Building Forward Together | ADLINK

Invigorate Applications with Powerful Functions

Mobile Device Production Solution

Measurement and Automation Solution Guide

www.adlinktech.com

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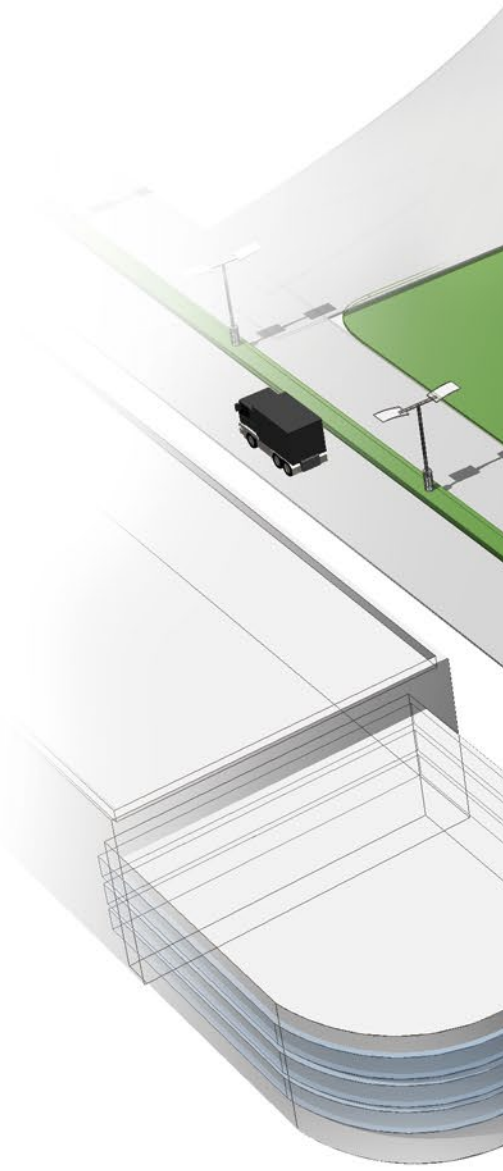

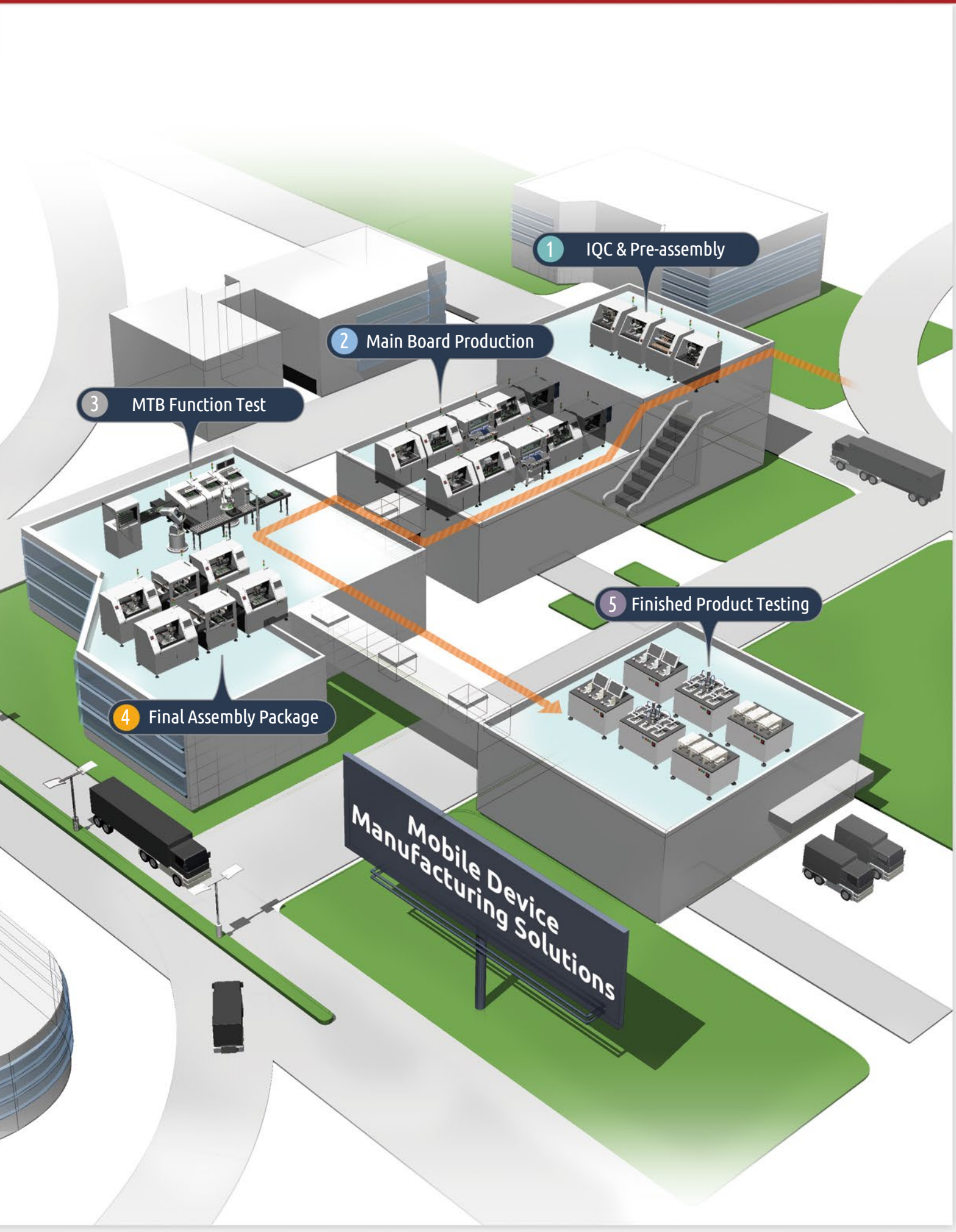
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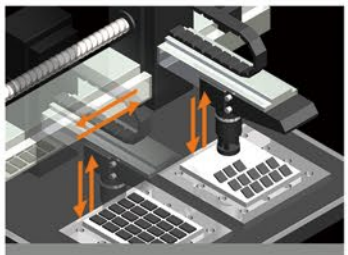
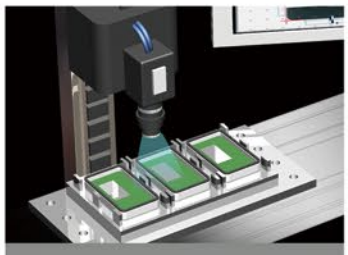
Mobile Device
Manufacturing Solutions

Maximizing Success for Mobile Device Production


Pick and Place


Contouring


Alignment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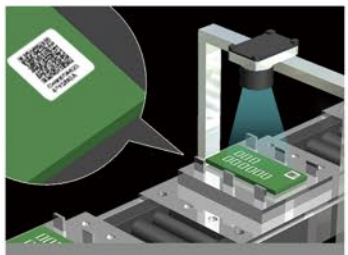
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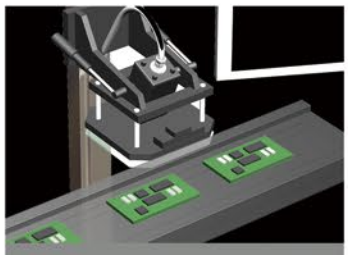
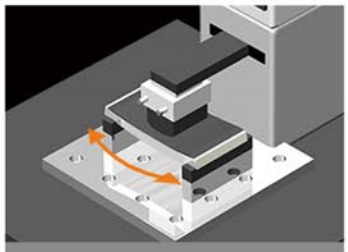
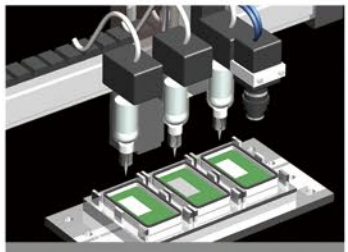
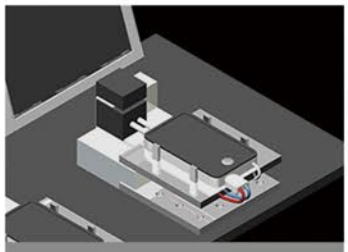

Inspection


Force Control


Comparison & Trigger


Audio/Video Testing

Invigorate Applications with Powerful Functions

With the explosive popularity of mobile device use, supply chain deployment supporting highly efficient manufacturing of quality mobile products is being increasingly recognized as a critical factor in market dominance.

Accordingly, it has become more and more important for providers to introduce automated systems and quality assurance solutions across their production procedures, from material feeding, component production and functional testing, assembly, final product quality assurance, and inspection to shipping, to minimize defect rates while boosting quality and throughput. Intelligent precision manufacturing can easily be the deciding advantage in guaranteeing success and competitiveness for mobile device manufacturers.

The complex manufacturing procedures for mobile devices, from an automation perspective, can be organized into functional categories such as Pick & Place, Contouring, Alignment, Force Control, Inspection, and others.

MMI Vibration

Touch Panel Testing

Dispensing

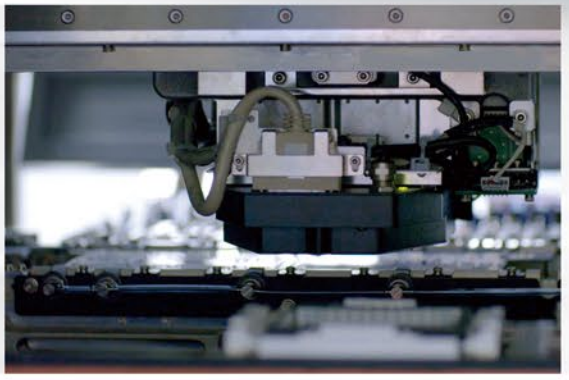
Audio Testing

Leak Testing

Laminating

On-the-fly Sorting

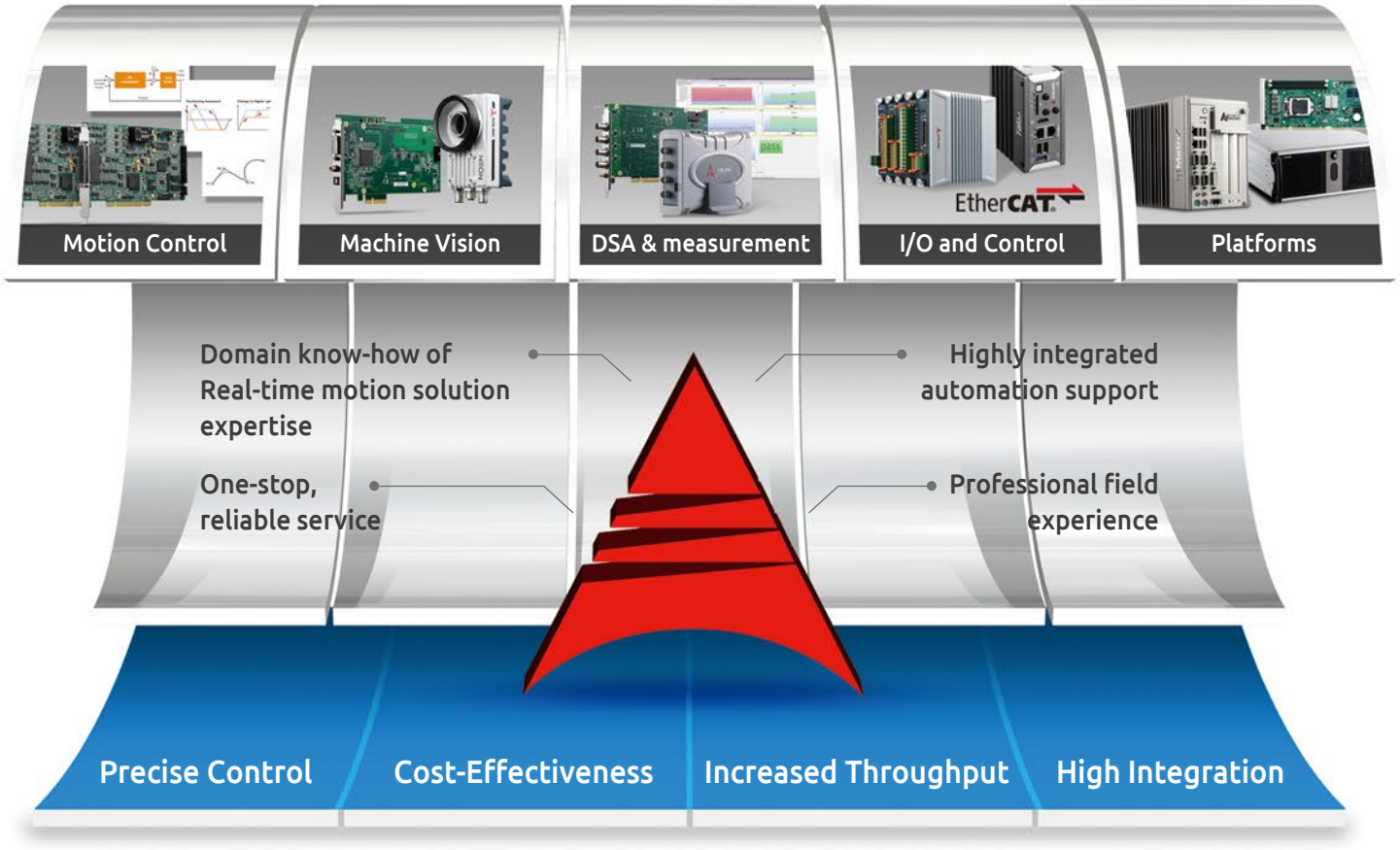
Laser Cutting



As an example, an automated dispenser unit can incorporate such functions as Position Comparison & Trigger and Contouring & Alignment, and, in the presence of automated function testing, Pick & Place as well, to enable robotic loading of workpieces onto the test equipment and Force Control to provide mobilization in lieu of manual function, achieving more consistent and precise test results.

