

Net.Time Ω



Net.Time Ω allows for multiple configurations to meet the timing demands of any industry, including data centres, 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 Ω 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.

ALBEDO
Just in Time

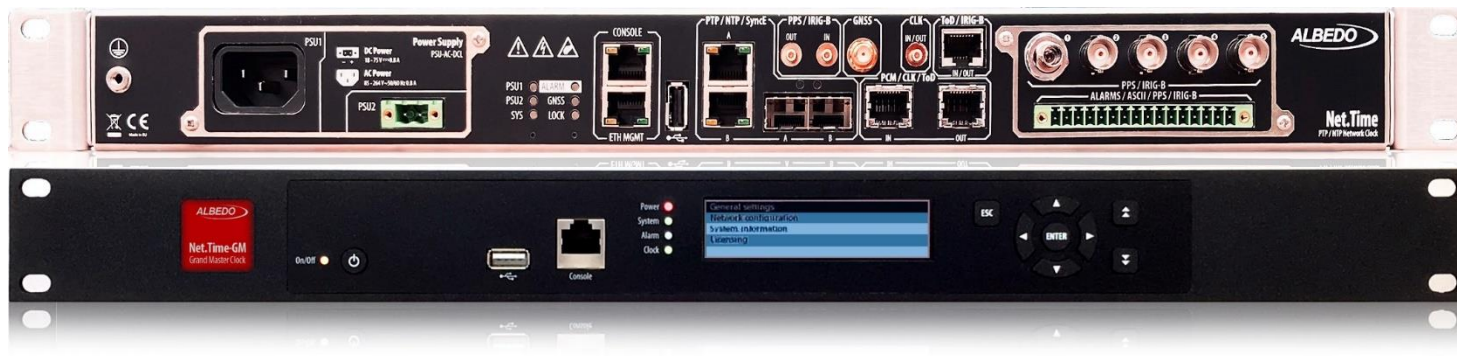
ALBEDO: a global player of **telecom** appliances



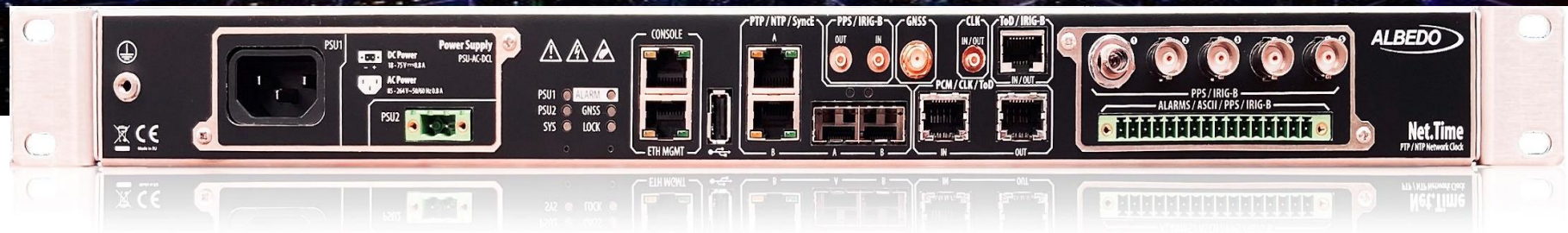
ICT electronics
(1983)



Trend Comms
(2001)



ALBEDO (2009-today)



Net.Time Ω is a flexible clock ideal for industries that are using NTP servers but plan to migrate to PTP or have to support legacy protocols such as IRIG-B.

Net.Time Ω has been designed in a modular way to solve any synchronization need of the industry, so that it is possible to integrate under the same architecture any combination of timing protocols including PTP, NTP, PRP, ToD, PPS, IRIG-B, DCF77, SyncE, MHz, T1/E1 and ASCII outputs.



- Wireless Networks devoted to control and timing
- 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

- OCXO default oscillator
- Rubidium optional oscillator

Locking time

Metric	OCXO	Rubidium
Locking time	< 5 minutes	< 4 hours

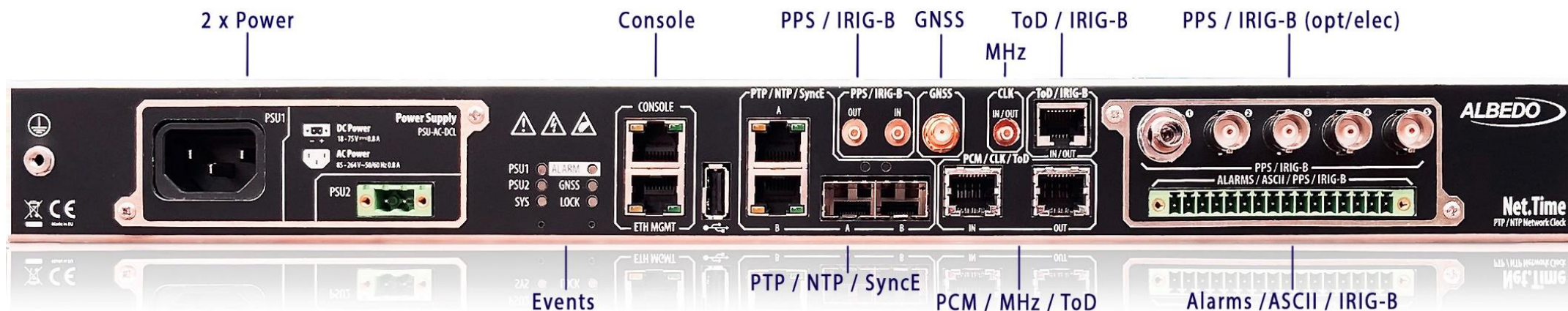
Performance locket 24h.

