DEUTA-WERKE

Paffrather Straße 140 | 51465 Bergisch Gladbach | Germany
Phone +49 (0) 2202 958-100 | Fax +49 (0) 22 02 958-145
support@deuta.de | www.deuta.com | www.icontrust.com

SIL 2 & SIL 3 certified

15,000 sold
IconTrust® Terminals worldwide

DEUTA – The Home of Trust-Technologie:

IconTrust®   SignalTrust®   MouseTrust®   SelectTrust®

DEUTA TRUST TERMINALS
Multifunctional Terminals

07_2021-REV04_EN

Icon Trust

IconTrust® – You can Trust.

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Technology under Control
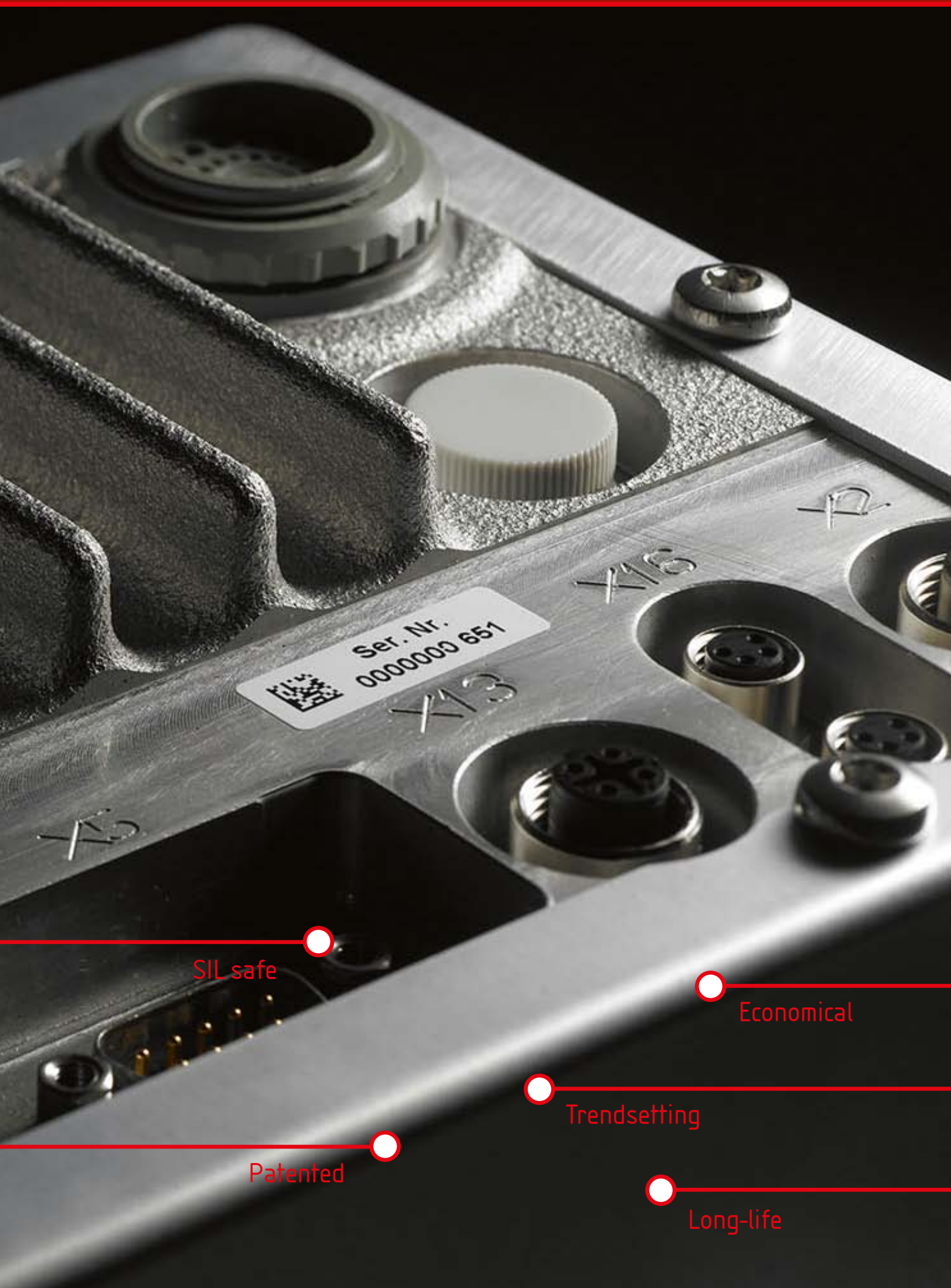
» DEUTA Trust Terminals –
You can depend on it!

Today and tomorrow«

Patented for sure!

DEUTA Terminals stand for a forward-looking display genera-
tion always in touch with the latest trends yet is also flexible
and economical.

When we develop our terminals, we exploit the latest in
technology for applications in rail vehicle traffic. SIL-capable
Terminals with patented IconTrust® technology are the new
standards in terms of driving safety for displays which
correspond to the safety standards of today and tomorrow.

Tailor-made!

SIL safe

Economical

Trendsetting

Patented

Long-life

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»DEUTA Trust Terminal Highlights –

Innovative safety technology from one source!«

- **Safe**: SIL 3-capable display solutions thanks to patented IconTrust® technology
- **Economical**: Minimised life-cycle costs and form-fit-function compatibility
- **Rugged**: Regarding extreme environmental conditions
- **High**: The MTBF values of the displays

6.5"

8.4"

Trendsetting technology

Everything from one source
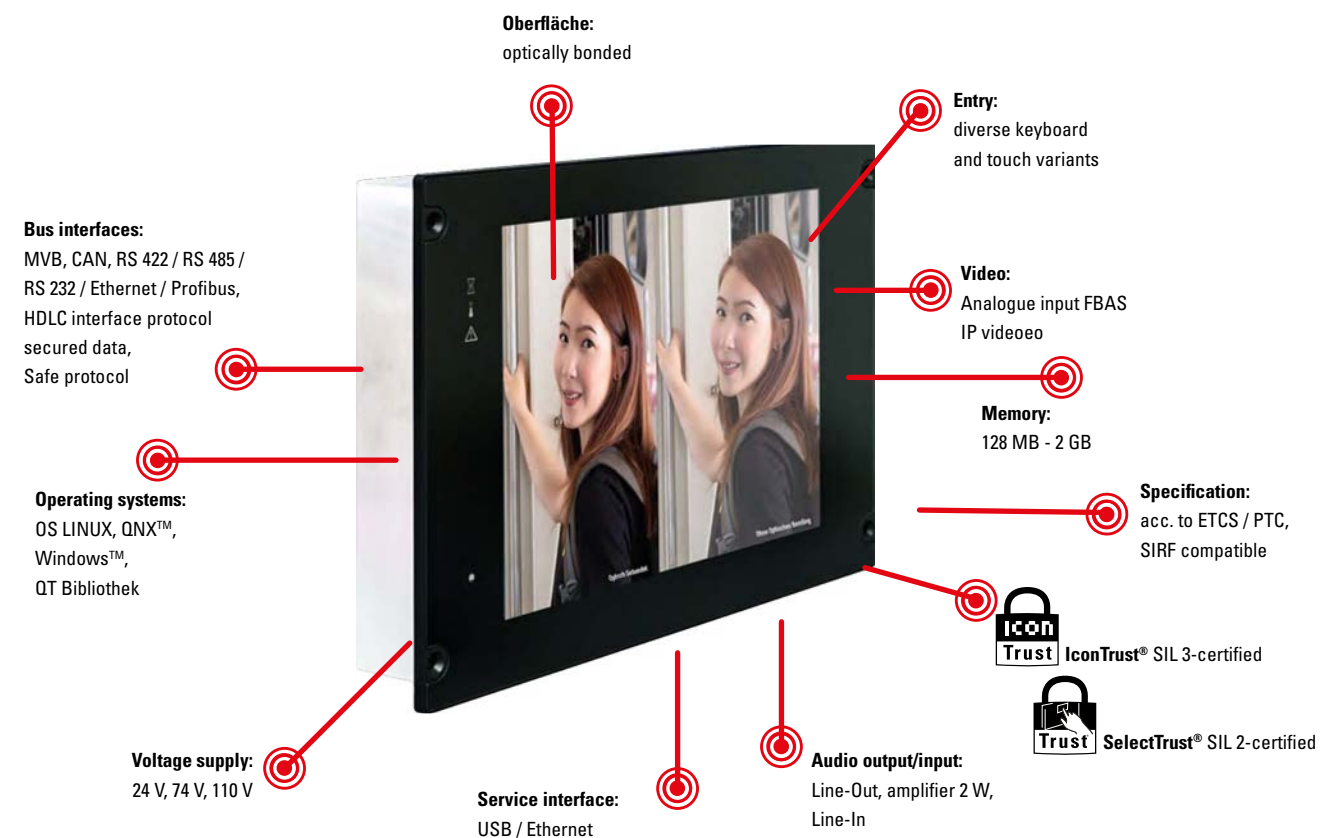Advice, development, layout and selection of components, board assembly, qualification, testing, production and support: DEUTA controls the entire process chain of display development

