

GE
Intelligent Platforms

avionics



imagination at work

Proven people, products and systems

GE Intelligent Platforms has decades of experience to help you take your designs from concept, through development, and into deployed military and commercial aviation environments.

If an ordinary computer system fails, data may be lost. If an avionics system fails, far more is at risk, and this harsh reality guides all our avionics operations. From the early design stages through manufacturing, testing, certification and product lifecycle management, we focus obsessively on reliability. Because without reliability, nothing else matters.

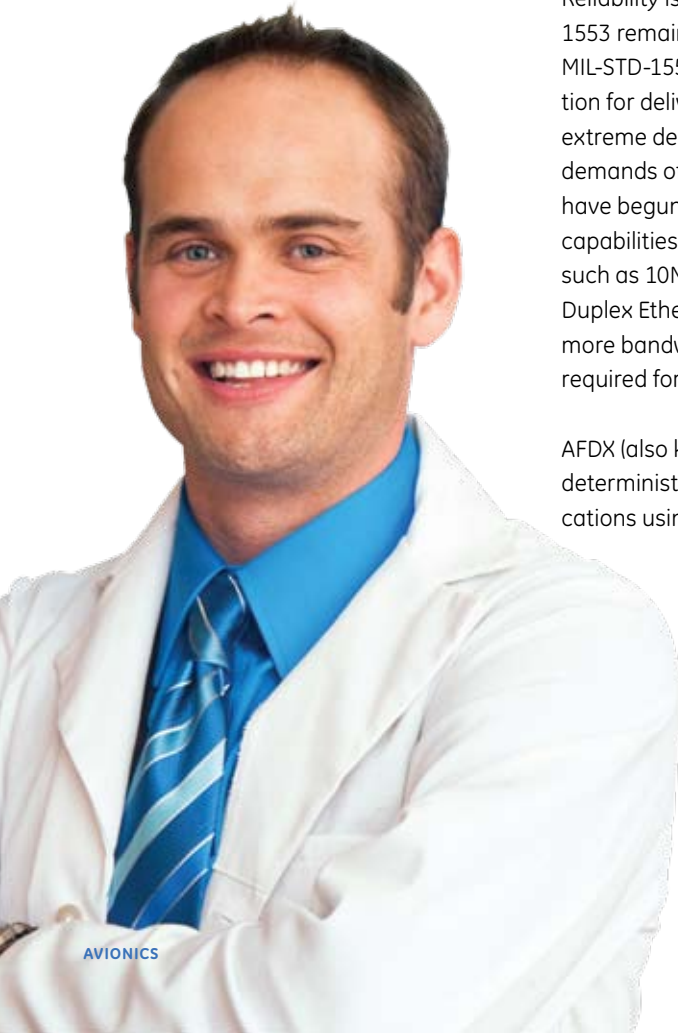
Reliability is one of the reasons MIL-STD-1553 remains a popular avionics bus. MIL-STD-1553 has a well-deserved reputation for delivering each command with extreme dependability. As the complex demands of the latest avionics systems have begun to overwhelm the bandwidth capabilities of MIL-STD-1553, new concepts such as 10MBit 1553 and Avionics Full Duplex Ethernet (AFDX) promise to deliver more bandwidth and the reliability required for avionics applications.

