

# DuraMAR2000 Series Network Centric Solutions for Transportation

DIGITAL TECHNOLOGIES FOR A BETTER WORLD  
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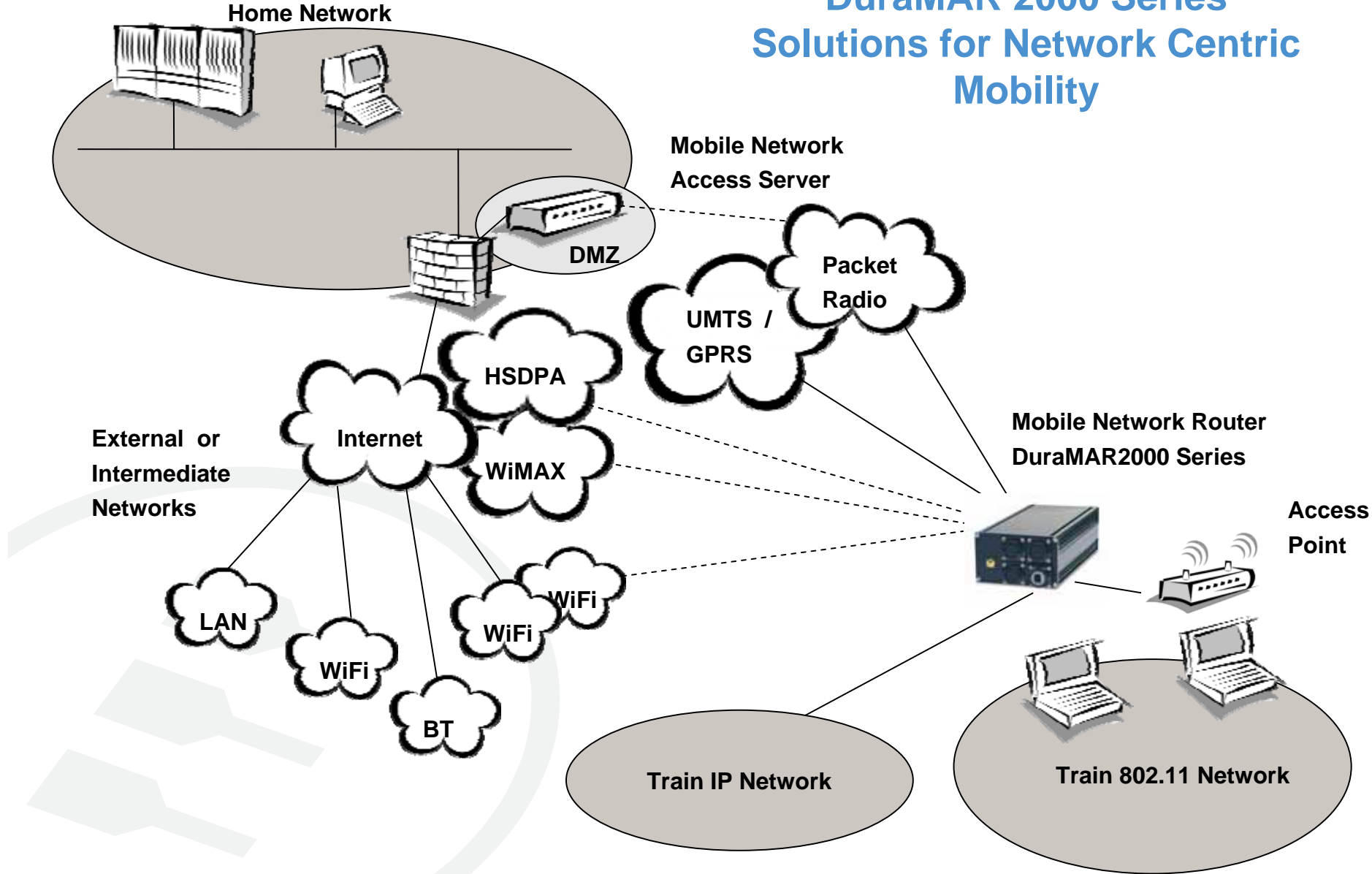