Thus, if highly efficient and fully compatible solutions delivering such functionality are available to mobile manufacturers, system integrators will be able to effect customized organization of the solutions for their specific variety of equipment and applications, translating into quick and flexible satisfaction of production line requirements and timely support of product launches, guaranteeing vertical market success.

The Measurement and Automation Experts



ADLINK Technology Inc., with years of market-proven expertise in measurement and automation technologies, provides a leading range of industrial automation products empowering motion control, machine vision, data acquisition, I/O control, and intelligent computing platforms.

To enhance competiveness and maximize return on investment, automatic system vendors and users require cost-effective and highly integrated solutions that can realize precise control and high throughput. ADLINK, with superior domain knowhow and field experience, meet and exceed customer needs, with a wealth of highly integrated automation solutions enabling real-time I/O and motion control, backed up with reliable one-stop service.

ADLINK has consistently delivered value by overcoming a wide variety of industrial challenges, with proven platforms optimizing operations, driven by a commitment to long-term sustainability and intelligent manufacturing design. ADLINK's flexible roster of system, platform-, and product-based solutions means customers can quickly deploy automated systems that can easily withstand the rigors of the most extreme manufacturing conditions, seamlessly meshing with enterprise-level management platforms to deliver fault-free performance on the front lines of the modern production environment.

Transforming Industry

Current manufacturing efforts face rapid changes in market demands and increasingly faster and more varied product launches. System integrators require flexible and expandable automation solutions that easily integrate into diverse applications with speedy deployment, allowing maximized output and cost-efficiency and generating tangible competitive value.

On the other hand, globalization of the manufacturing industry also prioritizes production efficiency and quality consistency, making it more important than ever to fully automate test and measurement to replace conventional manual function. Additionally, increasing miniaturization of components used demands higher performance platforms delivering precise motion control and sophisticated machine vision capabilities. Reliable connection and networking are required to support high performance manufacturing and meaningful integration into shop floor systems.

Cornerstones for Manufacturing Success

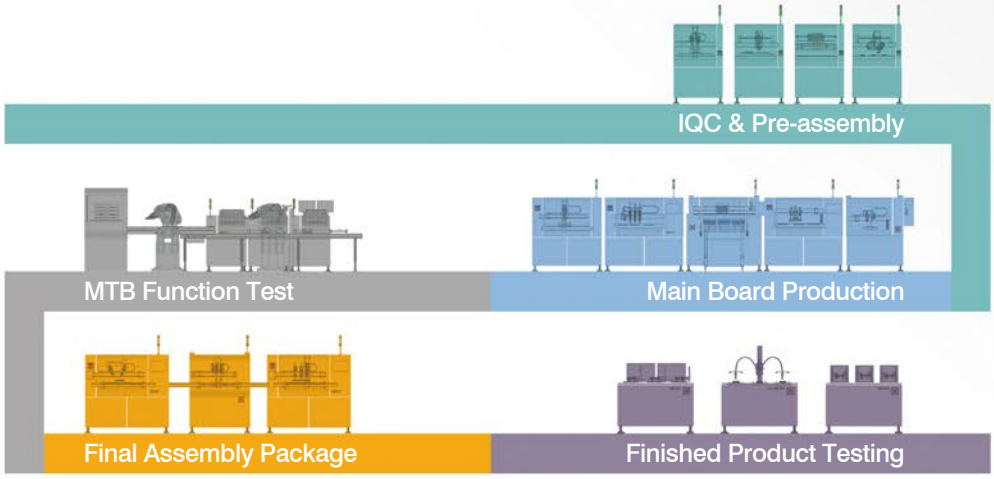
ADLINK's Value Proposition

ADLINK has sustained a superior caliber of automation expertise by consistently keeping pace with the evolution of industry, offering highly flexible and well-rounded automation solutions that continue to meet the changing demands of current customer trends.

For the vertical mobile device market, ADLINK has provided a series of solutions built around specific functions involved in automated manufacturing and testing environments. These solutions have their foundation in the intensive field knowledge and experience crucial to the delivery of seamless integration and leading performance.

ADLINK mobile device production solutions are specifically engineered to meet and exceed the requirements for high precision, high efficiency, and high flexibility in the mobile device manufacturing arena, allowing system vendors to speed product time-to-market and enable faster deployment of production lines to keep pace with or even lead market changes.

Mobile Device Manufacturing Solutions

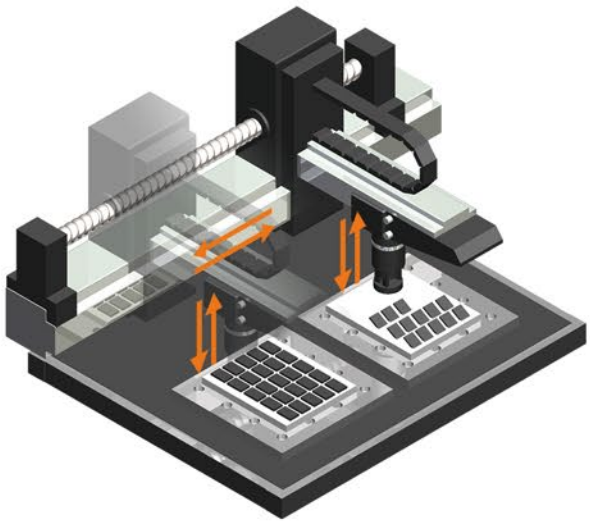



OCA Laminating Machine
CCM Assembly Equipment
Roll to Roll Equipment
Battery Default Inspection
1
IQC & Pre-assembly
Synchronous Control, Image Quality, Force Control, Audio Testing
Solder Paste
Dispensing
SMT
AOI
Soldering
2
Main Board Production
Pick & Place, Alignment, Inspection
Leak Testing
Touch Panel Testing
MMI Testing / Audio Testing / Video Testing
5
Finished Product Testing
Load Cell, Motion Control, Audio Testing, Video Testing
MMI Testing for Camera
MMI Testing fro Panel
MMI Testing for button
Audio Testing
Lightning/MHL Port Testing

Pick and Place

Introduction

Pick-and-Place operations, largely implemented by multi-axis robotics, are important in automated manufacturing in scenarios such as retrieving parts from pallets for positioning in a conveyor system or placement of completed products into packaging. To meet the ever-changing demands of the dynamic mobile market, speed, accuracy and flexibility are prime requirements. Shorter cycle time for motion control is needed to increase throughput, and higher flexibility aids reorganization of production lines to accommodate new product launches.



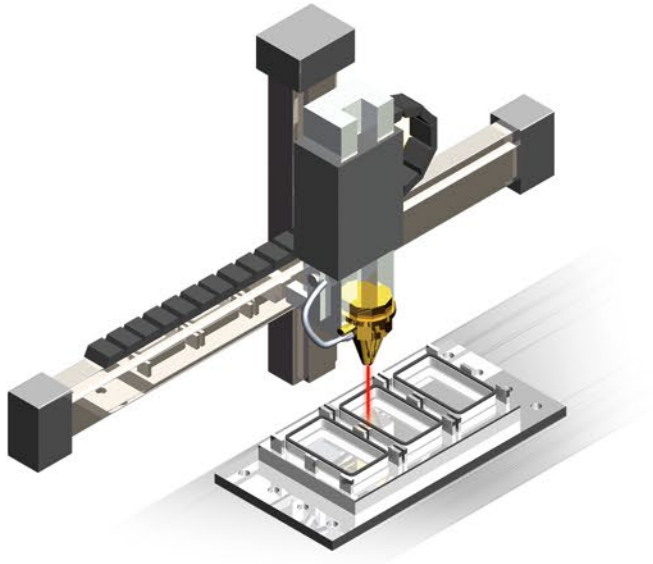
ADLINK Solution

- ***ADLINK EtherCAT:***
  - **Talos-3012: Intel® Atom™ Processor E3845 1.9 GHz-based EtherCAT Master Controller**
  - **EPS Slave System and Modules**
- ***AMP-204C/208C: DSP-based 4/8-axis Advanced Pulse-Train Motion Controllers***

Contouring

Introduction

Precise contouring is an integral contributor to product aesthetics and functionality in mobile manufacturing. Used widely in glue dispensing and laser cutting, as well as CNC machining, the importance of Contouring function increases commensurately with miniaturization of mobile parts, with which machining requirements become stricter than ever to maintain quality. Compared to Pick & Place, Contouring performance relies more on powerful motion control that supplies precise on/off-line trajectory planning and curve-fitting, as well as velocity planning.



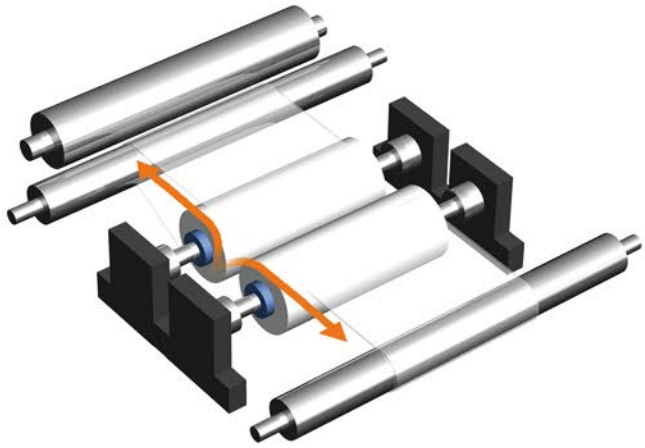
ADLINK Solution

- ***PCI-8254/8258: DSP-based 4/8-axis Advanced Motion Controllers***

Synchronous Control

Introduction

Speed, accuracy and precise movement are extremely important capabilities of manufacturing operations performed by components such as laminating, roll to roll, and screw fastening machinery, which often rely on high synchronization of multi-axis motion and various I/Os in complicated functional combinations. To ensure the absolute precision of motion behavior, ADLINK motion controllers provide multi-axis and mixed motion/IO synchronization with real-time cycle control within 1ms, precisely synching axis and I/O with near-zero time delay.



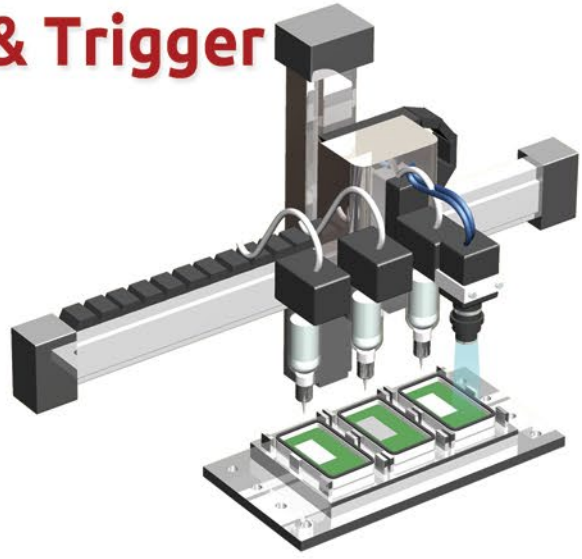
ADLINK Solution

- ***AMP-204C/208C: DSP-based 4/8-axis Advanced Pulse-Train Motion Controllers***

3D Position Comparison & Trigger

Introduction

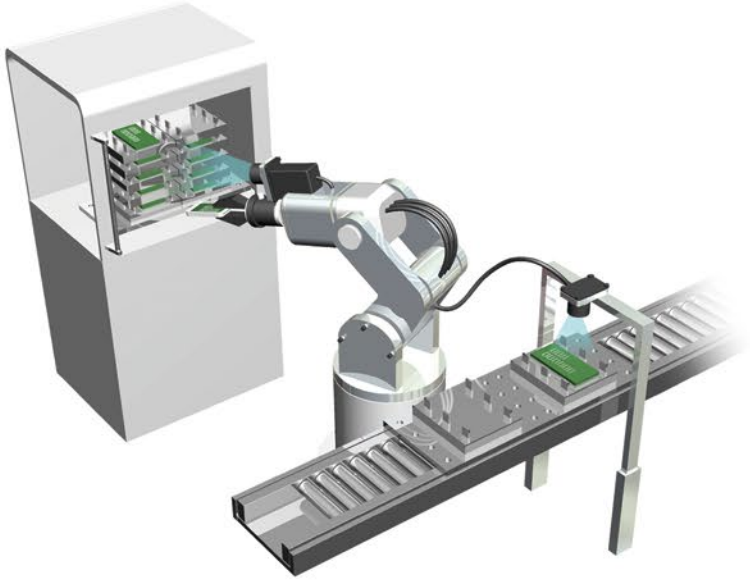
In laser, dispensing, and AOI applications, Comparison & Trigger function refers to motion controllers triggering device activity (laser, camera, etc.) at specific positions during materials processing or inspection. When applied in 3D-equppied operations, precise multi-axis application of the function presents a challenge for automatic control engineering, effectively addressed by ADLINK's offering of controllers that provide on-the-fly triggering in 3D space.



