

A large satellite dish antenna is silhouetted against a vibrant sunset sky. The dish is a complex grid of metal struts, and its feed horn is visible at the top. The sky transitions from a deep orange near the horizon to a pale blue at the top. The company logo, consisting of two red slanted bars, is positioned above the company name.

ROJONE[®]
PTY. LTD.

***Global Positioning System (GPS)
Product Guide***

GPS (Global Positioning System) Product Index



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Warranty

Rojone warrants products of its manufacture to be free from defects in material & workmanship under conditions of normal use. If within one year after delivery to the original owner, any Rojone product is found to be defective, Rojone shall, at its option, repair or replace the defective unit. This warranty does not apply to products which have been disassembled, modified or subjected to conditions exceeding the specification. Rojone reserves the right to make design changes without any obligation. In no event does Rojone assume liability for installation, labour or for consequential damages.

For any issues concerning warranty, please contact Rojone immediately.

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GPS/GLONASS Integrated Antenna & Receiver Module

The G1 Series is our highly sophisticated range of integrated GPS receiver & antenna modules. This level of integration directly attaches a quality GPS/GLONASS receiver directly to our high performance antenna, eliminating loss, gaining superior performance. This product is ideal for timing applications, mining, agriculture and the survey industries.

The Genius range has been designed with an integrated Switchmode power supply providing integrators the flexibility of an input voltage range of 8 to 30 Volts suitable for most vehicle installations.

As most applications are unique, the Genius range can be configured to your specific requirement by selecting the most appropriate interface (RS232, TTL or USB), standard or ruggedized environmental housing or cable and connector combination. Rojone is also able to offer affordable customization for both hardware and software. Please talk to us about your individual needs.

G1 Series

GPS Receiver with internal antenna
NMEA 4800 Baud Standard
Interface RS232 or TTL
A range of operating voltage choices
Standard cable length 3 mtrs (9.8ft)
Standard MINI housing or Environmental MAXI
Screw, Magnetic or Pole Mounting Options



G1 Series USB

GPS Receiver with internal antenna
NMEA 4800 Baud Standard
Interface USB
Drivers Windows or Mac
Operating voltage 5 Volts
Connector type USB
Standard cable length 3 Mtrs (9.8ft)
Housing 75mm (2.95") x 75mm (2.95") x 18mm (0.75")
Standard housing or Magnetic mounting available



OEM GPS Modules

GPS OEM Receiver with antenna attached
Or MCX Connector for external antenna connection
NMEA 4800 Baud Standard
Interface RS232 or TTL
Operating voltage 3 Volts & 2.9-7 Volts



GPS/GLONASS Receiver Specification

Chip	Ublox LEA-M8F
Frequency	L1, 1575.42 MHz GPS & 1602-1615 MHz GLONASS
C/A Code	1.023 MHz Chip
Receiver Type	GPS/QZSS, GLONASS
Augmentation & Assistance	SBAS, D-GPS, A-GNSS
Position Accuracy	Position 2.5m CEP, SBAS 2.0m CEP
Channels	72
Max update rate	Concurrent GNSS up to 5 Hz
Sensitivity	Cold Start -148dBm Reacquisition -160dBm Tracking & Acquisition -167dBm Hot Start -156dBm
Acquisition Rate	Hot Start 1.0 seconds average (Open Sky, Stationary) Aided Start 2.0 seconds average Cold Start 26 seconds average concurrent GNSS
Timing Accuracy	Clear Sky < 20ns
Timing Pulse	0.25 Hz to 5 MHz
Velocity	500 m/s (approx.1000 knots)
Power	5 volts USB 150mW Eco mode,160mW max
Serial Interface	RS232 or USB V2.0 Full Speed 12Mbit/s Connector USB-B
Protocols	NMEA 0183 version 4.0, UBX Binary, RTCM 2.3
Temperature range	-40 to + 85 Degrees C

If selected, the G1 product can be supplied with its own switchmode power supply providing a power input range of 8 to 30 Volts. This option is highly recommended for vehicle telematics.

G1 08 N A 1 X 232 05 C - MAXI



ROJONE®

GPS/GLONASS Integrated Antenna & Receiver Module



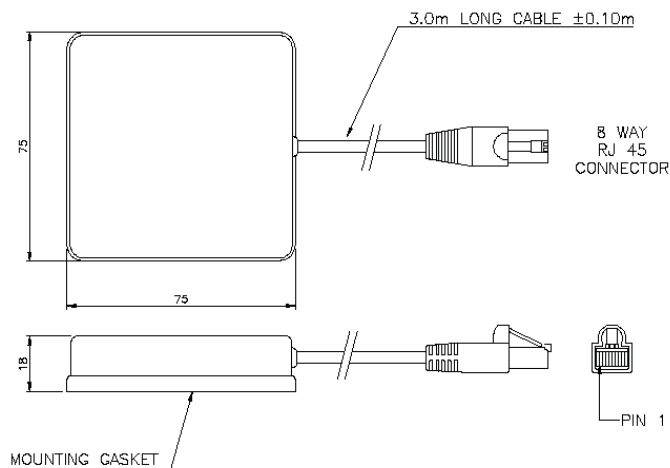
MINI Package Configurations & Mechanicals

Standard module package

UV stable, white injection module radome complete with scratch resistant rubber base.



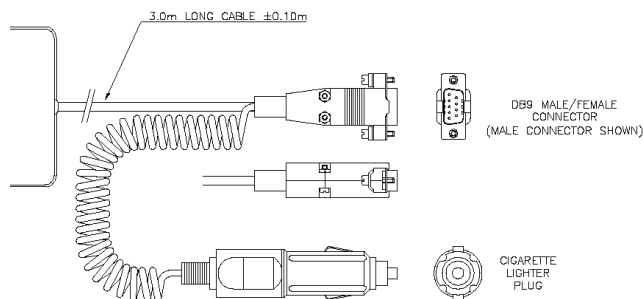
Connector Option 'A' RJ45 Plug



RJ45 Connector Pin out

PIN	FUNCTION
1	Timemark, Inverted, Open Collector O/P
2	TXA
3	RXA
4	Not Connected
5	Ground
6	VCC
7	Not Connected RESET
8	Not Connected Battery

Connector Option "D" 9 Way D Socket + Cig Lighter Power Connect

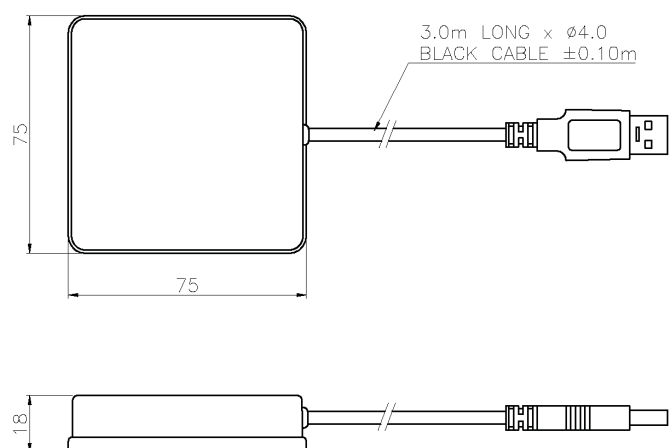


D9 Connector Pin out

PIN	FUNCTION
1	Not Connected Battery
2	TXA
3	RXA
4	Not Connected
5	Ground
6	Not Connected
7	Not Connected
8	Not Connected RESET
9	Timemark, Inverted, Open Collector O/P

02

Connector Option "U" USB B



GPS/GLONASS Integrated Antenna & Receiver Module



MAXI Package Configurations & Mechanicals

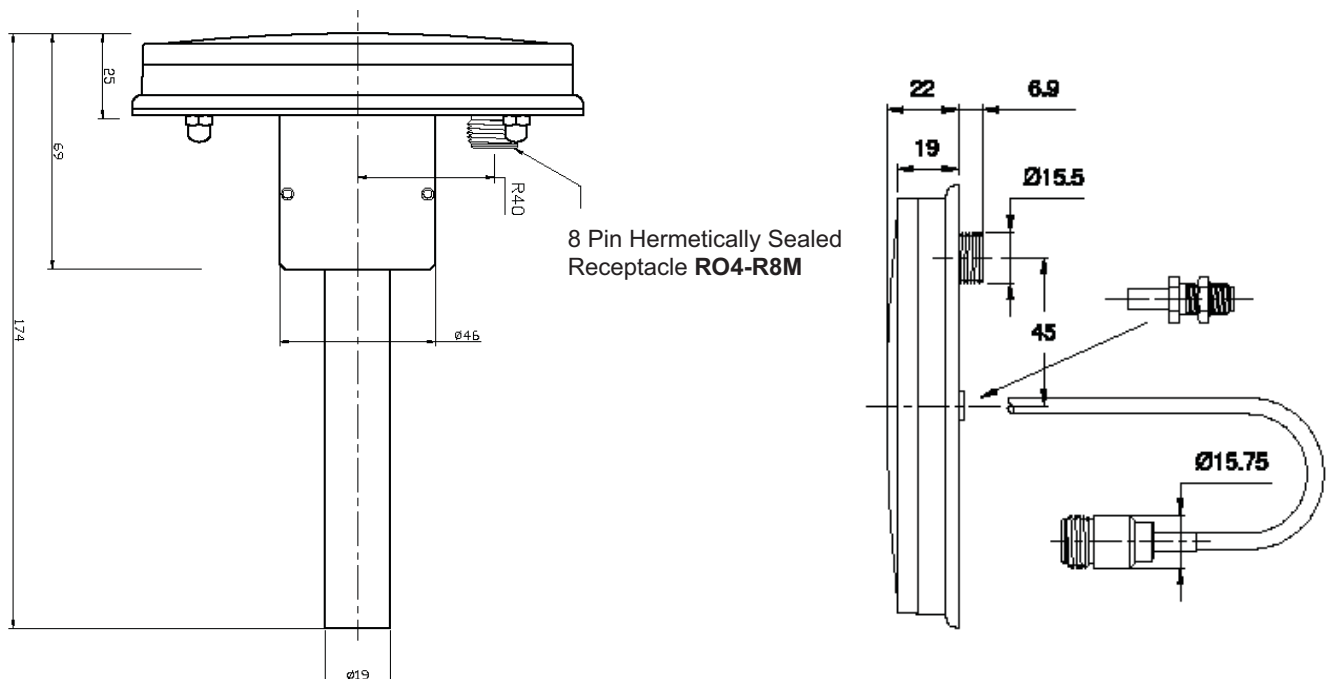
The radome is manufactured from high impact UV stable plastics, ideal for salt, high humidity, chemicals, oils, fuels & dirt exposed environments.

This unit is completely sealed & has 4 external through mounting holes for secure mounting with a flexible neoprene base for scratch resistance.



Connector Option "T"

Mounting Option "03" Pole Mount configuration



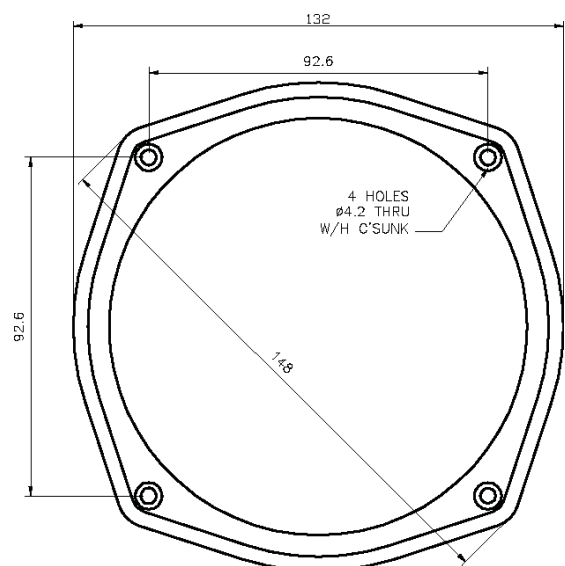
Order Code: RO4-P8F6'3

Mating Straight Plug Cable Clamp Max Cable Size 6.3mm
Purchased separately.

8 Pin Circular Connector Pin out

PIN FUNCTION

A	Timemark, Inverted, Open Collector O/P
B	TXA
C	RXA
D	Not Connected
E	Ground
F	VCC
G	Not Connected RESET
H	Not Connected Battery



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GPS/GLONASS OEM USB Receiver

Adding GPS positioning functionality to your electronic systems is easy. Rojone offers a high performance OEM USB GPS receiver that will provide fast, cost effective and precise position fixes for a wide variety of applications.

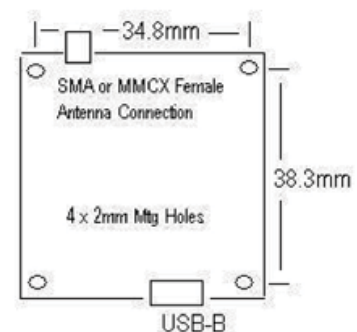
Features

- 72 Channel Ubox 8 engine
- <1 second time to first fix for hot start
- High immunity to jamming
- -167 dBm sensitivity in tracking mode
- RoHS compliant



Receiver Specifications

Chip	Ublox LEA-M8S (2014)
Frequency	L1, 1575.42 MHz & 1602-1615 MHz
C/A Code	1.023 MHz Chip
Position Accuracy ¹	Position 2.5mCEP, SBAS 2.0m CEP
Channels	72 up to 10Hz update rate
Sensitivity ³	Cold Start -148dBm, Hot Start -156dBm Reacquisition -160dBm & Tracking & Acquisition -167dBm
Acquisition Rate ¹	Hot Start 1.0 seconds average (Open Sky, Stationary) Aided Start ² 1.0 seconds average & Cold Start 27 seconds average
Timing Accuracy	Clear Sky < 20ns
Timing Pulse	0.25 Hz to 5 MHz
Velocity	500 m/s (approx. 1000 knots)
Power	5 Volt USB 150mW @3.0V Eco Mode, 160mW @ 3.0V Max without antenna connected
Serial Interface	SB V2.0 Full Speed 12Mbit/s Connector USB-B
Protocols	NMEA 0183 version 4.0, UBX binary, RTCM 2.3
Temperature	-40 to + 85 Degrees C, operating & storage temperature range
Size	39 x 42.5 mm + Connectors



Note

1. All SV @-130dBm
2. Dependent on aiding data connection speed & latency
3. With good external LNA

Order Code	G1OENU0XUSB01-170	SMA Female Antenna Connection
	G1OENU0XUSB01-310	MMCX Female Antenna Connection

GPS Miniature, Economical Active Antennas



FEATURES

- **Economical**
- **Suitable for a variety of GPS Receivers**

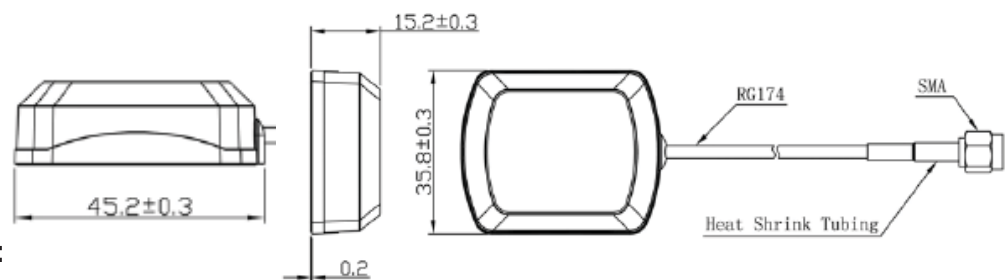
This range of GPS antenna has been designed as a versatile low cost active antenna solution. The antennas is active 3, 5 or 3-5 Volt ceramic patch encapsulated in a UV stable radome, cable is molded to the package for strength and waterproofing characteristics. It is offered as a magnetic mountable package making this antenna ideal for quick easy mounting.

