arLCD Start Up Guide

Step 1 – Install the drivers

In order to write code and upload it to your arLCD, make sure you have the latest Arduino IDE installed and became familiar with it.

- **Download** the Arduino IDE from the Arduino website:

http://arduino.cc/en/Main/Software

- Before connecting your arLCD **go to**: http://www.earthlcd.com/Downloads/arLCD_Software

And **download the latest zip files**:

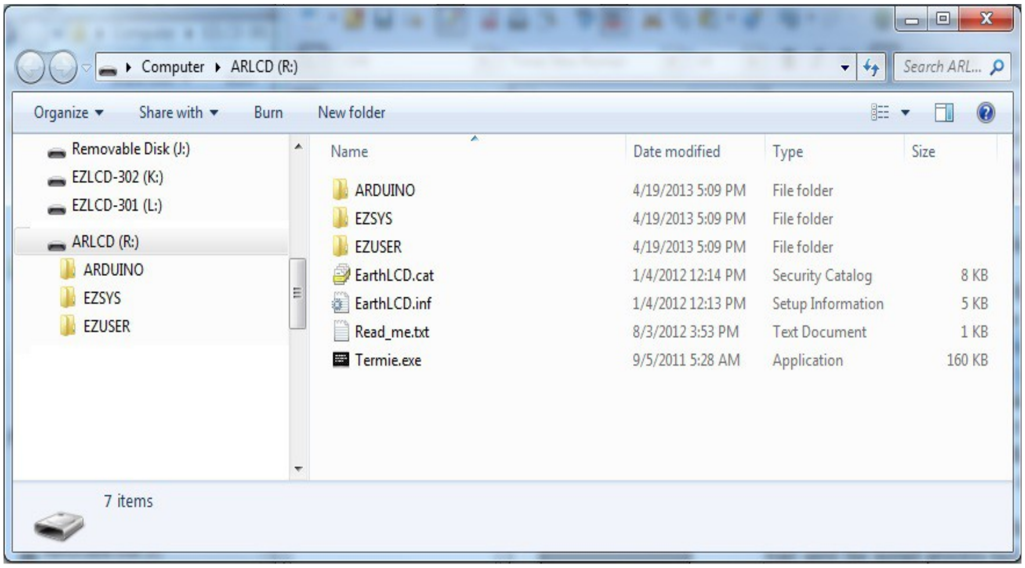
arLCD_Library_{date}.zip
arLCD_2pxx_Firmware.hex or zip
arLCD_Filesystem_{date}.zip
ezLCD-3xx Font Converter Setup.zip
ezLCD-3xx-Firmware-Loader.zip

If you want information on the different commands in the arLCD, download arLCD_Lib_xxx.zip at:

http://www.earthlcd.com/Downloads/arLCD_Documentation

- Now **plug in the arLCD** into a USB port and wait a few seconds.

- **Unzip the downloaded files**.



Name	Date modified	Type	Size
ARDUINO	4/19/2013 5:09 PM	File folder	
EZSYS	4/19/2013 5:09 PM	File folder	
EZUSER	4/19/2013 5:09 PM	File folder	
EarthLCD.cat	1/4/2012 12:14 PM	Security Catalog	8 KB
EarthLCD.inf	1/4/2012 12:13 PM	Setup Information	5 KB
Read_me.txt	8/3/2012 3:53 PM	Text Document	1 KB
Termie.exe	9/5/2011 5:28 AM	Application	160 KB

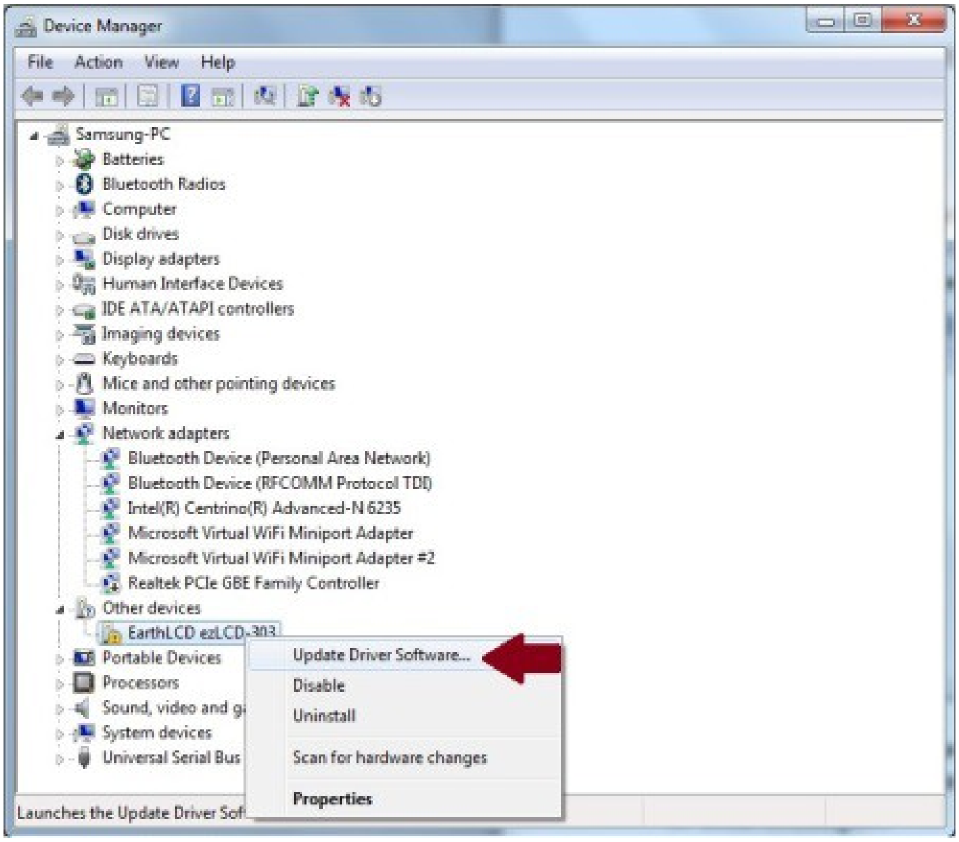
Windows will recognize the new hardware and show the “new hardware found” guide.

The driver should now be installed and ready to use. **If so go to Step 3**. In most cases a reboot isn’t necessary but it´s recommended.

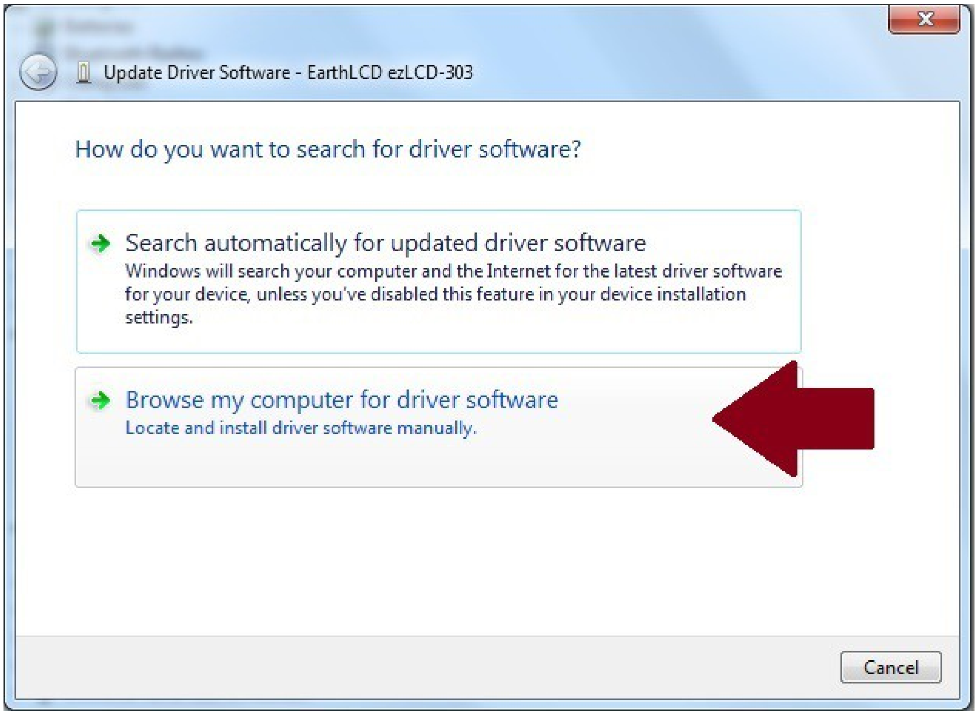
Step 2 – Install Device Driver

- Now go to **"Device Manager"** which you find through the search bar in the "Start Menu".

- Then **right click on the EarthLCD device** and **select "Update Driver Software"** as shown in the picture below


Device Manager
File
Action
View
Help
Samsung-PC
Batteries
Bluetooth Radios
Computer
Disk drives
Display adapters
Human Interface Devices
IDE ATA/ATAPI controllers
Imaging devices
Keyboards
Mice and other pointing devices
Monitors
Network adapters
Bluetooth Device (Personal Area Network)
Bluetooth Device (RFCOMM Protocol TDI)
Intel(R) Centrino(R) Advanced-N 6235
Microsoft Virtual WiFi Miniport Adapter
Microsoft Virtual WiFi Miniport Adapter #2
Realtek PCIe GBE Family Controller
Other devices
EarthLCD ezLCD-303
Portable Devices
Processors
Sound, video and g
System devices
Universal Serial Bus
Update Driver Software...
Disable
Uninstall
Scan for hardware changes
Properties
Launches the Update Driver Sof

- **Choose "Browse my computer for driver software"**



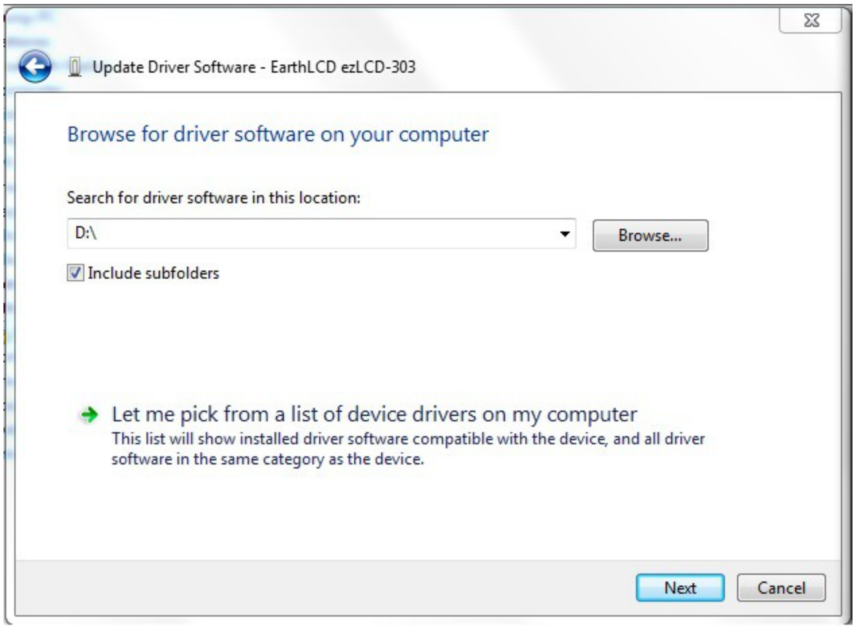
Update Driver Software - EarthLCD ezLCD-303

How do you want to search for driver software?

