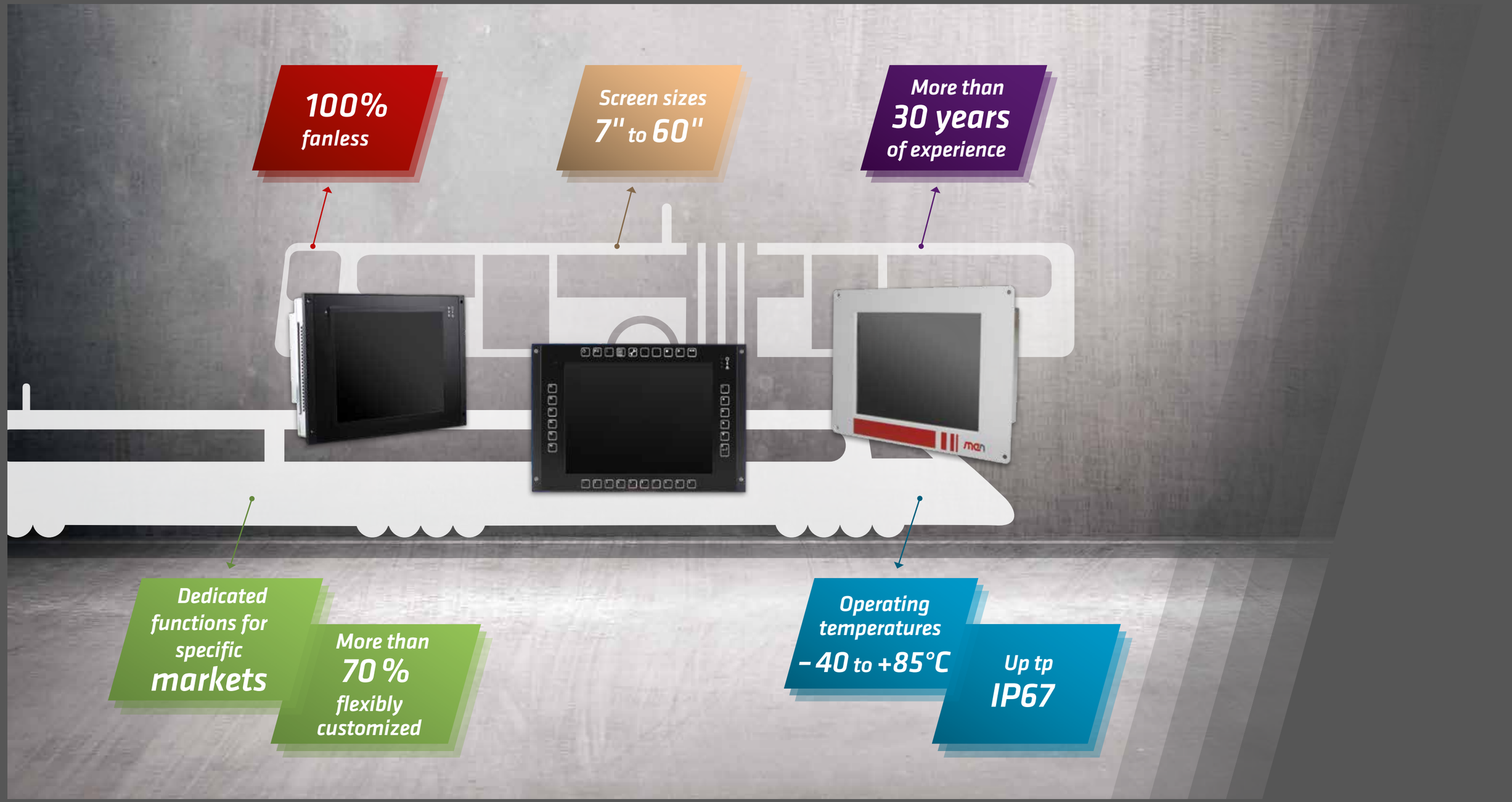
Modular Panel PCs for Rugged Systems

Reliable Fanless Display Computers and HMIs

Always **reliable.** *Always* **ahead.**

Rugged Panel PCs



Visualize your application and connect to the IoT world with reliable fanless display computers and HMIs from MEN.

