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Book1_20	Numbers Giga to Pico ( * 1000 , / 1000)
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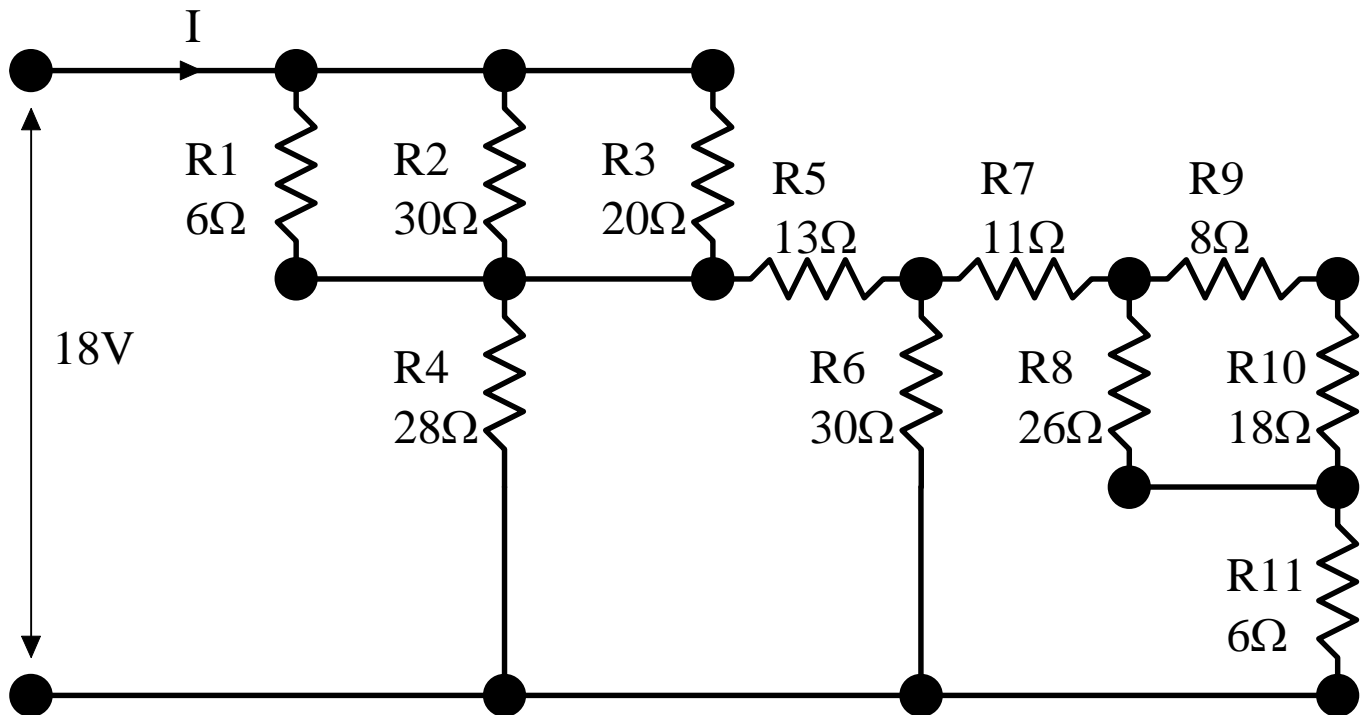
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Book4_02	General Purpose Log Sheet
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Book4_06	General Outline and structure of a Project Report.
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# RESISTORS.

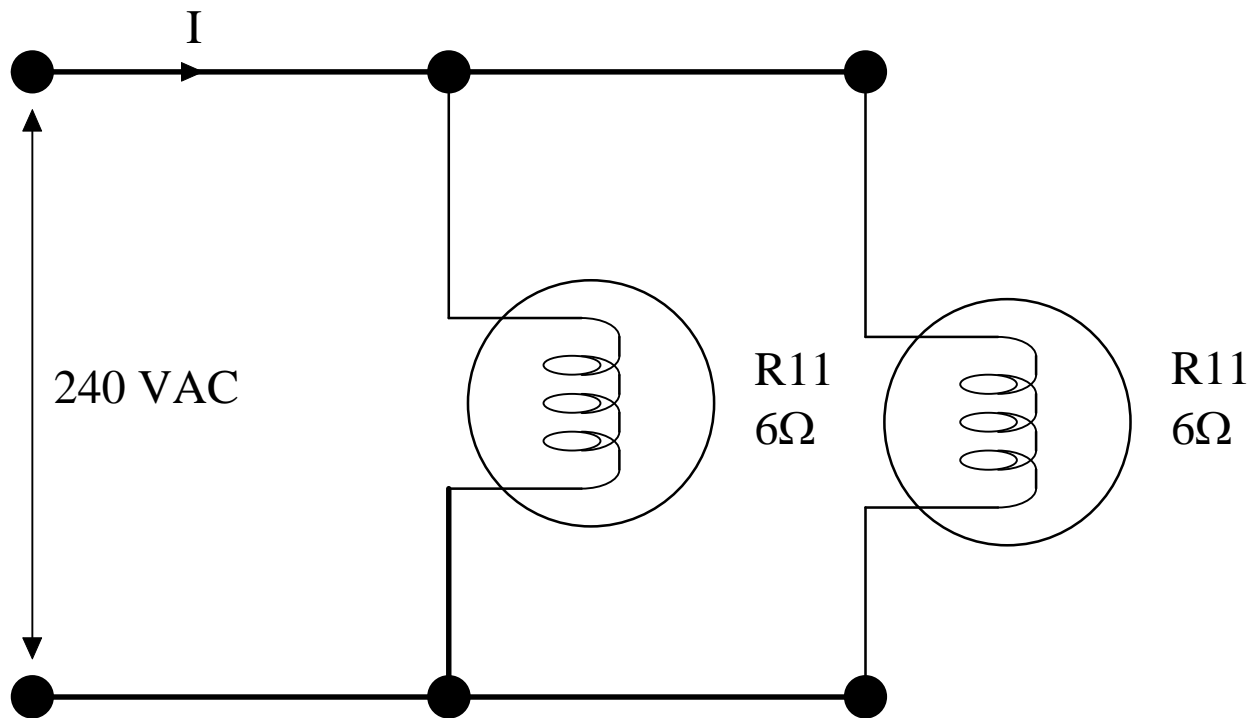


- Q1. What is  $I$  in Amps.
- Q2. What is the Current through  $R_8$ .
- Q3. What is the Voltage across  $R_7$ .

