

“Enjoying QRP operation at home & in the field: equipment options”

by Doc VK5BUG, Norm VK5GI & Greg VK5GJ

References

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“Rogues’ Gallery” introduction

As VK5HP & VK4CMY, Doc completed 12 000 QRP CW contacts between 1975-95 as the first VK op to achieve 20m QRP CW DXCC & WAC awards, and won the VK section of the 1975 inaugural MARTS SeaNet contest using a kit-built 3W Heathkit HW-8 on 20m, & the VK/Oceania sections of the busier 1976 USSR CQ-M contest with a 2.5W Ten Tec Argonaut 509, both rigs fired through a homebrew 2-element 20m spider quad aerial.

Currently as VK5BUG, he runs a stand-alone wind & solar powered home QRP station based on a Ten Tec 535 Argonaut II transceiver (ex-VK7AN), plus an SLA battery powered pedestrian portable trolley running Ten Tec 555 Scout (ex-Canadian eBay) & Realistic HTX-100 (donated by Greg VK5GJ) transceivers.

Norm VK5GI has embraced low power operation at home & portable for a number of years, using both SSB & CW from a range of commercial & kit-built equipment. He has recently acquired a camper trailer & plans to more frequently dent the ionosphere from exotic rural locations. This is scheduled to include AHARS Parks Award activations solo & in cahoots with Greg VK5GJ who has also engaged in a litany of portable & mobile low power SSB activity, particularly during caravanning adventures. Greg has a comprehensive test equipment set-up plus a well-equipped workshop & junkbox, & may frequently be found at the bench with Norm, sorting kitset alignments & all manner of other matters RF, automotive & caravan.

Background to QRP equipment options

Amateurs have never been so spoiled with respect to low-power portable equipment options for their domestic & radio operations. The most recently well-publicised transceivers include the Yaesu FT817/ND & Icom IC703Plus all-band, all-mode units. We are hoping to stimulate interest related to the participation in SOTA, WWFF, AHARS Parks Award & other portable activities through considering the wealth of other options that are available today.

The intention here is to provide a ‘heads-up’ on some of those other options, particularly for portable CW use. Some are very ‘today’, while others are older rigs, still obtainable from various secondhand marketplaces, & often much cheaper than the newer units.

Snapshots of various brands & models are included here with no fear or favour & this listing is certainly neither complete nor perhaps even comprehensive. We believe it is at least a starting point. Hopefully, there will be enough information to engage a reader and perhaps assist with purchase decision-making.

Equipment makes & models

ELECRAFT

K1

A compact dual- or quad-band CW transceiver with many of the K2 bells & whistles. It could be ordered with a choice of any TWO band modules, 80-15m, or if a FOUR band version was desired, provision could be made for 80, 40, 30, 20, 17 or 15m. 40 & 20m had potential for providing a good balance of regular & successful day/night operating. This rig is very compact & portable weighing only about one Kg. Power output is adjustable from 100mW to 5W & higher. Current drain is about 60mA on receive & one Amp when transmitting @ the 5W level. More information and photos are available @ www.elecraft.com

KX1

This is a trail-friendly, ultra-lightweight CW rig with all the controls on top of the case for ease of portable operation in almost any conventional situation. The basic transceiver covers 40 & 20m, with the option of 30m & 80/30m PC boards. There are auto-coupler & key paddle options for this shirt-pocket size radio & its internal battery provides 20-30 hours of casual operation.

Add a pair of earbuds, a resonant aerial & maybe a counterpoise wire, & you are off & running (no pun intended!). Doc had one of these up until a few years ago but found it to be too fiddly for field use compared to his current transceivers – he sold it to a VK6 who loves it!! Horses for courses...

It is a trail-blazing little rig with digital readout, adjustable IF filtration, an excellent power economy, compact size & easy to use.

TEN TEC

This USA company is synonymous with successful QRP & portable operation, having been highly active in the commercial QRP market since 1969:

TX1 – 2W on 40 & 80m PA board
VO1 – VFO & buffer to drive the TX1
MX1 – dual-gate MOSFET direct conversion mixer for 40/80m
AA1 – IC audio amplifier with 100db gain & output Z of 1Kohm

Check the eHam.net rating of 4.5/5 for what became known as the ‘PM’ or ‘Power-Mite’ units.

