QNX BSP for phyCORE-AM335x and phyBOARD-Wega-AM335x

FULL Version

by IBV - Echtzeit- und Embedded GmbH & Co. KG

Subject: Release Notes
Version: 1.1, QNX 6.5.0SP1
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1. Features

1.1. Components of the BASE Version of the BSP

Component	Format	Features, Notes
Startup (BASE version)	Source	♦ Configurable DDR3 RAM size
Serial	Source	♦ QNX character device driver (devc-) ♦ Supports AM335x UART0 (phyCORE signals X_UART_0) ♦ Supports AM335x UART1 (phyCORE signals X_UART_1) ♦ Supports AM335x UART2 (phyCORE signals X_UART_2) ♦ Supports AM335x UART3 (phyCORE signals X_UART_3) ♦ Driver is interrupt driven
FEC Network	Source	♦ QNX network driver DLL for io-pkt network stack (devnp-) ♦ Supports AM335x Ethernet Controller ♦ MAC address is used from AM335x MAC_ID register ♦ Supports RMII interface X_ETH1 with 10/100 MBit speed ♦ Supports half / full duplex mode

1.2. Components of the FULL Version of the BSP

Component	Format	Features, Notes
Startup (FULL version)	Source	♦ Configurable DDR3 RAM size
SD	Source	♦ QNX file system driver (devb-) based on QNX MMC driver framework ♦ Supports the AM335x MMC0 Controller (phyCORE signals X_MMC0) ♦ Supports operation in DMA and PIO mode ♦ Supports SD card detect
I2C	Source	♦ QNX I2C master driver (i2c-) ♦ Supports the AM335x I2C0 Controller in master mode (phyCORE signals X_I2C0_SDA, _SCL)

USB	Binary	♦ QNX USB driver DLL for io-usb USB stack (devu-) ♦ Supports the AM335x USB0 Controller in USB Host mode (phyCORE signals X_USB0) ♦ Supports the AM335x USB1 Controller in USB Host mode (phyCORE signals X_USB1) Driver is shipped as original binary as provided by the operating system vendor in the original AM335x reference BSP and without support.
SPI	Source	♦ QNX SPI master driver based on QNX SPI Framework ♦ Supports the AM335x McSPI0 Controller in master mode (phyCORE signals X_SPI0_...) ♦ QNX SPI master API library is shipped as binary without support ♦ The driver works interrupt driven
CAN	Source	♦ QNX CAN driver based on QNX CAN Framework ♦ Supports the AM335x DCAN Controller (phyCORE signals X_CAN0_... and X_CAN1_...) ♦ Supported baud rates: 5K, 10K, 20K, 25K, 50K, 100K, 125K, 250K, 500K, 1M ♦ Extension for transmission of CAN frames with payload sizes other than eight and remote frames ♦ Ready for use with EMBRICS® ioCAN
RTC	Source	♦ QNX RTC utility for setting and reading system time ♦ Supports on-board RTC U2 (RV-4162-C7)
GRAPHICS	Source	♦ QNX graphics driver DLL for io-display (devg-) ♦ Supports the AM335x graphic controller for applications working with the QNX GF interface and QNX Photon ♦ Supported display interface: 24-bit parallel LCD display *) ♦ Frame buffer access (no hardware acceleration) ♦ Configuration file for display parameters, parameters for display of PHYTEC Development Kit prepared ♦ Supported pixel formats: ARGB8888, RGB888, RGB565 Limitations: ♦ Only one graphics layer is supported ♦ There is no support for alpha-blending or chroma-keying

*) HDMI interface on phyBOARD-Wega-AM335x supported on request

1.3. Optional Driver Modules (not part of FULL Version of the BSP)

GPIO		on request
NAND		on request
TOUCH		on request
AUDIO		on request
ETHERCAT		EtherCAT Master and EtherCAT Slave (on TI AM335x PRU-ICSS) on request

1.4. Further BSPs for PHYTEC Boards

A complete list of all available QNX Board Support Packages for embedded boards by PHYTEC Messtechnik GmbH is available at:
http://www.ibv-augsburg.net/media/pdf/QNX_BSP_Overview_PHYTEC.pdf

2. General Information

2.1. Features of the BSP

The features of this Board Support Package and the Application Programming Interface (API) are defined and limited by the underlying QNX reference BSPs. Changes in the target system and/or peripheral components may require an adaption of the BSP. Therefore the BSP is provided in source code.

