

SIMx21

Technical Product Brief (TPB)



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Technical Product Brief (TPB)

Introduction

The SIMx21 series HMI modules are versatile and intelligent Human Machine Interface (HMI) platforms, designed for integration into Original Equipment Manufacturers' (OEM) products. These modules combine essential features, including a graphical controller, LCD interface technology, touch sensing capabilities, and the necessary storage and processing power to create a modern, responsive, and feature-rich user experience.

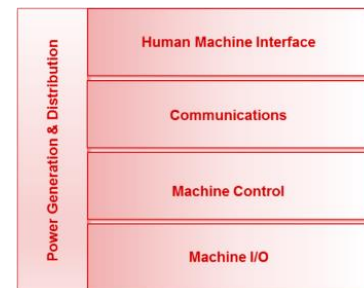
While the primary purpose of the **SIMx21** is to serve as an HMI, it also offers system control capabilities. OEMs can use the **SIMx21** series modules either as standalone units, or seamlessly integrate them into their existing systems. Connectivity options include direct integration within the system chassis or remote connections (e.g., over RS485 or RS422 networks using the Modbus protocol).

Key features of the **SIMx21** include native 3.3V UART, USB2.0 Host and Device support, CAN connectivity, WiFi capabilities, and RS422/485 communication. The UART, RS4xx, and USB interfaces are compatible with various protocols, including Modbus (Master/Slave, ASCII/RTU) for bi-directional client/server communications.

Usage Models

Most original equipment manufacturer (OEM) system architectures can be visualized as a functional stack comprised of four (4) key layers:

1. **Human Machine Interface (HMI):** Traditionally consisting of lights and buttons, HMIs are now transitioning to intelligent graphic/touch LCD panels.
2. **Communications Hub:** This layer manages all communication between the HMI and the machine, as well as external connections to cloud services and industrial/enterprise networks.
3. **Intelligent Machine Control:** Responsible for sequencing, safety algorithms, and monitoring of low-level machine input/output (I/O).
4. **Low-Level Machine I/O:** Includes actuators, sensors, and controls that directly impact the physical operation of the system.



In addition to these four layers, there's the power generation and distribution system, typically supplied at 12V or 24VDC initially from 110/220VAC wall power.

Often, designers work with existing products featuring traditional button-and-segment-LCD interfaces. When aiming for an 'extreme makeover' with a new graphic/touch panel, the existing design may already

be an intelligent system—for example, a pool control system with motor controllers, valve relays, sensors, and its own microcontroller on a ‘baseboard’ PCB. In some cases, this baseboard connects to a simple front panel interface via a wire harness. In others, the baseboard integrates with front panel buttons and indicators. User configuration and operation are managed by the existing baseboard and its software.

Rather than a complete hardware and software redesign, designers can replace the old front panel with a **SIMx21** connector using a simple UART + Power connection. This approach streamlines the transition while maintaining existing functionality.

e2ip’s Serious Integrated Modules (SIMs) provide ready-to-use solutions for HMI front panels. These off-the-shelf modules allow seamless integration using the ST TouchGFX Graphics Development Environments (GDE).”

Firmware & GUI Development

SIMx21 series HMI modules serve as ready-to-use, comprehensive solutions for HMI front panels. These modules enable high-level GUI development within the Azure RTOS framework, supporting a diverse range of Graphics Development Environments (GDEs), most notably ST TouchGFX along with many other lightweight software components.

The **SIMx21** framework & platform supports the following embedded SW/FW:

- **Embedded OS:** Azure RTOS Eclipse ThreadX
- **USB Device & Host Stack:** Azure RTOS USBX
- **File System:** Azure RTOS FileX & LevelX
- **Networking:** Azure RTOS NetX Duo
- **Coding Tools:** STM32CubeMX, STM32CubeIDE
- **GUI/GDE:** TouchGFX, QT and/or Crank
- **BSP/HAL:** STM32CubeMX
- **Debug/Probes:** STLink & J-Link

Templates, Drivers & Libraries

The **SIMx21** series modules provide libraries, templates & drivers to facilitate the development of Graphical User Interfaces (GUIs) when using TouchGFX.

Getting Connected

The **SIMx21** series modules come pre-installed with built-in firmware, OS and a simple UI dashboard. When initially powered, the e2ip splash screen and dashboard will display on the LCD screen. For more Getting Started & Out-Of-Box tips & instructions, see www.seriousintegrated.com/oob.

Development Accessory Kit

The SIMDKA-A60 Development Accessory Kit contains everything you need to connect to your SIMx21 module, including:

- A 16P wire harness for prototyping that can plug into the 16P W2B board connector.
- 5VDC & 12VDC Wall Power adapters (120/240VAC capable)
- Barrel jack conversion adapter from the barrel plug of the wall adapter to the wires of the example harnesses.
- A push-on spade lug & ground wire for connecting the chassis ground to either a system chassis ground, or, in the absence of such, looping over to a digital signal ground on the 6-pin Power/RS485 Connector.



Development kits for e2ip Serious Integrated Modules (SIMs) are available through authorized distributors, including DigiKey and Arrow.

Hardware Overview

While the **SIMx21** series modules include numerous specific ‘variants’ with subset capabilities, the **SIMx21** series has the following ‘core’ features:

Power and Environmental

- Optional 5VDC Power Input or 7.0-35VDC Power Input
- -40 to +85C operating temperature range components (further limited by LCD option)

Processor and Memory

- STM32H750XB MCU with 480MHz Arm Cortex-M7 MCU and 1MB integrated RAM
- 4-16MB SPI NOR Flash
- 128MB QSPI NAND Flash
- 8 to 64MB SDRAM

Integrated Liquid Crystal Display (LCD)

- Capacitive Touch Panel
- Option for external resistive touch panel via RTP Riser Cards.
- Flexible Audio Options
- Integrated Piezo Sounder or Electro-Mechanical Sounder for alarms
- Integrated 3W External Speaker Audio output
- I2S output for external DAC/Codec

