APC NEWS

IN THIS ISSUE

Above: The RS918 and the IC-705 together. See review p34

QTC

Well we are still soldiering along. Those of us who have no job are learning what it is to be a hermit in the modern world. Well sort of. The Covid19 virus will be with us forever along with many other potentially fatal diseases. We will learn to cope but life will never be quite the same. There are those who say look at me, no rules, no mask, I'm fine. Like taxes and death, selfish fools are ever with us.

The good news is that our shared hobby gives us so much interesting stuff to do. There are some more lockdown projects in this issue but I'd really like to hear from you about what you have done. We **need photos** even if you can't provide any words.

Help make the end of the year issue a big one.

TRADE DISCOUNT:
All Club members can get what is effectively a trade discount card by emailing me a passport type photo and you will get a card for use at Altronics and Jaycar. Also if you are a member of the WIA you can now download a discount card from the WIA website..

73,

Ron, VK3AFW,

APC News Editor.

M&DRC in LOCKDOWN

EVERY Tuesday 10:00 AM Club On Air Meeting. 146.550 MHz QSY's to VK3RMC 147.325 after 10:30 AM
Second Friday of the Month. 8:00 PM. Friday Frolics. **VK3RMC 147.325 MHz**
EVERY week day evening. 4:45 PM on. Drive Time. 146.550 MHz
EVERY Wednesday night, 8:00 PM. Club Net. **VK3RMC 147.325 MHz or 146.550 MHz and on Digital Voice.**

Updated 23 Jan 2020

NORTH AND SOUTH

When I was younger I was suckered in by testimonials of stations in Europe claiming super performance from a particular rig or antenna system. The more bizarre the better it seemed to work. Yet similar performance could not be had here. Why?

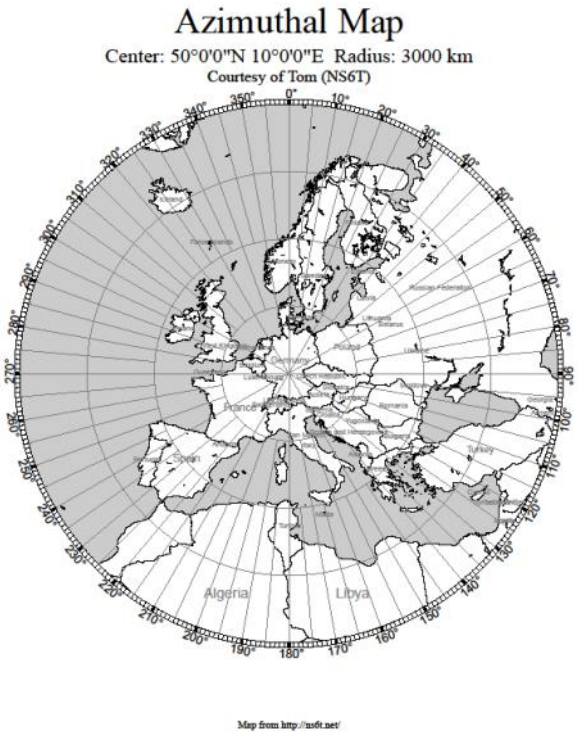
Simple. Geography. Look at an azimuth map. The next page shows that if you are in or near Munich there are some 30 countries within 3,000 km, or a typical two hop propagation path. Easy to rack up 10 countries on a bit of wet string in an afternoon.

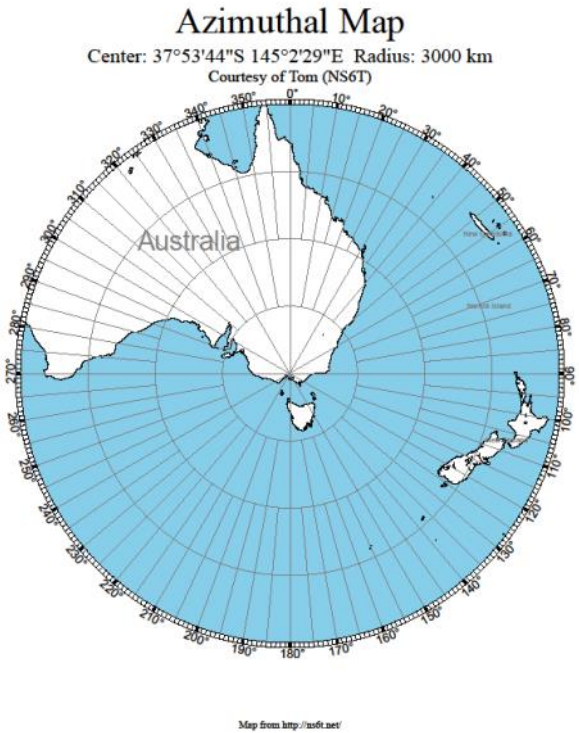
Along side is a similar map centred on Melbourne. It has the same 3,000 km radius but it doesn't even cover all of Australia. There are only three countries. For us to work the US we have to span 12,600 km to 16,600 km. From London to New York is 5,600 km.

Every time our signal bounces off the ionosphere and the ground or ocean some signal is lost so the fewer bounces or hops the stronger our signal. Typical single hop distance is 400 km to 1,500 km off the E layer and double that off the F layer. Of course this is a crude generalisation but is a useful guide. One obvious exception is on 80 m where at night through to mid morning the near vertical incidence reflections fill in the distances from 10 km to 400 km nicely.

Tom, NS6T's maps are very useful for anyone with a beam. https://ns6t.net

NORTH AND SOUTH CONT'D

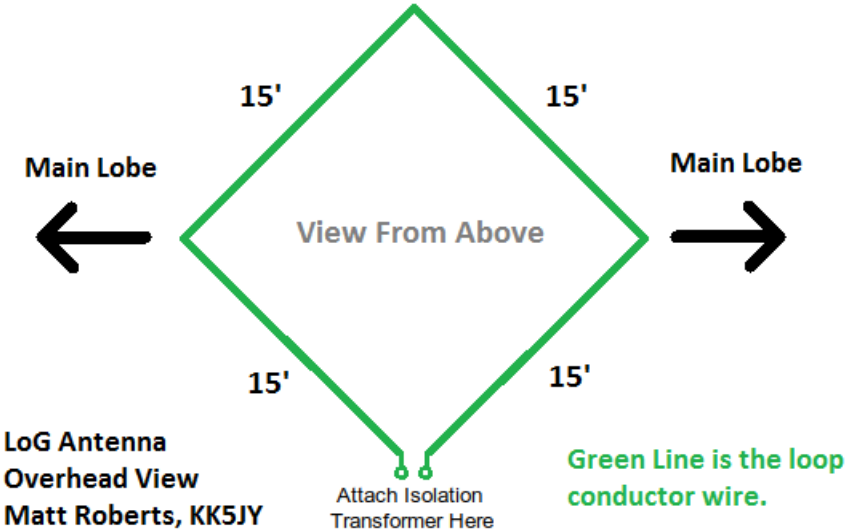




LOW NOISE RECEIVING ANTENNA

APC lockdown project #6.

