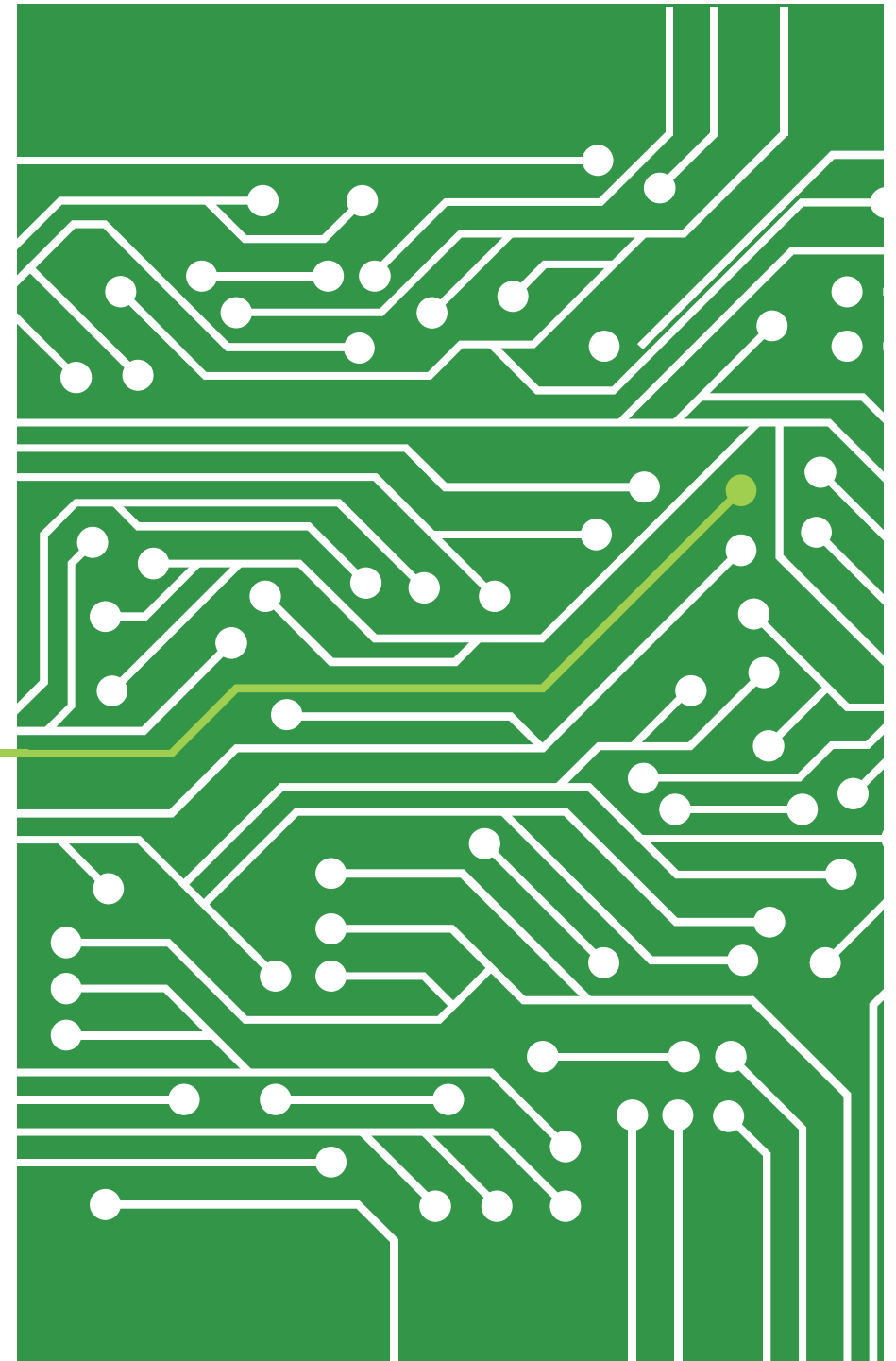




Vodafone CrowdCell Course:

