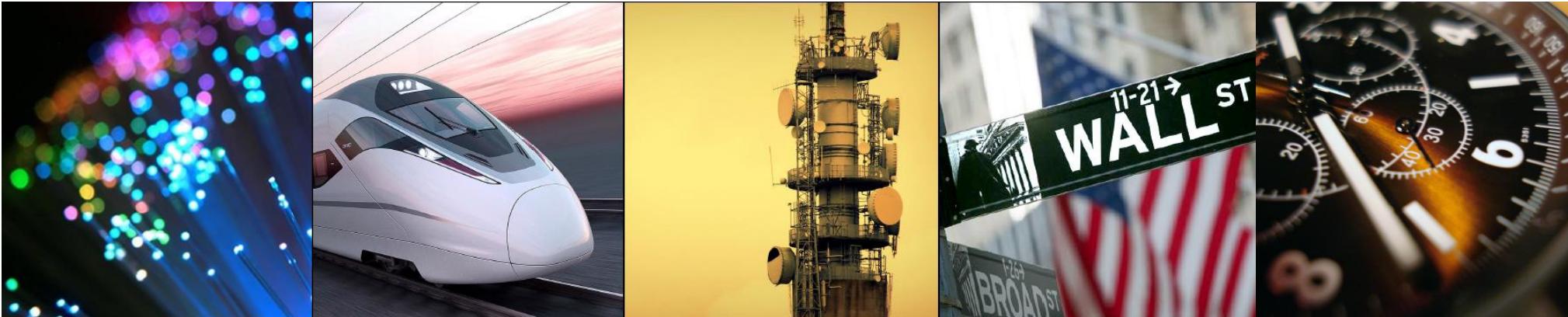


# Net.Time $\Omega$



*Net.Time  $\Omega$  (Omega) allows for multiple configurations to meet the timing demands of any industry, including data centers, stock exchange, broadcast, IoT, power utilities, or air traffic control. The result is always a reliable and fault-tolerant solution to loss of reference, network outages and power failures. Simultaneously Net.Time  $\Omega$  simplifies the migration to PTP without abandoning investments in NTP, IRIG-B or BITS, facilitating on this way the integration, interaction and translation of all types of signals, profiles and protocols.*



*Just in Time*



# ALBEDO: a **global** player of **telecom** appliances

ICT electronics  
(1983)



Trend Comms  
(2001)



ALBEDO (2009-today)

# About Net.Time Ω

3



Net.Time Ω is a modular 4-port PTP/NTP/PRP network clock supporting telecom and power profiles to meet the timing requirements of any industries especially utilities, data centres, broadcast, transportation and air traffic control. The result is a reliable and fault-tolerant solution to power failures, network outages or reference loss.

Net.Time Ω simplifies migration to PTP without abandoning investments in NTP, IRIG-B, MHz or BITS, because facilitating the integration, interaction and translation of all signals, profiles and protocols.

# Net.Time Ω Applications

4



- Power Utilities WAN and Substations
- Railway control and stations
- Air Traffic Control
- IEC-61850 Substations based on PTP, NTP, PRP willing to integrate
- Financial centers
- Broadcast Radio and TV
- Mission-Critical applications

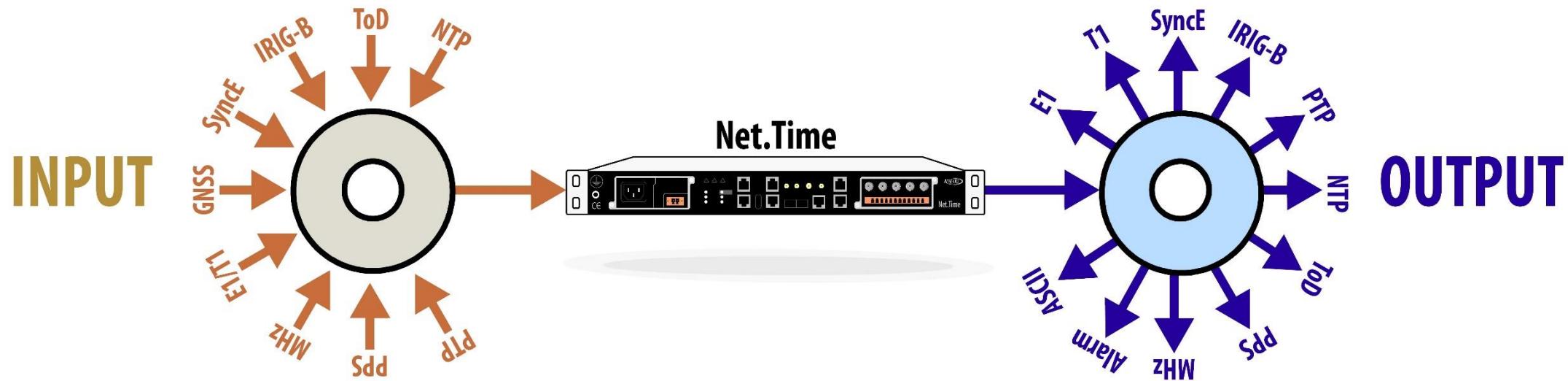
# Oustanding features



- Up to 4 x Ports 1Gb/s (opt/ele)
- NTP one-million transactions per sec.
- PTP: Telecom, Power, Utility profiles
- PTP: up to 1024 unicast clients
- Simultaneous PTP + NTP + SyncE
- PRP for PTP and NTP
- Simultaneous PTP, NTP, SyncE
- Customizable modules for ToD, PPS, T1/E1, IRIG-B, MHz, DCF77,...
- Rubidium HQ / Rubidium / OCXO / TCXO oscillator
- AC: 100 ~ 240 VAC, 50- 60 Hz (IEC 60320 C13/C14)
- DC: 18 ~ 75 VDC or 43 ~160 VDC (2-pin 5.1 mm)
- AC/DC: 85 - 264 VAC and 100 - 370 VDC (2-pin 5.1 mm)
- Lowers Wats: 10 -14 W (with Rb) means reliability
- Up to +70 °C fan-less operation
- Roles: GrandMaster, Boundary, Slave
- Optional Display+ Keyboard
- RADIUS & TACACS+