3. Target System

This BSP supports the following PHYTEC boards:

3.1. phyCORE-AM335x Module on Carrier Board PCM-953

- Phytec CPU Module phyCORE-AM335x (PCB#1358.3):
  - Texas Instruments AM335x ARM Cortex™-A8 Microprocessor, Silicon Revision 2.1
  - 512 MB DDR3 RAM (size configurable)
  - 512 MB NAND Flash
- Phytec Baseboard phyCORE Carrier Board PCM-953 (PCB#1359.3)
- Phytec Development Kit, LCD 800x480
- Operating system QNX 6.5.0 with SP1
- Boot loader barebox 2013.07.0-PD13.1.0 #1 Tue Sep 17 10:24:22 CEST 2013

3.2. phyBOARD-Wega-AM335x

- Phytec phyBOARD Wega-AM335x (PCB#1405.0) with
  - Phytec CPU Module phyCORE-AM335x (PCB#1358.3):
    - Texas Instruments AM335x ARM Cortex™-A8 Microprocessor, Silicon Revision 2.1
    - 256 MB DDR3 RAM (size configurable)
    - 128 MB NAND Flash
  - Phytec Eval-Board for phyBOARD-Wega (PCB#1413.0)
- Operating system QNX 6.5.0 with SP1
- Boot loader barebox 2013.11.0-PD13.0.0 phyBOARD-WEGA #1 Wed Nov 20 16:11:37 CET 2013

4. Host Development System

- QNX Software Development Platform 6.5.0SP1
- Terminal emulation program (Qtalk, Momentics IDE Terminal, tip, HyperTerminal, etc.)
- RS-232 serial port or a USB-to-serial adapter, and a straight-through serial cable
- Ethernet link

5. Known Issues for this BSP

- Network driver does not support RGMII interface X_ETH2 (Gigabit).
- SD card driver does not support the SD write protect signal (pin multiplexing of carrier board does not support this).
- USB OTG needs host socket adapter connected when driver starts. When the USB host controller driver is loaded, any USB port which does not have the ID pin set to act as a host port will not have the PHY powered and so devices connected will not be powered and enumerated. Ensure that all USB ports required for use have a USB OTG host cable (A port to micro B plug) connected which will set the ID pin correctly, before the driver is loaded (i.e. at boot time).
- There is an Errata of the AM335x whereby in RGB888 / ARGB8888 mode the red and blue channels are swapped. Different LCD adaptations are necessary for displaying the correct colours in 16 bit mode resp. 24/32bit mode (see also TI AM335x Silicon Errata “LCD: Color Assignments of LCD_DATA Terminals”).

6. Change History

6.1. Revision 1.0

- Adapted for phyBOARD-Wega-AM335x board
- Adapted for phyCORE-AM335x board
- CAN driver extended:
  - Supports transmission of CAN frames with payload sizes other than eight
  - Support of remote frames
  - API distinguishes 11bit (CAN 2.0A) and 29bit (CAN 2.0B) identifiers
  - Enable can1 clock in startup code which is used on Wega-AM335x board
- CAN driver ready for use with EMBRICS® ioCAN
- Bugfixes applied on AM335x QNX6 Reference BSP:
  - I2C driver:
    - Bugfix in reset handling
    - Usage of the correct parameters for input/output clock
    - Support of I2C multi-master communication
  - SPI driver:
    - Correctly check against invalid word length configuration
    - Reworked to support SPI transfers of different lengths
    - Use the correct clock divisor when a suitable clock configuration is given
  - Ethernet driver:
    - Adapted the behavior of the driver according to the terms of io-pkt
    - when TX was exhausted, RX and TX stuck (reset was needed)

6.2. Revision 1.1

- NAND driver available on request (not part of FULL BSP Version)

7. Sales / Technical Support

To get this BSP or to obtain technical support for the BSP, please contact:

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