

ARIES MUSIC SYNTHESIZER KIT----SYSTEM 300

GENERAL ASSEMBLY INSTRUCTIONS

The ARIES Music Synthesizer is both an extremely versatile musical instrument and a highly flexible research laboratory for experimentation with electronic sound production. It may also be used as an audio sweep frequency generator, waveform analyzer, and signal processor. In addition, it can modify external sounds.

The ARIES Music Synthesizer has functions found only in modular synthesizers costing many thousands of dollars, and is not limited by the fixed interconnections of lower cost instruments. Any one of our inputs and outputs may be connected to any other one, or more, resulting in literally billions of different connections. When you consider that even one set of interconnections (called "patches") can produce many different sounds, the total number of sounds available becomes astronomical. These sounds can be as different from each other as a saxophone is from a volcano.

The synthesizer consists of a cabinet with built-in power supply, a choice of up to ten modules (each providing a different function), and, if desired, a 5 octave dual-voice keyboard.

The ARIES Music Synthesizer performs with standards of accuracy, stability, and reliability equal to or better than those of any other synthesizer, regardless of cost. Yet, the synthesizer can be assembled from kits, either all together or one module at a time.

IMPORTANT! Read this manual **THOROUGHLY!** Assembly is not difficult and requires no knowledge of electronics or music, but every component and connection must be treated with care. Every step should be checked off (✓) with a pencil.

Aries stands ready to assist you if you have any problem with assembly or operation. Simply write:

Customer Service
ARIES, Inc.
P O Box 808
Peabody, Ma 01960

Fully describe the difficulty and return any defective components. If the problem is simple (or you cannot be delayed by time consuming written correspondence), call 617-532-0450 during regular business hours for immediate assistance.

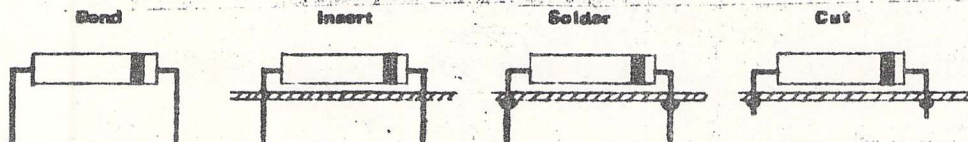
Our unique two-step warranty protects you if you cannot successfully complete this kit. Please read our complete warranty at the back of this manual.

The synthesizer modules each contain a number of miniature components to be soldered onto a printed circuit board. Although the components are heat resistant, a minimum of heat should be used to make the required connections. Accordingly, use only a small, low wattage, "pencil" type soldering iron; a 10 to 30 watt iron with a 1/32 or 1/16 inch tip is ideal. Use only 60/40 grade electrical solder with a non-corrosive rosin core flux. If you are not sure what kind of solder you have, don't take the chance. Solder is inexpensive, and use of the wrong type, such as acid core solder, or a paste flux, may severely damage the boards and components and void the warranty.

TOOLS A small pair of wire cutters, needle-nose pliers, wire strippers, and small and medium screwdrivers complete the list of tools you will need. These are standard electronic tools available at most supply houses.

INSTALLATION OF COMPONENTS The main assembly job consists of soldering several types of small parts, called components, onto a printed circuit board. Parts are carefully packed at our factory. However, if you find parts to be missing or damaged, please write our customer service office, describing the part carefully so that we can replace it. All parts will be installed on the blank side of the board with their leads extending through to the foil side. In attaching components to the board use the following procedure.

1. Bend the leads of the component to align them with the holes in the board.
2. Insert the component into the board, double checking to be sure the part is aligned properly with respect to polarity (if required) and to be certain it is correctly located.
3. Using a minimum of heat and solder, solder the component to the foil pads. Be sure the solder does not flow over onto an adjacent pad, as this could possibly result in damage when power is applied to the circuit.
4. Clip the excess leads off at the "peak" of the solder joint, and inspect the joint to be certain that it is "good" (rounded and shiny, flowing smoothly over the pad and the lead) and that no solder has run over onto nearby pads or leads.



