

# EDM Yocto 1.7 Pre-Built Image User's Guide

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***TechNexion***

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## 1. Boot Yocto image

### 1.1 Supported hardware

These are the systems covered in this guide:

System-on-Modules:

- EDM1-CF-IMX6
- EDM1-CF-IMX6SX
- EDM2-CF-IMX6
- PICO-IMX6

Carrier Boards:

- EDM1-FAIRY
- EDM1-GOBLIN
- EDM2-ELF
- Toucan-0700
- PICO-DWARF
- PICO-HOBBIT

Box industrial PC:

- TEK3-IMX6

### 1.2 Software version

name	version
u-boot	2015.04
linux kernel	3.14.52
Yocto	1.7 (dizzy)

### 1.3 Install Yocto Pre-Built image into eMMC

Please refer to the document “Yocto\_pre-built\_image\_installation\_guide.pdf”.

## 2. Memory layout of the yocto image

Section	Description
MBR	Partition information
SPL	First stage u-boot image
u-boot.img	
Partition 1 (FAT32) Under / directory <ul style="list-style-type: none"> <li>◆ uEnv.txt</li> <li>◆ zImage</li> <li>◆ dtb</li> </ul>	<ul style="list-style-type: none"> <li>◆ u-boot.img: Second stage u-boot image</li> <li>◆ uEnv.txt: U-boot environment, you can set display type in this plain text.</li> <li>◆ dtb: linux device tree file, it's platform-specific.</li> </ul>
Partition 2 (EXT3) rootfs	Yocto rootfs

## 3. Debug Console for Toucan

For all boards, the default debug console is output to ttymxc0, except Toucan. The debug console of Toucan-0700 is output to ttyUSB0 by default. We recommend to use USB-to-Serial cable (with Prolific or FTDI chip) on Toucan.

## 4. Login to Yocto on target board

Please enter “root” in Yocto login prompt.

```
Poky (Yocto Project Reference Distro) 1.7 picosom-dwarf-imx6 /dev/ttymxc0
```

```
picosom-dwarf-imx6 login: root
```

## 5. Change display settings

Display settings can be changed by modifying uEnv.txt.

The eMMC corresponds to /dev/mmcblk2. uEnv.txt is in /dev/mmcblk2p1.

```
root@edm-fairy-imx6:~# mkdir -p /mnt/temp
root@edm-fairy-imx6:~# mount /dev/mmcblk2p1 /mnt/temp/
```

```
root@edm-fairy-imx6:~# vi /mnt/temp/uEnv.txt
```

```
displayinfo=video=mxcfb0:dev=hdmi,1280x720M@60,if=RGB24 fbmem=28M
mmccargs=setenv bootargs console=${console},${baudrate} root=${mmcroot} ${display
bootcmd_mmc=run loadimage;run mmcboot;
uenvcmd=run bootcmd_mmc
```

Replace the red string with:

**For HDMI 720P:**

```
video=mxcfb0:dev=hdmi,1280x720M@60,if=RGB24 fbmem=28M
```

**For HDMI 1080P:**

```
video=mxcfb0:dev=hdmi,1920x1080M@60,if=RGB24 fbmem=28M
```

**For 7 inch LVDS panel:**

```
video=mxcfb0:dev=ldb,1024x600@60,if=RGB24,bpp=32
```

**For 7 inch TTL panel:**

```
video=mxcfb0:dev=lcd,800x480@60,if=RGB24
```

**For dual display for HDMI and LVDS:**

```
video=mxcfb0:dev=hdmi,1280x720M@60,if=RGB24
```

```
video=mxcfb1:dev=ldb,1024x600@60,if=RGB24,bpp=32
```

**Note:**

1. Because i.mx6sx lacks VPU, the freescale proprietary video decoder can't be used in video playback.
2. For now, EDM1-CF-IMX6SX doesn't support HDMI output, and it only supports to output to LVDS 7-inch panel now.root

## 6. Calibrate Resistive Touch Panel

For 4-wire resistive touch panel, the touch panel is connected to touch screen controller “ADS7846”. The calibration data is generated from ts\_calibrate (the calibration utility of [tslib](#)). The calibration data is fed to ADS7846 driver while booting to apply the calibration, so xinput calibration wouldn't be needed.

more /etc/init.d/touch\_cal.sh

```
#!/bin/sh
CALFILE="/pointercal"

if [ -e $CALFILE ] ; then
    TOUCH_INPUT=`cat /proc/bus/input/devices | grep -A9 'ADS7846 Touchscreen' | grep 'Sysfs' | grep -o 'input[0-9]'`
    if [ "$?" == "0" ];then
        cat ${CALFILE} > /sys/class/input/${TOUCH_INPUT}/calibration
        echo -e "\nFeed calibration data to ADS7846 driver\n"
    fi
fi

exit 0
```

**Generate calibration data:**

The calibration date would be expected to be placed on the path “ / ”.

```
root@edm-fairy-imx6:~# export TSLIB_CALIBFILE=/pointercal
```

Check the input device number for ADS7846

```
root@edm-fairy-imx6:~# cat /proc/bus/input/devices | grep -A9 'ADS7846 Touchscreen' | grep 'Sysfs' | grep -o 'input[0-9]'
```

```
input1
```

Here we get the input device number “input1” for ADS7846. For different platform, the input device number may be different.

