

SOLUTION BRIEF

ADLINK and Intel Power IoT Vertical Integration in Manufacturing

With Intel® IoT CONNECTIVITY and cloud applications, the ADLINK DEX-100 provide data acquisition and easy internet connectivity to upgrade legacy machines to Industry 4.0

For some time, leveraging smart manufacturing to boost production quality has been a common goal for manufacturing operations around the globe. IoT integration can enable production lines to process production data and respond in real time, maximizing production efficiency. ADLINK, with years of experience in production line integration, delivers highly compatible IoT solution that can acquire and manage information while connecting all legacy machines. The resulting highly flexible and cost- effective solution allows operators to enjoy the bene ts of smart manufacturing, gaining a considerable competitive edge in the global market



IoT-based integration of IT and OT with the Cloud transforms industry

Detailed and accurate monitoring of production line status and behavior has, in the past, required the presence of large scale highly automated facilities, the benefits of which were mitigated by hefty investment. Many small and medium-sized manufacturers have lacked the budget to implement such facilities, thereby missing the opportunity to compete with major market presences.

With the development of IoT and other information technologies, legacy machines can now integrate with IT, OT and cloud applications. The ADLINK DEX-100 can fully connect 80% or more of legacy machines in the most convenient and economical way, allowing manufacturers of virtually any size to assume smart factory operability. This will revive the stagnant manufacturing industry worldwide and transform it into an industry with strong core values and competitiveness.

Many companies have, in the past, faced logistical difficulty finding a suitable solution to integration of legacy machines with OT and IT. As well, such highly customized integration can be prohibitively expensive. With more than 80% of existing production equipment not connected to the Internet, a solution for fast integration at a reasonable cost is desperately called for. The ADLINK DEX-100 is the answer.

ADLINK
Leading EDGE COMPUTING

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ADLINK's data acquisition and conversion solutions simplify digital data acquisition on legacy machines irrespective of native communication interface, to provide facility-wide connectivity

Currently, most IoT gateways acquire data from equipment via native industrial protocols such as Modbus, Pro bus, and DeviceNet. However, integrating the communication protocols across a wide range of equipment types is problematic. In response, ADLINK developed the DEX-100 IoT able to acquire VGA signals via optical character recognition (OCR) for these legacy machines. The DEX-100 converts content from the machines' human machine interface (HMI) into digital data for transmission to the edge server. For real-time analysis, enabling administration respond to any problems in a timely manner, maintaining production at an optimized level. Technological feasibility must be carefully evaluated when it comes to connecting the information ows of low-level manufacturing machines.

ADLINK provides numerous advantages in initial implementation costs, technological threshold for integration, and follow-up operational costs by utilizing VGA signals and OCR.

- The I/O layer (Fieldbus) of the protocol can be easily implemented and expanded for increased exibility commensurate with production line growth
- First-hand information is available to admin to the management team even when log les are unable to provide real-time data compilation and monitoring
- Support for legacy machines not supporting integration by OPC-UA, allowing full connectivity for machines 2 in use for 2 or more decades
- Implementation costs substantially more reasonable than OEM API- based structure in most cases, with operation una ected by OEM support EOL
- Level of information for individual machines vastly more detailed than conventional tower light systems
- System development is much simpler than installing additional sensors, signi cantly lowering adjustment and implementation time and cost for each machine

