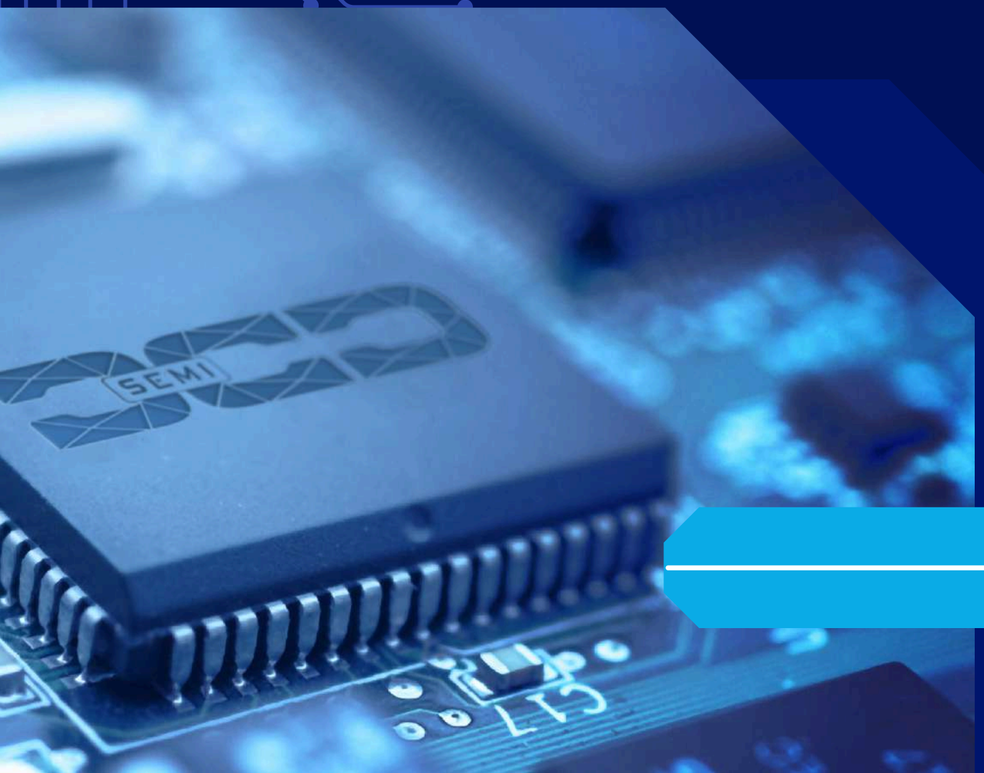
DCD-SEMI IP CORES

fuel for your next project

IP Cores tailored to your needs

Presentation By: Thomas Cwienk

AT DCD-SEMI,
WE DON'T JUST DESIGN
IP CORES
–
WE EMPOWER INNOVATION,
HELPING OUR CUSTOMERS
BUILD THE TECHNOLOGIES
THAT SHAPE THE FUTURE.



