The World Below 400 GHz

The Periodical Newsletter of the
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WAIKATO VHF GROUP EXECUTIVE

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General Meeting June 2014

A General Meeting of the Waikato VHF Group will be held on Sunday, 8th June, 2014 at 1:30pm.
at Te Puke, Branch 53 club rooms, State Highway 1, Te Puke.

The subject of our presentation will be **Vocoders for narrow-band digital radio communications** . A vocoder does the analogue to digital encoding and digital to analogue decoding in a digital radio transceiver, so is a core function within them. Little is publicically known about the vocoder used in many commercial and D-Star transceivers because it is a propriatary hardware device embedding highly protected secret software.

The video presentation we ll view provides an insight into the inner workings of a Vocoder via a non-mathematical explanation of how an open-source software version operates. Ian ZL1TAT will introduce this presentation by it s developer, David Rowe VK5DGR.

SOME COMMON COAXIAL RF CONNECTORS

A variety of connectors are encountered on coaxial cables connecting to radio frequency equipment. This article outlines a little background on a few of these, highlighting some features and drawbacks.

UHF

Commonly found on amateur radio equipment, the "UHF" plug, also referred to as a PL259 plug which mates with a SO239 socket on the equipment side, was invented in the 1930's. UHF coaxial connectors are general purpose units developed for use in low frequency systems from 0.6 ~ 300 MHz. UHF is an acronym for Ultra High Frequency because at the time they were invented, 300 MHz was considered high frequency!

UHF connectors feature a threaded coupling, however they rely almost entirely on torque applied to that for mating the contact surfaces for achieving a reliable connection. Because these connectors are low-cost, their impedance is not precise, particularly the version shown uppermost here. Available in several termination styles, probably the most commonly encountered is that shown above which relies on the cable braid being "screwed" into the back of the connector. Sometimes the braid is soldered into this connector, however heat applied during that process risks damaging the cable. Preferred styles providing more secure cable termination (while avoiding that risk of damaging the cable) are "clamp" (shown in the lower image) and "crimp" or "compression" styles. Quality connectors have gold-plated contacts and polytetrafluoroethylene or PTFE (white) insulators.

A 'mini UHF' version of this connector also exists (for those who just can't let them go).

Belling Lee

The oldest connector listed in this article (c 1922), these were found on earlier domestic TVs and associated equipment becoming known colloquially known as a "TV aerial plug", they were occasionally also used on amateur radio equipment. Suffering from imprecise impedance and unreliable braid termination arrangements, they do have wiping contact surfaces to achieve (potentially) more reliable contact. These were often made from inexpensive materials which oxidised over time, leading to unreliable performance. Full metal body ones like that shown were best.

F or F59

These inexpensive connectors are widely used for RF connections to current domestic television equipment. Invented in the early 1950s, they were designed for use with RG-6/U cable, or RG-59/U in older installations. Their impedance more precisely matches 75Ω systems used for RF connections between TV's and associated equipment. The F connector's design is subject to the surface properties of the inner conductor (which must be solid wire) and is not corrosion resistant.

BNC

Designed in the late 1940s for military use, the Bayonet Neill–Concelman or BNC connector has gained wide acceptance in video and RF applications up to 4 GHz. It features two bayonet lugs on the female connector; and mating is fully achieved with a quarter turn of the coupling nut (a principal feature of this connector). Its slotted outer conductor wiping contact provides a reliable contact however it influences the BNC's high frequency limit. Centre pins are almost always gold plated.

Available in both crimp or compression style termination (shown here), and clamp termination, both 50Ω and 75Ω versions are available. There are also 'Reverse Polarity' and 'High Density' styles.

TNC

The Threaded Neill–Concelman or TNC connector invented in the late 1950s is a threaded version of the BNC connector. Offering better performance at frequencies up to 11 GHz, with a 50 Ω impedance, a 75Ω version usable up to 1GHz is also available.

SMA

SMA is an acronym for Sub Miniature version A, and was developed in the 1960's. Using a 1/4"-36 thread threaded interface, 50Ω SMA connectors are semi-precision, sub miniature units which provide excellent electrical performance from DC to 18 GHz. They are compact high-performance connectors with outstanding mechanically durability.

"Reverse polarity SMA" connectors sometimes used on WI-FI equipment has the gender of the connector reversed with its threaded body side having a centre pin instead of receptacle contact. This series led to the **SMB** (a very different design) and **MCX**, plus **SMC** often used hand-held radios for the antenna connector and looking similar to a reverse SMA.

N series

Developed in the 1940's, the Type N was the first coaxial connector to offer true microwave performance. The Type N connector was developed to satisfy the need for a durable, weatherproof, medium-size RF connector with consistent performance through 11 GHz.

There are two families of Type N connectors: 'Standard N' (for coaxial cable such as RG58 / RG213 etc) and 'Corrugated N' (for helical and annular solid jacketed cable like LDF4-50 etc). These are one of the most widely used RF connectors for small to medium sized cables in professional applications. Although more weatherproof than many other RF connectors, its best to consider them only "shower proof", and external weatherproofing should always be applied when permanently installed outside.

General

Market day:- Branch 89 Radio Electronics Group, held its Market Day at the Glenview Club, in early May. The Waikato VHF Group had a table there, manned by the scribe. There were a number of useful items that the club sold, to raise funds for miscellaneous costs, such as licensing. Thanks to those to parted with their money ☺
The Hamilton Amateur Radio Club Market day is on 9 August, 2014, and the VHF Group will also man a table there to raise further funds.

On the bands:- While monitoring the low end of 2m, the scribe now hears the Auckland 2m beacon about 10 dB above the noise. A nice welcome back to this beacon (144.253 MHz).

The Wellington 144.275 MHz Beacon has a CW and JT4 mode, and can be decoded from better sites in Hamilton. It can also be heard up in Auckland and Northland.
The ZL2WHO/B beacon on 144.271 MHz can also be heard consistently.

The scribe hasn t listened too much on 6m, however recent activity from others has included Carribean DX. Antenna used by the scribe on 6m is a 2 element Moxon, which has a small footprint compared to other designs.

The Sunday Meteor Scatter skeds (inter-ZL) used by the scribe on 144.230 MHz FSK441 @ 8am, have been pretty consistent, although recently I have been plagued by an intermittent noise source, during the skeds. This effects the sensitivity by about 15 dB, and since most pings sit below 15dB Signal to Noise, then this is quite an issue. Other ops have complained about noise sources, with the most recent one being diagnosed as a sizzling RF relay ☹

If one is interested in taking part or listening to the 2m skeds, go onto the VKlogger on Sunday mornings about 7.45am. VK-ZL skeds are on Saturday at similar time. The scribe uses 100w to an 8 element Yagi. For those wanting to work VK on Meteor Scatter, West coast of ZL is usually ok, but with some enhancement at either end, other parts of NZ may get in on the act.

SWR meters

Recent tests by the scribe on a 2m FM home installation in Morrinsville, using an older SWR indicator gave misleading results. Testing of the setup with a REDOT VHF/UHF power meter gave consistent results.

Another point to note, was that Gavin Petrie ZL1GWP was the winner of the VHF/UHF power meter at the AGM, and we hope to hear feedback of its use.