Antenna Specifications

Frequency	1575.42 +/- 1 MHz
Bandwidth	CF 5 MHz
Bore sight Gain	5.0 dBi Min
Antenna VSWR	< 1.5:1
Polarization	RHCP
Axial Ratio	3dB Max
Elevation	Hemispherical
Temperature range	-40 to +85 Deg C
Protection	IP67
Weight	< 110 grams
Colour/Material	Black, ABS
Cable	RG174 1 to 5 mtrs
Connector selection	SMA, SMC, SMB, MCX + more

Low Noise Amplifier (LNA) Specifications

Amplifier Gain	28dB +/- 2dB
Noise Figure	< 1.5
Filter Insertion Loss	< 3dB
VSWR	2.0:1 Max
1dB Comp Pt	0dB
O/P 3 rd Order	+10dbm
Reverse Isolation	> +50dB
Impedance	50 Ohm
Supply Voltage	2.2~5 VDC @ 5~15mA
Out of Band	12dB min CF+50 MHz
Attenuation	16dB min CF-50 MHz



ORDER CODE:

GPS A 73 5X P 3

3	Cable Length in metres, specify connector style
P	Plug Connection
S	Socket Connection
5X	Magnetic Mount
5A	Adhesive Mount
73	Square Package identification
A	Active 2.2 Vots to 5 Volts

GPS Miniature, Economical Active Antennas

FEATURES

- Economical & Strong
- Superior waterproofing



This range of GPS antenna has been designed as a versatile low cost active antenna solution. The antennas is active 3, 5 or 3-5Volt ceramic patch encapsulated in a UV stable radome, cable is molded to the package for strength and waterproofing characteristics providing this antenna with the capability of water immersion to 1 metre depth for 12 hours while maintain 100% waterproofing.

Antenna Specifications

Frequency	1575.42 +/- 1 MHz
Bandwidth	CF 5 MHz
Bore sight Gain	5.0 dBi Min
Antenna VSWR	< 1.5:1
Polarization	RHCP
Axial Ratio	3dB Max
Elevation	Hemispherical
Temperature range	-40 to +85 Deg C
Mounting	Screw Centre
Weight	< 110 grams
Colour/Material	Black, ABS
Cable	RG174 1 to 5 mtrs
Connector selection	SMA,SMC,SMB,MCX + more
Waterproof	1mtr Water depth 12 Hours
Antenna Dimensions	46 w x 15 h
	Screw base Mounting L12mm M10 Thread

Low Noise Amplifier (LNA) / Filter Specifications

Amplifier Gain	28dB +/- 2dB
Noise Figure	< 1.5
Filter Insertion Loss	< 3dB
VSWR	2.0:1 Max
1dB Comp Pt	0dB
O/P 3 rd Order	+10dbm
Reverse Isolation	> +50dB
Impedance	50 Ohm
Supply Voltage	3~5 VDC @ 8~15mA
Out of band	
Attenuation	14dB min CF+50 MHz
	18dB min CF-50 MHz
	30dB min CF+100 MHz
	41dB min CF-100 MHz

ORDER CODE:

GPS A 72 5X P 3

3	Cable Length in metres, specify connector style
P	Plug Connection
S	Socket Connection
5X	Centre, screw mounting system
72	Round package identification
A	Active 2.2 Vots to 5 Volts

MiniNav GPS Antennas



FEATURES

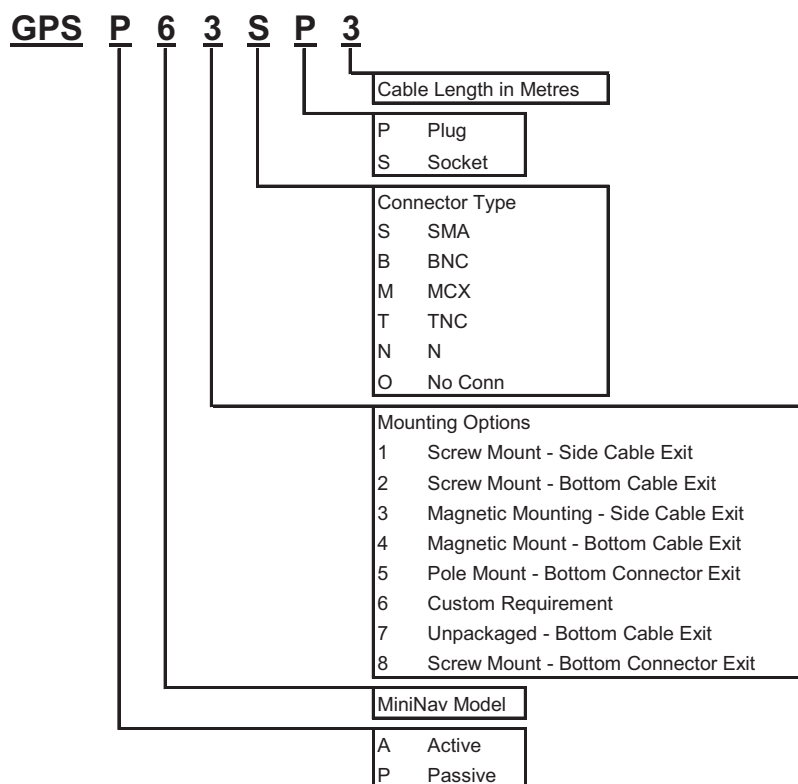
- **Low Cost – High Performance**
- **Suitable for a variety of GPS Receivers**

The MiniNav GPS antenna was designed as a low cost high performance antenna suitable for various GPS receivers & applications. This antenna is a stripline design using high quality Teflon PCB. Because of its size, the antenna carries its own ground plane and therefore requires no special additional mounting to offer peak performance.

Specification

Frequency Range	1575.42 MHz	Amplifier Gain	32dB Min, 35dB Max
Bandwidth	10 MHz	Noise Figure	< 1.0dB
Bore sight Gain	5.0 dBi	Bandwidth	10 MHz
Antenna VSWR	1.2:1 Max	Output VSWR	1.3: 1 Max
Polarization	RHCP	1dB Comp Pt	0dBm
Azimuth	Omni Directional	O/P 3 rd Order	+10dBm
Elevation	Hemispherical	Rev Isolation	> +50dB
Operating Temp range	-25 to +85 Deg C	Supply Voltage	5.0V +/-0.25VDC
Dimensions	75 x 75 x 18mm		@ 35mA

Order Code



MaxiNav Series GPS Antennas



FEATURES

- **Totally sealed Radome**
- **Ideal for Harsh Environments**
- **Suitable for marine & the tropics**

The MaxiNav is our flagship Antenna, developed specifically for harsh environment applications. The housing is manufactured from high impact, UV stabilized plastic formed to accommodate a snugly fitted O Ring. Once the radome has been heat sealed, the MaxiNav becomes the ideal choice for marine & high humidity environments and for applications in mining or heavy transport where the antenna may be subjected to high levels of dust, dirt, water, oils, solvents or possible abuse.

Specification

Frequency	1575 MHz
Bandwidth	20 MHz
Boresight Gain	7.7dBi
Antenna VSWR	1.2:1 Max
Polarization	RHCP
Elevation	Hemispherical
Azimuth	Omni Directional
Temp range	-25 to +85 Deg C
Dimensions	126 x 126 x 22mm

A – Active 5 Volt Version

Amplifier Gain	32dB Min, 35dB Max
Noise Figure	< 1.0dB
Bandwidth	10 MHz
Output VSWR	1.3:1 Max
1dB Comp Pt	0dBm
O/P 3 rd Order	+10dBm
Reverse Isolation	> +50dB
Impedance	50 Ohm
Supply Voltage	5.0 +/- 0.25VDC @ 35mA

AF OPTIONAL BANDPASS FILTER

Filter Type – 5 Section C

Filter Type	5 Section Cavity BPF
3dB Frequency Band	1545-1585 MHz
Centre Freq Band	1565 MHz
Bandwidth	40 MHz
Insertion Loss	< 2.0dB
Rejection	> 80dB @ fc +/- 50 MHz
Rejection	> 30dB @ fc +/- 120 MHz
Rejection	> 80dB
Re-entrant Frequency	>6GHz Typ >8GHz

Impedance	50 Ohms
VSWR	< 1.2:1

3A – Active 3 Volt Version

Amplifier Gain	27dB Typical
Noise Figure	1.5dB Typical
Bandwidth	10 MHz
Output VSWR	2.0:1 Max
1dB Comp Pt	0dBm
O/P 3 rd Order	+10dBm
Reverse Isolation	> +50dB
Impedance	50 Ohm
Supply Voltage	3 OR 5+/-0.25VDC @14mA

MaxiNav ORDER CODE

GPS

P

5

2

S

P

3

Cable Length in Metres

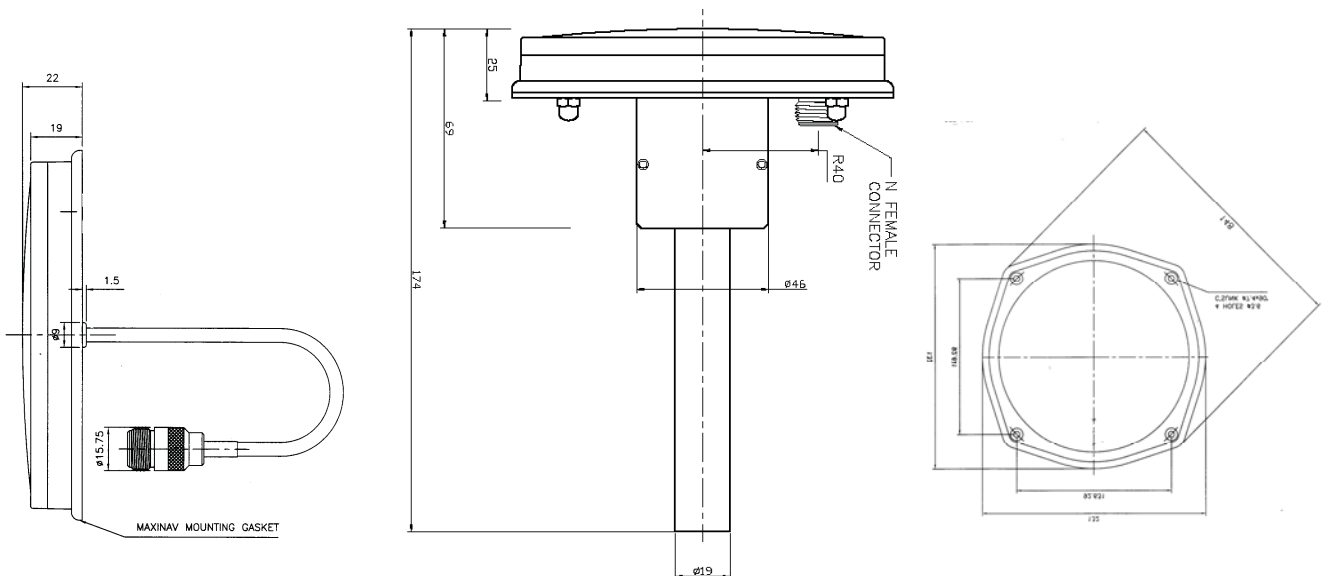
P Plug
S Socket

Connector Type
S SMA
B BNC
M MCX
T TNC
N N Type
O No Connector

Mounting Options
1 Screw Mount – Side Cable Exit
2 Screw Mount – Bottom Exit, Cable Tail
3 Pole Mount – Bottom Exit, Cable Tail
4 Magnetic Mount – Bottom Cable
5 Pole Mount – Bottom Connector Exit
6 Custom Requirement
8 Screw Mount - Bottom Connector Exit
9 Magnetic Mount – Side Cable Exit

MaxiNav Model

A Active 5 Volt Standard
AF Active Filtered 5 Volt
3A Active 3 Volt Special
P Passive



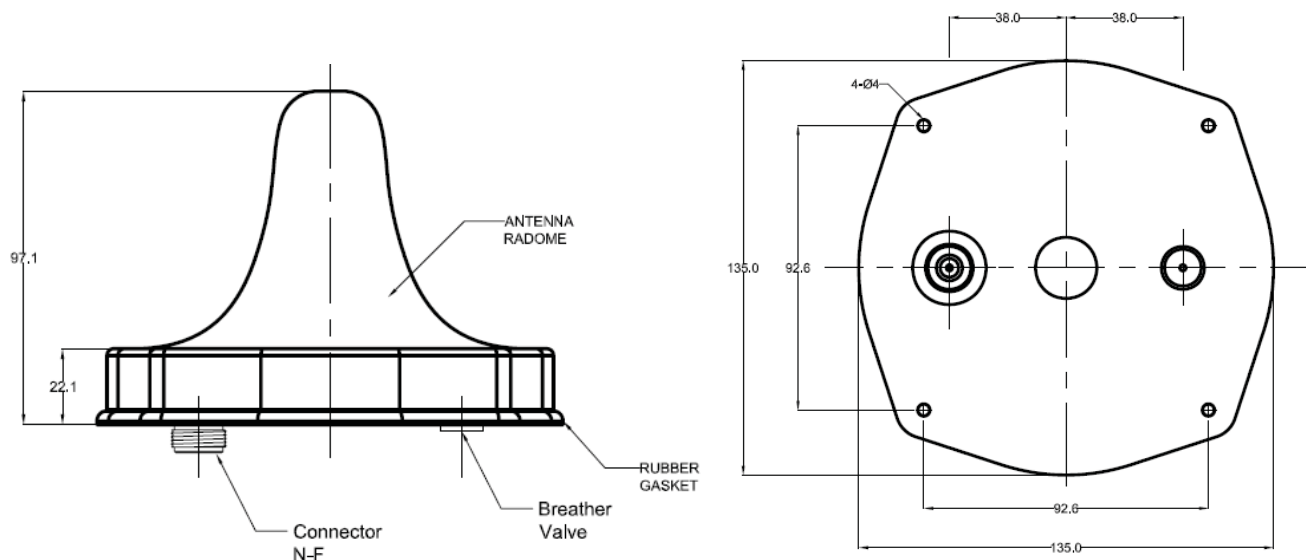
High Performance GPS Timing Antenna

A-GPSA80NS is a high performance GPS antenna, specially designed and manufactured by Rojone for GPS timing applications. This antenna provides super stable phase/gain parameters with up to 80dB rejection to all mobile phone and Wi-Fi signals. It's the best choice for base station timing applications where there may be a number of high power transmitters co located. The A-GPSA80NS can be directly connected to any GPS receivers working from a 2.7-15V supply.



Specifications

Part Number	A-GPSA80NS
Frequency	1575 +/- 5 MHz
Gain	35dB Typical
Power Supply	2.7-15 Volts @ 35mA
LNA Noise Figure	0.5dB Typical
Filtering	80dB to mobile phones & WiFi Signals
RF connector	N Female bottom exit
Temp Range	-40 to +65 Degrees C
Humidity	100 %
MTBF	100KH typical
Size	146(d) x 100(h) mm
Weight	235 Grams



High Performance GPS/GSM-CDMA Dual Antenna

A-GPSA56-AVNG series is a high performance GPS/GSM-CDMA dual antenna. This product was developed specifically for a public transport use, such as buses, light rail & trams. The extremely low noise figure, excellent polarised circulation and stable phase/gain parameters help to ensure that performance exceeds most commonly-used commercial GPS antennas.

With an excellent track record and hundreds of installations, this antenna is the ideal choice for GPS systems which require high sensitivity and reliable performance in dense urban applications where strong reflections often corrupt GPS signals resulting in huge errors to the GPS system.

