

DATA ACQUISITION

**CURTISS-
WRIGHT**

CURTISSWRIGHTDS.COM



+ Products + Capabilities + Solutions



FIXED WING



ROTORCRAFT



UNMANNED

■ Data Acquisition
■ Recorders
■ Network Switches
■ Ground Stations



DATA ACQUISITION UNIT



NETWORK RECORDER



ETHERNET SWITCHES

About Curtiss-Wright Defense Solutions

Curtiss-Wright Defense Solutions, a division of Curtiss-Wright, is an industry-leading supplier of sophisticated electronics products. We are recognized around the world as one of the most innovative designers and manufacturers of highly engineered systems built to perform reliably in harsh conditions. We continue to lead the way in developing and marketing advanced solutions that address the rapidly evolving requirements of naval, aerospace and ground defense customers. With design and manufacturing facilities located across North America and Europe, and sales and support teams located around the globe, we are uniquely positioned to satisfy the most demanding electronics, packaging and systems challenges.

The Curtiss-Wright Advantage

Curtiss-Wright provides the most flexible and widely-installed airborne data acquisition systems (DAS) in the world. The product line's success over two decades is a combination of constant heavy R&D investment and a philosophy of listening to customer needs and delivering the solutions they want.

Cost-effective

Curtiss-Wright helps reduce costs, development time and risk by using a Commercial Off-The-Shelf (COTS) approach that utilizes an extensive library of IP and decades of rugged system design experience. The common product line leads to acquisition cost savings by reducing the required inventory of spares while a simple plug-in module design yields extensive flexibility and results in short lead times ensuring the hardware is delivered quickly. Continuous module development yields lower life-cycle costs as the adaptable system is only ever one module away from supporting thenext-generation sensing or avionics bus technologies as they emerge.

Reliable data

Our DAS are designed for demanding data collection and storage applications in harsh environments where compact, low power systems are required and robust and reliable performance is critical. The data acquisition units, recorders and Ethernet switches use finite state machine design to aid reliability as it ensures that the hardware acts in a completely deterministic manner – there is no software in the acquisition path and the system recovers from brown-outs almost instantly to minimize data loss. Coherency is maintained as all parameters are sampled simultaneously and independently of transmission, across the complete system in every card in every chassis making it unnecessary to realign or interpolate samples during analysis.

Across applications

The flexible, rugged and reliable nature of Curtiss-Wright's data acquisition products have made them a perfect fit for a number of other airborne and terrestrial applications. These include engine test beds, operational loads and structural health monitoring, operational data recording and other applications such as condition based monitoring of wind turbines, testing vehicle engines and rolling stock. Powerful setup, management and visualization software, coupled with supporting products such as camera and ground station products ensures we can deliver complete end-to-end solutions.



Lowers risk

- **Reliable:** Proven on every platform type in all environmental conditions
- **Robust:** Works once, works always – the data is always valid
- **Short lead times:** COTS hardware with fast delivery

Reduces cost of ownership

- **Acquisition cost:** Reduced inventory of spares due to common product line
- **Operational cost:** Lower installation, setup and maintenance requirements
- **Life-cycle cost:** Adaptable and upgradable designs greatly extend system lifetime

Designed to deliver data reliably

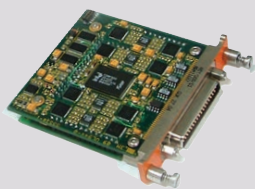
- **Deterministic:** Guaranteed and predictable data - you get what you expect every time
- **Coherency:** Simultaneous sampling occurs across the complete system
- **Rugged:** Qualified to work in the harshest environments

“Without the ease of use of the Curtiss-Wright system, we would not have been able to take on the flight testing in the tight timeframe available.”

