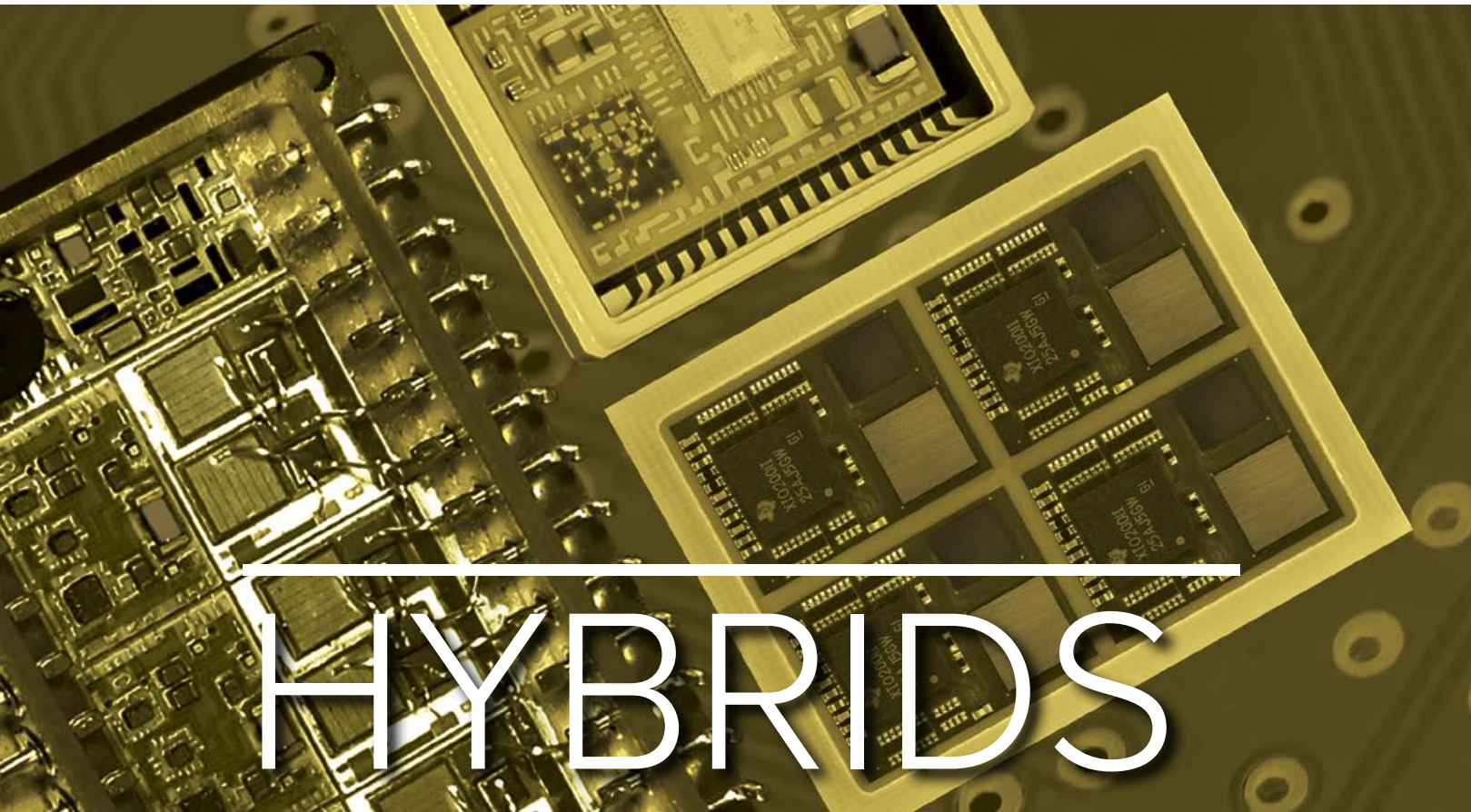


# Custom Hybrids & ASICs

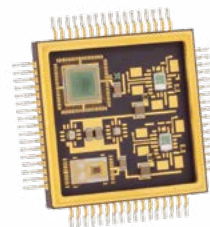
## Custom Solutions



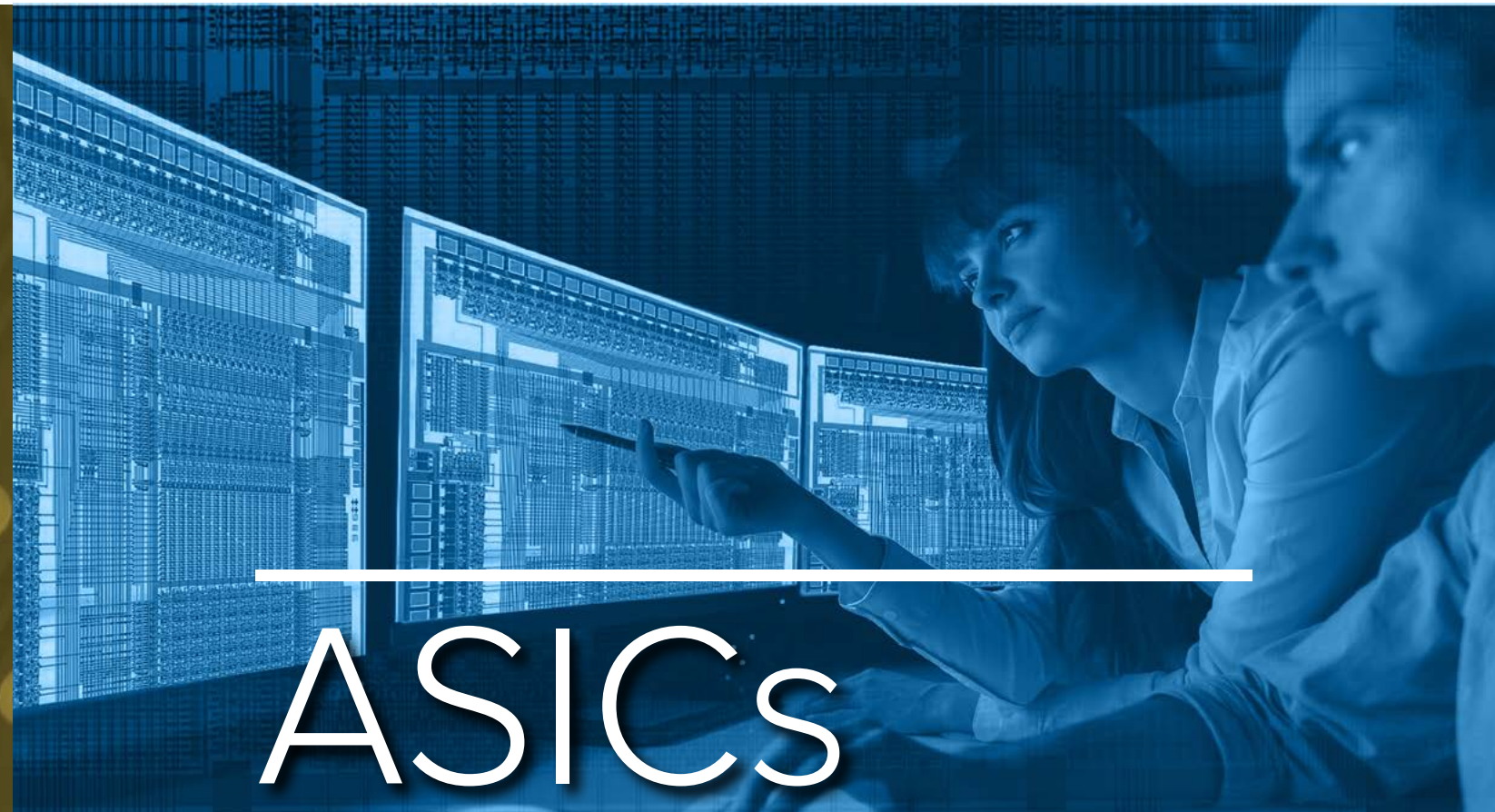


# HYBRIDS

For more than 50 years, DDC has been a trusted manufacturer of highly reliable hybrid microelectronic solutions, supporting the critical, long life cycle requirements of military, industrial and space applications worldwide. DDC's experience and expertise includes the design and manufacture of all types of hybrid microelectronics, including analog, digital, mixed signal, power, radiation tolerant/space grade, and high temperature.

