

NanoS⁽²⁾

Airborne Data Acquisition Units



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NanoS Family

Modular data acquisition unit

The NanoS⁽²⁾ acquisition system is the new most efficient flight test Data Acquisition and recording system, with an ultra-compact design, and an ease of changing acquisition modules.

The NanoS provide modularity and permit to stack eight data acquisition modules by NanoS unit or twelve data acquisition module for NanoS2 unit. A unit is constituted by a CPU module with a recording capacity (8 to 512GB) or a CPU Controller module without storage function (See p.12) and a power supply module.

The NanoS(2) is a data acquisition concentrator completed with recording system combined in the same device. With this device you can make all in one modular and compact solution where other solutions require two separated unit. The major advantage of this device is you can complete or change totally the functionality of the device following instant or future requirements. This device can support a lot of varied type of acquisition modules for analog, digital data bus or video recording purpose.

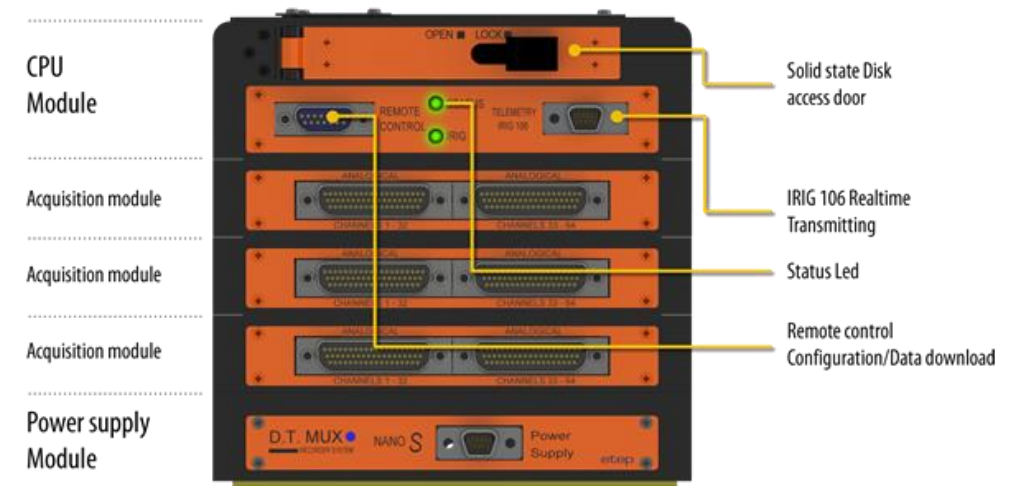
The NanoS⁽²⁾, CPU module

There is equipped with a reliable internal time code source/Irig B or it can be coupled in option with GPS time code. The unit is also equipped with solid state disk available from 8 to 512 GB capacity which directly record data in IRIG106 chapter 10 format. The flow rate of 500 Mbits/second by unit allowing to collect and record a large type of data like Full HD video, with another types acquisition modules in same time. You have also the possibility to make a connection with a remote control unit who can be supplied and download by Gigabyte Ethernet connection or by USB connection the data

acquired by the unit. The unit can be also Configured/Controlled by a remote control box or by a computer. An optional IRIG 106 chapter 4 telemetry output is also available in option, who permit to transmit all or a part (Selectable) of collected data in real time to a ground station or to a storage unit.

The NanoS, Power supply module

There is equipped with Ultra capacitor who protect system from power cut and preserves your data in critical condition (MIL STD704 E power interruption >50ms). The NanoS is declined in two versions (NanoS and NanoS2), depending of type of connector desired and your installation constraint. A large types of acquisition modules can be Stacked on the NanoS

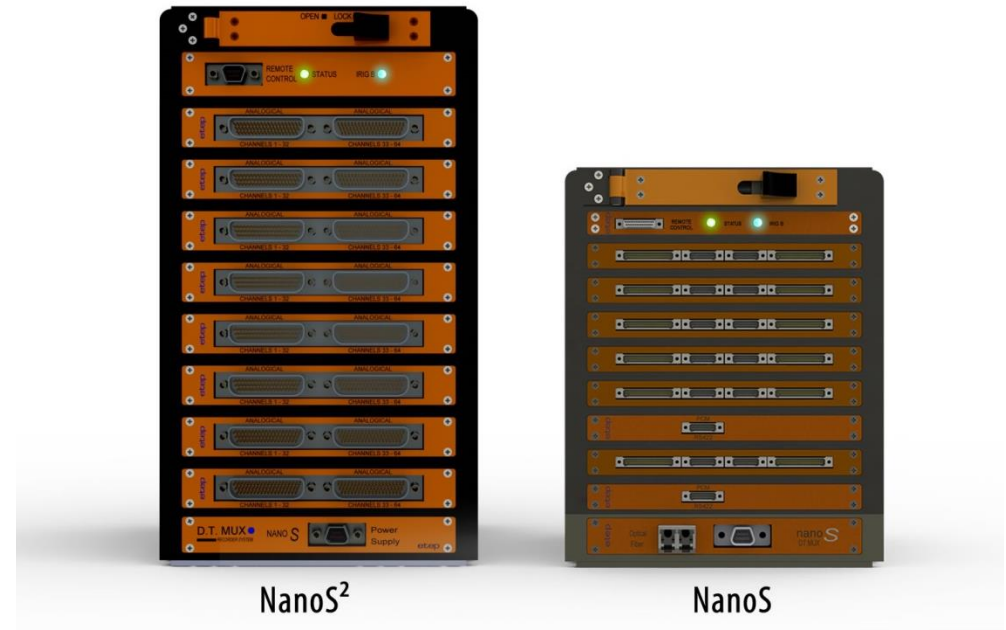


A NanoS2 unit with three data acquisition modules between CPU module and Power supply module

NanoS2

A different frame for the same performance, and better

NanoS range is available in another frame chassis call NanoS2, with the same performance and option but it cans up to 12 modules. The change in this version comes from the nature of connector used MICRO D (MIL-DLT-83513) instead of NANO D (MIL-DTL-32139). This structure is recommended when you have not restriction about a minimal space for your installation.



NanoS2 and NanoS with 8 modules

NanoS – Technical specifications

Size

NanoS with 1 user module (D x W x H)

110 mm x 112 mm x 56 mm

NanoS with 2 users module (D x W x H)

110 mm x 112 mm x 68 mm

NanoS with 3 users module (D x W x H)

110 mm x 112 mm x 80 mm

NanoS with 4 users module (D x W x H)

110 mm x 112 mm x 92 mm

NanoS with 5 users module (D x W x H)

110 mm x 112 mm x 104 mm

NanoS with 6 users module (D x W x H)

110 mm x 112 mm x 116 mm

NanoS with 7 users module (D x W x H)

110 mm x 112 mm x 128 mm

NanoS with 8 users module (D x W x H)

110 mm x 112 mm x 140 mm

Weight

About 1 Kg (With 2 users modules)

About 1.9 Kg (With 8 users modules)

Input Connector:

NANO D (MIL-DTL-32139)

Mounting

Bumper include

Power supply

28Volts DC (17 to 36V)

MIL STD704 E

Consumption: 12 watts nominal.

Ultra capacitor "to preserve recorder of power cuts (Power interruption >100ms).

Grounding:

Electronics electrically isolated of the primary 28 Volts supply. GND electronics is also isolated of the NanoS external box.

Cooling

By fan cooling (Default)

Or conduction cooling

Position of use

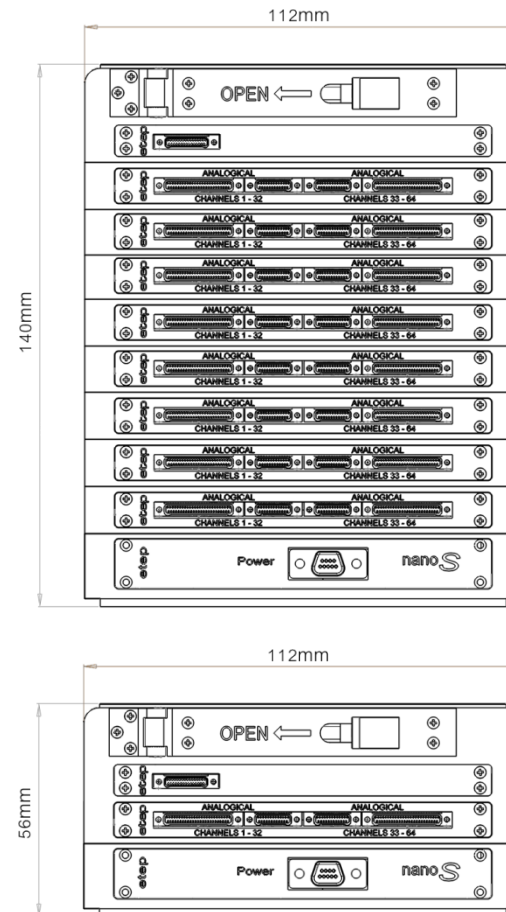
All positions

MTBF > 30 000 hours

MTTR < 30 minutes.

