User's Guide

LPT-6000

9 kHz -6.2 GHz

Digitally Synthesized RF Spectrum Analyzer

LP Technologies, Inc.

Chapter 1

Product specifications

In this Chapter, we will review the LPT-6000 Spectrum Analyzer's specifications

Chapter **1.** Product Specifications

1-1. Product Specifications

Frequency

► Range : 9 kHz to 6.2 GHz

► Resolution : minimum 1 Hz

► Span Range : 100 Hz / div to 300 MHz / div

Selection of 1,2,5 steps (automatic), ZERO Span, FULL Span (9 kHz to 6.2 GHz)

► Frequency Selection : Start, Stop, Center, Span set-up

► Span Accuracy : ±3 % of the Indicated Span Width

► Readout Accuracy : ≤±(Indicated frequency × Reference frequency accuracy + Span

× Span accuracy + 50% of RBW)

► Phase Noise : ≤−90 dBc/Hz @10 kHz offset

Amplitude

► Range : +20 dBm ~ −105 dBm

► Avg. Noise Level (1 kHz RBW, 10 Hz VBW)

≤−105 dBm : 150 kHz ~ 1 GHz

≤−100 dBm : 1 GHz ~ 2.4 GHz, 50 kHz ~ 150 kHz

≤−95 dBm : 2.4 GHz ~ 6.2 GHz

► Amplitude Unit : dBm, dBmV, dBuV, V, mV, uV, W, mW, uW

► Display Scale Linearity

≤±1.5 dB / 70 dB (10 dB / div), ≤±1.5 dB / 40 dB (5 dB / div)

≤±0.5 dB / 8 dB (1 dB / div), ≤±0.5 dB / 16 dB (2 dB / div)

► Frequency Response (0 dB attenuation) : −3.5 dB ~ 1.5 dB (100 kHz ~ 10 MHz)

±1.5 dB (10 MHz ~ 6.2 GHz)

► Reference Level

Range : −90 dBm to +20 dBm

Resolution : 0.1 dB step

Accuracy : ±1.5 dB

- ► Second Harmonic Distortion : ≤−60 dBc, −40 dBm input
- ► Intermodulation Distortion : ≤−70 dBc, −40 dBm input
- ► Residual Spurious : ≤−85 dBm (Input terminated, 0 dB attenuation)
- ► Other Input Spurious : ≤−60 dBc, −30 dBm input
- ► Resolution Bandwidth

  Selections : 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz, 300 kHz, 1 MHz, 3 MHz, 9 kHz, 120 kHz

  Accuracy : ±20 %

  Selectivity : 60 dB / 3 dB ratio < 15 : 1

                  60 dB / 6 dB ratio < 12 : 1 (9 kHz, 120 kHz)

  Switching Error : ≤±1.0 dB (1 kHz Reference RBW)

  Video Bandwidth : 10 Hz to 3 MHz in 1-3-10 step

Sweep

- ► Time : 100 ms to 1000 sec, 40 ms to 1000 sec (zero span)
- ► Accuracy : ≤±20 %
- ► Trigger Source : External (rear), Video, Free run, Line
- ► Trigger Mode : continuous, single
- ► Trigger Level : TTL level

Storage

- ► Trace Storage : maximum 900 waveforms
- ► Setup Storage : maximum 3,000 states

Screen Display

- ► Type : 6.4″ color TFT LCD screen
- ► Display Resolution : 640 (H) × 480 (V) active display area
- ► Marker Mode : Peak search, Delta marker, Marker to Center,

                  Marker to Reference (8 markers maximum)

Input

- ► RF Input Connector : N-type Female, 50 Ω nominal
- ► VSWR : 150 kHz to 3.0 GHz, VSWR < 1.5 : 1 (with 0 dBm Ref Level)
- ► Maximum Input Level : 0 Vdc, +20 dBm

Standard Frequency (10 MHz, Ref.)

► Temperature Stability : ±0.5 ppm

► Aging : ±0.5 ppm / Year

► Connector : BNC female

► Input Level : −5 dBm to +15 dBm

► Output Level : 10 MHz, +8 dBm nominal

Interface

► RS-232C

► Printer

Driver : PCL3 or PCL5, HP, EPSON, Laser-Jet, Desk-Jet etc. supports most of printers

Connector : for standard 25 pin female D-Sub parallel printer, support USB

► USB 2.0 Host

Printer Driver : Supports most of printers including HP, EPSON, Laser-Jet, Desk-Jet, etc.

USB Storage Device : supports 1.1, 2.0, for storing image files, supports GIF format

► Ethernet (Option)

10-Base-T Ethernet : supports Internet remote control

► GPIB Interface (Option) : IEEE 488 bus

General Specifications

► Size : 350 (width)×195 (height)×375 (length) mm

► Weight : 10 kg

► Warming-up Time : More than 20 minutes for precise measurement

► Power

Supply Electrical Power : 100-240 VAC at 50 / 60Hz

Consumption Power : 80 watts maximum (when an option is not built in)

► Operating Temperature : 0 ℃ to 40 ℃

► Temperature for Storage : −20 ℃ to 70 ℃

RF Emissions, Immunity

RF emissions : EN 550011, FCC PART15 Section 15.101

RF Immunity : EN 61326

► Altitude : 75kPa – 106kPa

Chapter 2

Preparation for Use

In this Chapter, we will review the following:

- Initial inspection
- Power requirements
- Fuse check
- Power cable
- Environmental conditions
- Turning ON the LPT-6000

Chapter 2. Preparation for Use

2-1. Initial Inspection

Please inspect the box contents and make sure all items listed are included. Keep the shipping box and all packing materials until the inspection of the LPT 3000 Spectrum Analyzer is complete.

Table 2-1 (below) shows all accessories offered with the LPT-6000 Spectrum Analyzer. Please contact LP Technologies Customer Support for any damaged parts, missing items or any other issue that you may need assistance with.

To clean the unit, please use a dry or wet cloth on the surface only. Do not clean the inside of the case.

WARNING ! To prevent an electric shock, please unplug the power cord from the main power supply on the back of the spectrum analyzer before cleaning.

Accessories	Note:
Operation Manual CD	Included in the package
Power Cable (AC Power Cable 3 Holes)	Included in the package

[Table 2-1] Accessories offered with the LPT 3000 Spectrum Analyzer

2-2. Requirements for Power

The LPT 3000 does not need any additional external devices, use only the power cord provided. For more information, see Table 2-2 below.

[Table 2-2] Requirements for AC Power

Input Voltage	100 - 120 VAC (50 - 60 Hz)

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Input Voltage	220 - 240 VAC (50 - 60 Hz)
Power Consumption When Using	Less than 80W

2-3. Fuse Check

When there is no spare fuse offered along with the device, the fuse to change should A fuse should be established in the fuse holder located in the upper part of the power switch on the back board. When replacing fuses, if no spare fuses were offered with the unit, the replacement fuse should match the properties listed in the fuse holder (250 VAC, 3.15 A type T 5 × 20 mm).

WARNING !	To prevent the danger of a fire, please use only the recommended fuses. Using a fuse with a different power rating may cause serious damage to the spectrum analyzer.

2-4. Power Cable

In accordance with International Safety Standards, the LPT 3000's power cable uses 3 lines including "Ground." When connected to a power outlet, the cable grounds a cabinet of the unit.

WARNING !	Please use a grounded power cable with three lines, or connect the spectrum analyzer to a protective "Ground" line. Operating the unit without following these requirements may put you at risk of an electric shock. It is also important to check the source voltage because if it exceeds the standard recommended value, the spectrum analyzer might get damaged permanently or catch fire.

2-5. Environment Conditions

The LPT-6000 Spectrum Analyzer will operate normally between the temperatures of 0 ℃ and 40 ℃. However, for the best performance, it is important to avoid exposing the unit to the following conditions: severe vibration, high moisture, direct sun rays and areas where the source voltage changes constantly.

WARNING ! To prevent short-circuits due to condensation. Make sure the spectrum analyzer is fully dry before using it in normal conditions, after storing or using it in low temperature environments for long periods of time.

WARNING ! In order to prevent the inner temperature of the unit from rising, there is a cooling fan on the rear panel. Please, leave at least 10 cm between the back panel and walls or other nearby devices in order to allow proper cooling.

2-6. Turning on Power

Please connect the power cord to the back panel of the LPT-6000 Spectrum Analyzer, before use, and then press the "On" button on the front panel. Allow the unit to warm up for approximately 10 minutes before operating.

If you intend to use an external signal of 10 MHz as a standard frequency, please use the 10 MHz REF IN input connector on the rear panel.

The signal level should be over -5 dBm.

Chapter 3

Getting started

In this Chapter, we will review the following:

- Front panel overview
- Rear panel overview
- Display overview
- Menu and soft key overview
- Measurement methods
- Summary of measurements

Chapter 3. Starting

3-1. Front Panel Overview
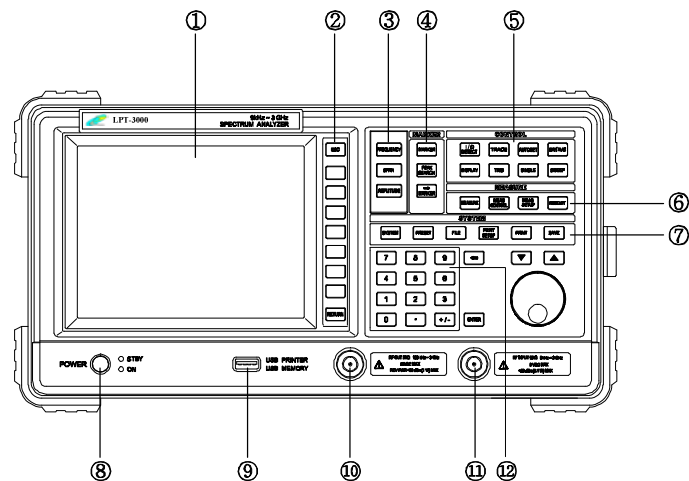
[Figure 3-1] Front panel

1. 6.4″ TFT-LCD.

