

# HGUIDE NAVIGATORS N380 AND N580 INERTIAL/GNSS.

Mechanical and Electrical Manual



**Honeywell**

# TABLE OF CONTENTS

3	Product Overview
4	Interaction
5	Signal Descriptions
6	IO1 and IO2 Descriptions
7	IO1 Integration Cable
8	IO2 Integration Cable
9	Mechanical Drawings
12	Accessories
13	Guidelines
14	Export / Regulatory



## **Warning**

*Device surface may become too hot to touch during operation depending on ambient temperature and sunlight exposure. To prevent personal injury, please take care when handling the device when the ambient temperature is above 50 °C, prolonged exposure to direct sunlight, or other situations where the device will naturally become hot.*

# PRODUCT OVERVIEW

The HGuide Navigators are small, light-weight, self-contained, all-attitude Inertial/GNSS Navigator which can be used in a wide variety of platforms, applications and industries where continuous navigation information is a critical component.

The HGuide Navigator contains Honeywell's leading edge IMU technology and provides a powerful dual-antenna, multi-frequency, multi-constellation RTK capability. Honeywell's integration expertise blends the IMU and GNSS data to provide an accurate, robust navigation service to your application with all the functionalities that you need.

The HGuide Navigator output data includes time stamped position, velocity, angular rate, linear acceleration, roll, pitch and heading information. In dual-antenna mode, the device supports GNSS-based heading measurements and initialization.

Key Honeywell Advantages:

- Honeywell proven navigation algorithms for Air, Land, and Sea
- World class inertial sensor development, calibration, and compensation
- Proven reliability, dependability, and ruggedness
- Accepts RTCM3 GNSS corrections
- Highest performing Inertial/GNSS navigator of its size, weight, and price
- Configuration flexibility. Only purchase the features you need.
- Multiple configurable communication ports.

The HGuide n580 and n380 are not ITAR controlled. Their Export Control Classification Number (ECCN) is 7A994.



# HGUIDE DATA READER/ INTERACTION

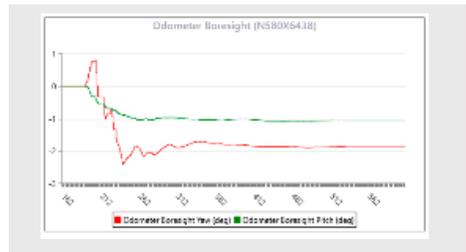
The Honeywell HGUIDE DATA READER is a web deployed software integration tool which configures Honeywell HGuide Products. For the n380 and n580, it will configure for message type (HGNSI or NMEA), baud rate, message information, installation set up (antenna lever arms, vehicle frames, and odometer).

The software integration tool will display and record data, generates supporting message documentation, and includes an example Windows executable which will parse and log data. The program will also export data to CSV format for easy plotting.

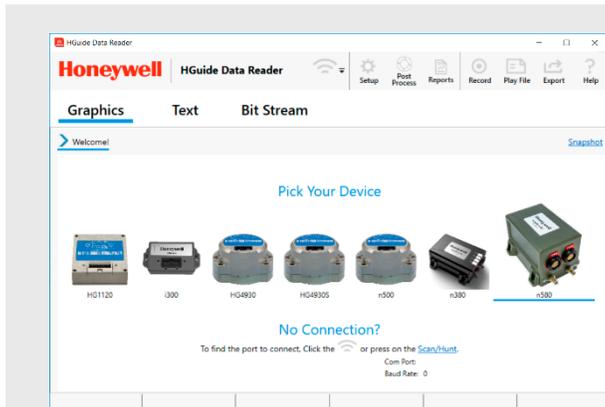
The Honeywell HGuide Data reader provides a software development kit (SDK) including C/C++ source code, header files, DLL, and essential functions. See "Bit Stream" window to produce the SDK.

If using the Honeywell Data reader, be sure to press the "scan/hunt" button on the introductory screen. The program will automatically do an initial search but will time out if device not connected.

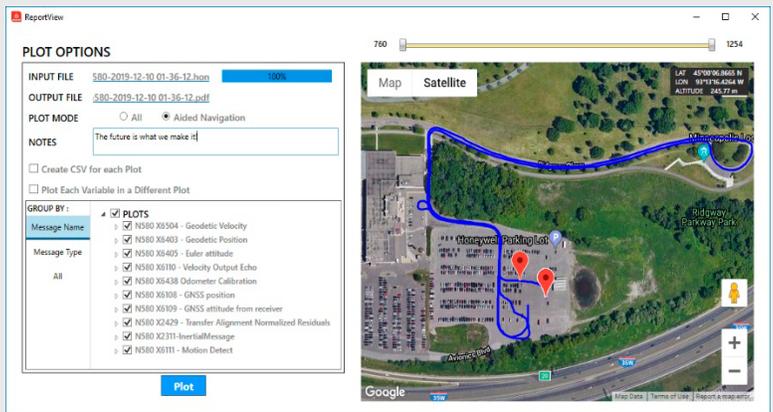
**TO DOWNLOAD  
HGUIDE DATA READER EMAIL  
hguide.support@  
honeywell.com**



