

## RIGS FOR PORTABLE OPERATION

Operating amateur radio in a fixed QTH has nothing to do with doing it portable in the open air. The second situation requires a careful choice of equipment and accessories to set up a simple system that allows performing an activity for a short period of time.

In this article we will just talk just about the selection of the transceiver, leaving for future articles, subjects like the power supply, aerials or any other accessory.

If we want to operate portable, we can find different rigs in the market, manufactured by several different branches. We are not going to talk about transmission on the VHF section, because there are plenty of small sized handhelds for that. Instead, we will see in detail the existing rigs that we could use for the HF bands. We can identify three different groups of rigs with similar characteristics for HF:

- a) The first group is composed of the so called compact mobile rigs. We can use them connected to the car's battery. Such rigs provide 100 watts output power.
- b) There are some smaller rigs that develop 5~10 watts output power. They are the so called QRP rigs. They have a low current drain. They are more appropriate for portable operation because can be fed with a smaller battery compared to the mobile rigs, and they tolerate a reduced voltage.
- c) The last option consists in monobanders, kits and homebrew rigs. Most of them are devoted to CW mode, although some are capable of SSB too.

### Selection criteria for an HF rig

When having so many different options... what would be the most adequate criteria to select a rig for portable operation? There is much talk in our forums about the good performance of this or that rig, or about the subjective feelings when using them, or about their difference in reception. We should find the right criteria to avoid trusting only in feelings of our ham mates.

First we should focus on the kind of activity we want the rig for. If we want to use it for an activation where the use of a car is allowed, and we can arrive to the trig point with it, we could select a mobile rig with the additional bonus of running 100 watts.

In the other hand, if the activity requires carrying the rig to a remote place with no access for vehicles, in the wild, we should then select QRP rigs or any sort of kit or monobander.

If we consider the case of SOTA program (Summits in the air), the rules state no car operation is allowed. All gear has to be carried by the activator including a battery power supply. Most mountains don't have a road up to the summit, and therefore this will require to choose a really portable rig plus the rest of necessary gear like antenna, battery, logbook, warm clothes, food, etc. All should fit inside a rucksack being important a careful selection of what to carry.

After trying different solutions in real life, I have now defined a criteria for the selection of such a rig intended for extreme degree of portability. It consists in 3 main points:

- The rig should work with a reduced voltage, less than 12 Volts

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- The rig should have a reduced current drain during reception (mAmps)
- The rig should have a reduced weight (kg)

### ● Reduced voltage:

It's important the rig work without degradation outside the common range of 13,8V  $\pm$ 15% (11,73 a 15,87 volts) that many mobile rigs have. Using a mobile rig would require a supply of 13,8V thus making necessary the use of big batteries. That would increase the weight and volume, limited by our rucksack.

There are fewer rigs capable of solid performance with a supply below 12V. Transmitted audio and output power in mobile rigs degrades when working under 11,7 volts. This would be an issue if we used them with small batteries like Lipo or NiMH. Instead, there is no issue when running under such conditions if we select QRP rigs capable of operation outside these voltage limits.

### ● Reduced current drain in reception (RX):

Mobile rigs have a high current drain in reception due to the multiple circuitry they feed, like AGC, preamplifiers, relays, etc.

When you operate portable in the wild, operating time is limited by the Ah (ampere hour) capacity of the battery. It is important that the receiver's current drain be as low as possible. Mobile rigs have elevated current in standby in the range of 500 ~ 800 miliamps or more. Such current in reception mode is a penalty for a portable operation. The higher current drain would of course be during transmit periods, but if we reduce it in reception that would enlarge the overall time.

This issue is improved when using QRP rigs that have a lower receiver current drain. There is no magic in such a feature. The circuitry and complexity of QRP systems is greatly reduced.

We can also find such advantage when running kits or monoband rigs that exhibits current drain as reduced as to 100 miliamps or less in reception. They are a real winner for the expeditioner who can stay for longer listening and operating.

### ● Weight:

What could we say in this point? The lightest mobile rig I know is 2,1 kilograms. When you jump to QRP rigs you cut that by half at least. Kits or monobanders decrease it to around 500 grams or even less.