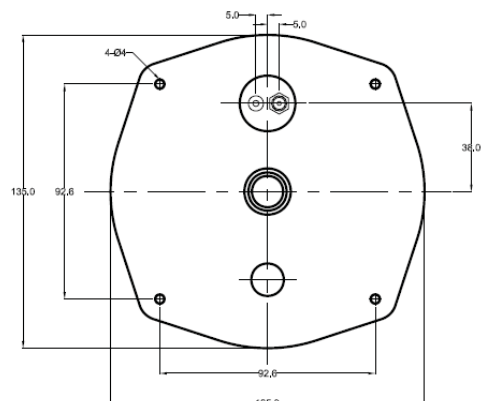


Specifications

Part Number A-GPSA56-AVNG (17A17A60)
(Connectors & Cable Length details)

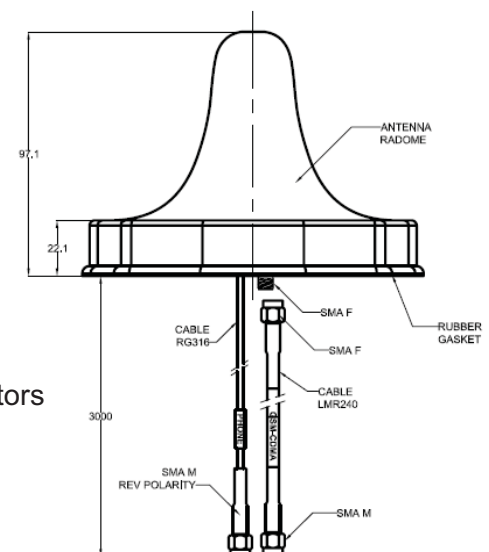
GPS Antenna

Frequency Range	1575 +/- 5 MHz
LNA Gain	33 dB Typical
LNA Noise figure	0.5 dB Typical
Polarization	RHC (Right Hand Circular)
Filtering	>80dB to radios & mobile phone bands
DC Supply	2.7 to 15 Volts @ 35mA Typical
Temperature Range	-40 to + 65 Degrees C
Humidity	100%
RF Connections	Bottom exit, customer specified.



GSM-CDMA Antenna

Frequency Range	800-960 MHz / GSM 1800 MHz
Gain	3dBi
Input RF Power	1 Watt max
RF Connector	Bottom exit, customer specified.
Size	146(d) x 100(h) mm + Cables & Connectors
Weight	235 Grams, Max 500 grams



GPS/DGPS Non-Magnetic Survey Antenna



FEATURES

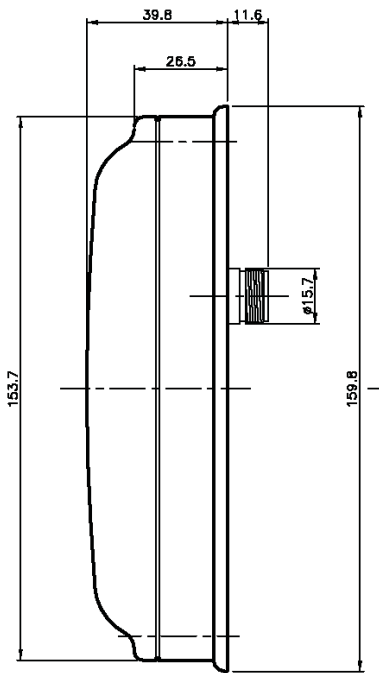
- **Wide Frequency Band 1530-1580 MHz**
- **Active Antenna - LNA 50dB Gain Typical**
- **NON-Magnetic construction**
- **Low profile, Modular Design Easy to Install**

The A-GPSA95NS Wideband Active GPS/DGPS Non-Magnetic antennas was specifically designed as a quality broadband receive antenna suitable for survey quality GPS/DGPS applications.

Antenna & Low Noise Amplifier (LNA) Specifications

Model Number	A-GPSA92NS1	A-GPSA95NSX
	1 Mtr Cable Tail	Pole Mount Version
Frequency Range	1530-1580 MHz	
Polarisation	RHCP (Right Hand Circularly Polarised)	
Circularity/Axial Variation	< 2dB	
VSWR	< 1.6 : 1	
Impedance	50 Ohms	
Gain	5dBi typical, 3dB Boresight 0dB above 10 Degrees	
Pattern Coverage	Hemispherical	
Temperature Range	-25 to + 80 Degrees C	
Voltage	4.5 to +15 Volts DC	
Current Draw	< 100mA	
Low Noise Amplifier Gain	50dB Typical	
Noise Figure (NF)	<1dB Typical	
L1 1575 MHz		
Phase Pattern Variation	<5.0mm over 10 Deg Elevation to 90 Deg Elevation	
Housing (Radome)	White, UV Stable High Impact Plastic	
Size	146 x 146 x 57mm max + Connectors	
Weight	250g	

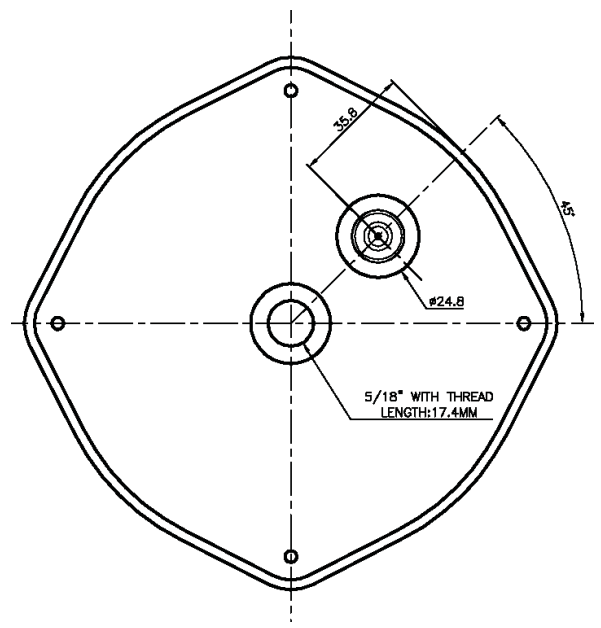
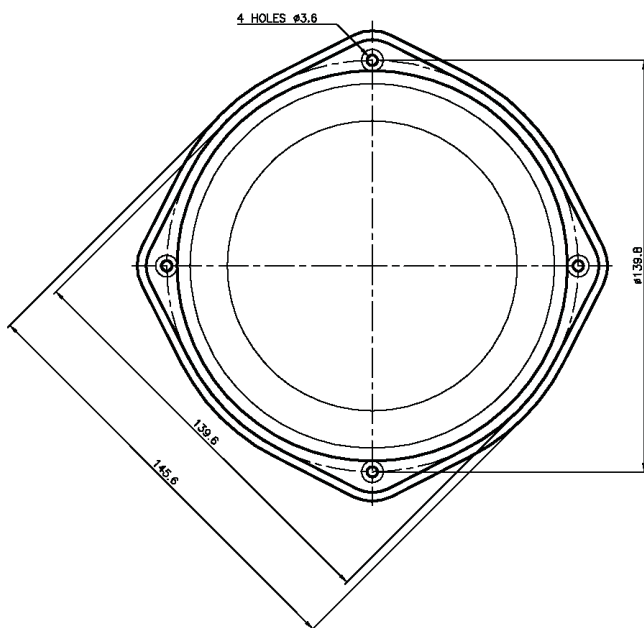
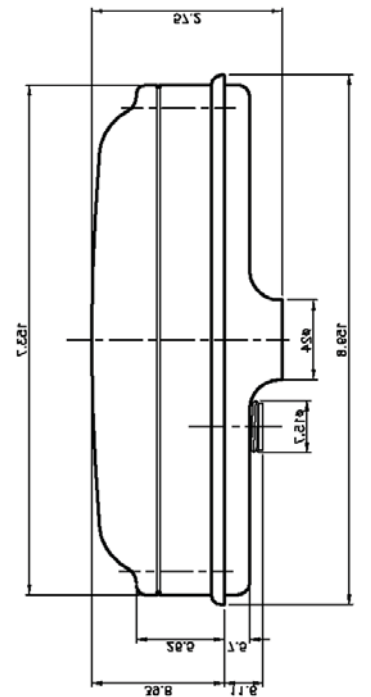
Mechanical Outline for A-GPSA92NS Series



POLE MOUNT FITTING
BASE VIEW



Unique mounting system
1/2" Survey Thread
(Pole not included)



GPS / GSM Combination Antenna



Specifications

PART NUMBER A-GPSG1A73SP3

GPS Patch Antenna Specification

Center Frequency	1575.42 MHz +/- 5 MHz
V.S.W.R.	1.5:1
Band Width	+/- 5 MHz
Attention	+/- 100 MHz>30dB
Impedance	50 ohm
Peak Gain	>3dBi based on 7 cm x 7 cm ground plane
Gain Coverage	>-4dBi at -90 <0<+90 (over 75% volume)
Polarization	RHCP

LNA Specification

LNA Gain (with cable)	28dB Typical
Noise Figure	1.5dB Max
V.S.W.R.	<2.0
DC Voltage	3V
DC Current	15MA Max

GSM Antenna Specification

Working Frequency	880 MHz~960 MHz; 1710 MHz~1990 MHz
V.S.W.R.	2:1
Impedance	50 ohm
Peak Gain	2dBi +/- 1dB at 900 MHz 1dBi +/- 1dB at 1800 MHz

Mechanical Specification

Weight	<130 gram
Size	70mm x 15mm
Cable	RG174 2 metres long
Connector	SMC straight Female for GPS side SMA Female for GSM side
Mounting	Hard Screw
Housing	Black

Environmental Specification

Working Temp	-40 C~+85 C
Storage Temp	-40 C~+100 C
Vibration	Sine sweep 1 g (0-p) 10~50~10Hz each axis
Humidity	95%~100% RH
Weatherproof	100% waterproof

Dual Band GPS / Iridium Antennas

This product is a combination active L1 GPS and passive Iridium antenna. Designed as a low cost High performance antenna to suite Satellite phone / data Modem applications. This antenna operates in the band used by Iridium Satellites.

Specifications

Part Number
A-IGPSA82-24C18C
A-IGPSA83-24C18C-MAG



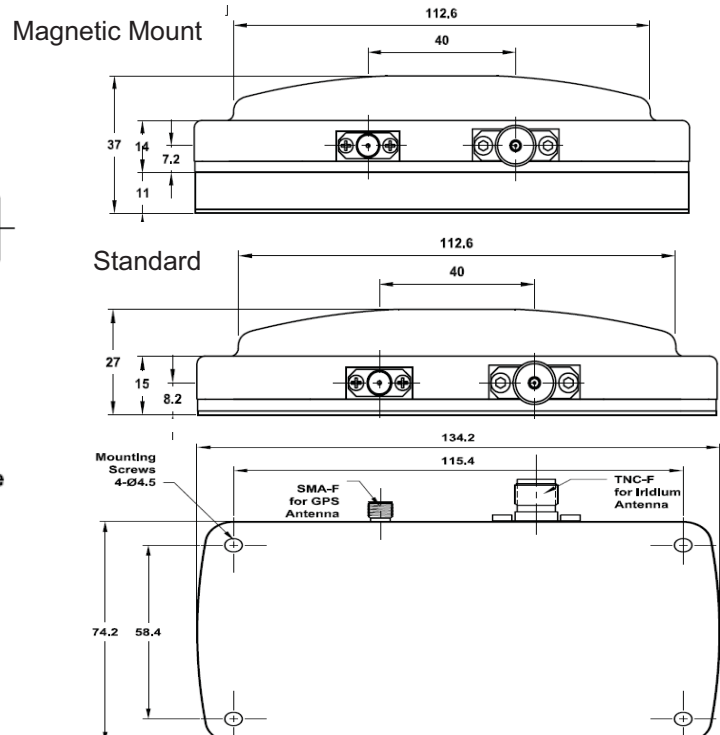
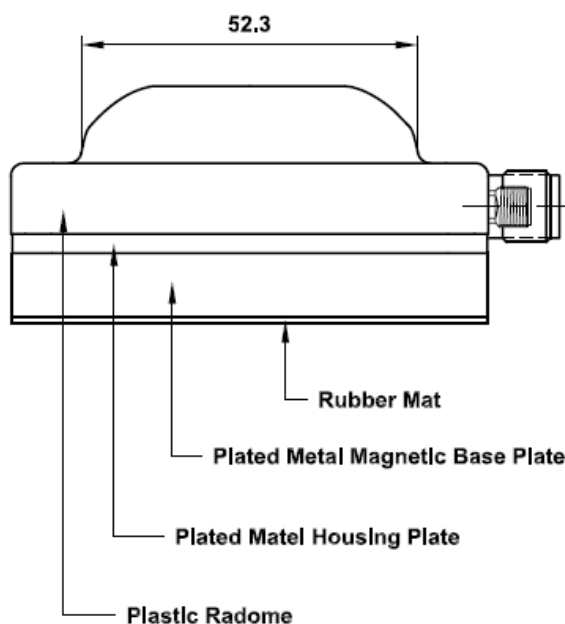
GPS Antenna

Frequency Range 1575 +/- 5 MHz
RF Gain 18 dB Typical
Noise Figure 1.5dB Typical
Polarization RHC (Right Hand Circular)
Return Loss <-10dB
Filtering >50dB @ +/- 100 MHz
DC Supply 2.7 to 5 Volts @ 28-50mA Typical
Temperature Range -40 to + 65 Degrees C
Humidity 100%
RF Connections 24 C TNC F / 18C SMA F

GSM-CDMA Antenna

1615-1627 MHz
5dBic
N/A
RHC (Right Hand Circular)
<-10dB
>30dB @ +/- 100 MHz
N/A
-40 to + 65 Degrees C
100%
24 C TNC F / 18C SMA F

Size 135(w) x 75(d) x 26(H) mm + Connectors for standard version
135(w) x 75(d) x 37(H) mm + Connectors for Magnetic Mount
Weight 290 grams standard, 350 grams Magnetic mount version



GPS L1 and GPS L1/L2 Antennas Designed for Military Applications

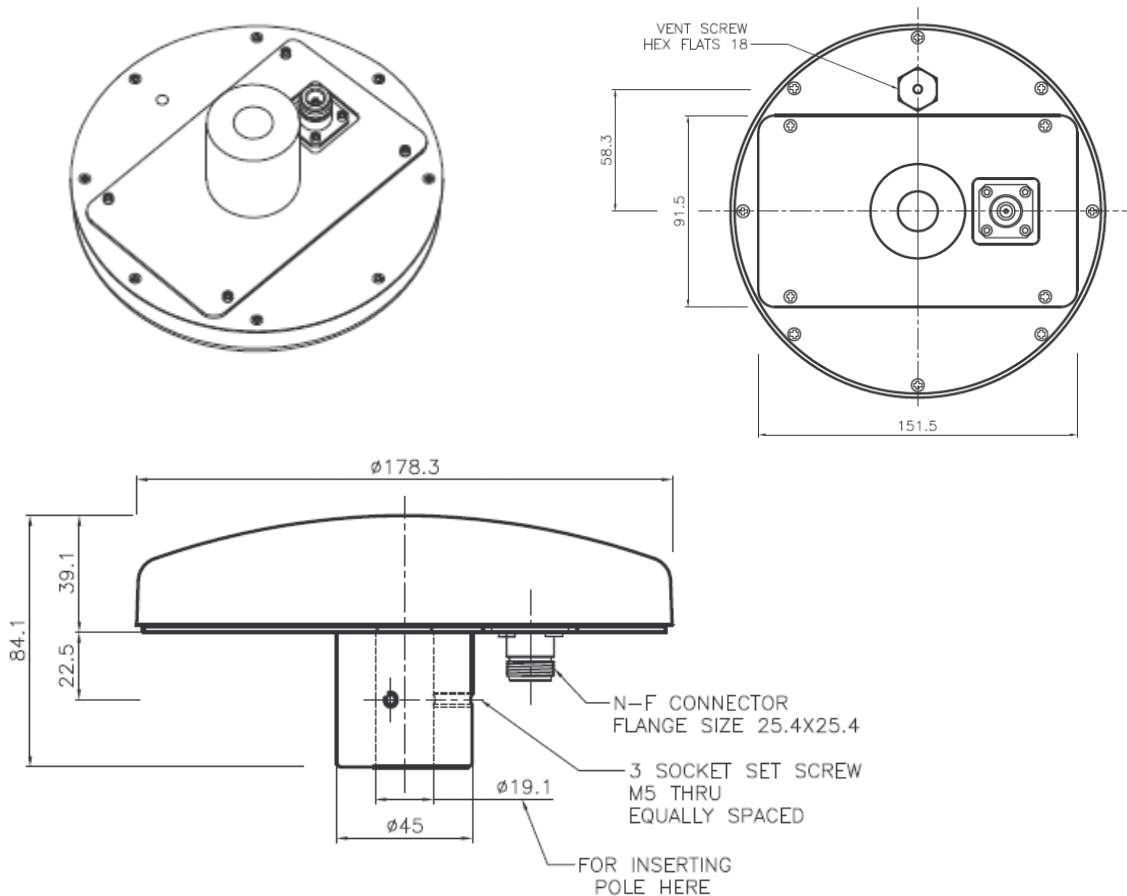
Specifications

Frequency Range (L1 Only)	1530-1580 MHz
	1530-1580 & 1220-1230 MHz (Dual L1/L2)
Gain of Antenna Element	> 6dBi @ Azimuth > -10dBic @ 5 Degree Elevation
Polarisation	RHCP (Right Hand Circular)
Input Impedance	50 Ohms
Azimuth Coverage	360 Degrees
Elevation Coverage	5-90 Degrees
Filtering	> 70dB @ FO +/-50 MHz for L2 > 70dB @ FO +/-100 MHz for L1
LNA Gain	50dB Typical – Standard Product
Input Return Loss	20dB Typical
Noise Figure of LNA	< 0.7dB (0.5dB typical) @ 20C < 1.0dB @ 50C
RF Input Blocking	> 20dBm @ FO +/- 100 MHz
DC Supply	5 to 15 Volts
Power Consumption	90mA Typical
RF Connector	N Female Socket 50 Ohms
Operating Temperature	-40 to +85C
Storage Temperature	-50 to +90C
Humidity	< 95% Non Condensing
Size (max)	180mm Diameter, Height 40mm (excluding connector)
Weight	600 Grams excluding pole mount