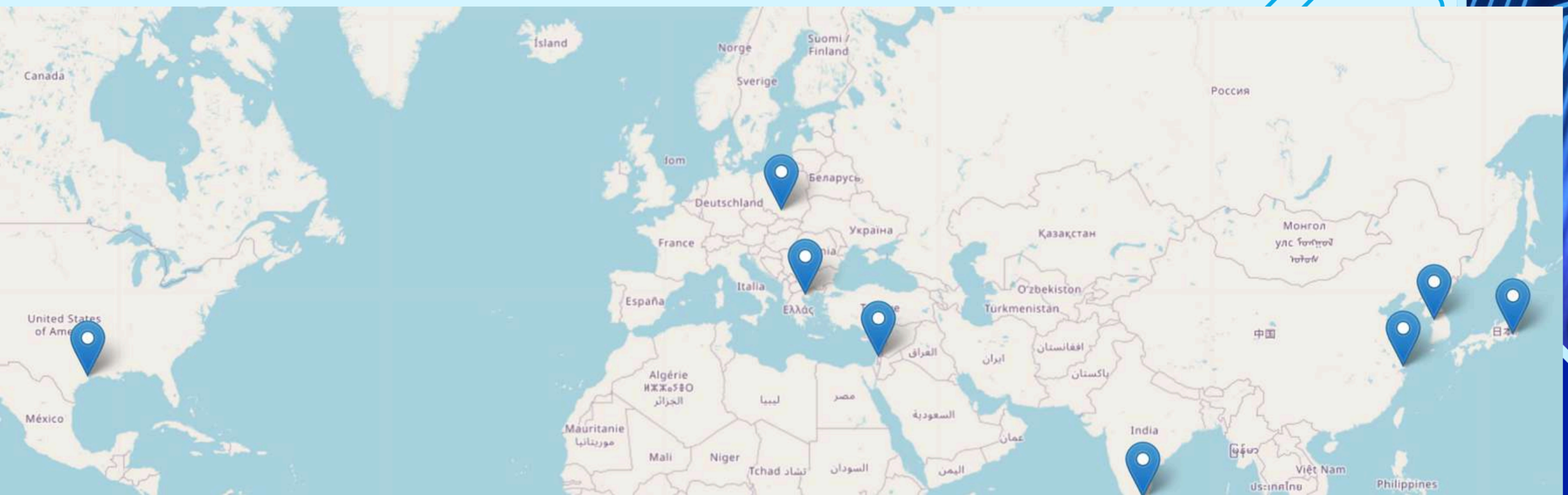
INTRODUCTION

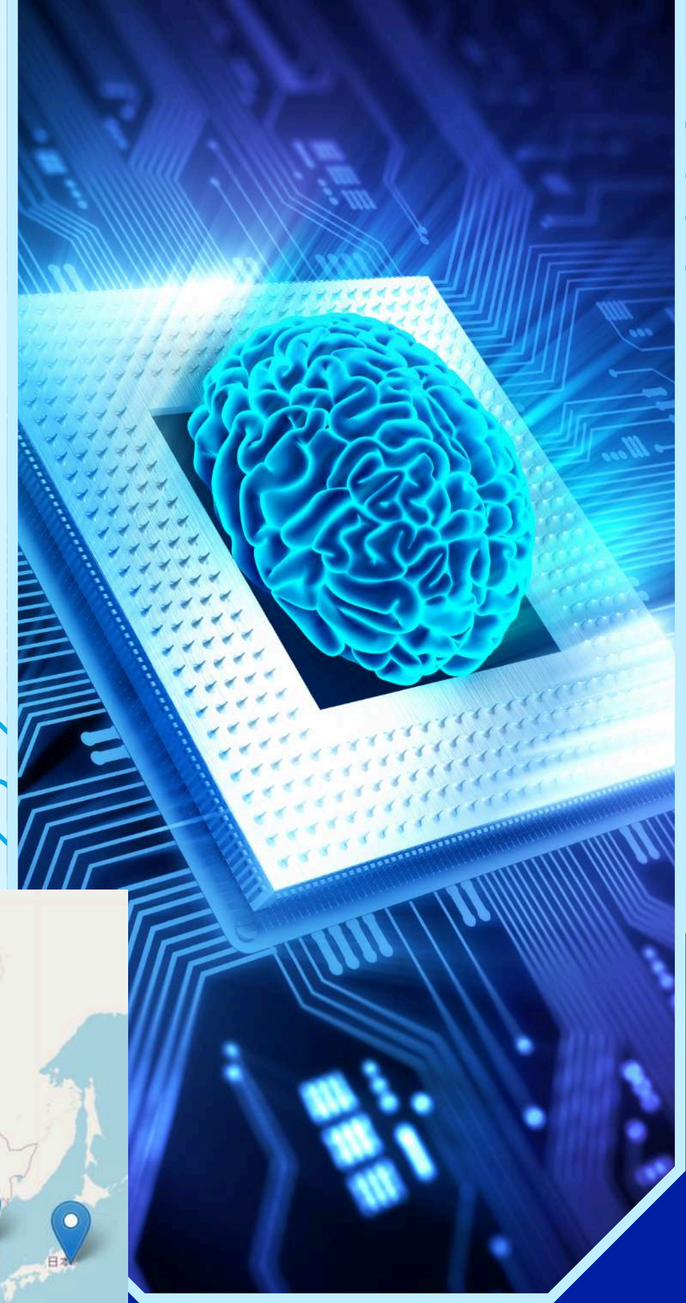
For over three decades, DCD-SEMI has been at the forefront of innovation in the semiconductor IP core industry. Founded in 1999, we have grown from a pioneering European design house into a trusted global partner for companies seeking reliable, high-performance solutions.

Our portfolio includes microprocessor cores, cryptographic engines, communication interfaces, and security modules, enabling our partners to accelerate development while ensuring compliance and long-term product support.

What sets us apart is our deep engineering expertise and customer-centric approach. We work closely with clients to provide customized solutions that accelerate time-to-market while ensuring performance, security, and compliance with the highest industry standards, including ISO 26262 (Functional Safety) and FIPS (Cryptographic Security).

GLOBAL TRUST = MADE IN EUROPE, TRUSTED WORLDWIDE





INNOVATION SINCE 1999

1000+ CUSTOMERS

JAE Japan Aviation Electronics Industry, Ltd.
SEMICON TAIWAN 30
EIZO
KeyASIC
FARADAY
avison The World to
asmedia
ASIX
3S Silicon Tech Inc.

RISC-V
CiA
FUNCTIONAL SAFETY ISO 26262 DCD
Design & Reuse
SAFRAN AEROSPACE · DEFENCE · SECURITY
BOEING
SAGEM
AIRBUS

TELEFUNKEN
THALES
MOTOROLA
Hisense
GE
intel
dialog SEMICONDUCTOR

NEC
BOSCH
CRAY THE SUPERCOMPUTER COMPANY
OSRAM
CISCO
#CyberMadeInPoland
AIROHA Airoha Technology Corp.
SONY
HUAWEI

Audi
Mercedes-Benz
TOYOTA
CHERY
NOKIA

SEMI DCD

OUR TEAM

The DCD-SEMI team comprises a dynamic blend of seasoned engineers and enthusiastic graduates hailing from top-tier universities. This adept team has honed their skills across over 100 complementary architectures, powering a staggering array of at least 1 billion products.

Jacek Hanke
CEO

Tomek Krzyżak
CTO

Nick Visic
Director of N.A.

Iwill Doit
FAE

DCD-SEMI'S KEY IP CORES

Our company's portfolio include more than 100+ holistic IP Cores, ready to connect all the pins in your next project.

World's Fastest 8051

RISC-V CPUs with peripherals

CAN XL (not only) for automotive

ROYALTY-FREE 32.BIT CPU
WORLD'S TINIEST 8051
I3C & I2C
DOZENS OF UARTS
EOL REPLACEMENT
M68K
CRYPTOGRAPHIC SYSTEM
CFD IP CORES
HARDWARE DEBUGGER
AND MUCH MORE...