## Advanced Questions.

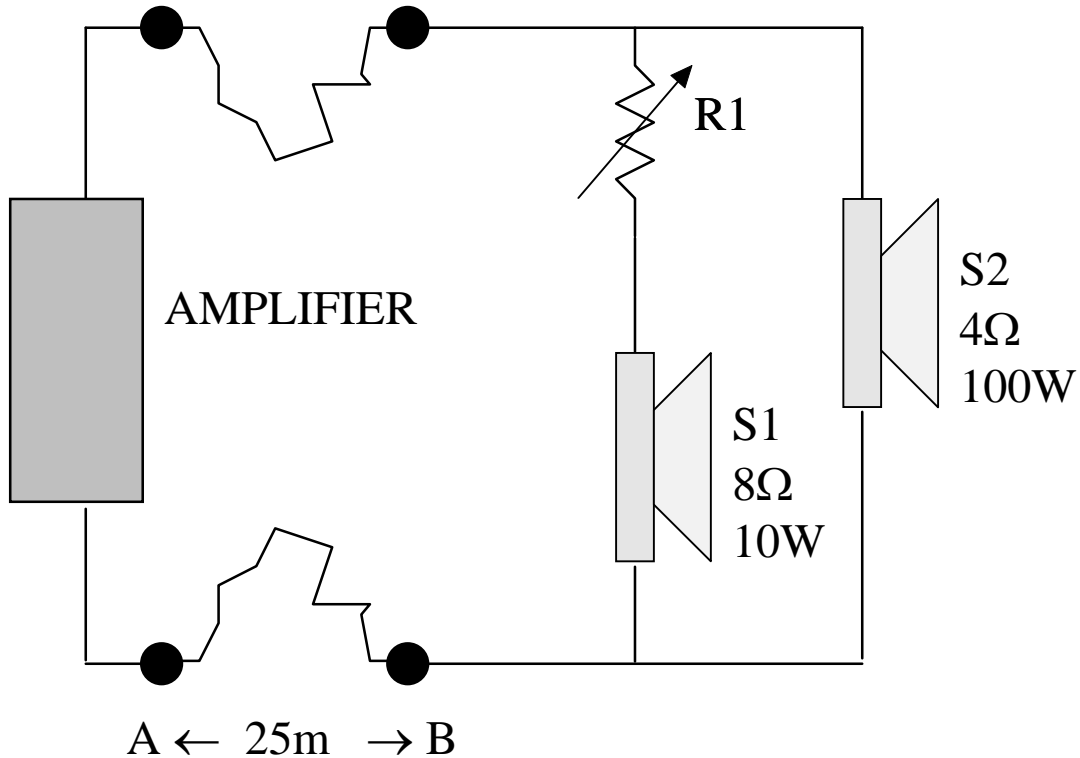
- Q4. Calculate the Voltage across every Resistor.
- Q5. Calculate the Current flowing in every Resistor.
- Q6. Calculate the power dissipated by every Resistor.

# POWER.



- Q1. What is the Resistance of the above circuit.
- Q2. How Much Current flows in the Circuit.

# POWER.



Q1. To Ensure that Speaker S1 is NOT destroyed when the Amplifier is run at Full power What value does R1 need to be ?

Q2. 7/0.2 wire is used to between points "A" & "B". How much power is lost in the cable ?

Note A 0.2mm wire strand  $\cong 92.2\Omega/\text{Km}$



# RESISTORS

<b>1st Band</b>	<b>2nd Band</b>	<b>3rd Band</b>	<b>4th Band</b>	<b>5th Band</b>
RED	BLUE	GREEN		
BROWN	YELLOW	BLACK	GOLD	
BROWN	BLACK	GREEN		
RED	ORANGE	BLUE	YELLOW	
GREY	WHITE	BROWN		
BLUE	SLATE	YELLOW		
VIOLET	YELLOW	BROWN	BLACK	
ORANGE	WHITE	RED		
BROWN	BLACK	BLACK	BLACK	GOLD
ORANGE	BLUE	GREEN	SILVER	
RED	RED	RED	RED	RED
BROWN	BLUE	BLACK	BLACK	BROWN

# NUMBERS

<u>Colours</u>	$\Omega$ or pF Convert	<u>3 Digits</u>
<u>19000</u>		1M
<u>625</u>		<u>390</u>
<u>620</u>		<u>390</u>
4K7 @2%		22K
2 $\mu$ 2		66n
1n7		100 @ 10%
22000pF		68R
56K		$\mu$ 12
100000		n57
R25		330000pF
2R7 @ 1%		M22
.1 $\mu$ F		1R0

**HEADWEY**

**ELECTRONICS**

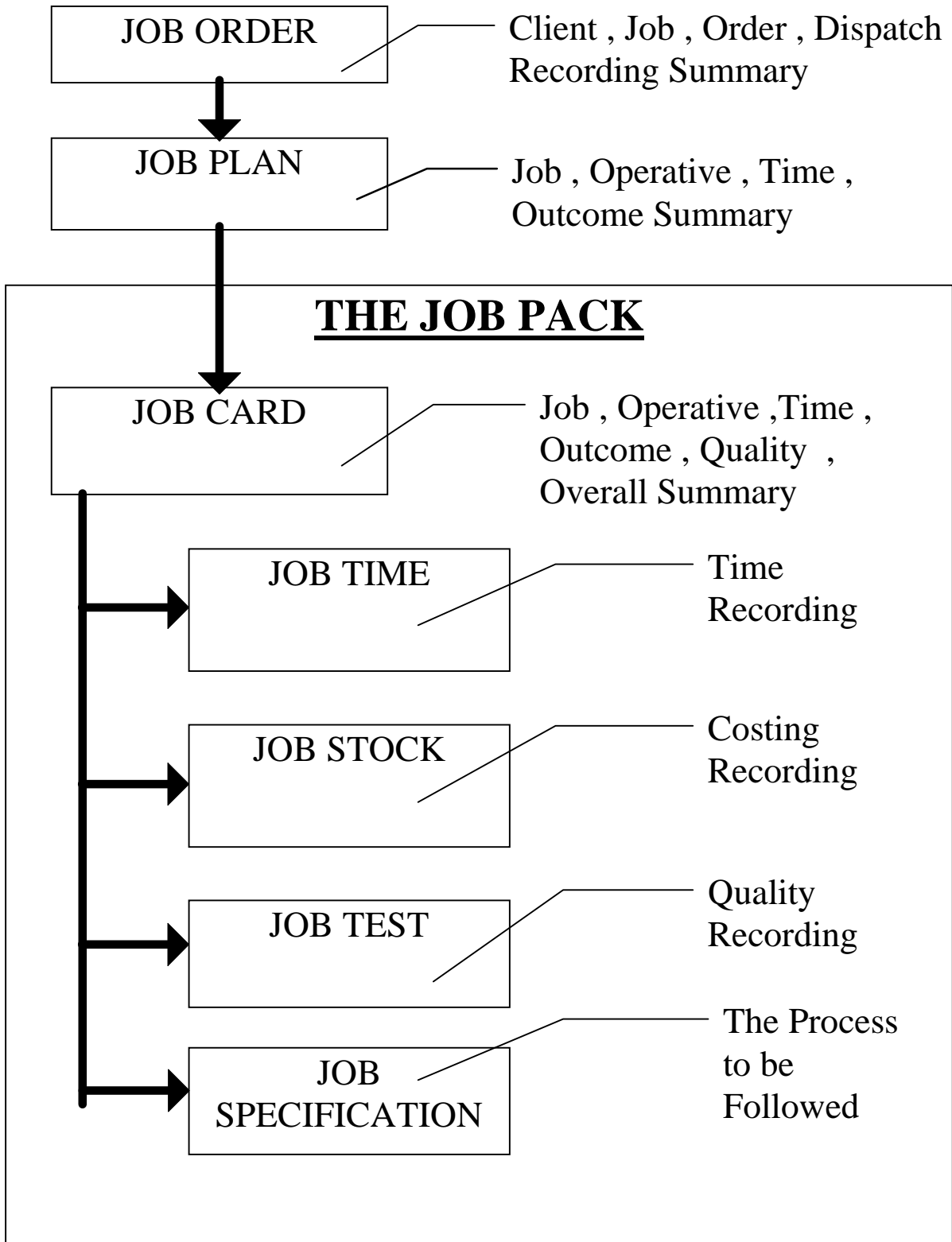
**PRODUCT**

**ASSEMBLY**

**COURSE**

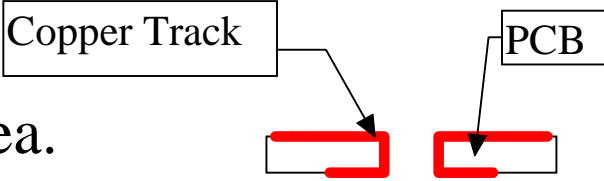
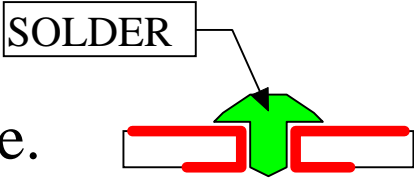
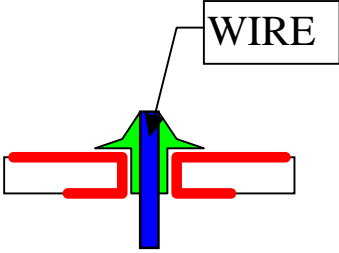
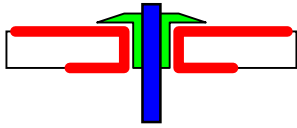
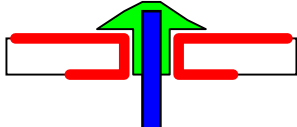
**HERE**

# JOBS



# LOW PROFILE SOLDERING.

## Used for some “Military Specification“ Work.

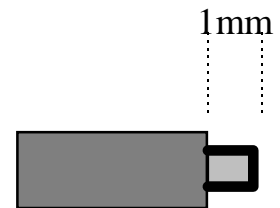
1. Clean work area.  

