

Software Installation Guide for L2Bot *

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(*) This Guide has been tested under Windows XP and Windows 7

1. Webcam driver
2. JMF 2.1.1.1.e
3. Eclipse setup for Webcam
4. Java comm API
5. Configure Eclipse for comm API
6. Let's drive L2Bot!

0. Install JDK (Java Development Kit) and Eclipse



Check if you are using a 64-bit Operating System. (Right click "Computer" on the desktop and select property to get the information.)

L2Bot requires 32 bit software. Download the newest version of 32 bit JDK (Java Development Kit) from: <http://www.oracle.com/technetwork/java/javase/downloads>

Note that 32 bit system is also called x86. If you already have 64 bit JDK version, it is fine to have 32 bit JRE (Java Runtime Environment) in addition on your computer. By default, it will be installed under c:\Program Files (x86)\Java.

Download the newest version of the Eclipse IDE (either for Developers or Classic) from <http://www.eclipse.org/downloads>

You do not need to install 32 bit Eclipse, when you have 64 bit OS. Find the downloaded Eclipse zip file, and extract it to a location. Inside the extracted Eclipse folder, you should find the Eclipse application. You may want to make a shortcut of this onto your desktop.

At least "Hello World" program using Eclipse must be tested before beginning the following installations.

1. Webcam driver installation

If your laptop has built in webcam, then skip this section 1. Usually the driver is already installed.

Any webcams (or camcorders) can be used for the L2Bot. In this guide, we have tested the following USB Logitech quick cams.



QuickCam® for Notebooks
FIRST SELECTION)



QuickCam® Deluxe for Notebooks



QuickCam® for Notebooks - Not Supported by Win 7. Win XP is OK

www.logitech.com/en-us/support-downloads

2. Under Option 3: First select Webcams, then select the correct model.

Option 1:
Automatically detect your USB corded, wireless or Bluetooth - attached Logitech products.
Detect your devices [What is auto-detect?](#)

Option 2:
Enter model number or product name
Search
[Where's the model number located?](#)

Option 3:
Select your product name
Webcams

Option 4: Select Your Webcam Name

The screenshot shows a navigation menu with four options. Option 1 is 'Detect your devices'. Option 2 is a search bar. Option 3 is a dropdown menu with 'Webcams' selected, showing a list of models: HD Pro Webcam C910, HD Pro Webcam C920, HD Webcam C270, HD Webcam C310, HD Webcam C510, HD Webcam C525, and HD Webcam C615. Option 4 is 'Select Your Webcam Name' with icons of a mouse and keyboard.

3. Select the Downloads tab, and choose your operating system, for us Windows 7. Select your version 32-bit or 64-bit.
4. Start the installation paying attention to these instructions:

You DO NOT have to install Logitech Vid, it is optional. If you decide not to select it, make sure to check the Webcam Application and the Webcam Driver.

Do not plug-in the cable in the beginning of the driver installation. Wait until you receive the software prompt before inserting the cable into the computer's USB port.

Double click the driver and follow the instruction. After restarting the computer, you will be asked to plug-in your webcam. Then read the instruction carefully. Do not click "Next" button until you see the video through the camera. After the installation is finished, Double click on Logitech QuickCam icon on the desktop. Click on "QuickCapture" button to test video capture. Also test "Logitech Control Panel" to change camera settings such as Brightness and Color Boost feature. Close all the windows related to the webcam.

2. JMF (Java Media Framework) Installation

Make sure the webcam is connected. Test your camera using the webcam application software.

Download and install Java Media Framework API, jmf-2_1_1e-windows-i586.exe, from <http://www.oracle.com/technetwork/java/javase/download-142937.html>

Note: You CANNOT install the JMF until the Java JDK is installed!

Use default location and selections. While initializing JMF, it will look for media devices (takes a while). Computer needs to be restarted.

After restart, double click on "JMStudio" icon on



your Desktop.

First, on the menu

Select **File | Preferences...**

Click on "**Capture Devices**" tab

Write down the last number of following line: "vfw:Microsoft WDM Image Capture (Win32) : **0**"

Usually, the number could be 0 or 1. This should match with `video.properties` file which will be explained later in section number 6 later in this manual.

Close the JMF Registry Editor.

In order to test the installation, click on **File | Capture...** on JMStudio window. Uncheck "**use audio device**" check box. Then click on **OK** button. After a few seconds, you should be able to see the video through the webcam.



Note for built-in webcam

If you have a built in webcam on your computer, but you wish to use an external one:

Select **File | Preferences**

Click on "**Capture Devices**" tab

Click "**Detect Capture Devices**"

If a menu soon appears with the option to choose webcams, examine both options, the external webcam will usually be noted as one of the following: usb webcam, usb capture device, Logitech webcam, or Logitech capture device. It will NEVER be integrated or onboard webcam / capture device.