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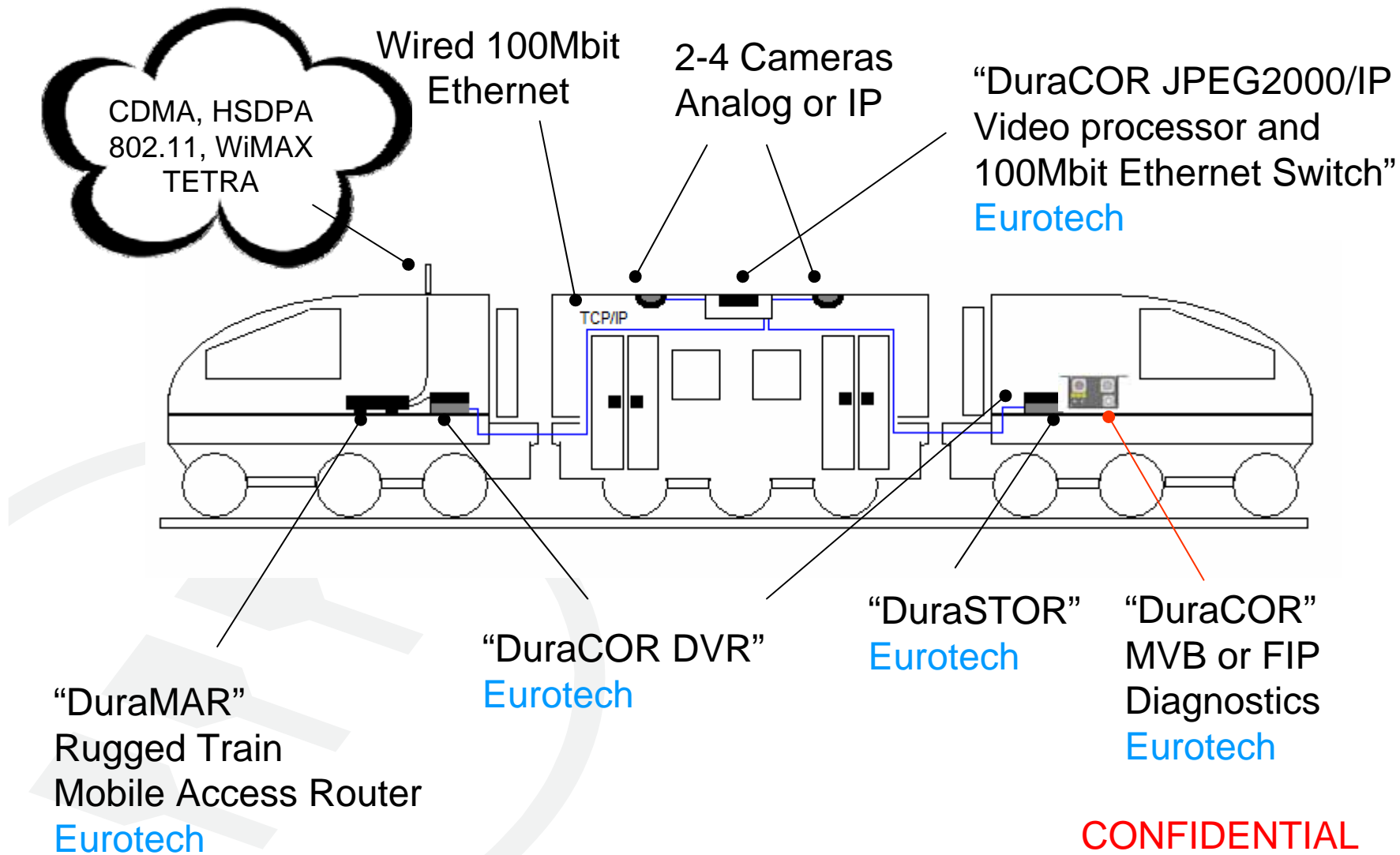
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# DuraMAR 2000 Series Solutions for Network Centric Mobility



