Nutaq
PicoSDR

FPGA-based, MIMO-Enabled,
tunable RF SDR solutions

PRODUCT SHEET

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INNOVATION TODAY FOR TOMORROW®

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Nutaq **PicoSDR**

- **Includes Nutaq OFDM Reference Design**
- **Up to 4 independent TRX, synchronized 2x2 and 4x4 MIMO solutions**
- **Wide frequency range : 0.3 – 3.8 GHz**
- **Selectable bandwidth : 1.5 – 28.0 MHz**
- **Combines Virtex-6 with Nutaq's Linux embedded OS framework**
- **Optional External PCIe Interface (Linux)**
- **Supports remote GigE access from Windows and Linux**
- **Supports embedded applications through Linux Quad-Core i7 processor blade option**
- **Develop applications more quickly with model-based design (Nutaq MBDK 1st license included)**
- **GNU Radio support**

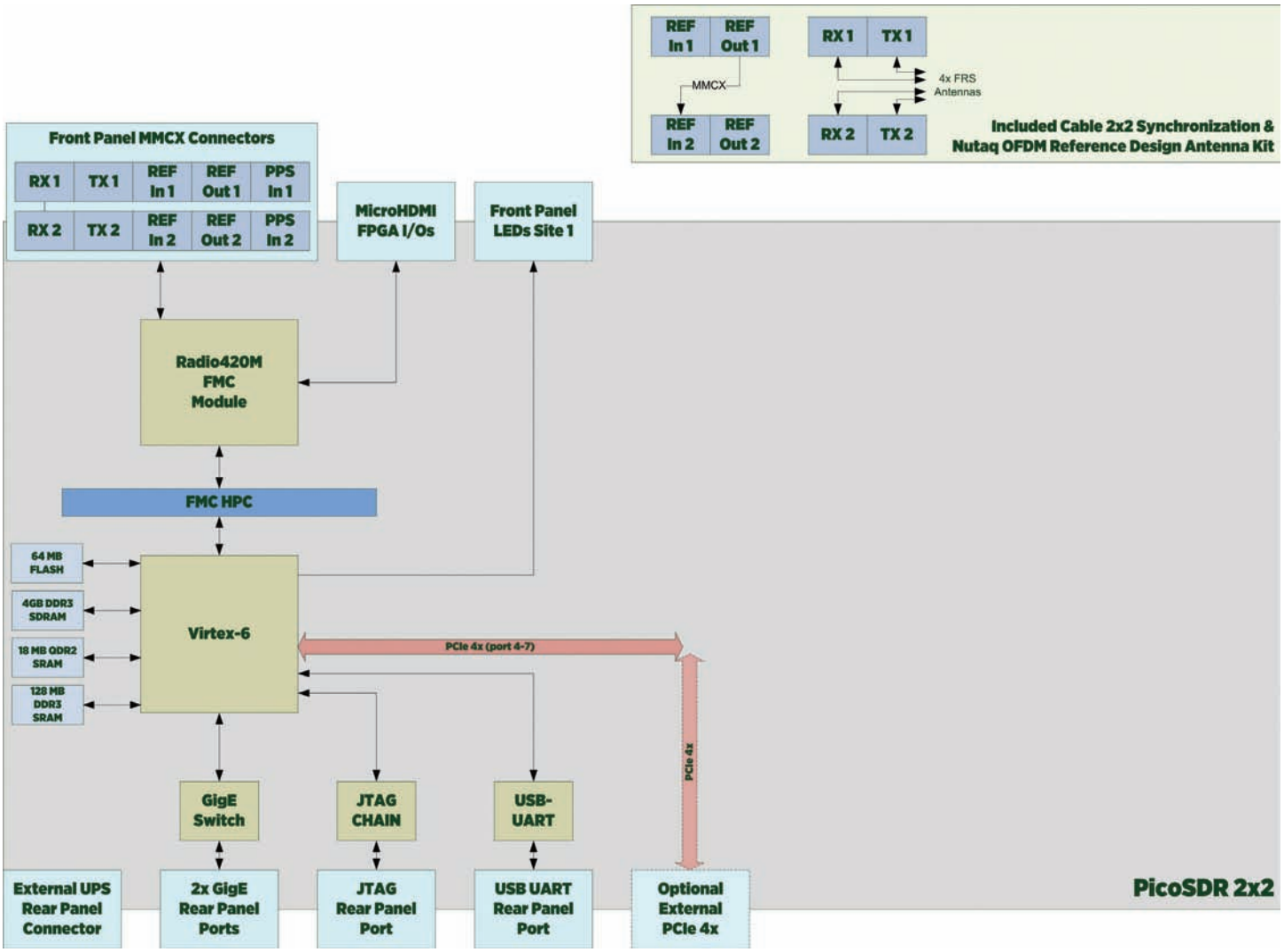
The Nutaq PicoSDR is a table top SDR solution that incorporates up to two powerful multimode SDR dual-channel RF transceiver modules, tremendous FPGA logic and memory that can be stacked together to form a 2x2 or 4x4 MIMO turnkey solution from baseband processing to the air interface. The PicoSDR is capable of uplinking and downlinking data streams to a remote computer running on Linux or Windows through high-speed GigE interface (and optional external x4 PCIe port with Linux drivers).