If only one option appears, or the dialog box does not pop up and you have already installed the appropriate drivers for the webcam, a clean installation of the jmf and webcam software may be needed. Follow the instructions at the end of this document for full details on this procedure.



JMF and Webcam clean install

To do a complete clean uninstall and reinstall of the JMF software, you must not only uninstall the software, but you will have to edit some system variables, so before attempting, if your still having trouble with an integrated vs. external webcam try the following.

Click the start button (Round blue button with the windows logo in it)

Select "Devices and Printers"

Right click on any whitespace in this menu.

Select "Device Manager" from the resulting pop up.

Expand "Imaging Devices"

Find your integrated webcam and right click.
From the resulting menu select "Disable Device"

Follow any resulting prompts, restarting the computer if necessary.
Try detecting the capture devices through JMF like above.

If this process did not resolve the situation, follow the steps below.

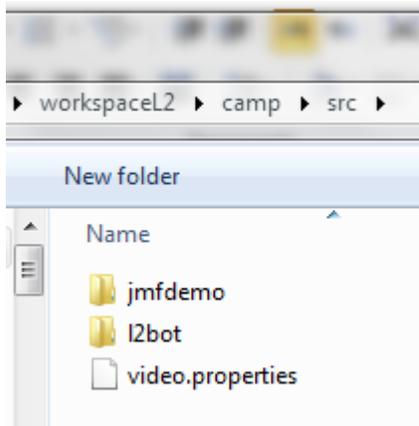
Uninstall both the webcam software and the JMF.
Click the Start button.
Click Control Panel
Click Uninstall a program, or Programs and Features
Select Java Media Framework 2.1.1e / JMF 2.1.1e, or any other version you have installed.
If the computer prompts you to restart, select restart later.
Next uninstall any and all Logitech webcam software, starting with Logitech vid (if installed)
Uninstall the Logitech Webcam Software
If prompted to restart, select restart now.

Click the Start button
Right click My Computer / Computer
Select Properties
On the left, select Advanced System Settings
Click Environment Variables
Look for the CLASSPATH variable in both menus.
Select edit on one menu.
Complete delete any text path (C:\PROGRA~2\JMF21~1 ... etc) that has JMF in it.
Click Ok
Make sure to edit the CLASSPATH variable in both System and User variables.

Download and install both the JMF and Webcam drivers again, restarting when necessary.
If this does not solve the issue, you will have to use your integrated webcam.

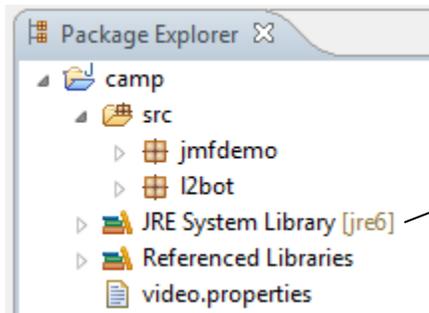
3. Java Eclipse setup for the vision processing in a Java Package

- 1) First create a new project, for example, "camp".
- 2) Create a Java Package called "12bot" by first highlighting the project "camp"
Select **File | New | Package**
Type in the Package name textbox, 12bot (note that the word starts with a small l)
Highlight the project **camp** and select **File | Refresh**
- 3) Download <http://www.robofest.net/l2bot/downloads/jmf.zip>.
- 4) Extract it into your Eclipse_workspace\camp\src folder
For example, if your workspace name is workspaceL2, then your "camp/src" folder structure should look like the following:



`video.properties` is for the whole project, not just for the `src`. Move it one level up, under the project directory, "camp".

In the `src` folder, you will see the `jmfdemo` package in the Eclipse Package Explorer window below. `video.properties` file is shown under **Referenced Libraries**. Ignore the warning signs in the `jmfdemo` package or fix it by commenting out some unused `import` statements.



Make sure this is 32bit JRE



If you see other compile errors in `FrameGrabber.java` and `FrameGrabberException.java` then you may need to remove `jmf.jar` file from `C:\Program Files (x86)\Java\jre6\lib\ext` and **add `jmf.jar` file in the Eclipse project environment as an external JAR file.** (See section 5 below to learn how to add external JAR files)

Open (double click) "`video.properties`" file. Make sure the last number is the same as the number from JMStudio. (It must be either zero or one. See section 3)

Download <http://www.robofest.net/l2bot/downloads/TestWebcam.java> into the `l2bot` Package directory, then select **File | Refresh** when project name is highlighted.

Run `TestWebcam.java`



Do not forget to close video window before starting a new program that uses the webcam.