ADLINK Solution

- ***AMP-204C/208C: DSP-based 4/8-axis Advanced Pulse-Train Motion Controllers***

Alignment



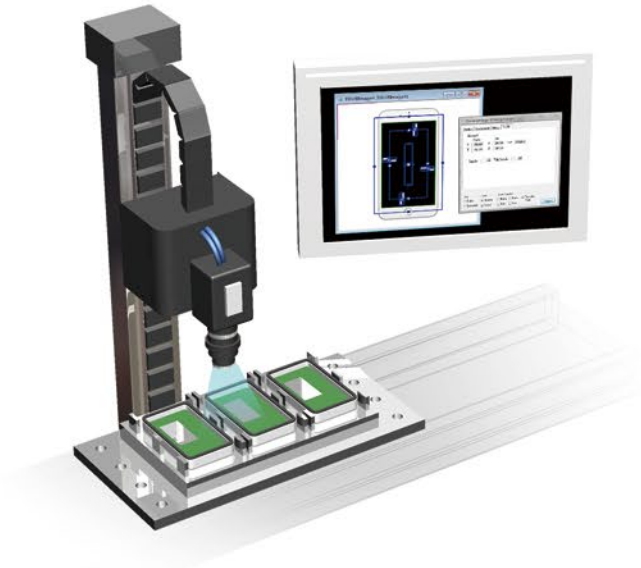
Introduction

Alignment is the fundamental of all machining processes; generating all position information for the workpiece. Compared with conventional manual operations, machine vision alignment not only requires no problematic direct physical contact, but further provides benefits of increased accuracy, throughput, and efficiency. With the increasing miniaturization of mobile device components, high resolution, high computing power and fast capture speeds have become critical in vision-based alignment systems, in addition to presenting favorable compact system size.

ADLINK Solution

- ***NEON-1040: Intel® Atom™ Quad-Core Processor E3845 1.9 GHz-based smart camera with 4MP, 60fps, global shutter sensor and IP67 rating***

Gauge



Introduction

One of the most critical dimension measurements, partly due to the necessity of up to micron-level precision, gauge is a key detection in product quality control. Machine vision-based Gauge function is non-contact, highly efficient, and optimally precise option, capable of measuring multiple objects simultaneously and ensuring higher throughput. With machine vision, users can implement uniform, automatic gauge measurement on production lines, minimizing human error and associated loss. As Gauge applications do not require high frame rates, the GigE interface is an optimal choice, especially for cost and cable length considerations.

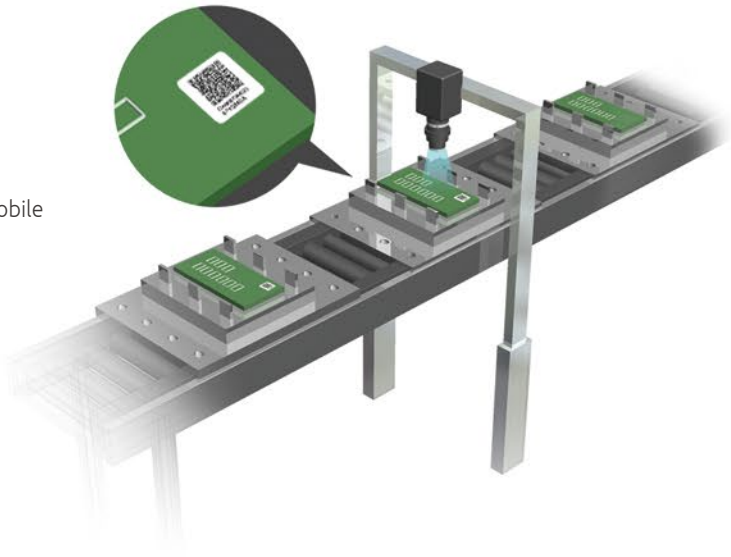
ADLINK Solution

- ***PCIe-GIE64+: 4-CH PCI Express® GigE Vision Power over Ethernet Frame Grabber***

OCR/Barcode

Introduction

OCR/Barcode scanning by machine vision is widely used in mobile device manufacture processing, often to support production records with data acquired from each workstation, ensuring quality consistency of products. With its straightforward and simple operation, cost-efficiency is usually a top concern in OCR/Barcode machine vision solution design, according to which GigE-based platforms present an excellent choice.



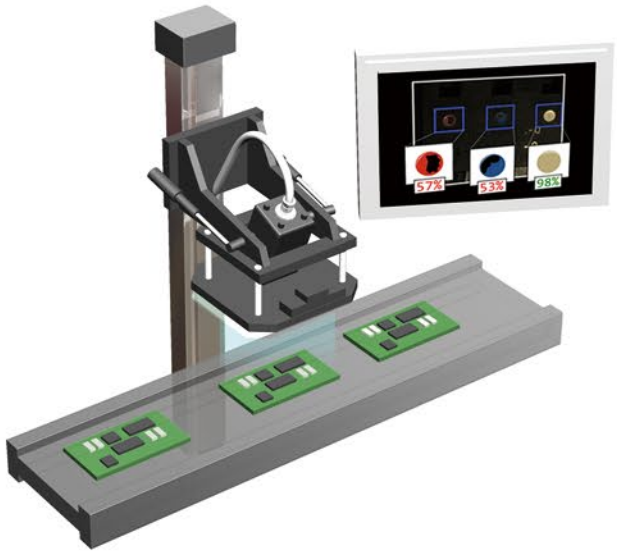
ADLINK Solution

- ***PCIe-GIE64+: 4-CH PCI Express® GigE Vision Power over Ethernet Frame Grabber***

Inspection

Introduction

Detection and identification of product defects is one of the most prevalent machine vision applications. An inspection system usually uses a frame grabber to catch images and implements image pre-processing, algorithm computing, analyses and comparison, in order to detect defects or faults in products. Machine-based automatic inspection for product quality assurance purposes is replacing traditional manual practice due to higher precision, accuracy and throughput. Major components for an automatic inspection solution include lighting, camera, vision platform and easy-to-use image analysis software to ensure best results.



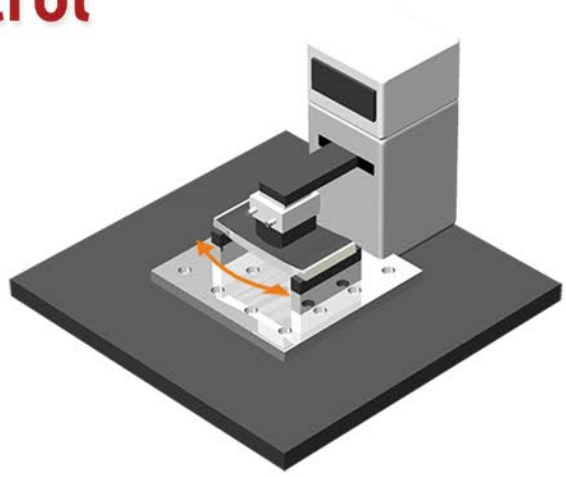
ADLINK Solution

- ***PCIe-GIE64+: 4-CH PCI Express® GigE Vision Power over Ethernet Frame Grabber***

Force Measurement & Control

Introduction

Force measurement and control is often used in cell phone production and testing, and typically involves the use of a load cell to convert force into signals for measurement. Because the load cell's signal output is very low (normally in mV), conventional measurement solutions use an extra signal conditioning device to amplify the signals and measure with a general-purpose DAQ. ADLINK offers a better solution, using a 24-bit high-resolution DAQ with built in signal conditioning circuit, significantly improving convenience and accuracy.



ADLINK Solution

- ***USB-2401: 4-CH 24-Bit Universal Input USB DAQ***
- ***PCI-9524: 24-Bit Precision Load Cell Input Card***

Audio Testing

Introduction

With multimedia capability established as a standard feature of mobile devices, the importance of audio and video quality testing has grown significantly. To minimize false detection, audio testing solutions must emphasize precision, accuracy, consistency and reliability. High flexibility and compatibility are also desirable to support speedy creation of applications quickly and to integrate systems with other test devices to streamline production lines.

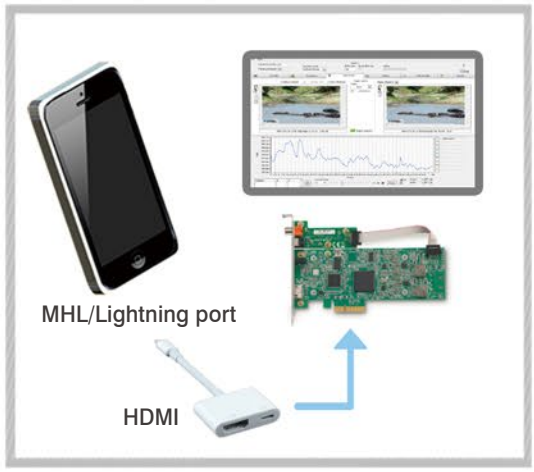
ADLINK Solution

- ***PCI/PXI-9527: High resolution 24-bit dynamic signal acquisition module with flexible input configuration and easy-to-use utility***

Video Testing

Introduction

Mobile devices providing multimedia capability must undergo a full range of testing procedures from input interface and display resolution to color space adjustment. However, as some advanced video features are difficult for the human eye to discern precisely, automatic testing of multimedia devices can provide significant increases in consistency, accuracy and efficiency. ADLINK's video testing solution supports up to 4k2k resolution and can integrate with multi-source digital audio data capture in a streamlined system.



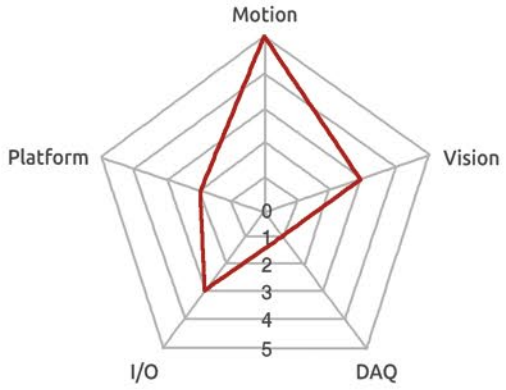
ADLINK Solution

- ***PCIe-HDV72: 1-CH PCI Express 4k2k HMDI Video and Audio Capture Card***

Laser Cutting

Introduction

Precision laser processing and cutting are common in silicon wafer slicing operations for solar cells, cell phone screens, semiconductor wafer, and CNC machines, among others. High-end motion control products for laser equipment must accommodate micro-level precision in contour cutting and adjusting released energy to accommodate varying materials while maximizing yield.



Requirement

- *Laser precision to µm scale*
- *Precision trajectory acquisition w/o vibration*
- *<1% resolution laser power adjustment*

Function

- *Precise trajectory tracing*
- *Automatic velocity planning*
- *On-the-fly laser intensity control*

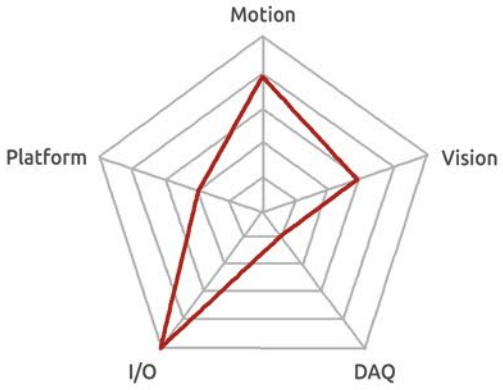
ADLINK Solution

ADLINK's advanced PCI-8254/8258 successfully incorporates complex velocity planning and laser power calculation into a single motion controller, maximizing convenience and economy. State-of-the-art DSP and FPGA technologies support high-speed and high-efficiency hybrid analog and pulse commands. Servo updates up to 20 kHz are delivered through hardware-based PID-FF closed-loop control. With downloaded programs ADLINK motion controller can execute up to eight individual tasks simultaneously, and incorporation with PCIe-GIE64+ and vision analysis tool for object alignment enable precise laser cutting. Further, ADLINK's high performance motion controllers will continue to meet laser cutting demands as 3D processing is adopted more and more, with more complex surface treatments required.

