

E10 Microwave

USER MANUAL

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Copyright

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Preface

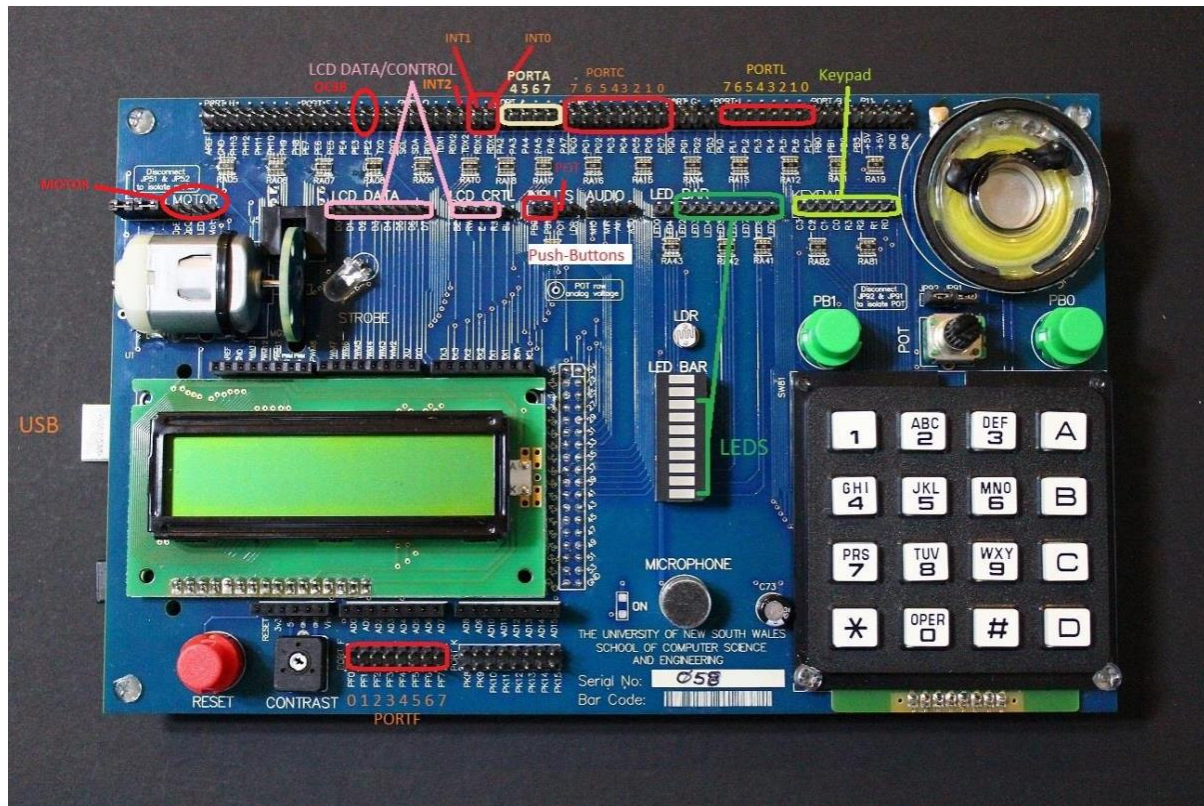
The E10 Microwave software has been designed according to the COMP2121 specifications. The E10 Microwave uses the Arduino ATmega2560 chip set with a custom built AVR board supplied by the staff of COMP2121. The E10 Microwave software was written using Assembly. The E10 Microwave was designed to revolutionise the way food is heated and will change the world forever. This guide will allow the user to understand how to operate the E10 Microwave software. This guide is written for Windows users, users of other operating systems are to use their knowledge of equivalent instructions.

Contents

Copyright	1
Preface.....	1
Contents	2
Getting started.....	3
Wiring the AVR Board	3
Connecting to the Computer	5
Find COM Port Number.....	5
Using the Program.....	5
Buttons	6
Display	6
LED	6
Basic Instructions.....	7
Entry Mode.....	7
Running Mode.....	7
Paused Mode	7
Finished Mode.....	7
Safety Information	8
Troubleshooting	8
Failure to download with ‘console.bat’	8
Board not functioning.....	8
FAQ.....	9
Contact Information	9

Getting started

The following figure is the microwave emulator AVR board.



Wiring the AVR Board

For the E10 Microwave to perform correctly, the following connections need to be made. These connections are described in terms of the labelling on the board.

AVR Pins (top and bottom row)		Input/Output Device Pins (middle row)	
Port Group	Pin	Port Group	Pin
PORT F	PF0	LCD DATA	D0
PORT F	PF1	LCD DATA	D1
PORT F	PF2	LCD DATA	D2
PORT F	PF3	LCD DATA	D3
PORT F	PF4	LCD DATA	D4
PORT F	PF5	LCD DATA	D5
PORT F	PF6	LCD DATA	D6
PORT F	PF7	LCD DATA	D7
PORT E	PE6	MOTOR JUMPER	JP91
PORT D	+5V	MOTOR	OpE
PORT D	OpO	MOTOR	TDX2
PORT D	RDX3	PUSH BUTTON	PB01
PORT D	RDX4	PUSH BUTTON	PB00
PORT A	PA4	LCD CTRL	BE
PORT A	PA5	LCD CTRL	RW
PORT A	PA6	LCD CTRL	E
PORT A	PA7	LCD CTRL	RS
PORT C	PC0	LED BAR	LED2
PORT C	PC1	LED BAR	LED3
PORT C	PC2	LED BAR	LED4
PORT C	PC3	LED BAR	LED5
PORT C	PC4	LED BAR	LED6
PORT C	PC5	LED BAR	LED7
PORT C	PC6	LED BAR	LED8
PORT C	PC7	LED BAR	LED9
PORT G	PG2	LED BAR	LED0
PORT L	PL0	KEYPAD	C3
PORT L	PL1	KEYPAD	C2
PORT L	PL2	KEYPAD	C1
PORT L	PL3	KEYPAD	C0
PORT L	PL4	KEYPAD	R3
PORT L	PL5	KEYPAD	R2
PORT L	PL6	KEYPAD	R1
PORT L	PL7	KEYPAD	R0
PORT B	PB0	SPEAKER	Red Wire