PM1 – the first complete commercial QRP transceiver & it contained all the above modules wired as a band-switched CW 80/40m transceiver. This rig had just front, back & base panels.

PM2/PM2B – is a PM1 in a full case. PM2B also featured 20m capability.

PM3/PM3A – a 5W Power-Mite for 20/40m. The PM3A boasted full CW break-in.

This series of quirky, interesting rigs appear well-priced on North American eBay reasonably frequently. Allow for tracked freight cost & the monetary exchange rate.

Argonaut 505 (see eHam.net) – from 1971 this is a solid state SSB/CW QRP rig covering 80-10m bands & having a 9MHz IF. Doc has owned & operated several of these radios at sea & ashore over the years, recalling that a lot of fun & reliable QRP operation resulted from use with very basic aerials.

Argonaut 509 (eHam.net rating of 4.8/5) - this model followed the 505 in 1973 & had improved circuitry plus the option of an external active CW filter. Again, Doc had several of these radios for DXing, contesting & local contacts. Originally the power supply was a pair of lantern batteries in series. Of course, there are a number of much more modern, efficient power sources available today!

The 505 & 509 come up occasionally on the VK market & much more often through the North American outlets, usually at very reasonable prices. Great ‘‘bang for your buck’’ fun machines!!

Argonaut 515 (eHam.net rating 4.8/5) – released in 1978 the 515 is known as **THE** classic QRP transceiver, with enhanced band-spreading, 10m divided into 3 ranges, & slicker T-R switching. It instantly won popularity with DX operators & 36 years later is still used by many hams as their main station rig.

Argonaut II 535 (eHam.net rating 4.8/5) – Doc’s current main QRP rig, this is really a 5W version of the 100W **Delta II** & is a big leap over the Argonaut 515. It is a fully synthesised transceiver with a general coverage (100KHz-30MHz) receiver & a 7-digit black-on-orange frequency display. It features a double conversion receiver with 45MHz & 6.144MHz IFs, the latter using a Jones filter (8-pole crystal filter with continuously adjustable bandwidth from 500Hz to 2.5KHz). It provides up to 5W of quality SSB/CW QRP action, features microprocessor control, multi-functional digital display, direct keypad entry, & is operationally the equal of Elecraft & any other current commercial rigs.

Argosy 525 & Argosy II 525D (eHam.net rating 4.8/5) – one of the best kept secrets in QRP amateur radio is the Argosy series. The 525 is analogue & 525D the model with digital readout. The Argosy can be switched from 5 to 50W output on the 80, 40, 30, 20, 15 & 10m bands. A T-Kit speech processor really adds punch when installed inside the Argosy. Regrettably, Doc had an Argosy II & sold it to a VK1 who desperately wanted a caravan rig about six years ago – we are given to believe that he has mentally kicked himself ever since! Rare in OZ, the Argosies appear on the North American market for around USD\$300-\$400 plus approximately \$67 shipping. Price naturally depends on condition, options installed, original manual, digital or analogue model, etc. Like the Argonaut II, these radios are very hard not to love using!!

Argonaut V Model 516 (eHam.net rating 4.7/5) – covers 160-10m with a general coverage receiver 0.5-30MHz, all band, all mode & 20W maximum output. This suggests ‘QRP with an edge’ but it would be a great power level for anyone enjoying the slow lane when operating mobile/portable, & those just trying to beat the noise level if operating portable in RF-unfriendly locations. 5W can be selected for all normal authentic QRP goings-on.

It has 35 inbuilt filters & draws 950mA on receive, 6A on transmit @ maximum output. The rig weighs in @ 2.2Kg & has 2 large front feet rather than a bail, 100 memories, scanning facility, CTCSS encoder, is PSK31 ready, IF-DSP, SDR & its RRP in 2003 was \$750USD.