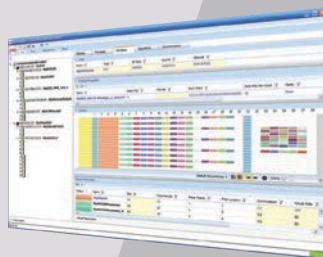
Flight Test Engineer

ATR





DATA ACQUISITION MODULE



INTUITIVE SETUP SOFTWARE



GROUND STATION PC

FTI Solution

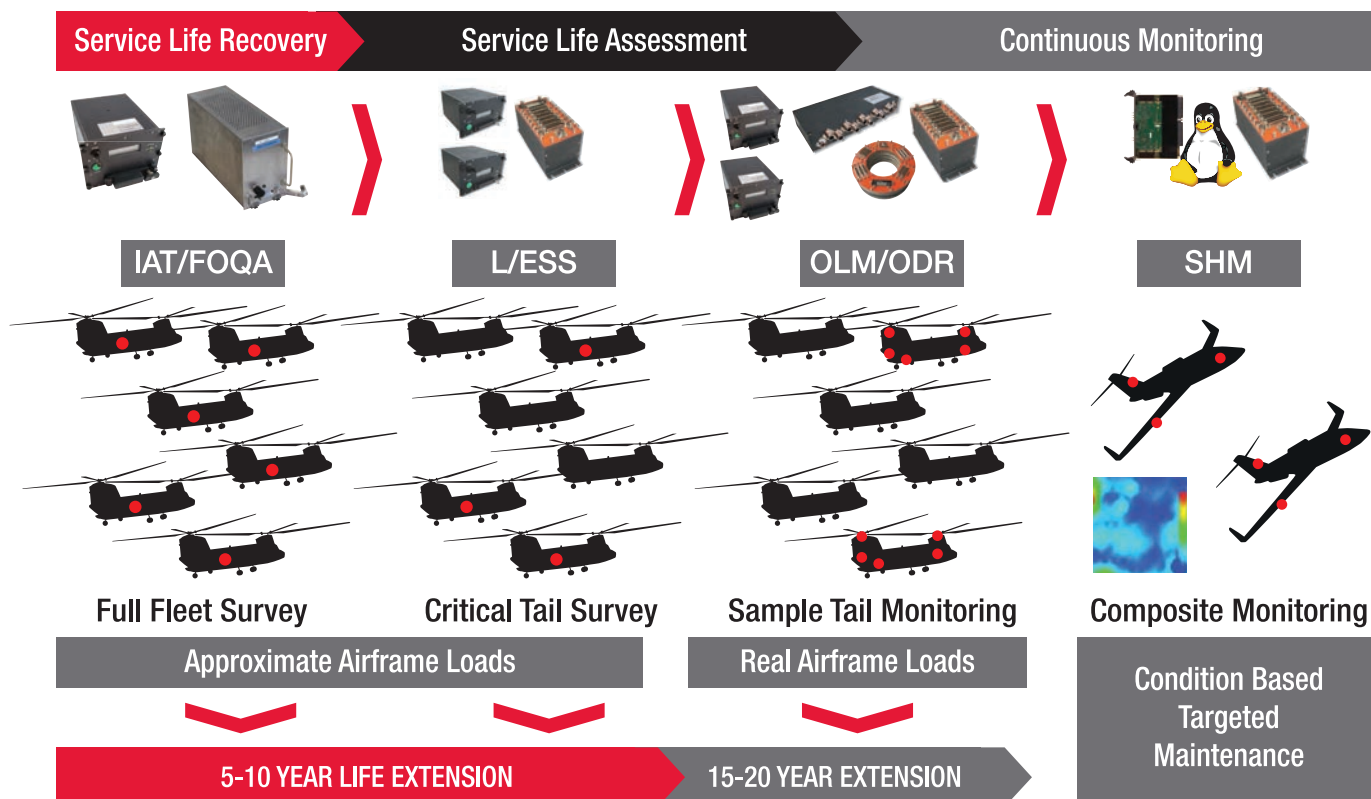
Curtiss-Wright provides a seamless end to end flight test solution from setup, data acquisition and transmission to analysis. The same modular products are used to build both single chassis and large distributed systems in PCM, Ethernet or hybrid topologies. Ethernet switches can provide interconnections across the system offering data transmission, programming and precision time synchronization over a single cable using standard technologies resulting in a system that is light, easy to setup and maintain.

- **Low latency:** Designed to minimize the data transfer time from sensor to screen
- **Deterministic:** Guaranteed and predictable data - you get what you expect every time
- **Coherency:** Simultaneous sampling occurs across the complete system
- **Reliable and rugged:** Driven by hardwired finite state machines; operates in harsh environments
- **Compact and low power:** Ideal when space and power are limited
- **High performance:** High system throughput and data integrity
- **COTS modular design:** 100+ plug-in modules fit all chassis
- **Powerful software:** Intuitive, fast set-up and programming; tight integration with display/analysis



Data Acquisition for Continued Airworthiness

Curtiss-Wright provides a complete airworthiness data management solution for the lifetime of your airframe in partnership with best in-industry integrators and data management experts.



- IAT – Individual Aircraft Tracking • FOQA – Flight Operations Quality Assurance • L/ESS – Loads/Environmental Spectral Survey
- OLM/ODR – Operational Loads Monitoring / Data Recording • SHM – Structural Health Monitoring

- 20 years heritage providing data acquisition for aircraft sustainment programs
- Continuous operation proven for 15 years (accelerated life testing) allows for “fit and forget” installations
- Hardwired circuits acquiring high-fidelity low-noise data (<2 bits typical)
- Live at power-up electronics with brown-out and glitch immunity
- One scalable, configurable system helps you avoid expensive platform specific designs and developments
- User programmable signal processing module for real-time analysis, event detection and data management
- Flight qualified hardware with an established path to certification for multiple platforms
- Global support network providing integration, consultation and training services

Diverse Rugged Data Acquisition

Curtiss-Wright's products are ideal for a number of diverse applications where rugged and reliable performance is required. Our products can deliver customized systems without the high cost, qualification requirements and inflexibility common to bespoke systems. Examples of rugged data acquisition applications Curtiss-Wright supplies to include

- Production line test
- Mission recording
- Engine test cell data acquisition
- Engine power assurance
- Wind turbine monitoring
- Rolling stock data acquisition





Curtiss-Wright Data Acquisition Units

Curtiss-Wright's data acquisition units (DAU) are airborne acquisition and transmission systems that typically comprise a chassis, a backplane controller and user selected modules. This highly configurable system enables fully customized systems to be built using COTS products. From their inception, the DAUs were designed specifically to optimally balance small size with high performance to be the perfect fit for the majority of FTI and rugged data acquisition applications.

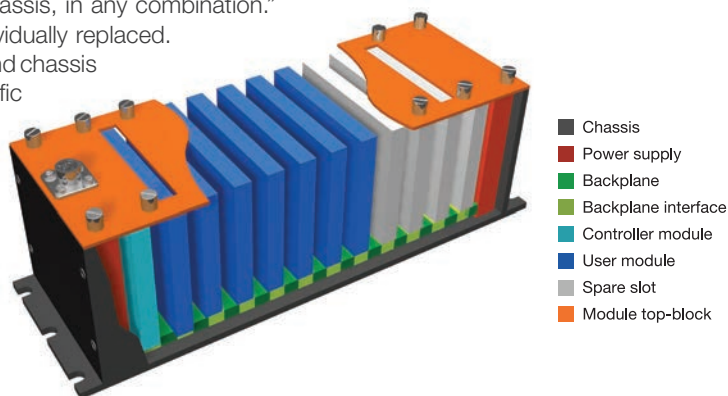
The DAUs are driven by hardwired finite state machines with a 'works once, works always' operation to make them extremely reliable. This low power design results in less heat and, coupled with their compact size and MIL-SPEC ruggedness, makes them ideal for installing in locations that have limited space and are subject to harsh environments.

