



Homebrew Group Newsletter
#60 April 2019

Compiled by Rob Whitmore
VK3MQ

The Homebrew Construction Group continues to attract new members, swelling the numbers in attendance to 18 at the last meeting. All visitors are most welcome, none more so than Andrew VK3CV, who at his first meeting, captivated the audience with the demonstration of his 122GHz duplex F.M. portable station.

Based on a module used in the automotive industry for anti-crash detection the basic system featured a lockable frequency synthesizer, multiplier, rx mixer, LNA and power amplifier. The limitations for amateur radio use are many, including high phase noise and lack of modulation options. Nevertheless a distance of 2.8 km has been spanned with more experimentation to follow.

Of particular note was Andrew's precision machining of the feed for the salvaged satellite dish with apertures as small as 2.4 mm. The beamwidth of the antenna is in the order of 0.5 degrees requiring extreme pointing accuracy.

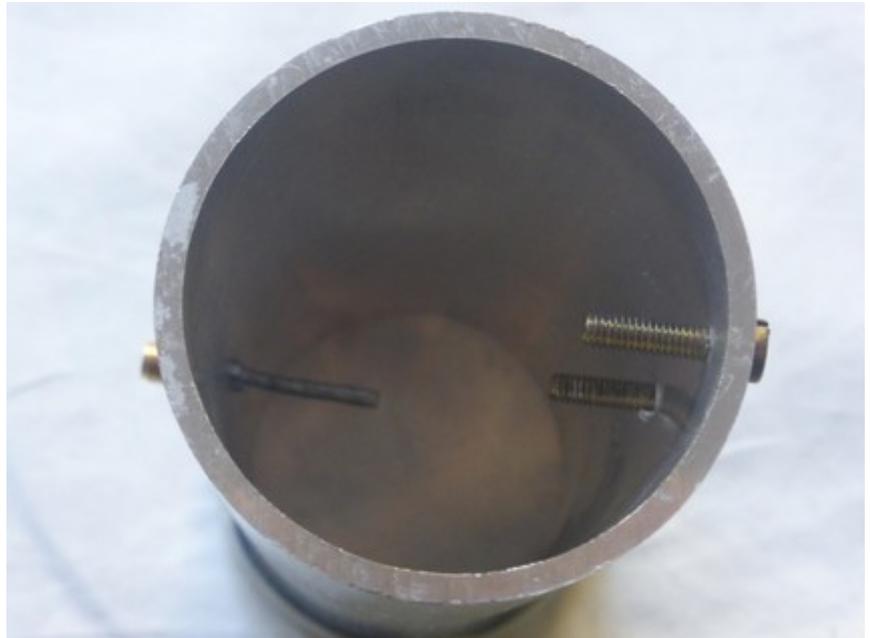


K6ML has published the details of a similar system that can be found at:
<http://www.bay-net.org/resources.html>

Look for **k6ml-122ghzradio-baycon2018.pdf** under the BayCon 2018 banner.

VK3MQ described a feed for a 3.4GHz dish antenna made from an off-cut of aluminium tubing. More common construction materials include discarded soup or coffee cans the latter giving its name to a spreadsheet that takes the pain out of working with formulas.

members.cruzio.com/~jeffl/crud/coffee-can05.xls



Noel VK3NH was able to confirm that the tuning screws needed to be a little longer using his portable network analyser. A return loss of 28dB was found at 3450MHz whilst at the target frequency of 3398MHz the return loss was still only 16dB (SWR 1.37:1).

On mounting the feed on a dish it was found that only the matching screw nearest the probe was needed for lowest SWR.

During the week Joe VK3YSP was confronted with the task of making a matching section of coax cut accurately to $\frac{1}{4}$ lambda on the operating frequency. With different manufacturing processes used by the various companies the velocity factor is not always the value of a generic product.

Fortunately an on line tool is available:

<https://owenduffy.net/calc/vfs.htm>

Despite the removal of Morse code from the exam regime interest in the skill remains. Simple paddle keys can be made from all sorts of materials:

<http://www.wa0itp.com/pcbpad.html>

<http://members.ziggo.nl/cmulder/paddle.htm>

<http://www.hpfriedrichs.com/radioroom/hdmorsekey/hdmorsekey.htm>

Automatic gain control explained.

https://www.qsl.net/va3iul/Files/Automatic_Gain_Control.pdf

Improving the performance of a direct conversion receiver.

<https://www.robkalmeijer.nl/techniek/electronica/radiotechniek/hambladen/radcom/1991/04/page39/>

Is there anything a Raspberry Pi cannot do? Turn it into a ham band transmitter!

<https://hackaday.com/2015/11/04/rpiti-turns-raspberry-pi-into-versatile-radio-transmitter/>

[https://www.google.com.au/url?](https://www.google.com.au/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=2ahUKEwjgzKLEp-rhAhU55uAKHTyAB88QwqsBMAF6BAgJEAQ&url=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DWSy-TAFNs90&usg=AOvVaw14ODWIh79tYqV_Yp9_JDBa)

[sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=2ahUKEwjgzKLEp-rhAhU55uAKHTyAB88QwqsBMAF6BAgJEAQ&url=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DWSy-TAFNs90&usg=AOvVaw14ODWIh79tYqV_Yp9_JDBa](https://www.google.com.au/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=2ahUKEwjgzKLEp-rhAhU55uAKHTyAB88QwqsBMAF6BAgJEAQ&url=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DWSy-TAFNs90&usg=AOvVaw14ODWIh79tYqV_Yp9_JDBa)

Sorry about the long link but You Tube is well worth a watch.

A thought for the week:

“Facts are stubborn; statistics are more pliable.”

73's

Rob VK3MQ