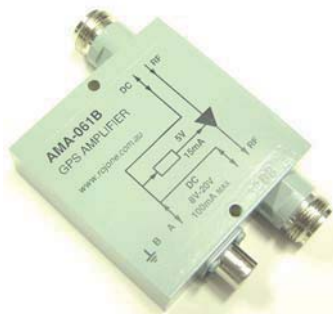


PART NUMBER OPTIONS

GPS	A5	F	2D	R	8	13G	A																		
							<table><tr><td>Blank</td><td colspan="2">Amplifier Gain Options</td></tr><tr><td>A</td><td colspan="2">0dB Passive or TX Version</td></tr><tr><td>B</td><td colspan="2">50dB Gain</td></tr><tr><td>C</td><td colspan="2">30dB Gain</td></tr><tr><td>D</td><td colspan="2">20dB Gain</td></tr><tr><td></td><td colspan="2">13dB Gain</td></tr></table>	Blank	Amplifier Gain Options		A	0dB Passive or TX Version		B	50dB Gain		C	30dB Gain		D	20dB Gain			13dB Gain	
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						13G	<table><tr><td colspan="2">Connector Options</td></tr><tr><td colspan="2">N Female Square Flange Mount</td></tr></table>	Connector Options		N Female Square Flange Mount															
Connector Options																									
N Female Square Flange Mount																									
					8		<table><tr><td>5</td><td colspan="2">Mounting Options</td></tr><tr><td>5X</td><td colspan="2">Pole (3/4") Mount, Bottom Exit Connector</td></tr><tr><td>6</td><td colspan="2">Pole (5/8") Survey Mount, Bottom Exit Conn</td></tr><tr><td></td><td colspan="2">Custom Mounting Requirement</td></tr><tr><td>8</td><td colspan="2">Screw Mount, Bottom Exit Connector</td></tr></table>	5	Mounting Options		5X	Pole (3/4") Mount, Bottom Exit Connector		6	Pole (5/8") Survey Mount, Bottom Exit Conn			Custom Mounting Requirement		8	Screw Mount, Bottom Exit Connector				
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				R			<table><tr><td>R</td><td colspan="2">RX - Receive Antenna Only</td></tr><tr><td>T</td><td colspan="2">TX - Transmit Antenna Passive 0dB ONLY</td></tr></table>	R	RX - Receive Antenna Only		T	TX - Transmit Antenna Passive 0dB ONLY													
R	RX - Receive Antenna Only																								
T	TX - Transmit Antenna Passive 0dB ONLY																								
			2D				<table><tr><td>2</td><td colspan="2">L1 - 1535 MHz Military Radome</td></tr><tr><td>2D</td><td colspan="2">L1/L2 1535 & 1220 MHz Dual Band Mil Radome</td></tr></table>	2	L1 - 1535 MHz Military Radome		2D	L1/L2 1535 & 1220 MHz Dual Band Mil Radome													
2	L1 - 1535 MHz Military Radome																								
2D	L1/L2 1535 & 1220 MHz Dual Band Mil Radome																								
		F					<table><tr><td>Blank</td><td colspan="2">No special requirement</td></tr><tr><td>C</td><td colspan="2">Filtering - Custom Requirement</td></tr><tr><td>F</td><td colspan="2">Filtered - Internal filtering</td></tr></table>	Blank	No special requirement		C	Filtering - Custom Requirement		F	Filtered - Internal filtering										
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C	Filtering - Custom Requirement																								
F	Filtered - Internal filtering																								
	A5						<table><tr><td>A3</td><td colspan="2">Antenna Type</td></tr><tr><td>A5</td><td>Active (Amplified)</td><td>3 Volts</td></tr><tr><td>P</td><td>Active (Amplified)</td><td>5 to 15 Volts @ 90mA</td></tr><tr><td></td><td>Passive</td><td></td></tr></table>	A3	Antenna Type		A5	Active (Amplified)	3 Volts	P	Active (Amplified)	5 to 15 Volts @ 90mA		Passive							
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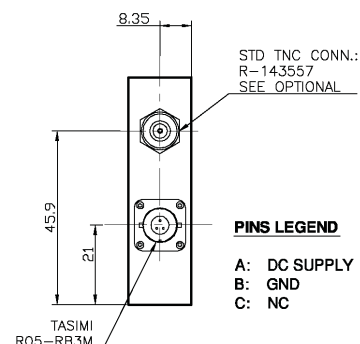
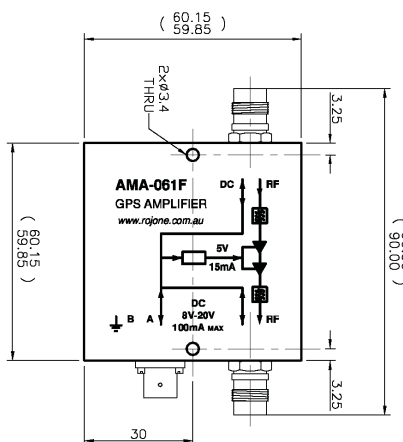
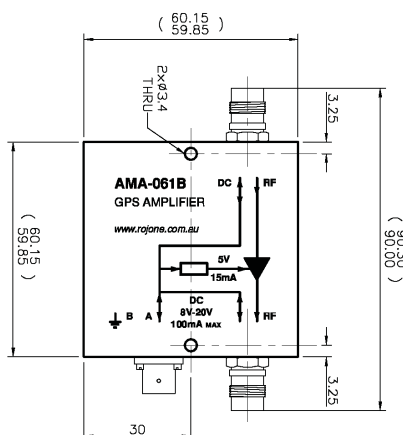
GPS Amplifiers



Rojone makes available two GPS amplifiers in our AMA-061 Series. AMA-061B is our broadband GPS Amplifier and our AMA-061F is a high rejection GPS filtered. Both these amplifiers are designed to boost GPS signals for long range transmission or for a GPS Repeater Kit. Our filtered amplifier is ideal for boosting GPS signal in noisy environments. These amplifiers can also be used as a DC feeder for a GPS antenna, additional amplifier or as a DC splitter. The DC through can be regulated or by passed to the antenna for 5V systems.

Specifications

Part Number	AMA-061B	AMA-061F
Frequency Range	1220-1700 MHz (suits L1&L2)	1575 MHz
Bandwidth	480 MHz	10 MHz (+/-5 MHz)
LNA Gain	38dB +/- 2dB	36 +/- 1dB
LNA Noise Figure	<1.3dB @ 20°C	< 1.3dB @ 20°
LNA OP 1dB Comp Pt	1dBm	1dBm
		Filter Rejection >70dB @ +/-50 MHz
Power Supply	DC Input 8 to 20 Volts @ 15mA or 5V @ 15mA Optional	Same
Impedance	50 Ohms	Same
DC thru Resistance	< 4 Ohms	Same
DC thru Power	8-20 Volts @ 100mA or 5V @ 50mA Optional	Same
I/O VSWR	< 2:1	Same
Connector Type	TNC Female connectors for Antenna 3 Pin Bayonet coupling power connection	Same
Temp Range	-40° to + 85°C @ 100% Humidity	Same



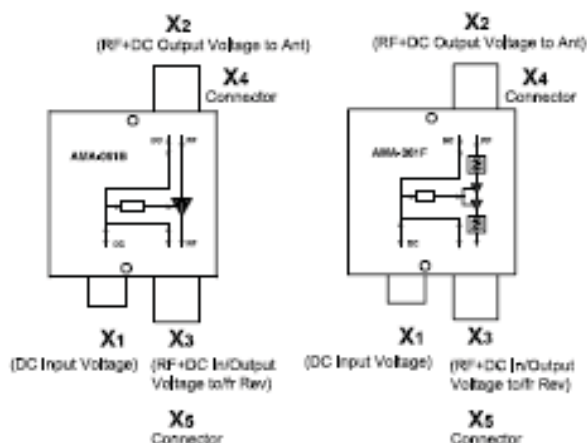
GPS Amplifiers

AMA-061 Series Options

061 Series Repeater

AMA - 061 X - X₁ - X₂ X₄ - X₃ X₅

B	1-2GHz GPS 32dB AMP
F	L1 GPS 30dB FILTERED AMP
None	DC Feeder (See Below)



Connector Type
N N-F (Standard)
T TNC Female (Std)
S SMA Female

Volts	RF+DC In/Output to/From Rev
0	DC blocked
3.3	In/Output Voltage
5	Output Voltage
12	Output Voltage
..

Connector Type
N N-F (Standard)
T TNC Female (Std)
S SMA Female

Volts	RF+DC Output to Ant
0	DC blocked
3.3	Output Voltage
5	Output Voltage
12	Output Voltage
..

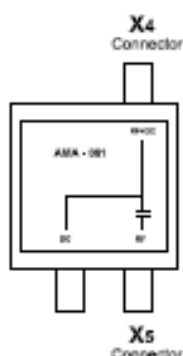
Volts	DC Input
0	DC blocked
3.3	Input Voltage
5	Input Voltage
12	Input Voltage
R	Regulated 3.3-12 Voltage

****Note:** Standard product is supplied with 2 TNC female connectors or 2 N-F connectors.

061 Series DC Feeder

AMA - 061 - X₆ - X₄ - X₅

P	DC Feeder 500000Hz
C	15 GHz 30-400MHz DC Feeder
2400	DC Feeder 1x20Hz



Connector Type
N N-F (Standard)
T TNC Female (Std)
S SMA Female

Connector Type
N N-F (Standard)
T TNC Female (Std)
S SMA Female

GPS (L1) Low cost Repeater Kit



FEATURES

- **Easy, Low Cost Installation**
- **Suits (L1) 1575 MHz GPS Receivers**

The GPS-Repeater System is essentially a repeater kit to provide wireless indoor GPS Signal to allow the use of a GPS Receiver indoors, without the necessity for connection to an external antenna. This system is ideal for testing or timing applications. The kit consists of three main components, two antennas and a repeater block. The active antenna is mounted outside the building or lab with a clear view of the sky. The passive antenna is mounted indoors, to the ceiling in a central position in the room, to allow for even coverage.

DC power is fed to both active antenna and the repeater block using a DC 9 Volt Plug pack (not supplied) or batteries. The DC source is connected to the Repeater Block and the active antenna is powered via the coaxial cable from the Repeater Block.

Specifications

How to Order: Part Number:
GPS-REPEAT-XXX

Suffix = Modifications or specials

The **GPS-REPEAT L1 (1535 MHz) kit** consists of the following items:

1. Active – Standard MaxiNav Antenna*. Supplied with a pole mount, Bottom exit RG58 cable tail 150mm (0.45') long, N Female (Jack) connectorized.
2. Passive – Standard GPS2000 Antenna*. Supplied with side exit RG58 cable tail One (1) Metre (3.28') long, BNC Female (jack) connectorized. Velcro or double sided tape can be used to mount this antenna to the ceiling (Part No # GPSP13BS1).
3. Repeater Block (AMA-061F). Provides filtering and amplification at 1575 MHz. Also used to supply power to the active antenna. A power cable is supplied, but a power source is not. Suggest the use of a 9volt DC plug pack or battery supply.
4. 3 Metre (9.8') power supply cable terminated at one end with a 3 pin Tajimi (R05-PB3F) power plug for connection to Repeater Block.
5. 12 Metre (40') low loss cable assembly – CA-04913A24A1200-08 is supplied for connection between the active antenna and the repeater block. N Male to TNC connectorized.
6. 5 Metre (16.4') low loss cable assembly – CA-04902A24A500-08 is supplied for connection between the passive antenna and the repeater block. Assembly BNC Male to TNC Male.
7. Optional Marine Knuckle can be supplied to allow 'aiming' of the roof top antenna. The knuckle screws directly into the pole mount on the active antenna, P/N: A-762.
8. * Upon request, the standard Antenna can be changed. Please consult Rojone Pty Ltd.

Optional Extra Accessories:

2 Way GPS Splitter Part Number # AMA-2301-2N

4 Way GPS Splitter Part Number # AMA-2301-4N

Passive Antenna Part Number # GPSP13BS1

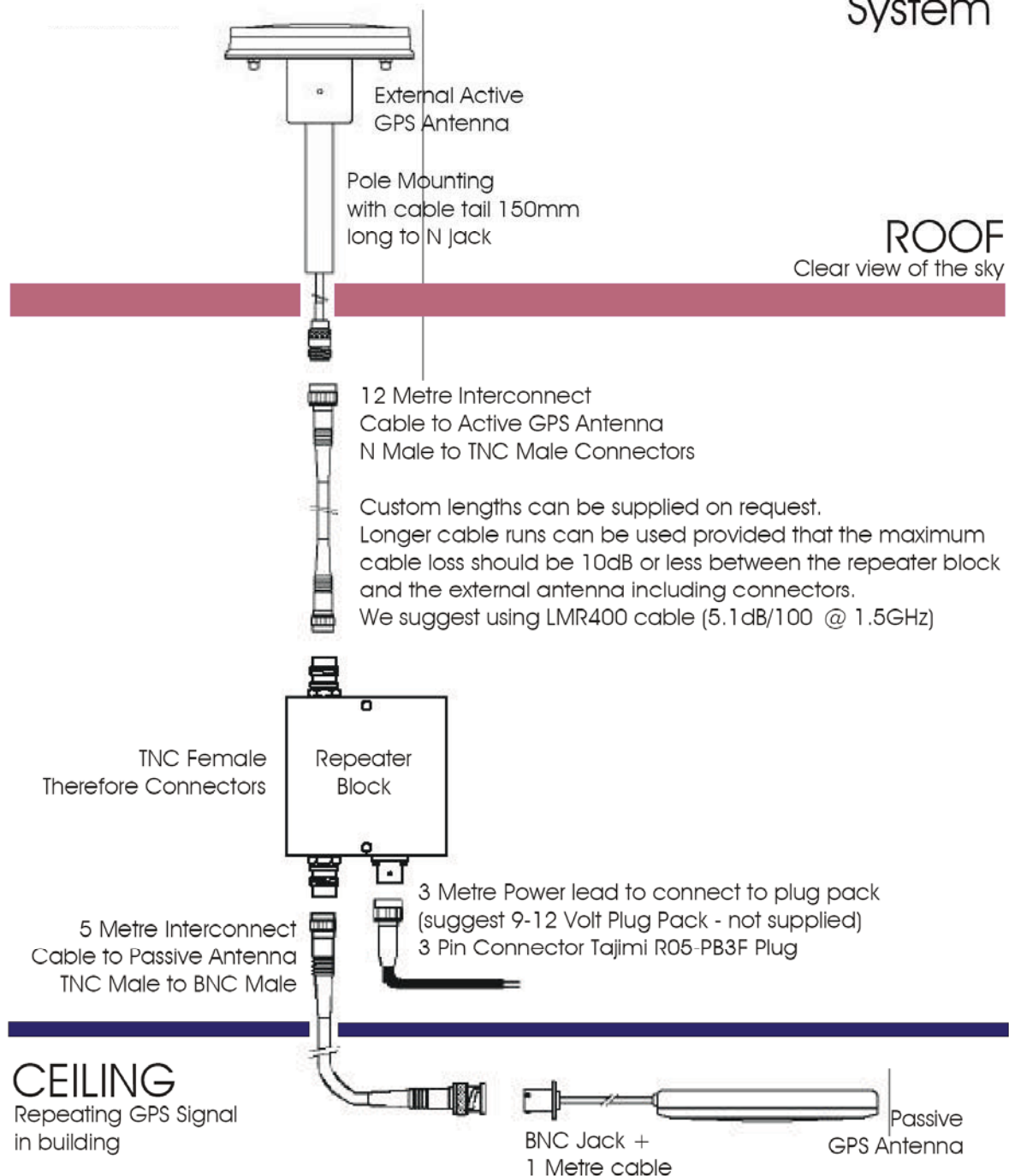
Standard Kit Weight 2Kg



44 Aero Rd, INGLEBURN NSW 2565 AUSTRALIA
TEL +61 02 9829 1555 EMAIL sales@rojone.com.au

GPS (L1) Low cost Repeater Kit

GPS Repeater System



Warning ! The system may cause interference, variable or inline attenuator should be used to back off the signal to an acceptable level.