# General Overview – Eurotech systems for metro/train control and communication



## DuraMAR 2000 Series

### Mobile Access Router Product Philosophy

- Ready off-the-shelf solution for seamless Mobile IP
- Fully integrated device – Router, wireless terminals and power supply
- 10/100Mbit Ethernet Interface to AP and DuraCOR Controller
- Versatile configurations:
  1. DuraMAR 2100 - Standalone CISCO MAR , MARC module from 3220
  2. DuraMAR 2150 - CISCO MARC with High-Speed wireless communications controller
    - HSDPA, CDMA2000, GPRS
    - WiMAX, 802.11 WiFi
  3. DuraMAR 2200 - Embedded Mobile Access Router
    - HSDPA, CDMA2000, GPRS
    - WiMAX ,802.11 WiFi
- Reduced cost of ownership
- New wireless technologies easy to adopt
- Upgradeable in HW and SW
- Supports factory or retro-fit installation
- Qualified and certified for train applications

## DuraMAR 2000 Series Mobile Access Router Product Matrix

- **DuraMAR 2100**
  - CISCO 3200 compatible Mobile Access Router
- **DuraMAR 2150**
  - CISCO based Mobile Access Router
  - Eurotech communications controller
- **DuraMAR 2200**
  - Embedded Mobile Access Router



## Suitable Applications in Rail and Rolling Stock

- High-Speed wireless passenger Internet service
- Train borne live video surveillance system back-hauls
- Advanced information and entertainment
- Remote train diagnostics



## DuraMAR 2000 Series Mobility Access Router Product Matrix

- **DuraMAR 2100**
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- DuraMAR 2200
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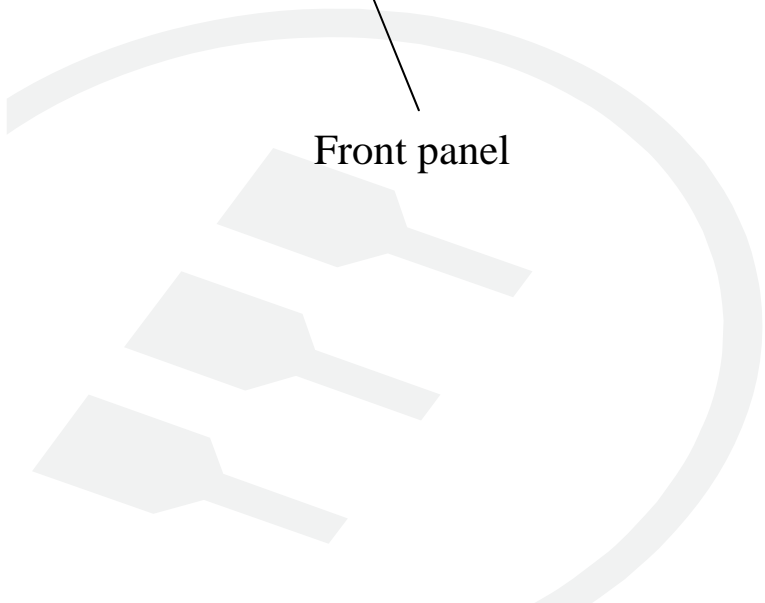
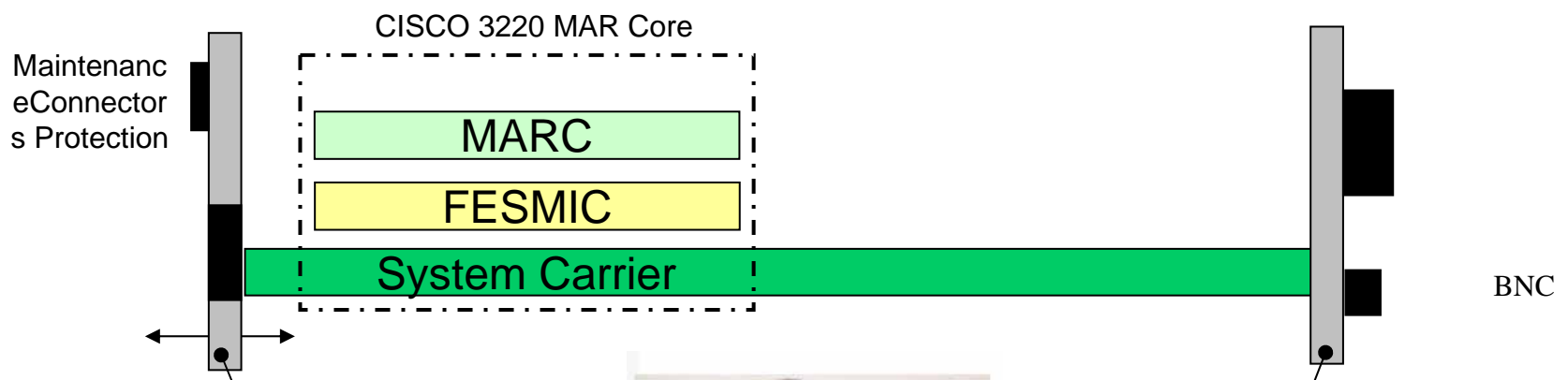
## DuraMAR 2100 Product Highlights

