

Parts List

QTY	Description	ABRA Part #
1	SMT LITERATURE	SMT SOLDERING
1	SMD COMPONENTS KIT	SMD-COMP-KIT
1	SOLDERING IRON	200GX-25
1	SOLDER TIP SMD	44-415402J
1	SOLDER STAND	TSH007
1	SOLDER	STUBE
1	SMT TWEEZERS	900-072
1	JEWELLER'S LOUPE	99-10-102
1	SOLDER FLUX	8341-10ML
1	DESOLDER BRAID	DW1

Introduction

Surface Mount Technology (SMT) is the current worldwide fabrication standard for electronic devices. The electronic components used are called Surface Mount Devices (SMD).

Learning how to solder Surface Mount Devices is an essential skill to master for the prototyping and repairing modern electronic products.

This kit will provide you with the tools, techniques and enough practice material to learn how to solder surface mount components efficiently.

You will practice soldering various SMD electronic components such as resistors, capacitors, diodes, transistors and integrated circuits to a printed circuit board (PCB) using a soldering iron with a tip designed for SMT.

Intructions

- Read the SMT Soldering Literature "It's Easier than you Think".
- Identify the items included in this kit.
- Install the replacement tip for SMT soldering iron:
 - Unscrew the iron solder tip locking nut.
 - Remove the standard tip and replace it with the SMT tip.
 - Secure the locking nut back on the iron.
- Assemble the soldering iron stand
 - Place the soldering iron on to the stand.
 - Moisten the cleaner sponge with water.
- Turn on the soldering iron and allow it to warm up.

Surface Mount Components

- Open the components kit bag and identify the components by using the quantities of each to distinguish the different components.
- The 3216 Diodes have two pins and SOT-23 Transistors have three pins.
- The SO-16 IC's have pins on two sides and the QFP44 IC's have pins on four sides

QTY	Description	Install Locations
1	SMT PCB	ALL
30	0805 RESISTOR	R1-R30
10	0603 RESISTOR	R25-R34
14	0806 CAPACITOR	C1-C14
6	3216 DIODE	D1-D6
6	SOT-23 TRIODE	Q1-Q6
2	SO-16 IC	SOG16 (2x)
2	LQFP44 IC	PQFP44 (2x)
1	SOLDER FLUX	8341-10ML
1	DESOLDER BRAID	DW1

0805 RESISTORS

- Locate the strip of 30 x 0805 resistors.
- Use your SMT tweezers to carefully pull back enough clear tape to pick up one part out of the strip of 30 x 0805 resistors.
- Place the resistor on a sheet of white paper so you can easily see it.
- Place the PCB in front you and locate the R1-R10 0805 resistor pads.
- Put on the Jeweller's Loupe (right eye is good for right handed users) to see the pads clearly.
- Lay the PCB on a flat surface.
- Keep both elbows on the surface to steady your hands.
- Follow the **SMT Basic Soldering Instructions** and solder resistors R1 to R10 in place.

0806 CAPACITORS

- Locate the strip of 14 x 0806 Capacitors.
- Use your SMT tweezers to carefully pull back enough clear tape to pick up one part out of the strip of 14 x 0806 Capacitors.
- Place the capacitor on a sheet of white paper so you can easily see it.
- Locate the C1 to C10 locations on the PCB.
- Follow the **SMT Basic Soldering Instructions** and solder capacitors C1 to C10 in place

3216 DIODES

- Locate the strip of 6 x 3216 Diodes.
- Use your SMT Tweezers to carefully pull back enough clear tape to pick up one diode out of the strip.
- Place the diode on a sheet of white paper so you can easily see it.
- Locate the D1 to D6 diode locations on the PCB.
- Follow the **SMT Basic Soldering Instructions** and solder Diodes D1 to D6 in place.

0603 RESISTORS

- Locate the strip of 10 x 0603 resistors.
- Use your SMT tweezers to carefully pull back enough clear tape to pick up one resistor out of the strip.
- Place the resistor on a sheet of white paper so you can easily see it.
- Locate the R25 TO R34 Resistor locations on the PCB.
- Follow the **SMT Basic Soldering Instructions** and solder Resistors R25 to R34 in place

SOT-23 TRANSISTORS

- Locate the strip of 6 x SOT-23 transistors with the three leads.
- Use your SMT tweezers to carefully pull back enough clear tape to pick up one transistor out of the strip.
- Place the transistor on a white sheet of paper so you can easily see it.
- Locate the Q1 to Q6 transistor locations on the PCB.
- Follow the **SMT Basic Soldering Instructions** soldering all three pins of Transistors Q1 to Q6 in place.
- Take care to align all three pads when starting to solder.