Metric	OCXO	Rubidium
GNSS	± 45 ns	± 40 ns
1PPS / ToD	± 10 ns	± 10 ns

Performance in hold-over

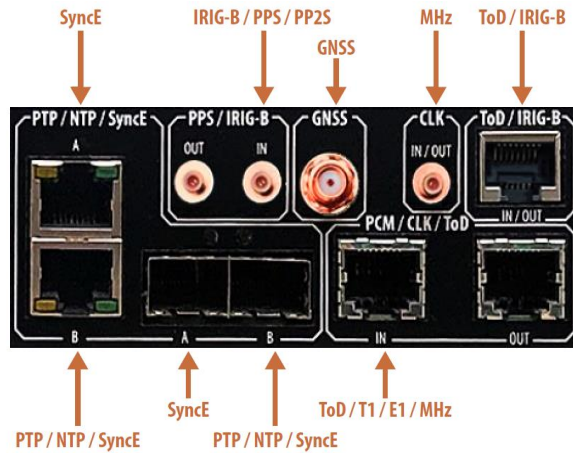
Metric	OCXO	Rubidium
Phase within ± 100 ns	-	10 hours
Phase within ± 500 ns	2 hours	24 hours
Phase within ± 1.0 μ s	4 hours	48 hours
Phase within ± 10.0 μ s	24 hours	-



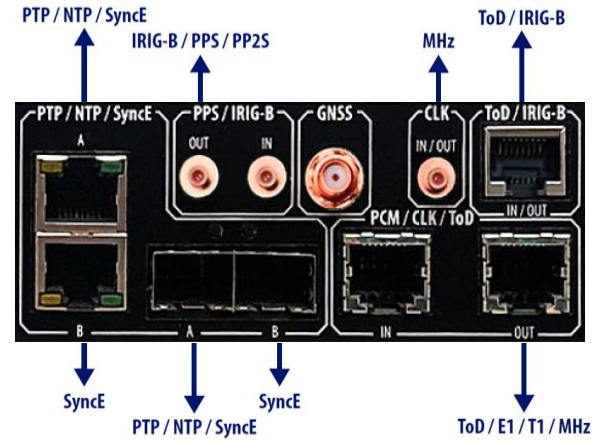


- 2 x 1Gb/s Optical & Electrical
- PTP telecom, power profile
- PTP and NTP over PRP
- Two combinable AC/DC sockets
- 6xLEDs (3xSystem + 3xTiming)
- 2xRJ45: Console and Remote Management
- USB port: update, data, results
- 2xSFP: 1 Gb/s in/out timing
- 2xRJ45: 1 Gb/s in/out timing
- 2xRJ48: in/out timing
- 3xSMB: in/out timing
- 1xSMA: GNSS

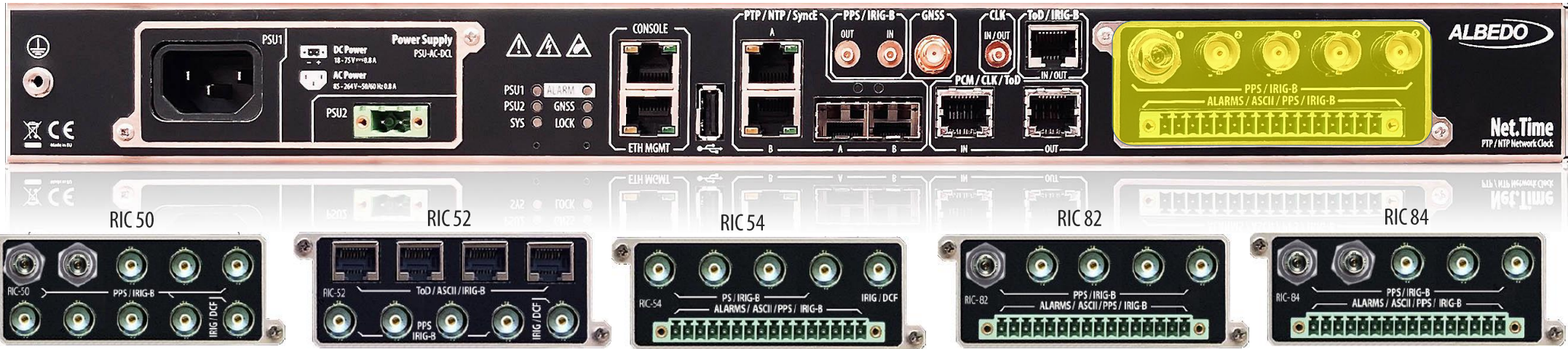
clock reference inputs



synchronization outputs

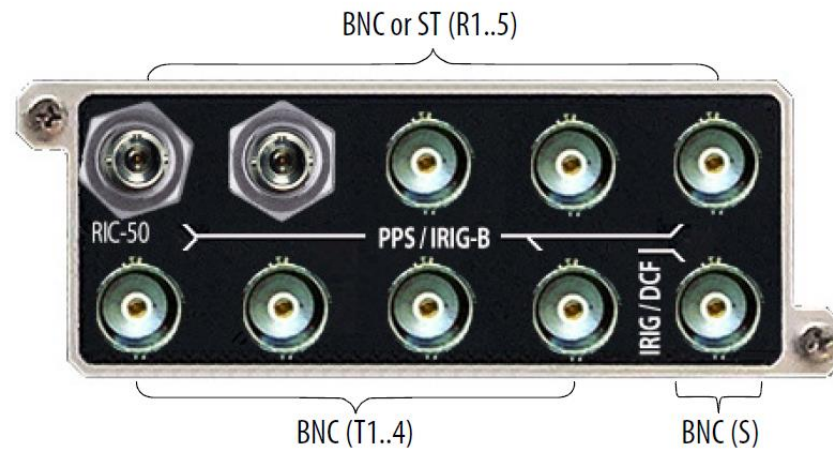


	GNSS	PTP	NTP	SyncE	ToD	IRIG-B	PPS	T1/E1	MHz
RJ45 (A)		out	out	out					
SPF (A)		out	out	out					
RJ45 (B)		in/out	in/out	in/out					
SPF (B)		in/out	in/out	in/out					
RJ48 (C)					in			in	in
RJ48 (D)					out			out	out
SMB (E)						out	out		
SMB (F)						in	in		
SMA (G)	in								
SMB (H)									out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

