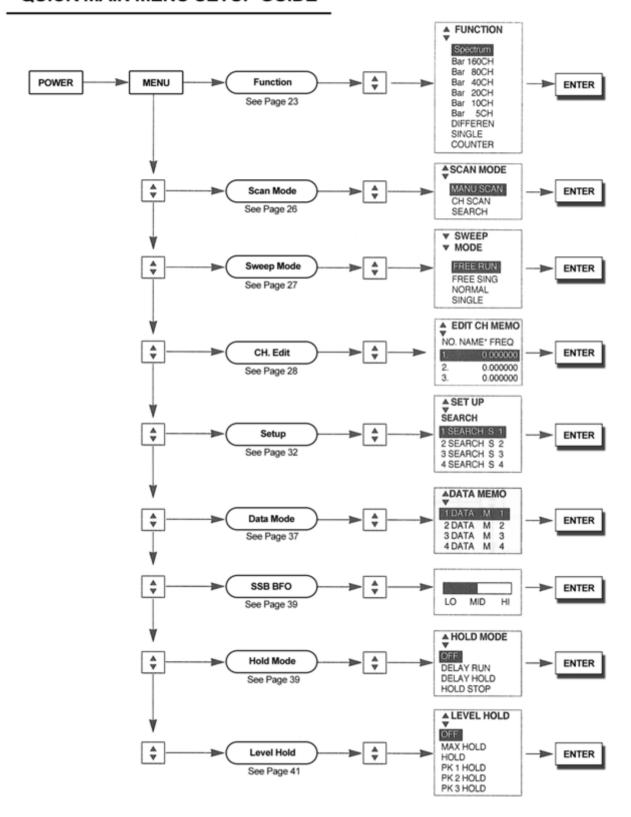
Protek 3290

RF Field Strength Analyzer 2.9GHz

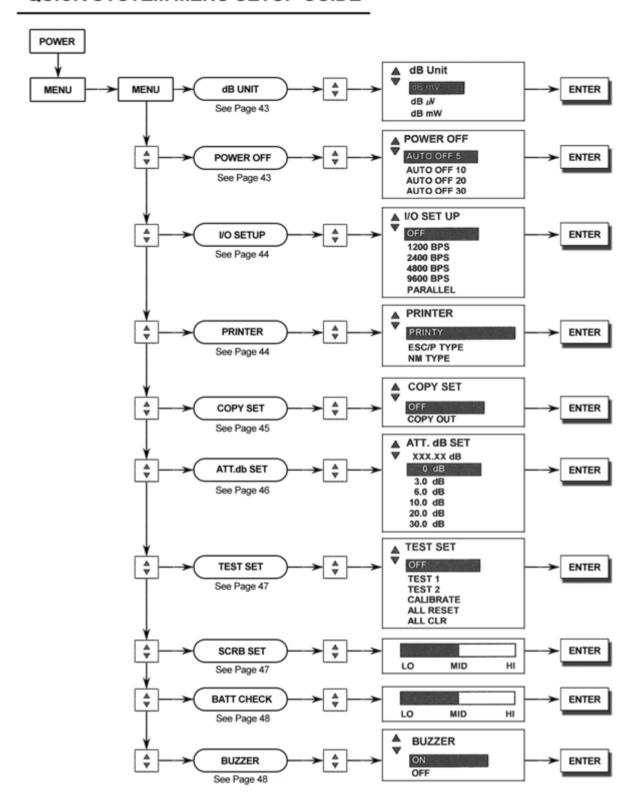


Protek

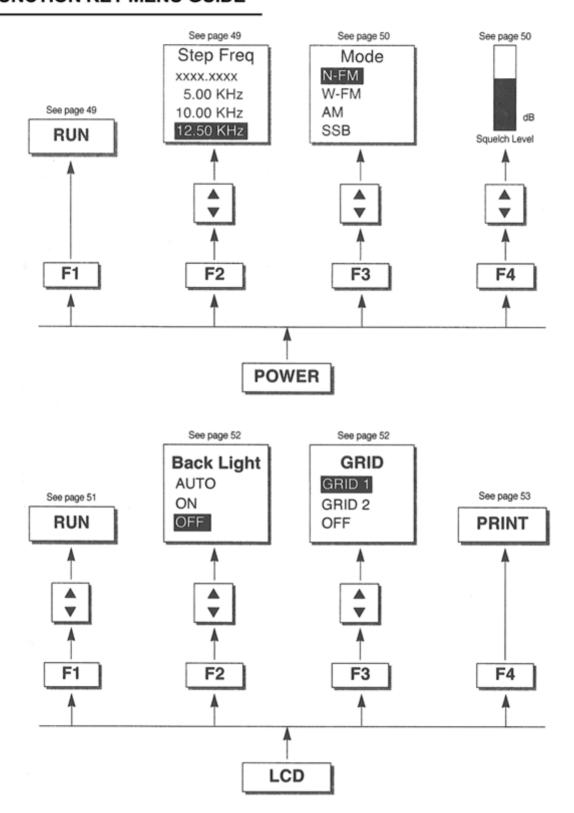
QUICK MAIN MENU SETUP GUIDE



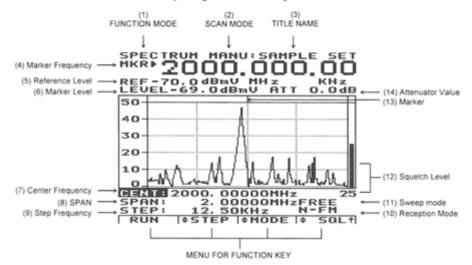
QUICK SYSTEM MENU SETUP GUIDE



FUNCTION KEY MENU GUIDE



Display Description



- (1) Function mode: Displays the currently selected display(Spectrum, Bar graph, and Counter) (see page 23)
- (2) Scan mode: Displays the selected scan mode.3 types of scanning may be selected. See page 14 and 26 for manual scan, pages 17& 26 for search and pages 16 & 26 for channel scan.
- (3) Title name: The data memory, which is, selected (page 37)
- (4) Marker Frequency: The frequency in which the unit is currently tuned to as indicated by the marker indicator.
- (5) Ref.Level: The base line reference amplitude(0 level). The Reception modes (page 50) or the selected external Attenuator value (page 46) sets this value.
- (6) Marker Level: The amplitude value of the signal level the unit is currently tuned to as indicated by the marker.
- (7),(8) Center Frequency and Span are used in Manual scan and are described on page 14.
- (9) Step Frequency: The scanning frequency increment value set by the [F2].(page 49)
- (10) Reception Mode: The type of modulation needed for aural reception of the incoming signal.
 Note: a CW or a signal other than a Narrow Band FM(NBFM), wideband FM(WBFM), AM or SSB may be displayed by selecting a reception mode which has the appropriate bandwidth (see page 5).

The Reception mode is selected by pressing the F3 button

- (11) Sweep Mode: Determines how the scan moves across the screen when the squelch is activated. (See page 26)
- (12) Displays the value of the squelch level (see page 51).
- (13) Marker: Indicates the signal level currently being scanned
- (14) Attenuator Value: Displays the amount of external attenuation connected to the input. When an external Attenuator is used, the value of the Attenuator must be added to the Reference level. This is accomplished through the ATT dB set in the system

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I. INTRODUCTION

1. General

The 3290 is the world's first hand-held RF Field Strength Analyzer.

With a wide band reception range of 100 KHz to 2900MHz, the 3290 is a compact and Lightweight portable analyzer. It is the ideal tool for field RF technicians to test, install and Maintain Mobile Telecommunications Systems, Cellular and Cordless Phones, CB Radios, Paging Systems, Cable and Satellite TV systems as well as antenna site measurements and Maintenance.

2. Features

- 100KHz to 2900MHz measurement range
- Measures and demodulates Narrow Band FM(N-FM), Wide Banc FM(W-FM),

AM, Single Side Band (SSB) signals.

- Built-in 2.9GHz Frequency Counter.
- PLL tuning system for precise frequency tuning.
- Up to 160 channels may be scanned and displayed on the LCD
- · Built-in Speaker
- 192 X 192 pixel backlit LCD
- · All functions are menu selectable
- Has a RS-232 and parallel interface

II. SPECIFICATIONS

Reception Frequency

Frequency range : 100KHz to 2900MHz

Freq. Accuracy (TXO) : ±3PPM
Freq. Accuracy (display) : ±25PPM

Demodulation : N-FM, W-FM, AM, SSB

Step frequency : 5KHz to 9995KHz in multiples of 5KHz and 6.25KHz

Data memory : Stores 10 displays of up to 160 Channels per display(1600)

Set Up memory : Stores 10 setups for each scan mode

Reception sensitivity : Approx.0 –6 dB_µ EMF.

(S/N: 12dB at N-FM, 10dB at W-FM)

Scan speed : 125Ch./sec.max.

 $\begin{array}{ll} \text{Input impedance} & : 50\Omega \text{ (standard)} \\ \text{Max.Input voltage} & : \text{Max. 5V RMS} \end{array}$

Audio output : 120 mW into 8Ω speaker

Level Measurement

N-FM mode Range : -70 to –20dBmV(-10 to 40dBμV)for 300 to 1800MHz

-60 to -20 dBmV(0 to $40 dB\mu V)$ for 1 to 300 MHz and 1800 to 2900 MHz

Resolution : $\pm 0.5 dB \mu V$

Accuracy : $\pm 3dB(at \text{ an ambient of temperature of } 23^{\circ}C \pm 3^{\circ}C)$

Repeatability : ±2dB

Bandwidth : Approx. 12.5KHz(-6dB)

W-FM/AM/SSB Range : -60 to $-10 dBmV(0 to 50 dB\mu V)$ for 300 to 1800MHz

-50 to -10 dBmV (10 to $50 dB\mu V)$ for 10 to 300MHz and 1800 to 2900MHz

Resolution : $\pm 0.5 dB \mu V$

Accuracy : ± 3 dB(at an ambient of temperature of 23 $^{\circ}$ C \pm 3 $^{\circ}$ C)

Repeatability : $\pm 2dB$

Bandwidth : WFM: Approx. 180KHz(-6dB), AM/SSB: Approx. 2.4KHz(-6dB)

Spurious and Noise Level internally generated : -35dBc W-FM

: -45dBc for N-FM typical, below a full scale signal level frequency.

Functions

Sweep modes

Scan modes

Hold modes

Display modes : Spectrum display

Multi Bar graph display(5, 10, 20, 40, 80, 160CH)

Single Bar graph display

Difference frequency display

Frequency measurement level display: Single, Normal, Free Run, Free Single: Manual, CH.Memory and Search scan: Delay run, Delay hold and delay stop

Level hold modes : Max. Hold, Hold, 40mS, 100mS and 200ms peak hold

Squelch function : Squelch level is displayed as a bar graph and a digital Readout. The

squelch level may be adjusted to any value from the reference level to

Full scale

Copy function : The copy set mode allows the contents of the Channel edit, Setup and

Data memories to be copied to an external device. Data may also be

written in to these memories from an external device.