2. Tin Thru Plated Hole.  

3. Insert Wire.  

4. Crop Wire & Solder.  

5. Cap Joint.  


# SHALLOW BUCKETS.

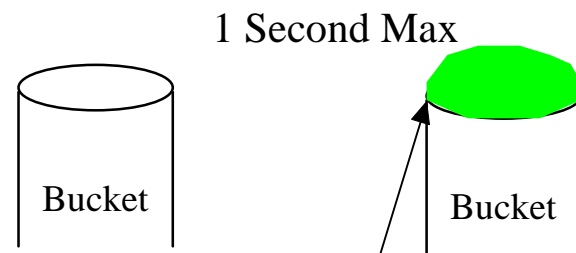
1. Twist & Tin Wire.



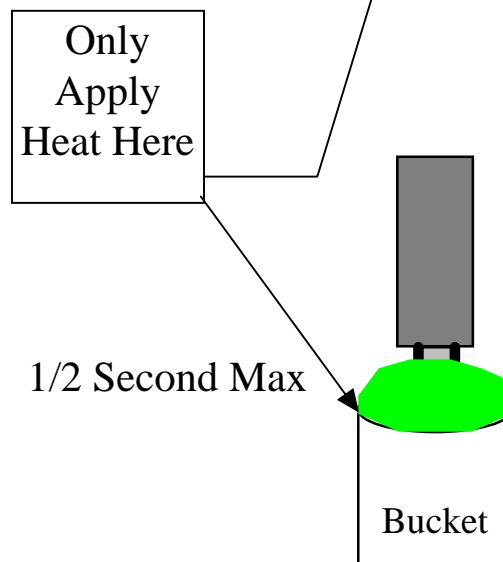
2. Trim Wire.



3. Solder Load.



4. Insert Wire.



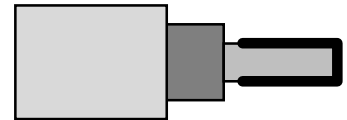
**BEWARE OF OVER HEATING THE CONNECTOR**

# SOLDER PIN.

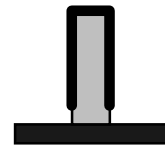
1. Twist & Tin Wire.



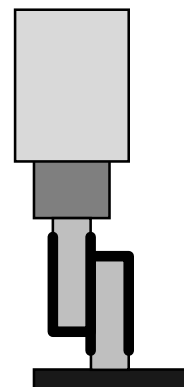
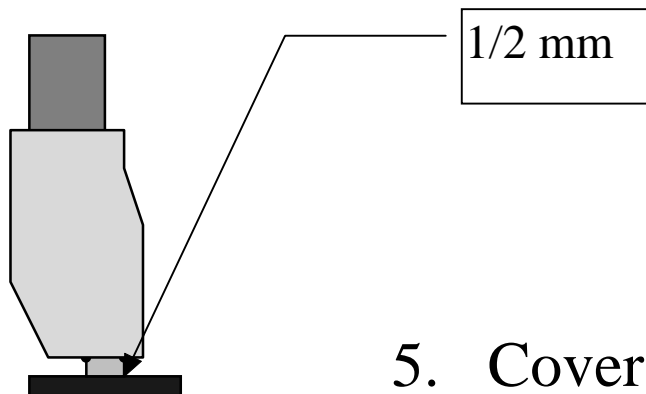
2. Trim Wire and Add Sleeve.



3. Tin Pin.



4. Lap wire to Pin.



5. Cover Joint and Pin with Sleeve.

# GENERAL NOTES

## TRANSISTORS. (Heat Sensitive)

1. Transfer of Resistance.
2. An Electronic Switch.
3. Three Electrodes (Normally)  
BASE , COLLECTOR ,  
EMITTER.
4. Two Major Constructions versions  
PNP & NPN.

## DIODE. (Heat Sensitive)(Polarity Conscious)

1. A two electrode device.
2. A One Way Device / Valve.
3. May emit light when current  
flows through it (LED).  
LED = **L**ight **E**mitting **D**iode.

## RESISTORS

1. Restricts flow of electrons  
i.e. Reduces Current.
2. Measured in OHM's



# GENERAL NOTES

## CAPACITORS

1. Stores energy as STATIC electric charge.
2. Measured in FARADS
3. Two major variations :-
  - a. NON POLARISED
  - b. POLARISED (Polarity Conscious)  
Type often is or called ELECTROLYTIC

## INDUCTORS

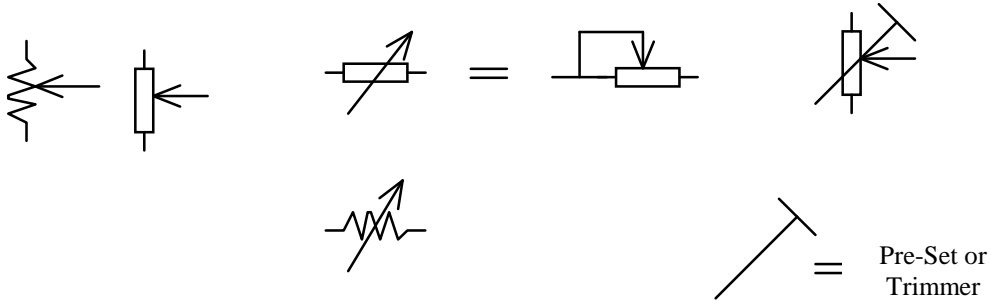
1. Stores energy as a MAGNETIC field.
2. Measured in HENRY's

