

Complete, Efficient Data Acquisition Leads the Way to the Factory of the Future

Edge IoT Smart Manufacturing Solution

Edge Computing Platforms Enabling Data-to-Decision

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Meet your Factory of the Future

A smarter, more flexible Factory of the Future

As a leading edge computing solution provider, ADLINK continues to target integration of IT, OT, and CT technologies to create highly competitive manufacturing environments, meeting the demanding application requirements of Factories of the Future (FoF).



Keys to the Factory of the Future

Digitized

Increases operating flexibility and production efficiency, and speeds product development.



Intelligent

The intelligent edge platform enables faster, more productive decision making based on real-time data.



Unmanned

With the development of deep learning and artificial intelligence, the longtime goal of unmanned manufacturing and production is closer than ever.





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Data-to-Decision

Connecting Factories to Make the Future Happen

ADLINK, with years of experience in production line integration, delivers highly compatible solutions via edge IoT data extraction, supporting universal data acquisition and management to achieve operational superiority.





Edge IoT Smart Manufacturing Solution

ADLINK's Vortex Edge[™] solution interconnects devices, personnel, and other factory assets, eliminating boundaries between IT and OT and freeing data for transmission from end to end and point to point.

- Actionable real-time data visualization
- Optimized process and product quality
- Maximized uptime and reliability



Production Efficiency Optimization

- Production information monitoring
- Availability/uptime management



Maximized Processing Efficiency

- Built-in predictive maintenance
- Real-time equipment adjustment



Intelligent AOI

- Improves inspection accuracy and quality control
- Deep learning and AI applications



5 DEX Series

MCM Series

EOS/NEON Series



Intelligent Logistics Management

- Automates and manages logistics status with real time communication between pallets
- Reduced human error-based losses and increased
 shipment throughput



Collaborative Robot Systems

- Simple development & flexible deployment
- End-to-end communicability



Condition Monitoring & Predictive Maintenance

- Instant monitoring and alarm
- Equipment life cycle warning



NEON Series

ROS Starter Kit - Neuron

MCM Series

Edge IoT Lets Data Flow Freely



Modular architecture, vendor agnostic, open source. IoT made simple.

Edge computing meets IoT to provide real-time data connectivity and extraction solutions so you can make the most of your data, IT OT systems, assets, and things for a real ROI. ADLINK IoT offers a true end to-end Edge IoT solution that guarantees your data is available in the correct format to who needs it, where it needs to be, precisely when it needs to be there.



Connect the Unconnected

Vortex Edge[™] allows OT leaders to connect assets by tapping into native communication protocols easily to generate and capture data from any asset via pre-validated sensors and pre-configured edge devices. No programming necessary.

Stream Anywhere

Vortex Edge™ uses peer-to-peer data movement technology to securely move data. Once connected, data can move freely to any cloud, analytic platform, database, or even between devices. Connect once and stream to any person, place, or thing.

Control the Edge

Vortex Edge[™] bridges the IT and OT divide with a set of integrated services for end-point monitoring, device management, visualization, analytics, and security which creates intelligent devices that can react to change and the world around them.

Vortex Data River™

Overcoming critical challenges of end-to-end IoT implementation

Vortex Data River[™] is an easily implemented solution enabling vendor-neutral ecosystem constituents to cooperate seamlessly. Translation among devices or between devices and applications leaves IoT architects free to implement best-in-class technologies and solve real-world problems. Vortex Data River[™] is based on an industry-standard protocol with significant usage in mission-critical applications, where the secure and timely delivery of data is essential. The peer-to-peer system requires no centralized broker, thereby eliminating the possibility of single point-failure.

The Vortex Data River™ is implemented in the Vortex Edge™ software suite, which builds a set of deployable microservices to communicate with end-points, devices or applications and which publish and/or subscribe to data topics on the Vortex Data River™.



