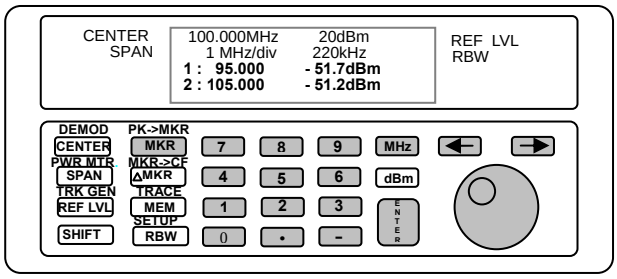
The GSP-810 supports 2 markers. To access the marker screen, press the MRK key. Displayed will be 2 marker frequencies. Accessing the marker frequency fields is performed through the left column of numbers. Cursor to the left most position, then use the *SPINNER* to switch between marker 1 and marker 2. Pressing ENTER will also switch between the 2 marker fields. The frequency value may be changed by entering the digits, decimal point, followed by the ENTER key, or the ← and → keys can select a digit within a marker to increment or decrement by using the *SPINNER.* The valid range of entries is 0.000 MHz to 1150.000 MHz.

A marker will appear on the CRT when the marker frequency selected falls within the range of frequencies defined by the main screen Center Frequency and Span. For example, if the center frequency selected is 100.000 MHz and the span is 1 MHz per division, a marker will appear on the screen if the marker frequency is anywhere between 95 MHz and 105 MHz. When the marker is displayed on the CRT, the signal level at the location of the marker will be displayed to the right of the marker frequency. This level will continuously update while in the marker screen. If the marker frequency is outside the range of frequencies for a given Center Frequency and Span, a message will indicate its status. If the marker frequency is too high to be displayed on the CRT, instead of the marker level, “Off (high)” will be displayed. If the marker frequency is too low, then “Off (low)” will be displayed. If the Markers are disabled, then “OFF” is displayed. To disable the markers, simply press the Marker key while in the markers sub-screen.

If the markers are enabled, their position on the CRT will be updated on each Center Frequency change and each Span change. If a Center Frequency or Span is selected such that the marker moves off the CRT screen, they will be off until the parameter is changed to allow the marker to re-appear.

The resolution of the marker on the screen is based on the span selected. There are 50 positions between major divisions on the CRT that a marker can be moved to. In the 100 MHz/div Span, for example, every 2 MHz will move the marker 1 position. On the outside edges of the trace, however, the maximum and minimum marker positions are considered out of range.

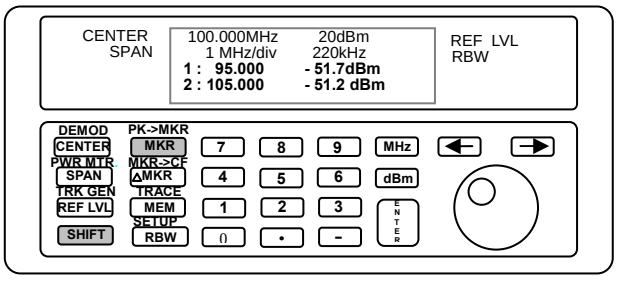
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100.000MHz 20dBm
1MHz/div 220kHz
1: 95.000 - 51.7dBm
2: 105.000 - 51.2dBm

PK->MKR

This is a peak search function. Using marker 1, the GSP-810 begins at the current marker 1 frequency and scans for a peak. When a peak is found in the trace, the marker frequency is updated to show the frequency of the signal and the level of the peak is also displayed. If no peak is found (that is greater in frequency than the current marker position), the marker stops at the end of the trace. Another press of the PK->MKR key will start a new search from the frequency point at the left-most edge of the span. If the marker is not active, it will be activated and a new search will begin from the frequency point at the left-most edge of the span. If the marker is active but the bottom half of the LCD display does not show the marker, the peak function will still complete and the marker on the CRT can be viewed.

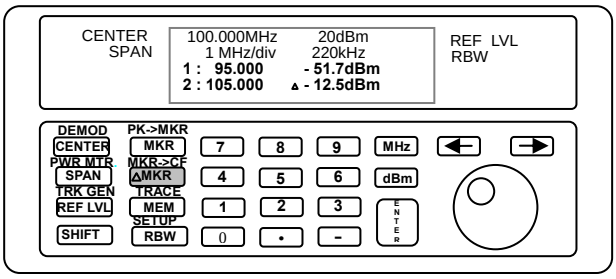


100.000MHz 20dBm
1MHz/div 220kHz
1: 95.000 - 51.7dBm
2: 105.000 - 51.2dBm

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DELTA MARKERS

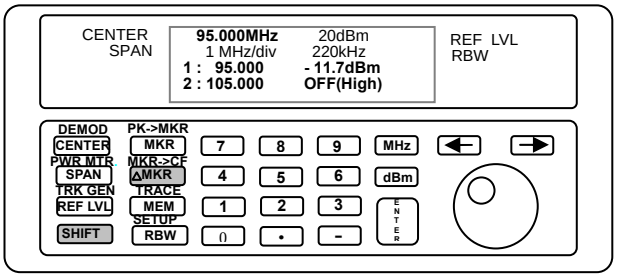
The delta marker function is similar to the marker function. To access the marker screen, press the ΔMKR key. In this function marker 1 is used as the reference marker level and the marker 2 level is level difference between marker 1 and marker 2. In the meantime, a "Δ" symbol will also be displayed on the LCD display.



