GENERAL DYNAMICS
Mission Systems

GPSS Operations Enabled

MS14ISO

Military Qualified ISO 1x4 GPS Splitter

Description

A military qualified, one-input four output GPS splitter with a MIL-STD-704 compliant isolated power supply. A typical application involves an input from an active GPS antenna that is split evenly between four GPS receiver units. The MS14ISO can be configured to pass DC to the antenna input port to power an active GPS antenna on that port. The RF outputs, J2, J3, J4, and J5, feature a 200 Ω DC load to simulate an antenna DC current draw for any receiver connected to that port. The MS14ISO is a qualified 1X4 GPS splitter with isolated power that has been tested to (and passed) the MIL-STD Tests specified below.

Features

- Designed and Manufactured to Military Specifications
- Passes L1/L2 GPS (including M Code), Galileo, GLONASS, BeiDou
- Isolated Power Feature (MIL-STD-704F Compliance)
- Includes water resistant, EMI shielding, and hermetic sealing standard
- Excellent Gain Flatness (Gain | L1 - L2 | < 3 dB)
- Amplified and Passive Options

MIL Standard Compliance	
MIL-STD-810	MIL-E-5400
MIL-STD-1472	MIL-HDBK-454
MIL-STD-202	MIL-STD-1587
MIL-STD-883	MIL-STD-461
MIL-STD-704	-

1 MS14ISO Specifications

Table 1-1: Electrical Specifications

Operating Temperature -40°C to 85°C

Parameter			Conditions	Min	Typical	Max	Units
Frequency Range			Ant: Any Port; Unused Ports: 50 Ω	1.1		1.61	GHz
Gain	Standard	Amplified	Ant: Any Port; Unused Ports: 50 Ω, L1, L2	3	5	7	dB
	Custom	Amplified	As Specified (x dB, from 0 to 5 dB), L1, L2	X - 2	X	X + 2	
Input SWR			All Ports 50 Ω			2.0:1	-
Output SWR			All Ports 50 Ω			2.0:1	-
Noise Figure	5 dB Gain	Amplified	Ant: Any Port; Unused Ports: 50 Ω			3	dB
Gain Flatness		Amplified	[L1 - L2] Ant: Any Port; Unused Ports: 50 Ω			3	dB
Amp. Balance			(J2 – J5) Ant: Any Port: Unused Ports: 50 Ω			0.5	dB
Phase Balance			Phase (J2 – J5) Ant: Any Port; Unused Ports: 50 Ω			1.0	Degree
Group Delay Flatness			$T_{d,max}$ - $T_{d,min}$; J2 – J1 (Ant)			1	ns
Isolation	Normal 5 dB Gain	Amplified	Adjacent Ports Ant - 50 Ω Opposite Ports: Ant - 50 Ω	16 24			dB
	High 0 dB Gain	Amplified	Adjacent Ports Ant - 50 Ω Opposite Ports: Ant - 50 Ω	27 31			
Input I $_{P3}$	Amplified		Ant: Any Port; Unused Ports 50 Ω 1 MHz Tone Spacing		10		dBm
Input P_{1dB}	Amplified		Ant: Any Port; Unused Ports 50 Ω		-6		dBm
Current ($I_{internal}$)			Current Consumption of device (28 V DCIN)		55	65	mA
Antenna Current	Powered		Powered MIL-STD-704			100	mA
Max RF Input	Amplified		Max RF Input Without Damage			20	dBm
DC IN	Powered		Military Connector VDC MIL-STD-704 Normal and Emergency Conditions	16	28	32	VDC
DC OUT (1)	Powered	Amplified	Military Connection; Ant thru Current up to 100 mA		5		VDC

(1) DC output voltage to the antenna port (J1) can be customized to 5 V or Block DC

Power Military Connectors PMS38999-704/XX

Input	Description	PMS38999-704/XX Options
A	Positive	
B	Ground	
C	No Connect	

(2) Image not to scale

General Specifications

Description	Measurement
Weight	0.856 lbs (388.3 g)
Mean Time Between Failure (MTBF)[3]	389,029 hours at 29 °C
	316,877 hours at 71 °C

(3) Calculation derived using Airborne Inhabited Cargo parameters per MIL-STD-217F

