Test and Review: JinHan JDS2012A Scopemeter

Price Paid: $109.00 w/free shipping

Description: This is a combination single-channel Digital Storage Oscilloscope and Basic DMM, boasting a scope frequency response of 20MHz. Comes with a nice carry case, DMM and O'scope probes, a disc with the manual (and several other models), a mini-USB charging cable, and a ball-point pen for your shop with all Chinese markings on it. At first, I thought the pen was a stylus.

PROS:

- Fairly easy to figure out but for some things you WILL have to read the manual or glean from this review.
- Bandwidth extends well beyond 20MHz – in fact, this scope can measure the 44.93MHz 1st IF frequency of a TS-930S. Displays the signal frequency accurately as long as you use AUTO mode.
- The frequency being displayed generally agrees with my frequency meters, and the display on my FeelTech signal generator.
- Shows the P-P voltage, plus and minus voltages, duty cycle, and frequency.
- The trigger circuit on this scope is quite stable. Choices are Edge, Slope Falling, Source, and T-Mode (Auto).
- The Digital Multimeter is accurate, and it has a very large and easy to read green display.
- Build quality is unusually solid for such an inexpensive meter. If you told a friend that this cost $299, he would probably believe you.
- Comes with a full set of probes. I scoffed at them at first, but the O'scope probe is actually decent. The DMM probes are just OK.
- This is a digital storage scope. You can easily save a waveform by pressing the "OK" button, and you can also record a series of measurements.

CONS:

- In order to get an accurate frequency, P-P voltage, and duty cycle, you must use AUTO mode. Basically, the horizontal sweep speed must be fast enough that the wave being displayed resembles a low-frequency sinusoid. If you or the scope can easily count the peaks, it will accurately display the frequency.
- The supplied battery charger is almost worthless but fortunately, they supply a nice USB cable that charges both batteries equally in short order. One battery is actually a spare.
- The spacing for the DMM probe sockets is non-standard, so you can't use those convenient BNC-to-banana plug adapters.
- The DMM only measures capacitance to 100uF, and the forward voltage reported during diode testing is lower than that shown by my other meters.
- The DMM probes are just OK, and they don't have threads so that you can screw on accessories like alligator or J-Clips. But other 4mm probes fit. I used my Amprobe probes during my testing.
- You can't charge this and use it at the same time. The manufacturer claims that might damage it. But it charges quickly, and the batteries last a long time.
- According to the manual, you should not leave the scope lead ground connected while you use the DMM test leads,

Bottom line: If you're looking for a basic Oscilloscope/DMM combo, this might be a good choice. It's no match for a Fluke handheld or a bench scope, but then it's as inexpensive as many DMM's alone like the Amprobe AM-570. For $109 to $125 (direct from China), you almost can't go wrong. This handy device is accurate enough for HAM radio use. I plan to feature it as I write the "Anatomy of a TS-930S Signal Unit". I've already scoped out all the signals on my test board and I adjusted the Transmit IF for max with it.

REVIEW

Despite the fact that I have two good Tek bench scopes (analog and digital) I've been yearning for a handheld scope for several years. I found myself looking at auctions for used Fluke 97's which can be had for around $200-$225 on eBay in good condition but with some wear and tear. But those are hard to find and I wanted something cheap and readily available that almost any HAM on a budget could buy.

The one I bought is the JinHan JDS2012A. I didn't opt for the dual-channel version (JDS2022A). I wanted the convenience of a Scope AND a DMM, since I plan to use this for both HAM radio and occasional automotive work.

The charger isn't shown in this picture, but it only charges one battery at a time, and mine came with round European plugs instead of US. So it's basically worthless. The scope meter runs on one battery – the other one is a free spare!