Search automatically for updated driver software
Windows will search your computer and the Internet for the latest driver software for your device, unless you've disabled this feature in your device installation settings.

Browse my computer for driver software
Locate and install driver software manually.

- **Click browse** using **the drive letter of your arLCD**.



Update Driver Software - EarthLCD ezLCD-303

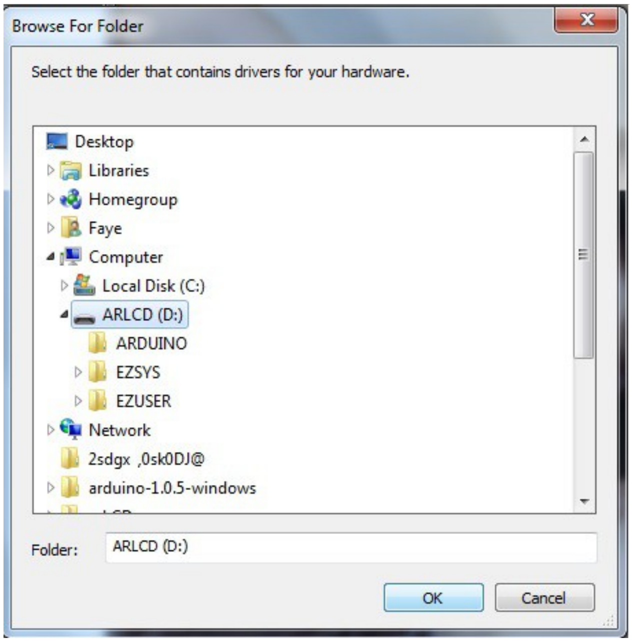
Browse for driver software on your computer

Search for driver software in this location:

D:\

☑ Include subfolders

Let me pick from a list of device drivers on my computer
This list will show installed driver software compatible with the device, and all driver software in the same category as the device.

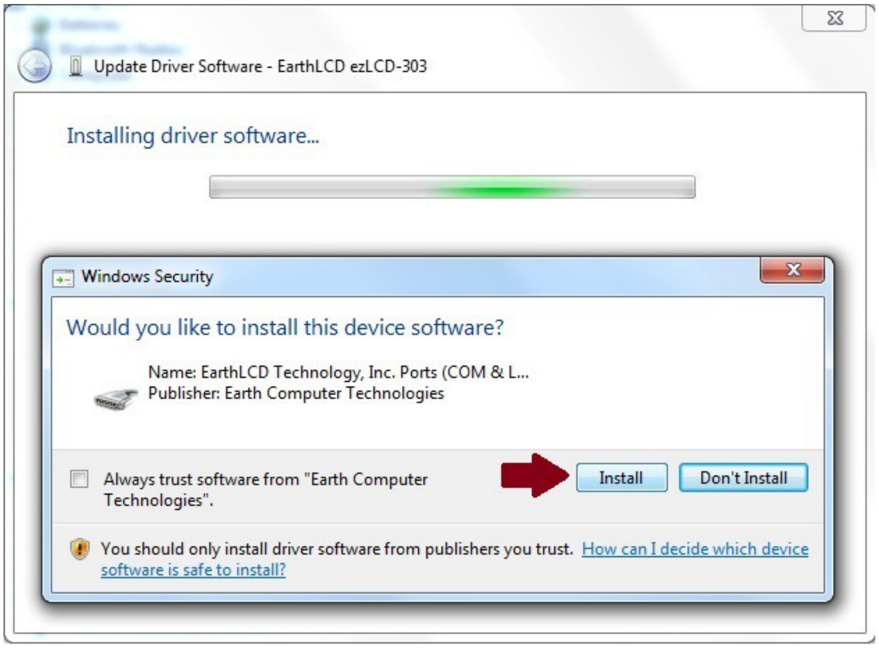


Browse For Folder

Select the folder that contains drivers for your hardware.

Folder: ARLCD (D:)

- **Click "Next"** and the window below should appear. **Select "Always trust software from "Earth Computer Technologies""** and **click "Install"**.



Update Driver Software - EarthLCD ezLCD-303

Installing driver software...

Windows Security

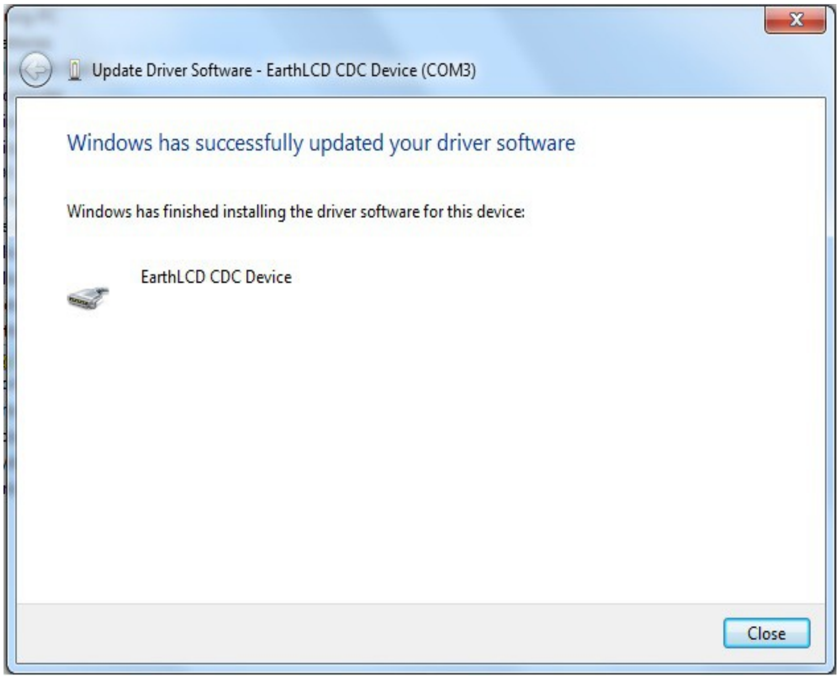
Would you like to install this device software?

Name: EarthLCD Technology, Inc. Ports (COM & L...
Publisher: Earth Computer Technologies

□ Always trust software from "Earth Computer Technologies".

You should only install driver software from publishers you trust. How can I decide which device software is safe to install?

The driver is now installed. The window that appears will show you the COM port the device is using. **Remember the COM port** for later.



Update Driver Software - EarthLCD CDC Device (COM3)

Windows has successfully updated your driver software

Windows has finished installing the driver software for this device:

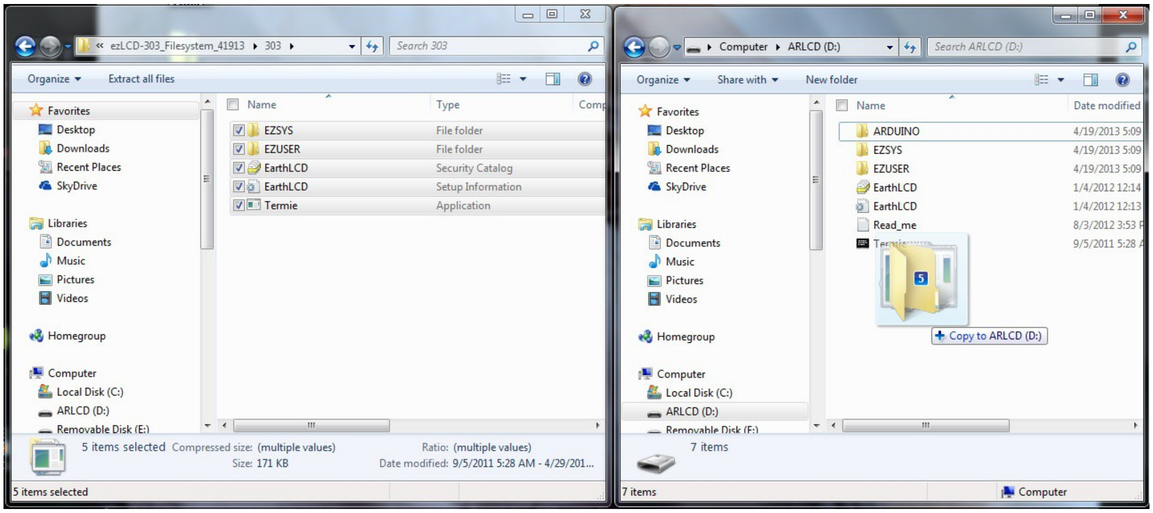
EarthLCD CDC Device

In this case we will use COM3.
Each time you connect the display it will use the same COM port unless you plug in 2 arLCD's at same time.

Step 3 – Update the Filesystem

In order to get the most out of your arLCD it’s recommended to update the filesystem to the latest version, which you downloaded in Step 1.

- **Open the zip file** named **“arLCD_Filesystem_{date}.zip”.**
- Like the pictures below, **select all files and copy**.
- **Go to “my computer”, click and open the drawe named “arLCD” and replace all the files in “arLCD”.**



« ezLCD-303_Filesystem_41913 ▸ 303 ▸

Search 303

☐ Name	Type	Comp
☑ EZSYS	File folder	
☑ EZUSER	File folder	
☑ EarthLCD	Security Catalog	
☑ EarthLCD	Setup Information	
☑ Termie	Application	

5 items selected Compressed size: (multiple values) Ratio: (multiple values)

Size: 171 KB Date modified: 9/5/2011 5:28 AM - 4/29/201...