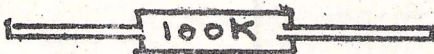
PARTS ORIENTATION (POLARITY) IMPORTANT-Some parts must be installed in the proper direction, while others, such as resistors, do not matter. AN INCORRECTLY INSTALLED PART WILL NOT FUNCTION, MAY BURN OUT, AND MAY DESTROY OTHER PARTS! Here is a general outline for proper orientation. Refer to this section during assembly.

ORIENTATION--(cont)

1. Fixed Resistors



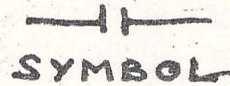
A=carbon composition



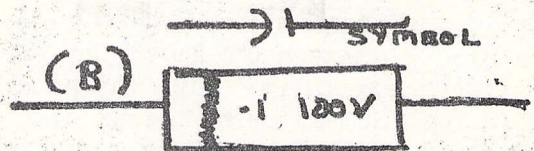
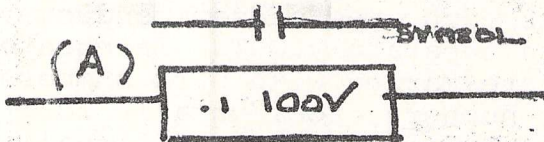
B=metal-film precision

Resistors are not polarity sensitive- that is, they can be installed in either direction. However, for precision resistors which have the value number on them, mounting should be done so that the number is facing up, for purposes of checking.

2. Disc(ceramic) Capacitors- also not polarity sensitive

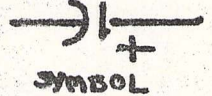
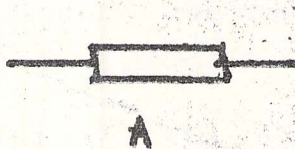


3. Mylar, paper, or polystyrene capacitors are not



polarity sensitive. However, if they have a band at one end, as in B above, it should be installed in the direction shown in the assembly drawing. If there is no band, as in A, it can be installed either way.

4. ELECTROLYTIC OR POLAR CAPACITORS (also Polar Tantalum Capacitors)



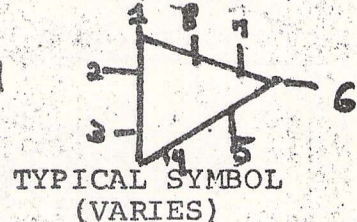
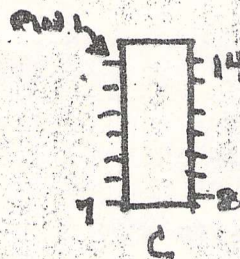
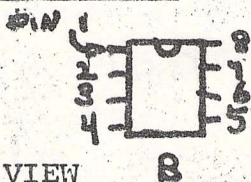
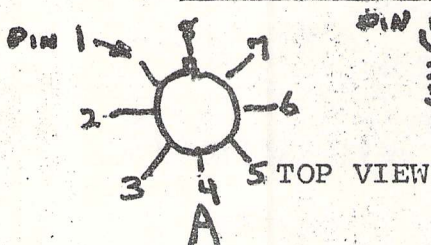
These must be installed correctly. The + sign near one lead indicates a polarity sensitive capacitor.

5. DIODE OR RECTIFIER



Diodes are polarized. Band indicates + end (cathode).