Transport

Delivered with a transport suitcase equipped to receive the DTMUX NanoS and accessories.



NanoS2 – Technical specifications

Size

With support plate (No bumpers)

NanoS with 1 user module (D x W x H)

110mm x 112mm x 78.3mm

NanoS with 2 users module (D x W x H)

110mm x 112mm x 96.3mm

NanoS with 3 users module (D x W x H)

110mm x 112mm x 114.3mm

NanoS with 4 users module (D x W x H)

110mm x 112mm x 132.3mm

NanoS with 5 users module (D x W x H)

110mm x 112mm x 150.3mm

NanoS with 6 users module (D x W x H)

110mm x 112mm x 168.3 mm

NanoS with 7 users module (D x W x H)

110mm x 112mm x 186.3 mm

NanoS with 8 users module (D x W x H)

110mm x 112mm x 204.3mm

NanoS with 9 users module (D x W x H)

110mm x 112mm x 222.3 mm

NanoS with 10 users module (D x W x H)

110mm x 112mm x 240.3 mm

NanoS with 11 users module (D x W x H)

110mm x 112mm x 258.3 mm

NanoS with 12 users module (D x W x H)

110mm x 112mm x 276.3 mm

Input Connector

MICRO D (MIL-DLT-83513)

Weight (with MOUNTKIT-S2)

About 1.5 Kg (With 2 users modules)

About 1.8 Kg (With 3 users modules)

About 2 Kg (With 4 users modules)

About 2.2 Kg (With 5 users modules)

About 2.4 Kg (With 6 users modules)

About 2.6 Kg (With 7 users modules)

About 2.8 Kg (With 7 users modules)

About 3 Kg (With 8 users modules)

Power supply

28Volts DC (17 to 36V)

MIL STD704 E

Consumption: 12 watts nominal.

Ultra capacitor "to preserve recorder of power cuts (power interruption >100ms).

Grounding

Electronics electrically isolated of the primary 28 Volts supply. GND electronics is also isolated of the NanoS2 external box.

Cooling

By fan cooling (Default)

Or conduction cooling

Position of use

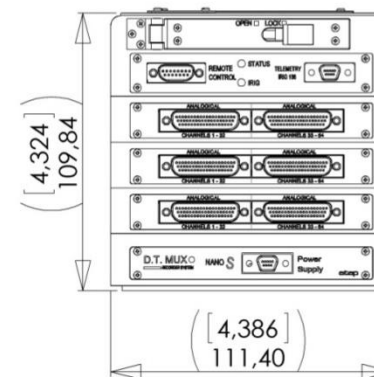
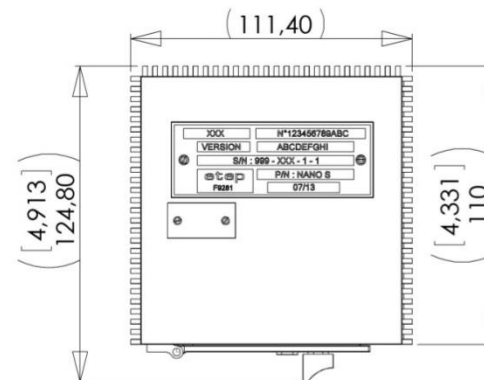
All positions

Mounting

Bumper include

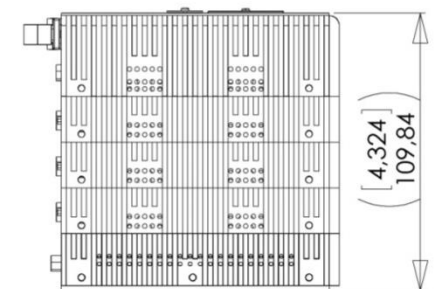
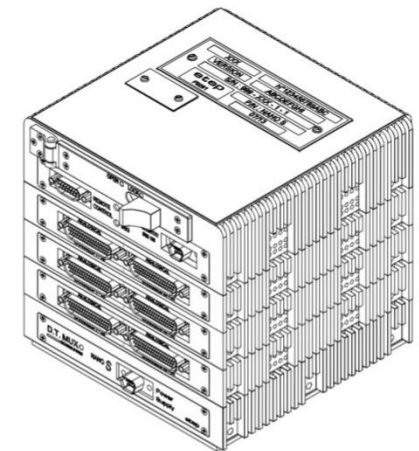
MTBF > 30 000 hours

MTTR < 30 minutes.



Transport

Delivered with a transport suitcase equipped to receive the DTMUX NanoS2 and accessories.



Example of NanoS2 with 3 user's modules [Inch] mm

Environmental Characteristics

NanoS & NanoS2 and modules associated

Vibration

MIL STD 810F/ RTCA/DO-160E
0.04 g² of 5 to 1000 Hz,
1 hour per axis (3 axis)

Accelerations:

MIL STD 810F/ method 513.5
Procedure I & II
10g (6 axis)

Shocks

MIL STD 810F
100 g, 11ms (6 axis) in functioning
Method 516.3

Operating Temperature

-40°C to +71°C.

Extreme of temperature

-55°C to 85°C [no destructive]
Test MIL STD 810F

Humidity in use

5% to 95 % without condensation
MIL STD 810F

Electromagnetic compatibility (EMI)

MIL STD 461 Rev. E(20/08/1999)
MIL STD 461 Rev. F (10/12/2007)
MIL-STD-464 Rev C (01/12/2010)

Altitude and decompression

Min: -1500 feet, max: 60,000 feet
With 12.000 feet/minute
(420 Kpa/minute), MIL STD 810F.

