Telemetry & Data Acquisition systems

ETH Ch. 1-2

ICP Ch. 4

POWER SUPPLY

INPUT 28 VDC

NANO X

IN V1

IN V2

IN V3

OUT V3   OUT V4

RGB

RS232/422 Ch. 1-8

CPU CC

STATUS
IRIG-B
GPS

CONTROLLER

GPS

NANO X
THE NEXT LEVEL OF DATA ACQUISITION

RTCA
DO-160
v G
TESTED

MILITARY
MIL-STD
810 G
TESTED

NANO X
THE NEXT LEVEL OF DATA ACQUISITION

Acquisition modules
Can up to 16 User Slots

Controller Module
With Optional SSD Cartridge

90° Rotation
fixation plate

Power supply Module

Main Advantages

- Lightweight and small footprint unit.
- Fully Flexible Acquisition module/Chassis dimension.
- High speed recording system (1Gbps) with adapted controller.
- High recording capacity (Can up to 2TB) with adapted controller.
- Real time Data Streaming in DTMUX / IRIG 106 Chapter 10 / IENA formats
- Patented Xchange® Module Technology.
- Record and Replay function available.
- Transmitter (TX) module available (5 to 20Watts)
- Master/slave(s) Ethernet or Wi-fi Architecture available.
- Can be configured from one acquisition module to sixteen (16).
- Integrate Battery module for standalone/backup application.
- Integrate module status led for easy Diagnostic.
- Easy fixation on each side with 90° rotation support integrate.
- IRIG 106 Chapter 10 compliant (Recording option)

The NanoX acquisition system is an efficient data concentrator and recorder, with an ultra-compact design, and an ease of changing acquisition modules. The NanoX provide modularity and permit to plug/stack until sixteen data acquisition modules by unit. A unit is constituted by a CPU/Controller module with a optional recording capacity (from 64GB to 2TB) and a smart power supply module. The **NanoX is a data acquisition concentrator completed with high speed (1Gbps) recording and transmitting system combined in the same device**, with this device you can make all in one modular and compact solution where other solutions require two or three separate units.

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NANOX
THE NEXT LEVEL OF DATA ACQUISITION

CPU-N-NX Module Overview
Network capacity *(For Master/Satellite(s) system).*

Power presence
Status LED (Blue)

Communication/Maintenance connector
Ethernet/RS-232/ IRIG B …

SMA Connector for GPS Antenna

Status LED
(Green/Yellow or red)

GPS/ IRIG Status LED

Extraction Module
screws

Removable fixation plate with
90° rotation axis. To fix unit in
each position

CPU-N-NX presented here

The NanoX Controllers are available in six different version following your need, this one can integrate only some basic functionalities or integrate transmission (telemetry) and recording functionalities to transform your data acquisition system to a real and powerful data recorder.

Four main controller configurations:
[CPU-N-NX]   Network capacity *(For Master/Satellite(s) system).*
[CPU-NR-NX]   Network & Recording capacity.
[CPU-NT-NX]   Network & PCM IRIG 106, chapter 4 telemetry.
[CPU-NTE-NX] Network & Ethernet IRIG 106-chapter 10 telemetry.

Premium configuration:
[CPU-NRT-NX] Network / Recording / IRIG 106-chapter 4 telemetry.
[CPU-NRTE-NX] Network / Recording / IRIG 106-chapter 10 telemetry.

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Controllers modules

Status LED
(Green/Yellow or red)

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CPU-NT-NX Module Overview
Network & IRIG 106 chapter 4 capacity

PCM Outputs connector
2 independents channels

Communication/Maintenance
Ethernet/RS-232/ IRIG B …

SMA Connector for GPS
Antenna

Extraction Module
screws

Removable fixation plate with
90° rotation axis. To fix unit in
each position

CPU-NT-NX presented here

Number of channels
Two completely independent
Compliant with IRIG 106 chapter- 4
(PCM Class I & Class II) Specifications

Bit Rate
Up to 20Mbps better than 0.1% of specified rate.

Words/major Frame
Compliant with IRIG 106 chapter- 4
(PCM Class I & Class II) Specifications

Frames/minor Frame
As per IRIG 106 chapter- 4 (PCM Class I & Class II)

Sub Frame Synchronization
By an incrementing Sub Frame identification (ID) word located
anywhere within the minor frame. Provision to support URS & FCC

Sub-Frame size for each stream
As per IRIG 106 chapter- 4 (PCM Class I & Class II)

Pre-Modulation Filter
Bessel Filter selectable by software for the PCM n°2 1.25 MHz; 2.5
MHz; 5MHz; 10 MHz; 20 MHz; Bypass

Output codes
2 PCM can be generated totally independent.
Should support multiple programmable PCM data codes
like NRZ-L, RNRZ-L, Bi-Phase-L/M

Output levels
For the PCM1 TTL or RS422
For the PCM2 TTL and Analog output with prefilter
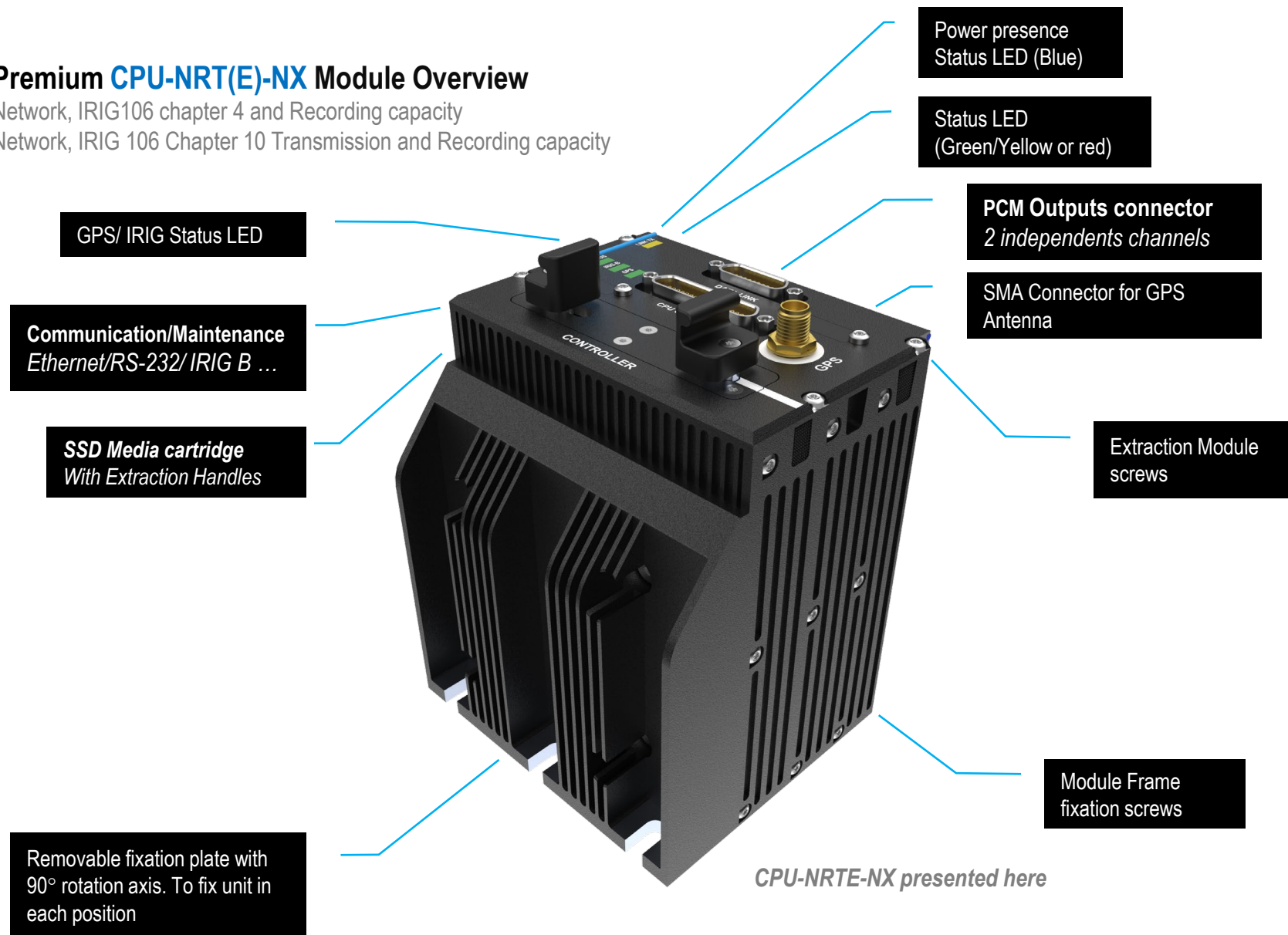
Time reference
From start of short or long frame with a resolution of better than
one millisecond.