Connecting to the Computer

To connect the board to the computer, use the USB Type-B port on the Arduino (left side). A green light should be visible on the Arduino board.

Find COM Port Number

To work out which COM port the Arduino is connected to, open system properties by clicking the start button, right-clicking 'My Computer' then clicking properties. In the 'Hardware' tab, click 'Device Manager'. You may get a warning about administrator privileges that you can ignore. Scroll down to 'Ports (COM & LPT)'. There should be one item called 'Arduino Mega 2560 (<portname>)'.

Using the Program

Download the file 'programmer.zip' from the 'AVR resources' page on the COMP2121 website. Extract the files and open the folder. Run the batch file 'console.bat' to open up a command prompt. To load the microwave emulator program, run using the download command:

```
download <comport> <hexfile>
```

<comport> is the name of the port you found earlier in the previous section.

<hexfile> is the hex file for the microwave emulator.

If the download is successful, the command prompt will display a message indicating success.

Buttons

Button	Function
0-9	Digit input
A	Enter power selection in entry mode
C	Add 30 seconds in running mode
D	Subtract 30 seconds in running mode
*	Start button
#	Stop button
Left push button	Open the door
Right push button	Close the door

Display

Display	Representation
00:00	Current time
‘-‘, ‘\’, ‘ ’, ‘’’	Turntable
O or C	O for door open, C for door closed

LED

LED Position	Representation
Top most LED	Door is open
Bottom 8 LEDs	Power level (2 for 25%, 4 for 50%, 8 for 100%)

Basic Instructions

Entry Mode

- Input up to four digits for desired cook time using the keypad buttons 0-9. If you do not have any preference for cook time, the default cook time is 1 minute. To clear the displayed time, press the stop button (#).
- Press A to set power level: 1 for 25%, 2 for 50% or 3 for 100%. Press stop button (#) to exit power selection. If you do not have any preference for power level, the default power level is 100%.
- To start cooking, press the start button (*) to enter running mode.
- If you accidentally open the door by pressing the left push button, press the right push button to close the door and resume entry mode.

Running Mode

- Press C to add 30 seconds to the cooking time. Press D to subtract 30 seconds from the cook time. Press the start button (*) to add 1 minute to the cook time.
- If you wish to pause cooking, press the stop button (#) to enter pause mode.
- When the time reaches 00:00, cooking has finished and will enter finished mode.
- If you accidentally open the door by pressing the left push button, press the right push button to close the door and resume running mode.

Paused Mode

- Press the start button (*) to resume cooking.
- Press the stop button (#) to return to entry mode.
- If you accidentally open the door by pressing the left push button, press the right push button to close the door and resume paused mode.

Finished Mode

- When the food has finished cooking, the display will say “Done, Remove Food” and will beep three times.
- To remove food, open the door by pressing the left push button.
- Close the door by pressing the right push button to finish or continue back to entry mode.

Safety Information

Do not be silly with the AVR board or your computer and you should not be able to kill yourself. The software will definitely not kill you.

Troubleshooting

Failure to download with 'console.bat'

- Ensure your com port is correct
- Ensure you are downloading the correct hex file
- Ensure the hex file is in the correct directory, if not in the directory of 'console.bat' then navigate to the directory of the hex file through the command prompt
- Try editing the 'download.bat' file and replace:

```
"c:\Program Files\Arduino\hardware\tools\avr\bin\avrdude.exe" -C  
"c:\Program Files\Arduino\hardware\tools\avr\etc\avrdude.conf"
```

with:

```
"c:\Program Files  
(x86)\Arduino\hardware\tools\avr\bin\avrdude.exe" -C "c:\Program  
Files (x86)\Arduino\hardware\tools\avr\etc\avrdude.conf"
```

- Try installing the Arduino IDE.
- Otherwise, google it.

Board not functioning

- Ensure the wiring is all connected properly, adjust potentiometer for motor
- Ensure the board is plugged to the computer via USB cable while operating the microwave
- Try downloading the microwave program again
- Try pressing the reset button
- If the motor is not spinning, ensure the PE2 jumper is removed
- There may be a fault with the AVR board. Please contact the COMP2121 staff for help.

FAQ

Q: Why is my food not getting hot?

A: This is only an emulator. It is not a real microwave.

Q: This software is terrible!

A: We're students, give us a break. Also, that is not a question.

Q: What do I do if I need to contact someone for help, to complain or to provide feedback?

A: Keep reading, the contact information is in the next section.

Contact Information

Contact	Contact Details
COMP2121: Staff	CSE Building (K17 of UNSW)
CEO of COMP2121: Daniel Murphy	dtsm460@cse.unsw.edu.au
E10 Group: Program Creators	CONFIDENTIAL