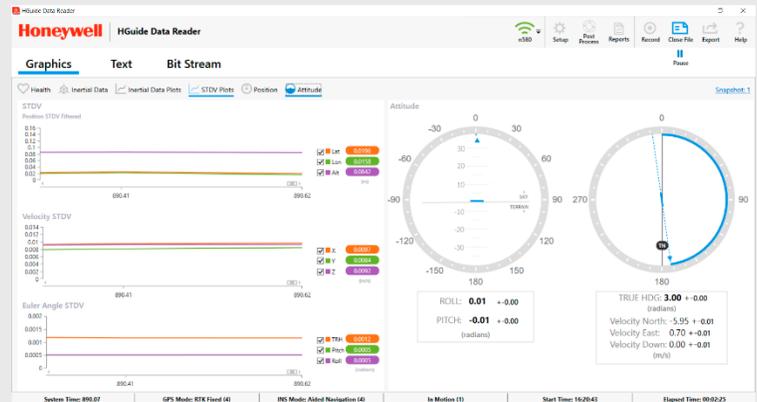
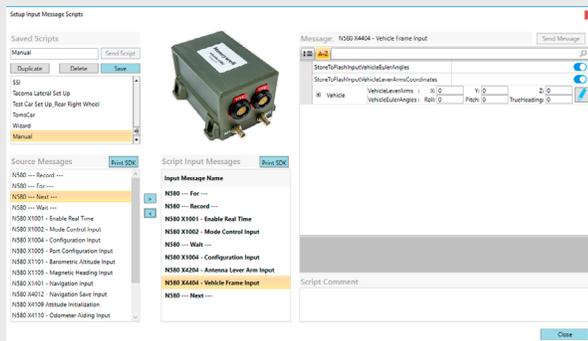
INTERACTIVE TEST REPORTS. REAL-TIME PERFORMANCE MONITORING



HGuide Data Reader (HGDR) Supports Honeywell IMU's and Navigators



## HGuide SDK Doc and C/C++ code



## N380 AND N580 SIGNAL OVERVIEW

Signal	Connector	Default Data Rates	Device Formats		
			n580	Both	n380
COM1	IO1	921600 Baud		HGNSI or NMEA*	
COM2	IO1	460800 Baud	GNSS		HGNSI, NMEA, Or GNSS
COM3 RX COM3 TX	IO1 n580 IO2 n380	921600 Baud		HGNSI or NMEA*	
COM4 RX COM4 TX	IO2	115200 Baud 115200 Baud	RTCM3 (In) \$GPGGA \$GPMRC		RTCM3 (In) NMEA
USB	IO1 n380		NA		Mass Storage Interface (MSI)
Ethernet	IO2 n380		NA		HGNSI, NMEA, Or GNSS
System TOV Mark	IO1 & IO2	100 Hz		Discrete – ~38% Duty Cycle	
GPS TOV Mark (PPS)*	IO1 & IO2	1 Hz		Discrete – ~ 1% Duty Cycle	
Event In Ports	IO1 & IO2	<= 100 Hz		2 - External Trigger. Edge / Latency Configurable 1 - Internal Trigger. GPS TOV PPS	

\* RS422/RS232 signals are asynchronous with 1 start bit (low), 1 stop bit, 8 data bits, and no parity. N580 Requires V4 Software for Event In and NMEA Capability.

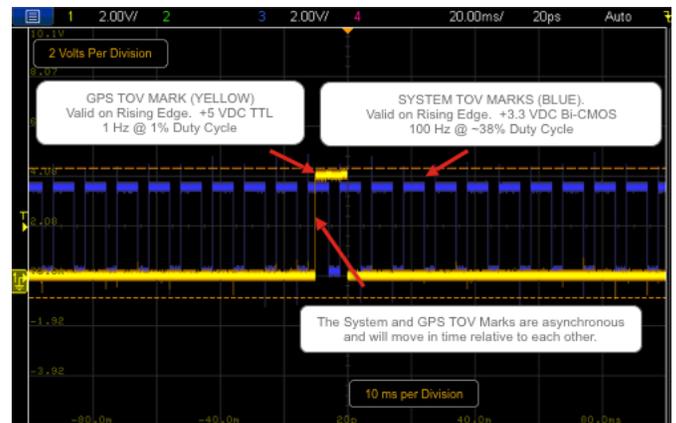
### Additional Electrical Information

Applying a voltage outside of the range specified will result in performance degradation and potentially irreparable damage not covered by warranty.

Grounds are connected to Honeywell provided cable shields, the RF1 and RF2 SMA connectors, and device casing. The device casing surface is anodized. The mounting hole inner surfaces are not anodized and therefore conductive.

TTL and CMOS are board level type signals and adequate protection needs to be provided with the appropriate buffering if connection is > 1 Meter.

The mounting plate (if metal) should be connected to chassis ground. Any cable termination should be tied to a chassis ground reference to provide the best EMC performance. Breakout cabling should make every attempt at full shielding of the cables.