2 Performance Data

Figure 2-1: MS14ISO Splitter: Gain vs. Frequency

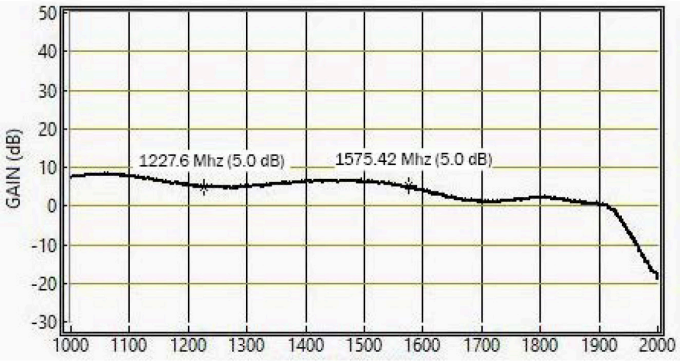
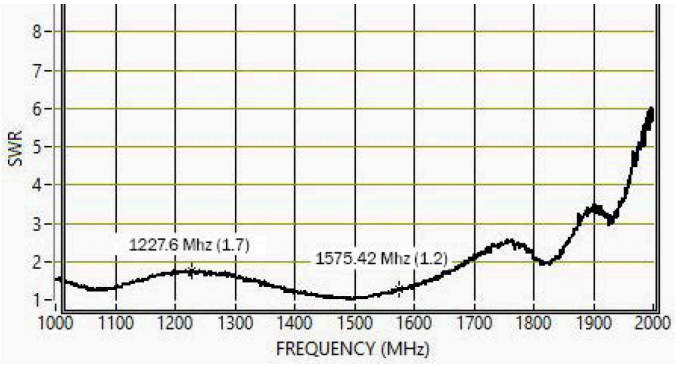


Figure 2-2: MS14ISO Splitter: SWR vs. Frequency



3 Environmental Requirements

3.1 Temperature and Altitude

The MS14ISO complies with the temperature-altitude tests per MIL-STD-810C, Method 504, Procedure 1 Equipment Category 5.

3.2 Temperature Shock

The MS14ISO is designed to withstand without degradation (while not operating) per MIL-STD-810H 503.7, Procedure I-C.

3.3 Explosive Atmosphere

The MS14ISO is designed for operation in the presence of explosive mixtures of air and jet fuel without causing explosion or fire at atmospheric pressures corresponding to altitudes from -1,800 ft to 50,000 ft. The MS14ISO does not produce surface temperatures or heat in excess of 400 °F. The MS14ISO does not produce electrical discharges at an energy level sufficient to ignite the explosive mixture when the equipment is turned on or off or operated. The MS14ISO meets the requirements of MIL-STD-810C, Method 511.1, and Procedure II. Hermetically sealed equipment meeting the Requirements of MIL-STD-202, Method 112D, or MIL-STD-883, Method 1014.7 (as applicable), and not exceeding a Helium leakage rate of 1 x 10-7cc/s are exempt from this requirement.

3.4 Decompression

The MS14ISO is designed to meet the performance standards per RTCA-DO-160E para 4.6.2 cat D during and following a rapid and complete loss of normal cabin compartment pressurization (10,000 feet) from an airplane flight altitude of 50,000 feet within 15 seconds. The MS14ISO will remain operating for five minutes at 50,000 feet before being returned to normal cabin pressure.

3.5 Overpressure

MS14ISO is capable of withstanding for 10 minutes while not operating. A 12.1 PSI compartment pressure with no physical distortion or permanent set RTCA-DO-160E PARA 4.6.3. The MS14ISO will operate satisfactorily upon return to normal pressure.

3.6 Salt Fog

The MS14ISO is designed to meet the requirements of Salt Fog conditions per Paragraph 3.2.24.9 of MIL-E-5400 and MIL-STD-810C Method 509.1. The MS14ISO is designed to withstand a salt concentration of five percent at a temperature of 35 °C for 48 hours without degradation.

3.7 Fungus

The MS14ISO is designed to meet the requirements of Fungus conditions per Paragraph 3.2.24.8 of MIL-E-5400 i.e. fungus inert materials per requirement 4 of MIL-HDBK-454.

3.8 Humidity

The MS14ISO is capable of meeting the requirements of a ten day humidity test conducted per MIL-STD-810C, Method 507.1; Procedure I. MS12 is designed to withstand exposure to 95 % relative humidity at a temperature of 30 °C for 28 days.

