



# *L1/L2GHNRRKIT*

## *L1/L2 GNSS Hanger Networked Re-Radiating Kit Technical Product Data*



### Features

- **Amplified L1/L2 GNSS Roof Antenna**  
Gain  $\geq$  33dB
- **Re-Radiating Amplifier with Power Supply**  
Typical Gain 30dB
- **Optional Mounting Kit Hardware**  
Roof Antenna Mount & Adjustable Re-Radiating Mount
- **Variable Gain Option**  
Re-Radiating Amp Gain Varies from approx 0-23 dB gain
- **Variable Gain Option with LCD Display**  
Push Button Control in 1dB Increments 0-30dB gain

### Description

The GPS L1/L2 GNSS Hanger Re-Radiating Kit (L1/L2GHNRRKIT) is a complete re-radiating system that allows re-radiation of the GPS L1/L2 signal as well as the other GNSS frequencies (including Galileo, GLONASS, Beidou and Omnistar indoors). The L1/L2GHNRRKIT consists of an active L1/L2 GNSS roof antenna, a re-radiating amplifier with a wall mount plug-in transformer that powers the entire system, and a passive L1/L2 GNSS re-radiating antenna. The GNSS signals from the roof antenna are amplified and radiated indoors. Thus, if a receiver has line of sight with the re-radiating antenna, it can receive the GNSS signal indoors up to 100 feet. A cable from the roof antenna to the re-radiating kit is required and can be purchased separately.

## Roof Antenna Specifications, $T_A = 25^{\circ}\text{C}$

Parameter	Conditions	Min	Typ	Max	Units
Frequency	See Active Antenna Specifications page 5				GHz
Bandwidth					MHz
Out Imped. <sup>(1)</sup>			50		$\Omega$
Pre-Amp Gain			30	33	dB
Noise Figure			2.0		dB
Output SWR				2.0:1	-
Filtering	See Active Antenna Specifications page 5				dB
					dB
Req. DC Input V.		4.5		24	Vdc
Current			22		mA

RF Connector Options		
Connector Options	CONNECTOR STYLE	CHARGE
	Type N-female	NC

## Re-Radiating Amplifier Electrical Specifications, $T_A = 25^{\circ}\text{C}$

Parameter	Conditions	Min	Typ	Max	Units
Freq. Range	Ant – J1	1.1		1.7	GHz
In/Out Imped.	Ant, J1		50		$\Omega$
Gain <sup>(1)</sup>					dB
		29	30	31	dB
Input SWR <sup>(2)</sup>	J1 - 50 $\Omega$			1.8:1	-
Output SWR	Ant - 50 $\Omega$			1.8:1	-
Noise Figure	Ant – J1		3.3	3.5	dB
Current			33	40	mA
Gain Flatness	L1 – L2 ; Ant – J1		0.5	1	dB
Reverse Isolation	J1 – Ant	35			dB
Group delay Flatness	$\tau_{d,max} - \tau_{d,min}$ ; Ant – J1			1	ns

Re-Radiating Amp System Power Supply Options		
Source Voltage Options	VOLTAGE INPUT	STYLE
	110VAC	Transformer (Wall Mount)
	220 VAC	Transformer (Wall Mount)
	240 VAC (United Kingdom)	Transformer (Wall Mount)
	Customer Supplied DC 9-32 VDC	Military Style Connector
Re-Radiating Amp Gain Control Options		
Standard Gain	30 dB (Custom Gain between 0-30dB available upon request)	
Variable Gain	$-3 \leq \text{Gain} \leq 23\text{dB}$	
Variable Gain with LCD Display	0-30dB gain range with push button control in 1dB increments	

## Re-Radiating Antenna Electrical Specifications, $T_A = 25^{\circ}\text{C}$

Parameter	Conditions	Min	Typ	Max	Units
Frequency	See Passive Antenna Specifications page 6				GHz
Bandwidth					MHz
Impedance			50		$\Omega$
Peak Gain			3		dBic
Output SWR				1.5:1	-
Polarization			RHCP		-