8-BIT WONDER

DQ80251

World’s Fastest 8051 CPU - more than 75. times faster

DT8051

World’s Tiniest 8051 CPU - for minimal silicon footprint

DP8051

Optimized 8051 with additional peripherals

EITHER DQ8051 OR DQ80251 OFFER ULTIMATE PERFORMANCE

DT8051 UTILIZES JUST 6K ASIC GATES AND IS EQUIPPED WITH HARDWARE ASSISTED DEBUGGER

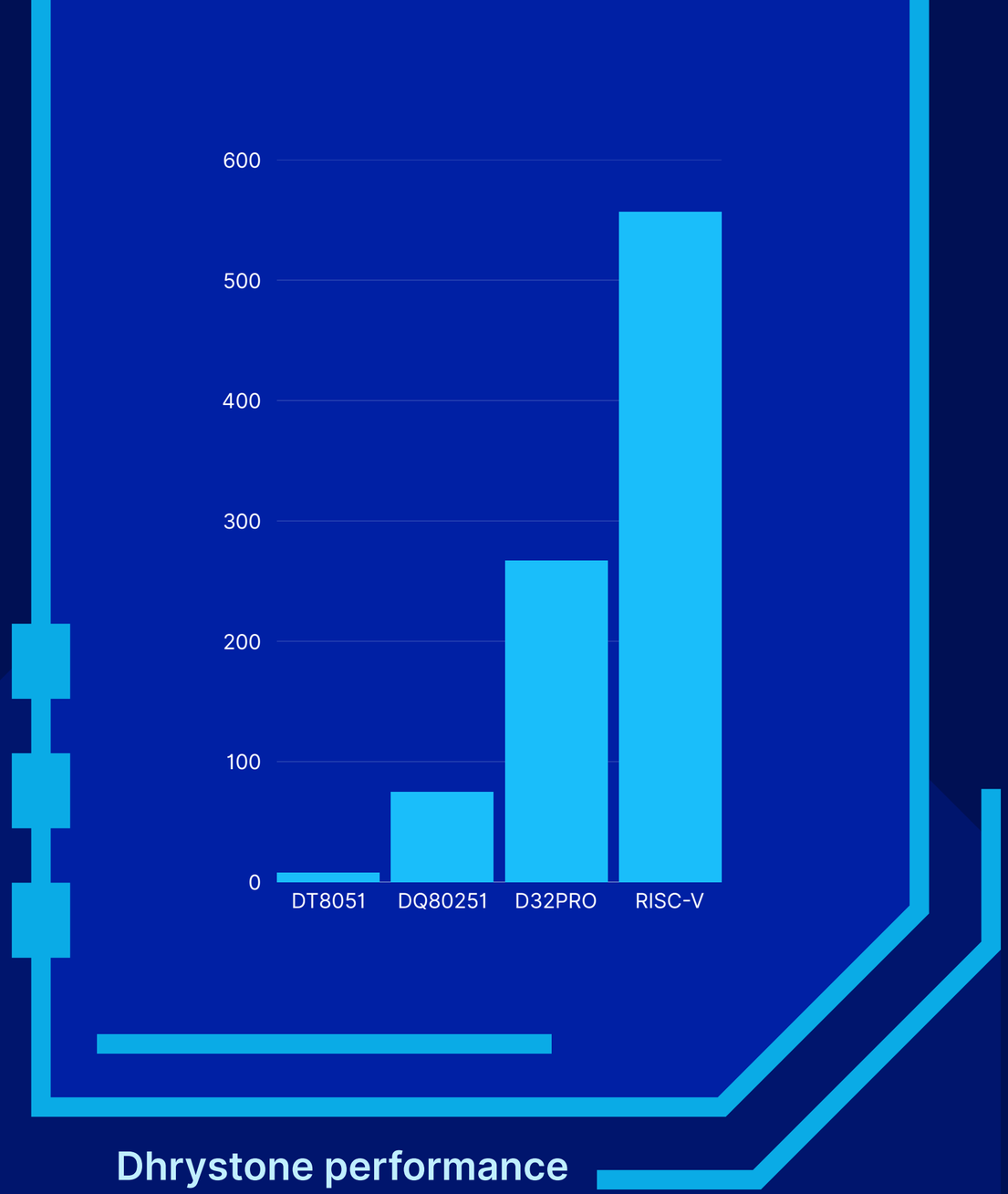
USB, HID, ETHERNET OR MAYBE...

One of the most popular architecture in the CPU history, Intel’s 8051 has been prepared for 21st centrury - ultimate performance, wide set of peripherals and more for IoT, IIoT, automotive, consumer electronics, embedded.

POWER PERFORMANCE

You can choose from various DCD's solutions to design the most appropriate SoC to your next project. Low power? Higher performance? Additional peripherals? No royalties? Sure!