Ten Tec Scout 555 & 556 (eHam.net rating 4.3/5) - another of the Ten Tec QRP radios about which Doc can write from personal experience & is the one now reposing on his RF pedestrian portable trolley: a Scout 555. It is a 5 or 50W radio, output power being altered by a small adjustment through an access hole in the bottom panel. The 556 does not have the 50W option at all. Both Scouts are very unique in that they feature plug-in single band modules for each of the HF bands including WARC. This allows a purchaser to acquire one with only the bands really wanted for use. Doc has the 80, 40, 30, 20, 15 & 10m modules & is on the lookout for a 160m in the North American market. He bought his Scout 555 via Canada on eBay.com.

No longer in production, used Scouts come up reasonably frequently in that part of the world, with a radio & six modules fetching about USD\$650 plus \$70 shipping. In Doc’s opinion, the eHam.net rating is harsh, and he assigns it at least 4.5/5.

Century 21 Model 570 (analogue) & 574 (digital)

Either of these presents a great QRP/QRO rig for the home station or someone using mains power @ caravan parks. It receives SSB & CW but transmits CW only, with an input power of 70W providing 25-30W output. It covers 80-10m & is a pre-WARC transceiver with onboard AC power supply: in fact, it is the only Ten Tec transceiver having an onboard AC power supply. Doc has run several of these since they first came on the market in the mid-1970s & speaks very highly of the operating fun that they provide.

Century 22

Norm's current home station QRO rig, this unit also receives SSB & CW and only transmits CW to about 20W output on 80, 40, 30, 20, 15 & 10m. He loves using it & had to search the overseas markets to find one.

Ten Tec summary – the company has supported the low power & portable operation fraternity since the 1960s, in spite of the fact that the cost of producing a QRP rig is the same as a 100W unit, but with much less market opportunity to recoup investment: research, design, manufacture, marketing, warranties etc. Since the QRP market is infinitesimal alongside the QRO scene, it is often a business disaster to enter into it, so before we bag any manufacturer for what it produces, we need to recall that it is actually NOT good business sense to do so. The view of QRP manufacturers is highly likely to differ from the view of amateur radio operators because of this fact.

HEATHKIT

Another long-time supporter of portable & QRP amateur radio was Heathkit (later as Daystrom), sadly no longer with us. However, it left behind a litany of budget-priced models from which to choose & have fun on air.

HW-7 (eHam.net rating 2.9/5) - appeared in 1973 & covered 40, 20 & 15m with about 2W CW output. Doc actually built one of these kits in 1976 as the required 'practical project' for the General Commercial Operators Certificate of Proficiency (which replaced the First Class COCP) & along the way had to modify a number of original circuit shortcomings so it performed well enough to use in contests & for reliable QRP DXing. In today's band conditions, he thinks one off-the-shelf or unmodified would probably show up to be little more than a toy, a novelty rather than a 'performer' compared with other rigs on the airwaves, but he would like to be proven wrong!

HW-8 (eHam.Net rating 4.6/5) – perhaps the most heavily modified/customised QRP rig ever to hit the market, this 80-15m 2-Watter has a good direct conversion receiver but its keying is relay controlled, thereby losing the traditional 'must have' full break-in for CW operators. Doc has had several of these over the years, all good performers, & they bob up in Australia & North America for around USD\$150-200 depending on condition & how many/how well modifications have been done: caveat emptor!! Has a cult following.

HW-9 (eHam.net rating 4.8/5) – this was an early 1980s radical design departure & not without its share of issues, particularly selectivity & unstable transmission on 15 & 10m. It does have a superhet receiver & all nine HF bands however, so a competent techno-amateur with spectrum analyser, CRO & sweep generator access could make this USD\$200-\$350 radio something very special. Not frequently seen in Australia.

KENWOOD

TS120V (eHam.net rating 4/5) – until very recently Doc had one of these 10W classics (VK5BW now has it in his stable!) that can be pulled down to 5W SSB & CW. It has a digital readout, many optional extras & produces good quality audio reports. For the keen among us, a whole 'TS120 lineup' can be assembled to good effect. Doc ran his with an

MC-60 desk microphone & also with a CW key for portable DXing. For home station use, he had the external VFO & companion loudspeaker. Other accessories for a lineup could include the matching aerial coupler, power supply & 100W linear amplifier. It covers the standard bands of 80-10m & would be a Number One recommendation for any QRP newbie looking to embark upon portable work on a tight budget. The transceiver is typically available for AUD\$250-400 depending upon condition and accessories.