Indicators

- Onboard, single green LED Power Indicator

- RGB LED Strip support via off-board connector

Numerous Communications Ports

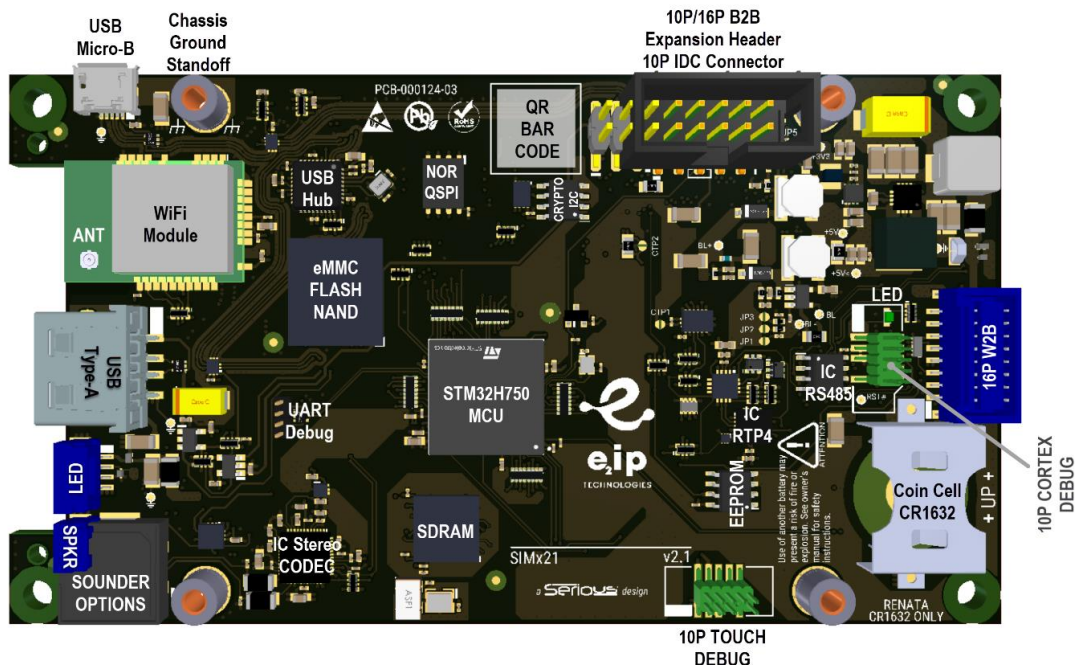
- USB 2.0 Full-Speed (12 Mbps) Device Port with USB Micro-B Connector
- USB 2.0 High-Speed (480Mbps/60MBps) Embedded Host Port with USB Type-A Connector
- RS422/485 Port with optional termination
- 3.3V UART Port with transmit control
- *CAN Port with optional termination
- *WiFi 802.11 b/g/n module (external antenna required)

Simple In-Chassis Connectivity

- 16P W2B Connector (RS4xx, CAN, UART, Power, Reset, USB Device)
- 2.54mm (0.1") dual row 10P/16P B2B Expansion Header
 - 10P variants: UART, Power, Reset, CAN Tx/Rx, RTP4, I2S
 - 16P variants add USB Device, USB Host