Dispensing

Introduction

Dispensing machines are widely used in mobile device assembly. With increasing miniaturization of components, precise and efficient dispensing is crucial for quality and productivity. To implement precise dispensing, digital camera-based alignment of workpieces and high-performance motion control are needed to trigger dispensers according to planned trajectories. A well-rounded dispensing solution integrates vision, I/O motion control, and related software.



Requirement

- ***Precise control***
- ***High productivity***

Function

- ***3D position comparison & trigger***
- ***Contouring***
- ***Pattern matching (alignment)***

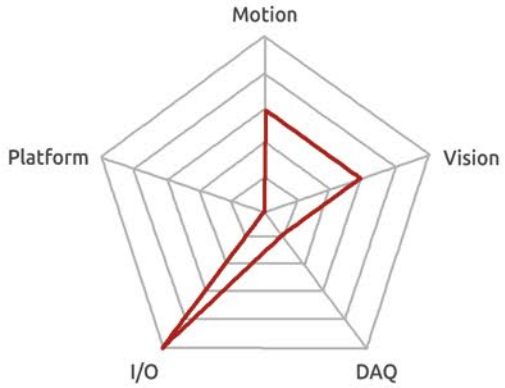
ADLINK Solution

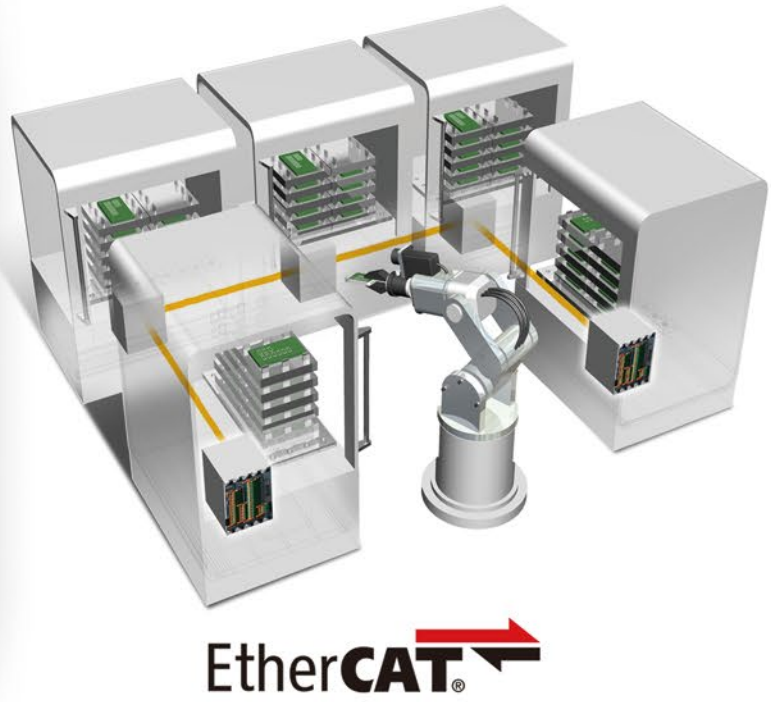
ADLINK incorporates a frame grabber (PCIe-GIE64+), vision analysis tool and motion controller (AMP-204C/208C), into its solution, supporting not only pattern matching and inspection, but overall system control. The AMP-204C/208C is an advanced pulse train motion controller that offers high speed multi-axis position comparison & trigger functions (1MHz), able to compare up to 4/8 axis command or encoder position counter at the same time. It is also useful in comparing specific positions of contouring in 3D applications. With its versatile trigger function, 4 trigger channels can be planned in one contouring path. With the ADLINK AMP-204C/208C, dispensing and inspection can be performed simultaneously, increasing throughput and improving productivity.

Testing & Sorting

Introduction

Testing and sorting is an important function to guarantee quality in the production of electronic devices (EDS). Subassemblies or final products are tested at the production line and defective or faulty items removed. Previously, testing and sorting have been conducted by discrete automated equipment. Recently, however, use of a single system combining two or more functions has gained popularity, to reduce costs, conserve space, and increase throughput.





Requirement

- *High UPH up to 5K+*
- *Binning up to 6+ Trays*
- *Index time ≥ 0.5 sec*

Function

- *Synchronous motion and I/O Control*
- *Position comparison & latch*
- *Electronic character measurement*
- *Pattern matching*

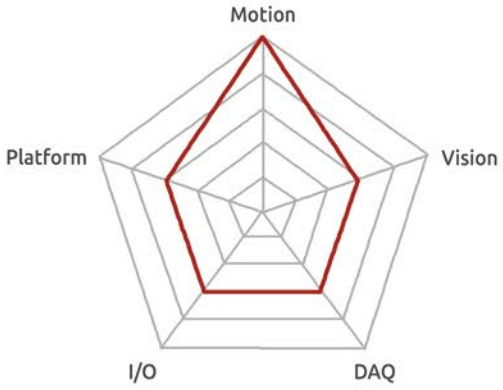
ADLINK Solution

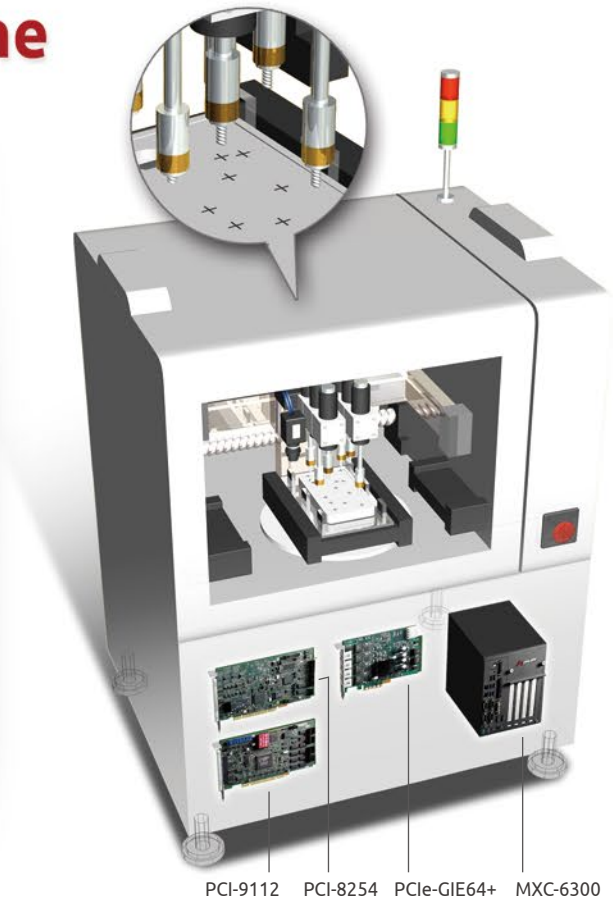
Two-in-one or multi-function machines require powerful and precise motion control that can support multiple handlers simultaneously. For Testing & Sorting machines, ADLINK provides an EtherCAT-based solution realizing time-deterministic control, comprising a Talos EtherCAT master controller to coordinate and control multiple EPS EtherCAT slaves, each connected to servos and digital or analog I/O devices for testing or sorting. The Talos controller has ADLINK's Softmotion package installed, enabling management of complicated motion function with simple and intuitive function blocks. Incorporating ADLINK vision and DSA products, the solution offers precise pattern matching and highly accurate results.

Screw Fastening Machine

Introduction

Screw fastening machines are deployed on assembly lines to automatically fix component parts together. With increasing miniaturization of mobile devices, the machines require more precise position alignment, auto-adjusted torque, high-speed movement, and dynamic locking to flexibly and quickly perform from different heights and angles. A screw locking solution thus demands integration of motion, vision and I/O functions.





Requirement

- *Real-time force feedback measures screw torque in ms*
- *Multi-axis synchronous control fastens multiple screws simultaneously*
- *Vision alignment integration for precise positioning accuracy*

Function

- *Program download synchronizes onboard analog input and motion in ms*
- *E-gearing function maximizes motion control synch*
- *Precise position comparison and high speed trigger functions*

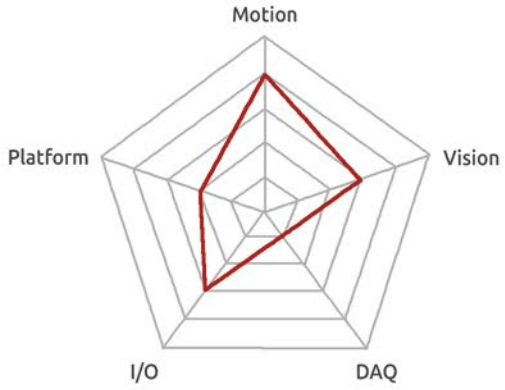
ADLINK Solution

ADLINK's solution successfully incorporates complex vision, velocity planning, and data acquisition to help system integrators develop mobile device screw fastening trajectory applications. ADLINK's advanced Data Acquisition Card PCI-9112 supports automatic analog input scanning and offers a unique mode for 8-CH analog inputs and maximum noise elimination, as well as single-ended modes for 16-CH analog inputs. As well, to achieve highly efficient, precise motion control, ADLINK's advanced motion controller PCI-8254/8258 provides a Program Download feature that helps execute up to 8 tasks simultaneously while automatically controlling all onboard I/O, while generating motion trajectories at the same time. ADLINK's vision solution is based on the PCIe-GIE64+, featuring automatic detection for reliable connection between cameras and frame grabbers, and supporting multiple GigE Vision device connections with data transfer up to 1000 Mb/s.

Laminating

Introduction

OCA lamination in touch screen manufacturing is pivotal for optical performance and reliability but is also a major source of product defects. Automatic OCA laminator solutions usually combine machine vision, motion control, and I/O control in a single apparatus, requiring equipment vendors to integrate these functions in the most efficient way possible, to maximize performance. Precision in glue dispensing and OCA laminating is widely recognized as a key factor in manufacturing success.



Requirement

- *Automatic vision positioning 0.005mm*
- *Position control over glue and OCR*
- *Glue dispensing trajectory control*

Function

- *Pattern matching*
- *Synchronous control*
- *Contouring control*

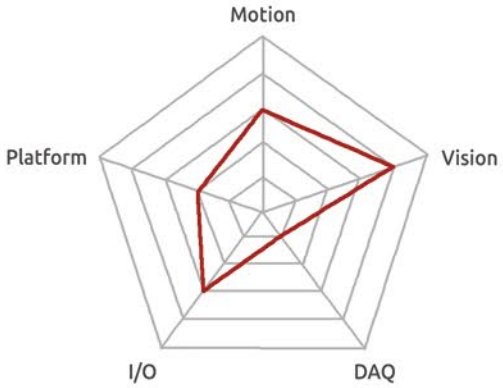
ADLINK Solution

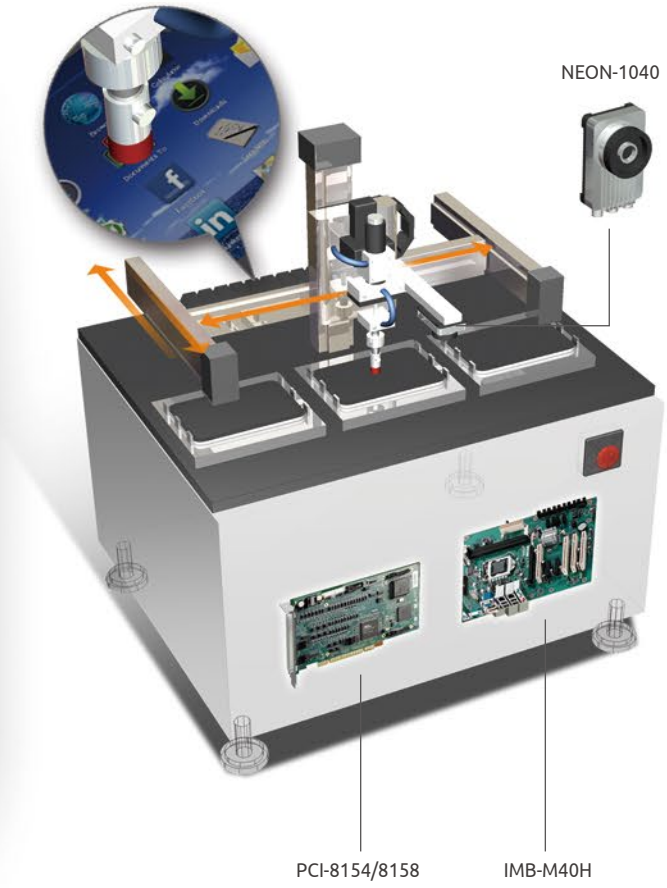
ADLINK provides a total solution for laminating machines that includes vision and motion controls. ADLINK's PCIe-GIE64+ frame grabber connects up to 4 GigE Vision cameras via Power over Ethernet (PoE). ADLINK's AMP-204C, a DSP-based 4-axis advanced pulse-train motion controller, provides high pulse output and fast encoder input and integrates multi-dimensional interpolation, completing the solution for high precision and complex motion control.