- Consistent data model simplifies IoT system architecture
- Broad ecosystem streamlines device-application transactions
- Dynamic auto-discovery of data sources and recipients
- Secure, scalable, fault-tolerant data connectivity
- Based on mature open-industry standard utilities, proven in
- Mission-critical environments

Real-time Collection and Management of Legacy Equipment Data



Data-oriented decision making optimizes overall production efficiency

Smart factory realization can present distinct challenges, including connection of legacy equipment and simplifying system integration for increased flexibility. Accordingly, ADLINK provides the means to integrate OT (equipment) and IT (management) technologies, creating a complete data gathering solution, with highly accurate, non-intrusive operation fast processing of extracted machine data, providing complete operating status information in real time. The Vortex Edge™ platform powers ADLINK's DEX Series to execute full-process data exchange among devices, thoroughly integrating network connection and data transmission/control in existing equipment and systems using MES or SCADA integration.



DEX Series

Non-intrusive System Computing Architecture

DEX Edge IoT integrates OCR technology based on deep learning computing, providing a unique data extraction system with high identification rates via non-intrusive operations. ADLINK uses an exclusive simplified script configuration program, providing easy access for generation of operating interfaces to further upgrade production line smart operation management.

System Advantages

- Non-intrusive operation improves production line stability and increases production capacity.
- VGA interface uniformly transforms different data formats from diverse devices into standard data, expediting deployment and conserving costs
- During data extraction, no visual interference interferes with the operating interface, streamlining the process.
- Supports direct use of script for configuration in order to flexibly satisfy customization demands.
- Connecting to Vortex Data River[™] enables real-time data sharing among diverse equipment to create a highly efficient management field.
- OCR based on deep learning algorithm delivers fully optimized data acquisition and processing, accelerating operations for precision data management and analysis



- Image Capturing
- Processing/OCR

Optoelectronic Application Sample Project

In an exemplary case, a manufacturer wished to implement integrated data acquisition and analysis incurring the lowest cost possible. Success, however, required extraction of data from multiple machine types, an operation that normally consumes massive engineering resources.

The large number of legacy devices supported no open API or log files and ran a practically obsolete OS, making them incompatible with current loT architecture. ADLINK's full connectivity solution provided non-intrusive, low-risk data acquisition via OCR technology through HMI. Production remained stable throughout integration of OT (equipment) and IT (management) information, achieving true Smart enterprise architecture. Full digital automation of the operation was achieved with minimal labor and material costs, dramatically boosting competitive advantage.



Equipment Condition Monitoring and Predictive Maintenance



Edge computing accelerates real-time decision making and supports proactive maintenance

With implementation of Industry 4.0, vibration analysis algorithms supported by cloud server architecture enable easy prediction of potential problems to adopt preventive action. As well, equipment maintenance or replacement can be executed preemptively, significantly enhancing efficiency. ADLINK's innovative equipment status monitoring edge computing platform delivers complete and comprehensive data acquisition, analysis, and upload. The real-time analytics can be sent to the data center, by upload to the cloud and fast connection to the ERP/MES upper layer application system. Effective dynamic preventive maintenance strategies can be generated according to machine operation status in real-time, improving equipment reliability.



MCM Series

Simple, Speedy Deployment

Unlike conventional combination-based solutions, ADLINK's MCM-100 adopts an integrated design, providing complete data acquisition, highly accurate real-time analysis and data upload, along with connection to information database, for complete equipment status monitoring and analysis. Deployment in the environment is significantly streamlined, reducing development time.

Vacuum pumps

Blower



Smart Factory Predictive Maintenance



- Factory/Equipment management
- Alarm notification
- Historical data
- Viewable at mobile end

Lifting equipment, vacuum pumps, air compressors and other rotating machines are critical in a wide variety of manufacturing and processing operations. Any suspension of production due to machine error can represent prohibitive losses in revenue.

ADLINK's Smart equipment status monitoring solution improves dramatically on conventional manual monitoring methods, supporting 24-hour online monitoring and malfunction prediction such that precise control of equipment status can be achieved and real-time feedback maintenance provided.



Complete single-operation data acquisition, analysis and upload

Data acquisition, execution of domain algorithm, use of data analysis, direct conversion of machine status, use of trend analysis, warning alert and upload.



CNC machine

Air compressors

Seamless OT/IT end-to-end connection

Capable of connecting to Vortex Edge™ architecture, no programming is required to achieve fast connection with third party cloud platforms. Vortex Data Rive™ live data streaming architecture enables deployment of multiple scenes more easily.



Remote equipment overview information dashboard

Providing equipment monitoring acquiring machine information, status, and alarm information in real time, with download of historical data records and equipment maintenance information fully supported.