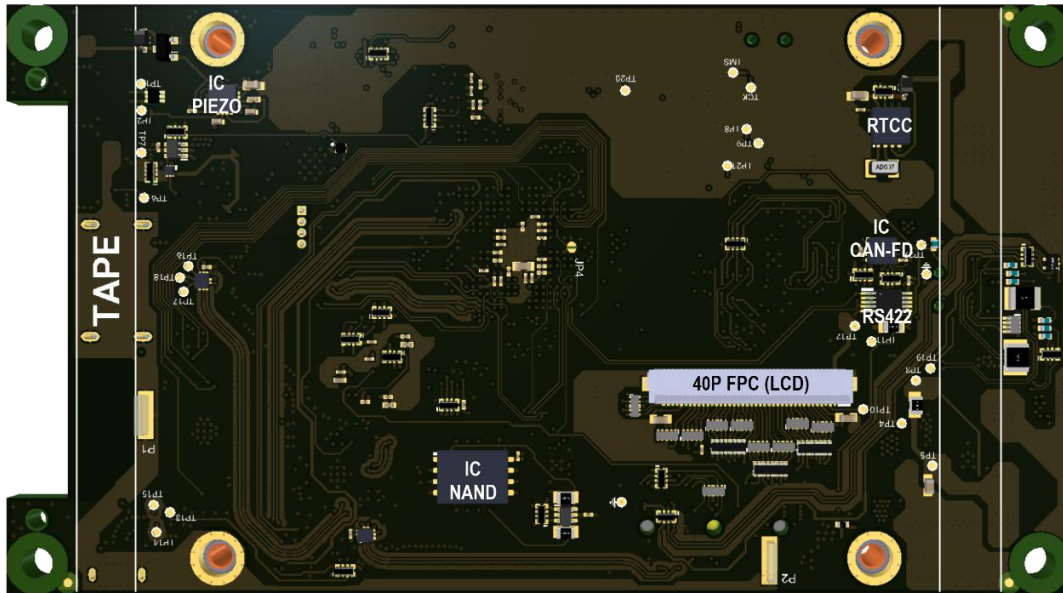
Board Views & Layout

Front View



*SIMx21-A00 Superset Variant

Back View

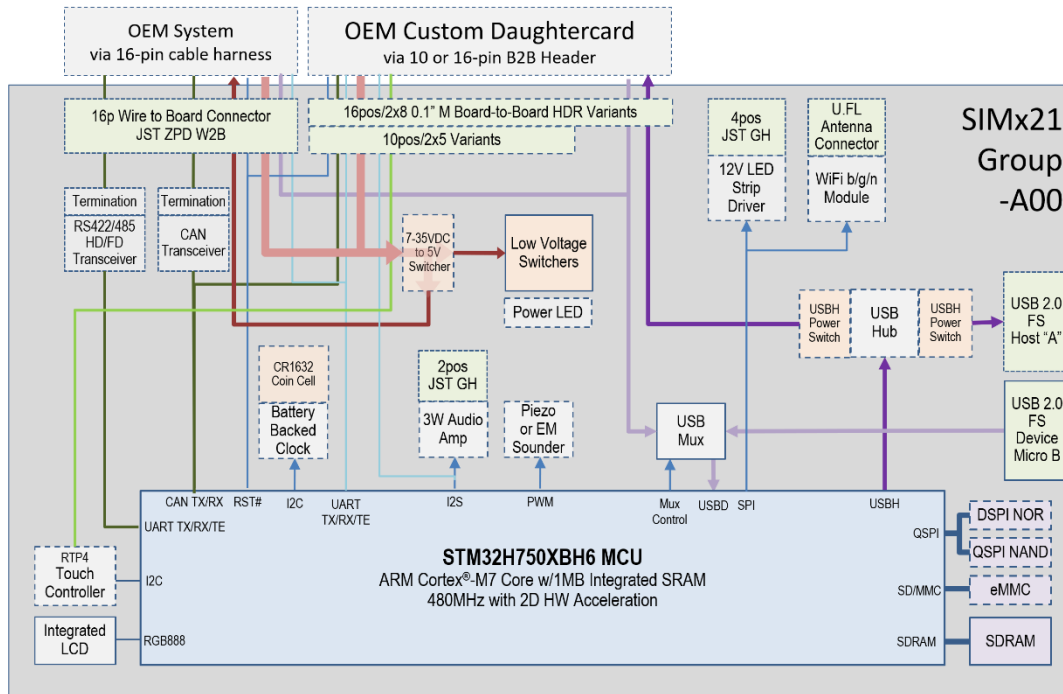


*SIMx21-A00 Superset Variant shown

Block Diagram(s)

The overall architecture of the **SIMx21** series modules is shown below. Dashed lines in the figure indicate variant-dependent options and optional accessories.

SIMX21-A00 Superset Variant



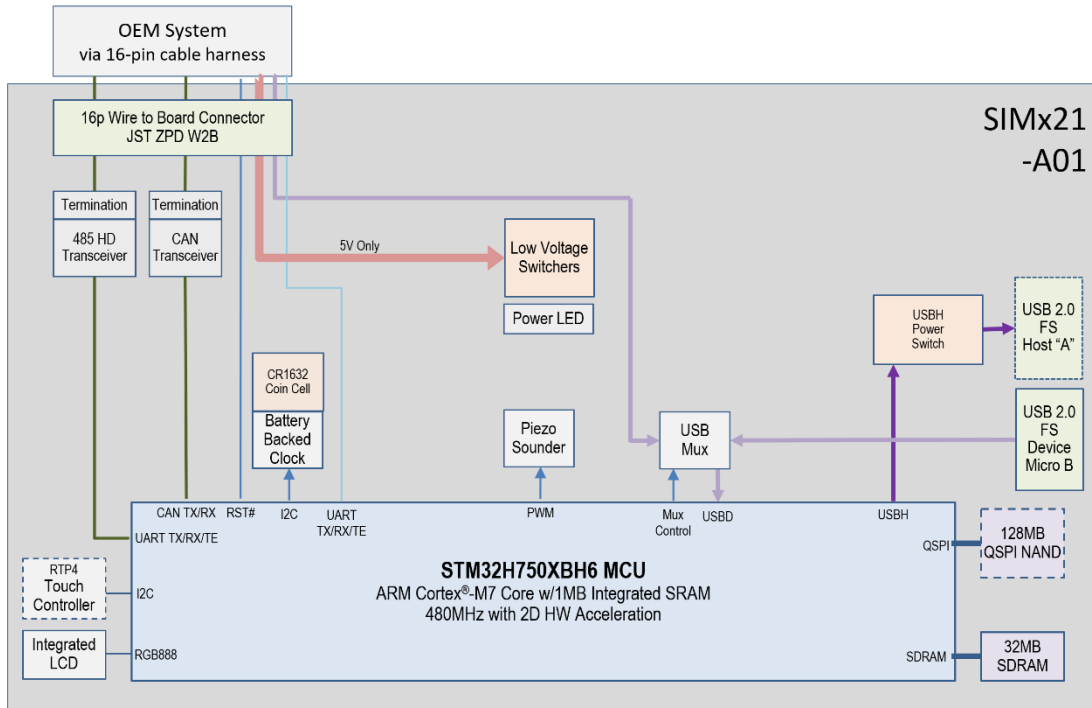
*Options not all available concurrently.



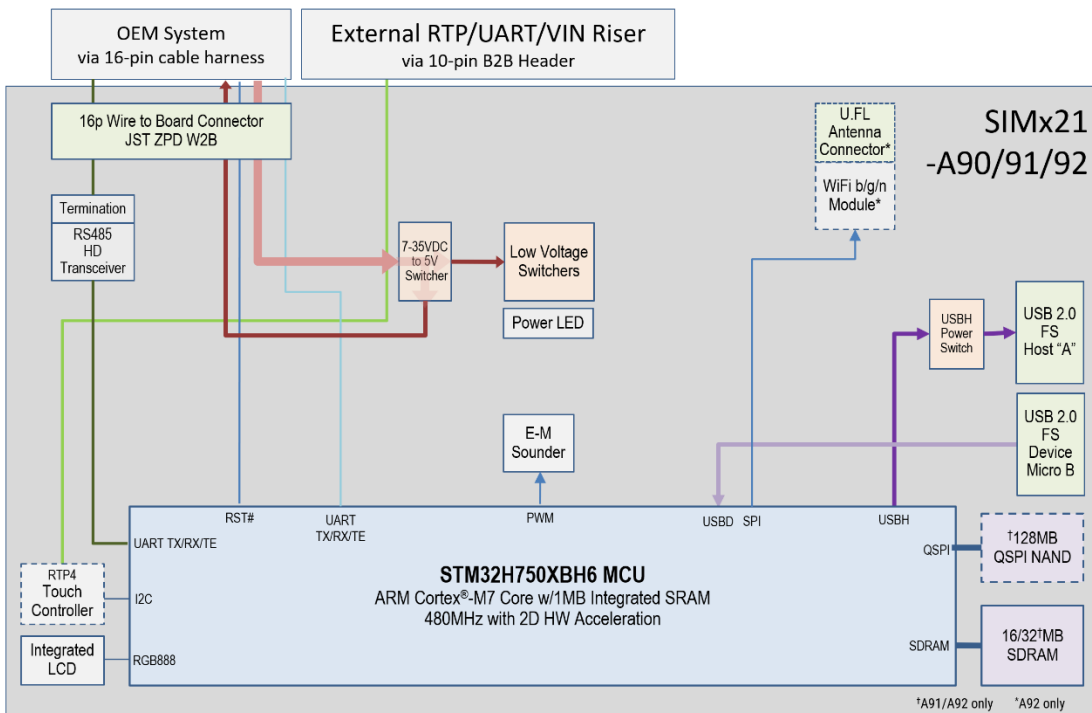
Note: Not all the features shown in this full block diagram are available at the same time. For example, the following sets of features are mutually exclusive:

- The Amplifier/Speaker Output and the External Codec/Amplifier Support
- The Amplifier/Speaker Output, Piezo Sounder, and Electro-Mechanical Sounder
- Various signal combinations on the 10/16-Pin Header

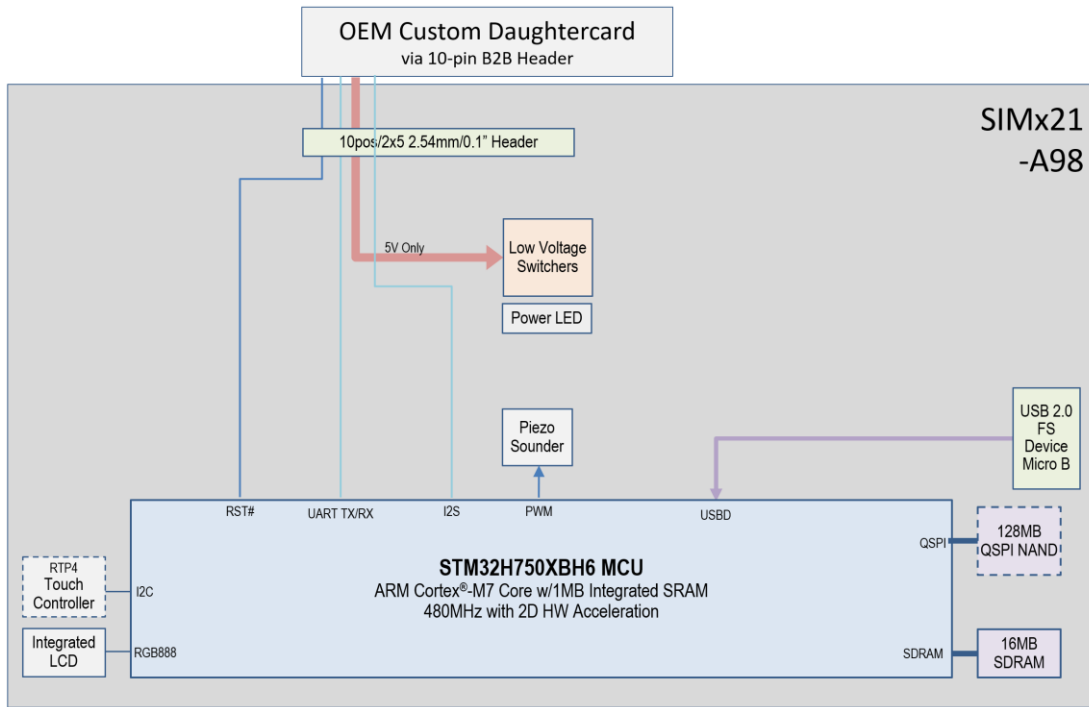
SIMX21-A01 Subset Variant



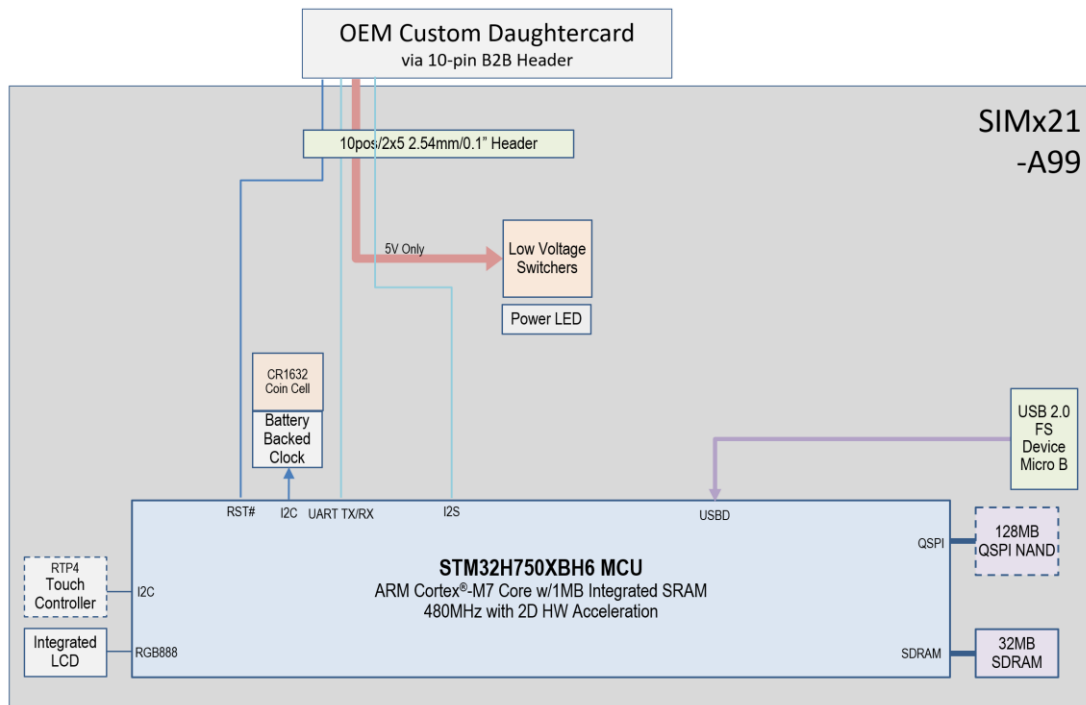
SIMX21-A90/91/92 Subset Variant(s)



