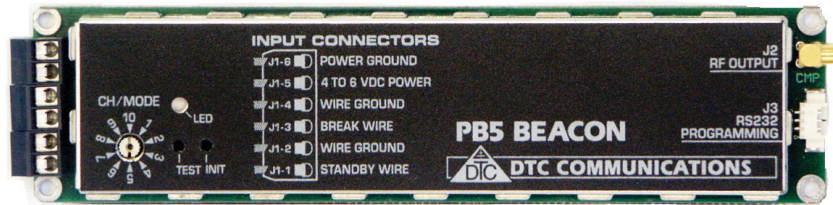


# PB-5 Beacon Transmitter Operator Manual



DTC COMMUNICATIONS INCORPORATED

OP1920148 Rev B

## How to contact DTC

For operator and troubleshooting information, customers are encouraged to refer to the details in this manual. For additional clarification or instruction, or to order parts, contact DTC. Customer Service is available Monday through Friday between the hours of 9:00 AM and 5:00 PM EST at:

Tel: 603-880-4411

Fax: 603-880-6965

Website: [www.dtccom.com](http://www.dtccom.com)

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Products manufactured by others that are approved for use with DTC equipment are warranted for the manufacturer's warranty period, commencing from the date of shipment from DTC.

## FCC information

Forms can be obtained from the FCC on their website at:

[www.fcc.gov](http://www.fcc.gov)


You can also contact the FCC using their FAX back service at: (888) 418-3676


Additional instructions are available by telephone at: (888) 225-5322


The filing fee form is returned to:

Federal Communications Commission  
1270 Fairfield Road  
Gettysburg, PA 17325-7245

## Manual Conventions

 **NOTE** Describes special issues you should be aware of while using a particular function.

 **WARNING** Calls out situations in which equipment could be damaged or a process could be incorrectly implemented, but in which operator safety is not a factor.

 **TIP** Describes application hints.

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Feature	Description
Synthesizer	<ul style="list-style-type: none"><li>• Allows the unit to be frequency versatile.</li></ul>
Programmable	<ul style="list-style-type: none"><li>• Allows user to program multiple feature sets and access them in the field through a 10 position switch. This switch is only read at power up.</li></ul>
External Battery	<ul style="list-style-type: none"><li>• This allows various size battery packs to be connected.</li></ul>
Modes of Operation	<ul style="list-style-type: none"><li>• Track Mode's primary purpose is to allow a tracking receiver to locate and track the beacon.</li><li>• Event Mode's primary purpose is to indicate the status of the break wire.</li></ul>

## TWO YEAR WARRANTY

DTC Communications, Inc. (DTC) warrants its RF transmitting and receiving products to be free from defects in workmanship or material for a period of two (2) years from the date of shipment unless otherwise stated.

The liability of DTC, Inc. under this warranty is limited to replacing, repairing, or issuing credit, at option, for any products, which are returned by the purchaser during such warranty period, provided: DTC is notified and a Repair Authorization Number is issued by DTC Customer Service within 30 days after discovery of such defects by Customer.

The defective units are returned to DTC with transportation charged Prepaid by the Customer.

Product damaged in shipment must be reported to and claim forms filed with the Carrier by the Customer. In shipments to the factory, notice and claim procedures will be initiated by DTC.

DTC's examination of such products shall disclose to its satisfaction that such defects exist and have not been caused by misuse, misapplication, neglect, improper installation, improper storage, alteration, physical damage or accidents.

The warranty shall not apply to microphones, batteries, antennas, crystals or material ordinarily susceptible to field damage or any accessories of a disposable nature. The warranty shall not apply to Engineering Prototypes or Customer requested modifications to electronic circuits.

This warranty does not apply to and DTC does not independently warrant items or systems sold by DTC which are produced by other manufacturers. With respect to such items, the Customer shall look to the warranty of the original manufacturer and DTC disclaims all warranty, expressed or implied.

Nothing in this warranty, or any statement, brochure, bulletin, or advertisement is to be interpreted as establishing the suitability of any product for particular application or use. Applications of the product and the determination of suitability for any application, is the sole responsibility of the Customer.