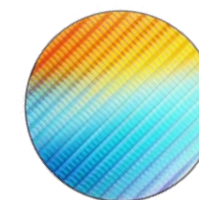


[www.ddc-web.com/Hybrids](http://www.ddc-web.com/Hybrids)



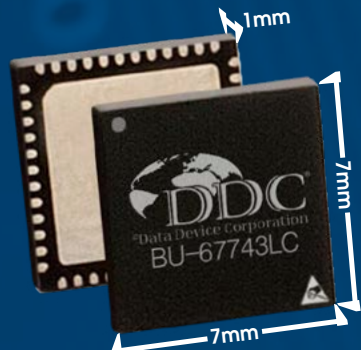
# ASICs

As the worldwide leader in MIL-STD-1553 data bus and synchro/resolver-to-digital conversion components, DDC is uniquely positioned to leverage our in-house experience and expertise to create low-risk, high Technology Readiness Level (TRL) custom analog, digital, and mixed signal ASIC solutions. Additionally, DDC has the capacity to support high volume packaging and testing through partnerships with industry leading semiconductor foundries and packaging houses.



[www.ddc-web.com/ASICs](http://www.ddc-web.com/ASICs)

# World's Smallest Footprint



Nano-ACE™  (Actual Size)

Nano-ACE is the world's smallest and lowest power, complete, MIL-STD-1553 Remote Terminal/Monitor, enabling the development of more compact and higher density boards.

# HYBRIDS

## Applications

- Data Buses/Networking (MIL-STD-1553, ARINC 429, 629, Fibre Channel, Ethernet, CANbus, & others)
- Data Storage
- Motor Controllers/Drives
- Avionics Computing
- Motion Feedback/Conversion (Synchro/Resolver/LVDT)
- Multiplexers
- Nuclear Event Detectors
- Power Distribution / Protection / SSPCs
- Power Supplies/DC-to-DC Converters

## Core Expertise

- Analog
- Digital
- Mixed Signal
- Power
- Processors, Microcontrollers, FPGAs
- Memory Modules
- Radiation Tolerant/Space Grade, including RAD-PAK® shielding
- High Temperature
- Chip on Board
- Embedded Transformers & Inductors
- Stacked Die MCMs

## Technical Services

- Electrical Design Engineering
- Software Engineering
- Mechanical Engineering
- Process Engineering
- Radiation Effects Engineering
- Program Management
- Design Validation & Verification
- Test & Evaluation
- Component Engineering
- Design for Manufacturing
- Life Cycle Management
- DLA Compliant Designs (DO-254/178)

## Packaging

- Hermetic
- Power Hybrids
- Metal
- Ceramic including Co-Fired
- Chip-On-Board
- RAD-PAK®  
- High Radiation Protection (TID 100 krad)
- Plastic BGA (Ball Grid Array)
- MLCC (Micro Lead Frame Chip Carrier)
- PLCC (Plastic Leaded Chip Carrier)
- QFP (Quad Flat Pack)
- QFN (Quad Flat No-Lead Package)
- 3D Packaging
- Mixed Technology
- SMT/COB

## Manufacturing

- Near Void Free Die Attach
- Flip-Chip Capability
- Multilayer Silk Screen
- Automated Wire & Die bonding
- Lid seal & Environmental Conditioning
- High Definition Leak Detection
- Automated In-House Electrical Test & Environmental Screening
- Secure Programs
- TOR Compliant
- Active Trimming
- In-House Magnetics

# ASICs

For over 30 years, DDC's customers have benefited from our ASICs used in standard products. Now your program can directly leverage our ASIC expertise.

## Process Experience

- Dedicated ASIC Design Team
- Experience in High Voltage Processes
- DO-254 and DO-178 Certifiable
- Radiation Hard ASICs with High TID and SEE/SEU Immunity
- Experienced in Sub Micron Processes
- Experience in a wide range of processes:
  - CMOS
  - BiCMOS
  - BCDMOS
  - HVIC
  - GaAs
  - SOI

## Core Expertise

- Analog
- Digital
- Mixed Signal
- Radiation Tolerant/Space Grade
- RF
- Data Bus and Networking Solutions
- Power Conversion and Distribution
- Motor and Power Control
- Hermetic and Non-Hermetic Packaging
- High Voltage
- Hybrid/MCM Packaging
- UHDL Programming

## Building Blocks

- Operational amplifiers, OTAs and Comparators
- A/D and D/A Converters
- Precision Clock Generators
- Precision Voltage References
- Low Dropout Regulators
- Phase Locked Loops
- Complex Digital Circuits
- Programmable Gain Amplifiers and Attenuators
- Voltage Controlled Amplifiers
- RF amplifiers and switches
- Linear Amplifiers
- Oscillators
- Power Electronics
- Transceivers

