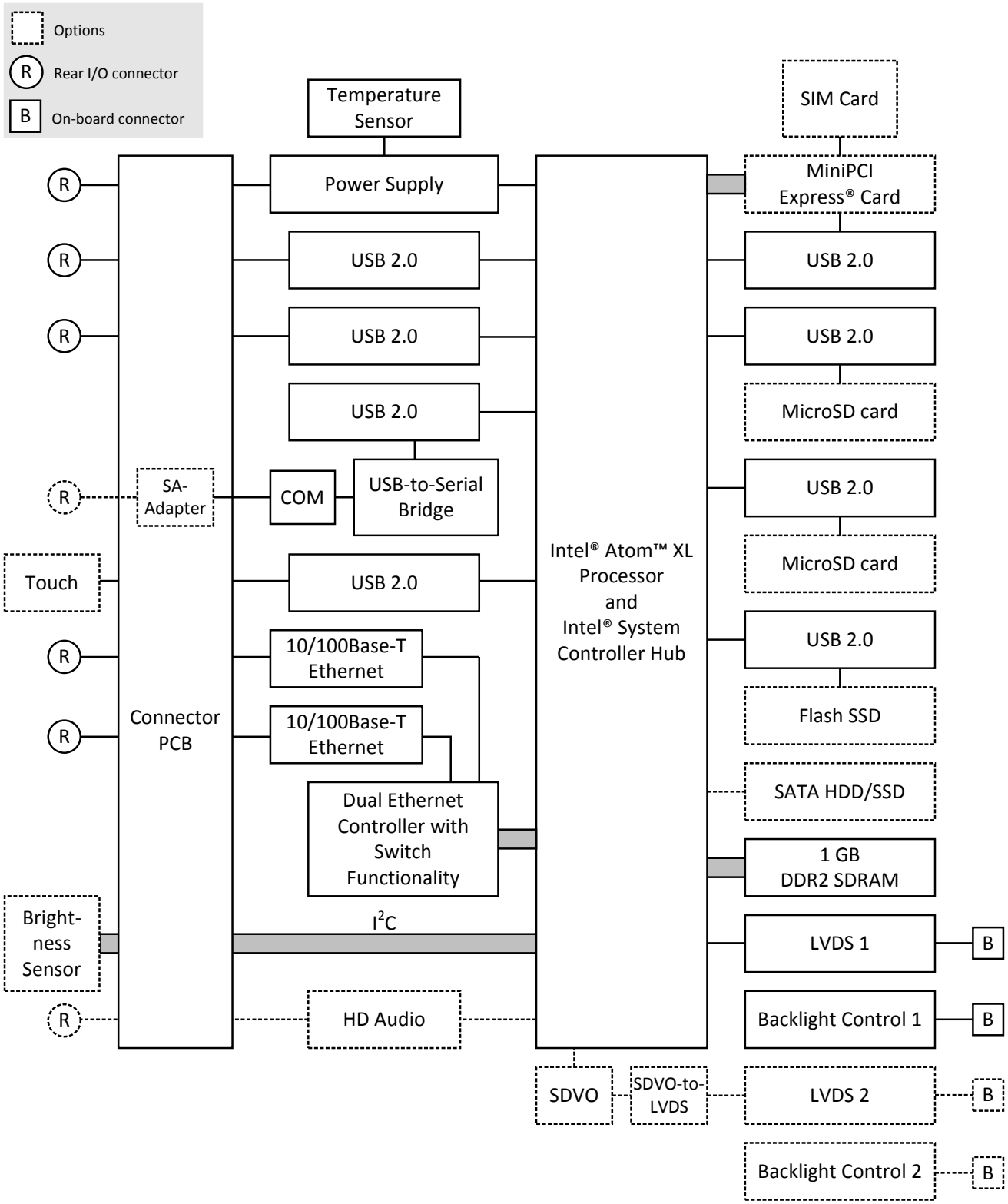
SC21 – Intel® Atom™ SBC for Intelligent Displays