## INTRODUCTION

The PB-5 is a reliable, fully synthesized, user programmable, one watt, package beacon. It has a number of unique features. Two modes of operation allow you to track or monitor a package using a DTC TRAK/R system or a VHF-FM receiver, **Tracker mode** and **Event mode**. The beacon's two primary connections are the **break wire** and the **standby wire**. When the break wire is broken the alarm is activated, which is transmitted to the receiver. When the standby wire is removed, the transmitter wakes up and begins its pre-configured actions. The configuration options include the ability to enable or disable the motion sense feature, event or track, and deviation settings.

## TRACKER MODE

For tracking a letter or package, Tracker mode is used in conjunction with the DTC TRAK/R system. In the Tracker mode, the PB-5 will send pulses to the DTC TRAK/R system at various repetition rates to signal that the package is stationary or in motion and to identify location. The PB-5 Tracker mode is intended to be used with DTC's TRAK/R systems. When the PB-5 is in Tracker Mode, it transmits pulses, which alerts the TRAK/R operator to the condition of the PB-5. The pulses produced by the PB-5 can be directly monitored or converted to signal strength tones through the TRAK/R system. The pulse is a group of four 15 millisecond pulses, spaced 15 milliseconds apart.

- **Stationary**

Stationary mode is transmitted when physical movement has not been detected for at least 4 seconds, but less than 30 minutes. At power up, the PB-5 defaults to stationary condition. The pulses are transmitted every two seconds in stationary condition.

- **Parked**

Parked condition is transmitted when physical movement has not been detected for 30 minutes. The pulses are transmitted every four seconds in parked condition.

- **Motion**

When physical movement has been detected, the PB-5 will transmit in the motion condition. The pulses are transmitted every second in the motion condition.

- **Break Wire**

If the break wire is broken, the unit goes into alarm mode and sends out alarm tones once a second (interleaved with tracking pulses also occurring once per second).

- **Standby Wire**

If the standby wire feature is used, then the unit will not begin to send tones until standby is exited (the alarm feature will still work normally).

# OVERVIEW

## EVENT MODE

While in Event mode, the PB-5 transmits confidence tones at a default rate of 30 second intervals. When the Break Wire is broken (circuit is opened), the PB-5 will alert the agent that the package or door has been opened. The PB-5 quickly changes the tone transmission to the easily recognized alarm signal. The alarm signal transmits twice per second.

## BREAK WIRE INPUT

The break wire input on the PB-5 will detect a change-of-state. This means that you can use the break wire in the traditional way and use a wire loop from the Break wire pin to the ground pin on the terminal strip. After the power is applied, if the loop breaks the alarm will go off. If you want, you can use a normally-open switch as well; just connect the switch between the Break wire and GROUND pins, and the alarm will go off if the switch is closed.

## STANDBY WIRE

The standby wire input allows you to put the PB-5 into a standby mode. When a wire loop is connected between the STANDBY pin and the ground pin on the terminal strip, before or during normal operation, the PB-5 will be on hold, no confidence tones. This will preserve valuable battery power. When the STANDBY loop is broken the PB-5 will then begin confidence tone transmissions and normal operation.

**Note:** Regardless of the standby wire loop condition, if break wire loop is broken the PB-5 will begin to alarm.

# CONNECTIONS

## Channel/Mode switch

There are ten user programmable modes selectable via the 10-position switch. The mode switch will only be read at power up or upon re-initialization. Changing the mode switch while the unit is running will have no effect.

## LED

The diagnostic LED on the PB-5 is on the top of the case, clearly marked. The LED will flash once on power up to indicate that the transmitter has checked its memory and is ready for deployment. If the PB-5 senses an internal problem the LED will flash three times.

## Test Push-button

Holding this push-button, while powering up, causes the unit to go into test mode. Based on the break wire and standby wire inputs, the unit will go into one of the four transmit modes.