## Design Complexity

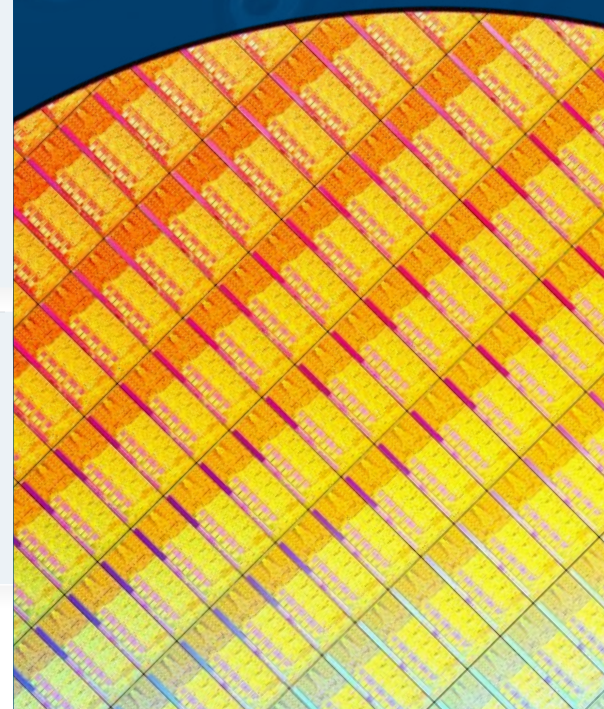
- High Density Transistor counts for Mixed Signal ASICs 100,000 or greater
- High logic gate counts - up to 50,000
- Flip Chip Compatibility
- On Chip Calibration
- Fuse Trimming
- High precision - 16-bit Resolver-to-Digital converters, with accuracies down to ±1 Arc Minute
- Rad-Hard by Design

# Did You Know ?

DDC MIL-STD-1553 ASICs have achieved over 1 billion hours of in-service history on the world's leading aerospace platforms, including:

- AH-64 Apache
- A350-XWB
- EuroFighter Typhoon
- Mitsubishi F-2B
- CH-47 Chinook
- F-16 Falcon
- F/A-18 Hornet
- F-22 Raptor
- F-35 Lightning
- International Space Station
- KC-46A Pegasus Tanker

"The value provided by DDC's knowledgeable and experienced team was a key component to the success of my project"  
- Tier 1 Contractor



DDC's hybrids and multi-chip modules leverage our core expertise to deliver highly integrated, value added solutions.

### Innovation

DDC has a long distinguished history of integrating the most advanced technologies to deliver a higher level of functionality in packages optimized for size, weight and power while maintaining backwards compatibility to preserve the investment of our customers' programs. DDC's 3D microelectronic packaging allows us to deliver radiation tolerant memory modules with the highest density in the market today.

