





Aerospace and Defense

The aerospace industry is about to take off. Five Years Out, space commercialization will reach new heights. Recent successes in private aerospace ventures mean that governments will soon take advantage of private-sector speed, efficiency and emerging technologies. Large corporations are already exploring the opportunities waiting beyond earth's atmosphere.



Five Years Out

Five Years Out, projects and prototypes now on the drawing board will be pushed into testing and production. Multiple private aerospace and defense companies will compete for government space contracts while launching their own products and projects for space exploration, mining and tourism.

Even today, governments are engaging private companies for space projects, such as delivering supplies and personnel to the International Space Station. Space tourism—including moon excursions—is expected to be a \$1 billion industry within 20 years. Closer to home, flying drone applications will multiply, requiring a steady stream of innovative new products of all sizes and capabilities.

At Arrow, thinking Five Years Out is a way of life. Procuring millions in inventory to support your supply needs for decades to come is a sign of our steadfast commitment to your future.

As technology progresses, aerospace and defense contractors with speed and cost advantages will be the leaders and survivors. Private companies will significantly shorten the time to market for aerospace and defense products. And, beholden to stockholders rather than voters, aerospace companies will be expected to turn a consistent profit sooner rather than later.

What won't change is the enormous supply chain risk that aerospace and defense contractors must master to be the go-to providers to governments and big industry. In an electronics market that favors change and where suppliers are driven by short-term goals, how do you guarantee a supply of compliant, OEM parts for products with a 30-year lifecycle? The risk of substandard parts and counterfeits entering

the supply chain is real. Opportunists are waiting to capitalize on the panic when parts are discontinued.

Success in aerospace and defense will depend on strategies to mitigate supply chain risks in futurity. Companies with a supply chain advantage will be better positioned to fulfill DoD and other defense and aerospace contracts.

Arrow, one of the world's largest distributors of quality OEM and mil-spec products, is also a global leader in electronics supply chain solutions. Arrow can help you avoid costly redesign efforts due to supply shortages. And help you avoid quality and compliance issues due to substandard or counterfeit parts entering the supply chain.

We can help you secure your slice of the aerospace and defense electronics market today so that Five Years Out, you'll be a vital and sought-after resource.

Arrow Supply AssuranceSM

What happens when a manufacturer decides to discontinue parts that are crucial to your production? Hopefully nothing, thanks to Arrow's Supply AssuranceSM program.

At Arrow, one of our primary goals is to provide you with a reliable supply of critical components well after parts becomes unavailable, so you have access to a consistent supply of quality, compliant parts to support your products throughout their lifecycles.

Arrow supply chain solutions are designed to speed your time to market and provide peace of mind, with services such as our free Electronic Part Change Notification (ePCN), which automatically sends appropriate supplier part change alerts by email.

Arrow's Supply AssuranceSM program helps aerospace and defense customers avoid costly and time-consuming redesigns as a solution to parts obsolescence. As one of the world's largest providers of electronics supply chain solutions, Arrow has tens of millions of end-of-life, factory-pedigree products in stock.

Parts purchased from Arrow are always factory-direct, genuine parts shipped with full Certificates of Compliance, which removes the risk of counterfeit parts entering your supply chain.