Frequency Counter

Frequency range : 9MHz to 2900MHz

No. of digits : 7 digits

Resolution : 1KHz

Accuracy :±50 PPM ±1 count

Sampling time : 0.512sec.

Input sensitivity : 9MHz to 2000MHz: 150mV RMS

20MHz to 1000MHz: 100mV RMS 2000MHz to 2900MHz: 400mV RMS

Input impedance : 50Ω

Max.Input voltage : 5V RMS Max.

Data memory : 10 readings may be stored

Miscellaneous Specifications

LCD : 192 X 192 pixels green, Led backlit

Back light : Back light will shut off 5 seconds after the last key depression or

continuously on may be selected

RS-232C Interface : 1200, 2400, 4800, 9600 BPS(8 Pin Mini Din)

Power source : (6)1.5V AA type NICD batteries 11V to 16V 400mA Max. AC to DC

adapter, 12VDC car adapter

Auto Power Off : Unit will shut off after 5, 10, 20 or 30 minutes of idle time, menu selectable.

Physical specifications

Operating Temperature & Humidity

Storage Temperature : 0°C to 40°C at 35-85% RH

Dimension : 10°C to 50°C

: 4"(W) x 9"(H) x 1.77"(D)

: Approx. 1.4lb(including antenna)

Std Accessories

Coaxial cable, earphones, Antenna (receiver only), (6)AA NiCd batteries, RS232C cable, carrying Case, carrying strap, Holster, BNC to N adapter, operators manual.

Optional accessories

Parallel printer cable and PR-232C mini printer, Vehicle power adapter, AC/DC adapter, Matching Pad (75 to 50Ω), ATT (10dB, 20dB, 30dB, 40dB), F-BNC adapter, AA Rechargeable batteries (6EA).

III. PRECAUTIONS

Storage

Do not store this equipment in:

- Direct sunshine, near heating devices or in an automobile in the summer time.
- Locations with high humidity and poor ventilation.
- · Dusty or smoky environments.
- Extremely low temperature.

Handling

- This product is a sophisticated electronic device, do not: Service or perform adjustments.
- Do not apply great force to the keys and switches.
 Be sure the slide switch inside the battery cover is set to the right Position, If alkaline batteries are used set the switch to right (dry position). If NiCd batteries are being used set the switch to the left (NiCd position)

Warning: If the switch is in the NiCd position when alkaline batteries are used may cause these batteries to over heat, explore or leak.

Antenna

Due to the broad applications of this unit, the supplied antenna is for the 800MHz cellular band. It may be necessary to use a different antenna more appropriate for your application. The receiving conditions vary with location and antenna. On some occasions, it's not possible to

receive the desired signals due to strong Interference from other electronic sources such as broadcast stations.

Connecting to other devices

When connecting this unit to other devices (CATV cable etc) be sure that the measured system voltage is not greater than the maximum input voltage. Use attenuators to prevent the input voltage from being overloaded by higher than the rated input voltage(5V rms). If the input voltage is greater than the rated input voltage of this unit, possible damage may result.

Be sure that the external DC input jack is the correct polarity.

The DC jack tip must be positive in respect to ground.

If the unit is not functioning correctly or "locked up" when the power is turned on perform the following procedure:

- Press the power button to shut the power off
- Turn the unit on again while pressing the CLR/. and ENTER keys simultaneously. This will clear the internal memory and return the unit to normal operation.

Note: An alternate method to clear a malfunctioning unit is to select ALL RESET from Test set menu located in the system menu.

- 1. Connect 3290 to power (AC Adapter)
- 2. Press Reset button (In the Battery Cover)
- 3. Press POWER in Key Pad to be Off.

Caution: Pressing Reset Button, there will be "Beep" sound after 2.5 second and will be displayed.

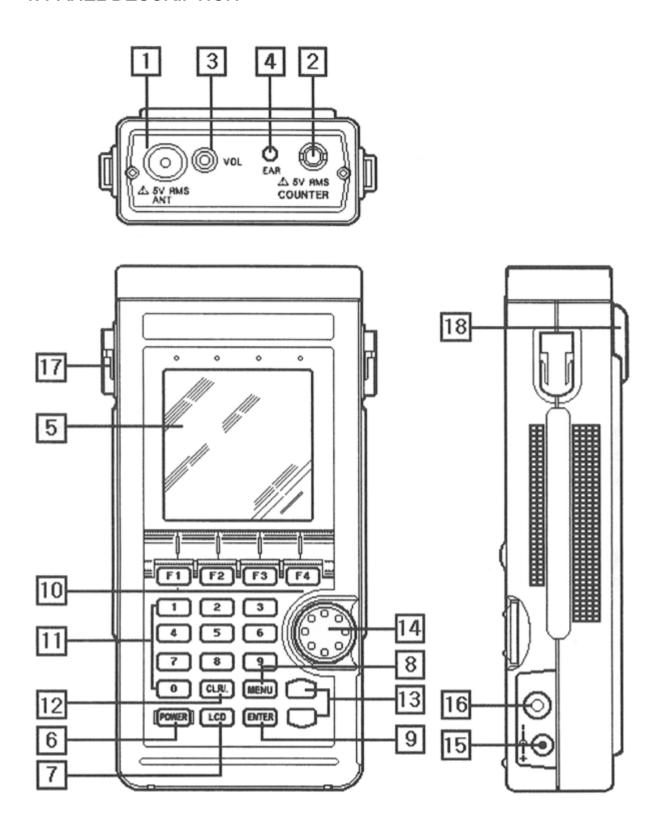
Press F2 key before the Beep to be Off.

- 4. Press CLR/. and ENTER key at the same time (Processing #5 during press)
- 5. Press POWER key and release it.
- 6. Check if the product operates normally.

Caution: Selecting ALL RESET Button in Test Set of System Menu will stop all operations.

IV. FUNCTIONAL DESCRIPTION

1. PANEL DESCRIPTION



1). Signal level input connector

Connect to the Antenna or Coax cable. Maximum input Voltage is 5 Volts.

2). Frequency counter input

Connect to the signal source to be measured. Maximum input voltage is 5 Volts.

3). Volume control

Audio output Volume control. To increase the volume, rotate the Volume control clockwise.

4). Earphone Jack

5). LCD (Liquid Crystal Display)

Displays the Signal levels, their characteristics (frequency, amplitude, etc) and pertinent system data.

6). POWER

Press this button to turn the power on. Press again to turn the power off.

7). LCD KEY

Press the LCD key to display the LCD menu. The LCD menu items consists of LCD Contrast control, LCD Grid select, Backlight and Print command. These items are displayed when the LCD key is pressed and selected with the F1 - F4 keys.

8). MENU

Pressing the MENU key once displays the Main Menu items. Pressing the MENU key again displays the System Menu items and pressing the MENU key a 3rd time returns the LCD to the signal level displays.

9). ENTER

This key enters the menu item you have selected or the numeric values you have entered from the keyboard.

10). F1 to F4

These keys select: Run, S

These keys are located at

These keys select: Run, Step frequency menu, Reception mode menu, and squelch Level.

These keys are located at the bottom of the LCD display. They also are used to select the items in the LCD menu when the LCD key is pressed.

11). 0 to 9 Numeric keys

Enters numeric data from the keypad for frequency values. The 0 and 1 keys are also used for assigning a sign to a numeric Value. The 1 key will enter a negative (-) value used for difference mode only), the 0 key a positive (+) value.

12). CLR/.

This key is used for entering decimal points. If a decimal point is already entered, this key is then used for clearing a keyboard entry.

13). ▲▼

This key is used for incrementing and decrementing the Market frequency and for selecting items in the various menus.

14). Rotary Dial Knob

Performs the same function as the up/down key () but at a faster rate. The rotary dial knob allows one-handed operation.

15). DC Input Jack

The AC/DC adapter and cigarette lighter adapter connect to this input for applying DC Power to the unit from an external source.

16). RS-232C Connector(8 pin mini DIN connector)

This connector is used for interfacing to a personal computer or a printer.

17). Belt Clip

For attaching the RF-3290 to your belt.

18). Speaker

For listening to the demodulated output of a RF carrier signal level.

V. BASIC OPERATION

1. General

1 Prior connecting to a power source

See page 22 for inserting batteries, battery charging and connecting to a power source.

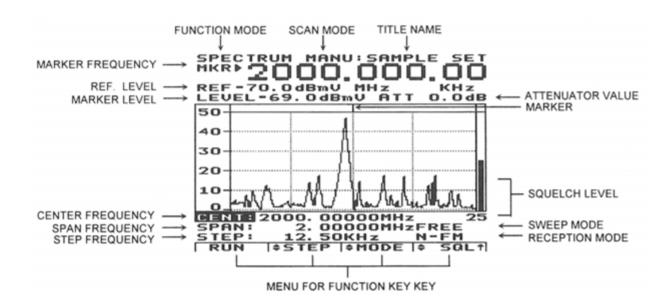
2 Input connection

Connect the antenna or coax cable to the BNC input marked ANT if measuring a RF carrier signal level. If measuring a frequency connect the coax cable to the Frequency counter input.

Note: Do not exceed 5V rms

3 Powering the unit on

- [1] Press the POWER key to turn the unit on.
- [2] The welcome screen will be displayed followed by the last screen that was displayed prior to shutting the power off.
- [3] To adjust the LCD contrast press the LCD key then press the keys until the LCD display is set to the desired contrast then press ENTER.
- [4] See the graphic below for a description of the LCD display when powered on.
- [5] Adjust the volume control for an appropriate sound level. If the signal level is below the squelch level there will be no output sound from the speaker.
- [6] To adjust the squelch level press the F4 key then press the ★▼ keys until the squelch level is at the desired level. Press the ENTER key to quit.