- CISCO K9 IOS - Advanced IP services & interoperability
- Rugged implementation of CISCO 3220 MAR
  - 3220 MARC
  - 3220 FESMIC
  - Standard 3220 ports to external devices
- Supports use of external wireless terminals
  - 3 x 10/100Mbit Ethernet – MAR router ports
  - 1 x Serial port
- -20 to +70C operating temperature range
- Train power supply 24VDc or 110VDc
- MIL-26482 Series rugged connectors
- Qualified for train and rolling stock installation

Front Side  
(Maintenance)

# DuraMAR 2100 Structure

Rear Side  
(Field)



## DuraMAR 2100 System interfaces

- Power
  - +110V train feeder supply
  - +8 to 36Vdc
- Ethernet
  - 3 x 10/100Mbit Ethernet ports MARC and FESMIC
  - POE for external devices
- Serial
  - Asynchronous RS232 serial port with power
- Utility
  - AUX and Console port of MARC

## DuraMAR 2000 Series Mobile Access Router Product Matrix

- DuraMAR 2100
  - CISCO 3200 compatible Mobile Access Router
- **DuraMAR 2150**
  - **CISCO based Mobile Access Router**
  - **Eurotech communications controller**
- DuraMAR 2200
  - Embedded Mobile Access Router

## DuraMAR 2150 Product Highlights

- Rugged implementation of CISCO MAR
  - 3220 MARC and FESMIC
- External device connectivity
  - 1 x 10/100Mbit Ethernet port
  - 2 x Serial ports
- Embedded communications controller – wireless bridge
  - HSDPA to 3220 MAR – Ethernet connection (internal)
  - WiMAX to 3220 MAR - Ethernet connection (internal)
  - USB2.0 Diagnostics and configuration port
- -20 to +55C operating temperature (WiMAX & HSDPA)
- Train power supply 24VDc or 110VDc
- MIL-26482 Series rugged connectors
- Qualified for train and rolling stock installation