# Universal Protocol / Profile translator

6

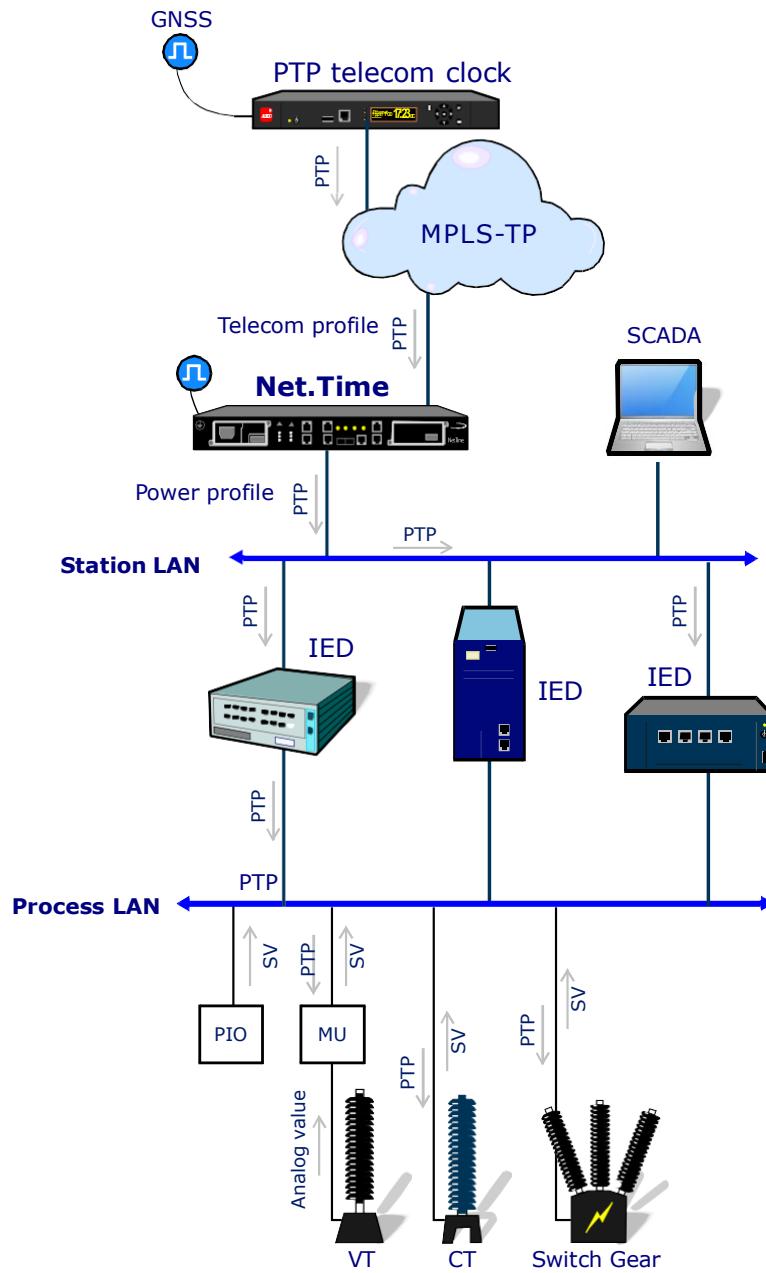


Net.Time is very flexible because it accepts multiple clock references to discipline the internal circuits. GNSS is the default and the most obvious reference but signals such as PTP, NTP, SyncE, ToD, IRIG-B even MHz, E1/T1 can also be used as back-up time references in case of failure of the first reference or in case of GNSS spoofing. Everything will continue as before and without losing the phase or the time of output signals.

It can also translate the PTP profiles for instance being disciplined by PTP telecom profile while offering PTP synchronization with Power profile.

# PTP Protocol and Profile Translation

7



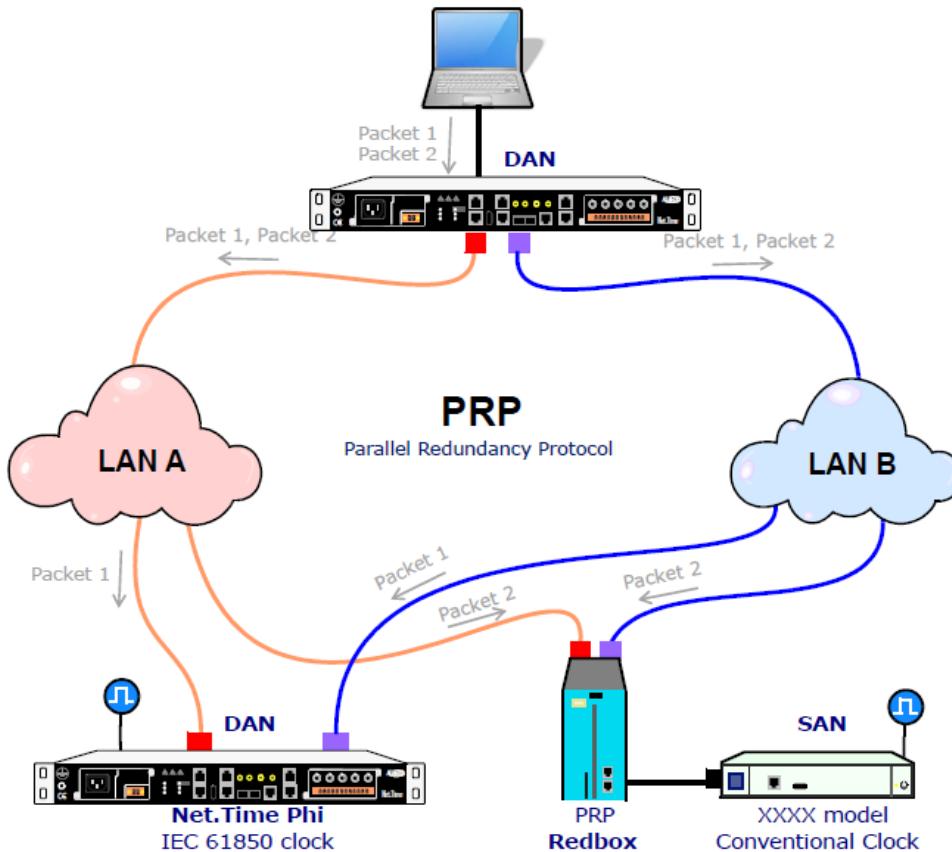
## Protocol translation

- PTP to NTP
- NTP to PTP

## Profile translation

- Telecom to Power or Utility PTP profile
- Default to Power or Utility PTP profile

# PRP fault-tolerant to failures



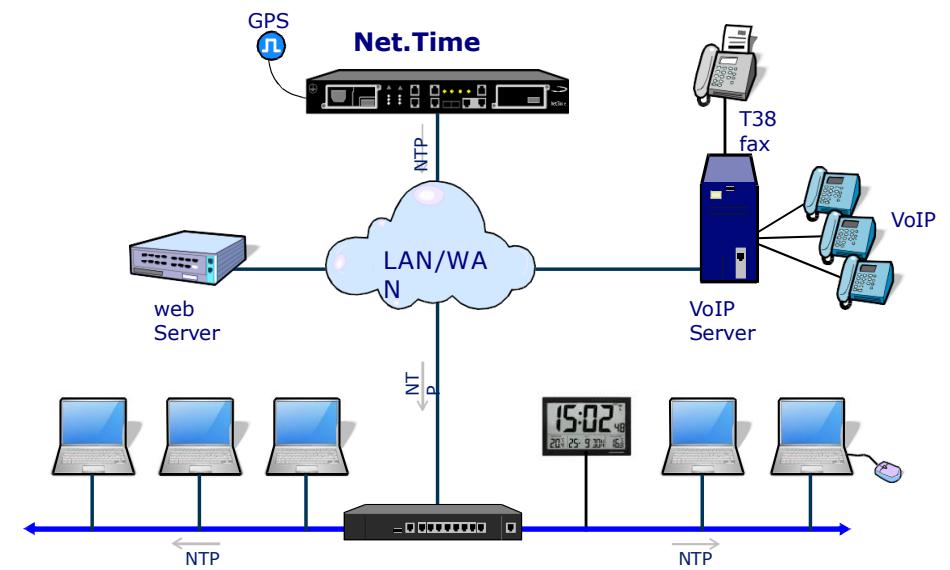
## Mission critical applications

- PRP zero-time recovery for PTP / NTP
- PRP Link Redundancy Entity (LRE) as IEC
- IEC 62439-3, generation of RCT
- Duplicate discard mode and PRP supervision generation / decoding
- PRP extensions for IEEE 1588-2008 / IEC 61588:2009 defined in IEC 62439-3 Annex A connected with Grandmaster PTP clock operation

