

# BSP FreeRTOS NXP iMX7 ALPHA1 Release Notes

Operating System	FreeRTOS
BSP Release Status	RELEASED
Release Date	05 Oct 2016
Repository	<a href="#">PHYTEC Public FreeRTOS Repo</a>
Binaries	<a href="#">FreeRTOS_ALPHA1_imx7d-phyboard_demos.tar.bz2</a>
Source Archive	N/A
Release Notes	<a href="#">Click Here</a>



This is an ALPHA BSP. Please use this BSP for evaluation purposes. Future Production Quality releases will be made.

## Versioning

### Software

FreeRTOS	v8.0.0
Multi-core Communication Stack	RPMsg, v1.0.0



This release has been tested with Linux release [BSP Yocto FSL iMX7 ALPHA2](#) (kernel 4.1.15)

## Source Code Summary

phyBOARD-iMX7 Demos	<install_dir>/examples/imx7d_phyboard_zeta/demo_apps/
phyBOARD-iMX7 Driver Examples	<install_dir>/examples/imx7d_phyboard_zeta/driver_examples/
NXP Documentation	<install_dir>/doc/
Middleware	<install_dir>/middleware/
RPMsg stacks	<install_dir>/middleware/multicore/open-amp/
Driver library, startup code, and utilities	<install_dir>/platform/
Cortex Microcontroller Software Interface Standard (CMSIS) ARM Cortex®-M header files, DSP library source	<install_dir>/platform/CMSIS/...
Linker control files for each supported toolchain	<install_dir>/platform/devices/MCIMX7D/linker/
SoC header files	<install_dir>/platform/devices/MCIMX7D/include/
CMSIS-compliant startup code	<install_dir>/platform/devices/MCIMX7D/startup/
Peripheral Drivers	<install_dir>/platform/drivers/
Utilities such as debug console	<install_dir>/platform/utilities/
FreeRTOS Kernel Code	<install_dir>/rtos/FreeRTOS/

External Tools

&lt;install dir&gt;/tools/

## Compatible Hardware

### Supported Hardware Versions

Hardware Description	Part Number	PCB Version
phyCORE-i.MX7 SOM	PCM-061.A4	1458.2
phyBOARD-Zeta Carrier Board	PBA-C-09.A4	1459.2

## BSP Features

Interface	Detail	Implemented	Tested	Software Status	Notes
UART	uart1	Yes	No	<a href="#">[click for info]</a>	DB9 connector on PEB-EVAL-02
	uart2	Yes	Yes	Enabled	RS232 default serial console at DB9 connector on PEB-EVAL-02
	uart3	Yes	No	<a href="#">[click for info]</a>	expansion header
	uart4	Yes	No	<a href="#">[click for info]</a>	
	uart5	Yes	No		RS232 Linux default serial console at Connector X2
	uart6	Yes	No	<a href="#">[click for info]</a>	expansion header
	uart7	Yes	No	<a href="#">[click for info]</a>	expansion header
I2C	i2c1	Yes	Yes	Enabled	expansion header
	i2c2	Yes	No		AV Connector X4
	i2c3	Yes	No	<a href="#">[click for info]</a>	
	i2c4	Yes	No		expansion header
Ethernet	RGMII1	Yes	No		KSZ9031RNX PHY on SOM, Connector X8
	RGMII2	Yes	No		KSZ9031RNX PHY on CarrierBoard, Connector X7
SAI	sai1	No	No		Audio/Video Connector X4
	sai2	No	No	<a href="#">[click for info]</a>	expansion header
	sai3	No	No	<a href="#">[click for info]</a>	
MMC/SDIO	SD1	No	No		microSD slot connector X11
	SD2	No	No	<a href="#">[click for info]</a>	expansion header
	SD3	No	No		signals routed to eMMC.
Communication	<a href="#">TiWi-BLE</a> Bluetooth	No	No		
	<a href="#">TiWi-BLE</a> WiFi	No	No		
USB	usb1	No	Yes		USB-A Host Connector X9
	usb2	No	Yes		USB-AB OTG Connector X10
CAN	can1	Yes	Yes	Enabled	Header X1
	can2	Yes	No	<a href="#">[click for info]</a>	
SPI	spi1	Yes	No	<a href="#">[click for info]</a>	expansion connector
	spi2	Yes	No	<a href="#">[click for info]</a>	expansion connector
	spi3	Yes	No	<a href="#">[click for info]</a>	expansion connector
	spi4	Yes	No	<a href="#">[click for info]</a>	
Display and Touch	LCD Display	No			via expansion board PEB-AV-02
	Analog LCD Touch	No			Capacitive ETM-FT5x06 via expansion board PEB-AV-02

