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Getting Started With the iMX Developer's Kit

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1 Document Revision History

<i>Revision</i>	<i>Date</i>	<i>Description</i>
A	2015-09-28	First release
B	2016-01-21	Made the document more general to also be valid for iMX6 Quad, iMX6 DualLite and iMX6 UltraLite.
C	2016-05-17	Added information about iMX7 Dual uCOM and <i>Adding Display</i> document.
D	2016-08-30	Added information about iMX7 Dual COM. Also specified that a password (<code>pass</code>) is now required for the root user.
E	2016-09-24	Clarified console connector placement.
E1	2016-12-29	Added more documents in the "Further Information" section.

2 Introduction

This document provides you with step-by-step instructions to start working with one of Embedded Artists' iMX Developer's Kit. The document is valid for any of the following iMX Developer's Kits:

- iMX6 SoloX Developer's Kit (**EAK00245**)
- iMX6 Quad Developer's Kit (**EAK00251**)
- iMX6 UltraLite Developer's Kit (**EAK00253**)
- iMX6 DualLite Developer's Kit (**EAK00263**)
- iMX7 Dual uCOM Developer's Kit (**EAK00268**)
- iMX7 Dual Developer's Kit (**EAK00273**)

By following these instructions you will have a terminal application connected to the board and Linux running on the board.

2.1 Conventions

A number of conventions have been used throughout to help the reader better understand the content of the document.

Constant width text – is used for file system paths and command, utility and tool names.

```
$ This field illustrates user input in a terminal running on the  
development workstation, i.e., on the workstation where you edit,  
configure and build Linux
```

```
# This field illustrates user input on the target hardware, i.e.,  
input given to the terminal attached to the COM Board
```

```
This field is used to illustrate example code or excerpt from a  
document.
```

3 Getting Started

3.1 Kit Content

- One iMX Developer's Kit which consists of one COM board and one Carrier board (and in the case of iMX7 Dual uCOM Developer's Kit, also a *uCOM Adapter Board*)
- One micro-B to A USB cable
- One FTDI cable (UART-to-USB bridge for console output)
- One Debug interface board with 10-pos FPC cable
- Power supply
- One Micro-Fit 3.0 2-pos connector with 30 cm cables
- One Micro-Fit 3.0 10-pos connector with 30 cm cables

3.2 Hardware Overview

Figure 1 and Figure 2 below shows the *iMX6 SoloX Developer's Kit* but the pictures are generic for all *iMX Developer's Kits*.