Break wire	Standby wire	Transmit Output
None	None	Continuous Tone
None	In	Continuous Tone
In	None	Tracking Pulses
In	In	Unmodulated Carrier

## Init Push-button

Holding the init switch for one second, re-initializes the unit. It reads the mode/channel switch and can be used to change the channel/mode without cycling the power. The LED blinks once. If the init switch is held for more than 5 seconds, the unit is switched to default mode. This is indicated by 5 LED blinks, a short delay, and then one LED blink.

### Default Settings:

**Tone:** 1000 Hz on all channels

**Default Confidence tone interval:** 30 seconds

**Battery Monitoring:** Disabled

**Standby:** On closed on all channels

**Break wire:** Auto configured on all channels

## RF Output

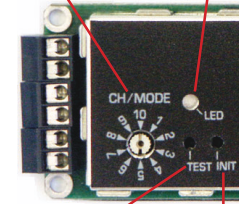
Connect the antenna to this connector.

## RS232 Connector

The programming cable is connected to this connector when programming is required.

# CONNECTIONS

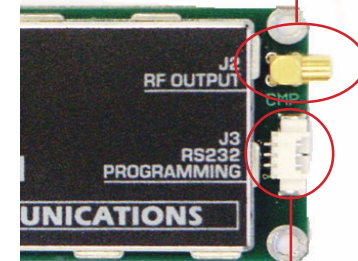
Channel/Mode switch      LED light



Test push-button

Init push-button

Antenna connector



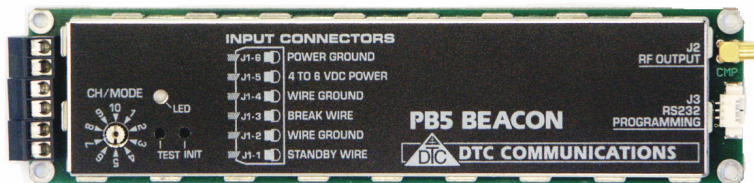
Programming Cable Connector

# QUICK START

What should you expect to receive with your PB5 Beacon Transmitter?

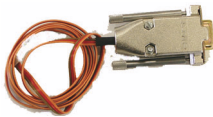
- 1 PB-5 Beacon Transmitter
- 1 Antenna
- 1 Screwdriver
- 1 DTC programming software package
- 1 DTC programming cable
- 2 Battery Pack with batteries
- 1 Test Cable

## PB-5 Beacon Transmitter



# OPTIONAL ACCESSORIES


## Part Number Description


4044359	Antenna 
4045163	Programming Cable 
8002025	Programming Software 

## Part Number

## Description

8590093	Battery Holder for 4 AA batteries 
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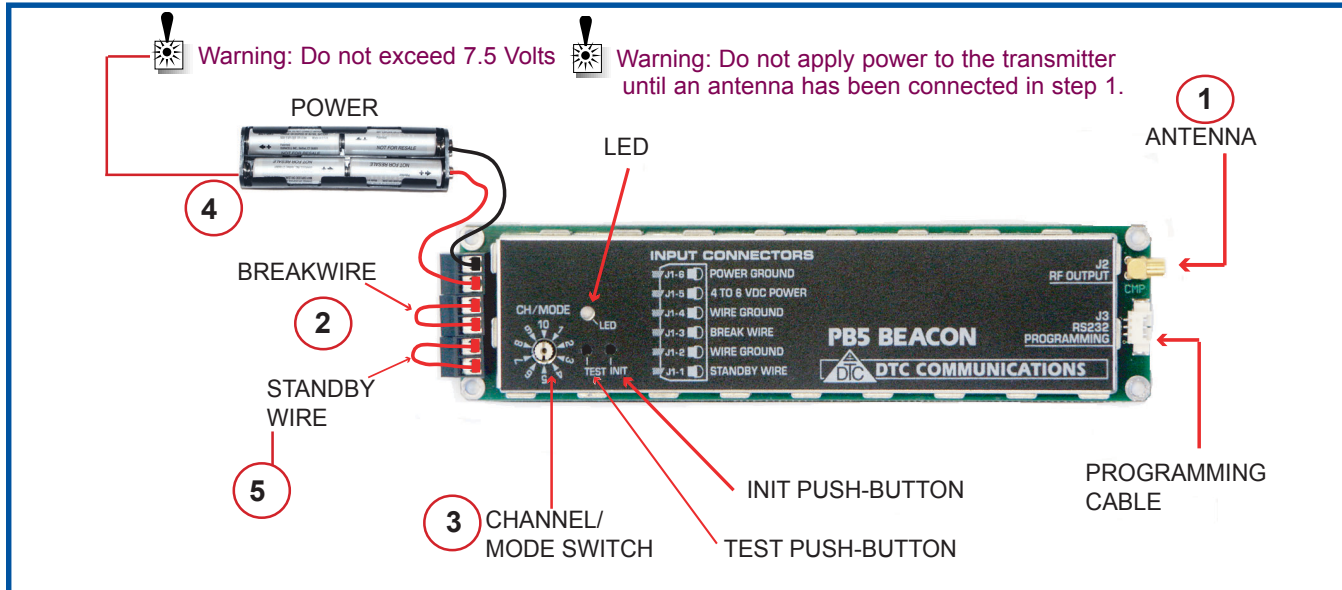
8590094	Battery Snap with flying leads 
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4044348	Test Cable, MMCX to BNC 
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# QUICK START