AI-enabled Machine Vision



Intelligent edge computing supercharges smart manufacturing

Al implementation in edge computing enables easy implementation of normally difficult production tasks such as customized quality inspection, detection of minute irregularities in textured surfaces, and labeling recognition for irregularly stacked cargo. Machine learning, cognitive services, image processing analysis, and other complex information management tasks can be performed at the edge to make adjustments in real time, Production equipment, unmanned vehicles, and complex robotics benefit from the increased stability, reduced latency, and enhanced efficiency provided in FoF operations, with accuracy increased through continuous training and significantly reduced development time.



Application field



Vision guided robot

Automatic Guided Vehicle



Automatic warehouse



Automatic production line

EOS/NEON Series

The Real Machine Vision Solution

ADLINK provides a variety of machine vision platforms, featuring highly integrated edge computing, built-in deep learning modules, motion control function, and real-time connectivity. Implementation of the open architecture ROS2 standard supports thorough communication with robots from various manufacturers or AGV and equipment to realize the FotF ideal. The OPC UA communication protocol enables seamless communication among automation equipment, connecting and streaming image data through Vortex Data River™ to the cloud and, after analytics, the AI training server, empowering data-to-decision results. Adjustment of reaction ultimately improves accuracy of machine vision detection and optimizes production.





Real-time Smart Decision Making, Realization of Smart Logistics

Al-enhanced edge computing is benefiting industry-leaders in manufacturing and e-commerce, empowering unmanned warehouse-, vehicle, and drone-based operations. Having reshaped the profit model of the logistics industry, the technology has far surpassed the thildinges of diverse product shipping, and edge machine vision platforms utilizing bacrode, QR, and OCR, are able to ID and locate products much more accurately in real time. Upon encountering errors, notifications are issued instantly and directly to responsible personnel, product data is communicated in real time with no delays, and smart forecasting prevents continuous error and significantly increases logistics, picking accuracy, and shipping performance.

Selection Guide

Machine Condition Monitoring Edge Platform

	MCN	4-100	
	ADLINE C		
System Specification		Vibration Measurement I/0	O Specification
Processor	Intel Atom [®] x7-E3950 processor	Channels	4CH
Video	1x DisplayPort	Resolution	24-Bit
Memory	DDR3L 1066 SODIMM 2 GB	Max. Sampling Rate	128 kS/s
Storage	Factory installed 128 GB mSATA SSD	Input Range	±10V
Ethernet	2x GbE LAN (Intel® I210-IT)	Input Mode	Diff/P-Diff
Serial Port	2x COM (2 x RS-232/422/485)	Input Coupling	AC/DC
USB	2x USB 2.0 + 2x USB 3.0	IEPE Excitation Current	0 or 2mA (IEPE compliance: 24V)
Mini PCle	2x Mini PCIe card slots	Over-Voltage Protection	±60V
Wireless Kit (option)	Wi-Fi/4G LTE wireless Kit	DC accuracy - Offset Error	Typical: ±0.15mV, Max. ±0.3mV
Power Supply	6 ~ 36 VDC, Optional 40W AC/DC adapter	DC accuracy - Gain Error	Typical: ±0.15%, Max. ±0.3%
Mechanical		System Noise	50 µVrms
Dimensions	183 (W) x 110 (D) x 83.85 (H) mm	-3dB Bandwidth	0.49 * sampling rate
Construction	Full Aluminum Alloy	AC Cutoff	0.4Hz (-3dB), 2.4Hz (-0.1dB)
Mounting	DIN-rail/wall mountable	Flatness	±0.01 dB (20 Hz to 1 kHz)
Environmental		CMRR	60 dB (20 Hz to 1 kHz)
Operating		Crosstalk	-100 dB
Temperature	0 to 55°C (32 to 131°F)	Dynamic Range	100 dB
Storage		SFDR	104 dB
Temperature	-20 to 70°C (-4 to 158°F)	THD/THD+N	94 dB/-91 dB
Humidity	approx. 95% @ 40°C (non-condensing)	Trigger Source	Analog or digital, software selectable
Vibration	Operating 5 Grms, 5-500 Hz, 3 axes w/ mSATA SSD	Trigger Mode	Post, delay, middle, pre-trigger, re-trigger
ESD	Contact +/-4 KV, Air +/-8 KV	Auto-Calibration	Yes
Shock	Operating 100 G, half sine 11 ms duration	DIO	2 programmable function I/O
SHUCK	w/ mSATA SSD	Software Support	
EMC	CE & FCC Class B (EN61000-6-4/EN61000-6-2)	Operating System	Windows [®] 10 IoT Enterprise/ Windows [®] 10 IoT Core

