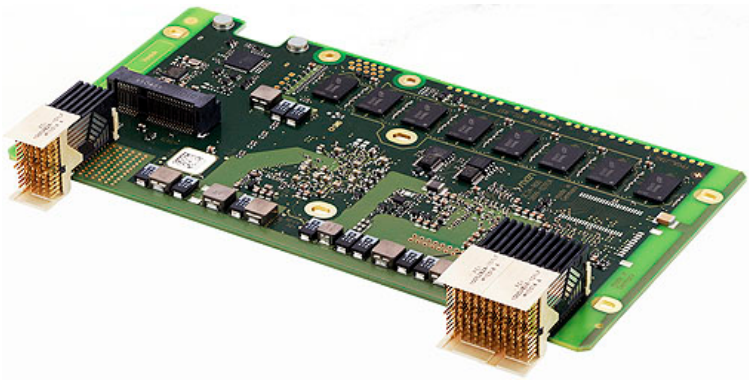
SC24 – AMD G-Series SBC for Multi-Display Control

- **For LCD TFT panels from 12" to 60"**
- **AMD T48N, 1.4 GHz**
- **2x2 DisplayPort® interfaces**
- **Maximum resolution 2560x1600**
- **Up to 4 GB DDR3 RAM**
- **2 Gigabit Ethernet**
- **SD card and mSATA slots**
- **Prepared for -40 to +85°C operating temperature (screened)**
- **Optimized for conductive cooling**



The SC24 is a maintenance-free single-board computer designed to serve as the heart of MEN's box and display computer systems for use in commercial vehicles, mobile machines, railway applications, avionics and industrial automation.

It is powered by an AMD Embedded G-Series APU (Accelerated Processing Unit), the T48N, running at 1.4 GHz. The G-Series combines low-power CPUs and advanced GPUs, in this case an AMD Radeon™ HD 6310, into a single embedded device. The use of the Embedded G-Series makes for high scalability in CPU (single/dual core) and graphics performance (various Radeon™ GPUs or none at all).

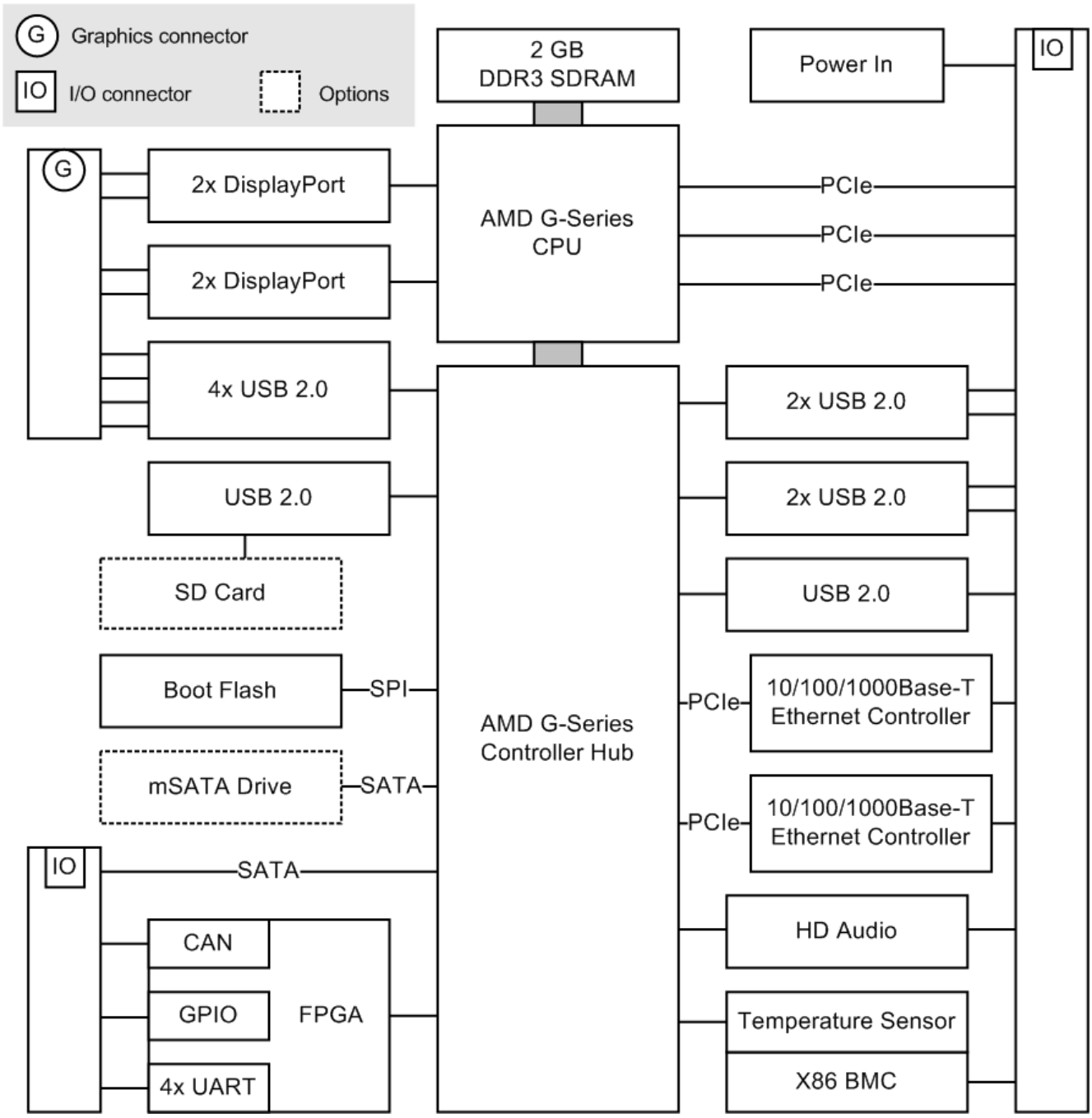
The system is equipped with 2 GB of DDR3 SDRAM and offers SD card and mSATA slots. It is designed for fanless operation at temperatures from -40 to +85°C. For this it relies on conduction cooling, as realized in the BC50M Box PC, for example, where the entire housing serves as a heat sink for the internal electronics.