SIMX21-A98 Subset Variant



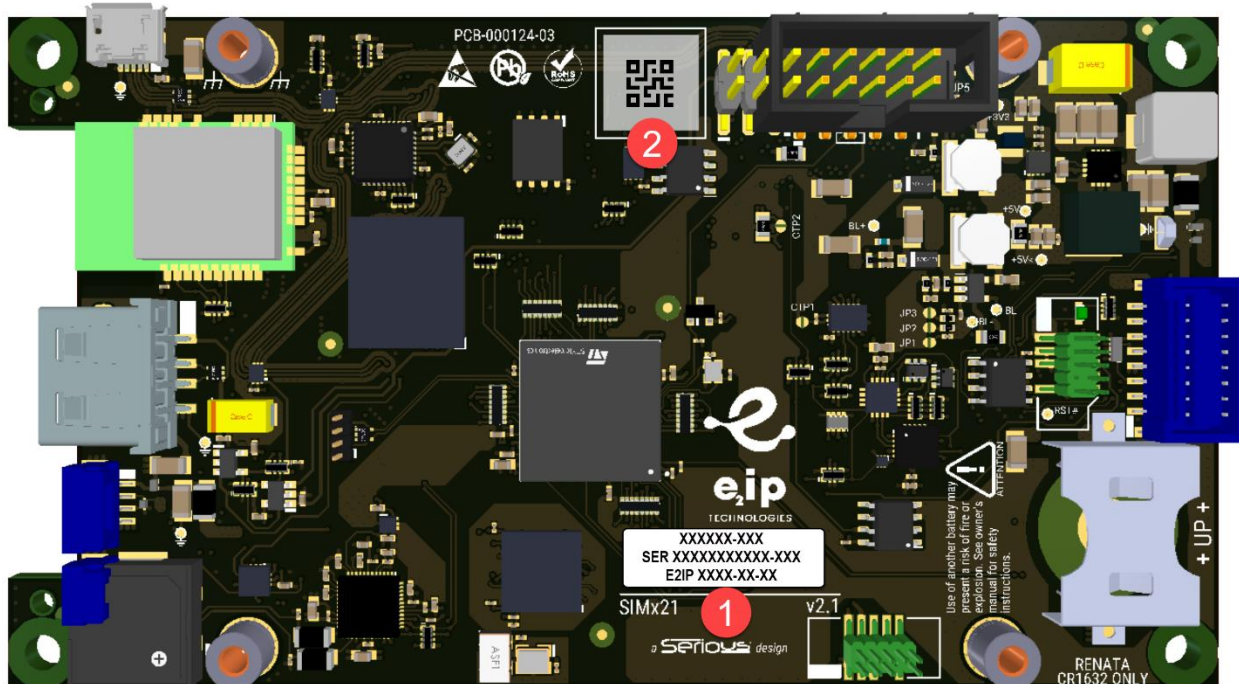
SIMX21-A99 Subset Variant



Product Identification

All SIMx21 products include Product Code & Identification labels/markings:

- The SIM Series & version is marked on the PCB directly, often with a corresponding factory applied sticker in a designated & allocated location, like **1** shown below, indicating the corresponding SIM P/N, production date & job/batch ID info.
- A unique Manufacturing ID (aka “MID”) as a 2D scannable barcode, to be used to uniquely identify the product, as shown in location **2** below. This MID is unique across every manufactured SIM product and can be scanned with many common free mobile phone apps as well as nearly any USB barcode scanner.
- In addition, there may also be an internal unique Serial Number (SN or SSN) that can only be accessed & retrieved from the HMI, or through a connected device.
- Either number - the MID or the SSN - can be used by e2ip to uniquely identify the SIM product, including model, family, attached LCD, manufacturing date, and more.



Product Codes

All **SIMx21** series modules are coded & identified under the following base structure & classification:



Module Type & Series

SIMx21 series modules feature capacitive touchscreen displays and are categorized into distinct series based on the size of the LCD display (or "glass"), when measured diagonally across the active area. The different size options enable end-system designers to customize their selection according to specific cost considerations, available space constraints, and usability requirements.

Series	SIM221	SIM321	SIM521	SIM821
LCD Size (Diag.)	4.3"	5"	7"	10.1"
Screen Type	*Available upon request	IPS-TFT	IPS-TFT	*Available upon request
Viewing		Full View (MVA)	Full View (MVA)	
Orientation		Landscape	Landscape	
Resolution		800x480	1024x600	
Brightness		400+ cd/m ²	500+ cd/m ²	
Backlight Life (hrs)		30K	30K	
Color Depth		24-bit, 16.7M Colors	16-bit, 65.5K Colors	
Touch Options		Capacitive Touch (Standard) *Resistive & no-touch available upon request		

The LCDs used in the **SIMx21** series modules are transmissive displays and will not be visible unless the backlight LEDs are lit sufficiently for ambient light.



For sufficient annual volume commitments, LCD touchscreen displays can be customized to meet specific requirements such as resolution, brightness, and other relevant display or performance characteristics. Additionally, different touch screen technologies can be made available. For instance, the **SIMx21** model can be equipped with resistive touch screen technology. Additionally, non-touch LCDs are also available, allowing them to be paired with external resistive touch panels (RTPs) - this design allows the RTP to be a replaceable element in the end system. Contact **e2ip technologies** for details.