	DEX Modbus I/O			
	Coming Soon			
	Digital I/O Module Analog I/O Module) Module	
	ND-6150	ND-6160	ND-6117	ND-6124
Channels	16	8	8	4
ASCII command & Modbus RTU	•	•	•	•
Communication speed	from 1200 to 115.2K			
Data flow control	•	•	•	•
Watch dog timer	•	٠	•	•
Isolation protection	•	•	•	•

Data Extraction Edge Platform

DEX-100

System		
Processor	Quad-Core Intel Atom [®] processor E3950	
Operating system	Windows 10 IoT Enterprise 64	
RAM	DDR3L 1066 4GB/8GB	
Storage	128GB SSD	
I/O Interface		
	2x GbE LAN (Intel® I210-IT)	
	2x COM (2x RS-232/422/485)	
	2x USB 2.0 + 2x USB 3.0 + 2x Micro USB-Type B	
	2x PS/2 input+2x PS/2 output	
	2x isolated DI	
	Display port	
Power Supply		
DC Input	12-36 VDC	
AC Input	Optional 40 W AC-DC adapter	
LED indicator	Power/storage/WDT	
Mechanical		
Dimension	140 (W) x 110 (D) x 80 (H) mm /	
Dimension	5.5(W) x 4.3 (D) x 3.1(H) inch	
Weight	< 1kg	
Construction	Full Aluminum Alloy	
Mounting	Wall mount, DIN-rail	
Communications		
Communication	DDS (Distributed Data Service),	
protocol	REST API(Xml and JSON)	
Field bus support	Modbus TCP/Modbus RTU	

Data extraction via Optical Character Recognition (OCR)

- Up to 500 tags
- Up to 30 extraction pages

Script Generation

- Over 50 script commands supported
- Online and offline scripting supported
- (with offline reducing machine interference)
- Pre-configured script loading for script deployment
- Data extraction and user full machine control modes
- switchable by user via hard or soft control
- Event notification of machine alarm/warnings
- Data extraction summary page supports up to 500 rows of data
- Local Log File retained for up to 120 days

System Processor Intel Atom[®] x5-E3930 dual core processor Windows 10 IoT Enterprise 64 Operating system RAM DDR3L 1066 2GB 64 GB SSD Storage I/O Interface Ethernet 2x Intel® GbE LAN Serial Port 2x COM (RS-232/422/485, BIOS Selectable) USB 2x USB 2.0 + 2x USB 3.0 Video 1x DisplayPort 1.2 (Support DP++) DIO 2x isolated DI Expansion Mini PCle 2 x Full-size Mini PCIe slots USIM 1x USIM slot for 3G/4G LTE communication Power Supply DC Input 6-36 VDC AC Input Optional 40 W AC-DC adapter LED indicator x Pwr ready, 1x Storage, 1x WDT Storage Device 1x full-size Mini PCIe slot mSATA SATA III 1 x 2.5" SATA by storage kit (Optional) Micro SD 1x Micro SD card slot (Up to 32 GB) Mechanical Dimension 140 (W) x 110 (D) x 58 (H) mm Weight < 1 kg Construction Full Aluminum Alloy Mounting Wall mounting, DIN-Rail Software Support Data extraction PLC memory mapping method Mapping tool PLC Mapping tool with Cheat engine Maximum 1000 tags Extraction ROIs Supported PLC See supporting list Data keep in local Yes, up to 30 days for Runtime Data Format .CSV, Txt Communication DDS (Distributed Data Service), protocol and REST API(xml and JSON), *MQTT Interface Field bus