100.000MHz 20dBm
1MHz/div 220kHz
1: 95.000 - 51.7dBm
2: 105.000 Δ- 12.0dBm

MKR->CF

This function moves the Center Frequency to the current Marker 1 frequency. This will occur even if the marker is OFF. The span may be adjusted as required for the Center Frequency. It has no effect if the current span selection is zero span.



95.000MHz 20dBm
1MHz/div 220kHz
1: 95.000 - 11.7dBm
2: 105.000 OFF(High)

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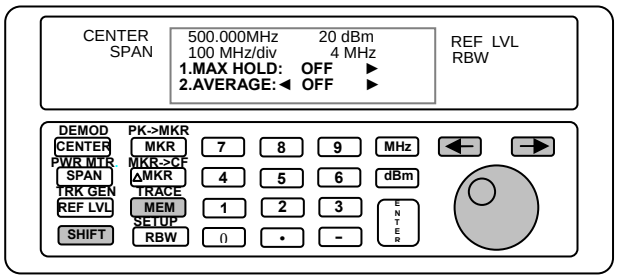
TRACE

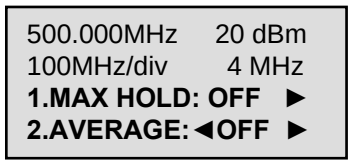
The TRACE key provides access to the Peak Hold, Average, and Freeze features of the GSP-810. These items are shown on the bottom half of the LCD display. By scrolling, all three items can be accessed.

The Max Hold Function, when enabled, will maintain a trace showing the maximum signal received for each point in the trace. It can be reset by disabling the function followed by re-enabling. Enabling this feature will disable the Averaging feature if averaging was on. Markers may be used with the peak hold function when not in zero span.

The Average Function, when enabled, shows a field showing the number of traces being used for averaging. The selection can be changed with the ← and → keys. The valid selections are: “Off”, 2,4,8,16, and 32 traces. Enabling this feature will disable the Peak Hold function if Peak Hold was on. Markers may be used with averaging when not in zero span.

The Freeze Function, when enabled, will freeze the CRT trace with no subsequent updates to the screen. Updates will resume on the first key press after enabling the Freeze function.





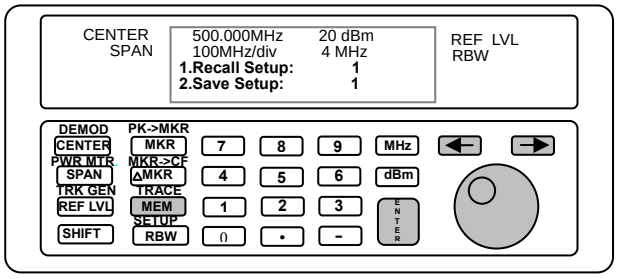
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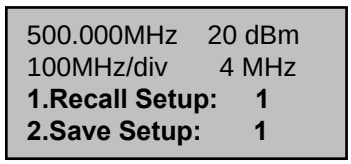
MEMORY OPERATIONS: SAVE / RECALL

The save and recall functions are accessed by pressing the MEMORY key. The bottom half of the screen shows one line for saving and one line for recalling up to 10 setups.

The "Recall" field provides the user with the ability to recall up to 10 different configurations of the GSP-810 including main screen fields, markers, tracking generator fields, and the power meter fields. To recall a new set of parameters, press the ➔ key to move the cursor to the load number field. Then use the *SPINNER* to change the number from 1 to 10. While the cursor is on that field, pressing the ENTER key will load the current state of the GSP-810 with the loaded parameters.

The "Save" field provides the user with the ability to save up to 10 configurations of the GSP-810 including the main screen fields, markers, tracking generator fields, and the power meter fields. To save the current state of the unit, press the ➔ key to move the cursor to the save number field. Then use the *SPINNER* to change the number from 1 to 10. While the cursor is on that field, pressing the ENTER key will save the current state of the GSP-810 into that storage location.





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SETUP SCREEN

The setup screen provides access to various parameters. The setup screen functions are accessed by pressing the SHIFT RBW key. The trace will stop updating while in the setup screen. The parameters are accessible using the *SPINNER*. The following identifies the various parameters:

1. CAL Signal

The “CAL Signal” provides access to an internal amplitude calibrator signal of 80MHz. Pressing the ➔ key toggles the reference signal between “Off” and “On”.