NANO X
THE NEXT LEVEL OF DATA ACQUISITION

Premium CPU-NRT(E)-NX Module Overview
Network, IRIG106 chapter 4 and Recording capacity
Network, IRIG 106 Chapter 10 Transmission and Recording capacity

Power presence
Status LED (Blue)

Status LED
(Green/Yellow or red)

GPS/ IRIG Status LED

PCM Outputs connector
2 independents channels

Communication/Maintenance
Ethernet/RS-232/ IRIG B …

SMA Connector for GPS
Antenna

SSD Media cartridge
With Extraction Handles

Extraction Module
screws

Module Frame
fixation screws

Removable fixation plate with
90° rotation axis. To fix unit in
each position

CPU-NRTE-NX presented here

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Features/Utility channels
- Audio input
- Irig B Time input
- GPS input (Time, Position…)
- Support IEEE 1588 Time v2
- Discrete; ON/OFF and ON/OFF record
- Tricolor status outputs LED
- CPU, IRIG B, GPS status LED

RS 232 Communication
- Port for configuration
- Port for maintenance

Gigabit Ethernet
- Configuration/Control/Status/Download (from SSD)
- Real time transmitting for Real time visualization
- Network link with NanoX Satellites units
- PTP v2 Grandmaster Clock (option)

Wi-Fi 802.11g [OPTION]
- Configuration/Status/Download (from SSD)
- Network link with NanoX Satellites units
- Real time transmitting (To master Unit/ To decom software).

Discrete used to the NanoX 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.
- Sample frequency 31.25KHz
- Band pass: 0 to 14.7KHz
- Input impedance: 1 MΩ

Input Connector
- MICRO D (MIL-DTL-83513) for data Input/output
- SMA for GPS input

Recoding Capacity
From 32GB to 2TB
Available with CPU-NR-NX or CPU-NRT-NX only.

Ethernet Data Streaming
- DTMUX Format (By default)
- IRIG 106 Chapter 10 (Option)
- IENA (Option)

Time stamping/Synchronization
- Internal Time/IRIG B Time
- Time accuracy 1 µsec
- GPS Time
- IEEE 1588 (PTP v2) –Precision Time Protocol
- Time Offset programmable

Irig B channel
- Input: Sinus 1000 Hz, modulation level 1/3- 3/3.
- Output IRIG B time generation (1pps TTL).
- Modulation: 8Volts P to P max.
- To 500mVolts P to P min.
- Input Impedance greater than 10 KΩ
- Loss of the Irig B, time continuous to progress on internal base time
- Second, minutes, Hours and days.

GPS Function
- SMA independent input.
- Second, minutes, Hours and days (UTC).
- GPS data GPRMC format (Latitude, Longitude, Ground speed)
- Satellite acquisition less than 50 Seconds (Clear Sky)
- Output IRIG B time generation from GPS (1pps TTL).
- NMEA output at a rate of 1Hz
- Compatible with GPS Patch Antenna

Internal Sensors
- Temperature sensor / Pressure sensor / Humidity sensor

Master/Slave(s) link
- By Gigabit Ethernet (GbE) with IEEE 1588 Time (PTP v2)
- By Wi-Fi 802.11g [OPTION]

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Optional Memory cartridge

The unit can be also equipped with removable Solid-State Disk (SSD), available from 64GB to 2TB capacity. This Memory unit is rugged and full qualified for harsh environment. SSD cartridge can be easily removed from unit and connected to a Windows based computer with USB 3.0 cable (Supplied).

P/N **SSD**XX-**DE**-**QE**-**DP**-**NX**
See below for part number composition
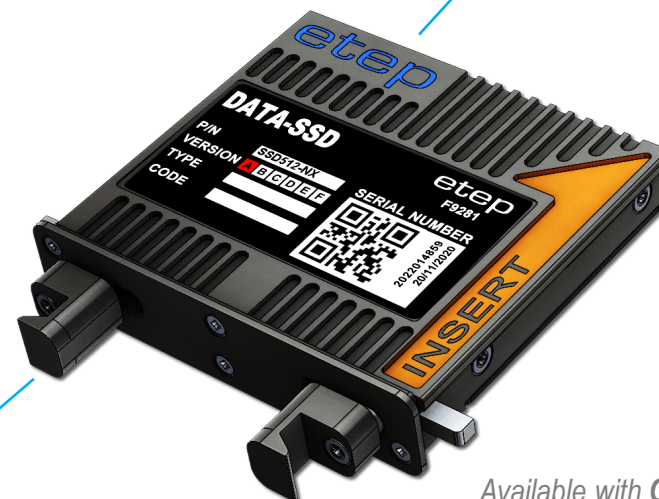
Rugged Connector
For easy plug on computer
(SATA/USB 3.0 Cable supplied)

Extraction Handles

Available with ***CPU-NR-NX*** */
CPU-NRT-NX / CPU-NRTE-NX*

Capacity
XX Capacity in Gigabytes (GB)
64 / **128** / **256** / **512** / **1024** / **2048**

Sequential R/W (MB/sec, max.)
90/90 (720Mbps)

Max. Power consumption
2.8 W (5Vx560mA)

Extra DRAM Buffer
Supported

ATA Security
Supported

Vibration
20G @7~2000Hz

Shock
1500G @0.5ms

Operation Temperature
-40°C~+85°C

Storage Temperature
-55°C~+95°C

Environmental standard
MIL STD 810F
MIL STD 461E

Replay
On any Windows desktop (Seven or higher) with USB 2.0 or 3.0 input

*Security
Password/ Encryption/Auto destruction can be available in option
- **DE** or none: 256bits AES Encryptions
- **QE** or none: Quick Erase
- **DP** or none: Physical Auto-Destruction

MTBF
3 million hours

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Power Supply module

Module Connector
Type MICRO D (MIL-DLT-83513)

Power presence
Status LED

Removable fixation plate with 90° rotation axis. To fix unit in each position

POWER-NX module

The power supply module is 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 NanoX installation from power interruption about 100 milliseconds. 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.

- Can support 16 different user modules.
- Until 130 Watts of power distribution.
- Compliant MIL-STD-704F standard.
- Powerful Ultra-capacitor to prevent power cut ~100ms.
- MICRO D (MIL-DTL-83513) connector.
- Can be Extended with Battery module

MIL-STD-704F qualified, this module assures over voltage protection and permit to protect and assure data safety during acquisition or recording in case of power failure. 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.

Temperature Management: Power supply module is also the seat of a smart and powerful Temperature control processor who permit the protection of all unit in case of aggressive temperature environment, this one monitors the temperature of each module and operate heating or cooling process following the environment encountered.