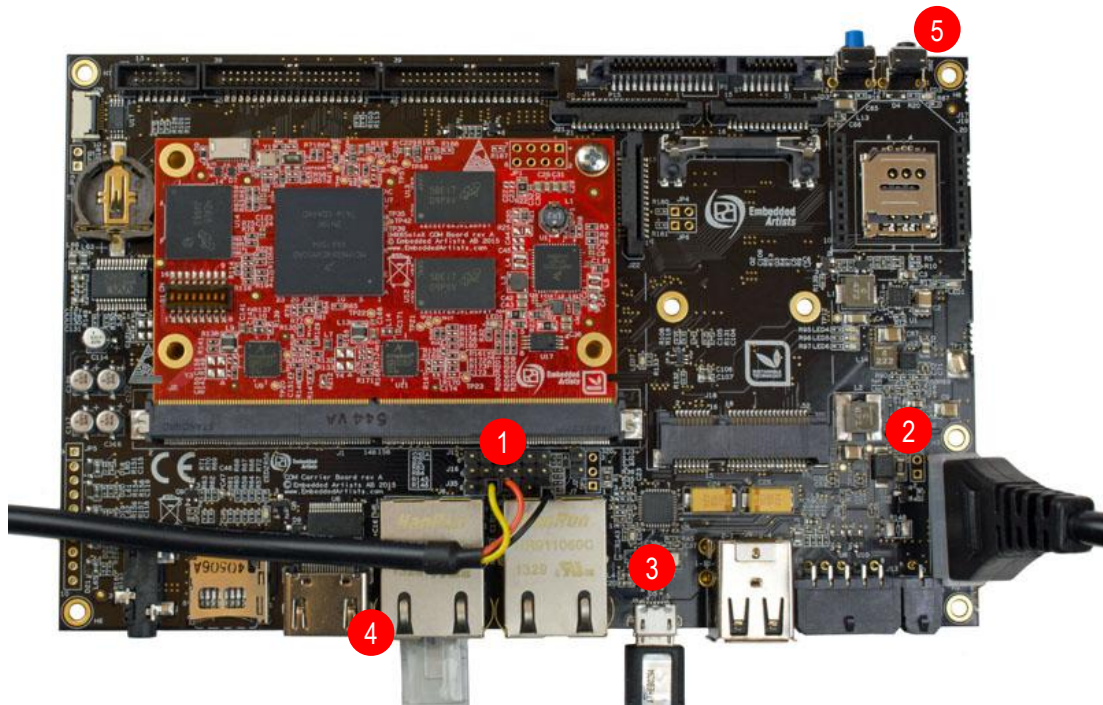


Figure 1 - iMX6 SoloX Developer's Kit Top View

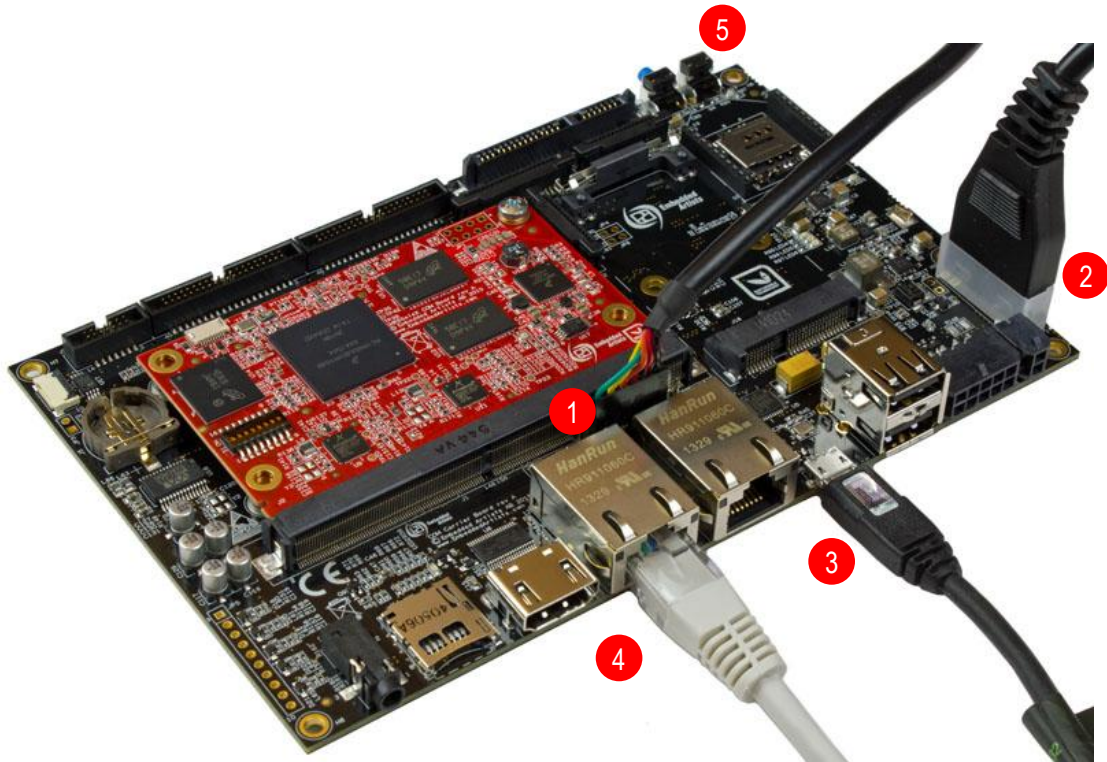


Figure 2 - iMX6 SoloX Developer's Kit Side View

1. FTDI cable
2. Power supply
3. Micro-B to A USB cable connected to USB OTG
4. Network cable connected to the RJ45 connector
5. Reset button

3.3 Connect FTDI Cable

Begin by connecting the FTDI cable. Depending on which Developer's Kit you have this cable should be connected to either the J35 or J16 connector.

