Cat. No. 22-305

OWNER'S MANUAL

Please read before using this equipment.

LCD RF Frequency Counter

Radio Shack®

FEATURES

Your Radio Shack LCD RF Frequency Counter is a microcomputer-based instrument that accurately measures radio frequency (RF) signals. It is ideal for measuring ham or CB radio frequencies.

Your counter can measure RF signals within a range of 1 to 1300 MHz (1.3 GHz). The counter can display RF signals with different resolutions and update rates.

Your counter also includes these features.

Selectable Measurement Update Settings — let you choose a fast setting for quick measurement updates or a slow setting for maximum resolution.

Selectable Input Impedance — lets you select a 50Ω or high input impedance.

Selectable Input Frequency Range — lets you select an input frequency range between 1 and 50 MHz or between 50 MHz and 1.3 GHz.

BNC Connector — lets you connect the supplied antenna to measure through-air RF signals, or a cable with a male BNC connector (not supplied) for direct frequency measurements.

Backlight — makes the display easy to see in low-light conditions.

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CHOOSING A POWER SOURCE

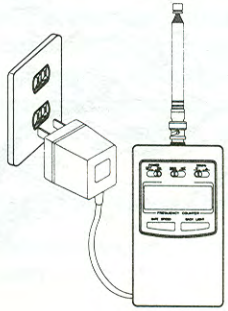
You can power the meter from a standard AC outlet or from four AA batteries (alkaline or rechargeable nickel-cadmium).

USING AC POWER

You can power the counter from a standard AC outlet using a 9V AC adapter (such as Radio Shack Cat. No. 273-1455, not supplied).

Caution: Use only an AC adapter that supplies 9 volts DC, delivers at least 300 milliamps, and has a center negative plug that properly fits the counter's **DC 9V** jack. Using an adapter that does not meet these specifications could damage the counter or the adapter.

Connect the adapter's barrel plug to the counter's **DC 9V** jack (on the counter's left side). Then plug the adapter's other end into a standard AC outlet.



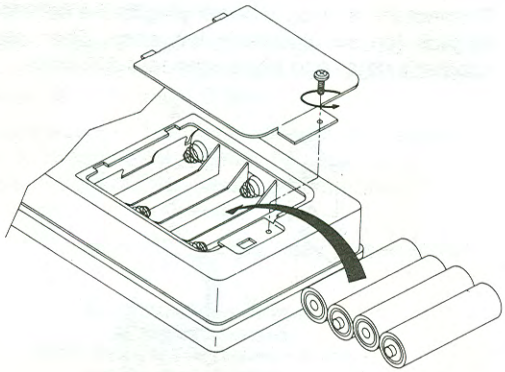
USING BATTERY POWER

You can power the counter using four AA batteries. For the longest battery life, use alkaline batteries (Radio Shack Cat. No. 23-552). You can also use nickel-cadmium rechargeable batteries (Cat. No. 23-125).

Installing the Batteries

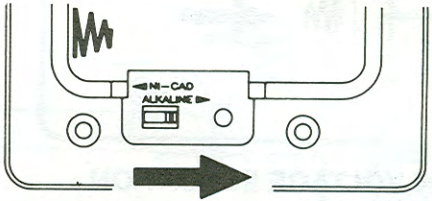
Follow these steps to install the batteries.

1. Loosen the screw on the counter's battery compartment cover. Then remove the cover.
2. Install the batteries as shown inside the compartment.



3. Set the counter's battery type switch according to the type of batteries you installed. Use a small, pointed tool, such as a small screwdriver, to set the switch.

   Set the switch to the appropriate position — **ALKALINE** for alkaline batteries or **NI-CAD** for rechargeable nickel-cadmium batteries.



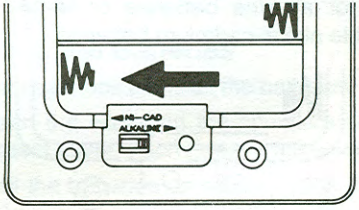
   Warning: If you installed alkaline or other non-rechargeable batteries, do not connect the AC adapter to the counter with the switch in the NI-CAD position. Doing so activates the counter's charging circuit. Trying to charge non-rechargeable batteries can cause the batteries to leak or explode, possibly causing personal injury.

4. Replace the battery compartment cover.

To ensure consistent operation, replace alkaline batteries about every 12 months.