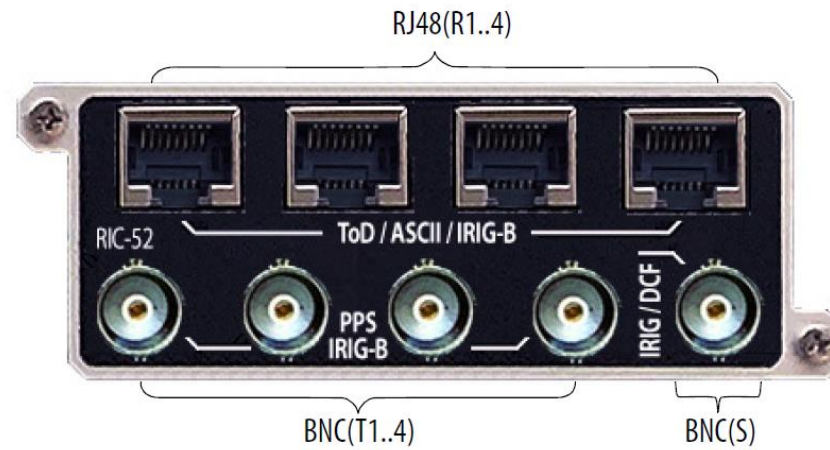


Variety of modules to satisfy most of industry timing requirements:

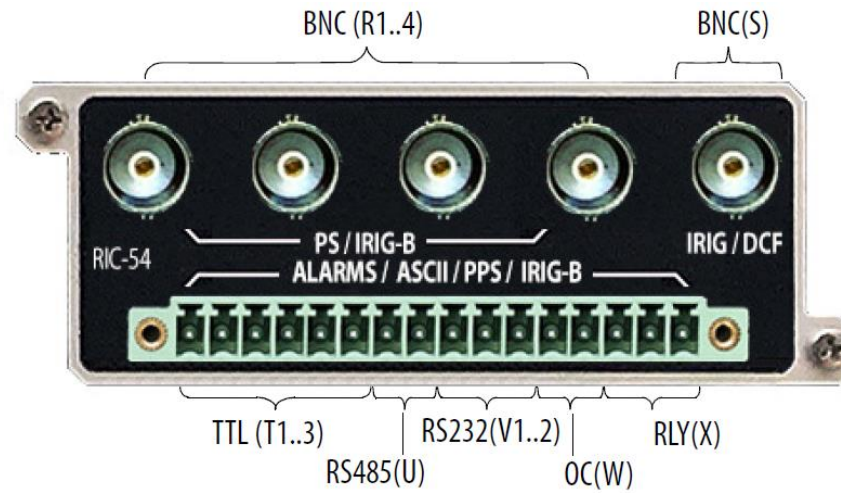
- N x PPS or PP2S
- N x ToD
- N x MHz
- N x IRIG-B (optical & electrical)
- N x DCF77
- N x ASCII
- NMEA
- Alarms



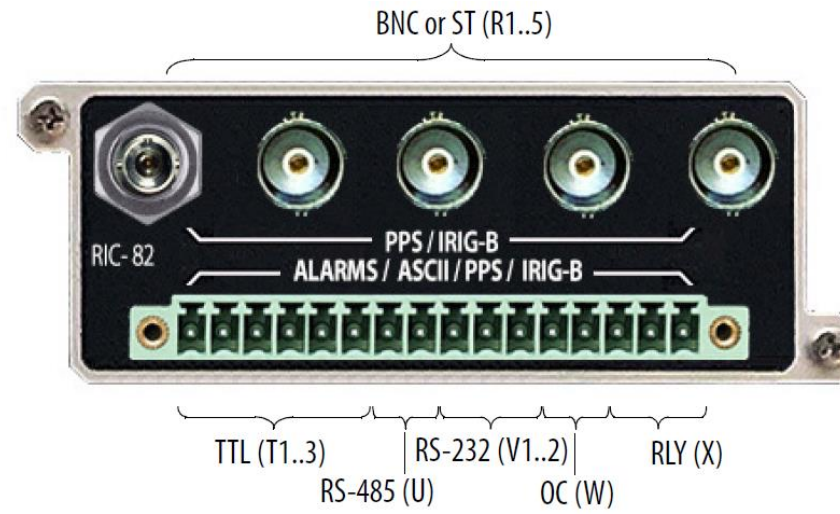
	ToD	IRIGB	PPS	ASCII	DCF77	Alarm	MHz
ST (R1..5)		out	out				out
BNC (R1..5)		out	out				out
BNC (S)		out			out		
BNC (T1..4)		out	out				out



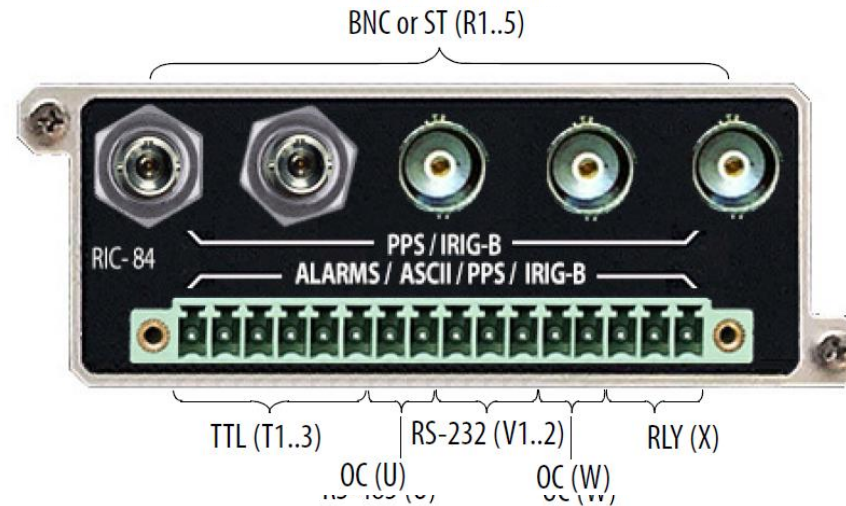
	ToD	IRIGB	PPS	ASCII	DCF77	Alarm	MHz
RJ48 (R1..4)	out	out		out			
BNC (S)		out			out		
BNC (T1..5)		out	out				out