Unified Solution Meets the Needs of Brownfield Deployment

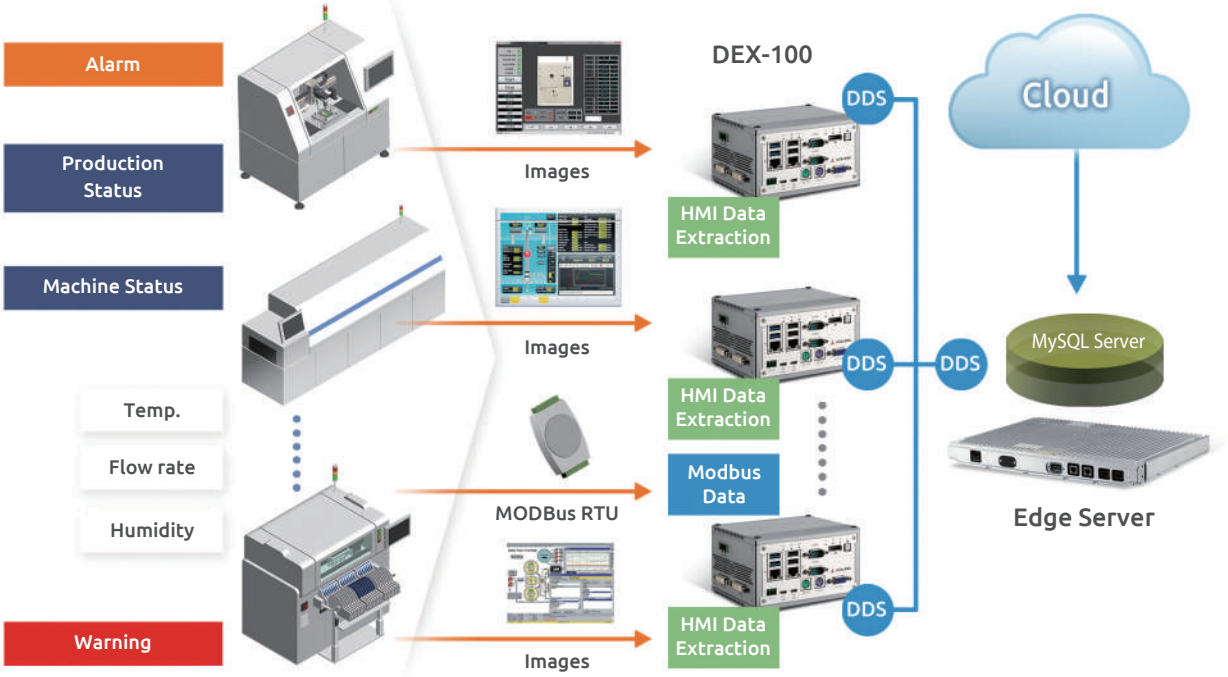


Figure 1. ADLINK, with Intel® IoT technology, has launched solutions that can acquire production data and connect legacy machines for manufacturers. These solutions fully support OT, IT and M2M communications as well as Microsoft Azure Smart Factory Suite, making them complete end- to-end solutions. The ADLINK DEX-100, with image processing and keyboard/mouse support, e ectively connects existing legacy machines, delivering data collection and automation solutions, allowing complete monitoring of the production line and speedy response to any issues in real time, maintaining maximum throughput. It also provides the most accurate production data for analysis at the cloud platform level to support top level administrative functions such as production prediction and maximizing yield.

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The DEX-100 utilizes video transmission capture and can fully analyze machine operations via just 2 VGA ports. Acquired data is then transmitted to the cloud database of the backend. With management and analysis tools, admin can keep track of each machine's operation with a single interface. The DEX-100 can then control machines remotely, performing troubleshooting in the event of malfunction or shutdown. Improving on conventional tower light systems, ADLINK's IoT solution not only acquires machine data but also provides remote operation and management of machines. Troubleshooting is executed with no need for personnel to be physically present, conserving manpower resources tremendously and assisting first-line maintenance/management to maintain maximum production efficiency.

FPGA technology, implementing parallel processing, is particularly suited to analysis and processing of large image data. Compared to conventional SOC (system on chip) performance, Intel SOC combined with the FPGA solution accelerates data processing and image recognition by more than 10 times.