5 items selected

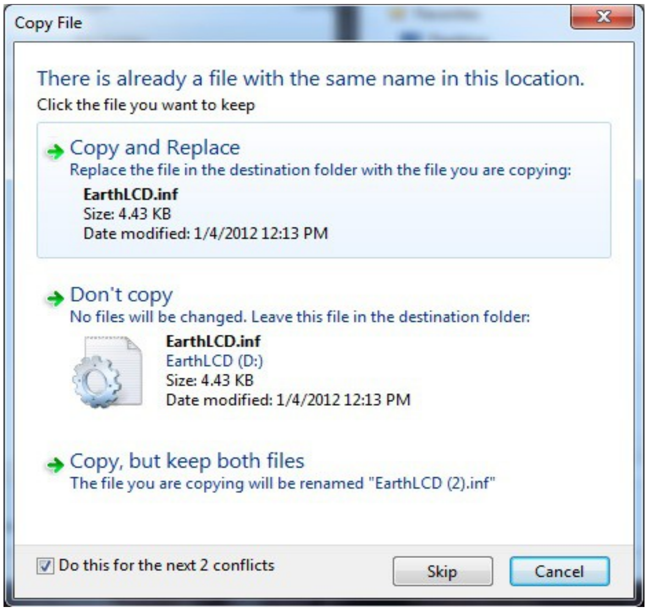
▸ Computer ▸ ARLCD (D:)

Search ARLCD (D:)

☐ Name	Date modified
ARDUINO	4/19/2013 5:09
EZSYS	4/19/2013 5:09
EZUSER	4/19/2013 5:09
EarthLCD	1/4/2012 12:14
EarthLCD	1/4/2012 12:13
Read_me	8/3/2012 3:53 P
Termie	9/5/2011 5:28 A

7 items

7 items


Copy File

There is already a file with the same name in this location.

Click the file you want to keep

Copy and Replace

Replace the file in the destination folder with the file you are copying:

EarthLCD.inf
Size: 4.43 KB
Date modified: 1/4/2012 12:13 PM

Don't copy

No files will be changed. Leave this file in the destination folder:

EarthLCD.inf
EarthLCD (D:)
Size: 4.43 KB
Date modified: 1/4/2012 12:13 PM

Copy, but keep both files

The file you are copying will be renamed "EarthLCD (2).inf"

☑ Do this for the next 2 conflicts

- **Restart the arLCD** by pressing the **RESET button on the back**.

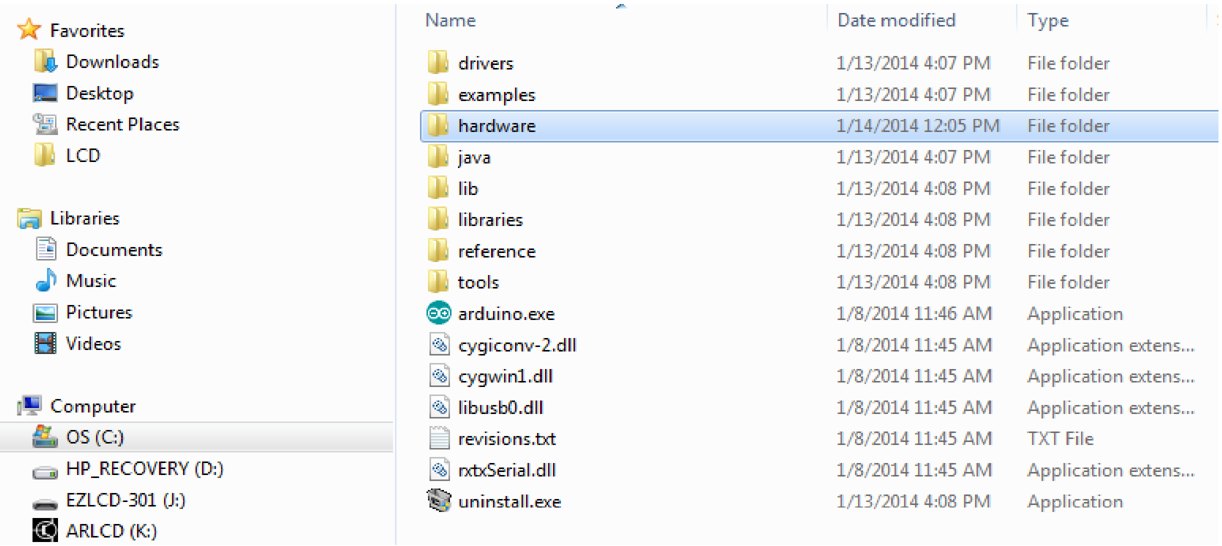
- **<u>Upgrade the firmware as described in Appendix A.</u>**

Step 4 – Install the arLCD 3rd party hardware configuration

If you want to use the arLCD without the bootloader, the 3rd party hardware configuration should be install. If the user wants to use the arLCD with the bootloader then the user can skip this step and simply select an Arduino Uno from the menu.

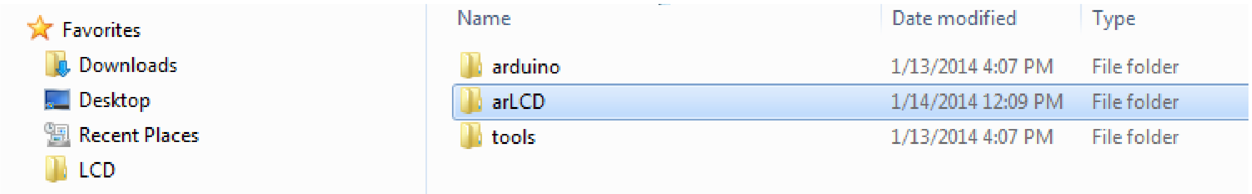
The arLCD is supplied with a 3rd party hardware configuration directory (arLCD). The procedure for Arduino IDE 1.0.5-r2 is slightly different for IDE 1.5.5-r2.

Arduino IDE 1.0.5-r2
Copy the content of this zip file into the Arduino\hardware directory.



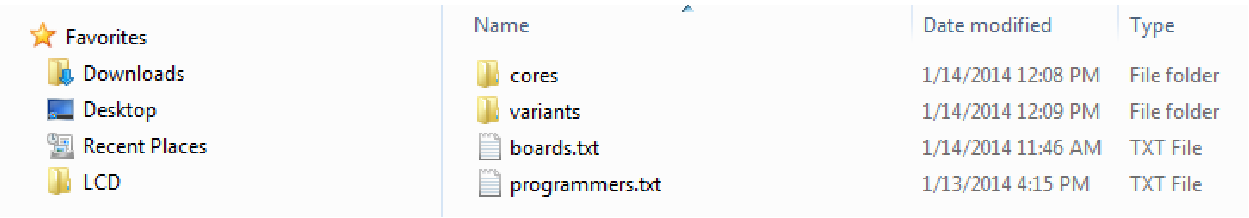
Name	Date modified	Type
drivers	1/13/2014 4:07 PM	File folder
examples	1/13/2014 4:07 PM	File folder
hardware	1/14/2014 12:05 PM	File folder
java	1/13/2014 4:07 PM	File folder
lib	1/13/2014 4:08 PM	File folder
libraries	1/13/2014 4:08 PM	File folder
reference	1/13/2014 4:08 PM	File folder
tools	1/13/2014 4:08 PM	File folder
arduino.exe	1/8/2014 11:46 AM	Application
cygiconv-2.dll	1/8/2014 11:45 AM	Application extens...
cygwin1.dll	1/8/2014 11:45 AM	Application extens...
libusb0.dll	1/8/2014 11:45 AM	Application extens...
revisions.txt	1/8/2014 11:45 AM	TXT File
rxtxSerial.dll	1/8/2014 11:45 AM	Application extens...
uninstall.exe	1/13/2014 4:08 PM	Application

In the Hardware directory you will see an Arduino and tools directory.



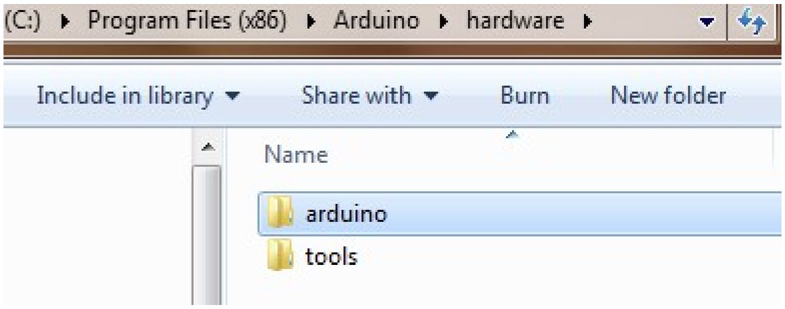
Name	Date modified	Type
arduino	1/13/2014 4:07 PM	File folder
arLCD	1/14/2014 12:09 PM	File folder
tools	1/13/2014 4:07 PM	File folder

<u>The arLCD directory contains the boards.txt and programmers.txt files required for the Arduino IDE to understand and program the arLCD.</u>



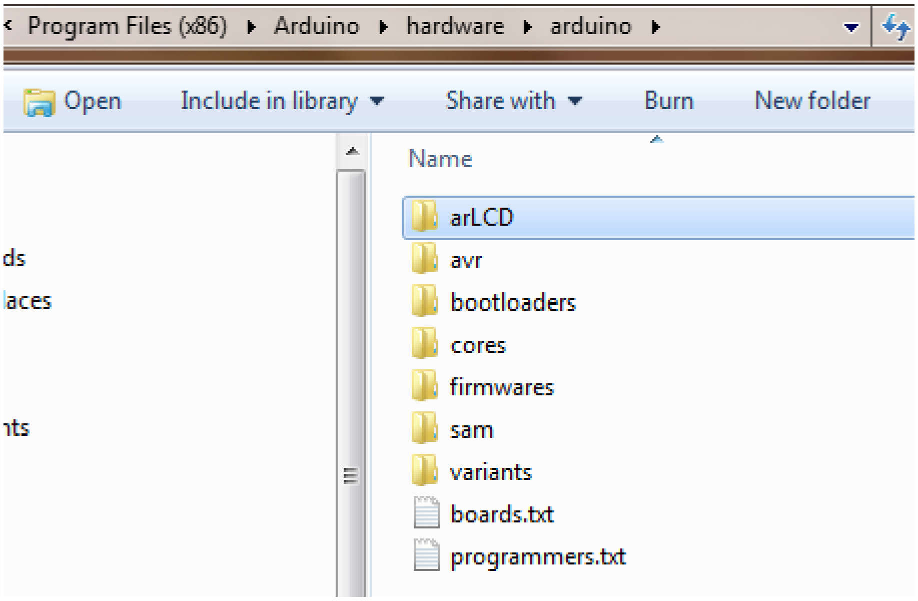
Name	Date modified	Type
cores	1/14/2014 12:08 PM	File folder
variants	1/14/2014 12:09 PM	File folder
boards.txt	1/14/2014 11:46 AM	TXT File
programmers.txt	1/13/2014 4:15 PM	TXT File