- 1 Connect an antenna to the RF Output connector on the transmitter.
- 2 Connect the break wire and or standby wire depending on the desired configuration.
- 3 Using the supplied screwdriver, turn the channel selector to the correct channel number.
- 4 Connect the power source to the PB-5's power terminals.
- 5 If standby wire is used the PB-5 will not be enabled until the wire is removed. You will have to remove the wire to activate.
- 6 If standby wire is not used, the PB-5 is activated immediately, and will operate within the programmed parameters.
- 7 If the default settings are not the desired settings, then programming is required. Go to the programming section on page 12 to program the PB-5 with new settings.



# SPECIFICATIONS

## Specifications for the PB-5 Transmitter



<b>Dimensions</b>	5.0" L x 1.2" W x 0.35" H
<b>Controls and Indicators</b>	<ul style="list-style-type: none"> <li>• 10 position rotary channel/mode switch</li> <li>• Initialize push-button switch</li> <li>• Test push-button switch</li> <li>• LED indicator</li> </ul>
<b>Connectors</b>	<ul style="list-style-type: none"> <li>• <b>RF output:</b> Type MMCX</li> <li>• <b>Battery Power:</b> 5mm screw terminal strip 2 ckt</li> <li>• <b>Standby Wire:</b> 5mm screw terminal strip 2 ckt</li> <li>• <b>Break Wire:</b> 5mm screw terminal strip 2 ckt</li> </ul>
<b>Frequency Stability</b>	Within +/- 2.5 ppm over -30° C to +60° C
<b>RF Output power into a 50 Ohm load</b>	1.0 W @ 6.0 VDC supply
<b>Channel Capacity</b>	10 User programmable via RS232 with PC running DTC frequency/configuration application.
<b>Frequency Range</b>	<ul style="list-style-type: none"> <li>• 150 - 174 MHz (VHF-High)</li> <li>• 138 - 150 MHz (Option VHF-Low)</li> <li>• 210 - 225 MHz (Option UHF-Low)</li> </ul>
<b>Modulation Modes</b>	<ul style="list-style-type: none"> <li>• Tracking modes</li> <li>• Event modes</li> <li>• Deviation: User programmable</li> <li>• NTIA compliant +/- 2.5 kHz max or +/- 5 kHz max</li> </ul>
<b>Spurious &amp; Harmonic Attenuation</b>	<p>Greater than -60 dBc (non-harmonic)            Greater than -50 dBc (harmonic)</p>
<b>Transmitter side-band suppression</b>	Greater than 50 dBc at greater +/- 10 kHz
<b>AM Hum and Noise attenuation</b>	Greater than 34 dB down from rated deviation
<b>FM Hum and Noise attenuation</b>	Greater than 34 dB down from rated deviation
<b>Operating Temp. Range</b>	-30° C to +60° C
<b>Operating Voltage Range</b>	4.0 VDC to 7.2 VDC