Optical Character Recognition Capability

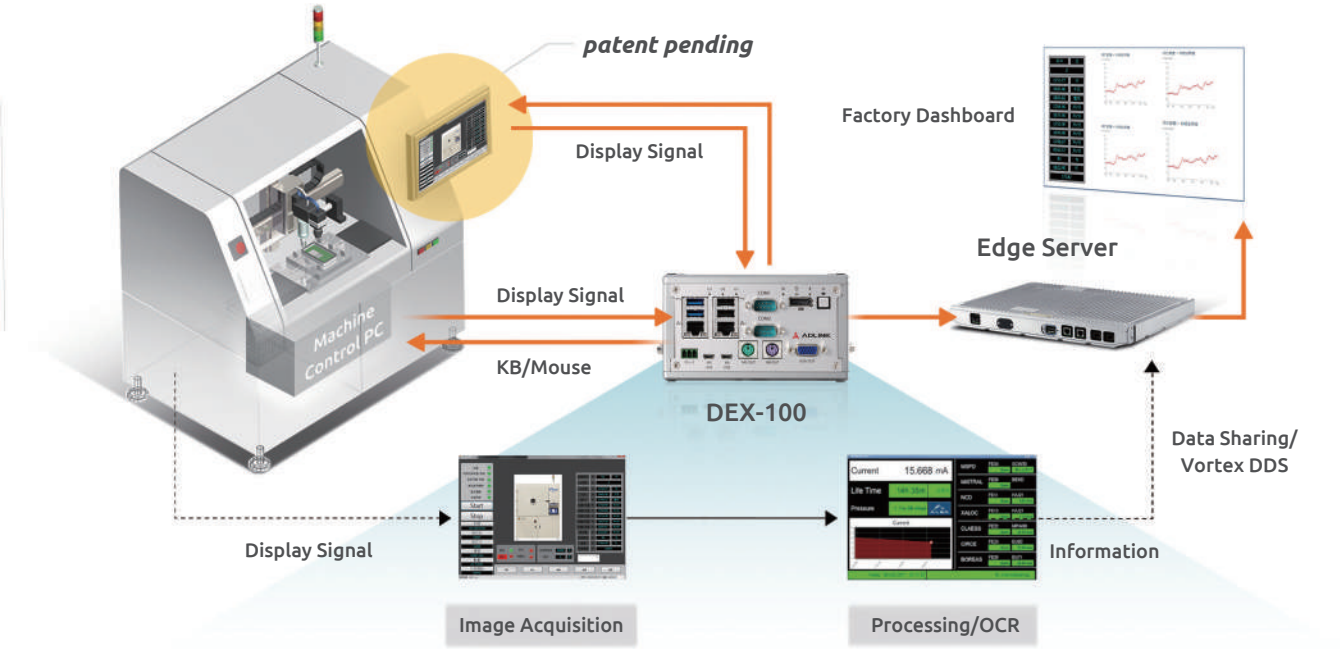


Figure 2. ADLINK DEX-100 combines Intel FPGA technology and OCR technology in a single solution to integrate multiple extraction methods. With its VGA interface output, it can unify legacy equipment protocols into standardized and easily expandable speci cations. DEX-100 can integrate signals and improve equipment stability and processing power tremendously. Built-in management tools in DEX-100 can be adjusted without additional programming.

Highly reliable M2M transmission helps build flexible IoT-based smart production lines

IoT solutions for the manufacturing industry are known for delivering highly exible integration and compatibility. Unlike large, conventionally automated facilities, the combination of IT and cloud technologies can be deployed at any scale or depth and integrated into any scale facility with any variety of machines on the same production line.

Smart production requires synchronized data exchanges among machines and cloud data synchronization to detect any line issues in real time, determine the causality, and allow the production team to remedy the problems and resume production as soon as possible. To facilitate reliable and secure data exchanges, the ADLINK DEX-100 can integrate with ADLINK DDS and Vortex edge servers to compile and exchange data from any machine type. It can also interconnect east-west and north-south data flow to establish a real-time and seamless backup mechanism to maximize production efficiency and quality.

The DEX-100 also provides multiple I/O protocols that are compatible with both new and legacy mainstream machines, allowing connection with scanners, mouse, and other input/output equipment. Deployment of the DEX-100 requires no overhaul of the factory, with simple structure and non-intrusive integration not impeding operations of existing production lines. High quality and durable construction can withstand the most challenging factory environments and lower future management/ maintenance costs.

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When machines are integrated to the Cloud, Smart Suites will continue to optimize production line performance

In both IT and OT frameworks, speed is the key to competitiveness. Intel®, with its years of experience in chip development, has enjoyed over 90% market share in both PC and server markets, able to connect all the dots in the IoT eld to boost operating e ciency in IoT devices needed to conduct edge computing for guaranteed smooth operation of the peripheral systems. When backed by a powerful and stable processor/ chipset combination, the system can significantly boost performance of the production line.

All data collected from the production lines by ADLINK's IoT solution is safely stored on the cloud, translating to no internet data center costs. For small and medium-sized manufacturers with modest IT capabilities, cloud resource integration also signi cantly reduces IT deployment e ort in the introduction of IoT solutions. Finally, Azure's cloud server room complies with rigorous data security certi cations, providing comprehensive protection for all data stored thereon.

A major bene t gained from the implementation of ADLINK's IoT solution is the competitive edge provided by data analysis. To maximize e ciency of analysis, ADLINK incorporates Microsoft Azure cloud computing services and smart factory management suite, providing numerous analysis tools and algorithms required by manufacturing operations. Management needs only consult with data acquisition admin and integrate and upload machine information to determine root causes of issues, enabled by Azure's analysis results, followed by implementation of countermeasures to alleviate any production issues.

Microsoft Azure's cloud computing platform provides more than su cient backend IT resources for the IoT structure, while also providing various analysis models pertinent to manufacturing operations. Once registered, account holders can utilize devices such as the ADLINK DEX-100 to compile data before uploading. Azure can then generate various trend analyses and predictions, providing even modest manufacturers with the same bene ts as major international operators and increase the added value in their products.

