TECHNICA ENGINEERING

Creating the Automotive Future

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TECHNICA ENGINEERING
CREATING THE AUTOMOTIVE FUTURE

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ABOUT US

1 WHO WE ARE
Technica Engineering started as a one-man company as consultant for electronic development in automotive environments at BMW. The focus of the early years was in the classic test tasks directly at the OEM.

More than 400 employees currently work at Technica Engineering with branches, distributors and partners in 5 continents all over the world. We offer the whole Automotive Industry all-in-one solution designs with own Hardware and Software products, supporting the innovation process from problem analysis to solution and validation.
THE COMPANY

BUSINESS DATA AT A GLANCE

400+
More than 400 employees currently work at Technica Engineering – with an upward trend.

95%
More than 95% of employees hold an academic title.

5
Technica Engineering is represented with branches, distributors and partners in 5 continents all over the world.
1. Germany
   Headquarters (Munich) and Product Logistics (Garching)

2. Scandinavia
   Partnership with our distributor TechTeal

3. USA and Canada
   Local representation

4. South Korea
   Partnership with our distributor CANSys tems

5. Spain
   Electronic Development Center (Barcelona)

6. Tunisia
   Offshore Development Center (Sfax)

7. China
   Partnership with our distributors Sigent and WindHill

8. Japan
   Partnership with our distributor Gailogic and our engineering partner Toyo Corp

9. India, Australia and South East Asia
   Partnership with our distributor Menlopark
ALL IN ONE

WHAT WE DO
COMPANY SERVICES

ALL-IN-ONE SOLUTION DESIGN

System Engineering
- Ethernet Networks
- ADAS
- Body Electronics
- Specifications for communication systems
- GW Specifications + Test Concepts
- Protocols: AVB, NM, SOME IP, TSN

Testing Services
- Test Management
- Test Specification
- Test Implementation
- Test Execution
- Test Reporting
- ISTQB Enabled / extern

Product & Test Solution
- Ethernet Media Converters
- Ethernet Media Gateways
- Ethernet Capture Modules
- ANDi Tool – RBS
- Ethernet Test Suite
- ADELA

Research & Development
- Rapid Prototyping
- Test Racks and Test Systems
- HW & Firmware development
- Design for Build to Print
- A-Samples ECUs Engineering
- Automotive Sound Design

Experience from different sectors boosts customer benefit and quality, leading to a faster response to customer requests.
TECHNICA ENGINEERING
OUR AUTOMOTIVE DNA

2008
Key work for the Automotive Ethernet industry: BroadR-Reach Research for BMW and Broadcom

2010
First product release: MediaConverter, the first BroadR-Reach to Ethernet Converter

2011
First BroadR-Reach Test & Logging System: The MediaGateway

2012
Development of the interoperability tests of Automotive Ethernet through the introduction of additional 100BASE-T1 Phys at BMW

2013
New business activity: Acoustic Sound Design for BMW First EoL test system for BMW surround view system

2015
New business activity: Tier-1-supplier-level ECU System Function Test (BMW) and testing of complex connectivity Gateways for leading OEMs

2016
The world’s first 1000BASE-T1 converter and world’s Gateway Testing Experts: start of work with Audi

2017
Upgrading of System Engineering team, new projects with Ethernet for ADAS networks, expansion to overseas: Distributors in Korea, China and Japan

2018
Prototypes for 10BASE-T1S, starting analysis for 10 Gbit Ethernet, MACsec Demo and analysis for Automotive use-cases, new "Capture Modules" for a perfect Ethernet logging network
PRODUCT PORTFOLIO

WHAT WE PRODUCE
OUR PORTFOLIO
HARDWARE PRODUCTS

CONVERTERS
- 100BASE-T1 MEDIA CONVERTER_RCM
- 100BASE-T1 MEDIA CONVERTER_NXP
- 1000BASE-T1 MEDIA CONVERTER
- USB-100BASE-T1 CONVERTER
- 100BASE-T1 MEDIA CONVERTER_EM SET
- 1000BASE-T1 EMC Converter
- 100BASE-T1 SFP MODULE
- 1000BASE-T1 SFP MODULE