Clean the old calibration data.

```
root@edm-fairy-imx6:~# echo '0 0 0 0 0 0 0 0' > /sys/class/input/input1/calibration
root@edm-fairy-imx6:~# ts_calibrate
```

Apply the new calibration data immediately.

```
root@edm-fairy-imx6:~# cat /pointercal > /sys/class/input/input1/calibration
```

## 7. Test WIFI and Bluetooth

The yocto qt5 image utilize “[connman](#)” as network manager.

The default settings for connman in the iameg is to turn WIFI and bluetooth on.

Please check:

```
more /var/lib/connman/settings
```

```
[global]
OfflineMode=false
```

```
[WiFi]
Enable=true
Tethering=false
```

```
[Bluetooth]
Enable=true
Tethering=false
```

### Test wifi:

If the CPU module is **PICO-imx6**, please load wifi driver module first.

```
root@picosom-dwarf-imx6:~# modprobe bcmdhd
```

Run “connmanctl” in interactive mode.

```
root@edm-fairy-imx6:~# connmanctl
```

Scan and list the wifi hotspots, then register the agent to handle user requests.

```
connmanctl> scan wifi
```

Scan completed for wifi

```
connmanctl> services
  hotspot      wifi_4439c4970d84_544543484e4558494f4e_managed_psk

connmanctl> agent on
Agent registered
```

Connect to the hotspot and enter the passphrase.

```
connmanctl> connect wifi_4439c4970d84_544543484e4558494f4e_managed_psk

Agent RequestInput wifi_4439c4970d84_544543484e4558494f4e_managed_psk
Passphrase = [ Type=psk, Requirement=mandatory, Alternates=[ WPS ] ]
WPS = [ Type=wpspin, Requirement=alternate ]
Passphrase?
Connected wifi_4439c4970d84_544543484e4558494f4e_managed_psk
```

Quit the interactive mode of “connmanctl”.

```
connmanctl> quit
```

Test if wifi actually works.

```
root@edm-fairy-imx6:~# ping www.google.com
PING www.google.com (203.66.124.251): 56 data bytes
64 bytes from 203.66.124.251: seq=0 ttl=59 time=4.905 ms
64 bytes from 203.66.124.251: seq=1 ttl=59 time=12.278 ms
64 bytes from 203.66.124.251: seq=2 ttl=59 time=4.307 ms
```

For the next boot, connman will automatically connect to the hotspot you used before.

Clean the stored settings of hotspot.

```
root@edm-fairy-imx6:~# rm /var/lib/connman/*/settings
```

Switch on/off wifi.

```
root@edm-toucan-imx6:~# connmanctl disable wifi
Disabled wifi

root@edm-fairy-imx6:~# connmanctl enable wifi
Enabled wifi
```

## Test bluetooth:

Make sure bluetooth device for testing is able to be scanned.

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Load bluetooth firmware into BT chip via UART and need to wait 5~10 sec to complete.

### For EDM1-CF-IMX6:

```
root@edm-fairy-imx6:~# brcm_patchram_plus -d --timeout=6.0 \  
--patchram /lib/firmware/brcm/bcm4330.hcd --baudrate 3000000 --no2bytes --tosleep=2000 \  
--enable_hci /dev/ttymx2 > /dev/null 2>&1 &
```

### For EDM1-CF-IMX6SX:

```
root@edm-goblin-imx6sx:~# brcm_patchram_plus -d --timeout=6.0 \  
--patchram /lib/firmware/brcm/bcm4330.hcd --baudrate 3000000 --no2bytes --tosleep=2000 \  
--enable_hci /dev/ttymx5 > /dev/null 2>&1 &
```

### For PICO-IMX6:

```
root@picosom-dwarf-imx6:~# brcm_patchram_plus -d --timeout=6.0 \  
--patchram /lib/firmware/brcm/Type_ZP.hcd --baudrate 3000000 --no2bytes --tosleep=2000 \  
--enable_hci /dev/ttymx1 > /dev/null 2>&1 &
```

Check if interface “hci” device node exist.

```
root@edm-fairy-imx6:~# hciconfig -a  
hci0: Type: BR/EDR Bus: UART  
BD Address: 43:30:A0:00:00:00 ACL MTU: 1021:8 SCO MTU: 64:1  
DOWN  
RX bytes:574 acl:0 sco:0 events:27 errors:0  
TX bytes:411 acl:0 sco:0 commands:27 errors:0  
Features: 0xbf 0xfe 0xcf 0xfe 0xdb 0xff 0x7b 0x87  
Packet type: DM1 DM3 DM5 DH1 DH3 DH5 HV1 HV2 HV3  
Link policy: RSWITCH SNIFF  
Link mode: SLAVE ACCEPT
```