Inside the Box: LimeSDR-USB and LimeNet Micro

Lime Microsystems | FPRF company
Guildford, Surrey, United Kingdom



Introducing LimeNet Micro – Key Specifications 1



Contains SISO LimeSDR

Based on half of LMS7002M RFIC

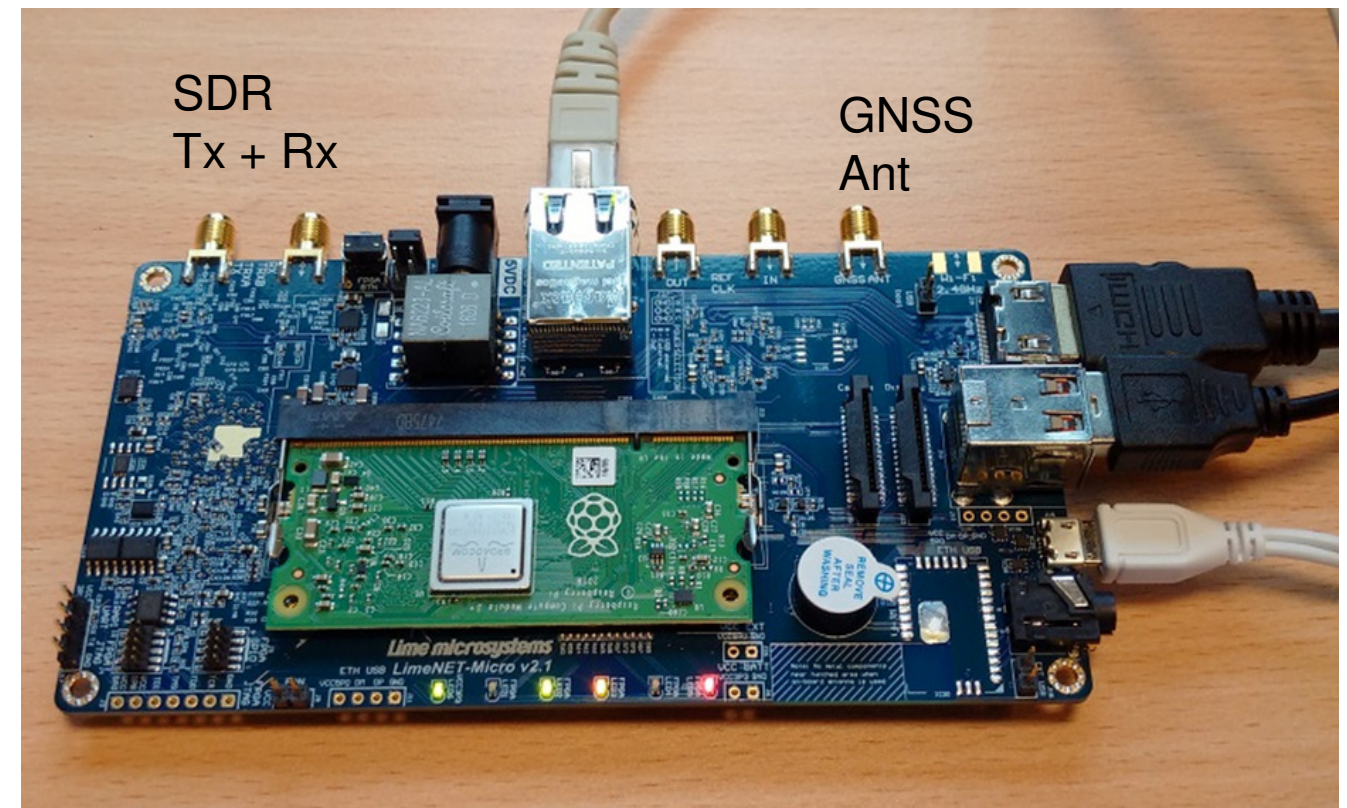
- 10MHz-3800MHz
- System NF typically 4dB (RF Matched)
- Phase noise -160dBc at 50MHz
- ACPR typically >50dBc
- OCXO – high stability timing