# VARIABLE COMPONENTS.

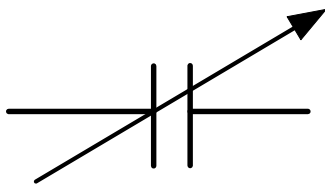
## RESISTORS

POTENTIOMETER

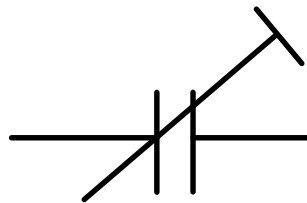
RHEOSTAT



## CAPACITORS

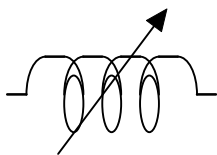


VARIABLE

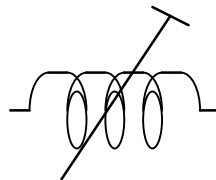


PRE-SET or TRIMMER

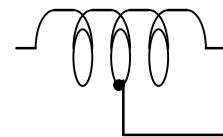
## INDUCTORS



VARIABLE

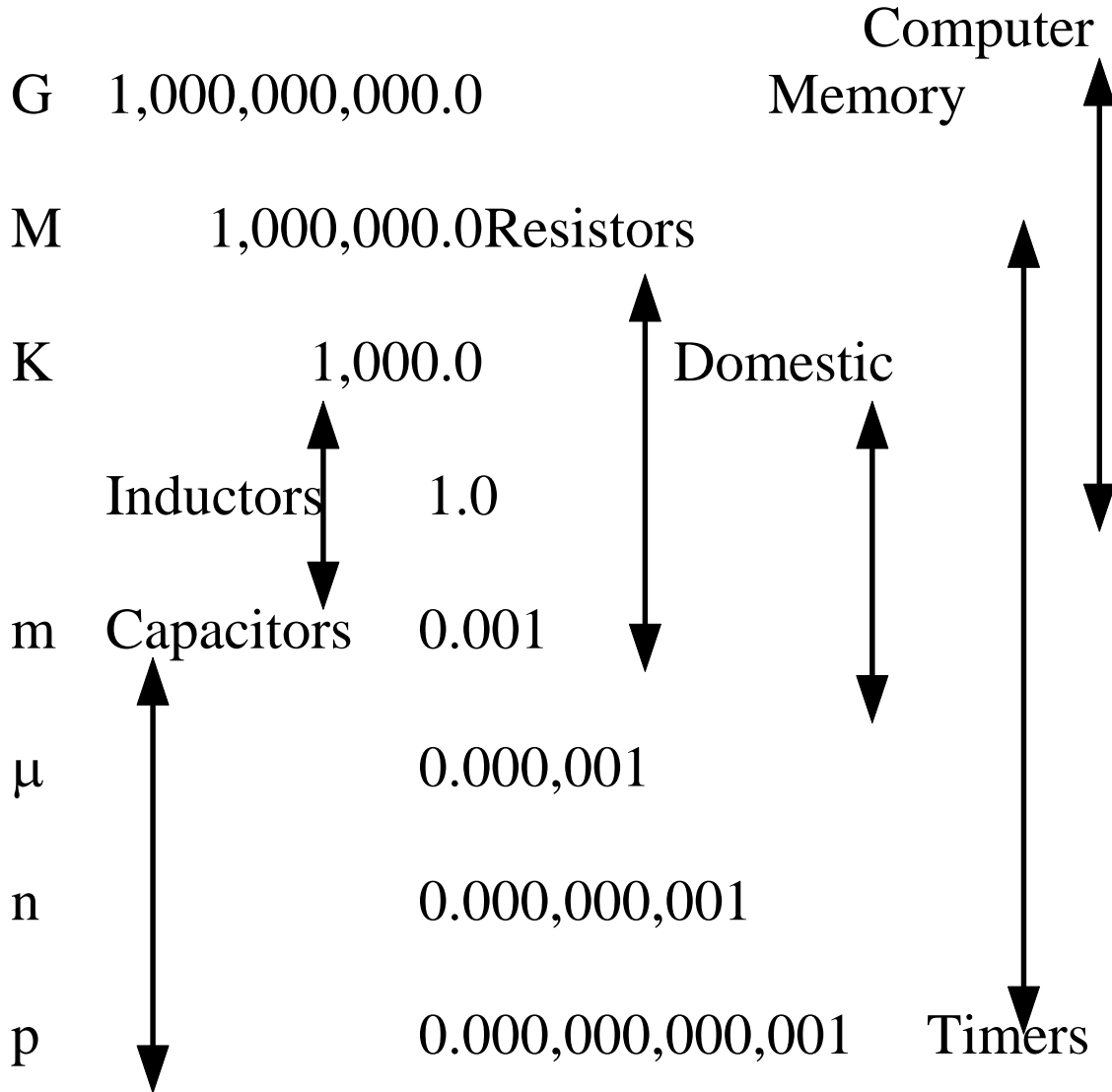


PRE-SET



TAPPED

# NUMBER RANGE.



Capacitors	Farads	Domestic	Grams
Inductors	Henrys		Metres
Memory	Bytes		Litres
Resistors	Ohms	Timers	Seconds
			Hertz

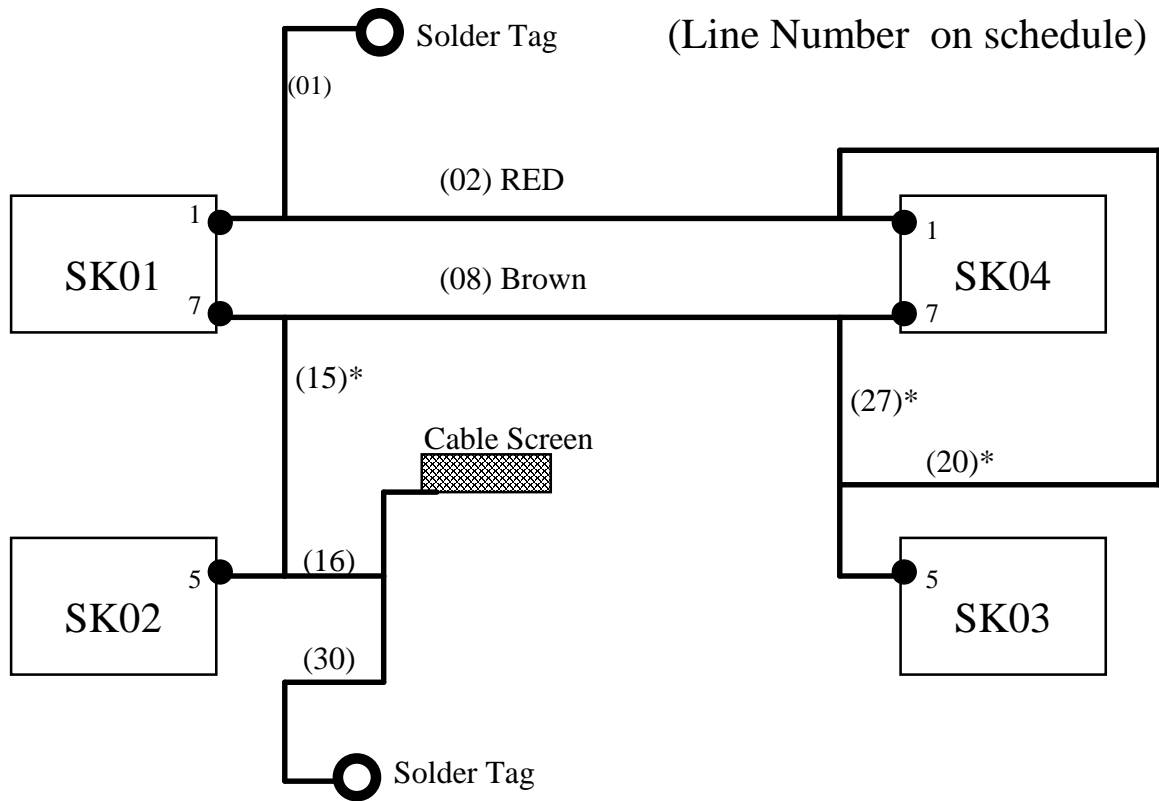
# **BIG LOOMS**

1. Add termination point to end of each connector on cable form layout.
2. Route wires as per schedule.
3. Place on Loom Sleeving and Shrink as required.