### HF rigs comparative chart

We present below a comparative chart showing existing rigs for all three ranges. The more known rigs have been selected for mobile, QRP or kits, including some of the new recent models. You'll see as well some that are no longer in production but can still be found as of second hand.

Data presented in the chart is as precise as possible but we can't warrantee accuracy at 100%, because for some models we couldn't find much info in some areas.

The chart shows some features and focus on the three mentioned criteria: Voltage / RX Current drain and Weight.

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## BRAND RIGS: QRO/ MOBILE



Bands TX  
 Mode  
 PWR @12V  
 Weight (gr)  
 Current RX  
 Current TX, 5w  
 Current TX, 100w  
 Pwr. supply  
 Others

	YAESU FT-857	YAESU FT-897	YAESU FT-450D	ICOM 706 MKIIg	ICOM 7000	KENWOOD TS-50	KENWOOD TS-480 Sat
Bands TX	160m a 70cm	160m a 70cm	160m a 6m	160m a 70cm	160m a 70cm	160m a 10m	160m a 6m
Mode	CW, SSB	CW, SSB	CW, SSB	CW, SSB	CW, SSB	CW, SSB	CW, SSB
PWR @12V	100w	100w	100w	100w	100w	100w	100w
Weight (gr)	2100	3900	3600	2450	2350	2900	3700
Current RX	900	900	1000	2000	1150	800	1200
Current TX, 5w	4100	4100	6000		7820		4700
Current TX, 100w	15500	15500	15000		19000		15000
Pwr. supply	13,8V ±15%	13,8V ±15%	13,8V ±15%	13,8V ±15%	13,8V ±15%	13,8V ±15%	13,8V ±15%
Others		Optional ATU	ATU included			Not in production	ATU included



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## BRAND RIGS: QRP



Bands TX  
 Mode  
 PWR @12V  
 Weight (gr)  
 Current RX  
 Current TX  
 Pwr. Supply  
 Others

	YAESU FT-817	ICOM IC-703	ELECRAFT K1	ELECRAFT KX-1	ELECRAFT K2	ELECRAFT KX-3
Bands TX	160m a 70cm	1,8 a 50 MHz	40, 30, 20, 17, 15m	80, 40, 30, 20m	160m a 10m	160 a 6m
Mode	SSB, CW	SSB, CW	CW	CW	SSB, CW	SSB, CW, Data
PWR @12V	0,5-5w	0,1 a 10w	0-5w	4	10w	10
Weight (gr)	1100	2000	635	283	1500	680
Current RX	450	320 (DSP off)	60	34	200	150
Current TX	1600	2000	1180	700	1600	1500
Pwr. Supply	8V min	9 a 15,8V	9 a 15V	7 a 14V	9,5 a 15V	8 a 15V
Others		Not in production	Optional ATU	ATU included	Optional ATU	ATU & 2m optional





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## KITS / MONOBANDS



Bands TX  
Mode  
PWR @12V  
Weight (gr)  
Current RX  
Current TX  
Pwr. Supply  
Others

TENTEC 1320	HENDRICKS PFR-3	KN-Q7A	ILER	LNR LNR FX-4	LNR LNR FX-2
20m	40, 30, 20m	40 o 20m	40 o 20m	40, 30, 20, 17m	40, 30m
CW	CW	SSB	SSB	CW, SSB	CW
3	5	10	5	5w	4/2,5w
1020	510	500	155 (sin caja)	363	290
35	47	30	35	260	90
800	650	2000	900	1200	580
12-14V	8-12,5 V	12 a 13,8V	12 a 14V	9-13,8 V	9-13,8 V
	ATU included				

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**KIT / MONOBANDS (chinese market)** Lack of information in some areas.



Bands TX  
 Mode  
 PWR @12V  
 Weight (gr)  
 Current RX  
 Current TX  
 Pwr. Supply  
 Others

YOUKITS HB-1B	EK-1B	YOUKITS TJ-6A	XIEGU X1M	HF-One MKII
80, 40, 30, 20m	20, 17, 15m	80 a 15m	160m a 10m	
CW	CW	CW, SSB	CW, SSB	CW, SSB
5	5	10w	5w	10w
380	420		650	1200
80	130	180	350	500
800	800		1200	2500
9 a 14 V	9 a 16 V	12 a 13,8V	12 a 14V	11 a 15V
=TenTec 4020				SDR technology

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