Designed to operate in harsh environments, MEN panel PCs withstand operating temperatures from –40 °C up to +70 °C (+85 °C), as well as shock, vibration, drop, resonance, humidity, chemicals, etc. They are either developed according to EN 50129 or IEC 61508 and often comply with standards like EN 50155 for railways or with the automotive E-mark. They are available for up to 10 years and more, thanks to MEN's superior obsolescence management.

Product offering starts with the board-level electronics, which can turn into a fully customized design or be a standard device. PCI Express Mini Card slots, in combination with an external antenna, are used to incorporate wireless functions like WLAN / Wi-Fi, GSM / GPRS, UMTS, LTE, Bluetooth or GPS / GLONASS. Additional I/O include audio, UART or fieldbus interfaces.

Display Computers and HMIs

Railway Display Computer

DC17 - Rugged 12.1" Panel PC with Touch Screen

- 12.1" display with LED backlight
- 1024 × 768 pixels resolution
- AMD Embedded G-Series
- Wireless communication 2G, 3G, 4G, WLAN, GNSS
- MVB interface
- All external interfaces on M12 connectors
- –40 °C to +70 °C operating temperature
- Fanless and maintenance-free design
- Compliant to IP65 (front) and EN 50155 (railway)
- Windows and Linux support

DC15 – Rugged 10.4" Panel PC

- 10.4" display with LED backlight
- 1024 × 768 pixels resolution
- AMD Embedded G-Series
- Wireless communication 2G, 3G, 4G, WLAN, GNSS
- MVB interface
- All external interfaces on M12 connectors
- –40 °C to +70 °C operating temperature
- Fanless and maintenance-free design
- Compliant to IP65 (front) and EN 50155 (railway)
- Windows and Linux support

DC13 – Rugged 8.4" Panel PC with Front Keys

- 8.4" 4:3 TFT LCD panel
- 800 × 600 pixels resolution
- Intel Atom E600 series
- 1 USB 2.0 Type A
- 1 Fast Ethernet on M12
- Power supply via PoE Class 0
- –30 °C to +70 °C (+85 °C) operating temperature
- Fanless and maintenance-free design
- IP65 compliant
- EN 50155 railway compliant

Find the complete product range under:
www.men.de/products/rail-public-transport-systems/

Panel PC Electronics

Tested for Rugged Environments

Display Control Board

SC24 – AMD G-Series SBC for Control of Multiple 12" to 60" Displays

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

SC27 – Intel Atom SBC for Control of 7" to 15" Displays

- For LCD TFT panels from 7" to 15"
- LVDS up to 1280 × 768
- Intel Atom E600 series, up to 1.6 GHz
- Up to 2 GB DDR2 SDRAM
- 1 Fast Ethernet (PoE Class 0) on M12
- 1 USB 2.0 (M12), 1 USB 2.0 (Type A)
- PCIe Mini Card and 1 microSIM card slot
- 1 GNSS interface
- 1 mSATA and 1 microSD slot
- 24 VDC/36 VDC nom. (10 to 50.4 V) class S2
- –40 °C to +85 °C operating temperature
- EN 50155 compliant (railways)
- Prepared for ISO 7637-2 compliance (E-mark for automotive)

CC10S – ARM i.MX 6 SBC for Control of Multiple 7" to 15" Displays

- For LCD TFT panels from 7" to 15", Full HD
- Dual-channel LVDS or two single channels, with 2 independent screen contents
- Freescale ARM i.MX 6 Series
- Multi-stream-capable HD video engine, OpenCL support
- Maximum resolution 1920 × 1200
- Up to 4 GB DDR3 SDRAM, eMMC multimedia card
- 1 Gb Ethernet, 2 USB 2.0, 1 UART-to-USB
- 2 UART or CAN bus interfaces
- Power supply 9 to 16 VDC (12 V nom.)
- –40 °C to +85 °C

Find the complete product range under:
www.men.de/products/single-board-computers/

Computers for Operation in Harsh Environments

MEN always designs and produces its boards and systems for reliable operation in rugged mobile applications. An own environmental test laboratory helps to monitor and prove the quality of the products.

To make sure that MEN electronics fulfill given requirements and to gain pre-qualification status for the products, our boards and systems are tested in our in-house environmental laboratory.

