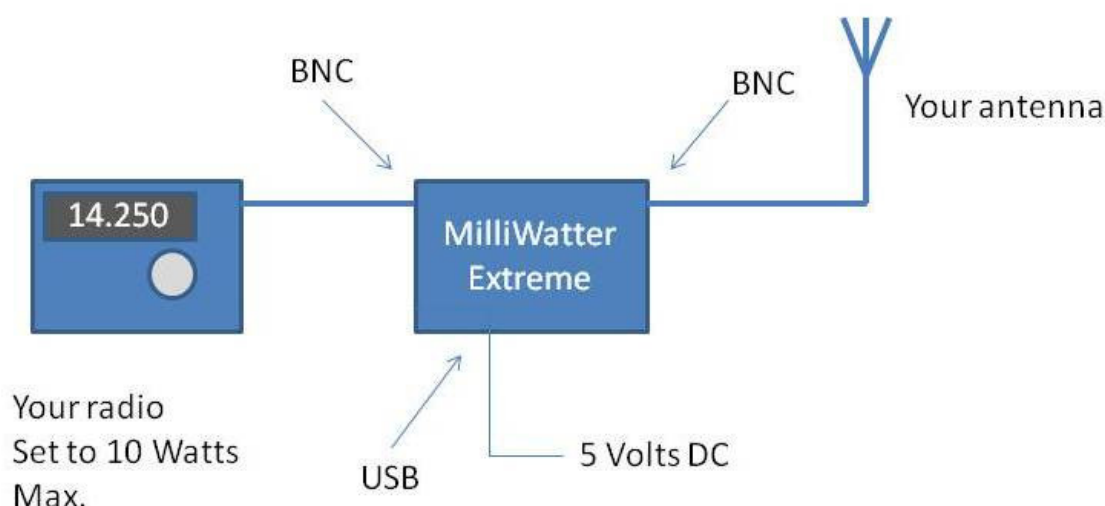


## Using the BOXA-MilliWatter Extreme

The BOX-MWEXTREME makes it easy for you to experiment with very low power operating. You will be amazed what can be achieved with power levels of less than a Watt!

Connecting the BOXA-MWEXTREME is simple. It connects between your transmitter and antenna. Connect your transmitter (transceiver) to the TX socket and the antenna to the ANT socket.



DC power is supplied via a USB-B connector on the rear of the unit. Most printers come with a suitable USB lead so most folks have at least one spare one! You can get power from a USB port on your computer or a USB charger. The supply voltage should be between 4.5 and 6 Volts. The BOXA-MWEXTREME will take around 50mA.

When switched off the BOXA-MWEXTREME is out of circuit and the antenna is connected directly to your transceiver. In this mode, do not exceed 20 Watts as you may damage the BOXA's relay contacts.



When switched on (LED on front panel illuminated) the transmit attenuators will be automatically switched into circuit when you transmit. When "low" is selected, your power will be reduced to  $1/10^{\text{th}}$  (= -10 dB). The "Extreme" position reduces power to  $1/50^{\text{th}}$  (= -17 dB). Thus with the two toggle switches you can select full power (BOXA switched out "Thru"), low and extreme.

The relay switching is automatic, using an RF sensed switch. The RF switch as an adjustable "hang" delay time. This is internally adjustable to suit your own use of the device. The delay is somewhat dependent on the input power that you use. The lower the input power, the shorter the delay will be. To adjust the delay, remove the front panel of the unit and slide the PCB out at the back. The blue potentiometer near the TX socket sets the delay. If you need a very short delay for some special application, remove the link on the header pins close to the 2N7000 FET.

It is best to have the delay set so that the BOXA relay does not switch between syllables or CW characters i.e. don't aim for "full break in".

The table below can be used to estimate your power levels at the various settings available.

Full (mW)	Low (mW)	Extreme (mW)
10000	1000	200
9500	950	190
9000	900	180
8500	850	170
8000	800	160
7500	750	150
7000	700	140
6500	650	130
6000	600	120
5500	550	110
5000	500	100
4500	450	90
4000	400	80
3500	350	70
3000	300	60
2500	250	50
2000	200	40
1500	150	30
1000	100	20
500	50	10

The BOXA-MWEXTREME reduces your power by using resistive attenuators. These turn the surplus RF into heat. To avoid damaging the attenuators your normal maximum power should be 5 Watts. At this level the BOXA-MWEXTREME will be fine for use on any mode including data modes.

You can use an input power of up to 10 watts for SSB and CW but at this level, do not use data modes or other modes that require a continuous carrier (e.g. FM).

### Is it working?

The quickest way to see how low power works for you is to make use of the Reverse Beacon Network. The RBN will allow you to experiment with



low power CW and data modes and to quickly gain an appreciation of what you can achieve.

<http://www.reversebeacon.net/>

Another interesting avenue of experimentation is to try WSPR – a weak signal mode. You will be spotted – even with 10mW!

<http://wsprnet.org/drupal/>

By using the MWEXTREME, you will know the power differences accurately. This allows you to make much more objective tests.

Of course, the BOXA-MWEXTREME can be used to make contacts on any mode. Your QSO partners will be amazed when you tell them how little power you are using. Working towards DXCC on 100mW would be a great challenge – and one that is entirely possible with CW and modern data modes. Extreme low power is even more of a challenge to the SSB user!