Module Variants & Features

In addition to LCD screen size & touch panel technology options, **SIMx21** series modules are comprised of 'variants' with a subset of the total feature capability of the **SIMx21** series, and each 'variant' will be mated with one of several different standard-available LCD touchscreen options. The 'variant code' (**AXX**) describes the non-LCD related features of the **SIMx21** series modules such as memory size and on-board feature options. At the time of this document's date, the standard 'variants' are:

SIMx21-AXX, Module Variants & Features

SIMx21-	A00	A01	A90	A91	A92	A98	A99
System Features							
Operating & Storage Temperature ¹	-40 to +85C						
Relative Humidity	≤90% non-condensing @≤50°C and ≤60%@≥50°C						
Power Indicator LED (Green)	x	x	x	x	x	x	x
Separate Signal Ground & Chassis Ground	x	x	x	x	x	x	x
Main Power Input (VDC)	7-35	5	7-35	7-35	7-35	5	5
Processor/Memory/Peripherals							
ST STM32H750 ARM Cortex-M7 MCU (MHz)	480	480	480	480	480	480	480
SDRAM (Mb/MB)	256/32	256/32	128/16	256/32	256/32	128/16	256/32
RAM Speed (MHz)	143	143	166	143	143	166	143
NOR QSPI FLASH (Mb/MB)	128/16	128/16	128/16	128/16	128/16	128/16	128/16
NAND QSPI FLASH (Gb/MB)	1/128	1/128	-	1/128	1/128	1/128	1/128
e.MMC FLASH (GB)	4	-	-	-	-	-	-
Peripherals, Ports & Connectors							
USB 2.0 FS Device Ports (total)	1	1	1	1	1	1	1
USB 2.0 FS Device w/ Micro-B Port	x	x	x	x	x	x	x
USB 2.0 HS Host Ports (total)	1	1	1	1	1	-	-
USB 2.0 HS Host w/ Type-A Port	x	x	x	x	x	-	-
RS422 Full Duplex Transceiver	-	-	-	-	-	-	-
RS485 Half Duplex Transceiver	x	x	x	x	x	-	-
RS4XX Termination	x	x	x	x	x	-	-
CAN (Network Ready w/Transceiver)	x	-	-	-	-	-	-
UART 10P/16P B2B Exp Header or Conn	-	-	10P HDR	10P HDR	10P HDR	10PCONN	10P HDR
16P W2B Connector	1	1	1	1	1	-	-
Battery Backed Real Time Clock Calendar	x	x	x	x	x	-	x
WiFi 802.11 b/g/n	x	-	-	-	x	-	-
RGB LED Strip Driver & 4P Connector	x	-	-	-	-	-	-
Piezo Sounder	-	x	-	-	-	x	-
Electro-Mechanical Sounder	-	-	x	x	x	-	-
I ² S audio on B2B Exp Header	-	-	-	-	-	-	x
3W Codec/Amplifier & 2P Connector	x	-	-	-	-	-	-



¹Module operating temperature typically limited by the LCD; see the specific product description for details

LCD Codes

All **SIMx21** series modules include an 8-character format “LCD Code”, where each alphanumeric character represents a specific characteristic of the LCD attached to that specific SIM order code. Different LCD options are available upon request outside the standard LCD touchscreen options within the same series/variant of **SIMx21**.

	Touch	NITs	Life	Temp	Color Depth	Viewing	Resolution	Cover Glass							
R	Resistive 4-Wire	1	100+	2	20K	A	-20/+70C	M	Mono	L	Landscape	A	320X240	N	None
C	Capacitive	2	200+	3	30K	B	-10/+70C	B	8-bit	P	Portrait	B	480X272	A	~1mm
N	Non-Touch	3	300+	4	40K	C	-10/+60C	W	16-bit	M	MVA	C	640X480	B	~1mm w/ASF
E	External RTP4	4	400+	5	50K	D	0/+70C	E	18-bit	S	IPS	D	800X480	C	~2mm
		5	500+			E	0/+60C	L	24-bit			E	1024X600	D	~2mm w/ASF
		6	600+			F	0/+50C					F	1280X800	E	~3mm
		7	700+ ¹			G	-20/+60C					G	1280X720	F	~3mm w/ASF
		8	800+			H	-10/+50C					H	1920X1080	G	~1mm AG+AF
		9	900+			J	-30/+85C					J	1366X768	H	~2mm AG+AF
		A	1000+ ²			K	-20/+50C					K	858X480	J	~3mm AG+AF
		B	1100+			L	-30/+80C							K	~1mm AG
		C	1200+											L	~2mm AG
		D	1300+											M	~3mm AG
		E	1400+											P	~1mm AF
		F	1500+											Q	~2mm AF
														R	~3mm AF

¹Considered MIN for viewing in Daylight

²Considered MIN for viewing in Full Sun

AG =

ASF =

AF =

Anti-glare

Anti-shatter Film

Anti-fingerprint coating

Physical Characteristics

Catalogue off-the-shelf **SIMx21** products are shipped without a bezel or enclosure. The corresponding **SIMx21** Mechanical Design Package (MDP) contains 3D STEP files, 3D PDFs, and 2D drawings of the various modules in production.

Environmental

All components & variants of the **SIMx21** group family members are rated for -40°C to +85°C operating & storage temperature, and Relative Humidity ≤90% non-condensing @≤50°C and ≤60% @≥50°C. However, standard **SIMx21 assembled modules** will have the operating temperatures limited by the temperature range of the LCD itself, which is typically -20°C / +70°C. Although the non-LCD elements may be able to function over their full temperature range, the LCD temperature range is most restrictive. At or outside LCD range limits, displays may become difficult to read, sluggish, non-functional, and can sustain temporary degradation. When operated or stored more than 10°C outside table specified MIN/MAX limits, the LCD may sustain permanent damage.