They achieve high performance by utilizing a 100% digital architecture to support high throughputs, aggregating up to a Gigabit per second through a network distributed system. The mature architecture philosophy has remained stable for decades thanks to the future proof design and continued technology evolution. This eliminates the need to refresh an entire product line every few years, offers unequalled backwards compatibility and means there is a vast selection of modules available.

A key concept behind the DAUs is "any module, any chassis, in any combination."

Modules or chassis can be added to the system or individually replaced.

There are over a hundred modules and variants available and chassis can be built with any mixture of modules to meet the specific needs of a program. The high number of modules and ongoing development means that a chassis is only ever a few modules away from any application. This modularity means inventory requirements are minimized and the proven, easy migration path to new networking and sensor technologies, such as smart and wireless sensor networks, greatly extends system life time and reduces lifecycle costs.



"There has not been a lost flight or aircraft grounded on the program due to Curtiss-Wright equipment. It has worked flawlessly since the first flight."

Flight Test Instrumentation Acquisition System
Team Leader

Airbus

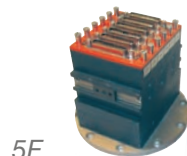
Standard Chassis

The Acra KAM-500 standard chassis are the most popular DAU and ideal for most applications.



Chassis	User Slots	Dimensions (H x L x W)	Mass*
CHS/03U	3	3.88 x 5.51 x 3.15" 98.5 x 140 x 80mm	2.87 lb (1.3 Kg)
CHS/06U	6	3.88 x 7.17 x 3.15" 98.5 x 182 mm x 80 mm	2.75 lb (1.7 Kg)
CHS/09U	9	3.88 x 8.82 x 3.15" 98.5 mm x 224 mm x 80 mm	4.74 lb (2.2 Kg)
CHS/13U	13	3.88 x 11.02 x 3.15" 98.5 mm x 280 mm x 80 mm	5.95 lb (2.7 Kg)

Alternative Chassis



The alternative DAUs use the same stable, well proven and mature backplane technology as the standard chassis and utilize the same standard modules. A wide range of module-level core logic, combined with a stable backplane design ensures that no challenge is too great where the program merits the customization of COTS technology and the schedule can accommodate the corresponding lead-times.

Chassis	User Slots	Dimensions (H x L x W)	Mass*
CHS/02F	2	3.31 x 5.37 x 2.05" 84 x 137 x 50 mm	1.79 lb (0.81 Kg)
CHS/03F	3	3.31 x 4.78 x 2.51" 84 x 122 x 64 mm	1.97 lb (0.89 Kg)
CHS/05F	5	4.62 x 5.51 x 3.92" 118 x 140 x 92 mm	3.43 lb (1.56 Kg)
CHS/04L	4	3.88 x 9.52 x 1.6" 99 x 242 x 40 mm	3.27 lb (1.48 Kg)
CHS/012R	12	3.88 x 9.84" 99 x 250 mm	8.28 lb (3.75 Kg)
microKAM	2	1.86 x 4.92 x 1.99" 47 x 125 x 51 mm	0.58 lb (0.26 Kg)

* Fully populated with typical modules. The microKAM is an ultra-compact unit and does not use the standard modules. Please contact sales for further details.

IRIS airborne camera

The Curtiss-Wright IRIS airborne camera is a highly rugged, full HD FTI camera with integrated H.264 compression and Ethernet connectivity. It can be seamlessly integrated with other Curtiss-Wright products or used as a standalone system. Uniquely this camera outputs two compression streams – a low bit-rate for telemetry and a high bit-rate recording needs. The images in the video stream are timestamped as they are acquired ensuring highly accurate synchronization with other flight data parameters. The IRIS can be configured using the DAS Studio 3 set-up and management software like any other Curtiss-Wright data acquisition product.

Chassis	Variant	Dimensions (H x L x W)	Mass
OBE/CAM/001	Indoor	2.36 x 7.09 x 2.36" 60 x 180 x 60 mm	1.4 lb (0.62 Kg)
OBE/CAM/002	Outdoor	2.36 x 7.09 x 2.36" 60 x 180 x 60 mm	1.6 lb (0.73 Kg)

Various lens options available.



