



CHELTON

Antenna
Catalogue
2022

Edition 1



Welcome to the era of zero defects

Through continuous improvement and innovation, Chelton designs for mission success, manufactures using zero defect procedures including automated manufacturing, and tests almost to destruction.

Welcome.

First established in 1947, Chelton defined the avionic and defence industry with a number of world firsts.

From novel static discharger designs, radio silent tuneable antennas through to the first airborne LTE mission critical public safety radio. For 75 years Chelton has continued its founders' principles, to overcome immensely complex communication challenges and deliver failsafe, pioneering technology to some of the world's most formidable militaries and public safety agencies.

There are few more demanding environments than those faced by public safety and elite military personnel. Whether in the theatre of operations, on search and rescue missions or during emergency services incidents, the settings are uncertain, changeable and dangerous - requiring accurate, reliable and robust equipment to achieve mission success.



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The Chelton Difference

We design and build our antennas with pedigree, functionality and precision so you get back what we put in.

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Communication Antennas

Chelton has a wide portfolio of airborne communication antennas for a variety of applications including Defence, Security and Commercial.

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Navigation & Identification

Navigational guidance and collision avoidance antenna products are available for Defence, Security and Commercial applications worldwide.

- Instrument Landing System (Localiser, Glideslope, Marker Beacon) and VOR page 72-74
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Direction Finder

Chelton's series of Direction Finders (DF) provide a range of integrated DF solutions for bus-controlled and stand-alone direction finding systems.

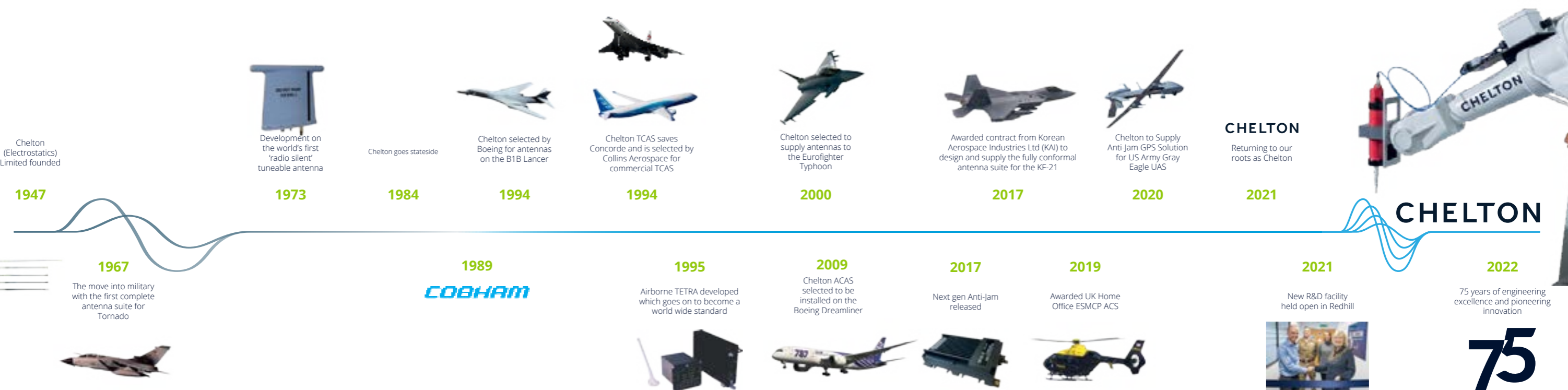
page 104-115

1 The Chelton Difference

Securing success in some of the world's most demanding environments isn't just down to Chelton's failsafe, pioneering technology. From aerospace and defence communications through to navigation and electronic warfare, it's all driven by the people behind it.

Top-level talent pushing boundaries from the moment we first explore your requirements. Always looking for new ways to meet tough challenges. And asking the right questions to find answers that redefine your capabilities.

At Chelton, we're proud to be on our customers' team. Bringing together smart thinking, technological excellence and future vision - whatever a system ambitions.





CHELTON

EST. 1947

75 years of Engineering Excellence and Pioneering innovation

2

Communication

High Frequency Towel Rail Antennas

About.

Chelton series of HF (High Frequency) antenna arrays are designed primarily to enable towel rail transmit/receive HF antennas to be installed on fixed and rotary wing aircraft in such a way as to optimise efficiency within the constraints of minimal drag, weight and size.

A range of individual components and masts is available to cater for the widely differing electrical requirements of currently available HF radios, tuners and couplers, and also to provide for the multitude of different mechanical installation problems that can be encountered, particularly on "electrically small" airframes.

Chelton are able to assess an installation to ensure that it fits your platform's needs and requirements. Through our investigation and collaboration, we propose a bespoke solution.

Contact us at info@chelton.com with your query.

435



455



405



485



A typical array comprises the following:

- A feed through or lead-in mast for direct connection to the antenna coupler
- A number of insulated "stand-offs" or support masts
- An aluminium alloy tubular element of 1" diameter, 20 SWG wall thickness to specification L114TF, such as the 435RA Series.



435, 455, 465, 475 & 485

Towel Rail Antenna Arrays

2 - 30 MHz

A typical array comprises the following:

- A feed through or lead-in mast for direct connection to the antenna coupler
- A number of insulated “stand-offs” or support masts
- An aluminium alloy tubular element of 1” diameter, 20 SWG wall thickness to specification L114TF, such as the **435RA Series**.

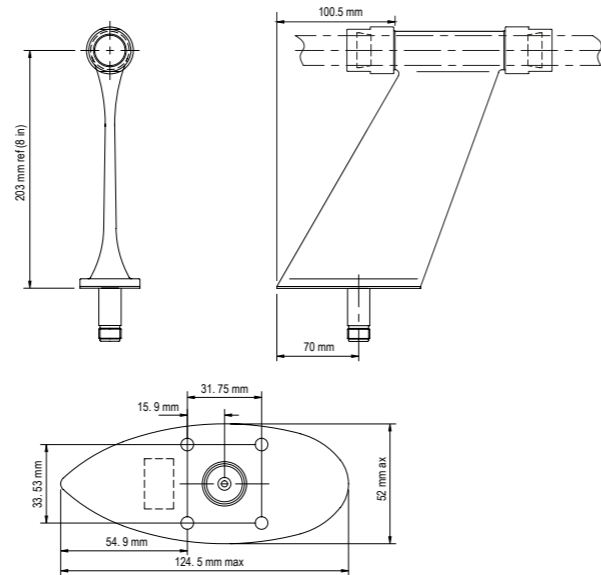
In some installations, particularly when Near Vertical Incident Skywave (NVIS) operation is required, the tubular element is grounded to the airframe at some point along its length. This is, typically, at the end furthest from the feed through mast, but in some cases additionally at some intermediate position. This optimises radiation patterns and efficiency, and a switched grounded/support mast is available for such applications.

All lead in masts and clamping head masts have a double collet head cap assembly to secure the tubular element. All metalwork is selected for electrochemical compatibility ensuring minimal RF resistance. A PTFE sleeve is fitted within the head cap of sliding head support masts.

A vital consideration when installing any long rail type of antenna on an airframe is the avoidance of stress and strain to both the airframe and the antenna, such as can be imposed during airframe flexing and vibration.

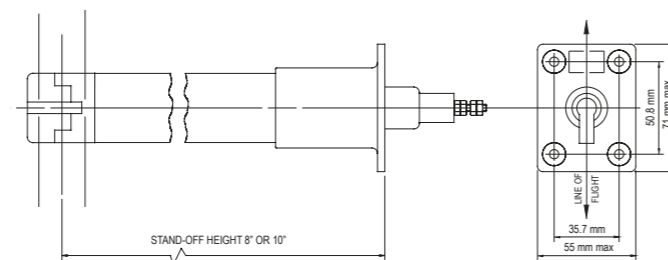
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To cater for this, a complete array will normally have a minimum number of rigid anchor points and movement will then be permitted by incorporation of support masts, which allow the element tube to slide within the mast itself. In addition, specially shaped grounding elements are available which permit, and are tolerant of, lateral and longitudinal movement.



8 inch 485 Series lead in mast with Type HN RF connector

465 Series lead in mast with 10-32 UNF Thread RF connector



The dimensioned drawings above are for illustrative purposes. Information on the full range of variants is available upon request.

435, 455, 465, 475 & 485

Towel Rail Antenna Arrays

2 - 30 MHz

ELECTRICAL

Frequency	2 MHz - 30 MHz (typical, dependent on coupler)
RF Voltage Rating	5 kV peak at 2 MHz
Mast Insulation	≥ 40 MΩ at 1000 V dc
Resistance Through Conducting Paths	≤ 2.5 mΩ for lead-in, grounded masts and across captive head couplers
Radiation Diagram and Polarisation	Dependent upon configuration and airframe
Connectors	Typically HN or 10-32 UNF Thread

ENVIRONMENTAL 435, 475 and 485

Temperature	MIL-STD-810C, Meth 504.1, Proc I, Cat 4 Normal Operation: -54°C to +71°C Occasional: -54°C to +95°C Storage: -62°C to +95°C
Altitude	9144 m (30000 ft)
Vibration	435 MIL-STD-810C, Meth 514.2, Proc I, Cat C, Table 514.2-III, Fig. 514.2-3, Curve M 485 BS 3G 100, Part 2, Sect 3:3.1, Proc I, Cats 4 and 5
Shock	MIL-STD-810C, Meth 516.2, Procs I and II
Rain	MIL-STD-810C, Meth 506.1, Proc I
Humidity	MIL-STD-810C, Meth 507.1, Proc I
Fungus	MIL-STD-810C, Meth 508.1, Proc I
Salt Fog	MIL-STD-810C, Meth 509.1, Proc I
Dust (Fine Sand)	MIL-STD-810C, Meth 510.1, Proc I
Magnetic Effect	RTCA DO-160B, Sect 15, Class Z

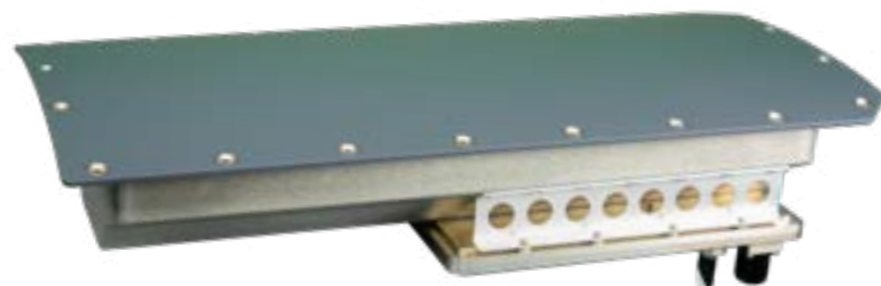
ENVIRONMENTAL 455 and 465

Temperature	RTCA DO-160C, Sect 4, Cat C2 Normal Operation: -55°C to +70°C Occasional: -55°C to +70°C Storage: -55°C to +85°C
Altitude	10668 m (35000 ft)
Temperature Variation	RTCA DO-160C, Sect 5, Cat A
Operational Shocks and Crash Safety	RTCA DO-160C, Sect 7, Paras 7.2.1 and 7.3.1
Vibration	RTCA DO-160C, Sect 8, Curves L, Y and V MIL-STD-810E, Meth 514.4, Cat 6, Fig. 514.4-9
Humidity	RTCA DO-160C, Sect 6, Cat C
Fluids Susceptibility	BS 3G100, Part 2, Sect 3:3.12, Class A
Fungus Resistance	BS 3G100, Part 2, Sect 3:3.3, Para 2.1
Salt Fog	MIL-STD-810E, Meth 509.3, Proc I
Magnetic Effect	RTCA DO-160C, Sect 15, Class Z



2 Communication Tuneable Antennas

Chelton are world leaders in the design and manufacture of tuneable antennas from 30MHz up to 1850MHz.



About.

Chelton has been pushing the boundaries since the early days, and in the 1960s it was unrelenting in creating an 'all-singing, all-dancing' antenna. The result? The world's first radio-silent tuneable antenna. Up until Chelton's pioneering solution, tuneable antennas needed a burst of transmission to be able to re-tune, which in turn gave away an aircraft's position and left its communication system vulnerable to jamming attacks.

A tuneable antenna is a simple concept; it contains electronics that allow the antenna to be 'tuned' to a particular frequency range on demand. This provides up to 15dB better gain at the lower end of the Very High Frequency (VHF) band compared to a passive blade antenna of equivalent size.

Higher gain equals better communications range and so tuneable antennas are ideal for applications where good performance in the low VHF frequency band is required but there is limited space available on the platform.

Developing antennas for the future battlefield

The KF-21 (Next-Generation Fighter) program is a full scale fighter development program, set to introduce an outstanding aircraft for future battlefields. Chelton is providing the full conformal tuneable antenna suite for the KF-21.

What they can do for you.

Increased power handling

RF power rating increased from 23W to 50W

Broader frequency range coverage

To support Next Gen Radio technology compatibility with major manufacturers

High gain at low frequencies

Enables greater antenna gain in the tactical VHF band at the cost of reduced instantaneous bandwidth for a given aperture size.

Maximum gain, minimum height

Chelton's tuneable range provides up to 15dB better gain at the lower end of the VHF band compared to a passive blade antenna of equivalent size.

Bespoke for your platform

Blade, Integral, Conformal - we have a solution for you

- Narrower individual bandwidth improves Q factor
- Conformal and integrated tunables available
- Suitable for installation in higher temperature locations
- Radio Agnostic
- Enhanced environmental qualifications
- Qualified to MIL-STD-810

Tuneable Antennas

Quick Reference Table

Part Number	Description	Frequency MHz	Gain dBi @30MHz	Compatible Radios	Configuration	Antenna Height (inches)
12-190-160	Low Profile Tuneable V/UHF Blade	30 - 512	-15	Collins ARC-210 (Gen 3, 4, 5 and 6) Collins ARC-182 R&S 6000 series BAE Systems ARC-222 L3Harris ARC201D BAE Systems ARC-231 / ARC-232 Leonardo SRT651 / SRT700 / SRT800 Thales TRA6XXX series radios	Blade	6.5
12-190-530LP	V/UHF L-Band Tuneable Blade	30-512 960-1220	-14.5	Collins ARC-210 (Gen 3, 4, 5 and 6) Collins ARC-182 R&S 6000 series BAE Systems ARC-222 L3Harris ARC201D BAE Systems ARC-231 / ARC-232 Leonardo SRT651 / SRT700 / SRT800 Thales TRA6XXX series radios	Blade	9.22
12-190-6/1	Low Profile V/ UHF L-Band	30 - 1220	-14.5	Collins ARC-210 (Gen 3, 4, 5 and 6) Collins ARC-182 R&S 6000 series BAE Systems ARC-222 L3Harris ARC201D BAE Systems ARC-231 / ARC-232 Leonardo SRT651 / SRT700 / SRT800 Thales TRA6XXX series radios	Blade	9.22
12-190-60	V/UHF Tuneable Blade	30 - 400	-14.5	Collins ARC-210 (Gen 3, 4, 5 and 6) Collins ARC-182 R&S 6000 series BAE Systems ARC-222 L3Harris ARC201D BAE Systems ARC-231 / ARC-232 Leonardo SRT651 / SRT700 / SRT800 Thales TRA6XXX series radios	Blade	9.25
12-190-61	V/UHF Tuneable Blade	30 - 400	-14.5	Collins ARC-210 (Gen 3, 4, 5 and 6) Collins ARC-182 R&S 6000 series BAE Systems ARC-222 L3Harris ARC201D BAE Systems ARC-231 / ARC-232 Leonardo SRT651 / SRT700 / SRT800 Thales TRA6XXX series radios	Blade	9.22
12-4004	Multiband Tuneable	30 - 600	-15	Collins ARC-210 (Gen 3, 4, 5 and 6) Collins ARC-182 Collins ARC-186 BAE Systems ARC-222 Canyon Aerospace RT5000/RT7000 R&S 6000 series L3Harris ARC201D BAE Systems ARC-231 / ARC-232 Leonardo SRT651 / SRT700 / SRT800 Thales TRA6XXX series radios CNR 9000	Blade	16.1
12-224	Very Low Profile Tuneable V/ UHF	30-960	-15	Canyon Aerospace RT5000/RT7000	Blade	5.5
12-5002	Multiband Tuneable Blade	30-960	-14	Canyon Aerospace RT5000/RT7000	Blade	9.5
10-3003-X	Conformal Tuneable U/ VHF	30-400	-29	Collins ARC-210 (Gen 3, 4, 5 and 6) BAE Systems ARC-231 / ARC-232	Conformal	0
10-3003-X	Conformal Tuneable U/ VHF	30 - 400	-26	Collins ARC-210 BAE Systems ARC-231 / ARC-232	Conformal	0



How can your aircraft benefit from a tuneable antenna?

Tuneable Blade antennas provide the best performance to size ratio, and are readily available in different shapes, heights and frequencies to satisfy different customers' needs.

The below provides a comparison between three main tuneable blade antenna types against a typical Passive Antenna, showing the extent to which the antenna performance is linked to the antenna dimensions. It clearly demonstrates that all three tuneables perform considerably better than the comparative passive within the frequency bands 30MHz and 88MHz, despite the substantial shorter height of both the 12-190-530LP and the 12-190-160.