- **For LCD TFT panels sized 10.4" and larger**
- **LVDS up to 1366 x 768**
- **Backlight control, prepared for touch**
- **Intel® Atom™ Z520PT, 1.33 GHz**
- **1 GB RAM, microSD™ card slot**
- **PCI Express® Mini Card and SIM card slot for WLAN, UMTS, GPS, GSM, HSDPA, EDGE, LTE**
- **2 Fast Ethernet, 2 USB 2.0**
- **SA-Adapter™ slot for serial interface**
- **Power supply 9 to 36 VDC (12 or 24 V nom.)**
- **Prepared for -40 to +85°C (screened)**
- **Optimized for conductive cooling**
- **EN 50155 compliant (with special PSU) (railways)**
- **e1 compliant (automotive)**

The SC21 is a rugged, fanless and maintenance-free single-board computer for intelligent display devices, e. g., for infotainment purposes in trains, public buses or airplanes. Its small size makes it suitable for display devices with TFT LCD panels as small as 10.4".
The SC21 is controlled by the Intel® Atom™ XL Z520PT running at 1.33 GHz and comes with 1 GB of DDR2 SDRAM and a MicroSD card slot. The standard interfaces comprise 2 Fast Ethernet (via RJ45 connectors) and 2 USB ports as well as four binary inputs (via the 10-pin power supply connector). The two Ethernet interfaces have switch functionality to provide Ethernet connection to subsequent intelligent displays. A temperature sensor is provided to monitor and control the display. With the exception of the LVDS signals and the display backlight brightness control, all I/O signals are concentrated on a customizable connector PCB, including a USB-driven connector for a touch interface.

The SC21 is equipped with an internal 9 to 36V (12VDC nom. or 24VDC nom.) wide-range power supply and able to operate in a -40 to +70°C environment (+85°C for 10 minutes) with sufficient cooling. It complies with the class Tx railway standard, an optionally available external PSU suited for railway applications can also provide EN 50155 conformity. All electronic components are soldered to withstand shock and vibration and prepared for conformal coating.
Options include other types of the Intel® Atom™ XL processor, a brightness sensor to control the display, a serial interface that can be added via an SA-Adapter™, HD audio via a D-Sub connector and an additional LVDS connection for a secondary display, with the two displays then showing individual or identical content as required by the application. A PCI Express® Mini Card slot (with a SIM card slot) in combination with an external antenna can be used to incorporate wireless functions like Wi-Fi, WIMAX, GSM/GPRS, UMTS etc.

Diagram


Options
Rear I/O connector
On-board connector
Temperature Sensor
SIM Card
Power Supply
MiniPCI Express® Card
USB 2.0
USB 2.0
USB 2.0
MicroSD card
SA-Adapter
COM
USB-to-Serial Bridge
USB 2.0
Touch
USB 2.0
MicroSD card
Intel® Atom™ XL Processor and Intel® System Controller Hub
10/100Base-T Ethernet
USB 2.0
Connector PCB
10/100Base-T Ethernet
Flash SSD
Dual Ethernet Controller with Switch Functionality
SATA HDD/SSD
1 GB DDR2 SDRAM
Bright-ness Sensor
I2C
LVDS 1
B
HD Audio
Backlight Control 1
B
SDVO
SDVO-to-LVDS
LVDS 2
B
Backlight Control 2
B