Analog Module Selection Guide

Module	Channels	Accuracy (+/- FSR)	Max rate (sps/ch)	Bandwidth (Hz)	Analog Gain	Excitation	Voltage	Current	Temperature	Strain	Vibration	Position	Pressure	3 Phase Power	Examples of Signal Sources and Notes
ADC/008	3+3	0.3	20	1 k	Variable 1, 10	n/a								•	Three phase power supplies.
ADC/105	8	1.2 ⁻¹	24 k	6 k	Variable 1, 10, 100, 1000	n/a	•								Differential voltage sources.
ADC/106	6+2	1.2 ⁻¹	24 k	6 k	Variable 1, 10	Fixed 3.6 mA/ch					•				ICP type accelerometers. Inputs: 6 accelerometer + 2 differential voltage.
ADC/109	8	1.2 ⁻¹	24 k	6 k	Variable 1, 10, 100, 1000	±5.1V, 30 mA/ch	•			•	•	•	•		Full, half, quarter-bridge strain gages. S2 variant features sense lines.
ADC/111	48	0.1	4 k	1 k	Fixed 0.25, 1	n/a	•								Single ended voltage sources.
ADC/112	24	0.01	12 k	3 k	Fixed .25, 1, 10 or 100	n/a	•								Differential voltage sources.
ADC/113	16	0.35	12 k	3 k	Fixed	1 - 2 mA/ch			•						PT100 temp sensors. Analog gain set to maximize PT100 range.
ADC/114	16	0.01	12 k	3 k	Fixed 1, 10 or 100	0 - ±5.1V, 15 mA/ch	•			•	•	•	•		Full, half, quarter-bridge strain gages. Excitation shared between two channels.
ADC/115	16	0.25	25 k	6.25 k	Fixed	250 - 500 µA/ch			•						Current excitation applied in groups of 4 channels. PT1000 temperature sensors.
ADC/116	12	0.4	12 k	3 k	Fixed	Fixed 3.6 mA/ch					•				ICP®, Isotron®, Piezatron® and Deltatron® accelerometers.
ADC/117	8	1.2 ⁻¹	24 k	6 k	Variable 1, 10, 100, 1000	0 - 20 mA/ch				•					Full, half, quarter-bridge strain gages. Excitation buffer per channel.
ADC/118	12	0.42 ⁻²	12 k	3 k	Fixed 1, 10 or 100	0 - ±5.1V, 30 mA/ch				•					Full, half, quarter-bridge strain gages. Individual excitation buffer and balance adjust per channel.
ADC/120	12	0.42 ⁻²	12 k	3 k	Fixed 1, 10 or 100	0 - ±5.1V, 30 mA/ch	•			•	•	•	•		Full-, half, quarter-bridge strain gages, pressure sensors, DC accelerometers, potentiometers.
ADC/126	4	0.1	100 k	25 k	Variable 1, 10	24V, 3.6 mA					•				ICP®, Isotron®, Piezatron® and Deltatron® accelerometers.
ADC/129	4	0.02	100 k	24 k	Variable 1, 10, 100, 1000	0 - 14.5 mA/ch	•			•	•				Full, half, quarter-bridge strain gages. Excitation buffer per channel.
ADC/130	4	0.1	12 k	3 k	Fixed 0.05	1-16	•								Differential high voltage sources (±200V).
ADC/132	24	0.02	12 k	3 k	Fixed	1-16	•								Voltage ladder analog channels (250V common mode).
ADC/134	16	0.25	25 k	6.25 k	Fixed 0.1, 1 or 10	0 - ±5.1V, 15 mA/ch	•			•					Full, half, quarter-bridge strain gages. Excitation buffer per channel.
ADC/135	12	0.03	25 k	6.25 k	Variable 1, 2, 4, 8, 16, 32, 64, 128	0 - ±5.1V, 30 mA/ch	•			•		•	•		Eight programmable bipolar excitation outputs.
ADC/136	8	0.02 (max)	50 k	12.5 k	Variable 1, 2, 4, 8, 16, 32, 64, 128	0 - 10.2V 30 mA/ch	•	•	•	•	•	•	•		Flexible input configuration – full or half bridge, ICP, PT100 and thermocouple. Programmable input range, balance current, classic shunt and current or voltage excitation per channel. Accuracy varies on configuration.
CDC/002	24	1*3	17.5 k	1.1 k	n/a	n/a		•							Differential-ended current channels.
CDC/101	4	0.4	24 k	300	Variable 1, 10	n/a					•				Piezoelectric accelerometers. 300 Hz and 3 kHz variants available.
LDC/101	4	1.25	24k	6 k	n/a	3Vrms 25 mA/ch						•			LVDT and RVDT sensors. Excitation frequency options available: 2.5 kHz, 5 kHz and 10 kHz.
MDC/002	2x64 +2	0.25	195	n/a	Variable 1, 2, 4	0.5 or 2.5 mA							•		Scanivalve analog pressure scanner interface with temperature compensation sensor. Gain is fixed for the 2 mux input channels and 2 PT100/PT500 inputs.
MDC/103	2x64 +2	0.25	312.5	n/a	Variable 1, 2, 4	5V (50 mA) or 12V (120 mA)							•		Interfacing to Esterline analogue pressure scanners with temperature compensation sensor.
SDC/101	2	5 min of arc	25 k	n/a	n/a	n/a						•			Synchro sensors. Measures angle and angular velocity.
TDC/102	15 +1 ref	0.04	512	250	Fixed	n/a									Thermocouples (K, B, J, E, R, S, T, T99).
TDC/107	12	0.23	8	70	Fixed	n/a				•					Thermocouples (K-type). High accuracy with reference compensation.

Acra KAM-500 Module Selection Guide

Bus Monitors

KAD/ABM/101	ARINC-429 bus monitor snarfer/parser – 8 ch
KAD/ABM/103	ARINC-429 bus monitor parser/packetizer – 24 ch
KAD/ARI/002	ARINC-429 transmitter – 1 ch
KAD/ARI/103	ARINC-573 bus monitor parser – 1 ch
KAD/ARR/101	AFDX redundancy remover – 1 ch
KAD/CBM/101	CCDL bus monitor parser – 4 ch
KAD/CBM/103	CCDL/MCDL bus monitor parser – 4 ch
KAD/CBM/104	CSDB bus monitor parser – 4 ch
KAD/CBM/107	CAN bus monitor parser/packetizer – 4 ch
KAD/EBM/101	Ethernet bus monitor parser – 1 ch
KAD/EBM/102	Gigabit Ethernet bus monitor parser – 1 ch
KAD/EBM/103	ARINC-429 on AFDX bus monitor parser -1 ch
KAD/FBM/102	Firewire bus monitor parser – 1 ch
KAD/FBM/103	Firewire S200b bus monitor parser – 1 ch
KAD/FBM/105	Multi-rate FireWire bus monitor parser – 1 ch
KAD/HBM/102	G1000 HSDB bus monitor parser – 1 ch
KAD/MBM/101	Dual redundant MIL-STD-1553 bus monitor parser/packetizer – 1 ch
KAD/MBM/102	MIL-STD-1553 bus monitor parser/packetizer – 4 ch dual redundant
KAD/MSB/103	MIL-STD-1553 bus monitor parser – 1 ch dual redundant
KAD/PBM/001	Panavia bus monitor parser – 8 ch
KAD/PBM/104	IRIG-106 PCM bus packetizer – 4 ch
KAD/SDI/103	Serial data bus monitor parser – 1 ch
KAD/TBM/101	TTP bus monitor parser/packetizer – 1 ch dual redundant
KAD/UAR/102	RS-232/422/485 bus monitor snarfer/parser – 4 ch
KAD/UAT/101	RS-232/422 asynchronous transmitter – 8 ch
KAD/UBM/101	RS-422/485 serial bus packetizer – 8 ch
KAD/UBM/103	RS-232, RS-422 or RS-485 serial bus parser/packetizer – 16 ch
KAD/UBM/104	ABI/ACE-CCDL/ACB serial bus monitor parser/packetizer – 8 ch
KAM/SBM/101	EFABus Express/STANAG 3910 bus monitor parser – 1 ch dual redundant