	HDMI	No			via expansion board PEB-AV-01
	Backlight	No			PWM via pwm4 via expansion board PEB-AV-02
GPIO	User Buttons and LEDs	Yes	Yes	Enabled	User LED D1 and Button S1 on PEB-EVAL-02
Memory	8/16-bit NAND Flash (GPMC)	No			MT29F4G08 - not populated in default SOM configuration
	SPI NOR Flash	Yes	Yes		N25Q128A on QSPI_A
	EEPROM on SOM	Yes	Yes	Enabled	M24C32 on i2c1
	EEPROM on eval board	Yes	No		CAT24C32 on i2c4 PEB-EVAL-02
	eMMC	No			MTFC4GMDEA-4M on SD3
RTC	Internal i.MX7	No			SNVS RTC
	External RTC	No			RV-4162-C7 on I2C1
Power Management	PMIC	No			PF3000 on I2C1
WDOG	wdog3	Yes	Yes	Yes	
GPT	gpt3	Yes	Yes	Yes	
	gpt4	Yes	Yes	Yes	
ADC	adc1	Yes	Yes	Yes	
JTAG	JTAG				ARM JTAG 20 connector on PEB-EVAL-02
PCIe	mini-pcie	No			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](#) processor technical reference manual for more information.

## Supported Demos:

Demos have been adapted from the i.MX7D Sabre demos. For details on building and running demos, see PHYTEC's [How-To article](#) as well as NXP's Getting started and User's Guide for FreeRTOS\_iMX7D\_1.0.1 Release, located in the docs/ directory of the source code.

Demo App	Description
Hello World	run on: <ul style="list-style-type: none"> <li>• Cortex-M4's TCM</li> <li>• QSPI</li> <li>• OCRAM</li> <li>• DDR</li> </ul>
Blinking IMX demo	Uses GPT. Change blinking frequency of LED D1 on EVAL board
Low Power	Dual-core power management
RPMsg	GPIO toggle (FreeRTOS) - Type command in Linux running on Cortex A7 to trigger toggling of LED D1 by FreeRTOS on Cortex M4
	ping pong (Bare metal and FreeRTOS) - Transfer integer values back and forth between Cortex M4 and Cortex A7
	str echo (Bare metal and FreeRTOS) - Receive and print out messages from Cortex A7
Sema4	Trigger mutex lock and unlock

Driver Examples	Description
ADC iMX7D	Prints ADC output every second for ADC1_IN3
FlexCAN	Loopback and network modes
GPIO	Press button S1 to switch LED D1 on/off
GPT	Interrupt based polling of counter for two GPT instances

I2C	(Interrupt and polling) Write data to EEPROM on SOM, connected to I2C1 address 0x50. Read data back to check that data matches.
UART	(Interrupt and polling options) board will receive and echo characters typed from keyboard. Uses interface UART2
WDOG	WDOG3 timer demo with ISR refreshing timer

## Development Tools

Can be compiled with the following:

- Makefile support with GCC ARM embedded toolchain (Tested with revision 5.4-2016-q2)
- ARM Development Studio 5 (DS-5™) (Tested with v5.23.1)

## Fixed In This Release

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N/A

## New In This Release

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N/A

## Known Issues

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### PHYTEC Known Issues

- The following demos cannot be built with the debug configuration since they are too large.
  - rpmsg\_gpio\_toggle\_freertos\_example.bin
  - rpmsg\_str\_echo\_freertos\_example.bin

### NXP Known Issues

See [FreeRTOS\\_iMX7D\\_1.0.1 Release Notes](#) from NXP.

## Technical Support

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For further information or to report any problems, visit the [PHYTEC Support Portal](#)