

BMK BEACON

400 – 480 MHz Locator Beacon Transmitter

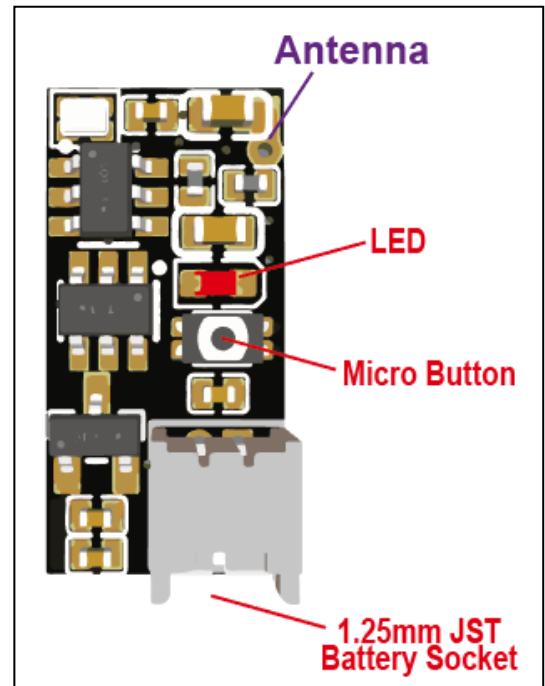
BMK Beacon is a configurable tiny radio transmitter beacon for license-free PMR, FRS(US, Canada), UHF CB(Australia, NZ, Malaysia) radio channels. It is also configurable above the band frequencies if you wanna go wild ;)

Features

- Working Frequency : 400-480MHz
- Max.Output Power: +14dBm
- Range: >5km with Baofeng UV-5R+
- Input Voltage: 3-15v
- Current Consumption (3-Tones): 1.8mA @ 4s intervals
- Current Consumption (1-Tone): 0.5mA @ 4s intervals
- Max. Current: 36mA
- Intervals: 1-16 seconds configurable
- Modulation: FM(narrow)
- Channel Spacing: 12.5kHz
- Channel Count : 64
- Dimensions: 16mm x 8mm x 5mm
- Weight: 0.54g

Compatible Public Radio Systems

- PMR446
- FRS
- UHF-CB
- SPECIAL



FREQUENCY OPTIONS

■ PMR446

This band is licence-free in the UK, EU and Turkey.

It starts from 446.00625 MHz with 12.5kHz channel spacing.

The channel numbers are linear. The beacon channel number is the same as the PMR radio channel number. You can find more information on Wikipedia.

The default channel is CH16 (446.19375MHz) when your beacon is delivered.

■ FRS

This band is licence-free in the US and Canada

It starts from 462.5500 MHz with 12.5kHz channel spacing. The channels are not linear. Please check the FRS channel table below before changing the beacon settings. You can find more information on Wikipedia.

The default beacon channel is CH14 (FRS CH7) (462.7125MHz) when your beacon is delivered.

■ UHF-CB

This band is licence-free in Australia, New Zealand, Vanuatu and Malaysia.

General use channels start from 476.625 MHz with 12.5kHz channel spacing. The channels are not linear and very complicated. Please check the UHF-CB channel table below before changing the beacon settings. You can find more information on Wikipedia.

The default beacon channel is CH15 (UHF-CB CH16) (476.800MHz) when your beacon is delivered.

■ SPECIAL

You can order a special frequency beacon for your own use at a small cost. I will tune the firmware for this frequency then test and seal the circuit. Please don't use this option for a single item or if you don't have enough knowledge of local amateur radio rules.

How To Calculate The Output Frequency?

If you are using a radio with keypad (e.g. BAOFENG UV-5R+), you need to know the beacon output frequency to enter your radio.

Search **[START_FREQUENCY] + (0.0125 * ([BEACON_CH_NO]-1))** on Google and it will calculate the frequency in MHz.