MAX 10 FPGA

- 16k LEs
- 549kB M9K memory
- 2.368MB Flash
- JTAG support

GPS Module

- U-Blox NEO-M8Q-0-10



https://wiki.myriadrfr.org/LimeNET_Micro

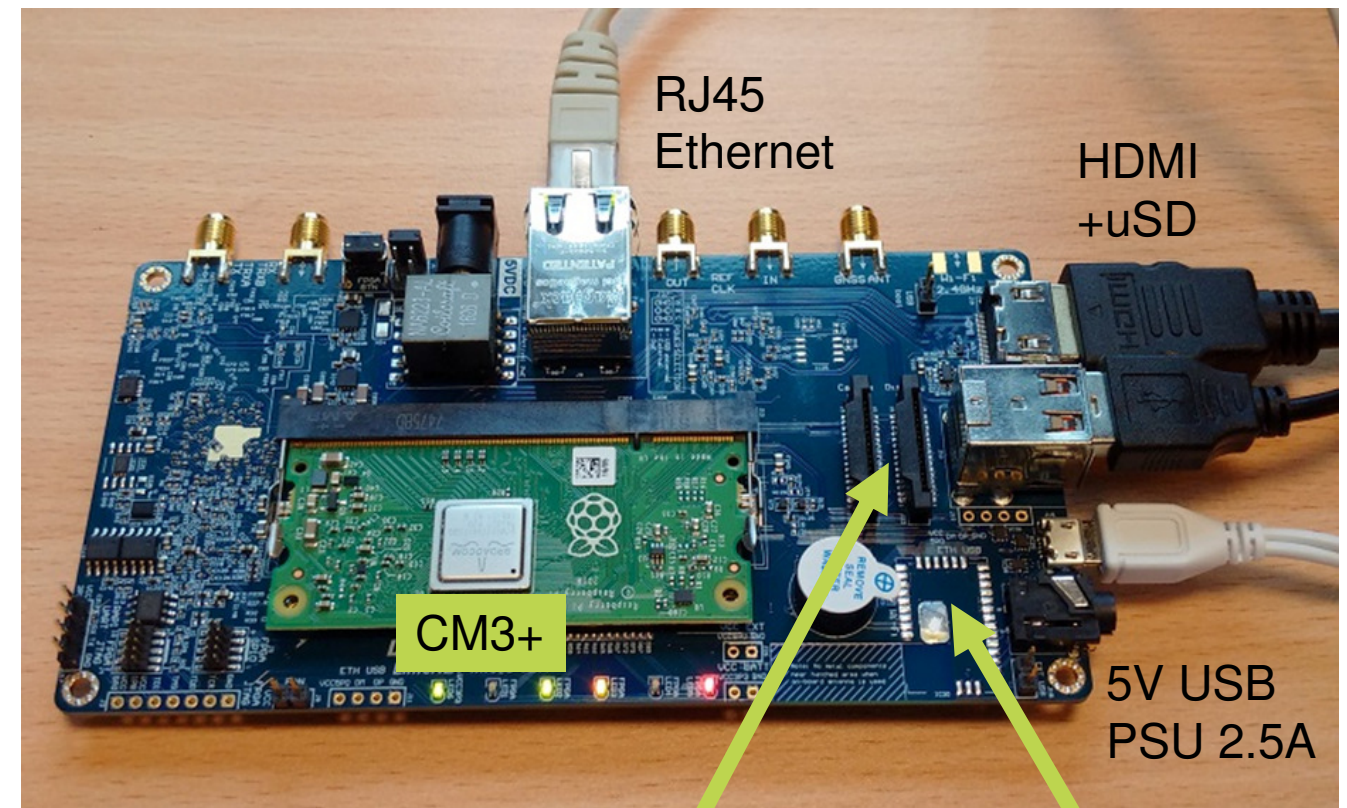
Introducing LimeNet Micro – Key Specifications 2



Raspberry Pi Compute Module 3+

- Broadcom 2837 SoC (Eqv R'Pi 3)
- Quad Core ARM 53 (ARMv8) NEON 1.2GHz
- 8GB eMMC Storage
- 1GB LPDDR2 RAM
- GPU with HDMI Graphics Interface
- RJ45 Ethernet + USB2 + uSD card Slot
- Optional WiFi
- Camera and Touch Screen support
 - Raspbian Stretch
 - Ubuntu Mate 16.04
 - Alpine Linux
 - Diet Pi etc.