How It Works

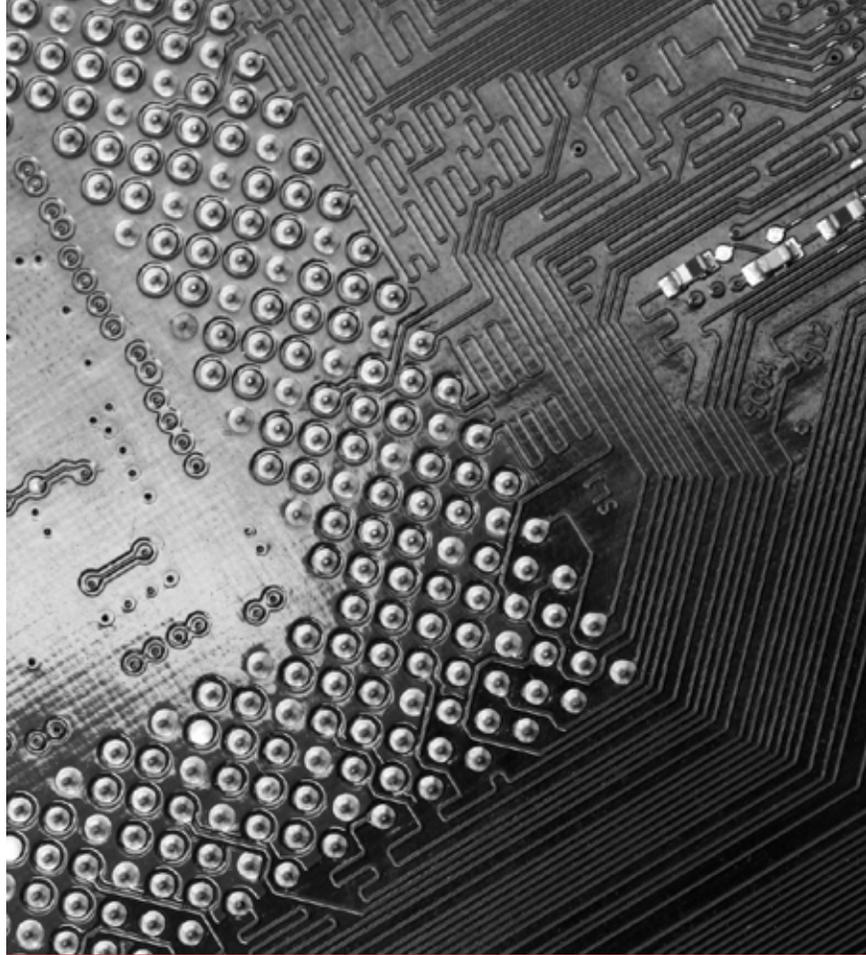


Access to the Parts You Need

We've purchased hundreds of millions of dollars in obsolete finished goods and dies since 1996, and we currently offer 1,500 different discontinued standard microcircuit drawing (SMD), JM38510 and QML parts (MIL- PRF-38535). Based on global demand, we invest in both products and intellectual property. We support our customers by packaging, receiving DSCC qualifications on select devices and supplying factory-pedigree products years beyond normal lifecycles.

Arrow also offers long-term storage of customer-owned dies and wafers at our state-of- the-art die storage facilities. These facilities use the latest circulating nitrogen technology to protect your die and wafer investments.

Through Arrow, you also have immediate access to a broad inventory of Arrow-owned, factory-direct discontinued dies. Arrow combines this die inventory with best-in-class manufacturing capabilities to support more than 1,500 QML devices. Arrow can deliver these parts to customers at reduced minimum quantities and lower cost.



Arrow gives you the power to:

- > Extend the life of active products
- > Eliminate redesign or extend the redesign window
- > Reduce inventory risk
- > Eliminate the cost of re-qualification
- > Obtain an ongoing supply without unreasonable price increases or large order minimums

Arrow Advantages

As an industry-leading supplier of electronics for the aerospace and defense industries, Arrow has a lot to offer:

- > Decades of experience
- > Military expertise
- > Certified team members
- > Rigorous inspection process
- > Military-qualified and commercial off-the-shelf products from more than 300 manufacturers
- > Mil-spec source-controlled drawings and manufacturer part number standardization
- > Value-added capabilities
- > Robust quality management system
- > Global presence
- > Design services
- > Quality control
- > Fully compliant products

Certified Experts

Our team is qualified and certified to help you with your aircraft, space and military product designs. We maintain a variety of regional certifications such as:

- > ISO 9001:2008 and AS 9120:2002 third-party certified
- > ITAR registered
- > JESD 3-compliant as a stocking distributor for commercial, industrial, military and space products
- > QSLD-certified through DLA Land and Maritime (DSCC)
- > Member JEDEC 13, GIDEP, ECIA, AIA and SAE G19

Arrow is well versed in global and regional requirements and can help ensure your products are fully compliant early in the design phase.

Quality OEM Parts and Components

Arrow is the world's largest and leading distributor of electronics with products that can meet virtually every need. Arrow delivers peace of mind to the aerospace and defense markets, which require the availability of OEM-quality components over a long period of time.

With Arrow, you can speed your time to market, avoid costly redesigns and source quality, mil-spec components throughout your products' lifecycles.

ELECTRONIC COMPONENTS

Arrow meets your changing needs with a comprehensive portfolio of products from the world's leading technology suppliers.

- > Semiconductors
- > Passives
- > Electromechanical
- > Computer product solutions

Arrow Partners with Leading Manufacturers

For more than 20 years, Arrow has partnered with the world's leading component manufacturers to procure EOL parts or dies in bulk—direct from the factory. This assures that you have access to a safe, factory-direct supply for thousands of obsolete parts throughout your products' lifecycles. Manufacturers include:

- > AMD
- > AnalogDevices
- > Atmel
- > Cortina
- > Cypress
- > e2v
- > Fairchild Semiconductor
- > IDT
- > Intel
- > International Rectifier
- > Intersil
- > Lattice
- > Linear Technology
- > National Semiconductor
- > ON Semiconductor
- > Spansion
- > STMicroelectronics
- > TE Connectivity
- > Zilog



High-Performance Interconnect Products

Arrow maintains one of the industry's most comprehensive inventories of high-performance and OEM-specification interconnect products, including standardized component configurations for mil-spec connectors as well as custom assemblies.

With us, you can expect industry-leading turnaround time (48 hours for in-stock components), so you can get products to market faster.

