

BSP Yocto FSL iMX7 PD17.2.1 Release Notes

Operating System	Linux
BSP Release Status	RELEASED
Release Date	11 Oct 2017
Repository	PHYTEC Public Repos
Binaries	BSP-Yocto-FSL-iMX7-PD17.2.1
Source Archive	
Release Notes	Click Here

Introduction

This BSP provides a basis for development, deployment and execution of Linux based applications on the iMX7 System on Module (SOM). For detailed information on the various software components included in the release and how to use them, please refer to the [Quickstart](#).

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Versioning

Software

Linux Kernel	4.1.15 (Based on NXP Release L4.1.15-2.0.1_ga)
U-Boot	2016.03 (Based on NXP Release L4.1.15-2.0.1_ga)
Yocto	2.1.1 Krogth(Based on NXP Release L4.1.15-2.0.1_ga)
Qt	Not Supported (Click Here for more info)
Host OS	Tested on 64-bit Ubuntu 14.04 LTS

Yocto Machine Configuration Table

This BSP release supports various configurations of the phyBOARD-Zeta i.MX7. **You will need to know which Yocto machine configuration corresponds to your kit in order to build the appropriate BSP.** By default, only the standard kit configurations are shown in the table. If you have a different kit, use the filters below to search by Kit Part Number or SOM. The U-Boot defconfig and kernel device tree file names are important when creating custom U-Boot and kernel images outside of Yocto development.

Kit Part Number =

- PB-01910-001(i.MX7Dual Kit)
- PB-01910-002(i.MX7Solo Kit)

SOM Part Number =

Yocto Machine Config	Kit Part Number	SOM Part Number (Click Here for description)	Modules	U-Boot defconfig	Kernel Device Tree File
imx7d-phyboard-zeta-001	PB-01910-001 (i.MX7Dual Kit)	PCM-061-2110111C	PEB-EVAL-02 PEB-WLBT-03 PEB-AV-02	mx7d_pcm061_21x_config	imx7d-phyboard-zeta-001.dtb
imx7s-phyboard-zeta-002	PB-01910-002 (i.MX7Solo Kit)	PCM-061-0502100E	PEB-EVAL-02 PEB-WLBT-03	mx7s_pcm061_05x_config	imx7s-phyboard-zeta-002.dtb

Linux Device Tree Summary

The following is an example describing the structure of the device tree for the standard phyBOARD-Zeta Kit (machine configuration imx7d-phyboard-zeta-001).

Please look at the dts file corresponding to your machine configuration for the included dtsti files.

Hardware Target	Device Tree File Descriptions	Filename
i.MX7D phyBOARD-Zeta (PB-01910-001)	Default dts build target	imx7d-phyboard-zeta-001.dts
	SOM (<i>Superset</i>) - enables all SOM features.	imx7-phycore-som.dtsi
	SOM Variant- excludes features that are not supported by the BOM population options for PCM-061-2110111C.	imx7d-pcm-061-2110111c.dtsi
	Carrier Board	imx7-pba-c-09.dtsi
	LCD Display Adapter	imx7-peb-av-02.dtsi
	Evaluation Board	imx7-peb-eval-02.dtsi
	WiFi/Bluetooth Module	imx7-peb-wlbt-03.dtsi

Alternate dts **imx7d-phyboard-zeta-001-m4.dtb**: configure u-boot to use this DTS if running Linux on the Cortex-A7 while running FreeRTOS on the Cortex-M4

Compatible Hardware

Supported Hardware Versions

Hardware Description	Part Number	Configuration Details (i.MX7 / DDR3 / eMMC or NAND / Ethernet PHY populated)	PCB Version
phyCORE-i.MX7 SOM	PCM-061.A4		1458.2

	PCM-061-2110111C.A0	Dual / 1GB / 4GB eMMC / Yes	
	PCM-061-2110111C.A1		
	PCM-061-0502100E.A0	Solo / 256MB / 256MB NAND / No	
	PCM-061-2111101E.A0	Dual / 1GB / 4GB eMMC / No	
	PCM-061-2211101E.A0	Dual / 1GB / 8GB eMMC / No	
	PCM-061-2111111E.A0	Dual / 1GB / 4GB eMMC / Yes	
phyBOARD-Zeta Carrier Board	PBA-C-09.A4		1459.2
	PBA-C-09.A5		1459.3

Device tree changes are required to support earlier SOM and Carrier Board revisions. Visit the [PHYTEC Support Portal](#) to open a support ticket for help on how to make the device tree changes.