Altitude max. Storage

No limit

Storage temperature

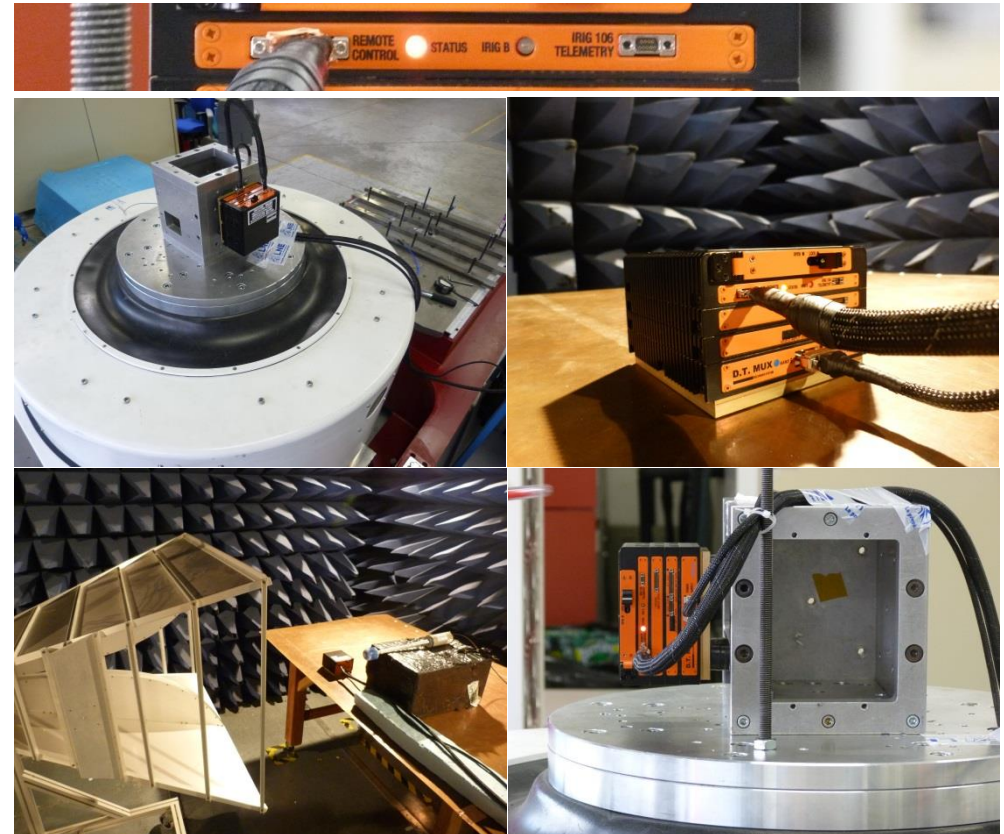
-55°C to +90°C

Humidity in storage

5% to 95 % without condensation
MIL STD 810F

Aircraft Electrical Power

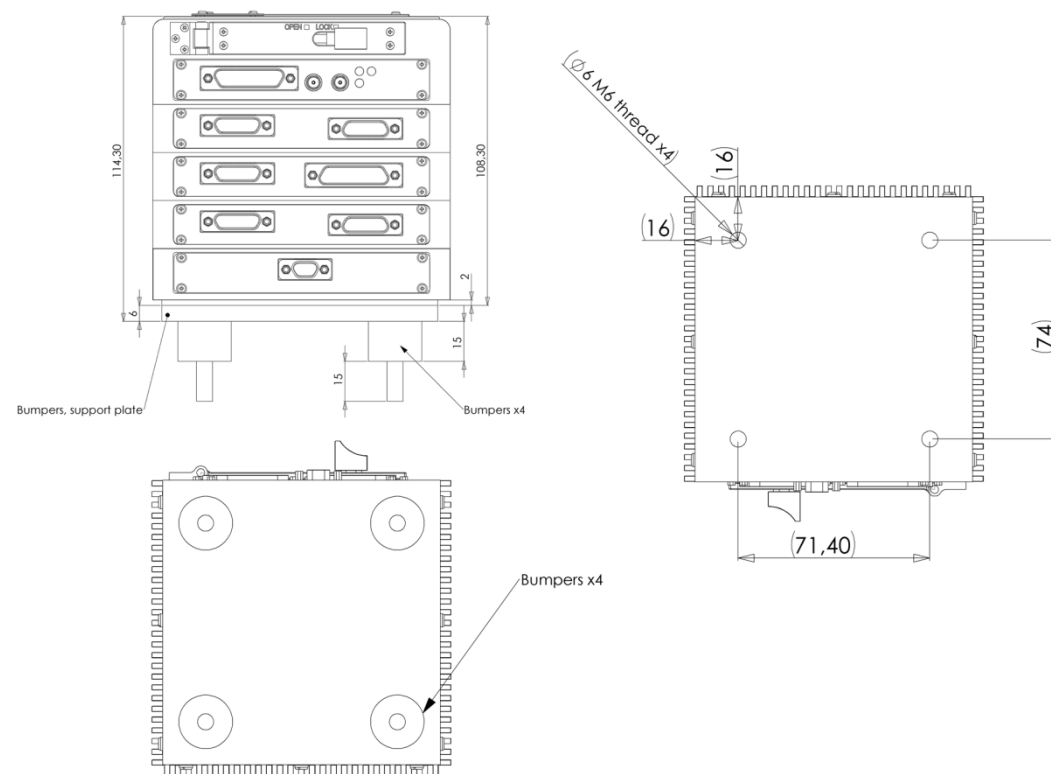
MIL-STD-704 Rev. F
Power down 100 millisecond



Some view of NanoS under Vibration and Electromagnetic test

Fixation

The NanoS⁽²⁾ unit is supplied with four bumpers who permit to fix the unit on a support plate inside the aircraft. The installation of bumper is recommended.



Fixation drawing (NanoS2 with 3 user's modules)

Dimensions are in **mm**

Chassis parts and Options list

Chassis Parts

	NanoS	NanoS2	Page
CPU Module	CPU-S	CPU-S2	9
CPU Module / 2x PCM Transmitting	CPU-2PCM-S	CPU-2PCM-S2	10
CPU Controller/ 2x PCM Transmitting	CONTROLLER-S	CONTROLLER-S2	10
PCM Stream module	PCMS-S	PCMS-S2	13
Power supply Module	POWER-S	POWER-S2	14
Ethernet Network coupling module	ETH-CONTROL-S	ETH-CONTROL-S2	15
Optical Network module switch	OPT-SWITCH-S	OPT-SWITCH-S2	18
Optical Network coupling module	OPT-SERIALNET-S	OPT-SERIALNET-S2	16

Memory Cartridge

	NanoS	NanoS2	Page
Solid State Disk 8GB	SSD-8GB	SSD-8GB	13
Solid State Disk 16GB	SSD-16GB	SSD-16GB	13
Solid State Disk 32GB	SSD-32GB	SSD-32GB	13
Solid State Disk 64GB	SSD-64GB	SSD-64GB	13
Solid State Disk 128GB	SSD-128GB	SSD-128GB	13
Solid State Disk 256GB	SSD-256GB	SSD-256GB	13
Solid State Disk 512GB	SSD-512GB	SSD-512GB	13

Accessories

	Reference	Page
Sentinel - Crash Protected Memory Standard ED-155	CPM155-8GB/CPM155-16GB/ CPM155-32GB/CPM155-64GB	27
Sentinel - Crash Protected Memory Standard ED-112	CPM112-8GB/ CPM112-16GB / CPM112-32GB /CPM112-64GB	27
Remote control simple	RCS-SIMPLE	28
Remote control complete	RCC-COMplete	28
Ethernet 8-Port Switch 10/100/1000	ETH-SWITCH-8	
Ethernet 12-Port Switch 10/100/1000	ETH-SWITCH-12	

Chassis Parts

CPU Modules

NanoS Ref#	CPU-S
NanoS2 Ref#	CPU-S2

Recording Capacity

From 8 to 512 GB

Utility channels

2x RS232 ports: configuration and maintenance

1 x audio channel,

1 x time channel: Irig B

Discrete; ON/OFF and ON/OFF record

Tricolor outputs LED

1 Ethernet 10/100 UDP for Control unit/configuration/Download/Real time view (By Laptop or touchpad)

RS 232 Communication

Port for configuration: 2 stop bits, even parity, 8 bits, 38 400 Bauds.

Port for maintenance: 1 stop bit, no parity, 8 bits, 9 600 Bauds.

Discrete used to the Nano S functioning

Discrete; ON/OFF and ON/OFF record

Tricolor outputs LED

Outputs: 2 cathodes and anode for operating green, orange, red.

Intensity outputs for LED: 20 mA max.

Audio channel

Input: 1 volt efficient.

Band pass: 0 to 14.7 KHz.

Input impedance: 1 MΩ.



Time stamping

Internal Time/IRIG B Time [Direct Irig B source on SMA connector]

[Option] GPS Time [Direct Antenna on SMA connector]

[Option] IEEE 1588 – Ethernet Precision Time Protocol

Irigo B channel

Input: Sinus 1000 Hz, modulation level 1/3- 3/3.

Modulation: 8Volts P to P max

To 500m Volts P to P min.

If you lost the Irig B time, the time continues to progress on internal base time (flag: losing Irig B).

Ethernet 10/100/1000 UDP

Configuration and Download (download from SSD),

Real time data Stream with Universal Recorder System Software

Master/Slave(s) link

By Ethernet with IEEE 1588 Time (Precision Time Protocol)

For Master/Slave unit link (See p.19)

Input connector:

NanoS: NANO D (MIL-DTL-32139)

NanoS2 : MICRO D (MIL-DTL-83513)

Real-time Transmitting option

NanoS Ref#	CPU-2PCM-S
NanoS2 Ref#	CPU-2PCM-S2

This CPU include all function of basic CPU Module



NanoS CPU Unit with PCM option

This option encodes data from any modules of the NanoS⁽²⁾ in IRIG-106 Ch.4 PCM stream. This option is decline in two version one channel or two channels.



NanoS2 CPU Unit with PCM option include in Remote/control connector

This Option is also available on NanoS² device CPU module, which permits directly to transmit a part or total collected data in real time to a ground station by telemetry or on another recorder system. All parameters can be configured with simple software (LAB DTMUX Software) at ground or in flight.

Number of channels

1 or 2 independent

Irig 106 chapter 4 generator

Frequency's generated: from 100Khz to 20MHz
(Configurable)

TTL or RS 422 output

Data: 0-4 V, 50Ω in TTL
Clock: 0-4 V, 50Ω in TTL
On 15 pins

Analogic outputs Commutable by switches

Data: -0.5V +0.5V, 50Ω, -1V+1V, 50Ω, -2V+2V, 50Ω, -4V+4V, 50Ω,
Clock: -0.5V +0.5V, 50Ω -1V+1V, 50Ω, -2V+2V, 50Ω, -4V+4V 50 Ω

Frames description

Synchro word: 8 to 64 bits (8 to 32 for Ch. 4)
Word value: programmable
Size data words: 8 bits to 64 bits
Minor frame: up to 32 K words
(Ch. 4 limited to 1024 words and 16 384 bits)
Major frame: up to 250 K words

Parity word

On LSB or MSB (odd/even/none)
Odd/even/none

Type of PCM output programmable

ØL, NRZL, RNRZL

Programmable data filter output

20 MHz, 10 MHz, 5MHz, 2.5 MHz
and 1.25 MHz
By pass (without filter).

Programmable channels during the PCM transmission

All the channels are programmable to constitute the "PCM frames" that will be send.

Input connector:

NanoS : NANO D (MIL-DTL-32139)
NanoS2 : MICRO D (MIL-DLT-83513)

CPU Controller

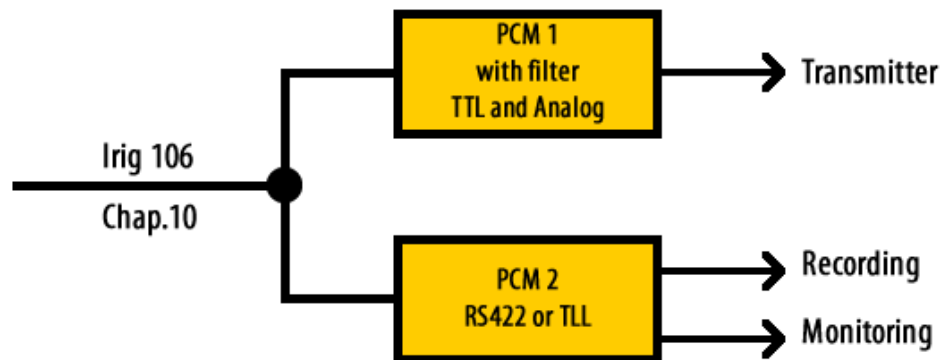
NanoS Ref#	CONTROLLER-S
NanoS2 Ref#	CONTROLLER-S2



NanoS2 PCM CPU Controller

This module meets the specifications of the CPU module and also the specification of PCM Real time transmitting option. It is used as a controller without disk storage.