[PMR446 - CH16 \(Beacon CH16\) example](#)

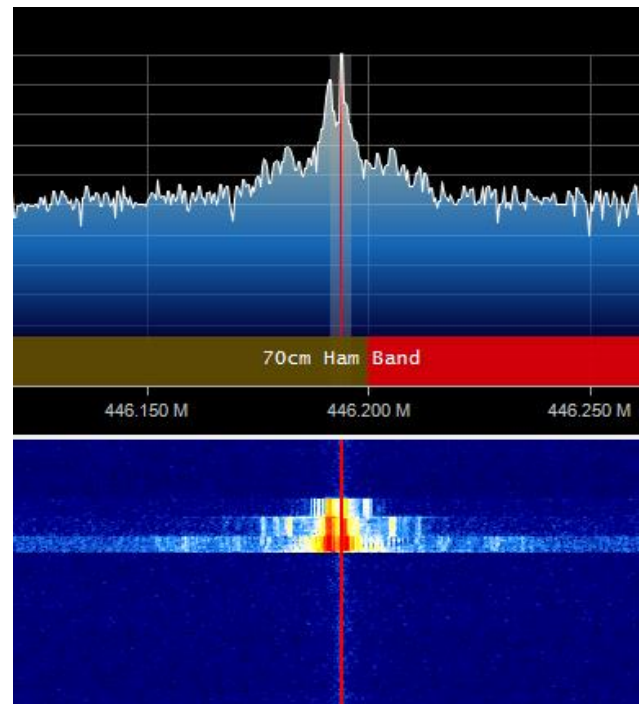
[FRS - CH7 \(Beacon CH14\) example](#)

[UHF-CB - CH16 \(Beacon CH15\) example](#)

TONE OPTIONS

■ 3-Tones (Recommended)

The standard 3-Tone Audible version's output signal is 3 tones (100mS each) at 3 different powers(+14dbm,+2dbm,-10dbm) so you can estimate the distance by how many tones you can hear. You can see the different power levels as a myramid on a SDR radio. (on the right)



■ Chirp

The chirp version transmits single tone 50mS beeps and emulates old-school analogue beacons. The current consumption of this version is 3-4 times lower but it can not activate the squelch of the receiver radios due to the very short burst. You must listen to the channel continuously by pressing the "MON" button or setting Squelch level to zero.

INTERVAL OPTIONS

The default interval is 4 seconds between the signals and it is configurable between 1s to 16s. You must consider the current consumption (table.1) before the change.

Table 1.Current Consumption vs Interval @3.7v

| Interval | Avarage Current | Battery Life(100mAh) |
|---|-----------------|----------------------|
| 2s | 3.6mA | >25 hours |
| 4s (default) | 1.8mA | >50 hours |
| 8s | 0.9mA | >100 hours |
| 16s | 0.45mA | >200 hours |
| Notes: | | |
| [1]. The battery capacity may change by the temperature. | | |
| [2]. The intervals are not exact, the timer has +-5% tolerance. | | |

How To Set The Frequency?

Before changing the channel, first check your local radio laws and see the Channel Number vs Frequency tables below.

- Press and hold the onboard button before plugging the battery.
 - Plug the battery, then release the button
 - Click the Micro Button X times for the Channel X.
 - Remove the battery and plug again to use.
-

How To Set The Interval?

- Plug the battery first.
 - Press and hold the micro button until the next transmission
 - The LED will turn RED
 - Release the button
 - Click the Micro Button X times for X seconds interval between the transmissions.
 - Remove the battery and plug again to use.
-

Basic Settings For The Receiver Radios

You can use standard PMR / FRS / UHF-CB walkie talkie radios to receive the beacon but most of these don't have a removable antenna or squelch/mon buttons which is important when searching.

BAOFENG UV-5R+ is the best radio for the purpose. It is very cheap, available in almost every country, sensitive and comes with a really good antenna.

Channel spacing (STEP): 6.25khz

The original public channel spacing is 12.5khz but Baofeng radios may jump to 0.25khz higher or lower frequency if you select that spacing. Better set it to 6.25khz and you can tune it to the correct frequency easily.