Compatible Expansion Boards and Accessories

Module Name	Part Number	PCB Version	Description
LCD Display Adapter with 7" capacitive display	PEB-AV-02-070W.A0 (Includes AV module, display, and cable)	1415.1	ETM0700G0DH6 LCD Display/ Capacitive touch interface
Evaluation Board	PEB-EVAL-02	1460.0	Connects to expansion header and provides: UART1, UART2, JTAG, I2C EEPROM, three user buttons, three user LEDs
WiFi/Bluetooth Module	PEB-WLBT-03-CA.A1	1478.1	LAIRD Sterling-LWB module, connects to phyBOARD expansion header

BSP Download

Prebuilt images of BSP-Yocto-FSL-iMX7-PD17.2.1 can be downloaded and extracted from the link below:

[BSP-Yocto-FSL-iMX7-PD17.2.1](#)

Quickstart

Quickstarts for BSP-Yocto-FSL-iMX7-PD17.2.1:

[BSP Yocto FSL i.MX7 PD17.2.1 Quickstart](#)

BSP Features

The following table lists the interfaces available from the phyCORE-iMX7 SOM.

- **Implemented** - driver support exists in the kernel.
- **Tested** - the interface has been configured in the device tree and was tested by PHYTEC
- **Enabled in DTS** - the corresponding device tree nodes are enabled in the device tree. See [Linux Device Tree Summary](#) for more information.

The "Enabled in DTS" column is specifically for the standard phyBOARD-Zeta kit (machine configuration imx7d-phyboard-zeta-001).

Please look at the dts file corresponding to your machine configuration for differences.

Interface	Detail	Implemented	Tested	Enabled in DTS	Notes
UART	uart1	Yes	Yes	Yes	DB9 connector on PEB-EVAL-02
	uart2	Yes	Yes	Yes	DB9 connector on PEB-EVAL-02
	uart3	Yes	No	[click for info]	expansion header
	uart4	Yes	No	[click for info]	
	uart5	Yes	Yes	Yes	RS232 default serial console at Connector X2

	uart6	Yes	No	[click for info]	expansion header
	uart7	Yes	Yes	Yes	expansion header - Configured for BT on PEB-WLBT-03
I2C	i2c1	Yes	Yes	Yes	expansion header
	i2c2	Yes	Yes	Yes	AV Connector X4
	i2c3	Yes	No	[click for info]	
	i2c4	Yes	Yes	Yes	expansion header
Ethernet	RGMII1	Yes	Yes	Yes	KSZ9031RNX PHY on SOM, Connector X8
	RGMII2	Yes	Yes	Yes	KSZ9031RNX PHY on CarrierBoard, Connector X7
SAI	sai1	Yes	No		Audio/Video Connector X4
	sai2	Yes	No	[click for info]	expansion header
	sai3	Yes	No	[click for info]	
MMC/SDIO	SD1	Yes	Yes	Yes	microSD slot connector X11
	SD2	Yes	No	[click for info]	expansion header
	SD3	Yes	Yes	Yes	signals routed to eMMC.
Communication	MultiCore Communication with Cortex-M4 (RPMsg)	Yes	Yes	Yes	See FreeRTOS release for more info.
	Laird Sterling LWB Bluetooth	Yes	Yes	Yes	on PEB-WLBT-03
	Laird Sterling LWB WiFi	Yes	Yes	Yes	on PEB-WLBT-03
USB	usb1	Yes	Yes	Yes	USB-A Host Connector X9
	usb2	Yes	Yes	Yes	USB-AB OTG Connector X10
	usbh (HSIC)	Yes	Yes	No	expansion header
CAN	can1	Yes	Yes	Yes	Header X1
	can2	Yes	No	[click for info]	
SPI	spi1	Yes	No	[click for info]	expansion header
	spi2	Yes	No	[click for info]	expansion header
	spi3	Yes	No	[click for info]	expansion header
	spi4	Yes	No	[click for info]	
ADC	adc1	Yes	Yes	Yes	expansion header
Display and Touch	LCD Display	Yes	Yes	Yes	via expansion board PEB-AV-02
	Analog LCD Touch	Yes	Yes	Yes	Capacitive ETM-FT5x06 via expansion board PEB-AV-02
	HDMI	No	No		via expansion board PEB-AV-01
	Backlight	Yes	Yes	Yes	PWM via pwm4 via expansion board PEB-AV-02
GPIO	User Buttons and LEDs	Yes	Yes	Yes	User LED GPIO2_10 on CarrierBoard Three user LEDs and three buttons on PEB-EVAL-02
Memory	8/16-bit NAND Flash (GPMC)	Yes	Yes	No	MT29F4G08 - not populated in default SOM configuration
	SPI NOR Flash	Yes	Yes	Yes	N25Q128A on QSPI_A
	EEPROM on SOM	Yes	Yes	Yes	M24C32 on i2c1
	EEPROM on eval board	Yes	Yes	Yes	CAT24C32 on i2c4 PEB-EVAL-02
	eMMC	Yes	Yes	Yes	On SD3 PCM-061.A0 -.A4 SOMs: MTFC4GMDEA-4M PCM-061-2110111C.A1: MTFC4GACAJCN-4M IT
RTC	Internal i.MX7	Yes	Yes	Yes	SNVS RTC

