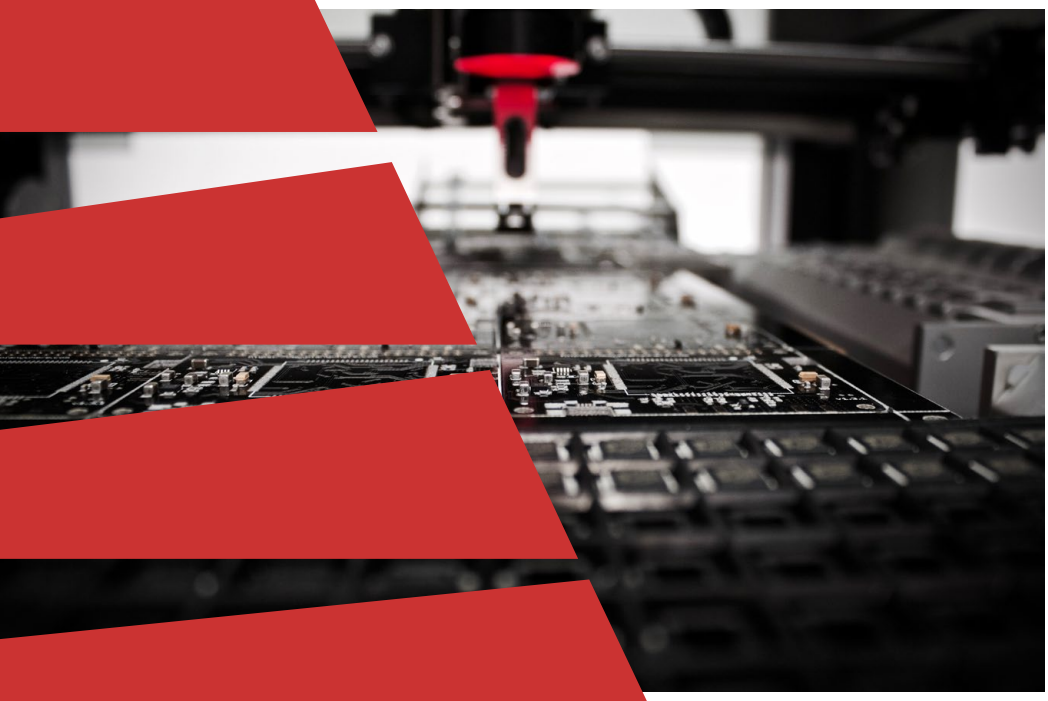
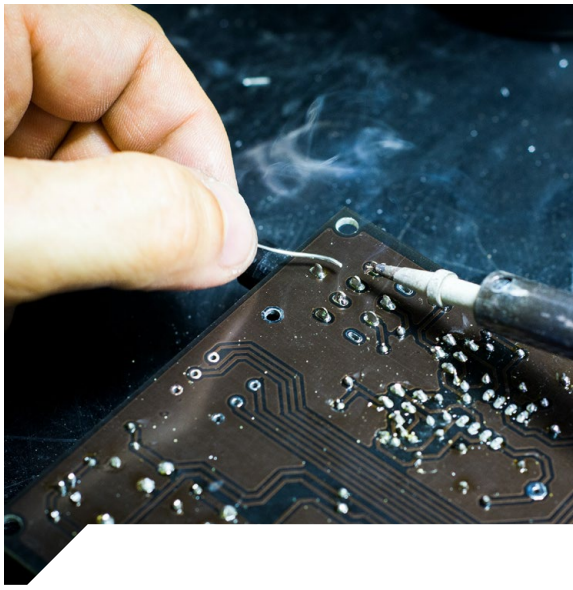
ADLINK

Leading EDGE COMPUTING

Adaptive Innovation

ADLINK ODM/Customization Services





ADLINK rises to the challenge of designing, developing, and manufacturing computing solutions that address the specific demands and requirements of individual businesses. As an agile company with truly global reach, ADLINK leverages its partnerships with other industry leaders to engineer ODM solutions for several critical sectors.