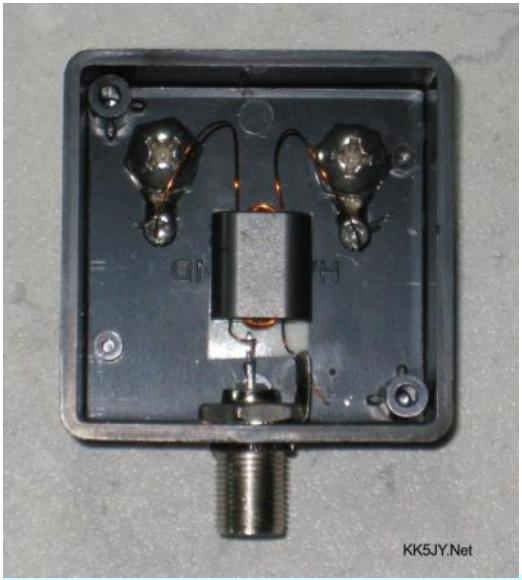
One of the problems with living in suburbia is the increasing radio frequency pollution. QRN. Digital noise reduction can help, sometimes adding an S unit to the incoming signal. But we need something more. If you have more than one antenna you may have noticed that switching to a non-resonant antenna gives better copy. Beverage antennas, long low wire antennas are well known for their low noise receiving characteristics. But a Beverage can't be erected in suburbia. There is hope however. Matt KK5YJ has a solution for the 160 m, 80 m and 40 m bands.



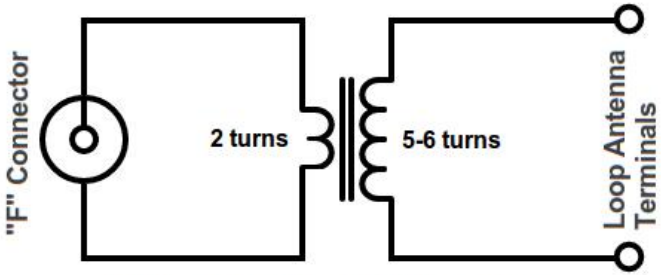
LOW NOISE RECEIVING ANTENNA

APC lockdown project #6.

As seen on the previous page it is a square loop. This is laid in the ground and held down wit lawn stakes, or wire pegs so the mower passes harmlessly over it.



It is fed with coax cable. 75 ohm is suggested but you could use 50 ohm. A transformer provides balanced drive and isolation. See left and below and next page



Loop-on-Ground Isolation Transformer
Matt Roberts, KK5JY
2017-12-14

LOW NOISE RECEIVING ANTENNA

APC lockdown project #6.

On the left is the completed balun in a box with coax and antenna. Waterproofing is highly recommended for Melbourne's climate.

The transformer is wound with 28 gauge enamelled copper wire on a Fair-Rite #73 material binocular core. Type 73 material has a high u_0, 2,500 so if using another core you will need to alter the number of turns on the core to get the same inductance.

For example if your core has a u_0 of 100 you need 5 times as many turns as shown on the previous page.

This antenna is a receiving antenna. It is lossy and would not be much of a transmitting antenna.

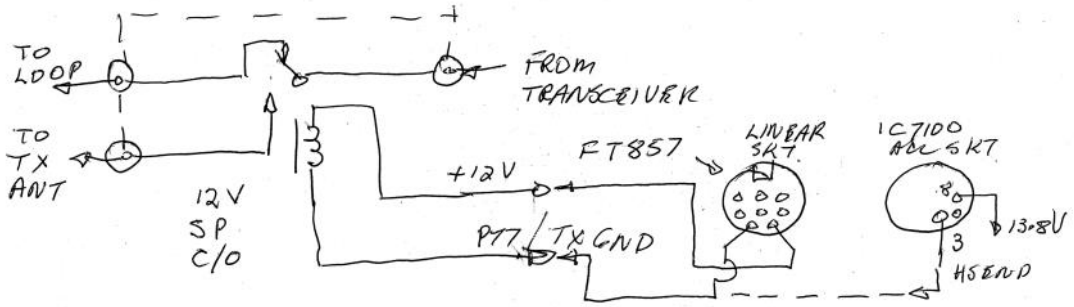
Ref: http://www.kk5jy.net/LoG/

LOW NOISE RECEIVING ANTENNA

APC lockdown project #6.

Some transceivers have a separate receive only antenna connector and this is ideal for this antenna. If you do not have such a luxury then you need to make up an antenna switching box as shown,

This uses the linear amp TX connection. Most transceivers have a 6 pin plug for accessories. Consult your manual.



JOULE THIEF
APC lockdown project #7.

Each month if you are like me you may have a number of cells that have lost enough charge to make them unsuitable for their application but still have maybe 20% of their electrical energy inside. This circuit extracts most of that before you send the battery off for recycling.

The circuit is a hysteresis oscillator that is self adjusting. So long as the cell has a terminal voltage of 0.6 V on no load the circuit will run, even with a terminal voltage on load down to half that.

I came across this little gem on the internet (of course) at: www.instructables.com.

Like the original I used it to run a LED light. I tried a series connection of three LEDs and that worked well with the individual LEDS being almost as bright as when run singly. It may not do so with a battery with low terminal voltage. With a fresh 1.5 V cell it will drive a 1 W LED.

Initially I tried it with a 560 ohm base resistor and an RF toroid intended for a BALUN from 3 MHz up. That worked fine. I decided to use a toroid available from Jaycar so it could be replicated..

It is a powered iron toroid cat no 1244. The resistor was changed back to 1 k ohm but this can be varied by a factor of 2 without noticeable change.

JOULE THIEF
APC lockdown project #7.

Right: The prototype MKII.

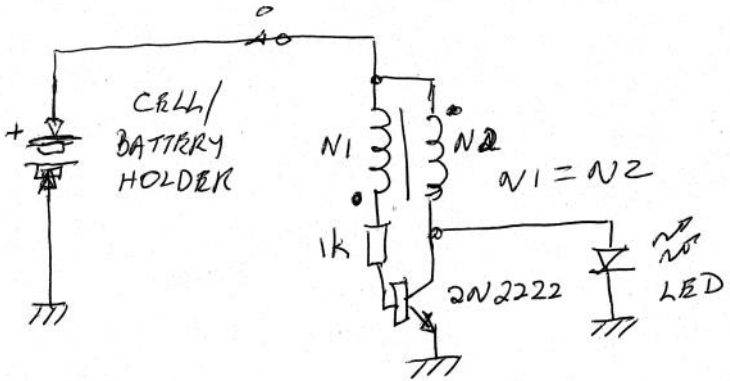
The LED is quite bright when viewed on axis.
The C cell was discarded some year or so ago but still showed about 1.2 V on no load. A 9 V battery that showed 7.5 V on no load only lasted a few minutes before the on load voltage fell to 0.4 V. The LED still glowed but less brightly, showing a fair degree od self regulation. In the circuit.

The power drawn from the battery is if course a bit more than the power used by the LED. Very roughly the battery drain will be double the LED current. The efficiency should be around 90%. As a torch or night light it should be possible to get up to 3 hours running time from a discarded AA cell or more from a C or D cell. . YMMV.

JOULE THIEF CONT'D
APC lockdown project #7.

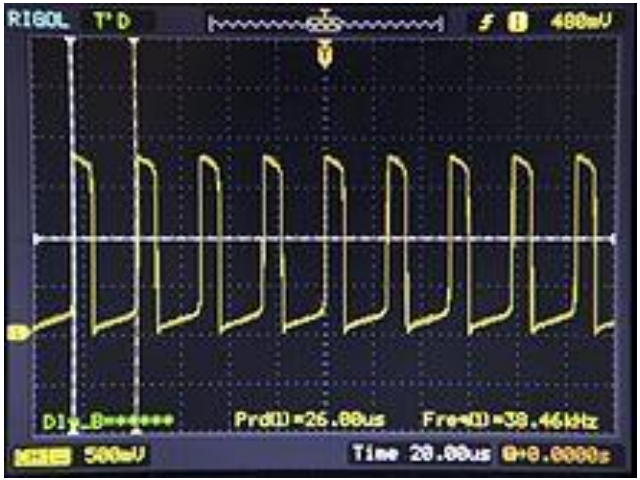
The circuit operates in the tens of kilohertz region and may be a source of RFI so build it in a metal box if it is to be on for any time.