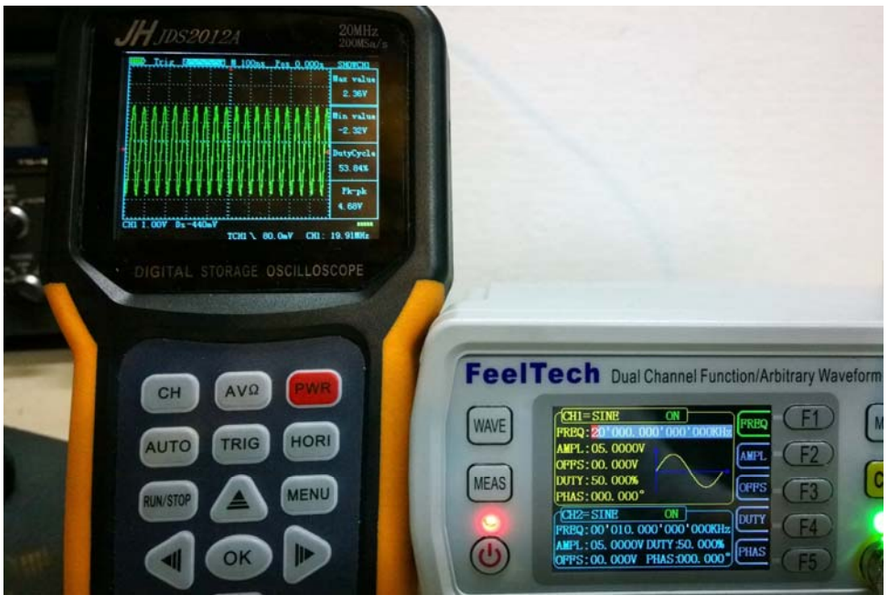
The meter arrived a bit sooner than I expected. Packaging was basic – a padded mailer with a blue & white retail type box inside. The box was a bit disheveled, but the meter survived.

Since the most important feature on this device is the scope portion, I'll look at that first. The manufacturer claims a bandwidth of 20MHz, and a 200 Megasample/second speed. The specs in the manual are all over the place here, so I'll summarize: The maximum vertical sensitivity is 10.0mV/Div. Not as good as a Tek or other bench scope (typically they go down to 2.0mV/Div), but good enough for a handheld instrument. The horizontal sweep can go up to 10.0 ns/div, which is pretty competitive. In fact, my Tek 2235 bench scope only goes down to 0.1 uS, which is 100 ns/div. In AUTO mode, the horizontal sweep is fast enough to show a 60MHz signal as a sinusoid whose peaks can be counted with the naked eye. Wait a second – 60MHz?

Frequency

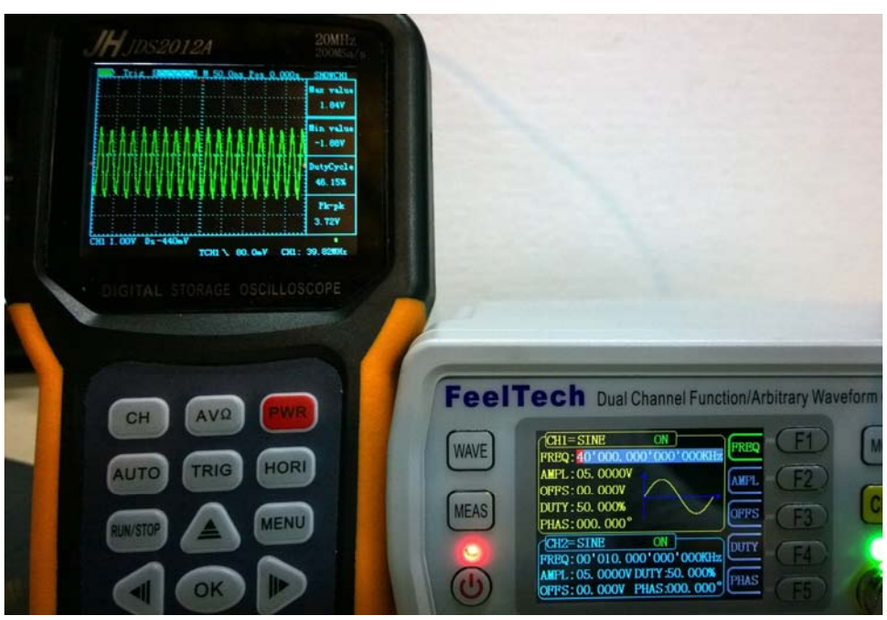
I was hoping that this scope would reach the advertised bandwidth of 20MHz, and I was pleasantly surprised. It went well beyond that. At 30MHz, the response was down by less than 0.1 dB. By 40MHz, it's only down by 1dB. The wave display becomes a bit distorted, but the instrument still reports the P-P voltage, frequency, and other parameters. Thus, you could use this scope to check just about any oscillator or amplifier stage in a HAM rig like the TS-930S. It displays the waveforms and frequencies for all three IF stages, including the 44MHz 1st IF. I used it to adjust the Tx IF cans without any trouble at all. Here are some photos:

20MHz. Note that the frequency states 19.91MHz. I didn't have the scope in AUTO mode.



