

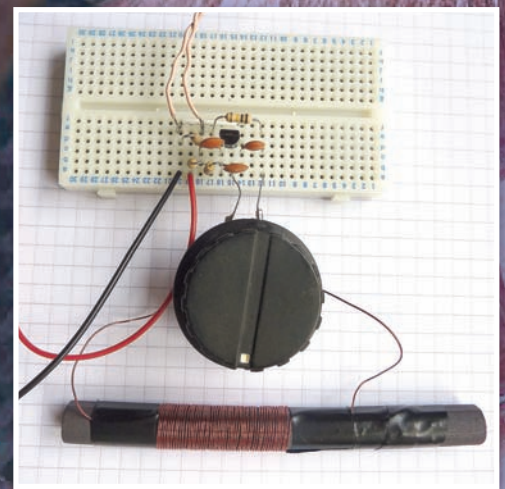
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YouKits FG-01 SWR Analyser

Our Technical Editor, 'Tex' Swann G1TEX gets to grips with a new, small s.w.r. analyser from the YouKits stable.

I'm always fascinated by the various devices that are around to show the matched state of antenna systems.

Like many other Radio Amateurs, I started out with a dip meter that showed the frequency that the system was resonant at, but not how good the matching was. I then progressed on to a unit that just indicated the standing wave ratio (s.w.r.), which was followed by a hand-held unit with two meters – one for s.w.r., the other for an approximation of impedance.

These later units were followed by smaller models that needed a computer to show the system variations with frequency. Their 'tethered' state was offset by the amount of information that could be gathered from the displayed data.

The subject of this review is a hand-held unit, that although displaying less information than the computer-based type, has reverted to being a stand-alone unit with a built-in colour display. The type that I'm looking at is an early production model, and will change slightly when the full production one becomes available. And although its operation is effectively complete – it doesn't have the rechargeable battery fitted. So, I was provided with a small external power supply to undertake the review.

The Analyser

So, what does the YouKits FG-01 Antenna Analyser consist of? The first impression is that when it's compared to previous units – it's tiny! It's a mere 35mm deep box measuring just 55mm wide and around 97mm high, excluding knobs and projecting sockets. The display is some 30mm square, just above the one control knob, which due

to the small size of the unit, gives the impression of being rather larger than it really is.

The unit's one control is a rotary encoder with a push-to-switch action and all functions are controlled either by rotation of pressing this control. The only other item on the front panel is the **On/Off** switch.

When I first switched it on the multi-colour display came on within a couple of seconds. It displayed a clear s.w.r. plot with a coloured legend for numerical values of s.w.r., green for values up to and including 2.0:1 and red for values above this point. There's only a central vertical line to indicate the centre frequency ('CF:') of the sweep.

Centre Frequency

The centre frequency may be set to between one and 60MHz and is displayed – to a resolution of 1kHz – as yellow text directly under the centre line. The maximum frequency of the oscillator is 60MHz and the frequency will not go beyond that value. Neither will it go below 1MHz.

Under the centre frequency and displayed in white text, is the 'edge to edge' sweep (SW:) of the plot. This can have values of 50, 20, 10, 5, 2 or 1MHz, or smaller sweeps of 500, 200, 100, 50, 20 or 10kHz. There's one more setting, that shows 0kHz, allowing the output to be set for use as a signal generator or s.w.r. display at just one frequency.

The third line of text, shown under the two frequency lines, is of the s.w.r. at the centre frequency. The text in this instance changes with the s.w.r., green for less than 2:1, red for values above this level, so, mirroring the s.w.r. display. And finally in the low right



The YouKits FG-01 SWR analyser showing the variation of s.w.r. to be found in a typical multi-band antenna.

hand side of the display, is the supply voltage, so allowing you to monitor the battery voltage.

A momentary click of the switch function of the control toggles a small green triangle between the CF: and SW: lines of text, showing where changes will take place, when the control is rotated. When the CF: line is active a longer press of the control, will cause, one of the characters of the frequency setting to change to a red colour.

Then, rotating the control will cause the red coloured character to move left or right, indicating that steps will be in 1, 10, 100 or 1000kHz (1MHz) steps. A momentary click returns the control to its frequency setting mode, with the step rate controlled by the last setting.

When the SW: line has the green active triangle against it, a longer press of the control saves the centre frequency, step and sweep settings to memory for the next time you switch on. Set up your favourite band and sweep width for instant use on switch-on!

In use, I found that the display, though small was very clear, and gave a bright, clean indication of the s.w.r. over the swept range. Bear in mind though, that there can be some small 'wobbles' on the otherwise smooth curves of the plot. I suspect that these

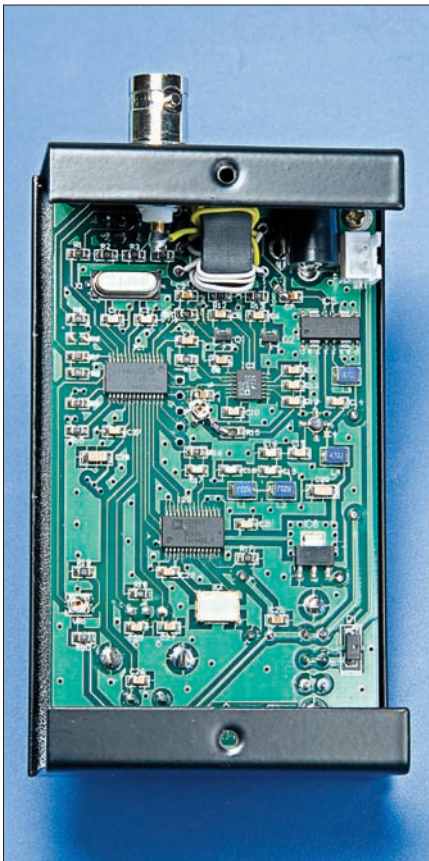


Fig. 1: Inside the YouKits FG-01 SWR Analyser, as you'd expect with such a small unit, it's mainly surface mount components.

are to do with the stepping of the direct digital synthesiser (d.d.s.) oscillator.