GPS L1/L2 Repeater System

The most recent edition to our repeater kit range is our New L1/L2 Dual Band series. Unlike the requirements of commercial GPS users, both the antennas and repeater module have been created for high performance Military & commercial applications.

The L1/L2 Repeater kit basically only contains the antennas & repeater module; a suitable power supply and quantity of RF Coaxial interconnect cables will be required in addition for installation.



Specifications

How to Order: Part Number:
AMA-L1L2REPEAT-1

The Dual Band **GPS-REPEAT L1/L2 kit** consists of the following items:

1. Active – L1/L2 Antenna - Supplied with a pole mount installation option, bottom exit N Female (Jack) connector (Part No: GPSA5F2DR513GA).
2. Passive – L1/L2 Antenna - Supplied with bottom exit N Female (Jack) connectors (Part No: GPSPF2DR813G).
3. L1/L2 Repeater Block (Part No: AMA-161). Provides filtering and amplification at both 1530-1580 MHz & 1220-1230 MHz. It is also used to supply power to the active antenna.

Note:

RF coaxial interconnecting cables are NOT supplied as part of this kit. Products of this nature are specialized; as such we recommend custom cable to suit your specific application. (See page 30 for further information). Please consult with Rojone.

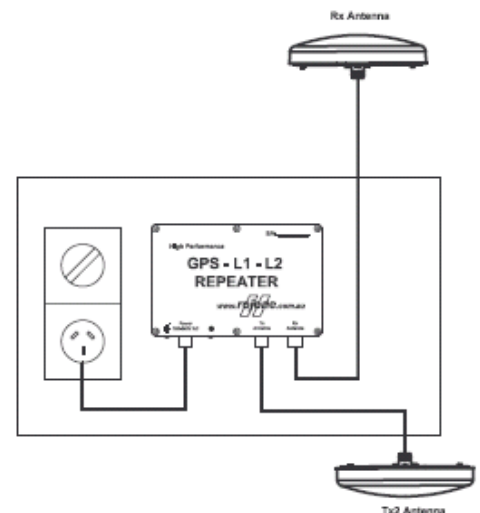
Above standard kit weight: 2.8 Kgs

Accessories :-

2 Way Splitter Part No: AMA-2255-2N

Passive Antenna Part No: GPSPF2SR813G

Low Loss Cable assembly's custom manufactured to order for interconnections.



Warning – This system may cause interference; variable or inline attenuators should be used to back off the signal to an acceptable level.

GPS L1/L2 Repeater/Distribution module with alarm option

Rojone's ROJ-150 Series product is a high performance GPS repeater/distribution module ruggedized & compact in its design to provided GPS Coverage within Armored vehicles & Personnel Carrier (APC) applications.

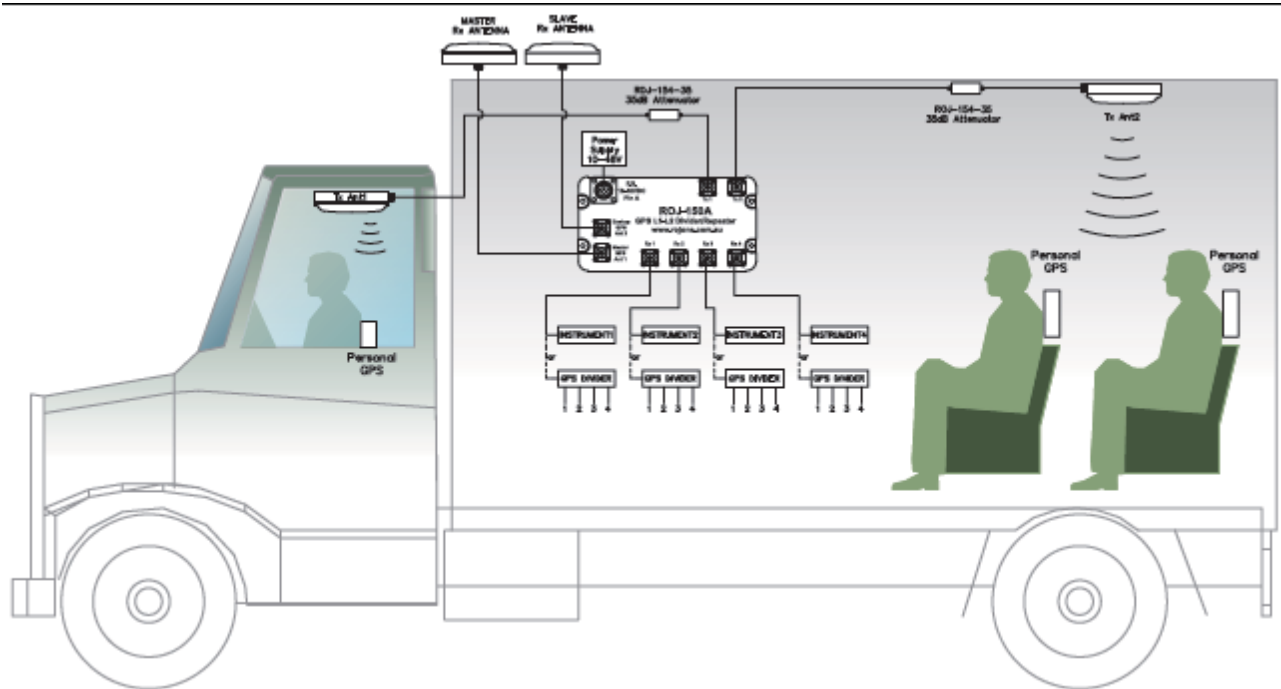
This module is a dual GPS antenna system. One receiving antenna works as a master and the other as a slave. In the event of damage to the master antenna, the slave antenna will be switched in automatically.

The standard module can be connected to Rojone's RX antenna or most military antennas that have an operating current between 25mA & 105 mA.



Specifications

Operating Frequency range	1100-1800 MHz
Impedance	50 Ohms
VSWR	< 2:1 for all ports
Isolation	> 20dB between any two ports
Supply & Consumption	10-48 VDC, < 5 Watts
Operating Temperature range	-30 to + 85 Degrees C
RF Ports Connectors	TNC Female



Please contact Rojone for further information re this product range.

GPS 2 & 4 Way Splitter / Dividers

FEATURES

- **Medium Power**
- **L Band 1200-1650 MHz**
- **Port 2 DC Blocked**

Rojone's AMA-2300-XN Series of power dividers are specifically designed for GPS applications. One output is AC coupled to the input while the other is DC coupled to allow for two receivers to a single active antenna. The receiver connection to the power divider's DC path will be able to pass DC to the antenna. The DC current capability is > 500mA.

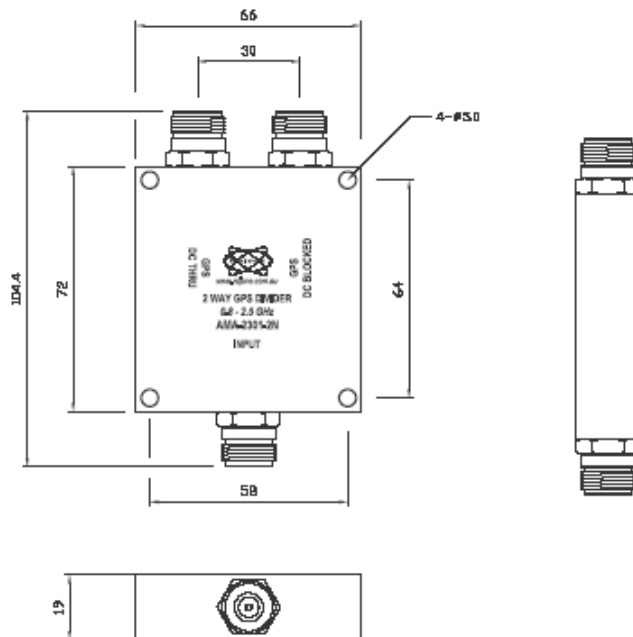


L1/L2 Splitters are also available; please contact Rojone Pty Ltd.

Specifications

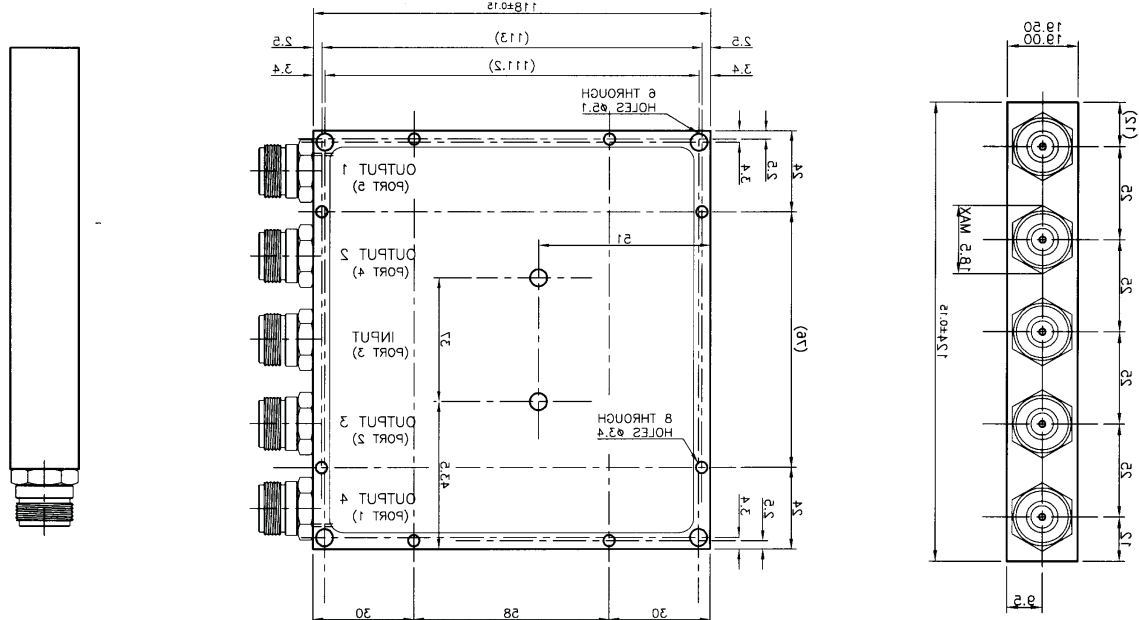
Part Number Description	AMA-2301-2N 2 Way GPS Splitter	AMA-2301-4N 4 Way GPS Splitter
Frequency Range	1200 to 1650 MHz	1200 to 1650 MHz
Number of Ports	2 Port	4 Port
Isolation	20dB Typical	20dB Typical
Through Loss	3.32dB Typical	7.0 Typical
Return Loss	-14dB Typical	-14dB Typical
Amplitude Balance	< 0.2dB	0.2dB Typical
Phase Balance	< 2 Degrees	5 Degrees Typical
Average Power	50 Watts CW	50 Watts CW
Impedance	50 Ohms	50 Ohms
Connector Standard	N Female	N Female
Change to T Suffix	TNC Female	TNC Female
Package Size	87 x 46 x 16mm ex conn	118 x 76 x 19 mm ex conn
Weight	260 grams (max.)	650grams (max)

Mechanical Outline



Old Part Number: AMA064

Part No # AMA-2301-2N



Part No # AMA-2301-4N.

N connectors are standard; other connector types are also available on request.

Temperature Range 0 to +60 degrees C.

Peak Power for all our devices is 3KW @ 1% duty cycles.

All products have a Storm Gray Polyurethane painted finish.

Recommended coupling torque force for N connector 40 to 60 Ncm.

Note: Over tightening the connectors may damage the connector.

To stripline transition internally, please take care.

Miniature GPS 2 & 4 Way Splitter / Dividers

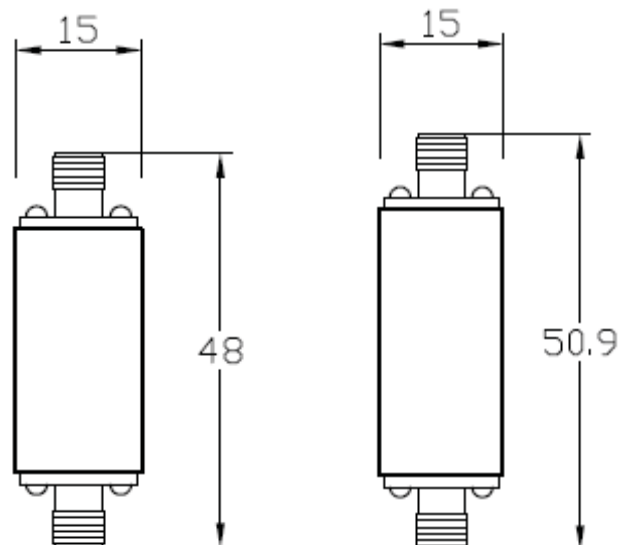
FEATURES

- **L Band 1100-1700 MHz**
- **Port 2 DC Blocked**

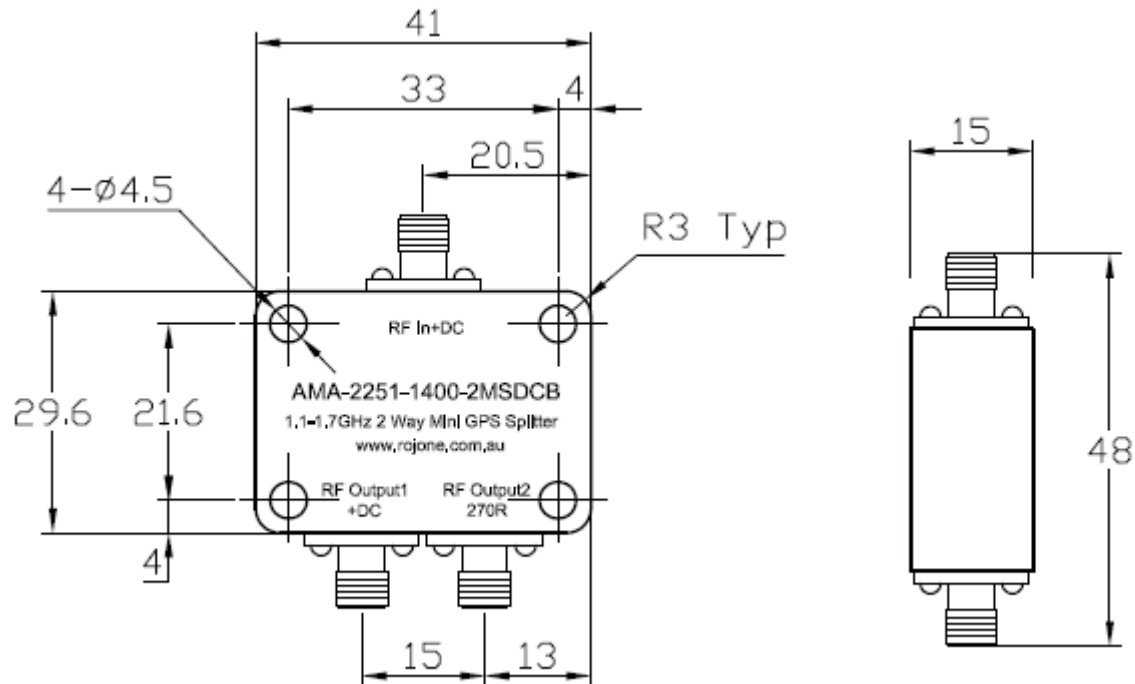
Rojone's AMA-2251-1400 Series of miniature dividers are specifically designed for space critical GPS applications. One output is AC coupled to the input while the other is DC coupled to allow for two receivers to a single active antenna. The receiver connection to the power divider's DC path will be able to pass DC to the antenna. The DC current capability is > 500mA.