On switch-on the transistor starts to draw current. If there were no other effect it would go into saturation with only a small collector emitter voltage. Because the transformer is connected as shown the collector current induces extra current into the base circuit, making the collector current increase and so inductively increase the base current. Positive feedback. Once in saturation the current in the transformer increases and the collector voltage starts to rise a little.



Basic Joule Thief Circuit.
Cell 1.5 V nominal.
Transformer. N1 = N2 = 13 turns 0.51 mm insulated wire ex CAT5 cable on a powered iron core.. LED to suit.
Small on/off switch
2n2222 or other small switching transistor.
Resistor, 1 k ohm 0.125 W..

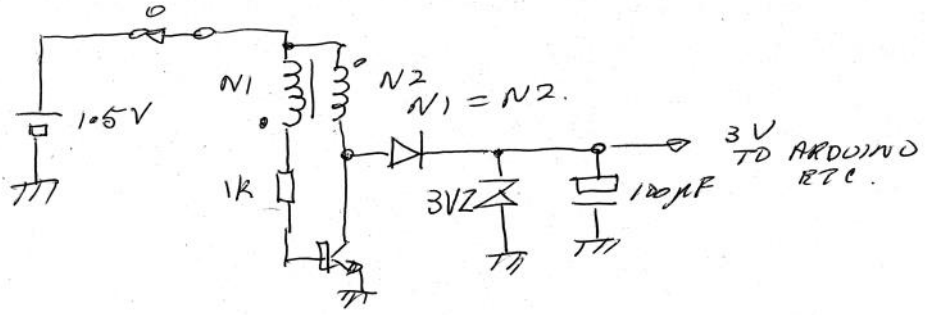
JOULE THIEF CONT'D
APC lockdown project #7.



Then the collector voltage starts to rise with the increased collector current because of its resistance. The increase in collector voltage reduces the transistor drive which reduces the transformer secondary current and with positive feedback the transistor snaps off as quickly as it snapped on.

Now there is energy stored in the transformer and this tries to keep the collector current flowing by increasing the collector voltage. But the transistor is off so the voltage becomes large unless there is a load. In this case it is a LED which turns on and consumes the stored energy. When the inductive voltage surge has died down the transistor is again able to turn on and the cycle repeats. As the waveform on the left shows it is a less than 50% duty cycle. My circuit drew 80 mA from the battery.

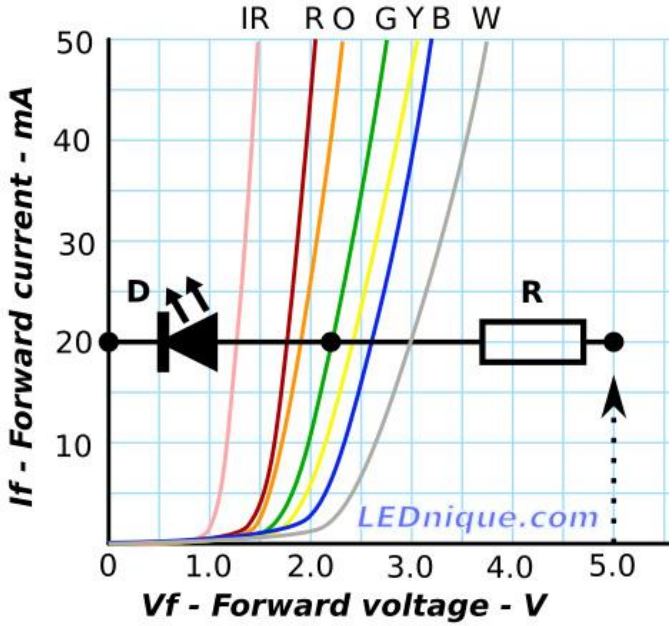
JOULE THIEF CONT'D
APC lockdown project #7.



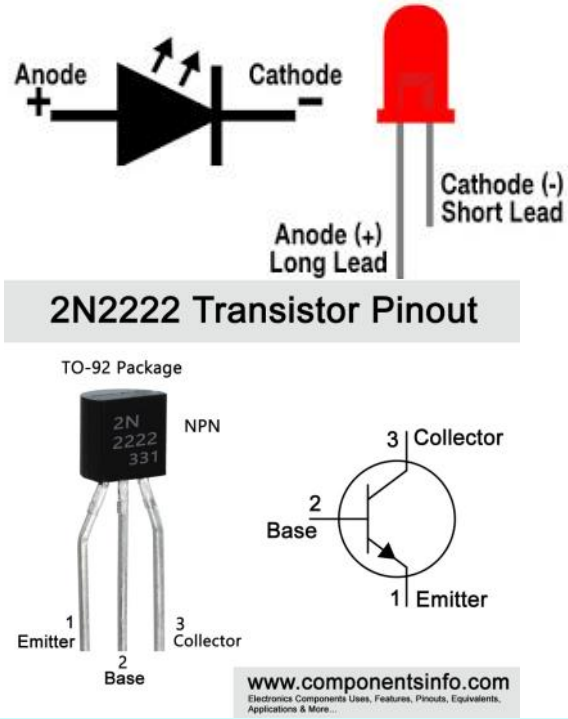
Apart from a torch using discarded cells the circuit can be modified as above to provide a regulated supply for an Arduino or to charge a phone (change Zener to 4.7 V) from a 1.5 V cell. If a third winding is added high voltages are possible. Use t turn per desired volt to start with and add a rectifier and smoothing capacitor for a dc supply.

Note The dot signifies the start of a winding, so the end of N1 connects to start of N2.

JOULE THIEF CONT'D
APC lockdown project #7.



3 mm LED typical VI data



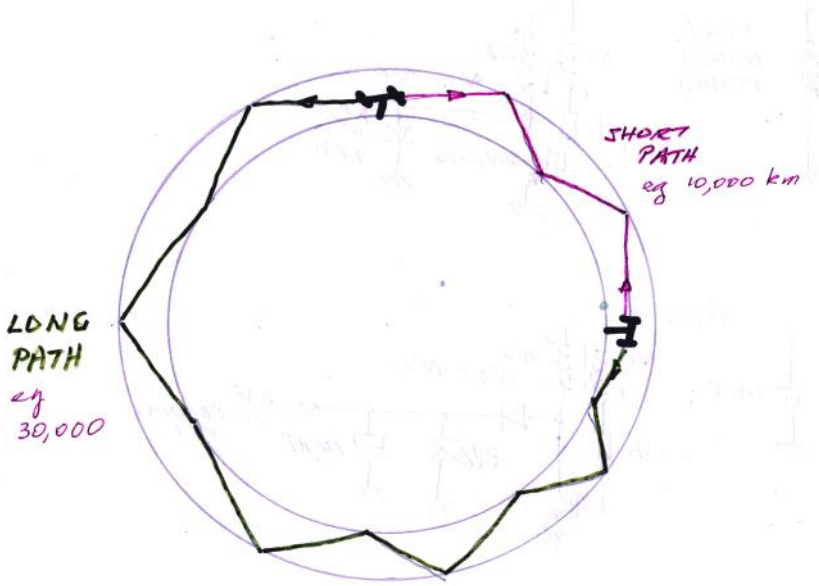
LONG PATH VS SHORT PATH

One member asked what is the difference between short path and long path. Here is the answer.

