Triplett 9055 Review

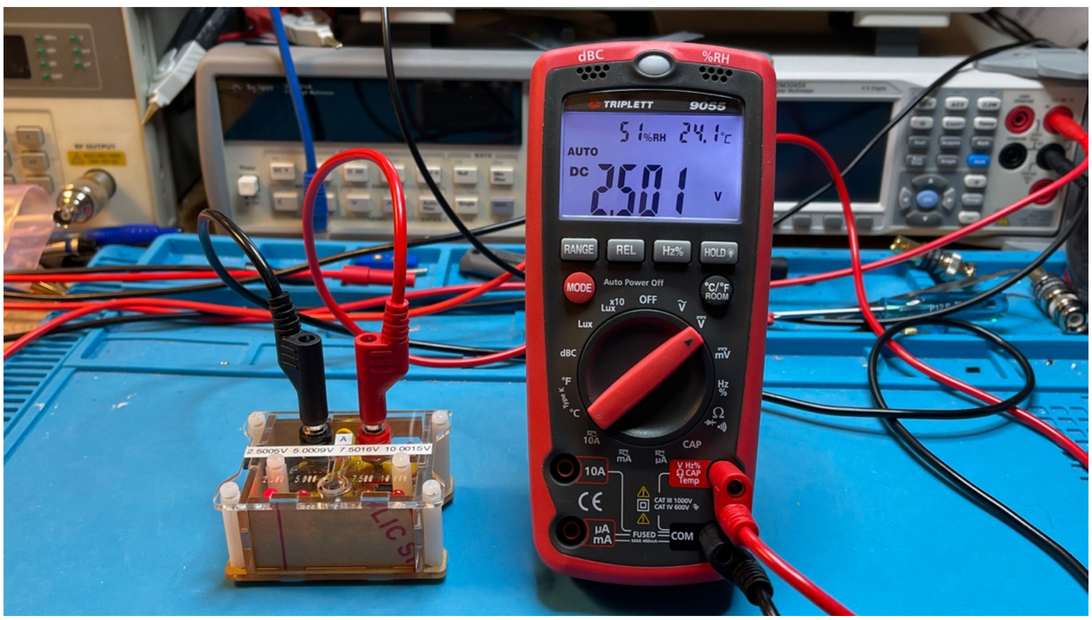
Introduction

Hi, I am Tom, amateur radio call sigh N8FDY. This is a review of the Triplett 9055 multimeter for use in hobby electronics projects primarily related to amateur radio.

Disclaimer

I am not a professional, I am a hobbyist. This review is not sponsored; I bought this multimeter with my own money. I only used and tested this multimeter in CAT I and CAT II environments. I do not have a way to review or test the safety of this meter. I leave the CAT III and CAT IV environments to trained and licensed professionals.   It may seem like I am a Fluke fan boy, but I recognize their flaws along with their advantages. There may be unintended mistakes and/or errors in this review.

Overview



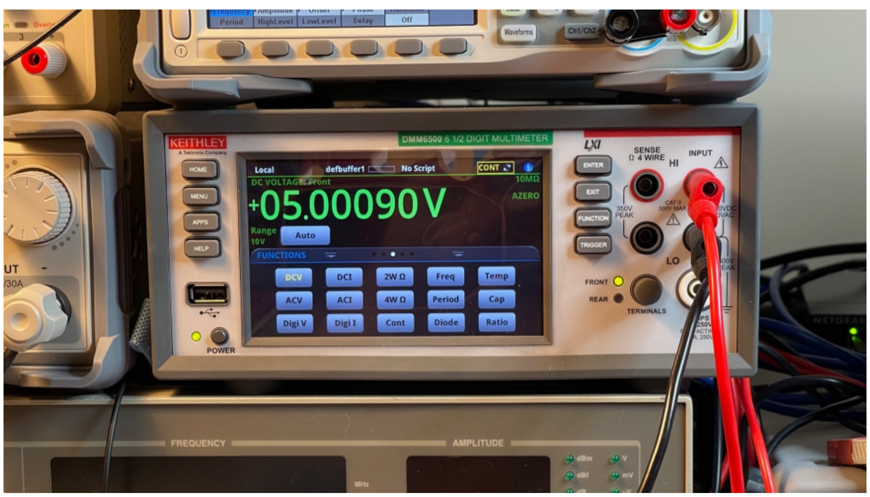
I am testing and demonstrating this Triplett 9055 multimeter that I purchased from the Triplett online store for $90.99. It is a refurbished unit. I only used it in CAT I and CAT II environments.
CAT I is for measurements on circuits not directly connected to mains. For example, battery-operated electronics, or radio gear connected to a 13V DC power supply.
CAT II is for measurements performed on circuits directly connected to 120V (240V in some countries) power outlets at least 15 feet from the distribution panel. For example, your 120V AC to 13V DC power supply or a vintage piece of ham radio gear we lovingly call “boat anchors” that plug into a 120V AC outlet.
First, we will look at the features of the multimeter, then we will look at the accuracy of the meter. We will then go over the ergonomics. We will wrap up with the pros, cons and conclusion.
I will not be using the test leads that came with the meter. I have not liked any test leads that came with multimeters except the Fluke TL175 TwistGuard® test leads that were bundled with the Fluke 87V MAX. I also use Probe Master Series 8000 Test Leads.