Specifications

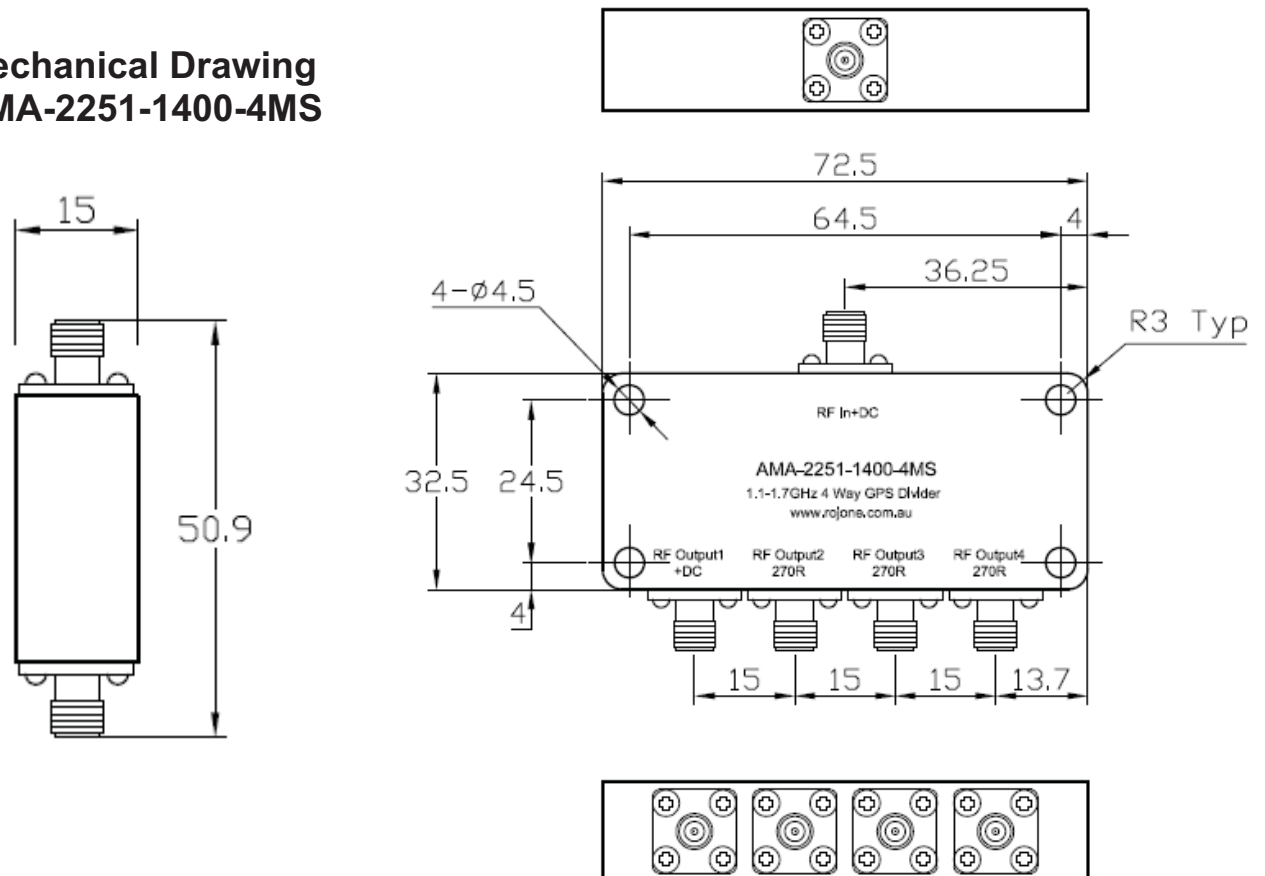
Part Number Description	AMA-2251-1400-2MSDCB 2 Way Mini GPS Splitter	AMA-2251-1400-4MS 4 Way Mini GPS Splitter
Frequency Range	1100 to 1700 MHz	1100 to 1700 MHz
Number of Ports	2 Ports	4 Ports
Isolation	20dB Typical	20dB Typical
Through Loss	3.4 dB Typical	6.5dB Typical
Return Loss	-14dB Typical	-14dB Typical
Amplitude Balance	< 0.2dB	< 0.2dB
Phase Balance	< 2 Degrees	5 Degrees Typical
Average Power	1 Watts CW	1 Watts CW
Impedance	50 Ohms	50 Ohms
Connector Standard	SMA Female	SMA Female
Package Size	41 x 30 x 15mm ex conn	73 x 33 x 15 mm ex conn
Weight	100 grams	100 grams



Mechanical Drawing AMA-2251-1400-2MSDCB



Mechanical Drawing AMA-2251-1400-4MS

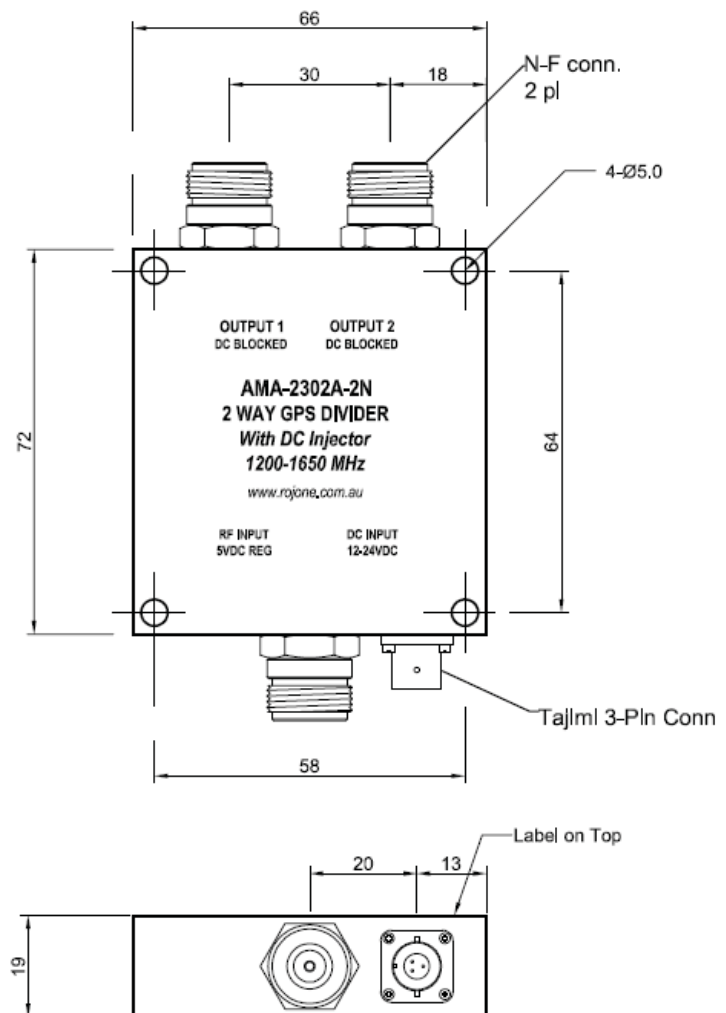


Active 2 Way Power Divider for GPS L1/L2 & GLONASS with DC Injector

This active 2 Way divider was designed for vehicle application allowing the signal to form a single GPS antenna to be shared between two receivers. The unit is configured to insert 5 Volts DC to the antenna via the three pin power connector, while the output ports are DC loaded to simulate current draw. DC is blocked to the 2 output ports. Supply to the input port.

Specifications

Part Number	AMA-2302A-2N
Frequency	1200-1650 MHz
Return Loss	-14dB Typical all ports
Through Loss	3.6 dB Typical
Amplitude Balance	< = - 2.0 dB
Impedance	50 Ohms
Input RF Power	10 Watts Max
Isolation	10 dB typical
Output Ports	All DC Blocked
RF Input	5 Volts DC Regulated
DC Input	12-24 Volts DC
RF Connector	N Female

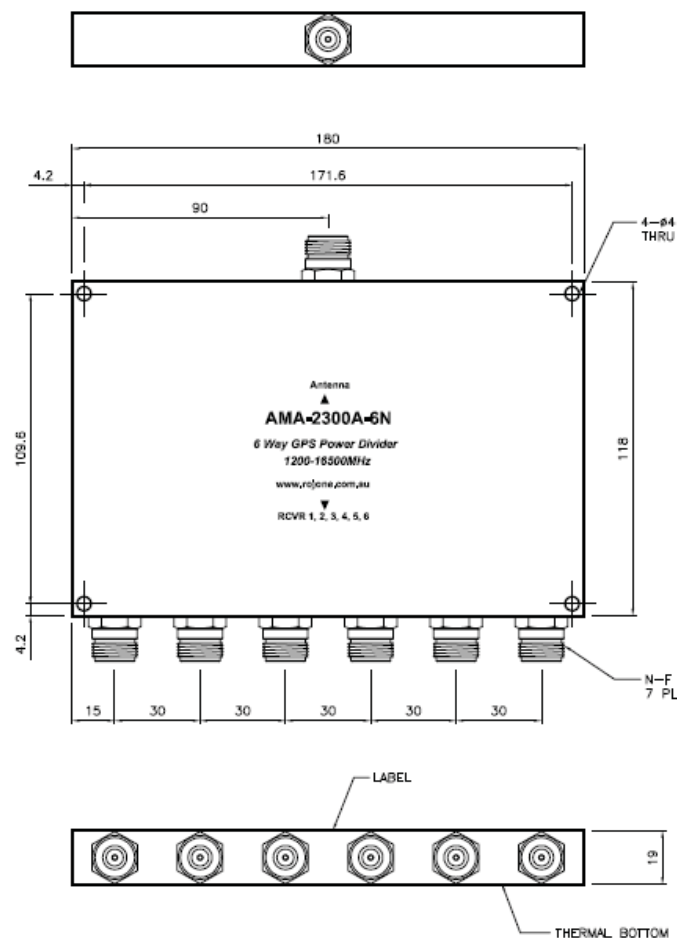


GPS 6 Way Splitter / Dividers

AMA-2301-6N is specifically designed for L1, L2 and GLONASS receivers. This divider incorporates 6 diodes to provide DC through from each output to the antenna with 20dB Isolation; this allows any one port to supply DC while the diodes block the other ports. Six resistors apply a DC load to allow the GPS receivers to operate.

Specifications

Part Number	AMA-2300-6N
Description	6 Way GPS Splitter
Frequency Range	1200 to 1650 MHz
Number of Ports	6 Port
Isolation	20dB Typical
Through Loss	8.6dB Typical
Return Loss	-18dB Typical
Amplitude Balance	< 0.2dB
Average Power	50 Watts CW
Impedance	50 Ohms
Connector Standard	N Female
Size	180 x 118 x 19mm + connector

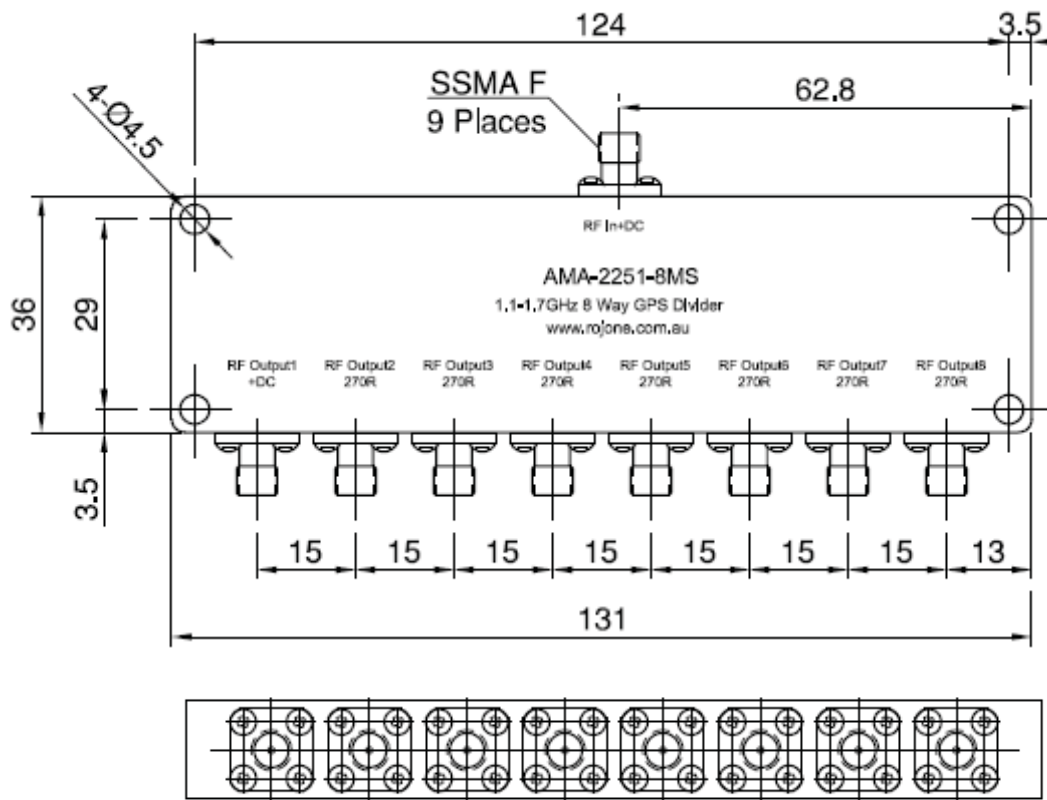
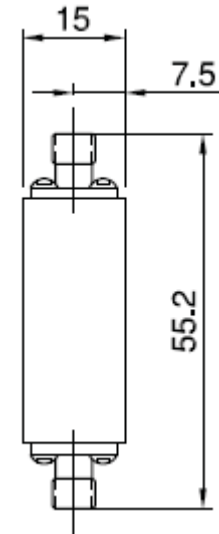


GPS 8 Way Miniature GPS Splitter / Dividers

Rojone's AMA-2251-8MS is a miniature 8 way dividers are specifically designed for space critical GPS applications. One output is AC coupled to the input while the other is DC coupled to allow for two receivers to a single active antenna. The receiver connection to the power divider's DC path will be able to pass DC to the antenna. The DC current capability is > 500mA.