Platform concept
One platform, many possibilities for individualisation. With just a few components and plug connections, we have displays compatible in terms of installation and function available at any time.

Safety technology
DEUTA Trust Terminals offer SIL-capable display solutions thanks to the patented IconTrust® technology. That is what makes DEUTA the leader in safety technology for display applications.

Oberfläche:
optically bonded

Entry:
diverse keyboard
and touch variants

Bus interfaces:
MVB, CAN, RS 422 / RS 485 /
RS 232 / Ethernet / Profibus,
HDLC interface protocol
secured data,
Safe protocol

Video:
Analogue input FBAS
IP videoeo

Memory:
128 MB - 2 GB

Operating systems:
OS LINUX, QNX™,
Windows™,
QT Bibliothek

Specification:
acc. to ETCS / PTC,
SIRF compatible

Icon Trust IconTrust® SIL 3-certified

Trust SelectTrust® SIL 2-certified

Voltage supply:
24 V, 74 V, 110 V

Service interface:
USB / Ethernet

Audio output/input:
Line-Out, amplifier 2 W,
Line-In

10.4"

Longevity
The long-term availability of the components and their reliability have top priority. This sustainable strategy guarantees displays that will work for decades and long-term security of investment with high MTBF values and minimised life-cycle costs.

Obsolescence management
Follow-up concepts are already considered during the design phase. This ensures the availability of the MFTs across the entire life cycle. New displays are compatible to the predecessors in form, fit and function.

12.1"

»DEUTA IconTrust® & SelectTrust® –

The worldwide leading solution for ETCS !«

- Proved safey technology in many worldwide projects
- Can be implemented and demonstrated up to SIL 3 and completely appraised upon request
- Monitoring unit independent from PC with long service life
- Can be easily retrofitted as add-on in every terminal

SIL 3

SIL 2

IconTrust® – for safe display

IconTrust® monitors **predefined areas on the TFT display** and differentiates **between valid and invalid information.** IconTrust® uses a safe computer to transmit the data to the panel PC, where they are processed and displayed. IconTrust® monitors the represented screen areas on the TFT display and transmits the confirmation back to the safe computer. The comparison occurs in the safe computer, e.g. in the EVC (European Vital Computer).

SelectTrust® – for safe touch input

SelectTrust® is the first certified technology worldwide to **demonstrably enable safe manual input of information** via touch screen or a softkey. The entry and visualisation at this position are checked in the functional safe SelectTrust® solution. In case of total correctness, a functionally safe entry action will be transmitted to a safe computer.

Independent and cost-effective solutions

Along with IconTrust®, SelectTrust® provides a cost-effective solution for safety consideration respectively for the proof of compliance with current safety requirements. Both monitoring systems work fully decoupled from the display- and operating function making them unique in their mode of operation.

Simple, safe, flexible

IconTrust® & SelectTrust®

The monitoring of valid display and input areas on a touch panel as required in Subset-091 is monitored with IconTrust® and SelectTrust® on DEUTA Trust Terminals. These safety functions detect representation errors of the unsafe PC system and differentiate between valid and invalid input areas on the TFT.

The SelectTrust® function checks the activation or release of the touch area as well as the single or permanent transmission of the activation. Our technology thus complies with the requirements of Subset-091 with a safe, flexible and cost-efficient solution.

Prüfzeugnis

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IVEN - makes SIL configuration of terminals easy
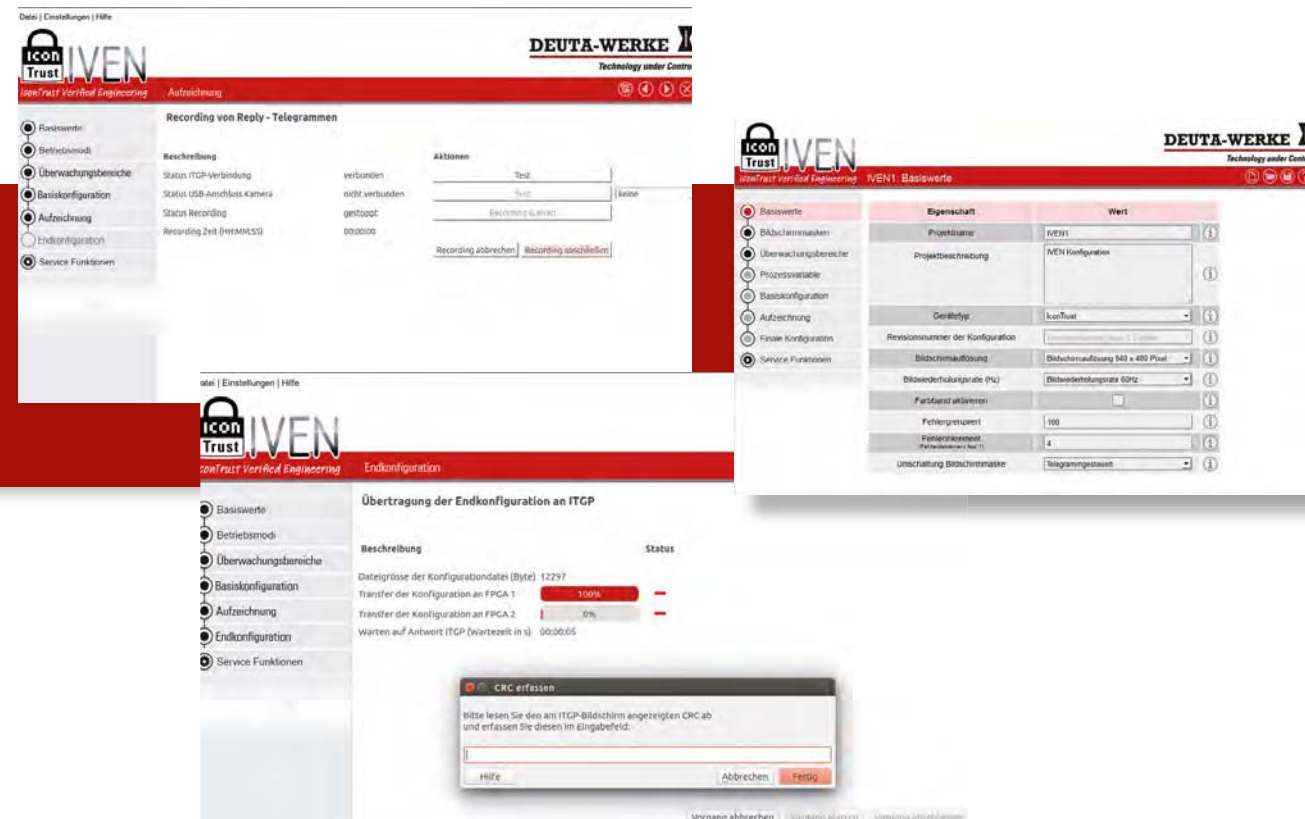
Application changes and project-specific adaptations can be easily implemented with the universal IVEN configuration tool.

