





Part #:	<b>ADPD188BI</b>	  
Description:	<ul style="list-style-type: none"> <li>• Complete photometric system for smoke detection</li> <li>• Integrates photometric front end, 2 LEDs, and 2 PDs</li> </ul>	 <a href="#">Download Datasheet</a>

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Topic: **ESI RS925A Decade Resistance Standard - Mini Teardown** (Read 4500 times)

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**Jay\_Diddy\_B**

Super Contributor



Posts: 2166

Country:



**ESI RS925A Decade Resistance Standard - Mini Teardown**

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« on: June 15, 2014, 01:45:09 am »

Hi,

On my trip to Dayton this year I picked up an ESI RS925A Resistance Standard. This is a very precise metrology grade decade resistance. It is an alternative to the General Radio 1433 series that Dave did a teardown in video 461.

The ESI decade box dates back to the mid 1960s. The current version RS925D is still available from IET Labs for a mere \$16,000. The D version has some trimmers to facilitate calibration.

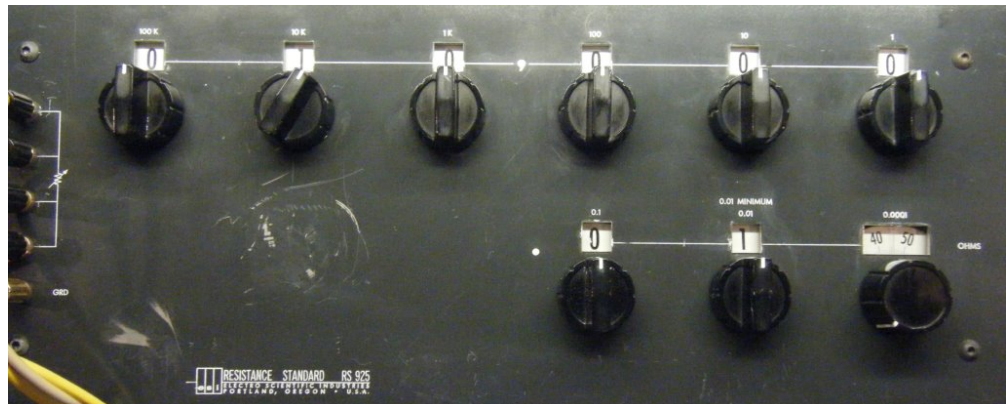
## 1.2 SPECIFICATIONS

Resistance Range:	10 milliohms to 1.2 megohms provided by 8 resistance decades and a rheostat with 20 microhms resolution
Initial Adjustment Accuracy at Any Setting:	$\pm(20 \text{ ppm} + 1 \text{ milliohm})$
Short-Term Repeatability of Resistance:	Mean value of variation of total switch contact resistance less than 100 microhms
Long-Term Stability of Resistance:	Resistance will remain within $\pm(50 \text{ ppm} + 2 \text{ milliohms})$ of nominal value for more than one year.
Calibration Conditions:	23°C, four-terminal measurement
Temperature Coefficient:	
100 ohm steps and higher . . . . .	$\pm 5 \text{ ppm}/^\circ\text{C}$
10 ohm steps . . . . .	$\pm 15 \text{ ppm}/^\circ\text{C}$
1 ohm steps and lower . . . . .	$\pm 20 \text{ ppm}/^\circ\text{C}$
Wiring and Switches . . . . .	$\pm 50 \text{ microhms}/^\circ\text{C}$
Power Coefficient for Typical Measurement Duty Cycle:	
100 ohm steps and higher . . . . .	$\pm 0.1 \text{ ppm}/\text{mw}/\text{step}$
10 ohm steps . . . . .	$\pm 0.3 \text{ ppm}/\text{mw}/\text{step}$
1 ohm steps . . . . .	$\pm 0.4 \text{ ppm}/\text{mw}/\text{step}$
0.1 and 0.01 ohm steps . . . . .	$\pm 1 \text{ ppm}/\text{mw}/\text{step}$
Wiring and Switches . . . . .	$\pm 50 \text{ microhms}/\text{watt total}$
Power Rating:	1 watt per step, 5 watts total, or 2 amperes maximum current

Really outstanding specifications.