Some of Chelton's tuneable antennas also include an L-band element in addition to VHF and UHF, essentially having the option of reducing the number of antennas needed.

Contact info@chelton.com to request Chelton's Whitepaper for more analysis!

Product	Type	Height	Gain @ 30MHz	Gain @ 88MHz
Type 12-200 Passive Antenna	Passive	14.7"	≥ -24 dBi	≥ -12 dBi
Type 12-4004 Tuneable Antenna	Tunable	16.1"	≥ -9 dBi	≥ -3 dBi
Type 12-190-530LP Tuneable Antenna	Tunable	9.22"	≥ -14.5 dBi	≥ -4.5 dBi
Type 12-190-160 Tuneable Antenna	Tunable	6.5"	≥ -15 dBi	≥ -7 dBi

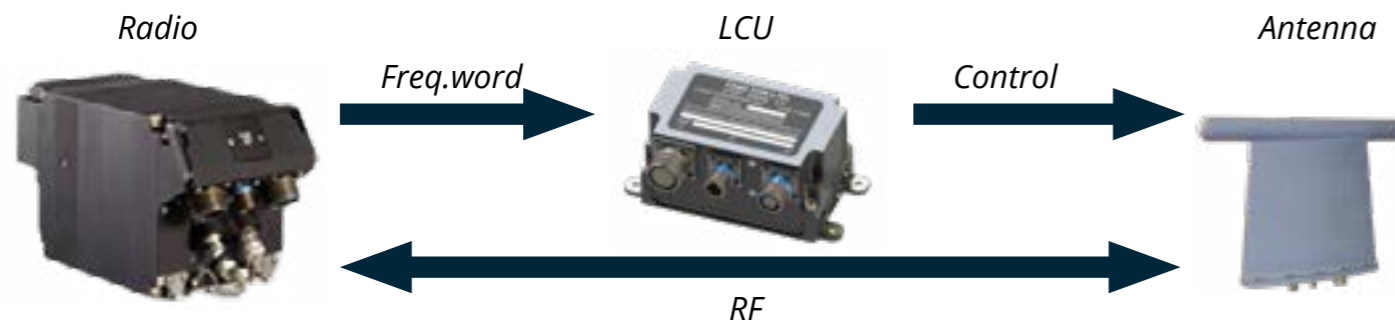
12-190-60

Low Profile V/UHF L-Band Tuned Antenna

30-88, 108-174, 225-400 MHz

In a traditional tuneable antenna system, a Logic Control Unit (LCU) is used to translate the radio signals and frequency information into tuning commands to drive a tuneable antenna. The LCU takes instruction from the radio and powers the antenna into the required tuning state.

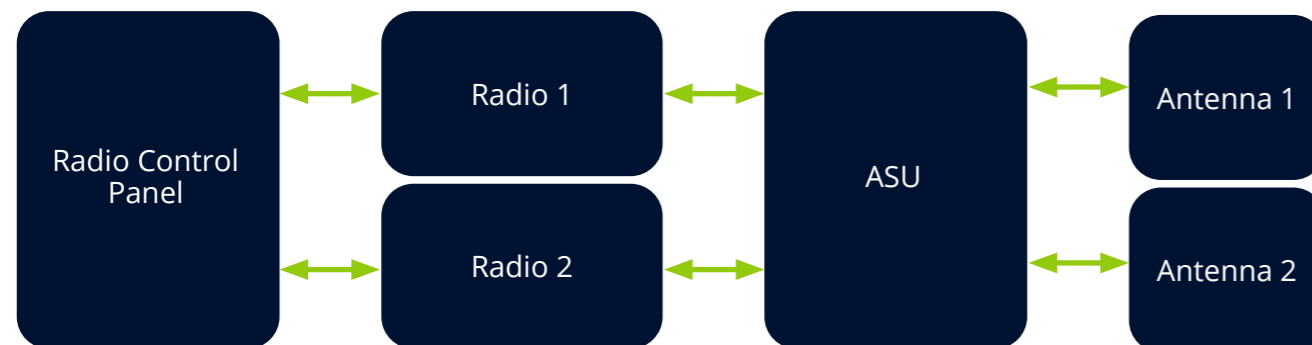
Chelton's portfolio includes a series of LCUs which are paired with our tuneable antennas.



In certain applications, it is also possible to implement an architecture where two LCUs and a cross-over switch are incorporated into an Antenna Switching Unit (ASU).

The ASU allows two radios to share two tuneable antennas, This provides diversity improvements to performance and reduces crew workload with the use of automatic switching between two antennas.

Other switching solutions are available.



Key features:

- Multi-Band Tuneable
- Lightning Protection
- Gain of -14.5dBi at 30MHz
- Guard performance at 121.5 MHz and 243MHz in all bands.
- Lightning Protected

Type 12-190-61 is a low profile, high efficiency, PIN diode tuned, antennas.

Intended for general airborne application, and operating over the frequency ranges 30 MHz to 88 MHz, 108 MHz to 174 MHz and 225 MHz to 400 MHz.



Similar to 12-190-61, but with 10 mounting holes.

ELECTRICAL

Frequency Range	30-88MHz 108-174MHz 225-400MHz
Power Handling	23 W maximum
Impedance	50 Ω
VSWR	30-88 MHz: ≤2.5:1 30- 88 MHz: ≤2.5:1 108- 174 MHz: ≤2.5:1 225- 299.9 MHz: ≤2.3:1 300- 400 MHz: ≤2.0:1
Gain	30 MHz: ≥-14.5 dBi 40 MHz: ≥-12.0 dBi 50 MHz: ≥-11.0 dBi 70 MHz: ≥-6.0 dBi 88 MHz: ≥-4.5 dBi 108 MHz: ≥-4.0 dBi 121.5 MHz: ≥-2.5 dBi 130 MHz: ≥-1.5 dBi 137 MHz: ≥-1.5 dBi 156 MHz: ≥-5 dBi 174 MHz: ≥-5 dBi 225- 400 MHz: ≥0 dBi
Polarisation	Vertical
Radiation	Omnidirectional

MECHANICAL

Dimensions (LxWxH)	315 x 71 x 235 mm
Weight	1.6 kg
Connector	TNC female
Platform(s)	Air

ENVIRONMENTAL

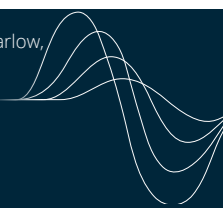
Standards	MIL-STD-810 MIL-E-5400
Continuous Operating Temperature	- 54°C Min + 71°C Max
Altitude	70000 ft
Vibration	MIL-STD-810D, Method 514.3, Procedure 1

Contact info@chelton.com for a datasheet on the Antenna Switching Unit (ASU).

Chelton Limited has a policy of continuous development and stress that the information provided is a guide only and does not constitute an offer or contract or part thereof. Whilst every effort is made to ensure the accuracy of the information contained in this Data Sheet, no responsibility can be accepted for any errors or omissions.

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12-190-530LP

V/UHF/L-Band Tuneable Antenna

30-88, 118-174, 225-512, 960-1220 MHz

The 12-190-530LP V/UHF/L-Band Tuneable Antenna is designed to provide communications in the frequency ranges 30 MHz to 88 MHz, 118 MHz to 174 MHz, 225 MHz to 512 MHz and 960 MHz to 1220 MHz. The antenna is intended for use in general subsonic airborne applications.

The antenna is provided with lightning protection.

The 12-190-530LP meets the stringent requirements of our military customers and provides unrivalled RF, mechanical and environmental performance.

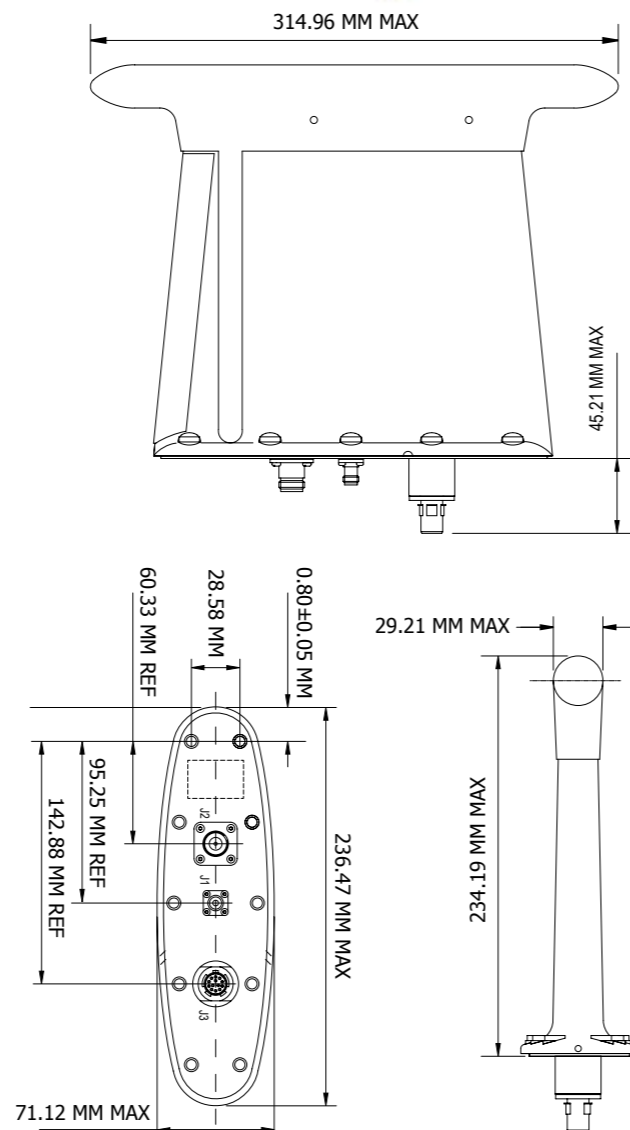
The 12-190-530LP comprises three separate radiating elements.

The VHF function is fulfilled by a PIN diode tuned structure wherein the capacitive reactance of the electrically small element is tuned out using a network of binarily related, PIN diode switched, lumped inductive elements. The remaining resistive component is then transformed using a reactive network to nominal 50 ohms impedance.

The UHF element comprises a separate essentially passive element, reactively matched. The VHF and UHF elements are then combined using a Tchebyscheff theory diplexer to a single RF connector.

The L-band antenna comprises a fan monopole, reactively matched and fed via a separate RF port.

CHELTON



12-190-530LP

V/UHF/L-Band Tuneable Antenna

30-88, 118-174, 225-512, 960-1220 MHz

The 12-190-530LP comprises a pressure moulded composite radome of aerofoil section surmounted by a tube, which provides the top loading for the VHF element. Within the blade is housed the electrical assembly. The structure is enclosed at the base by an aluminium alloy baseplate which supports the two RF connectors and the DC control connector.

Lightning protection is achieved by use of a pair of external diverter strips that conduct any direct attachment lightning strikes down the outside of the blade to the antenna baseplate.

ELECTRICAL

Frequency Range	30 MHz - 88 MHz	
	118 MHz - 174 MHz	225 MHz - 512 MHz
RF Power	Power	Frequency (MHz)
	23 W CW max	30 - 88
	23 W CW max	118 - 174
	23 W CW max	225 - 512
	1.5 kW peak	960 - 1220
	0.04% duty cycle	
Gain	dBi	Frequency (MHz)
	≥ -14	30
	≥ -4.5	88
	≥ -3 average	118 - 174
	≥ 0 average	225 - 512
	≥ 0 average	1000 - 1100
Polarisation	Predominantly vertical when mounted vertically	
Radiation Pattern	Essentially omnidirectional in azimuth	
Impedance	50 ohm nominal	
VSWR	VSWR	Frequency (MHz)
	≤ 2.5:1	30 - 88
	≤ 2.5:1	118 - 174
	≤ 2.5:1	225 - 512

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ELECTRICAL CONTINUED

VSWR	VSWR	Frequency (MHz)
	≤ 2.0:1	960 - 1220
	≤ 1.8:1	1000 - 1100
Connectors	RF Type N female	960 MHz - 1220 MHz RF
	Type TNC female	30 MHz - 512 MHz
	DC D38999 / 49WB35PN	

MECHANICAL

Aerodynamic Load	6300 kgf/m2 proof (9 psi)
	9500 kgf/m2 minimum ultimate (13.5 psi)
Dimensions (LxWxH)	234.19 x 314.96 x 71.12 mm
Weight	1.59 (kg)
Mounting	Eight holes fixed location

ENVIRONMENTAL

Altitude	MIL-STD-810C, Method 504.1 Procedure I
	Operational: 70,000 feet
	Storage: 70,000 feet
High Temperature	MIL-STD-810C, Method 504.1, Procedure I
	Continuous Operation: +71°C
	Storage: +95°C
Low Temperature	MIL-STD-810C, Method 504.1, Procedure I
	Operational: -54°C
	Storage: -62°C
Shock	MIL-STD-810E, Method 516.4, Procedures I and V
	Functional: 20 g, 11 ms, sawtooth
	Crash Hazard: 40 g, 11 ms, sawtooth
Vibration	MIL-STD-810E, Method 514.4, Procedure I, Cat 4
	0.01 g2/Hz at 15 Hz to 2000 Hz
	L1 = 0.6 g2/Hz at 68 Hz
Temperature Shock	MIL-STD-810E, Method 503.3
Rain	MIL-STD-810D, Method 506.2, Procedure I
	Normal operation when exposed to driving rain
Humidity	MIL-STD-810D, Method 507.2, Procedure III
	95% relative humidity at 60°C
Salt Fog	MIL-STD-810D, Method 509.2, Procedure I
	48 hours exposure to 5% salt solution
Magnetic Effect	DO-160D, Section 15, Class Z
Lightning	MIL-STD-1757, Zone 2B

12-190-6/1

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Low Height High Efficiency V/UHF Tuneable Antenna

30-88, 108-174, 225-400, 960-1220 MHz



Key features:

- Top tube for enhanced gain
- Lightning protection
- Guard facility at 121.5 MHz and 243 MHz
- A polyurethane leading edge strip

The 12-190-6/1 is a low profile, high efficiency PIN diode tuned antenna operating over the frequency ranges 30-400 MHz and 960-1220 MHz, intended for general airborne application. In addition the antennas offer a guard facility whereby performance is maintained at 121.5 MHz and 243 MHz when switched to any frequency within specified operating bands.

ELECTRICAL

Frequency	30-88MHz 108-174MHz 225-400MHz 960-1220MHz
RF Power	30- 88 MHz FM Mod. 23W 108-174 MHz 118- 156 MHz 225- 400 MHz 1.5 kW peak, 0.4 duty cycle 960-1220 MHz 15W CW with 100% mod. (am)
Impedance	50 ohm
VSWR	30- 88 MHz ≤2.5:1 108- 174 MHz ≤2.5:1 225- 299.9 MHz ≤2.3:1 300- 400 MHz ≤2.0:1 960-1000 MHz ≤2.0:1 1000-1100 MHz ≤1.8:1 1100-1220 MHz ≤2.0:1
Radiation	Azimuth Omnidirectional Elevation Electrically short monopole
Gain	30 MHz ≥-14.5 dBi 88 MHz ≥-4.5 dBi 108- 174 MHz ≥-3 dBi average 225- 400 MHz ≥0 dBi average 960-1220 MHz ≥0 dBi average
Polarisation	Vertical

ENVIRONMENTAL

Temperature	-54°C to +71°C (intermittent +71°C)
Altitude	70,000 ft
Acceleration	13.5g all axes
Mechanical Shock	15g/11ms functional
Vibration	MIL-STD-810D, Method 514.3, Procedure I. MIL-STD-810E, Method 514.4, Procedure I, Cat 6 modified DO160C Section 8 Curve L DO160C Section 8 Curve Y
Salt Fog	48 hours at 5% salinity
Magnetic Effect	Compass safe distance shall not be more than 300 mm

MECHANICAL

Dimensions (LWH)	315 x 71 x 234 mm 12.4 x 2.8 x 9.22 "
Max Weight	1.6 kg (3.5 lb-s)
Connectors	30- 400 MHz TNC female 960-1220 MHz N female
Mounting	10 holes, fixed location

12-190-60

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Low Profile V/UHF L-Band Tuned Antenna

30-88, 108-174, 225-400 MHz

Key features:

- Multi-Band Tuneable
- Lightning Protection
- Gain of -14.5dBi at 30MHz
- Guard performance at 121.5 MHz and 243MHz in all bands.
- Lightning Protected

Type 12-190-60 is a low profile, high efficiency, PIN diode tuned, antennas.

Intended for general airborne application, and operating over the frequency ranges 30 MHz to 88 MHz, 108 MHz to 174 MHz and 225 MHz to 400 MHz.



Similar to 12-190-61, but with 10 mounting holes.