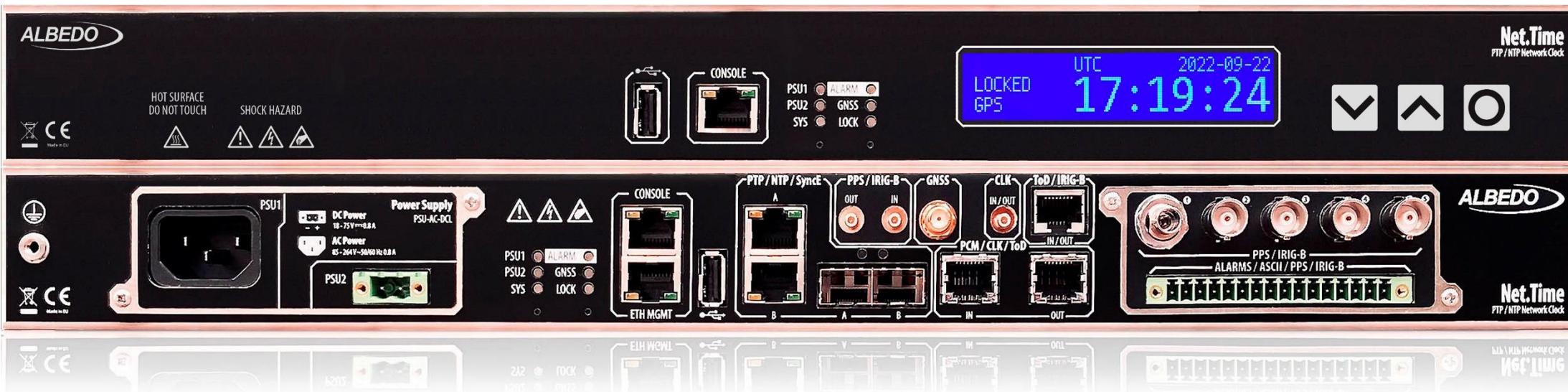
	ToD	IRIGB	PPS	ASCII	DCF77	Alarm	MHz
BNC (R1..4)		out	out				out
BNC (S)		out			out		
TTL (T1..3)		out	out				
RS485 (U)		out	out	out			
RS232 (V1..2)				out			
OC (W)			out			out	
RLY (X)						out	



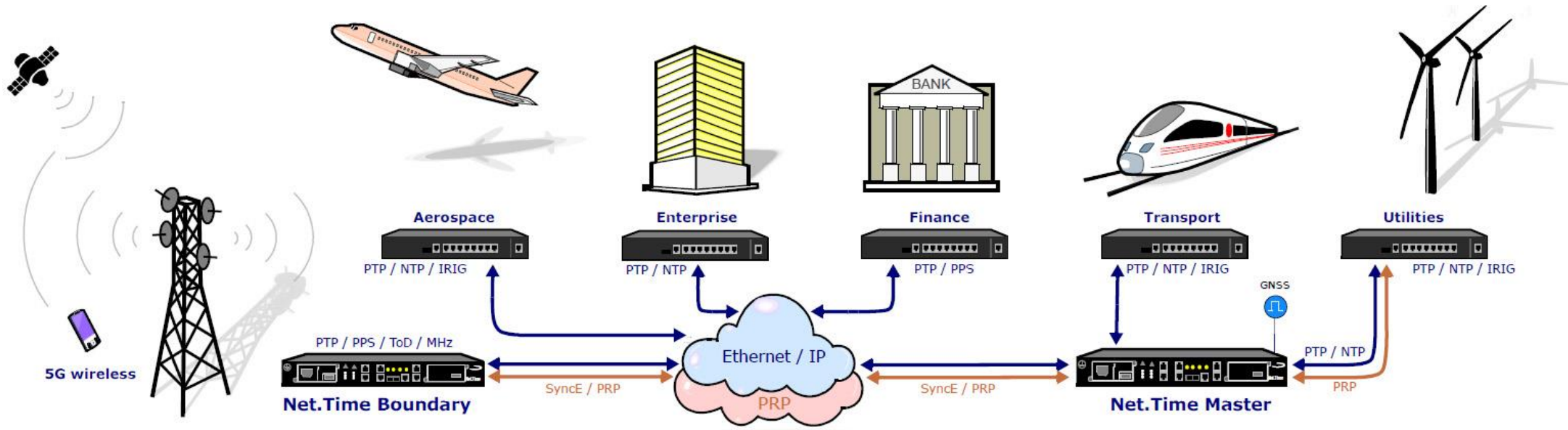
	ToD	IRIGB	PPS	ASCII	DCF77	Alarm	MHz
ST (R1..5)		out	out				
BNC (R1..5)		out	out				
TTL (T1..3)		out	out				
RS485 (U)		out	out	out			
RS232 (V1..2)				out			
OC (W)			out			out	
RLY (X)						out	