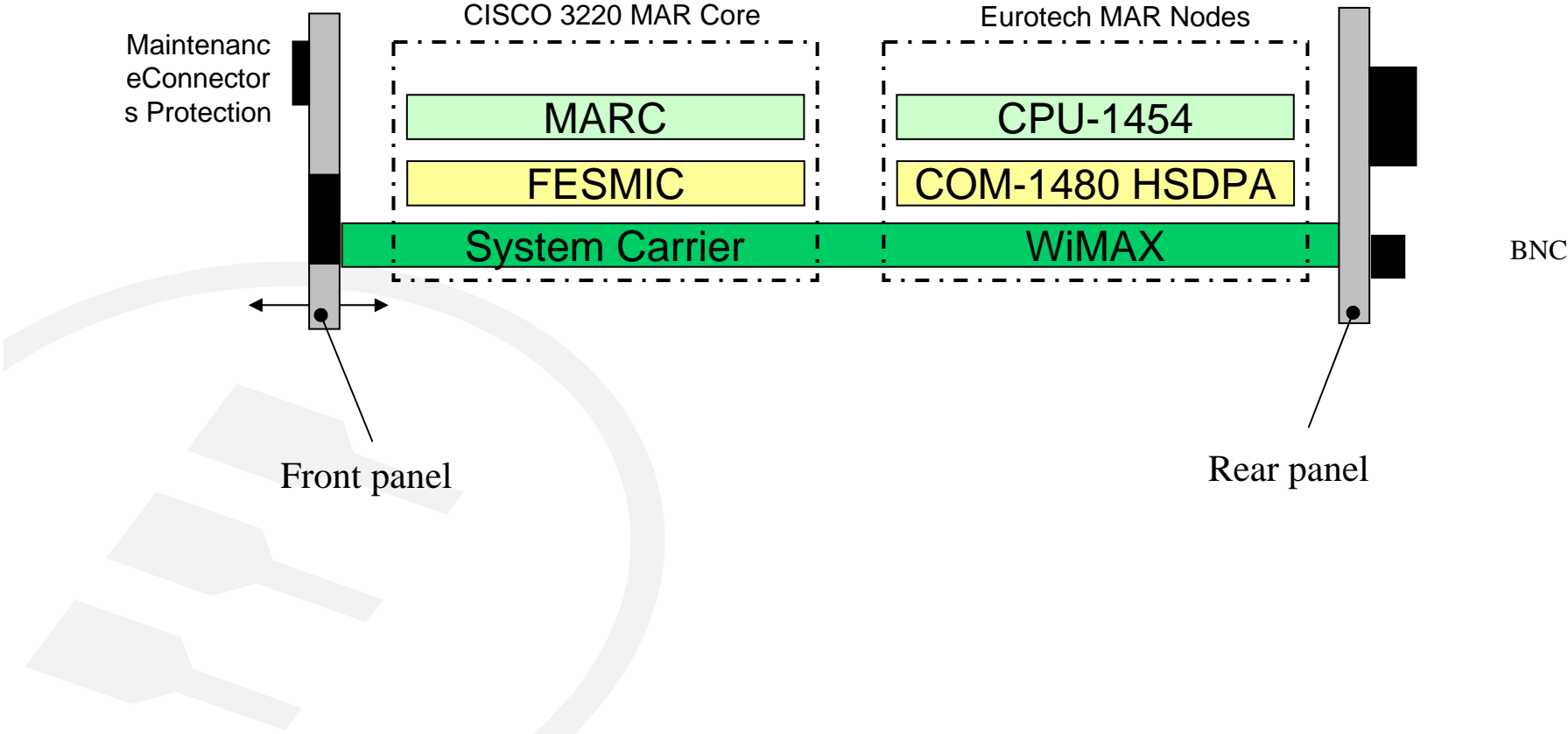
# DuraMAR 2150 Structure

Front Side

(Maintenance)

Rear Side

(Field)



## DuraMAR 2150 System interfaces

- Power
  - +110V train feeder supply
  - +8 to 36Vdc
- Ethernet
  - 10/100Mbit Ethernet – on port of MARC module
- Wireless – (connected to FESMIC)
  - HSDPA - 3.6Mbps or 7.2Mbps downlink
  - WiMAX
  - GPRS (Optional remote diagnostics interface)
- Serial
  - 2 x Asynchronous RS-232 serial ports
- Utility
  - USB 2.0 port to embedded communications controller CPU
- SIM Card
  - 2 x SIM card slots accessible under service panel (HSDPA and GPRS)

## DuraMAR 2000 Series Mobile Access Router Product Matrix

- DuraMAR 2100
  - CISCO 3200 compatible Mobile Access Router
- DuraMAR 2150
  - CISCO based Mobile Access Router
  - Eurotech communications controller
- **DuraMAR 2200**
  - **Embedded Mobile Access Router**

## DuraMAR 2200 Product Highlights

- Embedded software MAR implementation
  - Linux with Proprietary Eurotech networking software
  - Open X86 PC controller core
- External device connectivity
  - 5 x 10/100Mbit Ethernet, 2 x Serial ports
- Integrated wireless devices
  - HSDPA or CDMA2000
  - WiMAX
  - 802.11b
- -20 to +55C operating temperature (WiMAX & HSDPA)
- Train power supply 24VDc or 110VDc
- MIL-26482 Series rugged connectors
- Qualified for train and rolling stock installation