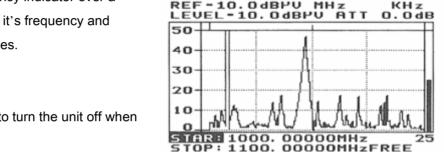


4 To enter a frequency value
[1] The selected scan mode is displayed in the top center of the LCD. In the above,
example manual scan was selected. The frequency entered from the keyboard in this
case is the is the center frequency and is the frequency indicated by the market.
Note: in order to enter a frequency from the keyboard scanning must be halted.
(The RUN icon on the bottom left of the LCD should not be highlighted.)
[2] A frequency maybe entered from the keyboard by pressing the 0 to 9 keys and the CLR/. key.
Example1: To enter 100.00625MHz from the keyboard: Press the following key sequence:
1 0 0 CLR/. 0 0 6 2 5 ENTER
Example2: To enter 500KHz press the following key sequence:
0 CLR/. 5 ENTER
Note: The CLR/. Key is used for entering the decimal point but if the decimal point has
already been entered, pressing the CLR/. Key will clear the entered frequency value.
[3] The frequency value has different functions for the Manual, Search and Cannel scan.
The entered frequency in manual scan sets the Center frequency where as the entered
frequency values in search scanning sets the Start and stop frequencies.
In the Channel scan mode the entered frequency value is stored along with its channel
name in the Channel memory, (see page 28 through 30). This will be used for scanning
previously stored scans along with their channel names and frequency.
5 Scanning
[1] Pressing the F1 key highlights the RUN icon and the scanning will start.
[2] If Free Run sweep is selected from the Sweep menu scanning will be continuous and
regardless of the squelch level. Pressing the F1 key a second time will stop the scanning.

- [3] When Normal Sweep has been selected the scan will halt when the signal level value is greater than the squelch level. Scanning will resume when the signal level value drops below the squelch level.
- [4] When scanning is halted the marker will indicate the signal level and display the amplitude value on the LCD.

6 Positioning the Frequency Marker indicator

Pressing the keys or rotating the dial knob when the scanning has been halted can be used to position the marker frequency indicator over a signal level in order to find it's frequency and signal level amplitude values.



7 Power Off

Press the POWER key to turn the unit off when finished.

Note: When the unit is powered-on again, the screen prior to powering off will be displayed.

2. Manual Scan Mode

- [1] when Manual scan mode is selected. It is necessary to enter the following information:
 - a) The Center frequency value from the keyboard,
 - b) The type of carrier signal modulation from the MODE menu.
 - c) The Frequency Span which is set by the Step frequency. The Frequency span is determined by the number of channels per displayed (Selected from the function menu multiplied by the step frequency. See the 2 examples below on how the frequency span is determined by the step frequency.
- Example 1: To set a frequency span of 8MHz using the Spectrum display mode a step frequency of 50KHz is required(160 x 0.050MHz = 8MHz).
- Example 2: If a 40 Bar graph display is selected and the step frequency is 100KHz the Frequency span is 40 x 0.1MHz = 4MHz.

[2] To select the Manual scanning mode press the following key sequence:

MENU \rightarrow ENTER \rightarrow ENTER \rightarrow ENTER (Select the Scan menu) (Select Manual Scan mode)

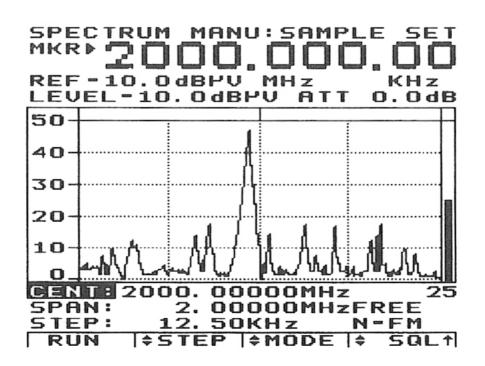
[3] The center frequency, Span, Step Frequency and reception mode are displayed in the lower part of the LCD.

Note: The frequency span is not displayed in the 2 channel difference, Single or counter modes.

- [4] To enter the Center/Market frequency the unit must not be Scanning (Run icon not highlighted) (See pages 12 and 13)
- [6] Pressing the F1 key will highlight the RUN icon and scanning will start from left to right. In the 2-channel mode the market/center frequency and the difference frequency are scanned and displayed.

Note: Scanning is not available in the signal channel or counter mode.

- [7] You can save 10 displays of up to 160 channels and their setups by storing them in the Data and setup memory. These may be selected from the main menu. (see pages 32 through 38)
- [8] Example of a manual scan display



3. Ch. Memory Scan

[1] Names and frequencies of signal levels of interest may be entered and stored in the channel memory prior to scanning. When scanned these signal levels will be displayed along with their frequencies and name.

Ten displays of up to 160 signal level Channels per display(1600 channels total) may be entered, edited and stored in the channel memory (See pages 28 through 30)

[2] To select the Channel scan mode press the following key sequence.

MENU →		-	ENTER	 		→	ENTER
(Select Scan Mode)		(Se	lect C	han. Sca	n)		

- [3] The LCD will display the current signal level frequency as indicated by the marker, the signal amplitude, and the channel name displayed at the bottom of the LCD.
- [4] A signal level frequency may also be entered in to the channel memory from the keyboard by pressing the 0 9 keyboard keys and the CLR/.

 (see page 12 for entering frequencies).

The type of reception (demodulation) must also be selected (see page 48).

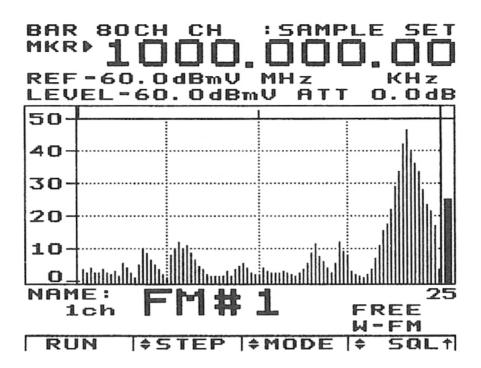
The step frequency will be indicated but is not used for the Channel scan mode.

- [5] Pressing the F1 key will start the scan from the left most position (The RUN icon is highlighted).
- [6] When scanning is halted, pressing the keys or rotating the dial knob will move the Marker frequency indicator and display the amplitude, frequency and name of the signal levels displayed on the LCD. The market indicator may be moved up to +80 channels to -80 channels from its present position.

Note: Scanning is inoperative in the Single scan and counter modes.

In the Difference mode only the Market and the difference frequency is scanned and displayed.

- [7] A stored display in the Data memory may be scanned and displayed in the channel scan mode. The set up memory in this case is used for selecting the stored display to be scanned.
- [8] Example of a channel scan display:



4. Search Scan

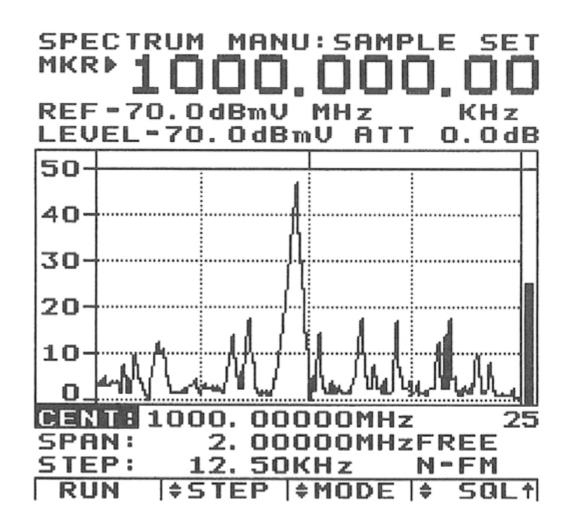
- [1] Search scan is the scanning between a start stop frequency, which are entered from the keyboard.
- [2] To selected the scan mode enter the following key sequence:



- [3] The **START**, **STOP**, **STEP** frequencies and the reception mode (demodulation type) will be displayed at the bottom of the LCD with the start frequency highlighted.
- [4] Enter the START FREQUENCY from the keyboard. This frequency will now be displayed as the start frequency and at the market frequency indicator (See page 12).
 When the START frequency is entered, STOP FREQUENCY will be highlighted.
 Enter the STOP frequency from the keyboard.

Note; scanning must be stopped before entering the START and STOP frequencies.

- [5] Pressing the or rotating the rotary dial while the scanning is stopped will move the market frequency indicator at the step frequency increment to different positions depending on which key is pressed or which direction the rotary dial is rotated.
- [6] Press the F1 key to start the scanning. The scanning will start at the start frequency the Marker frequency indicator will update at the step frequency increment until it reaches the STOP frequency. When the stop frequency is reached the scanning will start over at the start frequency if Free Run or Normal sweep was selected or stop if Free single or single sweep was selected.
- [7] Pressing the F1 key again will halt the scanning. The frequency and amplitude of the signal where the Marker frequency indicator halted will be displayed.
- [8] If the Scan mode is changed to Manual Scan the frequency where the marker halted (in step 7) will become the center frequency.
- [9] You can save 10 displays of up to 160 channels per display and their setups by storing them in the Data and setup memory in the main menu (See pages 32 through 38)

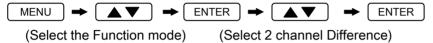


5. Difference mode

Scans and displays 2 signal levels in which one signal level frequency is entered from the Keyboard and the other signal level is at a difference frequency selected from the step Frequency menu. The amplitude of each is displayed as a bar graph on the right side of the Display along with their signal difference.

This feature is useful for measuring the difference in amplitudes between the video carrier And audio carriers of a TV signal or measuring the variation in amplitude of a transmitted Signal at different locations

[1] To select the 2 channel difference mode press the following key sequence:

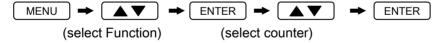


- [2] Enter the marker frequency to be measured from keyboard.
- [3] Select or enter from the keyboard the difference frequency to be measured form the step frequency menu (press the F2 key)
- [4] The LCD will display the bar graphs of the marker frequency and difference frequency amplitudes. The difference amplitude between the two signal levels will also be displayed.
- [5] Press the keys to select the marker or difference frequency

6. Frequency Counter

The frequency counter may be used to measure and record unknown frequencies

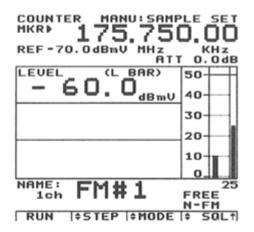
[1] To select the frequency counter press the following key sequence



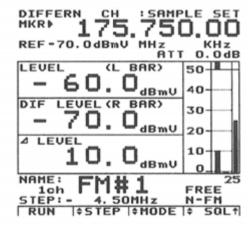
- [2] Select the counter mode by pressing the keys or rotating the dial knob.
- [3] Connect the signal source output to the counter input

Note: Maximum input voltage is 5Volts

- [4] Press the F1 key to start the counter. When a signal is measured, is frequency value will be stored in the data memory starting at frequency position #1 (see page 38). If the input frequency values changes the new frequency value will be stored in successive positions until all 10 positions are written. Additional frequencies will then displace previously stored frequencies starting with the 1 position.
- [5] Pressing the F1 key again will stop the counter. The last measured frequency will be the displayed at the marker indicator
- [6] A frequency stored in the counter data memory may be recalled by selecting the desired frequency with the keys and pressing the F4 key. This frequency may then be used as the center frequency when set to the manual-scanning mode.