   Displays the wave type, parameter set-up, indicated value, and menu key label.

2. Unlabeled soft keys next to the screen.

   Allow the user to perform several different functions using the menu displayed on the LCD screen.

3. FREQUENCY, SPAN, and AMPLITUDE keys.

   Activate the primary spectrum analyzer functions and access menus of related functions.

   FREQUENCY key allows the user to enter or change the frequency parameter data.

   SPAN key allows the user to enter or change the span parameter data.

   AMPLITUDE key allows the user to enter or change the amplitude parameter data.

4. MARKER function.

Controls markers, reads frequency and amplitude on the trace and automatically detects the signal with the highest amplitude.

MARKER key activates the marker function.

PEAK SEARCH key activates the peak search functions.

MARKER → Sets the marker value as a specific parameter.

5. CONTROL functions.

    Allows access to menus that control the spectrum analyzer display and other functions necessary for measurement.

    I/O DETECT key is for setting the input and output of a Ref. 10 MHz signal, and Detect Mode.

    TRACE key is related to the set-up of trace on an LCD screen.

    AUTOSET key searches and for the highest amplitude signal and automatically set the parameters.

    BW/AVG key is for setting functions including RBW, VBW, and AVG.

    DISPLAY key is for setting the screen indicating functions.

    TRIG key is for setting the trigger function.

    SINGLE key is for performing a single sweep.

    SWEEP key is for setting a sweep time and sweep mode.

6. MEASURE functions.

    Allows the user to set up, control and reset the spectrum analyzer measurements functions and use the built-in compliance masks.

    MEASURE key allows access to measurement tools and compliance masks.

    MEAS CONTROL is for controlling measurement functions.

    MEAS SETUP key is for setting measurement functions.

    RESTART key is for resetting measurements.

7. The function within a SYSTEM key, affects the entire state of the analyzer. You can make diverse set-up and arrangement by using this SYSTEM key.

    PRESET key is initializing the analyzer to an established state.

    FILE key menu makes it possible to save the current trace state in a memory of the analyzer or USB flash memory, or make it to be loaded from them.

    SAVE key immediately perform the currently defined saving function.

    PRINT SETUP menu key makes it possible to set printing stuffs.

PRINT key immediately sends printing data to a printer.

8. The power button turns ON/OFF the LPT-6000 Spectrum Analyzer. The Green light indicates the unit is ON and the Red light indicates it is in a STANDBY mode. The main power switch on the back of the unit must be ON to operate the unit. When the unit is ON, press and hold the POWER button for 3 seconds to turn it OFF.

9. USB interface for USB Flash memory stick or USB printer cable.

10. Tracking Generator or CDMA Signal Generator input connector (Optional).

11. RF signal input connection.

A data controlling keys including a step key, a knob, and a number key pad allow the user to change the numeric value of an active function. Turning the knob clockwise increases values while counter-clockwise decreases values. All controlling keys can be uses concurrently. For example, the values for the central frequency may be adjusted by using the knob, by punching new values using the key pad or by using the step keys to increase or decrease the values.

The knob makes it possible to successfully change values for functions such as central frequency, reference level, and a marker location. The scope of the adjustment will be determined by the scale of the scope of measurement. The number key pad is used to input precise values.

3-2. Rear Panel Overview
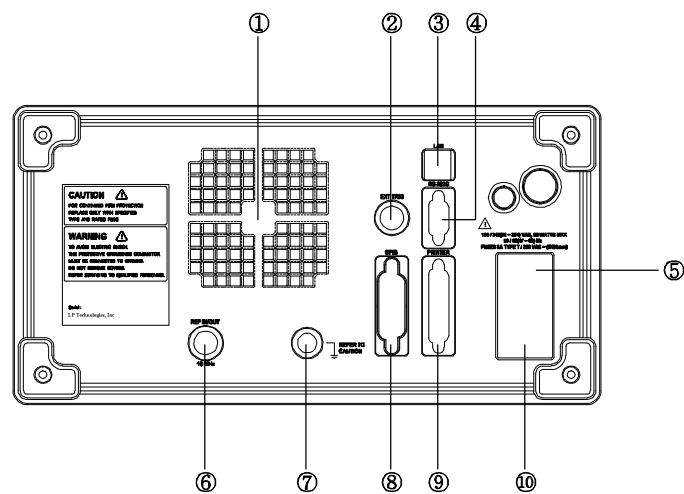
[Figure 3-2] Outline of the Function of a Rear Panel

1. Ventilation fan is installed to discharge heat generated inside equipment.

2. External trigger input connector

3. Ethernet connection interface

4. RS−232C connection interface

5. AC main power switch (including fuse)

6. Input/Output connector for standard frequency. This port is activated by pressing the I/O DETECT button in the CONTROL section on the front panel of the unit.

7. Ground connection

8. GPIB connector

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9. Printer connection

10. AC power switch (including a fuse)

3-3. Display Overview

This is a screen shot of the actual LPT-6000 display. A description of each item listed is provided below.
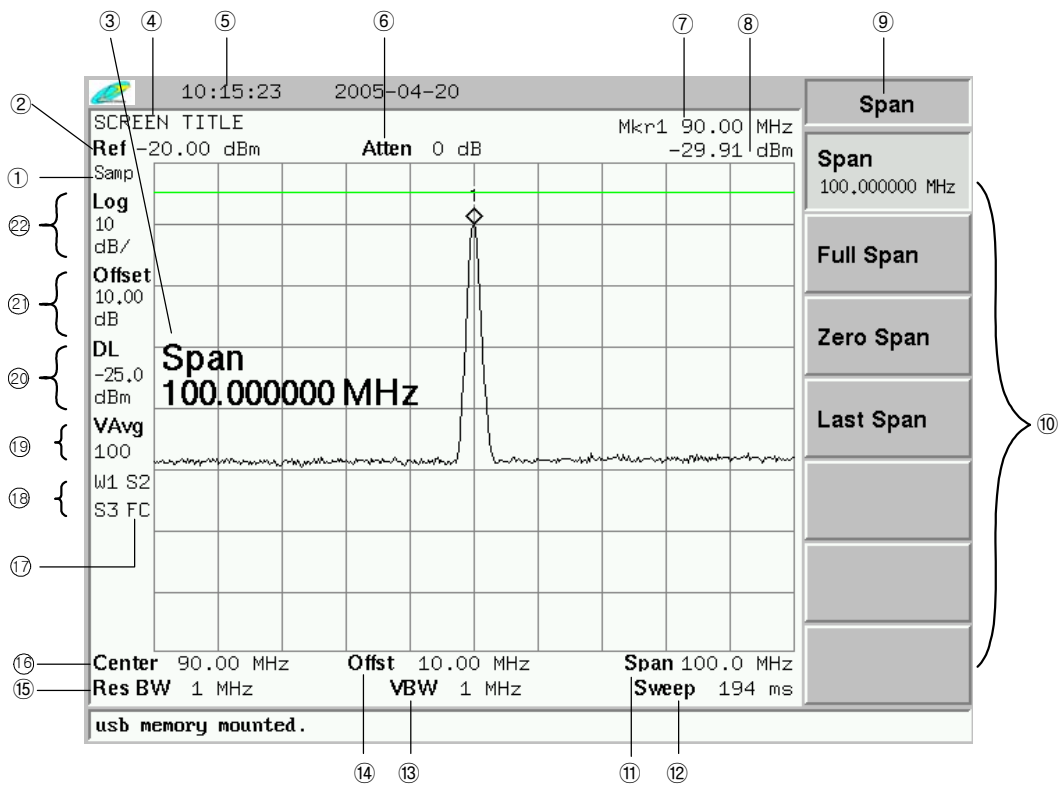
[Figure 3-3] Screenshot

[Table 3-1] Explanation of a Screen

Item	Explanation	Function Key
1	Detect mode	**I/O DETECT >> Detect**
2	Reference level	**AMPLITUDE >> Ref Level**
3	Activating function block	Subject to changes in accordance with the selection of a key

Item	Explanation	Function Key
4	Screen title	**DISPLAY >> Title >> Change Title**
5	Time and date	**SYSTEM >> Time/Data**
6	Attenuation	**AMPLITUDE >> Attenuation**
7	Marker frequency	**Marker**
8	Marker amplitude	**Marker**
9	Menu title	Subject to change according to the key selection
10	Menu	Subject to change according to the key selection
11	Frequency span or Stop frequency	**SPAN** or **FREQUENCY >> Stop Freq**
12	Sweep time	**SWEEP >> Sweep Time**
13	Video bandwidth	**BW/AVG >> Video BW**
14	Frequency offset	**FREQUENCY >> Freq Offset**
15	Resolution bandwidth	**BW/AVG >> Res BW**
16	Center frequency or starting frequency	**FREQUENCY >> Center Freq** or **FREQUENCY >> Start Freq**
17	Trigger / Sweep	**TRIG, SWEEP**
18	Trace mode	**TRACE**
19	Video avg.	**BW/AVG >> Average**
20	Display line	**DISPLAY >> Display Line**
21	Amplitude offset	**AMPLITUDE >> Ref Level Offset**
22	Amplitude scale	**AMPLITUDE >> Scale/Div**

[Table 3-2] Explanation of a Screen on Trace Mode

Screen Code	Explanation
W	Clear Write
M	Max Hold
V	View
S	Blank
m	Min Hold

[Table 3-3] Explanation of a Screen on Trigger Mode

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Screen Code	Explanation
F	Free Run
L	Line trigger
V	Video trigger
E	External trigger

[Table 3-4] Explanation of a Screen on Sweep Mode

Screen Code	Explanation
C	Continuous sweep
S	Single sweep

3-4. Menu and Softkey Overview

There are several keys labeled (FREQUENCY, SYSTEM and MARKER...etc) on the front panel of the LPT-6000 Spectrum Analyzer designed to execute specific different functions. Pressing a front panel key accesses a soft key menu that is located along the right side of LCD display.

