

241 FIELD CALIBRATION PROCEDURE

Suggested Equipment:

- 1) 6 Digit Frequency Counter, Accurate to +/- 5 PPM
- 2) Oscilloscope
- 3) Variable frequency function generator

Before any adjustments to the Model 241 are made, a fresh 9 Volt battery (Alkaline or Lithium are recommended) should be placed in the unit.

FUNCTIONAL TEST

Each key on the keypad should be checked for proper function. Turn power knob to OUTPUT, either zero crossing or zero based.

Repeatedly press the RANGE key. The LCD will display as below.

```
###.## KHz
##.### KHz
####.# Hz
####.# CPM
##### CPH
```

Press and hold each Arrow key. The digits on the LCD should scroll and carry over to the next digit.

Move "QUIK-CHEK" switch to HI

Select any value using the Arrow keys and press STORE.

Move "QUIK-CHEK" switch to LO

Select any value using the Arrow keys and press STORE

Toggle between HI and LO and observe that the values on the LCD are those that were stored.

Press and hold RESET key

Verify that holding the RESET key disables the output and that the output resumes when the key is released.

MEMORY TEST

Turn Power knob to OFF

Turn power knob back to either OUTPUT position

Again, toggle between HI and LO and observe that the values on the LCD are those that were stored.

CALIBRATION

SOURCE MODE

Connect the Model 241 to the frequency counter.
Adjust the counter for a one second gate time.
Turn power knob to Zero crossing.
Adjust OUTPUT LEVEL to MAX.
Adjust the RANGE to KHz (2 decimal places ###.##)
Scroll digits to display 160.00

Adjust C-TRIM until 160.000 KHz is stable on the frequency counter (see Diagram 1).

Check the output of each range by pressing RANGE key.

241	Counter
160.00 KHz	160.000
16.000 KHz	16.000
1600.0 Hz	1.600
16000.0 CPM	.026
16000.0 CPM	.004

(To convert from CPM to Hz divide by 60)
(To convert from CPH to Hz divide by 3600)

Connect the Oscilloscope to the Model 241. Set the oscilloscope trigger to DC Coupled. Turn power knob to Zero Based.

Move the OUTPUT LEVEL slide pot and verify that the square wave output varies from ≤ 50 mV to ≥ 14 Volts peak-to-peak with the wave output varying above and below zero level.

Turn power knob to Zero Based.

Again verify the OUTPUT LEVEL as above but with the wave going from zero level in only the positive direction.

READ MODE

Connect the Frequency Source and oscilloscope to the Model 241.
Select a Frequency of 60 KHz
Set the amplitude for approximately 15 Volt.

Turn the Power knob to xl
Set TRIGGER LEVEL slide pot to MAX
Press RANGE key until ##.### appears

The LCD should now be displaying 60.00 KHz and the LED should be lit.

Press RANGE key

The LCD should now be displaying OVER, 19.999 KHz and the LED should be lit or flashing.

The following table may be used as guide to checking each of ranges.

RANGE	FREQUENCY
KHz	0.01 to 199.99 KHz
KHz	0.001 to 19.999 KHz
Hz	0.1 to 1999.9 Hz
CPM	0.066 to 33.332 Hz
CPH	0.033 to 5.555 Hz

(To convert from Hz to CPM multiply by 60)
(To convert from Hz to CPH multiply be 3600)

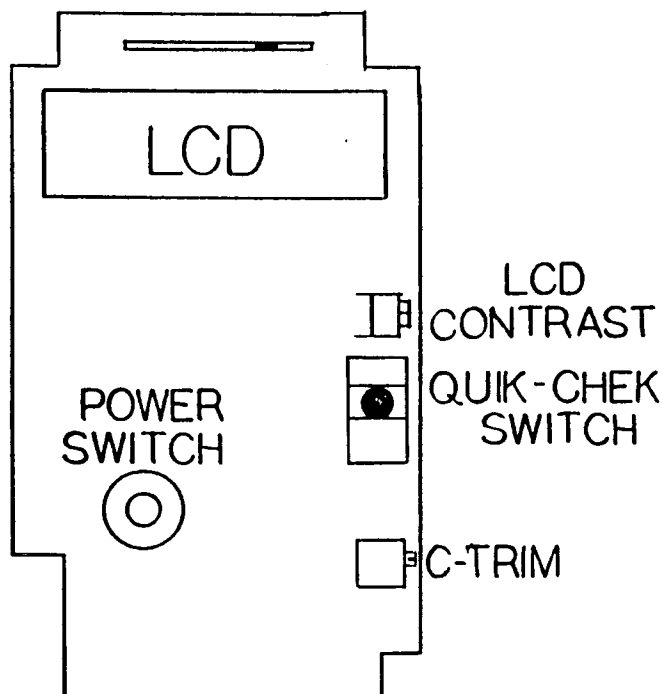


DIAGRAM 1

TRIGGER LEVEL

Select a sine wave of 200 KHz and set the amplitude to 100 mV peak to peak (Note: The wave should be symmetrical about Zero)

Turn the Power knob to x1
Set TRIGGER LEVEL slide pot to 0
Press RANGE key until ###.## KHz appears

The LCD should be reading 200.00 KHz. If the reading doesn't appear or isn't stable, adjust the trigger level pot which is located on the top PCB at the end opposite the LCD.

Select a Frequency of 60 KHz and set the amplitude for approximately 1 Volt.

Set TRIGGER LEVEL slide pot to 1

The LCD should now be displaying the frequency set on the source and the LED should be lit or flashing.

Set TRIGGER LEVEL to MAX and press RESET

The LCD should be reading 0 and the LED should be dark.

Gradually increase the amplitude of the frequency source until the LED lights or flashes and a stable reading appears on the LCD.

(Note: Ignore this test if your function generator cannot produce a sine wave of over 10 Volts.)

Set the TRIGGER LEVEL to 0
Turn the Power knob to x10

The LED should be lit or flashing and the same reading as above on display.

LCD CONTRAST

On all Model 241's produced since July, 1987 (Top PCB Revision D or greater) there is a pot located between the LCD and the "Quik-Chek" switch to adjust the contrast of the display. On earlier revisions a new value for R 23 must be selected. It is recommended that the Model 241 be returned to the factory for adjustment of an unreadable display.

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