<u>Arduino IDE 1.5.5-r2</u>
<u>Goto the Arduino\hardware directory.</u>


(C:) ▸ Program Files (x86) ▸ Arduino ▸ hardware ▸

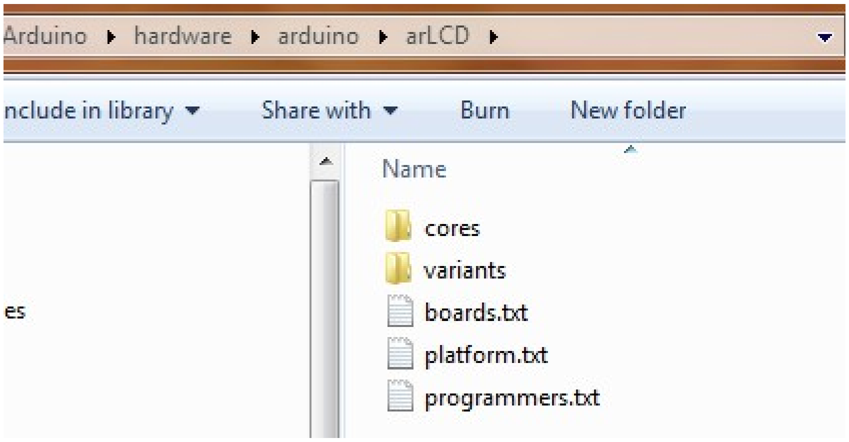
Name
arduino
tools

<u>In that sub-directory you will see an arduino and tools directory. Going into the arduino directory will show this directory.</u>



‹ Program Files (x86) ▸ Arduino ▸ hardware ▸ arduino ▸

- arLCD
- avr
- bootloaders
- cores
- firmwares
- sam
- variants
- boards.txt
- programmers.txt



Arduino ▸ hardware ▸ arduino ▸ arLCD ▸

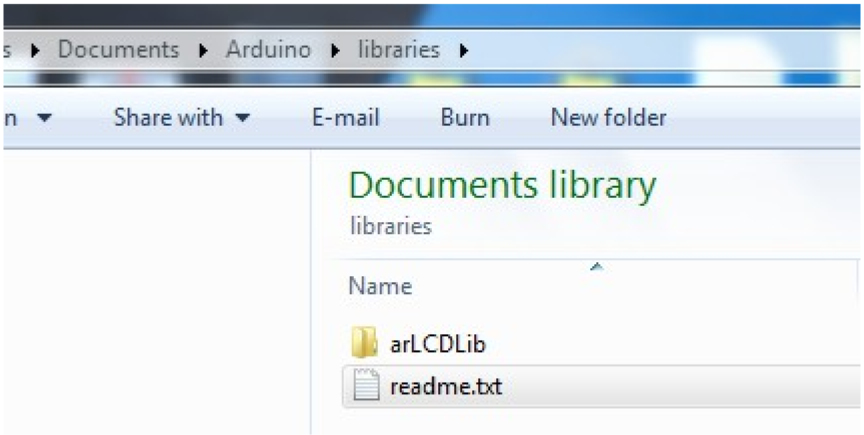
- cores
- variants
- boards.txt
- platform.txt
- programmers.txt

The arLCD directory should look like this.

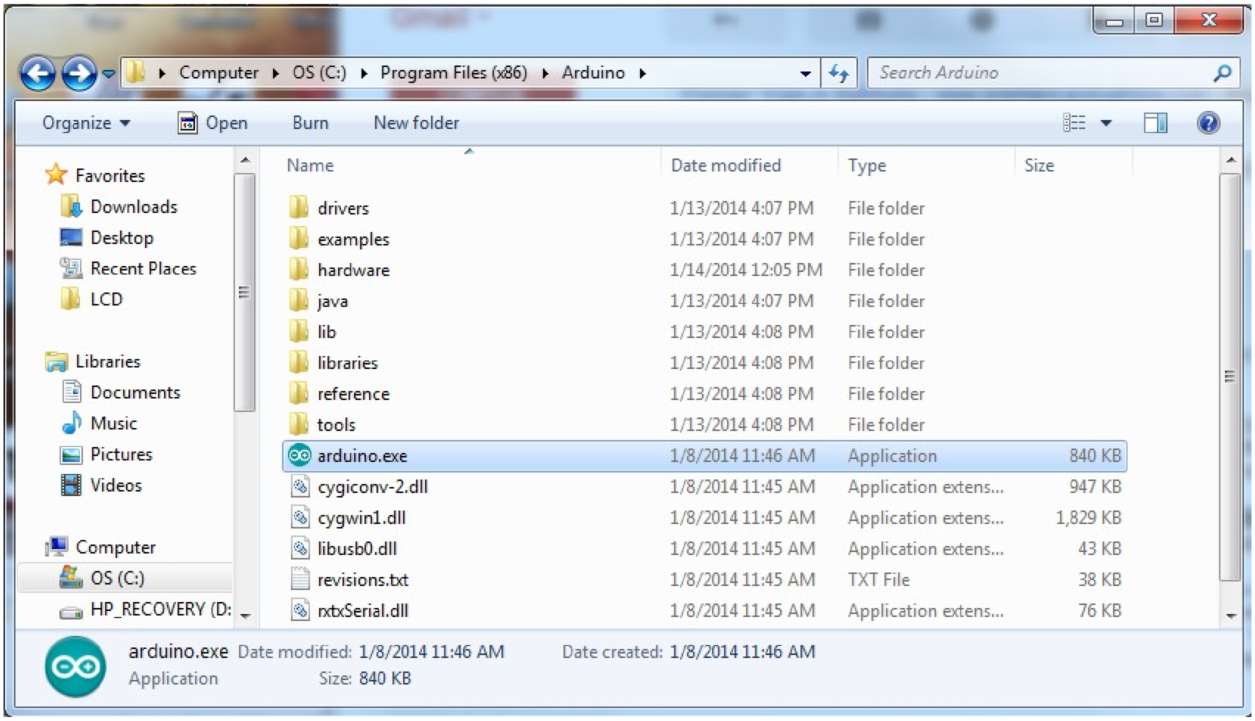
Step 5 – Install arLCD Library and Example Files

The arLCD comes with a library to be used with the Arduino IDE, this makes programming the arLCD very easy. In the file named **arLCD_Library_{date}.zip** that was downloaded earlier you will find a folder named **arLCDLib.** This folder contains the library and example files. However, it needs to be imported into the Arduino IDE.

Note: If you previously installed the arLCD library you must manually remove the old directory. It is located under Documents\Arduino\libraries



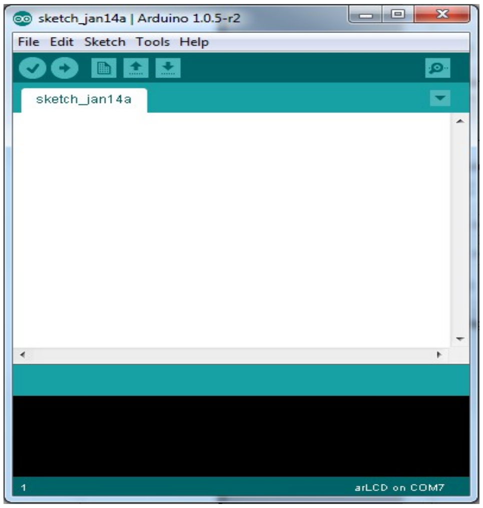
- **Open the Arduino IDE on your computer.**



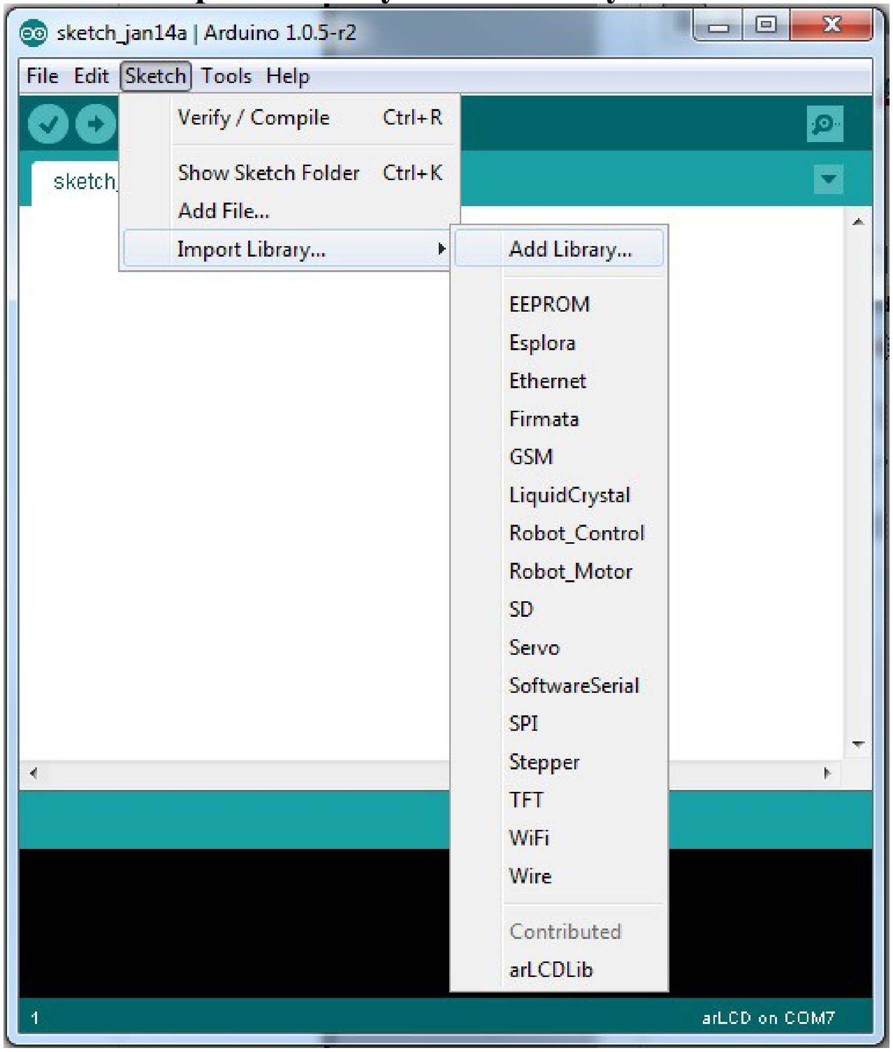
Name	Date modified	Type	Size
drivers	1/13/2014 4:07 PM	File folder	
examples	1/13/2014 4:07 PM	File folder	
hardware	1/14/2014 12:05 PM	File folder	
java	1/13/2014 4:07 PM	File folder	
lib	1/13/2014 4:08 PM	File folder	
libraries	1/13/2014 4:08 PM	File folder	
reference	1/13/2014 4:08 PM	File folder	
tools	1/13/2014 4:08 PM	File folder	
arduino.exe	1/8/2014 11:46 AM	Application	840 KB
cygiconv-2.dll	1/8/2014 11:45 AM	Application extens...	947 KB
cygwin1.dll	1/8/2014 11:45 AM	Application extens...	1,829 KB
libusb0.dll	1/8/2014 11:45 AM	Application extens...	43 KB
revisions.txt	1/8/2014 11:45 AM	TXT File	38 KB
rxtxSerial.dll	1/8/2014 11:45 AM	Application extens...	76 KB

arduino.exe Date modified: 1/8/2014 11:46 AM Date created: 1/8/2014 11:46 AM
Application Size: 840 KB