Size in "mm"

User-slot(s)	Depth*	width	Height
1	93	85	100
2	109	85	100
3	125	85	100
4	141	85	100
5	157	85	100
6	173	85	100
7	189	85	100
8	205	85	100
9	221	85	100
10	237	85	100
11	253	85	100
12	269	85	100
13	285	85	100
14	301	85	100
15	317	85	100
16	333	85	100

Depth is increased of 18 mm with CPU module who include recording capacity on SSD.

Depth is increased of 16 mm with CPU module who include IRIG 106 Chapter 4 capacity.

Depth is increased of 16 mm with CPU module who include Wi-Fi Network capacity option.

Depth is increased of 80 mm with Power Supply who include one additional Battery power supply module (Until 3 modules possible 3x80mm)

Depth is increased of 24 mm with cooler heatsink with M5 fixation (recommended for configuration use excitation voltage, video or more than 6 user module)

Input Connectors
MICRO D (MIL-DLT-83513)
& SMA (For GPS Antenna)

Mounting
90° Rotating support plate integrate.

Power supply
28Volts DC (16 to 36V) MIL STD704 E Consumption: 12 Watts nominal (Controller& Power supply modules) until 130 Watts following configuration. 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 NanoX external box.

Weight
About 1.8 Kg (2 user-slots) About 2.2 Kg (4 user-slots) About 2.6 Kg (8 user-slots) About 3.0 Kg (12 user-slots) About 3.4 Kg (16 user-slots)

Cooling
Passive convection

Position of use
All positions

MTBF> 30 000 hours
MTTR< 1 minute (With spare module)

Transport
Delivered with a transport suitcase equipped to receive the NanoX and accessories.

Vibration
MIL-STD-810G method 514.4
0.04 g² of 5 to 2000 Hz,
Overall RMS acceleration 2.97g
1 hour per axis (3 axis)

Linear Acceleration
MIL STD 810F,
15g for one minute in six directions.

Shocks
MIL-STD-810F method 516.5/516.3
100g, 11ms (6 axis) in functioning

Operating   Temperature
- 40°C to + 71°C.
MIL-STD-810G method 502.5 procedure II
MIL-STD-810G method 501.5 procedure II

Extreme of temperature (Short period)
- 55° C to 85°C [Short period no destructive]
Test MIL STD 810F
Extreme temperature cannot guarantee data integrity

Humidity in use
5% to 95 % without condensation
MIL STD 810F

Electromagnetic compatibility (EMI)
MIL STD 461 Rev. G (2015)
CS101 / CS114 / CS115 / CS116
CE102 / RE102 / RS103

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

Altitude max. Storage
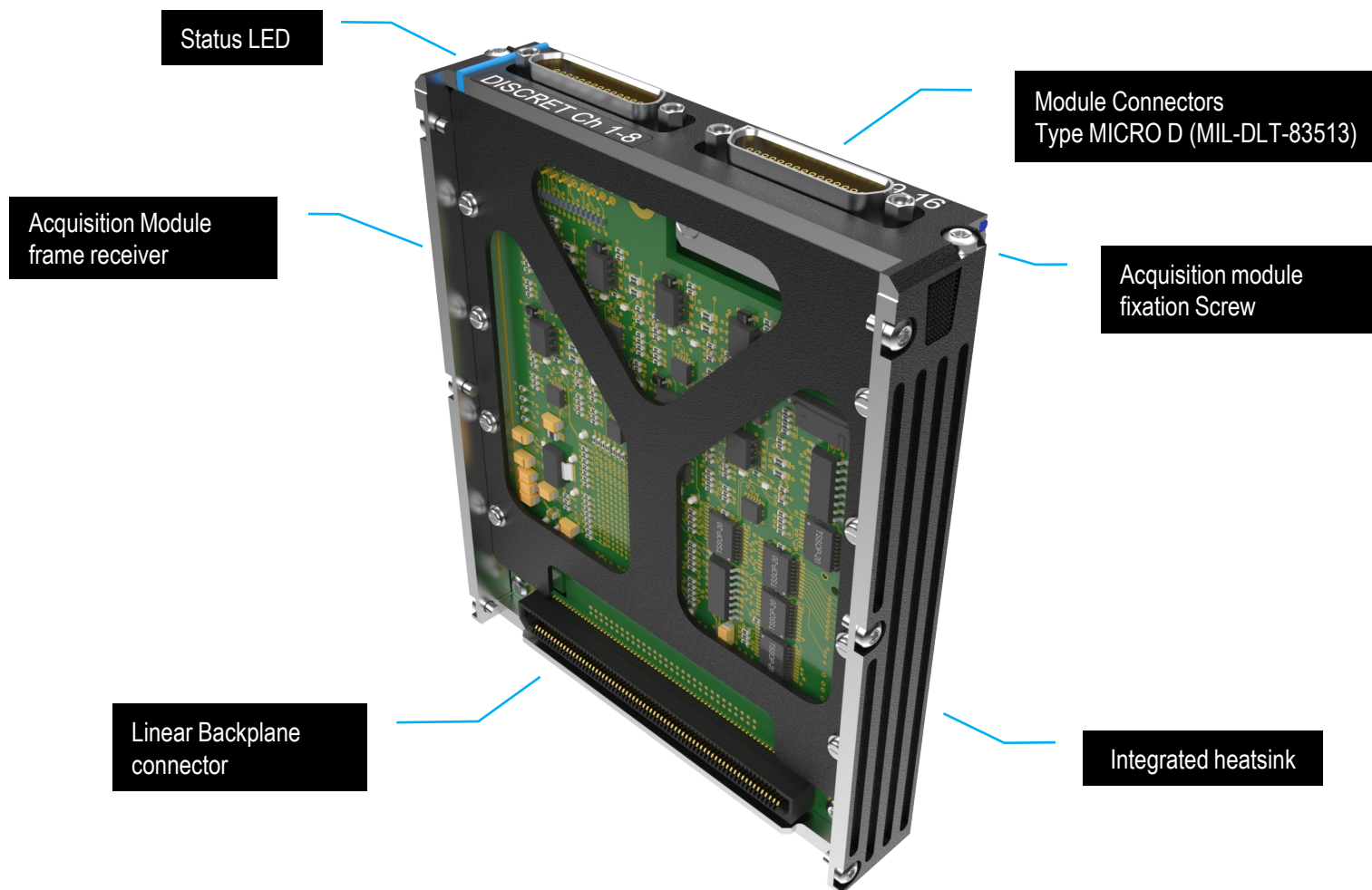No limit

Storage temperature
- 55°C to + 90°C

Humidity in storage
5% to 95 % without condensation
MIL-STD-810G method 507.4

Aircraft Electrical Power Characteristics
MIL-STD-704 Rev. F (2004)
Prevent power down < 60 milliseconds

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Status LED

**Module Connectors
Type MICRO D (MIL-DLT-83513)**

DISCRET Ch 1-8

**Acquisition Module
frame receiver**

**Acquisition module
fixation Screw**

**Linear Backplane
connector**

Integrated heatsink

One user module is constituted of two parts, firstly frame receiver module part who compose unit chassis and secondly the acquisition card part. The acquisition card part can be removed easily from the chassis module receiver part. With **Xchange® Technology** you can fit your frame dimension and acquisition modules exactly like you want. It's not more necessary to uninstall unit from aircraft when you want to change or remove a module.

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NANO**X**
THE NE**X**T LEVEL OF DATA ACQUISITION

Each Acquisition module can be extract and replaced easily

XCHANGE Technology

Xchange® patented Technology, has been study and developed hand to hand with end users, to give the maximum of flexibility and growth capacity to a system. NanoX system is fully flexible that mean each acquisition module can be replaced by another one. System can be combined with different controllers' modules and acquisition modules who can be easily removed from their module frame receiver. Each module frame receiver are equipped with linear backplane connector who permit a connection with each other (until 16). That mean Main frame of your unit is totally flexible, but you have also the flexibility to put/remove or change Acquisition module where you want.

