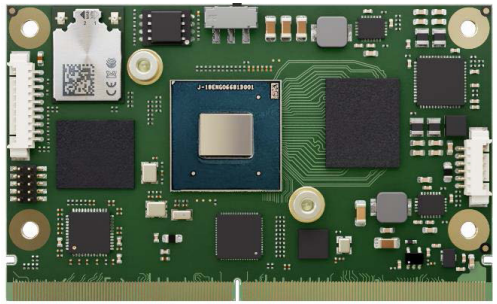

conga-SMX95 (Prototype Rev. X.2)

Sample Distribution Set for congatec SMARC 2.1 Development

Quick Start Guide

Revision 1.00

Preface

This quick start guide provides information about the contents of the Sample Distribution Set for conga-SMX95 (Prototype Rev. X.2) and how to set it up.

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Revision History

Revision	Date (yyyy-mm-dd)	Author	Changes
1.00	2025-03-10	BEU	First Release

1 Hardware

1.1 Sample Distribution Set

The hardware in the table below is included in the Sample Distribution Set:

Part #	Rev.	Name	Description
051690	X.2	conga-SMX95/i-6C-16G eMMC32	SMARC Module with NXP i.MX 95 six-core processor. Features 6x ARM Cortex-A55 @ 1.8GHz +1x ARM Cortex-M7 + 1x ARM Cortex-M33 + NPU, **16GB** onboard LPDDR5 memory and 32GB onboard eMMC. Industrial grade temperature range from -40°C to 85°C.
or			
051691	X.2	conga-SMX95/i-6C-4G eMMC64 DSI/NX611	SMARC Module with NXP i.MX 95 six-core processor. Features 6x ARM Cortex-A55 @ 1.8GHz +1x ARM Cortex-M7 + 1x ARM Cortex-M33 + NPU, **4GB** onboard LPDDR5 memory and 64GB onboard eMMC. Industrial grade temperature range from -40°C to 85°C. **With MIPI-DSI. With Wifi/BT module NX611.**
or			
051692	X.2	conga-SMX95/i-6C-8G eMMC64	SMARC Module with NXP i.MX 95 six-core processor. Features 6x ARM Cortex-A55 @ 1.8GHz +1x ARM Cortex-M7 +1x ARM Cortex-M33 + NPU, **8GB** onboard LPDDR5 memory and 64GB onboard eMMC. Industrial grade temperature range from -40°C to 85°C.
or			
051693	X.2	conga-SMX95/i-6C-8G eMMC32 HDMI	SMARC Module with NXP i.MX 95 six-core processor. Features 6x ARM Cortex-A55 @ 1.8GHz +1x ARM Cortex-M7 +1x ARM Cortex-M33 + NPU, **8GB** onboard LPDDR5 memory and 32GB onboard eMMC. Industrial grade temperature range from -40°C to 85°C. **With DSI to HDMI Bridge.**
051650	X.0	conga-SMX95/CSP-B	Passive cooling solution for SMARC Module conga-SMX95 with NXP i.MX 95 ARM processor. All standoffs are with 2.7mm bore hole.
or			
051651	X.0	conga-SMX95/HSP-B	Standard heatspreader for SMARC Module conga-SMX95 with NXP i.MX 95 ARM processor. All standoffs are with 2.7mm bore hole.
007010	C.2	conga-SEVAL	Evaluation carrier board for SMARC 2.1 modules.
48000023	A	Console Cable	MOLEX 6-Pin PicoBlade to two D-SUB 9
10000539	A	SD Card	MicroSDHC 32GB, SanDisk Ultra Class 10, U1, A1
N.A	1.0	Quick Start Guide	Quick Start Guide for conga-SMX95 (Rev. X.2) Sample Distribution Set

Optional Accessories:			
011115	B.0	conga-LDVI/EPI	LVDS to DVI converter board for digital flat panels with onboard EEPROM
033331	A	cab-LVDV-DAT-34-15	15 cm data cable LVDS to DVI adapter
052147	A	cab-LVDV-PWR-10-15	15 cm power cable LVDS to DVI adapter

1.2 conga-SMX95

For information about the planned conga-SMX95 Mass Production (MP) module variants, refer to the datasheet available at:

https://www.congatec.com/us/products/smarc/conga-smx95/

1.2.1 Pinout Description

The pinout description lists which signals of the NXP i.MX 95 processor are routed to the SMARC® connector. Use the link below to download the conga-SMX95 (Prototype Rev. X.2) pinout as an Excel file:

https://git.congatec.com/arm-nxp/imx9-family-ea/doc/cgtimx95_pinlist

Note

Contact congatec support to get access to the pinout.

