



PRODUCT DATA SHEET

AVALON-IF-Unit

REDEFINING RELIABILITY IN VEHICLE CLASSIFICATION

AVALON-IFU is a dedicated interface and preprocessing card designed to be installed inside the AVALON platform, with one unit required for each highway lane in MLFF projects. Its primary role is to collect raw data from lane-level sensors and convert it into structured, timealigned information ready for processing by the CPU.

The card reads axle-counting sensor signals from different technologies such as piezo sensors and fiber-optic-based sensors, and also acquires data from 2D LiDAR units installed per lane.

The IFU performs real-time preprocessing, filtering, and summarization of sensor data, then transfers the prepared data to the CPU card at defined timing intervals.

Two models of this card are available. The AVALON-IFU-LS supports both LiDAR and axle-counting sensors, making it suitable for full MLFF classification lanes where multiple detection technologies are used together. The AVALON-IFU-L is designed for installations that rely only on LiDAR, such as entrance points or MLFF sites where axle counting is not required based on customer preference.



The board communicates with external devices through multiple industrial interfaces including USB, LAN, SPI, and CAN Bus. It is built on a high-performance microcontroller architecture, operates without an operating system, and supports remote firmware update, ensuring longterm maintainability and flexibility in the field.

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AVALON-IFU SPECIFICATION

REDEFINING RELIABILITY IN VEHICLE CLASSIFICATION



Hardware (HW)	Software / Firmware (SW)
High-performance microcontroller-based architecture (No OS)	Bare-metal firmware architecture
Designed as a modular card for AVALON platform	Real-time sensor data acquisition
One card required per lane in MLFF systems	Pre-processing and filtering of raw sensor signals
Supports piezo axle-counting sensors (IFU-LS model)	Data summarization and structured output generation
Supports fiber-optic axle sensors (IFU-LS model)	Time-aligned data delivery to CPU (ZCU)
Supports 2D LiDAR input (both models)	Lane-level synchronization support
USB interface for device connectivity & service	Communication protocol handling for field devices
LAN interface for configuration & diagnostics	Deterministic timing control for data transfer
SPI interface for high-speed peripheral communication	Remote firmware update capability
CAN Bus interface for industrial integration	Health/status reporting to central CPU
Industrial-grade digital I/O for sensor interfacing	Configuration parameters stored in onboard memory
Designed for continuous 24/7 roadside operation	Optimized for low-latency real-time performance
Model Variants:	
AVALON-IFU-LS: LiDAR + Axle counting support	
AVALON-IFU-L: LiDAR-only support (no axle sensors)	



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