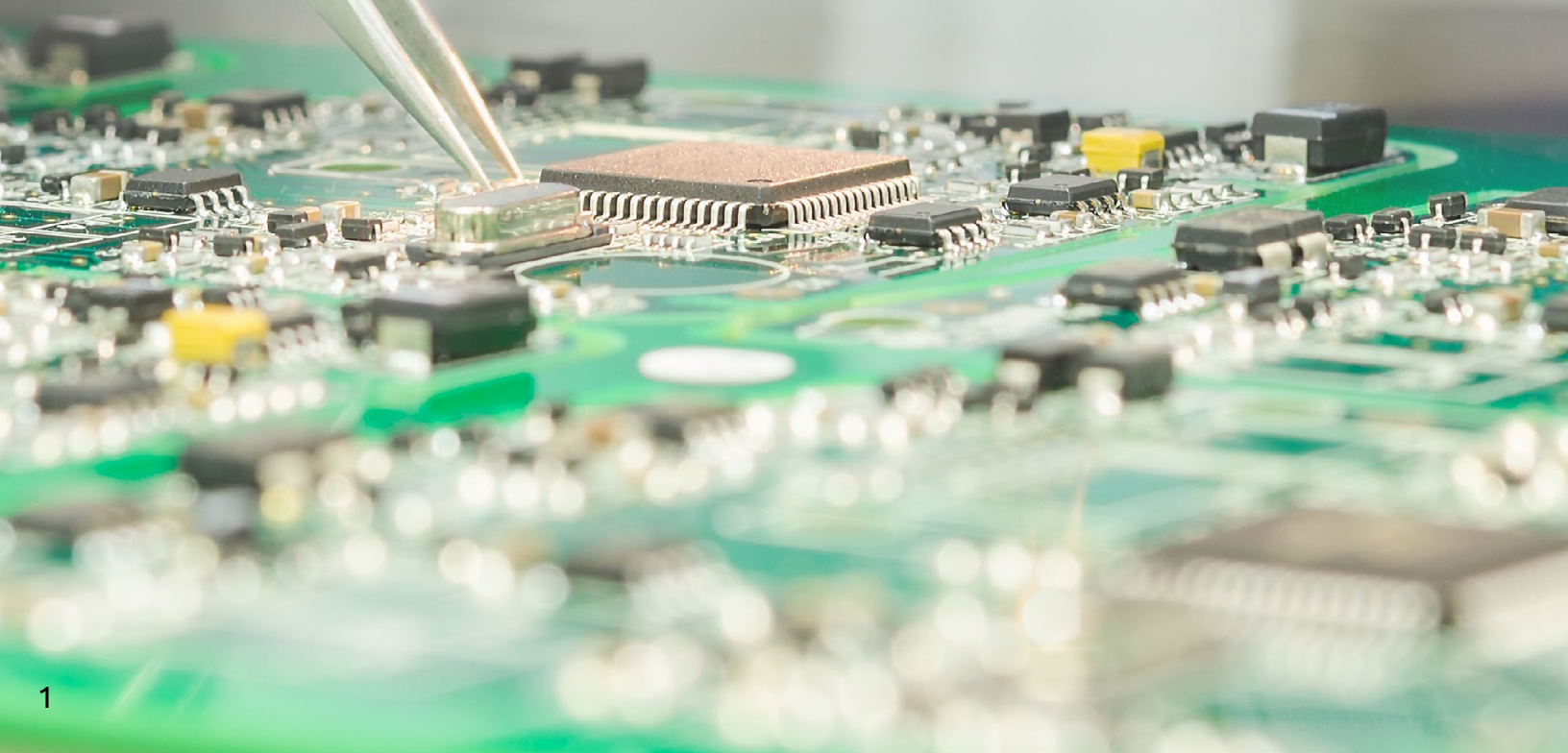
www.adlinktech.com

For many businesses and organizations, commercial off-the-shelf (COTS) hardware can meet most needs and fulfill objectives. Unfortunately, though, markets that require systems to withstand extremely hostile conditions, including temperature, shock, and dust, may face disappointing results from conventional OEM technologies. COTS equipment addresses the majority of needs, but deeper customization will often help customers overcome unique challenges.

