



Retrofit – USA

# Retrofitting individual components



**DEUTA-WERKE** 

*The Transport Vision Company*



“Retrofit solutions with integration of functions represent a new challenge in developing displays. – We would be pleased to make suggestions for project-specific solutions.”

*Dr. Karl-Heinz Schomaker, DEUTA*

*Innovation*

*Consultation*

### **The project:**

#### **Train protection in the U.S.**

Train protection displays in modular construction are in use in the U.S. Customary until a few years ago, the displays are made up of several p. c. boards and cable trees. However, the number of individual components, or their connection, made the device interference-prone and increased the Life cycle costs. Although the functionality and the safety concept still complied with the requirements, the reliability of the display was no longer state-of-the-art.

### **The task:**

#### **Highest possible availability as retrofit solution**

A display distinguished by the latest technology with highest availability was to be qualified for existing vehicles in the U.S. market. The particularity of the previously utilized display: the compact structural shape with specific shape factor, a built-in keypad, a control similar to a dead man's switch, a changeover switch and direct wired LEDs. For the replacement, the appearance, operating software, sound outputs and plug-pin assignments of the new display had to remain identical. Apart from the look and feel, the safety concept had to be maintained. Including compliance with the required U.S. standards, of course.

### **Customer-specific in-house developments**

To satisfy the specified requirements such as reliability and availability, the MFT 9 display was specifically developed for the customer on the basis of the MFT Geode platform. Competency in customer-specific in-house board development and production qualifies DEUTA in particular to replace discontinued displays with a form-fit-function compatible in-house development. Integration in our long-term MFT Geode platform road-map guarantees shorter delivery times and already well-tested components.

### **Reliability due to integrative approach**

By using the MFT Geode platform, the customer was able to immediately start developing the application software while DEUTA was redesigning the board in parallel. Further project-specific interfaces and keyboard, switch, and signal lamp interfaces were integrated on the same board with the processor part. This integrative approach enormously reduced the display's susceptibility to faults. The MFT 9 thus satisfies the highest requirements in terms of reliability and availability. The experiences previously gained with the displays for the U.S. market made it possible to comply with the specifications already during the development phase.



## MFT 9 – The multi-functional terminal

- Visualization of process data
- Data entry using backlit short-stroke keyboard
- Single board PC ("Embedded PC") with Geode processor
- 6.5" active matrix color display (TFT)
- Operating temperature – 25°C...+70°C
- Integrated environment controller
  - Independent processor for SIL concepts
  - Temperature monitoring
  - Brightness control of the display lighting
  - Activating status LEDs (at front)
  - Acoustic signal (beeper)
  - Watchdog function
  - Reading the device coding
  - Reading the frequency input
- Minor depth due to single-board structure
- Built-in keypad
- Control panel similar to a dead man's switch
- Changeover switch and directly wired LEDs
- No moving parts such as fan, hard drives, etc.
- Protection against water condensation in the device
- Suitable for rail applications according to EN 50155 and U.S. standards

Multi-functional terminal MFT 9



### MFT 9

<b>Display lighting</b>	through CCFL <sup>1)</sup>
<b>Lighting dimmable</b>	0; 4 to 350 cd/m <sup>2</sup>
<b>Status LEDs</b>	2 x status + 4 x signal lamps
<b>CPU/clock frequency</b>	Geode; 266 MHz
<b>RAM memory</b>	128 MB
<b>Internal flash disk</b>	Internal Compact Flash ≥ 128 MB
<b>Flash-EPROM</b>	1 MB
<b>Video memory</b>	4 MB
<b>Expansions</b>	customer-specific
<b>PC keyboard connection</b>	USB keyboard
<b>Additional controller</b>	Environment Controller
<b>Buzzer</b>	yes
<b>Temperature management</b>	yes
<b>Ambient light sensor</b>	front side
<b>Power supply</b>	24-90V DC ±30%
<b>Power consumption</b>	< 20 W
<b>Display type/size</b>	Color TFT / 6.5" (16.5 cm)
<b>Display resolution, color intensity</b>	640 x 480, 18 bit
<b>Ethernet</b>	10/100 Base T as M12D <sup>2)</sup>
<b>Serial interfaces</b>	2 x RS 485
<b>IrDA</b>	No
<b>USB</b>	2 x
<b>Input / Output</b>	2 x frequency inputs
<b>Keypad device front</b>	yes, customer-specific
<b>Keyboard lighting</b>	LED
<b>Front dimension (W x H)</b>	376 x 201 mm
<b>Mounting dimension (W x H x D)</b>	308 x 162 x 65 mm
<b>Weight</b>	approx. 4 kg
<b>Protection category front/rear</b>	IP 65 / IP 54
<b>Operating temperature</b>	-25°C to 70°C
<b>Temperature storage</b>	-35°C to 85°C
<b>MTBF value without CCFL<sup>1)</sup></b>	> 100,000 hrs

<sup>1)</sup> CCFL = Cold Cathode Fluorescent Lamp

<sup>2)</sup> Adapter available as accessory from DEUTA



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