1.3 conga-SEVAL

The conga-SEVAL included in this prototype kit is an evaluation carrier board based on the SMARC® Specification.

For more information about the conga-SEVAL, refer to the datasheet or User's Guide available at:

www.congatec.com/us/products/accessories/conga-seval/

1.4 NXP i.MX 95

The NXP i.MX 95 processor documentation is available at:

https://www.nxp.com/products/iMX95

1.5 Hardware Setup

Follow the steps below to set up the hardware:

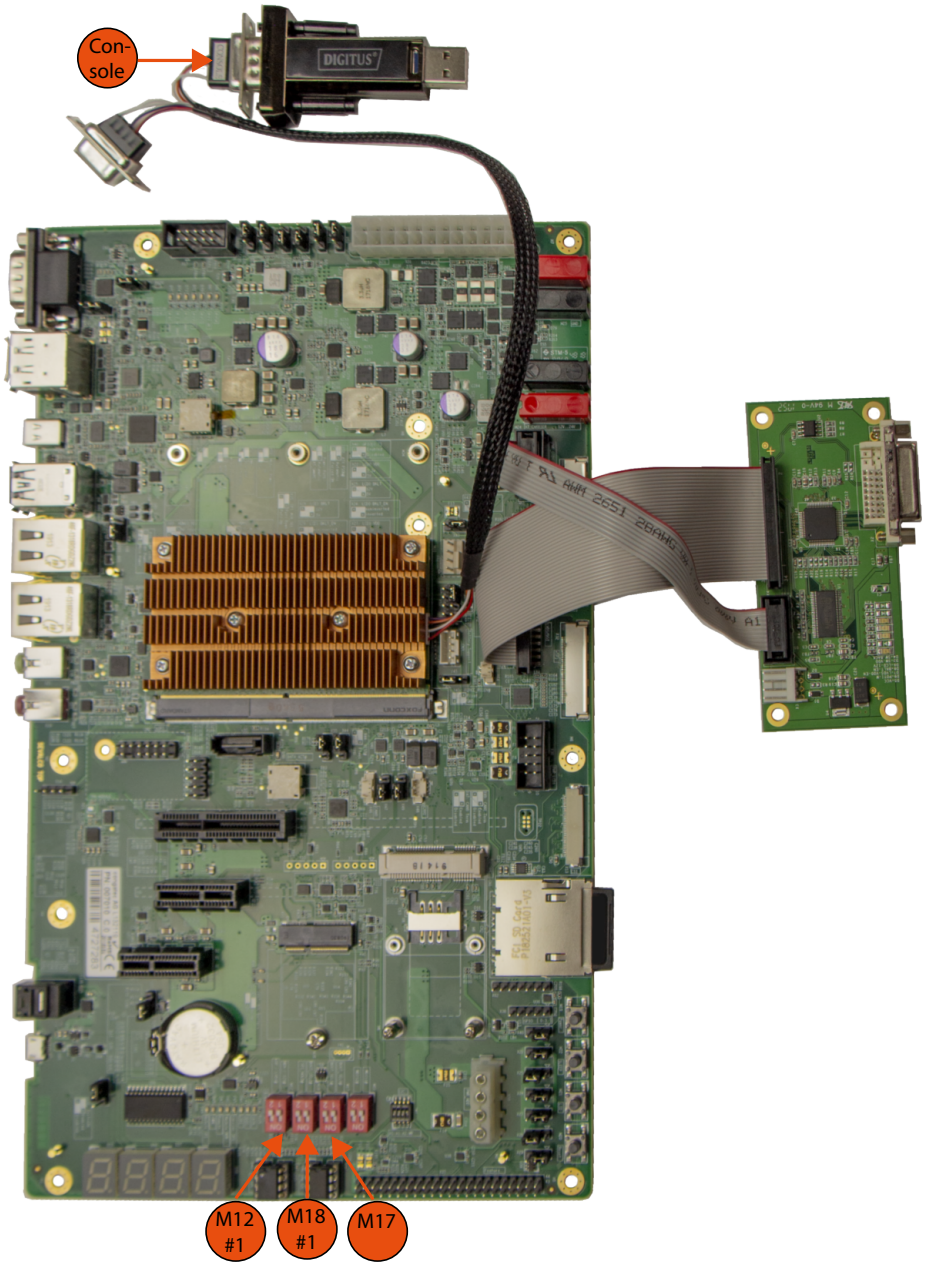
1. Ensure the hardware is protected from the effects of electrostatic discharge
2. On the carrier board, set DIP switch M12 #1 to OFF (Audio: I²S)
3. Set the carrier SD card as the boot source via DIP switches M18 and M17:

