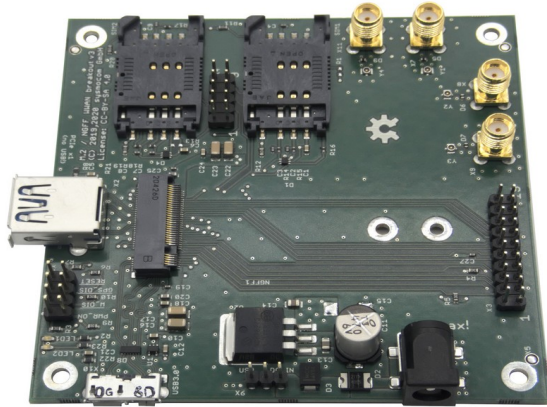# M.2 breakout board data sheet

sysmocom
systems for mobile communications GmbH

M.2 WWAN modem break-out

The M.2 WWAN modem break-out board is a useful utility for evaluating any kind of cellular modem in the more and more popular M.2 form-factor.

M.2 form-factor modems are pretty commonly found for all cellular technologies, but particular with LTE-A and 5G modems. Contrary to their predecessor mPCIe, M.2 supports higher transmission speeds of USB 3.0 super-speed and/or PCIe 1x.

Key Features

The main features of the board can be described as follows:

- on-board linear power regulator generating the 3.3V supply voltage for the mPCIe modem

- USB 2.0 high-speed and USB 3.0 super-speed signals exposed on USB 3.0 micro-B connector (microB-A cable included)

- PCIe lane exposed on non-standard USB-A-style connector; Extension Cable and adapter board to plug into a regular PCIe 1x slot included.

- Two 2FF (mini-SIM) slots for RUIM/CSIM/SIM/USIM. Second slot only used by dual-SIM capable modems.

- all unused M.2 pins are exposed on a 2.54mm break-out header. This is useful for attaching to non-standard interfaces such as PCM audio busses of modems.

- PERST and W_DISABLE can be configured via jumper

- 4x on-board SMA sockets with MHF4 next to them; MHF4 to MHF4 pigtail cables included. This provides proper strain relief of any antenna connections to the modem.

- Power LED and Modem Status LED

Compatibility

As the M.2 modem break-out board adheres to the M.2 mechanical form factor and standardized pin-out, it should work with any WWAN modem, irrespective of the supplier.

Open Source Hardware

The M.2 WWAN modem break-out board was created as an OSHW (Open Source Hardware) design.

This means not only schematics are available, but also the full design files including PCB layout. Anyone may create derivative works under the terms of the Creative Commons Attribution Share-Alike (CC-BY-SA) license.

For more information, see

https://osmocom.org/projects/ngff-breakout/wiki

https://git.osmocom.org/osmo-small-hardware/tree/ngff-breakout

Ordering

The M.2 WWAN modem breakout board is available for direct purchase from the sysmocom webshop:

http://shop.sysmocom.de/products/m2-wwan-modem-break-out-board-kit

For volume orders, please inquire at sales@sysmocom.de.

Included Accessories

Related Products

If you are looking for a similar product for the mPCIe form factor, please check out the sysmocom mPCIE WWAN modem breakout board.

If you are interested in a carrier board that hosts more than one modem, please check out our **sysmoQMOD** product. It hosts four modems with an on-board USB hub.
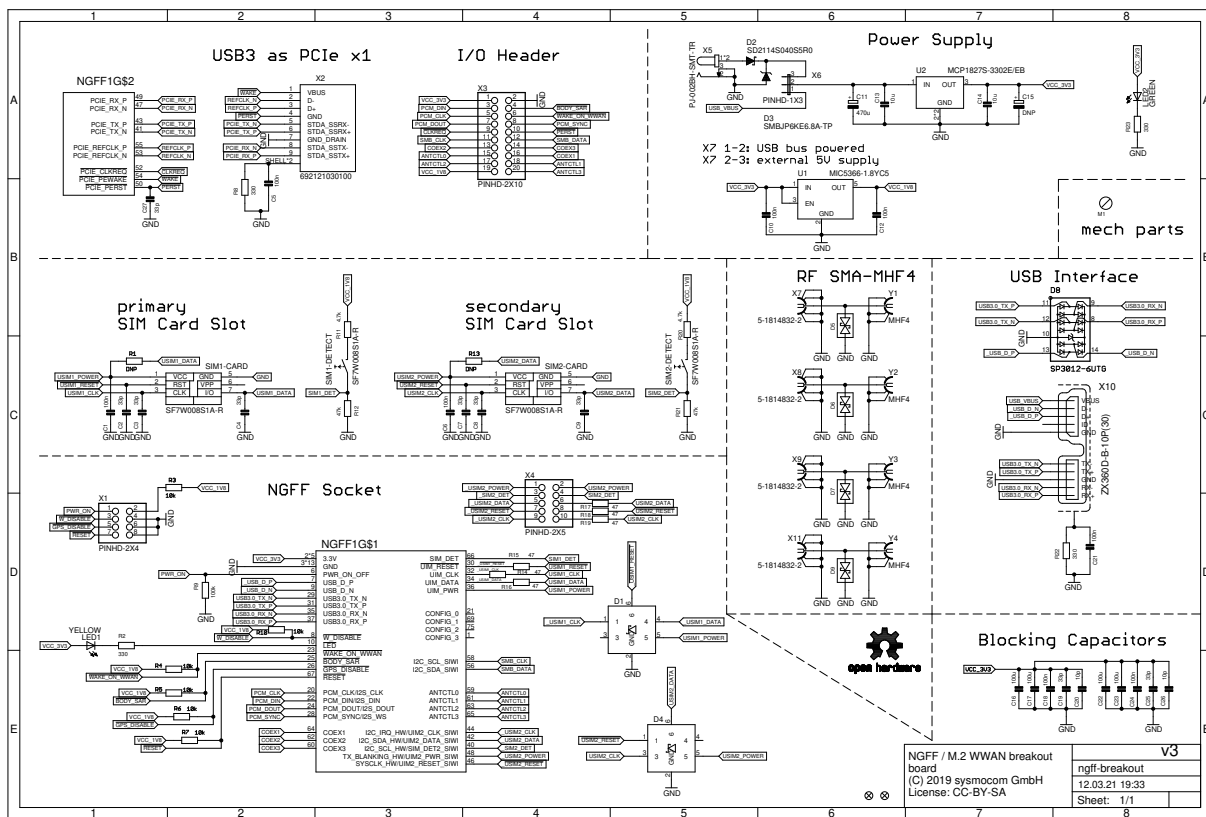
The sysmoQMOD also contains on-board microcontrollers for management as well as SIM card emulation / remote SIM functionality.

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Mechanical / Electrical Specification

Dimensions of PCB	90 x 90 mm
Mounting	M3 Mounting Holes for spacers/stands
SIM/UICC smart card slot	ETSI/3GPP 2FF form factor
USB port	USB-micro-B (3.0)
Debug facilities	all unused M.2 signals exposed on 2.54mm pitch header
LED	1x Power (green), 1x Modem Status (yellow)
Input Voltage	5 V DC (typ) on 5.5/2.5mm barrel type, current consumption as per modem

Schematics

sysmocom – systems for mobile communications GmbH
Siemensstr. 26a, 10551 Berlin, GERMANY

Phone: +49-30-60987128-0
Fax: +49-30-60987128-9
e-mail: info@sysmocom.de
web: http://sysmocom.de/

This data sheet is preliminary and subject to change without prior notification.   M.2 breakout board data sheet v5 (2024-04-24)

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