Synoptic



Different PCM output

1 or 2

Irig 106 chapter 4 generator

Frequency's generated: 20 Mbps, 10 Mbps, 5 Mbps, 2.5 Mbps and 1.25 Mbps.

3x TTL or RS 422 outputs

Data: 0-4 V, 50Ω in TTL

Clock: 0-4 V, 50Ω in TTL

On 15 pins

1x Analogic output (For transmission)

Commutable by switches

Data: -0.5V +0.5V, 50Ω, -1V+1V, 50Ω, -2V+2V, 50Ω, -4V+4V,

Clock: -0.5V +0.5V, 50Ω -1V+1V, 50Ω, -2V+2V, 50Ω, -4V+4V 50 Ω

Frames description

Synchro word: 8 to 64 bits (8 to 32 for Ch. 4)

Word value: programmable

Size data words: 8 bits to 64 bits

Minor frame: up to 32 K words

(Ch. 4 limited to 1024 words and 16 384 bits)

Major frame: up to 250 K words

Parity word

On LSB or MSB (odd/even/none)

Odd/even/none

Type of PCM output programmable

BØL, NRZL, RNRZL

Programmable data filter output transmission

20 MHz, 10 MHz, 5MHz, 2.5 MHz

and 1.25 MHz

By pass (without filter).

Programmable channels during the PCM transmission

All the channels are programmable to constitute the "PCM frames" that will be send.

Input connector:

NanoS : NANO D (MIL-DTL-32139)

NanoS2 : MICRO D (MIL-DLT-83513)

Additional PCM Stream Module

NanoS Ref#	PCMS-S
NanoS2 Ref#	PCMS-S2



Number of channels

1 or 2

Irig 106 chapter 4 generator

Frequency's generated: 20 Mbps, 10 Mbps, 5 Mbps, 2.5 Mbps and 1.25 Mbps.

TTL or RS 422 output

Data: 0-4 V, 50Ω in TTL
Clock: 0-4 V, 50Ω in TTL
On 15 pins

Analogic outputs Commutable by switches

Data: -0.5V +0.5V, 50Ω, -1V+1V, 50Ω, -2V+2V, 50Ω, -4V+4V,
Clock: -0.5V +0.5V, 50Ω -1V+1V, 50Ω, -2V+2V, 50Ω, -4V+4V 50 Ω

Frames description

Synchro word: 8 to 64 bits (8 to 32 for Ch. 4)
Word value: programmable
Size data words: 8 bits to 64 bits
Minor frame: up to 32 K words
(Ch. 4 limited to 1024 words and 16 384 bits)
Major frame: up to 250 K words

Parity word

On LSB or MSB (odd/even/none)
Odd/even/none

Type of PCM output programmable

BØL, NRZL, RNRZL

Programmable data filter output

20 MHz, 10 MHz, 5MHz, 2.5 MHz
and 1.25 MHz
By pass (without filter).

Programmable channels during the PCM transmission

All the channels are programmable to constitute the "PCM frames" that will be send.

Input connector:

NanoS : NANO D (MIL-DTL-32139)
NanoS2 : MICRO D (MIL-DLT-83513)

Memory Cartridge

NanoS Ref# **SSDXX*-S**

NanoS2 Ref# **SSDXX*-S2**

**XX must be replaced by its size in GB*



The unit is also equipped with solid state disk, available from 8 to 512 GB capacity. This Memory unit is rugged and full qualified for harsh environment. This unit can be easily removed from unit and connected to a Windows based PC with USB 3.0 cable (supplied).

SSD/USB 3.0 Cable

For an easy and fast transfer of data recorded on a PC equipped with windows 7 or higher operating system, this cable is supplied along with the Solid State Disk memory unit. The high reliability of USB 3.0 with a max flow rate of 4.8Gbit/s permit quick transfer of data on your computer. This cable is also full compatible with USB 1.0 and USB 2.0 socket. The file can be directly downloaded from the SSD in Irig chapter 10 format or in DTMUX format following device configuration.



Flash type

Capacity

Sequential R/W (MB/sec, max.)

Max. Power consumption

Extra DRAM Buffer

ATA Security

Vibration

Shock

Storage Temperature

MTBF

Operation Temperature

Environmental standard

Replay

Security

SLC or MLC (Simple level Cell)

8GB to 512GB (*Proposed 32GB*)

90/90

2.8 W (5Vx560mA)

Supported

Supported

20G @7~2000Hz

1500G @0.5ms

-55°C~+95°C

4 million hours (SLC)

3 million hours (MLC)

Industrial Grade: -40°C~+85°C

MIL STD 810F

MIL STD 461E

On any Windows desktop (XP or higher) with simple USB cable (Supplied)

Password/ Encryption/Auto destruction can be available in option

Power supply Modules

NanoS Ref#	POWER-S
NanoS2 Ref#	POWER-S2

NanoS Power supply



Ref: POWER-S (picture)

The POWER-S can support **8 modules**

This power supply modules was constituted by two electrical circuits and is conform to MIL-STD-704F. One circuit DC-DC Converter card, and another one is Ultra capacitor circuit who protect NanoS⁽²⁾ installation from power interruption about >100 millisecond.

There is no battery and therefore no preventive maintenance, for power down protection. These modules are also able to be powered by battery if aircraft power is not available.

NanoS2 Power Supply



Ref: POWER-S2 (picture)

The POWER-S2 can support **12 modules**

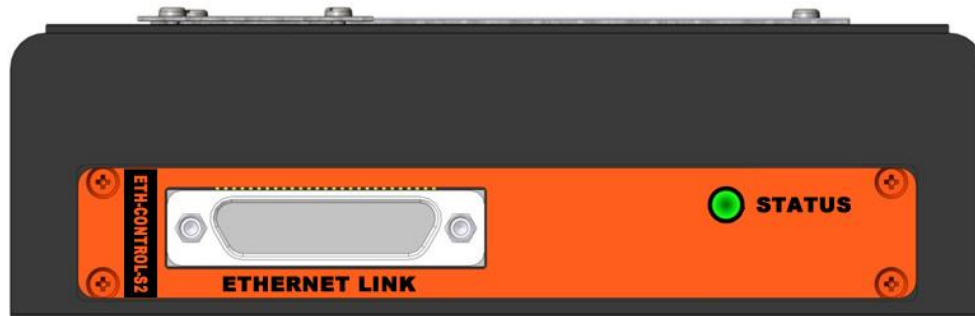
This power supply modules was constituted by two electrical circuits and is conform to MIL-STD-704F. One circuit DC-DC Converter card, and another one is Ultra capacitor circuit who protect NanoS2 installation from power interruption about >100 millisecond.

There is no battery and therefore no preventive maintenance, for power down protection. These modules are also able to be powered by battery if aircraft power is not available.

Ethernet Network coupling module

NanoS Ref# ETH-CONTROL-S

NanoS2 Ref# ETH-CONTROL-S2

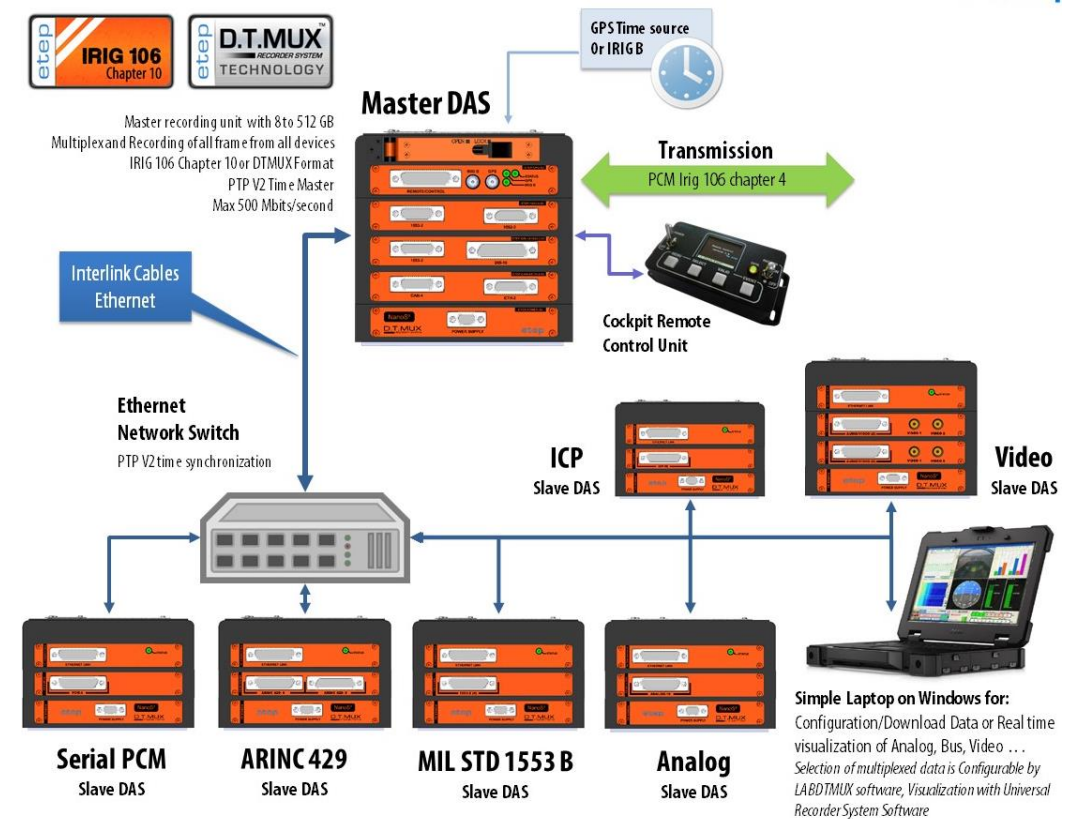


This Module is design for slave unit and permit to link master unit to a slave unit directly or to an Ethernet switch in case of multiple slaves units.

