



**Murdoch**  
UNIVERSITY

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*School of Engineering and Energy*

***ENG460 – Engineering Thesis***

Commissioning of the Pioneer Robot

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## ABSTRACT

*The Pioneer Robot 3-AT is a remote controlled vehicle with inbuilt sensors to feed back information to the internal electronics. The purpose of the Pioneer Robot 3-AT is to be an educational device to be used in classes where microcontroller technology is taught to engineering students. This paper presents the steps taken to make the Pioneer Robot 3-AT a robust and stable platform. Once this is done further projects created with separate microcontrollers can be added to the Pioneer Robot 3-AT. They will be connected via an internal microcontroller network.*

*Software has been refined to allow the Pioneer Robot 3-AT to move in various directions at different speeds. The distance from surrounding objects is provided by feedback from sonar sensors. A new I/O distribution board has been manufactured to replace the prototype board constructed in a previous thesis by Finbarr Doyle. A liquid crystal display and keypad have been added for extra programmable functionality to an angled panel mounted on the back of the Pioneer Robot 3-AT.*

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*NB: Internal appendices can be found in chapter 21.*

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## TERMINOLOGY AND ACRONYMS

<b>[*]</b>	=	Square brackets define a reference.
<b>Decimal</b>	=	# (eg : #542 means a decimal 542)
<b>Hexadecimal</b>	=	\$ (eg . \$8000 means hex 8000 = decimal 32,768)
<b>Binary</b>	=	% (eg : %00010101 means binary 10101 = decimal 21)
<b>NMIS/L-????</b>	=	The letters 'S' and 'L ' are exchangeable meaning Short or Long. This defines the physical size of the board and has no effect on the circuitry of the board itself. The following four numbers '????' define the board type.
<b>Word</b>	=	Is the equivalent of a function or a command in other programming languages.
<b>I/O</b>	=	Input / Output.
<b>OS</b>	=	Operating System.
<b>CMOS</b>	=	Complementary Metal Oxide Semiconductor.
<b>EEPROM</b>	=	Electrically Erasable Programmable Read Only Memory.
<b>TTL</b>	=	Transistor-Transistor Logic (or 0 volt and 5 volt used as binary signals).
<b>LED</b>	=	Light Emitting Diode.
<b>PCB</b>	=	Printed Circuit Board.
<b>GNU</b>	=	Gnu Is Not Unix (this is a recursive acronym)
<b>IC</b>	=	Integrated Circuit.
<b>M/C</b>	=	Motor / Controller.