Safety-relevant changes of the supervised areas or adaptations to new display parameters can be configured project-specifically with the engineering tool IVEN and prepared for assessment.

IVEN does not only check the configuration for consistency but provides also a preview of the configured supervised areas. In doing so, IVEN records all process values with a corresponding screen shot, transmits the configuration to the Icon-Trust module and automatically generates a PDF- validation report as documentation for the assessment.

Configuration, Diagnosis & Testing with IVEN Made Easy:

Define :

- SIL-relevant supervised areas und screen masks
- determine basic parameters (resolution, error counter, etc.)

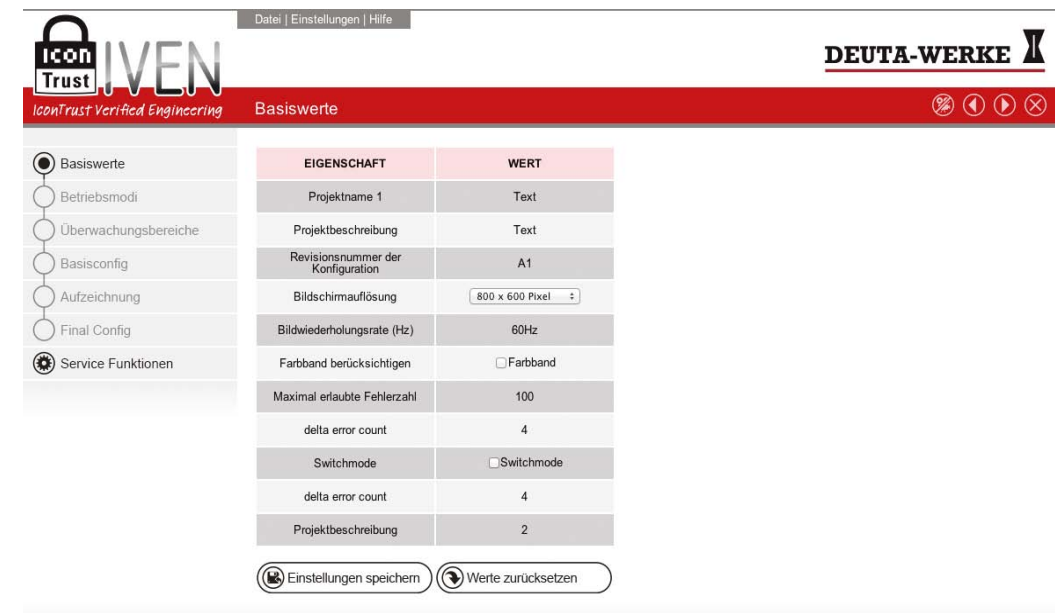**Learn**:

- determine the permitted graphical elements and the corresponding checksum
- determine the latency period between data entry and representation in the GUI

Implement:

- configure the IconTrust boards
- upload the configuration to the IconTrust board

Record:

- generate a documentation as part of the assessment

Select the Trust technology and the screen parameters

pixel accurate definition and configuration of SIL relevant supervision areas

determination and storage of check sums for all permitted elements

transmission of data and configuration to the IconTrust® board

»DEUTA Terminal Applications –
ergonomic, standard-compliant & safe«

- **Worldwide:** In many train protection systems
- **Ergonomic:** Support for Usability Engineering and UX Design
- **Flexible**: For all DEUTA Multifunctional Terminals and operating systems
- **Compliant with standards**: For safety applications in accordance with EN 61508 / 5012x, among others

The perfect software application begins with an in-depth understanding of the domain requirements within the system environment. As the supplier for sensors, travel data recorders and Multifunctional Terminals, DEUTA has more than 110 years of knowledge in speed processing and speed displaying.

Our employees check the hardware and software requirements in close coordination with the customer. The experienced software engineers use modern tools and methods to produce marketable application software for train protection systems. Depending on the project, our design engineers and hardware developers create a vehicle-specific retrofit solution or a new product – up to the generic product platform.

Retrofit ICE 3:
DEUTA Terminal Application for ETCS – SIL 2 / SIL 3
Hardware concept with two DEUTA ARM terminals
in one housing for Baseline 3.

DEUTA Terminal Application for PZB
Hardware concept with two DEUTA
ARM terminals

DEUTA Terminal Application
for SCMT, Italy

Usability Engineering for best User Experience
The comprehensibility and ergonomics of the terminal application is decisive for the safety of the train driver and his passengers.

Our software developers not only develop specification-compliant software interfaces based on international standards, but they also regard the terminal applications as a man-machine interface from the perspective of the train driver. Usability Engineering and User Experience form specific customer applications beyond the standardised applications: From very legible type fonts to easily understandable Graphic User Interfaces, the ergonomic layout of the user interfaces facilitates the work of the train drivers.

Safe screen areas for SIL
applications with IconTrust®
and SelectTrust®

SIL safe
Our DEUTA Safety Managers understand the safety-critical applications, are familiar with the specifications and know how to implement them in order to achieve the required Safety Level. The basis for software applications with the DEUTA Safety Level are the patented Trust technologies. IconTrust® ensures safe display up to SIL 3 and SelectTrust® for safe entry up to SIL 2.

DEUTA Terminal-
Application for I60R

Definition of Done
We are only then satisfied when our customers are satisfied. That is why we prepare a list of criteria as part of our agile software development before the start of the project.

Customer-oriented sprint planning …
Regular sprint planning provides our customers with a preview of upcoming interactions at short intervals. This creates room for actively prioritised project planning.

… in Bergisch Gladbach and Berlin
By expanding our software development capacities in the Berlin Technical Office, we are now even closer to our customers.

Configuration of the monitoring areas
with IVEN

Subsequent application changes outside the safety-related monitoring areas have no influence on the expertise. Our customers are welcome to configure their own project-specific safety-related changes and reconfiguration of the monitoring areas with the IVEN Engineering Tool and prepare for the expertise.

»DEUTA MFT111 –

High Performance in the driver's cab!«

- 10.4" colour TFT with at least 640 x 480, 18 bit, LED light
- AMD Fusion Dual-Core 1 GHz processor
- Resistive, scratch-proof touch screen or short-stroke keyboard
- Protection category: IP 65 front / IP 54 rear

MFT111, key

MFT111, touch

High Performace

Also applicable to the DEUTA MFT111: few components, few plug-type connectors, everything on one pc board and minor power losses. DEUTA thus ensures that each individual application is quickly and reliably ready for use and even exceeds the record-breaking MTBF values of the field data. The dual core processor is eminently suited for high-performance applications, .e. g., IP video applications.
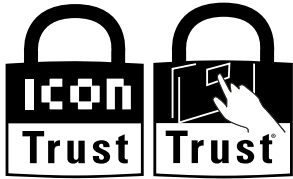
The compact housing of the MFT111 also fits into tight installation conditions. When equipped with the optionally available IconTrust, the MFT111 is converted into the SIL terminal MFTS111 with a maximum of certified evaluated safety.

