

# BC50M

## Rugged Box PC for Transportation with AMD G-Series

### Railway & Automotive Embedded Computer for Communication & Control

- » **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. class S2 power supply, incl. ignition**
- » **-40 to +85°C operating temperature, fanless**
- » **Conformal coating of internal components**
- » **Compliant to EN 50155 (railways)**
- » **Compliant to ISO 7637-2 (E-mark for automotive)**



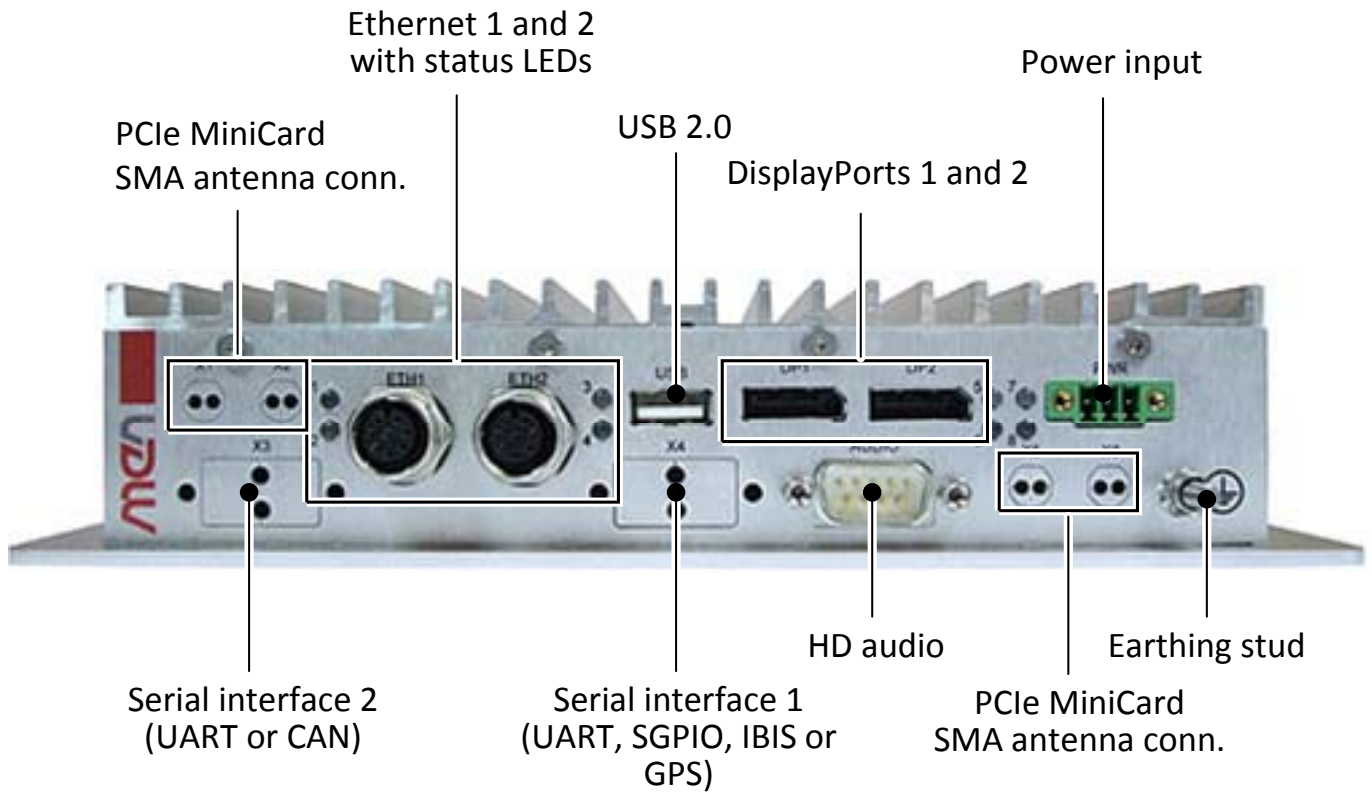
The BC50M is a maintenance-free box computer that has been designed for independent use or as display computer electronics for use in vehicles, e.g. in trains, commercial vehicles, mobile machines or airplanes. It is powered by an AMD Embedded G-Series APU (Accelerated Processing Unit), the T48N, running 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) as well as 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.



**CPU**

- AMD Embedded G-Series T48N
  - Dual-Core
  - 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
  - 1066 MT/s

**Mass Storage**

- One SD card slot
  - Via USB
- One mSATA slot
  - SATA Revision 2.x support
  - Transfer rates up to 300 MB/s (3 Gbit/s)
- Serial ATA (SATA)
  - One port for 2.5" hard-disk/solid-state drive mounted within the unit's housing
  - SATA Revision 2.x support
  - Transfer rates up to 300 MB/s (3 Gbit/s)

**Graphics**

- AMD Radeon HD 6310
  - Dual independent display support
  - Dual DisplayPort
  - 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

**Front I/O**

- 2 DisplayPort 1.1a interfaces
  - AUX channels and hot plug detection
- 1 HD audio
  - HD audio codec
  - Audio stereo in
  - Audio stereo out
  - SPDIF out
  - All available via 9-pin D-Sub connector
- 2 Gigabit Ethernet
  - Via M12 connectors
- 1 USB 2.0
  - Via Type A connector
- 2 SA-Adapter slots for serial I/O
  - 1 UART or IBIS, GPS, SGPIO
  - 1 UART or CAN bus (CAN on request)
- 8 status LEDs
  - 4 for Ethernet link and activity status
  - 2 for general board status
  - 2 user LEDs