### Construction

Outside views:



The ESI resistance standard using conventional switches, but four switch decks are wired in parallel.

### EEVblog #461 - Genrad Decade Resistance Box Teardown



#### Schematic

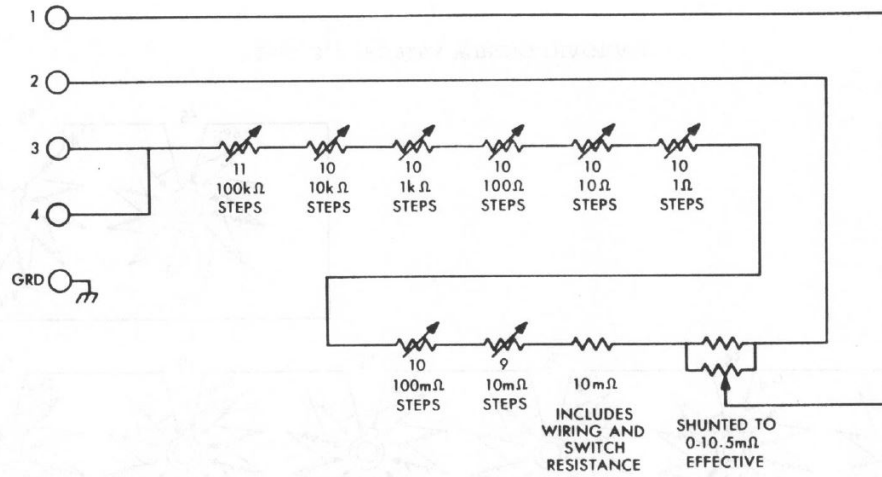
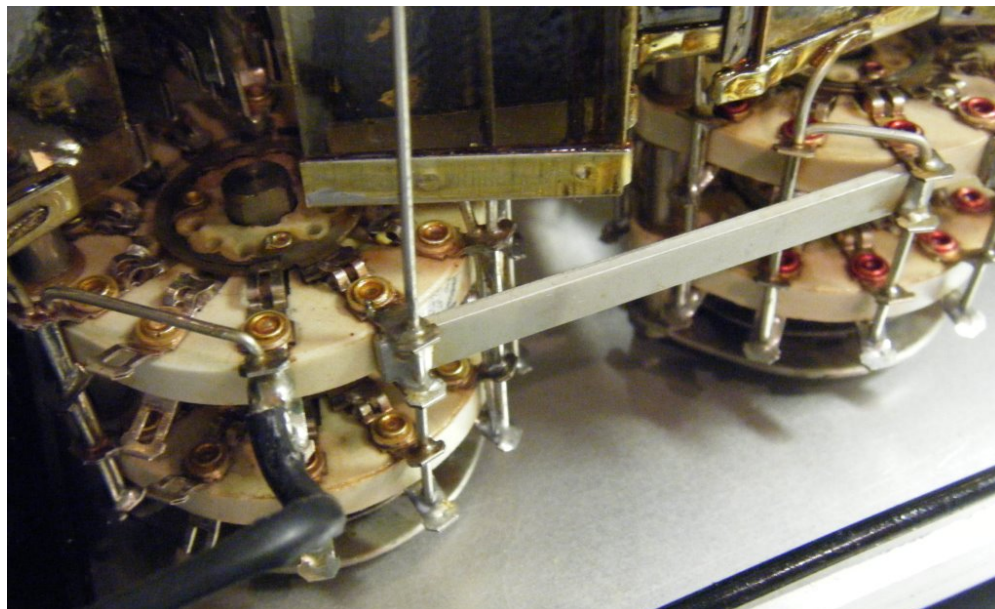