Supports Desktop or Command Line modes



Camera, Touch Screen

Optional WiFi

6 Modes of Using the LimeNet Micro



Standalone Raspbian Desktop System

- Effectively a Raspberry Pi + LimeSDR mini + GPS.
- HDMI monitor, USB keyboard and mouse.
- RnD and Student Lab Sessions

Remote Login with SSH and Xwindows

- e.g. Remote Laptop/Tablet control

Remote Login with SSH terminal (Headless)

- For integrated systems requiring intensive computing with only occasional admin, e.g. GSM Cell.

Remote Control with Pantahub

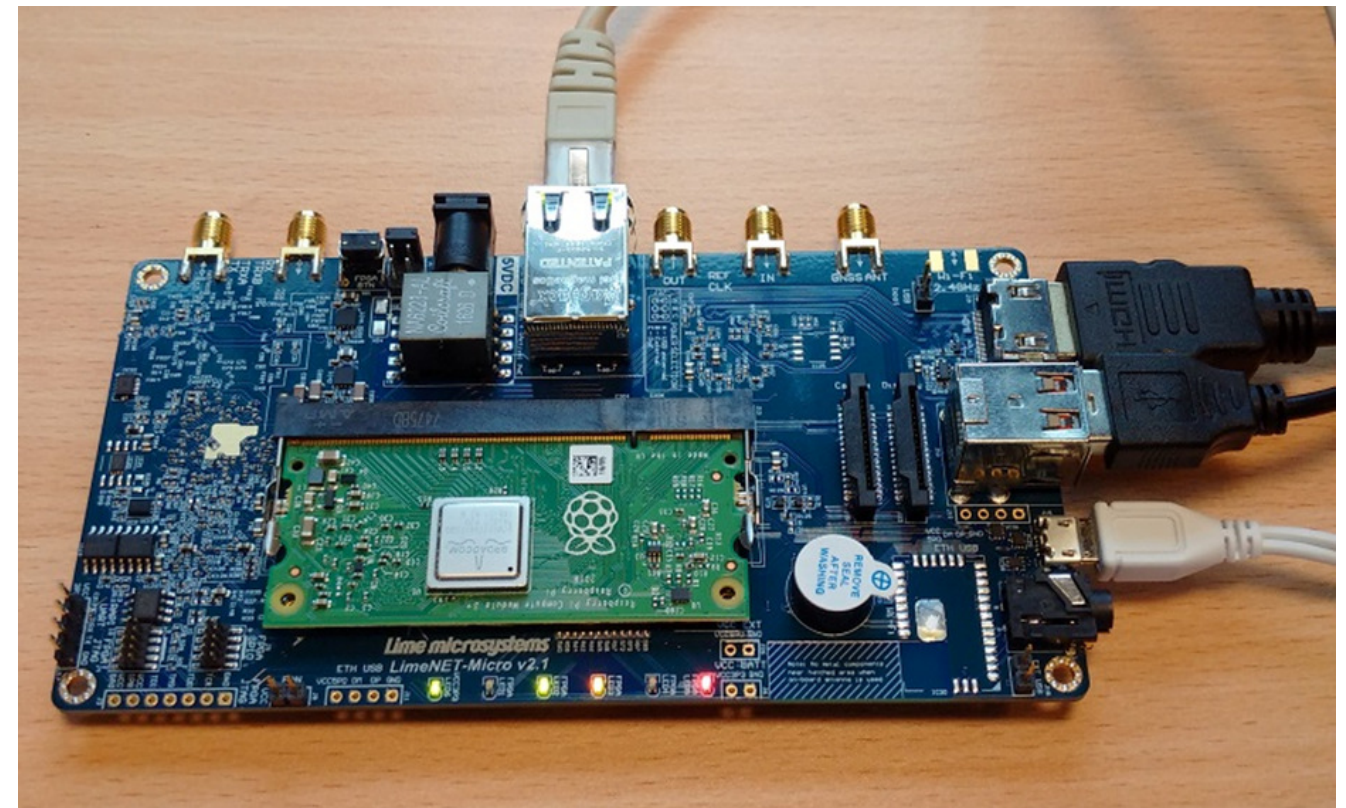
- Powerful web based connectivity

Standalone SDR with USB2

- Remove CM3+

Serial Login to Linux via UART

- Requires external USB to Serial module.
- Connects to J17 header.
- Text based control.