If this program does not work or see error messages, then perhaps `jmf` setup was done incorrectly. Check `jmf.jar` file is installed in the Eclipse project environment. you may need to remove `jmf.jar` file from `C:\Program Files (x86)\Java\jre6\lib\ext` and add `jmf.jar` file in the Eclipse project environment as an external JAR file. (See section 5 below to learn how to add external JAR files)



Note for webcams using “only” YUV format (not RGB)

Use a new `FrameGrabber.java` that can be downloaded from <http://www.robofest.net/l2bot/downloads/FrameGrabber.java>

4. Java Comm API

The Java Communications API (also known as `javax.comm`, 32-bit x86 version) provides applications access to RS-232 hardware (serial ports) and limited access to IEEE-1284 (parallel ports), SPP mode. Note that L2Bot uses a serial port to control motors.

Download it from <http://www.robofest.net/l2bot/downloads/javacomm20-win32.zip>

Recommended location to extract the files into is `C:\Program Files (x86)` folder. `commapi` folder will be created there. Go to the folder.

- Copy `win32com.dll` to `C:\Program Files (x86)\Java\jre6\bin`
- Copy `comm.jar` file to `C:\Program Files (x86)\Java\jre6\lib`
- Copy `javax.comm.properties` file to `C:\Program Files (x86)\Java\jre6\lib`

5. Configure Eclipse for comm API

Highlight project `camp` and right click

Select **Build Path | Configure Build Path ...**

Click on “**Libraries**” tab

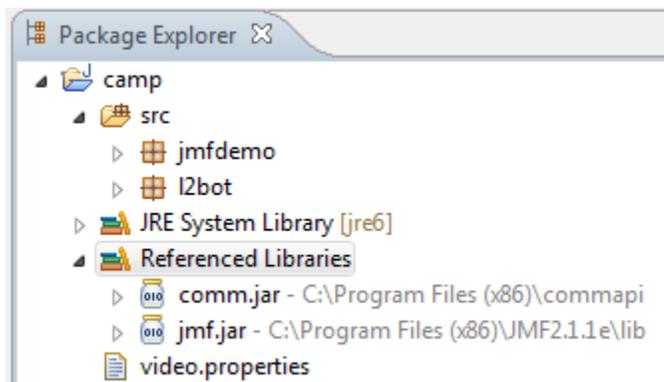
Click on “**Add External JARs...**” button

Go to the folder where the comm API was extracted, `C:\Program Files (x86)\commapi`

Double click `comm.jar`

Click on **OK** button

`comm.jar` entry will appear under **Referenced Libraries** as shown in the following figure.



6. Let's Drive the L2Bot

If your laptop does not have an RS-232 serial port, then you need a USB-Serial adaptor cable. Install the driver for the adaptor cable. **You may need to restart your computer after the installation.**

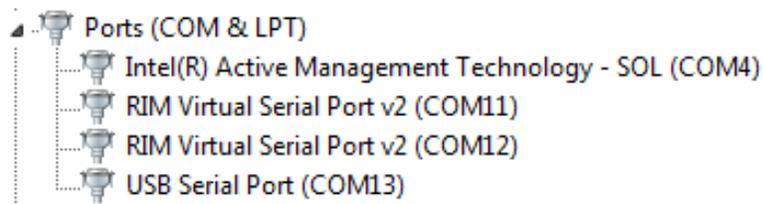
Check the Comport number of your laptop.

Right click on My Computer icon on your desktop. Select **Manage**.

Click on **Device Manager**.

Double click on **Ports (COM&LPT)**

Usually you will see: **Communications Port (COM1)**. If not COM1, remember the number that will be used in your programs.



Download <http://www.robofest.net/l2bot/downloads/TestLoCoMoCo.java> (or copy from CD) into the `l2bot` Package directory. Then select **File | refresh**.

Open the Java file and change the COM port number if your port number is not COM1.

```
private static final String COMPORT = "COMX";
```

Run `TestLoCoMoCo.java` program. (You do not need to connect your laptop to the robot yet)

You should see hexadecimal numbers being sent to the motor controller (LoCoMoCo v1.0).



If you keep getting error messages and you are importing previous project files, a suggestion would be recreating the project from the scratch.

Now place your laptop on L2Bot and connect the serial cable to your serial port. If the robot is moving backward and forward, then all the basic installations are done and you are ready to write code for the L2Bot. *Congratulations!*

Also copy <http://admin.robofest.org/web/downloads/LoCoMoCo1.java> and <http://admin.robofest.org/web/downloads/TestMotorsWithMenu.java> into l2bot package and test TestMotorsWithMenu.java program.

LoCoMoCo v1.0 manual can be found at:

<http://www.stoutware.com/downloads/LoCoMoCo/v1.0/assembly.doc>