Softkey menus allow access to a list of related functions to the ones obtained by pressing directly on the front panel keys. Pressing the unlabeled keys, also called softkeys, immediately on the right of the annotation screen will activate the functions on the softkey menu.

The function becomes active when the value of the concerned softkey menu can be changed. Activated functions appear on the LCD screen in the active function block. For example, pressing the FREQUENCY key will display a softkey menu of related functions on the right of the LCD screen. Pressing the softkey corresponding to Start Freq will result in the "Start Freq" being displayed in the active block.

Softkeys with ON and OFF allow the user to turn a function ON or OFF

Softkeys with AUTO and MAN allow the user to auto-couple or manually change values using the

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number key pad, scroll knob, or the step keys.

3-5. Measurement Methods

A 80MHz standard signal is generated inside equipment and is used as test signal.

1. Please turn on the device by pressing the ON button on the front panel and wait until the self test and the alignment process are complete.

2. Press SYSTEM >> Power On/Preset >> Preset Type >> Factory in order, and select Factory Preset.

3. Press **I/O DETECT >> Ref Out (On)** to turn on the 80 MHz standard signal generated inside the LPT-6000 Spectrum Analyzer.

4. Please set the frequency by pressing the **FREQUENCY** key.
    The Frequency softkey menu is now activated on the right side of the LCD and the Center Frequency will be displayed on the screen. Using the scroll knob, step key, or number key pad, please set the center frequency to 80 MHz.

5. Please set the span by pressing the **SPAN** key.
    The Span softkey menu is now activated on the right side of the LCD and the Span Frequency will be displayed on the screen. Using the scroll knob, step key, or number key pad, please reduce Span Frequency to 20 MHz.

6. Please set the amplitude by pressing the AMPLITUDE key
    It is necessary to adjust the amplitude level on the screen when the peak of a signal does not appear on the screen. Press the AMPLITUDE key, the REF Level softkey menu is will be activated on the right side of the LCD and the Reference Level of 0.0dBm will be displayed on the screen. Use the scroll knob, keypad, or the numeric keypad to adjust the REF level to the desired value until you get a good signal. When you change the reference level values, the amplitude of the highest graticule line will be changed.

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The figure 3-4 fully shows the relationship between the Central Frequency and Reference Fevel. The box in the figure shows a display of the analyzer. Changing of the Center Frequency changes the location of horizontal line on the display. Changing the Reference level changes the vertical position of the signal on the display. If you increase a span, the scope of frequency shown horizontal on the display will increase.

[Figure 3-4] Relationship Between Frequency and Amplitude

7. Please set the marker.

The marker function measures the frequency and amplitude of a signal and places a diamond-shaped marker on the maximum value of the signal. If you intend to activate the marker, please press the marker key. The normal button will be highlighted and the marker value will be displayed in the active function block. Please place a marker on the maximum value of a signal by turning a scroll knob. Also, you can automatically place a marker on the peak of trace by using a PEAK SEARCH key.

The decipherment result of the marker frequency and amplitude will show up on an activated function block, and on the upper right corner of the display. If you are to determine the amplitude of a signal, please check the decipherment result of the marker.

When other function is activated, you can find the marker frequency and amplitude on the ecipherment result of the marker on the upper right corner of the display.

3-6. Summary of Measurement

1. Please press **SYSTEM >> Power On/Preset >> Preset Type >> Factory**. Please press a PRESET key.

2. Turn on the 80 MHz standard signal generated the inside of the spectrum analyzer by pressing **I/O DETECT >> Ref Out (On).**

3. Set the Center Frequency to **80 MHz**

4. Set a Span Frequency to **500 kHz**

5. The 80 MHz standard signal of the inside of the analyzer is about -**40 dBm**, so using the scroll knob, step keys or the numeric keypad, adjust reference level to **-30 dBm.**

6. Set the marker by pressing the MARKER and moving the marker to the maximum value of a signal, or by pressing PEAK SEARCH.

   Please read amplitude and frequency. It should be indicated as the figure 3-5. The frequency is indicated horizontally, and the amplitude vertically.
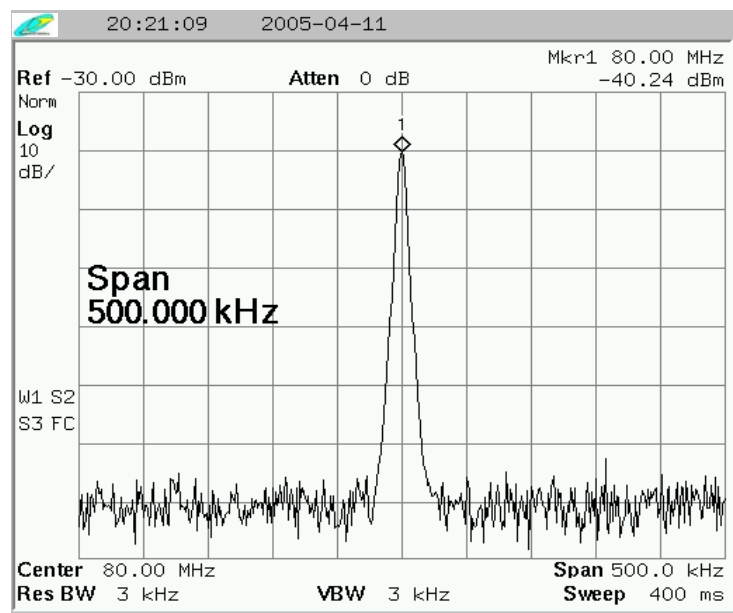
[Figure 3-5] Decipherment of Amplitude and Frequency

Chapter 4

Menu structure

In this Chapter, we will review the following:

- Menu Functions
- Menu Structures

Chapter 4. Menu Structure

4-1. Frequency

Frequency

Center Freq
Start Freq
Stop Freq
CF step Auto   Man
Freq Offset
Signal Track On   Off

4-2. Span

Span

Span
Full Span
Zero Span
Last Span

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4-3. Amplitude

Amplitude		Y Axis Units
Ref Level	→	dBm
Attenuation Auto Man		dBmV
Scale/Div		dBuV
Ref Level Offset		Watts
Y Axis Units		Volts

4-4. Marker

Marker	Marker	Readout
Select Marker 1 2 3 4	Select Marker 1 2 3 4	Frequency
Normal	Marker Trace Auto 1 2 3	Period
Delta	Readout	Time
Delta Pair Ref Delta	Marker On Off	
Span Pair span Center	Maker All Off	
Off		
More 1 of 2	More 2 of 2	
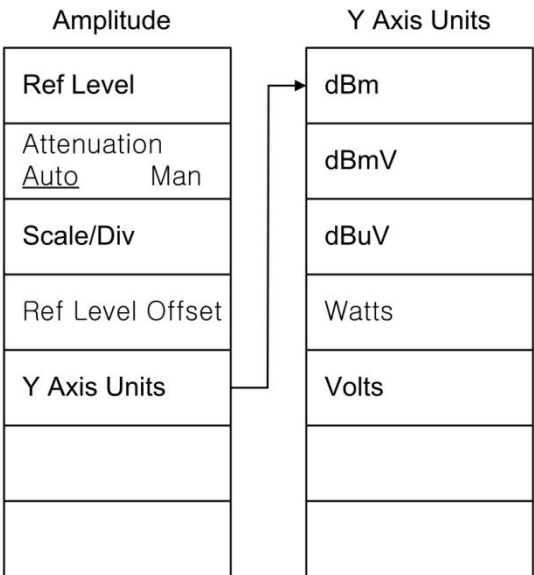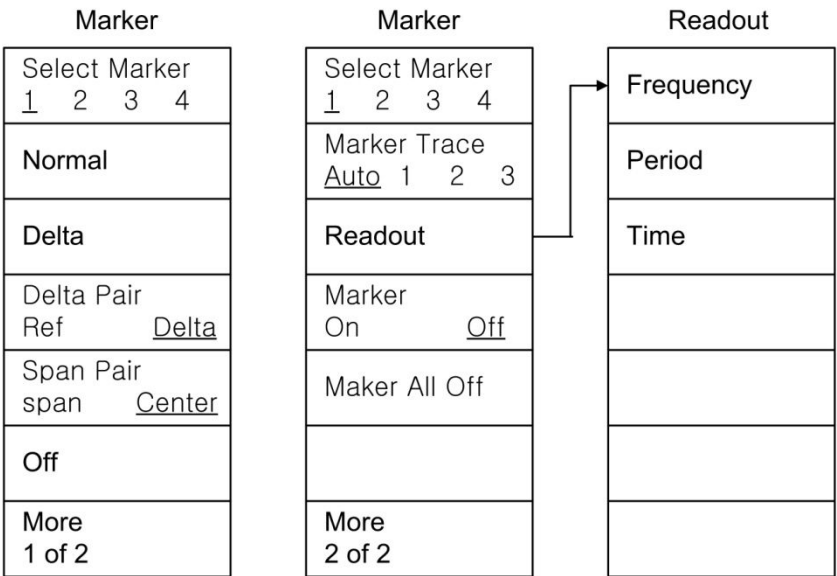
4-5. Peak Search