A quick word about Pantahub...



<https://www.pantahub.com/>

- Powerful web based software administration tool
- Simple remote installation of software
- Simple remote updating of software
- Simple remote editing of settings,
 - e.g. frequency band.
- Based on Docker containers,
 - Anibal will explain more tomorrow.
- Available via Pantacor
- LimeSuite
 - Osmocom GSM <https://osmocom.org/>
 - Lime's LimeScan <https://limescan.net/about>
 - SDRangel <https://github.com/f4exb/sdrangel>
 - SNA <https://github.com/nepeee/limeSNA>

<https://wiki.myriadr.org/PantaHub>

- Download image
- Install PVR
- Register with Pantahub
- Claim device
- Install software

Introducing LimeSDR-USB – Key Specifications



MIMO SDR with Waveform Playback

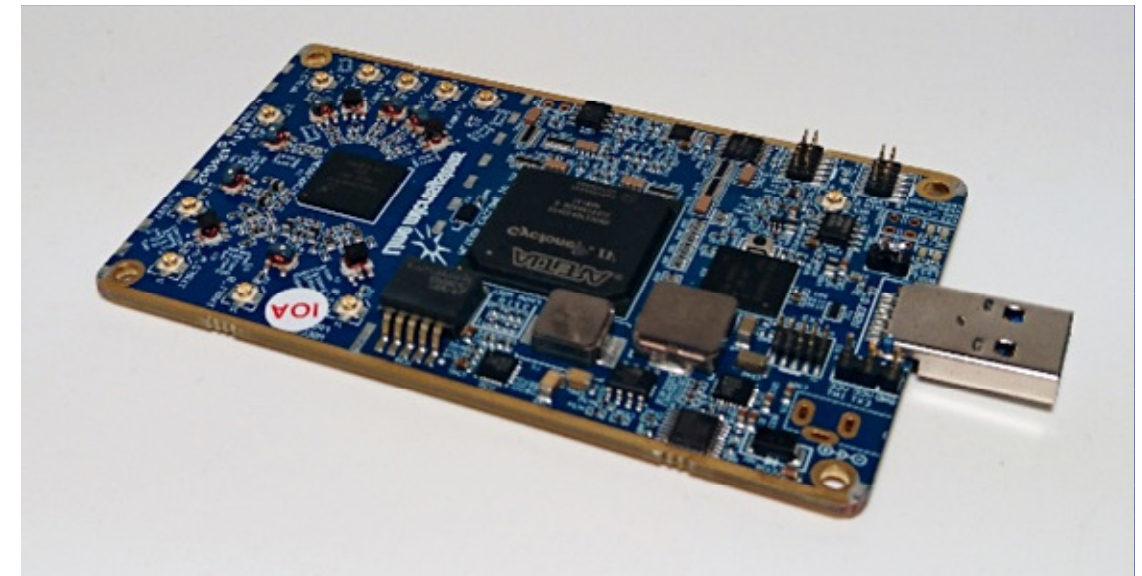
Used in CrowdCell and LimeNet Mini

Allows full use of LMS7002M RFIC

Supports sample rates 30.72MS/s and 40MS/s

Cyclone IV FPGA

- 40k LEs
- 1134kb memory
- 116 embedded 18x18 multipliers
- JTAG support



<https://wiki.myriadrfr.org/LimeSDR-USB>

LimeSDR-PCIE



MIMO SDR with Waveform Playback

x1 LMS7002M

Used in LimeNet Core.