Specifications

Part Number	AMA-2251-8MS
Description	8 Way GPS Splitter
Frequency Range	1200 to 1700 MHz
Number of Ports	8 Port
Isolation	20 dB Typical
Through Loss	9.5 dB Typical
Return Loss	20 dB Typical
Amplitude Balance	0.3 dB +/- 1.0 dB
Average Power	1 Watts CW
Impedance	50 Ohms
Connector Standard	SMA Female
Size	131 x 36 x 15mm + Connectors
Weight	300 Grams max



LP-GPX-05-T TNC Series L1, L2 & L3 GPS Lightning & Surge Protection



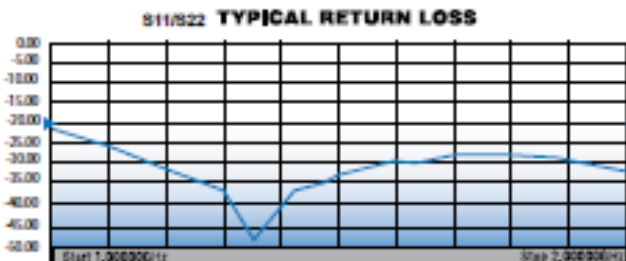
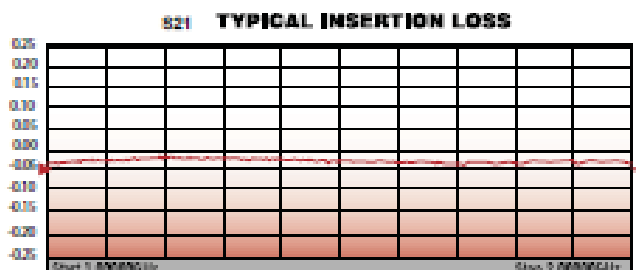
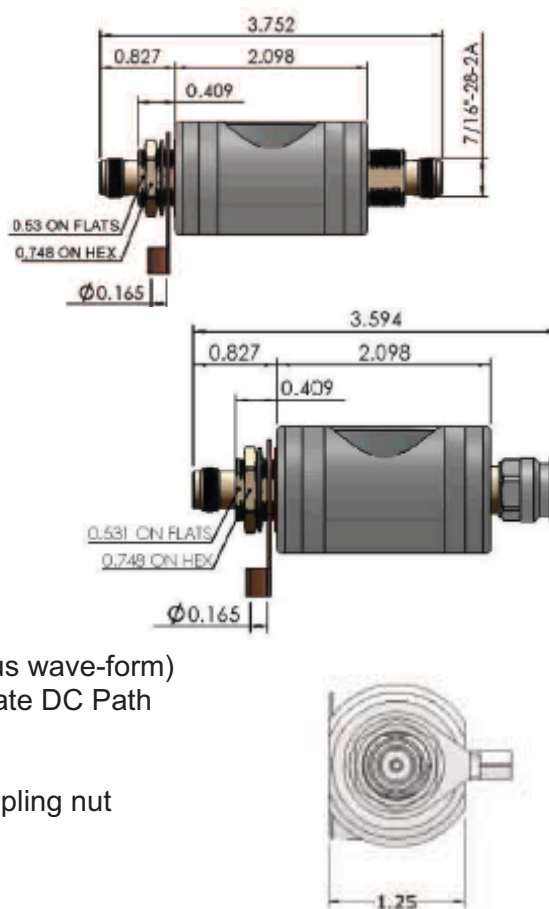
Times Microwaves LP-GPX-05-T high performance series is an exceptional DC pass design for protection of GPS receivers requiring up to 5Vdc power to be supplied on the center pin.

While the RF path is DC blocked, the biased DC voltage protection circuit uses Solid State Protection Technology to provide unsurpassed surge performance. The LP-GPX-05-T series offers outstanding insertion loss and return Loss characteristics over the 1000-2000 MHz band, making it suitable for protection of commercial and military GPS, as well as other applications in this band.



Specifications

Part Number	LP-GPX-05-TFF
Connector	TNC Female on both sides.
Part Number	LP-GPX-05-TFM
Connector	TNC Male to TNC Female
Frequency	1000 to 2000 MHz
Impedance	50 Ohms
VSWR/Return Loss	<1.2:1 / <-20dB
Insertion Loss	< 0.1dB
Max Surge Current	10kA multiple (1.2x50/8x20us wave-form)
Average Power	50 Watt
Turn-on	6 VAC
Residual Pulse Volt	< 12V (6kV/3kA 1.2x50/8x20us wave-form)
Protection Circuit	DC blocked RF Path/Solid State DC Path
Energy Throughput	< 110uJ
Temp Range	-40 to +85 Degrees C
Torque	7-10 lb-in Recommended coupling nut
Body/Washer/Nut	Brass, White Bronze Plated



LP-GPX-05 N Series L1, L2 & L3 GPS Lightning & Surge Protection

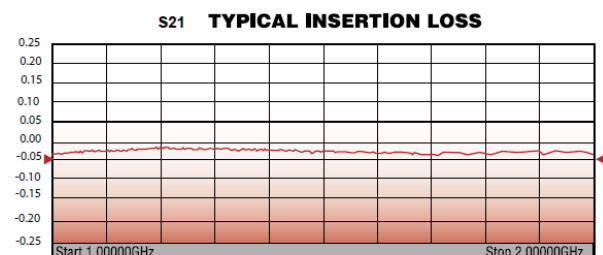
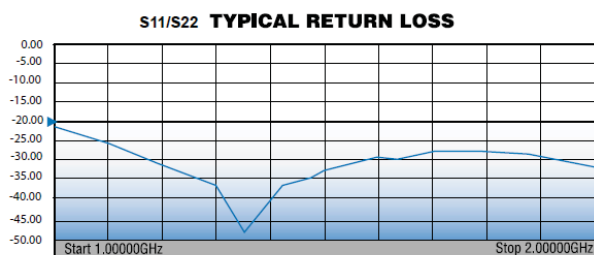
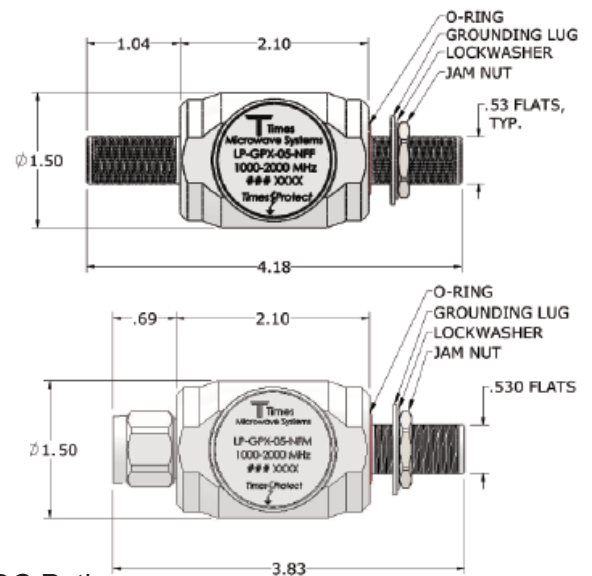
Times Microwaves LP-GPX-05-N high performance series is an exceptional DC pass design for protection of GPS receivers requiring up to 5Vdc power to be supplied on the center pin.

While the RF path is DC blocked, the biased DC voltage protection circuit uses Solid State Protection Technology to provide unsurpassed surge performance. The LP-GPX-05-N series offers outstanding insertion loss and return Loss characteristics over the 1000-2000 MHz band, making it suitable for protection of commercial and military GPS, as well as other applications in this band.



Specifications

Part Number	LP-GPX-05-NFF
Connector	N Female on both sides.
Part Number	LP-GPX-05-NFM
Connector	N Male to N Female
Frequency	1000 to 2000 MHz
Impedance	50 Ohms
VSWR/Return Loss	<1.2:1 / <-20dB
Insertion Loss	< 0.1dB
Max Surge Current	10kA multiple (1.2x50/8x20us wave-form)
Turn-on	6 VDC
Residual Pulse Volt	< 12V (6kV/3kA 1.2x50/8x20us wave-form)
Protection Circuit	DC blocked RF Path/Solid State DC Path
Energy Throughput	< 110uJ
Temp Range	-40 to +85 Degrees C
Torque	7-10 lb-in Recommended coupling nut
Body/Washer/Nut	Brass, White Bronze Plated



LP-GPX-05-S SMA Series L1, L2 & L3 GPS Lightning & Surge Protection

The LP-GPX-05-S high performance series is an exceptional DC pass design for protection of GPS receivers requiring up to 5Vdc power to be supplied on the centre pin. While the RF path is DC blocked, the biased DC voltage protection circuit uses Solid State protection technology to provide unsurpassed surge performance. The LP-GPX-05-S series offers outstanding Insertion Loss and Return Loss characteristics over the 1000-2000MHz band, making it suitable for protection of commercial and military GPS, as well as other applications in this band. Unlike competitive protectors, the white bronze plated construction of the LP-GPX-05-S series eliminates potential galvanic corrosion issues and provides long life in hostile environments. The fully weatherized housing is sealed to IP65 allowing for outdoor as well as indoor installation.

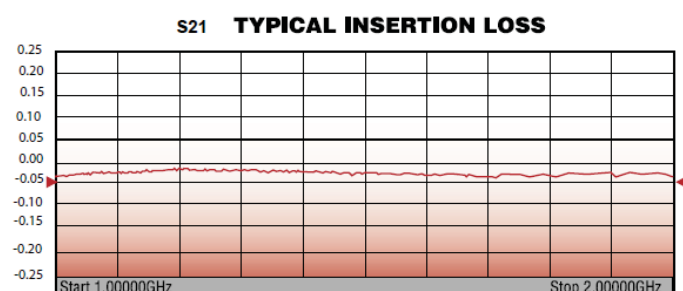
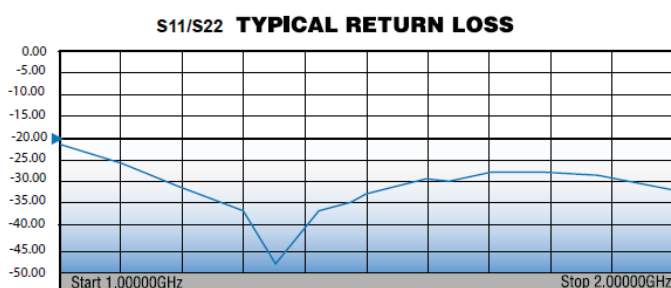
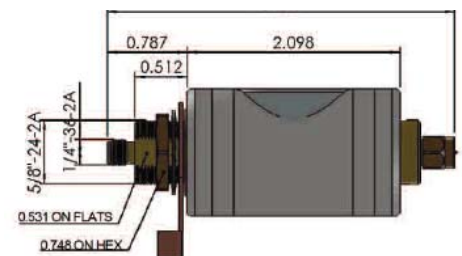
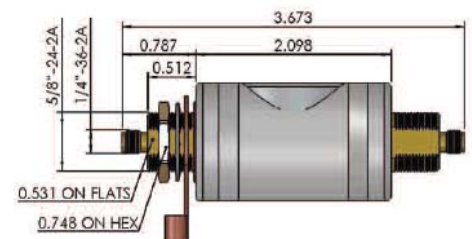


Specifications

Part Number LP-GPX-05-SFF
Connector SMA Female on both sides bidirectional

Part Number LP-GPX-05-SFM
Connector SMA Male to SMA Female bidirectional

Frequency 1000 to 2000 MHz
Impedance 50 Ohms
VSWR/Return Loss <1.2:1 / <-20dB
Insertion Loss < 0.1dB
Max Surge Current 10kA multiple
(1.2x50/8x20us wave-form)
Average Power 50 Watt
Turn-on 6 VDC
Residual Pulse Volt < 12V (6kV/3kA 1.2x50/8x20us wave-form)
Protection Circuit DC blocked RF Path/Solid State DC Path
Energy Throughput < 110uJ
Temp Range -40 to +85 Degrees C
Torque 3-5 lb-in Recommended coupling nut
Body/Washer/Nut Aluminum/Brass, White Bronze Plated

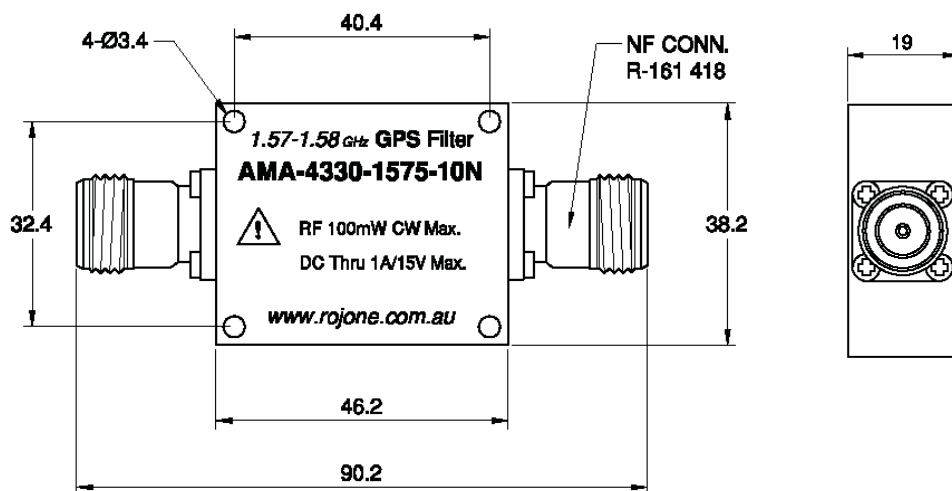


Bandpass Filters

Rojone's AMA-4330-1575-10N Bandpass filter is a narrow band, high rejection filter designed specifically to filter out unwanted Radio Frequency signals which can interfere with good reception of the GPS/DGPS signal.

Specifications

Part Number	AMA-4330-1575-10N	AMA-4330-1555-50N
Frequency	1570 to 1580 MHz	1520 to 1580 MHz
Impedance	50 Ohms	50 Ohms
Insertion Loss	< 3dB	< 2dB
Pass Band Ripple	< +/- 0.5dB	< +/- 0.5dB
VSWR	< 1.5 : 1	Same
DC Thru Power	1amp @ Max 15Volts	Same
RF Input Power	100mw CW Max	Same
Attenuation	50-90dB @ 0.1-1500 MHz 50-90dB @ 1650-2500 MHz	>50dB @0.1-1400 MHz >50dB @1.75-2.5 GHz
Operating Temp	-40 to +80 Degrees C	Same
Box Material	Brass	Same
Connector Type	N Female	Same
Size	46.2x38.2x19mm + Conn	Same



Cavity Bandpass Filters

FEATURES

- **5 Section High Performance Filter**
- **Preselected for GPS & DGPS Signals**

Rojone's AMA-055 Cavity Bandpass filter is a narrow band 5 resonant section filter designed specifically for preselection of GPS and DGPS satellite signals. This product is typically used to filter out unwanted Radio Frequency signals, which can interfere with good reception of the GPS/DGPS signal.



Specifications

Part Number	AMA-055
Type	5 Section Cavity BPF
3dB Frequency Band	1545 to 1585 MHz
Centre Frequency	1565 GHz
Bandwidth	40 MHz
Insertion Loss	< 2.0 dB
Rejection	> 80 dB
Frequency	fc +/- 50 MHz
Rejection	> 40 dB
Frequency	fc +/- 120 MHz
Rejection	> 80 dB
Re-entrant Frequency	> 6 GHz typical > 8 GHz
Impedance	50 Ohms
VSWR	< 1.2:1
Outer Dimensions	Approx 68 x 50 x 10mm without tuning slugs & connectors.
Thru mounting holes	2 mm thru holes
Connectors	SMA Female
Temperature Range	0 to 60 Degrees C

Coaxial Cable to LMR

Times Microwave Systems' LMR cables are high performance board band flexible, low loss 50 OHM coaxial cable designed for wireless applications.

Times LMR cables have RF performance comparable to traditional corrugated copper cables, but unlike corrugated cables they are highly flexible, non-kinking and offer unsurpassed ease and speed of connector installation. Compared with RG type braided cables, LMR offers far lower loss and better RF shielding.

These characteristics make LMR cables the best choice for any wireless and particularly GPS application.

Cross Reference Guide

Flexible Cables	Flexible LMR	DIA	DIELECTRIC	Attenuation/Loss dB/100 M @ 25° C		
				1500 MHz	1575 MHz	1600 MHz
RG174		0.100"	PE	111.163	114.065	115.018
	LMR100	0.105"	PE	98.675	101.329	102.201
RG316		0.102"	PTFE	105.911	108.676	109.585
	LMR100	0.105"	PE	98.675	101.329	102.201
RG58		0.195"	PE	62.621	64.324	64.885
	LMR195	0.195"	Foam PE	47.660	48.895	49.301
	LMR240	0.240"	Foam PE	32.385	33.226	33.502
RG142		0.195"	PTFE	52.668	54.118	54.595
	LMR195	0.195"	PEF	47.660	48.895	49.301
	LMR200	0.195"	PEF	3.240	6.550	10.480
	LMR240	0.240"	PEF	32.385	33.226	33.502
	LMR195	0.195"	PEF	47.660	48.895	49.301
	LMR200	0.195"	PEF	3.240	6.550	10.480
	LMR240	0.240"	PEF	2.450	4.970	7.990
RG213		0.405"	PE	30.471	31.381	31.681
	LMR400	0.405"	PEF	16.849	17.267	17.414
RG214		0.425"	PE	30.344	31.251	31.550
	LMR400	0.405"	PEF	16.819	17.267	17.414

Please contact your Rojone consultant for a full Times Microwave LMR Series catalogue. Alternatively see details on the Times website - <http://www.timesmicrowave.com/cms/products/cables/lmr/>

LMR-100 Flexible Low Loss Cable



Ideal for wireless & GPS Applications
Alternative to RG174 Coax with better
performance & shielding.