**2 PCI Express Mini Card slots**

- For functions such as
  - 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**

- Buffered by Gold Cap for 12 h

**Electrical Specifications**

- Isolation voltage 1,500 VDC
  - Ethernet port 1, Ethernet port 2, power input, system ground (USB, Display Port, Audio...)
- Supply voltage:
  - 24 VDC and 36 VDC
  - EN 50155 power interruption class S2
- Power consumption: up to 30 W

**Mechanical Specifications**

- Dimensions: approx. 250 mm x 220 mm x 44.1 mm
- Weight: 1.8 kg
- International Protection Rating: IP20

**Environmental Specifications**

- Temperature range (operation):
  - 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/s<sup>2</sup>, 30 ms
- Vibration (function): 1 m/s<sup>2</sup>, 5 Hz - 150 Hz
- Vibration (lifetime): 7.9 m/s<sup>2</sup>, 5 Hz - 150 Hz
- Conformal coating of internal components

---

## **MTBF**

- 262,804 h @ 40°C according to IEC/TR 62380 (RDF 2000)
- 

## **Safety**

- Flammability (PCBs)
    - UL 94 V-0
  - Fire Protection
    - EN 45545-2 (Railway)
    - ECE-R118 (Automotive)
  - Electrical Safety
    - EN 50153
    - EN 50155
- 

## **EMC Conformity (Automotive)**

- ECE R10 (E-mark)
  - ISO 10605 (ESD)
- 

## **EMC Conformity (Railway)**

- EN 50121-3-2
- 

## **BIOS**

- InsydeH2O UEFI Framework
- 

## **Software Support**

- Windows 7
- Windows Embedded Standard 7
- Linux
- [For more information on supported operating system versions and drivers see Software.](#)

## Options

### APU

- AMD T48N, 1.4 GHz Dual Core, 18W, AMD Radeon HD 6310
- AMD T56N, 1.65 GHz Dual Core, 18W, AMD Radeon HD 6320 (on request)
- AMD T56E, 1.65 GHz Dual Core, 18W, AMD Radeon HD 6250 (on request)
- AMD T48E, 1.4 GHz Dual Core, 18W, AMD Radeon HD 6250 (on request)
- AMD T40N, 1.0 GHz Dual Core, 9W, AMD Radeon HD 6290 (on request)
- AMD T40E, 1.0 GHz Dual Core, 6.4W, AMD Radeon HD 6250 (on request)
- AMD T52R, 1.5 GHz Single Core, 18W, AMD Radeon HD 6310 (on request)
- AMD T44R, 1.2 GHz Single Core, 9W, AMD Radeon HD 6250 (on request)
- AMD T40R, 1.0 GHz Single Core, 5.5W, AMD Radeon HD 6250 (on request)
- AMD T16R, 615 MHz Single Core, 4.5W, AMD Radeon HD 6250 (on request)
- AMD T48L, 1.4 GHz Dual Core, 18W (on request)
- AMD T30L, 1.4 GHz Single Core, 18W (on request)
- AMD T24L, 1000 MHz Single Core, 5W (on request)

### Memory

- 2 GB DDR3 SDRAM system memory
- 4 GB DDR3 SDRAM system memory (on request)
- SATA hard-disk/solid state drive (mounted within housing)

### 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 (on request)

### I/O

- Antenna connectors
  - 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 (CAN on request)

### Miscellaneous

- 3-axis accelerometer and 3-axis magnetometer
- Real-time clock
  - 12 h buffer time
  - 72 h buffer time (on request)

### Electrical Specifications

- Input voltages of 48V, 72V, 110V (on request)

### Mechanical Specifications

- Sides protected according to IP40 (on request)

### Environmental Specifications

- Temperature range (operation):
  - -40°C to 85°C (screened) with wider housing with additional cooling fins

### Other Options

- 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.**
- Some of these options may only be available for large volumes.

## Germany

### **MEN Mikro Elektronik GmbH**

Neuwieder Straße 3-7  
90411 Nuremberg  
Phone +49-911-99 33 5-0

sales@men.de  
[www.men.de](http://www.men.de)

## USA

### **MEN Micro Inc.**

860 Penllyn Blue Bell Pike  
Blue Bell, PA 19422  
Phone 215-542-9575

sales@menmicro.com  
[www.menmicro.com](http://www.menmicro.com)

## France

### **MEN Mikro Elektronik SAS**

18, rue René Cassin  
ZA de la Châtelaine  
74240 Gaillard  
Phone +33-450-955-312

sales@men-france.fr  
[www.men-france.fr](http://www.men-france.fr)

## China

### **MEN Mikro Elektronik (Shanghai) Co., Ltd.**

Room 808-809, Jiaxing Mansion, No. 877 Dongfang Road  
200122 Shanghai  
Phone +86-21-5058-0961

sales@men-china.cn  
[www.men-china.cn](http://www.men-china.cn)

### **Up-to-date information, documentation and ordering information:**

[www.men.de/products/bc50m/](http://www.men.de/products/bc50m/)

*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.*

© 2017 MEN Holding