Objectives

This review was produced to help you decide if the Triplett 9055 multimeter will fit your purpose and budget. This is part of a series of multimeters reviews.
A good multimeter for hobby electronic projects should be able to measure millivolts, volts, microamps, milliamps, amps, ohms, nanofarads and microfarads.
If you want to measure picofarads, nanohenrys, microhenrys or reactance you will need an LCR meter. I cover the two LCR meters I own in another review.

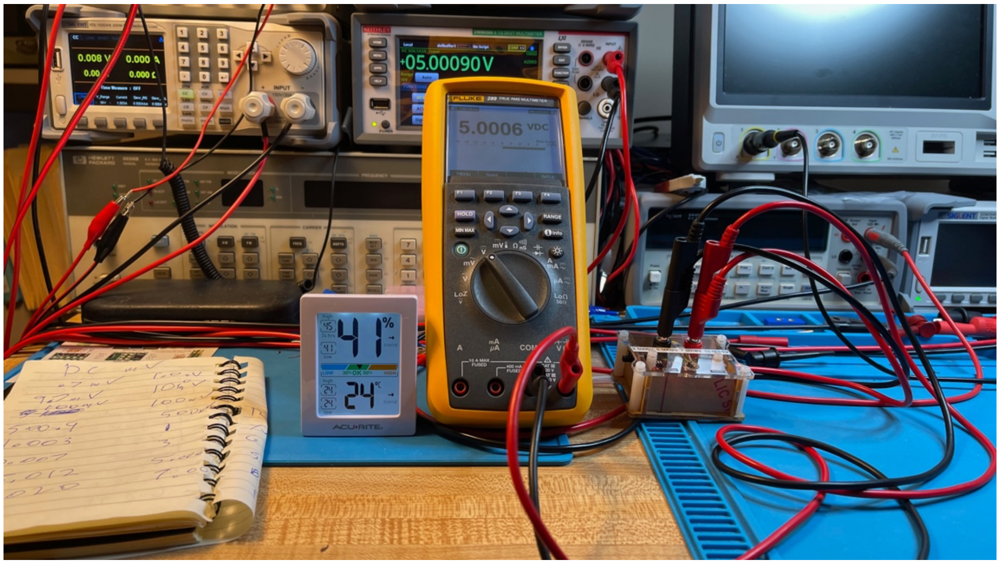
Features

- 4,000 Count
- Basic DC Accuracy ±(1% + 4)
- Hold
- Rel
- Light 1 to 40,000 Lux
- Sound Level 35 to 100dB (C weighting, fast response)
- Ambient Temperature 32 to 122°F (0 to 50°C)
- Relative Humidity 33 to 99%RH
- K-Type Thermocouple
- 9V Battery Included



I do not have reference standards. Instead, I use a Keithley DMM6500 6.5 digit bench multimeter that was calibrated recently to measure voltages, currents, resistances and capacitances. I take a reading from the Keithley and based on the Keithley stated tolerance for that range and reading, I compute the lowest and highest value the reading could be, then I take the meter under test and take a reading. I calculate the meter-under-test reading uncertainty value and subtract it from the lowest value and add it to the highest value. If the reading is within the range of the lower and higher limits, it meets meter-under-test accuracy specification.
For example, I have a voltage source that is 5 Volts. I take a reading with the Keithley and I get a value of 5.00090 and based on the Keithley specifications for that range ±(0.0025% of reading + 0.0005% of range); that value could be anywhere from 5.00072 to 5.00108. I then use the meter-under-test (for this example my Fluke 289, my most accurate hand-help meter) reading of 5.0006. The Fluke 289's accuracy at this range is ±(0.025% of reading + 2 least significant digits) for an uncertainty value of 0.00145015 Volts. So, subtracting this from the lowest value the Keithley reading gives us 4.99927V for the low value limit and adding to the

highest value the Keithley gives us 5.00253V for the high value limit. The meter-under-test reading (5.0006) is within the limits, so the meter under test meets its accuracy target for 5 volts.