## **DO NOT SEAL.**

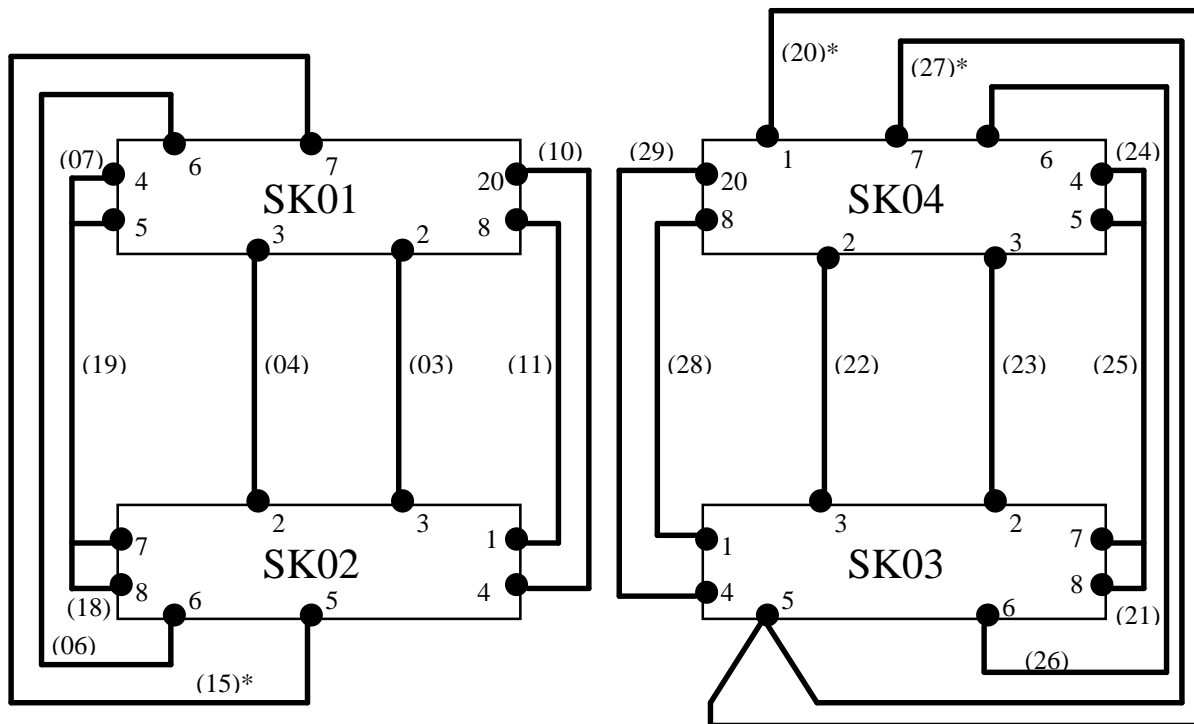
4. Check Routing of Loom.
5. Make off Soldered Connectors.
6. Check Routing of Loom.
7. Make off crimps.
8. Seal up Loom only after checking if all is OK.

# Loom 03 Hints.

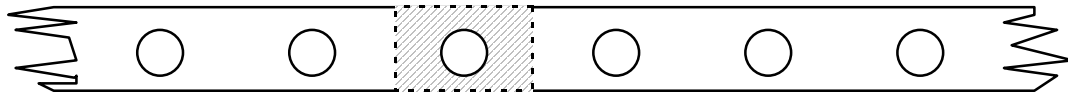


## Wire LINKS

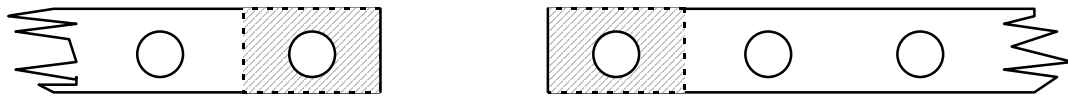
## Other Blue Wires.



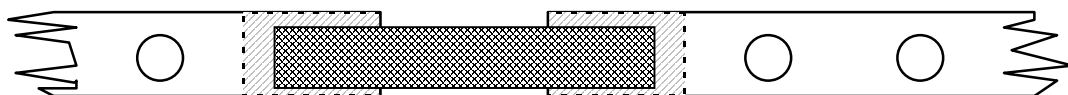
# Printed Circuit Board (PCB) Repair.



- (1) Cut/Score Track. Use heat to remove track. This activity will only be needed if this is a repair practice exercise.



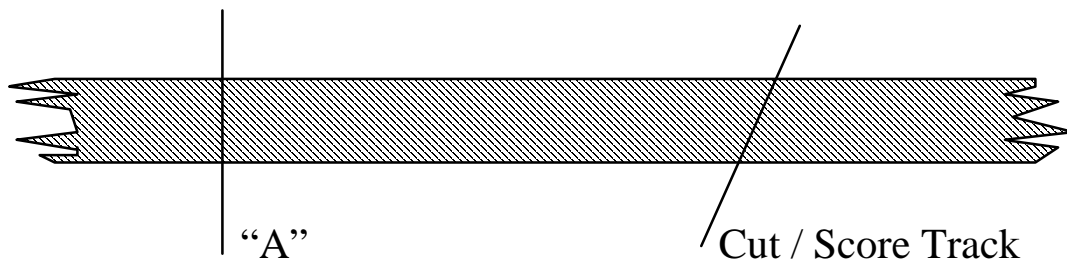
- (2) Clean and Tin the marked area. Tin section of single strand wire to bridge the gap.



- (3) Bridge gap with Tinned wire of roughly the same cross sectional area. Add extra solder as required.

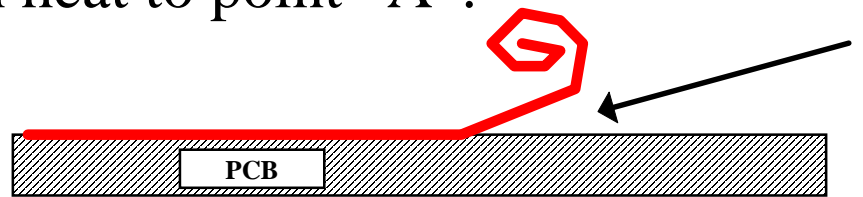
JOB 54 Specification Part 1

# Printed Circuit Board (PCB) Repair.

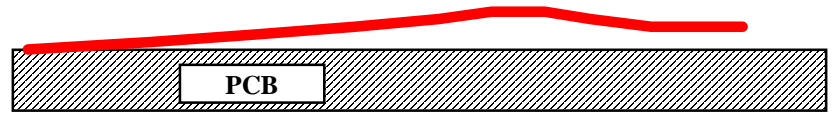


(1) Peel back with heat to point "A".

(2) Clean Area

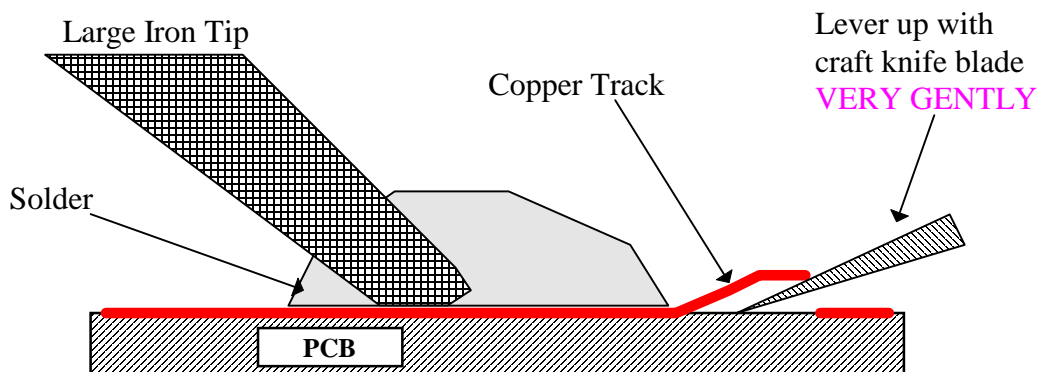


(3) Reshape track.



(4) Re-fit with EPOXY resin glue.

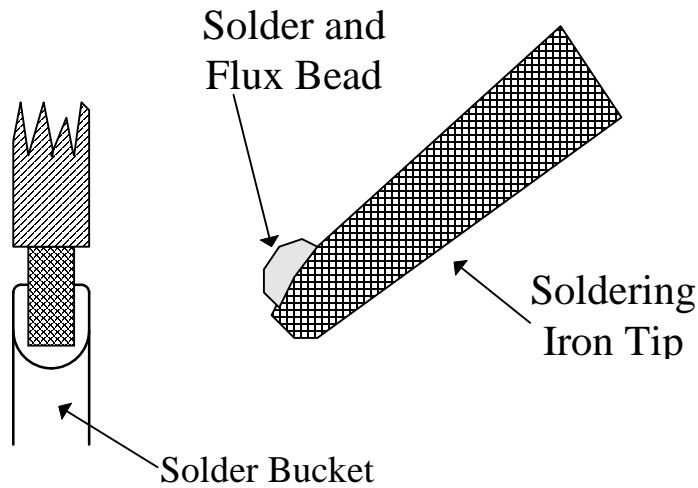
(5) Clean track surface.



