

BC50M – Box PC for In-Vehicle Applications

- **AMD Embedded G-Series APU**
- **2 DisplayPorts, up to 2560x1600 each**
- **2 Gigabit Ethernet, 1 USB 2.0**
- **WLAN, GSM (2G), UMTS (3G), LTE (4G), GPS or GLONASS via 2 PCI Express® Mini Card slots**
- **2 Slots for IBIS, GPS, RS232, RS485, RS422**
- **24 VDC and 36 VDC nom. (10 to 50.4 V) class S2 power supply, incl. ignition**
- **-40 to +85°C operating temperature**
- **Fanless and maintenance-free design**
- **Compliant to EN 50155 (railways)**
- **Compliant to ISO 7637-2 (E-mark for automotive)**



The BC50M (formerly called BC1) is a maintenance-free box computer that has been designed for independent use or as display computer electronics for use in vehicles, e.g. in trains, commercial vehicles, mobile machines or airplanes.

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 BC50M is equipped with 2 GB of DDR3 SDRAM and offers SD card and mSATA slots. A SATA hard-disk/solid-state drive can be installed within the housing as an option. The system is designed for fanless operation at temperatures from -40 to +70°C (+85°C for up to 10 minutes), its special aluminum housing with cooling fins serves as a heat sink for the internal electronics and in this way provides conduction cooling.

The BC50M supports up to two DisplayPort® interfaces with a maximum resolution of 2560x1600 each. The DisplayPort® interfaces and all other I/O are available at

the unit's front panel on standard connectors like USB, 9-pin D-Sub (HD audio and optional serial I/O), 8-pin M12 (Gigabit Ethernet) and DisplayPort®. On the inside, the system offers two PCI Express® Mini card slots with two SIM card slots. By default, one is used for each of the two PCI Express® Mini cards, but the first PCI Express® Mini card can also switch between the two SIM cards as an option. The necessary antenna connectors can be made available at the front panel.

The BC50M comes with an integrated 30W wide-range DC/DC converter and is compliant with EN 50155 (nominal input voltages 24 and 36 V) and is compliant with ISO 7637-2 (E-mark for automotive) (nominal input voltages 12 and 24 V). The power can be switched on and off using an ignition signal on the power connector, and a shutdown-delay time after switching off the power can be adjusted by software.

The combination of the various CPU/GPU options with the available selection of external interfaces (realized via separate graphics and I/O interface boards within the system) makes for an extremely flexible system design that can quickly be tailored to a vast number of applications.



Diagram

Technical Data

CPU	<ul style="list-style-type: none">■ AMD Embedded G-Series T48N<ul style="list-style-type: none">□ Dual-Core□ 1.4 GHz processor core frequency□ Accelerated Processing Unit (APU), also includes GPU (see Graphics)
Controller Hub	<ul style="list-style-type: none">■ AMD A55E
Memory	<ul style="list-style-type: none">■ 64 KB L1 and 512 KB L2 cache■ 2 GB DDR3 SDRAM system memory<ul style="list-style-type: none">□ Soldered□ 1066 MT/s
Mass Storage	<ul style="list-style-type: none">■ One SD card slot<ul style="list-style-type: none">□ Via USB■ One mSATA slot<ul style="list-style-type: none">□ Transfer rate up to 3 Gbit/s■ Serial ATA (SATA)<ul style="list-style-type: none">□ One port for hard-disk/solid-state drive mounted within the unit's housing□ SATA Revision 3.x support□ Transfer rates up to 600 MB/s (6 Gbit/s)
Graphics	<ul style="list-style-type: none">■ AMD Radeon™ HD 6310<ul style="list-style-type: none">□ Dual independent display support□ Dual DisplayPort®□ Maximum resolution: 2560x1600□ Embedded in T48N APU■ 3D Graphics Acceleration<ul style="list-style-type: none">□ 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<ul style="list-style-type: none">□ 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
Front I/O	<ul style="list-style-type: none">■ 2 DisplayPort® 1.1a interfaces<ul style="list-style-type: none">□ AUX channels and hot plug detection■ 1 HD audio<ul style="list-style-type: none">□ HD audio codec□ Audio stereo in□ Audio stereo out□ SPDIF out□ All available via 9-pin D-Sub connector■ 2 Gigabit Ethernet<ul style="list-style-type: none">□ Via M12 connectors■ 1 USB 2.0<ul style="list-style-type: none">□ Via Series A connector■ 2 SA-Adapter slots for serial I/O<ul style="list-style-type: none">□ 1 UART or IBIS, GPS, SGPIO□ 1 UART or CAN bus■ 8 status LEDs<ul style="list-style-type: none">□ 4 for Ethernet link and activity status□ 2 for general board status□ 2 user LEDs