# Output References: NTP

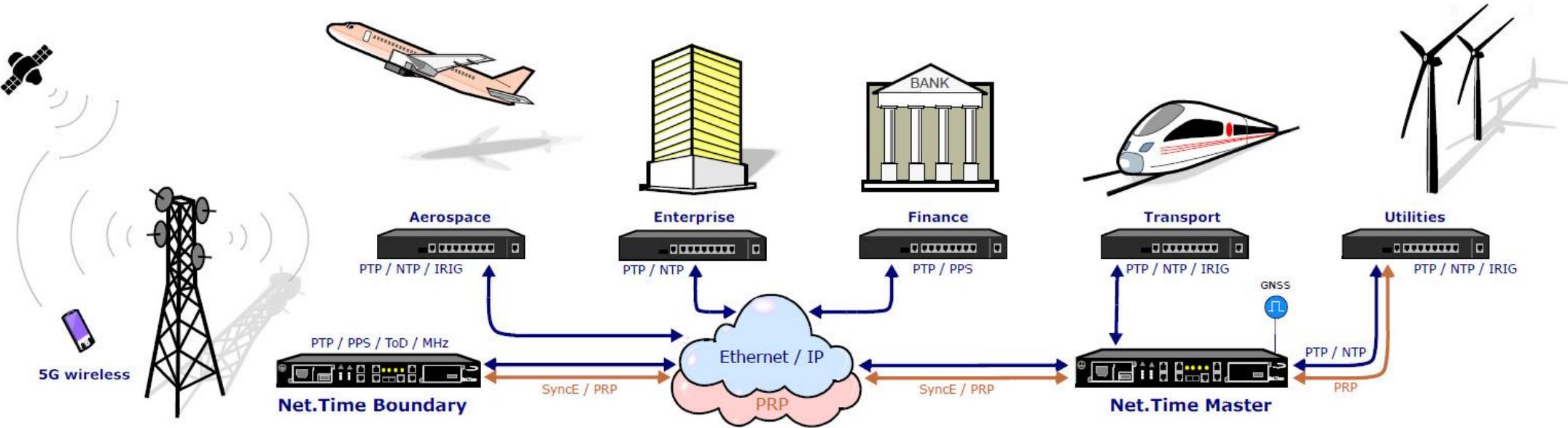


- Server & client modes
- Optical & electrical interfaces
- Two NTP servers with independent configuration
- Supports NTP over PRP for substation applications
- Up to 1 000 000 NTP transactions per second (million!)
- MD5 authentication
- NTP
  - NTPv3 (RFC 1305) (server and client)
  - NTPv4 (RFC 5905) (server and client)
- SNTP
  - SNTPv3 (RFC 1769) (server)



# Fault-tolerant to network failures

10



- ◆ Net.Time supports PRP (Parallel Redundancy Protocol)
  - PTP for PRP (IEC 62439-3 Annex A)
  - Native interfaces
  - Tolerant to one network failure
  - Mission critical applications

# OCXO / Rubidium Performance in Net.Time

Metric	<b>TCXO</b>	<b>OCXO</b>	<b>RB</b>
Locking time	< 1 minutes	< 5 minutes	< 4 hours

Metric	<b>TCXO</b>	<b>OCXO</b>	<b>RB</b>
GNSS (single-band)	±100 ns	± 45 ns	± 40 ns
GNSS (multi-band)*	±100 ns	± 15 ns	±15 ns

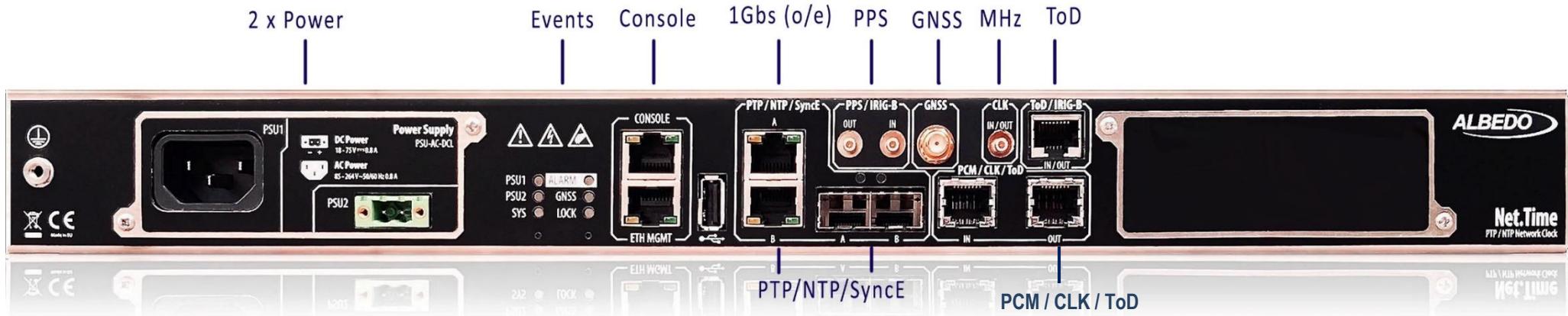


Metric	<b>TCXO</b>	<b>OCXO</b>	<b>RB</b>
Phase within ±100 ns	-	-	10 hours
Phase within ±500 ns	-	2 hours	24 hours
Phase within ±5.0 µs	1 hours	24 hours	1 week
Phase within ±10.0 µs	2 hours	-	-
Phase within ±50.0 µs	24 hours	-	-



# Net.Time Ω main board interfaces

12



## Power Supply

- AC: 100 ~ 240 V, 50 – 60 Hz (IEC60320 C13/C14)
- DCL: 18 ~ 75 V (2-pin 5.1 mm)
- DCH: 43 ~ 160 V (2-pin 5.1 mm)
- AC/DC: 85 – 264 VAC and 100 – 370 VDC (2-pin 5.1 mm)
- Single or redundant power supplies (any combination)
- Power consumption: 10 W (OCXO), 14 W (Rubidium)

## Display 192 x 32 pixels

- Date: Day, Time, Time scale (UTC, TAI, ARB...)
- Oscillator status: Free, Locked, Locking, Holdover...
- Clock reference: GNSS, PTP, NTP...
- Position: latitude, longitude, ellipsoidal height
- System: S/N, Ver, MAC, IP, Mask, Gateway, DNS

## Control

- 2 x RJ45: Console and Management
- 1 x USB: SW/FW upgrade & Storage

## Timing

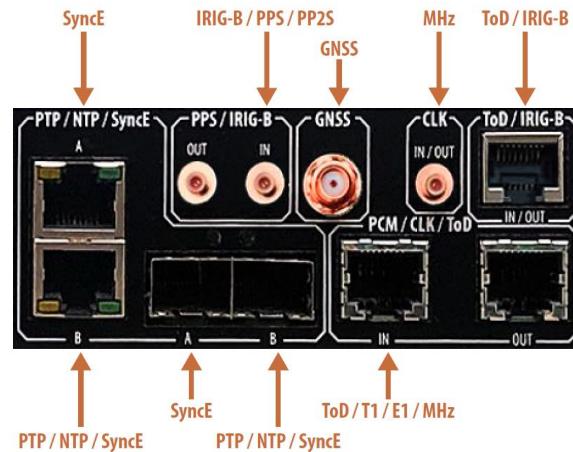
- 2 x SFP (Up to 1 Gbit/s)
- 2 x RJ-45 (Up to 1 Gbit/s)
- 1 x SMA: unbalanced 50 Ω
- 3 x SMB: unbalanced 50 Ω
- 3 x RJ-48: balanced (RS-422) 100 Ω