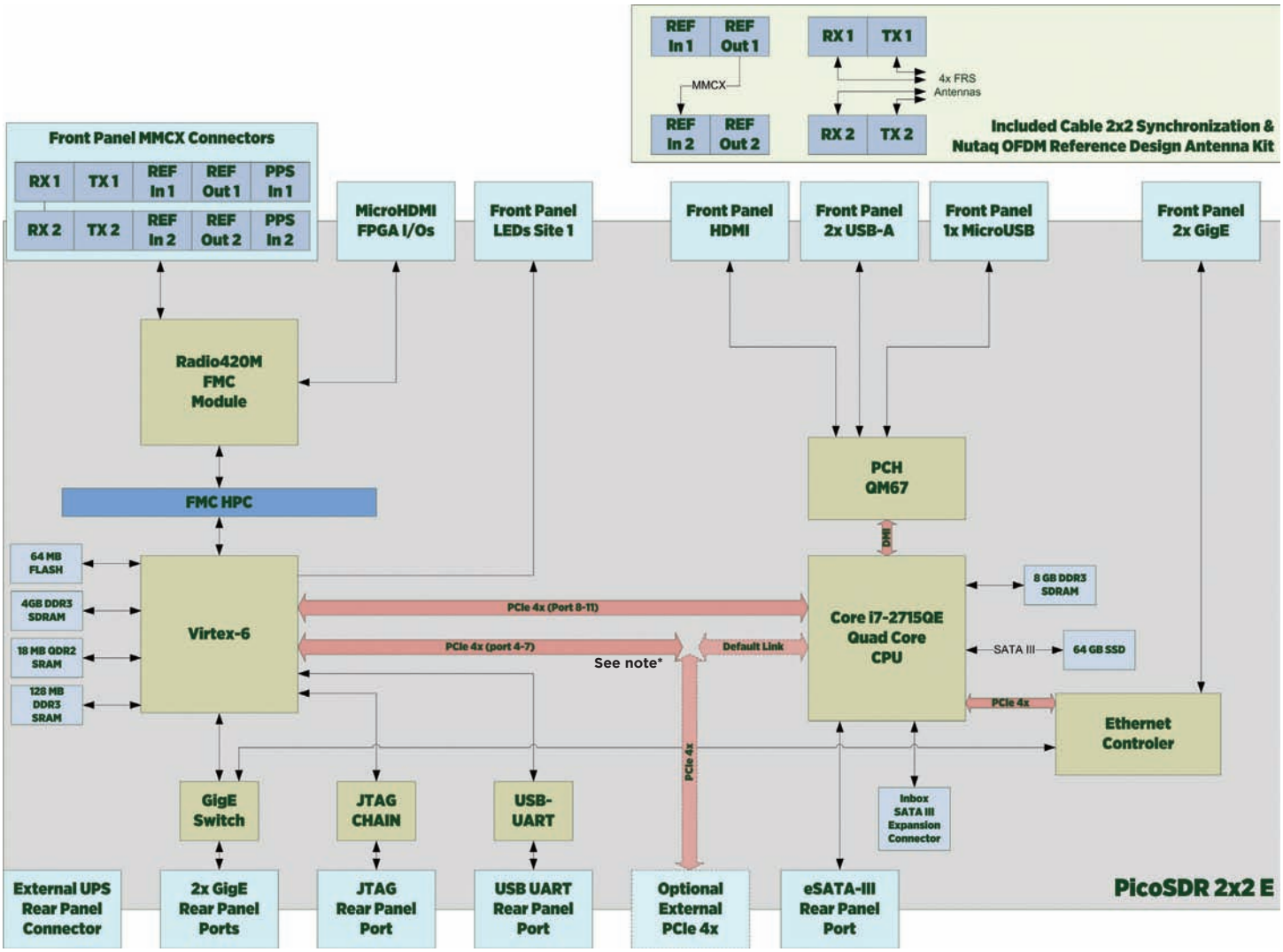
Embedded baseband processing is enabled through the addition of an embedded processor blade (Linux). In this configuration, up to a dual PCIe 4x link can be used to stream data between the radio-FPGA section and a Quad Core i7 Embedded Host. Combined with Nutaq's software framework, the PicoSDR can greatly reduce your time to market, bringing the performance that you need to a wide range of applications such as Cognitive Radios, TV White Space, Multimode SDR, Advanced Telecommunications (LTE, WiMAX, Wi-Fi, GSM, WCDMA), MIMO Systems (2x2 or 4x4), SIGINT, Mesh Networks and Test & Measurement.