The Earth is just a little over 40,000 km in diameter. Suppose we are looking for a station in Asiatic Russia. If we transmit beaming due North the station may be say at a distance of 10,000 km. The band conditions will mostly favour the shortest path around the globe. That is the short path. Just before sun-set 20 m may give better signals to this station with the beam pointed South. The signal will have travelled 30,000 km. That's long path.

On 20 m usually the US is best worked on long path (SSW) in the morning and short path (NNE) in the afternoon.

Below. The signal bounces between the earth and ionosphere on its journey on Short Path or Long Path, The antipodes is the point 20,000 km away with short and long path equal.



END FED 40/20 M ANTENNA
APC lockdown project #8.

I don't like most end fed antennas for HF as they tend to be less efficient than a dipole. The difference I believe averages 2 dB. For SOTA this may be significant but for 100 W stations the difference is less of a problem as signals are less likely to be near the noise floor.

The selection of the transformer core and the number of turns in the core is important for its efficiency. The winding needs to be of high inductance, the end impedance is maybe 4,000 ohms, and the winding inductance impedance should exceed that by a factor of four at least.. The core losses also need to be low.

Also most rely on the coax outer and whatever is at the end of it to be the counterpoise. This is poor engineering.

In my mind the advantage of an end fed HF antenna is its versatility in erection. One end can be near the shack and the rest deployed in a straight line or with one or two bends to fit the available space. Also there is no feedline hanging from the centre and this may be more visually acceptable to others.

END FED 40/20 M ANTENNA
APC lockdown project #8 cont'd.

Here is an experimental design that covers 40 m, 30 m, 20 m 15 m and 10 m that was built for SOTA but is also suitable for the suburban back yard. I may extend it to 60 m and then perhaps 80 m with add on lengths of wire or coils..

The idea of using a dipole on its fundamental resonance and even harmonics has been around for nearly 100 years. I have only been playing with them for half that time.

Finding a feed point that suits all frequencies is a challenge. End feeding has become popular again, especially amongst the US SOTA fraternity.

It is claimed a 36:1 or 49:1 transformer will match a 50 ohm line on these bands.

In the fine print it does not state the antenna is resonant in the bands just that the VSWR is less than 2:1 and an ATU may be necessary sometimes.

Looking at the theory we see that dipoles are shorter than the basic formula would suggest by 5% roughly due to end capacitance effects.

END FED 40/20 M ANTENNA
APC lockdown project #8 cont'd.

The harmonic length formula takes this into account. The calculated lengths for the various harmonics are as follows.

L in m =[150(N — 0.05]/f MHz where N is the harmonic number, f in MHz

7.050 MHz	20.213 m
14.100 MHz	20.745 m
21.150 MHz	20.922 m
28.200 MHz	21.011 m

TABLE 1

RESONANT LENGTHS {FREE SPACE]

So an antenna that is resonant at 7.050 MHz will need to be extended 0.532 m to resonate on its second harmonic, 14.100 MHz. For 15 m and 10 m the antenna needs to be longer still as shown. So one size does not fit all. If I chose the length for 7.050 MHz as the basic resonant frequency then the second harmonic resonance would be close to 14.471 MHz. The SWR curve would be wide enough to allow SSB operation in the top of 20 m but not in the CW section without an ATU. For SOTA SSB on 7.090 MHz and 14.315 MHz this would suffice.

END FED 40/20 M ANTENNA
APC lockdown project #8 cont'd.

We can calculate "cut off sensitivity". That is if we initially make the antenna too long how much do we need to cut off to get our desired resonance.

TABLE 2.
Length change for 50 kHz change in resonance.

7.050 MHz	142 mm
14.100 MHz	73 mm
21.150 MHz	49 mm
28.200 MHz	37 mm

So if our antenna is resonant at 6.950 MHz and we want to move it to around 7.100 MHz we would cut it shorter by 3 x 142 = 426 mm.
Because every QTH is different it is wise to make the antenna longer and prune back. The following curves were obtained with the centre at 7 m and the ends at 2 m

END FED 40/20 M ANTENNA
APC lockdown project #8 cont'd.

There is another problem. If the transformer is connected right at the end of the antenna the feed current can flow into the antenna but there is no other bit of antenna for the complementary current to flow into so it flows down the outside of the coax. This is not a good design choice.

In this design the feed point is moved from the end to allow Kirchhoff's Law† to work without using the feed line as part of the antenna. Further the feed is isolated from the transformer secondary winding thereby providing a balanced/unbalanced system and minimising the dependency on the feedline for operation. Having the feed point slightly away from the end also reduces the impedance that has to be matched. So a ratio of 36 can be used instead of 49 or 64. It does mean that the feed point is at a slightly different point on each band in terms of wavelength however it seems a reasonable compromise in practice.

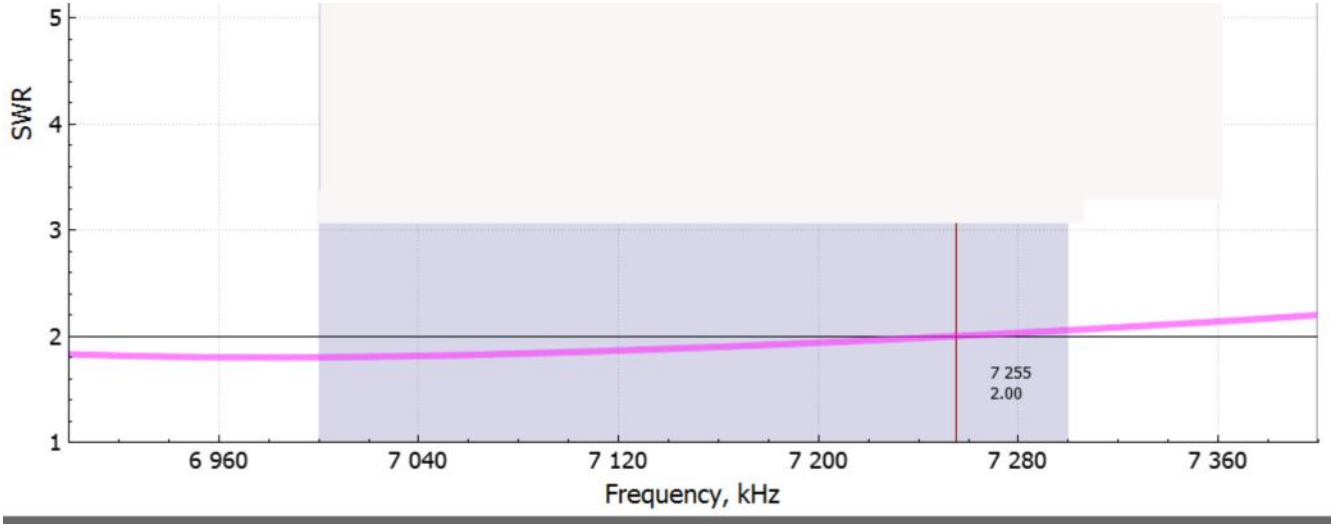
† *Kirchhoff's Law of junctions says that the sum of the currents flowing into a junction must be equal to the sum of currents leaving the junction.*

END FED 40/20 M ANTENNA
APC lockdown project #8 cont'd

My initial intention was to make a simple to deploy antenna that covered 40 m and 20 m. Two things made it a bit more complex. Firstly I decided to recycle two radials I had used on an experimental vertical antenna. That meant a join in the middle so I cut the first section for 20 m resonance and put in a joiner. Then I thought why not add 30 m. Its not much used but at least I could have the capability if required. So another cut and link modification. Finally I cut the wire for 40m. I actually made it a bit longer than it should be and may yet cut it back for optimum band coverage. Then I added a length with a link so it could be easily changed.
The link was optimum for 15 m with 20 m being OK and 10 m sort of OK. Have a look at the measured SWR curves. Its easy to switch from 40 m to 20/15/10 m as the wire can be pulled low enough to change the link without undoing the end or lowering the mast. Lowering the mast is probably the way to go to 30 m. As it happens the full wave on 20 m is a better match than the half wave.