## Duble set of LEDS (front + rear)

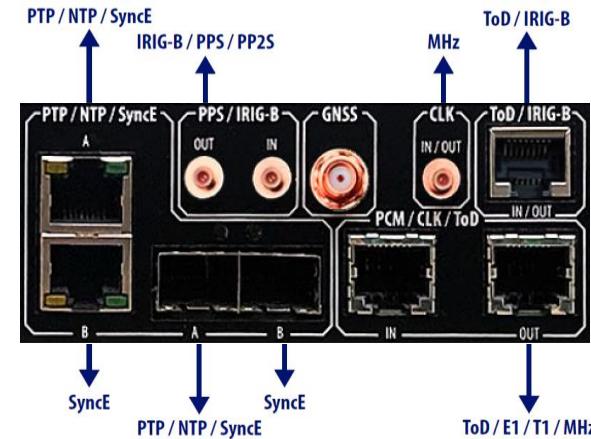
- Platform: PSU1, PSU2, System
- Application: Alarm, GNSS, Locked

# Timing signals: main board

## clock reference inputs



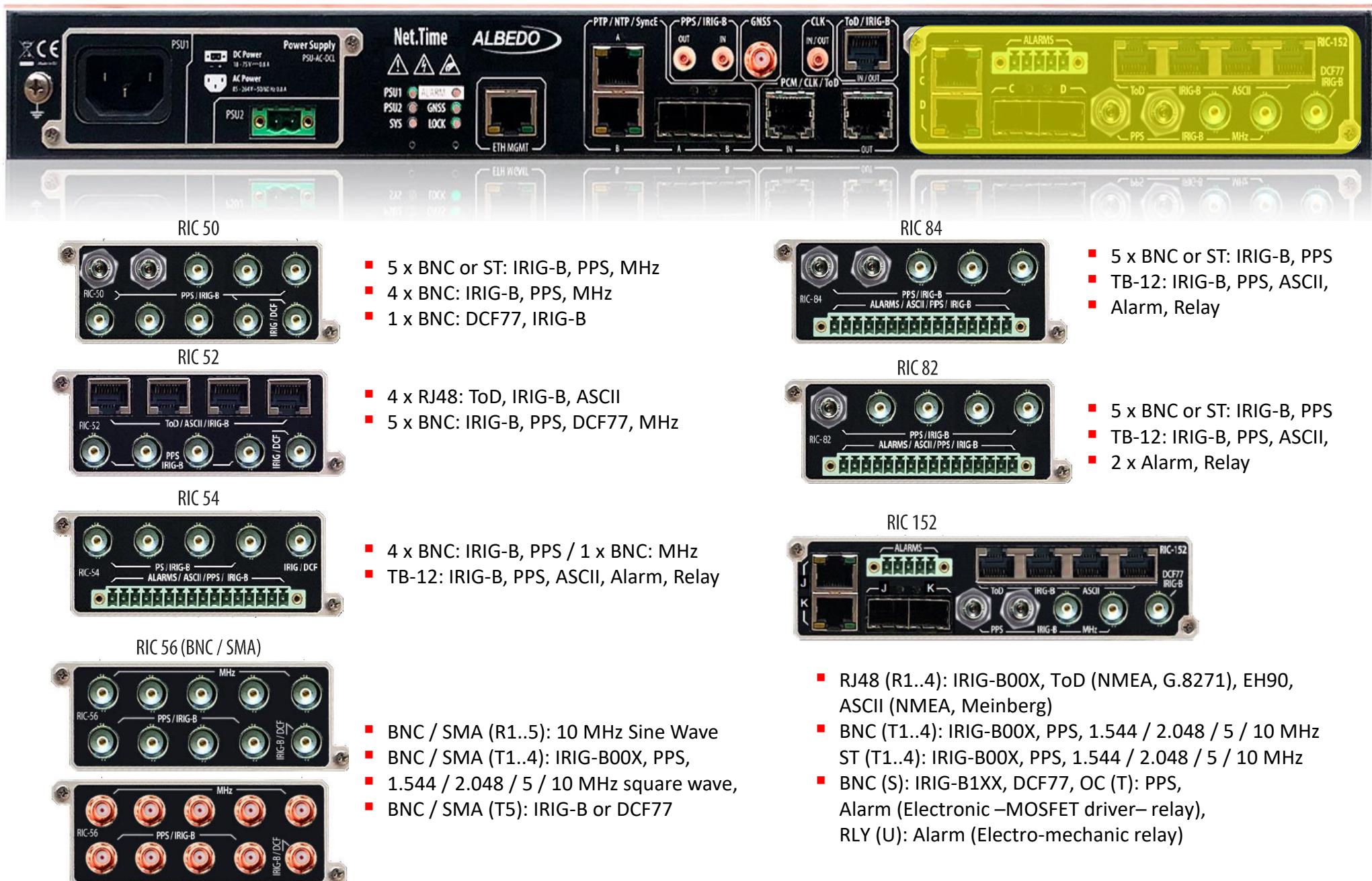
## synchronization outputs



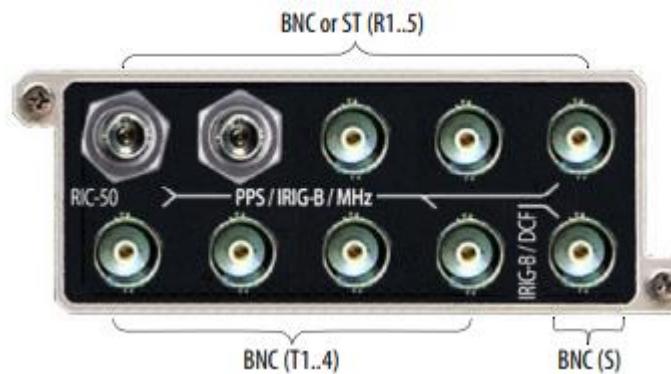
	GNSS	PTP	NTP	SyncE	ToD	IRIG-B	PPS	T1/E1	MHz
RJ45 (A, J)		out	out	out					
SPF (A, J)		out	out	out					
RJ45 (B, K)		in/out	in/out	in/out					
SPF (B, K)		in/out	in/out	in/out					
RJ48 (C)					in			in	in
RJ48 (D)					out			out	out
SMB (E)						out	out		
SMB (F)						in	in		
SMA (G)	in								
SMB (H)								in/out	
RJ48 (I)					in/out	in/out		out	out