## Part Number Configuration

**HS E W VG L1L2GHNRRKIT N / 5 / 110**

### Options:

**HS** = Hermetically Sealed

**E** = EMI Shielding

**W** = Weatherproofing

### Re-Radiating Kit Type:

**VG** = Variable Gain knob control 0-23dB gain

**VGLCD** = Variable Gain with push button control in 1dB increments 0-30dB gain

**L1L2GHNRRKIT** = L1/L2 GNSS Hangar Networked Re-Radiating

### Kit Connector Options (Type N-female Standard):

**N** = N-type, **S** = SMA, **T** = TNC, **B** = BNC

### DC Output Voltage

**5** = Amplifier Output Voltage (included antenna requires 4 - 24vdc-5vdc is default voltage)

### Source Voltage (Power Supply Options)

**110**=110VAC, **220**=220VAC (2 prong Euro), **240**=240 (3 prong UK)

**MC** = Military DC Connector (User Supplies 9-32VDC)

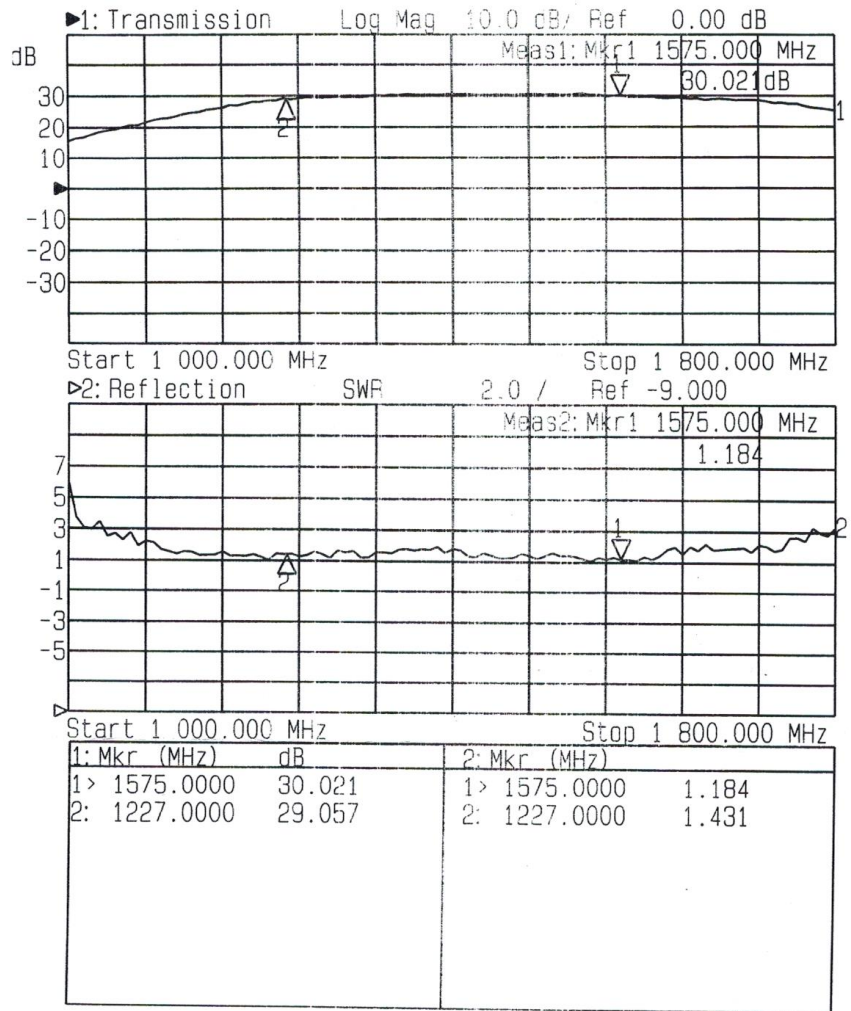
(Military DC Mating Connector is included standard with the MC power option)