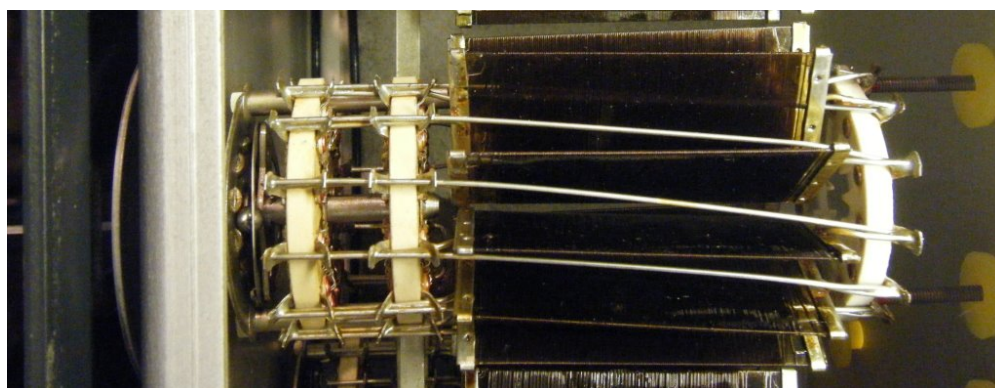
Fig. 3.1 RS 925A CIRCUIT DIAGRAM

A little different. The lowest decade is a potentiometer.