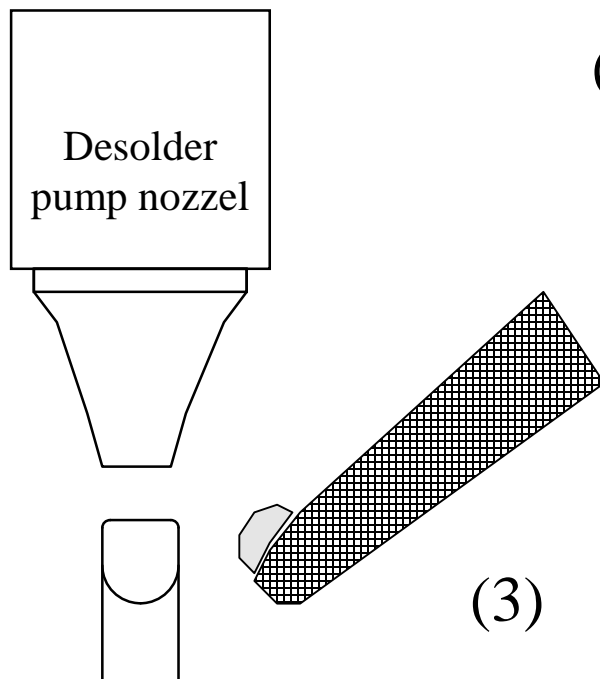
JOB 54 Specification Part 2

# De-SOLDERING.

- (1) Apply heat and remove contents.



- (2) Apply a little more solder and heat.



- (3) Remove surplus solder with De-soldering pump.

Try to avoid any damage to the insulation around the bucket.

JOB 53 Specification

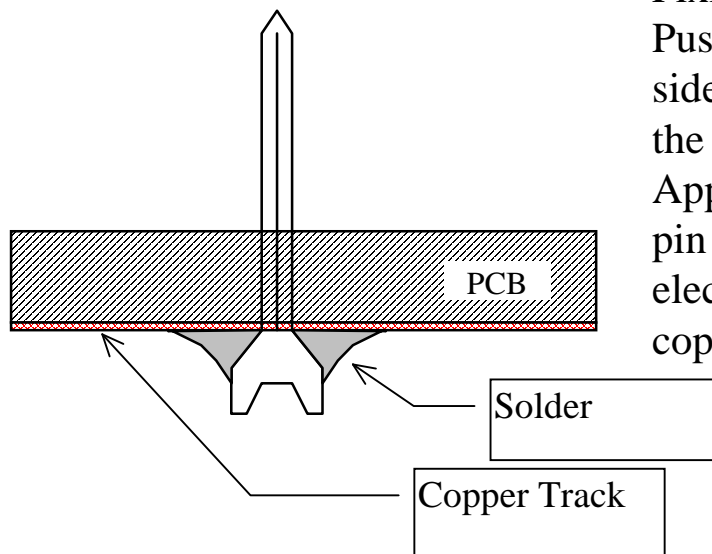


# WIRE WRAP

Fixing a Wire Wrap Pin.

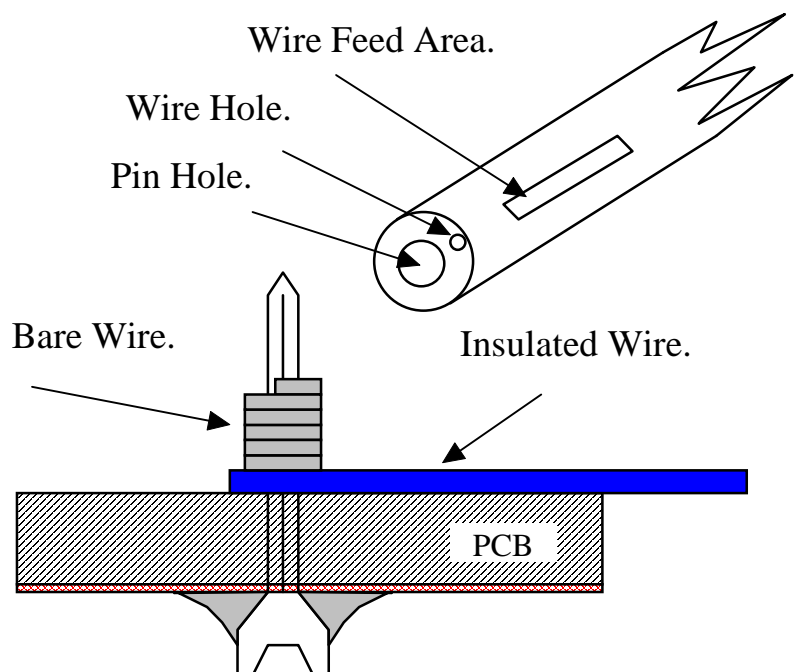
Push Pin in from copper track side of PCB until it is secured in the hole.

Apply sufficient solder to lock pin in place and make a good electrical connection with the copper track..



## Making a Wire Wrap Joint.

- 1) Strip about 1"/3cm of Insulation from the wire wrap wire.
- 2) Feed bare wire into the Wrap Tool via the Wire Hole.
- 3) Place Wrap tool over Wire Wrap Pin.
- 4) Rotate Tool in clockwise direction. Ensuring that the wire grips the Pin.



JOB 56 Specification

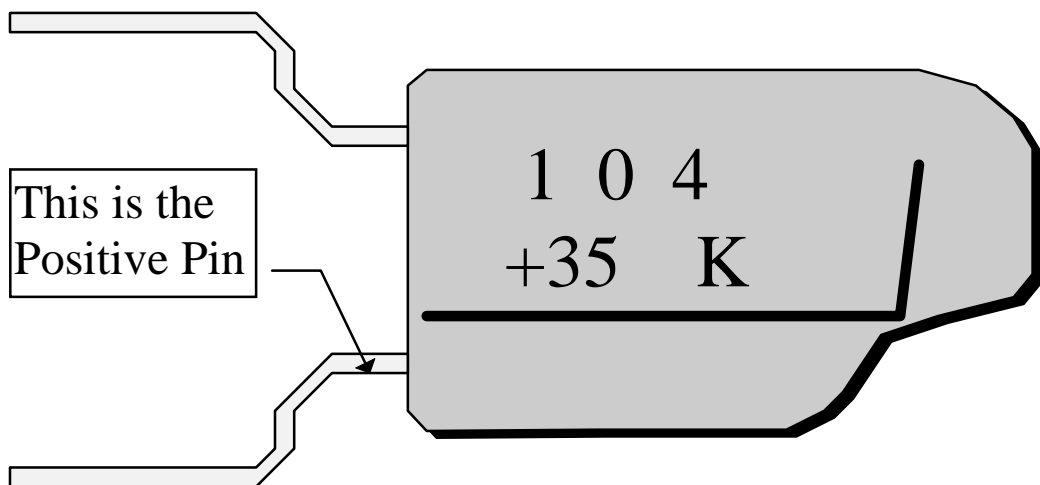
# CAPACITOR POLARITY.

1. In General the Bar or Line Indicates the Ground or Negative Pin.
2. **HOWEVER** Sometimes the Bar contains a + Symbol therefore this becomes the Positive Connection.
3. TANTALUM BEAD CAPACITOR.