GPS AND SYSTEM TOV MARK DESCRIPTION

## ETHERNET INFORMATION – N380 ONLY

Parameter	Default Setting	Configurable	Options
IP Address (Static)	192.168.0.4	Yes	192.168.0.2 through 192.168.0.255
Subnet Mask	255.255.255.0	No	
Default Gateway	192.168.0.1	No	
Port	4001	No	Open to any valid port number
Protocol	UDP	Yes	TCP/IP, UDP, UDP Broadcast
Mode	Server	No	Server (Required) or Client

# IO1 AND IO2 DESCRIPTIONS

## IO1 CONNECTOR PIN ASSIGNMENTS AND ELECTRICAL INFORMATION

Pin #	Device	Function	Input/Output	Electrical
1	n380	USB_VBUS	Output	Use Only For USB
	n580		NO CONNECT	
2		COM2_RX-	Input	RS422
3		COM1_RX-	Input	RS422
4		COM1_TX-	Output	RS422
5	n380	Reset	Input	Active Low - CMOS
	n580	System TOV Mark (100 Hz)	Output	+3.3 VDC BiCMOS
6		COM2_TX-	Output	RS422
7		COM2_TX+	Output	RS422
8		COM2_RX+	Input	RS422
9		GPS TOV (PPS) Mark	Output	+5 VDC TTL
10		Event In "1" Time Mark*	Input	+3.3 to 5.5 VDC LVCMOS
11		COM1_RX+	Input	RS422
12		COM1_TX+	Output	RS422
13	n380	USB Plus	Bi-Directional	+3.3 to 5.5 VDC LVCMOS
	n580	COM3_RX	Input	
14	n380	USB Minus	Bi-Directional	USB 2.0
	n580	COM3_TX	Output	+5 VDC BiCMOS
15		Current Return	NA	GND
16	n380	+9VDC to +36VDC	NA	VDD
	n580	+9VDC to +36VDC		

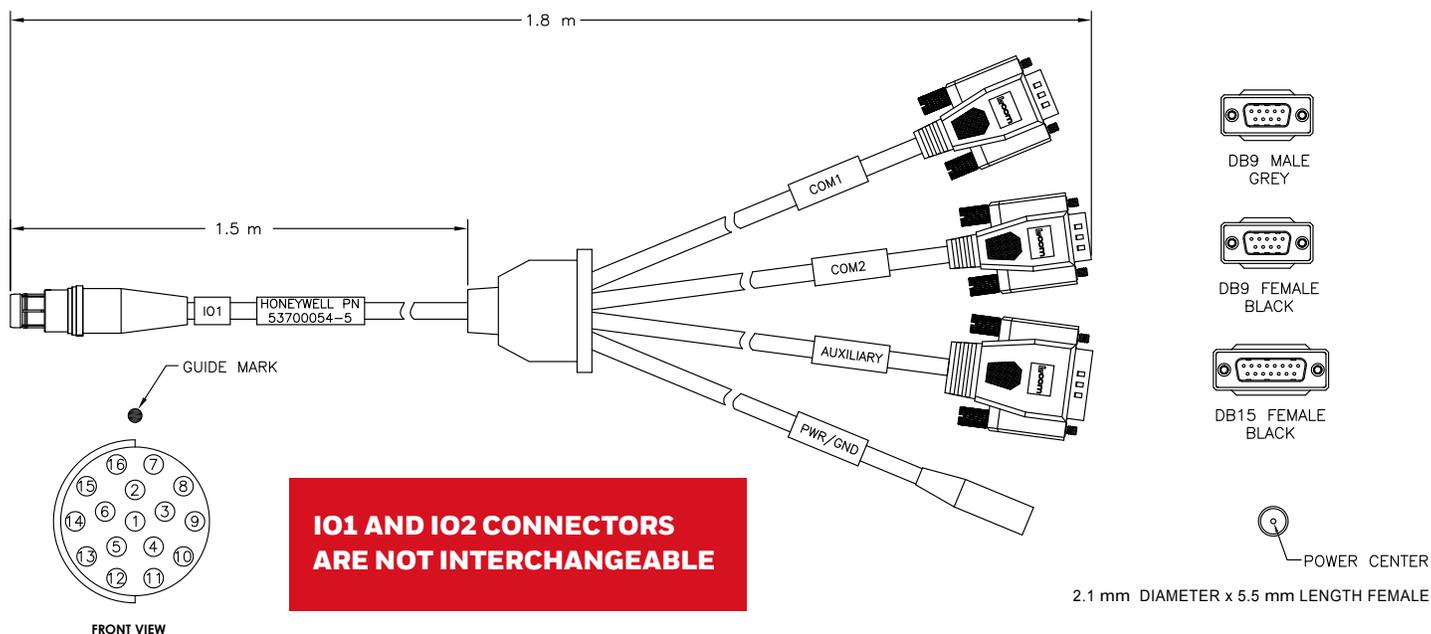
\*N580 Requires V4 Software for Event In Capability