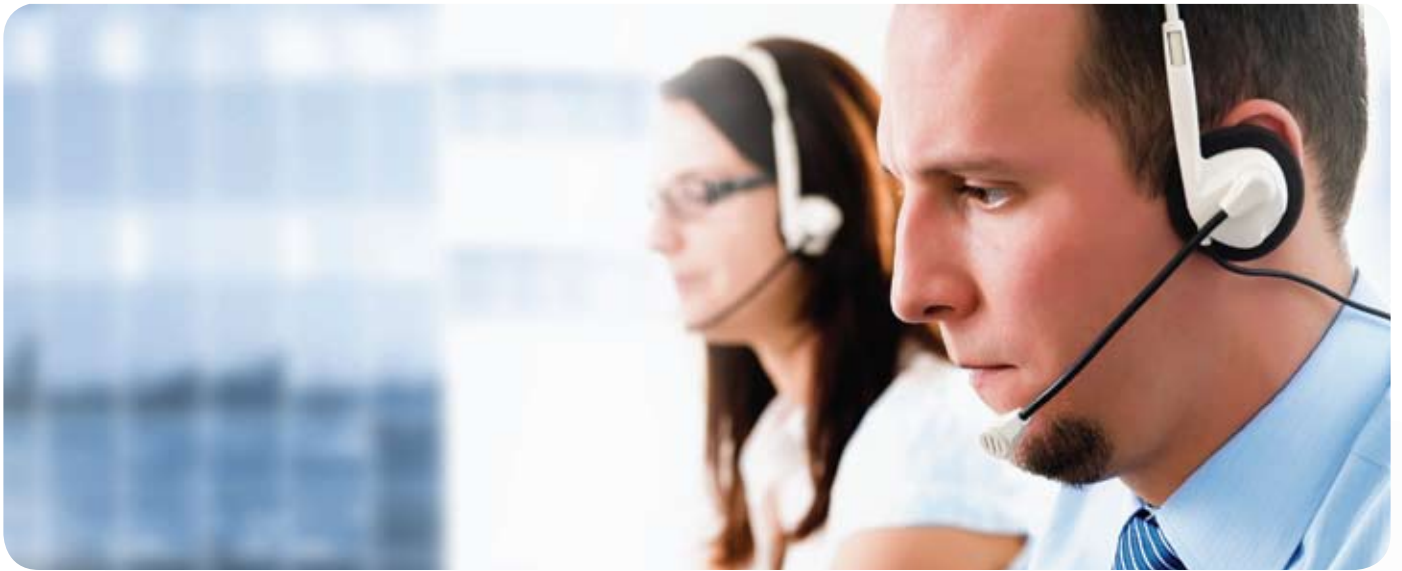
AFDX (also known as ARINC 664 Part 7) is a deterministic protocol for real time applications using Ethernet media for aircraft

flight critical interfaces. Another technology option is 10MBit 1553 which offers up to 10 times the data throughput.

Avionics products are also being revolutionized by major advances in the capacity, performance and cost-effectiveness of new generations of programmable logic devices (PLDs). These devices provide avionics system designers with new and exciting protocol communications options.

Bus analysis tools are critical to the avionics industry, and our powerful tools give you simplified control over receive, transmit, logging and analysis functions. You can analyze bus traffic, quickly generate or modify messages and view received data in engineering units. Our tools provide a full suite of advanced features for use in the laboratory, in flight, on the flight line, or in any application requiring real-time data acquisition and analysis.





Rugged Systems Design

The packaging of avionics systems is also a critical factor, especially for systems that must survive harsh environments. Our rugged systems stand up to extremes and our engineering team can quickly create custom designs based on our existing product portfolio for both military and civilian aircraft. In addition to development support, we also offer engineering development units and designer support to speed up the application development process. Please contact your sales representative to learn more about our systems product portfolio and to discuss your individual avionics system requirements.

Technical Support

Avionics customers receive support through online knowledge bases, on call technical experts and on site personnel for special situations. Direct access to the technical design team allows the integrating engineers the most expedited resolution to their needs, pre- and post-sale.

PLM

Certain military, transportation and automation applications have a predicted lifetime of many decades. For these customers, we offer services such as Product Lifecycle Management, which are designed to protect and extend the life of their investment. GE Intelligent Platforms provides cost-effective, long-term support through our Product Lifecycle Management (PLM) organization. We are committed to supporting customer programs through their entire lifecycle, so we offer a range of innovative Long-Term Support services to reduce the overall cost of ownership and provide industry-leading safeguards against component obsolescence.



MIL-STD-1553

MIL-STD-1553

We offer a wide range of intelligent MIL-STD-1553 interface hardware to meet demanding application needs. Our 1553 product line combines high-speed encoding/decoding, large onboard memory, intelligent protocol processing and advanced board-level functionality. This enables accurate buffering and recording of bus traffic with no data loss while simultaneously scheduling 1553 messages without host intervention.

10MBit 1553

This advanced solution, available in interface boards or FlightCORE, offers an alternative to regular 1Mbit 1553, while providing up to 10 times the data throughput. This interface is an excellent choice for stores management controllers or similar applications of standard 1553 protocol running over RS-485 lines requiring higher data rates.