No two organizations are alike, and smaller business units, regional offices, or specialized teams can require custom solutions that aren't available in an existing product line. In these situations, enlisting the services of an original design manufacturer (ODM) can give customers a partner with dedicated R&D, skilled onboarding, and committed lifecycle support.

As a trusted manufacturer of powerful, reliable embedded computer systems with over 25 years of experience, ADLINK exemplifies what a trusted ODM should be. The company possesses all the hallmarks customers require from an ODM partner. In-house engineering teams maintain total control over component design and development through every stage, including testing and validation. Headquartered in Taiwan, ADLINK also strategically allocates its design centers, manufacturing facilities and business support branches worldwide in locations including China, Japan, France, Germany, India, Korea, Singapore, the United States and UK, enabling easy reach across global markets. Moreover, ADLINK's strong customer-centric ethos ensures that every client's vision is perfectly executed and backed with fast, consistent support.

ADLINK understands that partnerships and alliances are essential for collaboration, innovation, and success. In addition to being a leading voice in several industry consortia, ADLINK also partners with leaders, such as Intel and NVIDIA, to build a dynamic portfolio of components across a wide range of industries, particularly in heterogeneous computing and GPGPU-based AI-enabled solutions. As a result, ADLINK is a preeminent ODM for railway, aerospace and defense, networking, telecommunications, and industrial automation.



Railway

Over a million kilometers of railways crisscross countries on six continents. Worldwide, passengers travel trillions of kilometers annually, and countless tons of freight move along rail networks every day. Railways remain vital to many countries' infrastructures. ADLINK offers railway service providers ODM solutions adapted to leverage modern technologies and thrive in demanding environments.

Beginning its railway solution qualification process with the EN50155 standard for rolling stock, ADLINK provides railway service providers with turnkey systems that will meet compliance requirements. With highly responsive request for information (RFI) and request for quote (RFQ) processes, ADLINK can engage prospective clients from the initial project stages, assisting with design, and continue to provide expertise all the way through manufacturing. The company can quickly determine how to meet requested specifications in the most cost-effective manner possible. By working closely with customers during prototyping and production phases, ADLINK can employ its in-house manufacturing and assembly capabilities to stay on schedule and meet project deadlines.

As railway projects near completion, rigorous validation and verification processes help ADLINK meet the most stringent requirements for railway technology products. Moreover, ADLINK can assist with making sure that legacy elements within an end customer's data infrastructure meet modern standards and do not hamper the effectiveness and value of new deployments. By working within industry-accepted form factors and standards, ADLINK can replace obsolete components with more versatile alternatives and help railway service providers avoid unforeseen costly upgrades.

Aerospace & Defense

Few industries are as demanding on hardware as military and aerospace. Systems must endure consistent operation in scorching temperatures, dusty environments, and extreme shock and vibration conditions, all of which might normally contribute to rapid component failure with consumer-class systems. Clearly, failure during field use can have catastrophic consequences. Fortunately, with years of experience in designing and developing Extreme Rugged components for military and aerospace applications, ADLINK has the necessary expertise to provide highly reliable ODM systems for demanding industries.

With the ability to give potential customers across the spectrum of vertical markets unrivaled flexibility in meeting program-specific requirements, ADLINK can quickly understand and analyze all facets of a program's requirements and has a comprehensive approach to developing the ideal solution. Exacting control of design, engineering, and integration services ensures its ODM solutions meet the highest quality standards from start to finish. Moreover, for clients with localized purchasing requirements, including U.S. defense contractors, ADLINK will design and manufacture products locally to meet "country of origin" stipulations.

ADLINK's data collection and program management processes assist in gathering all project requirements, meeting deadlines, and adhering to budget requirements. In some cases, existing ADLINK COTS product lines may meet customer requests with only minor changes. This situation enables a modified COTS (MCOTS) option, which can reduce costs, accelerate deployment, or both. ADLINK also provides full lifecycle support, maintaining mission-critical support for the duration of an ODM solution's lifespan, even if that duration is extended by several years.

