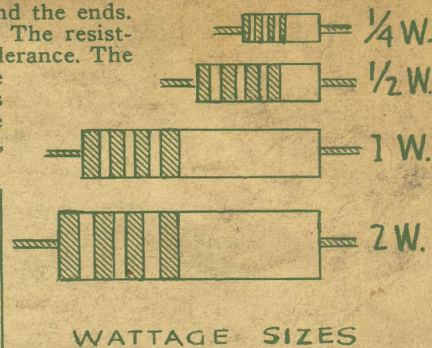


USEFUL INFORMATION FOR KIT BUILDERS

Resistors are identified by a color code used in several bands around the resistors. There are two general types of resistors. One, the un-insulated type, has the connecting wires bound around the ends. The other, the insulated type, has the wire connected internally and coming out the ends. The resistance code uses three bands or colors, while a fourth, usually silver or gold, indicates the tolerance. The colors are arranged so that the first two indicate the first two figures of the resistance, while the third indicates the number of digits (zeros or multiplier) which follow the first two figures. On un-insulated resistors, the body is the first figure, the end color the second figure, and the dot the number of digits. On insulated resistors, the band nearest the end is the first figure, the next band is the second figure and the third band the number of digits.



WATTAGE. Resistors are rated as to wattage (power dissipation) according to size. The chart shows approximate sizes which vary with manufacturers. To determine wattage size necessary multiply current through resistor in amperes by voltage drop across resistors in volts. Example—A plate loading resistor for a tube drawing 10 milli-amperes (.01 Amperes) has a voltage on one side of 300 volts and on the other side 200 volts, giving a drop of 100 volts. Therefore 100 volts \times .01A. = 1 Watt.

A higher wattage resistor can always be substituted for smaller size.

Uninsulated Insulated	Body Color First Ring	End Color Second Ring	Dot Color Third Ring	UNINSULATED TYPE	Examples	INSULATED TYPE Fourth Band For Tolerance	
Color	First Figure	Second Figure	Number of Digits				
Black	0	0	None				
Brown	1	1	0			BROWN 1	BROWN 1
Red	2	2	00			RED 2	RED 2
Orange	3	3	000			ORANGE 000	ORANGE 000
Yellow	4	4	0,000				
Green	5	5	00,000				
Blue	6	6	000,000				
Violet	7	7	0,000,000				
Grey	8	8	00,000,000				
White	9	9	000,000,000				

Some Popular Sizes of Resistors

RESISTANCE IN OHMS	BODY OR FIRST BAND	END OR SECOND BAND	DOT OR THIRD BAND
50	Green	Black	Black
250	Red	Red	Green
1500	Brown	Green	Red
30,000	Orange	Black	Orange
220,000	Red	Red	Yellow
1 Megohm	Brown	Black	Green

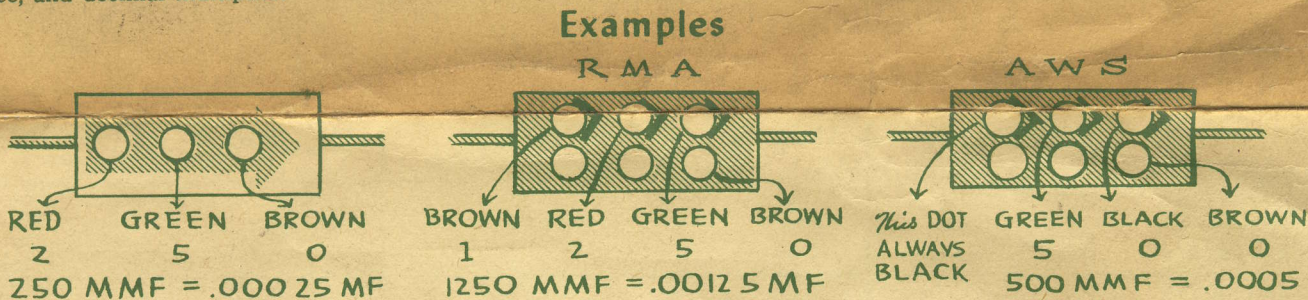
The fourth ring or other end may be silver (10% tolerance) or gold (5% tolerance) or it may be omitted entirely which indicates 20% tolerance.