Connector	Developer's Kit
J35	<ul style="list-style-type: none"> - iMX6 SoloX Developer's Kit (EAK00245) - iMX6 UltraLite Developer's Kit (EAK00253) - iMX7 Dual uCOM Developer's Kit (EAK00268) - iMX7 Dual Developer's Kit (EAK00273)
J16	<ul style="list-style-type: none"> - iMX6 Quad Developer's Kit (EAK00251) - iMX6 DualLite Developer's Kit (EAK00263)

Figure 2 above illustrates the location (1) of J16 and J35. There are three 6-position pin headers. The one closest to the Ethernet connectors is J35. The middle one is J16 and the pin header closest to the MXM3 connector is J15 (not used in this context).

Connecting the FTDI cable is needed for console input/output. Two different kinds of cables can be included in the kit. It could be a cable as shown in Figure 3 where each individual line must be connected. The other alternative is a cable as shown in Figure 4.

Pin marked GND (1) is ground and should be connected to ground (black) on the FTDI cable. The pin marked TX (4) is output from the board and should be connected to RX (orange) on the FTDI cable. The pin marked RX (5) is input to the board and should be connected to TX (yellow) on the FTDI cable.

NOTE: Figure 3 and Figure 4 shows how to connect the cable to J35, but it should be connected the same way to J16 (the middle connector, located just above J35 in the picture).

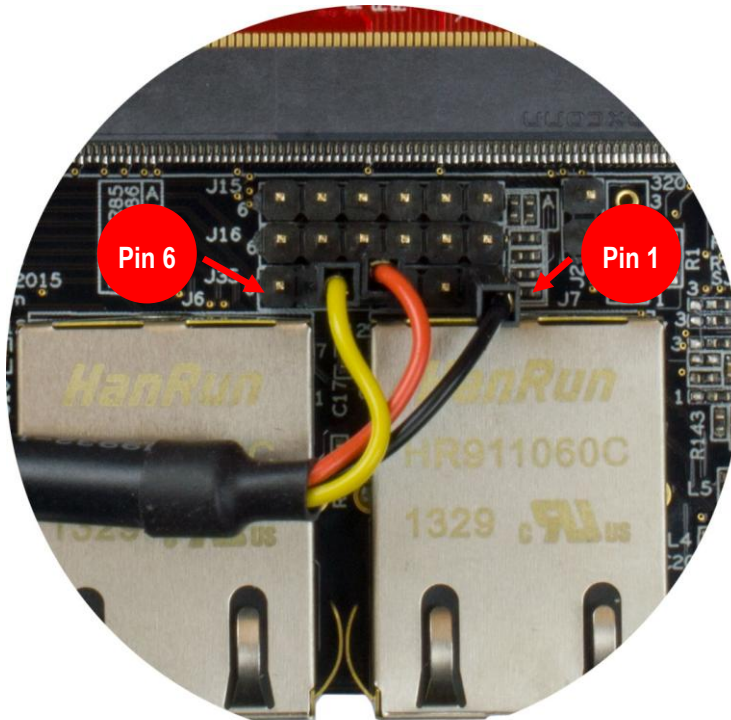


Figure 3 - Connected FTDI Cable with Independent Wires

The picture below illustrates an FTDI cable with a 6-position header. Note the orientation. The black wire shall be to the right in the picture below.