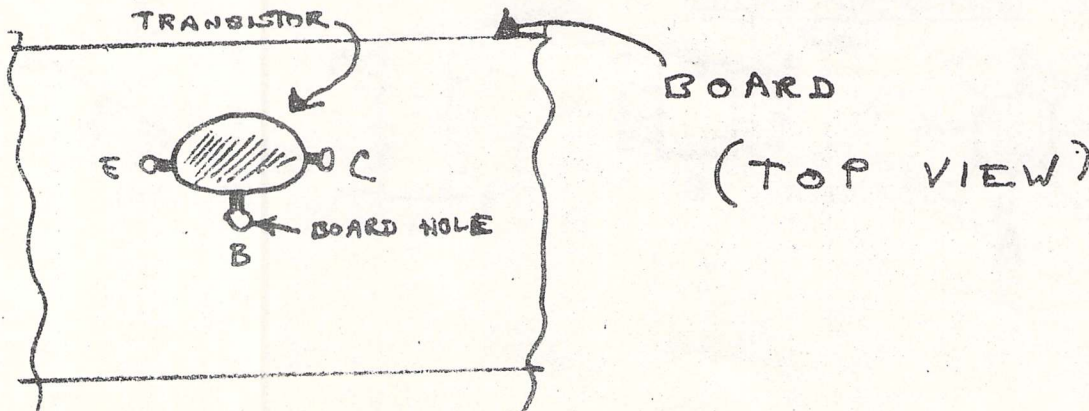
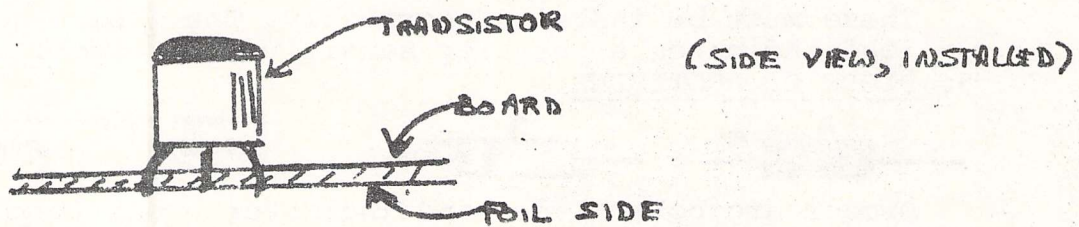
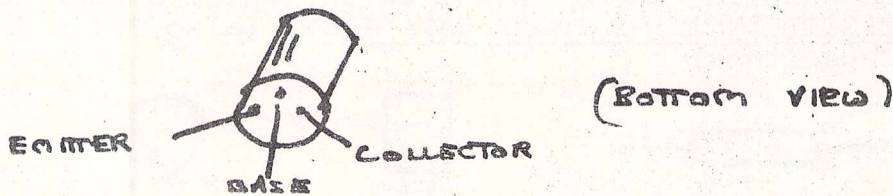
6. INTEGRATED CIRCUIT



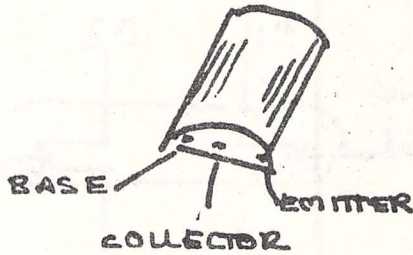
INTEGRATED CIRCUIT(cont.) Pins are numbered counter-clockwise when viewed from above the case. Observe tab (round case) or indentation (rectangular case). The number of pins may vary, typically being 8, 14, or 16. NOTICE! The name "Integrated Circuit" just refers to any small package containing circuitry. They may, however, be called by the name of their specific function, as, for example, an "Operational Amplifier" (op-amp for short), "Comparator", "And Gate", "Nor Gate", etc. This need not be of any concern, however. Merely check for the correct part number, for example, "LM301A" or 74122, and be certain to install the pins (bend if necessary) according to the assembly drawing.

7. TRANSISTORS Several types of semiconductor devices are used in some of the ARIES kits. Included here are transistors, dual transistors, field effect transistors (FET's) and dual FET's. Like integrated circuits, they are all polarity sensitive, and must be installed correctly. However, there are so many different types of pin configurations that each type of semiconductor used here must be pictured separately. NOTE: Integrated circuits and transistors are marked with part numbers. Sometimes there are other numbers, too, usually for manufacturing information. Disregard any additional numbers or symbols. Example of Transistor Installation

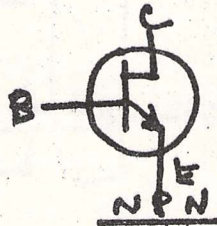
transistor type=TE3393



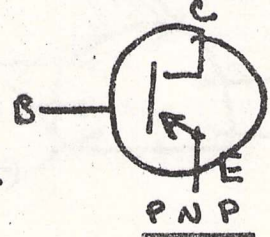
SEMICONDUCTOR BASING (PIN CONFIGURATIONS)