MCOTS:
Advantages to A Hybrid Approach

ADLINK offers a full suite of ODM services to its customers and can tailor its manufacturing process to address specific needs and unique circumstances. However, in many situations, ADLINK can meet clients' requirements by adapting one of its existing COTS products instead of engineering an ODM solution from the ground up. Modified COTS (MCOTS) is often the favored approach for customers in the military/aerospace and railway industries, as it offers sizable cost savings while drastically reducing time to market.

Prospective customers in mil/aero and railway can work with ADLINK to develop an MCOTS solution in different ways. Through MCOTS board modification, ADLINK can draw from its existing component portfolio and provide modifications, such as custom backplanes, reconfigured I/O interfaces, modified pinouts, and more.

ADLINK can also work with embedded systems and seamlessly integrate into existing subsystems, providing items such as drivers, interfaces, storage, and modules. ADLINK can also perform validation and qualification testing.

Based on the nature of customization and modifications, ADLINK intentionally structures its MCOTS service to meet customers on the spectrum between COTS hardware and a complete ODM product. MCOTS and joint development models give ADLINK's clients unmatched flexibility in producing products and designs that optimally align with requirements, budgets, and timelines.

ADLINK's team engages with industry customers to understand engineering requirements, perform critical reviews, and analyze and execute customer-specific designs. By using an MCOTS approach, military/aerospace and railway clients realize real, measurable benefits that can be seen in ADLINK's rapid prototyping capabilities. By starting with an existing, validated design, the race to production is already half won. ADLINK engineers begin with an established product, then incorporate unique client needs in proven, scalable ways. In this way, ADLINK ODM services can deliver prototypes that often outperform expectations on schedule and cost. In fact, ADLINK rapid prototyping can help customers reduce overall project development expenses by up to 60 percent and eliminate up to eight months of development time when compared with occasions when customers develop their own solutions. With ADLINK's hybrid MCOTS services, customers receive the proven benefits of a world-class ODM with significantly reduced cost and time expenditure.

Networking

Modern networking infrastructure continues to evolve, becoming both more powerful and more complex. Although COTS hardware tends to be sufficient for many situations, choosing a networking ODM like ADLINK can provide distinct advantages in specific feature implementations as well as project scalability. For example, a large cloud provider with very specific hardware needs could join forces with an ODM to build thousands of servers according to precise needs, saving the cloud provider time and money.

As a networking ODM, ADLINK can work closely with networking equipment providers (NEPs) or communication service providers (CSPs) and remove barriers often associated with platform production. Experience with coordinating worldwide distribution hubs, strong command of international supply chains, and top-tier service/support centers are all distinct strengths ADLINK leverages as it forms NEP and CSP partnerships. Additionally, thanks to its international footprint, ADLINK can adeptly manage certification processes to conform with major global standards, so companies won't suffer compliance difficulties as solutions ship internationally. Customization flexibility and heavy investment in R&D keeps ADLINK at the forefront of networking ODM innovation, leading the way forward with emerging technologies, including edge computing and video analytics.

Telecommunications

In parallel with networking, the telecom industry has also rapidly evolved. Innovations occur so quickly that service providers must carefully consider an ODM's ability to anticipate change and develop scalable, future-proof solutions. As technologies like 5G, artificial intelligence (AI), edge computing, and the Internet of Things (IoT) flourish, ADLINK has positioned itself as a telecom ODM prepared to meet tomorrow's communication challenges.

ADLINK understands the need for elecommunications solutions to be scalable and flexible. By meeting standards such as the Open Compute Project's (OCP) Open Rack, ADLINK can design, develop, and deliver high-density server and storage systems at mass scale that are compliant with the latest telecom-oriented standards and best practices. ADLINK also extends its ODM expertise to edge computing, collaborating with telecom providers to ensure edge cloud deployments are OCP-compliant. Similarly, ADLINK is ready for the 5G transition, whether a particular deployment happens to rely on Centralized/Cloud Radio Access Network (C-RAN) or Distributed Radio Access Network (D-RAN) architectures.