TS130V (eHam.net rating 4.8/5) – the most elusive QRP rig we have ever heard of! Doc has been trying to source one of these for 25 years without success. In fact none of us have never even SEEN one yet! A highly desirable & much enhanced version of the 120V, it features added WARC bands, a 20db RF attenuator, speech processor & selectable dual crystal IF filters for both SSB & CW.

Expect to pay whatever is being asked for one of these beauties – those who have one tell us that they are ‘keepers’, which is probably why we do not see them on the regular market forums ANYWHERE very often. Happy hunting, & if you find a second one, please let us know!!

QRP-PLUS

QRP-Plus (eHam.net rating 4.1/5) – produced in 1994-6, it has 160-10m & general coverage receiver, microprocessor control, low current consumption (140mA on receive, 1.5A in transmit) & compact physical size. Its large LCD display is useful for we OTs & it has a rugged steel case – quite handy for bush-bashing. Its superhet receiver has a good switched capacitance audio filter (SCAF) & its full output of 5W can be adjusted to mW levels for some 22-carat QRPing! Prices around \$350-400AUD are asked in the North American market.

MFJ

Here is another manufacturer that has produced quite a prolific line-up of low power rigs suitable for home and portable action. Readers are recommended to review the company website as there are so many details for the large model range, including:

MFJ 9015-40 series (often referred to as 90XX & 94XX series)

Norm & Greg are quite familiar with this marquee & user reviews state that they all work “as claimed”. The 90XX models are monoband CW only & 94XX monoband SSB only. They are robust plug & play models for 75, 40, 30, 20, 15 & 10m, producing 5W/10W respectively & have quality receivers with auto AGC but no NB. Weighing less than one Kg & physically small, they would be attractive to single band SOTA activators. The website shows a current RRP of USD\$209.95 & more than 20 items are listed.

MFJ 9340 Cub

This tiny rig gets really good user reports too, providing 80, 40, 30, 20, 17 or 15m, a hot receiver, sharp passband filtering, AGC, phones or external speaker options, full break-in, zero to 2W output up to 20m & 1W on 17 & 15m. Power consumption from 12-15V is reported to be a miserly 36mA on receive & 380mA on transmit.

ICOM

Icom IC-703 & 703Plus – in 2003 Icom introduced the IC-703 as a low power HF radio. Shortly after, it added the IC-703Plus to their production line. The 703Plus covers all the HF fun that its predecessor did plus 6m, an internal aerial coupler & 10W output capability. Both versions are basically stripped down variants of the IC706. The large LCD display is easy to read from any angle & the rig is ergonomically quite easy to use comfortably. It comes with a well-written manual. Portable 6m could easily be tackled with a discone, halo, J-Pole, dipole & even a rotatable quad or yagi aerial. For full-break-in CW operation, it leaves much to be desired when compared to almost anything from the Ten Tec stable, but it provides satisfactory semi-break-in action.

The critical data for any QRP rig is current drain & in the receive condition the IC-703Plus is claimed to lope along with 450mA.

YAESU

Yaesu FT-817/817ND – perhaps the highest volume seller in QRP history, the FT-817 versions were designed for 160-10m, 6m, 2m & 70cm bands with a power output of 5W.

Author's note – both the IC-703Plus & FT-817ND are current market products, with much recent material & reviews readily available. The reader is recommended to pursue further research given that scenario & chat with rig owners, perhaps even being able to negotiate a 'test drive' – an important purchasing strategy that cannot be achieved when buying online via any source!

KITS FOR QRP OPERATION

This market area is certainly the forte of Greg & Norm. Today's amateurs tend to be more 'plug & play', with operator technical standards & practical ability having dissipated during recent decades. That, along with the abundance of annual rollouts of commercial equipment, has seen the demise of homebrew transmitters, receivers & transceivers except perhaps for MF, microwave & QRP work. QRP does seem to be the hobby area most populated by kit availability for the home constructor. It is important to research thoroughly before committing time, effort & money for any kit. One of the most off-putting outcomes of kit building is having the first kit project fail to work. If a QRP radio, however basic, is your 'must have' project and that happens, QRP & perhaps amateur radio overall may lose a disciple. A would-be kit builder needs to carefully match enthusiasm, skillset, time, necessary equipment or tools, and of course the budget.

