

VXI Rubidium/GPS Frequency Standard

Racal Instruments™ 3352 Rubidium frequency standard module and the 3352-GPS, its GPS-disciplined companion, set a new standard for high density functionality in a single width VXI module. Using ANSI Standard M-Module building blocks, the 3352 series integrates the functions of a Rubidium oscillator and clock distribution together with an optional trigger distribution module and an optional digital I/O (DIO) module.

- ◆ **Single Width VXI Module for Highest Possible System Density**
- ◆ **Ten Channels of Clock Distribution are Included**
- ◆ **Standard and GPS-Locked Versions Available**
- ◆ **External Power Input Keeps Rubidium Oscillator Powered During System Shutoff**
- ◆ **Low-Jitter, Low-Noise and High Isolation Clock Distribution**
- ◆ **Optional Trigger Distribution and Digital I/O**

GPS Disciplining Option

The 3352-GPS uses the 1PPS output from a Motorola architecture GPS receiver to discipline the Rubidium oscillator. This technique results in improved long-term stability.

External DC Power Supported

If the VXI test station goes down, power may still be applied to the Rubidium oscillator and GPS receiver via a front panel external DC power input. This keeps the Rubidium oscillator very stable over time and eliminates the effects of retrace. For the 3352-GPS, it also keeps GPS location information stable, saving the time it takes for the receiver to do an auto-locate.

Rubidium Oscillator Control

Control of the Rubidium oscillator is available to enable or disable outputs or to query it for information such as serial number, operating hours, operating temperature, event history, self-test and other performance indicators.

Holdover

For the GPS-disciplined 3352-GPS, when GPS satellites are not available, the system performance reverts to that of a stand-alone Rubidium (this period is called the holdover period). Under worst case temperature conditions, the system will accumulate a maximum of 1.76 μ s of error after 1 day and 3.46 μ s after two days.

High Isolation Clock Distribution

The clock distribution amplifier section of the 3352 models provide over 90 dB of isolation between sine channels and 80 dB of isolation between TTL channels. TTL channel skew is less than 500 ps, and jitter is less than 50 ps RMS.

Software Driver Support

Software drivers are included which allow remote operation and control of the 3352 or 3352-GPS from almost any software environment including C, C++, Visual Basic, LabWindows/CVI, and LabVIEW.

Optional DIO

The DIO option provides 128 TTL channels in 16 groups of eight bits each. Internal or external trigger state control. is available on a per byte basis. Each channel is configurable as an input or an output. A 256 KB dual port buffer is used for input or output operations. In synchronous mode, the system data rate is programmable up to 10 MHz.

3352/3352GPS PRODUCT SPECIFICATIONS

OUTPUT CHARACTERISTICS

Output Frequency

10 MHz

Output Channels

Sinewave Channels: 2

TTL Channels: 8

Amplitude

Sinewave: +15 dBm min. into 50 Ω

TTL: 3 V minimum into 50 Ω

Isolation (between outputs)

Sine: > 90 dB

TTL: > 80 dB

TTL Parameters (TTL outputs)

Amplitude: 3 V_{peak}, 5 V max

Rise and Fall Times: < 3 ns

Skew (channel-channel): < 500 ps

Jitter: < 50 ps RMS

Spectral Purity (sine outputs)

Harmonics: < -40 dBc

Spurious: < -80 dBc

TIMEBASE CHARACTERISTICS

Initial Accuracy (@ 25° C)

5×10^{-11}

Stability

Frequency Drift: 5×10^{-11} /month

Frequency Retrace: $\pm 2 \times 10^{-11}$

Allan Variance (1 s): 3×10^{-11}

Allan Variance (10 s): 1×10^{-11}

Allan Variance (100 s): 3×10^{-12}

Phase Noise

10Hz offset: -90 dBc/Hz

100Hz offset: -128 dBc/Hz

1kHz offset: -140 dBc/Hz

10kHz offset: -147 dBc/Hz

Warm Up (@ 25° C)

< 4 minutes to lock

< 7.5 minutes to reach 1×10^{-9}

RECEIVER CHARACTERISTICS

Receiver Architecture

12 parallel channels

Tracking Capability

12 simultaneous satellites

Operating Frequency

L1 (1575.42 MHz)

Acquisition Time (Time to First Fix, TTFF)

Hot: < 25 s, typical

Warm: < 50 s, typical

Cold: < 200 s, typical

Internal Reacquisition: < 1 s, typical

FRONT PANEL I/O

Outputs

Sine (2): 10 MHz, 1 V_{rms}, 50 Ω (SMB)

TTL (8): 10 MHz, 3 V into 50 Ω (DE-15)

pps active: TTL, DE-9

1 or 100 pps from GPS: TTL, MMCX

Inputs

External Rubidium Power: 10-25 V (DE-9)

GPS Antenna: (SMA) 50

Status Lights

Red: Sysfail

Red: Module ID Signal Applied

Green (6): M-Module Accessed

Green: pps active (3352-GPS only)

Green: Rubidium Locked (internal)

OPTIONS

Opt. TD: Trigger Distribution

Routes up to two (2) input triggers to up to eight (8) TTL outputs and two (2) differential ECL outputs. For system trigger distribution.

DIO CHARACTERISTICS

Number of Channels

128

Data Rate

Static to 10 MHz (Synchronous or Asynchronous)

Operating Modes

Asynchronous

Synchronous

Mixed (Synchronous and Asynchronous)

Input/Output

TTL or CMOS

Configuration

I/O lines selected as either input or output on an 8-bit byte basis

Memory

256 K x 8 dual-ported

Connectors

Four 68-pin VHDCI

VXibus INTERFACE DATA

(Single slot, Register-Based, VXibus 1.4 Compliant)

Drivers

LabVIEW, LabWindows/CVI, VXIplug&play (WIN95/WINNT Frameworks)

Cooling (10° C Rise)

3.0 l/s @ 0.5 mm H₂O

Peak Current & Power Consumption

	+12	+5	-12
I _{Pm} (A)	1.7	5.2	.05
I _{Dm} (A)	0.6	0.8	.05

Total Power: 55 Watts

ENVIRONMENTAL

Temperature

Operating: 0° C-50° C

Storage: -40° C-70° C

Humidity (non-condensing)

5 to 95%

Weight


2.2 lb. (1 kg)

MTBF (ground benign)

Rubidium: 600,000 hours

Calibration Interval

15 years

 The CE Mark indicates that the product has completed and passed rigorous testing in the area of RF Emissions, Immunity to Electromagnetic Disturbances and complies with European electrical safety standards.

ORDERING INFORMATION

MODEL/DESCRIPTION

Racal Instruments 3352, Rubidium Oscillator with Clock Distribution

Racal Instruments 3352-GPS, Rubidium Oscillator with GPS and Clock Distribution

Racal Instruments 3352-GPS-TD, Rubidium Oscillator with GPS, Clock and Trigger Distribution

Racal Instruments 3352-DIO Rubidium Oscillator with Digital I/O

Optional GPS Antenna (for 3352-GPS only)

PART NUMBER

407919-001

407919

407919-002

407919-001-S-2395

407949

The EADS North America Defense Test and Services policy is one of continuous development, consequently the equipment may vary in detail from the description and specification in this publication.



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