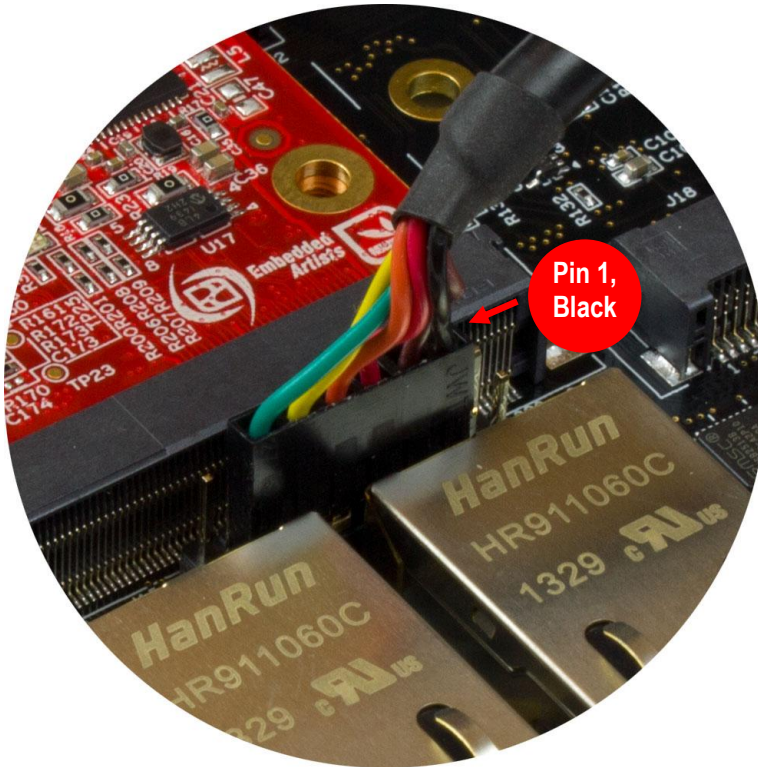


Figure 4 - Connected FTDI Cable with 6-position header

3.4 Terminal / Console Application

When the FTDI cable has been connected to the board and to your computer drivers are installed (if they haven't already been installed). Normally these are installed automatically.

Note: If you have problems with the drivers for the FTDI cable please visit www.ftdichip.com

The terminal application Tera Term will be used in these instructions and can be downloaded from <https://ttssh2.osdn.jp/index.html.en>.

1. Start Tera Term and select the virtual COM port that was created when connecting the FTDI cable to your computer. See Figure 5 for an example of how the dialog window looks like for a new connection.



Figure 5 - Tera Term, select COM port

2. Go to Setup → Serial port and set the Baud rate to **115200** as shown in Figure 6. The terminal application is now connected to the virtual COM port and the board.