# Net.Time Ω is modular

14

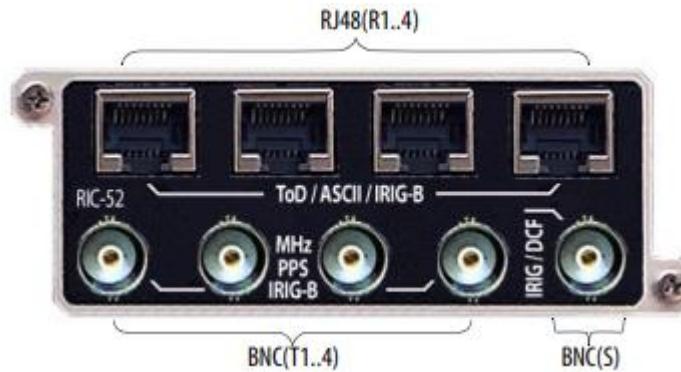


# Module RIC 50



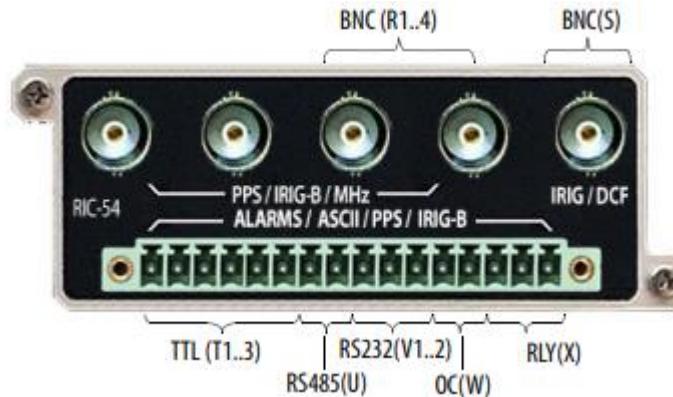
	IRIG-B	PPS	DCF77	MHz
ST (R1..5)	out	out		out
BNC (R1..5)	out	out		out
BNC (S)	out		out	
BNC (T1..4)	out	out		out

# Module RIC 52



	ToD	IRIG-B	PPS	ASCII	DCF77	MHz
RJ48 (R1..4)	out	out		out		
BNC (S)		out			out	
BNC (T1..5)		out	out			out

# Module RIC 54



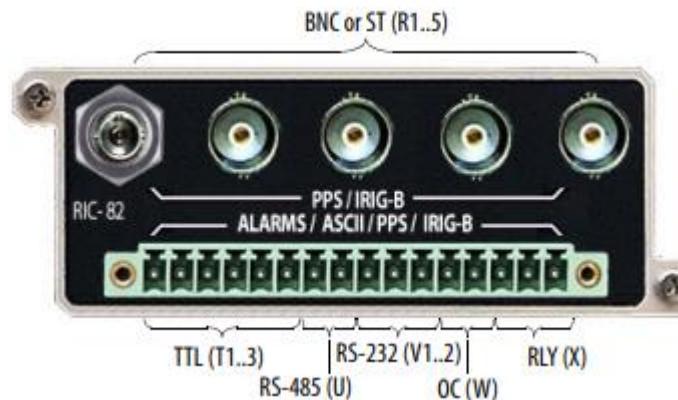
	IRIG-B	PPS	ASCII	DCF77	Alarm	MHz
BNC (R1..4)	out	out				out
BNC (S)	out			out		
TTL (T1..3)	out	out				
RS485 (U)	out	out	out			
RS232 (V1..2)			out			
OC (W)		out			out	
RLY (X)					out	

# Module RIC 56 (BCN or SMA)



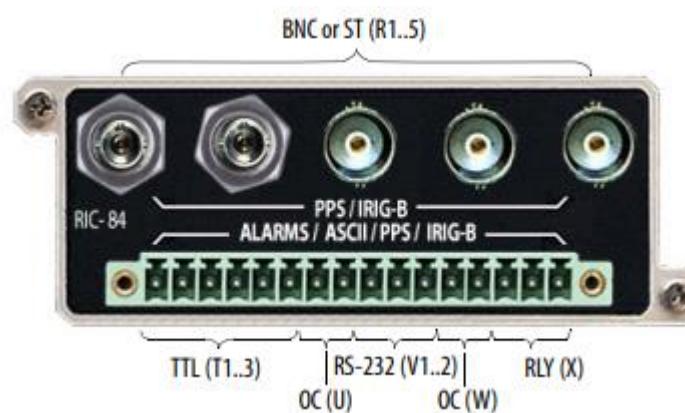
	IRIG-B	PPS	DCF77	MHz
BNC / SMA (R1..5)				out
BNC / SMA (S)	out		out	
BNC / SMA (T1..4)	out	out		out

# Module RIC 82



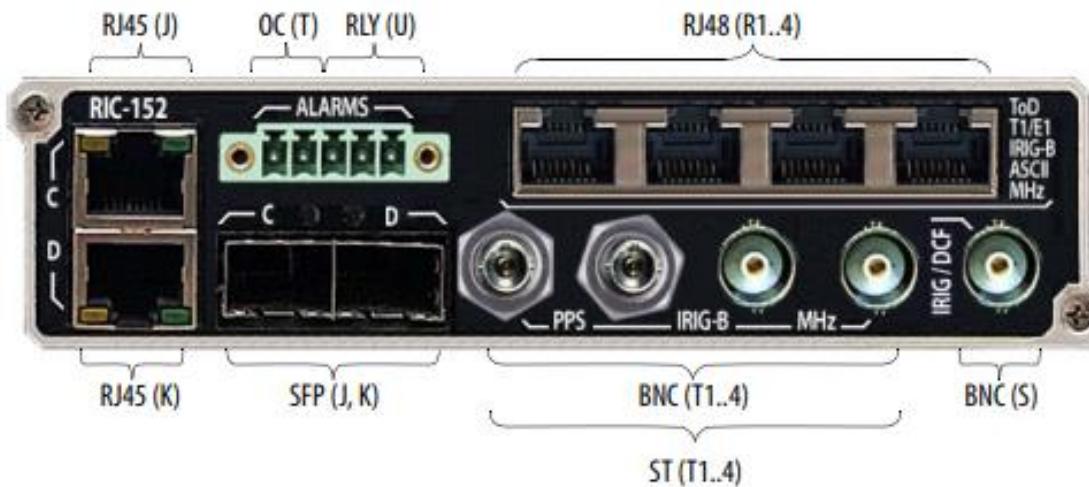
	IRIG-B	PPS	ASCII	Alarm
ST (R1..5)	out	out		
BNC (R1..5)	out	out		
TTL (T1..3)	out	out		
RS485 (U)	out	out	out	
RS232 (V1..2)			out	
OC (W)		out		out
RLY (X)				out

# Module RIC 84



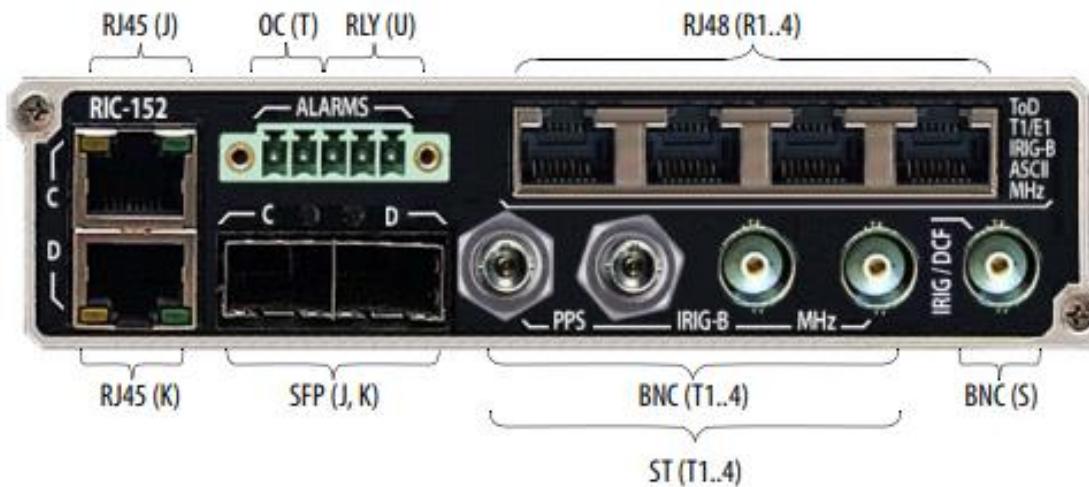
	IRIG-B	PPS	ASCII	Alarm
ST (R1..5)	out	out		
BNC (R1..5)	out	out		
TTL (T1..3)	out	out		
OC (U)		out		out
RS232 (V1..2)			out	
OC (W)		out		out
RLY (X)				out