DC Volts

Source	Reading	Specification	Uncertainty	Low Bound	High Bound
1 mVDC	1.0	1% + 4	0.014	0.98247	1.01753
10 mVDC	10.0	1% + 4	0.14	9.8562	10.1438
100 mVDC	100.1	1% + 4	1.401	98.5925	101.4075
500 mVDC	500	1% + 4	9	490.9815	509.0185
1 VDC	1.001	1% + 4	0.01401	0.98596	1.01404
3 VDC	3.001	1% + 4	0.03401	2.965865	3.034135
5.009 VDC	5.00	1% + 4	0.09	4.91882478	5.09917523
7 VDC	7.01	1% + 4	0.1101	6.889675	7.110325
10.00148 VDC	10.02	1% + 4	0.1402	9.86098	10.14198
102.8463 VDC	103.0	1.5% + 4	1.945	100.89659	104.79601
202.822 VDC	204.2	1.5% + 4	3.463	199.34489	206.29911
298.18 VDC	299.0	1.5% + 4	4.885	293.27707	303.08293
405.781 VDC	406	1.5% + 4	6.49	399.26877	412.29323
507.847 VDC	509	1.5% + 4	8.035	499.78569	515.90831
636.617 VDC	638	1.5% + 4	9.97	626.61554	646.61846

The meter met its accuracy specifications for all the DC voltages I tested. 1% + 4 is below average accuracy for this group of 6,000 count meters.

VDC Input	11 MΩ
mVDC input	19 MΩ

Both VDC and mVDC inputs have over 10 MΩ resistance, which is good, so the meter is less likely to load down a high-impedance circuit when checking voltage.

AC Volts

Source	Reading	Specification	Uncertainty	Low Bound	High Bound
100Hz Squarewave					
4.999 VAC	5.55 V	1% + 4	0.08999	4.9090	5.0890
60 Hz Sinewave					
1.02 mVAC	N/A	1.5% + 15			
10 mVAC	9	1.5% + 15	1.635	8.329	11.671
100.7 mVAC	99	1.5% + 15	2.985	97.62458	103.77542
500 mVAC	498	1% + 4	8.98	490.42	509.58
1.000 VAC	0.999	1% + 4	0.01399	0.98511	1.01489
3.012 VAC	3.012	1% + 4	0.03412	2.9730728	3.0509272
5.010 VAC	5.00	1% + 4	0.09	4.913994	5.106006
7.003 VAC	7.00	1% + 4	0.11	6.8857982	7.1202018

The 100 Hz square wave signal is off spec because this is an averaging meter. The meter met its accuracy specifications for all the AC sinewave voltages that I could test. The meter could not read a 1 mVAC signal. The AC Volts accuracy specifications are below average specification for this group of meters.

ACV 1V 3dB cutoff	7 kHz

The low frequency of the cutoff is typical of low-cost meters.

Current

Source	Reading	Specification	Uncertainty	Low Bound	High Bound
AC 100Hz Squarewave					
0.999 mA	1.09	1.5% + 4	0.05	0.9440	1.0540
DC					
0.896 µA	0.9	1% + 4	0.409	0.4860968	1.3059032
9.217 µA	9.2	1% + 4	0.492	8.72035235	9.71364765
99.03 µA	99.0	1% + 4	1.39	97.5904365	100.469564
131.86 µA	131.9	1% + 4	1.719	130.081613	133.638387
1.0088 mA	1.00	1.2% + 4	0.052	0.95629604	1.06130396
9.9917 mA	9.83	1.2% + 4	0.15796	9.83124166	10.1521583
99.415 mA	99.3	1.2% + 4	1.5916	97.798517	101.031483
1.000 A	0.997	2% + 5	0.02394	0.97561	1.02439
3.000 A	2.994	2% + 5	0.06388	2.9345	3.0655

The 100 Hz square wave signal is off spec because this is an averaging meter. The meter met its accuracy specifications for all the DC current values I tested. µADC, µAAC and mAAC specifications are average. The mADC, ADC and AAC specifications are below average for this group of meters.

A Shunt Resistance	.033 Ω
mA Shunt Resistance	1.9 Ω
µA Shunt Resistance	101.46 Ω

It is always good to know how much resistance you are adding to your circuit when you make current measurements.

