INSTRUCTIONS

MODEL 468 RESISTANCE DECADE BOX

Introduction: The Model 468 Resistance Decade is a simple instrument to both construct and use. Its main value is in the accuracy of the components.

Soldering: When soldering any precision components, it is most important to protect them from excessive heat. This may readily be accomplished by holding a pair of long-nose pliers between the joint to be soldered and the resistor proper. The pliers will conduct the heat away from the precision part. It is equally important that the joint be properly soldered. A "rosin joint" is often properly called a "high resistance joint". Any additional resistance added to the circuit will reduce the accuracy considerably. Under no circumstances should any solder other than rosin core be used. Acid core will eventually pit various of the components and may actually destroy the parts. Although rosin is invaluable in the usual soldering process, and is highly recommended for electronic circuits, care should be taken not to allow the rosin to flow between switch contacts since this could cause leakage.

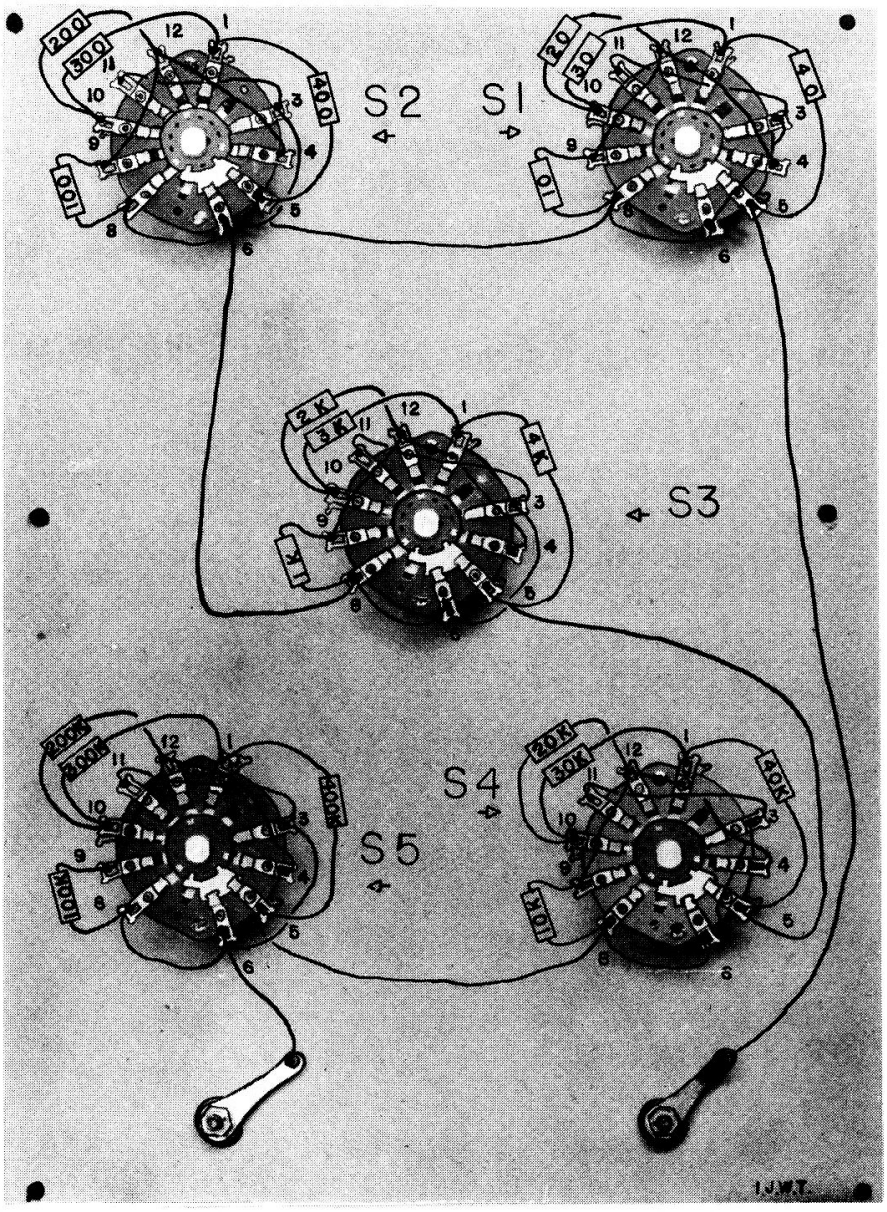
PARTS LIST

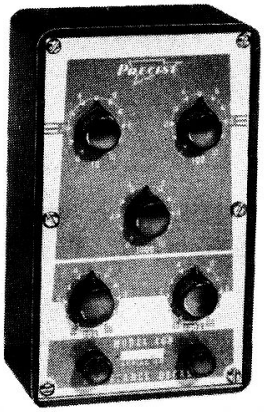
AM'T	DESCRIPTION	AM'T	DESCRIPTION
5	Single Wafer Switches	1	40 Ohm Prec. Res.
5	Switch Hex Nuts	1	100 " " "
5	Switch Lock Washers	1	200 " " "
5	Small Pointer Knobs	1	300 " " "
1	Panel	1	400 " " "
1	Cabinet	1	1K " " "
2	Binding Posts	1	2K " " "
2	Flat Fibre Washers	1	3K " " "
2	Fibre Shlder Washers	1	4K " " "
2	Solder Lugs	1	10K " " "
2	Binding Post Nuts	1	20K " " "
6	6-32 Machine Screws	1	30K " " "
1	Length Hook-up Wire	1	40K " " "
1	Instruction Sheet	1	100K " " "
1	10 Ohm Prec. Res.	1	200K " " "
1	20 " " "	1	300K " " "
1	30 " " "	1	400K " " "

ASSEMBLY: 1- Place the two binding posts into the two lower holes on the panel. The fibre shoulder washer should first be placed over the screw of the binding post. The post should then be placed into the panel with the small shoulder portion of the washer preventing the screw proper from hitting the panel. A flat fibre washer is then placed on the other side of the panel and a solder lug slipped on. The entire assembly is then secured with a nut. If the shoulder portion of the washer is properly seated in the panel, the chance of a short between the panel and the binding post is eliminated.

