

**Cub**

**USER MANUAL**



# CAUTION

**WARNING - Maximum input voltage is 12VDC.** Automotive voltages may exceed 12V causing damage to internal circuitry. Damage resulting from excessive input voltage is readily apparent and will not be covered under warranty. Units returned for warranty service that have damage resulting from excessive supply voltages will incur service charges.

**WARNING - Maximum antenna input signal is +15dBm (50mW).** Under no circumstances should the Cub be directly connected to an RF transmitter or be used in close proximity to a radio transmitter of more than 5 watts. Damage to the input amplifier circuitry is readily apparent and will not be covered under warranty. Units returned for warranty service that have damage to the input circuitry will incur service charges.

**This manual covers connection and operating instructions for the Optoelectronics Cub. The Optoelectronics Cub is covered under U.S. Patent Number 5,471,402.**

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# Front/Top Panel

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## **POWER ON/OFF**

Move the slide switch up to turn the Cub on.

## **RANGE 2.8GHz/250MHz**

To count from 1MHz-2.8GHz slide the switch up to the 2.8GHz setting. To count from 1MHz-250MHz only slide the switch down to the 250MHz setting.

## **FILTER/CAPTURE/NORMAL**

Slide the switch up the Filter/Capture setting to activate Filter mode. Press the gate button to activate Capture mode. Move the slide switch down to Normal setting to put it in Normal mode.

## **ARM/GATE**

Press the Arm/Gate button to increase or decrease the display resolution. Press the Arm/Gate button when in Filter mode to activate Capture mode.

## **Antenna**

50 Ohm BNC connector. Do not exceed +15dBm (50mW) signal to the antenna input. Please see our catalog or web site for antenna options. **[www.optoelectronics.com](http://www.optoelectronics.com)**

## **9-12VDC**

The connector labeled 9-12VDC on top of the Cub is used for accepting the plug from the supplied AC90 power adapter. The AC90 is a nominal 9VDC adapter. Plug the AC90 into the Cub to charge the unit. A full charge will take approximately 8-10 hours. The Cub will operate approximately 4-5 hours on a full charge.

## **Charging the Cub**

Plug the supplied AC90 adapter into the top of the Cub for 8-10 hours to fully charge the battery pack. The unit should operate for 4-5 hours on a full charge. The unit may be turned on while the AC adapter is plugged in. Charging will occur with the unit on or off. If the battery becomes discharged a battery symbol with a line through it will be displayed on bottom of the display.

## **Selecting a range**

The two ranges are as follows:

250MHz (switch down) for frequencies between 1MHz-250MHz

2.8GHz (switch up) for frequencies between 10MHz-2.8GHz

The 2.8GHz range covers all VHF and UHF communications. Leaving in this range may prove to be the most useful.

Selecting the 250MHz range is good if you require to count signals below 250MHz. The other advantage to this range is that it is faster to respond and gives more digits of resolution than in the 2.8GHz range.

## **Using the Normal/Filter-Capture switch**

When the switch is in the Normal mode position the display will oscillate. The only time the display becomes stable is when the unit is actively counting a signal. When the carrier drops then the display begins to oscillate again displaying random background RF.

## Operation cont.

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When the switch is in the Filter/Capture setting the display no longer oscillates. When in filter mode the display will display the word FILTER at the top of the display. In filter mode only real measurements are displayed. The frequency will be displayed on the display even after the carrier is gone. If the unit captures another signal then it will over right the last frequency displayed.

To place the unit in capture mode press the Arm/Gate button when the unit is in Filter mode. The unit will display the word CAPTURE and it will also flash. When a frequency is captured in capture mode the frequency will lock on the display and cannot be over written by another frequency. The only way to clear the display is to move the switch down to normal mode and then back up to filter/capture mode. Repeat the process above to go from filter to capture mode.

### **Selecting a gate time**

In normal mode press the arm/gate button to change the measurement time. A longer gate time means counting for a longer period of time and results in more digits displayed. The available gate times are shown on the following page.