SOT-23 TRANSISTORS

- Locate the strip of 6 x SOT-23 transistors with the three leads.
- Use your SMT tweezers to carefully pull back enough clear tape to pick up one transistor out of the strip.
- Place the transistor on a white sheet of paper so you can easily see it.
- Locate the Q1 to Q6 transistor locations on the PCB.
- Follow the **SMT Basic Soldering Instructions** soldering all three pins of Transistors Q1 to Q6 in place.
- Take care to align all three pads when starting to solder.

SO-16 IC's

- Locate the two SO-16 IC's with pins on two sides.
- Use your SMT tweezers to carefully pull back the clear tape.
- Remove one SO-16 IC and place it on a sheet of white paper.
- Locate the right hand SO-16 pad location on the PCB.
- Follow the **SMT IC Soldering Instructions** and solder the SO-16 in the right hand SO-16 location.
- The pin 1 white dot on the PCB should be matched with the dot on the SO-16.
- Repeat and solder the second SO-16 IC to the left side SO-16 location.

QFP44 IC's

- Locate the two QFP44 IC's with pins on all four sides.
- Place them on a white sheet of paper for easy access.
- Locate the right hand QFP44 pad location on the PCB.
- Follow the **SMT IC Soldering Instructions** and solder the right hand QFP44 IC in place.
- The pin 1 white dot on the PCB should be matched with the raised dot on the QFP44.
- Repeat and solder the left hand QFP44 in place.

SMT Basic Soldering Instructions

Refer to the *SMT SOLDERING* booklet illustrations showing how to solder Resistor and Capacitor two pad connections in the following steps:

STEP 1: TIN ONE PAD

- Clean and tin (put some solder on) the soldering iron tip to make soldering quicker.
- Tin one of the two pads using your soldering iron.
- The pad should be completely tinned. Avoid excess solder.

STEP 2: POSITION COMPONENT

- Pick up the component by its side with the tweezers and place it near the tinned pad.

STEP 3: SOLDER ONE PAD

- Clean and tin the solder tip
- Reheat the tinned pad and when the solder melts slide the component into position into the molten solder.
- Pull the soldering iron away while holding the part in place until the solder cools and becomes solid.

STEP 4: SOLDER THE SECOND PAD

- Clean and tin the solder tip.
- Touch the tip of your soldering iron to the second pad and apply solder to complete the joint.
- TIP: If you are having trouble soldering try putting on some liquid flux on the pad to help overcome any oxidization on the pads.

Step 5: INSPECT

- The pad connections should appear smooth and bright.
- If not redo any connections that are not.



Your face will be very close to the soldering iron, so be careful not to lift your soldering iron too high when you are finished a step.

SMT IC Soldering Instructions

Refer to the *SMT SOLDERING* booklet illustrations showing how to solder IC's in the following steps:

STEP 1: FLUX

- Put a small drop for flux on each of the (SO-16) pads.

STEP 2: TIN ONE PIN

- Clean and tin the solder iron tip to make soldering quicker.
- Tin one IC corner pad (white dot) using your soldering iron.
- The pad should be completely tinned. Avoid excess solder.

STEP 2: POSITION

- Pick up the IC with the tweezers.
- Place the IC with pin 1 (the dot) matching the white dot on the PCB.
- Carefully align all pins to the pads.

STEP 3: SOLDER ONE PIN

- Reheat pin 1 previously tinned pad.
The part should settle into position when the solder melts.
- Hold the part in place until you remove the soldering iron.
- Double-check that all the pins are aligned with the pads.
- If necessary realign the pins by re-melting the soldered pin.
After the next step it will become very hard to realign the pins.

STEP 4: SOLDER SECOND PIN

- Clean and add more solder to the tip of the iron.
- Solder the far diagonal corner pin opposite pin one in place.
 - This will lock the IC in place for the remainder of the soldering.

STEP 5: SOLDER REMAINING PINS

- Solder each remaining pin in place.
- Clean and re-tin your solder iron tip frequently.
- This will allow quicker soldering and avoid damaging the pads with too much heat

STEP 6: INSPECT

- The IC connections should appear smooth and bright.
- If not redo the connections that are not acceptable.



Your face will be very close to the soldering iron, so be careful not to lift your soldering iron too high when you are finished a step.

APPENDIX

- In the case where a solder joint has to be redone, excess solder can be removed using the de-solder braid.
 - Simply place the de-solder braid over the joint and heat the top of the braid to allow capillary action to wick up the solder from the joint.
- If more practice is desired, the remaining 20 of the 0805 Resistors can be soldered as well in positions R11 to R30.