### Integration

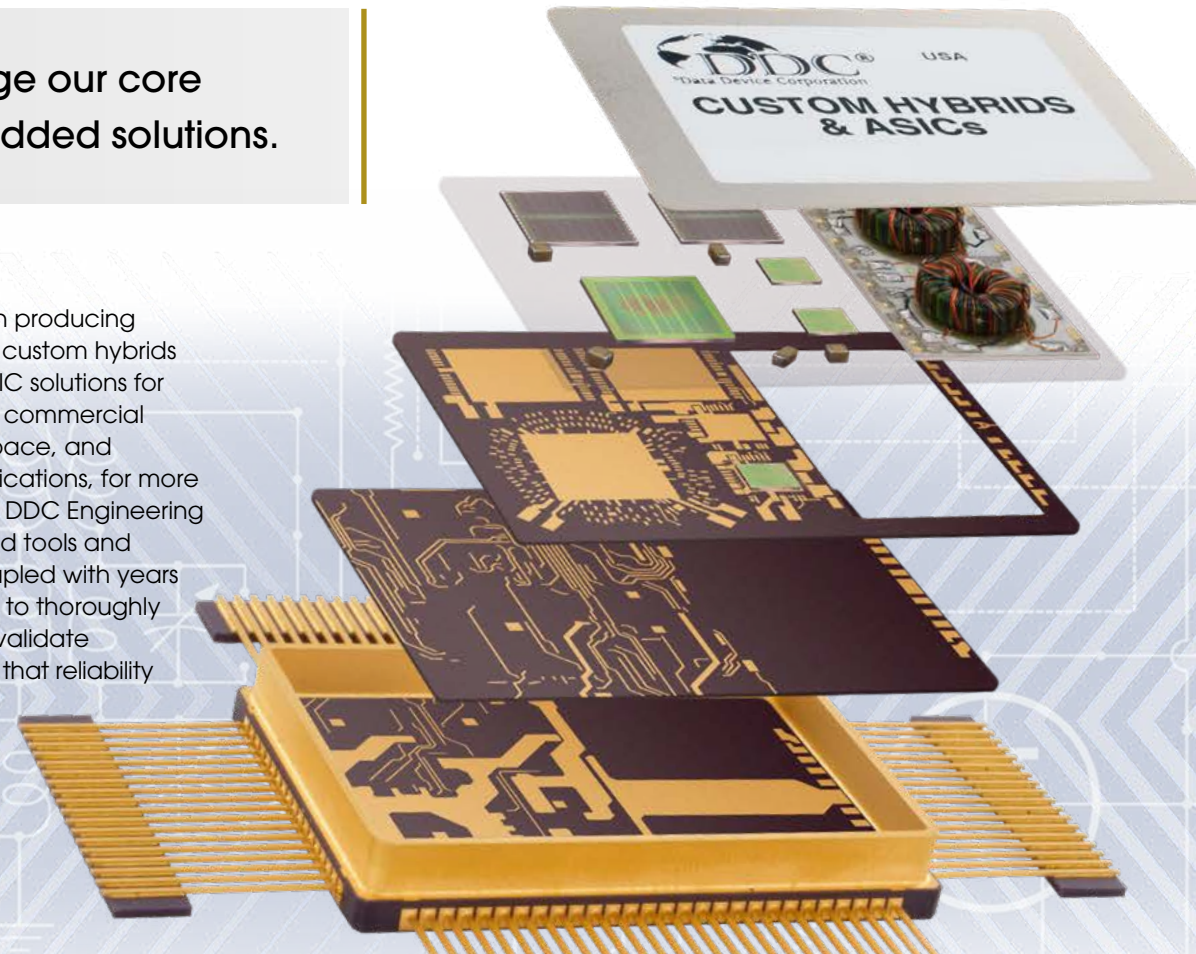
DDC designs highly integrated hybrids and 3D multi-chip modules containing state of the art analog, digital and mixed signal ASICs utilizing the latest packaging technologies such as:

- Flip Chip
- Ball Grid Array
- Stacked Die
- Embedded Magnetics

This level of integration enables highly compact solutions that our customers can count on for the duration of their programs. DDC custom products are delivered to the most stringent quality assurance requirements.

### Reliability

DDC has been producing standard and custom hybrids containing ASIC solutions for use in military, commercial aerospace, space, and industrial applications, for more than 50 years. DDC Engineering uses advanced tools and processes coupled with years of experience to thoroughly simulate and validate our designs so that reliability is built in.



## The DDC Advantage

Whether you need custom ASICs, custom hybrids, custom boards, and/or a complete box-level solution, you can leverage our vertically integrated capabilities to give your program the competitive advantage you need.

### Program Management

DDC's Program Management team works side by side as an extension of our customers' program organizations. With >200,000 square feet of world class manufacturing facilities and a deep Engineering bench, our Program Managers have the resources to convert your requirements into a highly reproducible and reliable product that is delivered on time and within budget. DDC has a demonstrated history of on time delivery and yield rates consistently exceeding 95%.

### Support

DDC's Applications Engineers can support you throughout the life of your program. Evaluation boards, handbooks, testing and development software, LabVIEW compatible support tools, behavioral and mechanical models are amongst the supplementary articles that can be provided to accelerate your time to market.

- Vendor Life Cycle Checks
- Lifetime Buy
- Customer Notification prior to Obsolescence (goal is 2 years)
- Configuration Management Class 1 for Standard Product
- Class 2 Notification Available
- Generation-to-Generation Compatibility

### Program Management

- Complete Support ① Product Definition ② Hardware Design ③ Mechanical & Thermal Analysis ④ Design Simulations and Circuit Analysis ⑤ Documentation ⑥ Manufacturing & Testing ⑦ Qualification & Validation ⑧ Product Support

## QUALITY ASSURANCE



DDC utilizes state of the art equipment from proven industry sources to perform die shear and wire pull tests. The Dage Model 4000 system shown is able to provide real time statistical analysis and automatic archiving of data to greatly reduce the amount of time required to perform Destructive Physical Analysis.