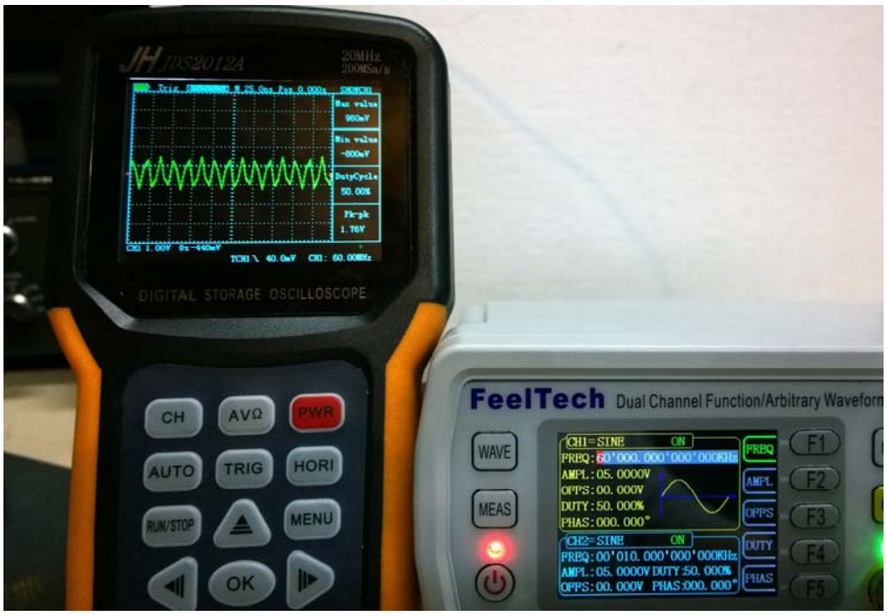
30MHz. It's set to AUTO. Note that the frequency does say 30MHz

40MHz. Yes. Again, a little frequency error. But I'm testing well out of the spec'd range here.