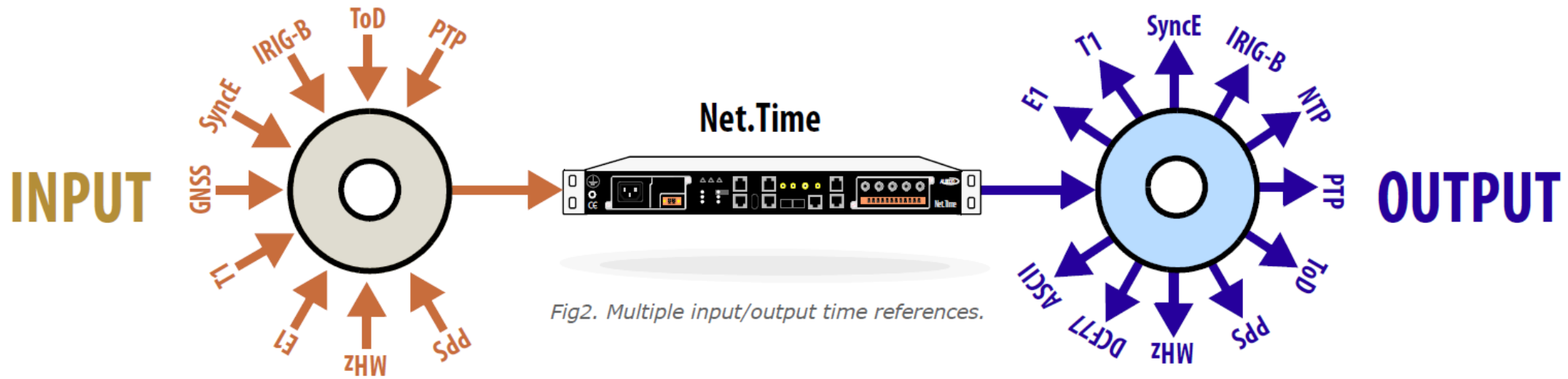
	ToD	IRIGB	PPS	ASCII	DCF77	Alarm	MHz
ST (R1..5)		out	out				
BNC (R1..5)		out	out				
TTL (T1..3)		out	out				
OC (U)			out			out	
RS232 (V1..2)				out			
OC (W)			out			out	
RLY (X)						out	



- Double Port 1Gb/s (opt/ele)
- NTP Server
- Profiles: Telecom, Power, Utility profiles and 512 unicast clients
- Simultaneous PTP + NTP
- PRP for PTP and NTP
- PTP, NTP, ToD, PPS, T1/E1, SyncE, IRIG-B, MHz, DCF77
- Carrier-class: 2 x Vac / Vdc
- +70°C fan-less operation
- Rubidium / OCXO oscillator
- Roles: GrandMaster, Boundary, Slave
- Optional Display



- ◆ 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



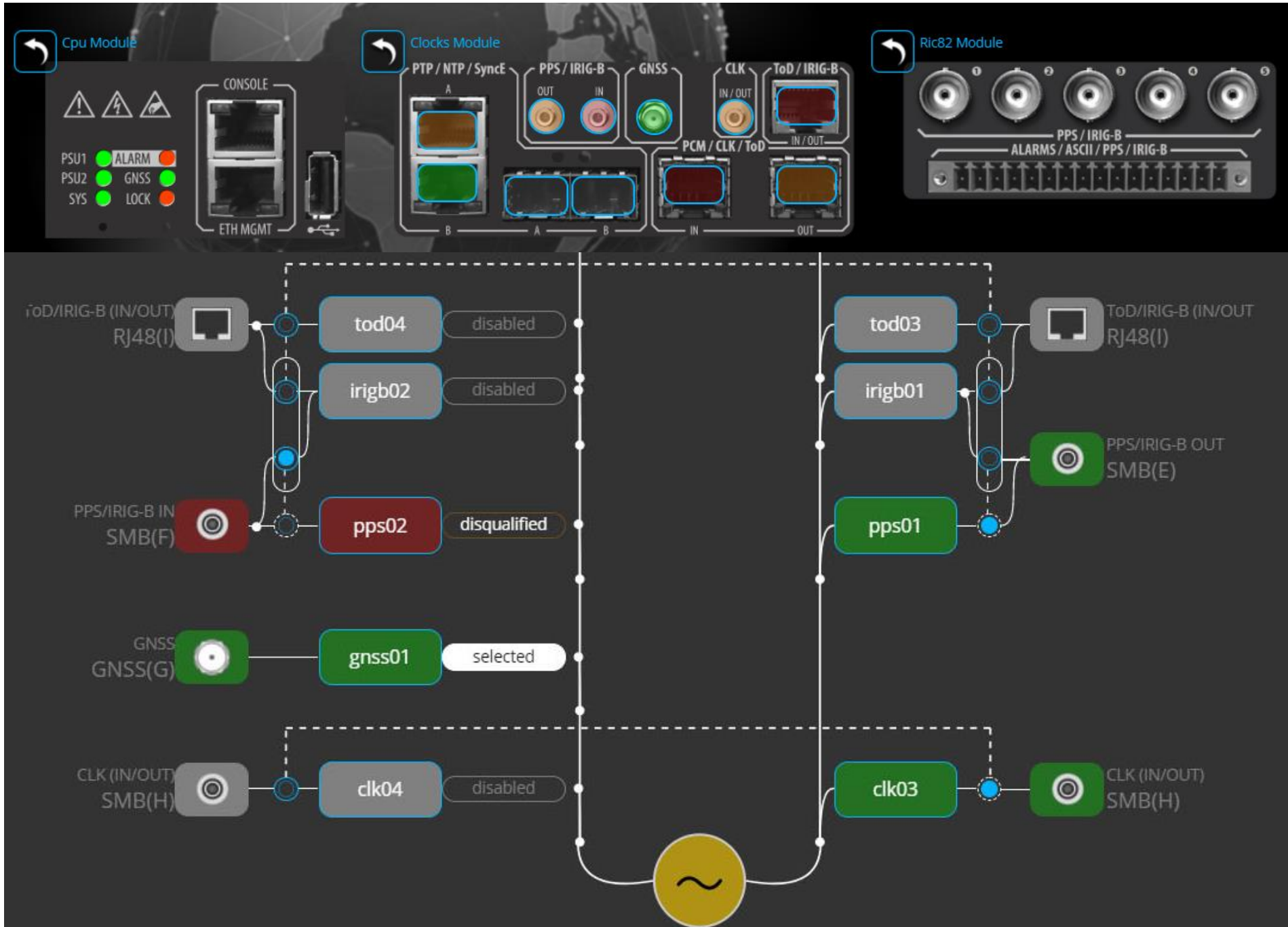
Net.Time is very flexible because it accepts multiple clock references to discipline the internal circuits. GNSS is the default and the most obvious reference but signals such as PTP, NTP, SyncE, ToD, IRIG-B even MHz, E1/T1 can also be used as back-up time references in case of failure of the first reference 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.