Contact GPS Networking Technical Support at 719-595-9880 or [salestech@gpsnetworking.com](mailto:salestech@gpsnetworking.com) for any questions regarding non-standard configurations and corresponding part numbers)

Performance:

**NRRKAMP** (Re-Radiating Kit Amp Standard Gain)

Input SWR (Ant. Port) and Frequency Response: Ant. To J1) (Typical, type N connectors):

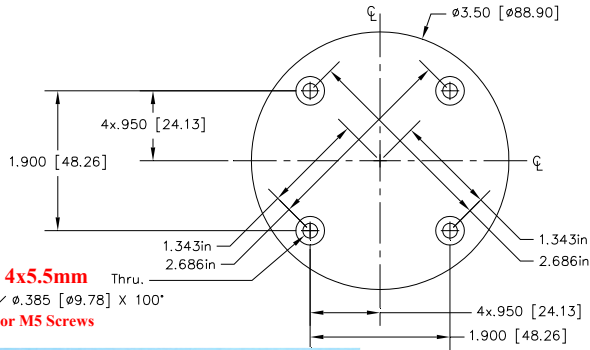


# Specifications:

## L1L2GGPSA (L1/L2 GNSS Active Antenna-Outdoor)

Includes all GNSS Frequencies

### SPECIFICATIONS



4x5.5mm Thru.  
 ✓ 0.385 [09.78] x 100°  
 For M5 Screws

#### ELECTRICAL:

	L5 GPS E5, E5a, E5b Galileo L5 IRNSS	L2 GPS B2 Compass	L2 GLONASS E6 Galileo B3 Compass	OmniSTAR / L-Band L6 Galileo B1 Compass	L1 GPS E1, E2 Galileo L1 IRNSS	L1 GLONASS
FREQUENCY:	1176.45 ± 12 MHz 1164.45 - 1219.14 MHz 1176.45 ± 15 MHz	1227.60 ± 12 MHz 1207.14 ± 10 MHz	1252.50 ± 7.5 MHz 1266.75 - 1290.75 MHz 1268.52 ± 10 MHz	1542.50 ± 14.0 MHz 1542.50 ± 5.0 MHz 1561.098 ± 10 MHz	1575.42 ± 15.0 MHz 1575.42 ± 17.0 MHz 1575.42 ± 12.0 MHz	1609 ± 7.0 MHz
RADIATION PATTERN:	HEMISPHERICAL					
POLARIZATION:	RHCP	RHCP	RHCP	RHCP	RHCP	RHCP
VSWR:	< 2.0:1	< 2.0:1	< 2.0:1	< 2.0:1	< 2.0:1	< 2.0:1
IMPEDANCE:	50 ohms	50 ohms	50 ohms	50 ohms	50 ohms	50 ohms
ANTENNA GAIN (dBic):	Free Space   4 ft G.P.	Free Space   4 ft G.P.	Free Space   4 ft G.P.	Free Space   4 ft G.P.	Free Space   4 ft G.P.	Free Space   4 ft G.P.
@ 90° (ZENITH):	-	+ 2.6	+ 4.8	+ 0.0	+ 2.4	+ 2.0
@ 10° Elevation:	-	- 3.5	- 3	- 6.5	- 6	- 4
@ 20° Elevation:	-	- 2.0	- 0	- 4.7	- 3	- 3
@ 30° Elevation:	-	- 0.4	+ 1.8	- 3.4	- 1	- 2
@ 60 - 90° Elevation:	> -4	> -4	> 1.3	> 2.6	> -1.5	> -0.1
BEAM WIDTH (3dB):	110 Deg.	120 Deg.	110 Deg.	115 Deg.	105 Deg.	110 Deg.
AXIAL RATIO:	1.5 dB	2 dB	1 dB	1 dB	2 dB	2 dB
LIGHTNING PROTECTION:	DC GROUNDING					
LNA GAIN:	35 dB	35 dB	35 dB	33 dB	33 dB	33 dB
LNA NOISE FIGURE:	3.0 dB	3.0 dB	3.0 dB	3.0 dB	3.0 dB	3.0 dB
LNA P1dB Out:	+13 dBm	+13 dBm	+13 dBm	+13 dBm	+13 dBm	+13 dBm
LNA DC POWER:	2.5V/20mA, 3V/23mA, 3.3V/35mA, (2.5-24)V/<50mA					
POWER HANDLING:	1 Watt CW. Optional: 10 Watts 1 Microsec Pulse (-AL-)					