### DDC is DLA Certified to MIL-PRF-38534 MIL-STD-883 & MIL-STD-750 Test Methods

- TM1003 - Insulation Resistance
- TM1004 - Moisture Resistance
- TM1005 - Life Test
- TM1008 - Stabilization Bake
- TM1009 - Salt Atmosphere
- TM1010 - Temperature Cycling
- TM1011 - Thermal Shock
- TM1015 - Burn-In
- TM2001 - Constant Acceleration
- TM2003 - Solderability
- TM2004 - Lead Integrity
- TM2009 - External Visual
- TTM2011 - Bond Strength
- TM2014 - Internal Visual & Mechanical
- TM2015 - Resistance to Solvents
- TM2016 - Physical Dimensions
- TM2019 - Die Shear
- TM2020 - PIND
- TM2023 - Non-Destruct Bond Pull
- Internal Visual
  - TM2010 Monolithic
  - TM2017 Hybrid
  - TM2032 Passive
  - TM2071 Transistors
  - TM2073 Diodes

### Certifications & Qualifications

- ISO-9 AS9100
- EN9100 Compliant
- JIS Q9100 Compliant
- MIL-PRF-38534; Class D, G, H, and K Qualified
- MIL-PRF-38535; Class V, and Q
- Certifiable to DO-254, DO-178, & DO-160

### Quality & Service Awards

Recognized by Industry Leaders, Including:

- General Atomics
- Honeywell
- Lockheed Martin
- L-3 Communications
- Raytheon

## SPACE SCREENING

### Hybrid Microcircuit 100% Testing

- Non-destructive bond pull
- Internal visual inspection
- Temperature cycling (10 times from -65°C to +150°C)
- Constant acceleration 3,000 G
- PIND 1% PDA on 5th run and under 25% total
- Burn-in 320 hours at +125°C, PDA 2% second half of burn in/ Burn-in 160 hours at +125°C, PDA 10%
- Seal (fine and gross)
- Full electrical test at min, max, and room temperature
- Radiography
- External visual

### Active Elements (every wafer lot)

- 100% high magnification visual
- 100% probe at room temperature
- Samples assembled and subjected to standard environmental screening, including burn-in and electrical at minimum, maximum, and room temperature
- Life Test
- Scanning Electron Microscope (SEM)
- Wire bond pull
- Radiation lot acceptance testing

### Passive Elements (per manufacturing lot)

- 100% visual
- 100% electrical on select parameters at room temperature
- Samples assembled and screened, including voltage conditioning and full electrical at room temperature
- Wire bond pull



DDC completes non-destruct process monitoring and internal inspection of product assemblies utilizing contemporary real time X-ray imaging machines such as the Fein Focus TIGER with five axis of movement. DDC is continuously updating our capital equipment to improve productivity and provide meaningful data to mitigate risk.



Your Solution Provider for... Connectivity, Power, and Control



## Contact Us

Inside the U.S. : Call 1-800-DDC-5757

Outside the U.S. : Call 1-631-567-5600

### Operations

#### DDC Headquarters and Main Factory

105 Wilbur Place, Bohemia, NY 11716-2482  
Tel: 1-800-DDC-5757 or (631) 567-5600  
www.ddc-web.com

Data Device Corporation

#### DDC Space Microelectronics

13000 Gregg Street, Suite C, Poway, CA 92064  
Tel: 1-800-DDC-5757 or (631) 567-5600

#### Beta Transformer Technology Corporation

40 Orville Drive, Bohemia, NY 11716-2426  
Tel: (631) 244-7393  
www.BTTC-Beta.com

#### Beta Transformer Mexico, S. DE R. L. DE C.V.

Avenida 20 De Noviembre  
959 Zona Centro, Ensenada, Baja Mexico  
Tel: (631) 244-7393

#### North Hills Signal Processing Corporation

Avenida Jose Escandon y Helquera No. 21  
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H. Matamoros Tamaulipas, Mexico  
Tel: (631) 244-7393

#### DDC Electronics Ltd Headquarters

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Tel: +44 (0) 1983 817300



### Sales Offices

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92411 Courbevoie Cedex, France  
Tel: +33-1-41-16-3424

#### Germany: DDC Elektronik GmbH

Triebstrasse 3, D-80993 München, Germany  
Tel: +49 (0) 89-15 00 12-11

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Koraku 1-chome,  
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Tel: 81-3-3814-7688  
www.ddc-japan.co.jp

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M.G Road, Bangalore 560001, India  
Tel: 91 80 46797 0368



## The first choice for more than 50 years!

DDC is a world leader in the design and manufacture of high-reliability Connectivity, Power and Control solutions (Data Networking Components to Processor Based Subsystems, Space Qualified SBCs & Radiation Hardened Components; Power Distribution, Control & Conversion; Motor Control & Motion Feedback), has served the aerospace, defense, and space industries as a trusted resource for more than 50 years.