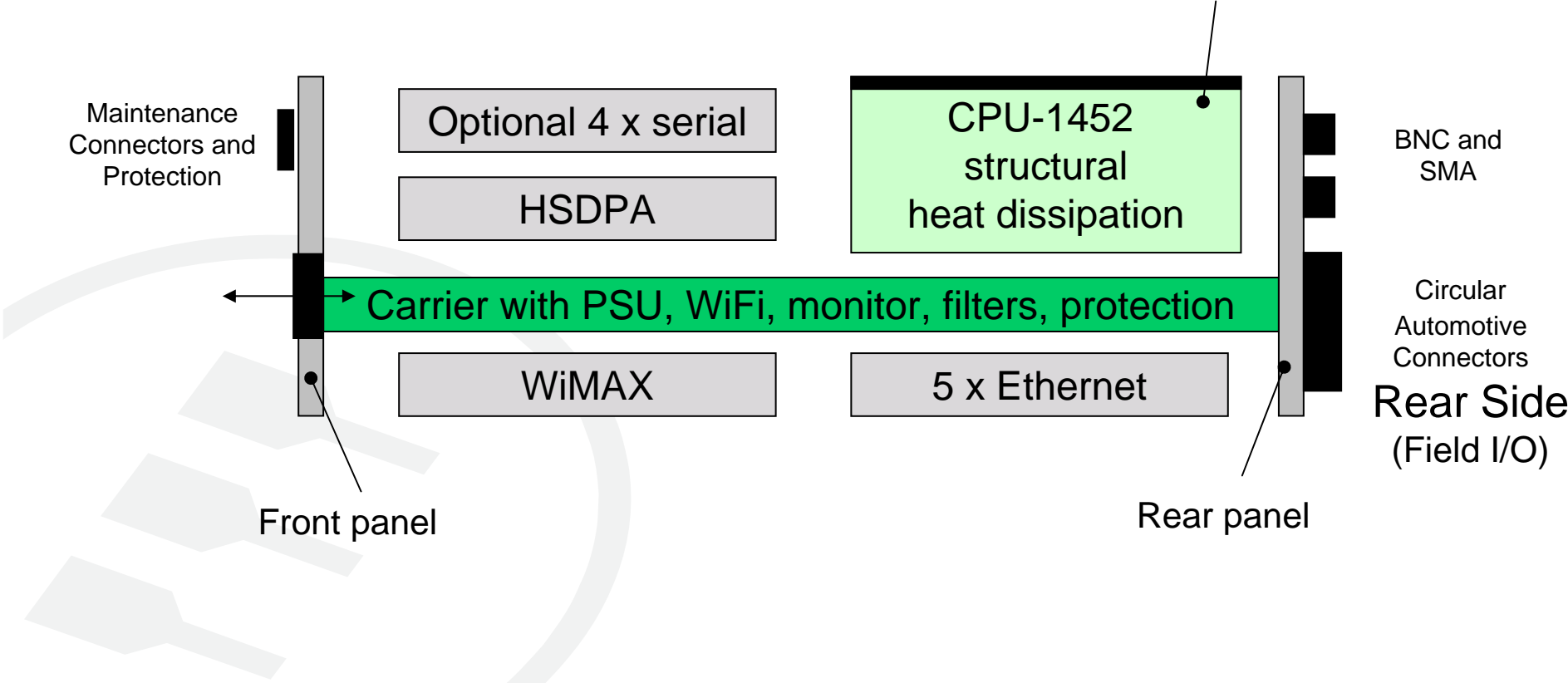
## DuraMAR 2200 MAR implementation

- VPN and encrypted tunnels
- Configurable communication path selection
- Path health monitoring
- Seamless and transparent switchover between wired or wireless communication paths
- Link aggregation
- Policy routing of traffic
- DHCP/DNS services
- GPS data stream redirection

# DuraMAR 2200 Structure

Front Side  
(Maintenance)

High Reliability Celeron  
400MHz CPU



## DuraMAR 2200 System interfaces

- Power
  - 110V train feeder supply or 8 to 36Vdc
- Ethernet
  - 2 to 5 10/100Mbit Ethernet
- Wireless
  - HSDPA, CDMA2000 and/or WiMAX
  - 802.11b optional GPRS, GSM-R
  - Optional GPS
  - TETRA (serial port interfaced external terminal)
- Serial
  - 2 to 8 Asynchronous RS-232 serial ports
- Utility
  - USB 2.0

## Vehicle Logic Units - Overview

- DuraCOR
  - Rugged X86 central units
- DuraNAV
  - Rugged PXA270 central units
- ZyWAN
  - Application ready Linux/Java wireless
- Application specific
  - Various vehicle computers