2. Option Report

The “Opt Report” provides access to the current configuration of the GSP-810 including optional hardware that is installed. Pressing the ➔ key displays a screen showing Software Version (SW), Firmware Configuration (FW), Tracking Generator Configuration (TG, where “N” means option not installed), Receiver (R), Power Meter (PM) and Reference Signal (REF). The “TG”, "R" and "PM" labels will be followed by “N” if the option is not installed. The “REF” label is followed by two fields that identify the status of a 10 MHz system frequency reference signal that can be applied to the unit. The first field will display “STD” for standard and “IMP” for improved. The second field will display “INT” for internal 10MHz reference, or “EXT” for external 10MHz reference.

3. Test All

The “Test all” field automatically checks the LO statuses of LO1, LO2, and LO3. If all three LO’s are locked, the “Locked” is displayed. If one of the three is unlocked, then “Unlocked” is displayed.

4. LO1 Status

This displays the status of LO1. An internal status is monitored to determine if it is “Locked” or “Unlocked” with the result being displayed.

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5. LO2 Status

This displays the status of LO2. An internal status is monitored to determine if it is “Locked” or “Unlocked” with the result being displayed.

6. LO3 Status

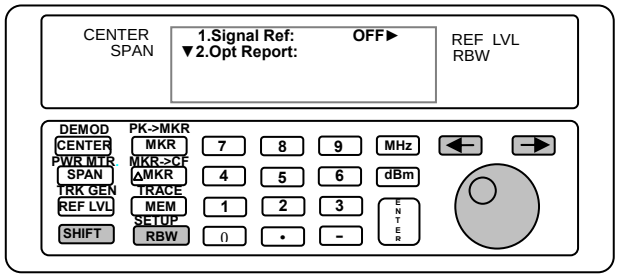
This displays the status of LO3. An internal status is monitored to determine if it is “Locked” or “Unlocked” with the result being displayed.

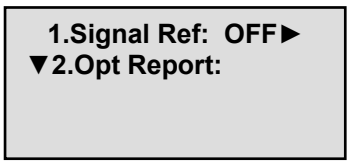
7. POWER Units

This controls the units displayed for the optional power meter. The selections are “mW” and “dBm”.

8. Marker Style

The Marker can appear as type of either “Line” or “Dot”. By pushing the “ [➔] ” key can toggle the option





SAVING POWER-UP SYSTEM PARAMETERS

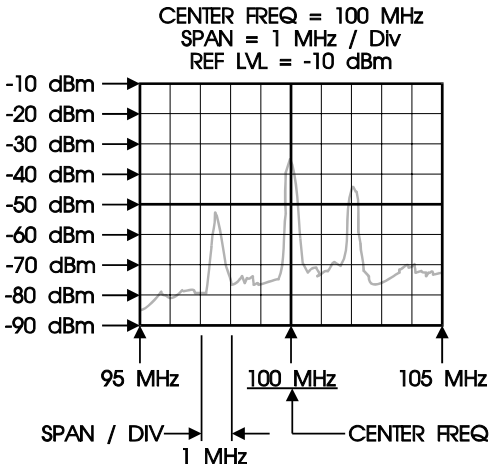
Power-up information will be saved any time the setup screen is exited. To access the setup screen, press the SHIFT SETUP key. To exit the setup screen, press the ENTER key. When exiting, the fields will be saved to a non-volatile storage device. The information saved includes the Center Frequency, Span, and Reference Level fields, the marker frequencies, the power meter fields, and the Tracking Generator fields.

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Operation

Next figure shows a typical spectrum display. This example shows the settings for a 100 MHz center frequency, a 1 MHz / division span and a reference level of -10 dBm. The 8 by 10 division display indicates RF level on the vertical or y-axis, and frequency on the horizontal or x-axis.

The reference level is the top line on the screen, and each vertical division down represents 10 dB. The center frequency is located at the center grid position of the display, and each division across the display represents 1MHz.

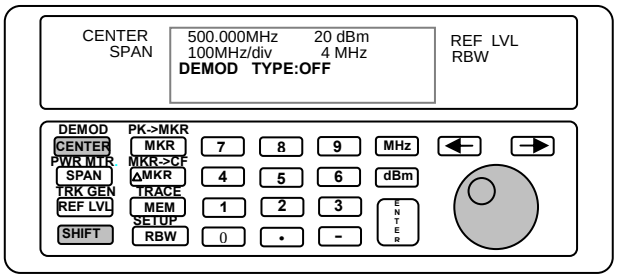


Spectrum Display

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DEMOD (Optional)

The GSP-810 can be optionally configured to perform FM and AM demodulation. To access this feature, press the SHIFT DEMOD key. The bottom half of the LCD display will show the current demodulation selection that can be changed with the *SPINNER*. Demodulation can only be performed in Zero-Span mode. When in Zero Span the demodulation audio will be routed to the speaker. When a demodulation mode is selected, the span will automatically switch to Zero Span (if it was not already in Zero Span). There are default RBWs associated with the various demodulation modes. For FM-Wide, FM-Medium, and FM-Narrow, the default RBW is 220 kHz, the RBW may be changed between 220 kHz and 4 MHz. For AM demodulation, the default RBW is 30 kHz, the RBW may be changed between 3 kHz, 30 kHz, 220 kHz, and 4 MHz. The default RBW is restored each time SHIFT DEMOD is pressed.