The depth & breadth of available kits is very encouraging & inviting, if not daunting. Greg VK5GJ & Norm VK5GI have made & tested quite a number of kits in recent times, & it could be well worth a chat with them before you make a decision or commitment.

Some of the kit breeds & models they suggest that readers might like to explore include:

AusQrp VK2DOB MST-2

This is a monoband SSB rig for 80, 40 or 20m. PCBs & parts kits are available for the transmitter, DDS VFO & LED S-meter sections. Current prices are listed on the website as AUD\$82 for the transmitter kit minus a case or controls; AUD\$65 for the DDS VFO kit; & AUD\$28 for the LED S-meter kit.

Milton Keynes MKARS 80

Anyone interested in pursuing building this kit might give consideration to having a chat with Norm VK5GI who has built & used one of these 80m units.

Small Wonder Labs (SWL)

DSW1 rigs are sometimes available secondhand but please check the website for present availability status as the original designer/manufacturer retired some time ago & a 'caretaker' has been at the helm since. Other aspects of life have impacted that person as well, hence the advice to check prior to building up your hopes.

Oak Hills Research (OHR)

Run by former AHARS member Marshall Emm, this USA firm has produced a number of mono- & dual-band QRP rigs for 20 years. The OHR100A is currently listed on their website, & it is a single band CW transceiver kit with a RRP of USD\$179.95. Powered by 12-13.8V its current drain is nominated as being 80mA on receive & 850mA on transmit. Available for 80, 40, 30, 20 & 15m versions, it produces 5W, has a superhet receiver with RIT, 4-pole crystal IF filter, smooth break-in, separate AF & RF controls that are not generally common among the tiny portable transceivers available today.

Bitx 17A & 20A

These are 10W complete monoband SSB transceiver kits having a RRP of USD\$180. Please check the website for more information & ask around, as a number of local operators have built & are using the 20A certainly.

What else?

There are many other brands involved & websites to explore using key words such as:

Kanga Products
Walford Electronics
Cumbria Designs
Hendricks
Waters & Stanford

QRP Club magazines

The UK SPRAT QRP club magazine index lists over 200 construction articles for QRP rigs, kit & homebrew designs, as well as WARC band & 160m coverage extensions to commercial QRP rigs & kits. Valve & solid state units are revealed to you when entering quirky or intriguing article titles such as:

One tube amateur station complete (SPRAT Vol 7 page 6)

Tunbridge SSB/CW transceiver (26, 3)

10MHz transceiver (31, 11)

Super OXO All Bands transceiver (32, 12)

20/20 transceiver (33, 6)

Force Three 7MHz transceiver (36, 3)

160m DSB transceiver (44, 3)

Rock's Fishing Box (46, 8)

Transceiver for 7/14/21MHz (47, 4)

The Unichip (54, 10)

The Kitten Two transceiver (65, 32)

A solar-powered 40m transceiver (73, 6)

Modifications to the MFJ9020 transceiver (75, 13)

A valve transmitter & receiver for 80m (79, 18)

The Rockcrusher (85,14)

Norm VK5GI is the VK representative for the G-QRP Club & suggests that interested readers might keep a lookout for the next reprint of the G-QRP Club Circuit Book, a mine of ideas, transmitters, receivers, transceivers & all accessories for domestic & portable low power SSB & CW operation.

Please also explore our own VK CW Operators QRP Club via <http://vkqrpclub.org/> for more accessible local information, how to source back issues of the club's Lo-Key journal, membership details etc.

Epilogue

Our intention here has been to post indicators to AHARS members & beyond, that there are potentially a lot of secondhand and/or older QRP radios out there, acquisition of which may empower almost any amateur to gain access to low power & portable operation. We hope you have found it useful.

Best 73 for lots of fun, personal fitness & stress management through low power amateur radio.

de Doc, Norm & Greg