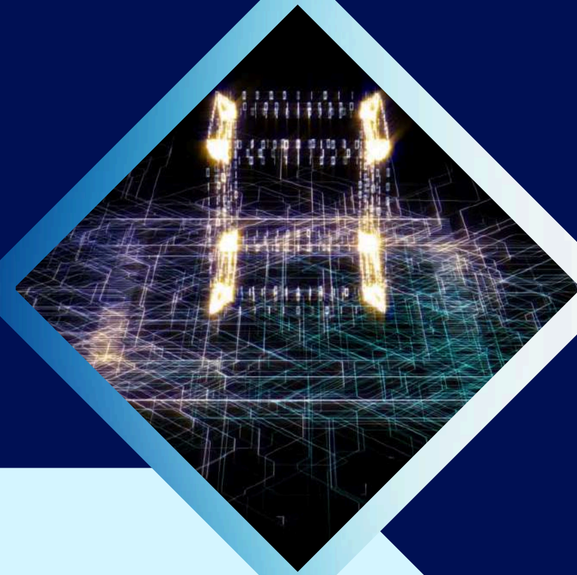
ALL IP CORES ARE TAILORED TO THE PROJECT NEEDS



Dhrystone performance

D32PRO CPU

- Configurable 32-bit Harvard architecture
- Performance up to 1.52 / 2.67 DMIPS/MHz and 2.59 CoreMarks/MHz
- Small footprint starting at 10.6k/6.8k ASIC gates
- Very high clock frequency up to 1 GHz in modern ASIC technologies
- Royalty-free



Royalty-Free

With the performance of ARM0 and more, you get IP with no royalties

All in One from One Vendor

Get CPUs with peripherals to build your SoC

RISC-V

TOUCH THE FUTURE
FOR FREE

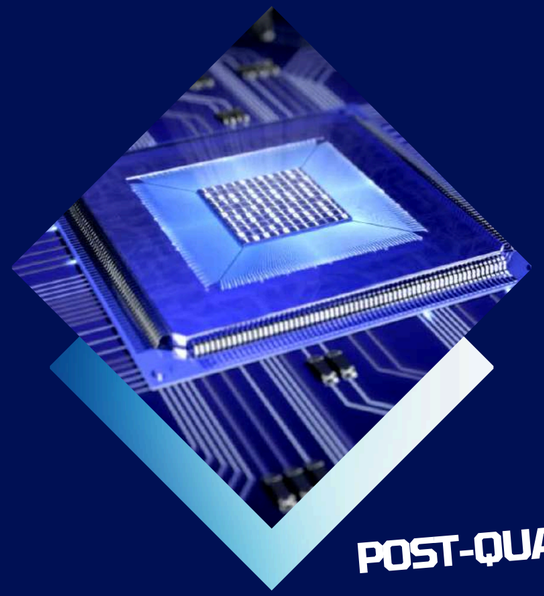
DCD-SEMI is an active member of RISC-V International.
RISC-V combines a modular technical approach with an open, royalty-free ISA — meaning that anyone, anywhere can benefit from the IP contributed and produced by RISC-V. The DRV32IMZicsr is a 32-bit RISC-V CPU with M, Zicsr extensions, and External Debug support:

- a five-stage pipeline,
- Harvard architecture
- flexible size of program and data memory to-gether with their allocation in address space.

Our solution offers performance tailored to the project requirements, starting from:

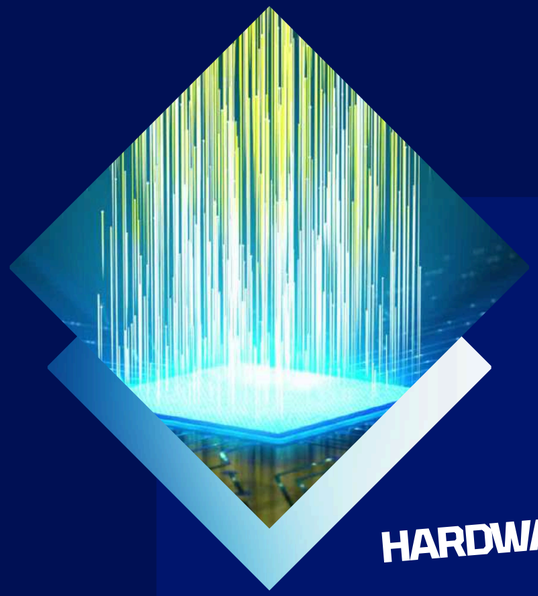
- Dhrystone: up to 1,23 DMIPS/MHz
- Coremark: up to 2,45 CoreMark/MHz

CRYPTONE CRYPTOGRAPHIC SYSTEM



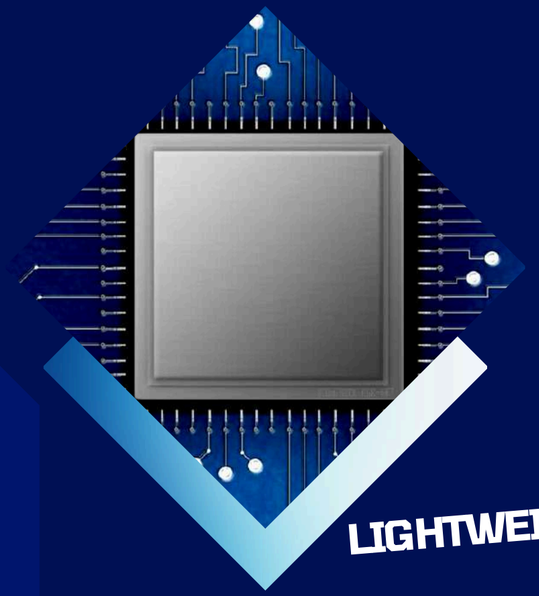
POST-QUANTUM

CryptOne can implement next generation cryptography standards approved by NIST. Thanks to it you can protect your data against future threats with post-quantum hardware encryption.



HARDWARE

CryptOne – a 100% secure cryptographic system based on more than 25 years of DCD's market experience. It is a universal and fully scalable solution that is able to boost asymmetric cryptographic algorithms.



LIGHTWEIGHT

Safety & security meet the best size/performance ratio with:DAES XTS - cryptographic co-processor, ECC verification IP Core, ECDSA signature generation engine, ECDSA verify 384, DSHA2-384 Hash and HMAC Functions

MEET THE CAN ALL:
A CUTTING-EDGE SOLUTION
DESIGNED FOR TOMORROW'S
AUTOMOTIVE CHALLENGES.