Digital

KAD/DSI/102	Discrete input (counters, time tagging) – 24 ch
KAD/DSI/104	Bi-level optically isolated input (counters, time tagging) – 24 ch

Backplane Controllers

KAD/BCU/101	IRIG-106 backplane controller and encoder
KAD/BCU/140	Ethernet backplane controller - iNET-X compatible
KAD/BCU/145	Ethernet backplane controller - IENA/iNET-X compatible, PTPv1 client/Grandmaster, PTPv2 client, dual Ethernet output

Other Modules

KAD/BIT/101	Built-in self test module
KAD/BIT/102	Built-in self test for networked FTI
KAD/ENC/106	IRIG-106 PCM encoder with PMF output
KAD/ETH/101	Data acquisition and programming over Ethernet – 2 ch
KAD/ETH/102	iNET-X, 2.5 Msps, DA and programming over Ethernet – 2 ch
KAD/MAT/101	Microcontroller-based data processing module
KAD/MEM/004	CompactFlash, data extraction via Ethernet
KAM/MEM/103	CompactFlash memory
KAD/SWI/107	Ethernet tap module - 4 port
KAD/SWI/108	Ethernet switch (Xbar) - 4 port
KAM/TCG/105	Time-code generator with GPS/IRIG input and battery backup
KAD/VDC/001	CVSD voice to digital converter – 2 ch
KAD/VID/106	H.264 video encoder – 1 ch

“We looked at three other vendors but only Curtiss-Wright were prepared to do the system the way we wanted it - as opposed to taking what they had.”

Flight Test Instrumentation Engineer
Embraer





ETHERNET RECORDER



NETWORK ATTACHED STORAGE

Recorders

Curtiss-Wright manufactures rugged, compact recorders that utilize removable COTS solid state media. The range features dedicated data recorders and recorders with integrated data acquisition capabilities.

- Integrated Ethernet recording
- Discrete I/O and Ethernet remote control

NET-500 range

The NET-500 recorder range consists of stand-alone Ethernet recorders that store data to COTS removable CompactFlash or Solid State Drive (SSD) media. They support 100/1000Base-T recording, utilize IRIG/GPS/IEEE 1588 PTP time synchronization and are live on power-up. A PC identifies the media as a FAT32 drive so that the data is instantly accessible with no need for proprietary hardware or software and data files are recorded in the popular open PCAP (packet capture) format.

Features

- Streamlined data buffering techniques protect data from power outages
- Display panel indicates the memory and recording status

Chassis	DZUS Rail	Storage	Dimensions (H x L x W)	Ethernet Speed
NET/REC/001	2	CF	2.24 x 2.75 x 4.9" 57 x 70 x 127 mm	100Base-T
NET/REC/002	3	SSD	2.8 x 6.4 4.9" 71 x 163 x 127 mm	100Base-T
NET/REC/011	N/A	SSD	1.5 x 2.75 x 4.75" 38 x 70 x 116 mm	100Base-T

Network Attached Storage (NAS)

Curtiss-Wright encrypted Network Attached Storage (NAS) products are rugged storage subsystems utilizing solid state media for a wide range of aerospace applications. These rugged NAS file servers were specifically designed to provide file services to clients on an Ethernet network. They offer data encryption and sanitization options including 256-bit AES data encryption certified to FIPS 140-2 and an option for NSA Type 1 to keep your information secure.

Features

- Support NFS, CIFS, FTP, HTTP, PXE and PCAP (DTS option only)
- Convection cooled

Product	Form Factor	Interface	Capacity (max)	Encryption	Ruggedization
CNS FIPS	1/2 ATR short	4x 1 GbE, RS-232	4 TB	256-bit AES, FIPS 140-2 validated	-40 to 71°C
CNS Type 1	1/2 ATR short	2x 1 GbE, RS-232, CIK interface	2 TB	NSA type 1 secret and below	-40 to 71°C
DTS	DZUS panel mount	4x 1 GbE, RS-232	3 TB	256-bit AES encryption option	-40 to 55°C (71°C for 30 min)
CNS4	1 ATR 10 x 7.62 x 12.5" 256 x 194 x 318 mm	4 x 1 GbE, RS-232	8 TB	256-bit AES or secret and below encryption	-40 to 55°C (71°C intermittent operation)

Recorders with Data Acquisition

The SSR-500 family is a rugged range of multi-role recorders with integrated data acquisition to cater for diverse application requirements. Based on open standards, these network native recorders allow immediate access to your data. They leverage the investment in Curtiss-Wrights' data acquisition range by utilizing the same modules to provide a comprehensive range of interface support. Aperiodic data is recorded only when there is activity on an asynchronous bus, resulting in efficient file storage.