PCIe connectivity

- MIMO connection speeds of 61.44MS/s.



https://wiki.myriadrif.org/LimeSDR-PCle_v1.3_hardware_description

LimeSDR-QPCle



MIMO SDR with Waveform Playback

x2 LMS7002M

Used in LimeNet

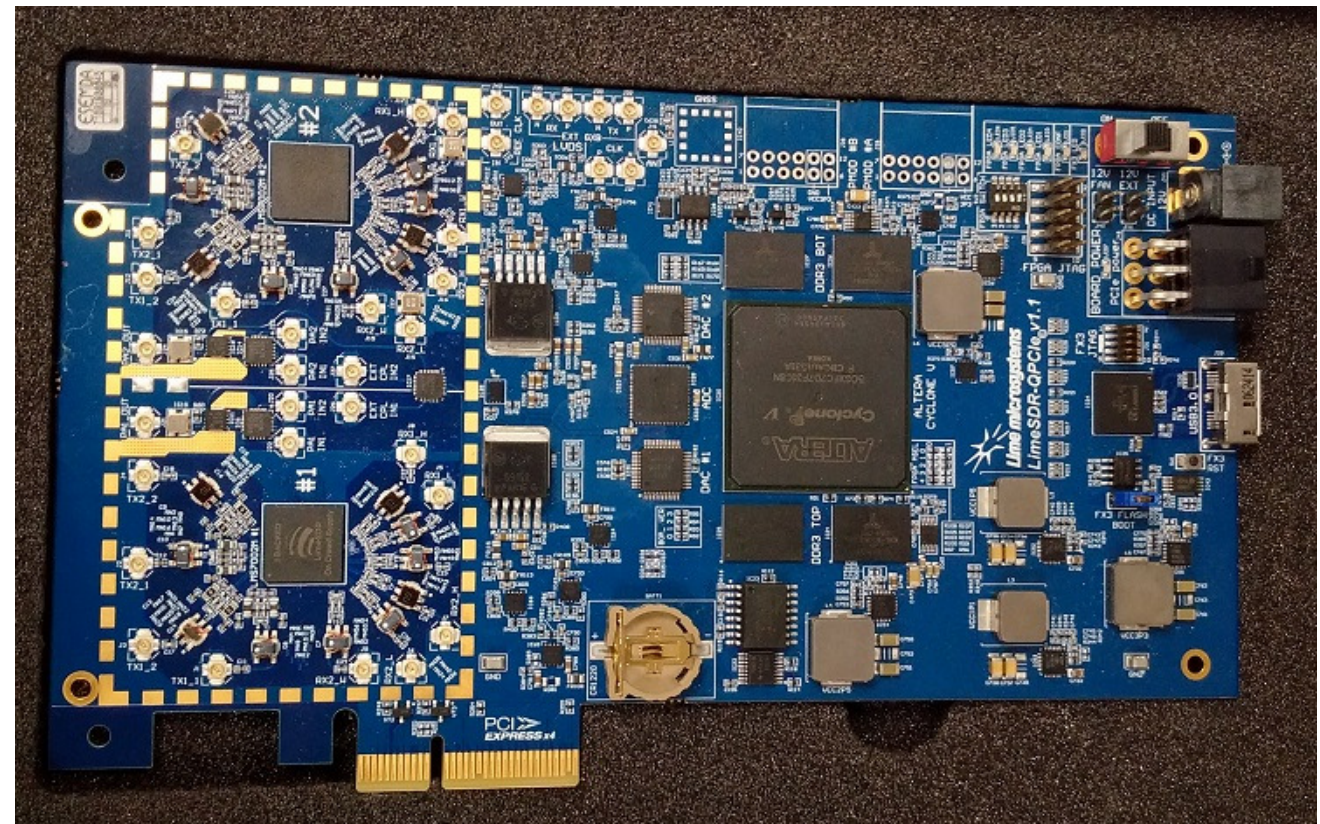
PCIe connectivity

- MIMO connection speeds of 61.44MS/s.

Cyclone V FPGA

- 150k LEs
- 6860kb memory
- 312 embedded 18x18 multipliers
- JTAG support

Suitable for DPD for high power RF amplifiers.



<https://wiki.myriadrf.org/LimeSDR-QPCle>