Peak Search

Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Cont Pk On   Off
Mkr -> CF

4-6. Marker →

Marker ->

Mkr -> CF
Mkr -> CF Step
Mkr -> Start
Mkr -> Stop
Mkr Delta->Span
Mkr -> Ref Lvl

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4-7. I/O DETECT

I/O Detect

10 MHz EXT	INT
Ref Out On	Off
Detect Auto	Man

Detect

Auto
Peak
Sample
Normal
Average
Neg Peak
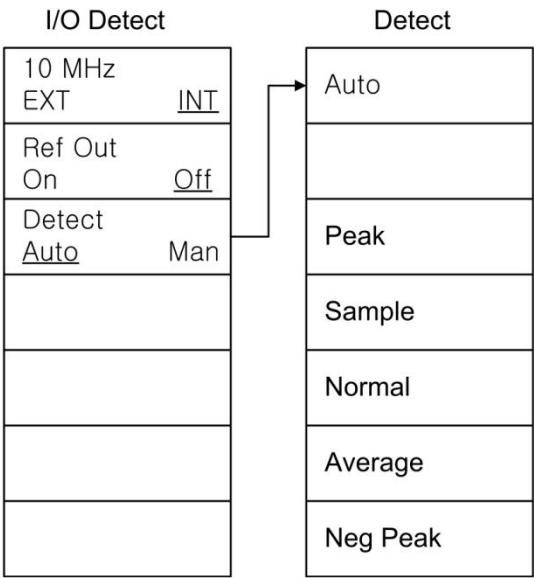
4-8. Trace

Trace

Trace 1 2 3
Clear Write
Max Hold
Min Hold
View
Blank

4-9. BW/Avg

BW/Avg		Average Type	EMI Res BW
Res BW Auto Man		Auto	120 kHz
Video BW Auto Man		Video	9 kHz
VBW/RBW Auto Man		Pwr	
Average On Off			
Avg Type Auto Man			
EMI Res BW			
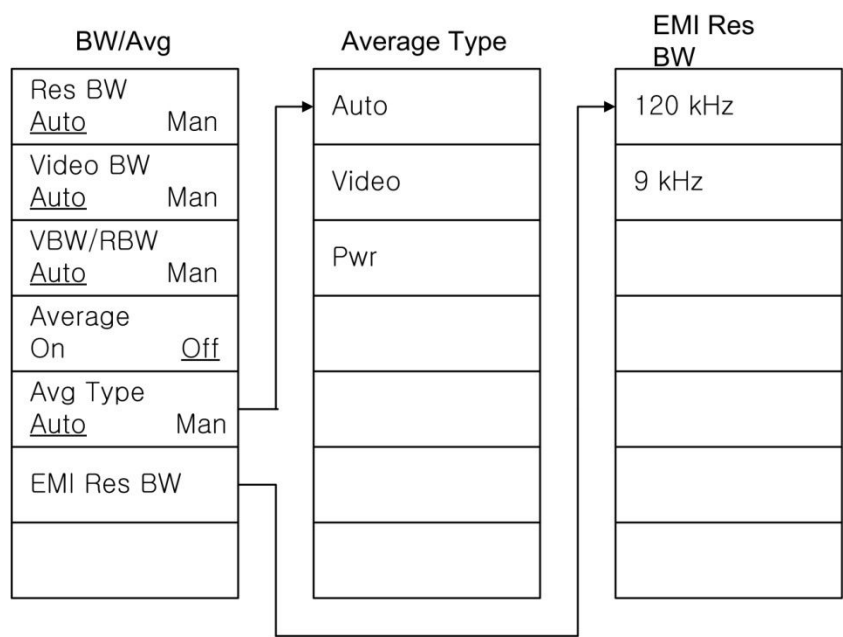
4-10. Trig

Trig
Free Run
Video
Line
External Pos   Neg
Trig Delay On   Off

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4-11. Display

Display		Active Position		Title	
Full Screen		Top		Change Title	→ Editor
Display Line On _Off_	→	Center		Clear Title	
Active Position		Bottom			
Title					
Graticule On _Off_					

Editor		Editor		Editor
A B C D E F		a b c d e f g		( ) : ; , ' "
G H I J K L		h i j k l m n		_ ! ? ~
M N O P Q R		o p q r s t u		+ − * / < > =
S T U V W X		v w x y z		l { } [ ]
Y Z				@ # $ % ^ &
Space		Space		Space
More 1 of 3		More 2 of 3		More 3 of 3

pg. 30
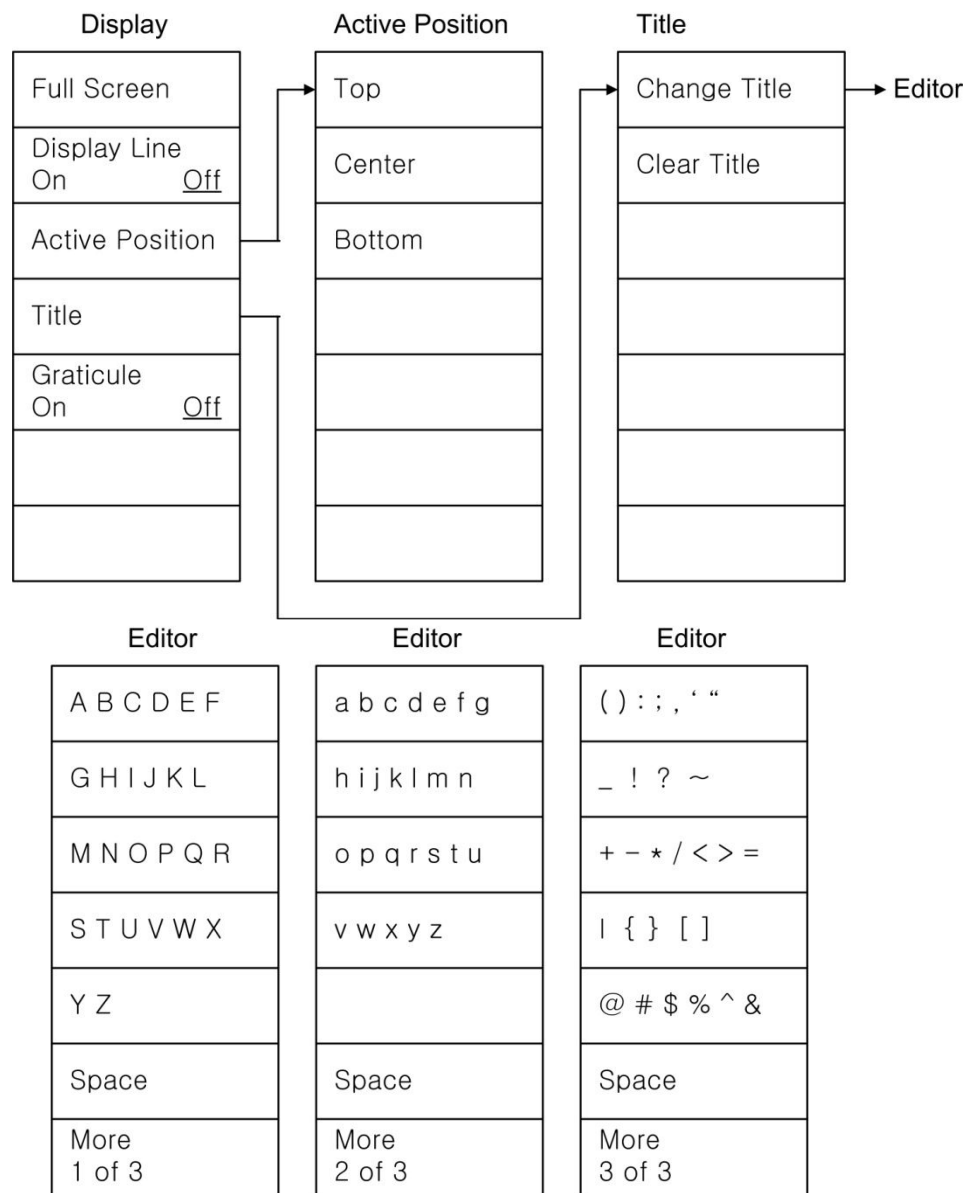
4-12. Sweep

Sweep

Sweep Time Auto   Man
Sweep Single   Cont

4-13. Measure

Measure

Meas Off
Channel Pwr
Occupied BW
ACP

4-14. Measure Control

Meas Control

Restart
Measure Single   Cont
Pause

4-15. Measure Setup

a. Meas Setup

Avg Number On   Off
Integ BW
Ch pwr span

b. Meas Setup

Avg Number On   Off
Occ Bw % Pwr
OBW Span
x dB

c. Meas Setup

Avg Number On   Off
Ch Integ BW
Offset

Meas Setup

Offset A   B   C   D
Offset Freq On   Off
Offset BW

a. Channel Power
b. Occupied BW
c. ACP

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4-16. System

System	PwrOn/Preset	Preset Type	Time/Date
Show System	Power On Last Preset	User	Time/Date On Off
Power On/Preset	Preset Type	Factory	Date Format YMD MDY
Time/Date	Save User Preset		Set Time
Alignment			Set Date
Config I/O			
More 1 of 2			

System	Diagnostics	Config I/O	Alignment
Diagnostics	Front Panel Test	GPIB Address	Align Now
Program Update	Screen Test Black Pixel	IP Address	Align Auto On Off
	Screen Test White Pixel	Host Name	
		Subnet Mask	
		Gateway	
		RS-232 On Off	
More 2 of 2			