Absolutely safe
Equipped with IconTrust® & SelectTrust®, the MFTs offer a maximum of safety.

Feature/Specification	MFT111
Display lighting	LED backlight
Dimmable lighting	0 to 1,000 cd/m^2
Status LEDs	3 LEDs
CPU/clock frequency	AMD Fusion, Dual-Core processor, 1 GHz
RAM memory	1 GB / 4 GB
Flash-EPROM	1 MB
Video memory	4 MB
Flash memory	min. 4 GB
Extensibility	upon request
PC keyboard connection	USB keyboard
Additional controller	Environment Controller
Buzzer	yes
Temperature management	yes
Ambient light sensor	front side
Power supply	24 - 110 V (DC $\pm$ 30%) (wideband)
Power consumption	< 30 W
Display type/size	colour TFT/10.4" (26.4 cm) or upon request
Display resolution, colour intensity	640 x 480, 800 x 600, 1024 x 768
Ethernet	2x 10/100 BaseT as (M12 d-coded[1])
Audio out	2x Line-Out or 1x 8 W
USB	2x USB 2.0 (M8 a-coded[1]) + 1x Feature Connector
Vehicle bus, I/O	Ethernet, RS 422, RS 485, MVB, CAN, RS 232, Profibus
Device address	3 bit
Keypad device front	Short-stroke keyboard upon request
Keypad backlight	upon request
Touch screen	capacitive / resistive
Front dimension (W x H)	310 mm x 214 mm
Mounting dimension (W x H x D)	280 mm x 204 mm x 88.5 mm
Weight	approx. 3.6 kg
Protection class front/rear	IP 65 / IP 42
Temperature range operation	full functionality: -25°C to +70 °C
Temperature range storage	-35°C to +85°C
MTBF value	calculated approx. 100,000 hrs.
Operating system	OS LINUX, QNX™, Windows™
Applications	ETCS, diagnostics, brake control, etc.
SIL data indication	with IconTrust® up to SIL3 (upgradeable)
SIL data entry	with SelectTrust® up to SIL3 (upgradeable)

[1] Available as accessory from DEUTA: Adapter/Cables/Loud-speaker front plates/serial switchbox/USB Ethernet adapter/Power supply

»DEUTA MFTS11/2 –

Safety and reliability with IconTrust®!«

- 10.4" colour TFT with 640 x 480, 18 bit, lit by LED
- Geode, LX 800, 500 MHz processor
- Safety Integrity Level SIL 3
- Safe Supervision Function: IconTrust®

Patented safety

The MFTS11/2 is equipped with the patented IconTrust® technology as standard. IconTrust® monitors dedicated areas on the TFT panel and differentiates between safety-related and non safety-related information.

Each of the individual areas of the displayed image are analysed and compared to the value of the respective input variable during every image refresh cycle in **IconTrust®**. The patented procedure demonstrably ensures topicality and correctness. The generic verification is certifiable up to the SIL 3 level. If the application changes, our customers can easily modify the monitoring areas with the **IVEN** Engineering Tool and document it for the experts.

MFTS11/2
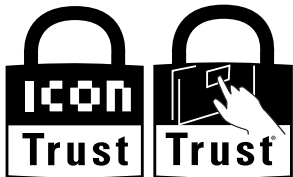
Feature/Specification	MFTS11/2
Display lighting	LED backlight
Dimmable lighting	0 to 350 cd/m²
Status LEDs	3 LEDs
CPU/clock frequency	Geode, LX 800, 500 MHz
RAM memory	256 MB (incl. video memory)
Flash memory	min. 4 GB
PC keyboard connection	USB keyboard
Additional controller	Environment Controller
Service Interface	USB and Ethernet
Buzzer	yes
Temperature management	yes
Ambient light sensor	front side
Power supply	24, 48 or 74 - 110 V (DC ±30 %)
Power consumption	typ. 25 W
Display type/size	colour TFT 10.4" (26.4 cm), additional sizes upon request
Display resolution, colour intensity	640 x 480, additional resolutions upon request
Ethernet	2x 10/100 BaseT as (M12 d-coded[1])
Audio out	2x Line-Out or 2x2 W loudspeakers
USB	2x USB 2.0 (M8 a-coded[1])
Vehicle bus, I/O	Ethernet, RS 422, RS 485, MVB, CAN, RS 232, Profibus
Device address	3 bit
Keypad device front	upon request
Keypad backlight	upon request
Touch screen	yes, resistive, scratch-proof
Front dimension (W x H)	310 mm x 214 mm
Mounting dimension (W x H x D)	280 mm x 204 mm x 65 mm
Weight	approx. 3.6 kg
Protection category front/rear	IP 65 / IP 54
Temperature range operation	-25°C to +70°C (full functionality)
Temperature range storage	-35°C to +85°C
MTBF value	calculated approx. 100.000 hrs.
Operating system	LINUX, QNX™, Windows™
Applications	ETCS, diagnostics, brake control, etc.
Safe Supervision Function	IconTrust®, SelectTrust®

[1] Available as accessory from DEUTA: Adapter/Cables/ Loudspeaker front plates/serial switchbox/USB Ethernet adapter/Power supply

Absolutely safe

Equipped with IconTrust® & SelectTrust®, the MFTs offer a maximum of safety.

»DEUTA MFT11/2 –

High-end terminal - singularly successful!«

- 10.4" colour TFT with 640 x 480, 18 bit, lit by LED
- Single Board Computer with AMD Geode, LX 800, 500 MHz processor
- No moving components (such as fans)
- Minor installation depth, more random access memory, energy-saving technology

MFT11/2 mqe

MFT11/2 bya

Examples of the different variations of the MFT 11/2

MFT11/2 vqe (Velaro)

Different variations in keyboard layout

The Multifunctional Terminal MFT11/2 is used in complex control
and guidance systems as a man-machine interface for process visualisation and
data input.

The data is entered either via touch panel or short-stroke membrane keypad. Different
keyboard layouts are available.

The MFT11/2 is based on a single board PC with AMD-GEODE™ processor.
An active matrix colour display (TFT) is used for the display.

MFT11/2

MFT11/2

MFT11/2 S1

Feature/Specification	MFT11/2
Display lighting	LED backlight
Dimmable lighting	0 to 350 cd/m^2
Status LEDs	3 LEDs
CPU/clock frequency	Geode, LX 800, 500 MHz
RAM memory	256 MB (incl. video memory)
Flash memory	min. 4 GB
Extensibility	upon request
PC keyboard connection	USB keyboard
Additional controller	Environment Controller
Buzzer	yes
Temperature management	yes
Ambient light sensor	front side
Power supply	24, 48 or 74 - 110 V (DC $\pm$ 30%)
Power consumption	typ. 25 W
Display type/size	Colour TFT/10.4" (26.4 cm)
Wide angle display	optional
Display resolution, colour intensity	640 x 480 18 bit, 800 x 600 18 bit, 1024 x 768 bit
Ethernet	2x 10/100 BaseT as (M12 d-coded[1])
Video in	up to 4 cameras
Audio out	2x Line Out or 2x2 W loudspeakers
Sound amplifier	optional
Serial interfaces	1x RS 485/RS422, RS232 (CAN variant)
USB	2x USB 2.0 (M8 a-coded[1]) + 1x Feature Connector
Vehicle bus, I/O	Ethernet, MVB on board (ESD or EMD), CAN Profibus, RS 422, RS 485, RS 232, dig. inputs/outputs
Device address	3 bit
Keypad device front	Short-stroke membrane keypad
Keypad backlight	yes, LED dimmable
Touch screen	yes, resistive, scratch-proof
Front dimension (W x H)	310 mm x 214 mm
Mounting dimension (W x H x D)	280 mm x 204 mm x 47 mm
Weight	approx. 3.6 kg
Protection class front/rear	IP 65 / IP 54
Temperature range operation	-25°C to +70° (full functionality)
Temperature range storage	-35°C to +85°C
MTBF value	approx. 100,000 hrs
Operating system	OS LINUX, QNX™, Windows™
Applications	ETCS, diagnostics, brake control, etc.