# Module RIC 152



# Module RIC 152

22

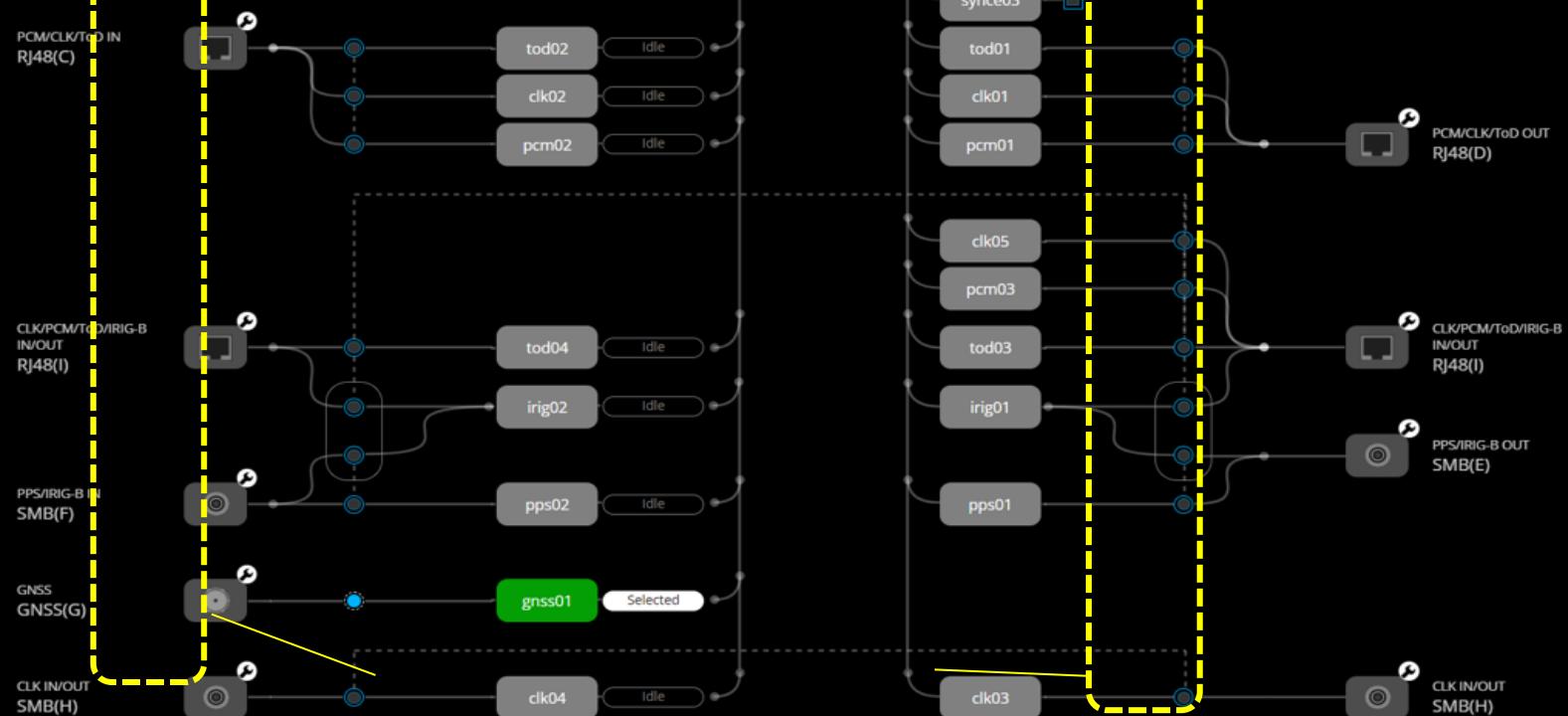


# Web Server Interface

The screenshot shows a web browser window titled "Net.Time". The address bar displays the URL "172.26.4.244". The page content is a login interface for a "PTP / NTP Network Clock". The logo features a clock icon with the text "Net.Time" and "PTP / NTP Network Clock". The status bar at the top of the page says "Unconnected". The login form includes fields for "User" (set to "admin") and "Password" (represented by four dots). A "LOG IN" button is at the bottom of the form. To the right of the login form, yellow text lists the features provided by the web server:

- The web server
- + configuration
- + the status
- + input / output ports

## Front panel connection



## Additional references

# Network Management System

25



## AGNOSTIC Solution

- FCAPS-based system for multi-vendor and multi-technology network infrastructure.
- Flexible and modular ideal for mission critical networks.
- Monitoring of alarms, status, statistics, inventory, circuits, and performance, allowing for visualization of temporal correlation of events and their impact on services.
- Consolidating the management of legacy and next generation networks, enabling OT&IT convergence.
- Configuration and provisioning of E2E circuits, backup history, firmware update.

# SGRwin solutions suite

26

## OSS - Operations Support System

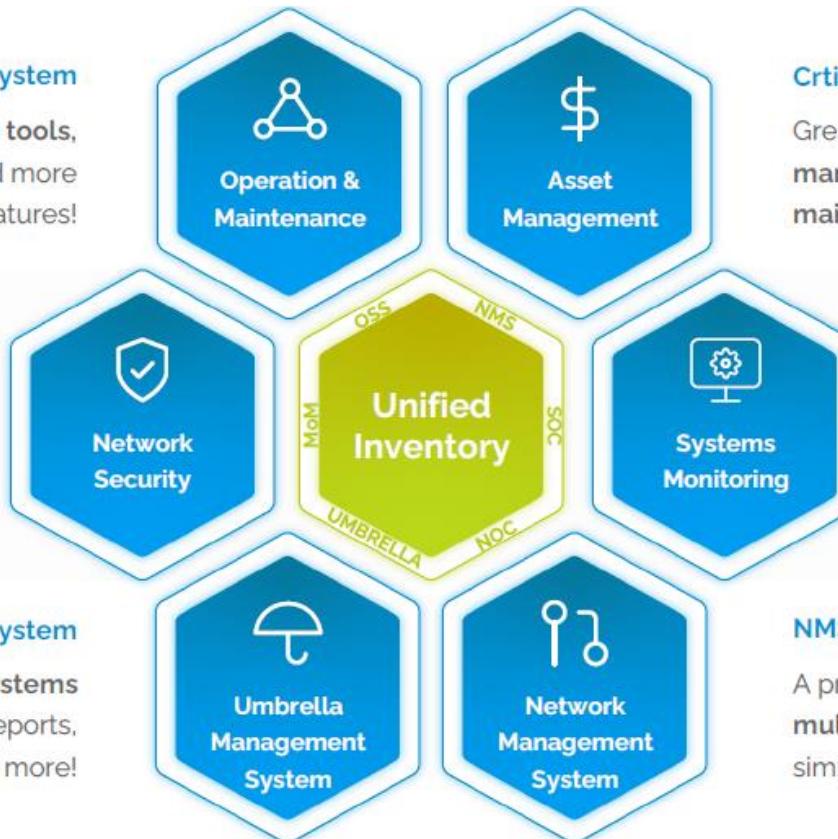
Service provisioning, fault correlation tools, massive backup execution. All of these and more features!