## Specifications for the PB-5 Transmitter

<b>RF Output Load-stability</b>	Stable into a VSWR of 8 to 1 or better
<b>Weight</b>	1.6 ounces (less batteries)
<b>Power Source</b>	Four AA batteries (external)
<b>Battery Life</b>	Four AA batteries (Duracell MN1500 rated at 2450 mAH) will transmit in confidence mode for more than 400 hours.
<b>Current Drain</b>	<ul style="list-style-type: none"><li>• <b>Standby:</b> 200 uA Max</li><li>• <b>Active Transmit:</b> 350 mA peak (1.0 Watt @ 6 V with 50 Ohm antenna)</li></ul>
<b>NVRam settings</b> (Default)	<p><b>Tone:</b> 1000 Hz on all channels</p> <p><b>Default Confidence tone interval:</b> 30 seconds</p> <p><b>Battery Monitoring:</b> Disabled</p> <p><b>Standby:</b> On closed on all channels</p> <p><b>Break wire:</b> Auto configured on all channels</p>

## SPECIFICATIONS





When you order a PB-5 Beacon transmitter, DTC will factory program your frequencies at no additional charge to you. This is often the best path for state and local agencies with limited frequencies available to them.

DTC will also provide you with free software and a free programming cable, enabling you to change your frequencies. This is ideal if you often work with other agencies, or anticipate the equipment being used by a multi-jurisdictional task force. You can program up to ten channel settings per unit. In general, this allows you to program most variations you might encounter in the field at the depot level.



**TIP:** Make sure that you program your transmitter to match the frequencies of your receiver, and test the components as a system prior to going into the field!