NPN
T2-81
2N5249
2N5172



PNP
T2-581
2N5367

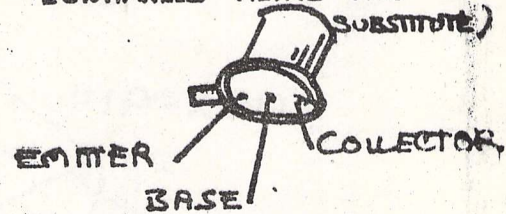


PLASTIC CASE

PNP
2N3638



(CURVED METAL CAN SUBSTITUTE)



PLASTIC CASE

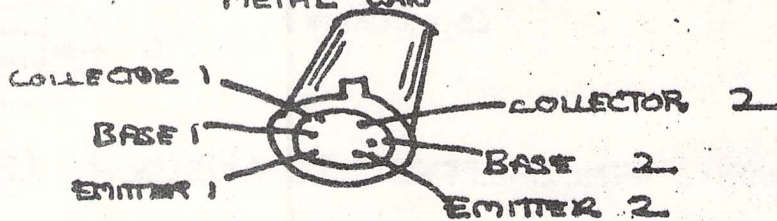
NPN



TE 3393

2N3393

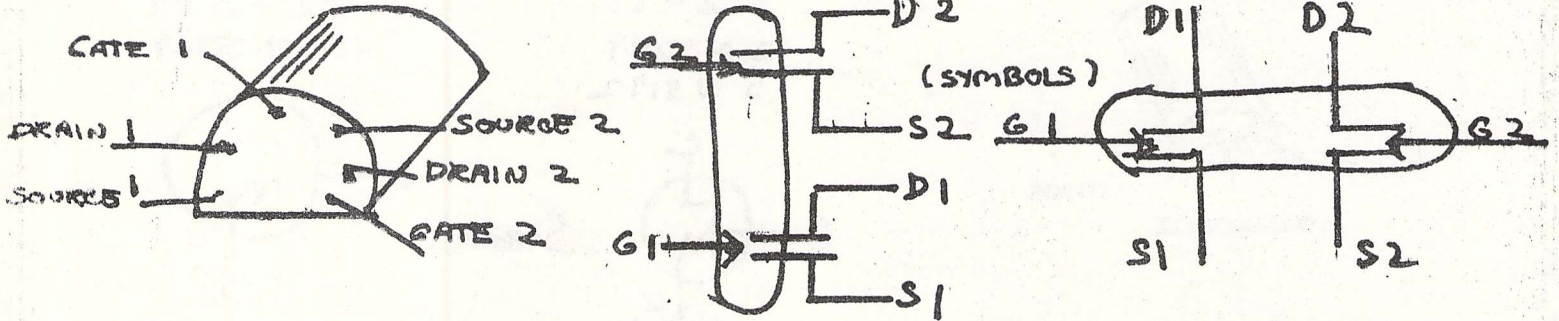
METAL CAN



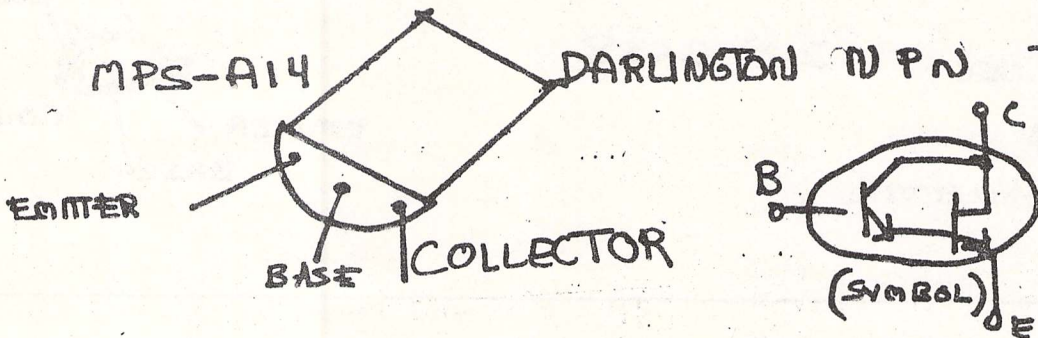
DUAL PNP

3347-1

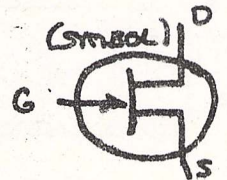
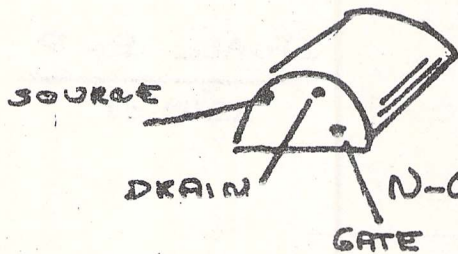
E 411 (SILICONIX) DUAL N-CHANNEL FET