CAN ALL AUTOMOTIVE IPS

CAN XL

Full CAN IP Cores portfolio including CAN XL, CAN FD, CAN Light.

LIN & SENT

Small IP Cores targeted to low power solutions like mirrors, sensors etc.

PSI5

Complies V2.3 and is designed for use in ECUs to ensure communication with up to 6 sensor

The CAN ALL is a robust, feature-packed solution designed specifically for the automotive industry. Built on DCD's expertise and, most importantly, our customers' needs, it offers a comprehensive suite of peripherals essential for the vehicles of tomorrow. No compromises — just pure functionality.

CAN XL

- Proven quality during CiA's Plug Fest in Baden-Baden
- Technology independent
- Enhanced with Functional Safety features up to ASIL D
- Handles data rates exceeding 20 Mbit/s
- Optimized for AUTOSAR and SAE J1939 specifications

The DCAN XL IP presents a revolutionary advancement bridging the gap between CAN FD and 100Mbit Ethernet, making strides in data transmission technology. With support for data rates reaching up to 20 Mbit/s and accommodating data fields up to 2048 bytes in length, it surpasses previous standards. Moreover, it offers the flexibility of employing higher layer protocols and Ethernet frame tunneling, enhancing its versatility in various applications.

CAN IP CORES

CAN FD Full = “full-featured” version with advanced error handling, configurability, scalability, and deterministic performance, suitable for complex or safety-critical applications

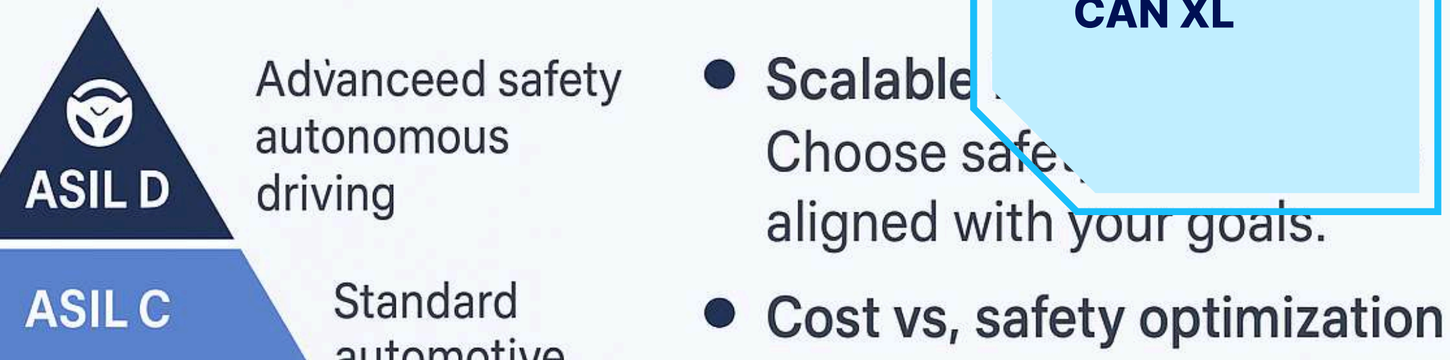
- Extended error management (fault confinement, advanced error recovery)
- Enhanced message buffering and prioritization
- Deterministic low-latency behavior for critical systems
- Complete configurability for bit timing, payload handling, and multiple nodes