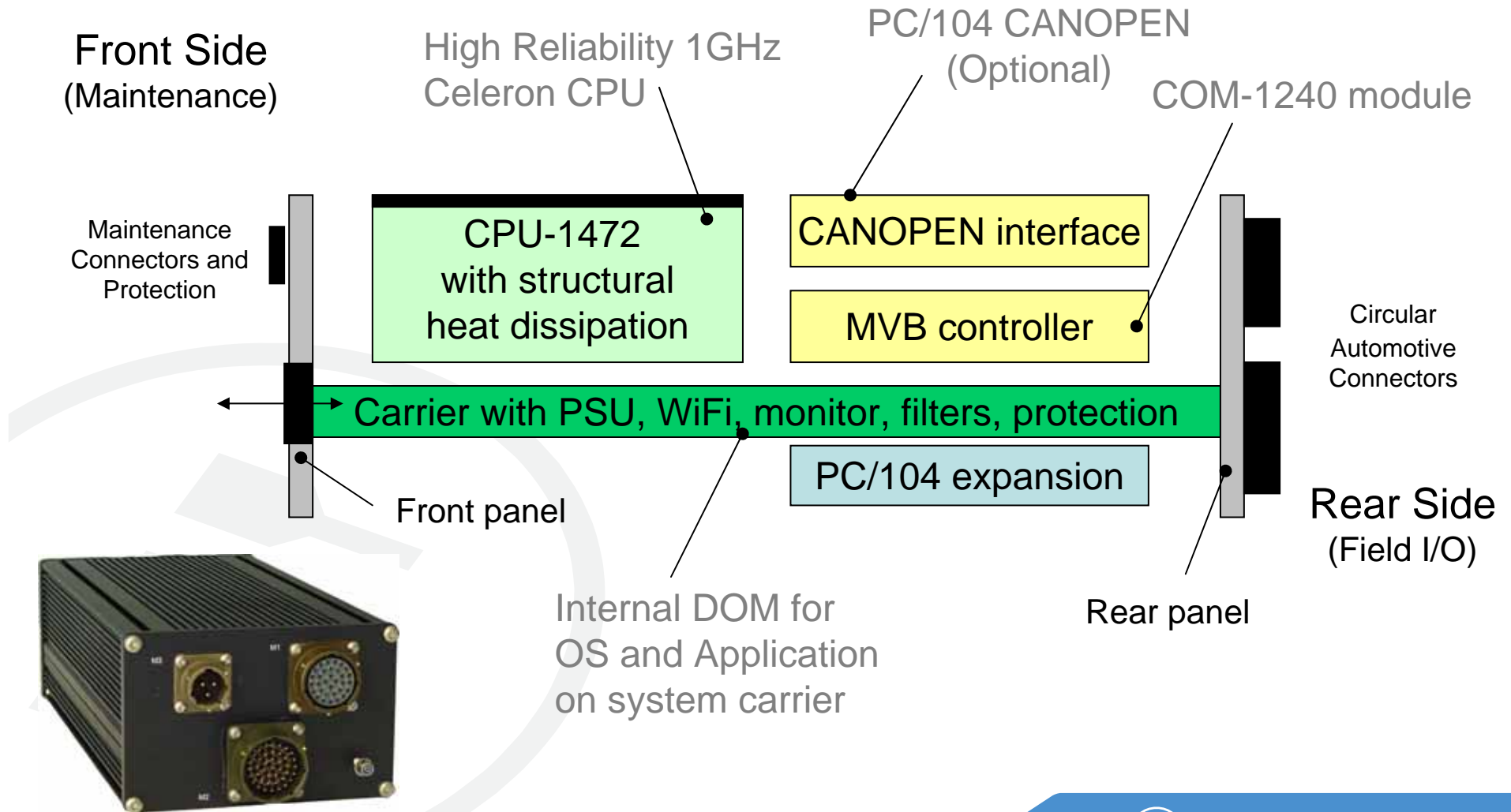


## DuraCOR Ready-to-Use Systems for Trains

- **Ready off-the-shelf system for rugged computing applications**
- Linux, WinCE or eXP operating systems (VxWORKS selectively)
- **Modular PC/104 structure** adapts to project specific requirements
- Design and production supporting long product lifetime
- Rugged sealed I/O connectors
- Structural heat dissipation for CPU and power supply
- Wide operating temperature: -20 to +70C or -40 to +80/85C
- Compliance with EN50155, EN50121
- Power supply options 9-36VDC or isolated 110VDC nominal
- HSDPA, CDMA, GPRS, GSM-R, WiFi and GPS integrated inside
- High peripheral integration, versatile interfaces
- Extensive vehicle class EMI filtering and protection
- uC - based diagnostic monitoring system "Guardian"