ELECTRICAL

Frequency Range	30-88MHz 108-174MHz 225-400MHz
Power Handling	23W max
Impedance	50 Ω
VSWR	30-88 MHz: ≤2.5:1 30- 88 MHz: ≤2.5:1 108- 174 MHz: ≤2.5:1 225- 299.9 MHz: ≤2.3:1 300- 400 MHz: ≤2.0:1
Gain	30 MHz: ≥-14.5 dBi 40 MHz: ≥-12.0 dBi 50 MHz: ≥-11.0 dBi 70 MHz: ≥-6.0 dBi 88 MHz: ≥-4.5 dBi 108 MHz: ≥-4.0 dBi 121.5 MHz: ≥-2.5 dBi 130 MHz: ≥-1.5 dBi 137 MHz: ≥-1.5 dBi 156 MHz: ≥-5 dBi 174 MHz: ≥-5 dBi 225- 400 MHz: ≥0 dBi
Polarisation	Vertical
Radiation	Omnidirectional

MECHANICAL

Dimensions (LxWxH)	315 x 71 x 235 mm
Weight	1.6 kg
Connector	TNC female
Platform(s)	Air

ENVIRONMENTAL

Standards	MIL-STD-810 MIL-E-5400
Continuous Operating Temperature	- 54°C Min + 71°C Max
Altitude	70000 ft
Vibration	MIL-STD-810D, Method 514.3, Procedure 1

V/UHF Tuneable Blade Antenna

30-400 MHz

Key features:

- **Multi-Band Tuneable**
- **Lightning Protection**
- **Gain of -14.5dBi at 30MHz**
- **Guard performance at 121.5MHz and 243MHz in all bands.**
- **Lightning Protected**

Type 12-190-61 is a low profile, high efficiency, PIN diode tuned, antennas. Intended for general airborne application, and operating over the frequency ranges 30 MHz to 88 MHz, 108 MHz to 174 MHz and 225 MHz to 400 MHz. Similar to 12-190-60, but with 8 mounting holes.



ELECTRICAL

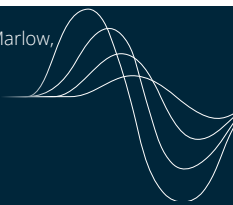
Frequency	30 - 400 MHz
Power Handling	23W max
Impedance	50 Ω
VSWR	30- 88 MHz: ≤2.5:1 108- 174 MHz: ≤2.5:1 225- 299.995 MHz: ≤2.3:1 300- 400 MHz: ≤2.0:1
Gain	30 MHz: ≤-14.5 dBi
Polarisation	Vertical
Radiation Pattern	Omnidirectional
Azimuth	

MECHANICAL

Dimensions (LxWxH)	315 x 71 x 235 mm
Weight	1.6 kg
Connector	TNC female

ENVIRONMENTAL

Environmental	MIL-STD-810
Continuous Operating Temperature	- 54°C Min + 71°C Max
Vibration	MIL-STD-810D, Method 514.3, Procedure 1



12-4004

CHELTON

Multiband Tuneable Antenna

30-600 MHz

Key features:

- **Multi-Band Tuneable**
- **Compatible with frequency hopping radios**
- **Meets Havequick II and Saturn Standards**

The 12-4004 is a multiband tuneable antenna designed to provide communications in the frequency range 30 to 600 MHz.

The antenna is compatible with Chelton's range of logic units that are capable of providing an interface to current fast frequency hopping radios and as a system is capable of meeting the tuning times with modes such as Havequick II and Saturn. The antenna is designed to meet the requirements of DO-186A, ED-23C and DO-253C.



ELECTRICAL

Frequency	30 - 600 MHz
Power Handling	50W max
Impedance	50 Ω
VSWR	30- 88 MHz: $\leq 2.5:1$ 108- 118 MHz: $\leq 3.05:1$ 118- 174 MHz: $\leq 2.5:1$ 225 - 88 MHz: $\leq 2.5:1$
Gain	30 MHz: ≤ -9 dBi 88 MHz: ≤ -3 dBi 108-174 MHz: ≤ -1 dBi 3225-600 MHz: $\leq +2$ dBi
Polarisation	Vertical
Radiation Pattern Azimuth	Omnidirectional

MECHANICAL

Dimensions (LxWxH)	301 x 91.5 x 409 mm
Weight	2.0 kg
Connector	TNC female

ENVIRONMENTAL

Environmental	MIL-STD-810G
Continuous Operating Temperature	- 54°C Min + 71°C Max
Vibration	MIL-STD-810G, Method 514.7, Procedure 1

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12-224

CHELTON

Low Profile Tunable V/UHF Antenna 30-600 MHz

ELECTRICAL

Frequency	30 - 960 MHz	
Power Handling	15 W cw max	29.7 MHz - 400 MHz
	10 W cw max	400 MHz - 960 MHz
Gain	30MHz ≥ -15.0dbi	
	80MHz ≥ -7.5dbi	
	118-174MHz ≥ -3dbi average	
	225-960MHz ≥ 0dbi average	
Polarisation	Vertical (when mounted vertically)	
Impedance	50 ohms nominal	
VSWR	≤ 2.5:1 all bands	
Radiation Pattern	Nominally omnidirectional in azimuth	
Connectors	RF:N Type Female	29.7 MHz - 400 MHz
	RF:TNC Female	400 MHz-960 MHz
	DC:PT02-12-10P	

MECHANICAL

Dimensions (LxWxH)	380 x 139.7 x 91.44 (maximum)
Weight	1.6 kg (maximum)
Connector	6 holes fixed location



ENVIRONMENTAL

Standards	Qualification to RTCA DO-160C
Temperature and Altitude	Section 4, Category D2
Temperature Variation	Section 5, Category A
Humidity	Section 6, Category C
Vibration	Section 8, Categories C, L, M and Y
Explosion Proofness	Section 9, Category X
Waterproofness	Section 10, Category R
Fluids Susceptibility	Section 11, Category F
Sand and Dust	Section 12, Category X
Fungus Resistance	Section 13, Category X
Salt Spray	Section 14, Category X
Magnetic Effect	Section 15, Class Z
Power Input *	Section 16, Category X
Voltage Spike *	Section 17, Category B
Audio Frequency Conducted Susceptibility - Power Inputs *	Section 18, Category B
Induced Signal Susceptibility *	Section 19, Category A
Radio Frequency Susceptibility (Radiated and Conducted) *	Section 20, Category Y
Emission of Radio Frequency Energy *	Section 21, Category A
Lightning Induced Transient Susceptibility	Section 22, Category XXXX
Lightning Direct Effects	Section 23, Category X
Icing	Section 24, Category X

* When used in conjunction with the Type 7-119PIN9 Logic Converter Unit

12-5002

CHELTON

Multiband Tuneable Blade Antenna 30-960 MHz

Key features:

- Multi-Band Tuneable
- Compatible with RT-5000 Radio
- Height 241mm (9.5 inches)
- Gain ≥ -14dBi at 30MHz

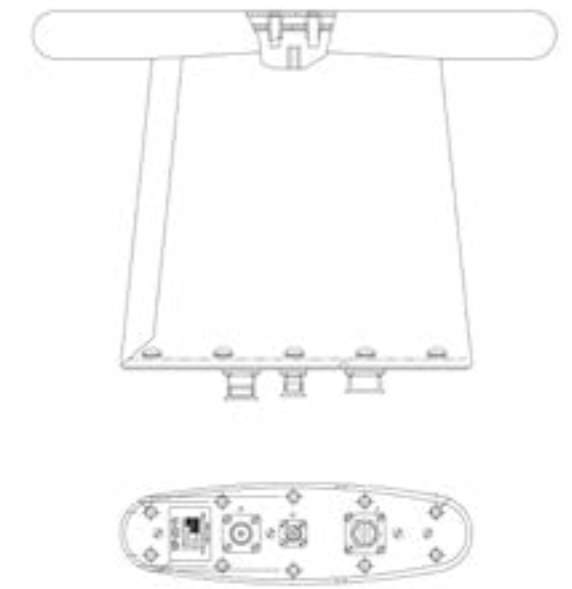
The 12-5002 Antenna is a Multiband Tuneable Antenna designed to provide communications over the frequency band 29.7 MHz to 960 MHz and intended for operation in general subsonic airborne applications.

The antenna comprises three separate radiating elements: The VHF function from 29.7 MHz to 174 MHz is fulfilled by a tuneable structure wherein a network of inductive elements are switched in combination by PIN diode switches to tune the antenna to the frequency selected by the radio. The tuning information is provided by the appropriate logic control unit.

The UHF function 225 MHz to 400 MHz is fulfilled by a passive element. The feed to this is combined with the VHF function via a simple L-C network to allow connection via a single RF connector.

A separate radiating structure provides the 400 MHz to 960 MHz capability via a second RF connector.

The antenna system and Type 7-1351 LCU is a replacement for Antenna Type 12-190-9 and LCU Type 7-19PIN9 providing improved harmonic performance.



ELECTRICAL

Frequency	30-960 MHz
Power Handling	15 W cw max - 29.7 MHz to 400 MHz
	25 W cw max - 400 MHz to 960 MHz
Impedance	50 Ω
VSWR	< 2.5:1)
Gain	> -14 dBi at 30 MHz rising to
	> -6 dBi at 88 MHz
	> 0 dBi average 108 MHz to 174 MHz
	> 0 dBi average 225 MHz to 960 MHz
Polarisation	Vertical
Radiation	Omnidirectional

MECHANICAL

Dimensions (LxWxH)	356 x 70 x 241 mm
Weight	1.22 kg
Connector	N Type 30-400MHz
	TNC 400-960MHz
	DC: PTO2 12-10P
Platform(s)	Air

ENVIRONMENTAL

Standard	RTCA DO-160F
Continuous Operating Temperature	- 55°C Min
	+ 70°C Max
Altitude	50000 ft
Vibration	RTCA DO-160F, Section 8, Categories U2 and S, Curves
	C, F, F1, L, M and Y

12-5008

CHELTON

Multiband Tuneable Blade Antenna

30-960 MHz

Key features:

- **Multi-Band Tuneable**
- **Compatible with RT-5000 & RT-7000 Radio**
- **Height 234mm (9.2 inches)**

The 12-5008 is a multiband tuneable antenna designed to provide communications in the frequency ranges 30 MHz to 600 MHz and 760 to 960 MHz.

The antenna is compatible with Chelton's range of logic units that are capable of providing an interface to current fast frequency hopping radios and as a system is capable of meeting the tuning times with modes such as Havequick II and Saturn.



ELECTRICAL

Frequency	30-600 MHz 760-960 MHz
Power Handling	50 W CW max
Impedance	50 Ω
VSWR	< 2.5:1)
Gain	> -14 dBi at 30 MHz rising to > -6 dBi at 88 MHz > 0 dBi average 108 MHz to 174 MHz > 0 dBi average 225 MHz to 960 MHz
Polarisation	Vertical
Radiation	Omnidirectional

MECHANICAL

Dimensions (LxWxH)	356 x 70 x 241 mm
Weight	1.22 kg
Connector	N Type 30-400MHz TNC 400-960MHz DC: PTO2 12-10P
Platform(s)	Air

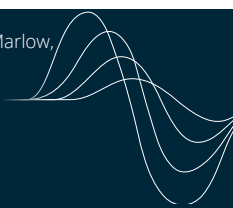
ENVIRONMENTAL

Standard	RTCA DO-160F
Continuous Operating Temperature	- 55°C Min + 70°C Max
Altitude	50000 ft
Vibration	RTCA DO-160F, Section 8, Categories U2 and S, Curves C, F, F1, L, M and Y

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10-3003-X

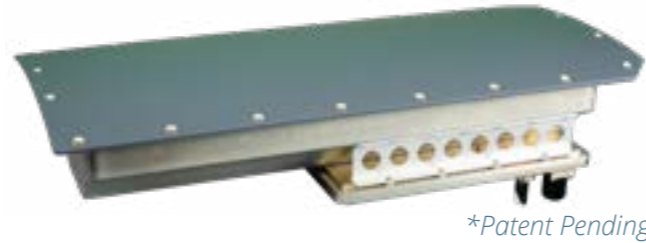
CHELTON

Conformal Tuneable U/VHF Antenna

30-400 MHz

Key features:

- Fully conformal
- Lightning protection
- Equivalent performance to 9 inch passive blade
- Suitable for supersonic applications



*Patent Pending

Antenna types 10-3003-1 and 10-3003-2 are multiband conformal tuneable antennas designed for fast jets to provide communications in the frequency range from 30 MHz to 400 MHz (with unused frequency gaps in the bands: 88 - 108 MHz and 174 - 225 MHz).

The antennas are compatible with Chelton's logic units that are capable of providing an interface to current fast frequency-hopping radios and, as a system, are capable of meeting the tuning times with modes such as Havequick II and Saturn.

The exact dimensions of the conformal antennas that have been developed are customer specific and the suffix that takes the place of the -X in the part number defines the specific antenna. These antennas cover the VHF and UHF band from 30 to 400 MHz (with future extension to 512 MHz) and require an Antenna Switching Unit (ASU) to power and control them.

**Please note, these antennas are conformal and so will be dependent and individual to the needs of each aircraft.*

ELECTRICAL

Frequency	30-400 MHz
Power Handling	
Impedance	50 Ω
VSWR	30 - 88 MHz < 2.5:1 (return loss > 7.36 dB) 108 - 174 MHz < 2.5:1 (return loss > 7.36 dB) 225 - 400 MHz < 2.5:1 (return loss > 7.36 dB)
Gain	30MHz > -29dBi 400 MHz > 0dBi
Polarisation	Vertical

MECHANICAL

Dimensions (LxWxH)	Bespoke
Weight	Bespoke
Connector	TNC Female

ENVIRONMENTAL

Continuous Operating Temperature	Bespoke
----------------------------------	---------

10-3003-X

CHELTON

Conformal Tuneable U/VHF Antenna

30-400 MHz

Key features:

- Fully conformal
- Lightning protection
- Equivalent performance to 9 inch passive blade
- Suitable for supersonic applications



*Patent Pending

Antenna types 10-3003-1 and 10-3003-2 are multiband conformal tuneable antennas designed for fast jets to provide communications in the frequency range from 30 MHz to 400 MHz (with unused frequency gaps in the bands:

88 - 108 MHz and 174 - 225 MHz). The antennas are compatible with Chelton's logic units that are capable of providing an interface to current fast frequency-hopping radios and, as a system, are capable of meeting the tuning times with modes such as Havequick II and Saturn.

The exact dimensions of the conformal antennas that have been developed are customer specific and the suffix that takes the place of the -X in the part number defines the specific antenna. These antennas cover the VHF and UHF band from 30 to 400 MHz (with future extension to 512 MHz) and require an Antenna Switching Unit (ASU) to power and control them.

**Please note, these antennas are conformal and so will be dependent and individual to the needs of each aircraft.*

ELECTRICAL

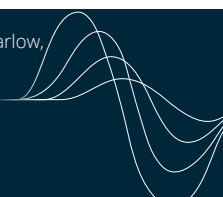
Frequency	30-400 MHz
Power Handling	
Impedance	50 Ω
VSWR	30 - 88 MHz < 2.5:1 (return loss > 7.36 dB) 108 - 174 MHz < 2.5:1 (return loss > 7.36 dB) 225 - 400 MHz < 2.5:1 (return loss > 7.36 dB)
Gain	30MHz > -26dBi 400 MHz > +1dBi
Polarisation	Vertical

MECHANICAL

Dimensions (LxWxH)	Bespoke
Weight	Bespoke
Connector	TNC Female

Standards

Environmental	DO-160
Continuous Operating Temperature	Bespoke



Chelton has a wide portfolio of airborne communication antennas for a variety of applications including Defence, Security and Commercial.



2 Communication Passive Antennas

About.

Once established as a leader in static dischargers, Chelton set its sights on the conquering the world of antenna aircrafts.

After learning British army helicopters were experiencing failure rates with their Ultra High Frequency blade antennas, Chelton saw a market niche and acted quickly designing its first self-complete communications antenna for military use. These pilot-proof antennas exceeded expectations and performed where their predecessors couldn't.

Time and time again, Chelton's antennas continued to outperform its competition thanks to its low drag, high strength-to-weight ratio and excellent signal sensitivity.

Today, its portfolio of Passive Antennas continues to expand with aircraft solutions across a number of different frequencies.