CAN Light

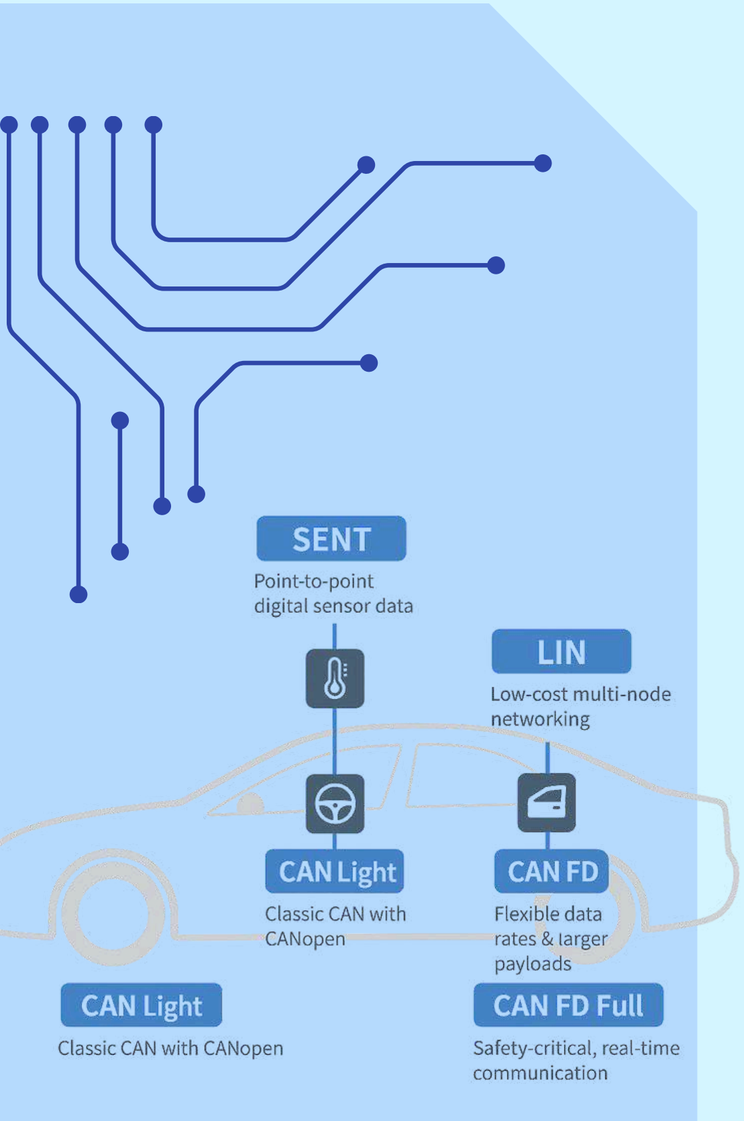
CAN FD Full

CAN XL

The CAN Light IP Core is a streamlined, resource-efficient solution for standard CAN networks, designed for simpler automotive, industrial, and embedded applications. It provides reliable communication with minimal footprint and fully supports higher-layer protocols such as CANopen, making it ideal for cost-sensitive or networked devices.



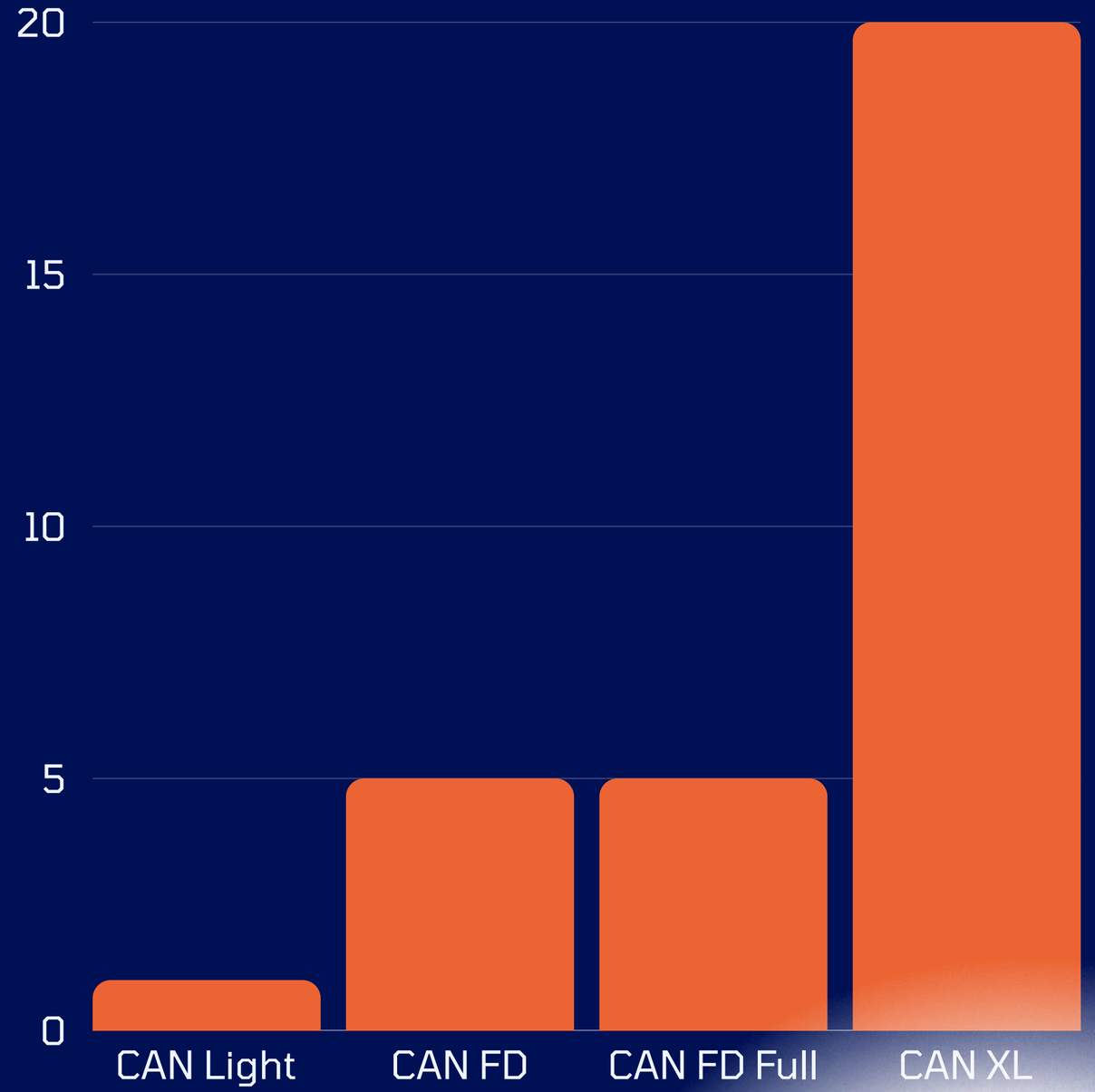
AUTOMOTIVE IP CORES



Protocol	Use Case	Speed / Data Rate	Complexity	Typical Applications
SENT	Point-to-point digital sensor data	Low (up to ~30 kbps)	Very Low	Temperature, pressure, throttle position sensors
PSI5	Safety-critical, multi-sensor communication	Low / Medium (125 – 189 kbps)	Medium	Airbag systems, braking, chassis control, ADAS sensors
LIN	Low-cost multi-node networking	Low (up to 20 kbps)	Low	Body electronics, mirrors, windows, HVAC, seat controls
CAN Light	Classic CAN with CANopen	Medium (1 Mbps)	Medium	Industrial control, basic automotive communication
CAN FD	Flexible data rates & larger payloads	Higher (up to 5 Mbps)	High	Powertrain, infotainment, advanced ECUs
CAN FD Full	Fully featured, safety-critical, real-time communication	Higher (up to 5 Mbps + advanced features)	Very High	ADAS, autonomous driving, real-time safety systems
CAN XL	Next-gen high-bandwidth backbone for software-defined vehicles	Very High (up to 20 Mbps)	Ultra High	Central vehicle gateway, zonal architecture, future EVs and AVs

CAN FAMILY

Speed and Data Rate



FUNCTIONAL SAFETY

Functional Safety (FuSa) ensures that automotive systems operate reliably and predictably, even in the presence of hardware or software failures.

