

## Making /p on HF a reality

### What sort of “Portable”?

I don't want to “teach my granny to suck eggs”, and if you are already an active /p operator (there are some in this club, I know) then you won't need help from me. But there could be some who, like me until a while ago, already have a radio suitable for portable work, or want to try “/p”, but through lack of confidence or knowledge hold back from this enjoyable way of using Amateur Radio. If so, then perhaps this talk is for you.

You need to ask yourself a few questions before you commit time and effort to putting the gear together. I also need to lay my cards on the table so that you know where my preferences are, and where your needs might differ.

I belong firmly in the “QRP” section of Amateur Radio. I have been a continuous member of the G-QRP Club from well before I was licensed, and I commend that Club to you whoever you are, and where-ever you are in the Amateur Radio spectrum, and whether or not you are a “QRP-er”. The Club fees are ridiculously small (£6 per year), and the quarterly magazine (“SPRAT”) is brilliant.

This is the place I choose to occupy in the hobby of Amateur Radio. I only operate below 5 Watts output. I have only ever used HF, I only use very simple home-built or home-modified aerials and only use Morse code. I don't use speech modes partly for preference (I used to talk for a living) and partly because my deafness can cause me difficulty in deciphering what is said. I do a little home-brewing and kit-building, but only if I need something. Elecraft radios deliver all I need, I am an enthusiastic user of their stuff, and I run the K2 and the K1, and now also the KX3; I have a good friend who uses the KX1 and he is equally wild about that tiny rig, there are some in this club who also use the KX1, its a brilliant concept beautifully executed!

All amateur radio is about compromise. Even if you're a hard-core QRO op with money to spend on several towers and multiple big rigs, you're still compromised by legal and common-sense restrictions. Portable operating just brings in a different subset of compromises, and that's what I'm speaking about tonight.

The basis of this talk is the type of portable radio-work where you put your radio in a rucksack and walk or cycle to the place you want to operate from. In my case, radio is usually the main reason for the walk or ride, rather than the other way round.

### Questions, Questions. Page 1. How, Where, What, Why?

So lets get to the questions.

How might you want to use the radio?

What kind of 'outdoors' do you enjoy? Where seems a good place to you?

What sort of situation might persuade you to go portable?

Why? Why bother to take it all outdoors when its easier (and better?) indoors?

Some thoughts that bear on your preparation before we answer the questions:

If you want to operate in your own back garden then anything you forget to bring is close at hand.

Half-way up a mountain or in a remote spot, a **broken connection** or forgotten item could mean the end of the operation. If climbing the mountain was the reason for going, then that is not a serious issue, and the radio would be only a light extra load.

But if your whole reason for being there was to “**play radio**” (my wife's expression) then it is a 'disaster', especially if you loaded yourself with heavy radio kit which turned a good walk into an endurance event for nil result.

It happens... I once forgot my Morse key, and had to use two banana-plugs as a key. Workable, though not the best. (Tell the story, Marsalforn beach, in Gozo. QSL cards from Deiter).

So where are we going with this? What would you be preparing for?

A week-end with relatives	-	or a day out with "The Radio Boys"?
A casual stroll	-	or serious mountaineering?
Stuff kept in the car 'just in case'	-	or a full-on effort?
Enjoyable day out	-	or the Wilderness for a week or more?
Amateur Radio as secondary purpose		or the primary reason?
Holiday trip, or a QRP Contest, or SOTA, or 'mini-DXpedition'?		

Also, hold the possibility, sometimes it *is better* outdoors – better aerials, less QRM, no home distractions.

How you personally answer those questions affects what you need, how you prepare and what kind of operating you will do, as well as how you pack your bag, and how big the bag needs to be. It is a personal choice. So let's consider the options regarding equipment, and try to sort out a way through those compromises which always exist in any kind of amateur radio work.

Each of us will be looking for different things in portable work, as in radio generally...  
(**show pic of Rolf, HB9DGV // 9H3RV**), but

The **reason why we do it**, always, is that radio is fun...

