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Preliminary Spec: phyCORE®-PXA255

Part #: PCM-022-xxx

Introduction

The new phyCORE®-PXA255 Single Board Computer subassembly from PHYTEC is characterized by high performance crossed with low power consumption. This newest addition to the industry-proven phyCORE® product family embodies the continued evolution of PHYTEC's insert-ready, modular hardware concept for embedded development.

The phyCORE®-PXA255, populated with the 32-bit Intel XScale PXA255 and running at 400 MHz clock speed, serves as the flagship of PHYTEC SBCs in terms of processor performance. The phyCORE-PXA255 also offers the same advantages as other phyCORE modules from PHYTEC, namely optimized EMI resistance, broad support in terms of hardware and software tools, minimal form factor and peripheral devices that enhance the primary processor.

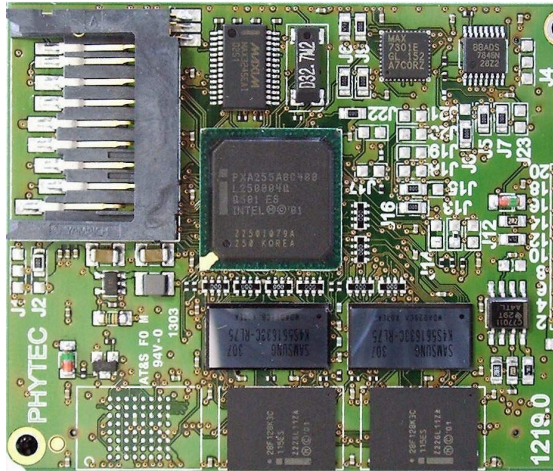
The ARM V.5TE RISC kernel on the PXA255 is code compatible not only with its SA-1110 predecessor, but to all other controllers based on ARM technology as well. Software or drivers that have already been written for other ARM controllers can therefore be used on the phyCORE®-PXA255. Since the controller is equipped with a Memory Management Unit (MMU), operating systems such as Linux are also supported.

The PXA255, manufactured with 0.18µm CMOS technology, consumes half the power at 300 MHz/400 mW that does its SA-1110 predecessor at 206 MHz. In Idle mode, power consumption can be reduced to 100 mW. During the development of the phyCORE®-PXA255, special consideration was given to ensure low power consumption in regards to component selection and module design.

Technical Data

- Insert-ready Single Board Computer module in 57 x 70 mm dimensions
- Intel XScale PXA255 Controller (ARM V5.TE Core) operating at 400 MHz
- Memory
 - max. 128 MB on-board SDRAM
 - max. 64 MB on-board synchronous Flash
 - max. 4 MB on-board asynchronous Flash
 - 4 KB EEPROM
 - external memory expansion possible
- Interfaces
 - 2x RS-232
 - CAN
 - USB 1.1 Client
 - IrDa
 - Bluetooth (via class 2 Bluetooth system module)
 - 10/100 MBit Ethernet
 - AC97 / I2S for Audio Codecs
 - SPI / I2C
 - MMC / SD Card Interface
 - PCMICA / CF Card Interface
- LCD interface (color or b/w, max. 640 x 480 pixels, active and passive)
- Touch-panel controller (matrix and standard keyboard connection)
- Requires single 3.3 V supply voltage
- Power consumption t.b.d.
- Dual Molex 2x160-pin connectors (0.635 mm pitch)
- Temperature range: 0..70°C (-40..+85°C upon request)

Overview

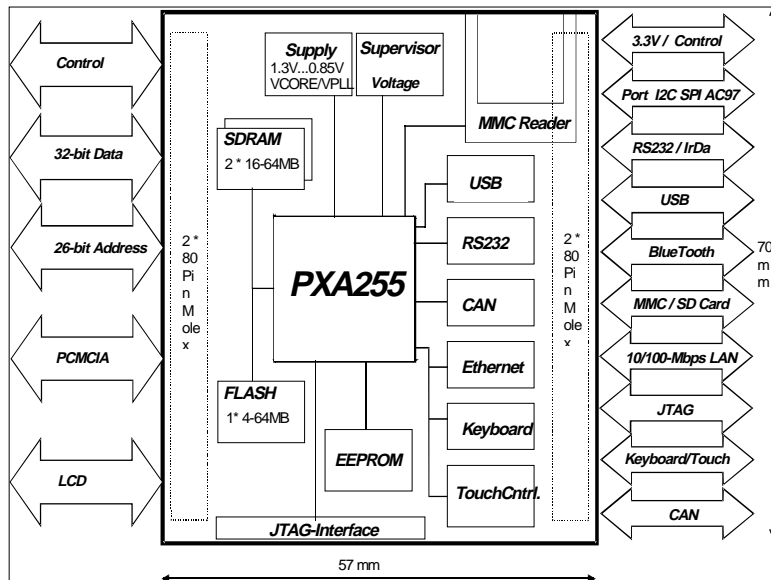


phyCORE®-PXA255 (Top View)



phyCORE®-PXA255 (Connector Side)

