

1 Module Details	
Module Name	Through Hole Soldering Skills
Nominal duration	It is expected that students with the appropriate entry knowledge and skills will successfully complete this module in 18 - 20 hours
Module code	NUE 128
Discipline code	0703230 Electronic Installation and Maintenance
2 Module purpose	To enable students to develop the knowledge and skills to perform high reliability through hole soldering
3 Prerequisites	NE29 or NE184.1 Electronic Hand Soldering Technology
4 Relationship to competency standards	This module provides some of the knowledge and skills underpinning competency in the following standards: National Electrotechnology Industry Standards, Units NES 111, NES 201; NES202; NES 401 Metals & Engineering Industry Standards, Unit 5.2A
5 Content	<ol style="list-style-type: none">1. Identification of Components<ul style="list-style-type: none">• Resistors• Capacitors• Inductors• Relays• Switches• Diodes• Light Emitting Diodes (LEDs)• Connectors• Transistors• Integrated Circuits• Semiconductor devices2. Operation and routine maintenance of a range of soldering equipment<ul style="list-style-type: none">• Vacuum desoldering tools• Soldering tweezers• Solder Pots• Preheat plates• Hot air/gas pens• Manual pick and place machines• Viewing and Inspection devices3. Requirements of Standard ANSI/J-STD-001<ul style="list-style-type: none">• Requirements for Soldered Electrical and Electronic Assemblies with respect to through hole soldering• Requirements of the standard for a given through hole work situation4. Post Solder inspection of through hole technology<ul style="list-style-type: none">• Visual

	<ul style="list-style-type: none"> • Cleaning requirements • Visual aids • Lighting requirements <p>5. The use of flux, cleaning agents and solder paste</p> <ul style="list-style-type: none"> • Flux <ul style="list-style-type: none"> • Resin/rosin based flux • Low residue flux • No clean flux • Flux percentage, by volume in solder • Wire and solder paste • Cleaning agents <ul style="list-style-type: none"> • Chemical • Aqueous • Aqueous additives • Solder Paste <ul style="list-style-type: none"> • Suitability for hand dispensing • Shelf life and manufacturers designators • Dispensing methods • Testing
<p>6 Assessment strategy</p> <p>Assessment methods</p> <p>Conditions of assessment</p>	<p>Assessment should be progressive reflecting a holistic approach to ensure the module purpose is met. To assist in ensuring validity, reliability and fairness assessment instruments should include practical exercises, assignments and written tests consisting of a number of item types, such as multiple choice, short answer and problem solving.</p>
<p>7 Learning Outcome Details</p> <p>Learning Outcome 1</p> <p>Assessment criteria</p> <p>Learning Outcome 2</p> <p>Assessment criteria</p> <p>Learning Outcome 3</p>	<p>Identify components used in PCBA through hole assembly and rework situations</p> <p>1.1 List a range of typical through hole components</p> <p>1.2 Identify any given component from a random selection of through hole components</p> <p>Set up and maintain specialised soldering equipment</p> <p>2.1 Set up and operate specialised soldering equipment</p> <p>2.2 Clean and maintain specialised soldering equipment</p> <p>Describe the standards required for reworking a through hole PCBA as laid down in standard ANSI/J-STD-001</p>

Assessment criteria

- 3.1 Describe the cleaning requirements of components and PCB's prior to through hole soldering
- 3.2 Explain the through hole soldering temperature requirements and the need to use a variable temperature, electronically controlled soldering iron.
- 3.3 Demonstrate the correct method used when forming component leads.
- 3.4 Explain the reasons for gold removal during through hole soldering.
- 3.5 Describe the correct accept/reject criteria for through hole soldered joints
- 3.6 Demonstrate approved post-solder cleaning techniques
- 3.7 Explain the requirements of the 3 levels outlined in ANSI-J-STD-001.

Learning Outcome 4

Use a range of typical specialised soldering equipment to solder and de-solder a PTH PCBA

Assessment criteria

- 4.1 Demonstrate the correct method used to solder a range of leaded components on a PTH PCBA to the requirements of ANSI/J-STD-001
- 4.2 Demonstrate the correct method used to de-solder and replace a range of leaded components on a PTH PCBA to the requirements of ANSI/J-STD-001
- 4.3 Inspect a PTH PCBA populated with leaded components and classify individual solder joints acceptable or rejectable in accordance with the requirements of ANSI/J-STD-001
- 4.4 Describe the visual aids and lighting requirements for post PTH solder inspection

Learning Outcome 5

Describe the requirements and uses of fluxes, cleaning agents and solder pastes

Assessment criteria

- 5.1 List the advantages and disadvantages of different flux types
- 5.2 List the different types of cleaning agents and explain the need for each type.
- 5.3 Describe the composition of solder paste and its suitability for manual deposition.
- 5.4 Describe solder paste shelf life.
- 5.5 Describe the common manual dispensing methods for fluxes, cleaning agents and solder pastes

Delivery Strategy	<p>5.6 Conduct basic solder paste tests</p> <p>This module is designed to be taught in either a classroom/workshop or on industrial premises</p> <p>It is important that occupational health and safety issues, static discharge avoidance and workplace cleanliness that are part of the learning outcomes in the prerequisite module are reinforced throughout the delivery of this module.</p> <p>The majority of learning outcomes are suited to lecture, demonstration, practice sessions with an emphasis being put on time allocation for the practice elements of all sessions.</p>
Resource requirements	<p>It is recommended that the following equipment be available for the delivery of this module.</p> <ul style="list-style-type: none">6 copies of ANSI/J-STD-001 Requirements for Soldered Electrical and Electronic Assemblies12 variable temperature, electronically controlled soldering stations.6 Vacuum desoldering stations.6 Soldering tweezers4 Hot air/gas SMT rework stations.4 Paste dispensing stations.4 Visual inspection stations with times 10 and times 20 magnification.
Occupational health and safety requirements	<p>A safe and healthy environment will be provided for students and teachers as well as safety procedures followed with regard to teaching/learning activities. In addition the following points should be considered.</p> <ol style="list-style-type: none">1. Fume extraction.2. Storage and use of chemicals.3. Use of equipment and components at elevated temperatures.4. Eye protection from lead and wire offcuts