Bring hci interface up.

```
root@edm-fairy-imx6:~# hciconfig hci0 up
```

Scan the bluetooth device.

```
root@edm-fairy-imx6:~# hcitool -i hci0 scan  
Scanning ...  
00:1F:20:7E:21:6C Logitech Bluetooth Mouse M555b
```

## 8. Switch audio output

The default audio output for HDMI pre-built image is HDMI audio and for LVDS pre-built image is SGTL5000.

List the available audio output sink in the system.



```
root@edm-fairy-imx6:~# LANG=C pactl list sinks | grep 'Name: ' | cut -d" " -f2
alsa_output.platform-sound-hdmi.25.analog-stereo
alsa_output.platform-sound-spdif.24.analog-stereo
alsa_output.platform-sound.23.analog-stereo
```

### **For EDM1-CF-IMX6:**

Set audio output to HDMI.

```
pacmd set-default-sink alsa_output.platform-sound-hdmi.25.analog-stereo
```

Set audio output to SGTL5000 audio codec.

```
pacmd set-default-sink alsa_output.platform-sound.23.analog-stereo
```

Set audio output to SPDIF.

```
pacmd set-default-sink alsa_output.platform-sound-spdif.24.analog-stereo
```

Play sound.

```
gst-launch-1.0 filesrc location=/usr/share/qt5everywheredemo-1.0/qml/QtDemo/demos/maroon/content/audio/bomb-action.wav ! decodebin ! pulsesink
```

### **For PICO-IMX6:**

Set audio output to HDMI.

```
pacmd set-default-sink alsa_output.platform-sound-hdmi.26.analog-stereo
```

Set audio output to SGTL5000 audio codec.

```
pacmd set-default-sink alsa_output.platform-sound.24.analog-stereo
```

Play sound.

```
gst-launch-1.0 filesrc location=/usr/share/qt5everywheredemo-1.0/qml/QtDemo/demos/maroon/content/audio/bomb-action.wav ! decodebin ! pulsesink
```

### **For TEK3-IMX6:**

Set audio output to HDMI.

```
pacmd set-default-sink alsa_output.platform-sound-hdmi.24.analog-stereo
```

Set audio output to SGTL5000 audio codec.

```
pacmd set-default-sink alsa_output.platform-sound.23.analog-stereo
```

Play sound.

```
gst-launch-1.0 filesrc location=/usr/share/qt5everywheredemo-1.0/qml/QtDemo/demos/maroon/content/audio/bomb-action.wav ! decodebin ! pulsesink
```

Change the audio output permanently:  
The audio settings for output are in the bottom of /etc/pulse/default.pa.

### For EDM1-CF-IMX6:

vi /etc/pulse/default.pa

```
#For edm-fairy-imx6/edm-toucan-imx6:

#set-default-sink output
#set-default-sink alsa_output.platform-sound-hdmi.25.analog-stereo
set-default-sink alsa_output.platform-sound.23.analog-stereo
#set-default-sink alsa_output.platform-sound-spdif.24.analog-stereo
```

### For PICO-IMX6:

vi /etc/pulse/default.pa

```
#For edm-fairy-imx6/edm-toucan-imx6:

#set-default-sink alsa_output.platform-sound-hdmi.26.analog-stereo
set-default-sink alsa_output.platform-sound.24.analog-stereo
```

### For TEK3-IMX6:

vi /etc/pulse/default.pa

```
#For edm-fairy-imx6/edm-toucan-imx6:

#set-default-sink alsa_output.platform-sound-hdmi.24.analog-stereo
set-default-sink alsa_output.platform-sound.23.analog-stereo
```

## 9. Adjust backlight for LVDS panel

### For EDM1-CF-IMX6:

Brightness is from 0 to 7.

```
echo 0 > /sys/class/backlight/backlight_lvds.30/brightness
```

### For EDM1-CF-IMX6SX:

Brightness is from 0 to 7.

```
echo 0 > /sys/class/backlight/backlight2.16/brightness
```

### For PICO-IMX6:

Brightness is from 0 to 7.

```
echo 0 > /sys/class/backlight/backlight_lvds.31/brightness
```

## 10. Test MIPI camera

```
gst-launch-1.0 imxv4l2src device=/dev/video0 ! 'video/x-raw,  
format=(string)UYVY,width=640,height=480,framerate=(fraction)30/1' ! imxv4l2sink
```

**Note:**

Because i.mx6sx lacks MIPI interface, EDM1-CF-IMX6SX doesn't support MIPI camera.