Difference Display (Pg. 19)

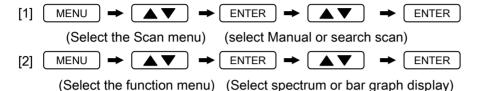


Counter Display (Pg. 19)

7. Recorder function

The 3290 may be used to display and record (store in memory) trends and variations of a Signal level as a continuous pattern of bar graphs. This feature is convent if the amplitude Variations of a signal level under test need to be monitored over a period of time.

To set the Recorder mode use the following procedure:



- [3] Input from the keyboard the frequency to be measured. If using the Manual scan mode set the center frequency of if using the search scan input the start frequency.
- [4] Set the step frequency to 0kHz. This may be accomplished as follows: Select the step frequency menu by pressing the F2 key.

 Then press the following key sequence:

 $0 \implies CLR/. \implies 0 \implies ENTER$

[5] Start the scan by pressing the F1 key.

The scan will start from the left side of the LCD at a rate of 80mS/CH or 12.5Ch/Sec.

This is 3.2sec/Div. In the 80Bar graph display the scan speed is 6.4Channels per second or 1.6 sec per division.

[6] The displays and settings may be stored in the data and setup memories

8. Power supply

1. Car adapter and Ac adapter

- [1] Before connecting be sure the power is off
- [2] Connect the AC adapter to the external DC input jack (see page 9 for location)

2. Battery replacement

- [1] Shut of the power and remove the external power adapter.
- [2] Remove the screws form the battery cover. Lift the battery cover and remove the 6 AA batteries.
- [3] Set the slide switch according to the type of battery being installed. (To the left for alkaline or manganese batteries (dry). To the fight for NiCd batteries)
- [4] Insert the new batteries into the case. Observe battery polarity.
- [5] Replace the battery cover and reinstall the screw.
- [6] Check to the Battery test indicator in system menu (see page 48) for the condition of the battery installed.
- [7] For a quick charge it is recommend charging the batteries while the power is off.

 When using the car adapter recharge the batteries while the engine is operating

VI. Menu Description

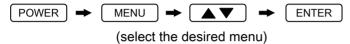
1. The Main Menu

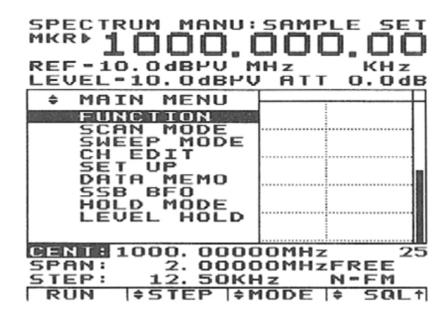
Press the MENU key to display the Main menu as shown below.

Press the key or rotate the rotary dial to highlight the desired menu item then press the ENTER key to make the selection.

1. Main menu display

To display the main menu Press the following keys





Main Menu Display

2. Function mode

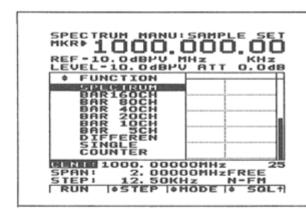
The Function mode selects the type of LCD display.

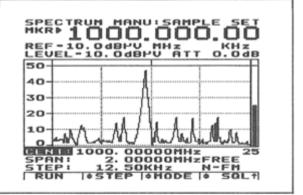
Press the following keys to select the Function mode:



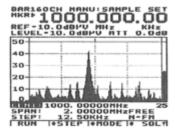
A V	FUNCTION (Display)
① SPECTRUM	Scans 160 Channels and displays their signal levels as a spectrum. The channel at the marker indicator will have its frequency and amplitude displayed on the LCD. See figure 1 on page 25.
② BAR 160CH	Scans 160 Channels and displays their signal levels as bar graphs. The channel at the marker indicator will have its frequency and amplitude displayed on the LCD. See figure 2 on page 25.
③ BAR 80CH	Scans 80 Channels and displays their signal levels as bar graphs. The channel at the marker indicator will have its amplitude and frequency displayed on the LCD. See figure 3 on page 25.
⊕ BAR 40CH	Scans 40 Channels and displays their signal levels as bar graphs. The channel at the marker indicator will have its amplitude and frequency displayed on the LCD. See figure 4 on page 25.
⑤ BAR 20CH	Scans 20 Channels and displays their signal levels as bar graphs. The channel at the marker indicator will have its amplitude and frequency displayed on the LCD. See figure 5 on page 25.
® BAR 10CH	Scans 10 Channels and displays their signal levels as bar graphs. The channel at the marker indicator will have its amplitude and frequency displayed on the LCD. See figure 6 on page 25.
⑦ BAR 5CH	Scans 5 Channels and displays their signal levels as bar graphs. The channel at the marker indicator will have its amplitude and frequency displayed on the LCD. See figure 7 on page 25.
DIFFEREN	▶ Scans and displays 2 signal levels in which one frequency is entered from the keyboard and the other signal level is at difference frequency selected from the step frequency menu. The amplitude of each is displayed as a bar graph along with their difference amplitude. See Figure 8 on page 25.
SINGLE	► Displays a single frequency and its amplitude as a bar graph. See figure 9 on page 25.
@ COUNTER	► Displays a measured frequency together with its amplitude as a bar graph

see figure 10 on page 25.

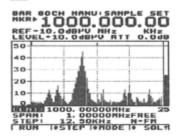


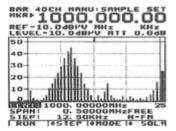


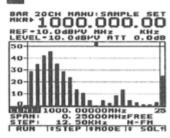


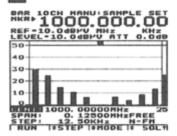


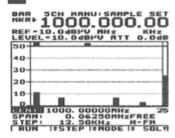


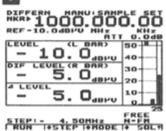


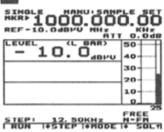


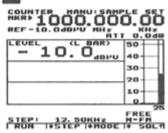










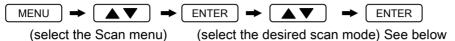


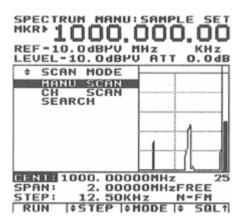
3. Scan modes

Selects the manner in which signal levels are scanned and displayed on the LCD.

There are three scan modes to choose from, Search, Manual and Channel scan.

Press the following key sequence to display the scan mode menu:





► Manual Scan: (Menu Scan)

A signal level frequency is entered from the keyboard And is displayed as the center frequency.

The frequency span is set by a frequency selected form The step frequency Menu.

► Channel Scan: (CH Scan)

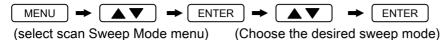
This function is used to store the frequencies you want to measure and select the required frequencies using the kev.

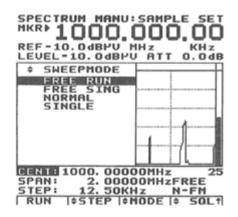
► Search Scan: (search)

This function is used to search the required frequency. To search the frequency, specify the start and the stop frequencies.

4. Sweep mode

Press the following keys to select the sweep mode menu





► FREE RUN (Free Sing)

The display trace sweeps continuously across the screen Regardless of the signal level amplitude or squelch level setting.

► FREE FUN SINGLE:

Operation is identical to FREE RUN and sweeps one time on the screen. Pressing the RUN button will then restart the trace from the beginning.

► NORMAL

The display trace will sweep across the screen until Incoming signal amplitude is greater than the squelch Level. The trace will halt at this point and can be restarted By pressing the up key or automatically if a hold Item in the HOLD menu is selected.

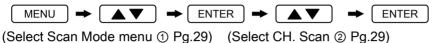
► SINGLE

Operation is identical to NORMAL and will sweep one time on the screen.

5. Edit Channel

Signals with known frequencies along with their manes may be assigned a channel Number, edited and stored in the channel memory, The channel memory consists of 10 Memory banks, where each bank stores up to 160 channel frequencies and their names These stored channels may then be scanned and displayed in the Channel scan mode.

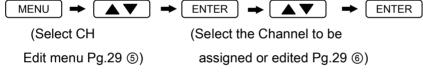
- 5-1 Selecting Edit channel:
- [1] Select Channel Scan by pressing the following key sequence



- [2] Select the setup menu from the main menu and choose a memory bank where the Signal levels are to be stored. Bank 1 though band 10 may be selected. Each bank stores up to 160 channels.
- Press the following key sequence to select the setup up and a memory bank.

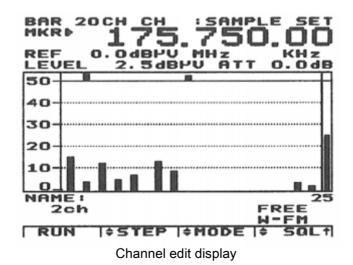


[3] Select the CH. Edit Menu by pressing the following key sequence

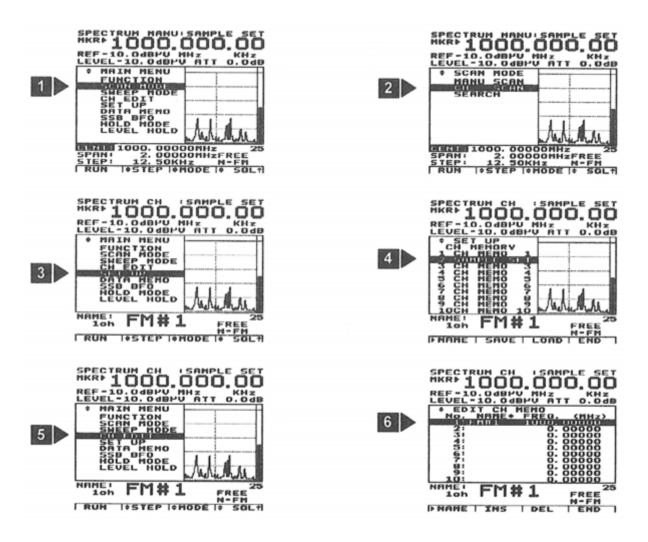


for further information on Channel editing

see sections 5-2, 5-3, 5-4, 5-5.