Based on this module you can distribute device in all parts of the aircraft, and interlink this ones from each other by Ethernet link.

The Diagram shown against is an example of configuration with 6 slaves units and a Master unit who transmit acquired parameters in real time in PCM chapter 4 data stream. The CPU module permit also by Ethernet to show in real time analog and video data acquired with a simple laptop with Universal Recorder System Software installed.

Example of an Ethernet Network Diagram



Fiber Network coupling module

NanoS Ref# OPT-SERIALNET-S

NanoS2 Ref# OPT-SERIALNET-S 2

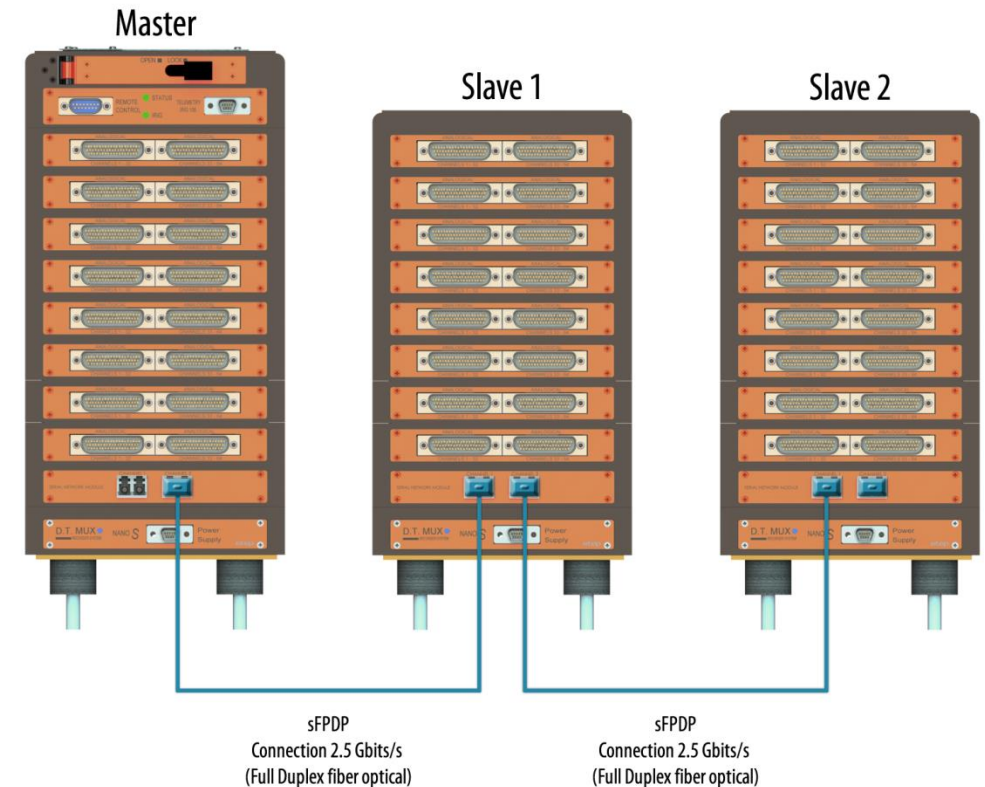


This module permits to link a NanoS⁽²⁾ slave unit to a master unit and also to make a link with another slave unit. This module can be use also to build a Serial network connection between one Master and another slave unit.

The coupling with other slave units is operated by a serial fiber optical link available on Serial coupling module. Total of 1000Mbps flow rate is available in this configuration, in a total synchronous mode. The maximum theoretical distance between units can up to 10 kilometers (6.2 mi). The advantage of slave unit(s), it's to capture others sensors parameters from another aircraft location and reducing the wiring.

CPU Module of master unit multiplex the data from other units placed in different place of the aircraft. Slave units are extension of the master unit assured by Manchester connection of 2.5 Gbits/s (Full Duplex fiber optical), who assure a total synchronous acquisition, between units.

Serial coupling Diagram



This synoptic represent a serial connection between one NanoS master unit and other slave units

Fiber Network Switch module

NanoS Ref# OPT-SWITCH-S

NanoS2 Ref# OPT-SWITCH-S 2



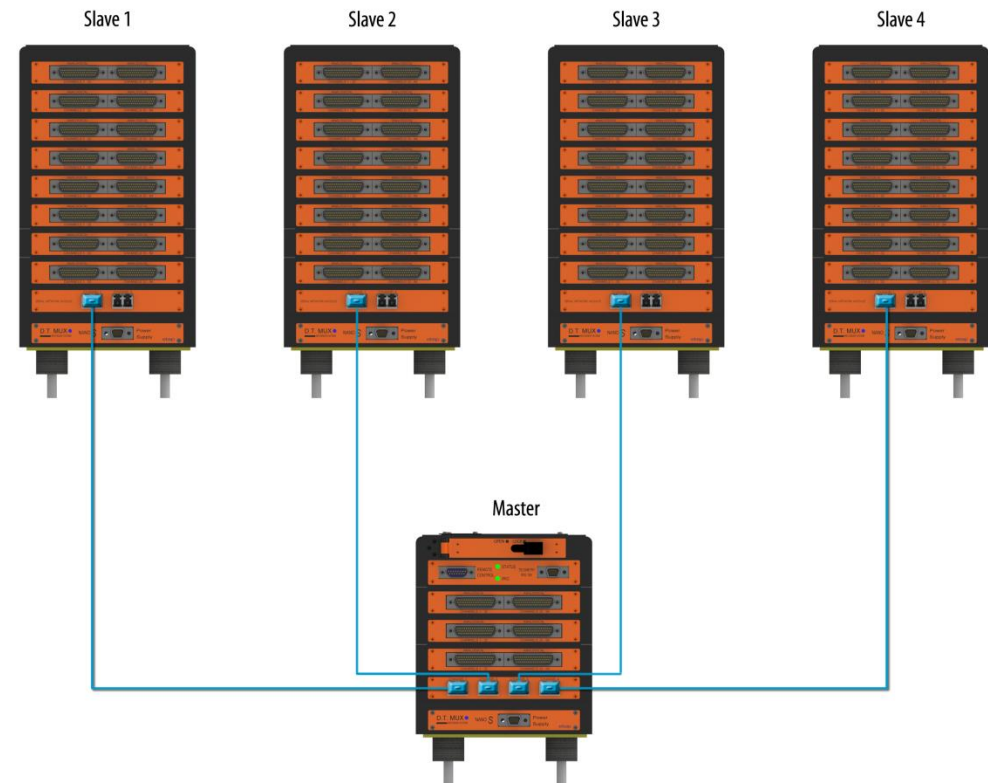
This module has been developed for start network use.

It allows to connect Four slave NanoS⁽²⁾ units to a master unit or link a slave unit to another slave units.

Network with other slave units is operated by serial fiber optical link present on Switch module. Total of 1000Mbps flow rate is available in this configuration, in a total synchronous mode. The maximum theoretical distance between units can up to 10 kilometers (6.2 mi). The advantage of slave unit(s), it's to capture others sensors parameters from another aircraft location and reducing the wiring.

CPU Module of master unit multiplex the data from other units placed in different place of the aircraft. Slave units are extension of the master unit assured by Manchester connection of 2.5 Gbits/s (Full Duplex fiber optical), who assure a total synchronous acquisition, between units.

Star Network synoptic



Network connections

Overview

Two technological ways are possible to connect master unit to other slave units.
The Ethernet protocol way and the Fiber optical way

Ethernet Connection

This way permit to connect Master/Slave(s) units by an Ethernet connection.
This solution requires a CPU/Controller module for each Master or Slave NanoS⁽²⁾ units. Each unit can be configured like a Master or slave. The time precision between units is assured by IEEE 1588 Standard protocol (Precision Time Protocol).