Touch Panel Testing

Introduction

Automated touch panel testing calls for high integration and synergy among the major functions--vision, motion and measurement. Machine vision is used to detect the position of the workpiece (touch panel), and gives the position information to the motion system, so that the motion system can align the workpiece to the right position for the vision system to implement measurement and analysis. Meanwhile, Precision load cell input card is used to give pressing force instead of less precise manual practice.





Requirement

- *Optical precision to µm scale*
- *Wide range field of view (FOV) and high resolution*
- *Maximum integration for reduced TCO*

Function

- *High performance imaging efficiency*
- *Pattern matching*
- *Precise position control*
- *Position comparison & trigger*

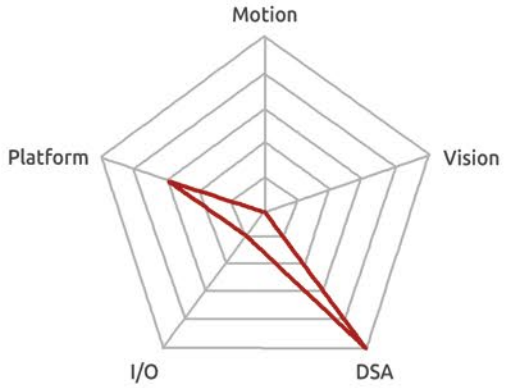
ADLINK Solution

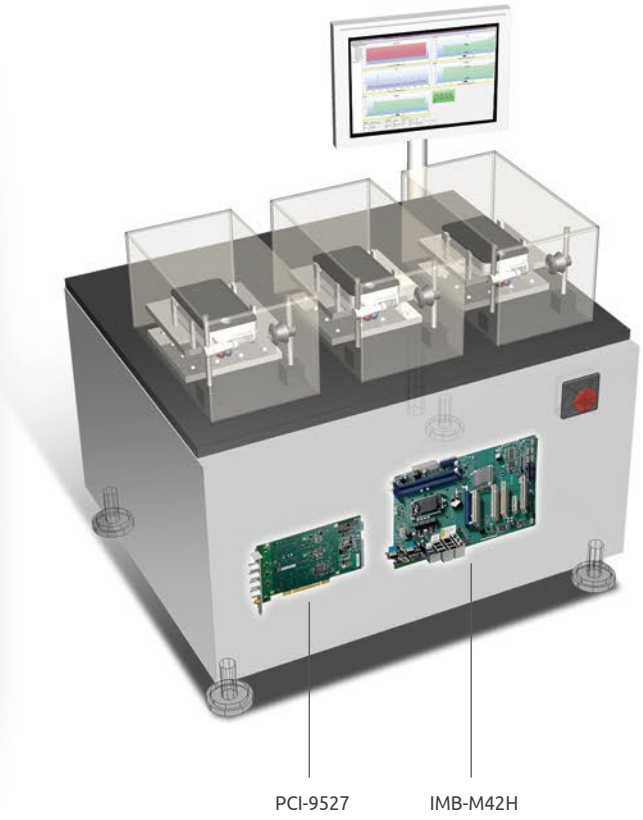
ADLINK's total solution for touch panel testing integrates vision, motion, and measurement. The NEON-1040 smart camera, at the heart of the solution, features an Intel quad-core Atom processor, 1" global shutter CMOS sensor, up to 4MP image resolution, and wide range field of view (FOV), and fully supports simultaneous testing of multiple touch panels for reduced testing cycle. The NEON-1040 accommodates a variety of 3rd party vision applications enabling fast and easy application development. For motion control, the ADLINK PCI-8154/8158 advanced pulse train motion controller generates high frequency pulses to drive stepper or servo motors, capable of simultaneously operating 4/8 axes.

Audio Testing

Introduction

Audio testing is often conducted at the end of production to verify acoustic quality of mobile phones or other handsets, and typically comprises measurement of frequency response and microphone sensitivity crosstalk, among others. To ensure HiFi quality of mobile devices, highly efficient and precise audio testing solutions are needed to generate consistent testing results. Audio testing equipment with multiple-channel inputs and shorter test cycle capabilities enables quick testing of multiple devices at the same time by a single machine, maximizing throughput.





Requirement

- *Reduced audio test cycle time and higher test efficiency*
- *Precision and consistency of test results*
- *Quicker system development and installation*
- *Multi-channel capability integrating more tests*

Function

- *Audio loop test*

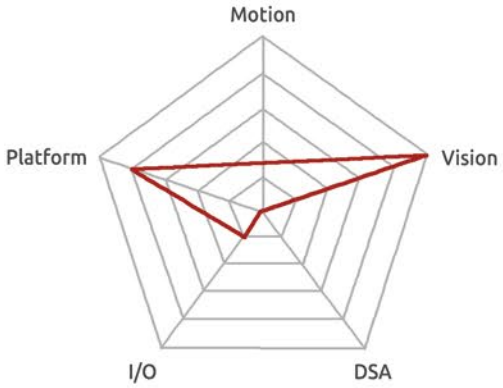
ADLINK Solution

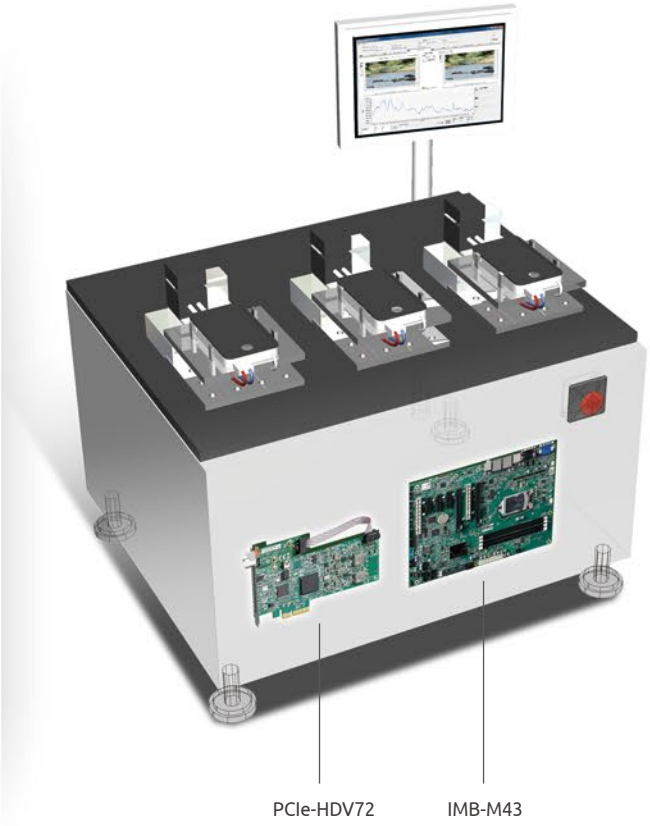
The ADLINK PCI-9527 24-bit high efficiency dynamic signal acquisition card is well suited for mobile device audio testing, incorporating multiple analog input/output channels in a single card to reduce cycle time and testing costs. With high resolution capability ensuring precision and consistency of test results, the ADLINK PCI-9527 is pre-installed with easy-to-use SDK and supports multiple programming languages including C/C++, .NET and LabVIEW, helping system integrators to quickly develop audio test systems and integrate other test applications (such as video test) flexibly. ADLINK even provides ready-to-use audio test software, further reducing system development time and speeding time to market.

Video Testing

Introduction

Quality requirements for video display in mobile devices are increasing constantly in step with the sophistication and performance of the devices themselves. Video testing must, accordingly, satisfy a full range of testing criteria, including input interface, display resolution, color space adjustment, and others. Increased complexity dictates that formerly acceptable manual-based testing can no longer meet testing requirements, such that automatic testing is becoming the standard, reducing costs while improving efficiency, consistency, accuracy and yield.





Requirement

- ***Multiple standard and format support 1080P Full High Definition and 4K2K Ultra HD Resolution***
- ***Fast, accurate identification and location of dead pixels, abnormal colors, and other display faults***
- ***Included SDK speeds system integration and testing***

Function

- ***Video Properties Detection, including Resolution, Frame Rate, Color Space, and others***
- ***Frozen or dropped Video Frame Detection***
- ***Video Content Analysis using SSIM (Structural Similarity Index) and PSNR (Peak Signal-to-Noise Ratio)***
- ***Video Malfunction Detection, including Macroblocking, Pixelation, Synch Failure***

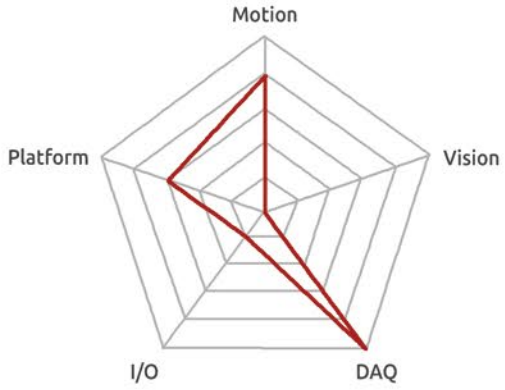
ADLINK Solution

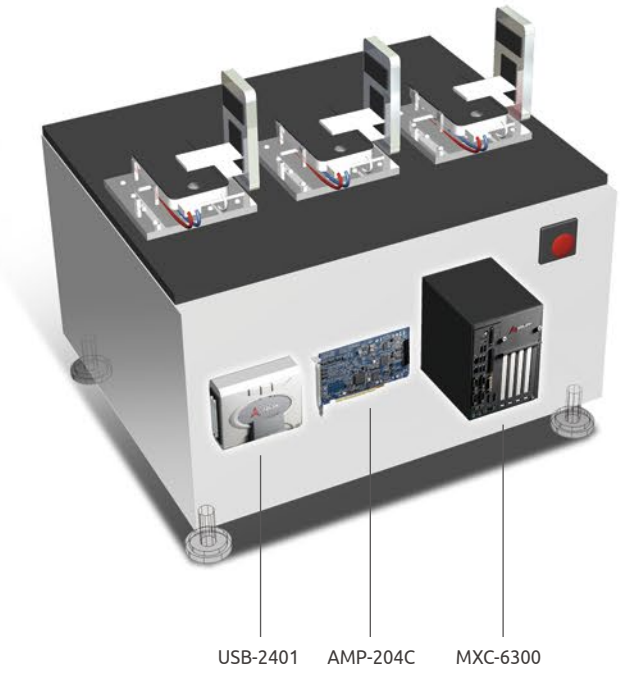
The ADLINK PCIe-HDV72 implements audio and video testing simultaneously in a single controller. It features uncompressed image support up to 4K2K, integrated multi-source digital audio data capture, HDMI, sRGB, YPbPr and SPDIF. The PCIe-HDV72 connects directly to multimedia devices, acquiring video and audio data for analysis using algorithms such as PSNR (peak signal to noise ratio), SSIM (Structural Similarity Index), and FFT (Fast Fourier Transform), and can also modify EDID content. The ADLINK PCIe-HDV72 ensures compatibility across multiple platforms, delivering superior accuracy in a cost-effective and highly integrated solution for automated multimedia testing.

Leak Testing

Introduction

Leak testing, often conducted at the end of portable device production to verify waterproofing, typically creates a testing hole in the device casing. Air is evacuated from the device interior, and if waterproofing is intact, an inner vacuum exerts a measurable reaction force on the exterior.