Enabling An End to End Solution

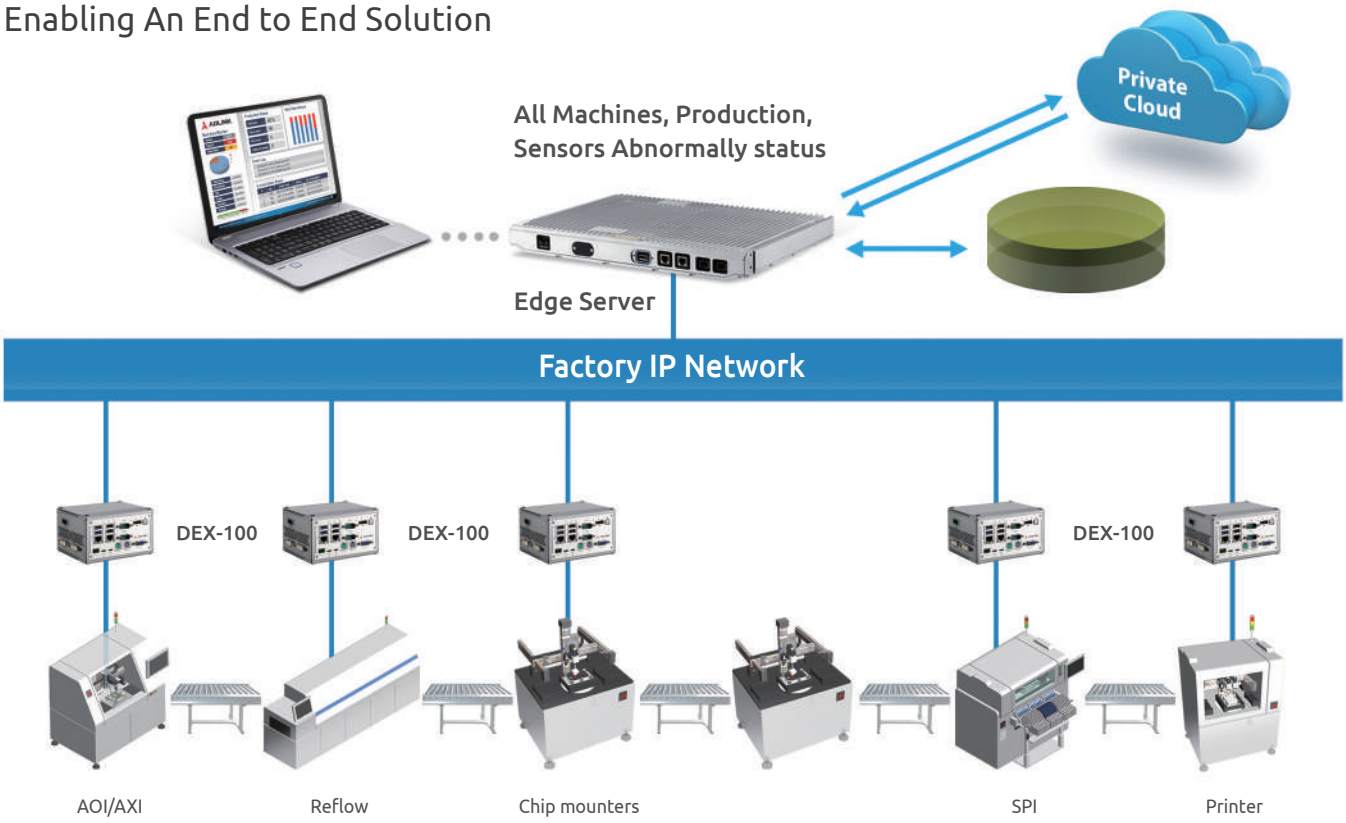


Figure 3. IoT connectivity's greatest value and challenge lies in horizontal integration. Intel® thus has adopted an open chip design compatible with a wide variety of IT, OT and communication technologies, including even backend cloud service integration. This approach allows companies such as ADLINK to design IoT devices, such as DEX-100, that can be deployed on various types of production lines. These devices can integrate both IT and OT to help manufacturers escape the limitations of conventional structures and establish highly competitive smart production lines.

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Easy to integrate, Intel®'s modular system encourages industries to upgrade to IoT

For the manufacturing industry, IoT technology integration requires joint cooperation among many operations. ADLINK, with Intel®'s hardware and Microsoft Azure cloud platform, delivers the IoT solution perfect for the manufacturing industry, allowing operators to integrate based on their needs and production line types, speeding the adaptation to the new processes and reducing adaptation costs.

IoT connectivity has delivered signi cant bene t to a wide variety of industries. ADLINK has fully combined Intel® hardware and innovative cloud applications that is both easy to integrate and highly expendable. The solution will help legacy production lines obtain Internet connectivity in a more economical and convenient way.



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