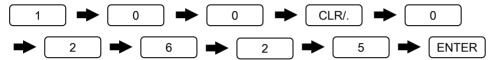


EDIT CH MEM	10		
Mem. NO.	NAME	FREQ	
1	WLTW	107.6 MHz	
2	WWOR	191.75 MHz	
3	WPIX	203.75 MHz	
4	WABC	179.75 MHz	
5	WPLJ	95.5 MHz	
6	WCBS	101.1 MHz	
7	WPBS	215.75 MHz	
8	WRCA	71.75 MHz	
9	WQXR	104.3 MHz	
10	BILL'S TAXI	153.2523 MHz	



5-2 Assigning a channel number
[1] To assign a signal level, a channel number, or edit a frequency in the Channel Memory
(refer to screen in the example in section 5-1), select the desired channel to be assigned or
edited by pressing the
[2] Highlight the NAME icon in the lower left-hand side of the LCD screen by pressing the

[3] To enter a frequency of 100.02625 MHz in to the Channel memory: Press the following Key sequence:



The entered frequency will be displayed to the right of the Marker arrow (MKR) located in the center of the LCD when the ENTER key is pressed.

Note: The CLR/. Key when pressed, will enter a decimal point after numerical sequence has been entered from the keyboard. If a frequency has already been entered (including the decimal point), pressing this key will clear the frequency display.

5-3 Entering a name in to the Channel Memory

F1

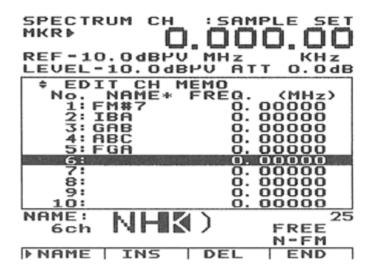
key.

[1] Press the Key to highlight the NAME icon located on the bottom left of the screen. The alphanumeric character entry cursor will then appear at the bottom of the LCD screen as a reversed contrast block.

[2] To select characteristics, numbers or signals, press the key or rotate the rotary dial knob.

Note: Be sure the Character entry cursor is in the left most position before entering a channel name. To move the character entry cursor press and release the is in the left most position.

- [3] Press the F1 key to advance the cursor to the next character position and repeat the procedure until all characters are entered.
- [4] Pressing the ENTER key will store the channel name into memory as shown in the figure in section 5-1.
- Example: To enter the Channel name NHK: 1 in to the channel memory use the following procedure: (See the below figure.)



- [1] Press the F1 key to highlight the NAME icon. Press the V key or rotate the dial knob until the letter of 'N' appears in the reversed contrast cursor block.
- [2] Press the F1 key to enter the second character. Press the key or rotate the dial knob until the letter of 'H' appears in the reversed contrast cursor block.
- [3] Enter the remaining of the characters in the channel using steps 1 and 2
- [4] Press the CLR/. key after the last character in the Channel name to store the name in memory.

Note: When the CLR/. Key is pressed a space will be entered as a character and the cursor Will advance to the next position to the right.

The insert (inc) function. The insert function allows you to add a new channel name and frequency into any position in your stored Channel list.		
[1] Highlight the where the new channel is to be inserted in to the Channel list by pressing		
the keys or rotating the dial knob		
[2] Press the F1 key to highlight INS at the bottom of the LCD screen.		
[3] Assign a frequency and name to the new channel using the procedure given in sections 5-2 and 5-3.		
5-5 DEL (Delete) function		

keys or by rotating the dial knob

6 Setup memory

[2] Press the

6-1 Setup Menu

[1] Select the channel to be deleted by pressing the

F3

[1] The Setup memory menu enables you to save previously selected menu settings and recall them at a later date. This provides fast display setups when time is of the essence.

key to delete the channel

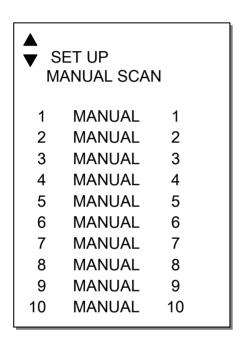
[2] The menu settings for the LCD display screens in the Channel, Manual and search scan modes may be stored in the setup memory.

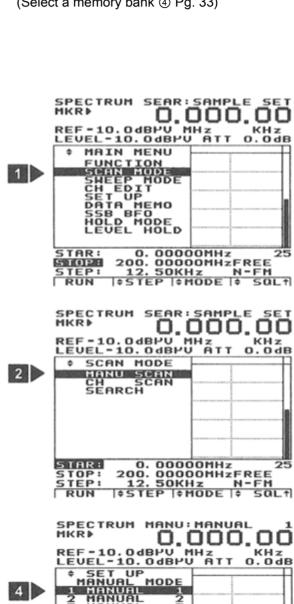
Note: The setup memory in the channel scan mode is used for selecting one of the 10 channel list which stores 10 displays of 160 Channel frequencies and their names. This allows 1600 channels to be saved in 10 channel scan displays.

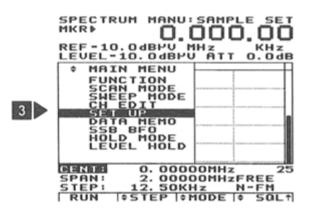
Press the following key sequence to select the set up memory:

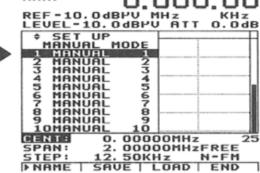


Press the F4 to complete the setup





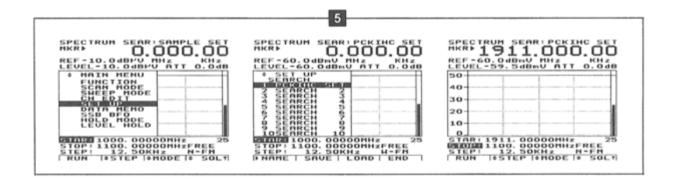




6-2 Save and Load Setups
[1] Select the memory location where a setup is to be saved or recalled with the or rotary dial (See page 32 sect. 6-1)
[2] Press the F2 key to highlight the SAVE icon at the bottom of the LCD. This will save the current menu selections, display data and the title name in the selected memory location.
[3] Press the F3 key to highlight the LOAD icon at the bottom of the LCD. This will recall from the selected memory location the previously stored menu selections, display data and the title name
[4] Press the F4 when finished
[5] The following items are saved in the setup memory when the F2 key is pressed.• Marker frequency
Reception mode
Step FrequencyDifference frequency
Attenuator level
Sweep mode
Function mode
Max Hold mode
Squelch level
Hold mode
• SSB BFO
SCRB set level
Start/Stop Frequency
Title names (10 alphanumeric Characters Max).

Press the following key sequence to load or recall a setup from memory





6-3 Title name

A title name with up to 10 alphanumeric characters may be assigned to a display setup. To enter a title name use the following procedure.

- [1] Press the F1 Key to highlight the NAME icon located on the bottom left side of the LCD screen. The alphanumeric character entry cursor will appear at the top middle of the LCD screen as a reversed contrast block.
- [2] The Characters for the title name are selected with the Keys or the rotary dial.
- [3] Press the F1 key to select the desired character and to advance the character cursor to the next character position. Numerical characters may be entered with the numeric keys.

 Up to 10 alphanumeric characters may be used for a title name.

[4] When the title name is completed press the ENTER key
Example: To enter CATV 9501 as a title name use the following procedure:
A) Press and release the F1 key. Until the character cursor is in the first character position.
B) Select C with the Keys or the rotary dial knob.
a) Press the F1 key to advance the cursor to the next character position
b) Select the A with the A with the
c) Press the F1 key
d) Select the remaining letters T, V using the same procedure as a above
e) Press the CLR/. key to enter a space
f) Press the 9, 5, 0, 1 numeric keys
g) Press the ENTER key
[5] A title name may be changed or edited by pressing the F1 key and using the same procedure as in sect. 6-1
a) Select the title name to be changed or edited with the $lacktriangle$ keys or rotary dial.
b) Press the F1 key to highlight the character in the title name to be changed
c) Press the key to select the new character
d) Press F1 to advance the cursor to the next character ⑥ to be changed.
e) Press the ENTER key then the F4 key when finished
6
SPECTRUM SEAR: CKIHC SET MKR 1911.000.00 REF-60.0dBmV MHz KHz LEVEL-59.5dBmV ATT 0.0dB SEARCH 1 PCKIHC SET 2 SEARCH 2 3 SEARCH 2
4 SEARCH 4 5 SEARCH 5 6 SEARCH 6 7 SEARCH 7 8 SEARCH 7 8 SEARCH 9 105EARCH 10 STAR: 1911. 000000MHz 25 STOP: 1100. 00000MHzFREE STEP: 12. 50KHz N-FM

7 Data memory

7-1 Data memory setup

The Data Memory feature allows you to save 10 displays of up to 160 channels per display in memory including amplitude, Attenuator and difference level data.

These displays may be recalled at a later time. In the counter mode 10 measured frequencies may be saved and then recalled.

To display the Data memory menu use the following key sequence:



(Select data memo)

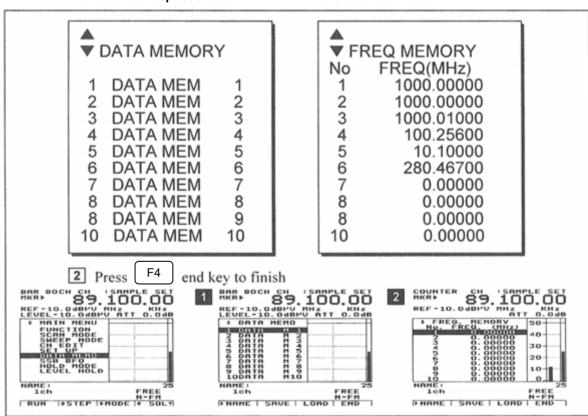
(Select Memory location)

(See page 38 for saving and loading data in the data memory)

To quit the data memory press the F4 key

Data Memory Menu for all Functions except counters

Data Memory Menu for the Counter mode



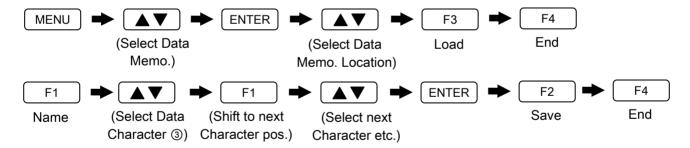
7-2 Saving and loading

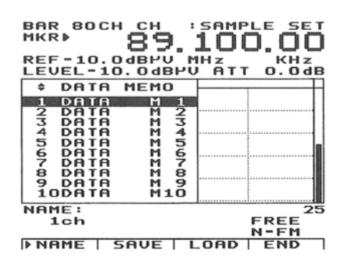
[1] The current LCD screen data and title maybe saved in a memory location by selecting the memory location with the keys and pressing the (save). F2 Note: In the counter mode, pressing the F2 key will store the frequency value indicated by the marker. [2] Previously stored data and title name may be recalled from a memory location by selecting the desired memory location with the keys and pressing the F3 (Load) key. F4 [3] Press the (End) key when finished. [4] Frequency measurements in the counter mode may be saved and recalled in the data memory, when in the Run mode, pressing the key will continuously store and update the F1

7-3 Assigning a title name

frequencies displayed at the marker indicator.

