

Features

Accuracy Calibrated to $<1\text{E-}12$
Flicker Floor: $<2\text{E-}14$
Stability: Resolution $1\text{E-}15$, Range $\pm 1\text{E-}9$
Eleven Outputs: 9 RF, 1 PPS & 1 TTL Programmable
Front Panel Keyboard Operator Interface With Display
Menu Driven Operation for Ease of Use
Caesium Tube - Lifetime or High Performance
Remote Control & Monitor via an RS232 Interface
Full Accuracy in Thirty Minutes or Less



CAESIUM PRODUCTS
Modules, Instruments, Militarized Instruments and Replacement Tubes

4065C Primary Frequency & Time Standard



Overview

The Datum 4065C is a high performance caesium frequency and time standard that provides the ultimate in accuracy and stability. An exceptional frequency distribution capability includes nine RF, high isolation, low phase noise outputs and one programmable TTL output. The nine RF outputs come in three different frequency values of three each or may be customized to meet individual frequency requirements. The newest caesium beam technology featured in this generation of the 4065 delivers improved efficiency, bet-

ter performance, longer life, a lower cost of ownership and ease of use. Simply connect to a power source (AC or DC) and the instrument automatically powers up to its full accuracy specifications within thirty minutes or less.

The 4065C is available with a choice of either a Lifetime (twelve year warranty) or High Performance (three year warranty) caesium beam tube that is maintenance free throughout its life.



datum

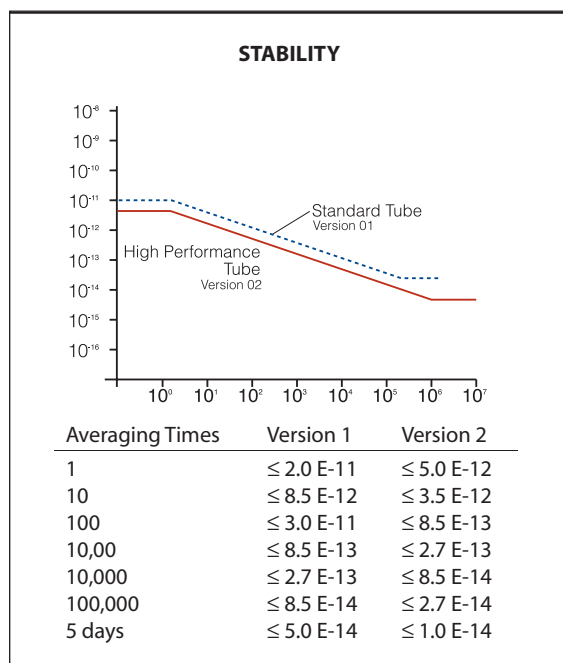
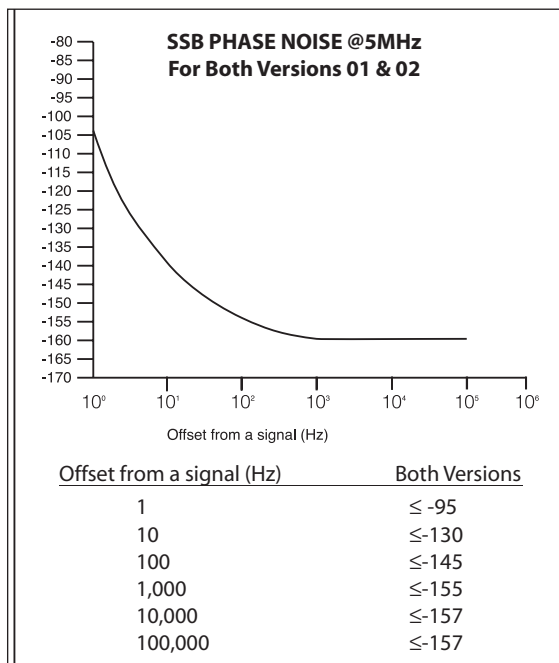
Timing, Test & Measurement

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Overview



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Synchronization Input:

Accuracy	150 ns
Amplitude	+2 to +10 V peak
Width/Rise Time	100 ns min. to 100 µs sec max./<50 ns
On-Time Ref/Arming	rising edge/menu Cmd
Connector/Location	BNC, front panel
1 PPS Advance/Delay	
Range/Resolution	±999,999.9 µs/100 ns
RF Phase Control	
Range/Resolution	±10,000 ns/1 ns
Clock Display	Day-of-Year & Time-of-Day



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Overview

The Datum 4065C produces accurate, stable, and spectrally pure sinusoidal signals. To accomplish this, a cesium beam tube resonator stabilizes the output of the instrument's ovenized quartz crystal oscillator. This oscillator drives output signals at 1, 5, and 10 MHz. The instrument also features precise time-of-day/day-of-year with 1 PPS outputs. Optional telecommunication outputs are available for T1 and E1, framed and clock signals. The instrument meets stringent precision time and frequency control requirements demanded of:

- Reference sources for synchronization of satellite ground terminals and remote stations
- Shipboard, aircraft, and land-mobile systems for navigation, timing, and communications
- Primary reference sources for positioning in oil exploration and mapping environments
- Independent time and frequency reference for uninterrupted service
- Master frequency & timing references for secure high data rate communication systems
- Master frequency & timing references for TV applications including Color Burst systems and HDTV Broadcast
- Master frequency and timing references in laboratory research facilities
- Primary reference instruments in metrology facilities
- Telecommunications master clock systems that meet Stratum 1 primary reference source needs for digital communications systems, in both public and private telephone networks



Automatic Microprocessor Control

The Datum 4065C is a third generation microprocessor controlled, instrument with automatic monitoring and control of the following tasks:

- Digital demodulation and integration of the servo loop signals
- Monitoring of 24 system parameters
- Control of adaptive servos to maintain: OCXO frequency locked to cesium resonance pedestal (search phase) and peak (normal operation)

C-Field locked to Zeeman resonance peak

Optimum microwave power levels

Automatic compensation for cesium tube signal level changes

When turned on, the system checks 24 key parameters and then an automatic routine ensures lock to the correct cesium resonance. Following turn on, the system continues to monitor and control system parameters to insure optimum performance.

The storage mode allows occasional or continuous operation of the cesium beam tube's ion pump while the unit is not in use.

The instrument allows adjustment of the cesium control loop time constant to optimize performance.

The front panel features control switches for synchronizing and advancing or delaying the 1 PPS signal.

Green, yellow, and red LED indicators on the front panel provide the operational status of the cesium control loop and other system functions. The cesium control loop status is translated to minor and major alarms available on the rear panel as form-C relays.

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Specifications



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ELECTRICAL SPECIFICATION

RF Output

Frequency	3 each at 1, 5, 10 MHz
Amplitude	>1 Vrms
Harmonic signals	<-40 dBc
Non-harmonic signals	<-80 dBc
Connector Type***	N
Load Impedance	50 Ohms
Location	Rear panel

Pulse Output

Amplitude/Width	>2.4V into 50Ω/20μs
Rise Time/Jitter	<5ns/<1ns rms
Connectors/Location	BNC 1 front, 2 rear panel

Programmable Output

Frequency	0.1, 1, 5, 10 MHz
Amplitude/wave shape	2.4V pk into 50 Ohms, sq.
Connector Type	BNC
Location	rear panel

Stability

	Version 01	Version 02
Averaging Time (seconds)	Allan Deviation	Allan Deviation
1	≤2 E-11	≤5.0E-12
10	≤8.5E-12	≤3.5E-12
100	≤3 E-12	≤8.5E-13
1,000*	≤8.5E-13	≤2.7E-13
10,000*	≤2.7E-13	≤8.5E-14
100,000*	≤8.5E-14	≤2.7E-14
5 days	≤5.0E-14	≤1.0E-14
SSB Phase Noise Offset (Hz)	5 MHz	5 MHz
1	≤95 dBc	≤95 dBc
100	≤135 dBc	≤135 dBc
100	≤145 dBc	≤145 dBc
1,000*	≤155 dBc	≤155 dBc
10,000*	≤157 dBc	≤157 dBc
100,000*	≤157 dBc	≤157 dBc

Performance Parameters

	Version 01	Version 02
Accuracy**	<1E-12	<5E-13
Warm-up Time (Typical)	30 min.	30 min.
Reproducibility	<1E-12	<5E-13

Settability

Range	±1E-9	±1E-9
Resolution	1E-15	1E-15
Control	via RS232	via RS232

ENVIRONMENTAL & PHYSICAL SPECIFICATIONS

Power Requirements

	AC	DC
Operating Voltage	90 to 265 V 180 to 265 V	± 38 to 71 V
Frequency Range	47 to 63 Hz 400 Hz	
Power (Operating)	110 VA, 65W	60W
(Warm-up)	140 VA, 90W	90W

Internal Battery

Capacity	1 hour at 25°C from charge
Charge Time	16 hours maximum
Charge Source	AC or DC

Dimensions

(EIA-310C)	
Height	5.22" (133mm)
Width (Front Panel)	19.00" (483mm)
(Instrument)	17.31" (440mm)
Depth	21.00" (533mm)

Weight

	70 lbs. (31.7 kg)
Additional shipping	15 lbs. (6.8 kg)

Standard Configurations

	Version
Standard Performance, 2 year electronic, 12 year tube warranty	01
High Performance, 2 year electronic, 12 year tube warranty	02

Options	Option P/N
• Rack Slides	6013
• Certified shipping container, cardboard	---

Non-Standard Options

10.23 MHz Synthesizer
3.58 MHz Color Burst

* Excluding environmental effects

** 100% verified & calibrated against Datum-Beverly in-house standard

*** For telecom options three possible types are available:
BNC, Weco 310 and Bantam.

Specifications subject to change without notice.