Advantage of Ethernet

- Each unit can be a stand-alone controller and a system manager (CPU/Controller present)
- You can use existing Ethernet network
- Common protocol

Fiber connection

The coupling with other slave units is operated by fiber optical link available on Switch module (See p.18) or on Serial coupling module (See p.16). Total of 1000Mbps flow rate is available in this configuration, in a total synchronous mode. The advantage of slave unit(s), it's to capture others sensors parameters from another aircraft location and reducing the wiring.

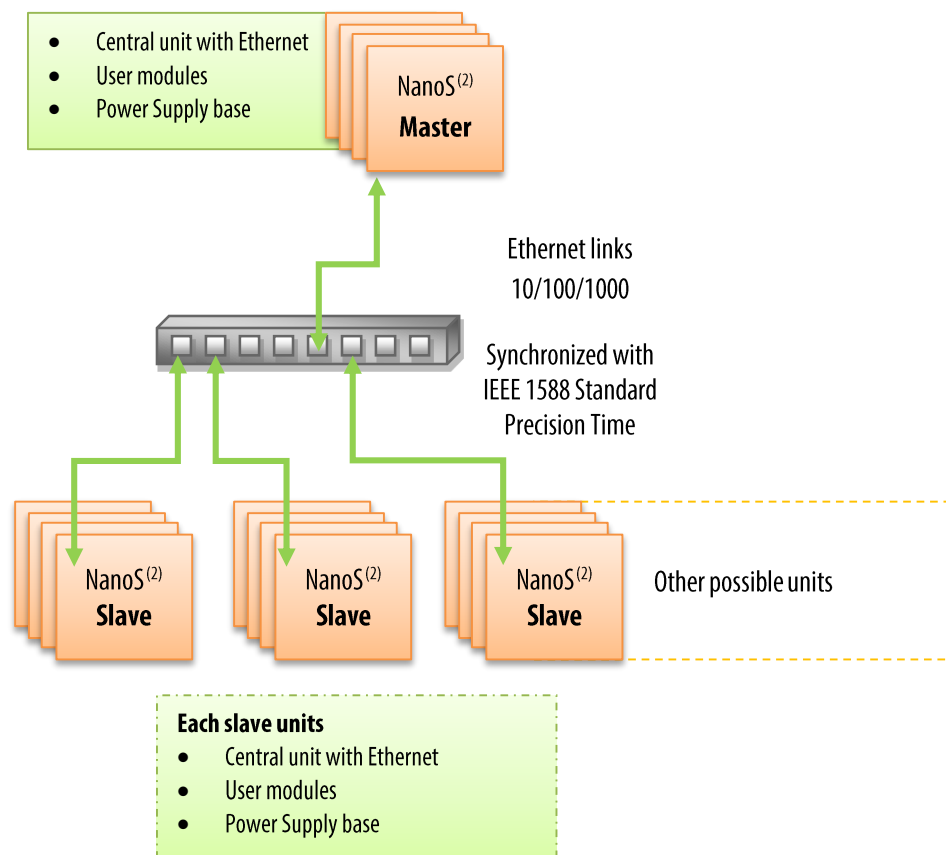
CPU Module of master unit multiplex the data from other units placed in different place of the aircraft. Slave units are extension of the master unit assured by Manchester connection of 2.5 Gbits/s (Full Duplex fiber optical), who assure a total synchronous acquisition, between units.

Advantage of Optical Fiber

- Deterministic flow rate until One gigabytes sustained between modules (Until 100 meters)
- Time accuracy about 100x better than Ethernet based link technology
- Only one CPU/Controller needed
- Not effected by Electromagnetic disturbance
- Confidentiality assured (Optical signal)
- Lower cost solution

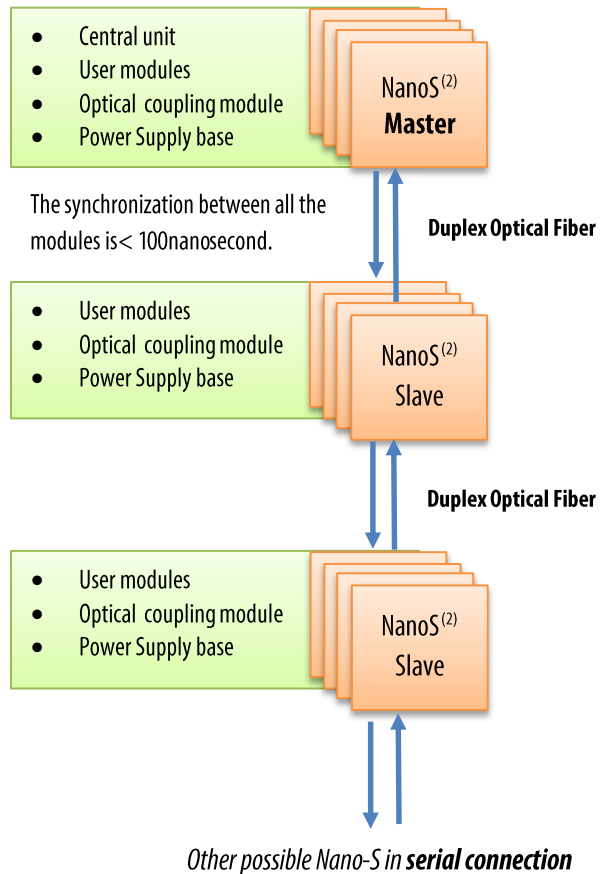
Ethernet Star Network

This case is the possible connection of Start Networks of NanoS⁽²⁾ with Ethernet connection operated between the CPU/Controller Module of each unit. Each unit can be configured to be a Master or Slave unit. The Time synchronization between units is assured by IEEE 1588 Standard Precision Time Protocol.

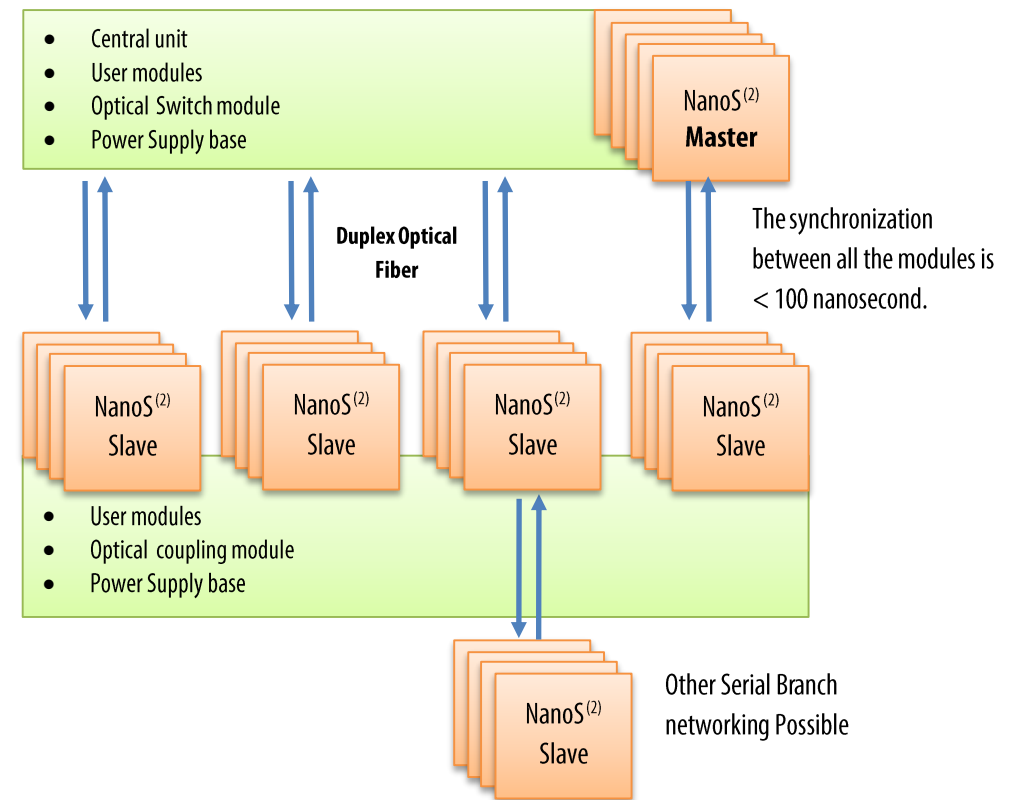


Optical serial network

This case is the possible connection of a serial Networks of NanoS⁽²⁾ (Modular flight test recorder) with a fiber optical module. This architecture provides a flow rate of 1000Mbps using a duplex optical fiber. (There is no theoretical connection limit)