## IO2 CONNECTOR PIN ASSIGNMENTS

Pin #	Device	Function	Input/Output	Electrical
1			NO CONNECT	
2	n380	ETH_RX+	Input	BASE 100
3			NO CONNECT	
4		COM3_RX	Output	+3.3 to 5.5 VDC LVCMOS
5		System TOV Mark (100 Hz)	Input	+3.3 VDC BiCMOS
6	n380	ETH_TX-	Output	BASE 100
7	n380	ETH_TX+	Output	BASE 100
8	n380	ETH_RX-	Input	BASE 100
9		GPS TOV (PPS) Mark	Output	+5 VDC TTL
10		Event In "2" Time Mark*	Input	+3.3 to 5.5 VDC LVCMOS
11			NO CONNECT	
12	n380	COM3_TX	Output	+5 Volt BiCMOS
13		COM4_RX	Input	+3.3 to 5.5 VDC LVCMOS
14		COM4_TX	Output	+5 Volt BiCMOS
15		Current Return	NA	GND
16	n380	+9VDC to +36VDC	NA	VDD
	n580	+9VDC to +36VDC		

\*N580 Requires V4 Software for Event In Capability

# I01 INTEGRATION CABLE



**I01 AND I02 CONNECTORS  
ARE NOT INTERCHANGEABLE**

## DB9 MALE CONNECTOR

DB9M	I01	Function	In/Out	Electrical
1	3	COM 1	Input	RS422 RX-
2	11		Input	RS422 RX+
3	12		Output	RS422 TX+
4	4		Output	RS422 TX-
5	15	Current Return	N/A	GND

## DB9 FEMALE CONNECTOR

DB9F	I01	Function	In/Out	Electrical
1	2	COM 2	Input	RS422 RX-
2	8		Input	RS422 RX+
3	7		Output	RS422 TX+
4	6		Output	RS422 TX-
5	15	Current Return	N/A	GND

## DB15 FEMALE AUXILIARY CONNECTOR

DB15F	I01	Function	In/Out	Electrical
1	9	GPS TOV Mark	Output	+5 VDC TTL
3	5	n380: Reset n580: System TOV Mark	Input Output	Active Low - CMOS +3.3 VDC BiCMOS
4	10	Event In "1" Time Mark n580 Requires V4 SW	Input	+3.3 to 5.5 VDC LVCMOS
7	1		NO CONNECT	
8	15	Current Return	N/A	GND
12	13	COM3 – n580 ONLY	Input	+3.3 to 5.5 VDC LVCMOS RX
13	14		Output	+5 Volt BiCMOS TX
12	13	USB and Mass Storage n380 ONLY	Bi-Directional	USB Plus
13	14			USB Minus

## POWER / GND

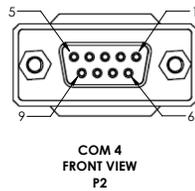
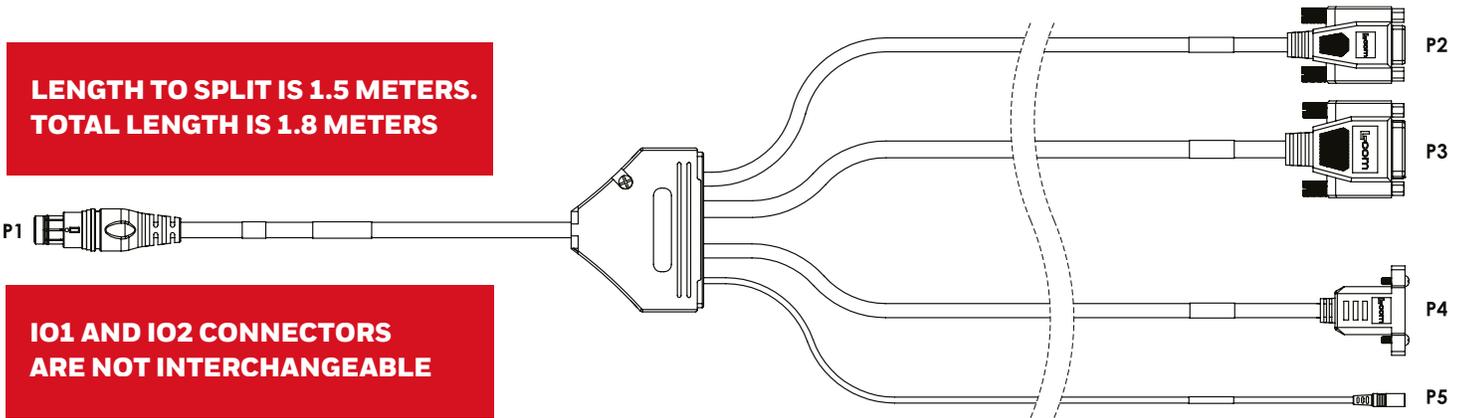
Barrel Jack	I01	Function	Electrical
NA	15	Ground	Current Return
NA	16	n380: +5VDC to +36VDC n580: +9VDC to +36VDC	VDD – Exceeding will damage device and void warranty

\*N580 Requires V4 Software for Event In Capability

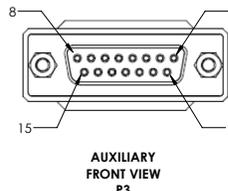
# IO2 INTEGRATION CABLE

**LENGTH TO SPLIT IS 1.5 METERS.  
TOTAL LENGTH IS 1.8 METERS**

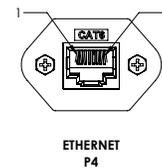
**IO1 AND IO2 CONNECTORS  
ARE NOT INTERCHANGEABLE**