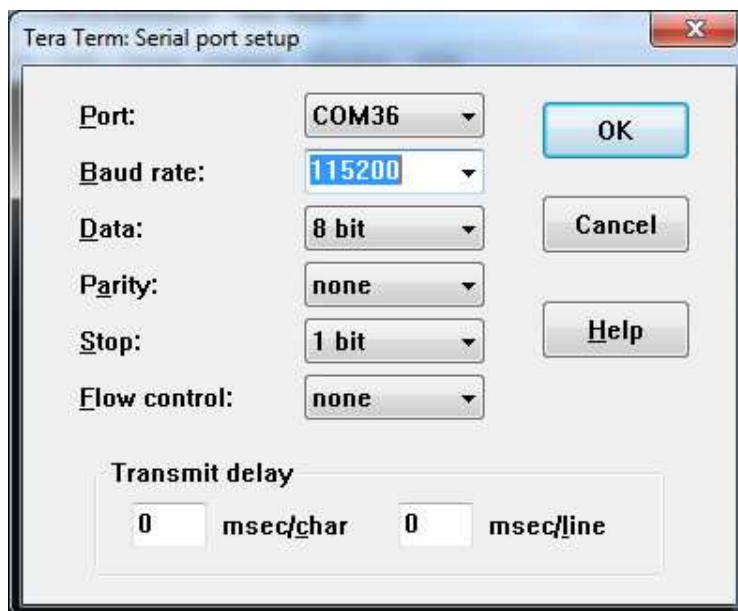


Figure 6 - Tera Term, setup serial port

3.5 Powering the Board

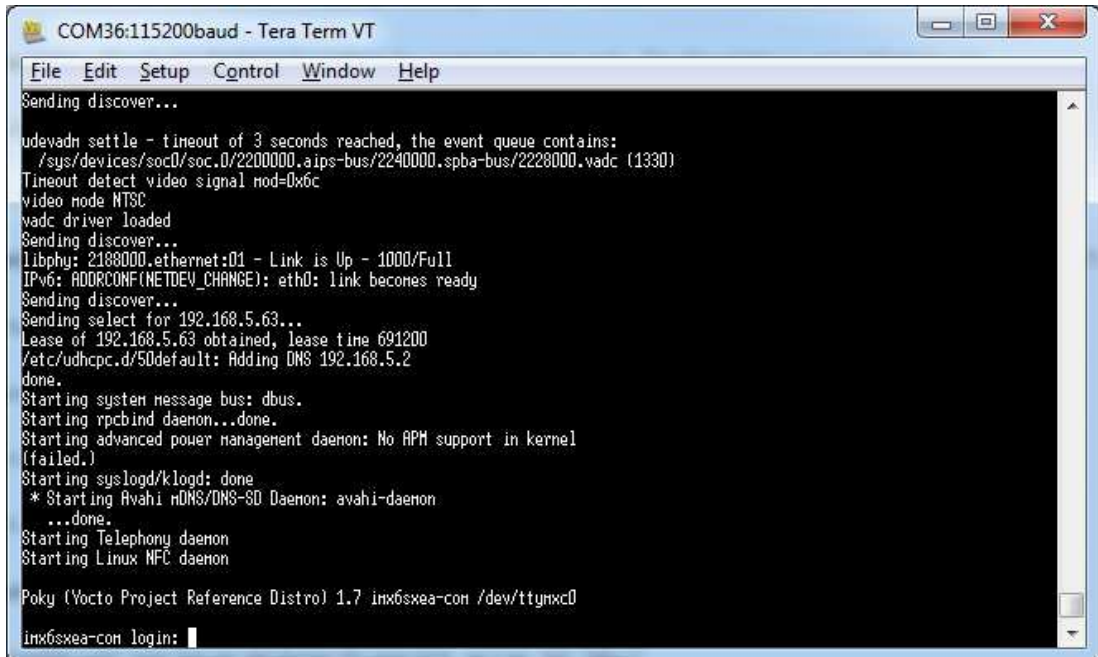
Connect the power supply to the J4 connector as shown in Figure 7.



Figure 7 - Power supply

When the power supply is connected to the board the u-boot bootloader will start to run and boot Linux. When Linux has booted you will be requested to login as shown in Figure 8.

1. Enter **root** to login and **pass** if asked for password. Older versions of the Linux distribution had by default no password associated with the root user.



```

COM36:115200baud - Tera Term VT
File Edit Setup Control Window Help
Sending discover...
udevadm settle - timeout of 3 seconds reached, the event queue contains:
/sys/devices/soc0/soc.0/2200000.aips-bus/2240000.spba-bus/2228000.vadc (1330)
Timeout detect video signal mod=0x6c
video mode NTSC
vadc driver loaded
Sending discover...
libphy: 2188000.ethernet:01 - Link is Up - 1000/Full
IPv6: ADDRCONF(NETDEV_CHANGE): eth0: link becomes ready
Sending discover...
Sending select for 192.168.5.63...
Lease of 192.168.5.63 obtained, lease time 691200
/etc/udhcpd.d/50default: Adding DNS 192.168.5.2
done.
Starting system message bus: dbus.
Starting rpcbind daemon...done.
Starting advanced power management daemon: No APM support in kernel
(failed.)
Starting syslogd/klogd: done
* Starting Avahi mDNS/DNS-SD Daemon: avahi-daemon
...done.
Starting Telephony daemon
Starting Linux NFC daemon

Poky (Yocto Project Reference Distro) 1.7 inx6sx6a-com /dev/ttyMxc0
inx6sx6a-com login:

```

Figure 8 - Tera Term Linux login

3.6 USB OTG

This step is only needed when deploying new images to the board using the *Manufacturing Tool*. Connect the micro-B to USB A cable to the micro-B connector on the board and to a USB A connector on your computer.