Requirement

- *Precise (24-bit), high-speed (≧ 2kS/s)*
- *Ability to compensate for errors caused by different accelerometers*
- *Closed-loop motion control with force feedback*

Function

- *Full-bridge sensor measurement with built-in excitation voltage and amplifier*
- *Ability to retrieve and read calibration data from sensors through TEDS interface for increased measurement accuracy*
- *Software-based force feedback Closed-loop motion control*

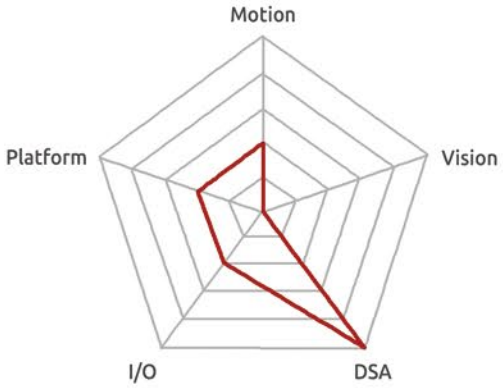
ADLINK Solution

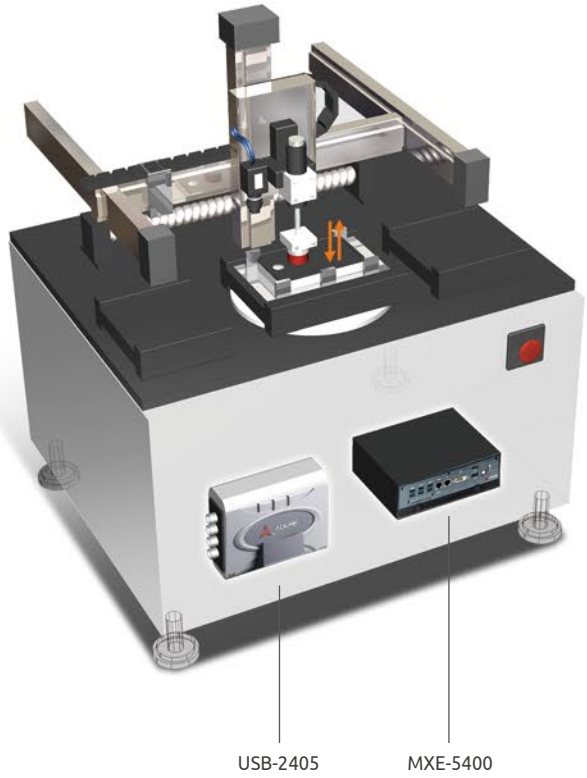
The ADLINK USB-2401 is a 4-CH, 24-bit, 2kS/s universal input USB module supporting high accuracy load cell (full-bridge) measurement without the need for extra signal conditioning or amplifier. It supports TEDS interface and can efficiently read back calibration data stored in the sensor to compensate for errors possibly caused by the sensor itself, ensuring consistent measurement results. Combined with the AMP-204C/208C DSP-based 4/8-axis advanced pulse-train motion controller, the USB-2401 enables effective leak testing for a wide range of mobile devices.

MMI Vibration Testing

Introduction

Vibration units are standard features in mobile communication devices, deployed together with Vibration testing for portable device MMI (Man Machine Interface) is a basic part of the production process. In vibration tests, the device is fixed by springs and switched to engineering mode to enable vibration. An accelerometer then measures the generated vibration.





Requirement

- *High accuracy (24-bit) IEPE/ICP accelerometer measurement*

Function

- *High resolution analog input supporting AC coupling and anti-aliasing filter*
- *Built-in excitation current source*

ADLINK Solution

The ADLINK USB-2405 is a 4-CH, 24-bit, 128kS/s dynamic signal acquisition USB module which can directly measure signals from accelerometers with no need for extra signal conditioning or amplification. The USB-2405 features built-in excitation power to drive IEPE/ICP accelerometers and anti-aliasing filters to eliminate unwanted noise to enable highly accurate measurement. The bus powered USB interface easily allows vibration test function to be integrated with other device MMI testing procedures.

Pulse Train Motion Control

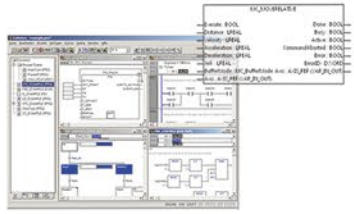
		PCI-8158	PCI-8154	PCI-8164	PCI-8102
					
Number of Axes		8	4	4	2
Support Motor		servo/ stepper	servo/ stepper	servo/ stepper	servo/ stepper
Encoder Input Frequency (Max)		6.55 MHz @ 1M, under 4 x AB phase	6.55 MHz @ 1M, under 4 x AB phase	6.55 MHz @ 1M, under 4 x AB phase	6.55 MHz @ 1M, under 4 x AB phase
Pulse Output Rate (Max)		6.55 Mpps	6.55 Mpps	6.55 Mpps	6.55 Mpps
Motion Features	*Linear Interpolation*	Any 2 to 4 of 4 axes	Any 2 to 4 of 4 axes	Any 2 to 4 of 4 axes	2 axes
	Circular Interpolation	Any 2 axes	Any 2 axes	Any 2 axes	2 axes
	Helical Interpolation	√	√	-	-
	Home Return Mode	13 (including auto homing)	13 (including auto homing)	13 (including auto homing)	13 (including auto homing)
	Continuous Contouring	by 3 command buffer	by 3 command buffer	by 3 command buffer	by 3 command buffer
Motion Profile		T/S curve (Non-symmetric acceleration/deceleration settings are supported)			
Dedicated Motion I/O		±EL/ORG/SVON/INP/ALM/RDY for each axis			
DI/O Channels		8 DI / 8 DO	4 DI / 4 DO	6 TTL DO	16 DI / 16 DO
Card Index Switch		√ (0 to 15)	√ (0 to 15)	-	√ (0 to 15)
Hardware Emergnecy Input		√	√	-	√
Advanced Motion Function	*Position Compare & Triggering*	√ (with DB-8150, up to 1 MHz)	√ (with DB-8150, up to 2 MHz)	√ (up to 15 kHz)	√ (up to 1 kHz by interrupt function)
	Backlash Compensation	√	√	√	√
	Simultanous Move	√	√	√	√
	Ring Counter Support	√	√	√	√

DSP-based Advanced Motion Control

		PCI-8254	PCI-8258	AMP-204C	AMP-208C
					
Number of Axes		4	8	4	8
Support Motor		servo/ stepper	servo/ stepper	servo/ stepper	servo/ stepper
Encoder Input Frequency (Max)		20 MHz under 4 x AB phase		20 MHz@1M,under 4 x AB phase	
Servo Update Rate		20 KHz		-	-
Trajectory Update Rate		1 KHz		1 KHz	
Pulse Output Rate (Max)		-	-	6.55 Mpps	6.55 Mpps
Motion Features	*Linear Interpolation*	Any 2 to 4 of 4 axes	Any 2 to 6 of 8 axes	Any 2 to 4 of 4 axes	Any 2 to 6 of 8 axes
	Circular Interpolation	Any 3 axes	Any 3 axes	Any 3 axes	Any 3 axes
	Helical Interpolation	√	√	√	√
	Home Return Mode	√	√	√	√
	Gearing	√	√	√	√
	Continuous Contouring	√	√	√	√
Motion Profile		User-defined		User-defined	
Dedicated Motion I/O		+/-EL/ORG/SVON/INP/ALM for each axis		+/-EL/ORG/SVON/INP/ALM for each axis	
AI Channels		4 (12 bit garuantee)	8 (12 bit garuantee)	-	-
DI/O Channels		20 DI / 20 DO	24 DI / 24 DO	20 DI / 20 DO	24 DI / 24 DO
Card ID		V (4-bit)	V (4-bit)	V (4-bit)	V (4-bit)
Program Download		8 tasks	8 tasks	-	-
Advanced Motion Function	*Position Compare & Triggering*	up to 1 MHz	up to 1 MHz	up to 1 MHz	up to 1 MHz
	PWM Control	2-CH	4-CH	2-CH	4-CH
	Simultanous Move	√	√	√	√
	E Gearing	√	√	√	√

EtherCAT Master Controller

Model Name		Talos-3012
Processor		Intel® Atom™ Processor E3845 1.9 GHz
Controllable Motion Axis		16/32/64
Controllable I/O Points		Up to 10,000 points
Control Cycle Time		250 us (min.)
Memory	RAM (Program & Data Memory)	2GB DDR3
	Retain Memory	Configurable on SD card
	Storage (Date Usage)	16 GB SSD / SD Card
Field Bus Connectivity		I for EtherCAT
Ethernet Connectivity I GbE		I GbE
System Indicators		3 User-defined
Programming Environment		CoDesys v3
		IEC 61131-3-Compliant
Supply Voltage		9-32 V_{DC} wide-range DC input
Environment Certificate		Vibration: 5 Grms, 5-500Hz
		Shock: 50G, Half Sine II ms duration
		EMC: EN 550111 class A
Operating Temperature		-20 ° C~60 ° C (-4 °F to 140 °F)
Dimension		120 (W) x 100 (D) x 55 (H) mm (4.68" 3.9" x 2.17")



Talos-3012

EtherCAT Slave System and Modules

EPS-9905 with EPS-6000

EPS-7002

EPS-1132/ 2032/ 2132/ 2308/ 3216/ 3032/ 7002

EPS-3504/ 4008

Model Name	EPS-9905 with EPS-6000
Installed Slots	5 (max.)
Protection Type	IP31
Hot Swap	Yes
Operating Temp.	-20~60Â° C
Dimension (mm)	130 (L) x 110 (W) x 105 (H)
Weight (estimated)	< 1,000 gram
Power Consumption	6.6W
Supply Voltage	24Vdc (,Â±10%)
Environment Certificate	Vibration: 5 Grms, 5-500Hz
	Shock: 50G, Half Sine 11 ms duration
	EMC: EN 55011 class A

Model Name	EPS-1132	EPS-2032	EPS-2132
I/O Type	Digital Input	Digital Output	Digital Output
Channel	32	32	32
Hot Swap		Yes	
Input / Output Type	Sinking	Sourcing	Sinking
Input Range (by Voltag e/Current)	IEC 61131-2 Type 1/3, 2.3mA	--	--
Sampling Rate	<1ms	4KHz	4KHz
Resolution	--	--	--
Output Current Capacity	--	300mA / ch	300mA / ch
Connector Type		Phoenix Contact DFMC	

Model Name	EPS-2308	EPS-3216	EPS-3032	EPS-3504	EPS-4008	EPS-7002
I/O Type	Relay Output	Analog Input	Analog Input	Terminal Input	Analog Output	Motion Control
Channel	8	16	32	4	8	2
Hot Swap	Yes	Yes	Yes	Yes	Yes	Yes
Input / Output Type	Relay	Differential	Single-ended /Differentia	RTD	Single-ended	Pulse-Train
Input Range (by Voltage/Current)	--	0~20mA	+/- 10V	RTD (PT100, 500, 1000)	± 10V	PUS/DIR: 4MHz ENC: 20MHz
Sampling Rate	5ms	100KHz	100KHz	5-20Hz	100KHz	--
Resolution	--	16 bit	16 bit	24bit	16bit	32 bit
Output Current Capacity	AC: 125V @ 0.5A DC: 30V @ 2A	--	--	--	5mA	--
Connector Type	Phoenix Contact DFMC					SCSI VHDCI 68p

Frame Grabber Selection Guide

	PCIe-HDV72	PCIe-2602	PCIe-GIE64+	PCIe-GIE62+
ADLINK Frame Grabber				
Standard	HDMI	SDI	Power over Ethernet	Power over Ethernet
Configuration	4K, UHD	SDI	Gigabit Ethernet	Gigabit Ethernet
Connector	HDMI	BNC x 2	RJ45 x 4	RJ45 x 2
Resolution	4096 x 2160P, 3840 x 2160P	1920 x 1080p	depends on camera specification	depends on camera specification
Interface	PCIe x4 (3.0)	PCIe x4	PCIe x4	PCIe x4
Max. Video Input	1	2	4	2
Max. Frame Rate	up to 60	60	depends on camera specification	depends on camera specification
Audio Input	√	SDI embedded	-	-
TTL I/O	√	√	-	√
Area Scan Camera	√	√	√	√
Line Scan Camera	-	-	√	√
Monochrome Camera	√	√	√	√
Color Camera	√	√	√	√
Interlaced Scan	√	√	√	√
Progressive Scan	√	√	√	√
Camera Tap	-	-	-	-
Pixel Depth	8-bit, 10-bit	8, 10, 12-bit	depends on camera specification	depends on camera specification
Max. Clock Frequency	-	-	-	-
On-board memory	2 GB	-	-	-

	PCIe-HDV62A/PXIe-HDV62A	PCIe-CPL64	PCIe-FIW64/PCIe-FIW62	PCIe-RTV24/PCI-RTV24
ADLINK Frame Grabber				
Standard	HDMI	PoCL (Power over Camera Link)	IEEE 1394b	Color: PAL/NTSC Monochrome: CCIR/EIA (RS-170)
Configuration	Full HD	base, medium	-	-
Connector Interface	DVI-I	MDR26	IEEE 1394b	BNC x 4
Resolution	1920 x 1080p	depends on camera specification	depends on camera specification	640 x 480 (NTSC/RS170), 768 x 576 (PAL/CCIR)
Interface Bus	PCIe x4	PCIe x4	PCIe x4 / PCIe x1	PCIe-RTV24: PCIe x1 PCI-RTV24: PCI
Max. Video Input	1	2	4 / 2	4 to 16*
Max. Frame Rate	60	depends on camera specification	depends on camera specification	30 fps / channel
Audio Input	√	-	-	-
TTL I/O	√	√	√ (FIW64)	√
Area Scan Camera	√	√	√	√
Line Scan Camera	-	√	-	-
Monochrome Camera	√	√	√	√
Color Camera	√	√	√	√
Interlaced Scan	√	√	√	√
Progressive Scan	√	√	√	-
Camera Tap	-	1-tap, 2-tap, 3-tap, 4-tap	-	1-tap (PCIe-RTV24)
Pixel Depth	8-bit, 10-bit	8-bit, 10-bit	depends on camera specification (FIW64) 8 to 10-bit (FIW62)	8-bit
Max. Clock Frequency	-	85 MHz	-	-
On-board memory	512 MB	128 MB	-	-