Squelch (SQL): 1 (or zero if your radio don't have a dedicated monitor button)

Squelch is a feature that suppresses the output of a radio receiver if the signal strength falls below a certain level so you will hear the communication instead of the background noise.

It's a good feature when talking but has some side effects when searching for a beacon. First, it limits the range, you must set it to zero or press the monitor button of the radio if you are not receiving any signal. Second, the squelch delay(~100mS) may suppress the first tone and you will hear the second and the third tones only.

FM Band Width (WN): Narrow (NARR)

Public radio channels use 2.5khz narrow band FM modulation for audio transmissions. It's also important for a clear, long-range reception.

DCS or CTCSS: Disabled

Digital Code Squelch(DCS) and Continuous Tone Coded Squelch System(CTCSS) are the muting methods for unwanted communications which are not possible to use on these beacons. If these modes are active on your radio, it will not receive the beacon signals. Please make sure they are disabled. Some PMR / FRS radios are sold as paired with these codes and you need additional software and a USB cable to disable them.



Analogue PMR446 Channels

The Beacon Channel numbers and the PMR Radio channel numbers are the same.
For example; If you set your beacon for CH4, You can hear it on PMR CH4.

| Beacon Ch | PMR Ch | Frequency (MHz) |
|-----------|--------|-----------------|
| 1 | 1 | 446.00625 |
| 2 | 2 | 446.01875 |
| 3 | 3 | 446.03125 |
| 4 | 4 | 446.04375 |
| 5 | 5 | 446.05625 |
| 6 | 6 | 446.06875 |
| 7 | 7 | 446.08125 |
| 8 | 8 | 446.09375 |
| 9 | 9 | 446.10625 |
| 10 | 10 | 446.11875 |
| 11 | 11 | 446.13125 |
| 12 | 12 | 446.14375 |
| 13 | 13 | 446.15625 |
| 14 | 14 | 446.16875 |
| 15 | 15 | 446.18125 |
| 16 | 16 | 446.19375 |

FRS Channels

The channels and the frequencies are not linear in the US.
For example, the 14th channel of the beacon is the 7th channel of the PMR radios.
Follow the table below to find the right frequency or channel number.

| Beacon Ch | FRS Ch | Frequencies (MHz) |
|-----------|--------|-------------------|
| 1 | 15 | 462.5500 |
| 2 | 1 | 462.5625 |
| 3 | 16 | 462.5750 |
| 4 | 2 | 462.5875 |
| 5 | 17 | 462.6000 |
| 6 | 3 | 462.6125 |
| 7 | 18 | 462.6250 |
| 8 | 4 | 462.6375 |
| 9 | 19 | 462.6500 |
| 10 | 5 | 462.6625 |
| 11 | 20 | 462.6750 |
| 12 | 6 | 462.6875 |
| 13 | 21 | 462.7000 |
| 14 | 7 | 462.7125 |
| 15 | 22 | 462.7250 |

UHF-CB Channels

The channels and the frequencies are not linear and also have some restrictions.

Check the [Wikipedia page](#) first.

Follow the table below to find the right frequency or channel number.

| Beacon Ch | UHF-CB Ch | Frequencies (MHz) |
|-----------|-----------|-------------------|
| 1 | 9 | 476.6250 |
| 2 | 49 | 476.6375 |
| 3 | 10 | 476.6500 |
| 4 | 50 | 476.6625 |
| 5 | 11 | 476.6750 |
| 6 | 51 | 476.6875 |
| 7 | 12 | 476.7000 |
| 8 | 52 | 476.7125 |
| 9 | 13 | 476.7250 |
| 10 | 53 | 476.7375 |
| 11 | 14 | 476.7500 |
| 12 | 54 | 476.7625 |
| 13 | 15 | 476.7750 |
| 14 | 55 | 476.7875 |
| 15 | 16 | 476.8000 |
| 16 | 56 | 476.8125 |

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