A big advantage also is the maintenance cost; with this kind of system if something goes wrong you can identify and replace quickly the problematic part of system.

In fact, NanoX system is assembly of different part who work together, and the assembly will make you think to a famous construction toy of your childhood.

PULSE Ch 1-8

Linear Backplane connector

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NANOX
THE NEXT LEVEL OF DATA ACQUISITION
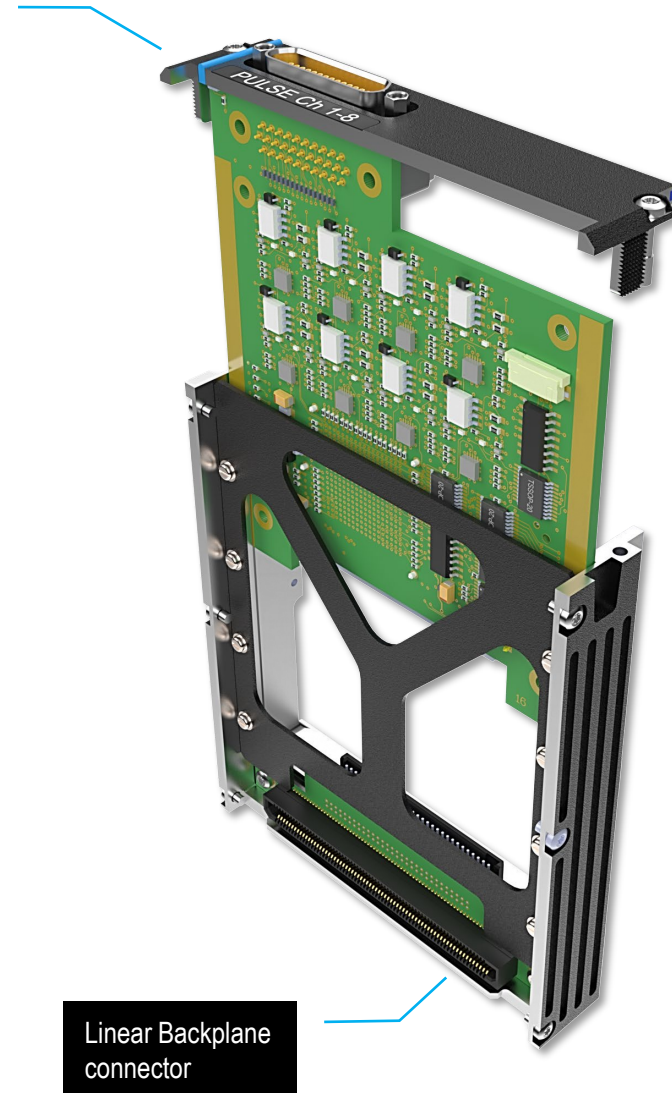
Acquisition/Replay cards Dimensions

Dimensions are in "mm"
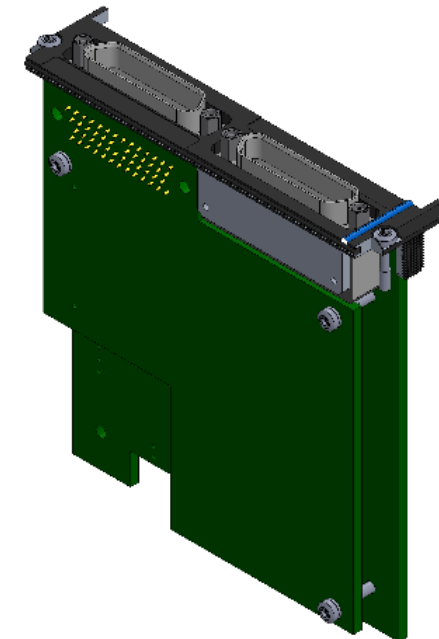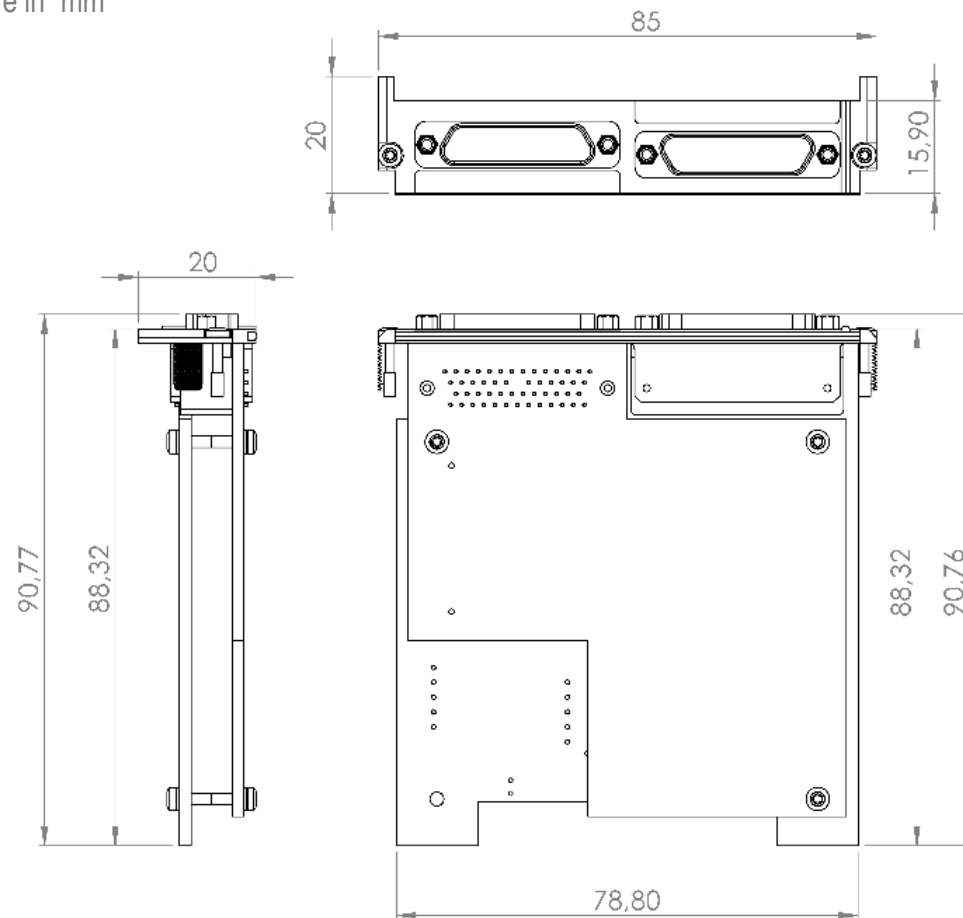
Acquisition/Replay module with frame receiver

Dimensions are in "mm"