Euresys Frame Grabber

	Grablink Base	Grablink DualBase	Grablink Full	Grablink Full XR
				
Standard	PoCL (Power over Camera Link)	PoCL (Power over Camera Link)	Camera Link	Camera Link
Configuration	Base	Dual Base	Base, Medium, Full	Base, Medium, Full
Connector Interface	HDR26 x 1	HDR26 x 2	HDR26 x 2	HDR26 x 2
Resolution	depends on camera specification	depends on camera specification	depends on camera specification	depends on camera specification
Interface Bus	PCIe x1	PCIe x 4	PCIe x 4	PCIe x 4
Max. Video Input	1	2	1	1
Max. Frame Rate	depends on camera specification	depends on camera specification	depends on camera specification	depends on camera specification
TTL I/O	√	√	√	√
Area Scan Camera	√	√	√	√
Line Scan Camera	√	√	√	√
Monochrome Camera	√	√	√	√
Color Camera	√ (Bayer, RGB)	√ (Bayer, RGB)	√ (Bayer, RGB)	√ (Bayer, RGB)
Interlaced Scan	-	-	-	-
Progressive Scan	√	√	√	√
Camera Tap	3 - tap	6 - tap	10 - tap	10 - tap
Pixel Depth	8-bit, 10-bit or 12-bit	8-bit, 10-bit or 12-bit	8-bit, 10-bit	8-bit, 10-bit
Max. Clock Frequency	85 MHz	85 MHz	85 MHz	85 MHz
On-board memory	64 MB	128 MB	128 MB	128 MB

Euresys Frame Grabber

	COAXLINK Series	Picolo Series
		
Standard	CoaXPress	Color (PAL/NTSC) Monochrome (CCIR/EIA (RS-170)
Configuration	up to 4	-
Connector Interface	DIN 1.0/2.3	Picolo: BNC, DB9, S-video Picolo Pro2: BNC x 4
Resolution	depends on camera specification	640 x 480 (NTSC/RS170), 768 x 576 (PAL/CCIR)
Interface Bus	PCIe x4 (2.0 and above)	32-bit, 33 MHz PCI bus
Max. Video Input	up to 4	Picolo: 1 to 3 Picolo Pro2: 4
Max. Frame Rate	depends on camera specification	30 fps
TTL I/O	√	√
Area Scan Camera	√	√
Line Scan Camera	√	-
Monochrome Camera	√	√
Color Camera	√	√
Interlaced Scan	-	√
Progressive Scan	√	-
Camera Tap	-	1-tap
Pixel Depth	depends on camera specification	8-bit
Max. Clock Frequency	-	-
On-board memory	√	-

EURESYS
Excellence in vision

* ADLINK is the official distributor of Euresys products in Greater China and Southeast Asia.

PCI/ PCIe/ PXI Analog Input/ Output Cards

Analog Input				Analog Output				Digital I/O	Model Number
No. of Cannels	Sampling Rate (Max.)	Resolution		No. of Cannels	Update Rate (Max.)	Resolution		No. of Channels	
4-CH	2MS/S	14-Bit	Simultaneous Sampling	2-CH	1MS/S	12-Bit	YES	24 DI/24 DO	DAQ/DAQe-2010, PXI-2010
	500kS/S	16-Bit							DAQ/DAQe-2005, PXI-2005
	250kS/S								DAQ/DAQe-2006, PXI-2006
96-CH	3MS/S	12-Bit							DAQ/DAQe-2208, PXI-2208
64-CH	500kS/S	16-Bit		2-CH	1MS/S	12-Bit	YES		DAQ/DAQe-2204, PXI-2204
	250kS/S								DAQ/DAQe-2205, PXI-2205
16-CH	250kS/S	16-Bit	Encoder Inputs		Static	16-Bit	YES	8 DI/4 DO	DAQ/DAQe-2206, PXI-2206
32-CH	500kS/S				1MS/S			16 DI/16 DO	PCI-9221
	250kS/S								PCI-9222
									PCI-9223
									PCI-9114 Series
16-CH	100kS/S	12-Bit						16 DI/ 16 DO	PCI-9113(3)
	250kS/S	16-Bit		2-CH	1MS/S	12-Bit	YES	24 DI/24 DO	DAQ/DAQe-2213
	100kS/S			1-CH	Static	12-Bit		16 DI/16 DO	DAQ/DAQe-2214
		12-Bit		2-CH					PCI-9111HR(1)
8-CH	400kS/S	14-Bit		4-CH	1MS/S		YES	24 DI/24 DO	PCI-9112
4-CH				8-CH					DAQ/DAQe-2501, PXI-2501
									DAQ/DAQe-2502, PXI-2502
				8-CH	Static	12-Bit		4 DI/4 DO Isolated	PCI-6308V
									PCI-6308A(2)
						16-Bit		4 DI/4 DO Isolated	PCI/PCIe-6208V
									PCI-6208A(2)
				16-CH					PCI/PCIe-6216V

Note: (1) HR: High gain (2) PCI-6x08A: Current Output available (3) Isolated analog input card

PCIe-9814

PXIe-9529

Digitizer					
Channels	Sampling Rate	Input Resolution	Onboard Memory	Digital Input	Module Name
8-CH	14-Bit	14-Bit	512 MB	-	PXIe-9848/9848H
4-CH	40 MS/s	16-Bit		-	PCI-9846, PXI-9846
	20 MS/s			-	PCI-9826, PXI-9826
		12-Bit	128 k samples	3-CH	PCI-9812A
			32 k samples		PCI-9812
		10-Bit	32 k samples		PCI-9810
	10 MS/s	16-Bit	512 MB	-	PCI-9816, PXI-9816
2-CH	65 MS/s(External) 60 MS/s (Internal)	14-Bit	512 MB	-	PCI-9820
4-CH	80 MS/s	12-Bit	1 GB	3-CH	PCIe-9814
2-CH	200 MS/s	14-Bit	1 GB	-	PCIe-9852, PXIe-9852

Dynamic Signal Analyzer								
Analog Input				Analog Output			Digital IO	Module Name
Analog Input Channels	Max. Sampling Rates (S/s)	AD Resolution (bits)	FIFO Size (sample)	Voltage Output Channels	Update Rate (S/s)	DA Resolution (bits)	Digital IO	
4+4 (4-ch load cell inputs & 4-ch general purpose AD)	Up to 30 kS/s	24	256 K	2	5 K	16	8 DI, 8 DO (Isolated)	PCI-9524
2	432 kS/s		2048		216 kS/s	24	-	PCI-9527 PXI-9527
8	192 kS/s	24	2048	no AO	-	-	-	PCIe-9529 PXIe-9529

PCI/ PCIe/ PXI Digital Input/ Output Cards

Digital Input			Digital Output			DIO Update	Tiemr/ Counter	Model Number
No. of Cannels	Sampling Rate (Max.)	Resolution	No. of Cannels	Resolution	Driver Type	Update Rate(Max.)		
High-Density Isolated DIO	0-28 V Isolated	128-CH						PCI-7443
		64-CH	64-CH	5-40V	Power MOSFET			PCI-7442
			128-CH					PCI-7444
Isolated DIO	0-24 V Isolated	64-CH						PCI-7433
		32-CH						PCI-7233
			32-CH	5-35V	Darlington			PCI/PCIe-7432
		16-CH	16-CH					PCI/LPCI/LPCIe-7230
	0-50 V Isolated	64-CH						PCI-7433HIR(2)
		32-CH	32-CH					PCI/PCIe-7432HIR(2)
			64-CH	5-35V	Darlington			PCI-7434
			32-CH					PCI-7234
Relay DO	0-24 V Isolated	2-CH		350 V, 0.12 A	PhotoMos Relay			PCI-7258
		16-CH	16-CH	125 VAC, 0.5 A 30 VDC, 1 A	Latching Relay			PCI/PCIe-7256
		8-CH	8-CH	250 VAC, 5 A 30 VDC, 5 A	High-Power Relay			PCI-7260
				120 VAC, 0.5 A 24 VDC, 1 A	Relay			PCI/LPCI/LPCIe-7250
High-Speed DIO	1.8V/2.5V/3.3V SW Selectable	32-CH S/W Programmable		1.8V/2.5V/3.3V SW Selectable		200 MB/s		PCIe-7350
						400 MB/s		PCIe-7360
TTL DIO	5 V TTL			5 V TTL		80 MB/s		PCI/PCIe-7300A
		32-CH	32-CH			12 MB/s		PCI/PCIe-7200
		96-CH S/W Programmable						PCI-7396
								PCI/PCIe-7296(1)
		48-CH S/W Programmable						PCI/PCIe-7248(1)
		24-CH S/W Programmable						PCI-7224(1)
Timer/ Counter		8-CH	8-CH				10-CH/ 16-Bit	PCI-8554

Note: (1) Opto-22 compatible (2) HIR: High input range

PXI and PXI Express Platform

ADLINK offers over 100 different PXI bus products for automation testing and measurement applications, including chassis, controllers and a variety of PXI modules, enabling easy integration of required test and measurement functions.

PXI/PXIe Chassis

Available for 3U/6U 6-19 slot chassis, bench-top, integrated and portable chassis

PXES-2590

PXES-2780

PXI/PXIe Controller

Controller options include high-performance embedded controllers and remote controllers

PCIe-PXIe-8638

PXIe-3985

PXIe-3975

Expandable Embedded Computers

		Value Series			High Performance		
		MVP-6000 Series			MXC-6400 Series		
							
Model Name		MVP-6001	MVP-6002	MVP-6003	MXC-6401D	MXC-6402D	MXC-6403D
System	Processor	Intel® Core™ i7-6700TE	Intel® Core™ i5-6500T	Intel® Core™ i3-6100TE	Intel® Core™ i7-6820EQ	Intel® Core™ i5-6440EQ	Intel® Core™ i3-6100E
	Chipset	Intel® H110			Intel® QM170		
	Memory	32 GB DDR4 2133 MHz 2 SODIMM module			32 GB DDR4 2133 MHz 2 SODIMM module		
	Video	2 DisplayPort 1.2 (4096 x 2304) 1 DVI (4096x2160) 1 VGA			2 DisplayPort 1.2 (4096 x 2304) 1 VGA+DVI Dual display output by DVI-I connector		
I/O Interface	Expansion Slots	1 PCI+ 1PCIe x 16			1 PCI + 2 PCIe x 8 slots or 1 PCI + 1 PCIe x16 slots		
	Ethernet	3 Intel® GbE ports			3 Intel® GbE ports		
	Serial Port COM1 & COM2	2 RS-232/422/485			2 RS-232/422/485		
	Serial Port COM3 & COM4	2 RS-232			2 RS-232		
	USB Port	4 USB 3.0 + 2 USB2.0 1 internal USB 2.0			6 external USB 3.0 + 1 internal USB 2.0		
	CAN	-			-		
	DIO	8-CH DI + 8-CH DO			Isolated 16-CH DI + 16-CH DO		
Manageability	Watchdog Timer	√			√		
	SEMA	-			-		
Storage	SATA HDD	One 2.5. onboard SATA III HDD/SSD			Two 2.5" hot-swappable SATA III drive bay Two 2.5" onboard SATA III HDD/SSD		
	CompactFlash	1 type II CFAST socket			1 type II CFAST socket		
	Operating Temperature*	Standard: 0°C to 50°C			Standard: 0°C to 50°C (w/HDD) Extended option*: -20°C to 70°C (w/industrial SSD or CFAST)		
	Vibration	With CFast/SSD: 5 Grms With HDD: 0.5 Grms			With CFast/SSD: 5 Grms With HDD: 0.5 Grms		
	ESD	Contact +/-4 KV and Air +/-8 KV			Contact +/-4 KV and Air +/-8 KV		
	Shock	With CFast/SSD: 50 G			With CFast/SSD: 50 G		
	EMC	CE and FCC Class A			CE and FCC Class A		
	Safety	UL/cUL,CB			UL/cUL,CB		
General	Power Supply	12-24 VDC			9-32 VDC		
Mechanical	Dimensions	220 (W) X 210 (D) X 170(H) mm (8.66" x 8.27" x 6.69")			170 (W) x 225 (D) x 200 (H) mm (6.69" x 8.86" x 7.87")		
Operation System		Win 7/10/Embedded standard 7, Linux Ubunto 12.04 and Fedora 18**			Win 7/Embedded standard 7/10, Linux Ubunto 12.04 and Fedora 18**		