It supports up to two pairs of DisplayPort® interfaces (two independent images, each sent to one or two display panels) with a maximum resolution of 2560x1600 each. Other I/O includes up to 9 USB 2.0, 2 Gigabit Ethernet channels, 3 PCI Express®, up to 5 serial interfaces (4 UARTs also configurable as IBIS or GPS and 1 CAN), HD audio, 1 SATA and various GPIO, e.g., for status LEDs.

The SC24 is not meant to be used as a stand-alone board, as all I/O is collected on two pairs of AirMax VS® connectors - one for all graphics interfaces and one for all remaining I/O, allowing for flexible configuration on separate boards. By using the necessary interface boards like an AE51 or similar customer-specific solutions, the signals can be made available on standard connectors and various types of wide-range PSUs can be added. An I/O board can also offer the option of additional mass storage via the SC24's SATA interface and connections to other periphery, e.g., PCI Express® Mini cards via the PCIe® interface. Used in combination with the AE51 interface board and its integrated PSU, the unit is compliant with EN 50155 and prepared for e1 certification.

The combination of the various CPU/GPU options with easily customized interface boards makes for an extremely flexible system design that can quickly be tailored to a vast number of applications.

Diagram


G Graphics connector
IO I/O connector
Options
2 GB
DDR3 SDRAM
Power In
IO
G
2x DisplayPort
2x DisplayPort
4x USB 2.0
USB 2.0
SD Card
Boot Flash
SPI
mSATA Drive
SATA
IO
SATA
CAN
GPIO
4x UART
FPGA
AMD G-Series
CPU
AMD G-Series
Controller Hub
PCIe
PCIe
PCIe
2x USB 2.0
2x USB 2.0
USB 2.0
PCIe
10/100/1000Base-T
Ethernet Controller
PCIe
10/100/1000Base-T
Ethernet Controller
HD Audio
Temperature Sensor
X86 BMC
IO