MPS-A14 DARLINGTON NPN TRANSISTOR



KE 4392 E212 (SILICONIX)

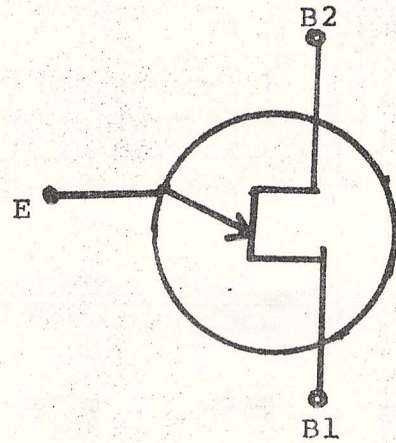
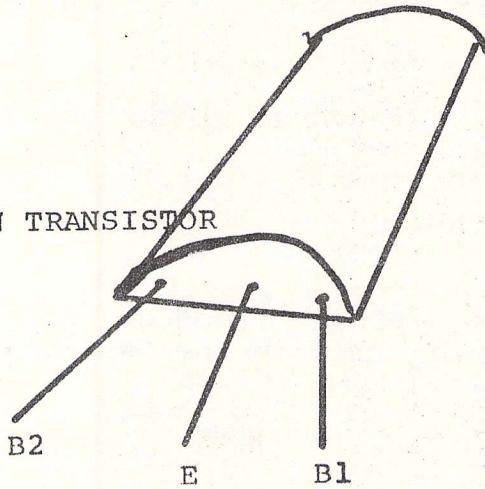


N-CHANNEL FIELD-EFFECT TRANSISTOR (FET)

SYSTEM 300
GENERAL ASSEMBLY

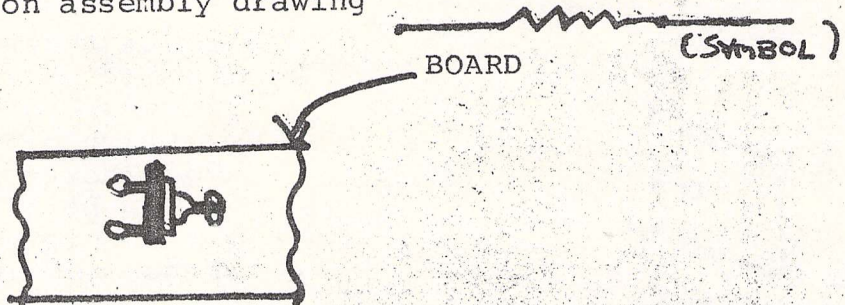
2N4870

UNI-JUNCTION TRANSISTOR



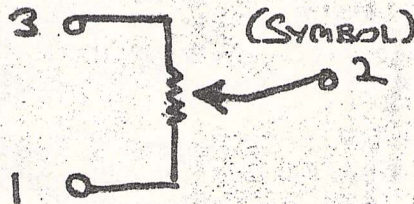
8. TRIMPOTS These are variable resistors mounted on the board. Mount as shown on assembly drawing

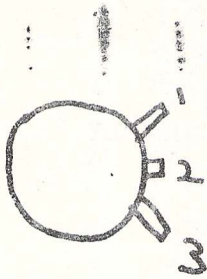
TOP VIEW



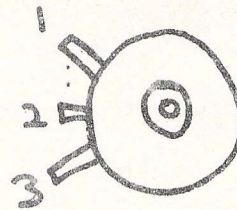
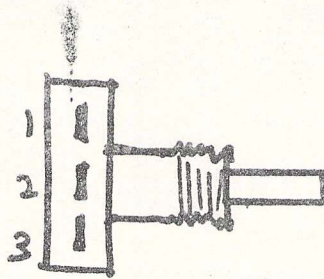
9. FRONT PANEL POTS These usually have 3 terminals which must be wired correctly. Refer to this numbering diagram.