Modbus TCP and Modbus RTU

communication

DEX-200



Selection Guide

Smart Camera Selection Guide

		NEON-1021/NEON-1021-M	NEON-1020	NEON-1040
Smart C	amera	Product of Mile		
Processin	g & Memory			
Processor		Intel [®] Atom	™ E3845 Processor, Quad Core @ ´	1.91 GHz
Display		VGA	output, max. 2048 x 1152 at 60 Hi	Z
RAM			4 GB DDR3L	
Storage			16 to 32 GB solid state drive	
	Processing	LUT, shading correction, ROI, Muti-ROI, binning	ROI, LUT, shading correction	
Sensor				1
Image Ser		e2v EV76C570	CMOSIS CMV2000	CMOSIS CMV4000
Resolutio		1600 x 1200	2048 x 1088	2048 × 2048
Sensor Siz	:e	1/1.8"	2/3"	1"
Format		Monochrome	Monochrome	Monochrome
Pixel Size		4.5		.5
Frame Ral Shutter	te (rps)	60	120 Clabal	60
Trigger M	odo	Global External trigger, software trigger, free run		
		Exter	nat trigger, sortware trigger, nee n	
<i>I/O Interf</i> Trigger In			An Opha included being a circuit	
Digital Ou		Au siele busie au	1x Opto-isolated trigger input	
Digital Oc Digital Inp		4x sink type output, max sink 100mA sink voltage max 30V _{DC}		max 30VDC
PWM	Drive Method	4x TTL level input		
Lighting	Applicable Light Units		Constant current 500mA	
Control	Dimming Resolution	24 Vpc illuminators 1000:1		
Ethernet	Dimining Resolution		1 x GbE	
USB		1 x RS-232 (TX and RX only) 1 x USB 2.0		
Mechanic	al			
Dimensio		68 5mm W x 110)mm D x 52.7 mm H / 2.70" W x 4.33	3" D x 2 08" H
	nt C mount	00.51111 W X 110	C mount	
Connecto		1 x M12 8-pin (Fe	male), 1xM12 17-pin (Male), 1x M12	2 12-pin (Male)
Software			,,	1
Operating		Windo	ws 7, Windows Embedded Standar	d 7
	Compatibility MVTec Merlic, HALCON, Stemmer CVB, Cognex Vision Pro, Euresys Open eVision, Matrox MIL, Teledyne Dalsa Sherloch			
	ronmental & Electricalions			
	nsumption		24 Vpc +/-10%, 13W (Typical)	
i ower eu	nsamption		0°C to 50°C	
Operation) Temperature	(32°F to 122°F)		
Vibration	,	Operating, 5 Grms, 5-500 Hz, 3 axes		
VIDIATION				

*NEON-1021-M Series includes built-in MVtec MERLIC machine vision software *Specific supported Linux version information available upon request

Embedded Vision Systems Selection Guide

	EOS-1300		
Embedded Vision Systems			
CPU	Intel [®] Core™i7-6700 / Intel [®] Core™ i5-6500 /		
CPU	Intel® Core™ i3-6100 / Intel® Celeron® G3900		
Chipset	Intel [®] H110		
Operating System	Windows 7/10 64 bit		
System Memory	Up to 32 GB DDR4 at 2133MHz		
Video	2 display ports with resolution		
VIdeo	up to 4096 x 2160		
Audio	7.1 channel audio via 5 jacks and S/PDIF output		
Ethernet	2x GbE port		
USB	4x USB 2.0 and 4x USB 3.0 ports (internal 1x USB 2.0)		
COM Ports	1x RS-232/422/485 and 1x RS-232		
Keyboard/Mouse	USB type		
Camera Interface	4CH Gigabit PoE		
Camera interrace	IEEE 802.3af compliant, total max. power output 32W		
	12x isolated DI; 2x Encoder input;		
Digital I/O	16x isolated DO		
Trigger I/O	4x Trigger I/O (Configurable)		
Weight	3 kg(6.6 lbs)		
Mounting	Wall and DIN rail mounting (optional)		
Power Supply	DC 24V, ATX mode		
Operating Temp.	0°C to +55°C (32°F to 131°F)		
Humidity	0% to 90%		
Dimensions	232W x 180.8D x 82.8H mm (9.1 x 7.1 x 3.2 in)		
Power Consumption	Up to 165W		
Storage	1x 2.5" SATA interface		
Random Vibration	Operating 0.5 Grms, 5-500 Hz, 3 axes w/ HDD		
Safety Compliance	CE/FCC, UL, RoHS		

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