[1] Available as accessory from DEUTA: Adapter/
cables/loud-speaker front plates/serial switchbox/USB
Ethernetadapter/Power supply

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»DEUTA MFT8/2 and 9/2 –

Solutions for special requirements!«

MFT8/2

• 8.4" colour TFT with 640 x 480, 18 bit, LED lighting
• Geode, LX 800, 500 MHz processor
• Resistive touch screen
• Protection category: IP 65 front / IP 54 rear
• Installation dimension: 264 mm w x 140 mm h x 65 mm

MFT9/2

• 6.5" colour TFT with 640 x 480, 18 bit, LED lighting
• Geode, LX 800, 500 MHz processor
• Short-stroke membrane keyboard
• Protection category: IP 65 front / IP 54 rear
• Installation dimension: 308 mm w x 162 mm h x 65 mm
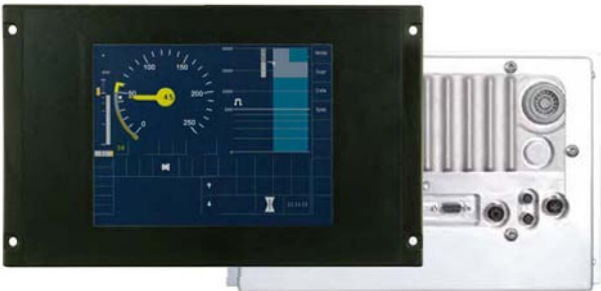
MFT8/2

The MFT8/2 presented a tailor-made Multi-functional 8.4" terminal for trams where MFTs with a display size of 6.5" were too small and 10.4" were too large. Whatever the matching size for your train, we will find the correct solution.

MFT9/2

As a form-fit-function compatible solution, the MFT9/2 replaces older working principles with additional features such as keypad, a control and a changeover switch as well as wired LEDs. The result: The maximum possible compatibility for the next decades.

MFT8/2

MFT9/2

Feature/Specification	MFT8/2 & MFT 9/2
Display lighting	LED backlight
Dimmable lighting	0 to 350 cd/m²
Status LEDs	2-3 device-dependent
CPU/clock frequency	Geode, LX 800, 500 MHz
RAM memory	256 MB
Flash memory	min. 2 GB
Extensibility	upon request
PC keyboard connection	USB keyboard
Additional controller	Environment Controller
Buzzer	yes
Temperature management	yes
Ambient light sensor	front side
Power supply	24, 48 or 74 - 110 V (DC ± 30%)
Power consumption	typ. 25 W
Display type/size	**MFT8/2:** Colour TFT/8.4" (21.34 cm) **MFT9/2:** Colour TFT/6.5" (16.50 cm)
Display resolution, colour intensity	640 x 480, 18 bit
Ethernet	10/100 Base T as M12 d-coded[1]
Video in	**MFT8/2:** 1 x Video
Audio out	**MFT8/2:** 2 x Line Out
Serial interfaces	**MFT8/2:** 1 x RS 485, IBIS upon request **MFT9/2:**1 x RS 485
USB	**MFT8/2:** 2 x USB1.1 (M8 a-coded[1]) **MFT9/2:** 2 x USB
Device address	**MFT8/2:** 3 bit **MFT9/2:** 3 bit + Digital I/O
Inputs/outputs	digital I/Os
Keypad device front	**MFT9/2:** Short-stroke membrane keypad
Keypad backlight	**MFT9/2:** LED
Touch screen	**MFT8/2:** resistive
Front dimension (W x H)	**MFT8/2:** 300 mm x 186 mm **MFT9/2:** 376 mm x 201 mm
Mounting dimension (W x H x D)	**MFT8/2:** 264 mm x 140 mm x 65 mm **MFT9/2:** 308 mm x 162 mm x 65 mm
Weight	**MFT8/2:** approx. 3 kg **MFT9/2:** approx. 4 kg
Protection class front/rear	IP 65 / IP 54
Operating temperature	-25°C to 70°C
Temperature storage	**MFT8/2:** -35°C to 85°C (full functionality) **MFT9/2:** -25°C to 70°C
MTBF value	approx. 100,000h
Operating system	OS LINUX, QNX™, Windows™

[2] Available as accessory from DEUTA: Adapters/cables/loudspeaker front plates/serial switchbox/USB Ethernet adapter/ power supply

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»DEUTA MFT5/2 –

The successful compact terminal in its third generation!«

- 6.5" colour TFT with 640 x 480, 18 bit, LED lighting
- Geode, LX 800, 500 MHz processor
- Resistive touch screen
- Protection category: IP 65 front / IP 54 rear
- Installation dimension: 248 mm w x 140 mm h x 65 mm d

MFT5/2

Compact displays with 6.5" had already been deployed in trams and metro projects since the mid 1990s. The first MFD5 was delivered in 1996; the displays are now in their third generation. The use of the MFT5 as successor to the MFD5 increases the service life of the display in a form-fit-function compatible manner.

MFT5/2

Feature/Specification	MFT5/2
Display lighting	LED backlight
Backlight dimmable	0 to 350 cd/m²
Status LEDs	2-3 device-dependent
CPU/clock frequency	Geode, LX 800, 500 MHz
RAM memory	256 MB
Flash memory	min. 2 GB
Flash-EPROM	1 MB
Video memory	4 MB
Extensibility	upon request
PC keyboard connection	USB keyboard
Additional controller	Environment Controller
Buzzer	yes
Temperature management	yes
Ambient light sensor	front side
Power supply	24 or 74 - 110V (DC ± 30%)
Power consumption	typ. 25 W
Display type/size	Colour TFT/6.5" (16,5 cm)
Display resolution, colour intensity	640 x 480, 18 bit
Ethernet	10/100 Base T as M12 d-coded[1]
Video in	1 x FBAS (analogue)
Audio out	2 x Line Out
Serial interfaces	RS 442/RS 485, IBIS upon request
USB	2 x USB1.1 (M8 a-coded[1])
Vehicle bus	MVB on board (EMD)
Device address	3 bit
Keypad device front	Short-stroke membrane keypad
Keypad backlight	LED
Front dimension (W x H)	275 mm x 144 mm
Mounting dimension (W x H x D)	248 mm x 140 mm x 65 mm
Weight	approx. 2.3 kg
Protection class front/rear	IP 65 / IP 54
Operating temperature	-25°C to 70°C (full functionality)
Temperature storage	-35°C to 85°C
MTBF value	approx. 100,000 h
Operating system	OS LINUX, QNX™, Windows™

[1] Available as accessory from DEUTA: Adapters/ cables/loudspeaker front plates/serial switch box/USB Ethernet adapter/ power supply

»DEUTA MFT6/2 –

Much information in the 12.1" terminal!«

- 12.1" colour TFT with 800 x 600, 18 bit, LED lighting
- Geode, LX 800, 500 MHz processor
- Short-stroke membrane keypad/ resistive touch screen
- Protection category: IP 65 front / IP 54 rear
- Installation dimension: 319 mm w x 235 mm h x 47 mm d
- Easy portability of customer application due to platform concept

MFT6/2
The Multifunctional Terminal MFT6/2 with its 12.1" SVGA TFT display is the largest in the DEUTA product range. For much useful information in the driver's console.