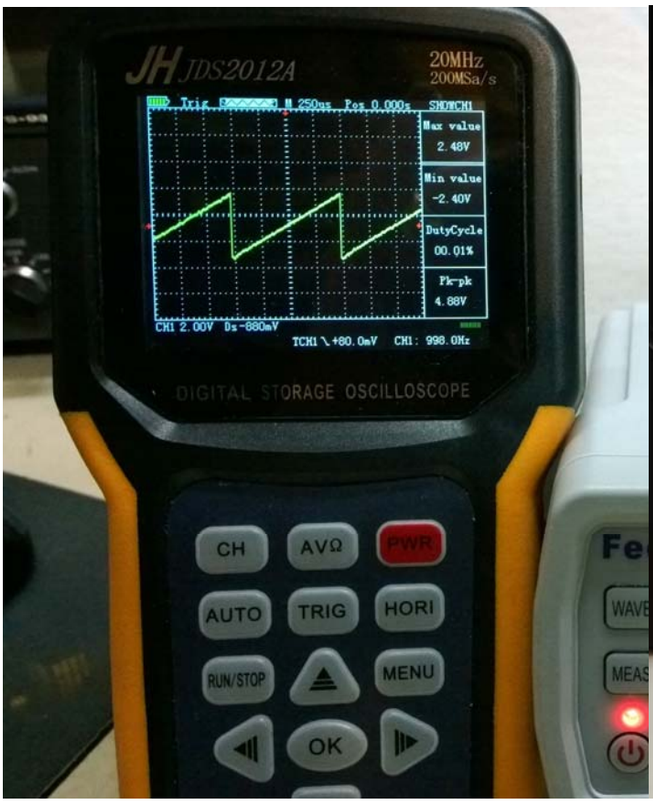


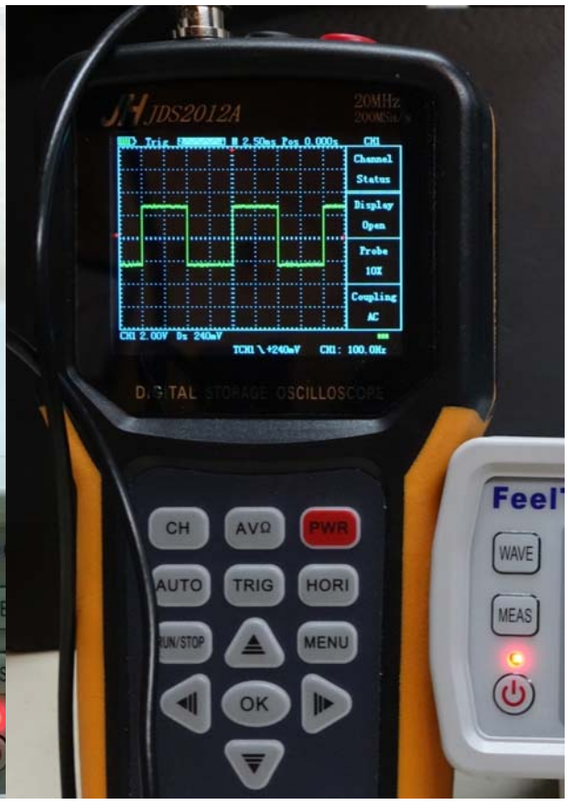
50MHz. It's set to AUTO. Note that the frequency does say 50MHz. The response is down quite a bit now.

60MHz. The limit of the Feeltech. The display is ragged, but the frequency says 60MHz



Obviously, this little scope will display any waveform within or even slightly over its claimed bandwidth.

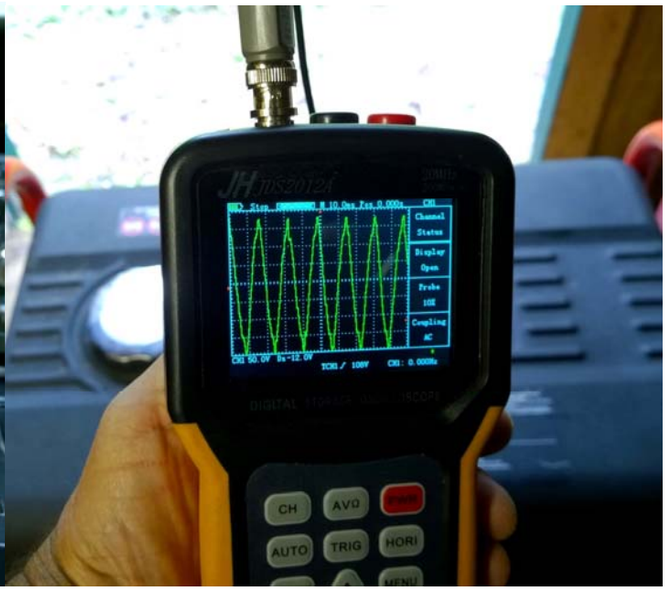




The convenience of having a handheld scope cannot be overstated. And this little thing generally agrees with my more expensive scopes. Here are a couple waveforms from common household power sources.

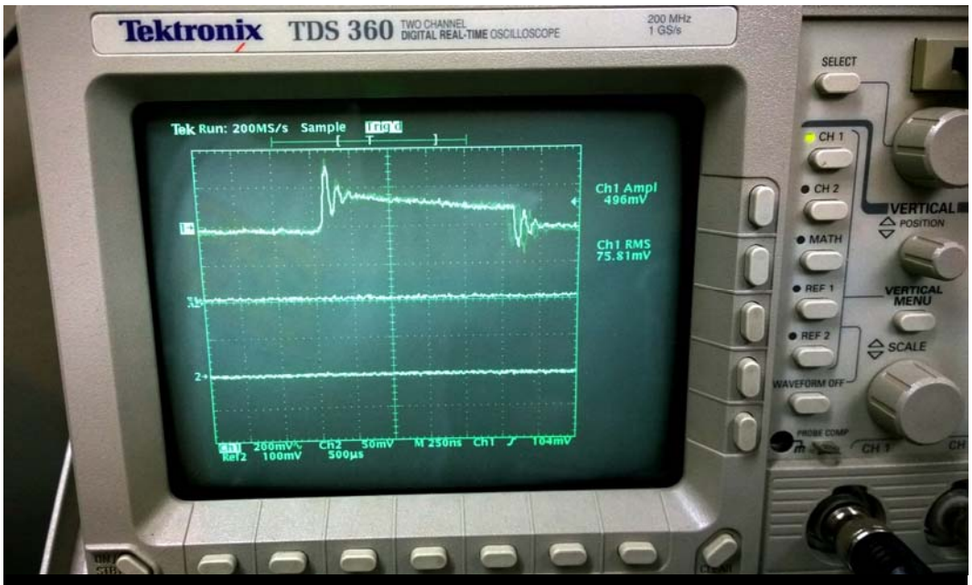
Typical computer UPS “Modified Sine Wave”