DB9 FEMALE BLACK



DB15 FEMALE BLACK



2.1 mm DIAMETER x 5.5 mm LENGTH FEMALE



POWER / RETURN P5

## DB9 MALE CONNECTOR

DB9F	IO2	Function	In/Out	Electrical
2	14	COM 1	Input	RS 232 RX
3	13		Output	RS 232 TX
5	15	Current Return	N/A	GND

## DB15 FEMALE AUXILIARY CONNECTOR

DB15F	IO2	Function	In/Out	Electrical
1	9	GPS TOV Mark	Output	+5 VDC TTL
3	5	System TOV Mark	Output	+3.3 VDC BiCMOS
4	10	Event In "2" Time Mark n580 Requires V4 SW	Input	+3.3 to 5.5 VDC LVCMOS
7	1		NO CONNECT	
8	15	Current Return	N/A	GND
9		NO CONNECT		
10		NO CONNECT		
12	13	n380 Only: COM3	Input	+3.3 to 5.5 VDC LVCMOS RX
13	14		Output	+5 Volt BiCMOS TX

## POWER / GND

Barrel Jack	IO2	Function	Electrical
NA	15	Ground	Current Return
NA	16	n380: +5VDC to +36VDC n580: +9VDC to +36VDC	VDD – Exceeding will damage device and void warranty

## ETHERNET – LED N380 ONLY

RJ45	IO2	Function	In/Out	Electrical
1	2	ETH_RX+	Input Output	BASE 100
2	8	ETH_RX-		
3	7	ETH_TX+		
6	6	ETH_TX-		

# N580 AND N380 MECHANICAL DRAWINGS

This device is a precision instrument and will measure all motion including any vibration / rotation of the mounting area. Installation on a flexible surface is generally not desirable and may degrade navigation performance. Placement at nodes will maximize angular rotation and minimize linear displacement.

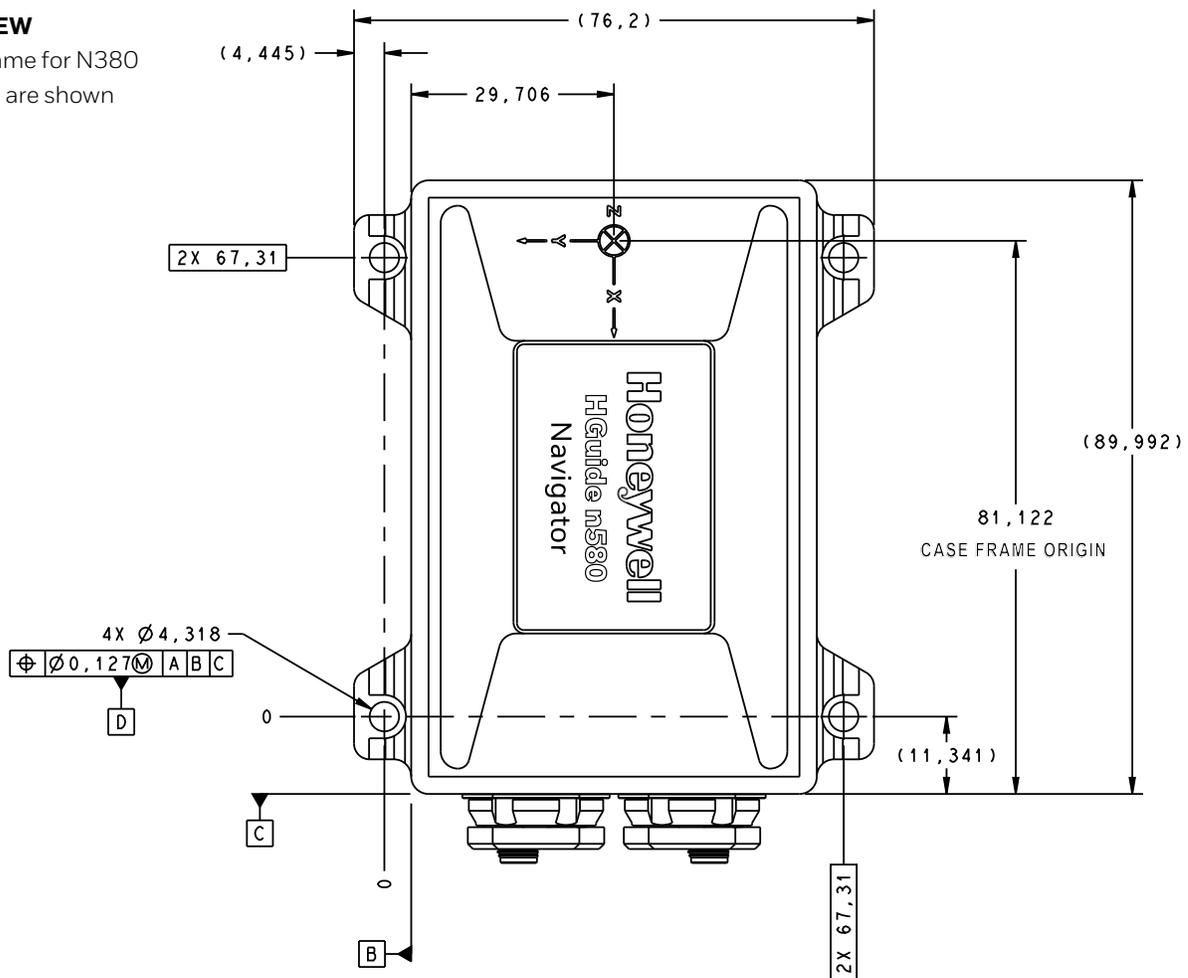
A STP file is available from Honeywell on request. The referenced Center of Navigation Point is coincident with "Case Frame" origin identified in a separate software interface manual. All dimensions are in millimeters.