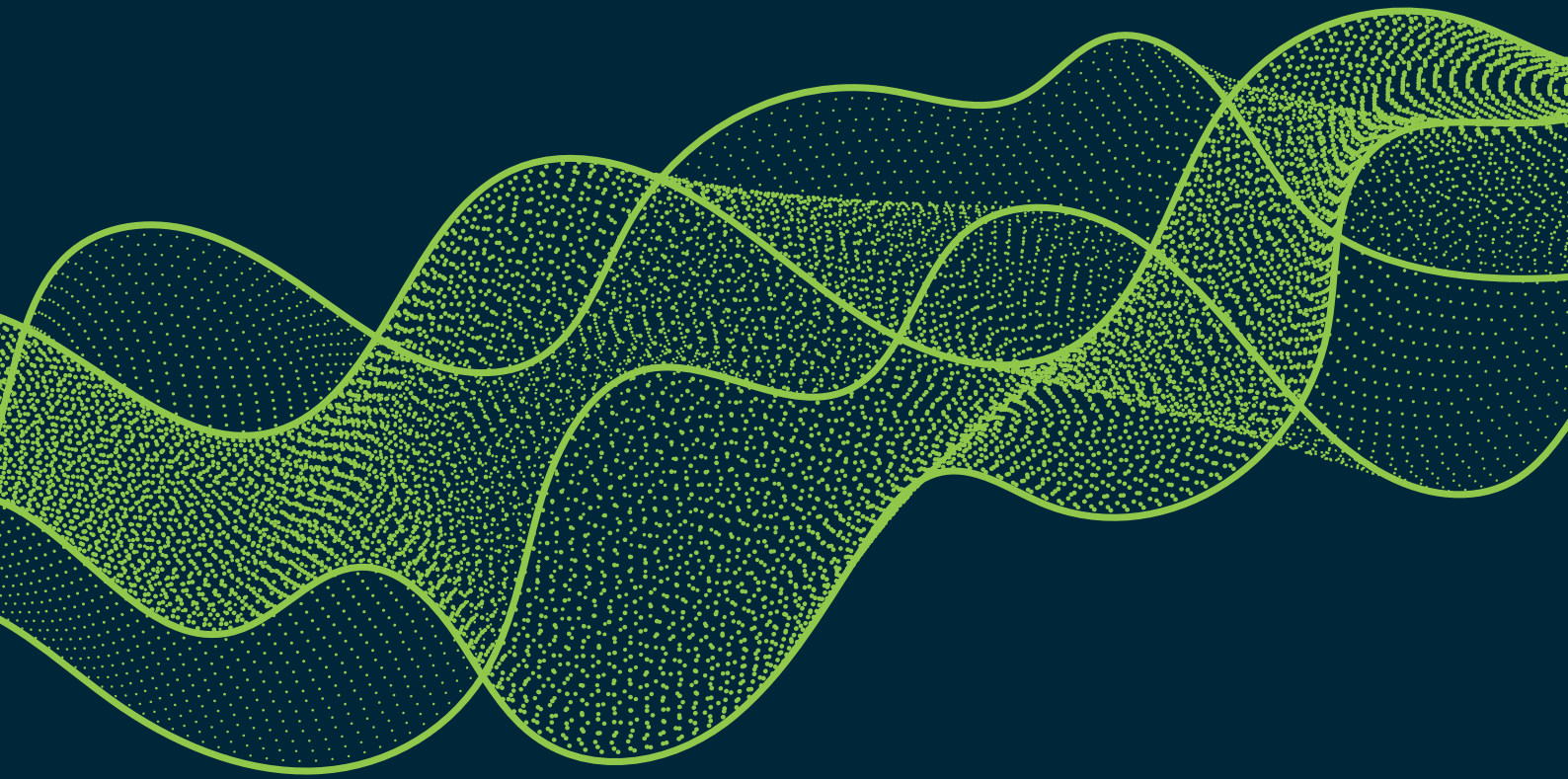
Passive Antennas Quick Reference Table

Frequency Category	Part Number	Description	Frequency MHz	Configuration	Height (inches)
VHF	19-415	VHF array	30-88	Towel Antenna Array	5.25
VHF	9-33-32	VHF array	116-174	High Speed Blade	9.5
VHF	16-21 Series	Lightweight low profile VHF antenna	118-136	Top Loaded Blade	Various
UHF	16-1	Comm/Nav UHF antenna	225-400	Blade	9.1
UHF	16-3	UHF antenna	225-450	Blade	9.1
UHF	16-11	UHF antenna	225-400	Raked Blade	8.2
UHF	16-16	UHF antenna	320-670	Raked Blade	6.7
UHF	16-39	Upper UHF antenna	400-1000	Blade	5.25
UHF	21-174	TETRA antenna	380-400 410-430	Whip	8.13
UHF SATCOM/ MUOS	19-4001	UHF SATCOM antenna	Communications and Low Angle UHF SATCOM: 30 - 512 High Angle UHF SATCOM: 240 - 400	Satellite	8.2
UHF SATCOM/ MUOS	19-430-10	UHF SATCOM antenna	Communications and Low Angle UHF SATCOM: 30 - 400 High Angle UHF SATCOM: 225 - 400	Satellite	8.2
UHF SATCOM/ MUOS	19-440	V/UHF comms and UHF SATCOM antenna	Communications and Low Angle UHF SATCOM: 30 - 400	Satellite	8.25
UHF SATCOM/ MUOS	19-440-10	V/UHF comms and UHF SATCOM antenna	High Angle UHF SATCOM: 240 - 400	Satellite	8.25
UHF SATCOM/ MUOS	19-450-10	UHF SATCOM and GPS antenna	UHF Low and High Angle SATCOM: 225 - 400 GPS: 1565 - 158 (L1) and 1217 - 123 (L2)	Satellite	9
UHF SATCOM/ MUOS	19-470-10	V/UHF SATCOM and GPS antenna	Communications and Low Angle UHF SATCOM: 30 - 400 High Angle UHF SATCOM: 240 - 400 GPS: 1565 - 1586 (L1) and 1217 - 1238 (L2)	Satellite	9
Wideband/ Multiband	20-200-20	VHF/L-BAND antenna	118-156 960-1220	Raked Blade	12.3
Wideband/ Multiband	16-113	UHF/L antenna	225-400 960-1220	Blade	7.95
Wideband/ Multiband	9-33-30	V/UHF, L BAND antenna	30 - 512 950 - 1250	Blade	13
Wideband/ Multiband	12-512	V/UHF antenna	30-512	Blade	16.2
Wideband/ Multiband	12-231	V/UHF antenna	30-512	Blade	14.7
Wideband/ Multiband	9-33-26	V/UHF antenna	30-512	Blade	6.3
Wideband/ Multiband	12-59	V/UHF antenna	30-400	Blade	9.05
ELT	25-1000	Tri-band ELT antenna	121.5/243/406	Whip	17.08
Datalink	10A2	L-band antenna	960-1220	Blade	2.23
Datalink	10A29-22	L-band antenna	960-1220	Blade	2.36
Datalink	10A5-1	L-band antenna	960-1220	Blade	2.24
Datalink	10-31	ECM	1-10 GHz	Blade	1.53

2

Communication

Passive VHF Antennas



VHF/FM Antenna Array

30-88 MHz



The 19-415 is an electrically short, high efficiency antenna, consisting of two glass reinforced plastic composite masts surmounted by an aluminium top loading. The antenna covers the VHF band 30 MHz to 88 MHz.

The **19-415** is a top loaded monopole.

The top loading is fed via a gain enhancing reactive circuit and a resistive loading network to improve the radiation performance at lower frequencies while maintaining a good match response over the whole frequency band.

The **19-415** array consists of two pressure moulded grp masts of aerodynamic form. Each mast is fitted with an aluminium alloy base plate. The lead-in mast houses an electronics assembly and is fed via a TNC female connector.

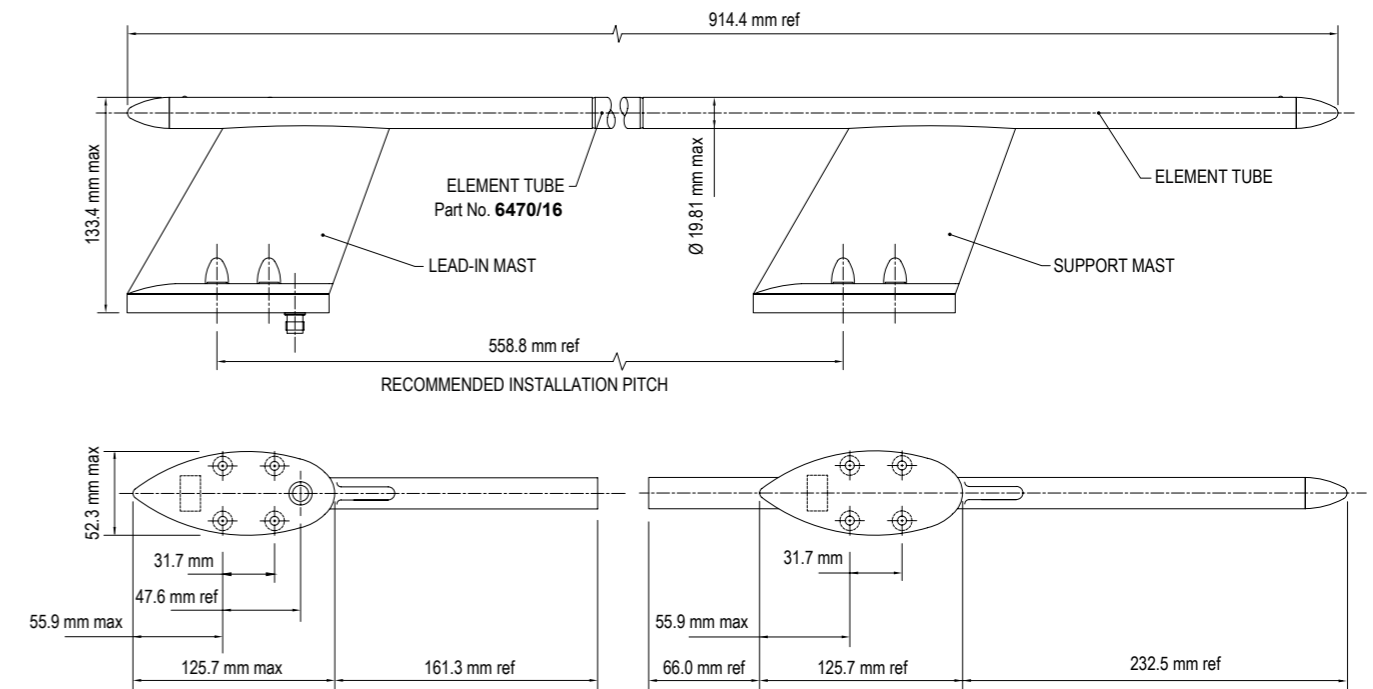
The masts are surmounted by stainless steel top tubes which are joined via a separate length of stainless steel tubing to create a 914.4 mm (36 inch) long element. Both masts are foam filled to prevent long term moisture ingress.

ELECTRICAL

Frequency	30-88 MHz	
Power Rating	50 W cw (maximum)	
Gain	Gain	Frequency
	≥ -25 dBi	30 MHz
	≥ -10 dBi	88 MHz
Polarisation	Essentially vertical when mounted vertically	
Impedance	50 ohm (nominal)	
VSWR	2.5:1 (maximum)	
Radiation	Nominally omnidirectional in Azimuth	
Connector	TNC Type Female	

VHF/FM Antenna Array

30-88 MHz



MECHANICAL

Dimensions (mm)	133.3 x 914.4 x 52.3 (maximum)
Weight (kg)	1.0 (maximum)
Mounting	8 holes fixed location

ENVIRONMENTAL

Temperature	Operational Continuous:	-54°C to +55°C
	Operational Continuous:	-54°C to +55°C
	Storage:	-57°C to +85°C
Altitude	15240 m	
Shock	Functional:	20 g, 11 ms, sawtooth
	Crash Safety:	40 g, 11 ms, sawtooth
Vibration	MIL-STD-810E, Method 514.4, Categories 4 (Propeller Aircraft and Turbine Engines) and 6 (Helicopter)	
Temperature Shock	+10°C per minute between operational limits	
Rain	Normal operation when exposed to blowing rain	
Humidity	Normal operation with relative humidity up to 95% throughout the operational temperature range	
Salt Fog	The equipment shall not be degraded by salt exposure up to 48 hours at 5% salinity	
Magnetic Effect	Less than 1° deflection at 300 mm	

General applications environment MIL-T-5400 Class 1.
Qualification and verification to MIL-STD-810 applicable methods and procedures

9-33-32

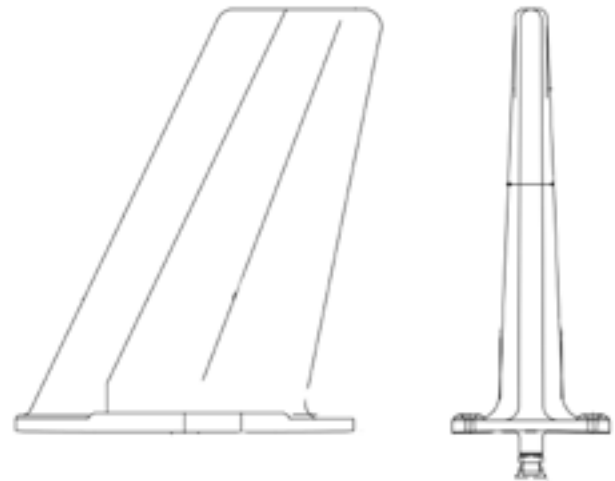
CHELTON

VHF Antenna

116-174 MHz

Key features:

- High speed blade antenna
- Provides communications over 116-174 MHz band
- High strength, temperature and pressure moulded composite blade



The 9-33-32 is a VHF passive blade antenna designed to operate over the frequency range of 116 MHz - 174 MHz. The antenna is primarily intended for use in general airborne applications.

It is configured as a broadband radiating element fed via reactive matching to optimise the gain and frequency depending loading to ensure VSWR compliance.

The 9-33-32 comprises a high strength, high temperature, pressure moulded composite blade of aerofoil section which supports the radiating element. This is mounted on an aluminium alloy baseplate which houses the matching circuitry and supports a single RF connector.

ELECTRICAL

Frequency	116-174 MHz
Power Handling	45W max
Impedance	50 Ω
VSWR	116 - 169.99 MHz < 2.5:1 170 - 174 MHz < 1.8:1
Gain	≥-14 dBi @ 116 MHz ≥-10 dBi @ 130 MHz ≥-7 dBi @ 150 MHz ≥-4 dBi @ 174 MHz
Polarisation	Vertical

MECHANICAL

Dimensions (LxWxH)	215.9 x 92.2 x 241.3 mm
Weight	1.5 kg
Connector	TNC Female

ENVIRONMENTAL

Continuous Operating Temperature	- 62°C Min + 71°C Max
Altitude	60,000 ft
Vibration	MIL-STD-810B, Method 514.1, Proc I modified



VHF Antenna

118-137 MHz

Antenna type 16-21 is a lightweight, low profile VHF antenna designed to operate with radio transmitters, receivers and transceivers operating in the frequency range 118 MHz to 137 MHz. The antenna is intended for use in general subsonic airborne applications.

Construction is of a one-piece glass fibre moulding of raked aerodynamic form with a stainless steel leading edge. The carbon composite top-loading tube enables the antenna to withstand greater vibration loads.

The vertical fan element is fed via a tuned circuit to enhance gain at 30 MHz, and a frequency dependent resistive pad network provides acceptable match at lower VHF frequencies.

Alternative types of RF connector (TNC or BNC) are available.



ELECTRICAL

Frequency	118-137 MHz
Power Handling	
Gain	-1 dBi (minimum) 118 MHz - 136 MHz -2 dBi (minimum) 136 MHz - 137 MHz
Polarisation	Predominantly vertical when mounted vertically
VSWR	≤ 2.5:1 118 MHz - 136 MHz ≤ 3.0:1 136 MHz - 137 MHz
Impedance	50 Ω
Radiation	Omnidirectional in azimuth (nominal) Elevation as 1/4 monopole (nominal)
Connector	BNC or TNC Male

MECHANICAL

Dimensions (LxWxH)	258.01 x 415.29 x 52.07 mm (maximum)
Weight	0.49 kg (maximum)
Mounting	6 holes fixed location

ENVIRONMENTAL

Temperature and Altitude	RTCA DO-160D, Section 4, Category C2 Operational: -55°C to +70°C Short Time: -55°C to +70°C Ground Survival: -55°C to +85°C Altitude: 10668 m
Temperature Variation	RTCA DO-160D, Section 5, Category A
Humidity	RTCA DO-160D, Section 6, Category C
Shock	RTCA DO-160D, Section 7, Category B 18 Shocks, 6 g, 11 ms 6 Shocks, 20 g, 11 ms 20 g, 3 s in 6 directions
Vibration	RTCA DO-160D, Section 8, Category S Curves L and M combined
Explosion Proofness	Explosion Proofness
Waterproofness	RTCA DO-160D, Section 10, Category R
Fluids Susceptibility	RTCA DO-160D, Section 11, Category F
Sand and Dust	RTCA DO-160D, Section 12, Category X
Fungus	RTCA DO-160D, Section 13, Category F
Salt Spray	RTCA DO-160D, Section 14, Category X
Magnetic Effect	RTCA DO-160D, Section 15, Zone Z





2 Communication

Passive UHF Antennas

16-1

UHF Broadband Antenna
225 - 400MHz

ELECTRICAL

Frequency	225-400 MHz
Power Handling	40 W cw
Impedance	50 ohm nominal
VSWR	≤ 2.0:1
Radiation	Nominally omnidirectional in azimuth
Gain	4 dBi minimum
Gain Variation	±1.5 dB across the frequency band
Polarisation	Essentially vertical when mounted vertically
Connector	N Type Female

MECHANICAL

Dimensions (LxWxH)	232 x 121 x 52mm (maximum)
Weight	6 kg (maximum)
Side Load Strength	135 N.m base bending moment unfactored
Mounting Configuration	6 holes fixed location