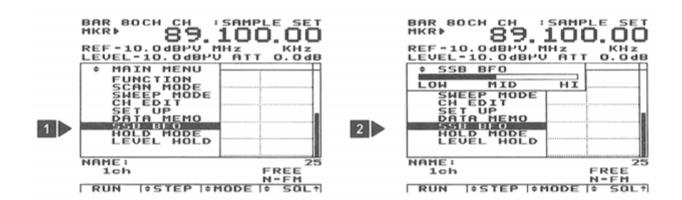
To assign a title name to a display stored in the data memory use the following key sequence:





8 SSB BFO

- [1] Press the MENU key and highlight the SSB BFO by pressing the or rotating the dial knob then pressing the ENTER key. Tuning the BFO will demodulate single side band signals.
- [2] The carrier frequency may be reinserted by tuning the BFO to 1.5KHz above the carrier frequency to recover the LSB or to 1.5KHz below the carrier frequency to recover the USB by pressing the
 ② or rotating the dial knob until the audible signal is heard.
- [3] Press ENTER when finished



9 Hold Mode

The Hold mode may be activated for use in the NORMAL or Single sweep mode. In hold mode scanning will be temporarily halted (approximately 5 seconds) when a signal Level amplitude is greater than the squelch level and then resumes scanning regardless of the signal level amplitude.

To activate the HOLD mode:

- [1] Press MENU key and select the Hold mode menu by pressing the MENU or rotating the dial knob
- [2] Select the desired hold mode from the menu. The following types of hold may be selected:



OFF

Hold mode disabled. Scanning stops when the signal level amplitude is greater than the Squelch level and restarts when the signal level amplitude drops below the Squelch level.

DELAY RUN

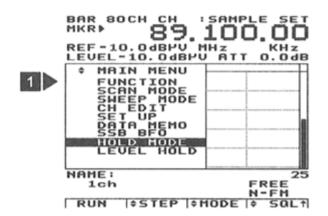
Scanning will stop when received signal level amplitude is greater than the squelch level and then restart after the hold time (approximately 5 seconds) if the signal level amplitude remains greater than the squelch level. If the signal level drops below the squelch level during the hold period scanning will restart.

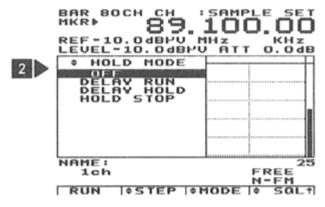
DELAY HOLD

Scanning will stop when a received signal level amplitude is greater than the squelch level then restart after the hold period, irregardless of the signal level value during the hold period.

HOLD STOP

Scanning will halt when the signal level is greater than the squelch level and will remain stopped. Pressing the key will restart the scan.

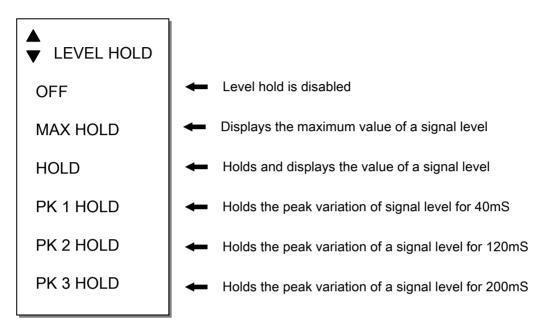




10 Level Hold

Stores and displays the maximum value of a signal level on the LCD. This feature is useful for finding the maximum value a signal level reaches over a period of time.

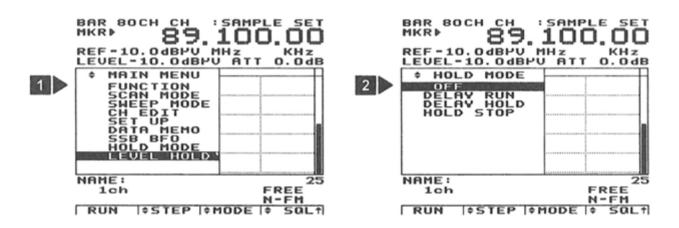
To select the Level Hold menu press the MENU key and press the To or rotate the rotary knob to select level hold and press ENTER. The following Level hold options will be displayed.



A LEVEL HOLD mode may be operated at all times while the 3290 is running. Prior to scanning in a **HOLD** mode set all signal levels amplitudes to their minimum value or 0dB.

The Peak hold modes are useful for displaying signal levels with a long burst or pulse time such as a **PCS** carrier signal.

Note: The scanning time during the **PK HOLD** modes will be longer than 125Ch. /Sec due to the time needed to set up and establish the hold time.



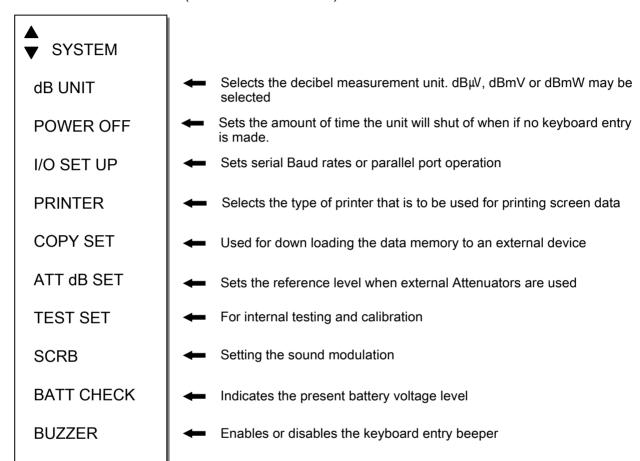
2 THE SYSTEM MENU

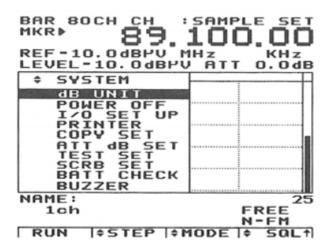
1 System Menu display

▼ To Display the System menu press the following Key sequence:



(Select the desired menu)





2 Setting the display dB units

To Display the System menu press the following Key sequence:

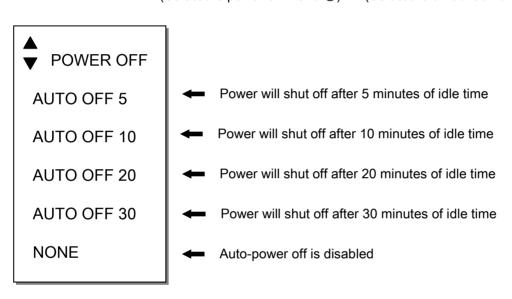


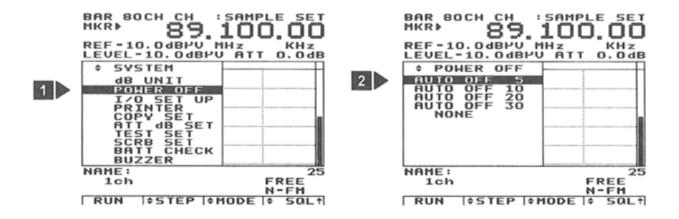
3 Setting the Auto power off feature

This feature sets the amount of keyboard idle time before the unit shuts off. 5, 10, 20 or 30 minutes may be selected.

Key sequence for selecting the Auto power off menu.



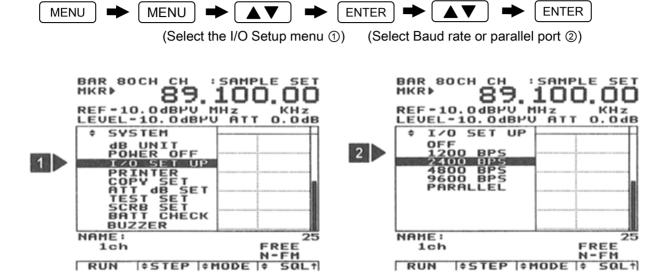




4 I/O Setup Menu

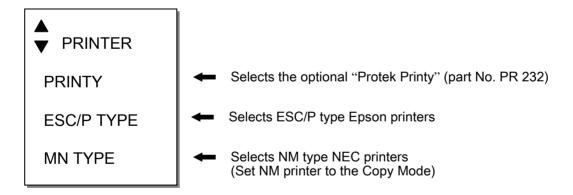
This Menu enables the serial port with baud rates of 1200, 2400, 4800 or 9600 for connecting to a computer or serial printer. The parallel port may also be selected for connecting to a parallel printer.

Note: To connect a parallel printer to the RF-3290, the optional parallel printer cable is needed.



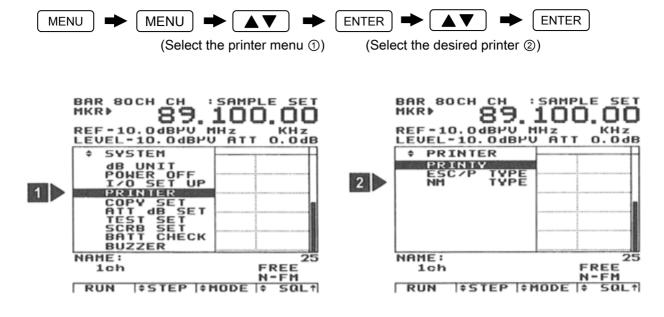
5 Printer Menu

Displays the list of printers, which may be connected to the 3290 for printing out display data.



See Page 53 for printer operation

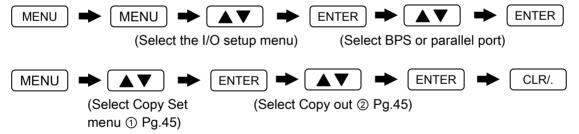
Key sequence for selecting the Printer menu

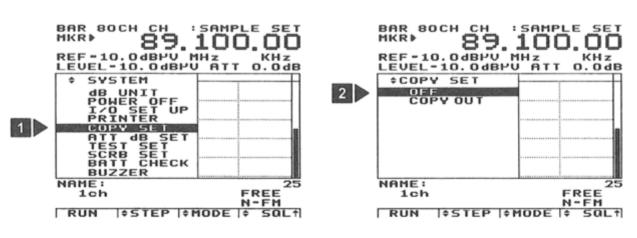


6 Copy set Mode

The copy set mode allows the contents of the Channel edit, Setup and Data memories to be copied to an external device. Data may also be written in to these memories from an external device. The I/O setup must be performed prior to using this feature. (See page 44 section 4)

Key sequence for selecting the copy set menu





7 External Attenuators

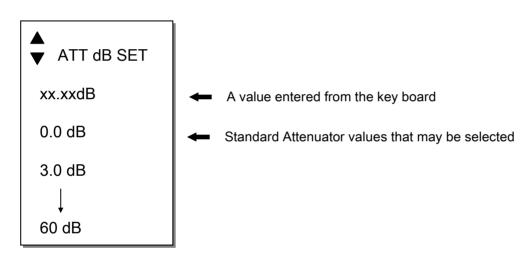
An external Attenuator may be connected to the signal level input in order to increase the measurement range. Upon doing so it is necessary to change the Reference level. This is accomplished by selecting the appropriate attenuation value in the ATT dB set menu. Standard Attenuator values of 3,6,10,20,30,40,50 or 60 dB may be selected with the Keys or dial knob or a non-standard value may be entered through the key board.