Module Features Overview

Processor and Memory

At the heart of the **SIMx21** series modules is the STMicroelectronics STM32H750 MCU featuring:

- 480MHz Arm® Cortex®-M7 core
- On-chip 128kB Boot Flash & 1MB on-chip high speed RAM
- At least one (1) optional serial SPI NOR Flash device w/ MIN. 4MB for bootloader & other storage.
- Some SIMx21 variants include a 128MB or larger Quad SPI NAND Flash.
- For large or ultra-high-speed bulk storage, the NAND flash can be replaced with an on-module e.MMC.
- Direct dedicated bus connection to high speed 16MB or 32MB SDRAM subsystem
- RGB LCD controller with 2D hardware graphics BLIT engine

SIMx21 series modules typically include 4GB of on-board non-volatile storage in the form of an Embedded MultiMediaCard (e.MMC). The main partition of the e.MMC is formatted as an embedded file system for storage of user files, including images, video playback files, audio files, configuration data, and more.

Powering the Module

SIMx21 series modules can be powered by either 5VDC or wide-range 7-35VDC, depending on the variant. The on-board power converters are generally tolerant of most embedded system supplies. However, in harsh power environments (such as automotive applications), it's strongly recommended to add additional filtering and clamping. Input power can be supplied through the 16P W2B Connector, or the 10P/16P B2B Expansion Header. For variants of the SIMx21 with the 16P W2B Connector, the power and ground (and chassis ground connected to digital ground) can be connected to an off the shelf 5V or 12V wall adapter (depending on variant voltage required) using the barrel-jack to wire-harness adapter.



Powering a **SIMx21** with the incorrect power supply may permanently damage the unit. Ensure you do not apply more than 5V to 5V-only **SIMx21** variants.



Ensure correct polarity of the voltage input: connecting the power backwards will damage the unit. Chassis ground provides significant ESD protection to the circuits. Ensure you connect a Chassis.



Connect a Chassis Ground option to a system chassis ground. If there is no system chassis ground available, tie this chassis ground from the **SIMx21** to signal ground.



The **SIMx21**'s power needs exceed the capabilities of USB 2.0 ports and hubs; therefore, it cannot be powered via the USB Micro B Device Connector.

Comm Ports and Protocols

Each **SIMx21** series module includes numerous physical connectors for communications, including:

- USB 2.0 Host Port, Type-A Connector
- USB 2.0 Device Port, Micro-B Connector
- 16P Power/RS4XX Connector
- 10P/16P B2B Expansion Header

The physical protocols of 3.3V UART, RS422/485, and USB Host/Device are carried on these various connectors.

Wired Communication Ports and Protocols

Communications Port

	USB Host	USB Device	RS422/RS485	3.3V UART	CAN L/H	CAN Tx/Rx
USB Type-A Host Connector	×					
USB Micro-B Device Connector		×				
16P W2B Connector		×	×	×	×	
10P B2B Expansion Header				×		×
16P B2B Expansion Header	×	×		×		×

Not all variants include all connectors. Therefore, each of the ports on a variant are completely independent and all port-supported protocols can be operational simultaneously, providing extensive GUI connectivity to an in-chassis system or external devices. Port protocols are supported as follows:

AUDIO

The **SIMx21** series modules support numerous & different audio options:

Piezo Sounder

Some variants of the **SIMx21** include a simple piezo sounder with a typical SPL of ≥ 75 dB at 4kHz at 10cm, and capable of frequency adjustment & modulation from 1KHz to 4KHz.

Electro-Mechanical Sounder

Some variants of the **SIMx21** include a simple electro-mechanical sounder with a typical SPL of ≥ 92 dB (95 TYP) at 2.7 kHz at 10cm, and capable of frequency adjustment & modulation across the full frequency range.

Amplifier/Speaker Output

Some **SIMx21** variants include a codec/amplifier combination capable of directly driving an external 1-2W/8 Ω or 2-3W/4 Ω speaker via the 2-Pin Speaker Connector to meet the needs of many products without having to use an external high-power amplifier.

External Codec/Amplifier Support

Some **SIMx21** variants with the 10P/16P Header allow substitution of the core I2S signals (CLK, WS, DATA) in place of the CAN Port & the Tx Enable of the UART Port. These variants of the **SIMx21** do not have the On-Board Amplifier/Speaker Output.

RTCC Battery Backup Power

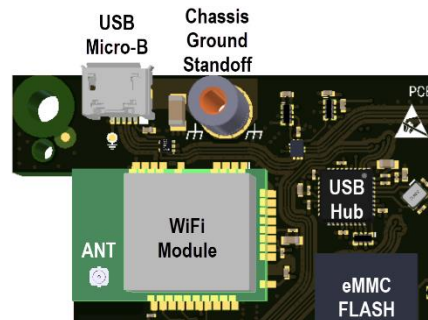
Some **SIMx21** variants have a battery-backed Real Time Clock/Calendar (RTCC) circuit for maintaining an on-board time/date capability even when the system is unpowered. These variants include a coin-cell battery holder to receive a Murata CR1632-type 3V non-rechargeable battery to keep the clock/calendar running even during power outages and through Reset cycles. The RTCC automatically switches to use the coin cell power only when main power is not available. The location/orientation and type of this coin cell holder depends on the module variant.

WiFi

Some variants of the **SIMx21** include an on-board WiFi 802.11 b/g/n, fully certified communications module.

An external antenna is required to connect to the small U.FL coaxial connector of the onboard WiFi module.

Note: An adhesive patch antenna is suitable for plastic & RF-transparent enclosures and can be mounted on flat or curved surfaces. For metal enclosures where metal would severely attenuate the range of the signal, a U.FL to SMA-panel-mount extension cable or a common external whip antenna is recommended.



RGB LED Strip Power

Some variants of the **SIMx21** include a driver circuit for a serial RGB LED strip delivered to a 4P LED Strip Connector.

Power LED Indicator

Most **SIMx21** variants include an onboard single green LED which lights when power is applied to the board and the 5V supply is stable. This LED is not user controllable.

Connectors & Headers

The **SIMx21** hardware will often be used inside a device or machine chassis where other OEM-unique electronics and controls are present. See the **SIMx21** Technical Reference Manual (TRM) for detailed descriptions (including pinouts, DC characteristics, and protocols supported) of the **SIMx21** connectors & headers.

USB Device & Host Ports

The USB Device & Host Ports can run any USB class / protocol that is supported by ST / RTOS library, or any other that the final user implements on their own.