# DuraCOR<sup>TM</sup> 0455-X0 System Construction example



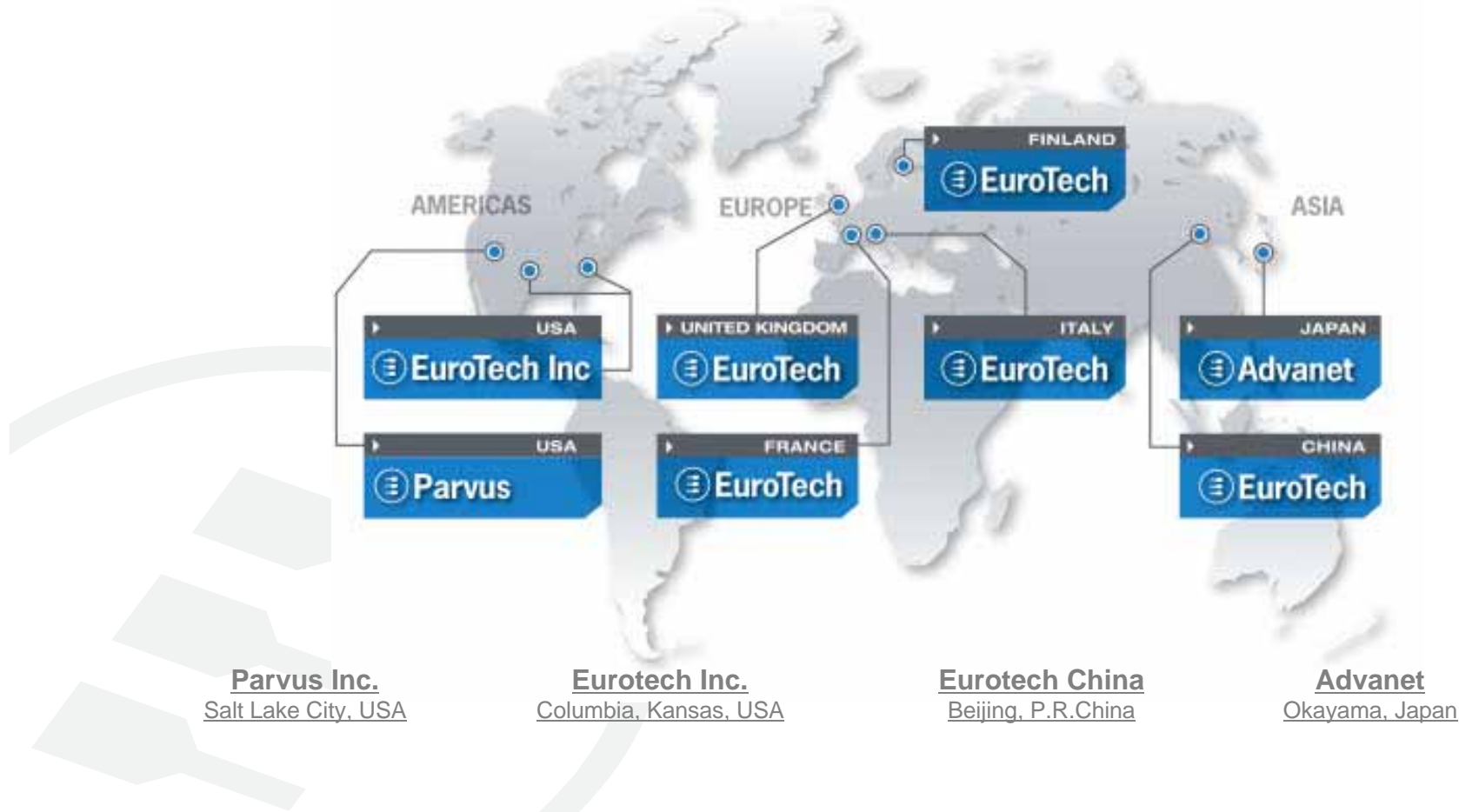
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