500.000MHz 20 dBm
100MHz/div 4 MHz
DEMOD TYPE:OFF

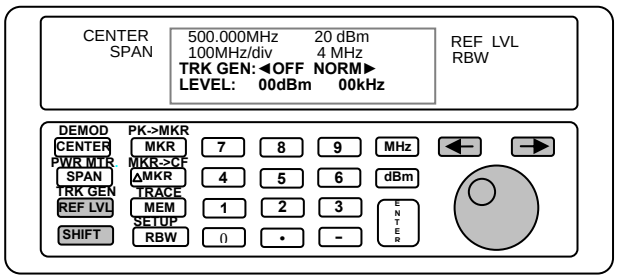
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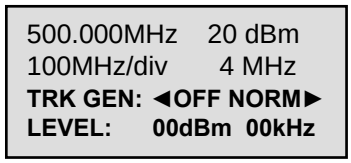
TRACKING GENERATOR (Optional)

The optional tracking generator screen is accessed through the SHIFT TRK GEN key. Upon entering the screen, 3 fields are displayed. The “TRK GEN” label displays the status of the tracking generator. Pressing the ← key will turn the tracking generator on and off if the option is installed. Pressing the → key will move the cursor to the NORMALIZE field. Pressing the → key once more will activates the NORMALIZE function. Using the *SPINNER* allows the user to access the second line. For convenience, pressing the ENTER key will move the cursor through the different fields for easier operation.

The second line displays the tracking generator level and frequency offset (no label for frequency offset). Both fields can be accessed by pressing the ← and → keys. To change the fields, use the *SPINNER*. The numbers will scroll through the valid range of values.

The normalize function allows the user to calibrate out the gains and losses in the cables or other units under test. To use the normalize function, connect the equipment to the tracking generator output port and the spectrum analyzer input port. Following a normalize, the GSP-810 will factor out the measured variances. When the Span or Center Frequency fields are changed, the normalize will be reset and should be run again.





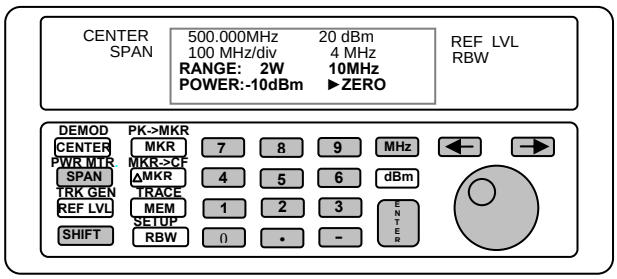
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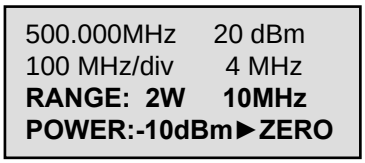
POWER METER (Optional)

To access the power meter in the GSP-810, press the SHIFT PWR MTR. The bottom half of the screen will show the power level in mW or dBm based on the units selected in the setup screen. The range field will allow the user to change the range of 2mW, 20mW, 200mW and 2W (or equivalently 3dBm, 13dBm, 23dBm and 33dBm). The AUTO option is helpful when the input signal power is unknown. If the reading under AUTO selection is close to any one of the four level boundaries as mentioned above, it is recommended to use the two next ranges to do again. In general, the lower range will be more accurate.

The "ZERO" function will zero the power meter in all ranges required. This should be performed before taking initial readings. When performing a zero function, there should be no signal source connected to the GSP-810.

The power meter readings will continuously update as long as the power meter is active. A power reading of "-∞" indicates a value of 0 mW in dBm units.





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5.0 Quick Use Index

(1) **Full Span :** Set CENTER=500MHz, SPAN=100MHz/Div, REF LVL=20dBm.
See CENTER FREQ, SPAN, REF LVL(P. 13~15).

(2) **Max. Hold :** SHIFT + TRACE → 1.Max Hold. See TRACE (P. 19).

(3) **Average :** SHIFT + TRACE → 2.Average. See TRACE (P. 19).

(4) **View the trace :** SHIFT + TRACE → 3.Freeze. See TRACE (P. 19).

(5) **Recall Setting :** Memory → 1.Recall. See Memory (P. 20).

(6) **Save Setting :** Memory → 2.Save. See Memory (P. 20).

(7) **Initial Status of Power On :** SHIFT + SETUP. See SETUP (P. 22).

(8) **Internal Cal. Signal :** SHIFT + SETUP → 1.CAL Signal. See SETUP (P. 21).