**"Do something mad with radio each day!"**

**Transceivers:** **show various rigs – in the flesh. K2, K1, KX3 (KX1?).**

The issues are basically, "Method" "Mode" and "Bands".

**Method, How will you achieve a portable rig?**

If you want to buy a **rig off the shelf** then you need to do some careful homework and flex your bank-card.

If you want to make it from a kit, do the homework, flex the plastic and go to it...

If you want to **scratch-build it** you need to do some careful homework, get the soldering iron warmed up, and drill holes in an old credit card to use as the front panel on your tiny new rig....

If you want to use something you already have then that might affect other choices. I chose to build from a kit (**Show pic of K1 under construction**). After assessing the Elecraft K1 and the KX1, I went for the K1 (reasons??).

**Mode:** The mode issue is important, and it will affect your choice of rig, and probably its price. Do you need SSB, and perhaps FM or data, or are you happy with "CW only"?

CW ops have particular preferences, and some rigs have poor performance on CW. Some 'portable' rigs will need an extra filter to make them properly capable on CW or SSB (£100+ for Yaesu FT8x7 series), and you need to factor in that cost.

When you buy, will it be your only rig (home & /p) or a special one for /p only?

For portable use, CW is a positive advantage. With low power and compromise aerials, and running on batteries, CW will get you heard when SSB could be lost. Speech-modes have another issue.

**Picture: "On the beach"** On the beach or in some beauty-spot it will change you from being the person with a radio aerial, to being "that idiot yelling 'Sea Queue' and shattering the peace". In that setting, CW with headphones is the quiet and considerate way to go.

Your CW doesn't need to be fast. 12 words per minute works for me. Just enjoy it, it will do wonders for your sending if you are not a regular Morse user, and you don't need to rag-chew if you don't want, though that can be fun too, sharing details of your setting with others across the world.

**Bands?** Which bands do you want, and how many? Several of the QRP rigs on sale have a limited

number of bands, and some can only offer a few from a small list.

**Extra features:** - Consider which options you need, which you don't need and those you can't do without:

**internal auto-Aerial Matching Unit** might be very useful, or **vital**.

**Internal battery packs** save you from leaving the batteries behind – unless you forget the rig...

**A stand for the radio**

**Personally**

I would go for the internal auto-AMU every time.

internal batteries might limit your operating time or output power. (I prefer external batteries...)

You usually DO need some sort of support for the radio.

Bands are a personal choice – nearer the equator, higher bands are better??

Consider the **current consumption** of the rig on receive. **I'll say that again...**

What ever else you look at, **Pic consider the Rx current-consumption.**

It is important. Higher consumption means bigger (heavier) batteries to hump around, and/or shorter operating times.

Some rigs claimed as “portable” require high current even on receive. Others have low current requirements all round, and are designed for portable work from the ground up.

**IC703 - 320-580mA, FT817 - 450mA, K2 - 150 – 200mA, KX3 - 200mA/190 mA, K1 - <60mA, KX1 - 34mA.**

***Pic from Keith. Read his email..***

To the rig itself you must add a mike, key or paddle for input. All the 'shack' versions of these tend to be heavy, so look for **lightweight options**. (**show them**) I use the Palm Paddle and the Palm Portable Key. Both are tiny and light, well designed and very effective items, and both retract into their cases for protection in transit. There are lightweight home-brew options if you can use a file a hacksaw and and a drill (see SPRAT, **print-out of article available**).

On **microphones**, I can't tell you much; in some photos I've seen folk using a very light, cheap microphone from Maplin. Modified or adapted computer head-sets might also be an idea. Look around, think outside the box, be prepared to make or modify leads to allow them to work.

You will need some kind of headphones. Standard ones from the shack are pretty bulky, and many portable operators favour “ear-buds”. I use a pair of “in-the-ear” lightweight flexible headphones by Sony, which fold up small, or a pair of Sennheiser ear-buds. Junk ones can cost a £1, but are poor. “Check the specs” before you buy, look at the “sensitivity” figure, which should ideally be more than 100dB/mW – e.g. some Sony models offer around 106-108dB/mW.