Technical Data

CPU	■ AMD Embedded G-Series T48N □ 1.4 GHz processor core frequency □ Accelerated Processing Unit (APU), also includes GPU (see Graphics)
Controller Hub	■ AMD A55E
Memory	■ 64 KB L1 and 512 KB L2 cache ■ 2 GB DDR3 SDRAM system memory □ Soldered □ 1333 MT/s (667 MHz)
Mass Storage	■ One SD card slot □ Via USB ■ One mSATA slot □ Transfer rate up to 3 Gbit/s
Graphics	■ AMD Radeon™ HD 6310 □ Dual independent display support □ 2x2 DisplayPort® 1.1a interfaces □ Maximum resolution: 2560x1600 □ Embedded in T48N APU ■ 3D Graphics Acceleration □ Full DirectX® 11 support, including full speed 32-bit floating point per component operations □ Shader Model 5 □ OpenCL™ 1.1 support □ OpenGL® 4.0 support ■ Motion Video Acceleration □ Dedicated hardware (UVD 3) for H.264, VC-1 and MPEG2 decoding □ HD HQV and SD HQV support: noise removal, detail enhancement, color enhancement, cadence detection, sharpness, and advanced de-interlacing □ Super up-conversion for SD to HD resolutions
Graphics interfaces via two 72-pin AirMax VS® graphics connectors	■ 2x2 DisplayPort® □ DisplayPort® A and B with AUX channel and hot plug detection □ DisplayPort® C and D are duplicates of A and B ■ 4 USB 2.0
Other I/O via two 72-pin AirMax VS® I/O connectors	■ 5 USB 2.0 ■ 2 Ethernet 10/100/1000Base-T channels ■ 1 SATA interface for HDD/SSD □ SATA Revision 3.x support □ Transfer rates up to 600 MB/s (6 Gbit/s) ■ 4 UART or IBIS, GPS ■ 1 CAN bus ■ 3 PCI Express® x1 □ Three x1 links □ PCIe® 2.x support □ Data rate 500 MB/s in each direction (5 Gbit/s per lane) ■ Various GPIO (e.g., for status LEDs) ■ HD audio □ HD audio codec □ Audio stereo in □ Audio stereo out □ SPDIF out
Real-Time Clock	■ Buffered by power source on connected interface board
Electrical Specifications	■ Supply voltage: 12 VDC nom. ±10% ■ Power consumption: Up to 25 W

Technical Data

Mechanical Specifications	■ Dimensions: approx. 170 mm x 90 mm x 30 mm ■ Weight: approx. 200 g
Environmental Specifications	■ Temperature range (operation): □ -40 to +85°C (screened) depending on cooling concept □ Sufficient conduction cooling required ■ 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: 50 m/s², 30 ms ■ Vibration (function): 1 m/s², 5 Hz - 150 Hz ■ Vibration (lifetime): 7.9 m/s², 5 Hz - 150 Hz ■ Conformal coating on request
MTBF	■ tbd. h @ 40°C according to IEC/TR 62380 (RDF 2000)
Safety	■ PCB manufactured with a flammability rating of 94V-0 by UL recognized manufacturers
EMC	■ Conforming to EN 55022 (radio disturbance), IEC 61000-4-2 (ESD) and IEC 61000-4-4 (burst) ■ Prepared for certification according to e1 requirements of the German Federal Motor Transport Authority when used in combination with an AE51 I/O board
BIOS	■ InsydeH2O™ UEFI Framework
Software Support	■ Windows® 7 ■ Windows® Embedded Standard 7 ■ Windows® XP Embedded (on request) ■ Linux ■ For more information on supported operating system versions and drivers see Downloads.

Configuration & Options

Standard Configurations

Article No.	APU	Graphics	Memory	Video Out
08SC24-00	AMD T52R, 1.5 GHz Single Core (18W)	AMD Radeon HD 6310	1 GB DDR3-1333, 64KB L1 cache, 512kB L2 cache	2x2 DisplayPort

Options

APU	■ AMD T56N, 1.65 GHz Dual Core (L1 cache 64KB, L2 cache 512kB x2, 18W), DDR3-1333, AMD Radeon™ HD 6320 ■ AMD T52R, 1.5 GHz Single Core (L1 cache 64KB, L2 cache 512kB, 18W), DDR3-1333, AMD Radeon™ HD 6310 ■ AMD T48N, 1.4 GHz Dual Core (L1 cache 64KB, L2 cache 512kB x2, 18W), DDR3-1066, AMD Radeon™ HD 6310 ■ AMD T40N, 1.0 GHz Dual Core (L1 cache 64KB, L2 cache 512kB x2, 9W), LVDDR3-1066, AMD Radeon™ HD 6290 ■ AMD T44R, 1.2 GHz Single Core (L1 cache 64KB, L2 cache 512kB, 9W), LVDDR3-1066, AMD Radeon™ HD 6250 ■ AMD T40E, 1.0 GHz Dual Core (L1 cache 64KB, L2 cache 512kB x2, 6.4W), LVDDR3-1066, AMD Radeon™ HD 6250 ■ AMD T40R, 1.0 GHz Single Core (L1 cache 64KB, L2 cache 512kB, 5.5W), LVDDR3-1066, AMD Radeon™ HD 6250 ■ AMD T16R, 615 MHz Single Core (L1 cache 64KB, L2 cache 512kB, 4.5W), LVDDR3-1066, AMD Radeon™ HD 6250
Memory	■ Up to 4 GB DDR3 SDRAM system memory
Graphics	■ Maximum resolution depending on GPU □ 2560x1600 (all DisplayPort® interfaces) with Radeon™ HD 6310 and 6320 □ 1920x1200 (all DisplayPort® interfaces) with Radeon™ HD 6250 and 6290
Software Support	■ Windows® XP Embedded (on request)

