

Precise Time and Frequency Equipment



Drumgrange has specialist, broad based expertise in time standards technology and offers both Caesium and Rubidium Precise Time and Frequency Equipment (PTFE). The Caesium based system has an integral 4th generation GPS receiver module, which disciplines a secondary Rubidium; the Rubidium based system uses dual redundant Rubidiums

Both PTFEs utilise the US Naval Observatory maintained Co-ordinated Universal Time (UTC), obtained via the NAVSTAR Global Positioning System (GPS). In the temporary absence of GPS satellite received time, the Drumgrange PTFE will maintain precise time to an accuracy of:

- Caesium: less than $50\mu\text{sec}$ after 90 days without GPS
- Rubidium: less than $250\mu\text{sec}$ after 45 days without GPS

Drumgrange's rubidium based PTFE is currently in service with the Royal Navy as Outfit FSF and is fitted to some twenty-five operational ships. Outfit FSF has been selected for the new Royal Navy Type 45 Destroyer.

Options

- Custom interface and output signal requirements implemented (frequency outputs, time messages, fibre optic interfaces) via Interface Modules, as required, including customised distribution.
- Alternative levels of redundancy available (with marginal decrease in reliability).
- Back-up battery (available in separate shelf unit providing more than one hour at full load).



Caesium PTFE



Rubidium PTFE



Caesium

- Caesium tube primary oscillator.
- Rubidium secondary oscillator.
- Highly stable phase-lock-loop control circuit for the secondary rubidium source.
- Integral GPS receiver module.
- Highly accurate and stable precise time and frequency in the temporary absence of GPS satellite information.
- Automatic and instantaneous switching to internal source should GPS be lost or degraded.
- Supports the NATO PTTI interface in accordance with STANAG 4430.
- High reliability due to self-arbitration and redundancy.

Rubidium

- Dual redundant internal Rubidium frequency source.
- Highly stable phase-lock-loop control circuit for each Rb oscillator.
- GPS interface in accordance with ICD-GPS-060.
- Supports the NATO PTTI interface in accordance with STANAG 4430.
- High reliability due to self-arbitration and redundancy.

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Technical Specifications	Caesium	Rubidium
Frequency Accuracy:	3×10^{-12}	5×10^{-11}
Frequency Stability (short term):	better than 5×10^{-12} per day	better than 2.5×10^{-12} per day
Frequency Stability (long term):	better than 8×10^{-14}	-
Ageing:	-	5×10^{-11} /month
Time Accuracy (GPS accessible):	within 100ns	within 100ns
Time Accuracy (GPS lost):	less than $50\mu\text{s}$ after 90 days	less than $250\mu\text{s}$ after 45 days
Electrical Power Source:	115V AC 60Hz / 240V AC 50Hz	
Electrical Consumption:	250W	
Back-up Batteries:	optional	
Physical Characteristics		
	Weight: 23kg	Weight: 50kg**
	Height: (5U) 222mm	Height: (8U) 355mm**
	Width: (19") 482mm	Width: (19") 482mm
	Depth: 460mm	Depth: 460mm
	** 50kg & 8U including integral battery modules	

“We design, develop and manufacture innovative products and are also experts at integrating existing technology to create successful, cost effective solutions.”



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