Average Number of ***Environmental Tests*** — ***600*** per year

Typical Environmental ***Testing Time*** per Product — ***4*** weeks

Typical Number of Environmental ***Tests*** per Product — ***17*** tests

Our Custom Design Service

It is MEN's goal to find a tailored solution for the application together with our customers. While using as many standard COTS components as possible, parts of the solution may include customization:

» System level » Board level » Component level (in FPGA)

The Design Process

Custom design at MEN follows a defined development process from specification to design, verification and validation of a product, which is part of our quality management system according to DIN EN ISO 9001, EN/AS 9100 and IRIS.

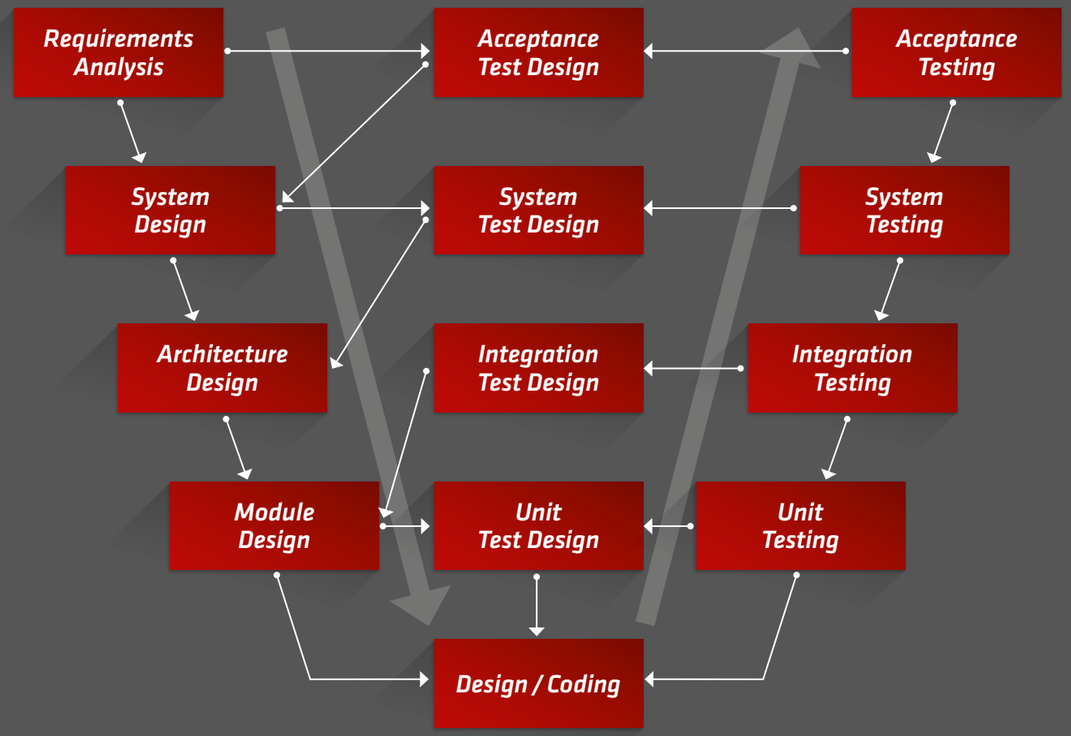
The design process follows an adapted V-Model, depending on SIL level, and includes requirement tracing.

RAMS (Reliability, Availability, Maintainability and Safety) procedures are applied in the planning phase to avoid costly mistakes down the road.

COTS and Custom Design Expertise

Whether standard or custom, MEN products benefit from our unique development expertise:

- Robust designs for harsh environments
- Safety-critical designs in accordance with IEC 61508, EN 50126, EN 50128, EN 50129, DO-245, DO-178B, DO-254
- Based on Intel, AMD, PowerPC and ARM architectures
- Based on more than 50 proprietary cores in FPGA
- Completed by real-world I/O
- Supported by real-time software



Application Examples

Driver Desk Solutions

The driver desk in a train is controlled by EN 50155 compliant standard display computers in combination with a customized panel PC version. The displays show, e.g., the current fuel consumption and the ideal performance for fuel-efficient driving.
The driver desk in a bus enables the driver to access various data. Additionally, these displays can be used to print and validate tickets.