With autonomous driving, ADAS, and software-defined vehicles, communication networks must meet ASIL-D requirements.

CAN XL emerges as the next-generation backbone for safe, high-bandwidth, and scalable in-vehicle communication.

Legacy protocols like Classic CAN and even CAN FD are reaching their limits for data throughput, real-time performance, and safety mechanisms.

KEY CHALLENGE:
MORE ECUS, MORE DATA, MORE SAFETY REQUIREMENTS – BUT NO ROOM FOR LATENCY OR ERROR.

A GAME CHANGER FOR FUSA?

DCD-SEMI brings 25+ years of experience in communication IP cores, including CAN, LIN, and automotive sensor interfaces.

Feature	CAN FD	CAN XL	Safety Impact
Payload Size	64 bytes	**2048 bytes**	Fewer messages → lower network congestion → more predictable timing
Bitrate	8 Mbps	**20 Mbps+**	Supports real-time ADAS and autonomous functions
Protocol Safety	Built-in integrity checks	**Built-in integrity checks**	Detect errors at the network level
Scalability	Limited	**Supports zonal architectures**	Easier partitioning and fault containment
ASIL Support	from ASIL-A to ASIL-D	**from ASIL-A to ASIL-D**	Complies with ISO 26262

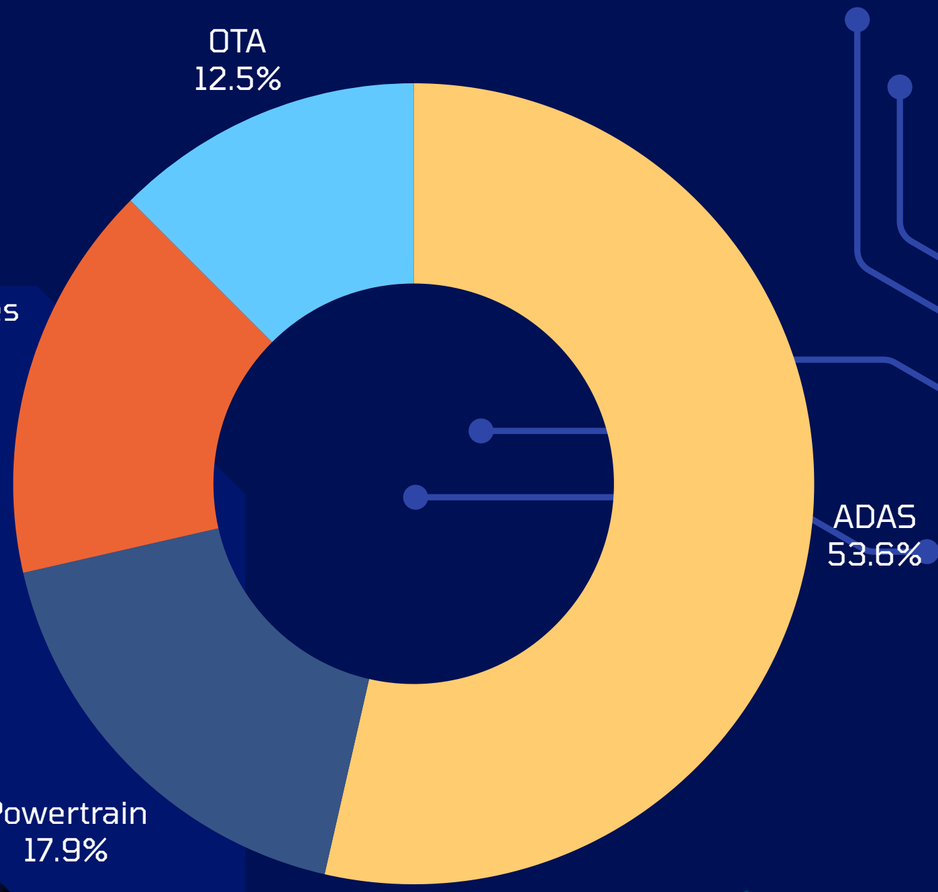
FUNCTIONAL SAFETY

Application	Why CAN XL?
ADAS & Autonomous Driving	Real-time, high-volume data exchange between ECUs and sensors
Powertrain Safety Systems	Deterministic behavior with redundancy for critical control
Zonal Architectures	Simplifies vehicle wiring and improves fault containment
Over-the-Air Updates (OTA)	Secure, safe transfer of large data packets

HARA

FMEDA

CRC



With autonomous driving, ADAS, and software-defined vehicles, communication networks must meet ASIL-D requirements.

YES! WE GOT IT

ASIL-D OR...

DCD-SEMI CAN IP cores are designed to support any functional safety level, from QM up to ASIL-D, depending on your project requirements and budget.