- ◆ Server & client modes
- ◆ Optical & electrical interfaces
- ◆ NTP
 - NTPv3 (RFC 1305) (server and client)
 - NTPv4 (RFC 5905) (server and client)
- ◆ SNTP
 - SNTPv3 (RFC 1769) (server)

Web Server Interface





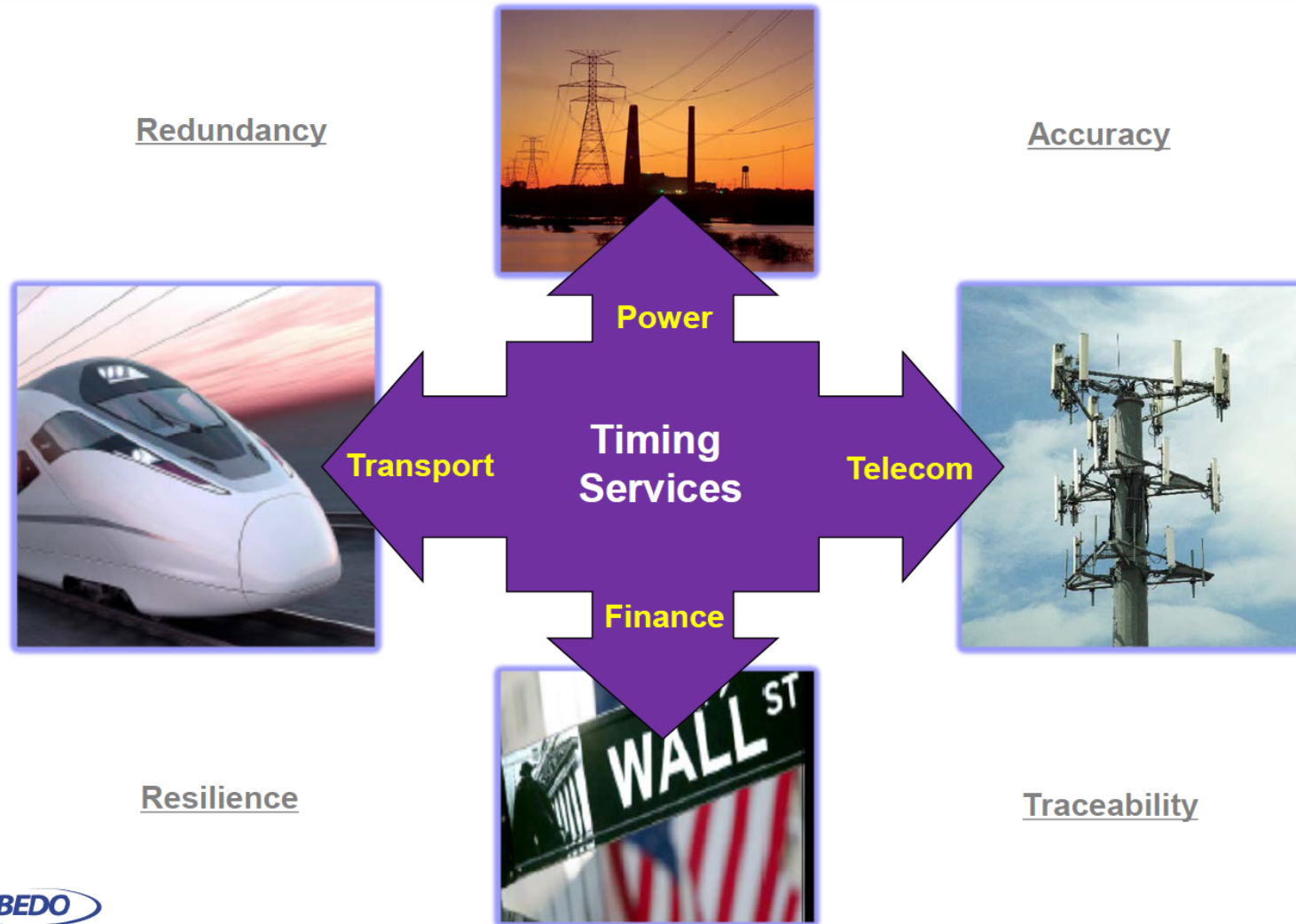
- ◆ Integration Clock
 - Universal Protocol translator
 - Universal Profile translator
 - Legacy + New timing signals