Flexibility

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THE NEXT LEVEL OF DATA ACQUISITION
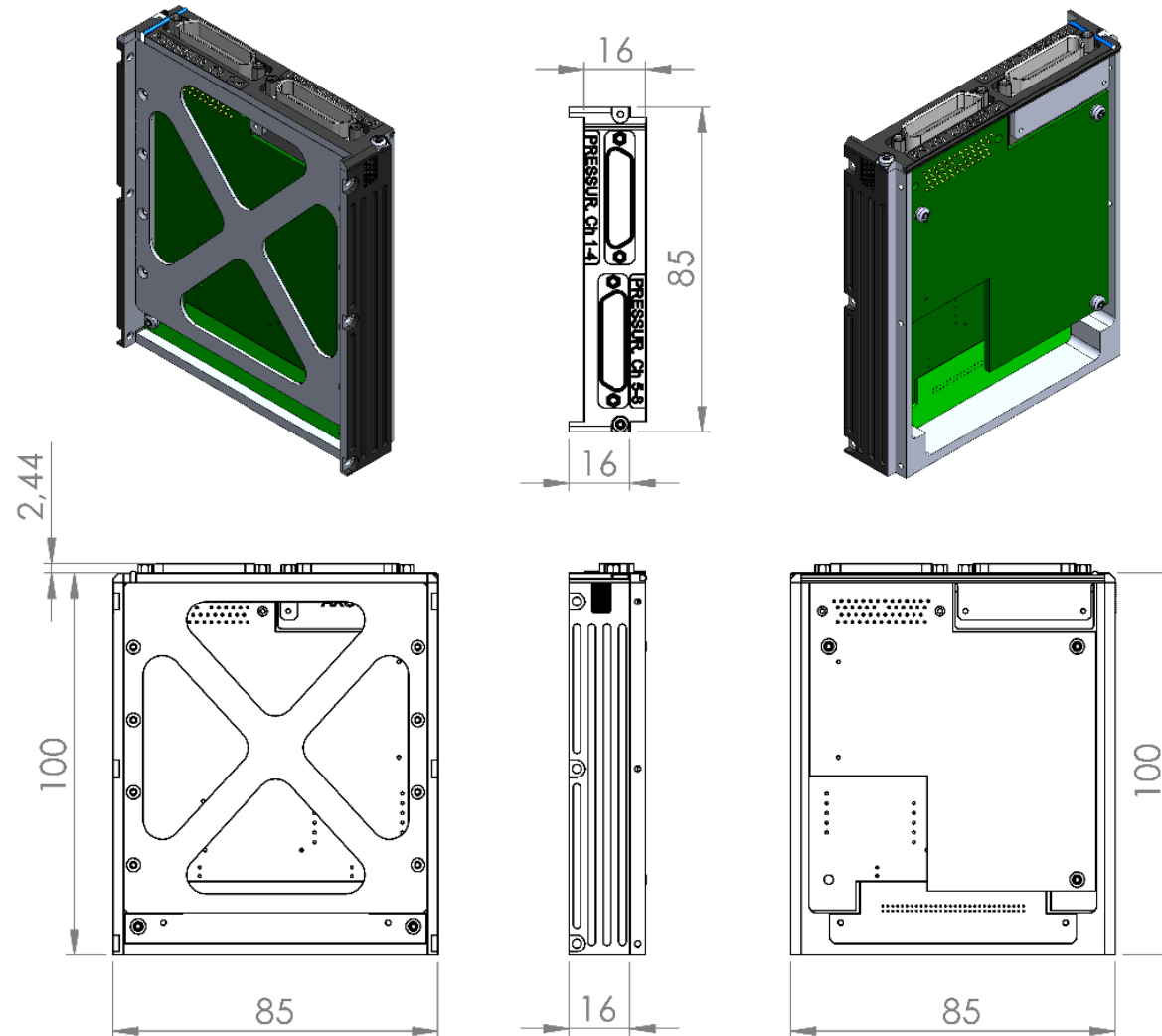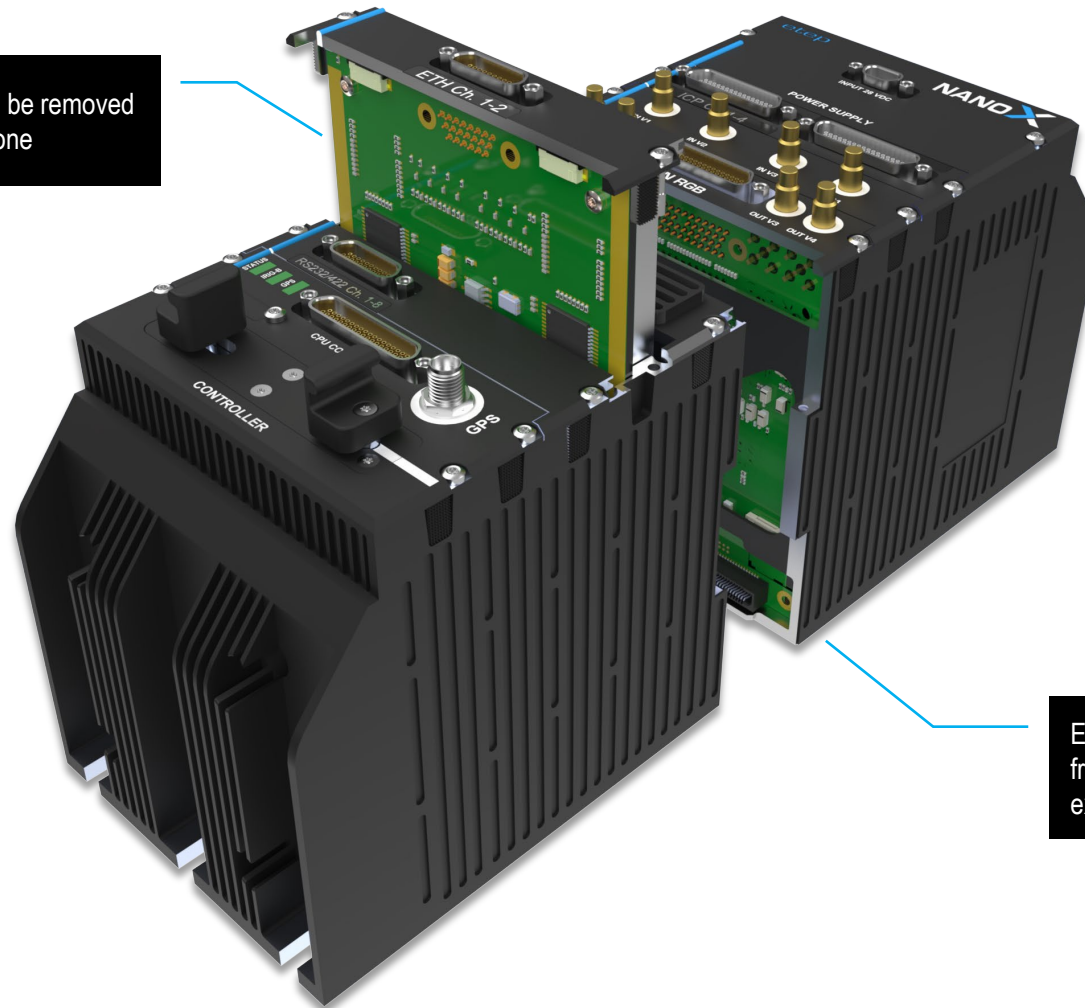
Focus on eXtreme Flexibility .

Each acquisition card can be removed and replaced by another one

Each module frame can be disassembly from each other, and unit can be extended/Composed following needs.