4-17. File

File

Save
Load
Delete
Copy
Rename
Create Dir

4-18. File (Save)

Save
Save Now
Type
Format
Source
Name
Dir Select

Type
State
Screen
Trace

Source
All Traces
Trace 1
Trace 2
Trace 3

Format
Trace + State
CSV

Format
GIF
Reverse GIF

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4-19. File (Load)

Load

Load Now
Destination
Dir Select

Destination

Trace 1
Trace 2
Trace 3
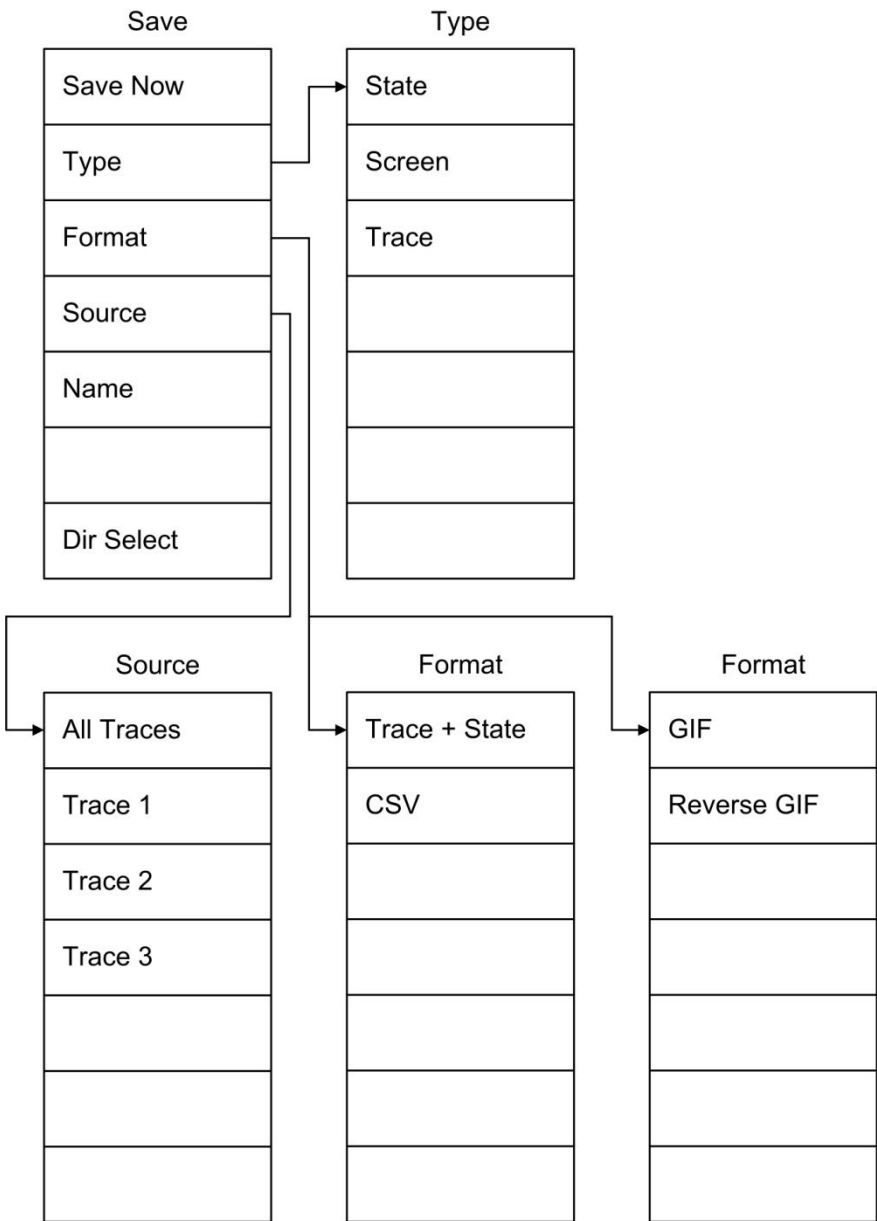
4-20. File (Delete)
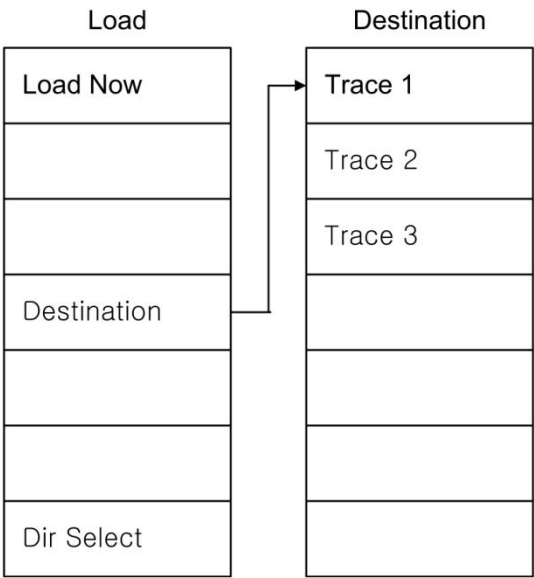
Delete

Delete Now
Dir Select

4-21. File (Copy)

Copy

Copy Now
Dir From   To
Dir Select

4-22. File (Rename)

Rename

Rename Now
Name
Dir Select

Name → Editor

4-23. File (Create Dir)

Create Dir

Create Dir Now
Name
Dir Select

Name → Editor

4-24. Print Setup

Print Setup

Printer Centr   USB
Printer Setup
Orientation
Page Size

Printer Setup → Printer Driver Selection Menu

Orientation → Printing Paper Direction Selecting Menu

Page Size → Printing Paper Size Selecting Menu

Chapter 5

Key descriptions

In this Chapter, we will review the following:

- Key descriptions
- Menu and soft menu overview

Chapter 5. Explanation of Keys on the Front Panel

5-1. AMPLITUDE

The amplitude key allows the user to activate amplitude related functions such as changing reference level, input attenuation, vertical scale, reference level offset, amplitude units and pre Amp

■ **Ref Level**

The Reference Level function is activated when you press the AMPLITUDE key and select Ref Level softkey. If you change the amplitude, the level indicated on the upper part of a lattice line on the display will indicate the new values. Use the step key, scroll knob, or a number key pad to input or adjust to the desired Rel Level.

AMPLITUDE >> Ref Level

■ **Attenuation Auto Man**

The input attenuation of the analyzer reduces the power level of the input signal entering the input mixer. You can change the input attenuation value manually by setting the Attenuation menu on MAN and using the step keys, the scroll knob, the number keypad. You can also set the Attenuation menu on AUTO and will be automatically set for you.

AMPLITUDE >> Attenuation

■ **Scale/Div**

It sets the log unit on the vertical lattice sector on the display. The scope of Scale/Div varies between 1 dB and 20 dB per vertical lattice sector, and can be changed by 1dB increments. You can change the input attenuation value by using the step key, scroll knob, or the number keypad.

AMPLITUDE >> Scale/Div

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■ **Ref Level Offset**

It adds the offset value to the currently indicated reference level. The reference level offset value can be changed only by using the numeric keypad. Changing the Reference Level Offset value does not change the trace or the input attenuation value. The reference level offset is used when there is a gain or loss of level between the inputs of a device under test, and the analyzer. Accordingly, a signal level measured by the analyzer can be thought to be the input level of the device for changing external amplitude. After the reference level offset has been changed, the new value will be indicated below the Ref Level Offset softkey on the screen. In order to remove offset, please press Ref Level Offset, 0, dB. Also, if you press Preset, the reference level offset value will be established as 0 dB.

AMPLITUDE >> Ref Level Offset

■ **Y Axis Units**

It allows the user to change the amplitude unit of measure. You can change the amplitude unit by selecting dBm, dBmV, dBµV, Volts or Watts.

AMPLITUDE >> Y Axis Units

5-2. BW/Avg

It activates the resolution bandwidth function, and sets the bandwidth function and the trace average function.

■ **Resolution BW Auto Man**

The 3 dB resolution bandwidth of the analyzer can be changed from 1 kHz to 3 MHz in 1. 3. 10. sequence by using the scroll knob or the step keys. Decreasing the Video Bandwidth increases the Sweep time in order to maintain the amplitude calibration . Also, the resolution bandwidth is connected to a span. When the span decreases, the resolution band will also decrease. If the resolution bandwidth is changed, the video band will be changed for keeping the ratio of VBW/RBW when in automatic connection mode. When it is not connected, "#" mark will appear beside the Res BW on a display. If you intend to connect the resolution bandwidth again, please press Resolution BW(Auto).

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BW/AVG >> Res BW

■ **Video BW Auto Man**

You can change the analyzer post-detection filter from 10 Hz to 3 MHz in a 1. 3. 10 sequence by using the scroll knob or the step keys. Decreasing the Video Bandwidth increases the Sweep time in order to maintain the amplitude calibration. When it is not connected, "#" mark will appear beside VBW on the lower part of the analyzer display. If you intend to connect the resolution bandwidth again, please press Video BW(Auto), You can change the video bandwidth by using the step key, the scroll knob, or the numeric keypad.

BW/AVG >> Video BW

■ **VBW/RBW Auto Man**

Select ratio between video bandwidth and resolution bandwidth. You can set the ratio below 1 to reduce the noise in situations where the signal response nears the noise level and is visually maked by it. Use the scroll knob and step keys to change the ratio in a 1, 3, 10 sequence. You can also set this fuction on AUTO.

BW/AVG >> VBW/RBW

■ **Average ON/OFF**

It turns ON or OFF the trace average function. When the trace average function is ON, and the detector is set to AUTO mode, it will be changed to the sample mode.