- **The IDE should look something like this.**



- **Go to Sketch>Import Library>Add Library.**



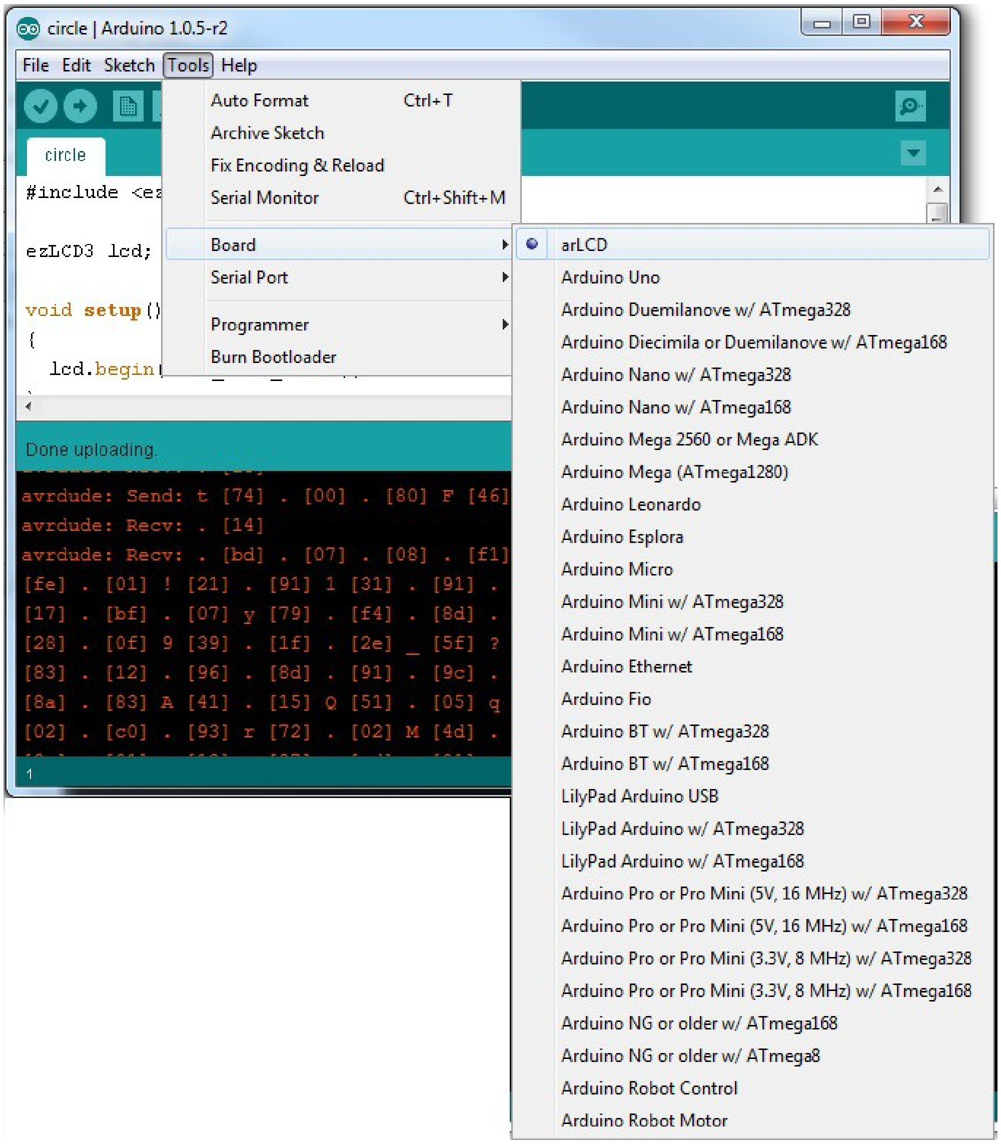
- Now **select arLCD_Library_{date}.zip-> arLCDLib** to import.

Now the arLCD Library is installed.

Step 6 – Loading an example sketch into your arLCD

You are almost ready to load the sketch into your arLCD. You just need to make sure your Arduino IDE is set to the correct type of hardware and COM port.

- From the Arduino IDE toolbar select **Tools -> Board -> Arduino Uno**.



circle | Arduino 1.0.5-r2
File
Edit
Sketch
Tools
Help
circle
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Serial Monitor Ctrl+Shift+M
Board
Serial Port
Programmer
Burn Bootloader
● arLCD
Arduino Uno
Arduino Duemilanove w/ ATmega328
Arduino Diecimila or Duemilanove w/ ATmega168
Arduino Nano w/ ATmega328
Arduino Nano w/ ATmega168
Arduino Mega 2560 or Mega ADK
Arduino Mega (ATmega1280)
Arduino Leonardo
Arduino Esplora
Arduino Micro
Arduino Mini w/ ATmega328
Arduino Mini w/ ATmega168
Arduino Ethernet
Arduino Fio
Arduino BT w/ ATmega328
Arduino BT w/ ATmega168
LilyPad Arduino USB
LilyPad Arduino w/ ATmega328
LilyPad Arduino w/ ATmega168
Arduino Pro or Pro Mini (5V, 16 MHz) w/ ATmega328
Arduino Pro or Pro Mini (5V, 16 MHz) w/ ATmega168
Arduino Pro or Pro Mini (3.3V, 8 MHz) w/ ATmega328
Arduino Pro or Pro Mini (3.3V, 8 MHz) w/ ATmega168
Arduino NG or older w/ ATmega168
Arduino NG or older w/ ATmega8
Arduino Robot Control
Arduino Robot Motor
1

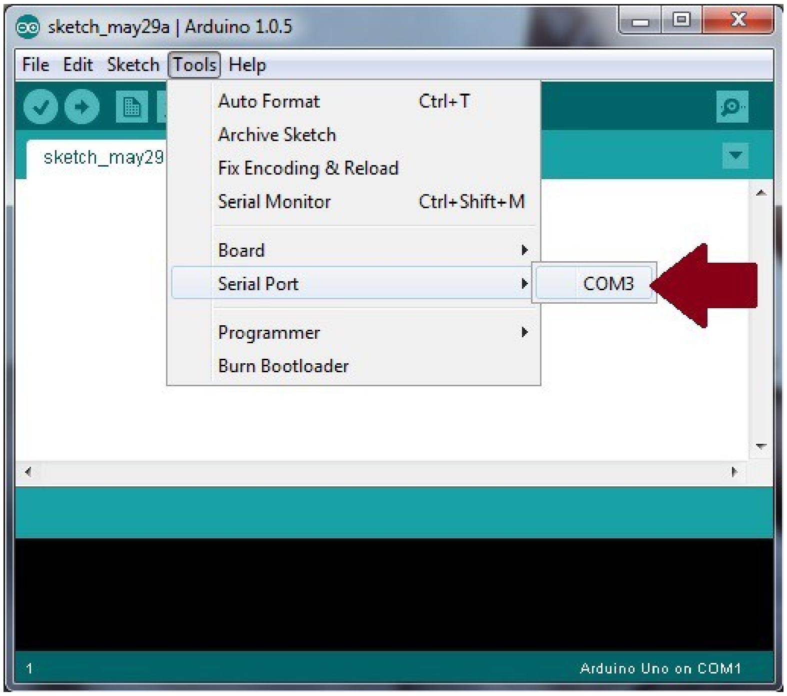
```
#include <ez

ezLCD3 lcd;

void setup()
{
  lcd.begin(
```

Done uploading.

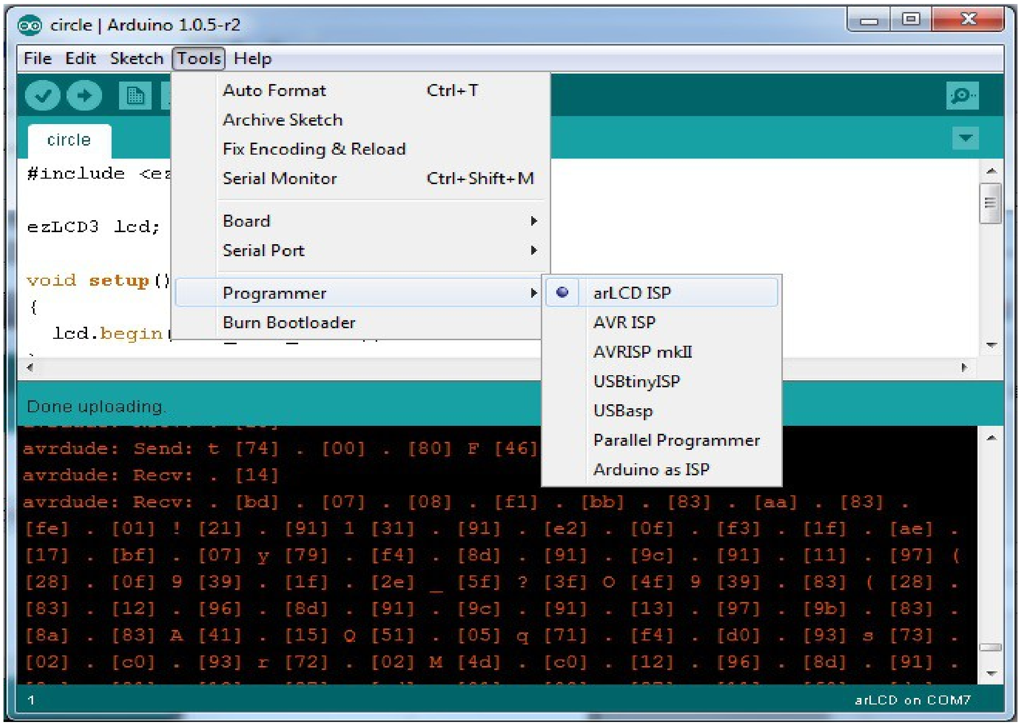
```
avrdude: Send: t [74] . [00] . [80] F [46]
avrdude: Recv: . [14]
avrdude: Recv: . [bd] . [07] . [08] . [f1]
[fe] . [01] ! [21] . [91] 1 [31] . [91] .
[17] . [bf] . [07] y [79] . [f4] . [8d] .
[28] . [0f] 9 [39] . [1f] . [2e] _ [5f] ?
[83] . [12] . [96] . [8d] . [91] . [9c] .
[8a] . [83] A [41] . [15] Q [51] . [05] q
[02] . [c0] . [93] r [72] . [02] M [4d] .
```

- Now from **Step 2** you should have **determined the COM port**.