Sometimes you end up **sitting well back from the rig** or above it. How long are the leads on your key / paddle / mike and your phones? Nothing is more aggravating than pulling your ears off, or pulling the rig over every time you speak, send or move. Make up extensions if needed.

**(break for a cuppa?)**

**Power: Pic 6, Gozo operating**

Without power your rig is just dead-weight. You will be away from mains power (unless using the “Garden QTH”) so you need batteries. Rechargeable or throw-away? Throw-away power would probably mean alkaline batteries, and probably AA sized. This may be a reasonable choice for a small low-power rig as they would last a reasonable time and they have a long shelf-life, but they would be an expensive option for something with a power output of more than a couple of watts.

The rechargeable options are:

**SLAB.** The **Sealed Lead-Acid Battery** (“**gel-cell**”) - rugged, reliable, easy to charge, forgiving... and

very heavy. They can also be pretty cheap. I used to buy from the local Alarm Company (cheaper than the High Street), but I knew the boss. The Alarm Company's old ones can be free but sometimes unreliable, having done four years duty.

I have carried a 2.1 or 2.4 Amp/hour SLA battery, weighing in excess of 1Kg. Even a little 1.4Ahr 12V SLAB weighs as much as my K1 transceiver (700 grams) and it severely cuts down the amount of usable power for a day on the airwaves.

**Lithium Polymer (LiPo)** batteries are used in electric-powered model aircraft (and in your phone or lap-top computer, perhaps). I have no experience of them, and what I pass on here is gleaned mainly from a friend and the Internet.

For aero-modellers, power-to-weight ratio is everything, so aero-modellers' Lithium Polymer batteries sound ideal for portable radio use. But they need great care with charging and protection against piercing, and against over-discharge and over-charging. Apparently, the quickest of short-circuits will destroy them with no second chance, and so will running them down too low.

They give great gains, but are an unforgiving battery system with risks if mistreated. You need to carry a meter to monitor battery-state (which adds very little weight). The cell voltage of 3.7 also means they come in slightly 'odd' voltages of 11.1(3 cell) or 14.8 (4 cell) - discharged voltage. They need a special charger, which monitors each cell separately during charging. You will have serious trouble if you don't charge each cell separately and something goes wrong – possibly a very difficult to extinguish chemical fire. No gain without pain!

However, they are cheaper now than ever before – at least in smaller sizes, and much, much lighter than all the other battery systems. Their power-outputs make QRO portable a reasonable possibility.

An “extreme” model-flyer friend warned me off LiPo, though he uses nothing else for his very capable aircraft models. A LiPo battery being punctured by a screwdriver in your rucsac doesn't bear thinking about and could be life-threatening. Take great care if you use them. I am still tempted though.

**NiMH.** Nickel Metal-Hydride batteries can easily be got with outputs of over 2000 mA/h in the AA size. I got mine in a local supermarket. They are reliable if looked after, can be charged 300-500 times and are a lot lighter per output than a SLAB. A pack of 10 weighs about 250 grams in a holder. They are a “greener” option than batteries containing lead or cadmium. NiMH is my preferred choice for portable power. Their only disadvantage is that they don't hold their charge for long periods, so will need a check and a charge before a radio adventure. This factor is improving...

**Charging:** *(show chargers for SLAB, NiMH, etc).*

Where will your battery get its recharge? Are you going home after a day excursion or are you out for several days away from mains electrical outlets? Even if you are going back to digs or a hotel, is the mains voltage there right for your usual charger? If you are abroad it may not be, or wall-socket may need a converter. Can you draw power from your car or a hire-car? On my holidays in Malta I take charging-power from the mains, where everything is identical to the British system – they also drive on the proper side of the road... sometimes.

I occasionally carry a small, light 2.5A/12V solar-panel which helps keep a SLAB topped up while operating – Malta has a lot of sun so the solar charge-rate is much greater than in the UK (needs a charge controller for NiMH– it's on my TO-DO list).