BW/AVG >> Average

■ **EMI Res BW**

It makes it possible to select between the resolution bandwidth of 120 kHz, 9 kHz.

BW/AVG >> EMI Res BW

■ **Avg Type Auto Man**

It displays a menu that makes it possible to select an average type.

▪ **Video**

After taking the average of data in the current trace memory, put it on the trace memory again, and display it. When the average type video is selected, VAvg

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will be indicated on the left of display LCD.

BW/AVG >> Avg Type >> Video

- **Pwr**

  After taking the average by converting data in the current trace memory, to a linear power level, then convert it again to a log scale, and then display it. When the average type is selected, PAvg will be indicated on the left of display LCD.

  BW/AVG >> Avg Type >> Pwr

5-3. Display

It is a menu setting the parts indicated including a title, display line, and the indication of lattice, on the analyzer.

■ **Full Screen**

It makes the measuring window fill up the LCD the display. Pressing any keys will cancel the Full Screen display.

DISPLAY >> Full Screen

■ **Display Line On Off**

It activates the display line. The value of the display line is indicated on the activated function block, or on the left of the display. The display line can be moved by using the step keys, the scroll knob, or the number key pad. To turn OFF the display line, please press Display Line(Off).

DISPLAY >> Display Line

■ **Active Position**

It makes it possible to change the location of the active function block on the display.

DISPLAY >> Active Position

■ **Title**

It allows the user to name or re-name titles on the display.

▪ **Change Title**

It enables you to write a title on a title indication line on the upper part of a display. If you press Change Title, the Alpha Editor menu including usable letters and signs will appear. The title of the display will be kept until you press the change title again, or withdraw trace saved along with the previous title.
You can delete the display title by using the delete function.
DISPLAY >> Title >> Change Title

▪ **Clear Title**

Delete the title on the upper part of a display. Once deleted, it cannot be restored again.
DISPLAY >> Title >> Clear Title

▪ **Graticule ON/OFF**

It turns on or off the display.
DISPLAY >> Graticule

5-4. File

This function allows you to load, save, and manage data in the internal memory of the spectrum Analyzer. The file menu key opens a conversation box equivalent to the function selected.

■ **Save**

It enables you to save the analyzer state, trace, and screen data on the internal memory.
If you intend to save the file, please perform the following steps.

1. Pleases select data type to save by pressing a menu key concerned. As for trace, you should select 1. 2. 3 or all on a source menu key.

2. Pleases select a format you want in a Format conversation box

3. If you intend to change a file name to save, please change the name by using a name menu key.

4. Please press a save now menu key after determining a location to save. When changing a directory to save, please change the location to save by using a step key and a dir select menu key.

- **State**

  The state file saves the set-up of a device. You can save the analyzer state on a memory with State.

- **Trace**

  Trace can be saved independently or along with the analyzer state. Although CSV type can be read in a form of a spread sheet of the PC, it cannot be drawn to the analyzer. If you save trace 1. 2 or 3, the trace selected can be saved along with the state. If you save the trace as All, the trace are all saved along with State in a .trc single file.

- **Screen**

  It enables you to save a screen image on a file, and to select GIF and Reverse GIF file format.   The screen image cannot be read with the analyzer.

■ **Load**

You can load the analyzer state and trace from the internal memory to the analyzer. If you intend to load a file, please perform the following steps.

7. Put the select bar on a file to load by using a step key. You cannot load GIF file by the analyzer. As for trace file, please select trace 1. 2 or 3 on Destination.

8. If you are ready to load, please press a Load Now menu key.

- **State**

  The state file includes the set-up of the analyzer. If you load the state, the most of set-up is restored to the value previously saved.

- **Trace**

  Trace can be loaded along with the analyzer state when saved. If you load Trace, it will be in View mode. If you load Trace, it will go to Trace 1 except for Trace All returning to a location of the state that each trace is saved. Trace + State type only can be loaded.

■ **Delete**

It deletes a file as a memory of the analyzer.

■ **Copy**

It copies a file on other directories of the internal analyzer or USB flash memory.

■ **Rename**

It changes a file name.

■ **Create Dir**

It creates a new directory on the internal memory of the analyzer.

5-5. FREQUENCY

It activates the center frequency set-up function, and displays the menu of the frequency function. Frequency values are show below each specific function soft key menu. It is not recommended to enter frequencies larger than the frequency span of the spectrum analyzer.

■ **Center Freq**

It sets the Center Frequency using the step keys, scroll knob and numeric key pad.
FREQUENCY >> Center Freq

■ **Start Freq**

It sets the start frequency. The left and right of the lattice conform to the start and stop frequencies. When this function is activated, the Start Frequency and Stop Frequency will be indicated on a location indicating the center frequency under the lattice and a span. The Start Frequency can be changed by using the step keys, scroll

knob and numeric key pad. If you press any number among 0 ~ 9 on a number key pad, a unit menu will appear.

FREQUENCY >> Start Freq

■ **Stop Freq**

It sets the Stop Frequency. The left and right of the lattice conform to the start and stop frequencies. When this function is activated, the Start Frequency and Stop Frequency will be indicated on a location indicating the center frequency under the lattice and a span. The Stop Frequency can be changed by using the step keys, scroll knob and numeric key pad. If you press any number among 0 ~ 9 on a number key pad, a unit menu will appear.

FREQUENCY >> Stop Freq

■ **CF Step Auto Man**

It allows the operator to change the center frequency step. The center frequency step function is useful for finding out harmonics or side band exceeding the current frequency span of the analyzer. When selecting Auto, the scale of the center frequency step will be established as one lattice (10% of a span). It can be changed by using a step key, scroll knob, or a number key pad. If you press any number among 0 ~ 9 on a number key pad, a unit menu will appear.

FREQUENCY >> CF Step

■ **Freq Offset**

It enables you to input the frequency offset value. The offset can be inputted only using the numeric keypad. There will be no change on the trace when this function is active. If you intend to remove the offset, please press Freq Offset, 0, Hz. When the frequency offset is entered, the value will show up on the lower part of the display.

Note: It is different from the reference level offset indicated on the left of the display.

FREQUENCY >> Freq Offset

■ **Signal Track ON/OFF**

When it is ON, the peak of the current trace memory is indicated in the center after

the sweep is over. Signal Track function gets inactivated in a zero span.
FREQUENCY >> Signal Track

5-6. I/O DETECT

■ **10 MHz**

It selects the use of the 10 MHz standard signal of the analyzer. When INT(Internal) is selected, the spectrum analyzer uses the standard signal of the inside of the analyzer, and outputs the 10 MHz standard signal through the port on the back panel. When EXT(External) is selected, the spectrum analyzer uses the signal coming into the standard frequency input/output port on the back as the 10 MHz standard frequency.
I/O DETECT >> 10 MHz

■ **Ref Out (f = 80MHz) On Off**

It turns ON or OFF the internal 80 MHz standard signal. When this function is active, RF inputs are de-activated..
I/O DETECT >> Ref Out

■ **Detect**

It enables you to select among Peak, Sample, Normal, Average, and Neg Peak detection modes.

▪ **Peak**

When selected, the peak is shown on the upper part of the left of the display. The detection of the peak is mainly used for detecting a signal on the noise level.
Find out the maximum level between the current display indicating point and the next indicating point, and save the level on a trace memory where it meets the current indicating point.

▪ **Sample**

When selected, the Samp is shown up on the upper part of the left of the

display. The detection of a sample is used for indicating noise or a signal similar to noise. The inspecting signal level on the current display point is saved on a trace memory.

▪ **Normal**

When selected, the Norm is shown up on the upper part of the left of the display.

The detection of normal is the detection mode combining the accurate signal measurement

of the peak, and the noise display function of the detection of a sample.

▪ **Average**

When selected, the Avg is shown up on the upper part of the left of the display. It saves the average data between the detection of the Peak and the Neg Peak. It is used for reducing VBW or irregular noise without using the trace average function. This function makes the indication of the averaged value to be with swifter sweep speed.

▪ **Neg Peak**

When selected, the NPk is shown up on the upper part of the left of the display. The detection of the Neg Peak is used for searching for a similar signal below the noise level.

Find out the minimal level between the current display indicating point and the next indicating point, and save the level on a trace memory where it meets the current indicating point.

I/O DETECT >> Detect

5-7. Marker

You can turn ON or OFF by selecting a marker type and number. The marker is a diamond-shaped letter showing a point. There can be four couples of markers at the maximum on the display at the same time. Only one couple can be controlled at one time. The marker controlled is called "activated" marker. If you press Marker, the Normal menu key gets activated.

- **Select Marker 1 2 3 4**

  Select one marker among 4 markers. Then, a marker already on, is activated when selected. When the marker is designated to a different trace while it is already on, the marker will be inactivated on trace concerned when selected.

  MARKER >> Select Marker

- **Normal**

  When the marker is not yet indicated, a single frequency marker on the currently selected marker will be activated on the center frequency. When the marker is already indicated, it becomes activated on a selected location. The marker number is indicated on the marker. The indications on the activated function block and the right of the display show the frequency and amplitude of a marker. If you press Normal, the Delta function goes out, and the activated marker moves to the location of the Delta marker.

  MARKER >> Normal

- **Delta**

  The second marker gets activated on the location of the first marker. (When there is no marker, two markers appear on the center of the display.) The amplitude and frequency of the first marker were fixed. The marker number is indicated on the Delta marker, and the same number is indicated on the standard marker as R. (For instance, 1R) The indications on the activated function block and the right of the display show the difference between the frequency and amplitude of two markers.