  Go to **Tools -> Serial Port -> COM3** (This will vary from computers)



- Now select the Programmer
  Go to Tools->Programmer->AVRISP mkII



```
#include <ez

ezLCD3 lcd;

void setup()
{
  lcd.begin(
```

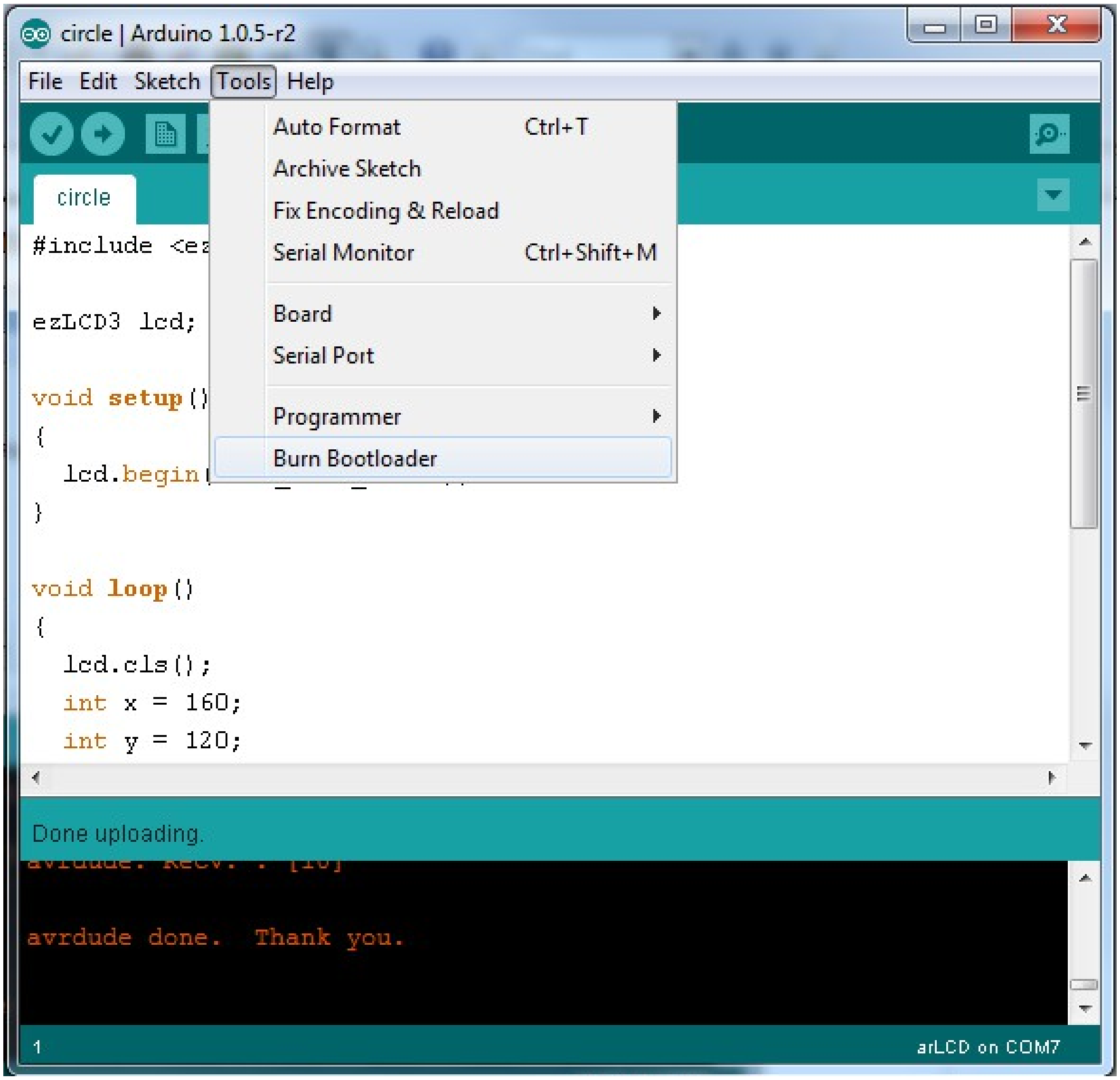
Done uploading.

```
avrdude: Send: t [74] . [00] . [80] F [46]
avrdude: Recv: . [14]
avrdude: Recv: . [bd] . [07] . [08] . [f1] . [bb] . [83] . [aa] . [83] .
[fe] . [01] ! [21] . [91] 1 [31] . [91] . [e2] . [0f] . [f3] . [1f] . [ae] .
[17] . [bf] . [07] y [79] . [f4] . [8d] . [91] . [9c] . [91] . [11] . [97] (
[28] . [0f] 9 [39] . [1f] . [2e] _ [5f] ? [3f] O [4f] 9 [39] . [83] ( [28] .
[83] . [12] . [96] . [8d] . [91] . [9c] . [91] . [13] . [97] . [9b] . [83] .
[8a] . [83] A [41] . [15] Q [51] . [05] q [71] . [f4] . [d0] . [93] s [73] .
[02] . [c0] . [93] r [72] . [02] M [4d] . [c0] . [12] . [96] . [8d] . [91] .
```

1 arLCD on COM7

These settings will be stored and used the next time you open the IDE.

If the user requires the fuses of the Atmega328 to be set, then use the Burn Bootloader as below. If the existing bootloader is OK then skip this step.



```
#include <ez

ezLCD3 lcd;

void setup()
{
  lcd.begin(
}

void loop()
{
  lcd.cls();
  int x = 160;
  int y = 120;
```

Done uploading.

```
avrdude: Recv: . [10]

avrdude done.  Thank you.
```

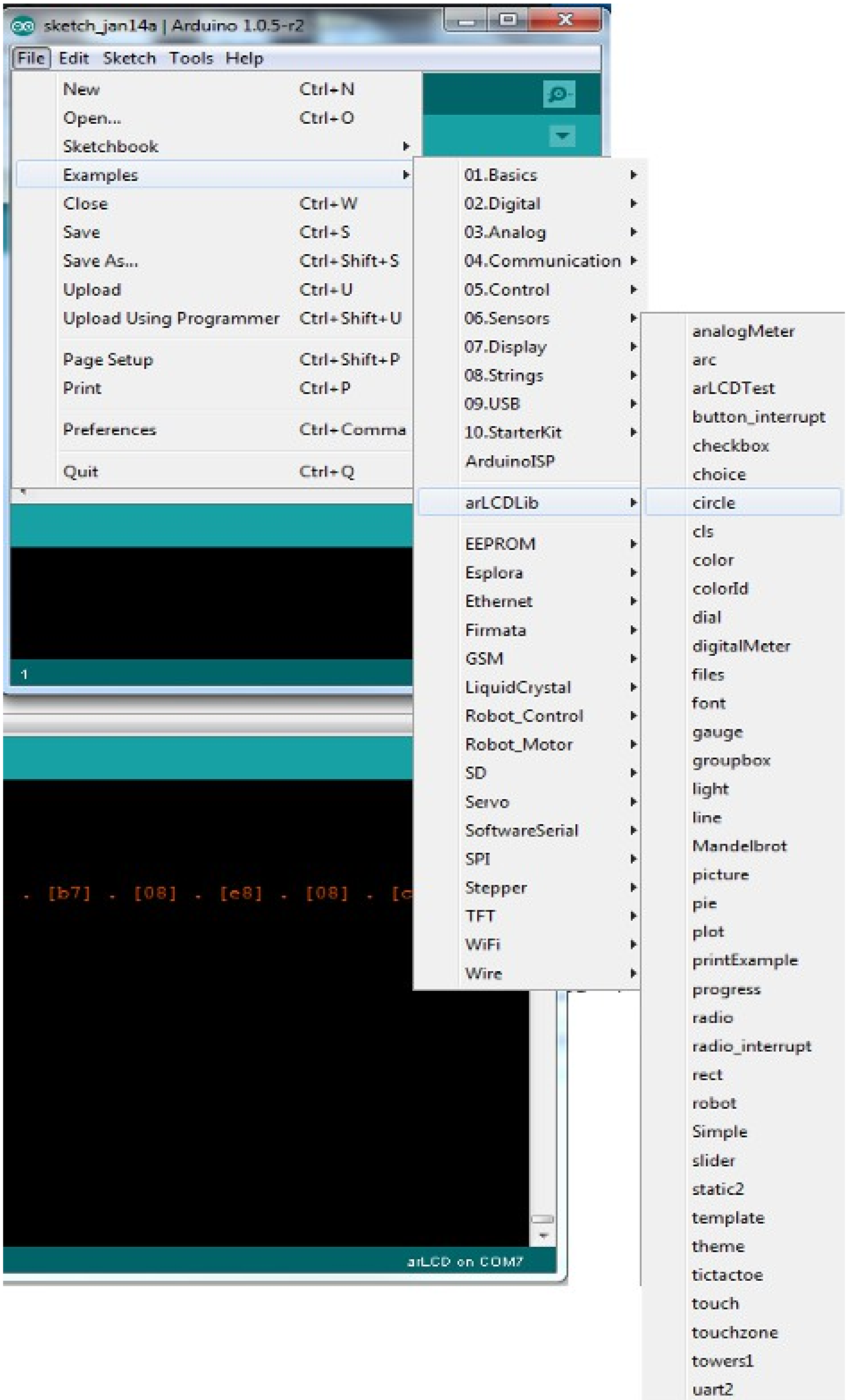
1   arLCD on COM7

- From the toolbar select **Tools->Burn Bootloader**

  You only have to burn the bootloader one time.

