



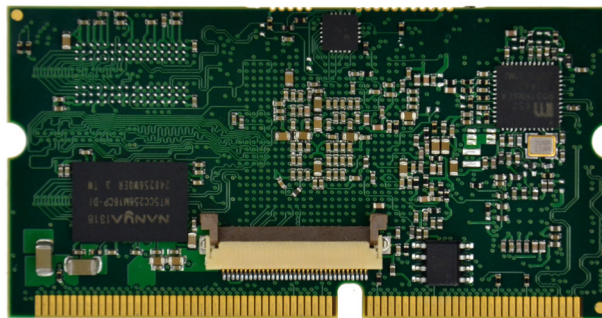
[www.lemonboard.org](http://www.lemonboard.org)

# Software Development Environment



# Lemonboard Development Environment

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## ***i.MX 6 Series***





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## 1. Introduction

### The Itib Build Environment

The Itib (Linux Target Image Builder) is an environment that supports you into building bootloader, kernel images and root filesystems for your lemonboard. It will automatically download all required src packages from the lemonboard website. The compiler toolchain will be installed under */opt/freescale*. This will change in the future since the place is not optimal.



## 2. Download

You can download the latest Itib Builder directly from our website [www.lemonboard.org](http://www.lemonboard.org)

Change into a directory where you want to install the development environment. Then:

```
mkdir IMX6DEV
```

```
cd IMX6DEV
```

```
wget www.lemonboard.org/ltib/ltib.tgz
```

```
tar -zxvf ltib.tgz
```



## 3. Installation

We normally qualify our Itib Environment under UBUNUT Linux. Other Distributions may require additional steps, please check the FAQ section under [www.lemonboard.org](http://www.lemonboard.org) for additional information.

After the successful download of the Itib installer package your system might miss some of the following packages needed for successful Itib installation.

bison	libx11-dev
build-essential	libxml2-dev
ccache	liblzo2-dev
flex	m4
gettext	patch
g++	rpm
intltool	tcl
libfontconfig1-dev	uuid-dev
libglib2.0-dev	wget
libncurses5-dev	x11proto-core-dev
libncursesw5-dev	xsltproc
libdbus-glib-1-dev	zlib1
libgtk2.0-dev	zlib1g
liborbit2-dev	zlib1g-dev
libtool	





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Under **UBUNTU** the installation of these necessary packages can be achieved by executing the following command on the commandline:

```
sudo apt-get install patch g++ rpm m4 bison libncurses5-dev libglib2.0-dev gettext  
build-essential tcl intltool libxml2-dev liborbit2-dev libx11-dev ccache flex uuid-dev  
libzoo2-dev ccache libfreetype6-dev liborbit2-dev zlib1g zlib1g-dev libtool wget  
libncursesw5-dev libglib2.0-dev xsltproc
```

If you are working under a 64 Bit Version of UBUNTU, you also have to install the 32 bit il-libs package.

```
sudo apt-get install ia32-libs
```

Next configure the sudo permissions for the **rpm command**.

As root user run the command `"/usr/sbin/visudo"`, and add the following line in the user privilege section:

```
username ALL = NOPASSWD: /usr/bin/rpm, /opt/freescale/ltib/usr/bin/rpm
```



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Finally we are ready to install the Itib Environment

If you are not in the **/IMX6DEV** directory change to it, else skip the next command.

```
cd IMX6DEV
```

Then start the lemonboard Itib install Command:

```
./lemonboard-Itib-installer/install
```

This should unpack the Itib Environment and create the Itib directory tree.  
Change to the new created Itib directory and execute Itib for the first time.

```
cd Itib
```

```
./Itib
```

Itib will check it's environment and compile everything missing. It will patch the standard Kernel with ARM, Freescale and lemonboard patches and then build the kernel. The same process will happen for all other packages too. This might take up to some hours, depending on the speed of your machine.

The next time you call *Itib* will be much faster since all packages are already built.



## 4. Working with Itib

All of the following steps are done in the Itib directory under **IMX6DEV** (`cd IMX6DEV/Itib`).

### 4.1. Directory Structure

Under the Itib tree you should find the following subdirectories:

<b>bin</b>	Includes some Itib perl scripts, nothing to be touched there
<b>config</b>	The Itib system configuration, also nothing to be touched under normal circumstances
<b>dist</b>	The dist lfs directory includes all the spec files for <i>Itib/rpm</i> . You might want to add your own packages into the Itib build process here. Also changes in the Version of existing Packages can be done within the spec files.
<b>doc</b>	This folder includes the original Itib documentation
<b>rootfs</b>	This is the target system root Filesystem output folder. You can for example rsync this content onto a SD Card as root partition for your lemonboard Target. Under <b>rootfs/boot/</b> the latest Kernel Image (ulmage) and the latest U-boot (u-boot.bin) can be found.
<b>rpm</b>	The rpm Build area. Under <b>rpm/RPMS/arm</b> you will find all the build Packages. The BUILD directory includes the SRC of the packages that are currently build. The SRC will be deleted after an successful build of the package. TIP: if you want to make changes to the Package on the fly, break the build process and start it again. Then the SRC will NOT be deleted. To force the rebuild of an existing Package either rename or remove the corresponding RPM package under <b>rpm/RPMS/arm/</b>
<b>tmp</b>	Temporary files, mostly rpm Build related
<b>tool</b>	Some special tools to create images or Cards