Technical Data

CPU	■ Intel® Atom™ Z520PT □ 1.33 GHz processor core frequency □ 533 MHz system bus frequency ■ Chipset □ Intel® system controller hub US15W
Memory	■ 1GB DDR2 SDRAM system memory □ Soldered □ 533 MHz memory bus frequency ■ MicroSD card slot ■ SATA interface for HDD/SSD □ Transfer rates up to 100 MB/s
Graphics	■ 1 LVDS 25-pin connector □ For direct connection of an LVDS display with a resolution of up to 1366x768 (secondary interface with up to 1900x1200) ■ 1 LVDS backlight 10-pin connector □ Brightness control via software
PCI Express® Mini Card slot	■ For functions like Wi-Fi, WIMAX, GSM/GPRS, UMTS ■ SIM card slot ■ PCI Express® and USB interface ■ Accessible via, e.g., a reverse SMA connector
I/O	■ USB □ Two USB 2.0 host ports □ Accessible via Series A connectors □ UHCI implementation □ Data rates up to 480 Mbit/s ■ Ethernet □ Two 10/100Base-T Ethernet channels □ Accessible via RJ45 connectors □ Switch functionality ■ Touch interface connector □ USB-driven 4-pin connector □ Touch technology depending on touch sensor, touch controller and software ■ 4 binary inputs via 10-pin power connector □ Universal inputs, e.g., for geographical addressing
Intelligent Power Supply with Controller	■ Voltage supervision ■ Temperature supervision via LM50 sensor ■ Backlight control (turns off display at configurable temperatures) ■ Buffer functionality for RTC and BIOS CMOS ■ Reset of CPU board possible ■ Wake on time ■ Watchdog ■ Accessible via SMBus
Electrical Specifications	■ Supply voltage: □ 12 VDC nom. or 24 VDC nom. (9 to 36 V) ■ Power consumption: □ Ca. 8 W (without display)
Mechanical Specifications	■ Dimensions: 220 mm x 150 mm x 35 mm ■ Weight: approx. 240 g (320 g with heat sink)

Technical Data

Environmental Specifications	■ Temperature range (operation): □ -40°C to 70°C, with up to 85°C for 10 minutes according to class Tx (EN 50155) depending on cooling concept (sufficient cooling required) □ Prepared for conductive cooling (via connection from mounting frame to metal display housing) □ Fanless operation ■ Temperature range (storage): -40..+85°C ■ Relative humidity (operation): max. 95% non-condensing ■ Relative humidity (storage): max. 95% non-condensing ■ Altitude: -300 m to + 3,000 m ■ Shock: according to EN 50155 (10.2.11) ■ Vibration: according to EN 50155 (10.2.11)
MTBF	■ 213,000 h @ 40°C according to IEC/TR 62380 (RDF 2000)
EMC	■ Conforming to EN 50155, EN 50121-3-2/EN 61000-4-5 ■ Conforming to e1 requirements of the German Federal Motor Transport Authority
Software Support	■ Windows® XP Embedded ■ Linux ■ For more information on supported operating system versions and drivers see Downloads.

Configuration & Options

Standard Configurations

Article No.	CPU	Memory	Graphics	I/O	Temperature
08SC21-00	Z520PT, 1.33 GHz	1 GB RAM	1 LVDS	2 Fast Ethernet, 2 USB 2.0	-40 to +85°C screened

Options

CPU	■ Intel® Atom™ Z530P, 1.6 GHz, 533 MHz FSB ■ Intel® Atom™ Z510P, 1.1 GHz, 400 MHz FSB ■ Intel® Atom™ Z520PT, 1.33 GHz, 533 MHz FSB ■ Intel® Atom™ Z510PT, 1.1 GHz, 400 MHz FSB
Graphics	■ 8-bit LVDS for secondary display via SDVO-to-LVDS converter □ Resolution: Up to 1920x1200 □ Backlight control via brightness sensor
Memory	■ Second MicroSD card slot ■ USB Flash SSD □ Up to 8 GB
PCI Express® Mini Card slot	■ Slot compatible with half-size modules
I/O	■ Ethernet □ 2 Fast Ethernet on M12 connectors ■ HD audio □ HD audio codec □ Audio stereo in □ Audio stereo out □ SPDIF out □ All available via 9-pin D-Sub connector ■ Serial interface □ 1 serial interface realized via SA-Adapter™, e.g., RS232 or RS422, isolated or not, IBIS ■ Custom connector available instead of standard I/O interface board
Electrical Specifications	■ External PSU suited for railway applications

As the product concept is very flexible, there are many other configuration possibilities. Please contact our sales team if you do not find your required function in the options.Please note that some of these options may only be available for large volumes.