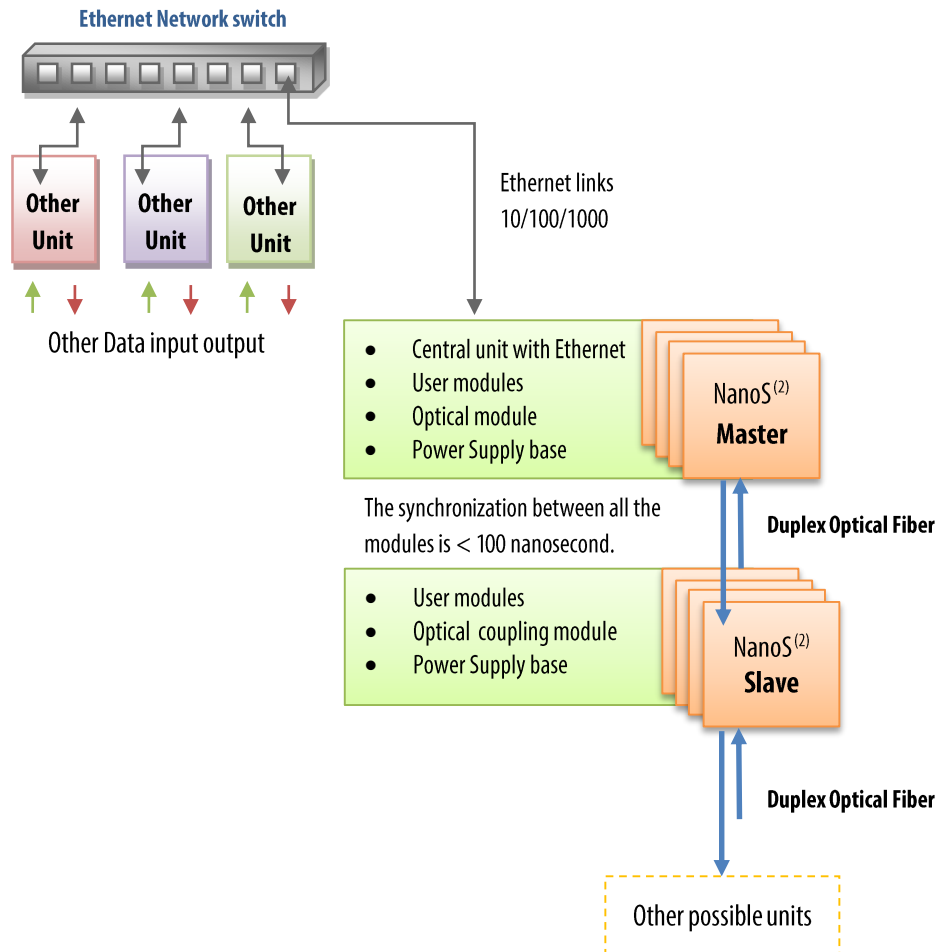
Optical star network



The quantity of user modules is limited to 8 or 12 (Depend of NanoS model) per unit (Master or Slave). There is no limit to the number of slave modules, the only limit is the total flow rate limited to 1000Mbps. The Slave unit have not CPU module, just acquisition module(s) and Power supply with Fiber optical option module

Optical serial network on existing Ethernet Network

This case is the possible connection of serial Networks of NanoS⁽²⁾ (Modular flight test recorder) with a Fiber optical module, on an existing network by Ethernet. This architecture provides a flow rate of 1000Mbps using an optical fiber



Example of installation

The Fiber optical permit to cover long range (About 100 meters) with a deterministic flow rate until One Gigabytes sustained between each module of all installation. The fiber optical permit to cover all part of a jumbo jet.



- Time accuracy about 100xbetterthan Ethernet based link technology
- Only one CPU/Controller needed
- Not effected by Electromagnetic disturbance
- Confidentiality assured (Optical signal)

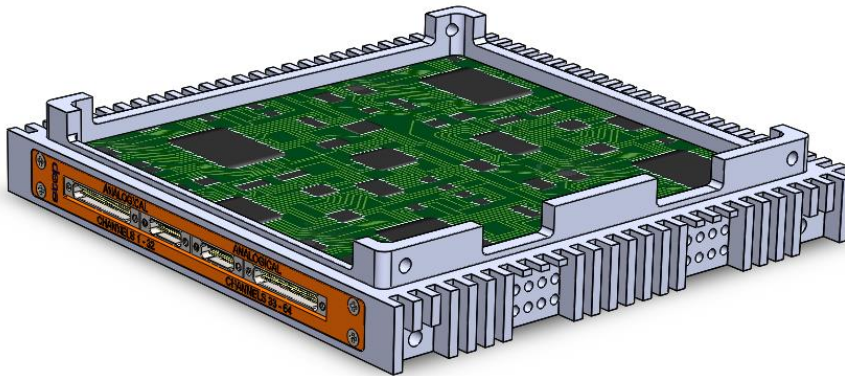
Acquisition Modules Overview

The NanoS modules are available in two forms, depending of type of connector desired and space available for your aircraft installation.

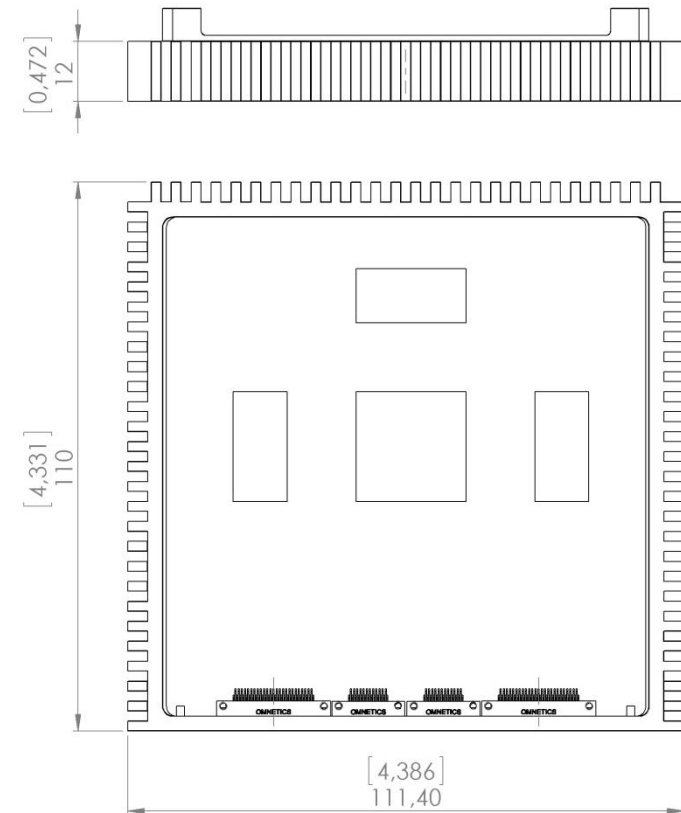
For more details about our acquisition modules, please consult the dedicated catalogue.

NanoS- Module type

If you look for the compact size of NanoS, the connector used will be NANO D (MIL-DTL-32139) for a module of 12 mm [0.472 inch] of height.



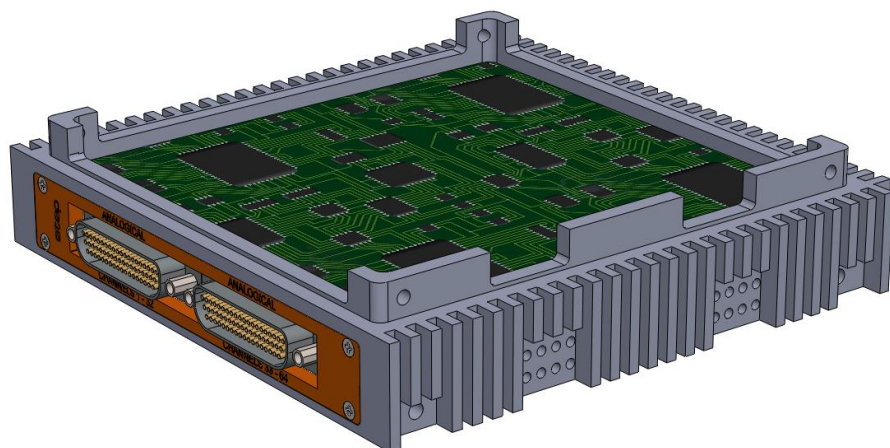
Outline Drawing



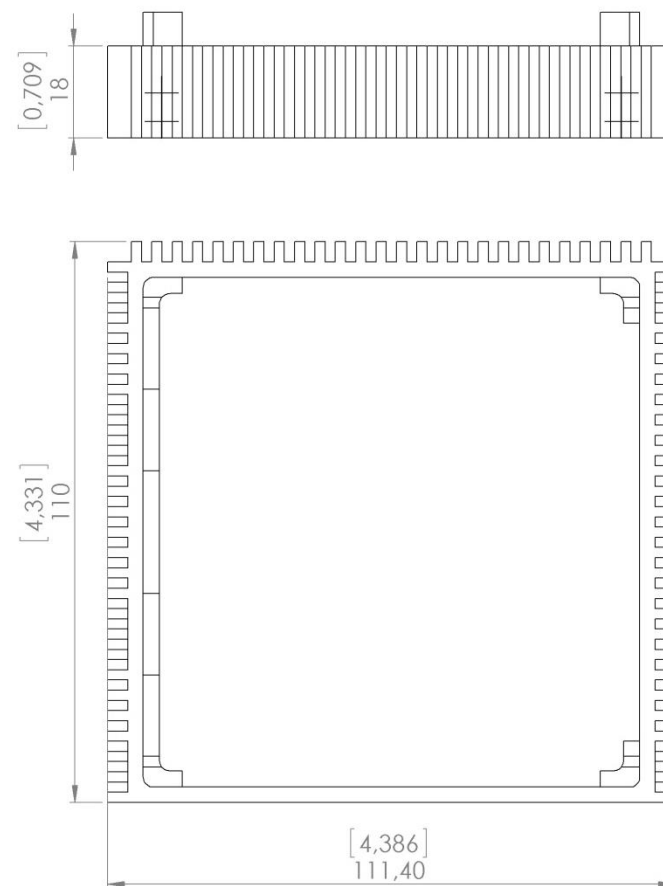
[Inch] mm

NanoS2- Module type

If you look for the NanoS2, the connector used will be MICRO D (MIL-DLT-83513), the height of this module is 18mm [0.708 inch].