The demo code of the **SIMx21** series modules implements example code for running USB device CDC class for serial communication, and USB host Mass Storage class for reading a flash drive.

USB Device Port Micro-B Connector

All **SIMx21** variants have the USB Device (or “function” in USB nomenclature) circuitry populated and exposed through a USB Micro B Device Connector. This USB port is a USB 2.0 Full Speed (12Mbps) port.

USB Host Port Type-A Connector

Some variants of the **SIMx21** series modules include USB Embedded Host circuitry along with the associated USB Type-A Connector. This USB port is a USB 2.0 High Speed (480Mbps / 60MBps) port. This is designed primarily for thumb drive memory expansion.

16P W2B Power/RSXXX Connector

For connection to an external system, most variants of the **SIMx21** include a 16P 2x8P JST ZPD Series connector providing post-transceiver access to RS4XX and CAN on certain variants including USB Device and UART support.

10P/16P B2B Expansion Connector

Some variants of the **SIMx21** include a 10P/16P B2B Expansion Header, providing a wide range of connectivity and expansion options including I2S, UART, USB Host, USB Device, and even a 4-wire external resistive touch panel interface.

The header footprint supports a 2x5P or 2x8P option with pin 10 of the 2x5 aligned with pin 16 of the 2x8 for a "standard" and "extended" version respectively. The 10P M 2x5P base-portion of the header footprint is used for signal configuration, and the 6P M 2x3P Extension Header pins provide USB capability (see USB on the Extended Pins).

Some variants of the **SIMx21** include a standard extended-length unshrouded/unkeyed 10P M 2x5P 2.54mm [0.100"] industrial header for 10P signal configuration & board-to-board stacking. Other variants include a shrouded/keyed header specifically for IDC cable use.

Note: the 10P/16P B2B Expansion Header may be populated at the same time as the 16P W2B Connector

Daughter Cards & Riser Cards

The **SIMx21** is designed to connect through the 16P W2B connector to an external system, or through the 10P/16P B2B Header to a custom-designed daughtercard mounted on two (2) or four (4) of the provided M3x0.5 4mm standoffs. Variants with the smaller 10P B2B header do not have USB device and host connections that are available on the 16P variants.

Two types of daughter cards are supported depending on the variant:

- Small RTP Riser Cards supporting external touch resistive touch panels, and,
- Full Sized Daughter Cards using the 10P or 16P version of the 10P/16P B2B expansion header.

Audio Line Out Connector

The **SIMx21** series has a built-in codec with line out connector for driving headphones or externally powered speakers. A 2-pin wire harness/crimp-pin connector provides connectivity for this purpose.

Audio Speaker Out Connector

The **SIMx21** also has a built-in speaker amplifier that can drive up to 3W into a 4Ω speaker. This output power will meet the needs of many products without having to use an external high-power amplifier. A 2-pin wire harness/crimp-pin connector provides connectivity for this purpose.

Chassis Ground Standoff

Chassis ground is independent from signal ground on the **SIMx21** modules. A minimum of one (1) of the four (4) available threaded M3 standoffs of the **SIMx21** is connected to Chassis Ground standoff, for connecting the on-board chassis ground to the system chassis ground and is clearly marked on the board with the chassis ground symbol.

Document Notices & Conventions

Important Legal Notice

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Serious & **e2ip** reserves the right to relocate components on the **SIMx21**, typically for manufacturability, cost, and other product and BOM optimization related reasons. Do not assume a specific **SIMx21** component placement to utilize the inner-stack-height more than the guidelines as this may cause daughtercard mechanical conflicts in future **SIMx21** revisions.

See the **SIMx21** Mechanical Design Package (MDP) for acceptable height envelope guidelines.

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Document Conventions



This symbol indicates an advanced tip for hardware or software designers to extract interesting or unique value from the **SIMx21**.



Pay special attention to this note – items especially subject to change, or related to compatibility, functionality, and usage.



WARNING: You can damage your board, damage attached systems, overheat or cause things to catch fire if you do not heed these warnings.



Notes with this symbol are related to license and associated legal issues you need to understand to use this software. We’re big believers in honoring license agreements, so please help the industry by respecting intellectual property ownership.

Related Documents

The **Technical Product Brief (TPB)** is a high-level document focused on understanding the principles and applications of using and ordering the **SIMx12** product, including:

- Hardware and software overviews
- Usage models

The TPB is to be used in conjunction with the following other documents:

SIMX21 Technical Reference Manual (TRM)

The **Technical Reference Manual (TRM)** is focused on detailed information necessary to the systems engineer to integrate and use the features of the modules, including:

- Hardware & Software Overviews
- Getting Started
- Handling precautions
- Environmental limitations
- DC Power characteristics
- Physical characteristics (weight, etc.)
- Hardware details & features
- Connector summaries

- Production module order codes

The TRM is intended to be used in conjunction with the following other documents:

SIMX21 Mechanical Design Package (MDP)

The **Mechanical Design Package (MDP)** is a .zip file downloadable by registered users from the 'My STS' portal & contains information for the Mechanical Engineer and PCB/Electrical Engineer, including 2D dimensional drawings and 3D STEP files of the various **SIMx21** series HMI modules, as well as a template for designers to create their own custom expansion boards.

Software Reference Manuals and Support

For software downloads, support, example projects, training, and reference material, consult the Documentation Zone of the 'My STS' portal.

e2ip technologies – Value Added Solutions

Customer-specific variants & customization of the **SIMx21** series HMI modules is available for sufficient annual volume commitments. Additionally, e2ip Technologies can offer services to further customize or complement **SIMx21** series modules with additional complimentary technologies:

- Smart Touch Surfaces
- SMART STRUCTURAL SERVICES™ (IME)
- Advanced Membrane Switches
- Capflex® Capacitive Switches
- ClickTouch™ Switches
- 5G Smart Surfaces
- Printed Sensors
- Printed Heaters
- Lumifilm®
- Project Management
- Ideation, Design
- Engineering & Manufacturing
- Certifications & Testing (ISO13485 and more)

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