Passenger Information System for Buses

Rugged, fanless panel PCs are used in the transportation sector, e.g. as a passenger information system in buses. They are intended for use in public buses in a setup sometimes involving a second, non-intelligent display. Either one or two 19" widescreen displays are placed in each vehicle. The intelligent display computers are located behind the driver.
Depending on the length of the bus, the additional non-intelligent displays are located behind the hinge of the bus, also visible in driving direction and supplied with the same signal as the main unit's display panel via DVI-D.

Textile Machine Supervision

Human-Machine Interfaces based on the computer-on-module concept are used in the interaction with different types of textile machines like (ring) spinning or winding machines, controlling operation of the machines as well as the processes, data storage and management. The operator configures the most important winding parameters on the control unit and gets data that serves for assessment of the machine's operation behavior and is stored for further analysis. Data such as machine configuration, quality and cleaning parameters as well as material data is graphically displayed for easy recognition and operation. All production data is logged individually and summarily.

Why MEN?

Development and production of rugged and reliable products

Our boards and systems are developed to meet requirements such as temperature ranges between -40°C and +85°C through convection or conduction cooling, shock, vibration, chemical influence or the option of coating against humidity right from the start.

Development based on quality management systems of our markets

We are certified according to ISO 9001 and ISO 14001, plus EN/AS 9100 (aerospace) and IRIS (railways) and provide systems according to ISO 7637-2 (road traffic) requirements. We develop according to the GRESS requirements by Airbus and are preparing for EFQM (European Foundation for Quality Management).

Development based on relevant standards know-how for our markets

Preparing products for environmental qualification according to vertical market standards is one of our key services, for example EN 50155 (railways), DO-160G (airborne), German Lloyd (ships) or ISO 7637-2 (automotive E-Mark).

Fully automated, high-quality in-house production

To achieve the highest product quality, our manufacturing and test process is fully automated. Vapor-phase soldering assures smooth processing of the components. Traceability is guaranteed by time stamps throughout the whole process.

All relevant environmental tests in-house

We carry out the preliminary qualifications in our own environmental test lab (temperature, shock, vibration, humidity), high-voltage and EMC chambers. Further calculations and analyses include MTBF, FMEA, Hazard Tree, HASS or HALT.

FPGA technology expertise

FPGAs allow us to customize our hardware without touching the board layout while keeping costs low, even in small quantities. FPGA-based solutions are flexible, offer long-term availability and support extended temperature operation.

Custom design of computer boards and systems

Often the most cost-effective solution results in a custom design – while using as many standard components as possible. Synergy effects emerge through the mutual development of standard and custom boards and systems, completed by the built-to-order approach of MEN's box PCs and 19"-based application-ready and turnkey systems.

Complete system solutions based on in-house mechanical design

Whether a 19" system, wall-mount, standalone or DIN-rail is needed, we guarantee overall operability of each system, minimizing the integration effort and the handling cost on the customer's side. The quality of our systems is assured by applying traceability through the V-model.

Customer assistance in configuration of mission-critical systems

Computer architectures with safety-critical requirements are very complex. Considerations include safety-critical characteristics and levels (SIL, DAL), reliability questions, error behavior modes and the major IEC and EN standards – backed by a professional safety and risk management.

MEN is a member of:

- **AMD Fusion Partner Program**
- **BavAIRia** *(Cluster for innovative aerospace technology in Bavaria)*
- **CNA** *(Center for Transportation & Logistics Neuer Adler e.V.)*
- **NXP / QUALCOMM Design Alliance**
- **Intel® IoT Solutions Alliance**
- **Open Source Automation Development Lab** *(OSADL)*
- **PCI-SIG** *(Peripheral Component Interconnect Special Interest Group)*
- **PICMG** *(PCI Industrial Computer Manufacturers Group)*
- **RSSI** *(Railway Systems Suppliers, Inc. Trade Association)*
- **Unife** *(Union des Industries Ferroviaires Européennes)*
- **USB-IF** *(Universal Serial Bus Implementers Forum, Inc.)*
- **VITA** *(VMEbus International Trade Association)*
- **Wind** *(Partner Eco System)*
- **ZVEI** *(German Electrical and Electronic Manufacturers Association)*

ISO 9001
ISO 14001
EN 9100

IRIS Certification

RoHS 2011/65/EU

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