Resistance

Source	Reading	Specification	Uncertainty	Low Bound	High Bound
1.0054 Ω	0.9	1.5% + 4	0.4135	0.59161454	1.41918546
10.007 Ω	9.9	1.5% + 4	0.5485	9.45744941	10.5565506
100.07 Ω	100.0	1.5% + 4	1.9	98.1594941	101.980506
1.0011 kΩ	0.998	1.5% + 3	0.01797	0.98304892	1.01915108
10.001 kΩ	9.98	1.5% + 3	0.1797	9.82048993	10.1815101
100.01 kΩ	99.9	1.5% + 3	1.7985	98.2029993	101.817001
0.9936 MΩ	1.001	2% + 3	0.02302	0.97047464	1.01672536
9.97 MΩ	9.95	2.5 + 3	0.27875	9.687162	10.252838

The meter met its accuracy specifications for all the resistance values I tested. The accuracy values for the resistance ranges are below average for this group of 6,000 count meters.

Resistance Test Voltage	
Low Range	0.446 V
Medium Range	0.405 V
High Range	0.20 V

Capacitance

Source	Reading	Specification	Uncertainty	Low Bound	High Bound
0.0093 nF	N/A				
0.1024 nF	0.06	5% + 70	0.703	0	0.8112192
1.008 nF	0.72	5% + 70	0.736	0.258936	1.757064
9.941 nF	9.52	5% + 70	1.176	8.715236	11.166764
99.45 nF	100.3	4% + 5	4.512	94.4402	104.4598
1.00081 µF	1.025	4% + 5	0.046	0.9570676	1.0591324
10.916 µF	11.11	4% + 5	0.4944	10.367936	11.464064
113.83 µF	N/A				
986.5 µF	N/A				

The meter could not read the 10pF, 113 µF or the 986 µF values. The uncertainty for the 100pF and 1nF is so large that the readings are not meaningful. The accuracy specification for capacitance is below average for this group of 6,000 count meters.

Diode

Max Diode Voltage	1.5 V
Max Diode Current	640 µA

This did not light the LEDs I tested.

Continuity

Does not latch.

Test Leads

If you are in the market for an under-$100 meter, you probably will not buy $40 Probe Master test leads to use with it, so I looked at the included test leads. The test leads were a rigid plastic type. The meter also came with a thermocouple and an adapter for measuring temperature. I did not test temperature measurements.

Ergonomics

The rotary switch requires more effort to turn than average.
The meter is wobbly and slippery when using the bail on a smooth surface.
The display is big, but the numbers are smaller since it a multi readout screen. The screen always shows the room temperature and relative humidity. The backlight is bright and even except for a little hotspot on the right side.

Other Functions

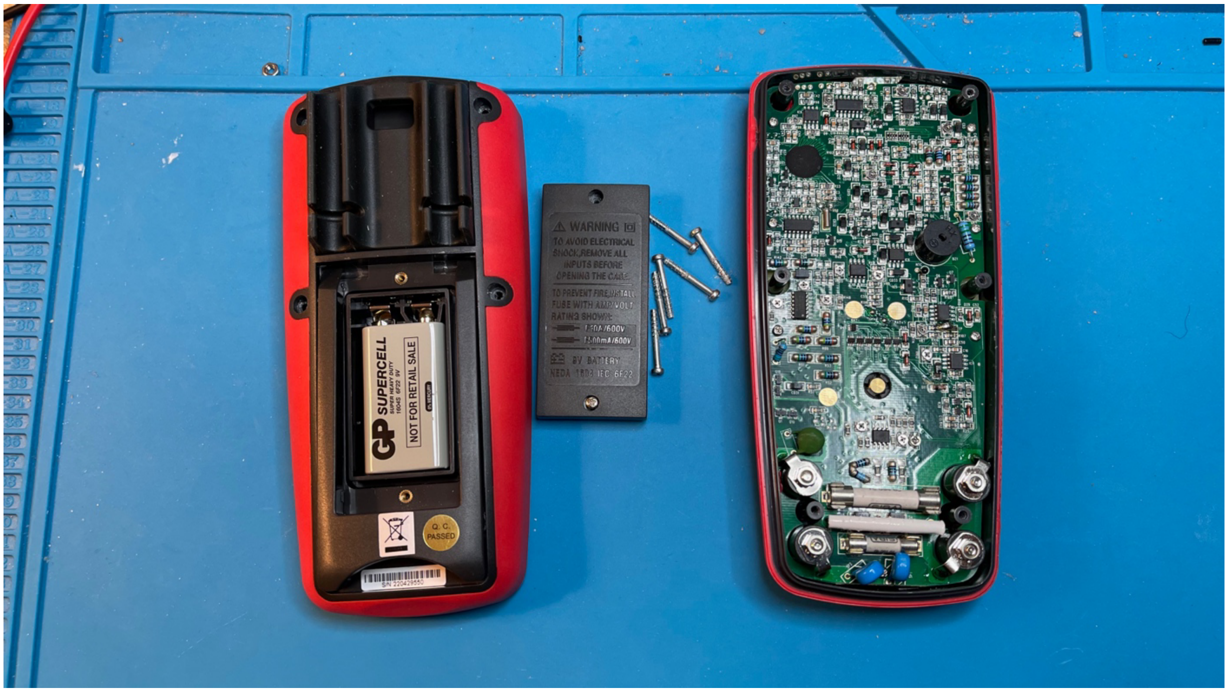
The meter can measure light in Lux up to 40,000 with 5% + 10 accuracy. The meter can measure sound in dB with 5 dB at 94 dB sound level, 1kHZ sine wave accuracy. I did not test the light or sound functions.