Industrial Automation

Manufacturers and large-scale industrial operations benefit immensely from staying on the forefront of technological advancement and development. Smart factories allow businesses to remain ahead of their competition by use of technologies including automation, seamless connectivity, and advanced AI. Results span from improved efficiency and productivity to reduced operational losses and safer work environments. Like other vertical markets, industrial manufacturers often have highly specialized processes and procedures that can only be properly addressed with help from an experienced ODM.

ADLINK maintains physical design and manufacturing facilities within several client companies, ensuring responsive and reliable communication through all solution phases. This co-location also helps with compliance and implementing relevant standards in accordance with local regulations. At the system level, ADLINK ODM capabilities extend to a multifaceted range of products and technologies, including Matrix MXE/MVP, Vision EOS, DAQ/IO, and CompactPCI. The range of industry standard board-level offerings easily incorporated into ADLINK ODM solutions include COM Express, SMARC, Mini-ITX, and PC/104.

Global Partnerships and Scale

Deep, strategic partnerships with some of the world's most foundational technology creators help propel ADLINK's ability to answer customers' next-generation solution requests. In 2018, ADLINK became an NVIDIA® Quadro® Embedded Partner and NVIDIA® OEM Preferred Partner for embedded graphics, HPC, and deep learning solutions. Only a few partners have obtained NVIDIA's permission to create chip-down Quadro GPU solutions for ruggedized embedded markets. Going further, ADLINK is an NVIDIA® Jetson™ Elite Partner, giving ADLINK early access to design and implementation expertise for extremely compact components able to drive deep learning products for low-power, embedded applications.

Similarly, ADLINK is a Premier member of the Intel® Internet of Things Solutions Alliance. From modular components to market-ready systems, Intel and the 500+ global member companies of the Intel Internet of Things Solutions Alliance provide scalable, interoperable solutions that accelerate deployment of intelligent devices and end-to-end analytics.

As ADLINK continues to work hand in hand with other industry heavyweights, establishing and expanding partnerships, the company itself consistently demonstrates bold thought leadership across a range of industries as a member of several key consortia. Through these bodies, ADLINK works collaboratively to establish industry standards and drive technological advancements for years to come. ADLINK belongs to the PCI Industrial Computer Manufacturers Group (PICMG), PC/104 Consortium, and VMEbus Internation Trade Association (VITA), all of which impact many industries.

In addition to these broad, influential consortia, ADLINK is also a proud member of several groups that focus more narrowly on developing new technologies in specific fields. By participating in the Sensor Open Systems Architecture (SOSA) and Future Airborne Capability Environment (FACE), ADLINK helps to define standards for military and aerospace technology. Through groups such as Open Data Center Committee (ODCC) and Telecom Infra Project (TIP), ADLINK brings its expertise in edge computing and GPGPU solutions to the telecom industry. ADLINK is also a Contributing Member and part of the Technical Steering Committee for Robotic Operating System's ROS-Industrial Consortium, a world leader in industrial automation.

Partnerships such as these, along with industry guidance through many consortia and standards bodies, have enabled ADLINK to expand its services around the world. The company now maintains R&D centers, sales and support offices, and manufacturing facilities on multiple continents. Expect ADLINK to continue this expansion in the years to come.

This expansive geo-coverage allows ADLINK to cultivate flexible supply chains and prompt customer support networks. Simultaneously, these many local footprints allow ADLINK to master regional platform certification requirements and, in parallel with ADLINK's R&D efforts, integrate them into solution offerings. ADLINK makes sure to back this customization ability with broad security awareness that ensures customer protection from the Unified Extensible Firmware Interface (UEFI) on upwards.

These many resources and advantages collectively enable ADLINK solutions to deliver exceptionally favorable total cost of ownership for clients, possible in part through extended end-of-life programs backed by comprehensive support service-level agreements (SLAs). Taken together, these benefits showcase why ADLINK remains one of the world's premier ODM providers for rugged, powerful solutions across the full spectrum of embedded computing markets.