***Aerials** can be the biggest problem when portable, particularly if you don't know beforehand whether there will be trees or other aerial supports when you get there.*

*I hope I can deal with some aspects of portable aerials another day (2<sup>nd</sup> July).*

*For this session lets assume we are using a length of wire plus some sort of counterpoise system with an AMU, simple and workable.*

### **Other items: show them**

So you have the rig, the headphones, a key or mike. You have sorted an aerial and perhaps an AMU, and bought or begged a battery. What else? You need ways of connecting it all together. I make up my own leads and feeders. My aerials are all connected via BNC sockets or "choc-block", I carry connectors for BNC-to-banana-sockets which are cheaply available at rallies (try Westlake). NEVER leave home without "choc-block", and a screwdriver to fit it of course. Its too useful to leave behind.

You will need a few tools. I take a couple of screwdrivers, & a pair of pliers. A multi-tool will cover for both of these in a single package, but remember that you can't use the screwdriver and the pliers at the same time.

I usually take too much of everything, just in case. You have to work out what you can live without, and what you simply must have, and strike your own balance. The Airport scales may be the final arbiter.

### **Comfort and convenience:**

This is easy to overlook, but try sitting on a rough lump of rock, working a pile-up of calling stations ( I have done it.. **Roman ruins Gozo picture, should still be on screen**). After an hour, you'll find you can't feel your nether regions, and everything has gone numb. That's when you realise that comfort is an essential rather than a luxury.

### **Show the options**

Look at kneeling cushions in a garden centre and small folding stools in camping and fishing-tackle shops. A kneeling pad might do double duty in cushioning the rig in the back-pack, so it is worth its place, and its low weight.

If you operate in a park or on the sea-front, there may be benches or picnic tables provided. Elsewhere, you WILL need a seat, and possibly a work-surface of some sort. On the beach my 'table' has sometimes been an up-turned beer crate, or a beach/garden chair with a fold-up table-flap. You need some way of keeping your radio kit out of the sand, and the sand out of the radio kit. I once failed, and had to wash a Palm Key several times and dry it carefully to get it to work again as it should. Some ops use a board on their knees. An A4 or larger piece of hardboard would do, or a cheap (large) chopping board. It gives you a surface to write on, and to rest the rig, the key, the log-book, the pen, your cup...

### Think about **clothing and protection.**

Will you be cold, not moving whilst operating in a cool climate?

Might you get rained on?

Will you be out in the hot sun?

In the heat I wear a long-sleeved shirt and slacks and a hat, but more than once the sun has managed to burn patches of my feet through gaps in my sandals. Hands can burn too. Pay special attention if you are near water, as you can get a second dose of sun from reflected light.

### **Dangers?**

- what dangers? Well, there may be a few, depending on where you are. Better to be aware than blunder in where you should take care.

Portable operating is often done on hill-tops. That means you are nearer to clouds and lightning. A vertical aerial with a ground-plane on top of a hill seems like an open invitation to a lightning-strike. Watch the weather or you may become an item of interest to Brian Austin.

If you are going to a tropical wonderland (Florida?) you might need to take note of **snakes** or other reptiles (alligators??!). Even in the UK you should watch out for snakes [not alligators, though] (in parts of Britain the adder is common). Another danger which is more subtle is **the tick**. Around the UK, Europe and USA they are common, and the frequency of Limes disease is increasing in all these places. If you know anyone with it, as I did, you will know Limes can become a serious, debilitating

and life-threatening affliction. Protect yourself in areas with long grass or bracken. Don't wear shorts...

Seaside operating is wonderful, and can be shared with the family. Salt-water provides nature's best ground-plane. But if you get too close to the sea in some parts the tide can cut you off quickly. Don't be silly, and keep your eyes open.