  MARKER >> Delta

- **Delta Pair Ref Delta**

  It converts to a mode that allows the two markers can be independently adjusted. When you press Delta Pair, there is a conversion between Reference marker and Delta. The reference marker number is indicated on the marker as R, (for instance, 1R) and Delta marker is indicated as a marker number.

  MARKER >> Delta Pair

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■ **Span Pair Span Center**

It converts to a mode that allows the two markers can be independently adjusted. If you press Span pair, there is a conversion between a span and the center marker. The reference marker number is indicated on the marker as R, (for instance, 1R) and Delta marker is indicated as a marker number. If you adjust a span, the difference between the two markers will be changed. If you change the center, the center point of the two markers will be changed.

MARKER >> Span Pair

■ **Off**

Turns OFF the Marker function and removes the marker indication on the display.

MARKER >> Off

■ **Marker Trace Auto 1 2 3**

It designates a marker on trace. If you press Marker Trace Auto 1 2 3, a marker on trace 1 will be activated when there is no marker on. While the marker is currently activated, press Marker Trace Auto 1 2 3 until there shows up an underline on 1, 2, or 3. The current activated marker will move to selected trace. If you select Auto mode, the marker will automatically move to the selected trace.

MARKER >> Marker Trace

■ **Readout**

It changes the activated marker value.

▪ **Frequency**

It sets the marker value as frequency. It is a basic value when it is not on zero span,

The following keys are used.

▪ **Period**

It sets the marker value as a period. It shows the reverse value of the frequency.

▪ **Time**

It sets the marker value as a time. It is a basic value when it is on zero span.

MARKER >> Readout

■ **Marker Table On Off**

It shows a marker table on the display. The information includes marker number,
trace number, X axis value, and the amplitude.

MARKER >> Marker Table

■ **Marker All Off**

It turns off all markers. Also, it deletes the marker indication.

MARKER >> Marker All Off

5-8. Marker →

■ **Mkr → CF**

It sets the marker frequency as the center frequency. On Delta marker mode, Mkr → CF
sets the center frequency as the marker delta value. Mkr → CF cannot be used when it
is on zero span.

MARKER → >> Mkr → CF

■ **Mkr → CF Step**

It changes the scale of the center frequency step so that it can match the activated
marker value. In order to see the scale of the step, please press FREQUENCY >> CF
Step. As for marker delta mode, the scale of the step is established as the difference
between a marker and the frequency. Mkr → CF Step cannot be used when it is on
zero span.

MARKER → >> Mkr → CF Step

■ **Mkr → Start**

It sets the marker frequency as the start frequency. On delta marker mode, Mkr →
Start sets the start frequency as the marker delta value. Mkr → Start cannot be
used when it is on zero span.

MARKER → >> Mkr → Start

■ **Mkr → Stop**

It sets the marker frequency as the stop frequency. On delta marker mode, Mkr → Stop sets the stop frequency as the marker delta value. Mkr → Stop cannot be used when it is on zero span.

MARKER → >> Mkr → Stop

■ **Mkr Delta → Span**

It sets the start and stop frequencies as the delta marker. Mkr Delta → Start cannot be used when the marker is off, or is on zero span.

MARKER → >> Mkr Delta → Span

■ **Mkr Delta → CF Step**

It sets the difference between markers as the scale of the center frequency. If you want to see the scale of the step, please press FREQUENCY >> CF Step. Mkr Delta → CF Step cannot be used when the marker is off, or is on zero span.

MARKER → >> Mkr Delta → CF Step

■ **Mkr → Ref Lvl**

It sets the analyzer so that reference level can be the amplitude of a marker. On delta mode, Mkr → Ref Lvl sets the reference level as the difference of amplitudes between markers.

MARKER → >> Mkr → Ref Lvl

5-9. Meas Control

It enables you to temporarily stop the power measurement function usable on a measure key menu, or resume it. Also, the Meas Control enables you to select continuous sweep or single sweep.

■ **Restart**

It repeats measurement from the beginning.

MEAS CONTROL >> Restart

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■ **Measure Cont Single**

Measure(Single) indicates the measurement result through one-time measurement sweep.

Measure(Cont) successively performs measurement, and shows the result by every measurement sweep.

MEAS CONTROL >> Measure

■ **Pause**

It temporarily stops measurement. If you press Pause, it makes conversion between the temporary pause of measurement and resume.

The key label makes conversion between Pause and Resume.

MEAS CONTROL >> Pause

■ **Resume**

It resumes the temporarily suspended measurement. The key label makes conversion between Pause and Resume.

MEAS CONTROL >> Resume

5-10. Meas Setup

It indicates the measurement set-up menu. The indicated set-up menu shows differently in accordance with selected measurement (ACP, Channel Power, Occupied BW, etc.) on the measure menu.

■ **ACP Meas Setup**

It sets the adjacent channel power measurement function.

▪ **Avg Number On Off**

In order to designate the average measurement number, please press Avg Number (On). When each sweep is over, the average value will appear.

MEAS SETUP >> Avg Number

- **Ch Integ BW**

  It designates the scope used in calculating the power on the center channel.

  MEAS SETUP >> Ch Integ BW

- **Offset BW**

  It designates the scope used in calculating the adjacent channel power.

  MEAS SETUP >> Offset >> Offset BW

- **Offset Freq**

  It designates the difference between the center frequency of the center channel, and the center frequency of the adjacent channel.

  MEAS SETUP >> Offset >> Offset Freq

■ **Channel Power Meas Setup**

It sets the channel power measurement function.

- **Avg Number On Off**

  In order to designate the average number, please press Avg Number (On). The average value will appear when each sweep is over. Avg Number (Off) inactivates the average measurement.

  MEAS SETUP >> Avg Number

- **Integ BW**

  It sets the scope of making calculation of channel power.

  MEAS SETUP >> Integ BW

- **Chan pwr span**

  It sets the span of the analyzer on the channel power measurement.

■ **Occupied BW Meas Setup**

It sets the occupied bandwidth measurement function.

- **Avg Number On Off**

In order to designate the average number, please press Avg Number (On). The average value will appear when each sweep is over. Avg Number (Off) inactivates the average measurement.

MEAS SETUP >> Avg Number

▪ **OBW span**

It sets the span of the analyzer on the occupied bandwidth measurement.

MEAS SETUP >> OBW Span

▪ **Occ BW % Pwr**

It changes the ratio of signal power used for determining the occupied bandwidth.

MEAS SETUP >> Occ BW % Pwr

5-11. MEASURE

It performs diverse measurement functions including the Adjacent Channel Power, Channel Power, and Occupied Bandwidth

■ **Meas Off**

It turns off the measurement function.

MEASURE >> Meas Off

■ **ACP**

It calculates power in the center and adjacent channel of a signal. A marker point can be established as a measurement set-up menu while ACP is selected.

If you press Meas Setup while ACP is selected, you can set the adjacent channel power measurement parameter. If you press Meas Control when ACP is selected, the measurement can be temporarily suspended or resumed or makes conversion between continuous or single modes.

MEASURE >> ACP

■ **Channel Power**

It calculates power and power spectrum density on a channel bandwidth designated by a user. A marker on the display indicates the end of the channel bandwidth. The marker selects Channel Power, and can be established as a Meas Setup menu. It operates on single or continuous sweep mode.

If you press Meas Set-up after selecting Channel Power, you can set the channel power measurement parameter. If you press Meas Control after selecting Channel Power, you can temporarily suspend or resume measurement or make conversion between continuous or single sweep modes.

MEASURE >> Channel Pwr

■ **Occupied BW**

The basic value of measurement is 99% of occupied bandwidth power. The measurement operates on single or continuous sweep mode.

If you press Meas Set-up after selecting Occupied BW, you can set the occupied bandwidth power measurement parameter. If you press Meas Control after selecting Occupied BW, you can temporarily suspend or resume measurement or make conversion between continuous or single sweep modes.

MEASURE >> Occupied BW

5-12. Preset

PRESET key initializes the analyzer back to the factory default state. As for the set-up of the state of a free set, please refer to the following table of conditions of free set. If you are to select Preset (Factory), press SYSTEM >> Power On/Preset >> Preset Type (Factory).

[Table 5-1] Conditions of Free Set

Amplitude Unit	dBm
Indication and Lattice Display	On
Attenuation	30 dB
Center Frequency	1.5 GHz

Start Frequency	0 Hz
Stop Frequency	3.0 GHz
CF Step	10% of a span
Detect	Normal
Display Line	-25 dBm, display turns off.
Frequency Offset	0 Hz
Log Scale	10 dB per sector
Reference Level	0 dBm
Reference Level Offset	0 dB
Marker	Off
Resolution Bandwidth	3 MHz (Auto)
Video Bandwidth	3 MHz (Auto)
VBW/RBW Ratio	1.000
Video Avg.	Off
Span	3.0 GHz
Sweep	Continuous
Title	Clear
Trace 1	Clear-Write
Trace 2	Blank
Trace 3	Blank
Trigger	Free Run

5-13. Print

Please press the Print key if you want to print a copy of screen using a recommended printer. The screen will remain temporarily suspended until the data transmission is completed.(there is no more sweep proceeded.)

5-14. Print Setup

It defines a printer, and selects a printer option.

■ **Printer**

Determine whether to output printed data via a Centronics printer port or USB printer port.
PRINT SETUP >> Printer

■ **Printer Setup**

Select a printer driver concerned on the inside of the analyzer.
PRINT SETUP >> Printer Setup

■ **Orientation**

Select between Portrait or Landscape print.
PRINT SETUP >> Orientation

■ **Page Size**

Select a paper to print.
PRINT SETUP >> PageSize

5-15. Return

It returns to the previous menu

5-16. Peak Search

It automatically places a marker on the highest amplitude signal of the trace and displays the marker's amplitude and frequency. If there is no peak, the marker will not move. If there is no marker indicated, marker 1 will appear.