SWITCH BASED
- MEDIA GATEWAY
- UNIVERSAL EMC DEVICE

TAPS
- 100BASE-T1 SPY-12 PORT
- 1000BASE-T1 SPY MINI

IVN 2 ETHERNET
- CAPTURE MODULES:
  - CM 1000 HIGH
  - CM 100 HIGH
  - CM ETH COMBO
  - CM CAN COMBO
  - CM LIN COMBO

INTEROPERABILITY
- GOLDEN DEVICE 100BASE-T1
OUR PORTFOLIO

SOFTWARE PRODUCTS

ANDi
AUTOMOTIVE NETWORK DIAGNOSER

The simple test and simulation environment for Ethernet controllers and bus systems. ANDi is a test and simulation environment for Ethernet electronic control units (BASE-T1) and also for the CAN/CAN-FD, LIN and FlexRay bus systems. The first-ever evaluation tool for SOME/IP, -SD

ADELa
AUTOMOTIVE DATABASE EDITION AND LAYOUT

The user-friendly automotive database tool that works perfectly with ANDi. ADELa is an automotive database edition tool that provides visualization and validation features of Fibex and ARXML automotive databases, primarily for Automotive Ethernet but also for CAN.

OBSERVER
AUTOMOTIVE ETHERNET TRAFFIC ANALYZER

Observer is an ANDi add-on feature that analyzes Ethernet traffic automatically by using different testing modules simultaneously. It is especially useful when having large and complex traffic captures.

ETHERNET TEST SUITE
AUTOMOTIVE ETHERNET TESTING TOOL

Ethernet Test Suite is a testing tool that includes all the specific Ethernet Tests: Basic TCP/IP, SOME-IP, Enhanced Testability Service (ETS), Service Discovery (SD), Stress tests, etc.

EVA
AUTOMOTIVE ETHERNET VIDEO ANALYZER

The Ethernet Video Analyzer is an application for displaying, recording and checking of Ethernet video-data of 100BASE-T1 cameras.
OUR SOLUTIONS

HW PRODUCTS: LOOK INTO THE FUTURE

• 1000BASE-T1 next-gen test device
• ECU/GW prototyping platform
• 10BASE-T1S testing solutions
• MultiGig testing solutions

Stay tuned!
OUR SOLUTIONS

INFORMATION AND TRAINING

The original book by our CTO, Thomas Königsdeder (formerly BMW)

Basic Automotive Ethernet Training

- **Protocols:**
  - Ethernet 802.3 frame
  - Ethernet as MAC layer
  - Ethernet Local Area Networks (802.1Q)
  - Single tag
  - Multiple tag
  - Switching - how does a switch work

- **Layer 3:**
  - Basic Terms and Functions
  - Protocol:
    - Internet Protocol (IPv4)
    - Internet Protocol Plus (IPv6)
  - Address Resolution Protocol

Advanced Automotive Ethernet Training

- **Layer 4:**
  - Basic Terms and Functions
  - Protocol:
    - Transmission Control Protocol (TCP)
    - User Datagram Protocol (UDP)
    - Internet Control Message Protocol (ICMP)

- **Layer 3 and 2:**
  - Basic Terms and Functions
  - Protocol:
    - Dynamic Host Configuration Protocol (DHCP)
    - Diagnostic Data Over Internet Protocol (DDoP)
      - Overview
      - Applications
      - Communication Example
    - SDHNP:
      - Overlay and Usage
      - Header
      - Data Types
    - SDHNP-SD (Service Discovery)
      - Header
      - Types
      - Start-up & Shut down
      - Reduced detection
    - SDHNP-TP (Transport)
      - L2TP-W (Network Management)

- **Quality of Service:**
  - Problems and Solutions
  - Traffic Management
  - Protocol:
    - Real Time Protocol (RTP)
    - IEEE 802.1Q (VLAN)
    - Time Sensitive Networking (TSN)
    - COVAY
    - Time synchronization
    - Traffic Shapers

- **Security:**
  - Basic and Terminology
  - Trusted Platform Module (TPM)
  - HSE
  - Secure Socket Layer (SSL) / Transport Layer Security (TLS)
  - Certificates

- **Author:**
  - Overview
  - Review
  - Versions

- **Testing:**
  - Functional
  - Test Types

- **Databases:**
  - Fibers
CAPTURE MODULES IVN TO ETHERNET
NEXT-GEN E/E ARCHITECTURE (AD)

OLD LOGGING SOLUTION: NOT ENOUGH!

• Stubs were simple solution for classic bus systems
  • (Take a simple and/or long stub, connect with the datalogger somewhere in the vehicle.)