3.9 Sand and Dust

The MS14ISO is capable of meeting the requirements of Sand and Dust conditions of method 510 of MIL-STD-810C, for a temperature of 145 °F for a duration of 22 hours.

3.10 Flammability

The MS14ISO is self-extinguishing or nonflammable and is designed to meet the Requirements of Paragraph 5.2.4 of MIL-STD-1587 and Requirement 3 of MIL-HDBK-454.

3.11 Finish and Colors

All case surfaces of the MS14ISO are treated with chemical film per MIL-DTL-5441, TYPE II, CLASS 3. The MS14ISO bottom contact surface is free of paint or non-conductive finishes. The MS14ISO bottom contact surfaces are protected from corrosion by a conductive coating (MIL-DTL-5541). All other surfaces, exceptconnector mating surfaces are primed per MIL-PRF-23377, TYPE I, CLASS N CLASS C and painted per MIL-PRF-85285, CLASS H, TYPE 1 COLOR NUMBER (26231), Military Gray (not lusterless variety) per AMS-STD-585 (Exceptions: bottom and connector surfaces are free of paint).

3.12 Human Factors

Human Engineering principles and criteria (including considerations for human capabilities and limitations) using MIL-STD-1472 in all phases of design, development, testing, and procedures development. The design is free of all sharp edges, according to MIL-STD-1472.

3.13 Electromagnetic Interference and Compatibility Test

MS14ISO performs its intended function and operation does not degrade the performance of other equipment or subsystems. The following table defines the test requirements and test procedures for conducting the required electromagnetic compatibiity testing.

The MS14ISO is designed and tested to meet the requirements of MIL-STD-461G.conditions per Paragraph 3.2.24.9 of MIL-E-5400 and MIL-STD-810C Method 509.1. The MS14ISO is designed to withstand a salt concentration of five percent at a temperature of 35 °C for 48 hours without degradation.

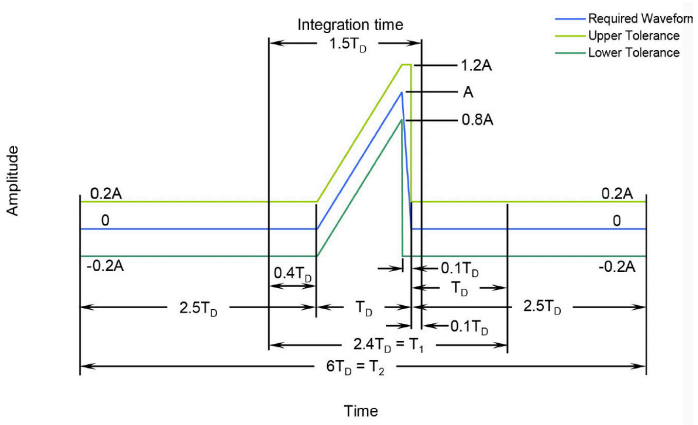
Table 3-1: MIL-STD-461G

Test	Description	
CE102	Conducted Emissions Power Leads	10kHz to 10MHz
CE106	Conducted Emissions Antenna Terminal	10kHz to 31.5GHz
CS101	Conducted Susceptibility Power Leads	30Hz to 150kHz
CS103	Conducted Susceptibility Antenna Port	Intermodulation
CS105	Conducted Susceptibility Antenna Port	Cross-Modulation
CS114	Conducted Susceptibility Bulk Cable Injection	10kHz to 200MHz
RE102	Radiated Emissions Electric Field	10kHz to 18GHz
RS103	Radiated Susceptibility Electric Field	2MHz to 18GHz
CS116	Damped Sinusoidal transients	RF Leads, 10kHz to 100MHz
		Power Leads, 10kHz to 100MHz

3.14 Shock

The MS14ISO is designed to withstand the shock levels specified in the saw tooth shock pulse parameter specified in Figure 3-1, 3-2, and Table 3-2. It is designed to meet the requirements of MIL-STD-810H 516.8, Procedure I and V.