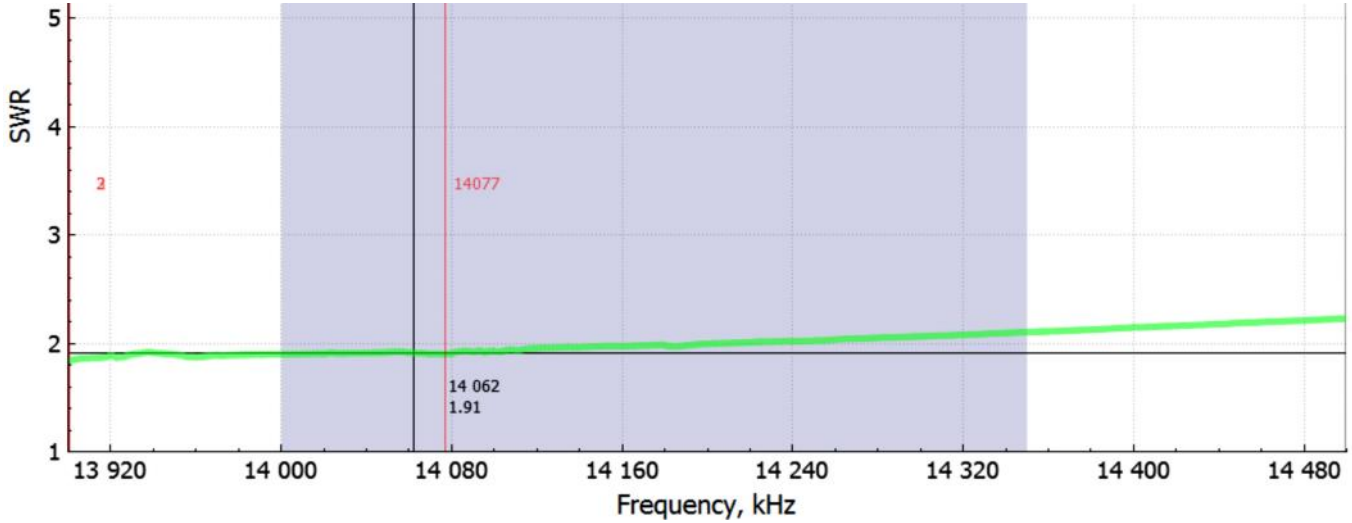
So the objective was met. I am making a copy with lighter wire for my MTR3 mini CW transceiver. The ability to change bands with opening or closing a link instead of having a tuner is attractive, albeit only having access to some bands.

END FED 40/20 M ANTENNA
APC lockdown project #8 cont'd



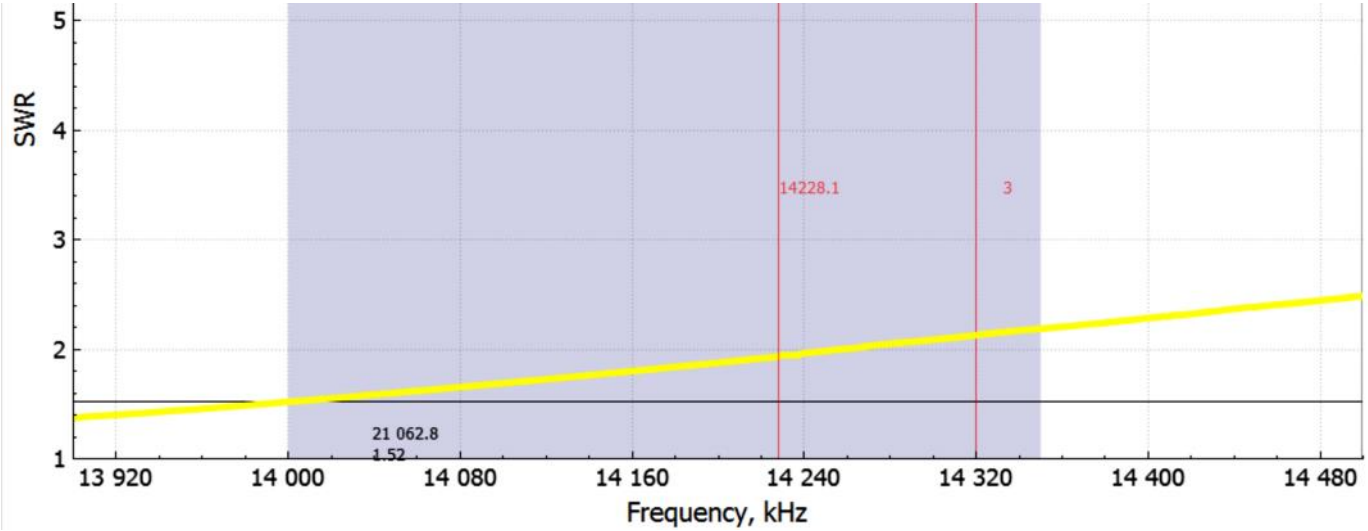
Above. 40 m end fed half wave antenna SWR curve. The SWR is under 2:1 up to 7.255 MHz. A little extra trimming could move the 2:1 point outside of the band. However as my main used frequencies are below 7.150 MHz I left it as is.

END FED 40/20 M ANTENNA
APC lockdown project #8 cont'd



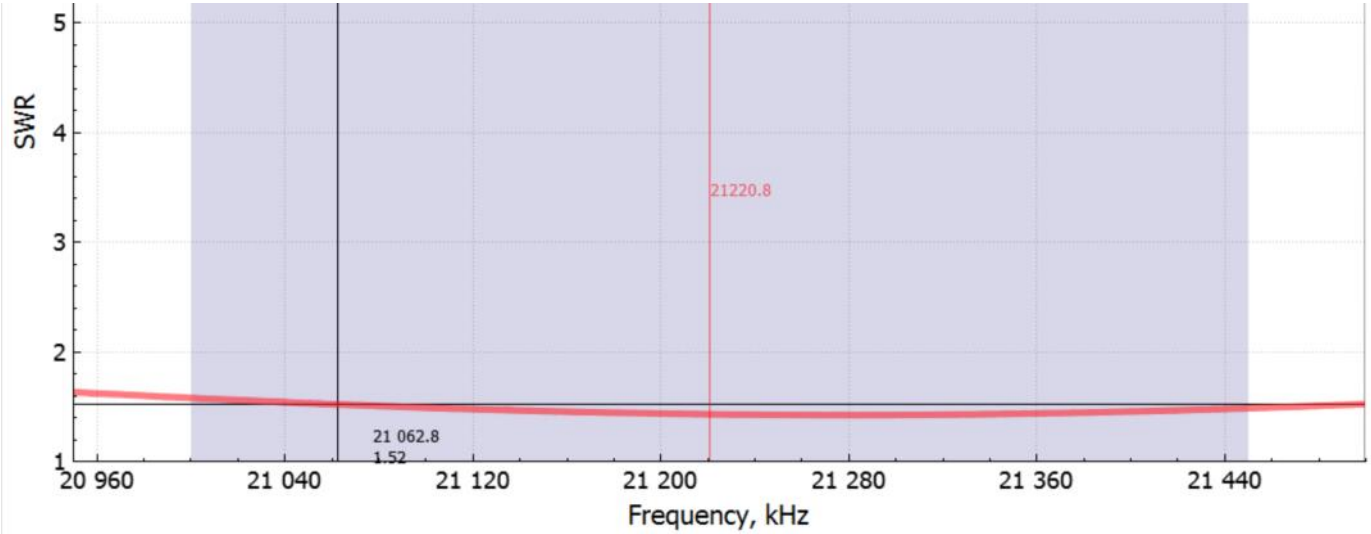
Above. 20 m half wave end fed antenna SWR curve. The SWR is under 2:1 up to 14.09 MHz. A little extra trimming could move the minimum SWR to 14.150 which would be a good compromise.