Inside The FG-01

I suggest that you now take a look at the picture of the insides of the FG-01, as shown in Fig. 1. As you'd probably expect, with such a small unit, it's almost constructed from all surface-mount components. The direct digital synthesiser (d.d.s.), and its crystal oscillator are centrally mounted low down on the main board. The output feeding a low-pass filter.

After the low-pass filter, there's a small 'chip' amplifier, followed by what appears to be a larger dual amplifier feeding the sensing transformer – the largest component on the board. The signals are thus fed out via a 50Ω BNC socket to the antenna system under test. This would probably mean that most users would need to source a BNC to SO-239 adapter or patch lead.

The unit has a 'healthy' output of between 4mW at 1MHz, falling to a little over 2mW at 60MHz into a 50Ω matched load. So, it's perhaps, wise to minimise the time that readings are taken on your antennas as even a few milliwatts can travel a long way to cause interference.

Just below the sensing transformer is the associated measurement chip (AD8302). This feeds all the levels back

to the main controller to carry out the calculations and display the results.

The final components on the board would appear to be the microprocessor and it's associated 'clock' crystal that controls the whole game. The socket for the battery is visible on top-right on the board shown in Fig. 1.

How Did It Perform

So how did the FG-01 perform? To answer that I have to say without hesitation – "Very well indeed!" The heading shot shows my antenna system over a sweep width of 20MHz, centred on 21MHz. As you can see the antenna system shows commendably low s.w.r. readings on both 14 and 21MHz, though faring rather less well on the 28MHz band.

By reducing the sweep width and changing the centre frequency settings, I could take better and more detailed readings of these or other bands. Incidentally, all of these were almost instantly displayed on the front of the hand-held unit.

I'm unable to comment on battery life as the unit I was playing with was so new, it didn't have one fitted. But when running it on the power supply, it became pleasantly warm to the touch after an hour or so. This fact alone would lead me to guess that battery life would probably be in the area of a couple of hours continuous use. However, this would be very dependent on the actual capacity of the battery pack fitted.

Finally, I can say that I'd be more than happy to add this unit to my armoury of antenna test equipment available to use when I have a go at h.f. antenna building and adapting! My thanks go to **Jeff Stanton G6XYU** of **Waters & Stanton PLC** for the loan of the review unit. ●

Supplier

Waters & Stanton plc
Spa House,
22 Main Road,
Hockley,
Essex SS54QS
Tel: 01702 204965
E-mail sales@wsplc.com

Pros

Small and very handy
easy to use after a few minutes with reference to an instruction book.

Cons

Display, though clear is quite small
Need to source a BNC to other socket adapter

My thanks go to Waters & Stanton for the loan of the YouKits FG-01 SWR Analyser for review. It costs £219.95 + £5 p&p.

Provisional Specifications

Overall Size	55 x 97 x 35mm (excluding knobs and sockets)
Controls	On/Off switch Rotary controller with push-to-make switch
Display	30 x 30mm multi-colour I.c.d. Shows s.w.r. graphically over the sweep range against a numerical scale, and numerically at the centre frequency separately
Frequency range	1 - 60MHz centre frequency
Frequency control	1, 10, 100, 1000kHz steps
Frequency sweep	50, 20, 10, 5, 2 or 1MHz, or 500, 200, 100, 50, 20, 10, 0kHz
Frequency accuracy	Not stated

Review of the FG-01 Antenna Analyzer By Youkits.com by Fred Lesnick VE3FAL

The Youkits FG-01 Antenna SWR Analyzer that covers 1-60 MHz arrived in my mailbox from China tightly and neatly protected by bubble wrap packaging. The unit when unwrapped is a rugged looking piece of test equipment. I quickly downloaded the manual from www.youkits.com and read over some of the features and setting for this unit. Once I was sure I read enough I set up a small 12v battery pack with connector (center positive) to use with the FG-01.

When I turned the unit on I was pleasantly surprised by the very bright and detailed display. Although small, the display is very easy to read and look at. The graph can be set up for whatever bandwidth you wish to see on your antenna. It also shows you the battery voltage, center frequency (CF), and SWR as well as impedance at CF. The unit needs a good 10-12v power supply and will deplete quite quickly as the unit draws a fair bit of power. There is also a optional lithium battery that can be purchased with the unit. The bandwidth can be adjusted by quickly pressing the tuning knob and adjusting your steps from 100KHz-50MHz and then pressing the tuning knob to save your custom setting. The center frequency (CF) is adjusted in the same way and can be set from 1KHz-1MHz and then saving your settings. The FG-01 will also show multi resonant plots of the antenna that you are testing. The unit has a BNC connector on top as well as the external power jack. The front has the display, ON/OFF switch and tuning knob. The case is black with bold white lettering on it.

I used it in the field for JOTA and it made antenna tuning a snap. Being small and light weight it will fit in your jacket pocket or backpack with ease. I have used it for tuning vertical antennas as well as dipoles with great success.

I have used the MFJ models as well as the Autek units but really like the size of the FG-01 as well as the display with all the information shown on one screen, makes tuning fast and easy at home or in the field. For HF only this unit has lots of potential and should be in everyone's antenna erecting kit.