Use case: Custom Memory Design for Exceptional Military Ruggedness

A military client needed a vehicle-mounted communications server able to withstand shock and vibration in exceptionally difficult terrain. The challenge was two-fold: 1) Create a solution compact enough fit in the vehicle's small server rack space without compromising on performance, and 2) take every measure possible to reduce the risk of failure due to shock and vibration during field operation.

Addressing the first requirement meant employing a four-processor (4P) motherboard. This is common in dense, large-scale data centers, but very rare in mobile-oriented platforms. ADLINK had to scale its 4P design down for this reduced form factor. Then, ADLINK took the unique step of eliminating DIMM slots, as standard slot design and retention clips are unable to deal with the heavy shock and vibration conditions encountered in the field. Instead, ADLINK designed to integrate 288 1Gb x8 DDR4-2666 DRAM chips (up to 576GB) directly onto the board's top and bottom of the board. This approach prevents both physical dislodging of critical components and potential corrosion over time.

This exceptional, innovative approach to meeting the client's needs delivered all of the performance required for the communications application, fit within the solution's space and power constrains, and exhibited exceptional ruggedness in a way that no other ODM was able to match.

Use Case: Next-generation Firewall for Significantly Enhanced Network Security

A leading network security hardware provider needed a next-generation firewall (NGFW) appliance and required collaboration to develop a network appliance with unrivaled threat protect and SSL inspection capabilities. However, the client had specific size considerations, requiring a smaller physical footprint while maintaining the capabilities of standard hardware.

As one of the foremost ODMs of compact networking equipment, ADLINK leveraged its expertise to develop a NGFW appliance in 3U rackmount form factor suitable for deployment in dense data centers and other networking operations where limited space is a consideration. Working with the customer, ADLINK created the 3U NGFW appliance to withstand the rigors of 24/7 operation in densely populated racks. ADLINK's solution offers 2+1 redundant, hot-swappable power supplies and an operating temperature range of 0°C to 40°C while delivering impressive slot density. The NGFW offers four 40/100G QSFP28 slots, 24 1/10/25G SFP28 slots, and three 10G SFP+ slots. There was no compromise on performance, with the appliance supporting intrusion protection system (IPS), NGFW, and threat protection throughputs up to 170 Gbps, 150 Gbps, and 100 Gbps, respectively, in mixed traffic environments.

Use Case: Communications Gateway for Reliable Train to Ground Connectivity

In an always-on era, organizations, along with public and private service providers, must keep pace by offering connectivity to customers and guests. This is especially evident in the transportation industry, where passengers routinely travel for several hours without access to typical internet services. For example, rail service providers can significantly increase business passengers' quality of life by providing fast, stable connectivity that lets them maintain productivity.

An international railway technology provider recently sought out ADLINK to develop a communications gateway that could be deployed in an environment that challenges typical hardware. Taking into account all of the critical parameters such as shock, vibration, operating temperature for demanding onboard deployment, ADLINK started with a couple of proof of concept (PoC) proposals, and developed an EN50155-compliant embedded fanless platform as an ideal communication control unit (CCU) for the technology provider's needs. Using a 6th Generation Intel® Core™ processor, the CCU is equipped to provide WLAN/3G/4G LTE/5G connectivity, and supports each cellular module with dual QMA antenna connectors. The CCU's external Ethernet and serial ports both have 2000 Vrms isolation, which ensures the communications gateway is a comprehensive, rugged solution that meets performance needs.

Benefits of ADLINK Manufacturing

Smart Teams Revolutionize Design and Manufacturing

The genius behind ADLINK's ability to deliver best-in-class, affordable products while minimizing time to market is our Design and Manufacturing Services team. Our DMS group brings years of experience with fast prototyping and highly effective R&D so that efficiency and quality are consistent throughout our product range. The team's efforts have earned ADLINK the prestigious ISO-9001 certification.

ADLINK's Asia headquarters also has in-house PCB layout teams, SMT lines, system integration, and test capabilities. Our tight control over every phase of manufacture lets our customers minimize total cost of ownership (TCO) while simultaneously giving them extensive customization and system integration advantages.

Finally, by having total control over our manufacturing facilities, ADLINK can boast end-to-end security, from design to production, making our hardware immune to outside tampering.