Fully integrated solution

The PicoSDR integrates a complete array of tools and capabilities for added efficiency and ease of use:

- Available FPGA for intensive processing, down-conversion, up-conversion, space-time coding, waveforms PHY layer (such as OFDM)
- Complete Nutaq FPGA framework, including embedded Linux MicroBlaze Ethernet/PCIe server
- Real-time PCIe data exchange with the embedded host device CPU (Linux)
- Real-time GigE remote data streaming tools (Linux or Windows)
- Optional Real-time PCIe 4x remote data streaming tools (Linux only)
- Multichannel recording and playback tools (DAQ applications)
- Local (embedded AMC processor blade) and remote control (optional)
- Real-time and hardware-in-the-loop co-simulation with the FPGA
- Seamless integration to the MATLAB/Simulink model-based design flow (1x workstation license included)
- Stand-alone operation, running directly from the FPGA-flash/HDD memory (embedded)
- Graphical control applications
- Includes Nutaq's OFDM Reference Design
- GNU Radio support

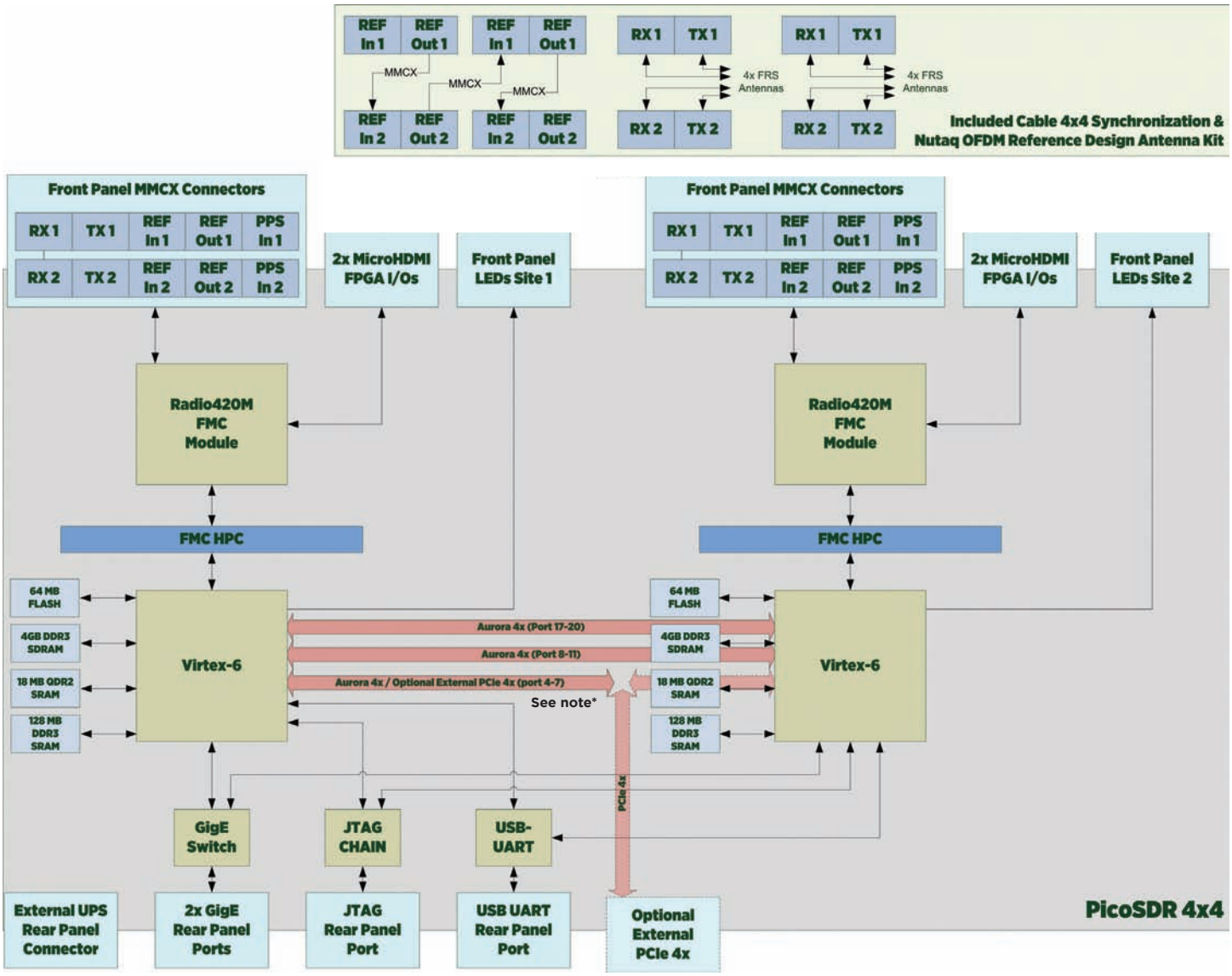




*Purchase HW option:
- Default Port 4-7 AMC configuration: Virtex-6 to i7 CPU
- Optional Port 4-7 AMC configuration : Virtex-6 to External PCIe 4x Connector (i7 port 4-7 disconnected)

Included OFDM PHY transceiver reference design

A complete model-based OFDM QAM64 FPGA PHY layer is available for model-based design Simulink users. The reference design shows real-time HD wireless video transmission between two transceivers through MIMO 2x2 RF interfaces (2x PicoSDR or 1x PicoSDR in loopback mode). Signal constellation and other parameters are directly accessible from the GNU Radio environment. The GNU Radio models are provided as source files.



*Purchase HW option:
- Default Port 4-7 AMC configuration: Virtex-6 AMC-A to Virtex-6 AMC-B
- Optional Port 4-7 AMC configuration : Virtex-6 AMC-A to External PCIe 4x Connector (Virtex-6 AMC-B port 4-7 disconnected)

FPGA section

The FPGA section of the PicoSDR is designed around a high performance Virtex-6, which offers the flexibility and massive digital signal processing power required for wideband advanced waveform application.