END FED 40/20 M ANTENNA
APC lockdown project #8 cont'd



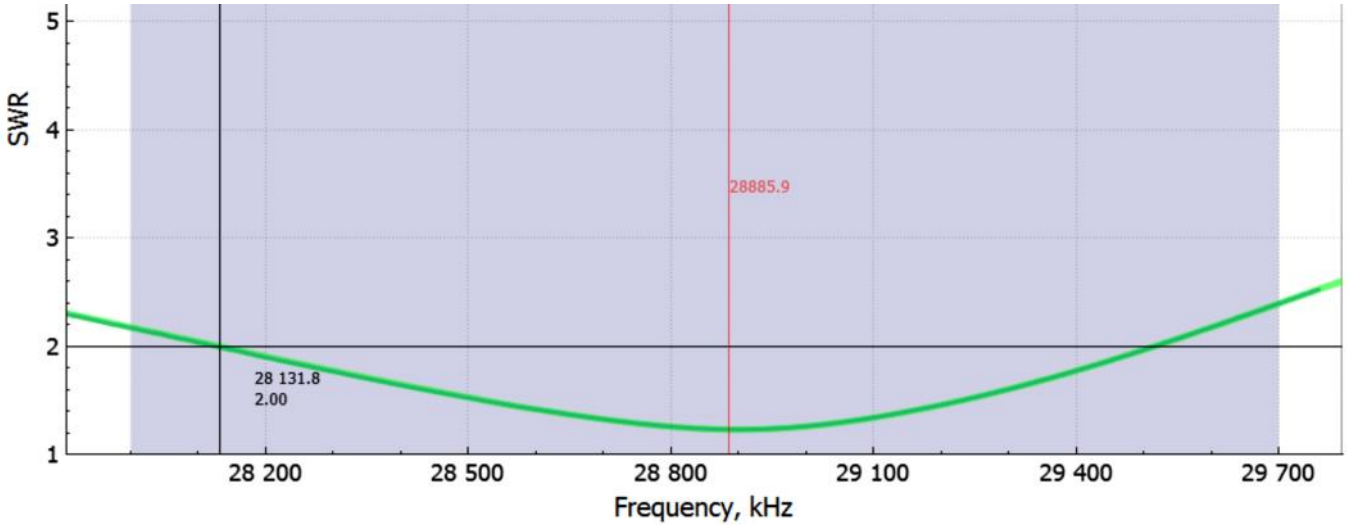
Above. 20 m full wave end fed antenna SWR curve. The SWR is under 2:1 up to 14.23 MHz. A little extra trimming could move the minimum SWR to 14.150 which would be a good compromise but this would affect 15 m and 10 m.

END FED 40/20 M ANTENNA
APC lockdown project #8 cont'd



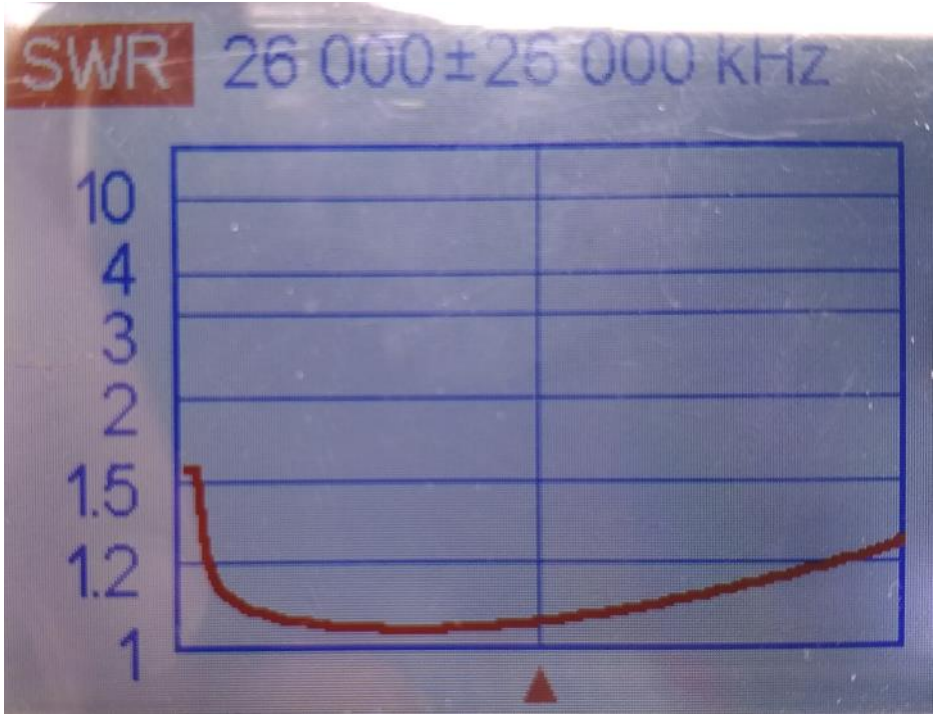
Above. 15 m three half wave end fed antenna SWR curve. The SWR is under 1.6:1 over the whole band.

END FED 40/20 M ANTENNA
APC lockdown project #8 cont'd



Above. 10 m two full wave end fed antenna SWR curve. The SWR is under 2:1 over the most of the band. It's a bit higher than desirable in the CW section.

END FED 40/20 M ANTENNA
APC lockdown project #8 cont'd

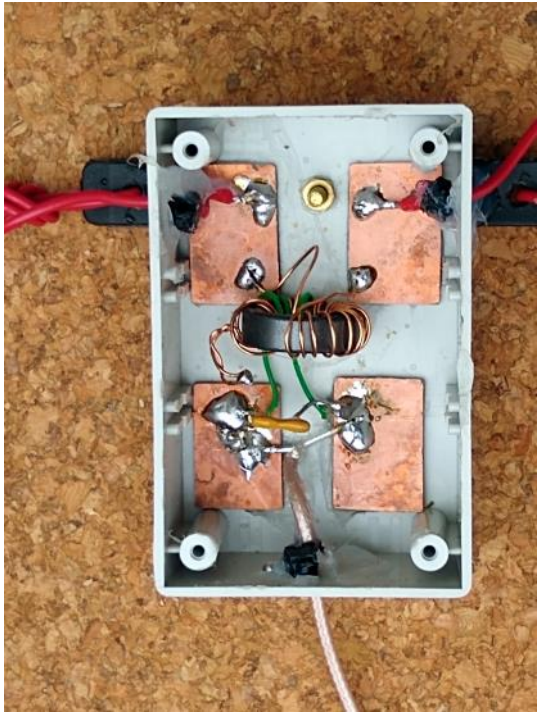


Left: The matching transformer was tested with a 2,500 ohm load and showed a good match to 50 ohms over the whole HF spectrum plus 6 m.