Our comprehensive line cards include wire, cable, connectors and harness management solutions delivered from state-of-the-art stock.

Globally, Arrow assembles connectors from more than 50 military qualified product families in accordance with the applicable OPL list.

We maintain over 100 million feet (30 million meters) of wire in warehouses in North America, Europe and Asia. We cover specifications from Airbus to Boeing, U.S. Military to European Defense and everything in between. This makes us the company to call for your high-performance wires, cables, connectors and harness management solutions.

- > Fiber optics
- > Coaxial
- > Ribbon
- > RF
- > Box connectors
- > I/O
- > Cable assemblies
- > DSUB
- > IC to board
- > Circular connectors
- > Ethernet
- > USB
- > Harness management products
- > Mil-spec hook-up wire and cable
- > High-speed data cables
- > Cable identification products
- > Backshells
- > Sleeving
- > Braiding
- > Tubing
- > Molded shapes

Power and Thermal Management

Our North American team specializes in providing you with complete power and thermal management solutions that range from off-the-shelf to custom builds. With an industry-leading line card, a comprehensive services offering and an expert team of power technical specialists, we can help you design and manufacture power supply products that meet your technical specifications.

STOCK AND CUSTOM POWER SUPPLIES

From off-the-shelf to custom and modified builds, our comprehensive lines of power products from the world's leading manufacturers connect you to the latest technologies.

- > Power supplies
- > Chargers
- > Inverters
- > Converters
- > Adapters
- > Uninterruptible
- > Power over Ethernet

THERMAL MANAGEMENT

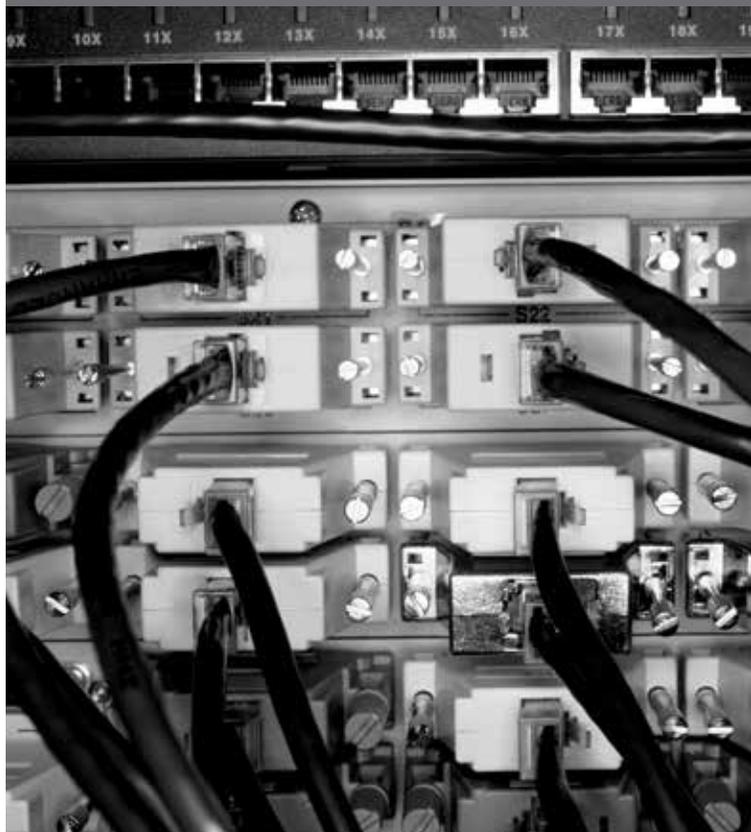
Arrow has an extensive line of thermal products to meet your cooling device needs.

- > Fans
- > Heat sinks
- > Thermoelectric coolers
- > Blowers

Discontinued Products— Direct from the Factory

Arrow's inventory of obsolete parts includes QML-certified manufacturer (MIL-PRF 38535) parts plus a wide range of commercial devices—all originating directly from the factory.

- > Microcontrollers
- > Microprocessors
- > Leaded (Pb) components
- > Military logic
- > Commercial logic
- > Programming logic
- > PLDs
- > GALs
- > PROMs
- > Memories
- > Relays
- > Network controllers
- > Network interface devices
- > Discreet components



Component Preparation Services

Our staff, facilities and infrastructure are ready to deliver consistent, production-ready components that fit your needs and the industry's demands.

MANUFACTURING SUPPORT SERVICES

- > **Centralized and ISO 9001:2008-certified programming centers** maximize efficiencies and deliver consistent levels of service and quality while keeping your intellectual property safe and secure.
- > **Tape and reeling** uses the latest technology available to provide compliant tape-and-reel solutions along with options for cut tape.
- > **Part marking and barcoding** can be performed in accordance with custom and industry-standard specifications.
- > **Wire services** keep you covered with just-in-time inventory programs, value added, laser-marked wire prep kitting services, technical and custom design support, and access to one of the world's largest inventories of aerospace and high-performance wire and cable.