- Proven, extensive range of data acquisition modules
- Integrated Ethernet recording
- Built-in audio encoding and GPS receiver
- Ethernet output for real-time data monitoring



SSR-500 Chassis

Chassis	User Slots	DZUS Rail	Storage	Dimensions (H x L x W)	Ethernet Speed
SSR/CHS/001	4	4	CF	3.34 x 5.67 x 4.9" 85 x 144 x 127 mm	100BaseT
SSR/CHS/002	4	5	SSD	4.45 x 6.39 x 4.9" 113 x 162.4 x 127 mm	100BaseT

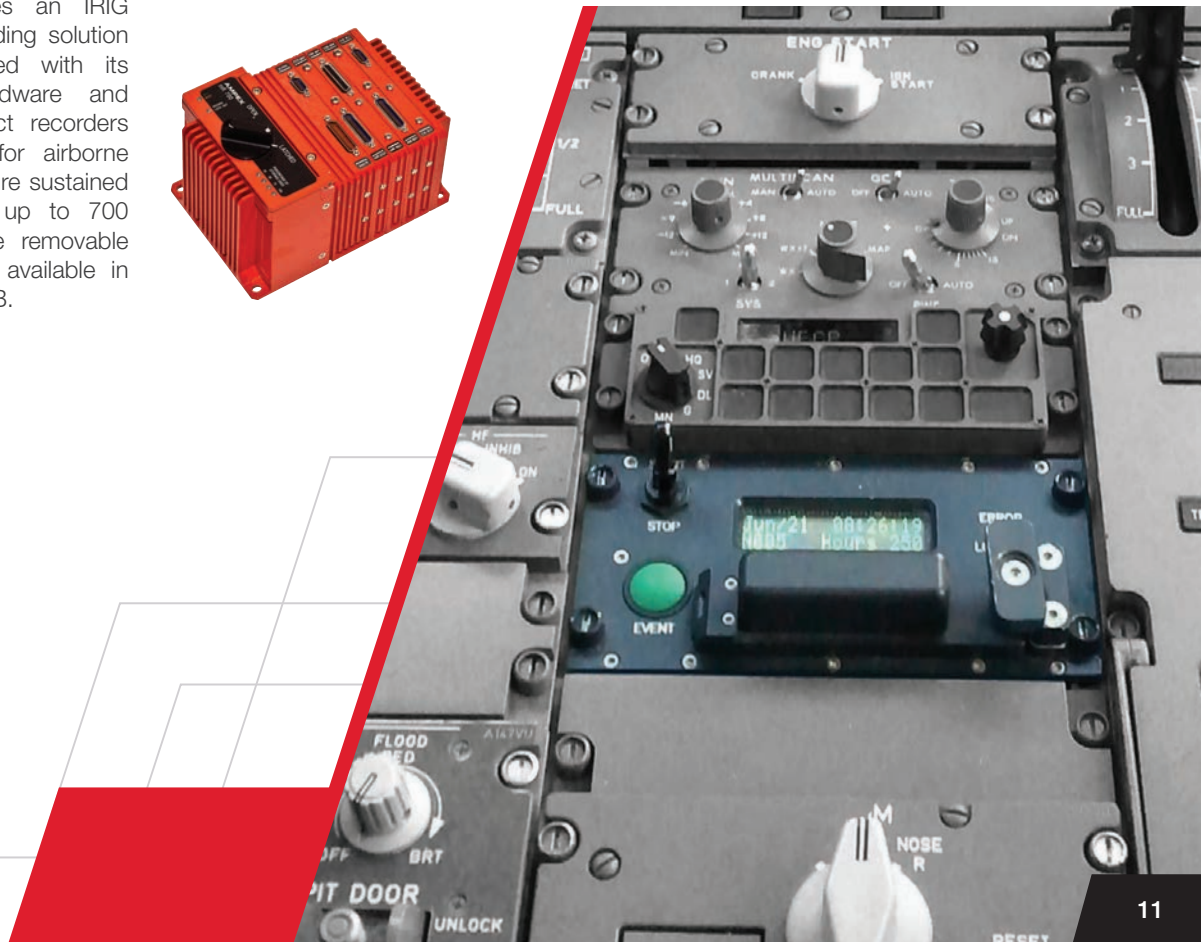
Crash Protected Recorder Family

Curtiss-Wright manufactures compact and light crash protected recorders that have the capability to acquire and store data from a number of sources. These multi-purpose flight data recorders are ideal for applications requiring a combined fully qualified and approved flight data recorder, cockpit voice recorder and data acquisition system.



Chapter 10 Recorders

Curtiss-Wright provides an IRIG 106 Chapter 10 recording solution that is fully integrated with its data acquisition hardware and software. The compact recorders are fully ruggedized for airborne environments and feature sustained data recording rates up to 700 Mbps. Hot swappable removable memory modules are available in sizes from 14 to 448 GB.





ETHERNET SWITCH



SWITCH MODULE

Ethernet Switches

Curtiss-Wright FTI network switch products are specifically designed for the unique requirements of airborne networks. They are deterministic, reliable and fast due to their hardwired switching design which eliminates packet loss in properly designed networks.

The switches have a rugged compact form to survive the extreme conditions of the aerospace environment and feature live at power-up functionality that eliminates boot-up delays and minimizes data loss from power outages. An Xbar architecture facilitates flexible forwarding (e.g. to send data to multiple destinations for real-time monitoring, recording and transmission). Configurable per port filtering available on some models enables highly customized filtering of traffic to end nodes based on attributes such as payload content.