## Frequency Display Resolution

Least significant digit displayed (LSD) as a function of Gate Time and Range

<u>Range</u>	<u>Gate Time</u>	<u>Meas. Time</u>	<u>LSD</u>	<u>Sample Display</u>
250MHz	100us	13mS	10kHz	150.00
	1mS	13mS	1kHz	150.000
	10mS	13mS	100Hz	150.0000
	100mS	110mS	10Hz	150.00000
	1S	1S	1Hz	150.000000
2.8GHz	6.4mS	13mS	10kHz	2000.00
	64mS	75mS	1kHz	2000.000
	640mS	640mS	100Hz	2000.0000

## Specifications cont.

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**Impedance:** 50 Ohm VSWR <2:1

**Range:**

10MHz

27MHz-150MHz

450MHz-800MHz

1GHz

2GHz

2.8GHz

**Sensitivity:**

15mV

2mV

3mV

3mV

50mV

100mV

**Maximum Input:**

50V AC + DC

+15dBm, 50 milliwatts

**Display:**

9 digit LCD. Decimal at MHz point

**Timebase:**

10MHz setable to +/- 1ppm (Option .5ppm TCXO)

**Size:**

3.7" x H x 2.75"W x 1.2" D

**Weight:**

8.5 oz

**Battery:**

Internal shrink wrapped 4 cell AA NiCad

**Operating Time:**

Approximately 5 Hours

**Charging Time:**

Approximately 8 hours

**Power:**

9-12VDC AC90 adapter supplied

**Power Connector:**

2.1 mm coax, center positive

**Cabinet:**

Stamped aluminum with black painted finish

### **ANTENNAS**

The small dual band, VHF/UHF, DB32 antenna is a very good multi-purpose antenna capable of picking up a very wide range of frequencies from 100MHz to 2GHz. There are other antennas available that are useful for specific frequency ranges.

RD27	26-150MHz
RD150	144-165MHz
RD440	440-480MHz
RD800	500MHz-1GHz
RD2400	2400-2500MHz.
BB85	100MHz-2GHz
Cell Lock	824MHz-2GHz
TA100S	100MHz-600MHz

### **FILTERS**

The N100 FM broadcast notch filter will remove the influence from local FM stations.

# Factory Warranty

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## **PRODUCT WARRANTY**

Optoelectronics, Inc. warrants all products and accessories for one (1) year against defects in materials and workmanship to the original purchaser. Products returned for warranty service will be repaired or replaced at Optoelectronics' option.

Specifically excluded are any products returned under this warranty that upon examination, have been modified, had unauthorized repairs attempted, have suffered damage to the input circuitry from the application of an excessive input signal, have suffered damage to the charging circuitry or internal batteries from the application of excessive voltage, or show other evidence of misuse or abuse. Optoelectronics reserves sole right to make this determination.

No other warranties are expressed or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Optoelectronics, Inc. is not liable for consequential damages.

## **WARRANTY**

Products under warranty must be returned, transportation prepaid, to Optoelectronics' service center. All parts replaced and labor performed under warranty are at no charge to the customer.

## **NON-WARRANTY**

Products not under warranty must be returned, transportation prepaid, to Optoelectronics' service center. Factory service will be performed on a time and materials basis at the service rate in effect at the time of repair. A repair estimate prior to commencement of service may be requested. Return shipping will be added to the service invoice and is to be paid by the customer.

## RETURN POLICY

The Optoelectronics Service Department will provide rapid turnaround of your repair. No return authorization is required. Enclose complete information as follows:

1. Copy of sales receipt if under warranty.
2. Detailed description of problem(s).
3. Complete return address and phone number (UPS street address for USA).
4. Proper packaging (insurance recommended). Note: Carriers will not pay for damage if items are improperly packaged.
5. Proper remittance including return shipping, if applicable (Visa/MasterCard number with expiration date, Money Order, etc.). Note:  
Personal checks are held for a minimum of two weeks before shipment.

Address all items to:

Optoelectronics, Inc.  
Service Department  
160 West Camino Real #233  
Boca Raton, FL 33432

If in question, contact the factory for assistance. Service Department: (954) 642-8997.  
Monday - Friday 8:30 AM to 5:00 PM Eastern Time.

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