Title	**Carry out soldering and de-soldering of printed circuit board mounted components and printed circuit board repair**		
Level	**3**	**Credits**	**8**

Purpose	People credited with this unit standard are able to: – maintain soldering and de-soldering equipment; – de-solder and solder using soldering irons and soldering stations; – de-solder and solder using airflow equipment; and – bridge and repair broken PCB.

Classification	Electronic Engineering > Electronic Installation and Maintenance

Available grade	Achieved

Guidance Information

1 References
Electricity Act 1992;
Electricity (Safety) Regulations 2010;
Electrical Workers Registration Board (*EWRB*) *Rules of the Board* and *Teaching Guidelines* available at www.ewrb.govt.nz;
Health and Safety at Work Act 2015;
IPC-A-610F: *Acceptability of Electronic Assemblies* available at www.ipc.org;
and all subsequent amendments and replacements.

2 Definitions
Industry practice – those practices that competent practitioners within the Electronic Engineering industry recognise as current industry best practice.
PCB – printed circuit board.
SMDs – surface mounted devices.

3 Range
a Soldering equipment – soldering irons, airflow soldering equipment.
b Electrical, radiation, and workshop or laboratory safety practices are to be observed at all times.
c All soldering work must be carried out using only lead-free solder.
d All activities and evidence presented for all outcomes and performance criteria in this unit standard must be in accordance with:
  i legislation;
  ii policies and procedures;
  iii ethical codes;
  iv Standards – may include but are not limited to those listed in Schedule 2 of the Electricity (Safety) Regulations 2010;

v EWRB Rules of the Board;
vi safe and sound practice;
vii applicable site, company, and industry practice.

Outcomes and performance criteria

Outcome 1

Maintain soldering and de-soldering equipment.

Performance criteria

1.1 Check soldering iron tips are tinned, clean, and the correct shape.

1.2 Confirm that the soldering iron temperature control system is operating in accordance with the manufacturer's specifications and conforms to electrical safety requirements.

1.3 Check nozzles for airflow soldering and de-soldering equipment are blockage free and clean.

Range airflow equipment includes one of the following – positive pressure, vacuum.

1.4 Check hoses of airflow soldering and check de-soldering equipment is damage free.

1.5 Check airflow soldering and check de-soldering equipment is operating to manufacturer's specifications.

Range temperature, vacuum and/or pressure.

1.6 Check airflow soldering and check de-soldering equipment conforms to electrical safety requirements.

Outcome 2

De-solder and solder using soldering irons and soldering stations.

Performance criteria

2.1 Complete de-soldering and removal of through-hole and SMDs from PCB within agreed timeframe using soldering irons and soldering stations.

Range through-hole and surface mount components include – resistors, capacitors, diodes, transistors, integrated circuits, inductors, wires, lugs, connectors.

2.2 Complete replacement and soldering of components onto PCB within agreed timeframe using soldering irons and soldering stations.

2.3 Check adjacent components are undamaged and unaffected by soldering and de-soldering operations.

Range no melting, discolouring, inadvertent removal, heat damage, short circuit tracks.

2.4 Check PCB is free from damage caused by use of soldering irons and soldering stations.

Range no bubbled board, burns, lifted tracks and lands, stressed tracks and lands, cut and broken tracks and lands, short circuits, board leakage.

2.5 Check soldered PCB is free from flux residue.

2.6 Check solder used matches component and board type.

Range paste, conventional solder wire.

2.7 Check soldering iron and soldering station temperature is correct for type of PCB and component.

2.8 Check soldered and de-soldered PCB is reliable and operational to manufacturer's specifications.

Outcome 3

De-solder and solder using airflow equipment.

Performance criteria

3.1 Complete de-soldering and removal of through-hole and surface mount components from PCB within agreed timeframe using airflow soldering and de-soldering equipment.

Range through-hole and surface mount components include – resistors, capacitors, diodes, transistors, integrated circuits, inductors, wires, lugs, connectors.

3.2 Complete replacement and soldering of components onto PCB within agreed timeframe using airflow soldering and de-soldering equipment.

3.3 Check adjacent components are undamaged and are unaffected by soldering and de-soldering using airflow soldering and de-soldering equipment.

Range no melting, discolouring, inadvertent removal, heat damage, short circuit tracks.

3.4 Check PCB is free from damage caused by use of airflow soldering and de-soldering equipment.

Range no bubbled board, burns, lifted tracks and lands, stressed tracks and lands, cut and broken tracks and lands, short circuits, board leakage.

3.5 Check soldered PCB is free from flux residue.

3.6 Check solder used matches component and board type.

Range paste, resin core solder wire.

3.7 Check airflow soldering, and de-soldering equipment temperature is correct for type of PCB and component.

3.8 Check soldered and de-soldered PCB is reliable and operational to manufacturer's specifications.

Outcome 4

Bridge and repair broken PCB.

Performance criteria

4.1 Identify cracks and breakages in PCB and fix within agreed timeframe.

4.2 Check repaired PCB withstands physical stress of normal wear and tear for type of product under repair.

4.3 Check repaired PCB is free from charcoal, burns, and holes.

4.4 Check repaired tracks on PCB deliver current carrying requirements of circuit.

4.5 Check PCB with bridged and repaired tracks is free from short circuits and leakage.

4.6 Check PCB with bridged and repaired tracks is free from dry joints.

4.7 Check PCB with bridged and repaired tracks meets manufacturer's operating specifications.

Planned review date	31 December 2025

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	29 October 1996	31 December 2011
Revision	2	3 April 2001	31 December 2011
Review	3	24 November 2003	31 December 2012
Review	4	21 July 2011	31 December 2022
Review	5	24 June 2021	N/A

Consent and Moderation Requirements (CMR) reference	0003

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Comments on this unit standard

Please contact The Skills Organisation reviewcomments@skills.org.nz if you wish to suggest changes to the content of this unit standard.