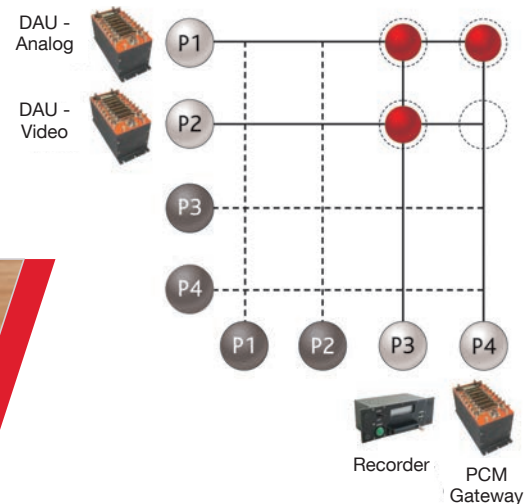
Curtiss-Wright also uses standard networking protocols such as the Simple Network Management Protocol (SNMP), IEEE 1588 PTP, Unicast Datagram Protocol (UDP) and the Trivial File Transfer Protocol (TFTP). Selected Ethernet switches have embedded IEEE 1588v1 and 1588v2 PTP Grandmasters which support the use of a GPS input, a digital IRIG-B input, an analog IRIG-B input, or the internal free-running clock to provide the time source. Bridging between PTP v1 and v2 domains is supported using a boundary clock meaning our switches can work with both PTP v1 and v2 devices in a network.

Switch	Ports	Ethernet Speed	Xbar Forwarding	Tap	Filtering	Grandmaster	Form Factor
NET/SWI/101*	8	10/100/1000	Y	Y	Y	Y	LRU
NET/SWI/005	16	10/100/1000	Y	Y	Y	Y	LRU
KAD/SWI/107	4	10/100	N	Y	—	—	Module
KAD/SWI/108	4	10/100	Y	1-2	Y	—	Module

* Compatible with, and can bridge between, PTP v1 and v2

“Thanks to our Curtiss-Wright teammates for helping us launch AV-1 into the Ethernet!”

Flight Test IPT Lead
Northrop Grumman



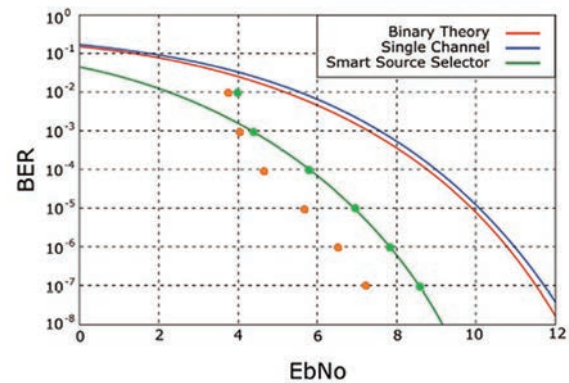
Ground Stations

Curtiss-Wright provides sophisticated ground station boards and systems based on cutting edge bit synchronizer, Smart Source Selector (SSS) and decommutator technology. The resulting systems significantly improve signal reception, reduce the number of dropped frames and increase data throughput. Combined with our SSS technology, a dual-channel ground station system using diverse receivers can achieve a possible BER of 3 dB better than theory for a single receiver. Three or more channel SSS are ideal for adding coverage to blind spots found, for example, around buildings or on runways. These can also be used to further enhance the reception when combined with other channels. This innovative SSS technology also supports the use of encrypted data.

The telemetry ground stations offer an end-to-end solution from receiver to processed data with tightly integrated hardware and software that has a host of features that allow displays, data and analysis techniques to be built, tested and saved with little effort at any time before or during the mission.

System	
GTS/SYS/005	GTS-500 telemetry ground station system with receivers, dual channel Smart Source Selector, PCM decom, GPS/IRIG time reference, GS Studio 3 and GS Works 7
GTS-500 PCI Boards	
GTS/BSC/003	20 Mbps bit synchronizer
GTS/BSC/004	Dual channel 20 Mbps Smart Source Selector
GTS/BSC/005	Dual channel 20 Mbps bit synchronizer
GTS/BSC/006	Tri channel 20 Mbps bit synchronizer
GTS/DEC/003	20 Mbps bit synchronizer and PCM decom
GTS/DEC/004	Dual channel 20 Mbps Smart Source Selector and PCM decom
GTS/DEC/005	Dual channel 20 Mbps bit synchronizer and PCM decom
GTS/DEC/006	Tri channel 20 Mbps bit synchronizer and PCM decom
GTS/FSC/003	20 Mbps PCM decom
GTS/FSC/005	Dual channel 20 Mbps PCM decom
Other Boards	
GTS/RCV/001/PBE	14 Mbps S-band receiver with 12 IF filters
GTS/RCV/001/PBL	14 Mbps L-band receiver with 12 IF filters
Accessories	
GTS/BAY/001	Desktop PC 5.25 inch DRE/SSD/001 harness
SAM/DEC/008	USB Type II IRIG-106 compatible PCM decom

A dual-channel SSS can yield a BER of 3 dB better than theory for a single receiver



2 channel Smart Source Selector 4 Mbps NRZL (measured) ●
3 channel Smart Source Selector 4 Mbps NRZL (measured) ●





Display and Analysis Software

DAS Studio 3 Setup and Management Software

DAS Studio 3 setup and management software has been developed using feedback from decades of support experience in the data acquisition community. It has been designed to save time in entering, reviewing and validating setup information and to ensure that instrumentation is correctly configured. Automated tools and wizards allow users to quickly and easily perform traditionally time consuming tasks such as hardware discovery, building frames, balancing bridges and carrying out pre-flight checks.

The software is optimized for multi-core platforms with a multi-threaded architecture and parallel processing. High performance means that system validation and programming occurs in minutes or even seconds. The user interface is simple and easy to learn with data rich tables and a consistent look that cuts through the complexity of configuring a data acquisition system.

Features

- Simple and intuitive interface
- Built in wizards and tools make time consuming tasks quick and easy
- Optimized for rapid system setup and programming
- Supports massive systems with 100,000s of parameters
- Validates software configuration according to hardware specifications and catches and clearly displays errors early
- Supports open XML format (XidML) to allow simple integration of third party equipment
- Library function to re-use proven configurations
- Change thousands of settings simultaneously



“Curtiss-Wright’s support of XidML has allowed us to improve the efficiency of our flight test programs.”