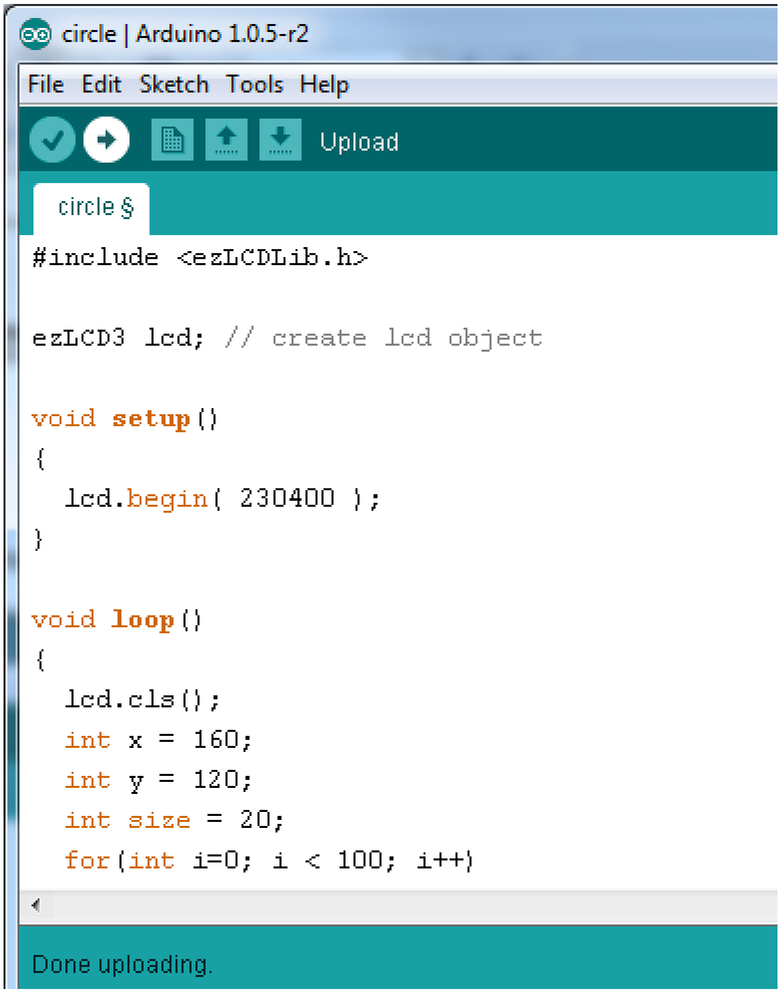
Now lets select a sketch to upload into the arLCD.

- From the toolbar select **File->Examples-> ezLCDLib-> circle.**

sketch_jan14a | Arduino 1.0.5-r2
File
Edit
Sketch
Tools
Help
New Ctrl+N
Open... Ctrl+O
Sketchbook
Examples
Close Ctrl+W
Save Ctrl+S
Save As... Ctrl+Shift+S
Upload Ctrl+U
Upload Using Programmer Ctrl+Shift+U
Page Setup Ctrl+Shift+P
Print Ctrl+P
Preferences Ctrl+Comma
Quit Ctrl+Q
01.Basics
02.Digital
03.Analog
04.Communication
05.Control
06.Sensors
07.Display
08.Strings
09.USB
10.StarterKit
ArduinoISP
arLCDLib
EEPROM
Esplora
Ethernet
Firmata
GSM
LiquidCrystal
Robot_Control
Robot_Motor
SD
Servo
SoftwareSerial
SPI
Stepper
TFT
WiFi
Wire
analogMeter
arc
arLCDTest
button_interrupt
checkbox
choice
circle
cls
color
colorId
dial
digitalMeter
files
font
gauge
groupbox
light
line
Mandelbrot
picture
pie
plot
printExample
progress
radio
radio_interrupt
rect
robot
Simple
slider
static2
template
theme
tictactoe
touch
touchzone
towers1
uart2
1
arLCD on COM7

```
. [b7] . [08] . [e8] . [08] . [c
```

- Now compile and upload the “**circle**” example to the arLCD.



```
#include <ezLCDLib.h>

ezLCD3 lcd; // create lcd object

void setup()
{
  lcd.begin( 230400 );
}

void loop()
{
  lcd.cls();
  int x = 160;
  int y = 120;
  int size = 20;
  for(int i=0; i < 100; i++)
```

Done uploading.

The example should take a few seconds to compile and be uploaded into the arLCD. You should see circles load in the center of the screen expanding to larger circles of different colors.

Another great example to try is “arLCDTest”. There should be various buttons and a slider on the screen after it finishes compiling. You can use this Sketch to calibrate the touchscreen.

If you want to upgrade your firmware see Appendix A.

If you do not see the test screen then go back through the steps and watch for error messages indicating something didn't go well.

More information

Now that you are up and running you can try selecting some of the other 25+ examples from the library and explore how they work. Make some code changes and see how it affects the display. Don't be afraid to try things. If you don't understand lines in the sketch, make some changes and see what happens.

Remember to select each sketch from the File menu.
File-> Examples-> arLCDLib-> (*selected sketch)*
and then upload
File-> Upload Using Programmer
for each sketch you want to try. You can modify and re-upload it as many times as you want. If you want to save it, we recommend you save it with another name you can remember so you can go back and look at the original.

Normally the GPU on the arLCD uses STARTUP.ezm when the touchscreen is not pressed during reset. At reset pressing various corners of the touchscreen will invoke other startup macros.

Upper left is STARTUP1.ezm Safe mode.

Upper right is STARTUP2.ezm Firmware Upgrade

Lower right is STARTUP3.ezm user defined

Lower left is STARTUP4.ezm user defined

STARTUP5.ezm is executed if the screen is pressed but outside the 50 x 50 pixel corners. If the selected startup file is not found, it is simply skipped. The unit is shipped with STARTUP.ezm, STARTUP1.ezm and STARTUP2.ezm.

On RESET the ezLCD GPU will check the touchscreen to see if after reset the user wants to bypass the normal startup.ezm. The user can supply alternative startup files or none at all. A startup1.ezm has been provided to mask any commands coming from the command port during programming. Its know as safe mode.

Note: Without a valid startup the COM ports are not setup and communication with the Arduino can not happen. The **startup*x*.ezm** files are changed by direct access to the flash drive on your PC.

Keep in mind, in order to communicate with your arLCD, the startup.ezm file must be setup correctly. If a startup.ezm is in the EZUSER\MACROS\ then it will be used. If not it will use the startup.ezm in the EZSYS\MACROS\ directory.

Visit our websites or links below for more documentation and et al.

EarthMake Product page: www.earthmake.com

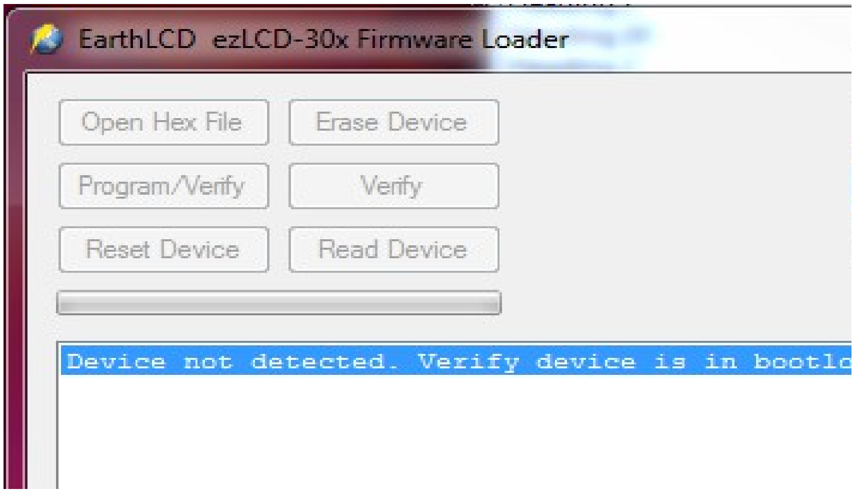
EarthLCD Website: www.earthlcd.com

www.earthlcd.com/Downloads/arLCD_Downloads

Appendix A: Upgrading the arLCD Firmware

A Windows PC is required to upgrade the firmware on an arLCD.

1 Run the Firmware Loader to load the firmware from your PC to the arLCD using the USB port. Before starting an upgrade be sure you have downloaded the ezLCD3xx Firmware Loader and installed it. You should see it waiting for the arLCD to attach.



```
Device not detected. Verify device is in bootlo
```

The latest firmware can be found at www.earthlcd.com/Downloads/arLCD_Software

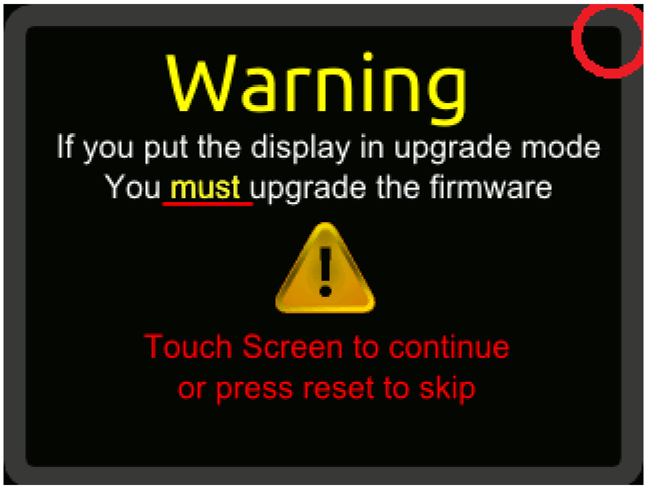
IMPORTANT: Never use any upgrade firmware that is not designed for the display you have. Only arLCD firmware should be installed. Using the wrong firmware could make your unit inoperable and leave no way to install the correct firmware.

NOTE: Once you put the arLCD in firmware upgrade mode it cannot come out of this state until new firmware is programmed using the provided program even if you unplug it or reset!

If the arLCD does not respond as a flash drive when plugged into the USB port, it is probably in upgrade mode. Install the new firmware as shown in step 2 below.

Step 1. Put the arLCD in Firmware Upgrade Mode.

The simplest way to go into upgrade mode is to press the upper right corner of the touchscreen as you press the reset button.