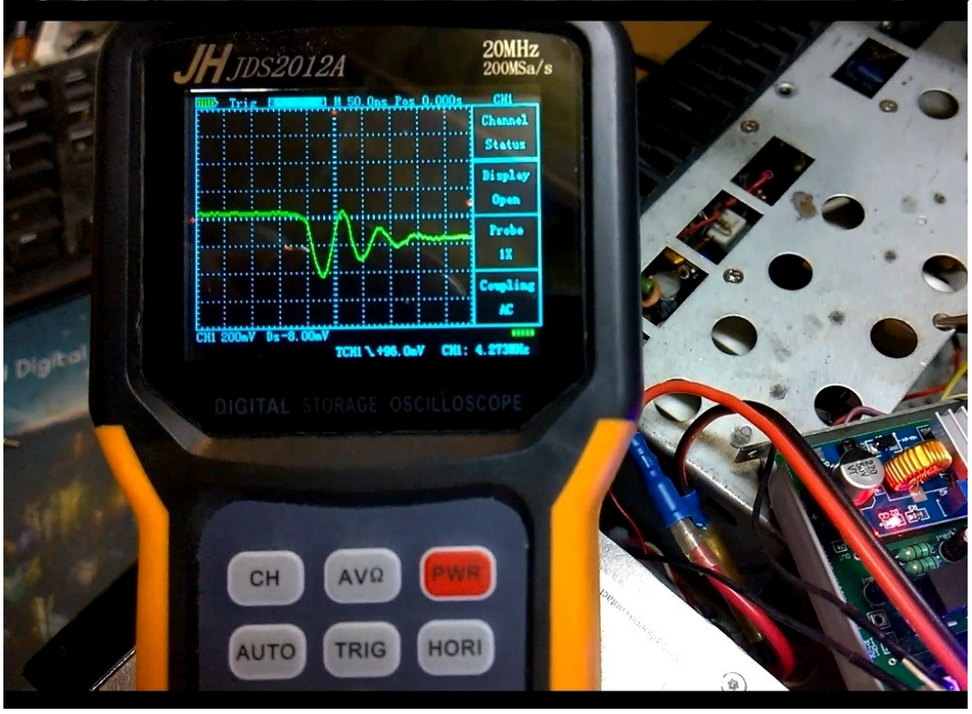
Output waveform from my Homelite generator



I was surprised at the generator sine wave. I expected much worse. The UPS sine wave did not come as a surprise.

One last set of pictures. In this set I’m looking for ripple/interference in the DC output from one of those little 5-volt buck voltage converters. Obviously, the bench scope is more precise, but the JinHan does a good job for the money.





The DMM

The DMM is pretty basic, but it's still useful. The first thing that some will notice is that the probe socket separation is non-standard, so you can't use a BNC adapter. JinHan needs to correct this.

As stated previously, the capacitance measuring capability only extends to 100uF. And the DIODE test, while useful, reports the lowest forward voltage of Any of my DMMs. The diode under test with all four is a 1N3404.

Jinhan 2012A | Amprobe AM-570 | Beckman DM27XT | AstroAI WH5000a

So who is right? I haven't been able to find the forward voltage info on any 1N3404 datasheet. DC voltage tests show that the meter is right on target. The DC voltages came from a Tek DC calibrator. Thanks to the non-standard probe spacing, I couldn't use a BNC adapter to do a direct-connect to my DC power supply. These readings agree with my other three DMMs.

1.0mV | **10mV** | **1.0V** | **5.0V** | **100.0V**

The AC accuracy is good also, considering that the manual does not claim that the meter has True RMS capability. Using a variable AC supply, set at 115.0VAC, The Jinhan's reading of 115.3VAC agrees pretty well with reality here.

Just a few resistance measurements. Perfectly adequate for DIY and radio work. Note the roundoff effect in the third photo.

3.0 kOhm 1% resistor **1.0 MegOhm 1% 1/2W** **377,500 ohm 1%**