Battery

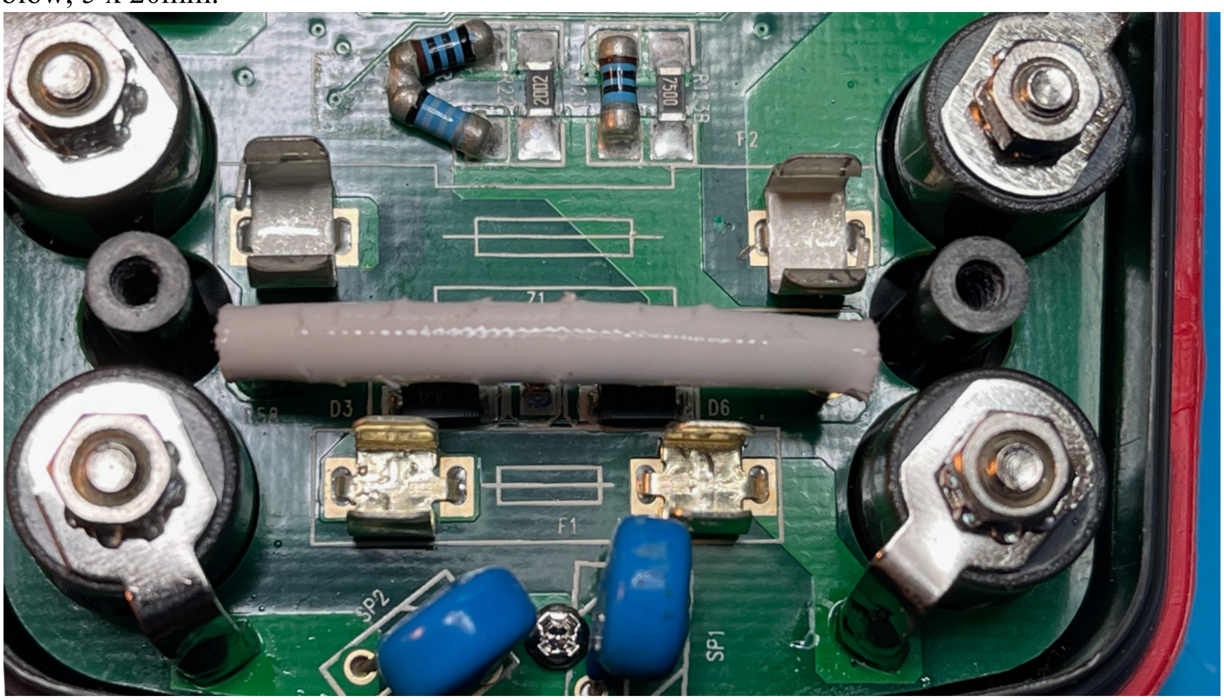
The meter uses one 9-volt battery accessible from the back by removing the battery cover. The battery cover has two Philips screws that mate with brass inserts.

Fuses

You must disassemble the meter to replace the fuses. You must remove 6 self-tapping screws.



The manual states the fuses are Fuse 1: 10A / 600V fast blow, 1-1/4” x 1⁄4” and Fuse 2: 500mA / 660V fast blow, 5 x 20mm.



Pros

- Under $100
- Almost all measurement met the specifications in the manual
- Measures light
- Measures sound
- 3-year warranty

Cons

- No indication of third-party safety testing
- Most specifications were below average accuracy for this group of 6,000 count meters
- Must disassemble meter to change fuses

Conclusion

You may want to get the Triplett 9055 to measure sound or light, but for everything else I would use a different meter.