For more details about using the manufacturing tool read section *Deploying Images* in the document *Working with Yocto to build Linux*. This document can be found on Embedded Artists website.



Figure 9 - micro-B to A USB, OTG

3.7 Networking

This step is only needed when connecting the board to a network. Connect an Ethernet cable (**not included**) to one of the RJ45 connectors on the board, for example, the first port as shown in Figure 10.



Figure 10 - Ethernet cable

To check the available network interfaces run `ifconfig` as shown below. If you have connected the cable to port 0 you will see an interface named `eth0`.

```
# ifconfig

eth0      Link encap:Ethernet  HWaddr 00:1A:F1:01:7F:28
          inet addr:192.168.5.63  Bcast:192.168.5.255
          Mask:255.255.255.0
          inet6 addr: fe80::21a:f1ff:fe01:7f28/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:17 errors:0 dropped:0 overruns:0 frame:0
          TX packets:26 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:2207 (2.1 KiB)  TX bytes:5762 (5.6 KiB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```

If you cannot see `eth0` or if it doesn't have a valid IP address (link addr) you can run `ifdown` followed by `ifup` to "restart" the interface.

```
# ifdown eth0
# ifup eth0

fec 2188000.ethernet eth0: Freescale FEC PHY driver [Generic PHY]
(mii_bus:phy_addr=2188000.ethernet:01, irq=-1)
udhcpc (v1.22.1) started
Sending discover...
Sending discover...
libphy: 2188000.ethernet:01 - Link is Up - 1000/Full
Sending discover...
Sending select for 192.168.5.58...
Lease of 192.168.5.58 obtained, lease time 691200
/etc/udhcpc.d/50default: Adding DNS 192.168.5.2
```

You could try to see if you have a working network connection by using the ping utility. In the example below `google.com` is "pinged". For this to work you need a working Internet connection. An alternative is to ping a computer on your local network.

```
# ping google.com

PING google.com (74.125.232.96): 56 data bytes
64 bytes from 74.125.232.96: seq=0 ttl=55 time=21.507 ms
64 bytes from 74.125.232.96: seq=1 ttl=55 time=16.993 ms
```

3.8 Further Information

The board is now up-and-running. We recommend you to look at the other documents that are available on Embedded Artists website. These will help you get a better understanding of the hardware as well as the available software.

Some recommended documents:

- *Working with Yocto to Build Linux* – if you want to build bootloaders, Linux kernel, and file system yourself.
- *Interface Testing on iMX Developer's Kits* – A document that show how you can test the hardware by utilities in u-boot and / or Linux.
- *Security Considerations* – Describes, for example, how to enable **secure boot**.
- *Working with Cortex-M4 on the iMX6 SoloX COM Board* and the associated *Working with Cortex-M4 on i.MX7 Dual* – Describes how to build and run applications for the Cortex-M4 core on the iMX6 SoloX / iMX7 Dual (u)COM Board.
- *Adding Displays to iMX Developer's Kits* - Describes the process of adding a display to an *iMX Developer's Kit*. The different display interfaces and how to connect to them are presented. Available commands in the bootloader and Linux kernel are also presented.
- *Wireless Communication on iMX Developer's Kit* - Describes different ways to add wireless functionality to an iMX Developer's Kit.
- *Developing with Phyton* - Provides a step-by-step instruction guide to start writing Python scripts executing on iMX COM boards.
- *Developing with Qt5 on iMX Developer's Kits* - Provides an overview of Qt and a step-by-step instruction for setting up Qt Creator - the development environment for Qt.

If you have any questions, want to discuss your project requirements, need assistance in integrating the board into your product; please don't hesitate to contact us.

www.embeddedartists.com/contact