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NANOX — THE NEXT LEVEL OF DATA ACQUISITION

	DESIGNATION	INPUTS			Max Sample Rate (kHz)		Max Dynamic (± Volts) *		Bridge Completion		RECORD & REPLAY	NanoX
Advanced Analog (All in one) • Analog signals (differential or single-ended) • Thermocouples (type K, J, T, E, N) • RTD (PT50, PT100, PT1000) • Full bridge strain gauges • Piezo IEPE /ICP accelerometers	VOLTA	8			31		4	10	FB			NX
Analog Single/Differential Ended	VOLT	4	8	16	31	250	4	10			RP	NX
Accelerometer (ICP Sensors)	ICP	4	8	12	31	250	4	10			RP	NX
Thermocouple (J, K, W, T, E)	THERMO	4	8	16	31		4	10				NX
Thermistor (PT100)	THERMI	4	8	16	31		4	10				NX
Pressure	PRESS	4	8		31	250	4	10			RP	NX
Strain gauges	GAUGE	4	8	12	31	250	4	10	FB	QB	RP	NX
Bridge signal (Piezoresistive)	BRIDGE	4	8	12	31	250	4	10	FB	QB	RP	NX
Charge amplifier (Piezo)	PIEZO	4	8		31	250					RP	NX
Pressure Scanner	SCAN	2									RP	NX
Synchro Resolver	SYNC	2	4		31						RP	NX
Frequency Period/Pulse	PULSE	8	16		31						RP	NX
LVDT/RVDT Converter	LVRV	4	8									NX
Power Monitor	POWER	3			31							NX

Dynamic are programmable by software:
For example, ±10V, ±1V, ±100mV, ±10mV

Example of a Part number: **GAUGE-8-250-4-FB-NX**

QB (Quarter Bridge)

FB (Full/Half Bridge)

RP Record & Replay function available following Green indication

☞ Modules can be tailored following your special needs,
☞ Hybrid modules are available for high integration application

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Digital/Bus Modules
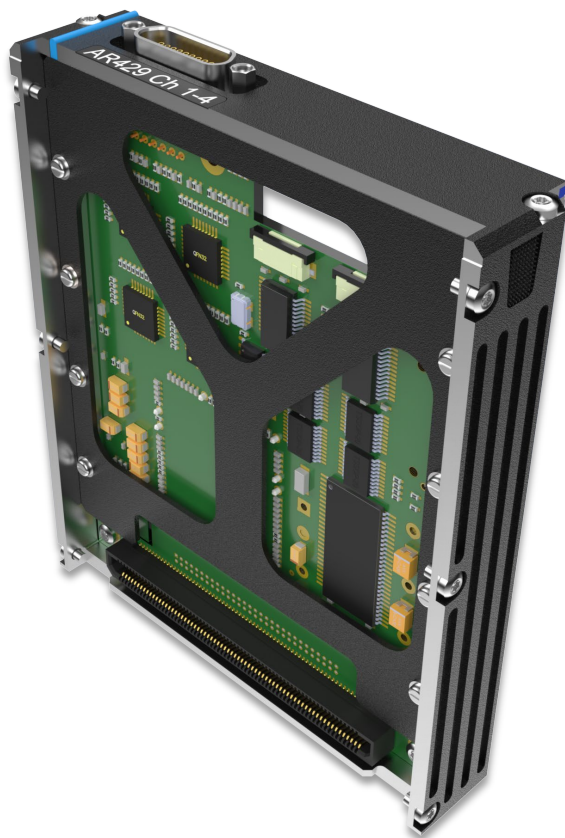
	Reference				Option	Device
	DESIGNATION	**INPUTS**			**RECORD & REPLAY**	**NanoX**
PCM acquisition	**PCM**	2	4		RP	NX
IRIG-106 PCM Decoder/Merger	**MERG**	2				NX
MIL-STD-1553 B, Redundant	**1553**	1R	2R	4R	RP	NX
AFDX ARINC 664	**AFDX**	1R			RP	NX
Stanag 3910	**3910**	1R			RP	NX
ARINC 429	**AR429**	4	8	16	RP	NX
RS 232 / 422 / 485	**RS**	4	8	16	RP	NX
Ethernet UDP	**ETH**	2			RP	NX
CAN data bus	**CAN**	2	4	8	RP	NX
Serial FPDP Fiber optical	**SFPDP**	3			RP	NX
Digital to Analog converter	**DIGIANA**	4	8		RP	NX
Differential discrete	**DISCR**	8	16	24	RP	NX
Pulses/Counter/frequency/Period	**PULSE**	8	16		RP	NX
Video SD & Audio	**VSD**	1	4		RP	NX
Video HD & Audio	**VHD**	1	2		RP	NX

Example of a Part number: *1553-1R-RP-NX*

**RP** *Record & Replay function available following Green indication*

☞ *Modules can be tailored following your special needs,*
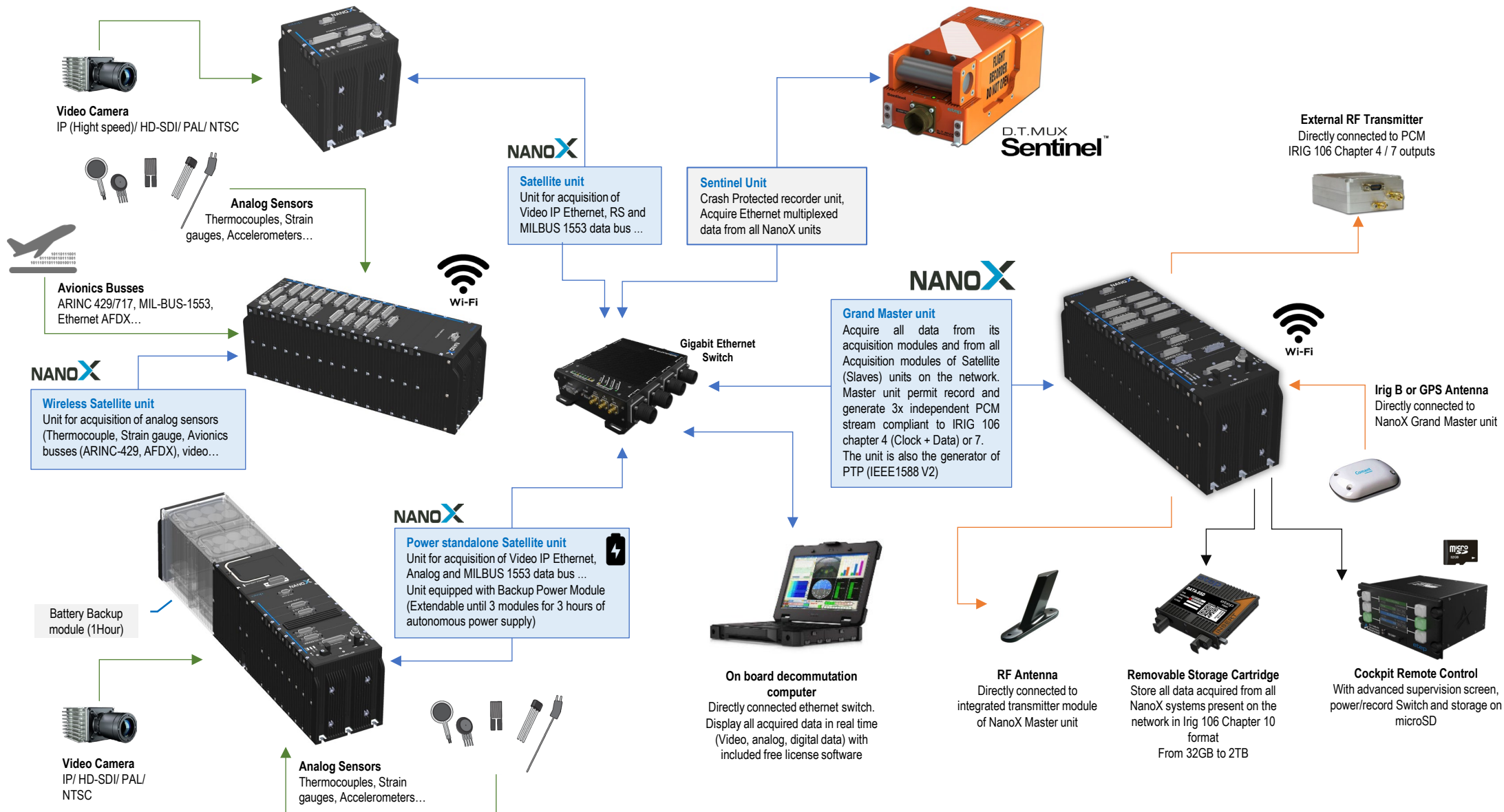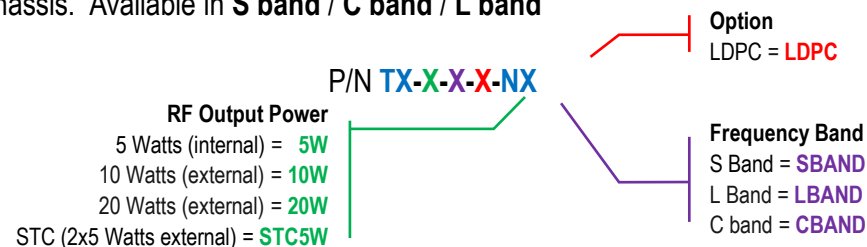☞ *Hybrid modules are available for high integration application*