Ordering Information

Standard SC21 Models	**08SC21-00**	Intel® Atom™ Z520PT 1.3GHz, 1GB DRAM, 2x Fast Ethernet, 2x USB, 1x LVDS, 1x MicroSD card slot, 24V PSU (non isolated), prepared for -40 to +85°C screened via conductive cooling
Related Hardware	**15PX01-00**	GLONASS & GPS PCI Express® MiniCard (full size), 3-axis Gyro sensor, -40..+85°C with qualified components
Memory	**0751-0046**	MicroSD card, 2 GB, -40..+85°C
	0751-0052	MicroSD card, 4 GB, -40..+85°C
SA-Adapters™	You can find a more detailed overview of possible carrier board/SA-Adapter™ combinations along with software support in our option matrix (PDF).	
	08SA01-06	RS232, not optically isolated, -40..+85°C screened
	08SA02-07	RS422/485, full duplex, optically isolated, -40..+85°C screened
	08SA03-01	1 RS232, optically isolated, -40..+85°C screened
	08SA22-00	IBIS master SA-Adapter™, -40..+85°C screened
	08SA22-01	IBIS slave SA-Adapter™, -40..+85°C screened
	08SA25-00	GPS receiver, isolated, -40..+85°C screened
	08SA26-00	RS422 with 15-pin D-Sub connector, with handshake signals (RTS, CTS, DCD, DTR), coated, -40..+85°C screened
Miscellaneous Accessories	**0712-0019**	Standard ATX PSU, 350 W, 0..+40°C
Software: Linux	This product is designed to work under Linux. See below for potentially available separate software packages from MEN.	
	For a Linux driver package supporting the Micrel KSZ8842-PMQLI Ethernet controller used in the SC21 and the DC2, please refer to www.micrel.com/index.php/en/products/lan-solutions/controllers/article/15-ksz8842-pmql.html. We highly recommend a kernel newer than 2.6.32.	
	13XC02-06	MDIS5™ low level driver sources (MEN) for XC2 PSU Control via SMBus (also used in DC1, DC2, SC21)
	13XM01-06	MDIS5™ low-level driver sources (MEN) for XM1, XM1L, MM1, MM2, XM2, F11S, F19P, F21P, F22P, G20, G22, SC21, SC27 and DC2 board controller
Software: Windows®	This product is designed to work under Windows®. See below for potentially available separate software packages from MEN.	
	10F014-78	Windows® XP Embedded BSP (MEN) for F11S, F14, F15, F17, F18, F19P, F21P, G20, XM1, XM1L, XM2, MM1, MM2, SC21, SC24, DC1, DC2, RC1, BC50I, BC50M and BL50W
	10Y000-78	Windows® Embedded Standard 7 BSP for F11S, F19P, F21P, F22P, G20, G22, XM1L, XM2, MM1, MM2, SC21, SC24, SC27, BC50M, BC50I, BL50W, BL50S, F206, F210, F215, F216, G215, P506, P507 and P511
	For a Windows® driver package supporting the Micrel KSZ8842-PMQLI Ethernet controller used in the SC21 and the DC2, please refer to www.micrel.com/index.php/en/products/lan-solutions/controllers/article/15-ksz8842-pmql.html.	
	13XM01-77	Windows® Installset (MEN) for XM1, XM1L, DC1, DC2 and SC21. (Includes all free drivers developed by MEN for the supported hardware.)

For operating systems not mentioned here contact MEN sales.

Ordering Information

Documentation	Compare Chart Standard and Custom Panel PCs » Download	
	20SC21-00	SC21 User Manual

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