

## BTEC Assignment Brief

<b>Qualification</b>	Pearson BTEC Level 3 National Diploma in Engineering
<b>Unit number and title</b>	Unit 34: Electronic Circuit Design and Manufacture
<b>Learning aim(s)</b> (For NQF only)	<b>A: Know the design processes and production methods used in the manufacture of a printed circuit board</b>
<b>Assignment title</b>	Design processes and production methods used in the manufacture of a printed circuit board
<b>Assessor</b>	J Kupper
<b>Issue date</b>	07/10/2020
<b>Hand in deadline</b>	21/10/2020

<b>Vocational Scenario or Context</b>	<p>You are working for a company that has asked you to investigate and report on the most common and used methods for the manufacture of printed circuit boards. In the report you have been asked to write sections that investigate:</p> <p>Single and multi-layer PCB manufacture and design processes</p> <p>How the company could use PCB design software and how it works in detail</p> <p>Why thermal analysis is relevant to the design , testing and manufacture of PCBs</p> <p>What and how surface mount technology works.</p>
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<b>Task 1</b>	<p>You are going to evaluate the effectiveness of PCB design and manufacture techniques.</p> <p><b>To do this:</b></p> <p>Your tutor will provide you with information and/or case studies. You need to:</p> <ul style="list-style-type: none"> <li>• Research the processes used: Single and multi-layer PCBs</li> <li>• Research how these engineering processes are used to manufacture PCBs</li> </ul>
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	<p><b>You then need to:</b></p> <p>Produce a report that evaluates the effectiveness of the PCB manufacturing and design processes used to manufacture various products. Your report should include:</p> <ul style="list-style-type: none"> <li>• Information on the advantages and limitations of the engineering processes compared with the advantages and limitations of using other possible processes, which should include justifications as to which processes are most effective, by referring to the specific requirements of PCB manufacture – as part of this, you must provide thorough details about how the engineering processes work/operate, including health and safety factors and legislation and regulations that apply; and</li> <li>• Evidence that you have a strong awareness of a range of engineering factors, and can judge how they impact on the design and manufacturing processes used in the creation of PCBs.</li> </ul>
<b>Checklist of evidence required</b>	A report, prepared as an individual, detailing engineering processes used in PCB manufacture that discusses the advantages and limitations of different processes as well as the commonly employed techniques used to test and check designs and QC products.
<b>Criteria covered by this task:</b>	
Unit/Criteria reference	To achieve the criteria you must show that you are able to:
M1	explain the benefits of using automated techniques for the manufacture of an electronic circuit
P1	describe the processes used in the design of both a single and multilayer PCB for electronic circuits of different complexity
P2	describe typical production methods used in the manufacture of both a circuits of different complexity
P3	describe how computer aided design software is used to analyse an electronic circuit prior to manufacture
P4	explain the need for thermal analysis and effective heat dissipation for an electronic circuit
P5	explain the use of SMT in the manufacture of an electronic circuit and

	give two examples of the outlines and packages used for surface mounted devices
P6	describe methods used for the manufacture of an electronic circuit using SMT

<b>Sources of information to support you with this Assignment</b>	<p>Textbooks</p> <p>Pearson textbook specific to new BTEC Nationals in Engineering</p> <p>Schrader, G. et al. (2000) <i>Manufacturing Processes and Materials</i>, 4th Edition, Society of Manufacturing Engineers, 0872635171.</p> <p>Mikell P. Groover (2010) <i>Fundamentals of Modern Manufacturing</i>, 5<sup>th</sup> Edition, John Wiley &amp; Son, Inc.</p> <p>Serope Kalpakjian, Steven Schmid (2007) <i>Manufacturing Processes for Engineering Materials</i>, 5<sup>th</sup> Edition, Prentice Hall</p> <p>Websites</p> <p><a href="https://archive.org/stream/IntroductionToBasicManufacturingProcessAndWorkshopTechnology/Introduction%20to%20basic%20manufacturing%20process%20and%20workshop%20technology%20%281%29#page/n0/mode/2up">https://archive.org/stream/IntroductionToBasicManufacturingProcessAndWorkshopTechnology/Introduction%20to%20basic%20manufacturing%20process%20and%20workshop%20technology%20%281%29#page/n0/mode/2up</a></p> <p><a href="http://www.efunda.com/processes/processes_home/processes.cfm">http://www.efunda.com/processes/processes_home/processes.cfm</a></p> <p><a href="http://www.peo.on.ca/index.php/ci_id/19394/la_id/1.htm">www.peo.on.ca/index.php/ci_id/19394/la_id/1.htm</a></p> <p><a href="http://www.kupper.org.uk/engineering/b-tec-content/unit-2">http://www.kupper.org.uk/engineering/b-tec-content/unit-2</a></p>
<b>Other assessment materials attached to this Assignment Brief</b>	<i>eg, work sheets, risk assessments, case study</i>