END FED 40/20 M ANTENNA
APC lockdown project #8 cont'd

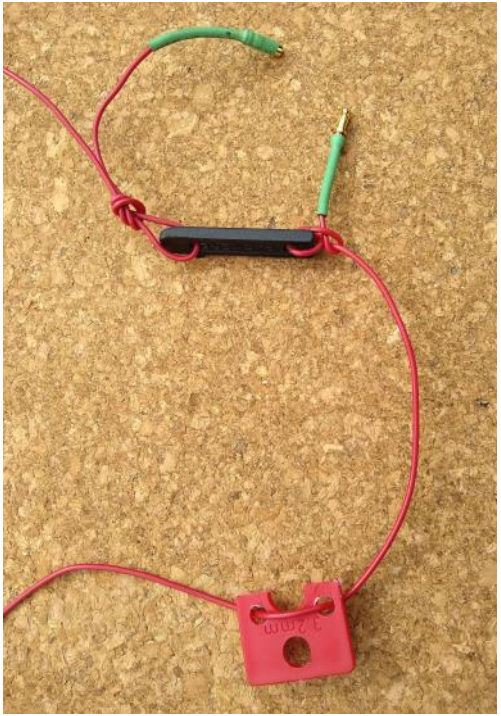
Right. The matching transformer is mounted in a small plastic jiffy box. The connections are soldered to small sections of pcb material held in place with silastic. Cable tie are used to prevent the wires and coax being pulled out of the box along with a generous blob of silastic. The 100 pF silver mica capacitor is soldered across the coax winding. It has a 500 v rating.

The strain of the antenna is taken by a plastic insulator held to the back of the box by a brass nut and bolt plus silastic. This arrangement is practical and allows for experimentation



END FED 40/20 M ANTENNA
APC lockdown project #8 cont'd

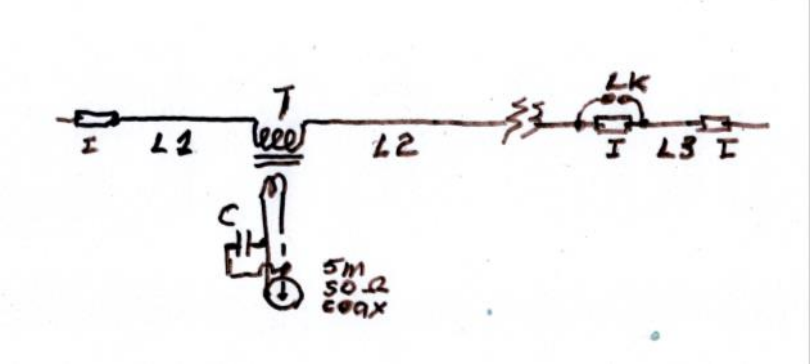
Lower Right:
Mast attaching insulator. The wire locks in position when it is under tension. Drill centre hole to fit the squid pole or other support.



Upper Left.
Typical link arrangement. Light weight plastic insulator with wire tied through clearance holes. The knot adds a tiny bit of inductance which is negligible at HF. Allow 40 mm of wire for the links., more of the knot has a large loop incorporated.

Alligator clips, automotive spade connectors or dc interconnecting plated pin and socket as shown all work well for the link.

END FED 40/20 M ANTENNA
APC lockdown project #8 cont'd



C is a 100 pF 500 V silvered mica capacitor.

SUGGESRED DIMENSIONS FOR 40/20 OPERATION.

L1 = 1.750 m
L2 = 18.500 m
L3 = 0.500 m to 1.000 m

Adjust L2 for best SWR at 7.1 MHz to 7.15 MHz with link LK open. Close link and adjust L3 for lowest SWR at 14.100 MHz to 14.200 MHz.

The core is an FT82-43 from Mini Kits. https://www.minikits.com.au

The primary is 4 turns of insulated #26 gauge copper and the secondary is #26 enamelled wire with 24 turns.

END FED 40/20 M ANTENNA
APC lockdown project #8 cont'd

The completed prototype on its winder.
The larger winder is designed for easy and rapid deployment. The cover was put on the Jiffy Box after the photo was taken.

LOOKING AT THE ICOM IC-705

This article is an expansion of the review published in AR issue 4 for 2020. A tabular comparison of some selected parameters is at the end of the text.

The IC 705 is the latest fully featured portable transceiver on the market. This article compares it to other 5W to 10 W class transceiver on the Australian Market. These are The KX2, KX3, RS918 mcHF clone and FT818. It looks more expensive until GST and delivery costs are added for the Elecraft range.

Although having a different shape to the FT817/818 it is roughly the same weight and volume. It also covers the same bands and modes and both do it at full power. The KX3 does have 6 m and as an option 2 m but only at 3 W.

The 705 uses DSP technology which expands the functionality of the transceiver compared to the analog FT817/818. This enables it to have all the functions you get with an IC7300 base transceiver plus full D-Star capabilities

You can connect to the rig via USB or Bluetooth and use an android phone to control the transceiver. The use of Bluetooth heaphones seems a useful thing for portable operation.

LOOKING AT THE ICOM IC-705 CONT'D

There is a SD card slot (card is user supplied) to record QSO's on and to use for setting up memories and setting backup.

It has a bigger screen than possible competitors, the same as in the popular IC7300 which helps those with less than perfect vision. The screen is bright enough for outdoor use. It has a decent spectrum and water fall display. The span can be adjusted from a few kHz either side of the operating frequency up to 500 kHz either side on UHF. No aliasing or internal spurs were detected in a weeks use.

The RS918 does show some signals on the waterfall/spectrum display that cannot be tuned but lurk there mimicking a carrier down the band.

The FT818 has a primitive spectrum display.

I find the waterfall display especially useful for monitoring activity while operating.

LOOKING AT THE ICOM IC-705 CONT'D

For D-Star users it has full capability.

It has a standard hand held radio clip-on battery (BP-272) which can be charged whenever the transceiver is connected to a power source or it can be unclipped and charged in a standard charger. It's adequate for several hours of operation so enough for most Park activations or maybe three typical SOTA activations. When running on it's own battery the power level defaults to 5 W.

An inbuilt battery management system charges the attached battery from any 13.8 V external supply and switches off charging when the battery is fully charged.

The external voltage is specified as 13.8 V +/- 15%. However the full 10 W power is not maintained once the supply drops below 13 .0 V which is a pain, and not what I expected. At 12.0 V the output has fallen to just over 8 W. The transceiver automatically switches to 5W and internal battery as the battery voltage drops further.

The speaker is forward facing which makes for clearer audio. This tiny speaker does a surprisingly good job. Of course you can use the supplied speaker-microphone or your favourite headphones.

LOOKING AT THE ICOM IC-705 CONT'D

The controls are a nice mix of buttons, knobs and menu items similar to the IC7300 and is an advance on the IC7100.

I have used it on SSB, and CW on HF and FM on VHF and it is a delight to operate.

The audio with the small supplied microphone has been reported as very good with a slight edge. Not a bad thing for HF comms. The supplies Speaker Microphone handset has two user programmable buttons and an up and a down button.

I was intrigued by the self-setting of the internal clock against the inbuilt GPS. I was not sorry to avoid the button pushing exercise to set the clock and it means my logged times will be more accurate.

To date I have only been able to use it in the back yard and the shack because of Virus restrictions. It has a big rig feel about it and 10 W is quite a useful power level. Build quality seems good as might be expected from Icom.