TESTING*

- > **X-ray fluorescence analysis (XRF)** determines lead (Pb) content of termination finishes and plating thickness.
- > **Fine and gross leak testing** verifies that the hermetic seal of a component is intact and typically follows trim and form and/or RHSD of a glass-sealed device.
- > **Solderability testing** verifies that termination finishes will accept solder during assembly using the MIL-STD-883, Method 2003 test or other military specifications.
- > **Cleanliness testing** determines whether there is ionic contamination on the component that may cause current leakage between leads.

*Available in most regions.

MODIFICATION AND REPAIR

- > **BGA re-balling for conversion to tin lead (SnPb)** flushes all spheres and alloy residue from the pads and replaces with SnPb balls.
- > **Trim and form** prepares straight leads for surface-mount placement per the customer drawing.
- > **Lead attach to leadless chip carriers (LCC)** attaches J-shape or L-shape leads to LCCs using thermocompression bonding or high-temp solder.

ROBOTIC HOT SOLDER DIP (RHSD)

- > **Tin whisker prevention** removes 100 percent of the pure tin (Sn) and replaces it with tin-lead (SnPb).
- > **Gold embrittlement prevention** removes gold (Au) and replaces it with tin-lead (SnPb). This process is for solder coverage beyond the effective seating plane.

Why Arrow

Arrow works with partners, suppliers and manufacturers to bridge the gap between the possible and the practical. We can think Five Years Out because of our commitment to lasting relationships with the most forward-thinking companies in the world. As the eyes and ears of the future, Arrow can help you take your business to the next level. From sensor to sunset.

SOLUTION ARCHITECTURE AND DESIGN

Change is constant. New standards, new ideas, new breakthroughs. Faster, better, cheaper are always around the corner. What doesn't change is Arrow's persistence in thinking Five Years Out. Partner with Arrow to help you design a new device, component or finished product, or to take an existing solution to the next level. Our engineers leverage the world's best resources to help you minimize design cycles to speed your time to market. We can help you find the shortest distance between inspiration and profits.

PROTOTYPE TO SCALE

At Arrow, we know everything great and monumental begins behind the scenes. Part selection. Engineering. Design. Put your custom-designed board, component or device to the test with our prototyping and testing services. And get it certified by UL, EnergyStar or DLC. When you're ready for market, use Arrow's custom manufacturing solutions to scale production to your needs quickly.

ROUTES TO MARKET

Creating a marketable solution is only half the battle. Getting your solution to market is the other half. Boost revenues and maximize business opportunities by working with Arrow to create lead-generation programs and new routes to market. Put your designs into production quickly with Arrow's turnkey manufacturing solutions. Meet the demand for short lead times with Arrow's renowned global supply chain and logistics support. With Arrow by your side, you can keep your products on the route to profits.

HARDWARE AND SOFTWARE INTEGRATION

So many platforms. So many protocols. And so many potential problems. Arrow's integration expertise complements yours to help you bridge the practical and the possible in networks, enterprise computing, IoT and wireless communications. Whether you need device-level integration or large-scale systems integration, Arrow can handle your needs, no matter how demanding.

CLOUD SECURITY AND ANALYTICS

The cloud is vast and ever changing. Arrow cloud consulting, infrastructure, software and security services help you navigate the shortest distance between innovation and reality. With Arrow, the cloud is clearer so you can create solutions unique to your company, your industry, your customers. Arrow data analytic tools and expertise help you turn data into insight. And insight into action. Because what you do with your data tomorrow depends on what you put in place today.

SUSTAINABILITY

Devices become obsolete. Basic materials don't. Turn to Arrow to unlock the value hiding in yesterday's innovation. Reduce, reuse and turn inefficiency into opportunity. From point of use to point of origin, Arrow's sustainable technology solutions group turns challenges into solutions, waste into profits. Arrow guides innovation forward through the reverse supply chain—spares management, returns management, inventory control, remarketing and electronic asset disposition. Arrow has you covered from sensor to sunset.

Are You Five Years Out?

Most people live in the present. The world of now. But a handful of us work in a unique world that doesn't quite exist yet—the world of Five Years Out.

Five Years Out is the tangible future. And the people who live and work there know that new technologies, new materials, new ideas and new electronics will make life not only different, but better. Not just cheaper, but smarter. Not just easier, but more inspired.

Five Years Out is an exciting place to be. So exciting that, once you've been there, it's hard to get excited about the present. Because we know what's coming is going to be so much better.

Five Years Out is a community of builders, designers, engineers and imaginers who navigate the path between possibility and practicality. Creating the future of everything from cars to coffeemakers.

Are you one of them? Then you're probably working with us.

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