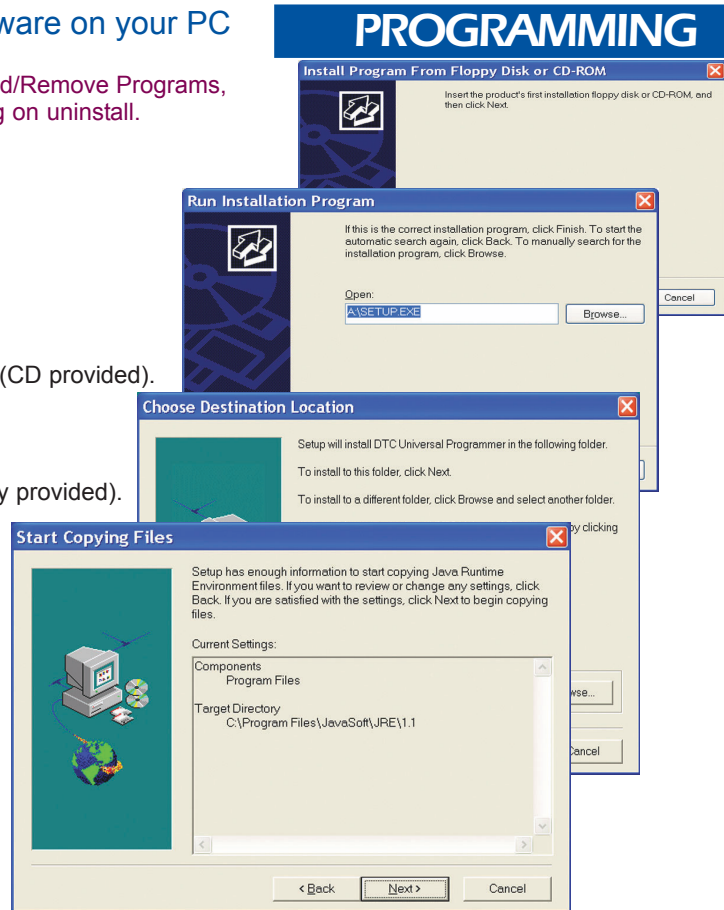


# Installing DTC Universal Programming Software on your PC

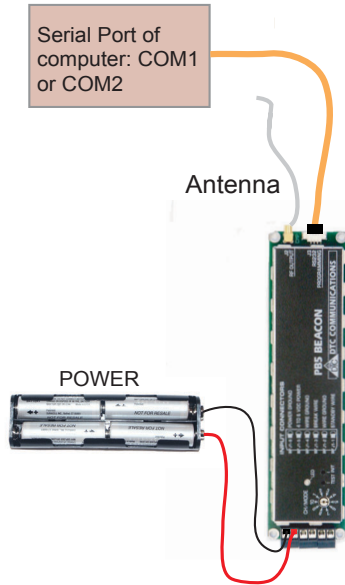
✓ **NOTE:** Uninstall any previous versions by going to Add/Remove Programs, clicking on DTC Universal Programming, and clicking on uninstall.

- 1 Click on Start, click on run.
- 2 Click on the Browse button.
- 3 Click on or find your CD drive.
- 4 Install the JAVA Runtime Environment Application first (CD provided).
- 5 Follow the install wizard screens.
- 6 Install the Universal Programming software next (floppy provided).
- 7 Click on Start, click on run.
- 8 Click on the Browse Button.
- 9 Click on your floppy drive.
- 10 Double click on the setup.
- 11 Follow the install wizard screens.

*Your programming software is installed.*



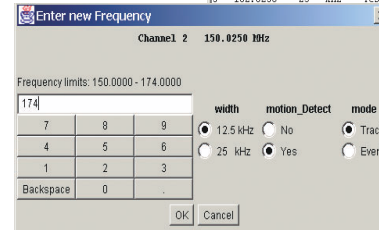
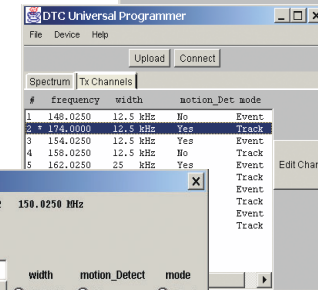
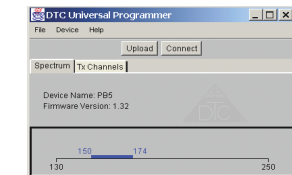
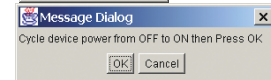
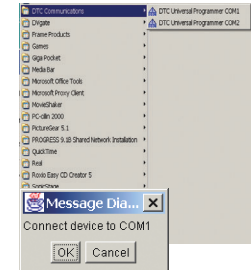
# PROGRAMMING



- 1 Connect the antenna to the PB-5.
- 2 Install the programming cable into the RS232 connector on the PB-5.
- 3 Plug the serial cable of the programming cable into the COM1 or COM2 port of your computer.
- 4 Select Start, programs, DTC communications on your computer.
- 5 The system allows you to select device COM1 or COM2, depending on which serial port you are connected to.

**The cycle power screen displays.**

- 6 Connect the battery pack to the PB-5 and click OK.
- A message screen displays PB-5 downloading.**
- 7 Click on the TX Tab of the screen.
- 8 Click on the channel you need to change and click on the Edit Channel button.
- 9 Enter the new settings in the “Enter new Frequency screen. You can also make changes to the width, motion detect, and the mode.
- 10 Click on the OK button.



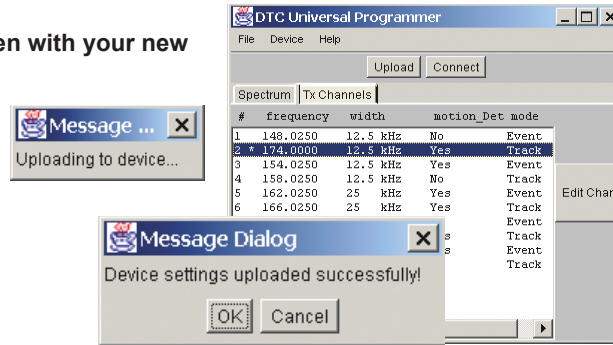
The programming software returns to the TX screen with your new settings displayed, and an asterick (\*) beside the channel that has changed.

- Click on the upload button.

A message screen displays the new settings being uploaded to device.

A message screen displays that your settings have been successfully uploaded.

*Your new settings have been installed.*





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