LOOKING AT THE ICOM IC-705 CONT'D

The bigger screen allows a comprehensive metering display. I can see not only power out and SWR but key down current (just over 2 A at 10 W), voltage and temperature.

If there is a problem with the battery or the rig getting hot it shows up on the screen.

I found it necessary to tilt the rig back or to elevate it so the tuning knob can be more easily turned. It has a standard camera screw mount on the base so it can be tripod mounted plus four tapped holes to fix it on a plate.

It's easy to adjust the mic gain and compression levels for SSB and to dial up the keyer speed on CW. The CW memories are very similar to earlier Icom rigs and easy to program.

One thing is missing. An inbuilt ATU. Both the KX2 and KX3 have these but not the RS918 nor the FT818. I have two LDG tuners that I use for SOTA and one of these has been adapted to be a companion to the IC705. I have seen a video of a 705 being disassembled and there is no room inside for an ATU.

LOOKING AT THE ICOM IC-705 CONT'D

I would have liked to have seen a CW decoder as per the Elecraft K2 and K3 or the RS918/ mcHF transceiver. While it only works under good conditions it can save some writing down.

Questions have been raised about the use of a touch screen on cold mountain tops. It is a resistive sensing screen so it should not be affected by high humidity or cotton gloved fingers. Mittens would present a challenge. I haven't had problems with a similar screen on an IC7100 on activations.

Frequency drift has also been raised as a possible issue for digital mode users. In standard form it is better than the others in this comparison. The internal GPS could have been connected to a stabilising chip for the reference oscillators. However if the set is given some protection from direct sunlight and breezes it should be stable enough for JT65 even on 70 cm if the power used is 5 W. Certainly there should not be issues with FT8 on HF. The observed drift is well within the specified limits. The FT817 was often GPS locked with an add-on board so may remain the transceiver of choice for the microwave EME brigade.

It has been suggested it can be used as a hand held walky-talky but 1 kg is a bit heavy for my arthritic wrists and a long QSO. The Elecraft KX2 however could qualify for that role.

LOOKING AT THE ICOM IC-705 CONT'D

Other useful features such as noise reduction and the selection of filters are state of the art.

I have not experienced receiver overload on the amateur bands. The RF gain can quickly be reduced if the over range message comes up or an attenuator switched in. I have seen the over range message on the AM broadcast band. The RS918 does need more attention to the rf gain to avoid overload and on the rare occasions I suffered from overload on the FT817nd the attenuator solved the problem.

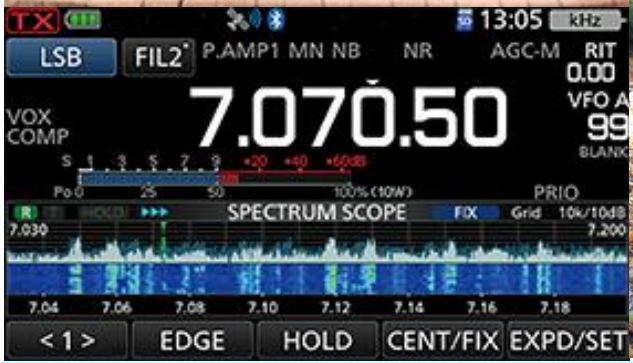
The IC-705 has raised the bar for highly featured small portable transceivers. Some new purchasers have decided to add a PA with tuner and keep it in the shack and buy a second one for portable use. The Xiegu XPA125B 100W HF Power Amplifier + Auto tuner ATU is popular as are amplifiers from HardRock and Elecraft.

A software update is now available from Icom. It deals with a minor battery charging indication issue.

Note: The RS918 is hard to specify as it cam be updated weekly to suit the owner. I have used common specifications.

VK3AFW purchased his rig from Strictly Ham

LOOKING AT THE ICOM IC-705 CONT'D



LOOKING AT THE ICOM IC-705 CONT'D

Portable QRP Transceiver Comparison

Parameter	KX2	KX3	IC-705	RS918	FT818
Tx Frequency Bands (m)	80 , (60), 40, 30, 20, 17, 15, 12, 10	160, 80 , (60), 40, 30, 20, 17, 15, 12, 10, 6, 0ption for 2m @3W extra cost.	160, 80 , (60), 40, 30, 20, 17, 15, 12, 10, 6, 2, 0.7	160, 80 , (60), 40, 30, 20, 17, 15, 12, 10,	160, 80, 40, 30, 20, 17, 15, 12, 10, 6, 2, 0.7
Modes	USB, LSB, CW, AM, DATA	USB, LSB, CW, AM, FM, RTTY	USB, LSB, CW, AM, FM, RTTY, DATA, Dstar. WBFM rx only.	USB, LSB, CW, AM, FM, RTTY	USB, LSB, CW, AM, FM, RTTY

LOOKING AT THE ICOM IC-705 CONT'D

Parameter	KX2	KX3	IC-705	RS918	FT818
Transmitter power	Up to 10 W	Up to 15 W	0.5 to 10 W, AM 0.25 to 2.5 W	Up to 15 W, 8 W 12, 10 m.	Up to 6 W
Memories	100 +	100 +	800 normal	None	200 regular
Power supply	7.4 V internal 13.8 ext.	7.4 V internal 13.8 ext.	7.4 V internal 13.8 ext.	7.4 V Internal if fitted, 13.6 Ext	9.6 V internal 13.8 ext.
Max Tx current	2 A typical	2 A typical, 10 W	< 3 A at 10 W	3.5 A at 15 W	2.4 A at 5 W
Max Rx current	> 0.135 A	> 0.18 A	0.5 A	0.45 A	0.45 A

LOOKING AT THE ICOM IC-705 CONT'D

Parameter	KX2	KX3	IC-705	RS918	FT818
Dimensions, mm	147 x 71 x 38	188 x 89 x 43	200 x 83.5 x 82	190 x 70 x 40	138 x 38 x 165
Weight	0.369 kg	0.680 kg	1.1 kg	0.63 kg	0.90 kg without battery
Internal Battery	Yes	Yes	Yes	Not all versions have the battery	Yes
Inbuilt ATU	Yes	Yes	No	No	No
Inbuilt mic., speaker	Inbuilt mic., speaker	Speaker	Speaker	Speaker	Speaker
Filters	DSP 50 to 4,000 Hz	DSP 50 to 4,000 Hz	DSP 3 per mode, Band Pass adjust	DSP 3 Selectable from 9	Amalog SSB and optional CW

LOOKING AT THE ICOM IC-705 CONT'D

Parameter	KX2	KX3	IC-705	RS918	FT818
Noise blamker	Yes	Yes	Yes	Yes	Yes
Digital noise reduction	Yes	Yes	Yes	Yes	No
PA control	Yes	Yes	Yes	Yes	Yes
USB port	No	No	Yes	Yes	No
GPS inbuilt	No	No	Yes	No	No
Bluetooth en-abled	No	No	Yes	No	No
Direct RF sampling	DSP	DSP	To 25 MHz.	DSP	Analog
Spectrum and Waterfall display	No	No	Yes	Yes	Very basic
Home station functions	Some	Some	Yes	Some	Some
Micro SD card slot	No	No	Yes	No	No

LOOKING AT THE ICOM IC-705 CONT'D

Parameter	KX2	KX3	IC-705	RS918	FT818
Frequency Stability	1 ppm typi-cal	1 ppm typi-cal	< 0.5 ppm	1.5 ppm std.	0.5 ppm
Clock	Yes	Yes	Yes, GPS sync.	Yes	No
Price AUD as at 26 October 2020	$1,825 plus freight and GST	$1.641 plus freight and GST	$1,849	$839 approx	$950

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