(9) **Option Report :** SHIFT + SETUP → 2.Option Report. See SETUP (P. 21).

(10) **Self Diagnose :** SHIFT + SETUP → 3~6. LO's status. See SETUP (P. 21~22).

(11) **Change Power Meter Unit :** SHIFT + SETUP → 7. Units. See SETUP (P. 22).

(12) **Dump the Trace to PC.** See Appendex 1 (P. 31).

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6.0 Specifications

Specifications are subject to change without notice. Refer to GoodwillW Instrument Co., LTD. for latest specifications.

Frequency	
Frequency range	150kHz to 1000MHz
Frequency resolution	1 kHz C.F. entry, 40 Hz Sweep resolution at 2 kHz/div
Frequency display	6 1/2 digit setting
Frequency control	Digital phase locked
Frequency stability	± 2 ppm/year aging , ±10 ppm, 0 to 50ºC
Frequency spans	Zero, 2 kHz to 100 MHz/div. in a 1-2-5 sequence
Bandwidth	
Resolution bandwidths	3 kHz, 30 kHz, 220 kHz, 4 MHz
Resolution BW accuracy	15%
Video Bandwidth	1.6 kHz / 90KHz coupled with RBW
Amplitude	
Reference level range	-30 dBm to + 20 dBm
Reference level accuracy	± 1 dB at 80 MHz
Input level range	-100 dBm to +20 dBm
Noise floor	-95 dBm @ 30 kHz RBW, -100 dBm typical -75dBm:150k~10MHz
Amplitude display range	75 dB
Amplitude accuracy	± 1.5 dB typical @ 0 dBm, 80 MHz
Amplitude level linearity	± 1.5 dB over 70 dB
Ref. Level frequency flatness	± 1.5 dB over 100 MHz, ± 2.5dB typical over entire band ± 3 dB : 150kHz~10MHz
Harmonic spur response	< -40 dBc, RF input < selected reference
Non-harmonic spur response	< -60 dBc typical down from reference level, average, 5 MHz/div
Intermodulation (3rd)	< -70 dBc, @-40 dBm input, 2 tones, 2MHz apart < -45dBc: 150kHz~10MHz
Phase Noise	- 77dBc/Hz @ 1 GHz, 30 KHz offset

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Input	
Input overload protection	+30 dBm continuous, ±25VDC
Impedance	50 ohm nominal
Return loss	< 16 dBRL (VSWR < 1.35)
Input attenuation	50 dB to 0 dB in 10 dB steps coupled to reference level
Connector	Type N female
Marker	
Number of markers	2
Marker resolution	0.1 dB, 1 kHz
Marker mode	Absolute, Relative, PK->Marker, Marker->Center
Marker accuracy	0.1dB ± Amplitude accuracy
Functions	
Memory	9 memories of save/recall
Trace	Max. Hold, Average (2~32 traces), Freeze(Hold)
Setup	Access parameters
Remote Display software and RS232	Connecting to PC and getting trace from GSP810, software will be downloaded from GW Web-Site
Receiver	
WB FM	120 kHz deviation
MB FM	75 kHz deviation
NB FM	30 kHz deviation
AM	
Outputs	Internal speaker, 3.5mm stereo jack, wired for mono operation
General	
Power Source	100/120/220/230 AC, 10%, 50/60Hz, approx. 75W, 90VA
Dimensions and Weight	310(W) x 150(H) x 455(D)mm, approx. 8.5kg
Accessory	Operation manual ×1
Options	
Tracking Generator(Option 01)	
Frequency range	10 MHz to 1000MHz
Amplitude range	0 to –50 dBm
Amplitude resolution	1 dB
Amplitude accuracy	±1 dB @ 0 dBm, 80 MHz
Attenuation accuracy	±1 dB @ 50 MHz
Amplitude flatness	±1 dB @ 10MHz/div, ±1.5dB @0dB, entire band
Harmonics	< -30 dBc
Reverse power	< +30 dBm

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Impedance	50 ohm nominal
Return loss	< 10 dBRL (VSWR < 2)
Connector	Type N female
Power Meter (Option 02)	
Frequency Range	10MHz to 2 GHz, usable to 2.7GHz
Power level range	-20 dBm to +23 dBm, usable to +30 dBm
Power level overload	+40 dBm < 10% duty cycle, < 10 mS duration
Return loss	< 1:1.35 VSWR into 50 ohms, < 1:1.25 typical
Readout resolution	0.2 mW, 100 mW scale, 2μ W, 1mW scale; 0.1dB, Log scale
Accuracy	± resolution ± 10% at 25 degrees C± 7 degrees C
Readout	mW or dBm
Remote control software (Option 03)	Connecting PC to get trace and provide the control for setting

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Appendix 1 - Remote Operation (Standard and Option)

With remote operation, the GSP-810 is capable of communicating with a computer over the RS-232 port. No setup is required on the GSP-810 to enable the remote interface. The GSP-810 will monitor the RS-232 port and respond when a PC is connected.