#### MECHANICAL:

SIZE: DIAMETER: 3.50 in. [ 88.90 mm]  
 HEIGHT: 0.86 in. [21.89 mm]

WEIGHT: 9 oz. (256 g)

FINISH: SKYDROL RESISTANT POLYURETHANE ENAMEL  
 BASE IRIDITE PER MIL-C-5541F CLASS 1A  
 GLOSS WHITE #17925 PER FED-STD-595B

COLOR: 6061-T6 ALUMINUM ALLOY BASE

MATERIAL: COMPOSITE RADOME, ABRASION, IMPACT, ABRASION, UV, SOLVENT, SKYDROL RESISTANCE, AND FIRE RETARDANT

CONNECTOR: TNC FEMALE  
 (OPTION: SMA, BNC, TNC Bulkhead, N, N Bulkhead, MCX, MMCX)

#### ENVIRONMENTAL:

TEMPERATURE: -67 °F TO +185 °F [-55 °C TO +85 °C] (Operational)  
 -85 °F TO +302 °F [-65 °C TO +150 °C] (Storage)

ALTITUDE: 70,000 ft.

VIBRATION: > 30 G's

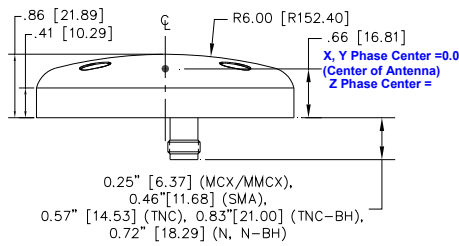
LEAKAGE: HERMETICALLY SEAL

HAILSTONES: < 0.5" Dia.

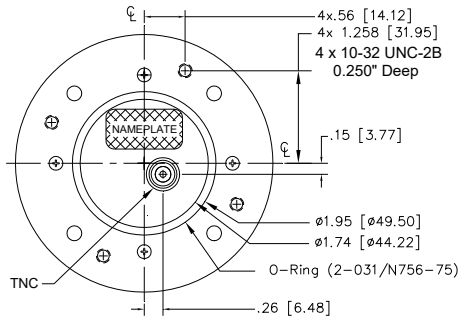
#### FEDERAL & MILITARY SPECIFICATIONS:

DESIGN TO: FAA TSO-C144, DO-160D, D0-228, MIL-C-5541, MIL-E-5400, MIL-I-45208A, MIL-STD-810, AND SAE J1455

QUANTITY REQD	DESCRIPTION	PARTS LIST
4	M5 Screws	
4	Washer, Custom C'Sink	3G15P1001-70
1	O-Ring or Gasket	2-031/N756-75 or 3G15P1001-3G



0.25" [6.37] (MCX/MMCX),  
 0.46" [11.68] (SMA),  
 0.57" [14.53] (TNC), 0.83" [21.00] (TNC-BH),  
 0.72" [18.29] (N, N-BH)



P/N: G5Ant-3AT1 Connector Color

SIZE:	LNA:	CABLE'S LENGTH:	CONNECTOR:	COLOR:
1: 2" SQ	A: WITH LNA	X: NO CABLE	S: SMA; B: BNC	-1: GLOSS WHITE #17925 PER FED-STD-595B
1.9: 1.9" SQ	A: WITH LNA	X: NO CABLE	M: MCX; MM: MMCX	-2: LUSTERLESS GRAY #36320 PER FED-STD-595B
2: 2.6" DIA	P: WITHOUT LNA		N: N, NB; N-B: Bulkhead	-3: OLIVE DRAB GREEN #34094 PER FED-STD-595B
3: 3.5" DIA			T: TNC, TB: TNC-Bulkhead	-4: LUSTERLESS BLACK #37038 PER FED-STD-595B
				-5: TAN #: FS 23446 or 33446, FED-STD-595