Figure 3-1: Peak Shock Levels [4]



(4) Image from MIL-STD-810H 516.8

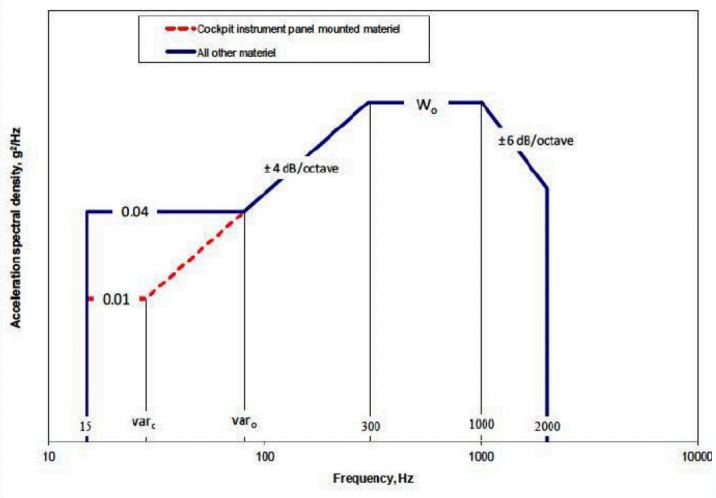
Table 3-2: Below

Test	Flight Vehicle Equipment	
	Minimum Peak Value (P)	Nominal Duration (D)
Functional	20 g-force	11 ms
Crash Safety	40 g-force	11 ms

3.15 Vibration

The MS14ISO meets the requirements of random vibration per conditions MIL-STD-810H, Method 514.8, Procedure I to the levels defined below. Acceleration Power Spectral Density (PSD) for a Fixed Wing Aircraft with a jet engine is shown in Figure 3-2

Figure 3-2: PSD for Fixed Wing Aircraft with a Jet Engine



4 Product Options

Electrostatic Sensitive Device (ESD)

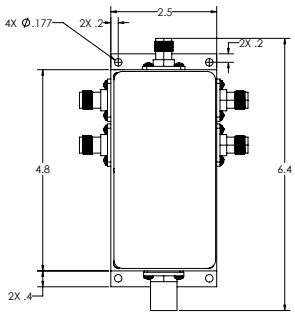
Remove electrostatic protection at use or in a protected area.

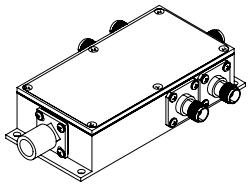
Reuse packaging materials for an unserviceable item. See DOD-HDBK-263 forprotective handling or testing measures for this item.

Table 4-1: MS14ISO Available Options

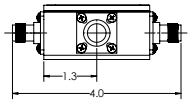
Power Supply		
Source Voltage	**Voltage Input**	**Type**
	DC 16-32 VDC	Military Style Connector
Output Voltage	5 V or Block DC	
RF Connector		
Connector	**Connector Type**	**Limitations**
	N (Female/Male)	N/A
	SMA (Female/Male)	N/A
	TNC (Female/Male)	N/A
Port		
Pass DC	Regulates the input voltage to output either 5VDC or Block DC at the input port	
DC Blocked	Standard configuration, J2,J3,J4, J5 DC Blocked with 200 Ω Resistive Load to Ground	

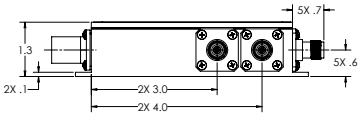
5 Mechanical Drawing

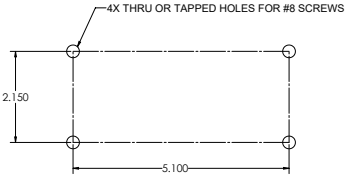




ISOMETRIC VIEW FOR REFERENCE ONLY







RECOMMENDED MOUNTING PATTERN

UNLESS OTHERWISE SPECIFIED,
DIMENSIONS ARE IN INCHES

6 Product Decoder

MS14ISO - A - PMS38999 - 704 / 5 - SF

Splitter
MS14ISO= 1X4 Military Qualified Isolated Power Splitter

Gain
-A = Amplified 5dB gain standard
-AS= Amplified as Specified by Output port (00dB to 5dB custom gain range
-AXX = Custom Gain (XXdB from 00dB to 04dB gain)

Connector
NF = N Female
SF = SMA Female
TF = TNC Female
NM = N Male
SM = SMA Male
TM = TNC Male
BF = BNC Female
BM = BNC Male

Antenna Output Voltage
5 = 5.0 V
BDC = INPUT BLOCK DC

Note: To have product/part codes customized to meet exact needs, contact GPS Source at **GPSS-Sales@gd-ms.com** or visit the website at **www.gpssource.com**

GENERAL DYNAMICS
Mission Systems

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