Network Architecture

NANOX — THE NEXT LEVEL OF DATA ACQUISITION

Video Camera
IP (Hight speed)/ HD-SDI/ PAL/ NTSC

Analog Sensors
Thermocouples, Strain gauges, Accelerometers…

Avionics Busses
ARINC 429/717, MIL-BUS-1553, Ethernet AFDX…

NANOX

Satellite unit
Unit for acquisition of Video IP Ethernet, RS and MILBUS 1553 data bus …

Sentinel Unit
Crash Protected recorder unit, Acquire Ethernet multiplexed data from all NanoX units

D.T.MUX Sentinel

External RF Transmitter
Directly connected to PCM IRIG 106 Chapter 4 / 7 outputs

Wi-Fi

NANOX

NANOX

Grand Master unit
Acquire all data from its acquisition modules and from all Acquisition modules of Satellite (Slaves) units on the network. Master unit permit record and generate 3x independent PCM stream compliant to IRIG 106 chapter 4 (Clock + Data) or 7. The unit is also the generator of PTP (IEEE1588 V2)

Gigabit Ethernet Switch

Wi-Fi

Irig B or GPS Antenna
Directly connected to NanoX Grand Master unit

NANOX

Wireless Satellite unit
Unit for acquisition of analog sensors (Thermocouple, Strain gauge, Avionics busses (ARINC-429, AFDX), video…

NANOX

Power standalone Satellite unit
Unit for acquisition of Video IP Ethernet, Analog and MILBUS 1553 data bus … Unit equipped with Backup Power Module (Extendable until 3 modules for 3 hours of autonomous power supply)

Battery Backup module (1Hour)

Video Camera
IP/ HD-SDI/ PAL/ NTSC

Analog Sensors
Thermocouples, Strain gauges, Accelerometers…

On board decommutation computer
Directly connected ethernet switch. Display all acquired data in real time (Video, analog, digital data) with included free license software

RF Antenna
Directly connected to integrated transmitter module of NanoX Master unit

Removable Storage Cartridge
Store all data acquired from all NanoX systems present on the network in Irig 106 Chapter 10 format
From 32GB to 2TB

Cockpit Remote Control
With advanced supervision screen, power/record Switch and storage on microSD

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Optional Digital RF Transmitter Module

On Board transmitter module for NanoX system.

This module can be combined to CPU-NRT-NX or CPU-NT-NX controller modules to integrate transmitter functionality directly into the same chassis. Available in **S band** / **C band** / **L band**

Option
LDPC = **LDPC**

P/N **TX-X-X-X-NX**

RF Output Power
5 Watts (internal) = **5W**
10 Watts (external) = **10W**
20 Watts (external) = **20W**
STC (2x5 Watts external) = **STC5W**

Frequency Band
S Band = **SBAND**
L Band = **LBAND**
C band = **CBAND**

| (((•))) RF Specifications	
Carrier frequency range:	2150 to 2400 MHz S band or 1400 to 1600 MHz L band or C band 4400 to 4900 MHz or 5091 to 5150 MHz (band must be specified when order).
RF output power:	From 5 W to 20 W (43 dBm ± 1 dB) all conditions (must be specified when order). 2 x 5 W for STC option
VSWR	1.5:
Load mismatch	no degradation (RF = open or short)
Spurious outputs	In accordance IRIG106-96 (-60 dBc typical)
Harmonics	In accordance IRIG106-96.
Carrier frequency tuning step	125 kHz (for rate below 1Mbits/s) 250 kHz (for rate 1Mbits/s to 20Mbits/s),
Carrier frequency stability	± 2.5 ppm over temperature range. ± 7.5 ppm all clauses including aging over 5 years.
Modulation	user selectable digital PCM/FM (Tier 0), SOQPSK-TG (Tier I)
Spectral occupancy	IRIG 106-17 Chapter 2 spectral mask for tier 0 and tier 1.
Data rate	1000 kbps to 20Mbps (100kbps option available) automatic adaptation of deviation according to Tier 0 and Tier I IRIG mask.
STC option	with two antennas with SMA connectors according to IRIG 106-15 Appendix S
LDPC option	1024, 4096 blocks code rate 1/2, 2/3 and 4/5 according to IRIG 106-15 Appendix R.
☼ Monitoring and Settings	
Through GUI or IRIG 106-17 Chapter 2 Appendix 2C	Temperature Alarms, Frequency, Modulation etc …
☼ Power Requirement	
Power input	28 V DC typical 24 V min to 32 V max (18 V min to 36 V max option available)
Current:	3A under **28 V @ 20 W RF.**
Reverse polarity protection	✓ Included
Thermal protection	✓ Included

*Also available in standalone format

Backup Power Module

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Extendable Battery Backup module, until 3 modules

Battery extraction handle for maintenance

Charging connector

Power supply module « POWER-NX »

« Battery Status » LED

Battery Backup module

Module Fixation
2x M4 (Right/left)

Each Battery module can sustain 1 hour of power energy to a full populated system (16 modules) with a power consumption of 70W/h. For a total of 3 hours with 3x Backup power modules,

Fixation
3x M4

PN# **BAT70W/H-NX**

The battery backup power module can be connected just after the power supply module of any NanoX system. The first battery module comprises a power connector intended exclusively for charging the battery module or modules. A battery module includes a charge state LED for fast display of the battery charge. Each battery module is equipped with a handle allowing the extraction of the battery module for replacement. A NanoX system can be extended up to 3 battery modules.

📄 Backup Battery module take automatic relay on primary 28VDC in case of power down without any impact on system.