Flexible Safety Levels – Tailored to Your Needs

DCD-SEMI CAN IP cores are designed to support any functional safety level, from QM up to ASIL-D, depending on your project requirements and budget.

- **Scalable IP offering**
  Choose safety mechanisms aligned with your goals.
- **Cost vs, safety optimization**
  Match project budget to the required ASIL level
- **Full integration support**
  Guidance and tools for **seamless** system-level implementation

Scalable IP offering:
- Choose safety mechanisms aligned with your goals.

Cost vs. safety optimization:
- Match project budget to the required ASIL level.

Full integration support:
- Guidance and tools for seamless system-level implementation.

IP VALIDATION

- UNIVERSAL & TOOL-AGNOSTIC – WORKS WITH WHAT YOU ALREADY USE
- FREE & OPEN ACCESS – LEVERAGE INDUSTRY-STANDARD TOOLS
- TESTBENCHES COMPATIBLE WITH ALL MAJOR COMPILERS
- FULL FUNCTIONALITY EVALUATION BEFORE LICENSING
- SIGNIFICANT COST SAVINGS – EVERYTHING INCLUDED IN OUR IP PACKAGES

RISK-FREE IP: DCD-SEMI'S DESIGN & VERIFICATION METHODOLOGY

When choosing an IP Core, the main concerns are:

✓ Does it meet the specification?
✓ Is it silicon-proven and bug-free?

1. Specification & Planning
- In-depth analysis of standards (CAN XL, RISC-V, crypfography, automotive)
- Clear functional specs and architecture plans

2. RTL Design & Quality Coding
- RTL in VHDL/Verilog/SystemVerilog
- Enforced coding rules, linting tools, and reusability practices

3. Functional Verification
- UVM/SystemVerilog environments
- Randomized & directed tests, assertions, coverage-driven metrics

4. Optimization & Quality Metrics
- Power, latency, and die-size optimization
- Compliance with OpenMORE quality rating

5. Hardware Validation
- Post-synthesis timing simulations
- FPGA verification on Xilinx, Intel, and Lattice platforms

With DCD-SEMI IP Cores, you invest in performance, reliability, and peace of mind.

IP VALIDATION

Specification & Planning

- Detailed analysis of standards and target use cases
- Creation of functional specifications, implementation schedules, and module architecture definitions.
- Development of a test strategy covering functional, corner-case, and performance scenarios.

analayze standards

define specs

define architecture

test strategy

work-flow

IP VALIDATION

RTL Design & Quality Coding

- RTL written in VHDL/Verilog/SystemVerilog, strictly following naming conventions, coding style guides
- Use of linting tools, rule-checkers, and code quality metrics to enforce compliance.

Continuous verification against specifications with testbench

VHDL/Verilog SystemVerilog

enforced coding

rules and linting

self-checking

test-benches

WHY WE DO IT?

At DCD-SEMI, we follow a rigorous design and verification process based on industry standards and best-in-class EDA tools. Our methodology ensures that each IP Core meets specification, achieves best performance, and is risk-free at deployment.

By combining robust methodology, advanced EDA flows, FPGA validation, and third-party certifications, DCD-SEMI delivers IP Cores that are among the most reliable and future-proof in the industry.

With DCD-SEMI IP Cores, you don't just buy code — you invest in performance, reliability, and peace of mind.

Risk-Free Deployment

silicon-proven before release

100% Spec Compliance

from automotive safety to crypto security

Seamless Integration

into ASICs, SoCs, and FPGAs

Globally Trusted

validated by industry leaders

TESTIMONIALS

Chief Technology Officer, Chinese Automotive Startup

"As our vehicles move toward software-defined architectures, DCD-SEMI's CAN XL IP gives us the bandwidth and flexibility needed for advanced features. It has been instrumental in accelerating our smart mobility strategy."

R&D Manager, Major Japanese OEM

DCD-SEMI's CAN XL solution provided outstanding reliability and low latency, which are essential for our ADAS and EV programs. Their team offered excellent technical support, ensuring a smooth and efficient integration process.

Lead Systems Architect, German Tier-1 Supplier

"Integrating DCD-SEMI's CAN XL IP into our next-generation ECU platforms was seamless. The IP's deterministic performance and conformance to ISO standards perfectly matched our rigorous quality expectations. It's a key enabler for future-ready automotive networks."

TESTIMONIALS

TAOS: SUPPORT – THE KEY TO SUCCESS.

“I have been working with DCD now for a few years. Everything I have received from DCD has worked for us. I would say one of the most important things a company can do is to give good support of the products.” Bob Stricklin TAOS Inc.

★★★★★

MYSON: OUTSTANDING PERFORMANCE

“We are very glad with the outstanding performance of the DCD DP80390 / DP8051 IP core. Our experience with DCD in terms of both product quality and prompt supporting, has led us to rely on them for quality IP core products.” Austin Chiang, Myson.

★★★★★

ASIX: DESIGNED TO OUR NEEDS

“We are glad to integrate DCD IP core into ASIX’s Network SoC solutions. We rely on DCD IP core to make our Network SoC products become more reliable and cost-effective.” Allan Chou, Asix.

★★★★★

SYNTRONIX: LONG TERM COOPERATION

“Outstanding performance, quality and reasonable price of DCD IP cores satisfy our needs to meet the time-to-market, lower the development cost and enhance the competitive strength of our products.” Jen-Sheng Hwang, Syntronix.

★★★★★

THANK YOU

+48 32 282 82 66

www.dcd-semi.com

info@dcd-semi.com

ul. Wroclawska 94, 41-902 Bytom, Poland