DIP M18	DIP M17		Boot Source [1,2]
M18.1	M17.2	M17.1	
ON	OFF	OFF	Carrier SD Card

4. Insert the included SD card into the carrier SD card slot CN1 [3]
5. Connect the console cable to the module connector X2
6. Connect the console cable port labeled "**CONSOLE**" to your PC [4]
7. Mount the cooling solution onto the module (Final torque: 0.4 Nm)
8. Mount the module onto the carrier board (Final torque: 0.4 Nm)
9. Connect your monitor to the default display interface of your module:

Part #	Default Display Interface [5,6]	Carrier Connector
051690	DisplayPort (DP)	X33 (upper port)
051691	MIPI-DSI	X23
051692	DisplayPort (DP)	X33 (upper port)
051693	HDMI	X33 (lower port)

11. Connect your ATX Power Supply Unit (PSU) to the carrier board
12. To start the system, switch the ATX PSU on



Note

1. *The boot source selection does not conform to the SMARC specification.*
2. *OTP fuses are not pre-programmed on the included conga-SMX95.*
3. *Yocto Linux is pre-installed on the included SD card.*
4. *Optionally, use an USB to Serial RS-232 adapter (not included).*
5. *Optionally, congatec offers an LVDS to DVI converter board with matching power and data cables—see section 1.1 "Sample Distribution Set".*
6. *Other supported display interfaces require changes to the device tree.*

2 Software

The software for the conga-SMX95 is available at:

https://git.congatec.com/arm-nxp/imx9-family-ea/

Note

Contact congatec support to get access to the repository.

2.1 Operating System

By default, the system boots the operating system that is stored on the SD card. Yocto Linux is preinstalled on the included SD card. [1,2]

Note

1. *Booting to a graphical user interface (GUI) may take some time. This is because the complete system initialization occurs from the SD card connected via a 4-bit interface.*
2. *In order to maintain the integrity of the file system, it is recommended to always shut down the system by issuing the command "poweroff" in the console terminal.*

2.2 Starting Up

The conga-SMX95 uses U-boot as standard bootloader. The bootloader is GNU GPL open source software. A serial terminal connection is required in order to display the boot process and to modify the boot behavior. The boot behavior is controlled via environment variables.

To establish a terminal connection, a terminal program such as TeraTerm or Putty can be used.

Use the following communication parameters:

Baud rate:	115200
Data:	8 bit
Parity:	none
Stop:	1 bit
Flow control:	none

2.3 Boot Process

The conga-SMX95 boot process starts at Power On Reset (POR), where the hardware reset logic forces the ARM core to begin execution, starting from the on-chip boot ROM of the processor.

After loading, the bootloader will be executed and will perform basic system initialization (e.g. the system memory, serial console, etc.). Afterwards, the environment settings are parsed and the system boot will go ahead as specified.

Press any key during startup to stop autoboot and to get to u-boot console. At the u-boot console, the environment settings can be displayed using the "print" command. In addition, useful functionality is available (such as memory dump, access to the SPI and the I2C system, etc.). The "help" command will display any command supported by the u-boot.

If autoboot is not interrupted by pressing a key, the boot process goes ahead and the module will boot the operating system that is installed on the SD card.

2.4 U-Boot Environment Variables

The u-boot environment of the conga-SMX95 (Prototype Rev. X.2) is stored on the SD card. One of the benefits of the u-boot bootloader is the possibility to specify its run time configuration using environment variables.

Note

Mass Production (MP) revisions store the u-boot environment in SPI Flash.

The environment variables of u-boot can be displayed using the printenv (or the print) command.

During the boot process, the bootloader evaluates the "bootcmd" variable and executes it. The boot command tries to load a bootscript or a kernel from the boot device. If this is successful, the script or kernel will be started, otherwise a fallback to network boot is performed. The variable "mmcdev" specifies the mmc boot device. Furthermore, the variable "mmcroot" is passed to the kernel in order to specify the location of the root filesystem.