- ◆ Modular architecture
 - Flexibility
 - Multiple i/o

- ◆ Network Fault Tolerant
 - Native PRP support
 - No RedBox required

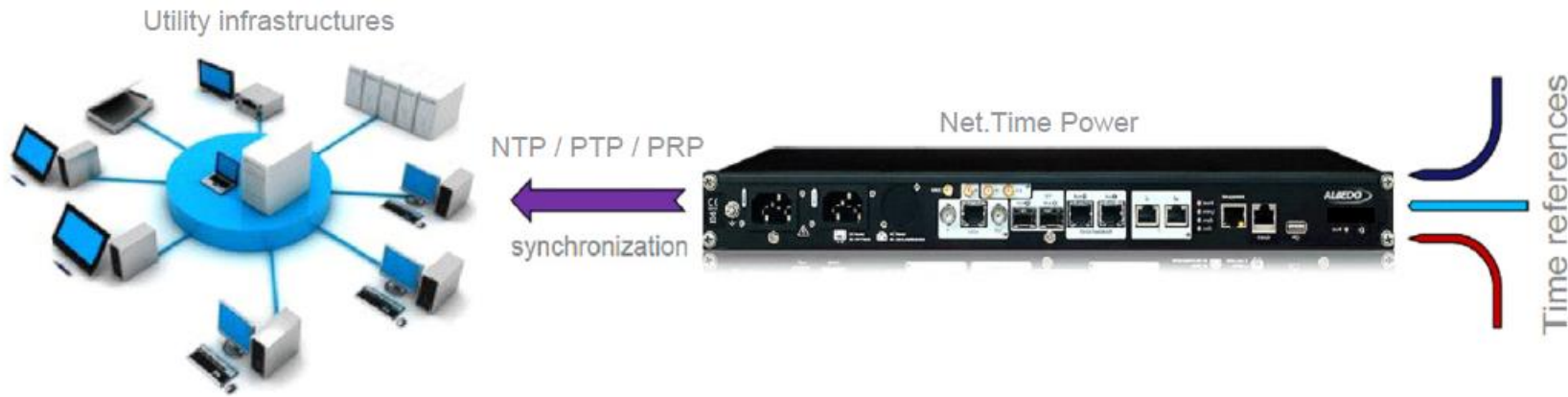
- ◆ Time ref. fault tolerant
 - Time assurance: n x refs.

- ◆ Power fault tolerant
 - (AC, DC, AC+AC, AC+DC, DC+DC)

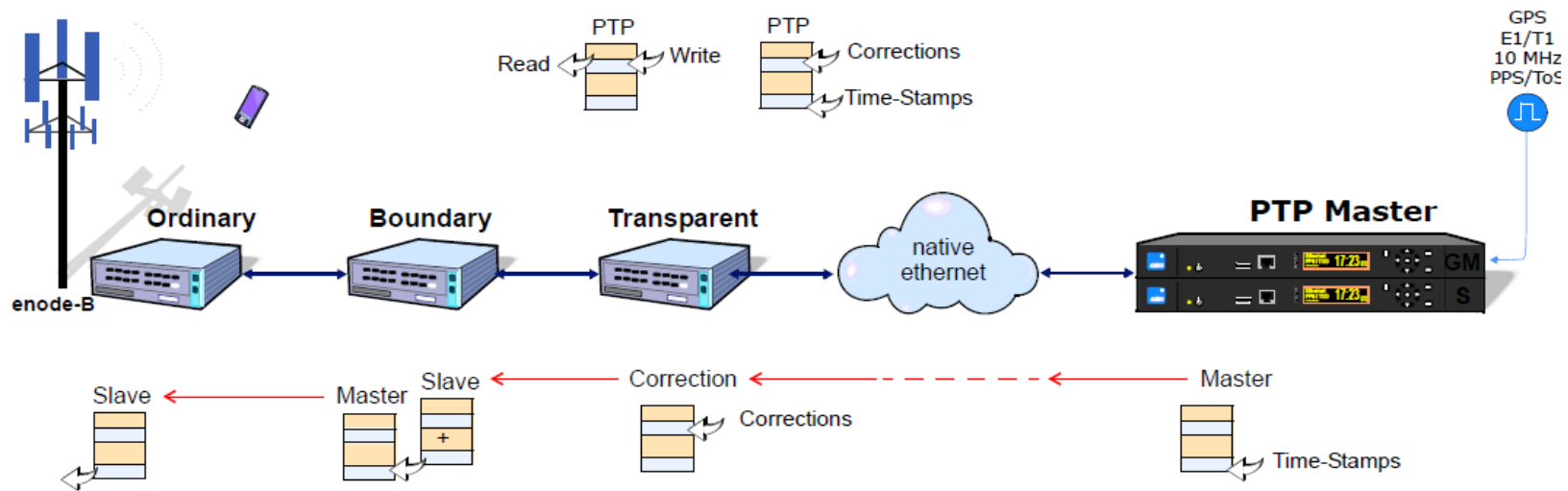


World market size is higher than 2.0 million nodes and, according to the GNSS Agency, it will reach 3.5 million in 2025. The growth is due to the increased number of applications in many areas and, depending on the evolution of IoT technologies, it could probably be bigger than actual forecasts.