- **Next Peak**

    It detects the second highest peak next to the current marker label, and moves it to the place.

    PEAK SEARCH >> Next Peak

- **Next PK Right**

    It moves the marker to the next highest peak of the right of the current marker. In order to be recognized as the signal peak, the level of the signal should be moved after it increase or decrease as much as the value of excursion (6 dB). If there is no peak on the right, the marker will not move.

    PEAK SEARCH >> Next PK Right

- **Next PK Left**

    It moves the marker to the next highest peak of the left of the current marker.. In order to be recognized as the signal peak, the level of the signal should be moved after it increase or decrease as much as the value of excursion (6 dB). If there is no peak on the left, the marker will not move.

    PEAK SEARCH >> Next PK Left

- **Min Search**

    It moves a marker on the current trace to the minimal level.

    PEAK SEARCH >> Min Search

- **PK-PK Search**

    It finds out and indicates the difference between frequencies between the highest

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tracer point and the lowest tracer point (or when the span is 0), and the amplitude.

PEAK SEARCH >> PK-PK Search

■ **Continuous Pk On Off**

When it is ON, the marker is located on the highest level of trace, and when the sweep is over, it successively detects the highest level, and locates the marker.

PEAK SEARCH >> Continuous Pk

■ **Mkr → CF**

It sets the center frequency of the analyzer as the marker frequency. On delta mode, Mkr → CF sets the center frequency as the marker delta value. Mkr → CF cannot be used when it is on zero span.

PEAK SEARCH >> Mkr → CF

5-17. Single Sweep

When the analyzer is on continuous sweep mode, it converts to a single sweep. When the analyzer is already on single sweep mode, it performs a new sweep once if the trigger meets the conditions.

■ **SINGLE**

SWEEP >> Sweep

5-18. SPAN

It activates the span function, and makes it possible to change the span.

■ **Full Span**

It sets the span as the entire frequency scope of the analyzer.

SPAN >> Full Span

■ **Zero Span**

It changes the frequency span as 0.

SPAN >> Zero Span

■ **Last Span**

It changes the frequency span of the analyzer to the previous span.

SPAN >> Last Span

5-19. Sweep

Accesses the sweep time menu and accesses the sweep-time softkey functions.

■ **Sweep Time Auto Man**

It sets the length of time in whitch the spectrum analyzer seeps the frequency span. If the sweep time is reduced, the sweep speed increases. The sweep time can be changed by using the step keys, scroll knob, or the numeric key pad.

SWEEP >> Sweep Time

■ **Sweep Cont Single**

It witches between continuous sweep mode and single sweep mode. If you press Sweep (Single), the analyzer will run a single sweep; when Sweep (Cont) is selected, one sweep will follow the other as PRESET SPECTRUM.

SWEEP >> Sweep

5-20. System

The System menu appears.

■ **Power On Preset**

If you press the Power On Preset button, the following menus will appear.

▪ **Power On Last Preset**

It determines the state of the analyzer when you turn on the analyzer. When

the function of turning on power is established as Preset, the state of the analyzer becomes the same of pressing Preset while the analyzer is turned on. When the function of turning on power is established as Last, the state of the analyzer will be restored to the previous state where the power was still on.

Although you press Preset, the set-up (Last or Preset) of the function of turning on power is not changed, To change the set-up of the state of the analyzer restored when inputting power, please use the Power On/Preset menu key.

- **Preset Type Factory User**

  If you press Preset (Factory), it becomes initialized in accordance with the composition of the original state of the analyzer, which was established in delivery. If you press Preset (User), you can set the analyzer as saved by the Save User Preset key. Also, if you press Preset (Factory) and Preset (User), the initialization of the device gets started. (Please refer to the Preset in this chapter.)

  Save User Preset
  When you press Save User Preset, the current state of the analyzer is saved on the User Preset register.

■ **Time/Date**

There appears a menu that you can change time and date.

- **Time/Date**

  It turns on and off the time and date.
  SYSTEM >> Time/Date >> Time/Date

- **Date Format**

  It changes the display type of a date from MM-DD-YY to DD-MM-YY.
  SYSTEM >> Time/Date >> Date Format

- **Set Time**

  It sets the time. Please enter the time in a 24 hrs HHMMSS format by using the

numeric keypad, than press Enter. The effective time values (HH) are 00 ~ 23. The effective MM and SS values are 00 ~ 59.

SYSTEM >> Time/Date >> Set Time

- **Set Date**

  It sets a date. Please enter a date in YYYYMMDD format by using the numeric keypad, than press Enter. The effective YYYYs are from 2000 to 2037. The effective MM value is 01 ~ 12, and the DD is 01 ~ 31. Use the following keys.

  SYSTEM >> Time/Date >> Set Date

■ **Alignments**

It enables you to accurately acquire frequency and level by arranging the internal circuit of the analyzer.

- **Align Now**

  It immediately starts the arrangement of a system.

  SYSTEM >> Align Now

- **Align Auto**

  Arrangement work of the analyzer will be automatically made every 30 minutes.

  SYSTEM >> Align Auto

■ **Show System**

There are the model number, serial number, firmware version, the version of each board within the device, and the state of the set-up of an option of the analyzer.

SYSTEM >> Show System

■ **Diagnostics**

- **Front Panel Test**

  It enables you to check the function of keys on each front panel. Whenever you press the key, the number beside the name of each key will be increased. If you turn a knob, the number of pulse will be counted. If you intend to terminate it, please press Esc.

SYSTEM >> Diagnostics >> Front Panel Test

- **Screen Test Black Pixel**

  It displays the pixels of a display LCD screen as all black.

  SYSTEM >> Diagnostics >> Screen Test Black Pixel

- **Screen Test White Pixel**

  It displays the pixels of a display LCD screen as all white.

  SYSTEM >> Diagnostics >> Screen Test White Pixel

■ **Program Update**

LPT-6000 offers convenient ways to update firmware. Copy firmware update file downloaded from a corporate website on a USB flash memory. Equip the USB flash memory to the front USB port, and press a menu key concerned. Then you will see a file list, and then press an update menu key while placing a file selection bar on an update file. Then, there will be a message of "Program update success. Reboot LPT-6000." On a status window on the most lower part of display LCD, when the update was successful, and if you turn on the power of the analyzer and turn on it again, the updated file will be applied to the analyzer.

SYSTEM >> Program Update

5-21. Trig

It selects trigger mode of the analyzer.

■ **Free Run**

When sweep is over, it will immediately start the next sweep.

TRIG >> Free Run

■ **Video**

It is synchronized with an ascending angle of detection wave bigger than trigger level, thus, it will start sweep.

TRIG >> Video

■ **Line**

It is synchronized with AC power frequency, it will start sweep. Line trigger is conveniently used when observing waves related to power.

TRIG >> Line

■ **External Pos Neg**

It is synchronized with external trigger source, thus, it will start sweep. The sweep starts from the ascending/descending angle of the signal wave form inputted on EXT TRIG input connector of the back panel. To start the trigger, TTL input signal is required.

TRIG >> External

■ **Trig Delay On Off**

You can set the delay of the time that the analyzer is awaiting, or turn it on or off before starting sweep after receiving the external trigger signal. This function can be used only when it is an external trigger.

TRIG >> Trig Delay

5-22. Trace

Allows the user to manipulate and save trace information displayed on the LCD screen. The spectrum analyzer renews the trace information after every sweep.

■ **Trace 1 2 3**

To select a trace, press the softkey Trace <u>1</u>   2   <u>3</u> until the number of the desired trace is underlined.

TRACE >> Trace

■ **Clear Write**

It deletes data previously saved in trace memory. It saves amplitude data newly acquired after sweeping, and indicates the amplitude data on display LCD screen. This function is applied to trace 1 when inputting power.

TRACE >> Clear Write

■ **Max Hold**

The Max Hold function displays and continuously updates the trace to display the highest peak amplitude of signal level.

TRACE >> Max Hold

■ **Min Hold**

The Min Hold function displays and continuously updates the trace to display the lowest amplitude of signal level.

TRACE >> Min Hold

■ **View**

The View function freezes the trace and displays trace information. The trace information is not updates even after a seep. To return to a continuous trace, press the "Clear White" key.

TRACE >> View

■ **Blank**

Save amplitude data on the selected trace, and delete it on the display. The trace memory selected will not be renewed even after sweep. This function will be applied to trace 2 and 4 when inputting AC power.

TRACE >> Blank

Chapter 6

Options

In this Chapter, we will review the LPT-6000 Spectrum
Analyzer's additional options

Chapter 6. Options

6-1. Specifications

- ▶ **Opt-1** : GPIB interface
  IEEE 488 Bus

- ▶ **Opt-2 :** ETHERNET interface ; for Internet Remote Control

- ▶ **Opt-3 :** SOFT CARRYING CASE

- ▶ **Opt-4 :** General KIT SET
  SMA-N adapter × 2
  10 dB attenuator × 1, 20dB attenuator × 1
  RF cable (SMA-SMA, RD316, 300 mm) × 2
  Kit box × 1

- ▶ **Opt-5 :** CATV KIT SET
  N-BNC adapter × 2
  50Ω ~ 75Ω adapter × 2
  RF cable (N-N, RD223, 1000 mm) × 2
  Kit box × 1

- ▶ **Opt-8 :** RETURN LOSS BRIDGE KIT SET
  Termination 50Ω × 1
  Cap with chain × 1
  RF cable (N-N, RD223, 1000 mm) × 2
  Kit box × 1

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