

**FIXED CAPACITORS AND FIXED RESISTORS
(KS-SPEC., MIL OR JAN, RETMA)
COLOR CODES AND REFERENCE DATA**

1. GENERAL

1.01 This section provides a means of decoding the colored spots and colored bands on certain types of the above apparatus. This apparatus is small and, except for the button-style capacitors, is mounted by means of integral (pigtail) wire leads or terminals. The capacitors have a dielectric of paper, mica, or ceramic. The resistors are of the low-power type and are either wire-wound or composition type.

1.02 This section has been reissued to include the color-coding arrangement used on button-type mica capacitors and to modify the tolerance requirements of KS-composition resistors. The color-coding standard now known as RETMA was formerly known as RMA.

1.03 MIL (formerly JAN) indicates the standard that has been adopted by the Military Services. RETMA indicates the standard that has been adopted by the Radio-Electronics-Television Manufacturers Association.

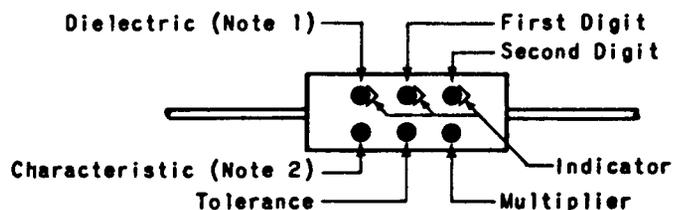
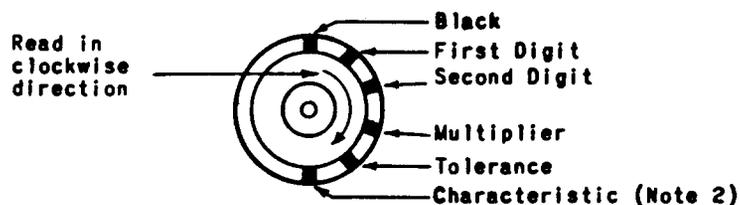
1.04 Composition-type resistors do not necessarily retain their resistance values with time, varying atmospheric conditions, and as a result of heating during the soldering operation. Care always should be taken in soldering resistors, since their ohmic value may be seriously affected by excessive heating. Soldering coppers should not be applied too close to a resistor body or for too long a time.

2. DECODING

2.01 Specific information for decoding the colors, etc., is shown in Tables A, B, C, and D, as follows:

<u>Table</u>	<u>Apparatus</u>
A	Capacitors, Mica or Paper Dielectric
B	Capacitors, Ceramic Dielectric
C	Resistors, KS- Spec.
D	Resistors, Composition and Low Power, Wire Wound

TABLE A

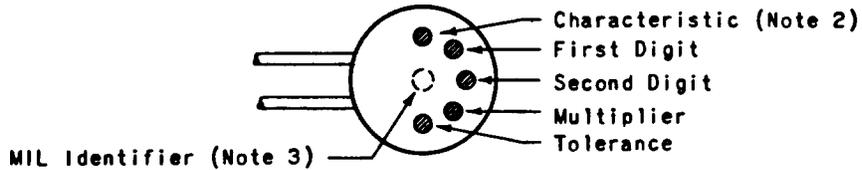
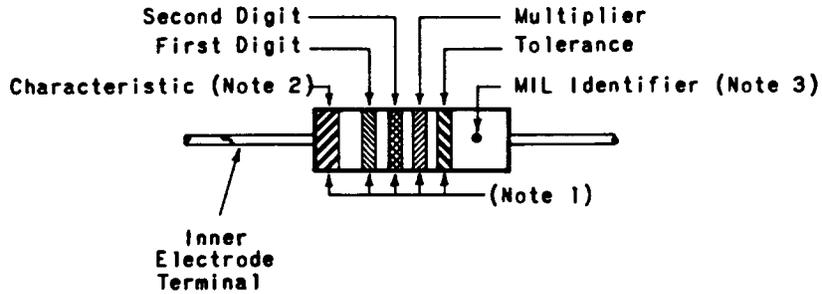
CAPACITORS - MICA OR PAPER DIELECTRICMICA DIELECTRIC, BUTTON STYLES