MFT6/2

Feature/Specification	MFT6/2
Display lighting	LED backlight
Dimmable lighting	0 to 350 cd/m^2
Status LEDs	2-3 device-dependent
CPU/clock frequency	Geode, LX 800, 500 MHz
RAM memory	256 MB
Flash memory	min. 2 GB
Extensibility	upon request
PC keyboard connection	USB keyboard
Additional controller	Environment Controller
Buzzer	yes
Temperature management	yes
Ambient light sensor	front side
Power supply	24 od. 74 - 110V (DC $\pm$ 30%)
Power consumption	typ. 25 W
Display type/size	Colour TFT/12.1" (30.7 cm)
Display resolution, colour intensity	800 x 600, 18 bit (optional 1024 x 768)
Ethernet	2x 10/100 Base T as M12 d-coded[1]
Video in	4 x FBAS (analogue)
Audio out	2 x Line Out or 2 x 2 W loudspeakers
Serial interfaces	1 x RS 422/RS 485
USB	2 x USB2.0 (M8 a-coded[1])
Digital Input / Output	+ Feature Connector
Vehicle bus	MVB on board (EMD or ESD), Ethernet
Device address	3 bit
Keypad device front	Short-stroke membrane keypad
Keypad backlight	LED
Touch screen	resistive, scratch-proof
Front dimension (W x H)	349 mm x 245 mm
Mounting dimension (W x H x D)	319 mm x 235 mm x 47 mm
Weight	approx. 3.8 kg
Protection class front/rear	IP 65 / IP 54
Operating temperature	-25°C to 70°C
Temperature storage	-35°C to 85°C
MTBF value	approx. 100,000 h
Operating system	OS LINUX, QNX™, Windows™

[1] Available as accessory from DEUTA: Adapters/cables/loudspeaker front plates/ serial switchbox/USB Ethernet adapter/ power supply

»DEUTA MFT102 - EBuLa Display -
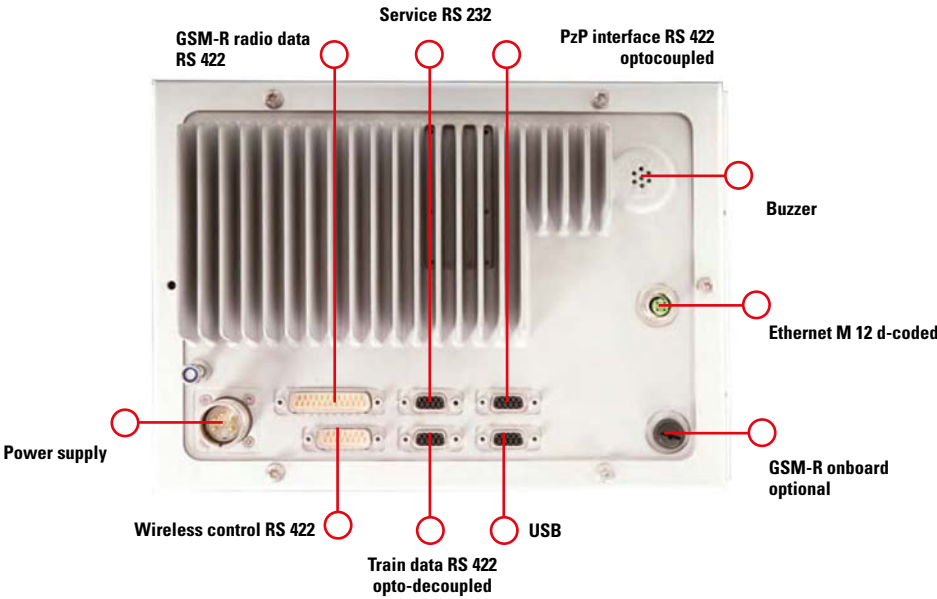
flexible, powerful and low-maintenance!«

- 10.4" TFT with 640 x 480, 256 K colours, LED lighted
- AMD Fusion, Dual-Core processor 1 GHz
- Internal Flash disk with 2 GB
- Protection category: IP 54 front / IP 21 rear
- Environmental Controller
- Approved for the "EBuLa" application by the DB AG

MFT102

Low-maintenance structure
The EBuLa display has omitted the accumulator block, fan, CD-ROM and hard disk, thus making the MFT102 a nearly maintenance free device.

Reduced installation depth
More room in the driver's console thanks to the reduced installation depth of 88.5 mm.

PC keyboard

Covered PCMCIA drive

USB

Environmental Controller
Simplified operating time diagnostics, optimally scheduled maintenance intervals and screen contents that can be read out at any time, and keyboard confirmations.

GSM-R radio data RS 422

Service RS 232

PzP interface RS 422 optocoupled

Buzzer

Ethernet M 12 d-coded

Power supply

GSM-R onboard optional

Wireless control RS 422

Train data RS 422 opto-decoupled

USB

Flexible system
Easily expandable system with integrated PC 104 interface. Next to the main EBuLa application under WIN XP Embedded®, additional applications can be used simultaneously under different operating systems such as, e.g. LINUX, QNX™ or WINDOWS™.

High performance
The high performance of the MFT 102 permits parallel applications.

Compliant with standards
The MFT 102 complies with the standards: EN 50155-V.2001, EN 50121-3-2, EN 61000-6-4, and EN 61000-6-2, LESDB.

Feature/Specification	MFT102
Resolution	640 x 480
Screen diagonal	10.4", 26.4 cm
Display lighting	LED backlight
Dimmable lighting	automatic regulation
CPU/clock frequency	AMD Fusion, Dual-Core processor, 1 GHz
RAM memory	1 GB
CFast™ Card	2 GB
Additional controller	yes
Slot for vehicle bus	optional onboard (e.g. CAN)
Expansion options	optional
Ethernet	10 BASE-T; 100 BASE-Tx M 12d
Serial interfaces	RS 232 for service,
	RS 422 for train data, LZB, PzP
	2x RS 422 for EBuLA radio approved for GSM-R by the DB AG
USB connection	D-Sub front and rear
PC card (PCMCIA)	yes
Ambient light sensor	front side
Keypad device at front	Short-stroke membrane keypad
Keypad backlight	LED
PC keyboard connection	yes, front face
Power supply	24 to 110 VDC
Power consumption	< 30 W
Mounting dimension (W x H x D)	310 x 214 x 88.5 mm
Temperature range operation	-25°C to +70°C (full functionality)
Temperature storage	-40°C to +85°C
Weight	approx. 4.5 kg
Protection class front/rear	IP 54 / IP 21
MTBF value	approx. 100,000 hrs.