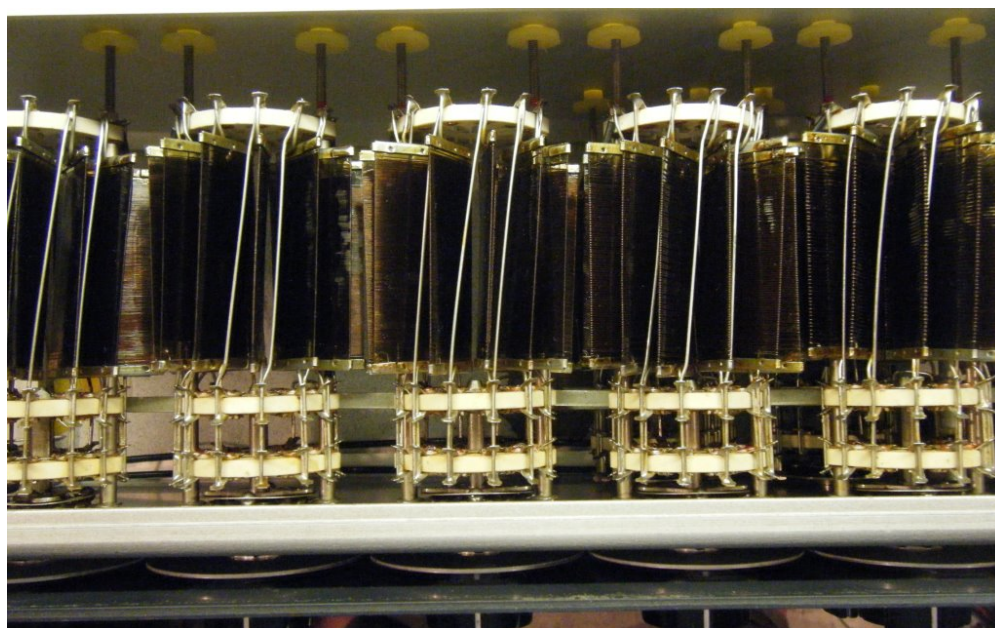
#### Specifications



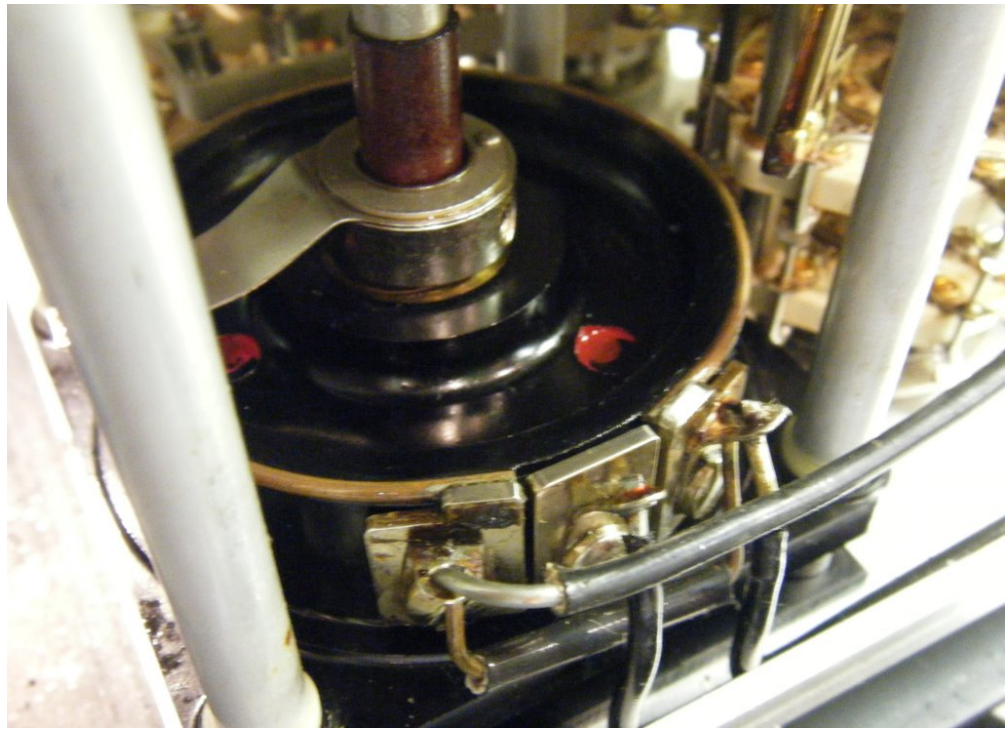
The resistors are wound on Mica formers.



Several Decades:



This is the variable 10m Ohm decade:



**So how good is it?**

All the measurements were made with a Datron 1281 in the 4W ohms mode:

10K Ohm (10 ppm error)



100K (42 ppm error)



1M (33 ppm error)

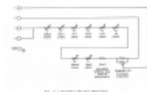


20K (20 ppm error)



Regards,

Jay\_Diddy\_B



Capture.JPG (67.58 kB, 1172x755 - viewed 3494 times.)



specifications.JPG (111.59 kB, 908x810 - viewed 2927 times.)



DSCF8350.jpg (69.76 kB, 1024x414 - viewed 2950 times.)



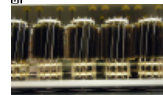
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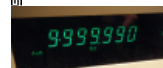
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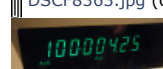
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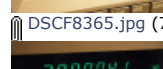
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DSCF8364.jpg (65.61 kB, 1024x512 - viewed 2756 times.)



DSCF8365.jpg (72.35 kB, 1024x513 - viewed 2795 times.)



DSCF8367.jpg (71 kB, 1024x522 - viewed 2861 times.)

« Last Edit: June 15, 2014, 01:50:19 am by Jay\_Diddy\_B »

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**Vgkid**  
Super Contributor



Posts: 2579  
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**quarks**

**Re: ESI RS925A Decade Resistance Standard - Mini Teardown**

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« Reply #1 on: June 15, 2014, 03:28:04 am »

Wow impressive score. That unit is really stable considering that its accuracy is 50ppm max for longer than one year. It was also used in the ESI 242 resistance bridge. 😊

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If you own any North Hills Electronics gear, message me. L&N Fan

**Re: ESI RS925A Decade Resistance Standard - Mini Teardown**

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Frequent Contributor



Posts: 834

Country:



« Reply #2 on: June 15, 2014, 05:12:48 am »

very nice

when I looked into precise resistance measurement solutions

<https://www.eevblog.com/forum/chat/help-wanted-low-and-high-ohm-measurement/msg169139/#msg169139>

I found the esi rs925 series as part of the esi 242 resistance measuring system is one of the very best ever made piece of gear of this kind

BTW 10k is only 1ppm off in your picture

« Last Edit: June 15, 2014, 05:46:34 am by quarks »

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