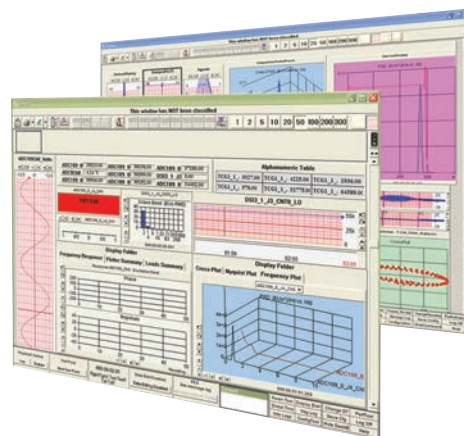
XidML



GS Works

GS Works is the real-time and post-test display and analysis software suite (powered by Symvionics IADS® technology) that has been designed from the ground up to meet the needs of the flight test community. Customers are assured of quality data as it is tightly integrated with Curtiss-Wrights data acquisition and ground station systems. It utilizes multi core capabilities with a multi-threaded architecture for maximum efficiency and is scalable from a laptop to a large workgroup through its Client/Server software architecture.

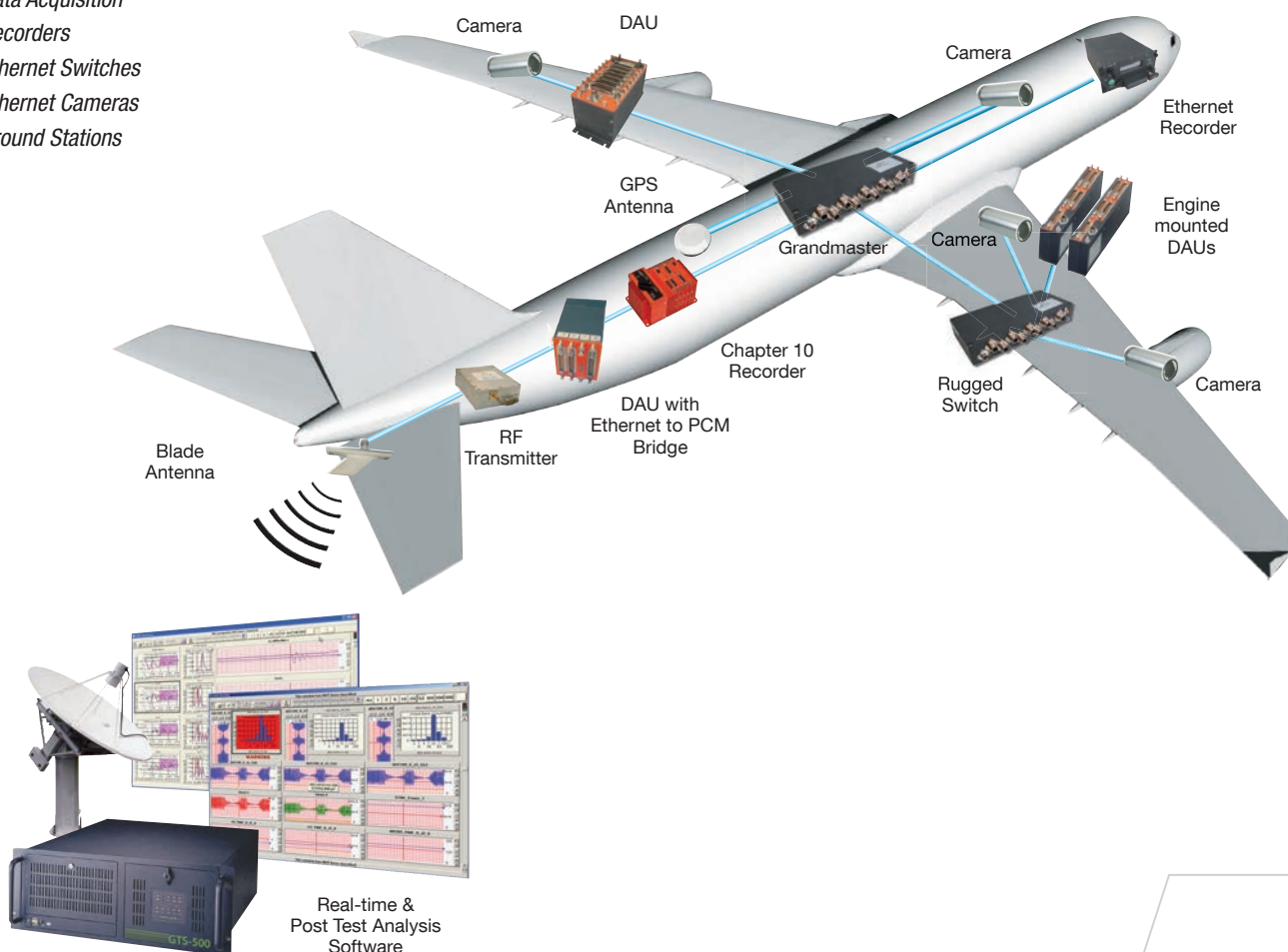
Every data point is cached to disk allowing immediate scroll back through the time history – no data is ever lost, it continues to be stored in real-time and can be instantly transferred to another analysis workstation. An interactive interface lets users create customized displays in seconds that can contain multiple windows arranged into different desktop groups and sent to multiple monitors via multi-port graphics processors or Ethernet.



Software & Accessories	
SWP/DAS/003	DAS Studio setup software for DAUs, network switches, recorders and ground stations
SWP/GSW/008	GS Works visualization and analysis software package - version 8

Reliable from Air to Ground

- / Data Acquisition
- / Recorders
- / Ethernet Switches
- / Ethernet Cameras
- / Ground Stations





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