The PC applications are designed to run on Windows® NT, Windows® 95, or Windows® 98. The serial port used is selectable and the port setups are handled automatically by the application. The cable should be a straight through RS-232 cable (not a NULL modem).

To have the application, simply to download the application file from GOODWILL INSTRUMENT CO., LTD. web site or directly click the following URL:

http://www.goodwill.com.tw/english/service-english/Sc.htm

Two programs are available for use with the GSP-810. The "standard" program provided with the GSP-810, "GSP810try" provides display of the spectrum trace, saving and printing of the trace, but no computer control of the GSP-810 settings. By clicking the “GSP-810 Remote display software”, the GSP810try can be downloaded.

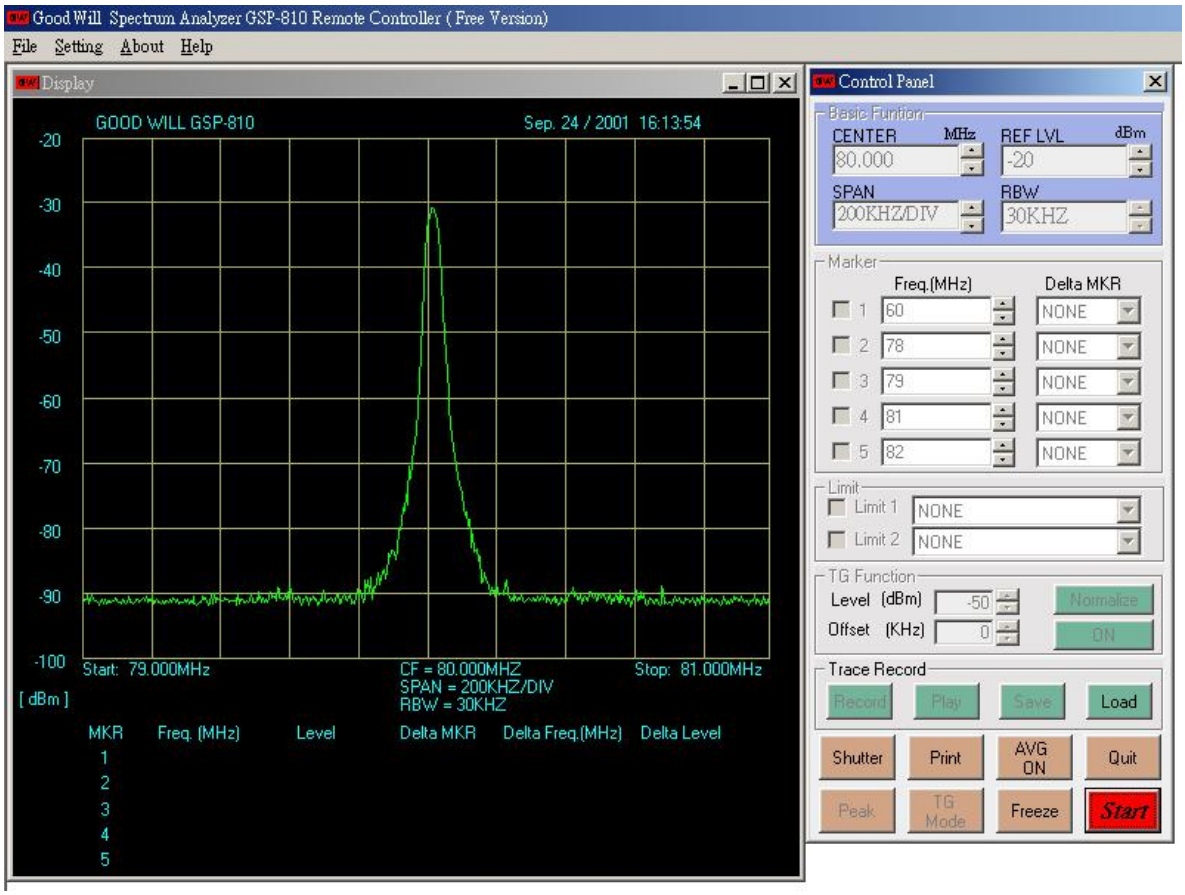
The optional program "GSP810" which can be downloaded by clicking “GSP-810 Remote control software” provides the same functions as the standard GPS810try, plus allows you to control the unit from the computer. With the optional “GSP810” application, a license code is necessary to perform. Please contact us for ordering the license code.

E-mail - marketing@goodwill.com.tw

URL - http://www.goodwill.com.tw

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GSP810try



To install GPS810try, download the GSP-810 Remote display software to get "GSP810try.zip" file. Extract the GSP810try.zip to execute "setup.exe". It is easy to setup this application by following the prompt instructions.

After the successful installation, there will be an icon of GSP810try 

added onto program files. To run the program, double-click this icon.

There are two major areas of this program, Display and Control Panel.