CHELTON

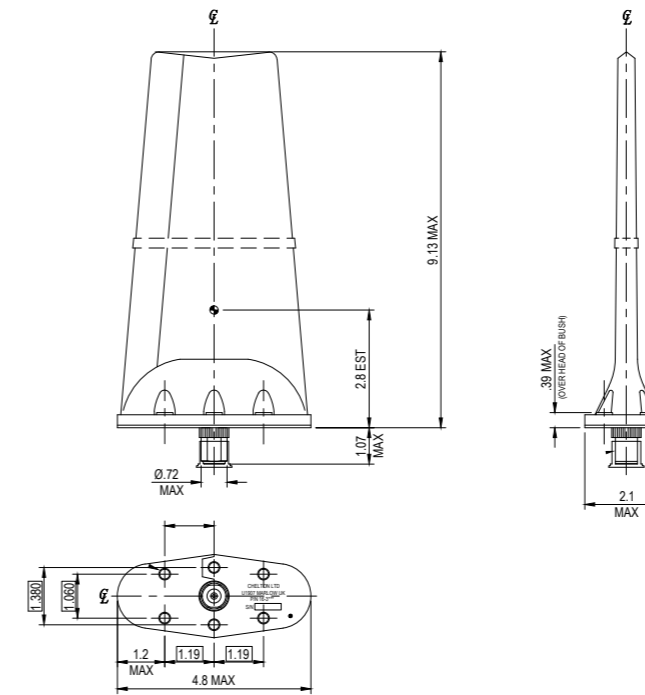
ENVIRONMENTAL

Temperature	MIL-STD-810E, Method 502.3, Proc II Survival Range: -62°C to +90°C Normal Operational: -40°C to +70°C Occasional Operational: -62°C to +85°C
Altitude	Operational: 4572 m Storage: 15240 m
Vibration	BS 3G 100, Pt 2, Sect 3:3:1, Region A, Cat 5
Acceleration	BS 3G 100, Pt 2, Sect 3:3:6 Normal Operation: Class 1A (i) (17 g) Crash Condition: Class 11 (25.5 g)
Humidity, Temperature and Pressure	BS 3G 100, Pt 2, Sect 3:3:2
Tropical Exposure	BS 3G 100, Pt 2, Sect 3:3:7
Mould Growth	BS 3G 100, Pt 2.1 J, 1985
Mould Growth	BS 3G 100, Pt 2.1 J, 1985
Salt Mist	BS 3G 100, Pt 2, Sect 3:3:8, Severity 2
Fluid Contamination	BS 3G 100, Pt 2, Sect 3:3:12
Dust and Sand	DEF STAN 07-55, Pt 2, Sect 4/1, Grade B
Waterproofness	BS 3G 100, Pt 2, Sect 3:3:11, Grade A
Magentic Influence	BS 3G 100, Pt 2, Sect 2
Explosion-proofness	BS 3G 100, Pt 2, Sect 3:3:5
Shock	BS 2011, Pt 2.1 Ea

Note: Antenna also tested to EUROCAE ED-14 / RTCA DO-160C. Criteria available on request.

16-3

Wideband UHF Blade Antenna
225 - 450MHz



The 16-3 is a UHF blade antenna designed to provide communications over the frequency range 225-450 MHz and intended for use in general airborne applications.

The 16-3 comprises a pressure moulded composite blade of aerofoil section upon which is deposited the radiating element. The structure is fed via matching circuitry housed within the blade. The antenna is enclosed at the base by an aluminium alloy baseplate which supports the RF connector.

CHELTON

ELECTRICAL

Frequency	225-450 MHz
Power Handling	40 W c.w. max
Impedance	50 ohm
Polarisation	Vertical
Radiation	Omnidirectional
VSWR	≤ 2 :1 225-400 MHz ≤ 2.5:1 400-450 MHz
Gain	+2 dBi min, +4 dBi typical

MECHANICAL

Dimensions (LWH)	122 x 54 x 232 mm 4.8 x 2.1 X 9.13 "
Max Weight	0.6 kg (1.32 lb)
Connectors	Type N Female
Mounting	6 holes fixed location (M5)

ENVIRONMENTAL

Qualification	MIL-E-5400T Class 2, MIL-STD-810
Temperature	-54°C to +71°C
Altitude	70,000 ft
Acceleration	13.5 g all axes
Mechanical Shock	11 ms, 20 g terminal sawtooth functional 11 ms, 40 g terminal sawtooth crash safety
Vibration	MIL-STD-SIOE, Method 514.4, Proc I, Cat 5
Rain	Normal operation when exposed to driving rain
Humidity	95% relative humidity at 60°C
Salt Mist	48 hours exposure to 5% salt solution
Mag!etic Effect	Less than 1° deflection at 300 mm

UHF Broadband Antenna

225 - 400MHz

Type 16-11 is a broadband, UHF, blade antenna for transmission and reception of communications/navigation signals over the frequency band 225 MHz to 400 MHz.

The antenna can be used singly or in matched pairs on high speed aircraft, particularly where minimal aerodynamic drag is required.

The antenna is a sleeved unipole, with radiating elements surface coated onto a solid, dielectric, support structure. The antenna is protected externally by coats of polyurethane or epoxy paint.



ELECTRICAL

Frequency	225 MHz - 400 MHz
Power Handling	35 W cw
Impedance	50 ohm (nominal)
VSWR	≤ 3.0:1 225 MHz - 235 MHz ≤ 2.0:1 236 MHz - 400 MHz
Radiation	Nominally omnidirectional in azimuth
Gain	> 0 dBi on 9.75 m (nominal) groundplane
Polarisation	Predominantly vertical when mounted vertically
Connectors	N Type Female

MECHANICAL

Dimensions (mm)	208.28 x 196.85 x 53.34 (maximum)
Weight (kg)	0.45 (maximum)
Mounting Configuration	6 holes fixed location

ENVIRONMENTAL

Temperature / Altitude	BS 3G 100, Pt 2, Sect 3:3:2, Grade F1 (modified)
Temperature	Normal Operational: -54°C to + 70°C Occasional Operational: -54°C to +105°C Survival Range: -62°C to + 90°C
Altitude	15240 m
Vibration	BS 3G 100, Pt 2, Sect 3.3.1 MIL-STD-810E, Method 514.4, Proc I, Cats 4, 5 and 6
Shock	MIL-STD-810E, Method 516.4, Procs I and V
Acceleration	BS 3G 100, Pt 2, Sect 3:3:2, Paras 7.2.1 and 7.3.1
Tropical Exposure	BS 3G 100, Pt 2, Sect 3:3:7
Mould Growth	BS 3G 100, Pt 2.1 J, 1985
Salt Mist	BS 3G 100, Pt 2, Sect 3:3:8, Severity 2
Fluid Contamination	BS 3G 100, Pt 2, Sect 3:3:12
Waterproofness	BS 3G 100, Pt 2, Sect 3:3:11
Magentic Influence	BS 3G 100, Pt 2, Sect 2



16-16

Broadband UHF Raked Blade Antenna

320 - 670MHz

Key features:

- Raked for low drag
- Lightweight
- N Type and TNC connector options

The 16-16 is a broadband raked blade antenna designed to provide communications and telemetry in the frequency band 320 MHz to 670 MHz, and intended for use in general subsonic airborne applications.

ELECTRICAL

Frequency	320-670 MHz
Power Handling	50W max
Impedance	50 Ω
VSWR	320 MHz to 360 MHz > 6.0 dB (VSWR < 3.0:1) 360 MHz to 380 MHz > 9.5 dB (VSWR < 2.0:1) 380 MHz to 520 MHz > 12.7 dB (VSWR < 1.6:1) 520 MHz to 580 MHz > 9.5 dB (VSWR < 2.0:1) 580 MHz to 670 MHz > 6.0 dB (VSWR < 3.0:1)
Gain	> 0 dBi
Polarisation	Vertical
Radiation	Omnidirectional

MECHANICAL

Dimensions (LxWxH)	183 x 52 x 170 mm
Height Above Base	170 mm
Mass	0.4 kg
Connector	N Female, TNC
Platform(s)	Air

Standards

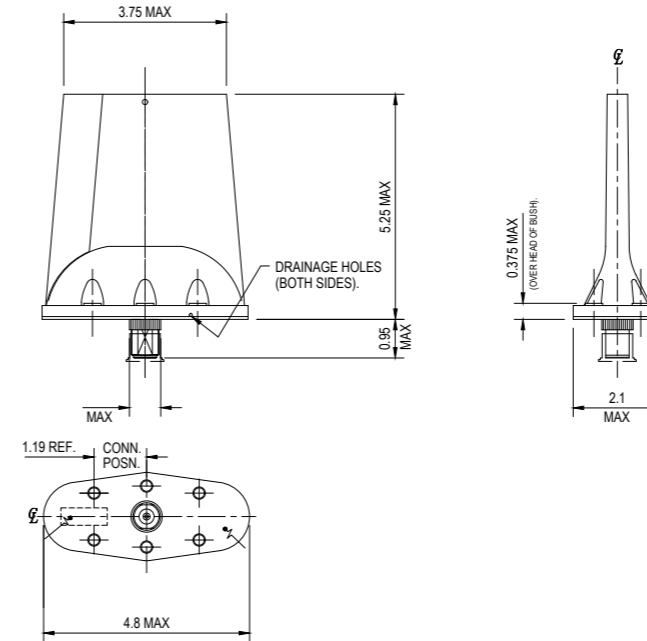
Continuous Operating Temperature	- 54°C Min + 71°C Max
Altitude	50000 ft
Vibration	MIL-STD-810E, Method 514.4, Proc I, Cat 5.

CHELTON

16-39

Passive Blade Antenna

400MHz - 1GHz



Key features:

- One piece shell for high strength
- Aerodynamically efficient blade
- Suitable for A2A & A2G communication and datalink applications

The 16-39 Antenna is a passive linearly polarised blade antenna, designed to provide communications over the frequency band 400 MHz to 1000 MHz. The radiating element consists of a broadband, susceptance corrected monopole antenna.

The 16-39 is an aerodynamically efficient blade of robust construction with high radiation efficiency in the band 400 MHz to 1000 MHz. It is useful for air to air, air to ground and communications and datalink applications where link budget considerations are paramount.

CHELTON

ELECTRICAL

Frequency	400-1000 MHz
Power Handling	50 W CW max
Impedance	50 Ω
Polarisation	Vertical
Radiation	400 MHz to 450 MHz >3.5 dB (<5:1) 450 MHz to 500 MHz >6.0 dB (<3:1) 500 MHz to 1000 MHz >9.5 dB (<2:1)
VSWR	Azimuth: Nominally Omnidirectional Elevation: As Monopole
Gain	> 0 dBi

MECHANICAL

Dimensions (LWH)	133.4 x 122 x 53.3 mm 5.25 x 4.8 x 2.1 "
Max Weight	0.34 kg (0.75 lb)
Connectors	Type N Female
Mounting	6 holes fixed location

ENVIRONMENTAL

Qualification	RTCA DO-160D, BS 3G100
Temperature	-40°C to +55°C
Altitude	50,000 ft
Acceleration	Normal: Grade C, Class 1A, 17 g Crash: Grade G, Class 11, 25.5 g
Vibration	MIL-STD-810C, Method 514.2, Category b2 Functional: Wo = 0.07 g ² /Hz Operational: Wo = 0.15 g ² /Hz
Solar Radiation	MIL-STD-810D, Method 505.2, Procedure II
Humidity	95% at 30°C
Explosion Proofness	RTCA DO-160D, Section 9, Environment II, Category E Site and 15,000 feet
Magnetic Effect	RTCA DO-160E, Section 15, Category Z



21-174

TETRA Antenna

380-400MHz, 410-430MHz

The 21-174 is a UHF whip antenna designed to operate over the frequency ranges 380 MHz to 400 MHz and 410 MHz to 430 MHz in general subsonic airborne applications.

The antenna comprises a composite, sleeved, monopole, mounted within a die cast aluminium housing, which contains the fixing holes and the RF connector. The assembly is foam filled for optimum environmental integrity.



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ELECTRICAL

Frequency	380-400 MHz 410-430 MHz
Power Handling	10W CW max
Gain	≥ +3 dBi
VSWR	≤ 2.0:1
Polarisation	Predominantly vertical (when mounted vertically)
Radiation Pattern	Essentially omnidirectional in azimuth. Nominally as $\lambda/4$ monopole in elevation.
Impedance	50 Ω
Connector	Type TNC Female

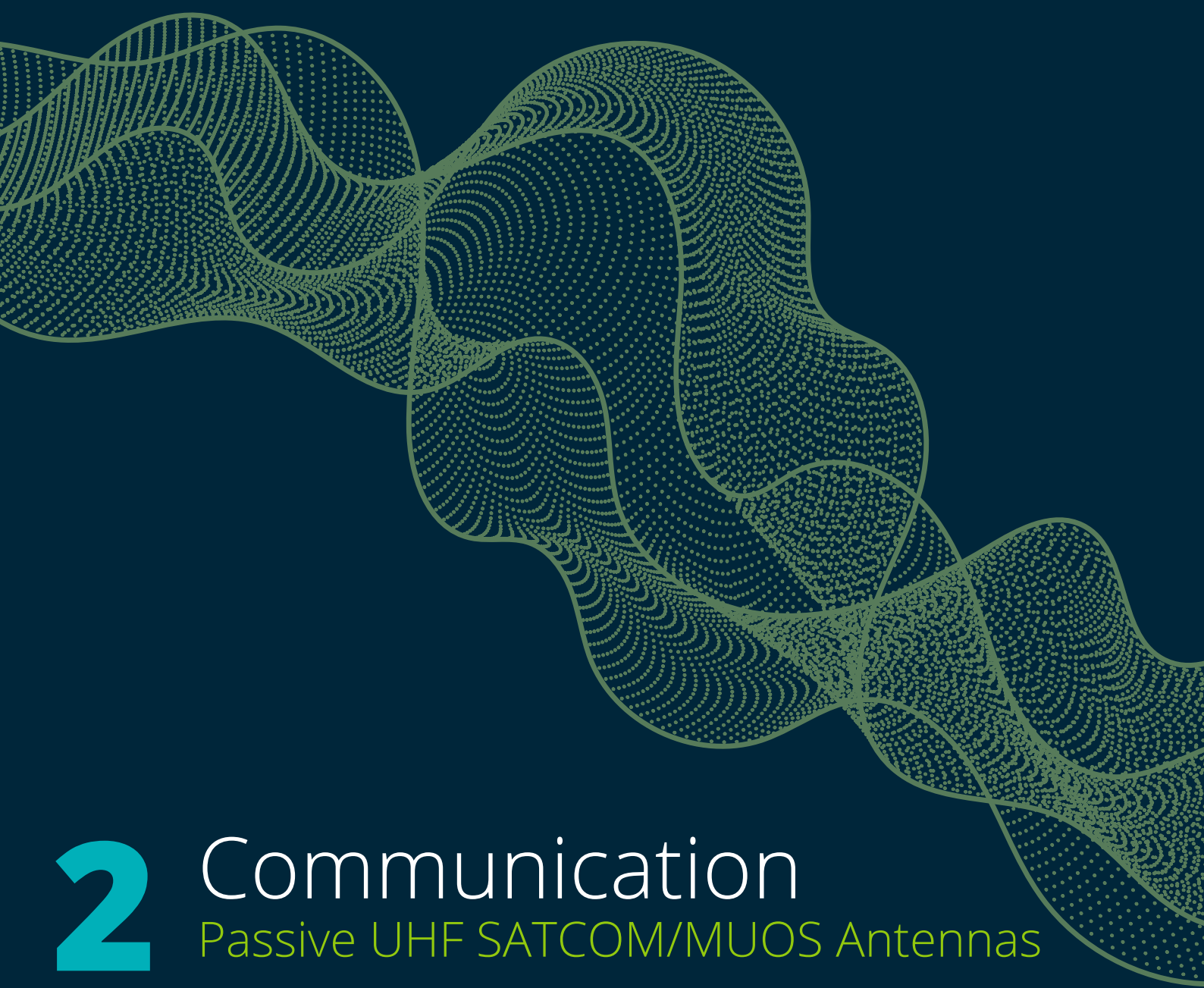
ENVIRONMENTAL

Temperature and Altitude	RTCA DO-160C, Sec 4, Cat D2
Temperature Variation	RTCA DO-160C, Sec 4, Cat D2
Humidity	RTCA DO-160C, Sec 6, Cat C
Operational Shocks and Crash Safety	RTCA DO-160C, Sec 7, Paras 7.2 and 7.3
Vibration	RTCA DO-160C, Sec 6, Cat C
Explosion Proofness	RTCA DO-160C, Sec 9, Cat X
Waterproofness	RTCA DO-160C, Section 10, Category R
Fluids Susceptibility	RTCA DO-160C, Sec 11, Cat F
Sand and Dust	RTCA DO-160C, Sec 12, Cat X
Fungus Resistance	RTCA DO-160C, Section 13, Category X
Salt Spray	RTCA DO-160C, Section 14, Category X
Magnetic Effect	RTCA DO-160C, Section 15, Class Z
Lightning Induced Transient Susceptibility	RTCA DO-160C, Sec 22, Cat XXXX
Lightning Direct Effects	RTCA DO-160C, Sec 23, Cat X
Icing	RTCA DO-160C, Sec 24, Cat X

Mechanical Specification

Dimensions (mm)	206.5 x 91.5 x 53.3 (maximum)
Weight (kg)	0.19 (maximum)
Mounting	3 holes fixed location





2

Communication

Passive UHF SATCOM/MUOS Antennas

19-4001

CHELTON

UHF SATCOM Antenna

Low Angle 30-512MHz

High Angle 240-400MHz

Key features:

- Combined broadband V/UHF
- Enables LOS and BLOS
- Low profile



The 19-4001 is a combined broadband VHF/UHF communications and UHF satellite communications antenna. It covers the frequency bands 30-88 MHz and 108-174 MHz for communications, 225-400 MHz for Line-of-Sight (LOS) and Beyond Line-of-Sight (BLOS) satellite communications, and 400-512 MHz for Special UHF requirements.