Mount device with four M3.5 Socket Head Cap Screws. Alternatively – a # 0.138-32 UNC Socket Head Cap Screw can be used.

Torque mounting screws to 1 +/- 0.05N-m (9 +/- 0.5 in-lbs).

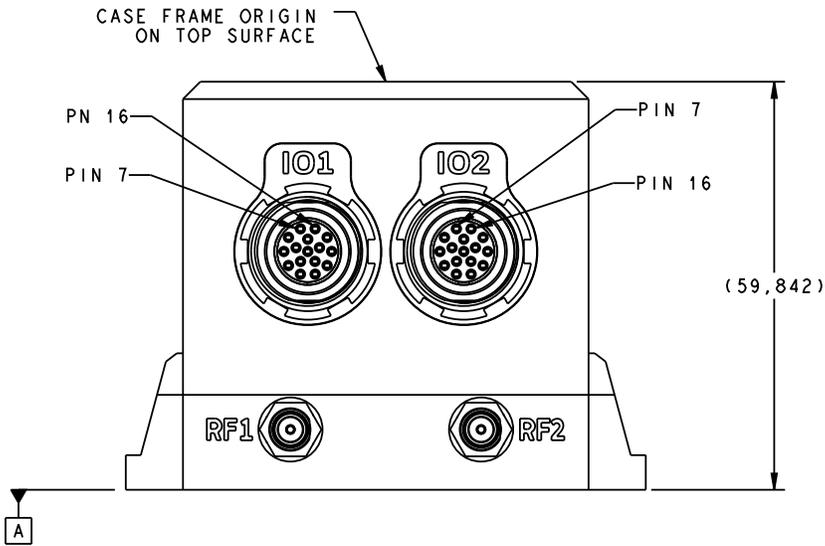
## N580 TOP VIEW

Dimensions same for N380  
All dimensions are shown  
in millimeters.



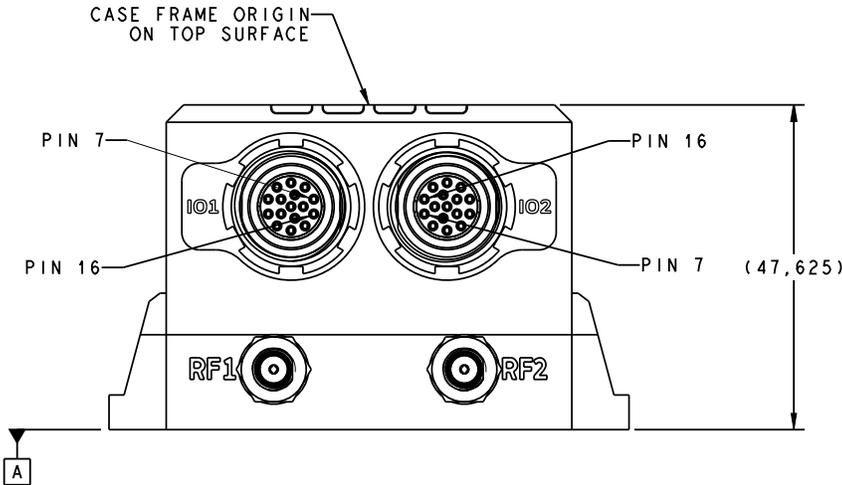
### N580 ONLY CONNECTOR VIEW

All dimensions are shown in millimeters.



### N380 ONLY CONNECTOR VIEW

All dimensions are shown in millimeters.