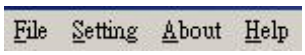
The Display area will display the trace and the basic configuration of GSP810, like Center frequency, Span, RBW and Reference level… etc. Another one for control panel provides control functions. These two areas are independent, if a larger scope of trace is desired, just click the  of Display area to enlarge the display.

****A more detail description of operation is in attached with Help function. Please click the Help to get the complete operation information**

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Display Area

There are File, Setting, About and Help functions on the display area.



File To quit this application, same as Quit in Control Panel.

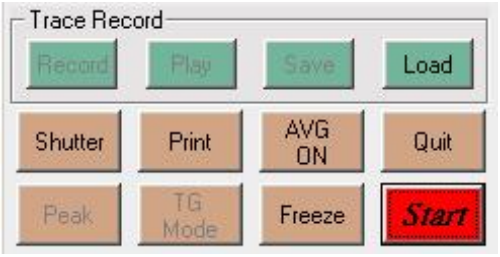
Setting To set the configuration of the display.

About Information of this application program.

Help Help file of this application program.

Control Panel

The available functions are Shutter, Print, AVG ON, Freeze, Start/Stop, Load and Quit.



Shutter To save the trace as a JPG file. The saved directory can be defined in " Setting " of Display area.

Print To directly print out the Display area through printer.

AVG ON To activate the Average function. Click again to disabled.

Freeze To Freeze the trace sweep. Click again to disable.

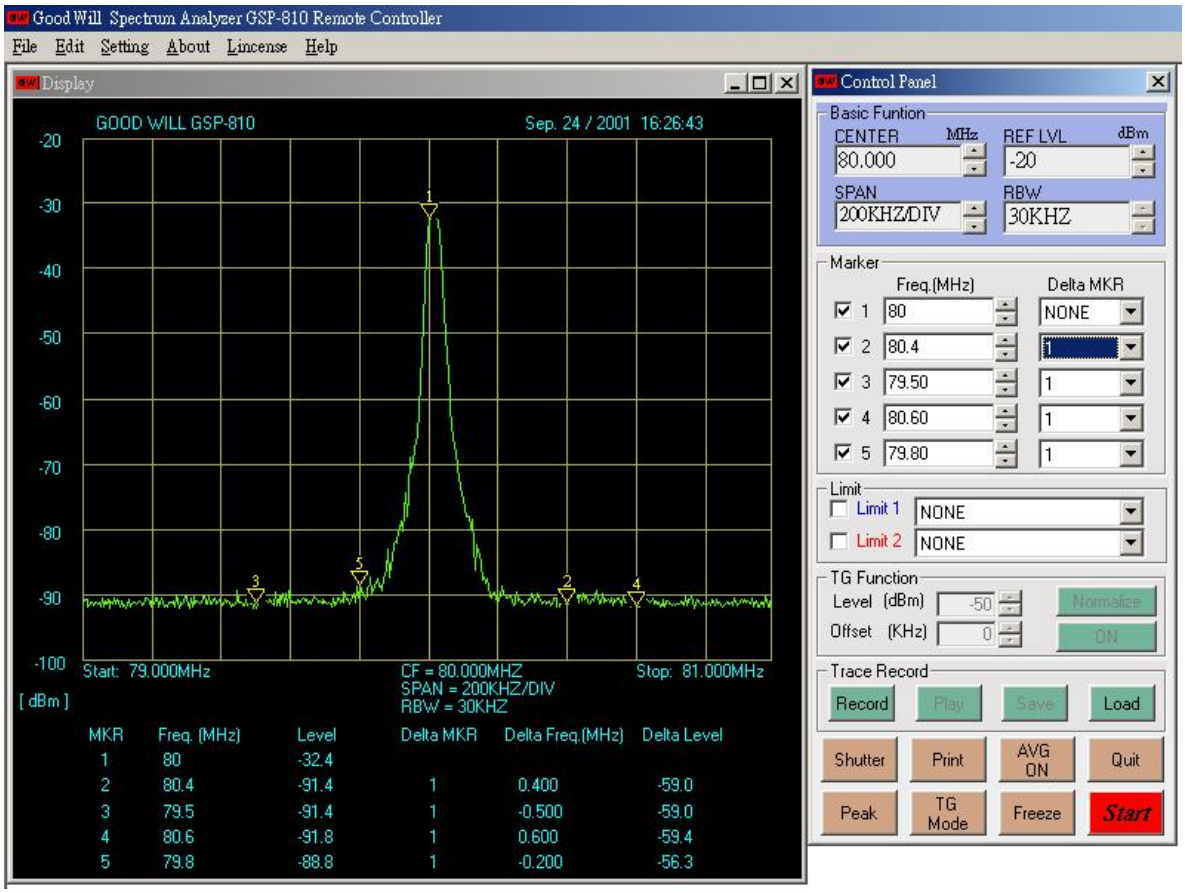
Load To load the recorded trace for preparing to play. When loading the record, at least one trace file should be existed.