## Network Security

Access control, authentication, DB encryption, reporting, and integration with external cybersecurity systems and more features.

## UMS - Umbrella Management System

A single solution integrating data from systems and monitoring tools, delivering advanced reports, inventory and much more!



## Critical Asset Management

Greater asset visibility and control, improved management, configuration, operation and maintenance processes.

## Systems Monitoring

Monitor critical network systems, important processes, and essential services within your company's management.

## NMS – Network Management System

A product with a strong background, designed for multi-vendor and multi-technology networks that simplifies monitoring and management operations

# SGRwin Highlighted features

27

F

## FAULT MANAGEMENT

- Network Topology.
- Alarm management and Correlation.
- Ad-hoc Dashboards and reports.
- Asset visualization.

C

## CONFIGURATION MANAGEMENT

- Asset Configuration
- Asset Auto-Discovery
- Asset Integrator
- Massive operations

A

## ACCOUNTING MANAGEMENT

- Network Inventory
- Advanced Analytics
- Reporting
- Integration

P

## PERFORMANCE MANAGEMENT

- Historical Statistics
- Real-Time Events
- Services performance
- Health indicators

S

## SECURITY MANAGEMENT

- Auditor
- User management
- Log activity
- High availability

# Competitive Advantages

28



- Brand-new platform with a 25 life cycle ahead
- + 40 year in Timing expertise
- 3 years default and up to 10 years warranty
- Low Power consumption (lower failures)
- Up to 75°C fanless operation
- Supports legacy (IRIG-B, MHz...) and IEC 61850
- Full support of PRP
- Universal Protocol Translator
- Universal PTP profile Translator
- Smart module to satisfy any customer need
- 100% made-in-EU (designed + manufacturing)

# Certifications

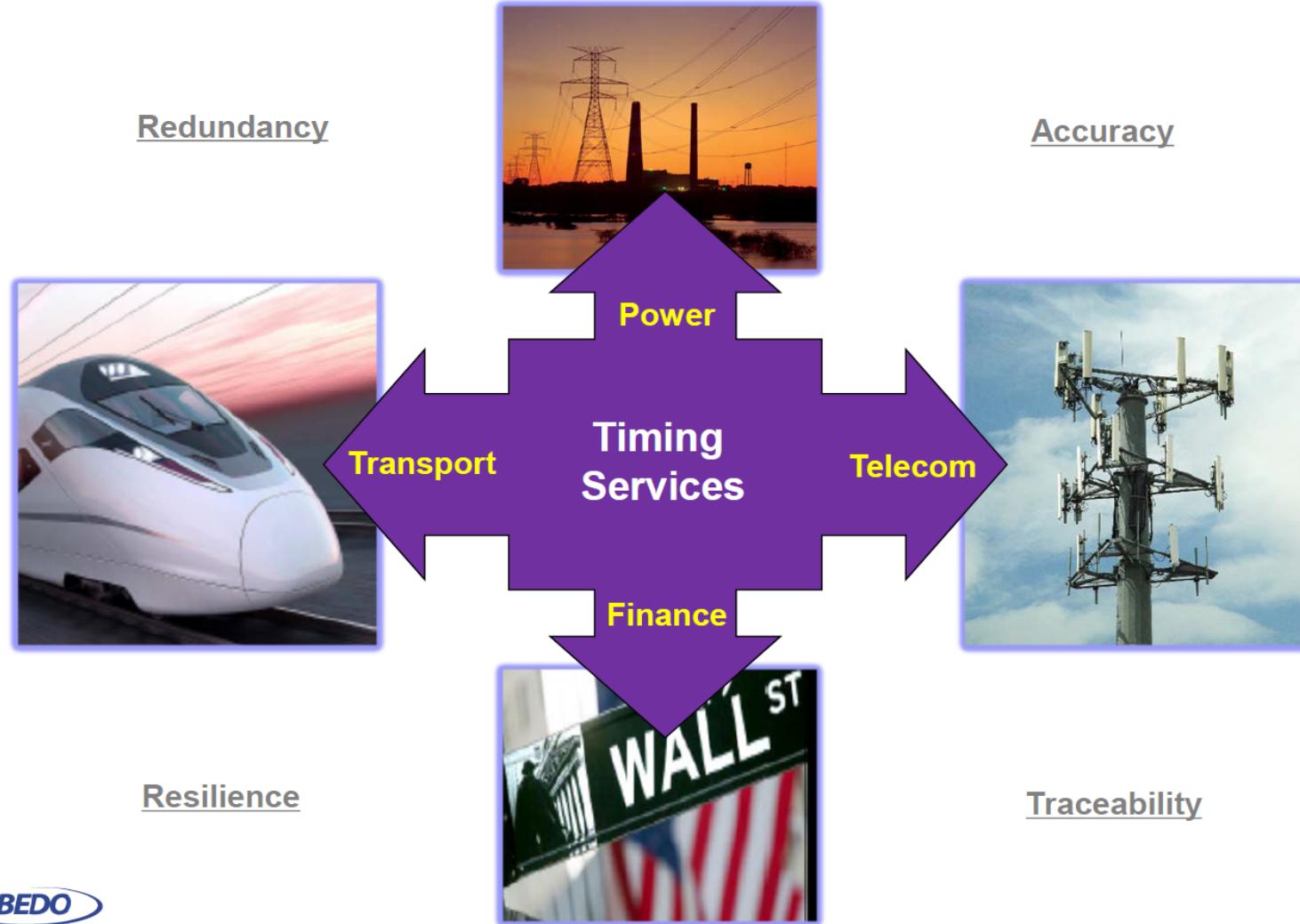
29



**IEC 61850**



- ISO 9001
- IEC 61850-3
- IEEE 1613 (C37.90.1/.2/.3)
- EMC & Product Safety
- Climatic Performance
- Mechanical Performance
- Intertek Audio/Video, Information and Communication Technology Equipment
  - Part 1: Safety Requirements [UL62368-1 :2019 Ed.3]
- Intertek Audio/Video, Information and Communication Technology Equipment
  - Part 1: Safety Requirements [CSAC22.2#62368-1 :2019 Ed.3]
- ISO 14040 LCA



The global market size exceeds 2.0 million nodes and, according to the GNSS Agency, will reach 3.5 million by 2025. Growth is driven by the increasing number of applications in many sectors and, depending on the development of IoT technologies, could be higher than actual forecasts.