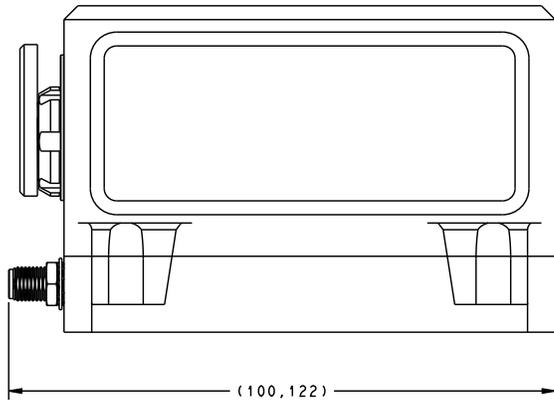


**IO1 AND IO2 CONNECTORS ARE NOT INTERCHANGEABLE**

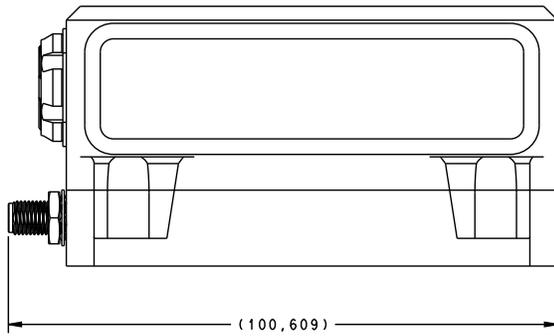
HGUIDE N380 LED					
LED	Description	LED OFF	Performance		LED ON
			Slow	Fast	
PWR	Power	No Power Applied	NA		Power Applied
POS	GNSS Status	No GNSS	RTK Float	Standalone or SBAS	RTK
INS	HGuide Navigation	Standby Awaiting Heading	Odometer Active*	Zero Motion Detected	Aided Navigation
LOG	Mass Storage	Logging InActive Not Mounted to PC	Logging Memory Okay	Mounted to PC Data Transferring	Mounted to PC No Data Transfer

\* This is intended as at test mode when setting up the system. The user must physically disconnect the antennas after the SYS LED goes solid (aided navigation). If a valid odometer message is being sent to the device, the unit will blink slowly. If the unit is blinking quickly due to zero motion being detected/enabled, it will transition to slow blinking. Reconnect antenna within one minute if Zero Motion Detect is not enabled.

**N580 SIDE VIEW**



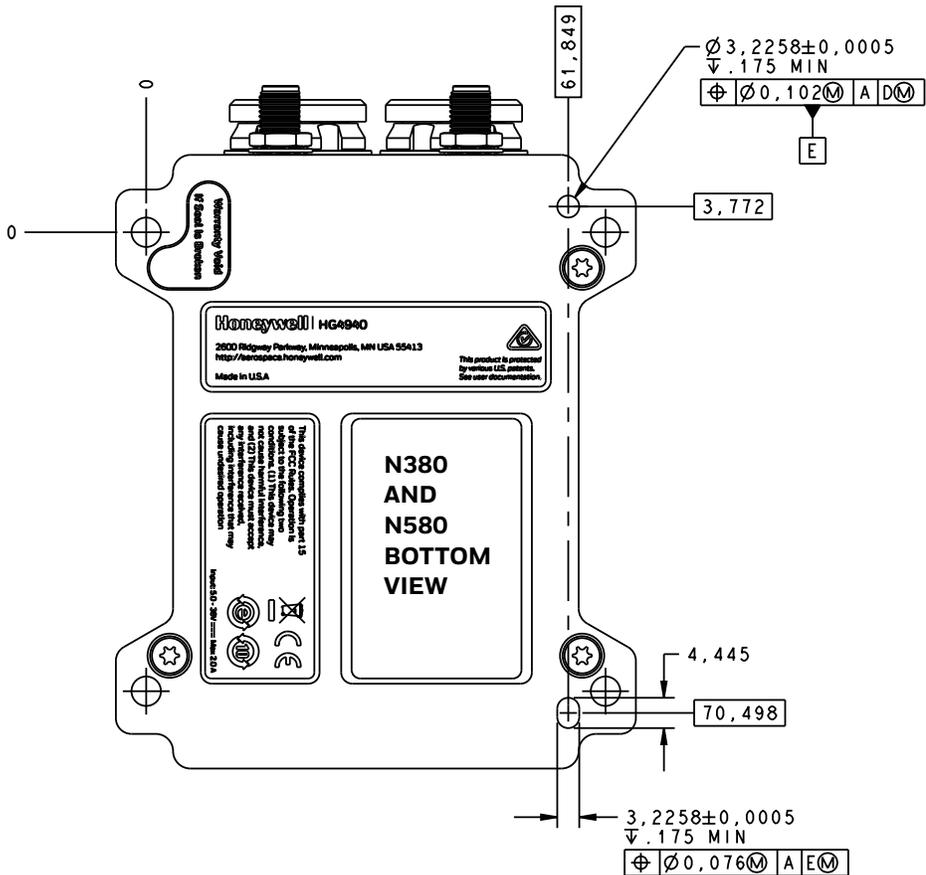
**N380 SIDE VIEW**



**BOTTOM VIEW IS SIMILAR FOR N380 AND N580**

All dimensions are shown in millimeters.