**IF IN DOUBT**

**ASK or CHECK**

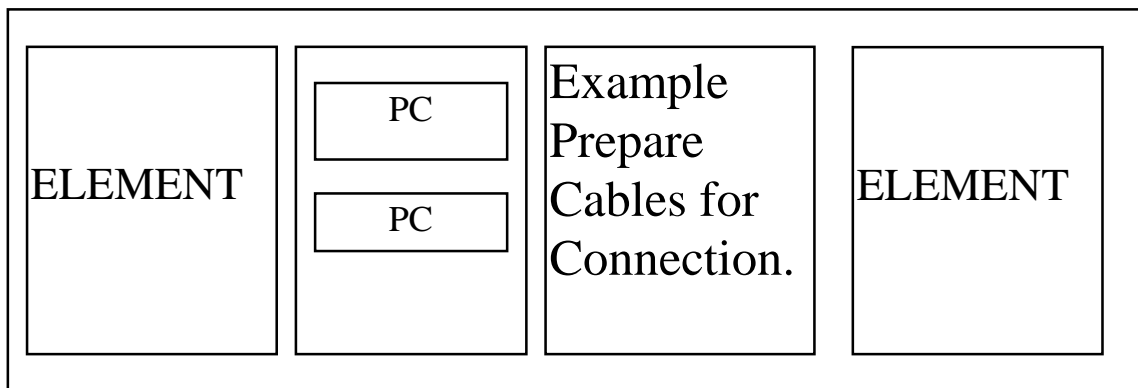
Example of a 100nF , 35 volt Working Capacitor.



# The Qualification

Developed by Industry for Industry.

Qualification = NVQ1 , NVQ2 ....

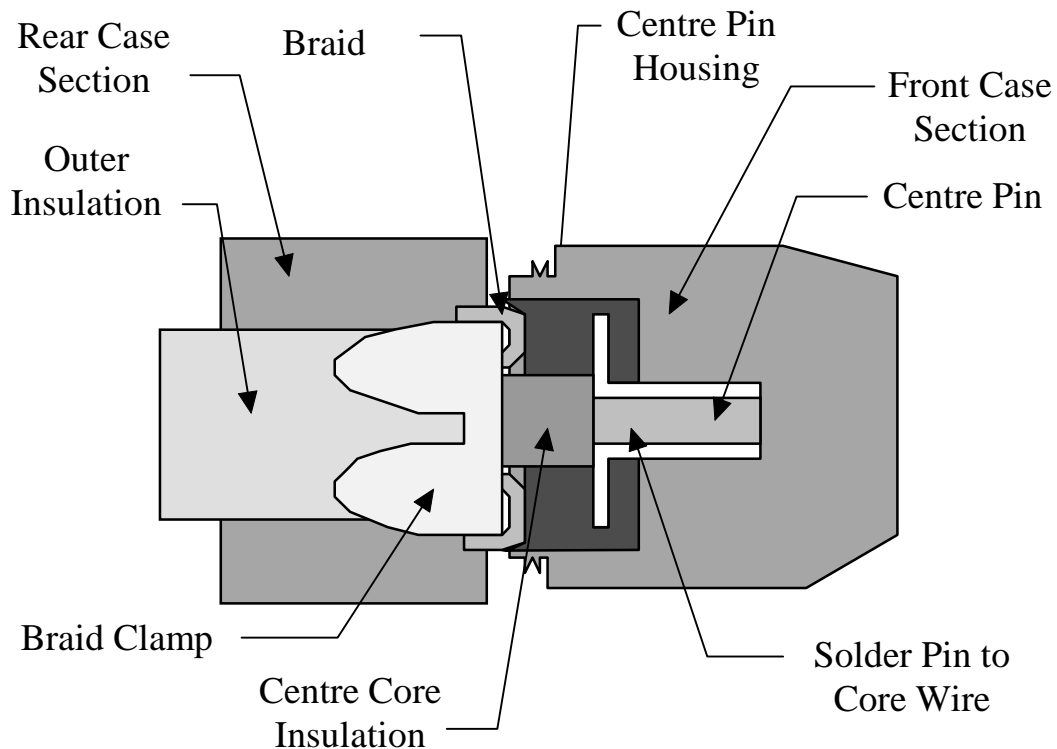


UNITs

Example  
Identify and Handle Tools and Components for Electronic  
Assembly.

PC = Performance Criteria

# TV COAXIAL



- 1) Place rear case section on coaxial Cable.
- 2) Strip outer insulation from cable and fit braid clamp.
- 3) Strip back braid and prepare centre core for soldering to center pin. Tin centre wire at least 1cm longer than require length.
- 4) Fit center housing so that the braid is clamped.
- 5) Solder Center pin to center pin wire.
  - **Note** The center housing is **very** easily melted.
  - **Note** That with the Socket version the centre pin is removable therefore careful measurement is needed for correct fitting.
  - Secure Front Case Section to rear Section and Clamp Tight

# RESISTORS

With values less than  $10\Omega$

## The Special Case

The count of zero's band has two additional colours.

GOLD = Divide value by 10

SILVER = Divide value by 100

e.g. 5R4 = GREEN YELLOW GOLD

R27 = RED VIOLET SILVER

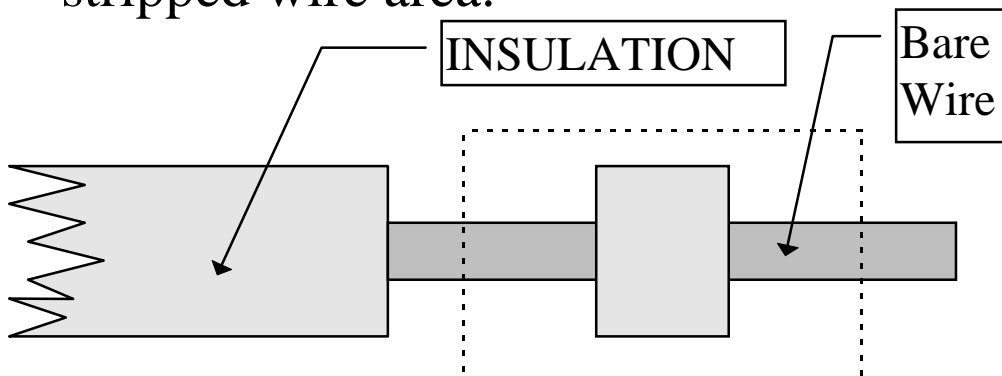
5R4 =  $5.4\Omega$

R27 =  $0.27\Omega$

# STRIPBOARD.

## Component or Link Soldering Practice. Using 1/0.6 Pink

1. Remove Length of Insulation from Pink Wire.
2. Using back of wire cutters move required measure length of Insulation down stripped wire area.

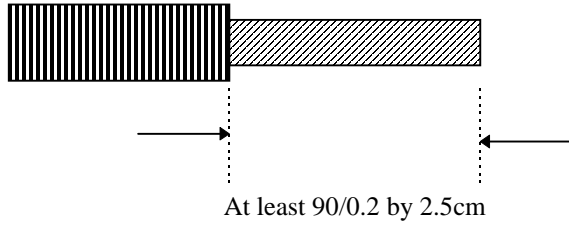


3. Cut off required (Dot enclosed) section and shape to fit PCB.
4. Use same technique to solder link to PCB as was used for the Terminal Pins.

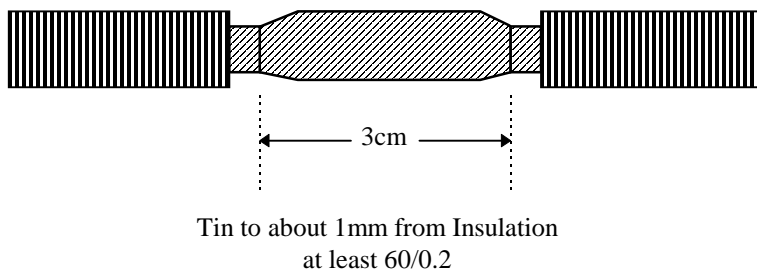
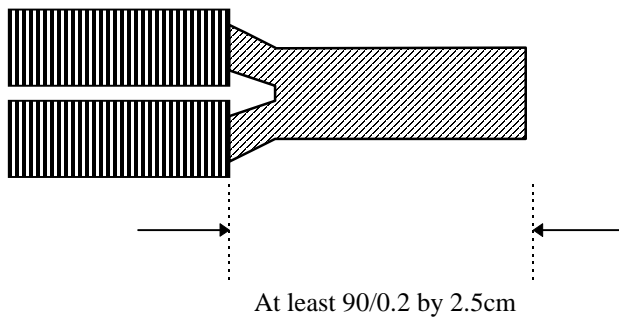
Practice as Required as Least 5 Links.