# Timing requirements by industry

31



	Telecom	Power	Finance	Transport	Broadcast
Accuracy	Sub-microsecond Hold-over 1us/day	Microsecond Hold-over 1us/day	100 microsecond Hold-over 1us/day	Microsecond Hold-over 1us/day	10 microsecond Hold-over 1us/day
Requirements	Frequency Phase	Frequency Phase ToD	Frequency Phase ToD	Frequency	Frequency Phase
Features	Authentication Robustness Availability	Authentication Redundancy Availability	Authentication Traceability	Robustness Availability	Availability
Profiles	Telecom, PPS,	Power, Telecom, Utility	Finance, Telecom	Power, Telecom	Broadcast, telecom
Signals	PTP, NTP, BITS	PTP, NTP, PPS, ToD, IRIG-B, DCF77	PTP, NTP	PTP, PPS, NTP, IRIG-B, DCF77	PTP, PPS, NTP, IRIG-B, DCF77

# Net.Time: 3 x Models

		Net.Time φ (Phi)	Net.Time Ω (Omega)	Net.Time T (Tau)
DIFFERENCES	Default rate	100 Mb/s (upgradeable to 1Gb/s)	1 Gb/s	1 Gb/s
	Ports	Up to 4 ports	Up to 4 ports	2 ports
	Alarm relay contacts	Optional	Optional	-
	Display	Yes	Optional	-
	Modules	Optional	Optional	-
	IRIG-B	Yes (i/o)	Optional	-
	NTP	Yes (i/o)	Yes (i/o)	-
	NTP transactions	Up to 1,000,000 / sec	Up to 1,000,000 / sec	-
	PRP	Optional	Optional	-
	PTP Power profile	Yes	Optional	-
	PTP Utility profile	Yes	Optional	-
	PTP Telecom profile	Optional	Optional	Yes (i/o)
	PTP unicast clients	Up to 1024	Up to 1024	Up to 512
	SyncE	-	Optional (i/o)	Yes (i/o)
COMMON FEATURES	Platform	19", 1 RU, Aluminum case, Up to 4 Ethernet modules		
	Temperature	-40 ~ +70°C (Passive cooling)		
	Power Supply	Redundant power supply (Single or Double) • AC: 100 ~ 240 VAC, 50- 60 Hz (IEC 60320 C13/C14) • DC: 18 ~ 75 VDC or 43 ~ 160 VDC (2-pin 5.1 mm) • AC/DC: 85 - 264 VAC and 100 - 370 VDC (2-pin 5.1 mm)		
	GNSS	72 channels (GPS, GLONASS, BeiDou, Galileo), Single/Multi-band		
	Oscillators	TCXO, OCXO, OCXO High Quality, Rubidium, Rubidium High Quality		
	Accuracy	GNSS <40 ns, ToD <10 ns		
	Holdover	• Rubidium: 100 ns @ 10h; 500 ns @ 24 hours; 1µs @ 48 hours • OCXO: 500 ns @ 2 hours; 1µs @ 4 hours; 5µs @ 24 hours		
	PTP Default profile	All models		
	Time signals (in/out)	PTP, NTP, ToD, n x PPS, IRIG-B, SyncE, MHz, T1, E1, DCF77, EH90		
	Protocol Translator	Any input signal or protocol to any output signal or protocol		
	Configuration	Slave / Master / Boundary (up to 1024 unicast clients)		
	Access Control	• RADIUS (Remote Authentication Dial-In User Service) • TACACS+ (Terminal Access Controller Access-Control System Plus)		
	Management	Web Server, CLI, Syslog, SNMP v2, v3, SGRwin		

# ALBEDO customers (2023)

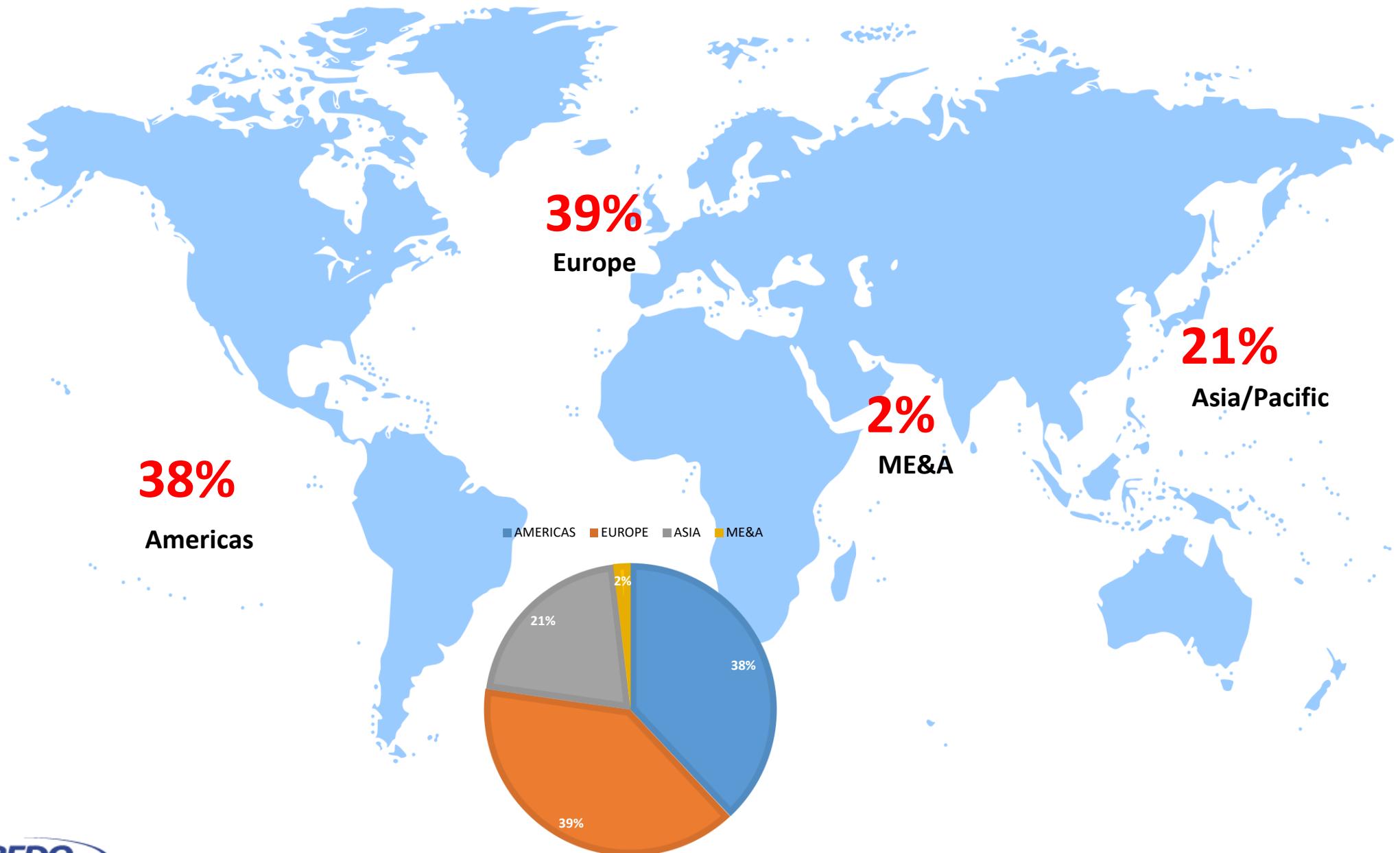


**Power  
(61%)**

**Telcos  
(24%)**

**Other  
(15%)**

# Sales Distribution (2023)



# Customers Clocks & Testers



That's all



[www.albedotelecom.com](http://www.albedotelecom.com)