**IO1 AND IO2 CONNECTORS  
ARE NOT INTERCHANGEABLE**



# HGUIDE NAVIGATOR ACCESSORIES

## AVAILABLE FROM HONEYWELL

Description	Ordering Part Number
HGuide N580 Evaluation Kit with IO1/IO2 cables	68010029-001
HGuide N580 Evaluation Kit with IO1/IO2 cables and 2 UAV Antennas	68010029-002
HGuide N580 Terminated I/O Cable 1	53700054-5
HGuide N580 Terminated I/O Cable 2	53700054-6
HGuide N580 Unterminated I/O Cable 1	53700054-7
HGuide N580 Unterminated I/O Cable 2	53700054-8
Survey Antenna	53700062-1
UAV Antenna	53700060-1
5m RF SMA Male to TNC Male Cable for Survey Grade Antenna	53700063-2
5m RF SMA Male to SMA Female Cable for UAV Antenna	53700063-3

## USB ADAPTER ELECTRONICS AVAILABLE FROM VENDORS

Port	Device	In Nav Kit?	Description	Vendor	Part Number
COM1 & COM2 (RS422)	All	Yes	RS485/RS422 to USB Converter	Serial Comm	USB-485B
COM1 (RS422)	All	Yes	DSUB Gender Changer DB9F to DB9F	Digikey	GCLP09F09F-ND
COM3 (TTL/CMOS)	All	No	DB 15 Pin Back Shell	Digikey	A34174-ND
			CONN D-SUB PLUG 15POS PNL MNT		1003-1833-ND
			TTL-232RG-VSW5V-W		768-1096-ND
COM4	All	No	RS232 to USB	Digikey	Adafruit Model SP-880 1528-1115-ND
USB	n380 Only	No	DB15 to USB A-Blunt	Digikey	Qualtek 3021005-03 Q363-ND
ETHERNET	n380 Only	No	USB 3.0 Ethernet Adapter	Amazon	Linksys USB3GIG



COM3 & USB



COM3



Ethernet



COM1



USB



COM4



COM1/COM2 Adapter

# GNSS ANTENNA GUIDELINES

GNSS ANTENNA GUIDELINES					
Honeywell Tested Antennas	Bands	Size	Use Cases	Performance	
				SBAS/DGPS/ Standalone	RTK
Maxtena (M1227HCT-A2-SMA)	L1/L2	3 cm radius 5.1 cm tall	Open Air UAV	No Effect	3 cm
AeroAntenna AT1675-382W-TNCF-000-RG-39-NM-R	Tri	7.3 cm radius 9.5 cm tall	Urban Canyons GPS Outages	No Effect	1 cm

Honeywell tests Antennas mounted at least 1 Meter apart with the RF2 (aux) antenna forward of the RF1 (main) antenna relative to the X Axis Case Frame with auto-estimation algorithms that further refine the antenna lever arm estimate. These estimation algorithms can be disabled using the HGuide Data Reader.

The HGuide default settings require that the antennas be physically mounted in line within 10 degrees of the X Axis Case frame for heading. For this same mounting with dual antennas, the roll angle (rotation about X Axis) to local level must also be < 5 degrees. The pitch angle can be up to 90 degrees but do not mount upside down. Customer may optionally define new locations for the antennas via the software interface; however, consult Honeywell if this involves physically mounting the n580 at an angle > 5 degrees from local level.

Antenna cable lengths should be identical within typical manufacturing tolerances. To achieve specified performance, all antennas must be at least L1/L2 capable. Maximum Antenna Current is 200 mA.

# EXPORT REGULATORY

## Export Guidance

All technology that leaves the United States is subject to export regulations. This manual contains technology that has an Export Commodity Classification of ECCN 7E994 with associated country chart control code of AT1. This technology generally will not require a license to be exported or reexported. However, if you plan to export this item to an embargoed or sanctioned country, to a party of concern, or in support of a prohibited end-use, you may be required to obtain a license.

## Regulatory Compliance

For United States end-use, the device meets the Federal Communications Commission (FCC) Part 15 Subpart B, Section 15.109 – Class B requirements for an unintentional radiator as a result of the device containing a GNSS receiver, which is considered to be “radio equipment.” For Canada end-use, the device meets Industry Canada ICED-003 Section 6.2 – Class B requirements.

The HGuide n580 complies with the European Union (EU) Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS Directive). The HGuide n580 complies with the European Union (EU) Directive 2002/96/EC on waste electrical and electronic equipment (WEEE). The purpose of this Directive is the prevention of waste electrical and electronic equipment (WEEE) and in addition, the reuse, recycling and other forms of recovery of such wastes as to reduce the disposal of waste. If purchased in the European Union, please return the device at the end of use to the supplier from which it was purchased. For European Union end-use, the HGuide n580 meets the EU Radio Equipment Directive (RED) – 2014/53/EU requirements.

These include appropriate flow-down requirements:

- Article 3.1(a) for Safety, in accordance with the appropriate clauses of EN 60950-1:2005 and EN 60950-22:2014
- Article 3.1(b) for EMC Radio Spectrum Part 19, specific conditions for GNSS receivers, in accordance with the appropriate clauses of EN 301 489-19 V2.1.1
- Article 3.2 for Radio Spectrum, in accordance with the appropriate clauses of EN 303 413 V1.1.1

For Australia and New Zealand end-use, the HGuide n580 complies with the Australian Communications and Media Authority (ACMA) requirements derived from the Radio Communications (Electromagnetic Compatibility) Standard 2008.

**For More Information**

[aerospace.honeywell.com/n580](https://aerospace.honeywell.com/n580)

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