LMR-100-FR Non-Halogen
LMR-100-PVC Indoor/Outdoor

Flex: With a 6.4mm minimum bend radius, LMR-100 can be easily routed into and thru tight spaces without kinking.

Low Loss: LMR-100 is much lower loss than standard RG cables. This is achieved through the use of high velocity dielectric & bonded aluminum tape to the outer conductor. The proprietary gas-injected closed cell foam dielectric prevents water migration through the cable & provides excellent crush resistance.

Weatherproof: The UV protected black polyethylene jacket makes the cable rugged & resistant to the full range of outdoor environments. The DB version includes a water blocking material within the braid to protect the cable from moisture ingress & corrosion should the jacket become damaged.

RF Shielding: The bonded aluminum tape outer conductor is overlapped to provide 100% coverage, resulting in >90dB RF shielding (>180dB Cross Talk) & excellent interference immunity.

Phase Stability: The intimated bonded structure & foam dielectric provides excellent phase stability over temperature & bending. The high velocity dielectric results in superior phase stability compared with solid & air-spaced dielectric cables.

Construction Specifications			
Description	Material	In.	(mm)
Inner Conductor	Solid BCCS	0.018	(0.46)
Dielectric	Solid PE	0.060	(1.52)
Outer Conductor	Aluminum Tape	0.065	(1.65)
Overall Braid	Tinned Copper	0.083	(2.11)
Jacket	(see table above)	0.110	(2.79)

Mechanical Specifications			
Performance Property	Units	US	(metric)
Bend Radius: installation	in. (mm)	0.25	(6.4)
Bend Radius: repeated	in. (mm)	1	(25.4)
Bending Moment	ft-lb (N-m)	0.1	(0.014)
Weight	lb/ft (kg/m)	0.0092	(.014)
Tensile Strength	lb (kg)	15	(6.8)
Flat Plate Crush	lb/in. (kg/mm)	10	(0.18)

Environmental Specifications		
Performance Property	°F	°C
Installation Temperature Range	-40/+185	-40/+85
Storage Temperature Range	-94/+185	-70/+85
Operating Temperature Range	-40/+185	-40/+85

Electrical Specifications			
Performance Property	Units	US	(metric)
Cutoff Frequency	GHz	90	
Velocity of Propagation	%	66	
Dielectric Constant	NA	2.30	
Time Delay	nS/ft (nS/m)	1.54	(5.05)
Impedance	ohms	50	
Capacitance	pF/ft (pF/m)	30.8	(101.1)
Inductance	uH/ft (uH/m)	0.077	(0.25)
Shielding Effectiveness	dB	>90	
DC Resistance			
Inner Conductor	ohms/1000ft (/km)	81.0	(266)
Outer Conductor	ohms/1000ft (/km)	9.5	(31.2)
Voltage Withstand	Volts DC	500	
Jacket Spark	Volts RMS	2000	
Peak Power	kW	0.6	

Frequency (MHz)	30	50	150	220	450	900	1500	1800	2000	2500	5800
Attenuation dB/100 ft	3.9	5.1	8.9	10.9	15.8	22.8	30.1	33.2	35.2	39.8	64.1
Attenuation dB/100 m	12.9	16.7	29.4	35.8	51.9	74.9	98.7	109.0	115.5	130.6	210.3
Avg. Power kW	0.230	0.180	0.100	0.083	0.057	0.039	0.029	0.027	0.025	0.022	0.013

Calculate Attenuation = $(0.709140) \cdot \sqrt{\text{FMHz}} + (0.001740) \cdot \text{FMHz}$ (interactive calculator available at <http://www.timesmicrowave/telecom>)
 Attenuation: VSWR=1.0; Ambient = +25°C (77°F) Power: VSWR=1.0; Ambient = +40°C; Inner Conductor = 100°C (212°F);
 Sea Level; dry air; atmospheric pressure; no solar loading



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LMR-195 Flexible Low Loss Cable



**Ideal for wireless & GPS Applications.
Great alternative to RG58 Coax,
with much better Loss and shielding.**

**LMR-195 Standard Outdoor Cable
LMR-195-DB Watertight Cable
LMR-195-FR Non-Halogen
LMR-195-UltraFlex Ultra Flexible**

Flex: With a 12.7mm minimum bend radius, LMR-240 can be easily routed into and thru tight spaces without kinking.

Low Loss: LMR-195 is much lower loss than standard RG cables. This is achieved through the use of high velocity dielectric & bonded aluminum tape to the outer conductor. The proprietary gas-injected closed cell foam dielectric prevents water migration through the cable & provides excellent crush resistance.

Weatherproof: The UV protected black polyethylene jacket makes the cable rugged & resistant to the full range of outdoor environments. The DB version includes a water blocking material within the braid to protect the cable from moisture ingress & corrosion should the jacket become damaged.

RF Shielding: The bonded aluminum tape outer conductor is overlapped to provide 100% coverage, resulting in >90dB RF shielding (>180dB Cross Talk) & excellent interference immunity.

Phase Stability: The intimated bonded structure & foam dielectric provides excellent phase stability over temperature & bending. The high velocity dielectric results in superior phase stability compared with solid & air-spaced dielectric cables.

Construction Specifications			
Description	Material	In.	(mm)
Inner Conductor	Solid BC	0.037	(0.94)
Dielectric	Foam PE	0.110	(2.79)
Outer Conductor	Aluminum Tape	0.116	(2.95)
Overall Braid	Tinned Copper	0.139	(3.53)
Jacket	(see table above)	0.195	(4.95)

Mechanical Specifications			
Performance Property	Units	US	(metric)
Bend Radius: installation	in. (mm)	0.5	(12.7)
Bend Radius: repeated	in. (mm)	2	(50.8)
Bending Moment	ft-lb (N-m)	0.2	(0.27)
Weight	lb/ft (kg/m)	0.021	(0.03)
Tensile Strength	lb (kg)	40	(18.2)
Flat Plate Crush	lb/in. (kg/mm)	15	(0.27)

Environmental Specifications		
Performance Property	°F	°C
Installation Temperature Range	-40/+185	-40/+85
Storage Temperature Range	-94/+185	-70/+85
Operating Temperature Range	-40/+185	-40/+85

Electrical Specifications			
Performance Property	Units	US	(metric)
Cutoff Frequency	GHz	41	
Velocity of Propagation	%	80	
Dielectric Constant	NA	1.56	
Time Delay	nS/ft (nS/m)	1.27	(4.17)
Impedance	ohms	50	
Capacitance	pF/ft (pF/m)	25.4	(83.3)
Inductance	uH/ft (uH/m)	0.064	(0.21)
Shielding Effectiveness	dB	>90	
DC Resistance			
Inner Conductor	ohms/1000ft (/km)	7.6	(24.9)
Outer Conductor	ohms/1000ft (/km)	4.9	(16.1)
Voltage Withstand	Volts DC	1000	
Jacket Spark	Volts RMS	3000	
Peak Power	kW	2.5	

Frequency (MHz)	30	50	150	220	450	900	1500	1800	2000	2500	5800
Attenuation dB/100 ft	2.0	2.5	4.4	5.4	7.8	11.1	14.5	16.0	16.9	19.0	29.9
Attenuation dB/100 m	6.5	8.4	14.6	17.7	25.5	36.5	47.7	52.5	55.4	62.4	98.1
Avg. Power kW	0.89	0.68	0.39	0.32	0.22	0.16	0.12	0.11	0.10	0.09	0.06

Calculate Attenuation = $(0.356859) \cdot \sqrt{\text{FMHz}} + (0.000470) \cdot \text{FMHz}$ (interactive calculator available at <http://www.timesmicrowave/telecom>)
 Attenuation: VSWR=1.0; Ambient = +25°C (77°F) Power: VSWR=1.0; Ambient = +40°C; Inner Conductor = 100°C (212°F);
 Sea Level; dry air; atmospheric pressure; no solar loading



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LMR-240 Flexible Low Loss Cable



Ideal for wireless & GPS Applications

LMR-240 Standard Outdoor Cable
LMR-240-DB Watertight Cable
LMR-240-FR Non-Halogen
LMR-240-UltraFlex Ultra Flexible

Flex: With a 19.11mm minimum bend radius, LMR-240 can be easily routed into and thru tight spaces without kinking.

Low Loss: LMR-240 is much lower loss than standard RG cables. This is achieved through the use of high velocity dielectric & bonded aluminum tape to the outer conductor. The proprietary gas-injected closed cell foam dielectric prevents water migration through the cable & provides excellent crush resistance.

Weatherproof: The UV protected black polyethylene jacket makes the cable rugged & resistant to the full range of outdoor environments. The DB version includes a water blocking material within the braid to protect the cable from moisture ingress & corrosion should the jacket become damaged.

RF Shielding: The bonded aluminum tape outer conductor is overlapped to provide 100% coverage, resulting in >90dB RF shielding (>180dB Cross Talk) & excellent interference immunity.

Phase Stability: The intimated bonded structure & foam dielectric provides excellent phase stability over temperature & bending. The high velocity dielectric results in superior phase stability compared with solid & air-spaced dielectric cables.

Mechanical Specifications

Minimum Bend Radius	0.75 in	19.1 mm
Bending Moment	0.25 ft-lb	0.34 N-m
Weight	0.034 lb/ft	0.05 kg/m
Tensile Strength	80 lb	36.3 kG
Flat Plate Crush	20 lb/in	0.36 kG/mm

Construction Specifications

Part Designation	Material	Inches	mm
Inner Conductor	Solid BC	0.056	1.42
Dielectric	Foam Polyethylene	0.150	3.81
Outer Conductor	Aluminum Tape	0.155	3.94
Overall Braid	Tinned Copper	0.178	4.52
Standard Jacket	Black Polyethylene	0.240	6.10

Environmental Specifications

	°F	°C
Installation Temperature Range	-40/+185	(-40/+85)
Storage Temperature Range	-94/+185	(-70/+85)
Operating Temperature Range	-40/+185	(-40/+85)

Electrical Specifications

Cutoff Frequency	31 GHz*	
Velocity of Propagation	84%	
Voltage Withstand	1500 VDC	
Peak Power	5.6 kW	
DC Resistance		
Inner Conductor, ohms	3.2/1000'	10.50/km
Outer Conductor, ohms	3.89/1000'	12.76/km
Jacket Spark	5000 VRMS	
Impedance	50 ohms	
Capacitance	24.2 pF/ft	79.40 pF/m
Inductance	0.060 uH/ft	0.20 uH/m
Shielding Effectiveness	>90 dB	
Phase Stability	< 10 ppm/C	
*Consult factory for applications over 6 GHz.		

Frequency MHz	Attenuation dB/100 ft dB/100 m		Avg. Power kW
30 MHz	1.3	4.4	1.49
50 MHz	1.7	5.7	1.15
150 MHz	3.0	9.9	0.66
220 MHz	3.7	12.0	0.54
450 MHz	5.3	17.3	0.38
900 MHz	7.6	24.8	0.26
1500 MHz	9.9	32.4	0.20
1800 MHz	10.9	35.6	0.18
2000 MHz	11.5	37.7	0.17
2500 MHz	12.9	42.4	0.15
5800 MHz	20.4	66.8	0.10
Add 15% to tabulated attenuation for LMR-UltraFlex			
Attenuation (db/100 ft) = (0.24208) • √FMHz + (0.00033) • FMHz			
(db/100 m) = (0.79426) • √FMHz + (0.00108) • FMHz			
(interactive calculator available at http://www.timesmicrowave.com)			
Attenuation: VSWR=1.0; Ambient = +25°C (77°F)			
Power: VSWR=1.0; Ambient = +40°C; Inner Conductor = 100°C (212°F);			
Sea Level; dry air; atmospheric pressure; no solar loading			

LMR-400 Flexible Low Loss Cable



Ideal for wireless & GPS Applications

LMR-400 Standard Outdoor Cable
LMR-400-DB Watertight Cable
LMR-400-FR Non-Halogen
LMR-400-UltraFlex Ultra Flexible

Flex: With a 25.4 minimum bend radius, LMR-400 can be easily routed into and thru tight spaces without kinking.

Low Loss: LMR-400 is much lower loss than standard RG cables. This is achieved through the use of high velocity dielectric & bonded aluminum tape to the outer conductor. The proprietary gas-injected closed cell foam dielectric prevents water migration through the cable & provides excellent crush resistance.

Weatherproof: The UV protected black polyethylene jacket makes the cable rugged & resistant to the full range of outdoor environments. The DB version includes a water blocking material within the braid to protect the cable from moisture ingress & corrosion should the jacket become damaged.

RF Shielding: The bonded aluminum tape outer conductor is overlapped to provide 100% coverage, resulting in >90dB RF shielding (>180dB Cross Talk) & excellent interference immunity.

Phase Stability: The intimated bonded structure & foam dielectric provides excellent phase stability over temperature & bending. The high velocity dielectric results in superior phase stability compared with solid & air-spaced dielectric cables.

Mechanical Specifications

Minimum bend radius	1.0 in	25.4 mm
Bending moment	0.5 ft lb	0.68 N-m
Weight	0.068 lb/ft	0.10 kg/m
Tensile strength	160 lb	72.6 kG
Flat plate crush	40 lb/in	0.71 g/mm

Construction Specifications

Part Designation	Material	Inches	mm
Inner conductor	Solid BCCAl	0.108	2.74
Dielectric	Foam polyethylene	0.285	7.24
Outer conductor	Aluminum tape	0.291	7.39
Overall braid	Tinned copper	0.320	8.13
Standard jacket	Black polyethylene	0.405	10.29

Environmental Specifications

	°F	°C
Installation temperature range	-40/+185	-40/+85
Storage temperature range	-94/+185	-70/+85
Operating temperature range	-40/+185	-40/+85

Electrical Specifications

Cutoff frequency	16.2 GHz*	
Velocity of propagation	85%	
Voltage withstand	2,500 VDC	
Peak power	16 kW	
DC resistance		
Inner conductor, ohms	1.39/1,000'	4.56/km
Outer conductor, ohms	1.65 /1,000'	5.41/km
Jacket spark	8,000 VRMS	
Impedance	50 ohms	
Capacitance	23.9 pF/ft	78.40 pF/m
Inductance	0.060 uH/ft	0.20 uH/m
Shielding effectiveness	>90 dB	
Phase stability	<10 ppm/°C	
*Consult factory for applications over 6 GHz.		

*Consult factory for applications over 6 GHz.

Frequency MHz	Attenuation dB/100 ft	Attenuation dB/100 m	Avg. Power kW
30 MHz	0.7	2.2	3.3
50 MHz	0.9	2.9	2.6
150 MHz	1.5	5.0	1.5
220 MHz	1.9	6.1	1.2
450 MHz	2.7	8.9	0.83
900 MHz	3.9	12.8	0.58
1500 MHz	5.1	16.8	0.44
1800 MHz	5.7	18.6	0.40
2000 MHz	6.0	19.6	0.37
2500 MHz	6.8	22.2	0.33
5800 MHz	10.8	35.5	0.21

Add 15% to tabulated attenuation for LMR-UltraFlex

Attenuation (db/100 ft) = (0.12229) • $\sqrt{\text{FMHz}}$ + (0.00026) • FMHz
 (db/100 m) = (0.40123) • $\sqrt{\text{FMHz}}$ + (0.00085) • FMHz
 (interactive calculator available at <http://www.timesmicrowave.com>)

Attenuation: VSWR=1.0; Ambient = +25°C (77°F)

Power: VSWR=1.0; Ambient = +40°C; Inner Conductor = 100°C (212°F);
 Sea Level; dry air; atmospheric pressure; no solar loading



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