• Starting at 10 MHz, this type of tapping is no longer that easy!
  • Stubs must be very short, or no Stubs are allowed
  • e.g. CAN-FD, FR – you cannot connect the datalogger in the trunk to the network in the front of the car!

• Active reinforcements are needed at appropriate locations to have appropriate signal integrity

• For networks like Ethernet 100BASE-T1 or 1000BASE-T1, there are no passive tabs!
NEXT-GEN E/E ARCHITECTURE (AD)

OLD LOGGING SOLUTION: NOT ENOUGH!

Solution:
- Use Active TAPs!
- Source & sink terminated correctly
- Signal is processed and correctly terminated
- Ethernet as a logging network!

But beware:
Active Tap is part of the network!

e.g. Ethernet: FullDuplex over one Pair
- Hybrids
- Master/Slave
- Data scrambler for Master/Slave Data

Today no alternative available
IN VEHICLE NETWORK (IVN) TO ETHERNET CAPTURE MODULES

CM 1000 HIGH
Art.-Nr.: TE-1176
- 6x Link Lines 1000BASE-T1 (12 Ports)
- PLP Protocol (Timestamp, ...)
- Configuration via Webserver
- Network Time Synchronization (802.1AS)
- Source Timestamping
- High Speed Startup
- AVB / TSN Capture Capable
- Cascading and Synchronization with multiple devices
- And much more...

CM 100 HIGH
Art.-Nr.: TE-1173
- 6x Link Lines 1000BASE-T1 (12 Ports)
- PLP Protocol (Timestamp, ...)
- Configuration via Webserver
- Network Time Synchronization (802.1AS)
- Source Timestamping
- High Speed Startup
- AVB / TSN Capture Capable
- Cascading and Synchronization with multiple devices
- And much more...

CM ETH COMBO
Art.-Nr.: TE-1175
- 1x Link Lines 1000BASE-T1
- 2x Link Lines 100BASE-T1
- PLP Protocol (Timestamp, ...)
- Configuration via Webserver
- Network Time Synchronization (802.1AS)
- Source Timestamping
- High Speed Startup
- AVB / TSN Capture Capable
- Cascading and Synchronization with multiple devices
- And much more...

CM LIN COMBO
Art.-Nr.: TE-1170
- 10x LIN
- 4x Analog Inputs
- 2x Analog Inputs (Galvanically Isolated)
- PLP Protocol (Timestamp, ...)
- Configuration via Webserver
- Network Time Synchronization (802.1AS)
- Source Timestamping
- High Speed Startup
- AVB / TSN Capture Capable
- Cascading and Synchronization with multiple devices
- And much more...

CM CAN COMBO
Art.-Nr.: TE-1171
- 6x CAN / CAN-FD
- 1x FlexRay
- 2x Rs-232 / TTL
- PLP Protocol (Timestamp, ...)
- Configuration via Webserver
- Network Time Synchronization (802.1AS)
- Source Timestamping
- High Speed Startup
- AVB / TSN Capture Capable
- Cascading and Synchronization with multiple devices
- And much more...
CAPTURE MODULES

**Scalable**
- Simply add the modules that you need, when you need them
- Time synchronization based on standards (+/- 1µs precision)

**Modular**
- Technology-based modular design
- Easy configuration via Web-browser

**Optimize**
- Reduce the length of stubs for Bus technologies and of break-out lines for T1 technologies
- Reduce the number of upload links to the logger via “cascading” and 10 Gbit uplink
- Cover the needs of self-driving E/E architectures!
New approach

- All captured data is transferred via standard IP network to PC or Logger
- Ensure loss-less capture of data
- Based on existing SPY technology, all captured data sources are sampled with common 40 ns hardware timestamp
- PLP protocol carries not just timestamp, but also exactly which port of which device did the capture

Proven technology

- Solution developed with BMW and key partners
- Complete solution already working on prototype test cars, both at OEM and at Tier 1 since 2018!
SOLUTIONS FOR TESTING

THE BENEFITS OF ALL-IN-ONE

- We build our **own test solutions**
- The test solution **fits to the customer** requirements
- The test solution builds on a **very flexible kit** from Technica Engineering
- The kit is tested on real series projects (**incremental quality increase included**)
- **Existing customer test solution** can be integrated and adapted to our solutions or vice versa
- **Essential tools** are part of the test solution (e.g. Fibex/ARXML Tooling, Restbussimulation, Recorders, Observers and Testframework)
- Early **Test Hardware** and own **DUT Emulation** help to overcome time gap before DUT is available
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