»DEUTA DAT2050

Compact & Brilliant«

- 5.0" TFT, 800 x 480 display resolution / 400 cd/m² lighting
- ARM, 1 GHz processor
- improved power consumption due to innovative technology
- sophisticated HMI in lean design
- wide range power supply with maximum efficiency

DAT2050

DAT2050kwc	
Display type	5" TFT display
Display resolution	800 x 480 Pixel
Display lighting	LED-backlight
Dimmable lighting	automatically 0 up to 350 cd/m²
Status LED	operating LED (yellow)
Buzzer	yes (approx. 3 kHz frequency)
Ambient light sensor	1 front side
Input unit	capacitive touch (RAL9005), optical bonded
CPU/clock frequency	ARM CPU, 1 GHz
RAM Memory	min. 512 MB, DDR3
Storage medium	internal flash drive min. 16 GB
Power supply	24 V DC up to 110 V DC (±30%)
Power consumption	typ. 10 W
Vehicle bus	1x RS485, D-Sub 9-pin, female UNC 4/40
Ethernet interfaces	1x Ethernet interface: M12, d coded female 1000 Base-T
USB interfaces	1x USB interface: M8, 4-pin pins, female
Mounting dimension (W x H x D)	143 x 100 x approx. 113 mm
Weight	approx. 1.5 kg
Protection category front/rear	IP 65 / IP 40
Temperature range operation	-25°C up to +70°C (full functionality)
Temperature range storage	-40°C up to +80°C
MTBF value	approx. 100,000 h
Operating system	LINUX
Project software	customised
EN standards	EN50155, EN 50121-3-2, EN55011, EN61000-4-2, EN61000-4-3, EN61000-4-4,EN61000-4-5, EN61000-4-6, EN61373, EN45545-2:2013
CE	yes

DAT2050

Thanks to its lean design DAT2050 can be applied as HMI in many fields. Even smallest details are sharply shown in a visualisation due to a high resolution of 800 x 480 pixels.

»DEUTA DAT1080/2080 –

Optional with IconTrust® and SelectTrust® up to SIL 3«

DAT1080/2080
- 8" WVGA terminals
- ARM, 500 MHz processor
- as redundant version in use for ETCS applications with STM/NTC
  (Specific Transmission Module)/(National Train Control)
- optional with patented IconTrust® safety technology

DAT1080/2080

The DAT can be used optionally as single display or as redundant double display to increase the availability.

With its compact housing shape, the DAT in the redundant double display variant is compatible with the standard 10" displays.

As an option the DAT series can be equipped with the patented IconTrust® technology as standard. IconTrust® **monitors predefined areas on the TFT display**, analyses the displayed image and compares the image data with the value of the initial input variable. In the event of deviations, IconTrust® triggers a safety-oriented response.

SelectTrust is the first technology worldwide to demonstrably **secure correct manual input of information** via touchscreen.

Absolutely safe
Equipped with IconTrust® & SelectTrust®, the DATS offers a maximum of safety.

DAT1080

DAT 2080

DAT1080/2080	
Display type	Colour TFT 8" WVGA
Display resolution	480 x 800 pixel
Display lighting	LED backlight
Dimmable lighting	0 to 500 cd/m2
Status LEDs	3 LEDs
Ambient light sensor	2 front face
Input unit	capacitive touch
CPU/clock frequency	ARM CPU, 1GHz
RAM memory	512MB, DDR 3
Flash memory	min. 4GB
Power supply	24V DC to 110 V DC (±30%)
Power consumption	max. 20 W
Vehicle bus	Diverse buses possible (MVB, CAN, Ethernet, RS485)
Ethernet interfaces	2x Ethernet interfaces, standard: as per IEEE 802.3 10BaseT and 100BaseTx
USB interfaces	2x USB interfaces, standard: as per USB2.0, up to 480 MBit/s (for service purposes)
RS422/485 interfaces	1x RS 422/485, standard: as per IEEE RS422 or IEEE RS485
Audio	1x 8 W at 8 ohm (others as option)
Mounting dimension (W x H x D)	240 x 150 x ca. 100 mm with plug
Weight	Approx. 3 kg
Protection category front/rear	IP 65 / IP 50
Temperature range operation	-25 ºC to +70 ºC
Temperature range storage	-40 ºC to +85 ºC
MTBF value	approx. 89,000 h
Safe Supervision Function (optional)	safe display: IconTrust® Plus Generic, up to SIL 3
	safe input: SelectTrust®, up to SIL 2
Operating system	LINUX
Project software	customer-specific
Application software	In accordance with ETCS Baseline 3 and national train protection requirements
EN standards	EN45545-2 2013, EN50016, EN50155, EN50121, EN61000-4-2,
	EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61373
CE	Yes

[1] Available as accessory: Plug for power supply 12-pole, redundant switch Scha151, USB service cable - M8 to standard USB adapter, cable length 1 m, Ethernet service cable - M12 zu RJ45 adapter cable, cable length 0.5 m, When used as redundant double display: Connecting cable vehicle bus DSUB9 4/40 UNC, ETH/ETC M12/M12

»DEUTA DAT3080 / MFT3110

One Mainboard = Two Variants«

DAT3080

- Quad Core CortexA35 1.2 GHz
- Display resolution up to 1920 x 1080 (Full HD)
- Security options
- 3GB RAM DDR4

DAT3080 / MFT3110

Depending on their system environments our customers use either 8" terminals for a redundant application or 10" terminals. The IMX8X ARM CPU platform offers equally the basis for both terminal variants with sustainable advantages:

- one common IconTrust for both terminal sizes
- one common assessment, regardless of the variant
- one common safety index for a simplified system assessment
- prepared interfaces for all applications
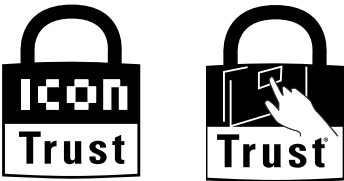
DAT3080

DAT3110

DAT3080 / MFT3110	
Display Type	Colour TFT 8" WVGA / Colour TFT 10.4"
Display resolution	480 x 800 Pixel / 1024 x 768 Pixel
Display lighting	3 LEDs
Dimmable lighting	0 up to 1,200 cd/m2
Status LEDs	3 LEDs
Ambient light sensor	front side
Keypad device front	capacitive touche
CPU/clock frequency	IMX8X ARM A35 1.2 GHz, CPU, >500MHz
RAM memory	3GB RAM DDR4
Flash memory	16 GB SD card
Extensibility	upon request
Additional controller	Environmental Controller
Buzzer	yes
Logical Inputs	yes
Power supply	24V DC up to 110 V DC (±30%)
Power consumption	< 20 W
Ethernet interfaces	2x 10BaseT (M12 d-coded)
USB interfaces	2x USB2.0 (M8-a-coded)
Vehicle bus, I/O	RS 422/485, MVB, CAN, RS232, PROFIBUS
Audio	1x 10 W, 8 Ohm amplifier
Mounting dimension (W x H x D)	DAT3080: 240 mm x 150 mm x approx. 65 mm with plug
	DAT3110: 280 mm x 204 mm x ca. 65 mm with plug
Weight	approx. 3 kg
Proection class front/rear	IP 65 / IP 30
Operating temperature	-25 ºC up to +70 ºC
Storage Temperature	-40 ºC up to +85 ºC
MTBF value	approx. 89,000 h
Safe Supervision Function (optional)	safe display: IconTrust® up to SIL 3
	safe input: SelectTrust®, up to SIL 2
Operating system	LINUX
Project software	customer specific
Application software	Acc. ETCS Baseline 3 and national train protection requirements
EN Standards	EN45545-2 2013, EN50016, EN50155, EN50121, EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61373
CE	yes

1) Available as accessory: Plug for power supply 12-pole, redundant switch Scha151, USB service cable - M8 to standard USB adapter, cable length 1 m, Ethernet service cable - M12 zu RJ45 adapter cable, cable length 0.5 m, When used as redundant double display: Connecting cable vehicle bus DSUB9 4/40 UNC, ETH/ETC M12/M12

Icon Trust

Trust

»DEUTA MFTR –

Redundant display solutions!«

- Two redundant 8" colour terminals
- 10.4" total surface
- ARM , 500 MHz processor
- optimised for ETCS and LZB

MFTR8/2

MFTRS1080

MFTR8/2

Two redundant full-valued 8" vertical terminals with a total surface of 10.4" optimise the display availability of the MFT R 8/2.