2- Secure each switch into the five switch holes of the panel. A lockwasher should be between the switch and the panel rather than directly behind the switch nut. Position each switch as shown in the drawing. Note that one of the studs has a blank space directly next to it; the other stud has contacts on both sides of it. The switch should be so positioned that the stud with the blank space right next to it, is toward the bottom of the panel.

WIRING: 1- Switches are numbered clockwise starting from top right hand contact. Contacts on panel side of switch are not used.
2- Connect a wire from Contacts 3 to 6 on switch S1. Repeat for all other switches. Do not solder.
3- Connect a wire from contacts 3 to 11 on switch S1. Repeat for all other switches. Solder.
4- Connect a wire from contacts 4 to 12 on switch S1. Repeat for all other switches. Solder #4 contacts only.
5- Connect a wire from contacts 6 to 8 on switch S1. Repeat for all other switches. Solder #6 contacts only.
6- Connect a 40 ohm Res. from contacts 1 to 5 on switch S1. Repeat for other switches except S2 uses 400; S3 uses 4K; S4 uses 40K; S5 uses 400K. Do not solder.
7- Connect a 30 ohm Res. from contacts 1 to 10 on switch S1. Solder #1's only. Repeat for other switches except S2 uses 300; S3 uses 3K; S4 uses 30K; S5 uses 300K.
8- Connect a 20 ohm Res. from contacts 10 to 12 on switch S1. Solder. Repeat for other switches except S2 uses 200; S3 uses 2K; S4 uses 20K; S5 uses 200K.
9- Connect a 10 ohm Res. from contacts 8 to 9 on switch S1. Solder #9 only. Repeat for other switches except S2 uses 100; S3 uses 1K; S4 uses 10K; S5 uses 100K.
10- Solder wire from left binding post solder lug to #8 of switch S5.
11- Solder a wire from #5 of S5 to #8 of S4.
12- " " " " #5 " S4 " #5 " S3.
13- " " " " #8 " S3 " #8 " S2.
14- " " " " #5 " S2 " #8 " S1.
15- " " " " #5 " S1 " right hand post.
You have now completed the wiring of your Model 468. Check all soldering carefully making certain each connection is soldered and there is no rosin between them. You may, if necessary, clean the contacts with carbon-tetrachloride.
16- With each switch in its maximum counter-clockwise position (as observed from the front panel), place small pointer knobs on shafts with indicator at the zero mark.


S2
S1
S3
S4
S5
200
300
400
100
20
30
40
10
2K
3K
4K
1K
200K
300K
400K
100K
40K
10K
1 J.W.T.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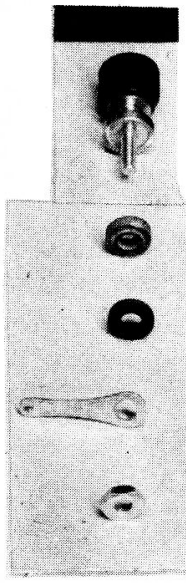
- BINDING POST
- SHOULDER WASHER
- PANEL - HERE
- FLAT WASHER
- SOLDER LUG
- NUT

OPERATION: The operation of this instrument is very simple. Each decade is variable from 0 to 10. The actual value is the number to which the switch is set times the multiplying factor beneath it. The resistance across the two binding posts is the sum total of each decade.
Example: If the 1000 switch were set to 4, the resistance in that decade would be 4000 ohms. When a decade is set to 0, the resistance of that decade is zero.
Example: If 1,053,070 ohms were desired, the following settings should be used: 100K decade to 10; 10K decade to 5; 1000 decade to 3; 100 decade to 0; 10 decade to 7.

POWER: All resistances are $\frac{1}{2}$ watt except for the 10-100 range which is 1 watt. The maximum possible voltages may be computed by the formula: $E = (PR)^{\frac{1}{2}}$ The maximum currents for each range are: 10 range - 159ma; 100 range - 35ma; 1000 range - 10.6ma; 10K range - 3.5ma; 100K range - 1.06ma. If the power in excess of that rated above is developed, there is the possibility of destroying the accuracy of the instrument.

APPLICATIONS: There are a great many uses for your Model 468 other than as a substitution device. It may be used for calibrating ohmmeters, voltmeters, ammeters, etc. It may be used as one or more arms of any number of different bridges. As an example, a Wheatstone bridge may be made by using two matched resistors for the ratio arms and the 468 for the known resistance arm. A Wien bridge may likewise be accomplished by using two Model 468 decades. The instrument is invaluable for breadboard lay-outs involving vacuum tubes. The inductance has been considerably reduced by using deposited carbon resistors for all but the lowest ranges.

SERVICING: Very little difficulty should be encountered in the construction and use of this instrument. Most cases of trouble have mis-wiring as their source. You may, however, return the instrument to the factory for repair at a service charge of $3.50. Please pack carefully.

WARRANTY: All merchandise is warranted to be free from defects in material and workmanship and is fully protected by the standard RMA GUARANTEE.