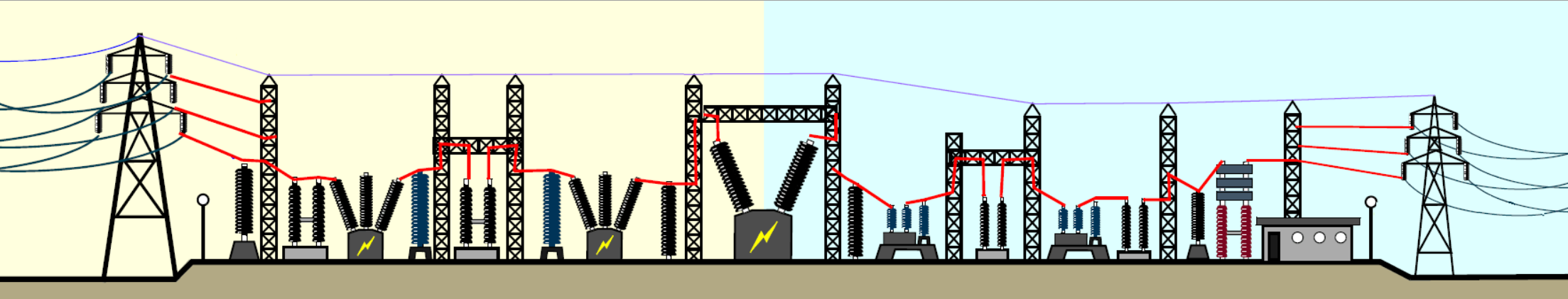
		Net.Time ϕ (Phi)	Net.Time Ω (Omega)	Net.Time T (Tau)
DIFFERENCES	Default rate	100 Mb/s	1 Gb/s	1 Gb/s
	Alarm relay contacts	Optional	Optional	-
	Display	Yes	Optional	-
	Modules	Optional	Optional	-
	IRIG-B	Yes (i/o)	Optional	-
	NTP	Yes (i/o)	Yes (i/o)	-
	PRP	Optional	Optional	-
	PTP Power profile	Yes (i/o)	Optional	-
	PTP Telecom profile	-	Optional	Yes (i/o)
	SyncE	-	Optional	Yes (i/o)
COMMON FEATURES	Platform	19", 1 RU, Aluminum case		
	Temperature	-40 ~ +70°C (Passive cooling)		
	Power Supply	Redundant (2 x Sockets): • 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)		
	Display	Graphical Display (virtual web server interface)		
	GNSS	72 channels (GPS, GLONASS, BeiDou, Galileo)		
	Oscillators	OCXO, Rubidium		
	Accuracy	GNSS <40 ns, ToD <10 ns		
	Holdover	• Rubidium: 100 ns @ 2h; 1 μ s @ 24 hours; 10 μ s @ 120 hours • OCXO: 1 μ s @ 1 hour; 10 μ s @ 12 hours		
	PTP Default profile	All models		
	Time signals (in/out)	PTP, NTP, ToD, n x PPS, IRIG-B, DCF77, SyncE, MHz, T1, E1		
	Protocol Translator	Any input signal or protocol to any output signal or protocol		
	Configuration Management	Slave / Master / Boundary (up to 512 unicast clients) Web Server, CLI, Syslog, SNMP v2, v3		



	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

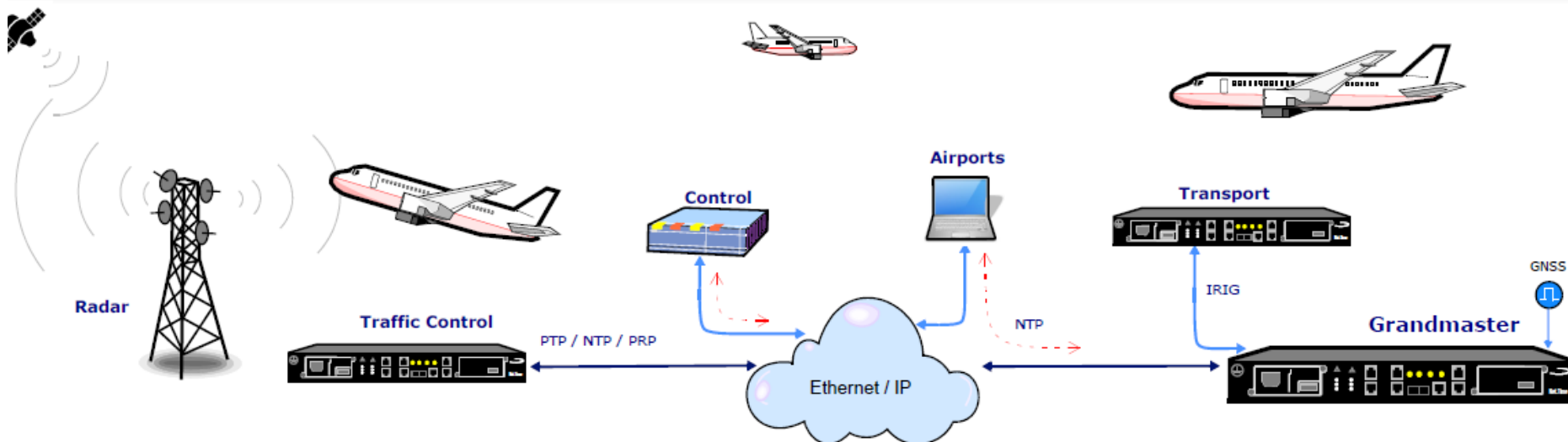


5G operators require accurate phase and time alignment at the backhaul of the wireless in order to increase the density of terminals reducing cells size.



Net.Time is a PTP/NTP synchronization clock that also supports SyncE, 1PPS, ToD and IRIG-B to satisfy all timing needs of utility substations.

- ◆ Future proof: It is compliant with IEC-61850 standards
 - Timing Protocols: PTP (Utility, Power, Telecom profiles)
 - Timing Protocols: NTP, SNTP
 - Lossless architectures: PRP
- ◆ Supports existing interfaces to facilitate the migration
 - IRIG-B, 1PPS
 - ToD, MHz, Mb/s
- ◆ Conventional / IEC-61850 Substations
- ◆ Synchrophasors, Virtual Power Utilities



Time is a key resource in Navigation Systems to ensure the proper functioning. Inherited signals such as IRIG-B, NTP and TDM are still in use but progressively are being replaced by PTP time-stamping systems to provide a unique, accurate and consistent synchronization based on Net.Time equipped with atomic oscillators disciplined by GNSS and distributed throughout the territory, air traffic control centres and airports.

- Timing Protocols: PTP (Utility, Power, Telecom profiles)
- Timing Protocols: NTP, SNTP
- IRIG-B, 1PPS
- ToD, MHz, Mb/s



Supports simultaneously both legacy and new protocols:

- PTP
- NTP/SNTP
- PRP
- SyncE

Legacy interfaces

- IRIG-B
- PPS
- MHz
- BITS

That's all



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in Test we Trust