Avionics Cores

By taking advantage of the revolutionary advances in capacity, performance and cost-effectiveness of a new generation of programmable logic devices (PLDs), we can provide avionics system designers with new and exciting protocol communications options. The electronics industry is rapidly moving to deploy these higher levels of integration provided by System on a Chip (SoC) or integrated I/O implementations. 1553 Cores allow the system designer the peace of mind of using certified 1553 intellectual property, while using their own hardware for maximum design density.

We support the following operating systems:



common features

- 1 MB shared RAM per channel
- Supports MIL-STD-1553A/B Notice II, 1760, MacAir and Link 16
- Multi-function – simultaneous Bus Controller, 31 Remote Terminals and Bus Monitor operational modes
- Single-function – Bus Controller or 31 Remote Terminals or Bus Monitor operational modes
- Supports Microsoft® Windows® GUI bus analyzer
- High-level API libraries for Microsoft® Windows® XP/2000/Me/NT/98/95, Linux®, LynxOS®, Solaris®, VxWorks®, LabVIEW™, LabVIEW™-RT, LabWindows™/CVI, Visual Basic and in source code with example programs
- IRIG-B Receiver (AM or DC/TTL)/Generator (DC/TTL) capability
- Real-time bus playback with RT edit mode
- I/O triggering, real-time scope triggering and synchronized BC to external triggers
- 45-bit microsecond timetags; IRIG/GPS synchronization capability
- Conditional BC branching on real-time message data or status
- Error injection/detection; BIT; RT map monitoring; two levels of aperiodic message insertion
- I/O discretes that support avionics-level voltages

form factors



ARINC



ARINC 429

Our ARINC solutions provide feature-rich functionality, ease-of-use and exceptional performance for embedded, test and simulation applications. Most interfaces offer individual channel programmability for source or sink, and an optional IRIG B receive time stamp. They provide a user-friendly design to the host system with on-board management of transmission, receive, and data logging execution.

ARINC 615 Data Loader

The streamlined, single- or multi-session interface software provides intuitive Microsoft® Windows®-based ARINC 615-3/603 data loading. The single-session software loads one ARINC 615-3/603 compatible LRU at a time. The multi-session integrated hardware/software solution supports up to 16 simultaneous upload or download sessions with ARINC 615/603 compatible LRUs.

Other ARINC Protocols

Interface to a wide range of avionics protocols with our single-board, multi-protocol solutions for PCI, CompactPCI®, PC/104, PCMCIA, VME, VXI and PMC platforms. Many of our ARINC 429 boards offer options for additional commercial avionics protocols. For additional flexibility, we offer modular board solutions for PCI, CompactPCI, VME and VXI platforms. Optionally supported protocols include:

- ARINC 561/568 6-wire
- ARINC 573/717
- ARINC 419
- ARINC 582
- ARINC 708/453
- RS-232/422/485
- ARINC 615-3
- CSDB

We support the following operating systems:



Linux VxWorks



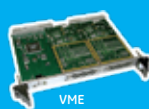
common features

- Dedicated, fully independent, receive and transmit channels
- High performance processing and large, shared memory buffers
- Supports GUI bus analyzers
- High-level API libraries included for operating environments including Windows® XP/2000/Me/NT/98/95, Linux®, VxWorks®, Solaris®, LabVIEW™, LabVIEW™-RT, LabWindows™/CVI and in source code with example programs
- Available in a variety of Rx/Tx and environmental configurations
- Supports maximum data throughput
- 32/64-bit time tagging and optional IRIG
- Multiple receive buffering modes and on-board transmit message scheduling
- I/O discretes that support avionics-level voltages
- Multiple protocols available on same board

form factors



cPCI



VME



PMC



VXI



PCI



PC-104



PCMCIA



ExpressCard



IP Module



PCI Express

AFDX®/ARINC 664

AFDX/ARINC 664

AFDX is a deterministic protocol for real time applications on Ethernet media, also known as ARINC 664 Part 7. AFDX is intended for high-speed deterministic aircraft interfaces, including Engines, Flight Controls and Navigation Systems. With both hardware-based and software-

loadable AFDX, we support AFDX across evolving platforms to protect your avionics investment. Analyzer architecture supports direct data to host memory for high speed data capture in demanding test and simulation environments.