Condenser Code

Condensers use the same code as resistors and are read in micromicrofarads.

If there is one row of dots, they are read in direction of arrow or if manufacturer's name appears in the same direction as name. If two rows of dots appear, it can either be of two different codes: The RMA or the AWS (American War Standard). In the RMA, the top row of dots are the first three figures (carried to three figures), the bottom row are left to right the voltage rating, tolerance, and decimal multiplier.

In the AWS code, the top row of dots are the first three figures while the bottom row are, left to right, characteristic, tolerance, and decimal multiplier.



Some Commonly Used Sizes of Condensers

MMF.	MF.	FIRST DOT	SECOND DOT	THIRD DOT
10	.00001	Brown	Black	Black
50	.00005	Green	Black	Black
100	.0001	Brown	Black	Brown
250	.00025	Red	Green	Brown
500	.0005	Green	Black	Brown
1000	.001	Brown	Black	Red
3000	.003	Orange	Black	Red
10,000	.01	Brown	Black	Orange

The tolerance rating corresponds to the color code, i.e., red — 2%, green — 5%, etc.

The voltage rating corresponds to the code multiplied by 100. Example: Orange dot — 300 volt rating; Blue — 600 volt rating.

148
500

RMA Color Code on Transformers

I.F. TRANSFORMERS

Blue — Plate Lead
Red — B + Lead
Green — Grid
Black — Ground or AVC

If center tapped other grid is green and black striped.

AUDIO TRANSFORMERS

Blue — Plate Lead
Red — B + Lead
Brown — Other Plate on Push Pull
Green — Grid Lead
Black — Ground Lead
Yellow — Other Grid on Push Pull

POWER TRANSFORMERS PRIMARY — BLACK

High Voltage Plate — Red
 Center Tap Red and Yellow Striped

Rectifier Filament — Yellow
 Center Tap Yellow and Blue

Filament No. 1 — Green
 Center Tap Green and Yellow

Filament No. 2 — Brown
 Center Tap — Brown and Yellow

Filament No. 3 — Slate
 Center Tap — Slate and Yellow

Soldering

The most important thing in good soldering is to heat the joint and allow the solder to flow into it. The solder should melt from contact with the joint rather than with the iron. Never use pastes or acids in radio work.

Use only rosin core solder. Never depend on the solder to hold a joint. Always make a firm connection with the wire before applying solder. To tin a soldering iron (soldering cannot be done with the bare copper) file the surface lightly while the iron is hot and then quickly apply a generous amount of rosin core solder while the filed surface is still bright. Wipe off excess solder with a cloth.

Tin all four sides of the tip in this manner.

The terminals must be clean, and preferably tinned. On some terminals that are hard to solder to (nickel plated f.i.) it is desirable to pre-tin the surface before installation or connection. Clean (scrape or sandpaper) the surface, heat with iron and apply rosin core solder liberally. Wipe off or shake off excess solder.

Recommended Tools

A good electric soldering iron (100 watt with small tip)
 Long or needle nose pliers 6".
 Diagonal or side cutting pliers (5" or 6").
 An assortment of screw drivers flat and Phillips type.

File. Round and flat types.

Purchase quality tools and you will enjoy and use them many years. American Beauty soldering irons, Plomb, and Williams pliers are recommended.

Symbols Used in Radio Circuits

	ANTENNA OR AERIAL		VARIABLE CONDENSER		QUARTZ CRYSTAL
	CHASSIS OR GROUND		ELECTROLYTIC CONDENSER SHOWING POLARITY		CONNECTION OF TWO WIRES
	AIR CORE COIL		SWITCH		NO CONNECTION
	AIR CORE TRANSFORMER OR COIL		ROTARY SWITCH		FUSE
	R.F. CHOKE		SPEAKER		PHONE PLUG
	FILTER OR IRON CORE CHOKE . . .		METER	K =	1000
	IRON CORE TRANSFORMER		PILOT LIGHT	M =	1,000,000
	FIXED RESISTOR		PHONE JACK		OHM.
	VARIABLE RESISTOR OR POTENTIOMETER			MF =	MICROFARAD
	FIXED CONDENSER			MMF =	MICRO MICROFARAD

THE HEATH COMPANY . BENTON HARBOR, MICH.