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## 4.2. Changing the Package Selection

One of the first steps you might want to do is adding more functionality to your lemonboard image. This can be done in the Package selection of your Itib tool. Run:

```
./ltib -c (If you are running ltib as root you will get a warning, say yes if root is your correct user)
```

And the following dialog should show

```

Freescale iMX6x Based Boards
Arrow keys navigate the menu. <Enter> selects submenus --->. Highlighted letters
are hotkeys. Pressing <Y> selects a feature, while <N> will exclude a feature.
Press <Esc><Esc> to exit, <?> for Help. Legend: [*] feature is selected [ ]
feature is excluded

(i)mx6q) Platform
--- LTIB settings
  System features --->
--- Choose the target C library type
  Target C library type (glibc) --->
  C library package (from toolchain only) --->
  Toolchain component options --->
--- Toolchain selection.
  Toolchain (ARM, gcc-4.6.2, multilib, neon optimized, gnueabi/eglibc2.13) --->
(-O2 -march=armv7-a -mfpv=vfpv3 -mfloat-abi=softfp) Enter any CFLAGS for gcc/g++
--- Choose your bootloader for U-Boot
  bootloader (u-boot) --->
  u-boot version (u-boot v2009.08) --->
--- Choose your board for u-boot
  board (mx6solo lemonboard) --->
--- Choose your Kernel
  kernel (Linux 3.0.35-imx) --->
[ ] Always rebuild the kernel
[ ] Produce cscope index
[*] Include kernel headers
[ ] Configure the kernel
--- Leave the sources after building
[ ] Build mfg firmware
--- Package selection
  Package list --->
--- Target System Configuration
  options --->
--- Target Image Generation
  options --->
---
v(+)
```

**<Select>**   < Exit >   < Help >

Picture 1



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Move the Selection down to Package List and press Enter. Now you are in the Package Selection:

```
Package List
Arrow keys navigate the menu. <Enter> selects submenus --->. Highlighted letters
are hotkeys. Pressing <Y> selects a feature, while <N> will exclude a feature.
Press <Esc><Esc> to exit, <?> for Help. Legend: [*] feature is selected [ ]
feature is excluded

-- Platform specific package selection
--- firmware-ixm
[*] imx-test
--- imx-lib
[*] kobs-ng
[ ] ltp_ixm
[*] wpa_supplicant
[*] gpu-viv-bin-mx6q
[ ] uuc
[ ] atheros-wifi
[*] perf
[ ] mtddev
[ ] gpu-viv-wl-bin-mx6q
[ ] weston-ixm-bin
  Freescale Multimedia Plugins/Codecs --->
--- Common package selection list
[ ] asterisk
[ ] atk
[ ] autoconf
[ ] automake
--- alsa-lib
[*] alsa-utils
--- bash
[ ] Don't link bash to /bin/sh
[ ] bind
[ ] binutils
[ ] bison
[ ] bluez-hcidump
[ ] bluez-libs
[ ] bluez-utils
v(+)
```

<Select> < Exit > < Help >

Picture 2

In this Dialog you can select or deselect the Packages that will be build through Itib. Just select additional Packages you need and leave the dialogs with **Exit**. At the End Itib will ask you if you want to save the new configuration. If everything was OK say yes here. Now Itib will download the additional Packages from the lemonboard website or from freescale and build the new rpm Packages for you. It will also install the newly built packages into the roofs directory.



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## 4.3. Changing the Kernel Image

Changing the Kernel is as easy as selecting additional Packages. Also here you have to run:

```
./ltib -c (If you are running ltib as root you will get a warning, say yes if root is your correct user)
```

You should see the Dialog out of Picture 1.

Move the Selection down to “Configure the Kernel”. Press the Space Key to select this item. Now leave the Dialog with exit. Ltib will ask you if you want to save your new configuration, if everything was ok say yes here.

```
.config - Linux/arm 3.0.35 Kernel Configuration

Linux/arm 3.0.35 Kernel Configuration
Arrow keys navigate the menu. <Enter> selects submenus --->. Highlighted letters
are hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes features. Press
<Esc><Esc> to exit, <?> for Help, </> for Search. Legend: [*] built-in [ ]
excluded <M> module < > module capable

[ ] Patch physical to virtual translations at runtime (EXPERIMENTAL)
  General setup --->
[*] Enable loadable module support --->
[*] Enable the block layer --->
  System Type --->
  Bus support --->
  Kernel Features --->
  Boot options --->
  CPU Power Management --->
  Floating point emulation --->
  Userspace binary formats --->
  Power management options --->
[*] Networking support --->
  Device Drivers --->
  File systems --->
  Kernel hacking --->
  Security options --->
-* Cryptographic API --->
  Library routines --->
---
  Load an Alternate Configuration File
  Save an Alternate Configuration File

<Select> < Exit > < Help >
```



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Now Itib will compile the Kernel configuration tool for you and come up with the standard Kernel Configuration Dialog:

This is mostly standard Kernel options. Most of the Freescale specific drivers can be found under “Device Drivers” → “MXC support drivers”.

After you made your changes quit the dialogs with Exit. The Kernel configuration tool will ask you if you want to save your configuration, if OK say yes here.

Now Itib will recompile your kernel and store the Image under **rootfs/boot**. The name is ulmage.



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