Technical Data

2 PCI Express® Mini Card slots	<ul style="list-style-type: none"> ■ For functions such as <ul style="list-style-type: none"> □ Mobile service standards: GSM (2G), UMTS (3G), LTE (4G) and derivatives □ Wireless communication: WLAN / WiFi IEEE 802.11 and derivatives □ Positioning: GPS, GLONASS, GALILEO ■ 2 SIM card slots ■ PCI Express® and USB interface
Real-Time Clock	<ul style="list-style-type: none"> ■ Buffered by Gold Cap for up to 12 h <ul style="list-style-type: none"> □ 72 h as an option
Electrical Specifications	<ul style="list-style-type: none"> ■ Isolation voltage 1,500 VDC <ul style="list-style-type: none"> □ Ethernet port 1, Ethernet port 2, power input, system ground (USB, Display Port, Audio...) ■ Supply voltage: <ul style="list-style-type: none"> □ 24 VDC and 36 VDC (10 to 50.4 V input voltage range) □ EN 50155 power interruption class S2 ■ Power consumption: up to 30 W
Mechanical Specifications	<ul style="list-style-type: none"> ■ Dimensions: approx. 250 mm x 220 mm x 44.1 mm ■ Weight: 1.8 kg ■ Front protected according to IP20
Environmental Specifications	<ul style="list-style-type: none"> ■ Temperature range (operation): <ul style="list-style-type: none"> □ Depends on system configuration (CPU, PCIeMiniCards, Ethernet, USB, ...) □ Maximum: +70°C (+85°C for 10 minutes) according to EN50155 Tx □ Minimum: -40°C (all processors) □ Conditions: typical power dissipation: 14.4 W (with 18W CPU T48N) with Windows® 7 operating system and 1 Gb Ethernet connection □ 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: 50 m/s², 30 ms ■ Vibration (function): 1 m/s², 5 Hz - 150 Hz ■ Vibration (lifetime): 7.9 m/s², 5 Hz - 150 Hz ■ Internal components comformally coated
MTBF	<ul style="list-style-type: none"> ■ 262,804 h @ 40°C according to IEC/TR 62380 (RDF 2000)
Safety	<ul style="list-style-type: none"> ■ PCB manufactured with a flammability rating of 94V-0 by UL recognized manufacturers
EMC	<ul style="list-style-type: none"> ■ Conforming to EN 55022 (radio disturbance), IEC 61000-4-2 (ESD) and IEC 61000-4-4 (burst) ■ Prepared for certification according to ISO 7637-2 (E-mark) requirements
BIOS	<ul style="list-style-type: none"> ■ InsydeH2O™ UEFI Framework
Software Support	<ul style="list-style-type: none"> ■ Windows® 7 ■ Windows® Embedded Standard 7 ■ Windows® XP Embedded ■ Linux ■ For more information on supported operating system versions and drivers see Downloads.