Block Diagram



Memory

Up to 128 MB SDRAM and 64 MB synchronous Flash can populate the module. As a cost-saving alternative, asynchronous Flash (up to 4 MB) can be populated in place of the synchronous Flash. This is an option of particular interest if the Flash is only required for booting. The module is also equipped with a receptacle socket for MMC or SD cards. PCMCIA or Compact Flash cards can be connected externally. An additional EEPROM can be used for storage of system data. The controller can support up to 256 MB SDRAM and 384 MB Flash or SRAM memory. If required, the on-board memory can be expanded with external devices to achieve these maximum values.

Interfaces

The serial interfaces of the PXA255 can operate at up to 230 kBaud. Serial signals are available at an RS-232 level on the phyCORE connector on the bottom side of the SBC module. Other controller interface resources are likewise routed to the connector pins: USB, Bluetooth, IrDa and I²C. Minimal external circuitry is required for some of these interfaces, allowing easy integration and immediate operation of the SBC subassembly in target hardware designs. In addition to the PXA255 on-chip interfaces, the phyCORE module features stand-alone CAN and Ethernet controllers allowing implementation of this SBC into an even wider range of applications. A minimum of external components are required to utilize these additional interfaces in an OEM design.

Supply Voltage / Power Management

The phyCORE®-PXA255 requires a single 3.3 V supply voltage. The supply voltage for the CPU core and the PLL is generated by a voltage regulator located on the board. For minimized power consumption, depending on the required computing performance, the voltage can be adjusted within the range of 1.3 V - 0.85 V by means of an I²C DAC. Power consumption can be reduced further by adjusting the clock rate within a range between 99 MHz and 398 MHz.

Input / Output

For visual input/output, the phyCORE®-PXA255 supports connection of active as well as passive color and black/white LCDs with resolution as high as 640 x 480 pixels. In accordance with modern LCD technology, the phyCORE module can also drive a touch screen panel, enabling use of the LCD as an input device. A touch panel controller populates the phyCORE®-PXA255. A standard or matrix version keyboard can be optionally used as an input device instead of a touch screen.

Connection to External Devices

All relevant controller and other logic device signals are routed to two 160-pin high-density (0.635 mm pitch) Molex connectors on the underside of the module. Use of such high-density connectors guarantees that all required signals are available to the user within a subminiature footprint. This provides the user with the maximum degree of flexibility in terms of connecting external peripherals to the phyCORE®-PXA255. This scalability further renders the phyCORE subassembly a cost-effective solution.

When mounted on the phyCORE®-PXA255 Development Board, the phyCORE SBC subassembly provides easy access to all important interfaces at common connectors, as well as start-up of the phyCORE SBC. Likewise, use of the Development Board further reduces development time and production costs.



phyCORE®-PXA255 Development Board (Image Similar to Final Hardware)

Operating Systems

The selection of an operating system should meet the requirements of the application rather than be predetermined by the controller and controller circuitry. The phyCORE®-PXA255 was designed to ensure its universal support of all standard operating systems, thereby maintaining complete flexibility in terms of operating system selection.

Regardless of whether the phyCORE®-PXA255 is implemented in a multimedia application or if it needs to meet stringent real-time requirements, appropriate operating systems are available.



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Custom-specific Solutions

During the development phase it is recommended to use the fully configured variant of a phyCORE®-PXA255. This ensures sufficient memory and other board-level resources during evaluation, prototyping and test/debugging phases.

As with the module, the Development Board can be adapted to meet specific end user needs in consultation with PHYTEC, and can be implemented as part of OEM designs.

When migrating from development to serial production, the module configuration can then be optimized to best meet application needs and cost targets. As paring components from development units that are not needed on production parts will lower per unit price, PHYTEC invites discussion of OEM configuration requirements.

Likewise, should the standard Development Board not suit the needs of an end application, PHYTEC offers development of a special-tailored application board. Take advantage of PHYTEC's many years of experience and know how in the field of embedded hardware development and production house.

Additional Information

Please contact PHYTEC to request any additional questions:

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