Each of the two displays are full-valued, individually replaceable function modules, thus satisfying the requirement towards minimised life-cycle costs. The train driver can manually switch between the terminals.
For train protection applications such as ETCS, LZB, and of course any customer application.

MFTRS1080

Would you like to replace your 10" driver's cab terminal with a redundant terminal equipped with IconTrust®? DEUTA proves that two redundant terminals fit into the MFTRS1080. This way, you simply replace a 10" terminal with a redundant terminal concept and without any modifications to the driver's console.

| **MFTR8/2 MFTRS1080**	
consisting out of 2 DATS2080kwe respectively 2 DATS1080kwa	
Feature/Specification	**for DAT2080kwe and DAT1080kwa**
Display type	Colour TFT 8" WVGA
Display resolution	480 x 800 pixel
Display lighting	LED backlight
Dimmable lighting	0 to 500 cd/m2
Status LEDs	3 LEDs
Ambient light sensor	2 front face
Input unit	capacitive touch
CPU/clock frequency	ARM CPU, 1GHz
Memory	512MB, DDR RAM
Storage medium	Internal Flash Drive min. 4GB
Power supply	24V DC to 110 V DC (±30%)
Power consumption	max. 40 W
Vehicle bus	Diverse buses possible (MVB, CAN, Ethernet, RS485)
Ethernet interfaces	2x Ethernet interfaces, standard: as per IEEE 802.3 10BaseT and 100BaseTx
USB interfaces	2x USB interfaces, standard: as per USB2.0, up to 480 MBit/s (for service purposes)
RS422/485 interfaces	1x RS 422/485, standard: as per IEEE RS422 or IEEE RS485
Audio	1x 8 W at 8 ohm (others as option)
Width / Height / Depth	240 mm / 150 mm / < 100 mm, with plug
Weight	Approx. 3.5 kg
Protection category front/rear	IP 65 / IP 50
Temperature range operation	-25 ºC to +70 ºC
Temperature range storage	-40 ºC to +85 ºC
MTBF value	approx. 89,000 hrs.
Safe Supervision Function (optional)	safe display: IconTrust® Plus Generic, up to SIL 3
	safe input: SelectTrust®, up to SIL 2
Operating system	LINUX
Project software	customer-specific
Application software	In accordance with ETCS Baseline 3 and national train protection requirements
EN standards	EN45545-2 2013, EN50016, EN50155, EN50121, EN61000-4-2, EN61000-4-3,EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61373
CE	Yes

1) Available as accessory: Plug for power supply 12-pole, redundant switch Scha151, USB service cable - M8 to standard USB adapter, cable length 1 m, Ethernet service cable - M12 zu RJ45 adapter cable, cable length 0.5 m, When used as redundant double display: Connecting cable vehicle bus DSUB9 4/40 UNC, ETH/ETC M12/M12

»DEUTA SmartView Terminals –

high quality & elegance with PROFINET & PROFIsafe«

- Extra flat design
- PROFINET CC-B with MRP
- Standard VESA 75 mounting option
- No moving parts like fans, hard disks, etc.
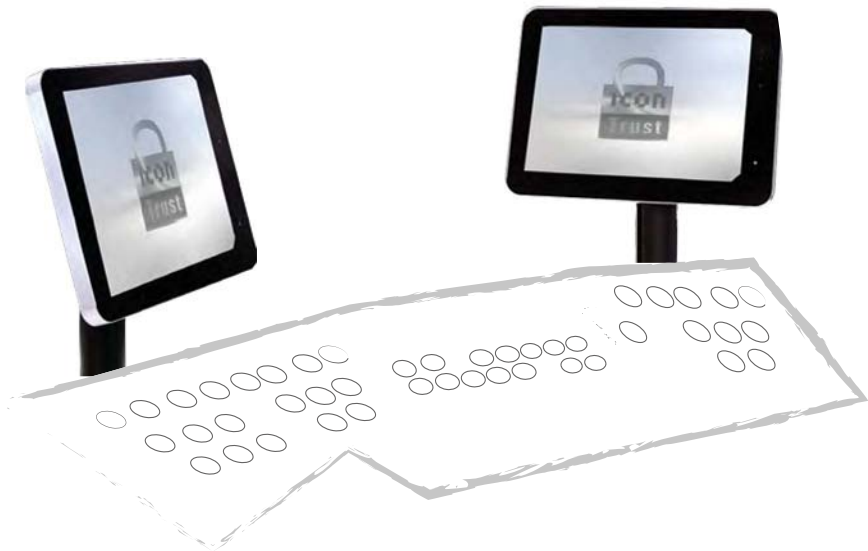
Modern optic with a new user experience

In modern rail vehicles, the driver's cab terminal is not just an operating instrument in the focus of the driver, but also an optical component in the overall appearance of the vehicle. The Deuta SmartView Terminal underlines the modernity of the vehicles with a very flat design, narrow, rounded display bezels and a brilliant optically bonded surface.

The Deuta SmartView Terminal will not longer be embedded inside the surface of the driver's desk, as it is designed to be mounted on a Vesa monitor system. Depending on the seating position and size of the drivers, the height of the terminal can be positioned variably.

D-SmartView & D-SmartView Trust

PROFINET
The unit is equipped with PROFINET:
- Compact field unit
- CC-B support
- Dual port
- With MRP support
- PNIO_version: V2.34
- Status LED for „DCP signal"

PROFIsafe (only MFTS204)
- PROFIsafe version: V2.4 and V2.6
- Adress type 2
- Without iPar-server support

[1] Available as accessory fromDEUTA: Adapter/cable/USB Ethernet adapter

Feature/Specification	D-SmartView / D-SmartView Trust
Display lighting	LED backlight
Dimmable lighting	0 to 800 cd/m^2
Status LEDs	3
CPU/clock frequency	Quadcore INTEL® Processor ATOM®, 4x 1.6 GHz
RAM memory	8 GB
Graphics	INTEL® HD Graphics 500
Mass memory	up to 64 GB
Additional controller	Environment Controller
Buzzer	yes
Temperature management	yes
Ambient light sensor	front side
Power supply	prepared for an external power supply VDC acc. railway standard
Power consumption	typ. 25 W
Display type/size	Colour TFT / 12.1"
Display resolution, colour intensity	1024 x 768
Viewing angle	±85° in horiz. (left -,right +) and vertic. (lower -, upper +) direction
Ethernet	1x 10/100 Base T as M12 d-coded[1], 2x PROFINET connector
PROFINET	2x CC-B, dual port, with MRP support, M12 d-coded PNIO_version: V2.34, status LED for "DCP Signal"
PROFIsafe only MFTS204	version 2.4 and V2.6 adress type 2, without iPar server support
Audio out	class-D stereo audio amplifier min. 5 W to 8 Ohm
Serial Interfaces	upon request 1 x RS 422/RS 485
Service Interfaces	2 x USB2.0 (M8 a-coded[1])
Vehicle bus	1x Ethernet, 1x PROFINET, 1x PROFIsafe (only MFTS204) upon request: CAN, MVB, RS422, RS485
Device coding	4 codings possible
Touch screen	capacitive, optically bonded
Front dimension (W x H)	318 mm x 234 mm
Weight	approx. 3.6 kg
Protection class front/rear	IP42 (sealed against dust and splash-proofed)
Temperature range operation	full functionality: -25°C up to +55°C
Operating system	Linux
Applications	variable, depending on the task
Mounting	prepared for standard VESA 75
SIL data indication	version MFTS204 - with IconTrust® up to SIL3
SIL data entry	version MFTS204 - with SelectTrust® up to SIL2
Standard	EN 45545, EN 50155, EN 50121-3-2, EN55011, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6