Outline Drawing



[Inch] mm

Analog/Sensors modules

	Inputs			Reference NanoS			Reference NanoS2		
Single/Differential Ended Voltage	16	32	64	VOLT-16-S	VOLT-32-S	VOLT-64-S	VOLT-16-S2	VOLT-32-S2	VOLT-64-S2
Current Measurements	16	32		CURR-16-S	CURR-32-S		CURR-16-S2	CURR-32-S2	
Accelerometer/ICP Sensors	8	16		ICP-8-S	ICP-16-S		ICP-8-S2	ICP-16-S2	
Thermocouple (J, K, W, T, E) conditioner	8	16	32	THERMO-8-S	THERMO-16-S	THERMO-32-S	THERMO-8-S2	THERMO-16-S2	THERMO-32-S2
Thermistor (PT100)	8	16		THERMI-8-S	THERMI-16-S		THERMI-8-S2	THERMI-16-S2	
Strain gauges (Half bridge and full bridge)	8	16		GAUGE-8-S	GAUGE-16-S		GAUGE-8-S2	GAUGE-16-S2	
Bridge signal (Half bridge and full bridge)	8	16		BRIDGE-8-S	BRIDGE-16-S		BRIDGE-8-S2	BRIDGE-16-S2	
Charge amplifier (Piezo)	8	16		PIEZO-8-S	PIEZO-16-S		PIEZO-8-S2	PIEZO-16-S2	
LVDT/RVDT converter	8	16		LVRV-8-S	LVRV-16-S		LVRV-8-S2	LVRV-16-S2	
Pressure/Temperature Scanner	2			SCAN-2-S			SCAN-2-S2		
Synchro Resolver	8			SYNC-8-S			SYNC-8-S2		
Power Monitor	3			POWER-3-S			POWER-3-S2		

Other modules are available on request

Video/Audio Modules

	Inputs			Reference NanoS			Reference NanoS2		
MJPEG 2000 module/Audio	1	2	4	MJPEG-1-S	MJPEG-2-S	MJPEG-4-S	MJPEG-1-S2	MJPEG-2-S2	MJPEG-4-S2
H.264 MPEG4 up to 1080p 30 fps/Audio	1	2		H264-1-S	H264-2-S		H264-1-S2	H264-2-S2	

Other modules are available on request

Digital/Bus Modules

	Inputs			Reference NanoS			Reference NanoS2		
PCM acquisition	2	4		PCM-2-S	PCM-4-S		PCM-2-S2	PCM-4-S2	
PCM Merger Modules	1	2		MERG-1-S	MERG-2-S		MERG-1-S2	MERG-2-S2	
MIL STD 1553 B, redundant	2	4		1553-2-S	1553-4-S		1553-2-S2	1553-4-S2	
AFDX ARINC 664	2	4		AFDX-2-S	AFDX-4-S		AFDX-2-S2	AFDX-4-S2	
Stanag 3910	1			3910-1-S			3910-1-S2		
ARINC 429	4	8	16	AR429-4-S	AR429-8-S	AR429-16-S	AR429-4-S2	AR429-8-S2	AR429-16-S2
RS 422/485	4	8	16	RS422-4-S	RS422-8-S	RS422-16-S	RS422-4-S2	RS422-8-S2	RS422-16-S2
RS 232	4	8	16	RS232-4-S	RS232-8-S	RS232-16-S	RS232-4-S2	RS232-8-S2	RS232-16-S2
Ethernet TCP/IP - UDP	2	4		ETHER-2-S	ETHER-4-S		ETHER-2-S2	ETHER-4-S2	
CAN data bus	2	4		CAN-2-S	CAN-4-S		CAN-2-S2	CAN-4-S2	
Serial FPDP Fiber optical	2			SFPDP-2-S			SFPDP-2-S2		
Digital to Analog converter	1(8)			DIGIANA-8-S			DIGIANA-8-S2		
Differential discrete	16	32		DISCR-16-S	DISCR-32-S		DISCR-16-S2	DISCR-32-S2	
Pulses Measure/Counter/frequency/Period	8	16		PULSE-8-S	PULSE-16-S		PULSE-8-S2	PULSE-16-S2	

Other modules are available on request

Accessories

Sentinel – Crash protected memory

CPM ED-155 Ref#	CPM155-8GB/ CPM155-16GB / CPM155-32GB /CPM155-64GB
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CPM ED-112Ref#	CPM112-8GB/ CPM112-16GB / CPM112-32GB /CPM112-64GB
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Sentinel - Crash Survivable Memory Unit is an optional unit design for all our Airborne Data Recorders, if you need a crash protected module (CPM) for your applications like flight testing, to be sure to recover data in case of a serious accident. This CPM has been design to meet all the performance and survivability requirements of EURO CAE ED-155 or ED- 112 normalization.

To take an example you can have a mission recorder in the cockpit with removable cartridge and have a sentinel unit in the tail of the plane connected to the mission recorder who recorded exactly the same things or add on parameters.

Sentinel CSMU is available in two types of Version CSMU-ED155 light version and CSMU-ED112 more rugged version. An optional underwater acoustic beacon is available to facilitate the location of the recorder

You can configure the recorder to meet your specific requirements for your air vehicle. The all in one solution package weighs about 4Kg with NanoS airborne recorder (Depend of configuration).



Remote Control – Simple/Complete

REMOTE CONTROL SIMPLE Ref#	RCS-SIMPLE
REMOTE CONTROL COMPLETE Ref#	RCC-COMplete
REMOTE CONTROL DZUS Ref#	RCC-DZUS

Simple version

The remote control is a metallic box which owns a tri-colour LED, Power ON/OFF switch, Record ON/OFF switch, one event buttons, and a connector on the left of the box to connect to the DTMUX Recorder.



- Connector to connect with the recorder
- Switch of recording
- Red- orange-green led: Alarm control
- Recorder Power supply switch (raise for turn off or turn on)

Remote Control box - Complete version



The remote control is a metallic box which owns a tri-colour LED, 4 buttons, an “OLED” screen, a switch, and a connector on the left of the box to connect to the DTMUX Recorder.

Its design looks like the following one:

- VALID button
- SELECT button
- MENU button
- EVENT marker button
- STATUS LED
- POWER switch (ON or OFF)
- LCD Screen
- CONNECTOR to communicate with the recorder

The remote control box allows the user to communicate and take control of the recorder’s CPU, to get useful information (recorder status, disk status . . .), to start recording, to start replaying or to start formatting disks.

The control of the DTMUX Recorder CPU is made by the three main remote control’s buttons through some menus. Information is displayed on the LCD. The MENU button is used to move through the 6 informative menus. The SELECT button is used to move the cursor (⌘) through a menu. The VALID button is used to validate the cursor position and trigger the next corresponding menu, according to the user’s choice.



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ETEP is an ISO 9001 certified company.

AS/EN 9100 Process

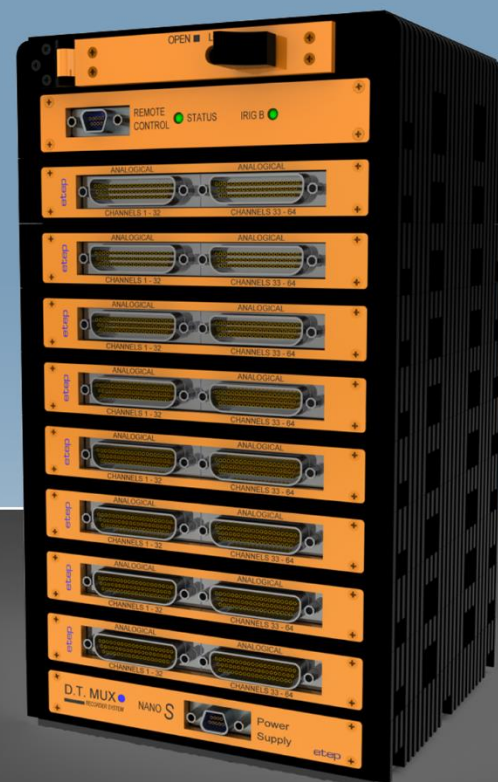
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