In addition, the antenna maybe used for either UHF communications or LOS UHF satellite communications (but not both simultaneously) purposes as required.

The antenna is low profile in construction and is designed for general airborne application in high temperature environments.

ELECTRICAL

Frequency	30-512 MHz 240-400 MHz
Power Handling	30 - 88 MHz 50W max 108 - 174 MHz 50W max 225 - 512 MHz 200W max
Impedance	50 Ω
VSWR	30 - 512 MHz < 2.5:1 240 - 400 MHz < 2.0:1
Gain	30 MHz: ≥-26 dBi 88 MHz: ≥-15 dBi 118-174 MHz: ≥-6.5 dBi (average full band) 225-512 MHz: ≥ 0 dBi (average full band)
Polarisation	Vertical

MECHANICAL

Dimensions (LxWxH)	403.9 x 92.86 x 208.3 mm
Weight	3.7 kg
Connector	TNC Female

ENVIRONMENTAL

Continuous Operating Temperature	- 40°C Min + 120°C Max
Altitude	50,000 ft



19-430-10

UHF SATCOM Antenna

Low Angle 30-400MHz

High Angle 225-400MHz

The 19-430-10 UHF SatCOM Antenna is a combined low-high angle, low weight, high efficiency airborne UHF satellite communications antenna operating in the 225 MHz - 400 MHz frequency band.

The antenna provides essentially hemispherical pattern coverage by means of two independent collocated elements built into a single, aerodynamic shell.

A variant of the 19-430-10, the 19-430-10N, offers alternative types of connector.

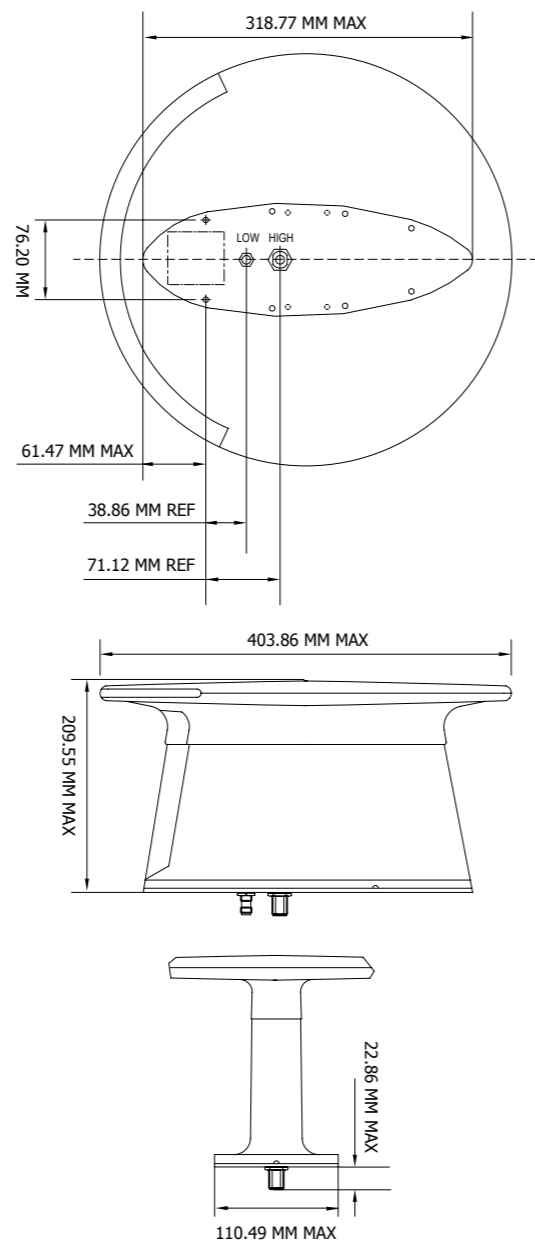
The 19-430-10 comprises two independent elements:

- A circularly polarised turnstile antenna comprising a pair of quadrature connected broadband horizontal crossed dipoles, fed via a pair of broadband baluns. The antenna is polarised Right Hand Circular (RHCP) according to IEEE definition. RHCP is interpreted as clockwise circular polarisation approaching an observer.
- A vertically polarised, reactively matched, broadband sleeved monopole.

Low angle coverage is provided by the vertical element and high angle coverage is provided by the circularly polarised element. In this way, essentially full hemispherical coverage is achieved over the specified operating band.

The 19-430-10 utilises a one-piece, vertical, shell moulded under heat and pressure for

CHELTON



19-430-10

UHF SATCOM Antenna

Low Angle 30-400MHz

High Angle 225-400MHz

high strength and resistance to moisture ingress.

The horizontal element is contained within a circular, fibreglass, moulding which is securely and permanently fitted to the vertical shell.

An aluminium alloy base plate provides for fixing the antenna to the airframe. Careful design of internal ribs and base-to-shell load transfer ensures very high side loading acceptance.

ELECTRICAL

Frequency	30-400 MHz 225-400 MHz
Power Handling	200 W max
Gain	Low Angle: Average within 2 dB of a quarter-wave monopole (+4 dBi typical) High Angle: +4.5 dBiC minimum (average full band) at zenith (+6 dBiC typical at zenith)
Polarisation	Low Angle: Essentially vertical when mounted vertically High Angle: Predominantly RHCP at zenith
Impedance	50 Ω
VSWR	Low Angle: 2.0:1 max High Angle: 2.0:1 max
Isolation	≥ 20 dB (mid-band)
Connectors	Type Low Angle High Angle 19-430-10 TNC Type Female N Type Female 19-430-10N N Type Female N Type Female

MECHANICAL

Dimensions	H 209.55, W 403.86 mm
Weight	3.4 kg
Mounting	8 holes fixed location

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ENVIRONMENTAL

High Temperature	MIL-STD-810D, Method 501.2, Procedures I and II Operational: +71°C Storage: +85°C
Low Temperature	MIL-STD-810D, Method 502.2, Procedures I and II Operational: -54°C Storage: -57°C
Altitude	MIL-STD-810D, Method 500.2, Procedure II 50,000 feet
Acceleration	MIL-STD-810E, Method 513.4, Procedure I 13.5 g all axes
Shock	MIL-STD-810E, Method 516.4, Procedures I and V Functional: 20 g, 11 ms, sawtooth Crash Hazard: 40 g, 11 ms, sawtooth MIL-STD-810C, Method 516.2, Procedure I Functional: 15 g, 11 ms, half sine
Vibration	MIL-STD-810E, Method 514.4, Procedure I, Category 4 0.01 g ² /Hz, 15 Hz - 2000 Hz, L1 = 0.6 g ² /Hz at 68 Hz MIL-STD-810E, Method 514.4, Procedure I, Category 4 0.1 g ² /Hz, 15 Hz - 2000 Hz, L1 = 0.6 g ² /Hz at 95 Hz MIL-STD-810E, Method 514.4, Procedure I, Category 5 MIL-STD-810E, Method 514.4, Procedure I, Category 10
Temperature Shock	MIL-STD-810E, Method 503.3, Procedure I
Rain	MIL-STD-810C, Method 506.1, Procedure I Normal operation when exposed to driving rain
Humidity	MIL-STD-810C, Method 507.1, Procedure I 95% relative humidity at 60°C
Salt Fog	MIL-STD-810D, Method 509.2, Procedure I 48 hours exposure to 5% salt solution
Magnetic Effect	Less than 1° deflection at 300 mm

19-440

V/UHF Broadband and UHF SATCOM Antenna

Low Angle 30-400MHz

High Angle 240-400MHz

Key features:

- Enhanced gain at 30MHz
- Very high side load resistance
- Lightning protection

The 19-440-10 V/UHF Broadband and UHF SATCOM Antenna covers the frequency bands 30 MHz to 88 MHz and 108 MHz to 152 MHz for communications, and 240 MHz to 400 MHz for high angle satellite communications. In addition, the 19-440-10 may be used for either UHF communications or low angle UHF satellite communications (but not both simultaneously).

The 19-440-10 is low-profile in construction and intended for general airborne applications.

A variant of the 19-440-10, the 19-440-10N, offers alternative types of connector.

Low angle coverage is provided by the vertical element, and high angle coverage is provided by the circularly polarized element. In this way, essentially full hemispheric coverage is achieved for satellite communications.

The 19-440-10 utilizes a one-piece vertical shell moulded under heat and pressure for high strength and resistance to moisture ingress.

The horizontal element is contained within a circular fibreglass moulding, which is securely and permanently fitted to the vertical shell.

An aluminium alloy base plate provides for fixing the antenna to the airframe, and careful design of internal ribs and base-to-shell load transfer ensures very high side loading acceptance.

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ELECTRICAL

Frequency Range	
Low Angle	30 MHz-88 MHz 108 MHz - 152 MHz 225 MHz - 400 MHz
High Angle	240 MHz - 400 MHz
Power Handling	
Low Angle	30 MHz-88 MHz 50 W max 108 MHz-152 MHz 50 W max 225 MHz-400 MHz 200 W max
High Angle	240 MHz-400 MHz 200 W max
Gain	
Low Angle	30 MHz >-26 dBi 88 MHz >-15 dBi 108 MHz-118 MHz >-10 dBi * 118 MHz-152 MHz >-6.5 dBi * 225 MHz-400 >0 dBi *
High Angle	+5 dBiC minimum (average full band) at zenith
Polarisation	
Low Angle	Vertical
High Angle	Predominantly RHCP at zenith
Impedance	
Low Angle	50 Ω
VSWR	
Low Angle	2.5:1 max
High Angle	2.0:1 max
Isolation	
	≥ 15 dB (mid-band)

19-440

V/UHF Broadband and UHF SATCOM Antenna

Low Angle 30-400MHz

High Angle 240-400MHz

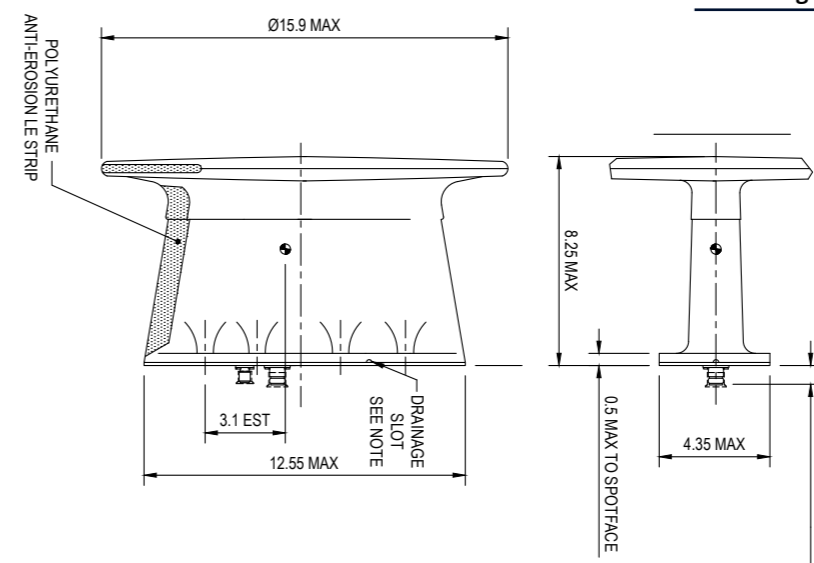
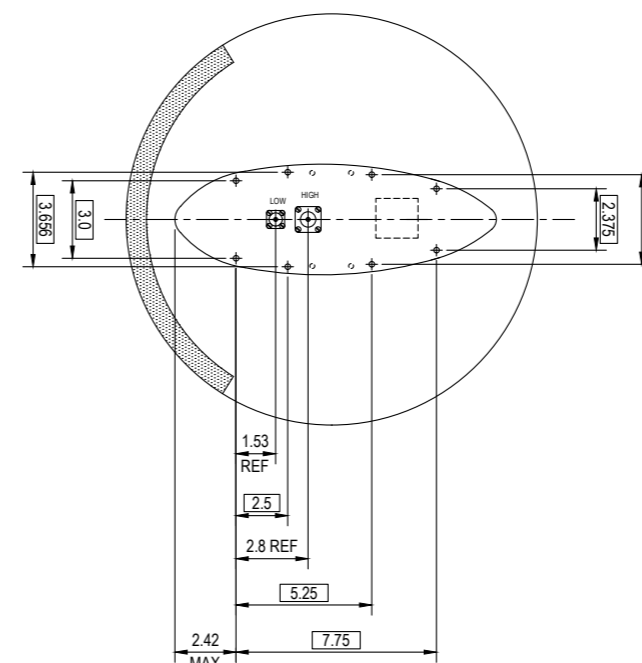
CHELTON

ENVIRONMENTAL

Operational Temperature	-54°C to +95°C
Temperature/Altitude	MIL-STD-810C, Method 504.1, Procedure I, Category 5
Acceleration	MIL-STD-810E, Method 516.4, Procedures I and V Functional: 20 g, 11 ms, sawtooth Crash Hazard: 40 g, 11 ms, sawtooth
Vibration	MIL-STD-810E, Method 514.4, Procedure I, Category 10
Temperature Shock	MIL-STD-810E, Method 503.3, Procedure I
Humidity	MIL-STD-810C, Method 507.1, Procedure I
Salt Fog	MIL-STD-810C, Method 509.1, Procedure I. 48 hours exposure to 5% salt solution
Dust (Fine Sand)	MIL-STD-810C, Method 510.1, Procedure I
Explosive Atmosphere	MIL-STD-810E, Method 511.3, Procedure I
Fungus	MIL-STD-810D, Method 508.3

MECHANICAL

Height	209.55 mm (8.25")	
Width	403.86 mm (15.9")	
Max Weight	3.65 kg (3.3 lbs)	
Connectors	19-440-10	19-440-10N
Low Angle	TNC Type Female	N Type Female
High Angle	N Type Female	N Type Female
Mounting	8 holes fixed location	



19-450

CHELTON

UHF and GPS SATCOM Antenna

UHF 225-400MHz

GPS 1565-1586MHz, 1217-1238MHz



The 19-450 UHF and GPS SatCOM Antenna is a combined UHF satellite communications and Global Positioning System (GPS) antenna. The antenna is low profile in construction and intended for airborne applications.

The UHF section provides essentially hemispherical satellite communications coverage. The GPS section provides nominal hemispherical coverage in the GPS L1 and L2 frequency bands to allow reception of microwave signals from a number of satellites.

A variant of the 19-450, the 19-450N, offers alternative types of connector.

The UHF section comprises two independent elements:

- A circularly polarized turnstile antenna comprising a pair of quadrature connected broadband horizontal crossed dipoles, fed via a pair of Roberts baluns. The antenna is polarized Right Hand Circular (RHCP) according to IEEE definition.
- A vertically polarized, reactively matched, broadband, folded monopole.

Low angle (0° to 35° nominal) coverage is provided by the vertical element, and high angle (35° to 90° nominal) coverage is provided by the circularly polarized element. In this way, essentially full

hemispheric coverage is achieved for satellite communications. Both elements are dc grounded to provide a degree of lightning protection.

The GPS section is a stacked patch arrangement giving right-hand circularly polarised radiation.

The 19-450 utilizes a one-piece vertical shell moulded under heat and pressure for high strength and resistance to moisture ingress.

The horizontal element is contained within a circular fibreglass moulding, which is securely and permanently fitted to the vertical shell.

An aluminium alloy base plate provides for fixing the antenna to the airframe. Careful design of internal ribs and base-to-shell load transfer ensures very high side loading acceptance.

The GPS element is mounted rigidly on the top face of the antenna.