Start To Start to display the trace on PC. A Stop key is followed to show up. Click the Stop will stop displaying trace.

Quit Quit this application.

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GSP810



To install GPS810, download the GSP-810 Remote control software to get "GSP810.zip" file. Extract the GSP810.zip to execute "setup.exe". It is easy to setup this application by following the prompt instructions.

After the successful installation, there will be an icon of GSP810 GWGSP810 added onto program files. To run the program, double-click this icon.

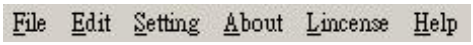
There are two major areas of this program, Display and Control Panel.

The Display area will display the trace and the basic configuration of GSP810, like Center frequency, Span, RBW and Reference level… etc. Another one for control panel provides control functions. These two areas are independent, if a larger scope of trace is desired, just click the  to enlarge the display.

****A more detail description of operation is in attached with Help function. Please click the Help to get the complete operation information**

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Display Area



Edit To edit the limit line. See “Limit” function in following.

License To enter the license code.

The others are the same as GSP810try.

Control Panel

There are four divisions of the control functions. They are Basic Function, Marker, Limit, TG Function, Trace Record and General Function.

Basic Function



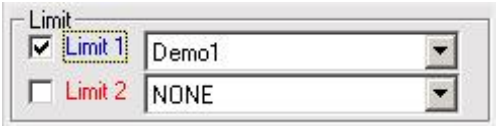
Center To set the Center frequency.

Span To set the Span.

REF LVL To set the Reference level.

RBW To set the RBW.

Limit



There are two limit lines that allow to be used in “Upper” and ”Lower” limit needed application. When installation is completed, there will be a “working” directory is set under the setup directory. This is also the default directory for demo limit line saved. Editing and saving a new limit line can also be done in “Edit” function.

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TG Function



All TG control functions can be remote control. The control is worked when the TG mode is in use. Clicking TG Mode/SA Mode can toggle the TG and SA control.

Trace Record

Trace Record offers the ability to store the dynamic trace in memory. It is very convenient to long term recording for tracking the sudden interference or signal.



Record To record the trace. The recording period can be set in "Setting" function.

Play To play the trace that was just recorded.

Save To save the recorded trace to a file.

Load To load the saved trace for preparing to play.

General Function



Peak To find the Peak with the Marker 1.

TG Mode To enable the TG controls remotely.

The others are the same as GSP810try.

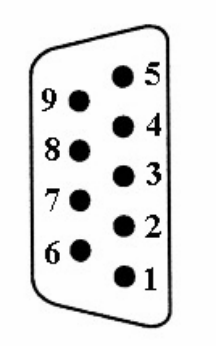
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RS-232 (9 Pin Female)

Some DTE devices may have female connectors. Also, the RS-232 parts of personal computers may be configured as DCE or DTE devices, with either a 25-pin or a 9-pin connector. Refer to the documentation that accompanies your computer or terminal to determine if it is a DTE or a DCE device.

The equipment is a DTE device with a 9-pin D-type shell RS-232 connector located on the rear panel. Figure 1 shows the equipment of 9-pin connector (female) with its pin number assignments. When connecting the equipment to another RS-232 device, please consider the following suggestions:

- Many devices require a constant high signal on one or more input pins.
- Do not connect the output line of one DTE device to the output line of the other.
- Ensure that the signal ground of the equipment is connected to the signal ground of the external device.
- Ensure that the chassis ground of the equipment is connected to the chassis ground of the external device.



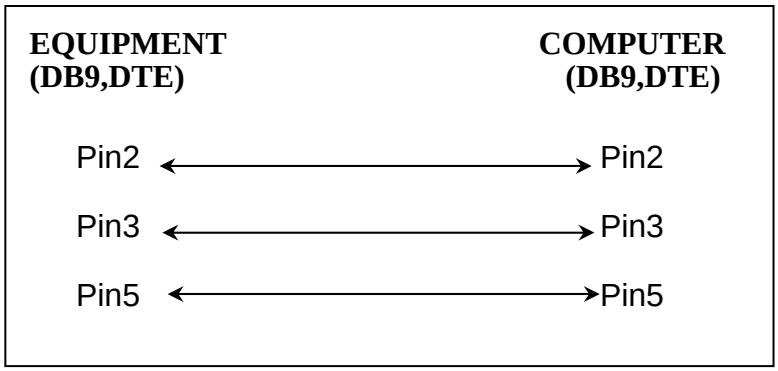
9-PIN D-SHELL

1. No Connection
2. Transmit Data (TxD) (output)
3. Receive Data (RxD) (input)
4. No connection
5. Signal Ground (GND)
6. No connection
7. No connection
8. No connection
9. No connection

Figure 1: Pin Assignments of the RS-232 Connector on the rear panel for DB-9-D Connector

DB9 to DB9

This wiring configuration is used for computers with DB-9-D connectors configured as Data Terminal Equipment.



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Figure 2: Wiring Configuration for DB9 to DB9

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