COLOR OF SPOT	SIGNIFICANCE OF FIRST TWO DIGITS	MULTIPLIER (SEE NOTE 3)	TOLERANCE
Black	0	1	$\pm 20\%$
Brown	1	10	
Red	2	100	$\pm 2\%$
Orange	3	1000	
Yellow	4		
Green	5		
Blue	6		
Violet	7		
Gray	8		
White	9		
Gold		0.1	$\pm 5\%$
Silver		0.01	$\pm 10\%$

NOTES

1. Silver = paper; black = mica (MIL); white = mica (RETMA).
2. The characteristic is a factor entering primarily into design considerations and has therefore not been included. Colors should match when replacing.
3. The multiplier is the factor by which the first two digits shall be multiplied to obtain the nominal capacitance in micromicrofarads.

TABLE B
CAPACITORS - CERAMIC DIELECTRIC



COLOR	SIGNIFICANCE OF FIRST TWO DIGITS	MULTIPLIER (See Note 4)	TOLERANCE	
			Nom. Capacitance	
			10 UUF or Less	Over 10 UUF
Per Cent				
Black	0	1	±2.0	±20
Brown	1	10	±0.1	±1
Red	2	100		±2
Orange	3	1000		±3
Yellow	4	10,000		
Green	5	100,000	±0.5	±5
Blue	6			
Violet	7			
Gray	8	0.01	±0.25	
White	9	0.1	±1.0	±10

NOTES

1. Colored spots or colored bands may be used.
2. The characteristic is a factor entering primarily into design considerations and has therefore not been included. Colors should match when replacing. Sometimes omitted on KS-Spec. Hi-K ceramics.
3. When spots are used, a black spot is applied on the opposite side.
4. The multiplier is the factor by which the first two digits shall be multiplied to obtain the nominal capacitance in micromicrofarads.

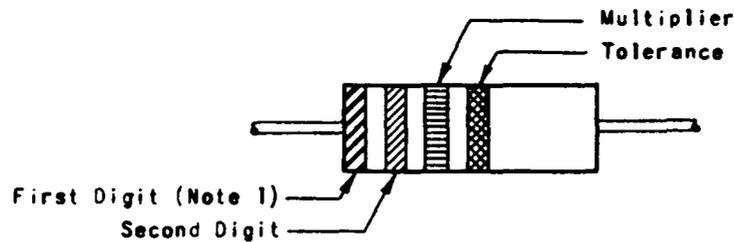
TABLE CRESISTORS - POWER RATINGS AND TOLERANCES ON KS-SPEC.

	<u>TYPE</u>	<u>POWER RATING</u> (watts)
	KS-13490	1/2
	KS-13491	1
	KS-13492	2

<u>LIST NO. FOR ABOVE RESISTORS</u>	<u>INITIAL MFR TOLERANCE</u>	<u>AFTER SHOP-INSTALLATION OR SHELF-AGING</u>	<u>LONG-TERM OPERATION TOLERANCE (NOTE 1)</u>
L1	±5%	-8 to +11%	-20 to +30%
L2	±10%	-13 to +16%	-25 to +35%
L3	±20%	-23 to +26%	-35 to +45%

NOTES

- The tolerances in this column should be noted before replacement of resistors in non critical paths.

TABLE DRESISTORS - COMPOSITION AND LOW POWER, WIRE WOUND

<u>COLOR OF BAND</u>	<u>SIGNIFICANCE OF FIRST TWO DIGITS</u>	<u>MULTIPLIER (See Note 3)</u>	<u>TOLERANCE (See Note 2)</u>
Black	0	1	
Brown	1	10	
Red	2	100	
Orange	3	1000	
Yellow	4	10,000	
Green	5	100,000	
Blue	6	1,000,000	
Violet	7	10,000,000	
Gray	8	100,000,000	
White	9	1,000,000,000	
Gold		0.1	±5%
Silver		0.01	±10%
No Color			±20%

NOTES

- Double-width band signifies low-power, fixed, wire-wound resistor.
- See Table C for tolerances of KS-Spec. composition resistors.
- The multiplier is the factor by which the first two digits shall be multiplied to obtain the nominal resistance in ohms.