- Supports LX240T, LX550T, SX315T and SX475T FPGA devices
- 4GB SODIMM DDR3
- 18 MB QDR2 SRAM
- 64 MB NOR Flash
- 128 MB DDR3 SRAM Dedicated for Nutaq BSDK's CCE and Microblaze Embedded Linux OS
- Supports Dual PCIe 4× [Embedded version]
- Includes a complete framework for Virtex-6 interfaces (Nutaq BSDK)
- Supports GigE interface [PicoSDR rear panel]
- APIs and graphical interfaces

Radio section

The radio section (based on the Nutaq Radio420x FMC module) is equipped with two (2x2 option) or four (4x4 option) state-of-the-art multimode, multiband RF transceivers that support operation anywhere between 0.3 GHz and 3.8 GHz, TDD or FDD. Its selectable bandwidth (1.5 to 28 MHz) makes it suitable for a large number of narrowband to wideband applications with excellent channel selectivity.

Embedded CPU section

The optional embedded CPU module is designed around the 2nd Generation Intel Quad-Core i7 CPU, combining an unsurpassed range of FPGA fabric interfaces such as PCIe with a large amount of soldered DDR III memory. Integrated SSD and the SATAII/III interface are supported.

- CPU: Intel Quad-core i7 Gen2 CPU, 2.1 GHz processor
- 8GB DDR3 SDRAM
- 64GB SSD
- GigE & PCIe 4x support
- SATA –II/III support

SPECIFICATIONS

Models:

Models	RF Channels	MIMO	RF Coverage	RF Bandwidth	Remote Host Interface	Remote Host Throughput	FPGA	Embedded CPU	Embedded Throughput FPGA-CPU	Embedded Storage
PicoSDR 2x2	2x TRX	2x2	0.3 - 3.8 GHz	1.5 – 28 MHz	1x GigE (opt. 4xPCIe)	~900 Mbps 6.4 Gbps	1x V6**	None	None	None
PicoSDR 2x2 E	2x TRX	2x2	0.3 - 3.8 GHz	1.5 – 28 MHz	1x GigE (opt. 4xPCIe)	~900 Mbps 6.4 Gbps	1x V6**	Intel 4C i7 2.1 GHz	2x (PCIe 4x) ~12 Gbps	64 GB SSD +2x SATA*
PicoSDR 4x4	4x TRX	4x4	0.3 - 3.8 GHz	1.5 – 28 MHz	1x GigE (opt. 4xPCIe)	~900 Mbps 6.4 Gbps	2x V6**	None	None	None

* : 1x SATA connection rear PicoSDR panel, 1x SATA for internal 1.8inch SSD Drive.
** : Virtex-6 options available: LX240T, LX550T, SX315T or SX475T.

Rear Panel Connections:

- 1x GigE port
- 2x USB UART FPGA console ports (1x for 2x2 option, 2x for 2x2 option)
- 1x External Universal Power Supply
- 1x SATA (model PicoSDR-2x2-E only)
- 1x PCIe 4x cable interface connector (with external PCIe purchase option)

Front Panel Connections:

Radio Section: **1x** for PicoSDR 2x2, **(2x)** for PicoSDR 4x4 models

- 2x (4x) MMCX TX
- 2x (4x) MMCX RX
- 2x (4x) MMCX Ref IN
- 2x (4x) MMCX Ref OUT
- 2x (4x) MMCX PPS IN
- 2x (4x) Micro HDMI (Used for FPGA I/Os)

Embedded CPU Section:
PicoSDR 2x2 E model only

- 1x HDMI
- 2x GigE
- 1x Mini USB port
- 1x COM-port
- 1x USB 2.0 ports

Ordering information:

PicoSDR-Ax-B-C-D-E:

Ax: MIMO Mode

- 2x = 2x2 Mode (2x TRXs)
- 4x = 4x4 Mode (4x TRXs)

B: Embedded CPU

- 0 = No Embedded CPU
- 1 = Embedded CPU (Only with option Ax = 2x)

C: FPGA Option

- 0 = LX240T
- 1 = LX550T
- 2 = SX315T
- 3 = SX475T

D: PCIe 4x cable interface connector option

- 0 = None
- 1 = PCIe 4x cable connector

E: Additional Embedded Storage :
PicoSDR 2x2 E model only

- 0 = None
- 1 = 200 GB SSD

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