19-450

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UHF and GPS SATCOM Antenna

UHF 225-400MHz

GPS 1565-1586MHz, 1217-1238MHz

ELECTRICAL

Frequency	225-400MHz 1565-1586MHz 1217-1238MHz		
Gain	Low Angle: Average within 2 dB of a quarter wave stub High Angle: +4.5 dBiC minimum (average full band) at zenith		
Polarisation	Low Angle: Essentially vertical when mounted vertically High Angle: Predominantly RHCP at zenith		
Power Rating	200 W max		
Impedance	50 Ω		
VSWR	Low Angle: 2:5:1 max High Angle: 2:0:1 max		
Isolation	≥ 15	dB Between Low and High Angle	
	≥ 30	dB Between Low Angle and GPS	
	≥ 30	dB Between High Angle and GPS	
Connectors	Type	Low Angle	High Angle
	19-450	TNC Type Female	N Type Female
	19-450N	N Type Female	N Type Female

MECHANICAL

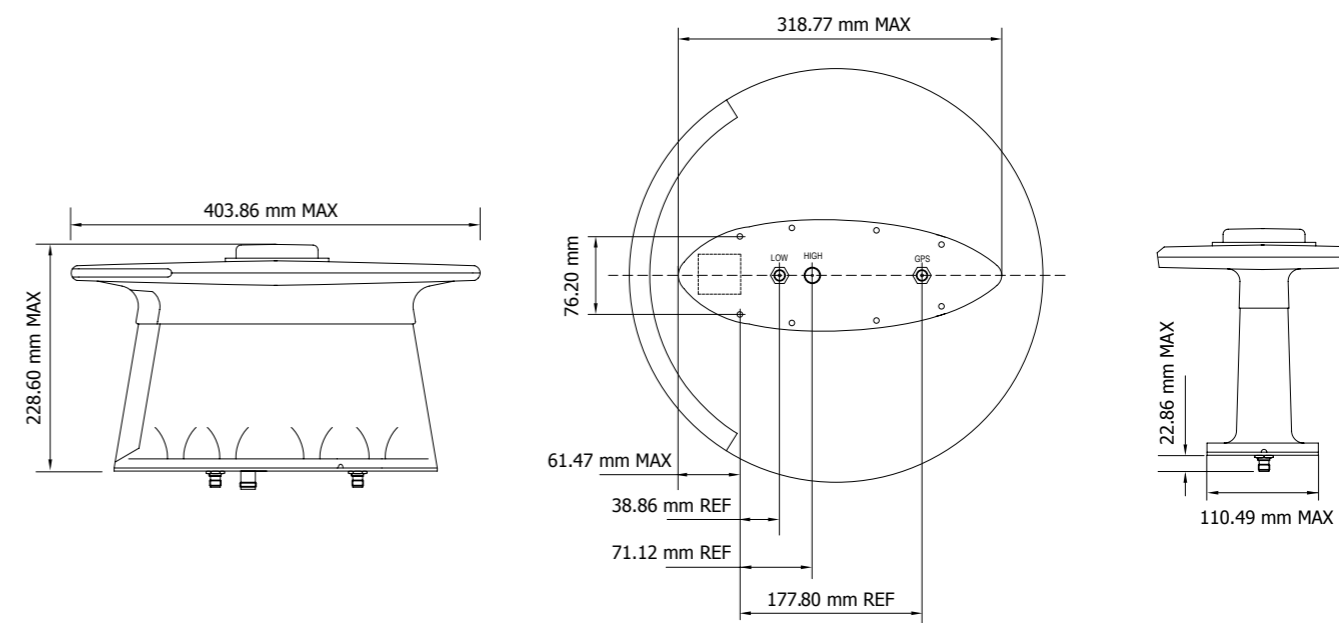
Dimensions	H 228.60 mm, W 403.86 mm
Weight	4 kg
Mounting	8 holes fixed location

ENVIRONMENTAL

High Temperature	MIL-STD-810D, Method 501.2, Procedures I and II Operational: +71°C Storage: +85°C
Low Temperature	MIL-STD-810D, Method 501.2, Procedures I and II Operational: -51°C Storage: -62°C
Altitude and Rate of Change	MIL-STD-810D, Method 500.2, Procedure II 30,000 ft and 2,000 ft/minute
Shock	MIL-STD-810C, Method 516.2, Procedure I 15 g, 11 ms, sine
Vibration	MIL-STD-810E, Method 514.4, Procedure I, Category 6
Humidity	MIL-STD-810D, Method 507.2, Procedure III 95% RH, 60°C - 30°C, 10 cycles
Salt Fog	MIL-STD-810D, Method 509.2, Procedure I

GPS SATCOM

Frequency	L1 band: 1565 MHz - 1586 MHz L2 band: 1217 MHz - 1238 MHz
Gain	+4 dBiC typical at zenith
Polarisation	Predominantly RHCP at zenith
Impedance	50 ohm nominal
VSWR	2.0:1 max
Connectors	TNC Type Female



19-470-10

CHELTON

V/UHF SATCOM & GPS Antenna

Low Angle UHF SATCOM 30-400MHz

High Angle UHF SATCOM 240-400MHz

GPS 1565-1586MHz, 1217-1238MHz

Key features:

- V/UHF communications
- GPS capabilities
- Low profile

The 19-470-10 is a combined V/UHF communications and UHF satellite communications antenna. It covers the frequency bands 30-88 MHz, 108-152 MHz and 225-400 MHz for communications and band 240-400 MHz for high angle satellite communications.

The 19-470-10 is also designed to provide GPS communications which is mounted on top of the moulded lid.



ELECTRICAL

Frequency	30-400MHz 240-400MHz 1565-1586MHz, 1217-1238MHz
Power Handling	30-88 MHz 50 W max (continuous) 118-174 MHz 50 W max (continuous) 225-400 MHz 200 W max
Impedance	50 Ω
VSWR	30 - 88 MHz < 2.5:1 (> 7.36 dB) 108 - 174 MHz < 2.5:1 (> 7.36 dB) 225 - 400 MHz < 2.5:1 (> 7.36 dB) 1565 - 1586 MHz: > 9.54 dB (VSWR < 2.0:1) 1217 - 1238 MHz: > 9.54 dB (VSWR < 2.0:1)
Gain	30 MHz > -26dBi 88 MHz > -12dBi 108 - 174 MHz > -12dBi 225 - 400 MHz > 0dBi
Polarisation	Vertical

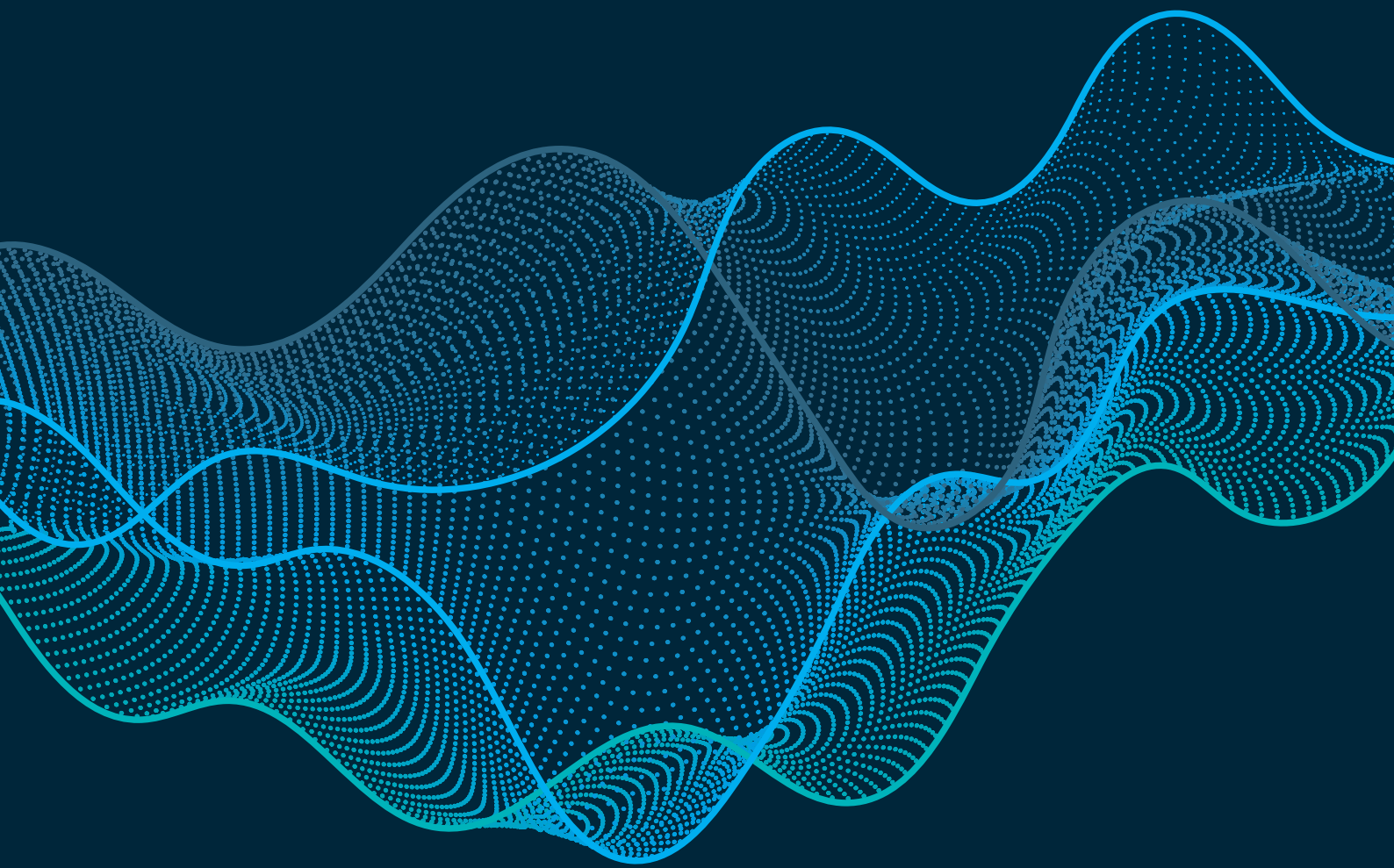
MECHANICAL

Dimensions (LxWxH)	403.9 x 92.9 x 228.6 mm
Weight	3.8 kg
Connector	TNC Male (GPS: Female)

ENVIRONMENTAL

Continuous Operating Temperature	- 51°C Min + 71°C Max
Altitude	35,000 ft





2

Communication

Passive Wideband and Multiband Antennas

20-200-20

CHELTON

Dual band high efficiency blade antenna with VHF and L-Band

118-156MHz, 960-1220MHz

Key features:

- High efficiency blade
- VHF and L-Band
- Lightning protection

The 20-200-20 is a high efficiency blade antenna dedicated to the frequency bands 118 MHz to 156 MHz and 960 MHz to 1220 MHz.

The antenna is designed for general airborne application.

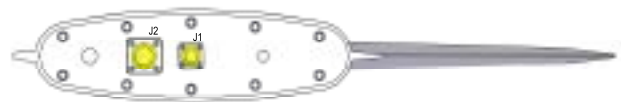
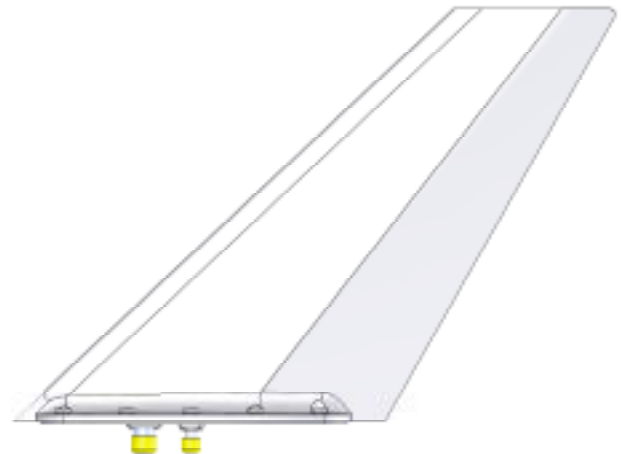
The antenna comprises two independent radiating elements, each served by a dedicated terminal.

The VHF Section utilises a broadband fan radiator, passively matched. The matching network includes dc grounding of the radiating element for lightning protection.

The L-band frequencies are served by a co-phased folded monopole couplet.

Printed circuit transmission line techniques are incorporated to reduce coupling into the VHF section and thereby avoid excitation of the main radiating element, and resultant corruption of the radiation pattern.

The radiating elements, together with all feed and matching circuitry are accommodated on a common pcb.



ELECTRICAL

Frequency Range	118-156 MHz (VHF) 960-1220 MHz (L-Band)
Power Handling	118-156 MHz : 25 W cw max 960-1220 MHz : 1.5 kW peak
Polarisation	Vertical
Radiation	Omnidirectional in azimuth
Impedance	50 Ω
VSWR (Return Loss)	118 MHz to 156 MHz ≤ 2.5:1 960 MHz to 1220 MHz ≤ 2.0:1 1000 MHz to 1100 MHz ≤ 1.8:1
Average Gain	118 MHz to 156 MHz 1.5 dBi 960 MHz to 1220 MHz +1 dBi

MECHANICAL

Height	311.2 mm (12.25")
Width	72.4 mm (2.85")
Length	276.9 mm (10.9") 450.9 mm (17.75") with rake
Max Weight	1.5 kg (3.3 lbs)
Connectors	
L-Band	N Female
VHF	TNC Female
Mounting	8 holes fixed location

ENVIRONMENTAL

Operational Temperature	
Continuous:	-55°C to +70°C
Intermittent:	+85°C
Vibration	MIL-STD 810D, Method 514.3, Procedure 1 MIL-T-5422F(AS)
Salt Fog	MIL-STD-810D, Method 509.2, Procedure I
Waterproofness	RTCA DO-160B, Section 10, Category R
Fluid Contamination	BS3G100 Part 2, Section 3
Magnetic Effect	RTCA DO-160B, Section 15, Class Z

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16-113

CHELTON

High Power UHF, L-band Passive Blade Antenna

225-400MHz, 960-1220MHz

Key features:

- Dual band passive
- High radiating power (100W) in both bands
- High Temperature
- Stainless Steel LE available

The 16-113 is a dual band passive airborne blade antenna operating at UHF and L-band frequencies.

ELECTRICAL

Frequency	225-400 MHz 960-1220 MHz
Power Handling	225-400 MHz: 100 W cw 960-1220 MHz: 100 W cw 1 KW Peak
Impedance	50 Ω
VSWR	225 - 240 MHz: <2.5:1 240 - 400 MHz: <2.0:1 960 - 1220 MHz: <1.8:1
Gain	225 - 400 MHz ≥ 0 dBi avg 960 - 1220 MHz ≥ 0 dBi avg
Polarisation	Vertical
Radiation	Omnidirectional

MECHANICAL

Dimensions (LxWxH)	122 x 53 x 202 mm
Mass	0.47 kg
Connector	N female
Platform(s)	Air

ENVIRONMENTAL

Environmental	MIL-STD-811
Continuous Operating Temperature	- 55°C Min + 95 (113 short term)°C Max
Altitude	70000 ft
Vibration	MIL-STD-810C, Method 514.2, Proc IA modified



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9-33-30

VHF/UHF/L-Band Antenna

30-512MHz, 950-1250MHz

The 9-33-30 is a combined VHF/UHF/L-Band broadband antenna designed to provide communications over the frequency bands 30 MHz to 512 MHz and 950 MHz to 1250 MHz. The antenna is intended for use in general subsonic airborne applications.

The 9-33-30 is configured as two separate radiating elements.

The VHF/UHF function is fulfilled by a broadband radiating element fed via a impedance matching network to optimise the VHF gain and a frequency dependent resistive matching network to achieve compliance with the return loss specification.

The L-band element is based on a folded monopole approach.

Decoupling networks are included in the VHF/UHF element to prevent corruption of the L-band elevation pattern.

The 9-33-30 comprises a pressure moulded blade of aerofoil section within which is housed the electrical assembly. The blade is enclosed by an aluminium alloy baseplate which supports the two RF connectors.

The structure is foam filled for optimum mechanical integrity.