### **Packing -**

Before you decide what you need and what you don't, my advice would be that you try the whole thing in your back garden or a near-by park. *(picture of table etc.)* Try sitting on the ground to operate if that's how you intend to work. Throw a wire in a tree, or clamp your vertical antenna to a picnic table. See if it all feels comfortable. Take note of the tools you needed to put it all together, and what you didn't need and can exclude from your pack. Then make a definitive list which will be your guide for a trip with the radio.

After I did the back-garden check, I put everything in a rucksack and took the dog for a long walk (with no intention of using the radio), to see if I was comfortable with it all on my back. A priority for me is protecting the rig from knocks and bumps. *(picture of K1 plus foam)*. However you pack and carry it, keep wire and cord from tangling. Use seal-able poly bags... The Pea in "stroke p" ??

**for a walk.** Radio is not the only need you have. A drink is a must, and usually some kind of snack is sensible and makes for a good day. Put it all in a rucksack and pack it in such a way that the rig is not digging into your shoulder or the battery bouncing on your hip. Even if you are taking a self-supporting aerial with you, you can make (or, perish the thought, buy) one that will break down small enough to go inside a 25 litre rucksack. There are designs on the Internet to start you off (PAC-12, the AD5X Phil Salas design; or W3FF Buddipole & Buddistik home-brew, and similar). All you need is a hack-saw and a few other simple tools.

**for the car** – take the "kitchen sink". If you don't use any of it because your wife wants to shop or sunbathe, you haven't lost anything.

**for the airport-** This is where it gets serious and you need to pay attention.

Some carriers used to allow an extra item of 'sports equipment' in addition to main luggage, free of charge – BA even allowed a bicycle if packed in a case. So you might get a "fishing-pole" antenna support on the flight for free, but some carriers (e.g. Ryanair), **will** charge extra for it. Check it out before you book, and remember there are limits beyond which you will be charged extra or be turned away.

**As I understand it**, attempting to take an SLA battery, or any cord, string or wire in your carry-on-luggage will get you into trouble. So will metal rods or tubes. Anything that could conceivably be used as a weapon or used to tie someone up or to threaten them is not allowed. You know that knives and nail-files are out. So are screw-drivers and other hand-tools. We live in a weird world. Put tools in your main luggage.

You are generally allowed to have AA batteries (alkaline or rechargeable) and similar in your hand-luggage, and you are allowed to take a radio provided it is not going to be operated on board. Keep your licence handy with the rig, pack sensibly and you will be all right. Play the angry and affronted citizen who "knows his rights" and who tries to get one over on the authorities, and you could find yourself retrieving your baggage and going back home. Security staff are there to assess your behaviour as well as your luggage.

### **Going abroad**

Check the licensing requirements for your destination. The RSGB or other national society can advise. "CEPT" allows for a reciprocal arrangement between most signatory countries, but maybe the

country you are going to has not signed up to it. If you need to apply for a licence, do it in plenty of time. Check that they allow you to be /p (or that you can “get away with it”). These things need to be found out **before** you plan your holiday around amateur radio. **Assume nothing, and check (Malta)**

If you are going abroad with Amateur radio this year, especially if it is the first time, enjoy yourself. If you are going portable - in the garden, up Snowdon, on the beach or a yomp across the moors, have a great time. And record the event on a photo-based QSL card for all your contacts to see. **(HB QSL)**

CU /p Les

### **A minimum /p Kit List**

#### **Radio gear**

Rig.  
Battery.  
Antenna – either self-supporting (with fixings), or wire + support. Take some “choc-block”.  
Key or paddle (microphone?).  
Feeder if required. Take some “choc-block”  
Ear-phones/headphones.  
Leads and Connectors - for aerial, power, key. Take some “choc-block”.  
Tools. At least a screwdriver to fit the choc-block.  
Log-book or paper, & pen/pencil

#### **Comfort**

A seat or cushioning, plus a “work-surface”.  
A drink & snack  
Hat + suitable clothing  
possibly a groundsheet &/or shelter + pegs & cord?

#### **And perhaps?**

Sun-screen, Insect repellent, Anti-Histamine cream.