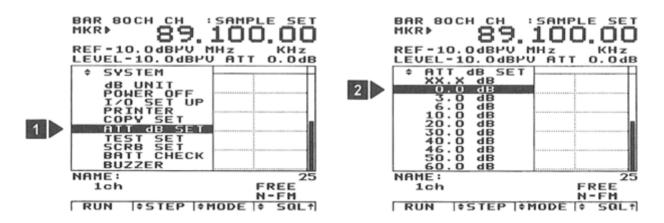
The reference level displayed on the LCD will then change according to the dB value selected.

Example: If a 20dB Attenuator is connected to the input. Select 20dB from the ATT dB Set menu. The reference level displayed on the LCD will change to 20dB.

F Key sequence for selecting the ATT dB set menu







8 Test set menu

The test set menu contains the following utilities:

	•
TEST MODE	
OFF	The signal level value displayed on the LCD includes the Calibration correction factor. For normal operation this mode should be selected
TEST 1	The LCD displays the output from the A/D converter. Users should avoid selecting this.
TEST 2	Same as Test 1.
CALIBRATE	This utility is used for internal calibration of the 3290. This utility compares the input signal level and the level detector output and creates a correction factor which is written in to a non volatile memory. Users should avoid selecting this.
ALL RESET	Initializes all settings and memory data. This utility is normally used after replacing the internal Lithium battery.
ALL CLEAR	Clears the Setup, Data and Channel edit memories and returns them to their default state.

Caution: Improper selection and operation of **CALIBRATE** and **ALL CLEAR** in this menu may result in the loss of all previously stored data and setups and the deletion of internal calibration data.

9 SCRB Menu

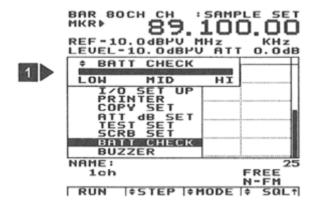
The menu is optional and is reserved for future use.

10 Battery Check

The status of the battery may be checked. This item displays the status of the battery as a bar graph. Batteries should be replaced or recharged when the Bar graph indicates low. See page 44 for battery charging and replacement.

F Key sequence for selecting the BATT. TEST menu

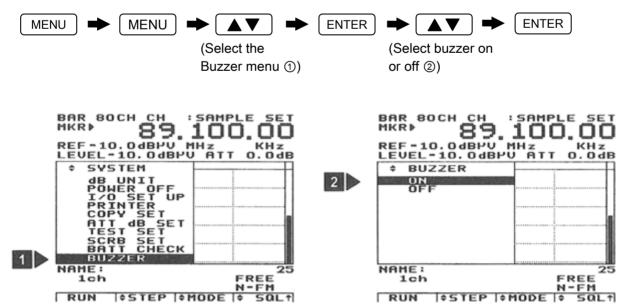




11 Buzzer

The keyboard buzzer when enabled will beep whenever a key is depressed. The buzzer may be enabled or disabled through this menu. The buzzer is normally enabled by default.

The key sequence for enabling or disabling the buzzer is:



3 Function keys

In normal operation the following menus are displayed at the bottom of the LCD. To select one of these menus press the corresponding function key

RUN	STEP	MODE	SQL
F1	F2	F3	F4

1 RUN

- [1] Pressing the F1 key highlights the RUN icon located at the bottom of the LCD (see above figure). Scanning will start, or enable the counter if the counter function has been selected.
- [2] Pressing the F1 key a second time, will stop the scanning or, when in the counter mode, the counter will stop measuring

2 STEP

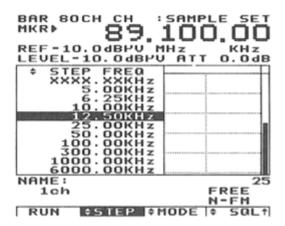
- [1] Pressing the F2 key displays the step frequency menu.
- [2] The step frequency determines the scanning frequency increment. (Example: the frequency Marker indicator will increment every 50 KHz if a step frequency of 50 KHz is selected.
- [3] The frequency span in the manual Scanning mode is also determined by the step frequency. (Span = No. Of channels per display as selected from the function menu multiplied by the step frequency. Example: If an 80-channel bar graph display is selected from the Function menu and the frequency step is 100KHz the Frequency Span is 8 MHz)
- [4] When the 2-channel difference display is selected, the step frequency determines the difference frequency. Example: If the marker frequency is 100MHz and the difference frequency is +8MHz, the difference frequency (R BAR) is 208MHz and the variation (△ Level) is displayed.

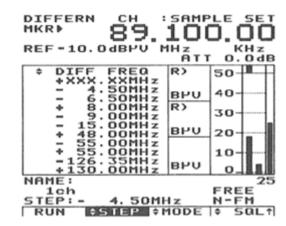
[5] A step frequency of frequency difference is selected by pressing the keys or rotating the dial knob and then pressing the ENTER key.

[6] When entering a step frequency from the keyboard, step frequencies of multiples of 5KHz or 6.25KHz must be entered. When entering a difference frequency value, pressing the

0 key prior to entering a difference frequency will enter a + (positive) frequency value. Pressing the

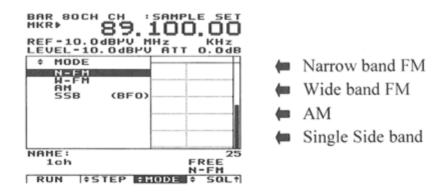
1 key will enter a – (negative) frequency value.





3 MODE (demodulation mode)

- [1] Pressing the F3 key displays the type of demodulation that is required for aural reception. There are 4 reception (demodulation) modes available, wide band FM, Narrow band FM, AM and Single side band.
- [2] To select a reception (demodulation) mode press the keys or rotate the rotary dial knob and then press the ENTER key.

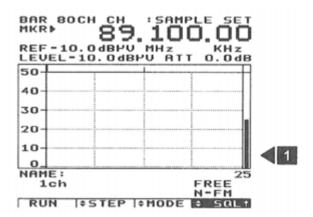


4 SQL (Squelch level)

To set the squelch level, press the F3 key to highlight the SQL icon on the lower right hand side of the LCD. Press the keys while observing bar graph to set the squelch to the desired level ①. Press the ENTER key when finished.

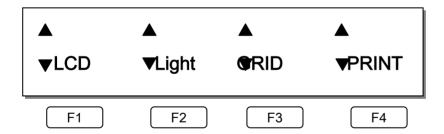
The squelch level performs the following functions:

- [1] The RF carrier's Audio modulation is available at the speaker when the RF carrier signal level is greater than the squelch level.
- [2] Halts the scan when the received RF carrier level is greater than the squelch level Scanning resumes when the RF carrier level falls below the squelch level.



4 LCD MENU

Pressing the LCD key displays the following menu at the bottom of the LCD:

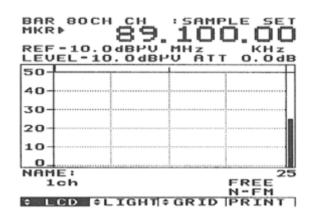


1 LCD Contrast

To adjust the LCD contrast press the F1 key

Then press the keys for a suitable display.

Press the ENTER key when finished



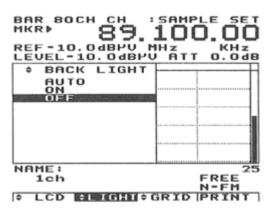
2 LIGHT

Press the LCD key then the F2 key to display the Back light menu. There are 3 items

that can be selected from this menu with the



key or the rotary dial.



Auto: Then back light will go off after approximately 5 seconds after the last key entry

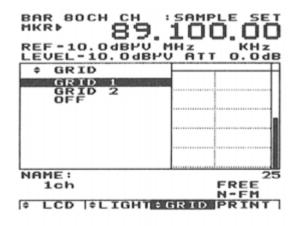
ON: The backlight is always on

OFF: The backlight is always off

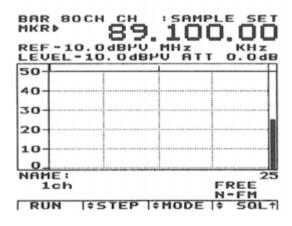
3 Grid (LCD)

Press the LCD key then the F3 (①) key to display the grid menu. There are three

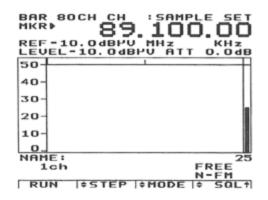
items to choose from and selected (see page 52) with the key or the rotary dial.



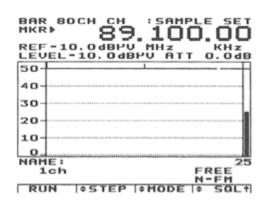
Grid selection menu



Grid 1: Horizontal and Vertical grid lines are displayed



OFF: No grid lines are displayed



Grid 2: Horizontal grid lines only are displayed

Press the ENTER key to complete the selection

4 PRINT

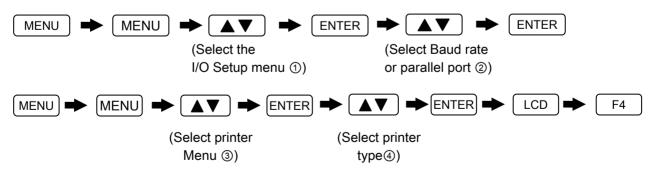
the

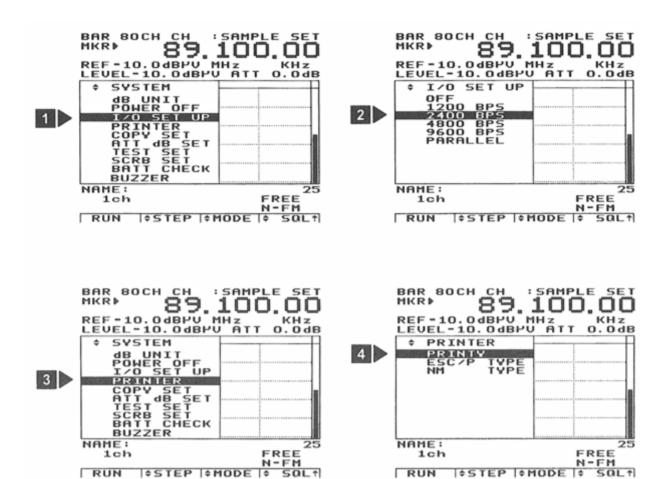
F4

A hard copy of the LCD display is possible by selecting a printer from the Printer menu. Prior to printing it is necessary to set up the correct baud rate if the printer to be used is a serial printer or select the parallel port if the printer is a parallel printer (See I/O menu page 44). It is also necessary to select the type of printer to be used from the printer selection menu (see page 44)

To Print the LCD screen, display the LCD menu by pressing the LCD key and then press

key





RS-232C REMOTE COMMAND

1. General Features

- 1) Each Mode Setup
- 2) Reading and writing each datum

2. COMMAND Type

"A0 XX CR"

A0: ASCII CODE

XX: When DATA needed

CR: 0DH(CR)

3. ERROR Output and REMOTE Control

If Communication Error, or Command Error occurs, "?" will be indicated on the bottom right side of the screen, and "R" will be indicated when data receive properly.