	External RTC	Yes	Yes	Yes	RV-4162-C7 on I2C1
Power Management	PMIC	Yes	Yes	Yes	PF3000 on I2C1
JTAG	JTAG				ARM JTAG 20 connector on PEB-EVAL-02
PCIe	mini-pcie	Yes	Yes	Yes	connector X12

[1] Interface requires additional configuration, such as pinmuxing. It may be possible to change the software configuration to utilize this interface even if it is not being set in the board's default configuration. Please see [NXP's i.MX7D Technical Reference Manual](#) for more information on the various modes each pin can be muxed to.

Fixed In This Release

- Kit imx7s-phyboard-zeta-002:
 - Communication with Cortex-M4: Linux failed to boot when RPMsmsg is enabled, the RPMSG driver hardcoded the location in memory used for RPMSG to be at the end of 1GB.
- Linux:
 - Optimized I2C and CAN1 drive strength

New In This Release

- **Linux**
 - PCIe: switch to using internal reference clk for PCIe PHY instead of external oscillator.
 - Reason: NXP initially recommended an external oscillator be used but has since validated that the internal reference clock meets PCIe requirements.
- **Meta-phytec-extra:**
 - New meta layer with machine configurations to support non-kit SOM variants:
 - PCM-061-2111101E
 - PCM-061-2111111E
 - PCM-061-2211101E

Not Tested

- Booting via network
- Qt5 - NXP includes "fsl-image-qt5" Yocto Image in the BSP but it is meant for i.MX SoCs with hardware graphics, and is not supported by NXP or PHYTEC for the i.MX7D.

Known Issues

PHYTEC Known Issues

- Ethernet:
 - iperf3 is included with the Krogth Yocto BSP. With UDP, this command reports much lower bandwidth than expected when compared with iperf command.
- eMMC:
 - Flashing with U-Boot:
 - fsl-image-gui-imx7d-phyboard-zeta.sdcard image is too large to be loaded into memory (1GB) from u-boot.
 - Workaround: Partition and flash eMMC from Linux instead. See [Quickstart](#) for instructions.
- Linux IMX Busfreq driver:
 - Driver disabled by default due to impaired UART console functionality when the system is idle (Low frequency setpoint).
 - For dynamic bus frequency scaling and improved power consumption, the busfreq driver can be enabled in the device tree by removing the "fsl,freq_scaling_disabled" property in imx7-phycore-som.dtsi. It can also be controlled in Linux sysfs:


```
echo 1 > /sys/bus/platform/drivers/imx_busfreq/soc\:busfreq/enable
```
- 256MB NAND is too small to flash fsl-image-gui filesystem. Booting from NAND was tested with core-image-minimal Yocto image, which is included with release binaries.
- Yocto kernel-module-laird-backports fetch error: LSR has released a new version of the package being fetched in this recipe, and replaced the tarball on their website with the same name. This is resulting in a checksum mismatch.
 - Workaround: See [Quickstart](#) section "Yocto Build Steps".

NXP Known Issues

See i.MX Linux Release Notes from NXP in [L4.1.15_2.0.0_LINUX_DOCS](#)