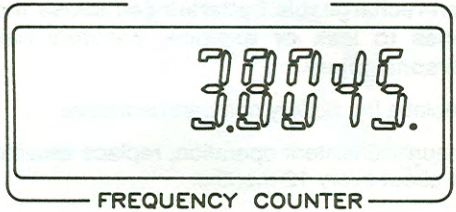
RECHARGING NICKEL-CADMIUM BATTERIES

To recharge nickel-cadmium batteries, connect the AC adapter to the counter when the batteries are installed and set the battery-type switch to **NI-CAD**.



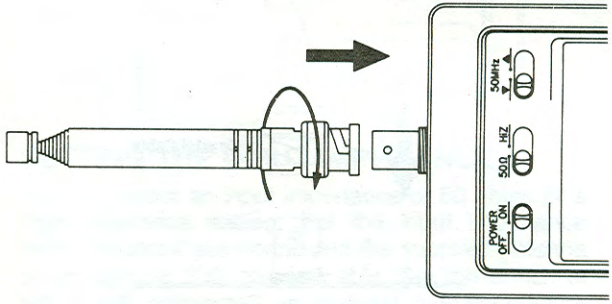
LOW VOLTAGE INDICATION

When the battery voltage becomes too low, or there is a low AC voltage condition, the counter might display incorrect measurements. The display shows a low-voltage condition by lighting the rightmost decimal point on the display.



CONNECTING THE ANTENNA

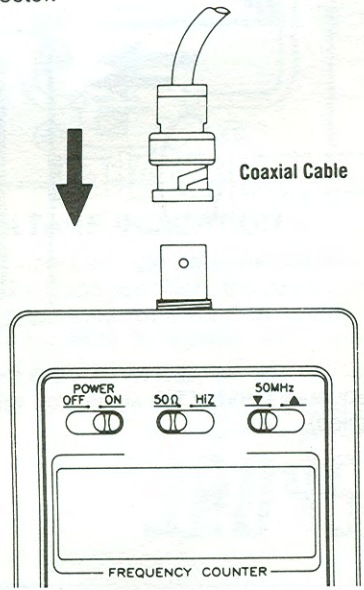
The counter has a standard BNC-type connector. To connect the supplied antenna, place it over the counter's connector as shown. Then slightly push down on the antenna's connector and turn it clockwise until it locks.



Note: You can also connect an antenna that is tuned to the frequency band of the signal you will measure (not supplied).

CONNECTING AN OPTIONAL COAXIAL CABLE

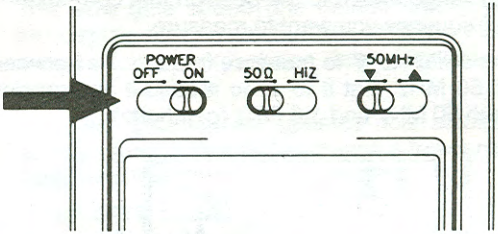
If you want to measure RF frequencies directly, connect a 50Ω coaxial cable or an oscilloscope probe to the counter, as shown. The cable must end in a male BNC connector.



OPERATION

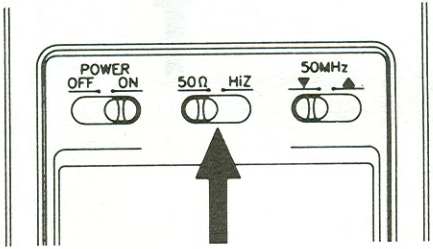
TURNING ON THE COUNTER

To turn on the counter, set **POWER OFF/ON** to **ON**.



SETTING THE INPUT IMPEDANCE

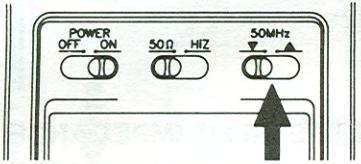
You can select an input impedance of 50 ohms or a high-impedance setting. Set the input impedance switch to **50Ω** if you connected the supplied antenna or an optional 50Ω coaxial cable. Set the switch to **HiZ** if you connected an optional high-impedance probe, such as an oscilloscope probe.



SETTING THE FREQUENCY RANGE

To ensure accurate measurements, set the frequency range switch to the position that corresponds to the frequency you want to measure.

Set the switch to ▼ to measure frequencies between 1 and 50 MHz. Set it to ▲ to measure frequencies between 50 MHz and 1.3 GHz (gigahertz).



Note: If the measured frequency is in a range other than that indicated by the switch setting, the meter might give incorrect results.

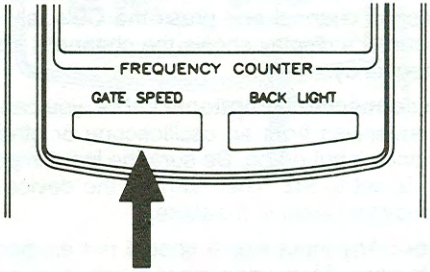
SETTING THE GATE SPEED

You can select from two gate speeds: slow and fast.