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NANO X
THE NEXT LEVEL OF DATA ACQUISITION
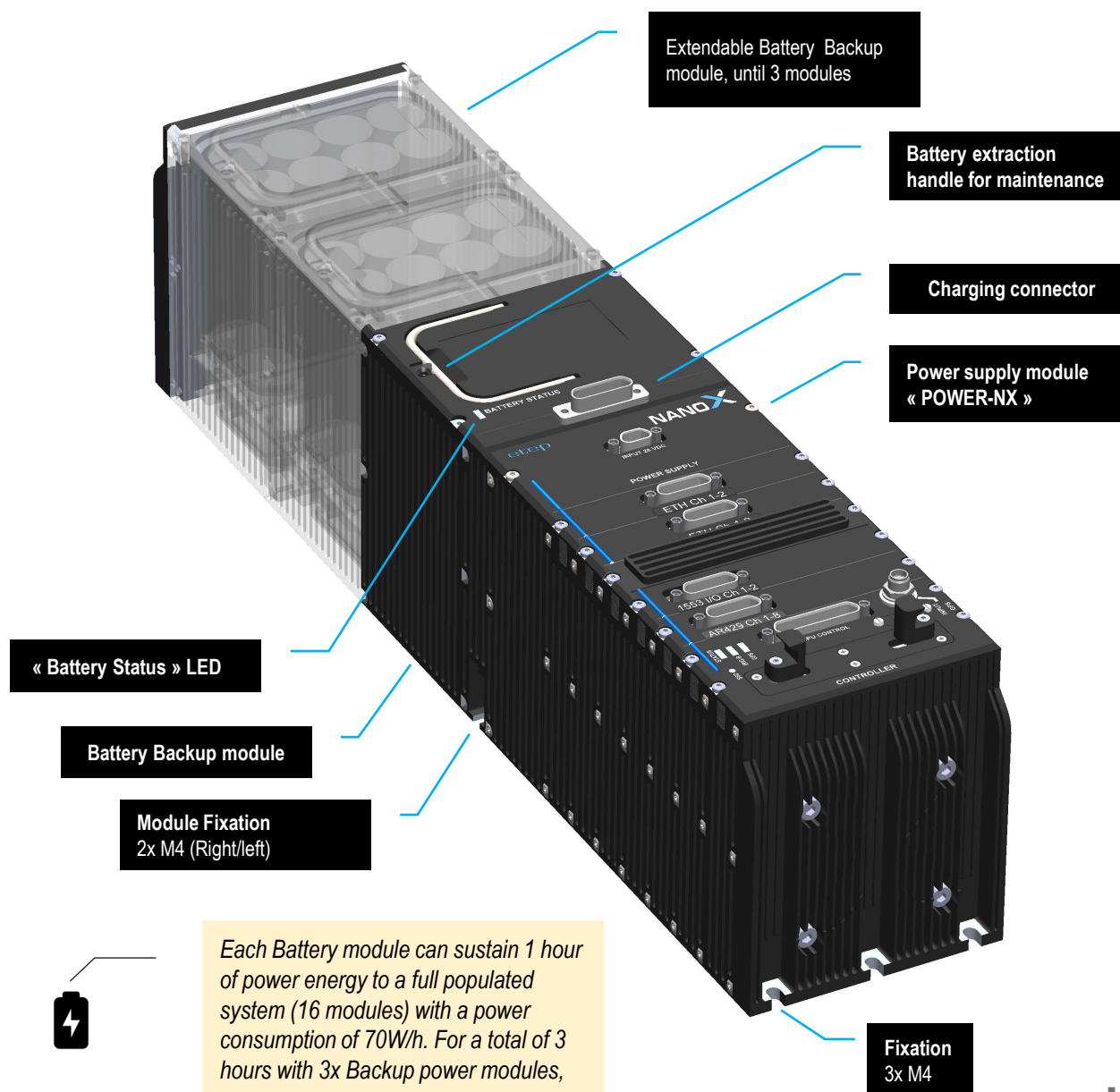
8/16/24ch. Gigabit Ethernet PTP GrandMaster Switch

From 8 to 24 Ch. Gigabit Ethernet Rugged Airborne managed Switch with support of IEEE 1588v1&2 PTP or PTP Grandmaster (GPS & IRIG-B) in option for hardware time stamping for precise time synchronization.

Ethernet Connector Type
PIN   Pin Contact MIL-38999 III
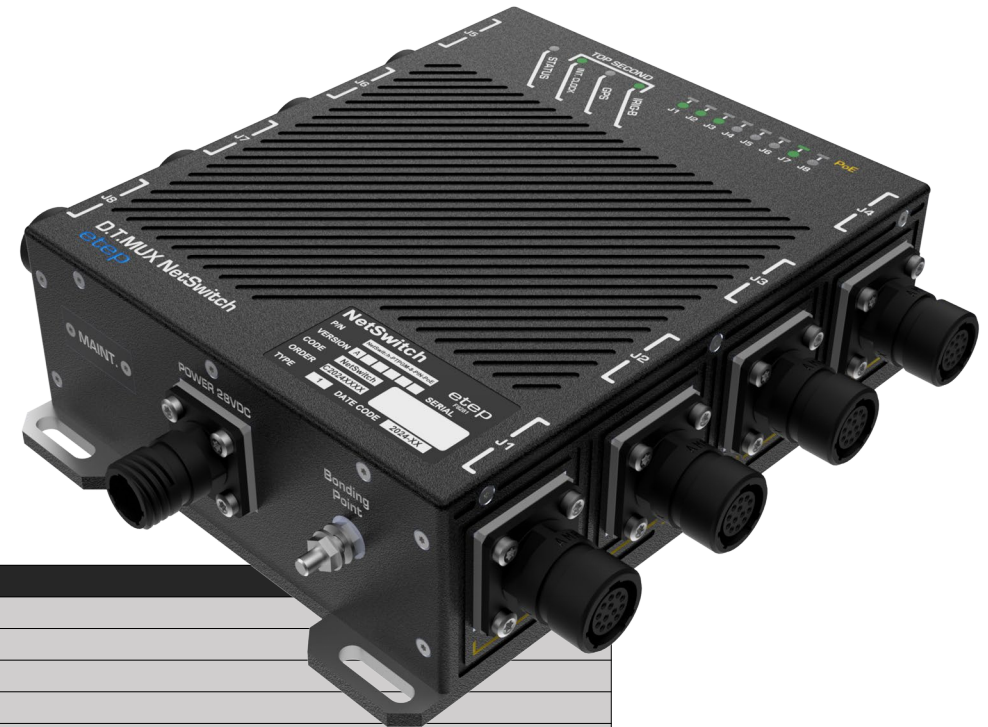**RJ45**   RJ45 MIL-38999 III

Power Over Ethernet
POE   8x PoE+ ports
0   None

NETSWITCH-PTPGM-16-RJ45-POE

Function
Unmanaged: **0** *(or nothing)*
Managed PTP Support: **PTP**
Managed PTP Grand Master: **PTPGM**

Inputs
8   8 ports Gigabit Ethernet
16   16 ports Gigabit Ethernet
24   24 ports Gigabit Ethernet

Hardware Specifications

Ethernet Switch Engine	Carrier Grade Ethernet Switch Chipset (NetSwitch 8Ch/16Ch/24Ch.)
Ports Type	8 to 24 Gigabit Ethernet (10/100/1000 Mbps)
GPS/IRIG B Input Connectors	SMA Serial: R.125.680.000 (PTP Grandmaster Option)
IRIG B Output Connector	SMA Serial: R.125.680.000 (PTP Grandmaster Option)
Ethernet Connectors	MIL-DLT-38999 Series III Pins or RJ45
Power Connector	MIL-DLT-38999 Series III (TV POO RW 0998 PN)
Time Precision Protocol	IEEE 1588 v2 – Grandmaster (Managed GM option) or Transparency mode
Management Access	Web Interface HTTP/HTTPS (Managed)
Input voltage	Wide input rage: +16V to +36V DC with Reverse Polarity Protection
Power Consumption	About 10Watts (8 ports), 15 Watts (16 ports), 25 Watts (24 ports) / Add 8W for GM
Power Over Ethernet (PoE+)	IEEE 802.3at (PoE+) Option, 8 ports with 60W power budget max (30W max by port)
Vibration, Shock, Acceleration	D0-160/MIL-STD-810 Qualified
Operating Temperature	-40°C to +85°C

Dimensions in **mm**.	NetSwitch 8ch.			NetSwitch 16ch.			NetSwitch 24ch.		
	L	W	H	L	W	H	L	W	H
(without connectors)	187.5	138.6	55.1	187.5	138.6	71.7	187.5	138.6	88.3
Weight ~ Kg [lbs]	0/PTP		PTPGM	0/PTP		PTPGM	0/PTP		PTPGM
	1.2 [2.6]		1.5 [3.3]	1.8 [3.9]		2.1 [4.6]	2.4 [5.3]		2.7 [5.9]

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