

M.2 GNSS/INS Card

High-precision GNSS/INS module family with
mosaic-G5 GNSS receiver and
high-grade MEMS-IMU



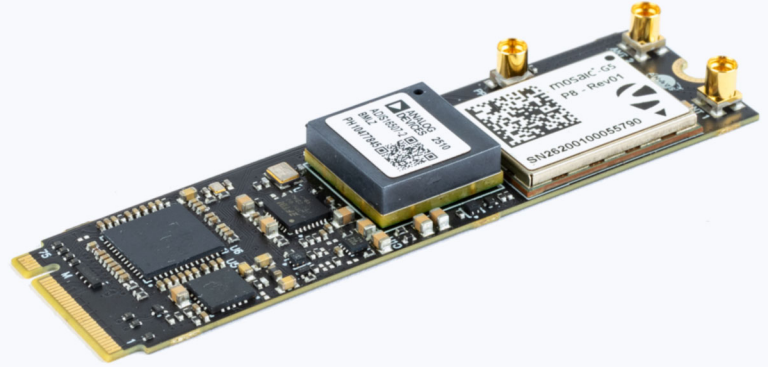
Advanced Navigation Solutions

The ANavS M.2 GNSS/INS cards are part of the ANavS Smart Module family and are designed to deliver high-precision, reliable positioning for industrial PCs and embedded development platforms. It provides accurate position, attitude, velocity, and timing information for a wide range of industrial and mission-critical applications.

The compact M.2 Key M form factor enables straightforward integration into existing hardware platforms.

Upon request, the patented ANavS tightly coupled sensor fusion algorithm can be integrated directly into the customer's computing platform. It combines its multi-constellation, multi-frequency GNSS raw measurements with the inertial sensor data and RTK and PPP correction services, including Galileo High Accuracy Service (HAS), to provide a robust and highly accurate navigation solution.

Advanced interference monitoring and integrity features support reliable operation in environments affected by jamming, spoofing, or limited GNSS availability, while providing enhanced situational awareness for mission-critical applications.



MEMS-IMU FEATURES

Type: Analog Devices ADIS16507
(other types upon request)

Accelerometer

Dynamic range	$\pm 392 \text{ m/s}^2$
Misalignment	0.05°
Bias Repeatability	$58.8 \times 10^{-3} \text{ m/s}^2$
Bias Instability	$125 \times 10^{-6} \text{ m/s}^2$
Bias Velocity Random Walk	$0.039 \text{ (m/s)}/\sqrt{\text{hr}}$
Bias Noise Density (RMS)	$880 \text{ m/sec}^2/\sqrt{\text{Hz}}$

Gyroscope

Dynamic range	$\pm 500^\circ/\text{sec}$
Misalignment Error	0.25°
Bias Repeatability	0.14°
Bias Instability	$1.6^\circ/\text{hr}$
Bias Angular Random Walk	$0.15^\circ/\sqrt{\text{hr}}$
Bias Linear Acceleration Eff.	$0.408 (^\circ/\text{s})/(\text{m/sec}^2)$
Bias Noise Density (RMS)	$0.0034 (^\circ/\text{s})/\sqrt{\text{Hz}}$

MOSAIC-G5 PERFORMANCE

Accurate RTK Positioning ¹ (1 σ)

Horizontal accuracy	$6 \text{ mm} \pm 0.5 \text{ ppm}$
Vertical accuracy	$10 \text{ mm} \pm 1 \text{ ppm}$
Initialization time	7 s

Other modes horizontal accuracy ¹ (1 σ)

Standalone	1.2 m
SBAS	0.6 m
DGNSS	0.4 m
HAS	0.1 m

Accurate Attitude ¹

1m antenna spacing	
Roll and Pitch	0.25°
True Heading	0.15°
5m antenna spacing	
Roll and Pitch	0.05°
True Heading	0.03°

Velocity Accuracy

0.03 m/s RMS

Maximum update rate

Measurements	
with attitude	50 Hz
with no attitude	100 Hz
Position	
with attitude	50 Hz
with no attitude	100 Hz
Latency	<10ms

Time precision

PPS resolution	1.4 ns
Event accuracy	<3 ns

Time to first fix

Cold start	< 35 s
Warm start	< 10 s
Re-acquisition	1 s

¹ Depends on Environment and used GNSS-Antenna

INTERFACES & PROTOCOLS

Interfaces

M.2 Key M connector:

PCIe 2.0: Two virtual USB devices
(GNSS receiver and IMU),
PPS1

MMCX connector „PPS“:

PPS Signal, configurable

MMCX connectors „ANT1“ and „ANT2“:

Primary and secondary GNSS antenna,
capable of powering active antennas

Protocols

Septentrio Binary Format (SBF)

NMEA 0183, v2.3, v3.03, V4.0

RTCM v3.x (P3 and P3H only, MSM included)

Authenticated in- and output through DTLS (P8 only)

PHYSICAL & ELECTRICAL

Package
Size

Compatible with M.2 Key M
22 x 80 x 6.84mm

GNSS connector

MMCX Jack

PPS connector

MMCX Jack

Operating temp.

-40 to 85° C

Storage temp.

-55 to 85° C

Humidity

5% - 95% (non-condensing)

Vibration

IEC 60721-3-5 Profile 5M3

Certification

RoHS, WEEE, CE, FCC

Input voltage

3.3 V +/-5%

Power consumption

2.6 W typ, 3.5 W max

Antenna pre-

amplification range

15-50 dB (single antenna)

15-35 dB (dual antenna)

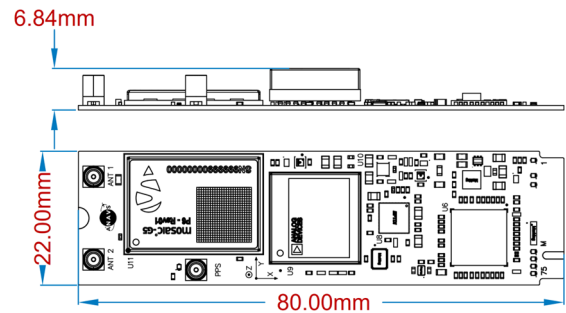
Antenna bias voltage

5V, current limit 150 mA

M.2 GNSS/INS CARD VARIANTS

Variants	P/N
With mosaic-G5 P6	70.40.0.67.5.0
With mosaic-G5 P8	70.40.0.68.5.0

DIMENSIONS



RELATED PRODUCTS

M.2 G5 P3/P3H/P6/P8 GNSS Cards

70.40.0.6x.0.0

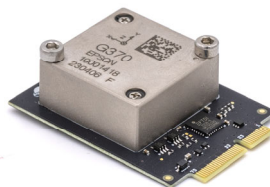
M.2 GNSS cards with the Mosaic
-P3 (65), Mosaic-P3H (66), Mo-
saic-P6 (67) or Mosaic-P8 (68)
chipset



M.2 Epson IMU card

70.40.0.00.x.0

M.2 IMU card, available in differ-
ent Epson FOG-performance
IMU variants



M.2 to USB-C Adapter

71.40.0.00.0.0

Adapter from M.2 Key-E cards to
USB Type C.



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