The *slow* gate speed (the default setting) updates the display every 1.28 S. This setting provides the maximum display resolution (least significant digit is in units of 100 Hz).

The *fast* gate speed updates the display more quickly (every 128 mS) but shows a lower resolution (least significant digit is kilohertz).

Press **GATE SPEED** to toggle between a fast and slow gate speed.



MEASURING FREQUENCIES

The counter's display shows all measurements in Megahertz (MHz).

After you turn on the counter and set the input impedance, frequency range, and gate speed, do the following to measure frequencies.

If you connected an antenna, fully extend the antenna and be sure the input impedance switch is set to **50Ω**. Then turn on the device whose frequency you want to measure.

For example, to check the transmission frequency of a channel on a CB radio, turn on the CB. Then select the desired channel and press the CB's talk button. The counter's display shows the channel's transmission frequency.

If you connected an optional cable, you can measure frequencies from an oscilloscope or other high-impedance input probe. Be sure the input impedance switch is set to **HiZ**. Then turn on the device whose frequency you want to measure.

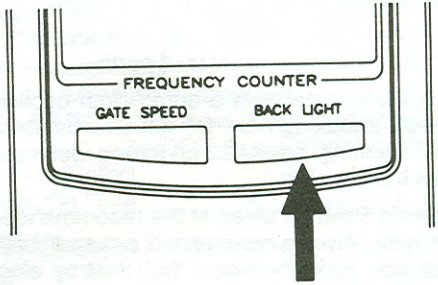
Caution: Any input signal should not exceed 1.4 V peak-to-peak. Measuring signals with a higher voltage could damage the counter.

Note: When you do input a specific frequency, the display shows random frequencies.

USING THE BACKLIGHT

The counter's display has a backlight to help you see the display in low light conditions.

To turn on the backlight, press **BACK LIGHT**. The backlight stays on for about 10 seconds. To keep the light on for an extended period of time, press and hold down **BACK LIGHT** for at least 2 seconds. The backlight stays on until you turn off the counter.



CARE AND MAINTENANCE

Your Radio Shack LCD RF Frequency Counter is an example of superior design and craftsmanship. The following suggestions will help you care for the counter so you can enjoy it for years.

- Keep the counter dry. If it gets wet, immediately wipe it dry.
- Use and store the counter only in normal temperature environments.
- Handle the counter gently and carefully.
- Keep the counter away from dust and dirt, which can cause premature wear of parts.
- Wipe the counter with a damp cloth occasionally to keep it looking new. Do not use harsh chemicals, cleaning solvents, or strong detergents to clean the counter.
- Use only fresh batteries of the recommended size and type. Always remove old or weak batteries. They can leak chemicals that destroy electronic circuits.

Modifying or tampering with your counter's internal components can cause a malfunction and might invalidate the counter's warranty. If your counter is not performing as it should, take it to your local Radio Shack store for assistance.

SPECIFICATIONS

GENERAL

Gate Time ..... 64 mS (Fast); 640 mS (Slow)
Display ..... 8-Digit Liquid Crystal
Display Update Rate ..... 128 mS (Fast)
1.28 S (Slow)
Display Resolution ..... 1 kHz (Fast)
100 Hz (Slow)
Accuracy (when AC powered):
1 ppm ± 1 Least Significant Digit
Operating Temperature:
+ 64°F (+ 18°C)/+ 95°F (+ 35°C)
Power Requirements:
4 x AA Alkaline Batteries (Cat. No. 23-552), or
4 x AA NiCad Batteries (Cat. No. 23-125), and/or
9 VDC Adapter (Cat. No. 273-1455)
Low Power Detect ..... 4.1 V ± 0.15 V
Backlight On Time ..... 10 Seconds ± 5 Seconds

INPUT CHARACTERISTICS

Range ..... 1 MHz to 1.3 GHz
Sensitivity ..... 150 mV min. 1 MHz to 1.3 GHz
(See Table 1)
Dynamic Range ..... 10 mV to 1V rms
Coupling ..... AC
Input Impedance ..... 50Ω or Hi-Z
Absolute Maximum Input Level ..... 1.4 V p-p
(You might damage the
counter if you exceed this level.)