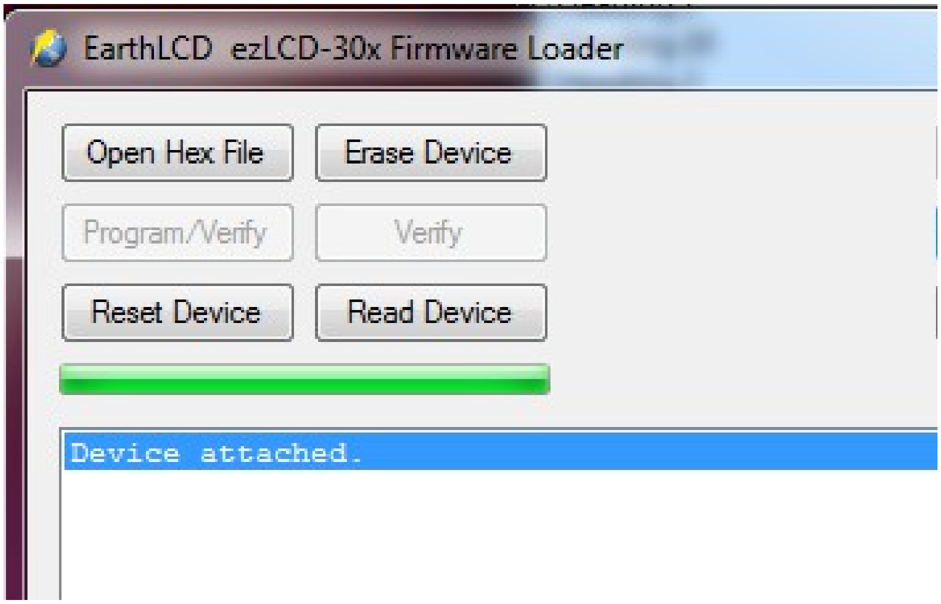


Warning

If you put the display in upgrade mode
You must upgrade the firmware

Touch Screen to continue
or press reset to skip

Step 2. Use the ezLCD-3xx Firmware Loader program (should already be running).



```
Device attached.
```

Step 3. The ezLCD-3xx Firmware Loader program will beep and the text box should display **Device attached**.

Step 4. Click Open Hex File in the ezLCD-3xx Firmware Loader program. Navigate to the location of your arLCD firmware hex file and click on it.

This hex file could be either an arLCD_2pxx.hex file or ezLCD303_2pxx.hex.

Step 5. Click Program/Verify in the ezLCD-3xx Firmware Loader program. The ezLCD-3xx Firmware Loader text box should display several status messages followed by Erase/Program/Verify completed Successfully.

Step 6. Click Reset Device in the ezLCD-3xx Firmware Loader program. The arLCD should sign back on.

Appendix B: Upgrading to bootloader free firmware (2.11)

Moving up to bootloader free firmware information

With firmware 2.11 the arLCD is no longer using the bootloader to program the flash. This allow the user to remove the bootloader and expand the flash area by 512 bytes. By upgrading the firmware to bootloader free operation the upgrade will:

1. Have bigger usable flash size (32768 vs 32256)

2. No chance of corrupting the bootloader.

3. Faster code startup

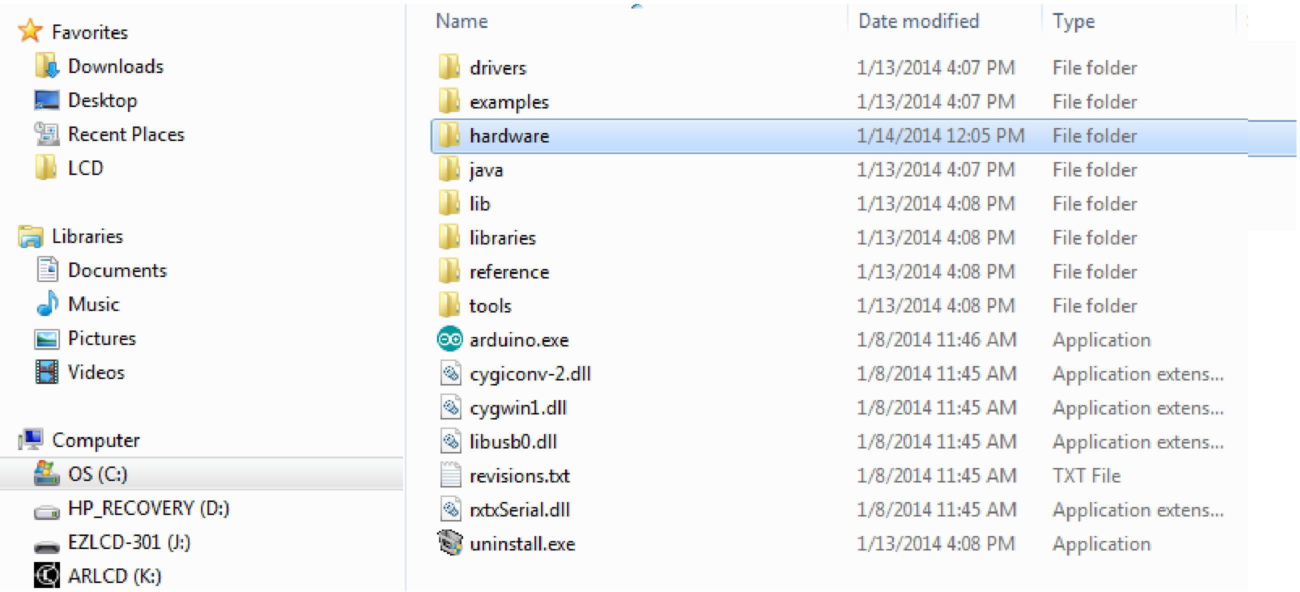
4. No arLCD library changes required.

The Atmel processor has 32768 bytes of firmware available. The bootloader takes up 512bytes of that space. To remove the bootloader, the firmware has implemented an Atmel compatible SPI programmer driven by the IDE. This removes the typical 2-3 second delay for your firmware to startup after all resets.

To upgrade your arLCD to this mode is pretty simple. Make sure the Arduino IDE is closed before making these changes.

1. Upgrade the boards.txt file to include the arLCD.

The arLCD is supplied with a 3rd party hardware configuration directory (arLCD.zip) Copy the content of this zip file into the Arduino\hardware\arduino directory.



Name	Date modified	Type
drivers	1/13/2014 4:07 PM	File folder
examples	1/13/2014 4:07 PM	File folder
hardware	1/14/2014 12:05 PM	File folder
java	1/13/2014 4:07 PM	File folder
lib	1/13/2014 4:08 PM	File folder
libraries	1/13/2014 4:08 PM	File folder
reference	1/13/2014 4:08 PM	File folder
tools	1/13/2014 4:08 PM	File folder
arduino.exe	1/8/2014 11:46 AM	Application
cygiconv-2.dll	1/8/2014 11:45 AM	Application extens...
cygwin1.dll	1/8/2014 11:45 AM	Application extens...
libusb0.dll	1/8/2014 11:45 AM	Application extens...
revisions.txt	1/8/2014 11:45 AM	TXT File
rxtxSerial.dll	1/8/2014 11:45 AM	Application extens...
uninstall.exe	1/13/2014 4:08 PM	Application

The arLCD directory contains the boards.txt and programmers.txt files required for the Arduino IDE to understand and program the arLCD.

You will notice the maximum code size is now 32768 instead of 32256. The fuse settings have changed because the flash space where the bootloader was previously loaded is no longer locked. Upload baud rate is ignored.

2. Ensure the GPU startup.ezm macro file is as follows. It is located on the arLCD:\EZSYS\MACROS.

```
'************** Startup.ezm ********************************
' ArduinoLCD startup.ezm
' (c) 2012 Earth Computer Technologies, Inc dba EarthLCD.com
'Release 2.11 Mar 14, 2014
'*********************************************************
'THIS MACRO IS AUTOMATICALLY RUN AT POWERUP AND RESET
verbose off   'Do not display debug information to command port
cfgio 1 out                     'reset enable
io 1 0                          'drive reset
light 85                        'set backlight to 85%
cls black white                 'cls to black with white text
Font 2                          'set font to default internal font
picture 0 0 3 magic.gif         'show picture
```

```
xy ct                                     'center top
print "arLCD HS 230400 Baud w/isp" ct     'center top
'configure IO
CFGIO 2 serial1_tx 230400 n81             'D0 Serial1 transmit
CFGIO 6 serial1_rx 230400 n81             'D1 Serial1 Receive
cmd serial1                               'connect command port to Serial1
wquiet ON                                 'No touch messages to Arduino host
bridge USBISP                             'setup ISP programming bridge
io 1 1                                    'deassert reset to host
cfgio 1 input                             'release the reset enable (input)
```

3. Load the latest ezLCD firmware (2.11 or later)

   Reset the arLCD by pressing the reset button and also press and hold the upper right corner of the LCD until the unit pops up a warning that you are going to upgrade the firmware. If you press the screen again as instructed you will go into firmware upgrade mode. Once you are in upgrade mode you can not get out of it even with another reset or power cycle. The firmware has to be upgraded to restore operation. The EarthLCD ezLCD-30x Firmware Loader is used to do the upgrade on a windows PC only.

   After the upgrade clicking on Reset Device in the loader will allow the new settings to take effect.

4. Now let’s start the Arduino IDE (1.0.5 assumed)

   1. Select an example sketch.

   2. In the IDE /Tools/Board select “**arLCD”** as your board type.

      In the IDE /Tools/Programmer select “**AVR ISP”** as your programmer.

5. Upload sketch

   Upload sketches as usual. The GPU on the arLCD will erase and program the flash in the Atmel 328 device.

Appendix C: Connecting ezLCD3xx to Arduino

Connecting an Arduino to an ezLCD3xx

A cable would be used to connect the 16 pin connector on the ezLCD3xx to the various IO of the Arduino.

Cable connects all the pins as follows.

ezLCD3xx	Arduino Pins	Name	Function
1	-	VBUS	Power input for USB (5Volt)
2	-	USBD-	USB negative
3	J1-7	GND	GND reference for USB power
4	-	USBD+	USB positive
5	J3-1	IO2	Used for COMM port transmit (hardware UART)
6	J2-3	IO1	RESETn to Arduino. Used for SPI programming Mode
7	J1-3	IO4	UART TX of second UART (if used)
8	J1-4	IO3	UART RX of second UART (if used)
9	J3-2	IO6	Used for COMM port receive (hardware UART)
10	J1-5	IO5	Used for MISO of SPI programming
11	J1-6	IO8	Used for SCLK of SPI programming
12	-	IO7	Used for DTR of Arduino (soft reset). Not used with SPI programming. *Can not be connected to Arduino without soldering a wire.*
13	-	MCLRn	Reset input of ezLCD3xx
14	J3-3	IO9	Interrupt Output from ezLCD3xx if used
15	J2-6,7	GND	GND reference for logic power input of ezLCD3xx
16	J2-4	VCC3.3	3.3Volt power input to ezLCD3xx.

Connecting up these 12 signals will allow connecting an Arduino directly to any ezLCD3xx product using standard firmware. Programming can be done through the SPI of the ezLCD through USB. The serial programming can not be used.