# Assessment Exercises.

## Tinning Exercise



## Joining Exercise



JOB 03 Specification Part 3

# METRIC - IMPERIAL

1 Inch	=	2.54 cm	=	25.4mm
12 Inches	=	1 Foot		
36 Inches	=	1 Yard		
39 Inches	≈	1 Metre		
3 Feet	=	1 Yard		

# STOCK RECORDING

All length measured in

METRE UNITS ie 3cm's NOT OK ×  
3cm's = 0.03m √

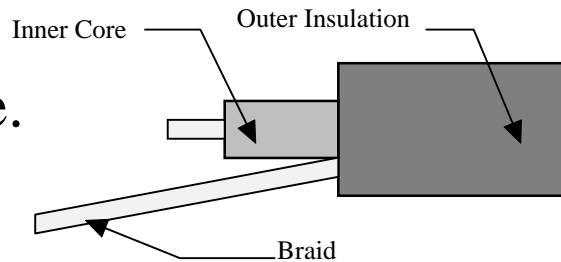
Round Quantities as follows :-

Below 0.1	=	0.1	0.5+→	0.8	=	0.8	
0.1+→	0.2	=	0.2	0.8+→	1	=	1
0.2+→	0.3	=	0.3	1+→	1.5	=	1.5
0.3+→	0.5	=	0.5	1.5+→	Round to		
					next whole		
					number		

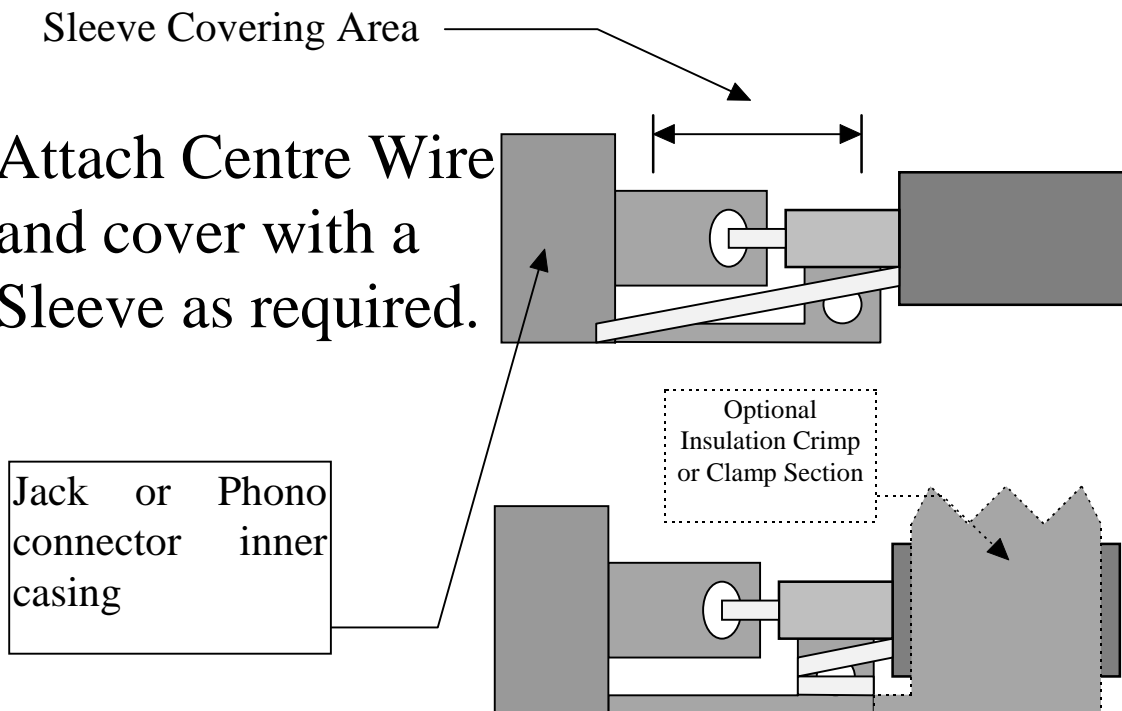


# PHONO & JACK.

1. Prepare and Tin Cable.



2. Attach Centre Wire and cover with a Sleeve as required.



3. Secure tinned braid to outer connection and crimp outer insulation as appropriate.
4. Finally fit outer connector casing.

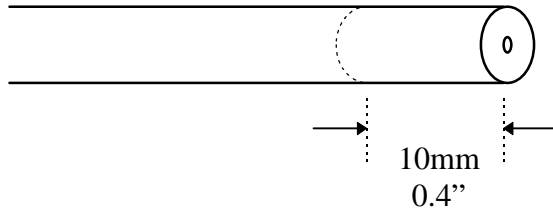
# GENERAL NOTES

## INTEGRATED CIRCUIT (IC).

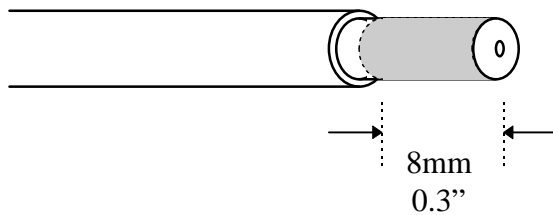
1. A collection of circuit elements contained within a single package.
2. Pin 1 is the Top Left Hand Corner and is marked or identified.
3. Count remainder of the pins round device in an Anti-Clockwise direction.
4. IC's are Both ESD and Heat Sensitive.
5. IC's come in various packages outlines :-  
SIL Single Inline One line of Pins.  
DIL Dual Inline Two Rows of Pins.  
Quad Packs Pins on all 4 sides.
- 6 Often IC's are referred to by generic part numbers i.e. LS151 could be a DM74LS151N or an SN74LS151N.
- 7 On circuit diagrams often only the signal connections are drawn. Most IC's need power to be applied to them and this information may supplied in an additional table. Remember that identified connections to power rails may only be preset logic level rather than being the actual power connection needed to drive the device.

# 'F' Type Plug

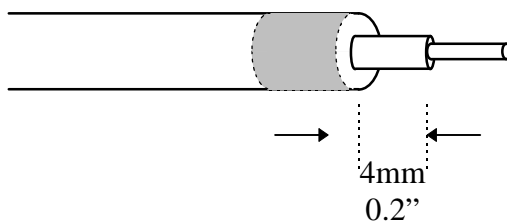
1. Trim back Outer Insulation Sheath.



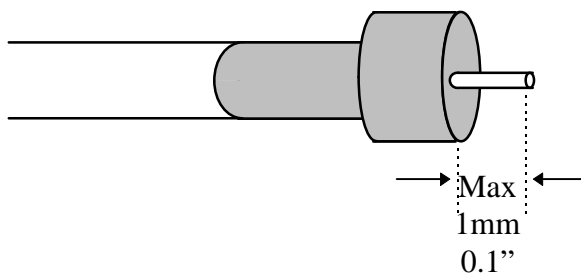
2. Trim back Metal Shield.



3. Fold back braid over Outer Insulation Sheath and trim Inner Insulation.



4. Finally hold cable and screw rear of connector over the cable.



5. Ensure that no more than 1mm of conductor sticks out from end of connector. Note that there should be some conductor protruding.
6. Final checks: Ensure that the centre core and the outer braids are totally isolated as the cable will usually carry both power and signals. Any shorts on the cable may well damage the equipment that it is to be connected to.