3.5in Dia.  
 L1L2GLonass/L1L2GPS/OmniSta  
 G5 ANTENNA  
 D|3CVE1| G5Ant-3AT1 |  
 SCALE 1/1 SHEET 1 OF 1

# Specifications:

## L1L2GRRKPA-N (L1/L2 GNSS Passive retransmit antenna-indoor)

Includes all GNSS Frequencies

### SPECIFICATIONS

#### ELECTRICAL:

	L5 GPS E5, E5a, E5b, Galileo L5 IRNSS 1176.45 ± 12.0 MHz 1176.45 ± 15.0 MHz	L2 GPS B2 Compass 1227.60 ± 12.0 MHz 1207.14 ± 10.0 MHz	L2 GLONASS E6 Galileo B3 Compass 1252.50 ± 7.5 MHz 1266.75 - 1290.75 MHz 1268.52 ± 10.0 MHz	OmniSTAR / L-Band L6 Galileo B1 Compass 1542.50 ± 14.0 MHz 1542.50 ± 5.0 MHz 1561.098 ± 10.0 MHz	L1 GPS E1, E2 Galileo L1 IRNSS 1575.42 ± 15.0 MHz 1575.42 ± 17.0 MHz 1575.42 ± 12.0 MHz	L1 GLONASS 1603 ± 7.0 MHz
FREQUENCY:						
RADIATION PATTERN:	HEMISPHERICAL					
POLARIZATION:	RHCP					
VSWR:	< 2.0:1					
IMPEDANCE:	50 ohms					
ANTENNA GAIN (dBic):	Free Space	5in G.P	Free Space	5in G.P	Free Space	5in G.P
@ 90° (ZENITH):	- 7	- 3	+ 0.5	+ 3	+ 1.9	+ 1.0
@ 10° Elevation:	- 13	- 10	- 5.6	- 4.1	- 5.0	- 5.7
@ 20° Elevation:	- 11	- 9	- 3.9	- 2.7	- 3.9	- 3.9
@ 30° Elevation:	- 10	- 8	- 2.6	- 0.8	- 4.3	- 1.5
@ 60 - 90° Elevation:	> - 8	> - 5	> - 1	> 1.8	> - 2.4	> 1.2
BEAM WIDTH (3dB):	105 Deg.	100 Deg.	105 Deg.	105 Deg.	95 Deg.	97 Deg.
AXIAL RATIO:	1.5 dB	3 dB	1 dB	1 dB	1 dB	1 dB
LIGHTNING PROTECTION:	N/A	N/A	N/A	N/A	N/A	N/A
LNA GAIN:	3.0 dB	3.0 dB	3.0 dB	3.0 dB	3.0 dB	3.0 dB
LNA NOISE FIGURE:	+13 dBm	+13 dBm	+13 dBm	+13 dBm	+13 dBm	+13 dBm
LNA P1dB Out:						
LNA DC POWER:						
POWER HANDLING:						
	DC GROUNDING					
	2.5V/20mA, 3V/29mA, 3.3V/35mA, (2.5-24)V/<50mA					
	1 Watt CW, Optional: 10 Watts 1 Microsec Pulse (-AL-)					

#### MECHANICAL:

SIZE: DIAMETER: 2.63 in. [66.8 mm]  
 HEIGHT: 0.985 in. [25 mm]

WEIGHT: 5.5 oz. (156 g)

FINISH: SKYDROL RESISTANT POLYURETHANE ENAMEL  
 BASE IRIDITE PER MIL-C-5541F Class 1A

MATERIAL: 6061-T6 ALUMINUM ALLOY BASE  
 COMPOSITE RADOME, IMPACT, ABRASION, UV, SOLVENT,  
 SKYDROL RESISTANCE, AND FIRE RETARDANT

CONNECTOR: TNC FEMALE BULKHEAD CONNECTOR  
 (OPTION: SMA, BNC, N, N Bulkhead, MCX, MMCX)

#### ENVIRONMENTAL:

TEMPERATURE: -67 °F TO +185 °F [-55 °C TO +85 °C]  
 70,000 ft.