Expandable Embedded Computers

			High Performance				Entry Level	
			MXC-6300/6310/6320 Series				MXC-2300 Series	
								
Model Name			MXC-6301D/6311D /6321D	MXC-6302D/6312D /6322D	MXC-6303D /6313D /6323D	MXC-6305D/ 6315D / 6325D	MXC-2300(CD) -3E1	MXC-2300(CD) -3S
System	*Processor*		Intel® Core™ i7-3610QE	Intel® Core™ i5-3610ME	Intel® Core™ i3-3120ME	Intel® Celeron 1020E	Intel® Atom™ Processor E3845	
	Chipset		Intel® QM77				Intel® SoC	
	Memory		4 GB DDR3 1600 MHz SODIMM module				4 GB DDR3L 1333 MHz SODIMM module, (up to 8 GB)	
	Video		2 DisplayPort + 1 VGA or 2 DisplayPort + 1 DVI-D				1 DisplayPort (2560x1600) 1 VGA (2560x1600) 1 DVI (1920x1200)	
I/O Interface	*Expansion Slots*		1 PCI + 2 PCIe x 8 slots or 1 PCI + 1 PCIe x16 (MXC-6300 Series) 1 PCI + 1 PCIe x 16 (MXC-6310 Series) 3 PCI + 1 PCIe x1 6 (MXC-6320 Series)				2 PCI + 1 PCIe x4	3 PCI
	Ethernet		2 Intel® GbE ports				2 GbE Intel® ports	
	Serial Port	*COM1 & COM2*	2 RS-232/422/485				2 RS-232/422/485	
		COM3 & COM4	2 RS-232				2 RS-232	
	USB Port		6 external USB ports (4 USB 3.0 + 2 USB 2.0) + 1 internal USB 2.0				5 external USB ports (4 USB 2.0 + 1 USB 3.0) + 1 internal USB 2 .0	
	CAN		-				DB9 isolated CAN port with SjA1000 CAN controller	
	DIO		Isolated 16-CH DI + 16-CH DO				Isolated 16-CH DI + 16-CH DO	
Manageability	*Watchdog Timer*		√				√	
	SEMA		-				SEMA support with BMC	
Storage	*SATA HDD*		Two onboard 2.5" SATA III HDD/SSD				One 2.5" HDD/SSD installation	
	CompactFlash		2 CFast socket (1 external + 1 internal)				1 Type II CF socket	
	*Operating Temperature**		Standard: 0°C to 50°C (w/HDD) Extended option: -20°C to 55°C for MXC-63 x 1D, -20°C to 60°C for MXC-63x2D/63x3D/ 63x5D (w/ industrial SSD or CFast)				Standard: 0°C to 50°C Extended option: -20°C to 70°C (w/industrial SSD or CF)	
	Vibration		With CFast/SSD: 5 Grms With HDD: 0.5 Grms				With CFast/SSD: 5 Grms With HDD: 0.5 Grms	
	ESD		Contact +/-4 KV and Air +/-8 KV				Contact +/-4 KV and Air +/-8 KV	
	Shock		With CFast/SSD: 50 G				With CFast/SSD: 50 G	
	EMC		CE and FCC Class A				CE and FCC Class A	
	Safety		UL/cUL, CB, KCC				UL/cUL	
General	*Power Supply*		9-32 V_{DC}				9-32 V_{DC}	
Mechanical	*Dimensions*		MXC-6300/6320 Series: 172.5 (W) x 225 (D) x 213 (H) mm (6.9" x 9"x 8.52") MXC-6310 Series:154 (W) x 225 (D) x 213 (H) mm (6.16" x 9" x 8.52")				142 (W) x 219 (D) x 210 (H) mm (5.84"x 8.76" x 8.4")	
Operation System			Win 7/Embedded standard 7/XP/XP Embedded, Linux **				Win 7/Embedded standard 7/8/ Embedded standard 8, Linux Fedora 18**	

* Heat Dissipation from inserted PCI/PCIe cards may affect thermal performance.
**Linux Distribution by request

PICMG Single board Computers

		PICMG 1.3 SHB				PICMG 1.0 SBC
		NuPRO-E43	NuPRO-E72	NuPRO-E42	NuPRO-E340	NuPRO-A40H
						
CPU	*Socket*	LGA1151	LGA1150	LGA1150	LGA1155	LGA1155
	CPU Support	Intel® Core™ i7/i5/i3/ Pentium® /Celeron®	Intel® Xeon® E3-1200 v3 Core™ i3/Pentium® /Celeron®	Intel® Core™ i7/i5/ i3/Pentium®	Intel® Core™ i7/i5/ i3/Pentium® /Celeron®	Intel® Core™ i7/i5/i3/Pentium®/ Celeron®
Chipset	*PCH*	Q170	C226	Q87	Q67	H61
Memory	*DIMM Type*	DDR4	DDR3	DDR3	DDR3	DDR3
	Clock Speed	2133 MHz	1600/1333 MHz	1600/1333 MHz	1600/1333 MHz	1600/1333 MHz
	DIMM	2	2	2	2	2
	Max. Capacity	32 GB	16 GB	16 GB	16 GB	16 GB
	ECC/Reg	–	YES	–	–	-
Form Factor	*Dimensions*	338 mm x 126 mm (L x W)	338 mm x 126 mm (L x W)	338 mm x 126 mm (L x W)	338 mm x 126 mm (L x W)	338 mm x 122 mm (L x W)
Display	*Graphics*	Intel® HD Graphics	Intel® HD Graphics	Intel® HD Graphics	Intel® HD Graphics	Intel® HD Graphics
	VGA support	YES	YES	YES	YES	YES
	DVI support	YES	YES	YES	YES	YES
Ethernet	*Gigabit*	2	2	2	2	2
	Controller	Intel® I219LM and Intel® I211-AT	Intel® I217LM and Intel® I211-AT	Intel® I217LM and Intel® I211-AT	Intel® 82579LM and Intel® 82574L	Dual Intel® I211-AT
Storage	*Serial ATA*	4x SATA 6 Gb/s (onboard)	4x SATA ports 6 Gb/s (onboard)	4x SATA ports 6 Gb/s (onboard)	2x SATA 6 Gb/s 4x SATA 3 Gb/s (2x onboard + 2x backplane)	4x SATA 3 Gb/s
I/O Ports	*USB*	8x USB 3.0 (2x rear+6x pinheader) 4x USB 2.0 (backplane)	6x USB 3.0 (2x rear+4x pinheader) 4x USB 2.0 (backplane)	6x USB 3.0 (2x rear+4x pinheader) 4x USB 2.0 (backplane)	2x USB 3.0 (rear) 12x USB 2.0 (8x pinheader+4x backplane)	8x USB 2.0 (2x rear + 6x pinheader)
	LPT	YES	–	–	YES	YES
	COM	2x RS-232 2x RS-232/422/485 auto flow onboard (pinheader)	5x RS-232, 1x RS-232/422/485 auto flow onboard (pinheader)	5x RS-232, 1x RS-232/422/485 auto flow onboard (pinheader)	5x RS-232, 1x RS-232/422/485 (pinheader)	5x RS-232, 1x RS-232/422/485 (pinheader)
	PS/2 KB/MS	YES (pinheader)	YES (pinheader)	YES (pinheader)	YES (pinheader)	Yes(pinheader)
	Audio	Realtek® ALC262 DB-Audio 2 (Option)	Realtek® ALC262 DB-Audio 2 (Option)	Realtek® ALC262 DB-Audio 2 (Option)	Realtek® ALC262 DB-Audio 2 (Option)	Realtek® ALC262 DB-Audio 2 (Option)
Expansion		1x PCIe x8, 3x PCIe x4 with WBP-13E4	1x PCIe x8, 3x PCIe x4 with WBP-13E4, 4x PCI	1x PCIe x16 , 1x PCIe x4 or 4x PCIe x1, 4x PCI	1x PCIe x16 , 1x PCIe x4 or 4x PCIe x1 , 4x PCI	-
TPM		Option	YES	YES	YES	-
Opearation System		Win 7 (32 bit), Win 7/8.1/10/Server 2012 R2 (64 bit), Fedora 21, Redhat Enterprise Linux 7, Ubuntu 14.04	Win 7/8.1/Server 2008 R2 (64 bit), Fedora 17, Redhat Enterprise Linux 6, Ubuntu 13.10	Win XP/7/8.1 (32 bit), Win 7/8.1/Server 2008 R2 (64 bit), Ubuntu 13.10	Win XP/7/8.1 (32 bit), Win XP/7/8.1 (64 bit), Fedora 14, Redhat Enterprise Linux 5	Win XP/7 (32/64 bit),Fedora 17, Redhat Enterprise Linux 6

Industrial Motherboard

		Extend ATX	ATX			
		IMB-S90	IMB-M43	IMB-M42H	IMB-M40H	M-342
						
CPU	Socket	LGA2011	LGA1151	LGA1150	LGA1155	LGA1155
	CPU Support	Dual Intel® Xeon® E5-2658 v2	Intel® Core™ i7/i5/i3/ Pentium®	Intel® Core™ i7/i5/i3/ Pentium® /Celeron®	Intel® Core™ i7/i5/i3/ Pentium® /Celeron®	Intel® Core™ i7/i5/i3/ Pentium®
Chipset	PCH	C604	Q170	H81	H61	Q67
Memory	DIMM Type	DDR3	DDR4	DDR3	DDR3	DDR3
	Clock Speed	1600 MHz	2133 MHz	1333/1600 MHz (based on CPU)	1333/1600 MHz (based on CPU)	1333/1600 MHz (based on CPU)
	DIMM	8	4	2	2	4
	Max. Capacity	128 GB	64 GB	16 GB	16 GB	32 GB
	ECC/Reg	YES	–	–	–	–
Form Factor	Dimensions	305 mm x 330 mm(W x L)	305 mm x 244 mm (W x L)	305 mm x 244 mm (W x L)	305 mm x 218 mm (W x L)	305 mm x 244 mm (W x L)
Display	Graphics	Integrated in Aspeed® AS2300	Intel® HD Graphics	Intel® HD Graphics	Intel® HD Graphics	Intel® HD Graphics
	VGA support	1	1	1	1	1
	DVI-D Support	–	–	–	1	1
	HDMI Support	–	–	1	–	2
	DisplayPort	–	2	1	–	–
	No. of Displays	1	3	2	2	2/3 (based on CPU)
Ethernet	GbE port	2	2	1	2	2
	Controller	Intel® I210-AT	Intel® I219LM and Intel® I210-AT	Intel® I217V	Realtek® RTL8111E	Intel® 82579LM and Intel® 82574L
Storage	Serial ATA	4x SATA 6 Gb/s from Marvell 88SE9230, 2x SATA 6 Gb/s from PCH, 2x SATA 3 Gb/s from PCH	6x SATA 6 Gb/s ports	2x Serial ATA 6Gb/s, 2x Serial ATA 3Gb/s	4x SATA 3 Gb/s	2x SATA 6 Gb/s ports, 4x SATA 3Gb/s ports
	RAID	RAID 0/1/10,Marvell (H/W) and PCH 0/1/5/10 (S/W) RAID groups are independent	SW RAID 0/1/5/10	–	–	SW RAID 0/1/5/10
I/O Ports	USB	8x USB 2.0 (4x pin header + 4x rear)	8x USB 3.0 (2x pin header + 6x rear), 4x USB 2.0 (pinheader), 2x USB 2.0 (Vertical Type A)	8x USB 2.0 (4x pin header + 4x rear), 2x USB 3.0(rear)	10x USB 2.0 (6x pin header + 4x rear)	12x USB 2.0 (8x pin header + 4x rear)
	LPT	–	1	1	–	1
	COM	1x RS-232 (pinheader), 1x RS-232/422/485 (rear)	4x RS-232(pinheader), 2x RS-232/422/485 Auto flow control(rear)	4x RD-232 (pinheader), 2x RS-232/422/485 one support 485 auto flow control (rear)	5x RS-232 (1x rear + 4x pinheader), 1x RS-232/422/485 (pinheader)	5x RS-232(pinheader), 1x RS-232/422/485 (pinheader)
	PS/2 KB/MS	–	1x PS/2 combo port	1x PS/2 combo port	1x KB, 1x MS	1x KB, 1x MS
	Audio	Realtek® ALC262 DB-Audio2 (optional)	Realtek® ALC262	Realtek® ALC662 Audio Codec	Realtek® ALC892	Realtek® ALC892
Expansion		4x PCIe x16, 1x PCIe x8 and 1x PCIe x4 slots	1x PCIe x8, 41x PCIe x4, 2x PCI slots	1 X PCIe x16, 1 x PCIe x4, 4x PCI slots	1x PCIe x16, 2x PCIe x1, 4x PCI slots	1x PCIe x16, 1x PCIe x4, 5x PCI slots
Opearation System		Win 7/Server 2008 R2 (64 bit), Redhat Enterprise Linux 6	Win 7 (32 bit), Win 7/8.1/10 (64 bit), Ubuntu 15.10	Win XP/7/8/ (32 bit), Win 7/8.1 (64 bit), Ubuntu 13.10, Fedora™ 19, Redhat Enterprise Linux 7.0	Win XP/ 7 (32/64 bit), Fedora 17, Redhat Enterprise, Linux 6.2	Win XP/ 7 (32/64 bit), Redhat Enterprise Linux 6.0

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