ILLUSTRATIONS ON FOLLOWING PAGE





BACK



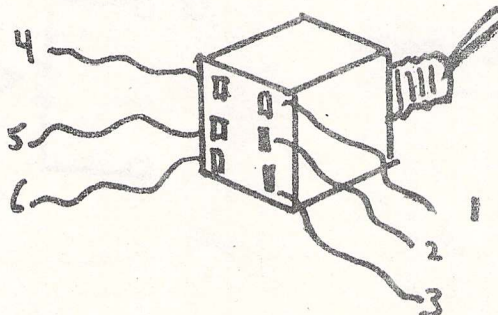
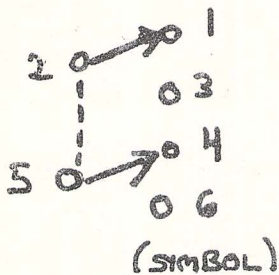
FRONT

Pin 1 is sometimes called CCW(counter clockwise) or low.
Pin 2 is sometimes called ARM or WIPER.
Pin 3 is sometimes called CW (clock wise), or high

10. FRONT PANEL SWITCHES There are many types of switches. The exact one used will be pictured in the Assembly Section, but here is an example.

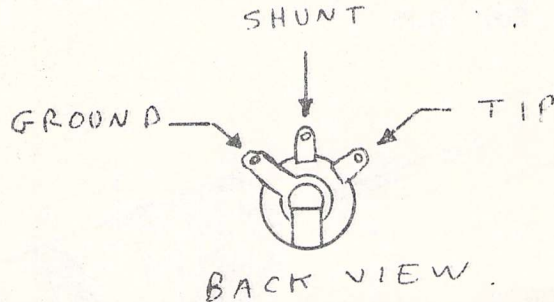
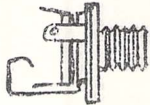
DPDT (Double-Pole Double-Throw) Toggle Switch

Notice that if the switch is rotated upside down, Pin 1 now becomes Pin 6, because what matters is which pin is up and which is down. Therefore, switches like this should be fastened to the front panel before wiring so that the pins do not get mixed up.

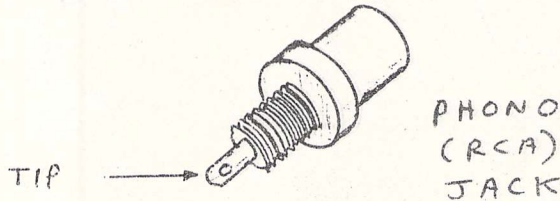


10. (cont.) Switches may also be mounted sideways. In that case, pin 1 is at the upper left (viewed from behind).
11. JACKS There are three kinds of jacks used in the ARIES Synthesizer.
- A) Minijacks-used for patching various modules together. They have 3 terminals.

MINI-JACK



- B) Phono (RCA) jacks-used for connecting the synthesizer output to an external amplifier. Used only on OUTPUT/POWER module.

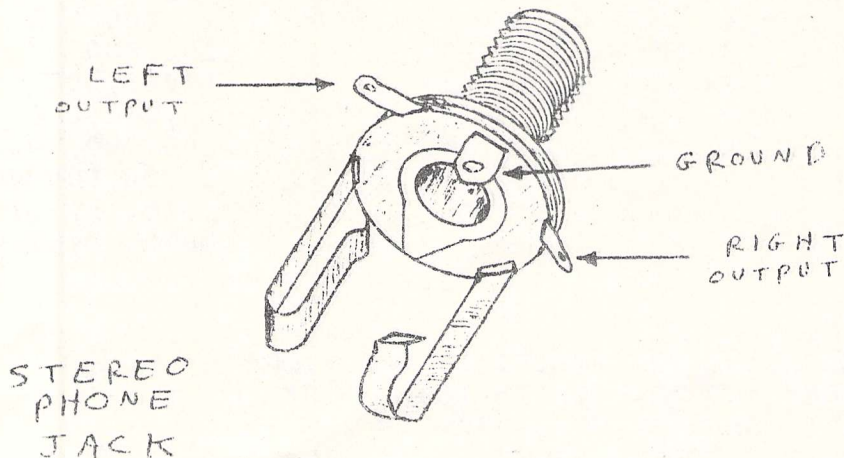


- C) Stereo Phone Jacks- Used only on OUTPUT/POWER module for plugging in stereo headphones.
12. JUMPERS These are plain wires, used to connect two holes on the board together. THEY MUST BE INSULATED EXCEPT AT THE ENDS!