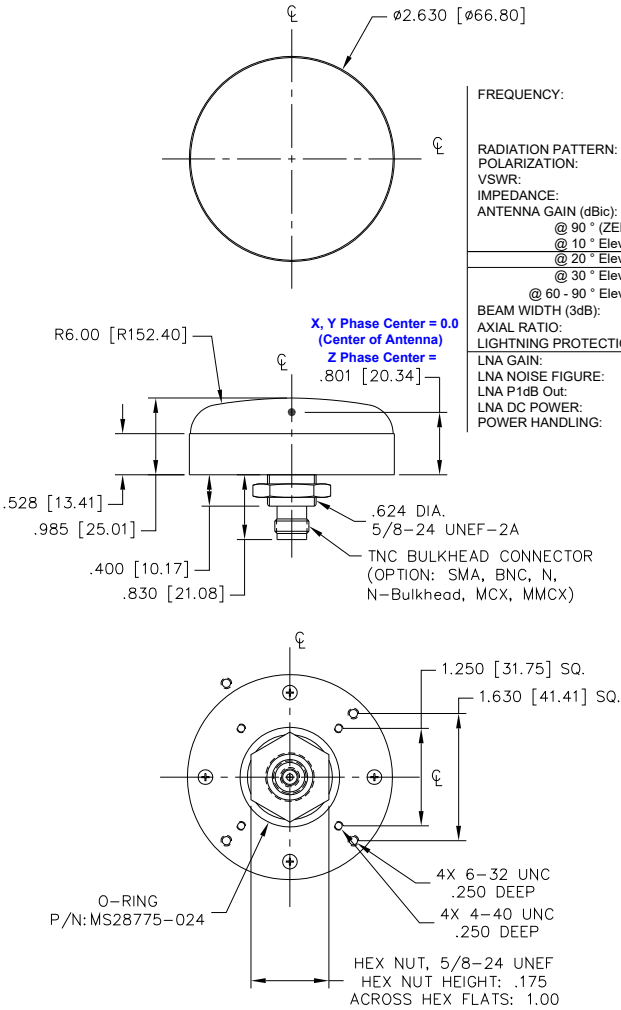
VIBRATION: > 30 G's  
 HERMETICALLY SEAL

#### FEDERAL & MILITARY SPECIFICATIONS:

FAA TSO-C144, DO-160D, D0-228, MIL-C-5541,  
 MIL-E-5400, MIL-I-45208A, MIL-STD-810, AND SAE J1455

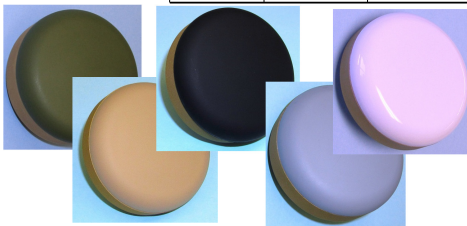
#### ACCEPTANCE TEST PROCEDURE:

ATP-GPS-L1L2-100



P/N: G5Ant-2PN4

SIZE:	LNA:	CABLE'S LENGTH:	CONNECTOR:	COLOR:
1: 2" SQ.	A: WITH LNA	X: NO CABLE	S: SMA; B: BNC	-1: GLOSS WHITE #17925 PER FED-STD-595B
1.9: 1.9" SQ.	P: WITHOUT LNA		M: MCX; MM: MMCX	-2: LUSTERLESS GRAY #36320 PER FED-STD-595B
2: 2.6" DIA.			N: N; NB: N-Bulkhead	-3: OLIVE DRAB GREEN #34094 PER FED-STD-595B
3: 3.5" DIA.			T: TNC; TB: TNC-Bulkhead	-4: LUSTERLESS BLACK #37038 PER FED-STD-595B
4: MINI ARINC			TNB: TNC-Bulkhead with N-connector Thread on Bulkhead	-5: TAN #: FS 23446 or 33446, FED-STD-595