Configuration & Options

Standard Configurations

Article No.	APU	Graphics	Memory	Input Voltage	HD Audio	Antenna Connectors	SATA HDD/SSD
09BC50M00	AMD T48N, 1.4 GHz Dual Core (18W)	AMD Radeon HD 6310	2 GB DDR3-1066, 64 KB L1 cache, 512 KB L2 cache	24 VDC nom.	Yes	No	No

Options

APU	<ul style="list-style-type: none"> ■ AMD T56N, 1.65 GHz Dual Core, 18W, AMD Radeon™ HD 6320 ■ AMD T56E, 1.65 GHz Dual Core, 18W, AMD Radeon™ HD 6250 ■ AMD T48N, 1.4 GHz Dual Core, 18W, AMD Radeon™ HD 6310 ■ AMD T48E, 1.4 GHz Dual Core, 18W, AMD Radeon™ HD 6250 ■ AMD T40N, 1.0 GHz Dual Core, 9W, AMD Radeon™ HD 6290 ■ AMD T40E, 1.0 GHz Dual Core, 6.4W, AMD Radeon™ HD 6250 ■ AMD T52R, 1.5 GHz Single Core, 18W, AMD Radeon™ HD 6310 ■ AMD T44R, 1.2 GHz Single Core, 9W, AMD Radeon™ HD 6250 ■ AMD T40R, 1.0 GHz Single Core, 5.5W, AMD Radeon™ HD 6250 ■ AMD T16R, 615 MHz Single Core, 4.5W, AMD Radeon™ HD 6250 ■ AMD T48L, 1.4 GHz Dual Core, 18W ■ AMD T30L, 1.4 GHz Single Core, 18W ■ AMD T24L, 1000 MHz Single Core, 5W
Memory	<ul style="list-style-type: none"> ■ Up to 4 GB DDR3 SDRAM system memory ■ SATA hard-disk/solid state drive (mounted within housing)
Graphics	<ul style="list-style-type: none"> ■ Maximum resolution depending on GPU <ul style="list-style-type: none"> □ 2560x1600 (all DisplayPort® interfaces) with Radeon™ HD 6310 and 6320 □ 1920x1200 (all DisplayPort® interfaces) with Radeon™ HD 6250 and 6290
I/O	<ul style="list-style-type: none"> ■ Antenna connectors <ul style="list-style-type: none"> □ For functions like Wi-Fi, WIMAX, GSM/GPRS, UMTS, LTE in combination with PCI Express® Mini Card(s) □ Reverse SMA connector ■ Two SA-Adapter slots for RS232, RS422/485, IBIS, binary I/O or CAN bus
Miscellaneous	<ul style="list-style-type: none"> ■ Real-time clock <ul style="list-style-type: none"> □ 72 h buffer time ■ 3-axis accelerometer and 3-axis magnetometer
Electrical Specifications	<ul style="list-style-type: none"> ■ Input voltages of 48V, 72V and 110V can be implemented on request
Mechanical Specifications	<ul style="list-style-type: none"> ■ Sides protected according to IP40
Environmental Specifications	<ul style="list-style-type: none"> ■ Temperature range (operation): <ul style="list-style-type: none"> □ -40°C to 85°C (screened) with wider housing with additional cooling fins

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 BC50M Models	09BC50M00	Box computer with dual graphics connection, 24 VDC PSU, AMD T48N, 1.4 GHz, 2 GB RAM, SD card slot, mSATA slot, 2x DisplayPort®, 2x Gb Ethernet, 1x USB, 2x SA-Adapter slot (UARTs, fieldbuses), 2x PCI Express® Mini card slot, 2x SIM card slot, -40..+70(+85)°C screened, conformal coating, IP40, EN 50155, ISO 7637-2 (E-mark)
Related Hardware	08AE63-00	DisplayPort® to LVDS converter, temperature sensor, ambient light, touch input, key control, input voltage 12V..24V, -40°..+85°C screened
	15PX01-00	GLONASS & GPS PCI Express® MiniCard (full size), 3-axis Gyro sensor, -40..+85°C with qualified components
	15PX04-00	Audio interface for mobile wireless cards, with SIM card holder, -40..+85°C screened
Memory	0751-0047	SD card, 4GB, -40..+85°C
	0751-0051	SSD mSATA, 8 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
	08SA08-01	CAN ISO high-speed, optically isolated, -40..+85°C screened
	08SA15-00	8 digital I/O channels, -40..+85°C with qualified components, no RoHS
	08SA22-00	IBIS master SA-Adapter, -40..+85°C screened
	08SA22-01	IBIS slave SA-Adapter, -40..+85°C screened
Miscellaneous Accessories	05BC00-00	Starter Kit for BoxPC: 1x AC/DC power supply, 1x DisplayPort® to DVI adapter (active), 2x M12 to RJ45 Gbit Ethernet cable, 4x HF cable with U.FL plug to RP-SMA plug
	05BC01-00	19" insertion frame for Box PCs including 2 heat sinks More info
	0780-0005	DisplayPort® to DVI-D adapter, 20 cm
	0780-0006	Active DisplayPort® (DP) to single link DVI-D adapter, 20cm, max. resolution 1920x1200, AMD / ATI Eyefinity technology
	0781-0002	HF antenna cable with U.FL connector to RP-SMA connector, 200 mm
	0799-0003	UMTS PCIe® Mini Card GTM661W, half-size card with adapter for full-size slot, -10° C..+55°C operating temperature, -40°C..+85°C storage temperature Note: when using wireless modules the R&TTE Guide of the EU has to be observed. See the R&TTE website For the module's driver see Option's website
	0799-0004	WLAN PCIe® MiniCard (Intel® Centrino Advanced-N 6205), 802.11n 2x2 MIMO, 2.4 GHz and 5 GHz, half-size card with adapter for full-size slot, operating temperature 0°C..+80° C, storage temperature -40°..+85°C Note: when using wireless modules the R&TTE Guide of the EU has to be observed. See the R&TTE website For the module's driver see the Intel® website