We support the following operating systems:



VxWorks



Linux

common features

- AFDX/ARINC 664 dual port interface (two independent 10/100 MHz duplex ports)
- Includes AFDX and low-level Software Developer's Kit at no additional charge
- Advanced reception features
- Advanced transmission features
- Advanced software support
- Four bi-directional avionics discretes
- Two Input and output triggers
- Built-in test features
- Microsoft® Windows® GUI Analyzer with ARINC 429 option

form factors



ExpressCard



PMC



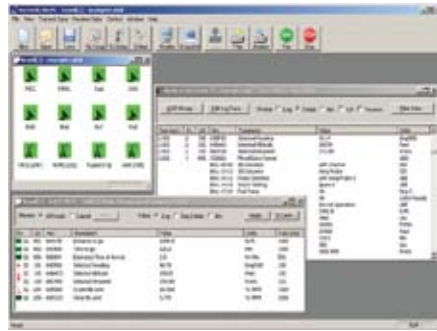
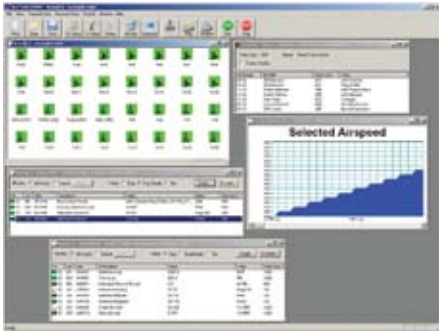
cPCI



PCI



PCI Express



Flexible Bus Analyzers

Today, aircraft may contain combinations of various (MIL-STD-1553, ARINC 429, CAN, and AFDX) busses as part of the overall system. GE Intelligent Platforms has multiple bus analyzers for these protocols, all of them based on the common format of the PC with a Graphical User Interface. The GUI can present data in several formats, from raw data, to Engineering Units, to visual formats such as gauges and strip charts, and data can be exported to other tools such as Microsoft® Excel®. GE Intelligent Platforms offers the **Pass3200** for 1553 and A429, **BusTools** for 1553, A429, or AFDX, and a new analyzer called the **BT-AIL** which does analysis on AFDX, A429, and tailored CAN bus activity.

The form of the analyzer depends largely on its intended use. If the work is in a lab, a rack mounting or bench mounting can be considered. These form factors include VME, VXI, cPCI, PCI, PCI-X, and PCI Express. For deployment and testing of avionic systems, more portable approaches are needed. Form factors available for this would include PCMCIA and ExpressCard®.

These form factors take advantage of the popularity of the modern laptop as a base for the analyzer.

All of our analyzers are capable of the key analysis functions: Data Display, Error Logging and Analysis, Simulation, and Playback of Data. Analyzers are available in multiple configurations: stand-alone software, card and software, and complete turnkey system of card, software and host laptop.

DATA DISPLAY

The BusTools line allows engineers to see the data superimposed on a line drawing of the target unit. The PASS3200 line allows the engineer to see the data on gauges, fault indicators, and charts, much like the indicators on an instrument panel.

ERROR/DATA LOGGING AND ANALYSIS

Error analysis is fundamental to avionics system development, and our analyzers allow engineers to see deeply into the operation of the bus. The analyzers can see and display errors as well as let engineers know that

the data sent by LRU's are correct to the design spec. Error conditions are flagged and identified.

SIMULATION

Our analyzers generate data that accurately simulates one or more of the LRU's, and they excel at injecting error conditions so that engineers can evaluate how the LRU's will behave. They are able to simulate both a 1553 Bus Controller and Remote Terminal; Transmitters and Receivers in A429, and in an AFDX End System.

PLAYBACK OF DATA

Many of our analyzers allow data recorded on the flight line to be played back to the laboratory. The data can be sent over a controlled bus to see if the same error conditions are observed compared to the live bus.





GE Intelligent Platforms Contact Information

Americas: **1 800 433 2682** or **1 434 978 5100**

Global regional phone numbers are listed by location on our web site at www.ge-ip.com/contact

www.ge-ip.com