# Mechanical

## Re-Radiating Kit Amplifier

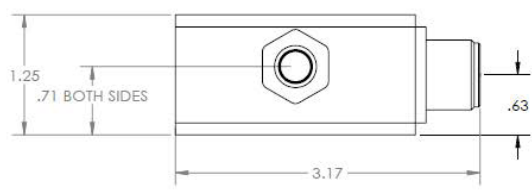
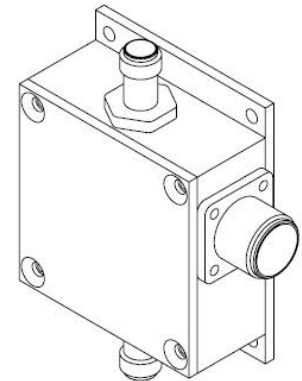
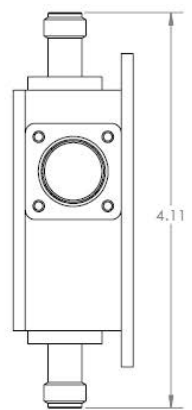
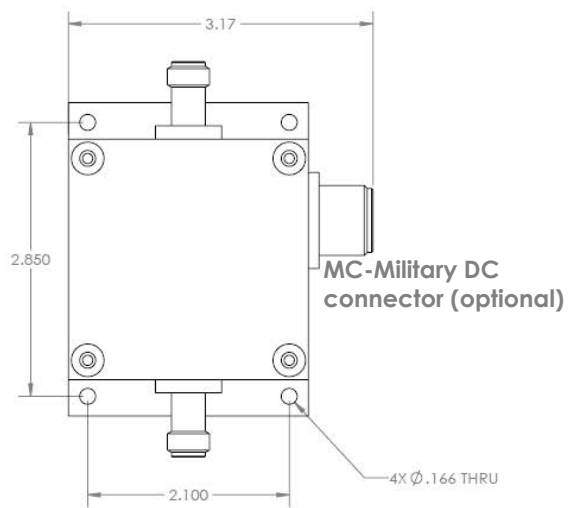
**Dimensions:** Height: 1.3"  
 Length (not including connectors) Body: 2.5"  
 Base Plate: 3.25"  
 Width (not including connectors): 2.5"

**Weight:** 11 oz. (316 grams)

**Operating Temp. Range:** -40° to + 75°C

Finish Housing and Base Plate: ELECTROLESS NICKEL PLATED  
 MIL-C-26074C CLASS 1, .0001-.0003 MAX  
 Finish Lid: ANODIZE, TYPE II, CLASS 2, BLACK, per MIL-A-8625

REVISIONS				
ZONE	REV.	DESCRIPTION	REV. BY	DATE
-	A	INITIAL RELEASE	-	-



GPS NETWORKING	<b>ASSY, 1X1 STANDARD</b>				Do Not Scale Dwg. Remove All Burrs And Sharp Edges to .000 Root Max.
	Drawn By: BPC	Date: 09/04/15	Design Eng:	Checked:	
	Checked By:	Issue:	Proj Eng:	Material:	
	Title:	Quantity / Unit Key:	Heat Treatment:	Notes:	
Heat Angle/Position:	Address:	Heat Key:	See Note	X = 1:500 XX = 1:250 XXX = 1:100 Angle 90° Surface Finish Unless Noted Inch Dimensions Unless Noted	
3D70 Industrial Blvd Hudson West CO 81007	Drawn: BPC Design: BPC Ass'y: BPC	SEE B SHEET A	SHEET 1 OF 1		