Ordering Information

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
13SC24-91	Linux tool (MEN) for UART mode setting for SC24, BC50M, BC50I and BL50W
13T026-90	Linux GPU and chipset driver (AMD) for BC50M, BC50I, BL50W, SC24 and G214
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

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, F75P, G20, G22, XM1L, XM2, MM1, MM2, SC21, SC24, SC27, BC50M, BC50I, BL50W, BL50S, DC13, 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
13T037-70	HD Audio Driver (VIA) for SC24, BC50M and BL50W
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](#).

Ordering Information

Documentation	Compare Chart Standard and Custom Box PCs » Download
20BC50M00	BC50M User Manual
20BC50MER	BC50M Errata
21APPN015	Application Note: Using Real-Time Operating Systems on MEN CPUs with InsydeH2O™ UEFI BIOS

Contact Information

Germany

MEN Mikro Elektronik GmbH
Neuwieder Straße 3-7
90411 Nuremberg
Phone +49-911-99 33 5-0
Fax +49-911-99 33 5-901

info@men.de
www.men.de

France

MEN Mikro Elektronik SAS
18, rue René Cassin
ZA de la Châtelaine
74240 Gaillard
Phone +33 (0) 450-955-312
Fax +33 (0) 450-955-211

info@men-france.fr
www.men-france.fr

USA

MEN Micro Inc.
860 Penllyn Blue Bell Pike
Blue Bell, PA 19422
Phone (215) 542-9575
Fax (215) 542-9577

sales@menmicro.com
www.menmicro.com

The date of issue stated in this data sheet refers to the Technical Data only. Changes in ordering information given herein do not affect the date of issue. All brand or product names are trademarks or registered trademarks of their respective holders.

MEN is not responsible for the results of any actions taken on the basis of information in the publication, nor for any error in or omission from the publication.

MEN expressly disclaims all and any liability and responsibility to any person, whether a reader of the publication or not, in respect of anything, and of the consequences of anything, done or omitted to be done by any such person in reliance, whether wholly or partially, on the whole or any part of the contents of the publication.

The correct function of MEN products in mission-critical and life-critical applications is limited to the environmental specification given for each product in the technical user manual. The correct function of MEN products under extended environmental conditions is limited to the individual requirement specification and subsequent validation documents for each product for the applicable use case and has to be agreed upon in writing by MEN and the customer. Should the customer purchase or use MEN products for any unintended or unauthorized application, the customer shall indemnify and hold MEN and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim or personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that MEN was negligent regarding the design or manufacture of the part.

In no case is MEN liable for the correct function of the technical installation where MEN products are a part of.

Copyright © 2014 MEN Mikro Elektronik GmbH. All rights reserved.