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 SC24 Models	**08SC24-00**	Multi-display SBC with AMD T48N, 1.4 GHz, 2 GB RAM, SD card slot, mSATA slot, 2x2 DisplayPorts, 12V PSU (non isolated), prepared for -40 to +85°C screened via conductive cooling
Related Hardware	**08AE51-00**	Graphics & I/O interface board for display and box computers; 2x DisplayPort®, 2x Gb Ethernet, 1x USB, 2x PCI Express® Mini card slot, 2x SIM card slot, 2x SA-Adapter™ slot, PSU 24 VDC, -40 to +85°C screened
Memory	**0751-0047**	SD card, 4GB, -40..+85°C
	0751-0051	SSD mSATA, 8 GB, -40..+85°C
	0754-0007	SSD SATA 256 GB, 2.5" MLC, 0..+70°C
Miscellaneous Accessories	**08AE84-00**	Carrier for 2.5" HDD/SSD SATA disk, -40°..+85°C with qualified components
Software: Linux	This product is designed to work under Linux. See below for potentially available separate software packages from MEN.	
	13SC24-90	Linux I2C controller driver (MEN) for SC24, AE51, BC50M, BC50I and BL50W
	13Y004-06	MDIS5™ low-level driver sources (MEN) for generic SMBus driver for F14, F15, F17, F18, F19P, F21P, F22P, G20, G22, D9, D601, F600 and F601, A19, A20, F217, SC24, BC50M, BC50I and BL50W
	13Z010-06	MDIS4™/2004 / MDIS5™ low-level driver sources (MEN) for 16Z076_QSPI
	13Z015-06	MDIS5™ low-level driver sources (MEN) for 16Z029_CAN (MSCAN/Layer2)
	13Z016-06	MDIS5™ driver (MEN) for 16Z029_CAN (CANopen master)
	13Z017-06	MDIS5™ low-level driver sources (MEN) for 16Z034_GPIO, 16Z037_GPIO and 16Z127_GPIO

Ordering Information

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
13SC24-77	Windows® Installset (MEN) for SC24, BC50M, BC50I and BL50W (Includes all free drivers developed by MEN for the supported hardware.)
13T010-70	Windows® 32-bit network driver (Intel®) for XM1, XM1L, XM2, MM2, F11S, F18, F18E, F19P, F21P, F22P, G20, G22, GM1, GM2, G211, G211F, SC24, BC50I, BC50M and BL50W
13T020-70	Windows® 64-bit network driver (Intel®) for F18, F18E, F19P, F21P, F22P, G20, G22, GM1, GM2, G211, G211F, XM2, SC24, BC50I, BC50M and BL50W
13T025-70	Windows® XP GPU and chipset driver (AMD) for BC50M, BC50I, BL50W and SC24
13T026-70	Windows® Vista™ / Windows® 7 GPU and chipset driver (AMD) for BC50M, BC50I, BL50W, SC24 and G214
13Z010-70	MDIS5™ Windows® driver (MEN) for 16Z076_QSPI devices
13Z015-70	MDIS4™/2004 / MDIS5™ Windows® driver (MEN) for 16Z029_CAN (MSCAN/Layer2)
13Z016-70	MDIS5™ Windows® driver (MEN) for 16Z029_CAN (CANopen master)
13Z017-70	MDIS4™/2004 / MDIS5™ Windows® driver (MEN) for 16Z034_GPIO devices

For operating systems not mentioned here contact MEN sales.

Documentation

Compare Chart Standard and Custom Panel PCs » Download

20SC24-ER	SC24 Errata
20SC24-00	SC24 User Manual
21APPN015	Application Note: Using Real-Time Operating Systems on MEN CPUs with InsydeH2O™ UEFI BIOS

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