Jumpers are indicated by a "J" and a number.



NOTICE ANY PART NOT DESCRIBED IN THIS SECTION WILL BE SHOWN IN THE ASSEMBLY SECTION.

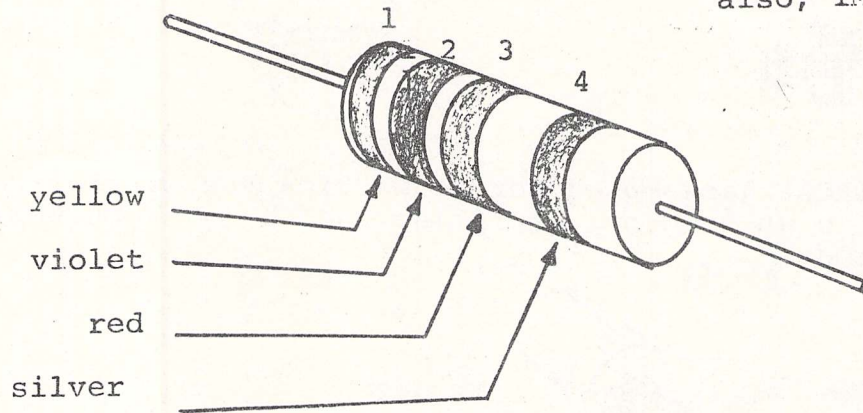


COMPONENT IDENTIFICATION

1. RESISTORS Bands indicate resistance value. Band 1 is closer to the end than any other.

 = symbol for OHM

NOTE:
1K=1000 
1 Meg(1M)=1,000,000 
also, 1M=1,000K





EXAMPLE = 4700 ohms = 4.7 k ohms

Bands 1 and 2 indicate the first two digits of the resistance and band 3 is the multiplier. The fourth band provides the accuracy range (tolerance) of the value.

	Band 1	Band 2	Band 3	Band 4
COLOR				
BLACK	0	0	1	
BROWN	1	1	10	1%
RED	2	2	100	
ORANGE	3	3	1000	
YELLOW	4	4	10,000	
GREEN	5	5	100,000	
BLUE	6	6	1,000,000	
VIOLET	7	7	10,000,000	
GRAY	8	8	100,000,000	
WHITE	9	9	1,000,000,000	
GOLD			mult. by .1	5%
SILVER			mult. by 0.01	10%

MORE EXAMPLES:

- BROWN, BLACK, BLACK, SILVER=10 , 10%
- BROWN, GREEN, BROWN, SILVER=150 , 10%
- RED, VIOLET, ORANGE, GOLD=27K, 5%
- ORANGE, WHITE, GREEN, BROWN= 3.9M, 1%

Some 1% resistors may not be color coded. They will either say the value ("100K") or have a number like "1003F". This number is a code. The first three numbers are the first three digits of resistance, and the fourth represents the multiplier or how many zero's to add. In some cases, 5% resistors may be supplied in place of the 10% value as shown on the parts list. This is a valid substitution.

2. CAPACITORS Disc capacitors can have a number from 5 to 820, if the value is in picofarads (pf's). Numbers from .001 up to .5 indicate microfarads (mf). NOTE: 1000pf=.001mf. Other capacitors, such as mylar, paper, or tantalum, have the value in microfarads. The value may normally differ by 10% without affecting the circuit. For example, although the parts list says "33pf", we may supply a 30 pf disc capacitor. Or a .5mf capacitor may replace one with a value of .47. Also, the tolerance may be lower than in the parts list, or the voltage rating higher, neither of which would affect the results.