TIMEBASE

Frequency ..... 4 MHz
Initial Accuracy ..... 1 ppm

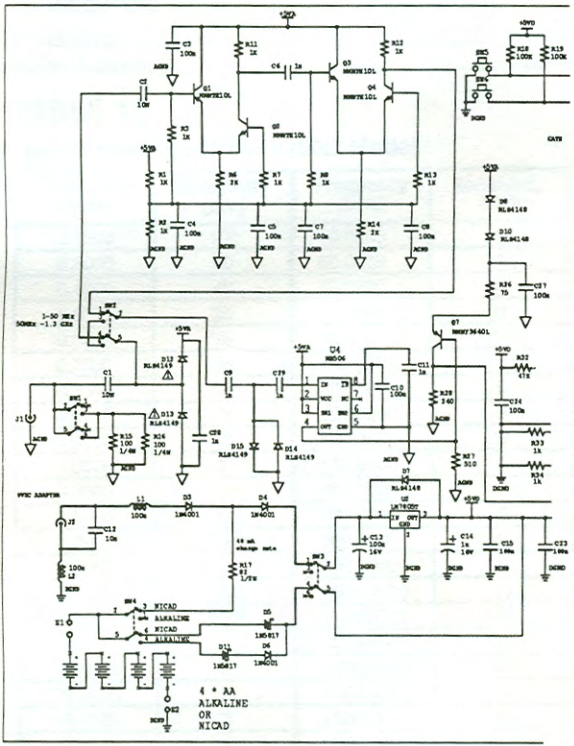
TABLE 1

Typical Input Sensitivity (50Ω Mode)

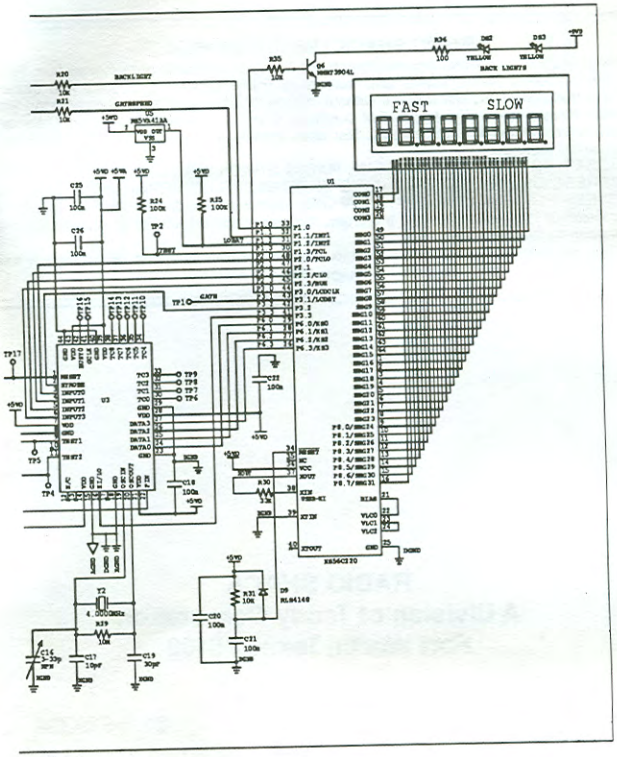
Frequency (MHz)	Sensitivity (mV)	Frequency (MHz)	Sensitivity (mV)
0.2500	100	50.0000	9
0.3000	60	60.0000	8
0.4000	40	70.0000	11
0.5000	25	80.0000	11
0.6000	20	90.0000	10
0.7000	18	100.0000	8
0.8000	18	200.0000	5
0.9000	14	300.0000	5
1.0000	13	400.0000	8
2.0000	7	500.0000	5
3.0000	5	600.0000	6
4.0000	5	700.0000	8
5.0000	3	800.0000	8
6.0000	3	900.0000	11
7.0000	3	1000.0000	13
8.0000	3	1100.0000	20
9.0000	3	1200.0000	31
10.0000	2	1300.0000	44
20.0000	2	1400.0000	60
30.0000	3	1500.0000	90
40.0000	9	1600.0000	145

NOTES

SCHEMATIC



SCHEMATIC



RADIO SHACK LIMITED WARRANTY

This product is warranted against defects for 90 days from date of purchase from Radio Shack company-owned stores and authorized Radio Shack franchisees and dealers. Within this period, we will repair it without charge for parts and labor. Simply **bring your Radio Shack sales slip** as proof of purchase date to any Radio Shack store. Warranty does not cover transportation costs. Nor does it cover a product subjected to misuse or accidental damage.

EXCEPT AS PROVIDED HEREIN, RADIO SHACK MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Some states do not permit limitation or exclusion of implied warranties; therefore, the aforesaid limitation(s) or exclusion(s) may not apply to the purchaser.

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RADIO SHACK
A Division of Tandy Corporation
Fort Worth, Texas 76102

811061930A
Printed in Taiwan

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