Customer-Focused Service—Local and Online

ADLINK's customers are our top priority, and we maintain a tireless dedication to all of our customers' needs. Over the years, we've built a strategic global footprint to facilitate customer proximity, a valuable advantage for high-touch-type customers and programs. In addition to local service, ADLINK provides the following online services on demand:

eRMA. ADLINK's eRMA system allows customers to begin the RMA process quickly. They can obtain an RMA number and track RMA status online at any time.

Partner Center. ADLINK distributes all product and marketing information on new solutions as soon as they're available at our global headquarters. Global sales representatives and distributors have instant access to the ADLINK Partner Center.

With globally distributed design and manufacturing resources across every major geographic region, ADLINK ODM services stand ready to assist all businesses and accommodate their local requirements. Geographic proximity allows ADLINK to turn around solutions in less time, from early design to full production, and deliver more tailored support options. ADLINK ODM services provide higher total value so integrators and solution providers can address challenges more profitably across a spectrum of industries.

Why ADLINK?

By leveraging more than 25 years of expertise in developing highly reliable and available embedded computing systems, ADLINK is a premier supplier to broad markets including railways, aerospace, defense, industrial automation, medical, networking and telecommunications. With a full spectrum of offerings spanning COTS, MCOTS, joint development and full customization, ADLINK is always able to provide customers with selection flexibility to find optimal solutions that best meet theirs unique needs and enhance their competitive advantage. ADLINK's industry-leading ODM/customization capabilities and services are deeply rooted in its extensive market experience and industry know-how, unmatched customer proximity, industry-appropriate supply longevity, and uncompromised integrity and security built on in-house design and manufacturing.

Technology Leadership

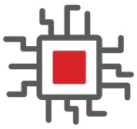
As a long-standing pioneer in embedded technologies, ADLINK drives industry standards and technology advancements with leading bodies, including the PCI Industrial Computer Manufacturers Group (PICMG), the PC/104 Consortium, and the VMEbus International Trade Association (VITA). The company also drives standards establishment and technology advancements by bringing its expertise in edge computing, IoT, AI, and machine learning.

Extensive Portfolio

ADLINK is dedicated to continued development of its extensive, highly cost-effective, industry standard based COTS/ MCOTS product portfolio. ADLINK's complementary product lines enable customers to deliver low total cost of ownership (TCO) with great flexibility in solution selection while addressing today's increasingly complex challenges.

Strategic Partnership

As a Premier member of the Intel® Internet of Things Solutions Alliance and an NVIDIA Quadro Embedded Partner, OEM Preferred Partner and Jetson Elite Partner, ADLINK leverages unrivalled access to advanced processing technologies as well as the highest levels of technical support, driving innovative, open standards-based heterogeneous computing solutions for next-generation applications.



Quality and Integrity

With world-class in-house manufacturing facilities, established quality management systems, and supply chain management (ISO-9000 and TL9000 certified), ADLINK ensures uncompromised military-grade quality, and equally importantly, fully controls product integrity and security, and is thus immune to any outside tampering.

Supply Longevity

ADLINK ensures best practices in product obsolescence and lifecycle management, and leverages strategic partnerships with key component and software vendors, delivering supply longevity to support the traditionally long lifecycle programs of critical industries. ADLINK also invests in sustaining legacy technologies to help customers undertake system upgrades and technology insertions.

Business Flexibility

As an ODM powerhouse with a flexible and agile organization, ADLINK can effectively and efficiently address rebranding, customization, and joint development. ADLINK makes ease of doing business one of its top priorities and focuses on helping customers speed time-to-market for long-term mutual success.

Global Support

As a global enterprise with a strategic footprint in design, manufacturing, and service worldwide, ADLINK leverages customer proximity to effectively deliver products to regional market specifications and requirements. This high-touch business model, which hinges on local technical and business services, is key to most customer programs.

SOSA™ Sensor Open Systems Architecture

FACE™ Future Airborne Capability Environment

VITA Open Standards, Open Markets

PICMG®

PC/104 Embedded PC Modules

Open Data Center Committee

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