[Not] Single time COMMAND process takes greater than 40ms subsequently. Do not use the command as it possible

4. Signal Line and Pin Number

When it connected to PC, operate it using the MINI DIN Cable (Option)

MINI DIN CABLE	25PIN DSUB	(9PIN DSUB)	COMPUTER	
PIN NO	PIN NO	Signal Name	PIN NO	Signal Name
SG	- 1	FG	- 1	FG
5	- 2(3)	RXD ←	- 2(3)	RXD
1	. 3(2)	TXD	3(2)	TXD
3	4(7)	CTS ←	4(7)	CTS
7	- 5(8)	RTS	5 (8)	RTS
	- 6(6)	DSR	6(6)	DSR
4	7(5)	SG	- 7(5)	SG
	- 20(1)	DCD ←	- 20(1)	DCD

^{※()} is PIN NO of 9PIN DSUB

5. Interface

Transmitting and receiving data from PC are RTS/CTS type Not using DSR/DCD, or XON/XOFF

6. Specification

Synchronization: ASYNC STOP BIT: 2 STOP BIT

PARITY: NONE
DATA Length: 8 BIT

Communication Speed: 1200, 2400, 4800, 9600 BPS

Communication setup: Press MENU KEY twice and select I/O SETUP MODE, then enter the speed rate. Best condition of data communication is 9600 BPS.

7. Frequency Setup

1) Frequency Setup Format Type

COMMAND + DATA(ASC CODE) + CR(0DH)

Ex.) MARKER frequency on 2000.10625 MHz "K02000.10625" CR

MARKER frequency on 12.5 kHz "K0.0125" CR

MARKER frequency on 40.0 MHz "K0004" CR, or "K040."

DIFFERENCE STEP on 130.0 MHz "K20130" CR

- 2) Setting Value of the Frequency Setup can be changed by SCAN MODE
 - ① MANUAL MODE

When setting up the MARKER frequency, tune in the center frequency to the MARKER frequency. Set up the MARKER on 80CH.

- 2 CH MODE
- **③ SEARCH MODE**

Entering first frequency value will be set up on START frequency, and Second frequency value will be set up on STOP frequency.

Ex.) START frequency on 500.0MHz, STOP frequency on 600.0MHz

"K0500.0" CR: START, "K0600.0" CR: STOP

3) Frequency Output Format

ASC DATA + CD(0DH)

Ex.) MARKER frequency "L0" CR:

2000.25625MHz

STEP frequency "L1" CR:

12.5kHz

DIFFERENCES STEP frequency "L2" CR:

-4.5MHz

COUNTER frequency "A9" CR: frequency COUNTER MODE

"L8" CR: COUNTER output MODE

"Q1" CR: RUN MODE

16.00800MHz 1900.01000MHz

0.0MHz

"Q0" CR: STOP

Instrument outputs COUNTER Value per 512ms in RUN mode

8. LEVEL DATA Output Format

8bit DATA + CR

In order to increase communication speed, LEVEL DATA outputs 30H-94H 8Bit DATA: CR

LEVEL 0.0dB 0.5dB 1.0dB ~ 15.0dB ~ 49.5dB 50.0dB DATA 30H"0" 31H"1" 32H"2" 4FH 93H 94H

9. ATT Level Data Setup

COMMAND + DATA(ASC CODE) + CR(0DH)

Ex.) ATT LEVEL on 18.5dB, ATT LEVEL on 0.0dB, Enter "S018.5" CR

Enter "S00.0" CR

10. COMMAND CODE(*: default set)

1) Function Mode Setup

*A0	SPECTRUM MODE
A1	BAR 160CH MODE
A2	BAR 80CH MODE
A3	BAR 40CH MODE
A4	BAR 20CH MODE
A5	BAR 10CH MODE
A6	BAR 5CH MODE
A7	DIFFERENCE MODE
A8	SINGLE MODE
A9	COUNTER MODE
Ex.) A1 CR:	BAR 160CH MODE

2) Scan Mode Setup

*B MANUAL MODE

B1 CH MODE

B2 SEARCH MODE

Ex.) B1 CR: CH MODE

3) Sweep Mode Setup

*C0	FREE RUN MODE
C1	FREE SINGLE MODE
C2	NORMAL MODE
C3	SINGLE MODE
Ex) C0 CR	· FREE RUN MODE

4) CH BANK Setup

D0	CH BANK in No 1
D1	CH BANK in No 2
D2	CH BANK in No 2
D3	CH BANK in No 3
D4	CH BANK in No 4
D5	CH BANK in No 5
D6	CH BANK in No 6
D7	CH BANK in No 7
D8	CH BANK in No 8
D9	CH BANK in No 9

Ex.) D1 CR: CH BANK in No 2 SCAN MODE will be operated in CH SCAN MODE only

5) SSB BFO LEVEL Setup

E0(30CH) BFO on LOW(-)

| | | |

E0(6FH) BFO on MID(0)

| | |

E (AFH) BFO on HI(+)

Ex.) E0 CR: On LOW

Receiving MODE is operated on SSB MODE Only

6) MODE Setup

F0 OFF

F1 DELAY RUN MODE
F2 DELAY HOLD MODE
F3 HOLD STOP MODE
Ex.) F1 CR: On DELAY RUN MODE

7) MAX HOLD Setup

G0 OFF

G1 MAX HOLD

G2 HOLD

Ex.) G1 CR: On MAX HOLD

8) Receiving MODE Setup

H0 N-FM MODE
H1 W-FM MODE
H2 AM MODE
H3 SS MODE
Ex.) H2 CR: On AM MODE

9) SQUELCH LEVEL Setup

I0(30H) SQUELCH ON ONLY

I1(31H) SQUELCH ON 0dB(Adding on 1dB)

I2(32H) SQUELCH ON 1dB
*II(49H) SQUELCH ON 25dB
Ib(63H) SQUELCH ON 50dB
Id(64H) SQUELCH OFF ONLY

Ex.) I4 CR: SQUELCH ON 3dB

10) CH MEMORY, DATA MEMORY COPY Input/Output

*J0 COPY input START
J1 COPY output START

Ex.) J1 CR: COPY input START

All the data of CH and DATA MEMORY will be outputted in HEX

** Recommend not to use this function. Special users only.

11) Frequency Setup

K0 MARKER frequencyK1 SETUP frequency

K2 DIFFERENCE STEP frequency

Ex.) K0 2000.12625 CR: MARKER frequency on 2000.12625MHz

12) Frequency Output

L0 MARKER frequency
L1 STEP frequency

L2 DIFFERENCE STEP frequency

L3 START frequency: can be operated on SEARCH MODE only
L4 STOP frequency: can be operated on SEARCH MODE only
L5 Center frequency: can be operated on MANUAL MODE only
L6 SPAN frequency: can be operated on MANUAL MODE only

L7 Current frequency

L8 COUNTER frequency: can be operated on OUTPUT MODE only

Ex.) L0 CR: MARKER frequency output

10.12625 CR: 10.12625MHz (**Reference to Frequency Output FORMAT)

13) TITLE NAME and CH NAME Setup

M0 TITLE NAME: Up to 10 characters

M1 CH NAME: Up to 5 characters (CH MODE only)

Ex.) M2 TEST2 CR: NAME of TEST2 will be Memorized on current CH

14) TITLE NAME and CH NAME Output

NO TITLE NAME: Up to 10 characters

N1 CH NAME: Up to 5 characters (CH MODE only)

Ex.) NO CR: TITLE NAME output

"CATV KOREA" CR: TITLE NAME

15) UP, DOWN Setup

O0 "UP KEY" one time
O1 "DOWN KEY" one time

Ex.) O1 CR: DOWN Operation

16) POWER MODE Setup

*P0 AUTO POWER OFF 5
P1 AUTO POWER OFF 10
P2 AUTO POWER OFF 20
P3 AUTO POWER OFF 30

P4 AUTO POWER ON

Ex.) P1 CR: AUTO POWER OFF after 10 minutes

17) RUN STOP Setup

Q0 STOP mode
Q1 RUN mode
Ex.) Q1 CR: RUN mode

18) LEVEL DATA Output Setup

*R0 LEVEL DATA Output

R1 Indicated CH LEVEL DATA Output

R2 Previous CH and DIFFERENCE LEVEL DATA Output

R3 CH DATA and CH DATA Output each time

19) A.T.T LEVEL DATA Setup

S0 ATT LEVEL DATA

Ex.) S0 12.5 CR: ATT LEVEL on 12.5dB

** Reference to ATT LEVEL DATA Setup

20) PRINTER MDOE Setup

*T0 PRINT MODE
T1 ESC/P MODE
T2 NM MODE

Ex.) T1 CR: ESC/P MODE

21) MARKER CH Setup

V0 1CH V1 2CH | |

Ex.) V9 CR: 160CH MARKER

22) Each CH Setup Output

W0 MARKER CH W1 Indicate left

W2 Current LEVEL CH Ex.) W0 CR: Set up MARKER CH

A CR: 17CH

24) dB UNIT MODE Setup

*X0 dB mV unit
X1 dB μA unit
X2 dBm unit

25) Voice Demodulation Setup

Y0 Demodulation LEVEL in LOW

Y 7FH Demodulation LEVEL in HIGH

Ex.) V9 CR: Demodulation LEVEL

** Recommend not to use this function. Special users only

26) TEST MODE OFF Setup

*Z0 TEST MODE OFF

^{**} Recommend not to use this function. Special users only