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ELECTRICAL

Frequency	30 MHz - 512 MHz 950 MHz - 1250 MHz												
Power Handling	25 W CW (max) 30 MHz-512 MHz 1.5 kW peak, 15 W CW (max) 950 MHz-1250 MHz												
Gain	<table border="1"> <tr> <th>dB</th> <th>MHz</th> </tr> <tr> <td>> -25</td> <td>30</td> </tr> <tr> <td>> -15</td> <td>88</td> </tr> <tr> <td>> -4</td> <td>118 - 174</td> </tr> <tr> <td>≥ 0 average</td> <td>225 - 512</td> </tr> <tr> <td>≥ 0</td> <td>950 - 1250</td> </tr> </table>	dB	MHz	> -25	30	> -15	88	> -4	118 - 174	≥ 0 average	225 - 512	≥ 0	950 - 1250
dB	MHz												
> -25	30												
> -15	88												
> -4	118 - 174												
≥ 0 average	225 - 512												
≥ 0	950 - 1250												
VSWR	<table border="1"> <tr> <th>VSWR</th> <th>Frequency</th> </tr> <tr> <td>< 2.5:1</td> <td>30 MHz - 512 MHz</td> </tr> <tr> <td>< 2.0:1</td> <td>950 MHz - 1 000 MHz</td> </tr> <tr> <td>< 1.8:1</td> <td>1000 MHz - 1100 MHz</td> </tr> <tr> <td>< 2.0:1</td> <td>1100 MHz - 1250 MHz</td> </tr> </table>	VSWR	Frequency	< 2.5:1	30 MHz - 512 MHz	< 2.0:1	950 MHz - 1 000 MHz	< 1.8:1	1000 MHz - 1100 MHz	< 2.0:1	1100 MHz - 1250 MHz		
VSWR	Frequency												
< 2.5:1	30 MHz - 512 MHz												
< 2.0:1	950 MHz - 1 000 MHz												
< 1.8:1	1000 MHz - 1100 MHz												
< 2.0:1	1100 MHz - 1250 MHz												
Polarisation	Vertical when mounted vertically												
Radiation Pattern	Omnidirectional in azimuth (nominal)												
Impedance	50 Ohms nominal												
Connectors	VHF/UHF: TNC Type Female L-Band: N Type Female												

9-33-30

VHF/UHF/L-Band Antenna

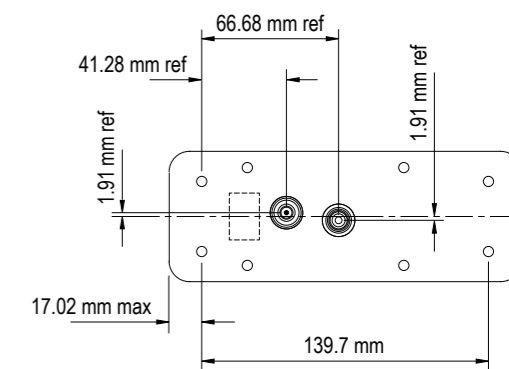
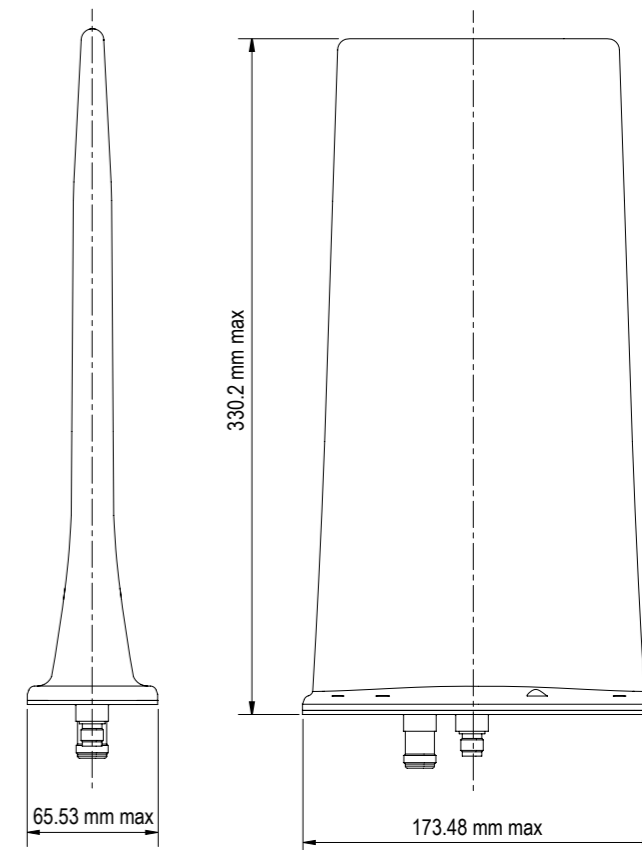
30-512MHz, 950-1250MHz

MECHANICAL

Dimensions (LxWxH)	330.20 x 65.53 x 173.48 mm (maximum)
Weight	1.14 kg (maximum)
Aerodynamic Loads	3500 kgf/m ² (5 psi) (minimum ultimate)
Aerodynamic Drag	19 N (1.95 kgf) at 250 knots EAS and 457.2 m
Mounting Configuration	8 holes fixed location

ENVIRONMENTAL

High Temperature	MIL-STD-810E, Method 501.3, Procedures I and II Continuous Operational: +120°C
Low Temperature	MIL-STD-810E, Method 502.3, Procedure I Operational: -54°C Storage: 57°C
Altitude	MIL-STD-810E, Method 500.3, Procedures I and II Operational: 15,240 m Storage: 15,240 m
Temperature Shock	MIL-STD-810E, Method 503.3
Vibration	MIL-STD-810E, Method 514.4, Procedure I, Category 4 0.01 g ² /Hz 15 to 2000 Hz L1 = 0.6 g ² /Hz at 68 Hz
Shock	MIL-STD-810E, Method 516.4, Procedures I and V Functional: 20 g, 11 ms, sawtooth Crash Hazard: 40 g, 11 ms, sawtooth
Rain	MIL-STD-810E, Method 506.3, Procedure I Normal operation when exposed to blowing rain
Humidity	MIL-STD-810E, Method 507.3, Procedure III 95% relative humidity at 60°C
Magnetic Effect	RTCA DO-160E, Section 15, Category Z Less than 1° deflection at 300 mm



12-512

CHELTON

V/UHF Antenna

30-512MHz

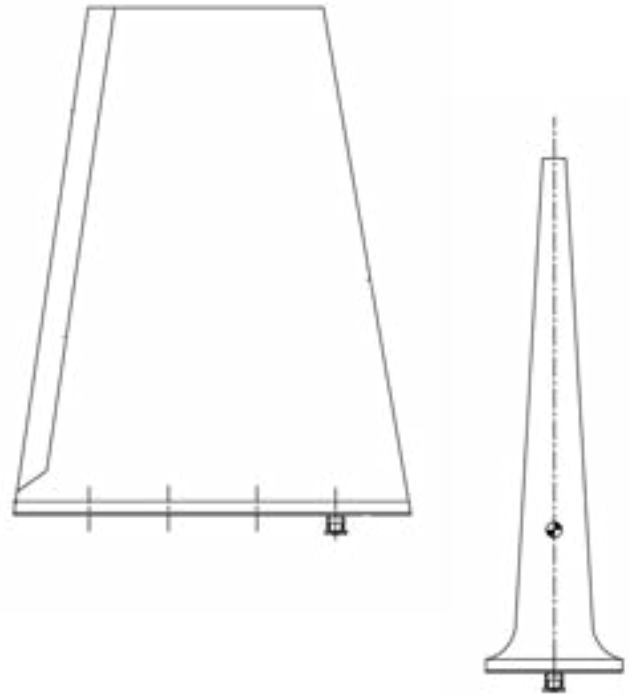
Key features:

- Dual band passive
- Gain enhancement at lower frequencies
- Subsonic airborne applications

The 12-512 is a passive antenna designed to operate within the frequency ranges 30-88 MHz, 118-174 MHz and 225-521 MHz.

The design is intended primarily for use in general subsonic airborne applications.

The antenna is configured as a broadband fan monopole incorporating a frequency dependent matching network to ensure acceptable VSWR at lower frequencies, whilst preserving optimum gain performance at higher frequencies.



ELECTRICAL

Frequency	30-512 MHz
Power Handling	50W max
Impedance	50 Ω
VSWR	30 - 88 MHz < 2.5:1 118 - 174 MHz < 2.0:1 225 - 512 MHz < 2.0:1
Gain	30 MHz > -22dBi 174 MHz > 0dBi 225 - 512 MHz > 0dBi
Polarisation	Vertical

MECHANICAL

Dimensions (LxWxH)	318.8 x 110.5 x 411.52 mm
Weight	3.0 kg
Connector	TNC Female

ENVIRONMENTAL

Continuous Operating Temperature	- 54°C Min + 71°C Max
Altitude	50,000 ft
Vibration	MIL-STD-810E, Method 514.4, Proc I, Cat 5



12-231

CHELTON

V/UHF Antenna

30-512MHz

The 12-231 antenna is a V/UHF passive blade antenna for operation with radios working over the frequency bands 30-88 MHz, 108-174 MHz and 225-512 MHz.

It is configured as a broadband fan monopole. Frequency dependent resistive loading is incorporated, which ensures an acceptable match at low frequencies whilst preserving high efficiency at higher frequencies. The element is also fed via a reactance-compensating network to enhance the gain at the lower frequencies.

ELECTRICAL

Frequency	30-512 MHz
Power Handling	50W max
Impedance	50 Ω
VSWR	30 - 88 MHz < 2.5:1 108 - 118 MHz < 5.0:1 118 - 174 MHz < 2.5:1 225 - 512 MHz < 2.5:1
Gain	30 MHz > -23dBi 88 MHz > -14dBi 108 - 174 MHz > -4dBi 225 - 512 MHz > 2dBi
Polarisation	Vertical

MECHANICAL

Dimensions (LxWxH)	298.7 x 91.4 x 373.3 mm
Weight	1.7 kg
Connector	TNC Female

ENVIRONMENTAL

Continuous Operating Temperature	- 40°C Min + 71°C Max
---	--------------------------



V/UHF Broadband Antenna

30-512MHz

ELECTRICAL

Frequency	30-512 MHz	
Power Rating	Rating	Frequency MHz
	25 W CW max	30 - 174
	45 W CW max	225 - 400
Gain	Gain dBi	Frequency MHz
	≥-25	30
	≥-15	88
	>-4*	118 - 174
	> 0*	225 - 512
	*average	
Impedance	50 Ω	
VSWR	< 2.5:1	
Radiation Pattern	Essentially omni-directional in azimuth	
Polarisation	Predominantly vertical when mounted vertically	
Connectors	TNC Type Female	

MECHANICAL

Dimensions (LxWxH)	331 x 66 x 173.5 mm max
Weight	1 kg
Aerodynamic Loads	3500 kgf/m ² (5 psi) (minimum ultimate)
Aerodynamic Drag	19N (1.95 kgf) at 250 knots EAS and 457.2 m
Mounting Configuration	8 holes fixed location

ENVIRONMENTAL

High Temperature	MIL-STD-810E, Method 501.3, Procedures I and II
	Continuous Operation: +55°C
	Intermittent Operation: +71°C
	Storage: +85°C
Low Temperature	MIL-STD-810E, Method 502.3, Procedures I and II
	Operation: -54°C
	Storage: -57°C
Altitude	MIL-STD-810E, Method 500.3, Procedures I and II
	Operational: -15,240 m
	Storage: -15,240 m
Acceleration	MIL-STD-810E, Method 513.4, Procedure I 13.5 g all axes
Temperature Shock	MIL-STD-810E, Method 503.3
Vibration	MIL-STD-810E, Method 514.4. Procedures I, Category 4
	0.01 g ² /Hz IS to 2000 Hz,
	L1=0, 6 g ² /Hz at 68 Hz
Shock	MIL-STD-810E, Method 516.4, Procedures I and V
	Functional: 20 g, 11 ms, sawtooth
	Crash Hazard: 40 g, 11 ms, sawtooth
Rain	MIL-STD-810E, Method 506.3, Procedure I Normal operation when exposed to blowing rain
Humidity	MIL-STD-810E, Method 507.3, Procedure III 95% relative humidity at 60°C
Salt Fog	MIL-STD-810E, Method 509.3, Procedure I 48 hours exposure to 5% salt solution
Magnetic Effect	RTCA DO-160D, Section 15, Category Z Less than 1° deflection at 300 mm



12-59

CHELTON

V/UHF Antenna

30-400MHz

The 12-59 is a low profile airborne antenna designed for passive operation over the following VHF/UHF frequency bands 30-88 MHz, 108-174 MHz and 225-400 MHz.

ELECTRICAL

Frequency	30-400 MHz
Power Handling	25W max
Impedance	50 Ω
VSWR	30 - 88 MHz < 2.5: 108 - 118 MHz < 5.0:1 118 - 174 MHz < 2.5:1 225 - 400 MHz < 2.25:1
Radiation	Omnidirectional
Polarisation	Vertical

MECHANICAL

Dimensions (LxWxH)	189.2 x 69.9 x 230.1 mm
Weight	0.95 kg
Connector	TNC Female

ENVIRONMENTAL

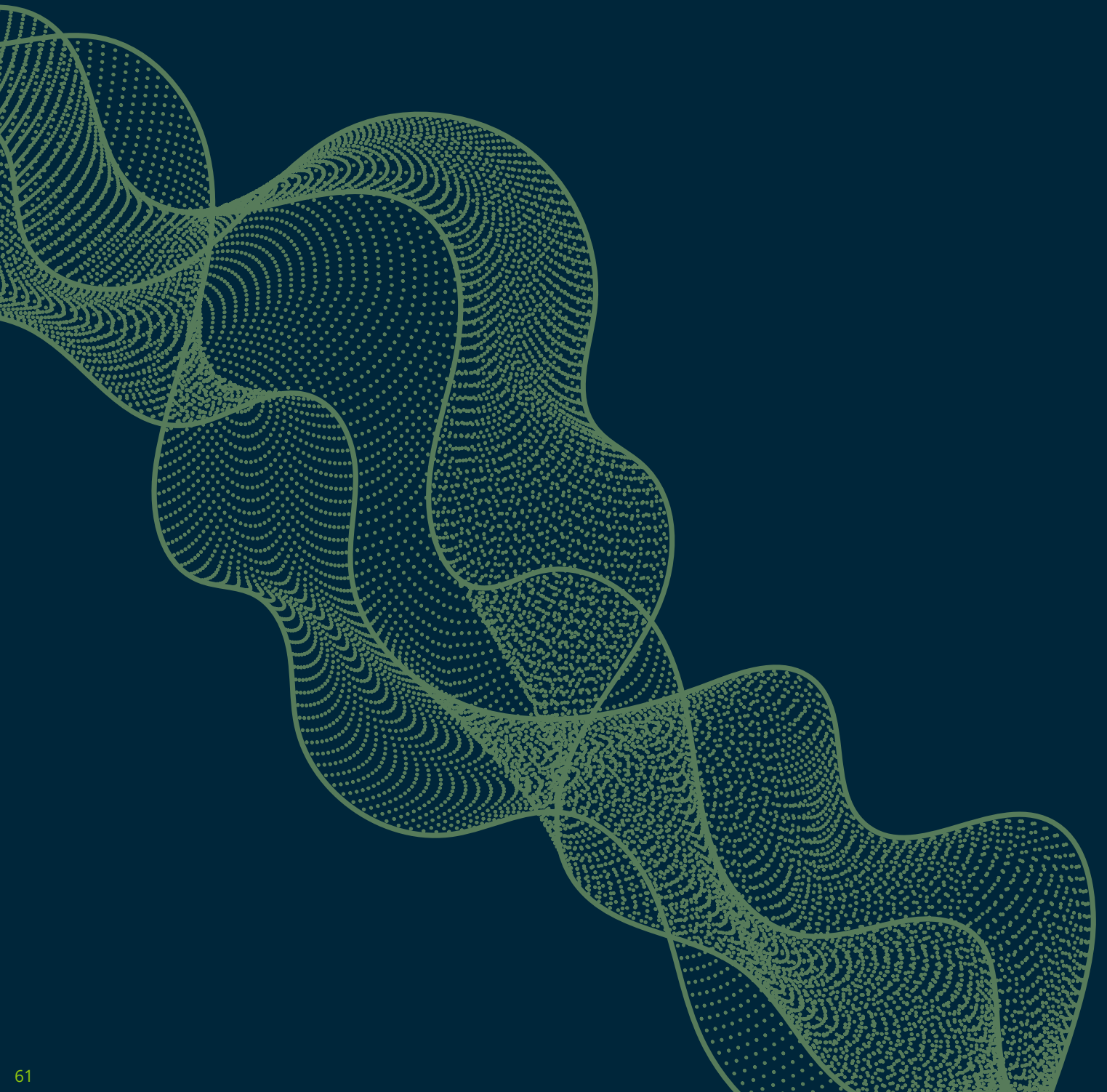
Continuous Operating Temperature	- 50°C Min + 50°C Max
Altitude	30,000 ft



2

Communication

Passive ELT Antennas



25-1000

CHELTON

Tri-band ELT Whip Antenna

121.5MHz, 243MHz, 406MHz

Key features:

- eTSO certified
- Multi-band
- Self-fixing mount

The 25-1000 is a multiple frequency emergency whip antenna for use in airborne applications. It is fitted with decoupling circuits, which prevent corruption of the radiation pattern at the upper frequencies and provide some loading to enhance performance at the lower frequency.

ELECTRICAL

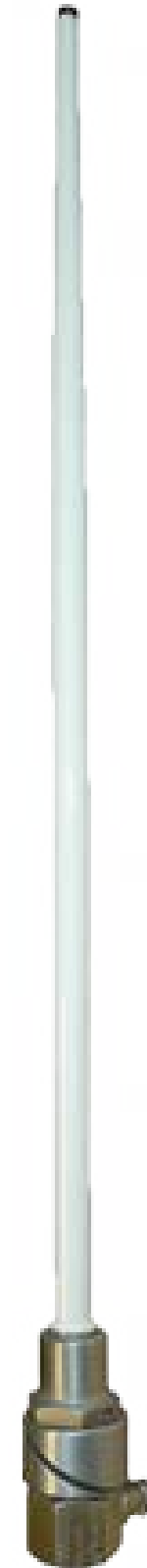
Frequency	121.5MHz 243 MHz 406 MHz
Power Handling	8W
Impedance	50 Ω
VSWR	121.5 ± 1.8 MHz ≤ 2.5:1
Gain	≤ 2 dBi
Polarisation	Vertical
Radiation Pattern Azimuth	Omnidirectional

MECHANICAL

Dimensions (LxWxH)	434 x 23.4 x 23.4 mm
Weight	0.14 kg
Connector	BNC Female

ENVIRONMENTAL

Continuous Operating Temperature	- 54°C Min + 95°C Max
Altitude	35,000 ft
Standards	DO-160



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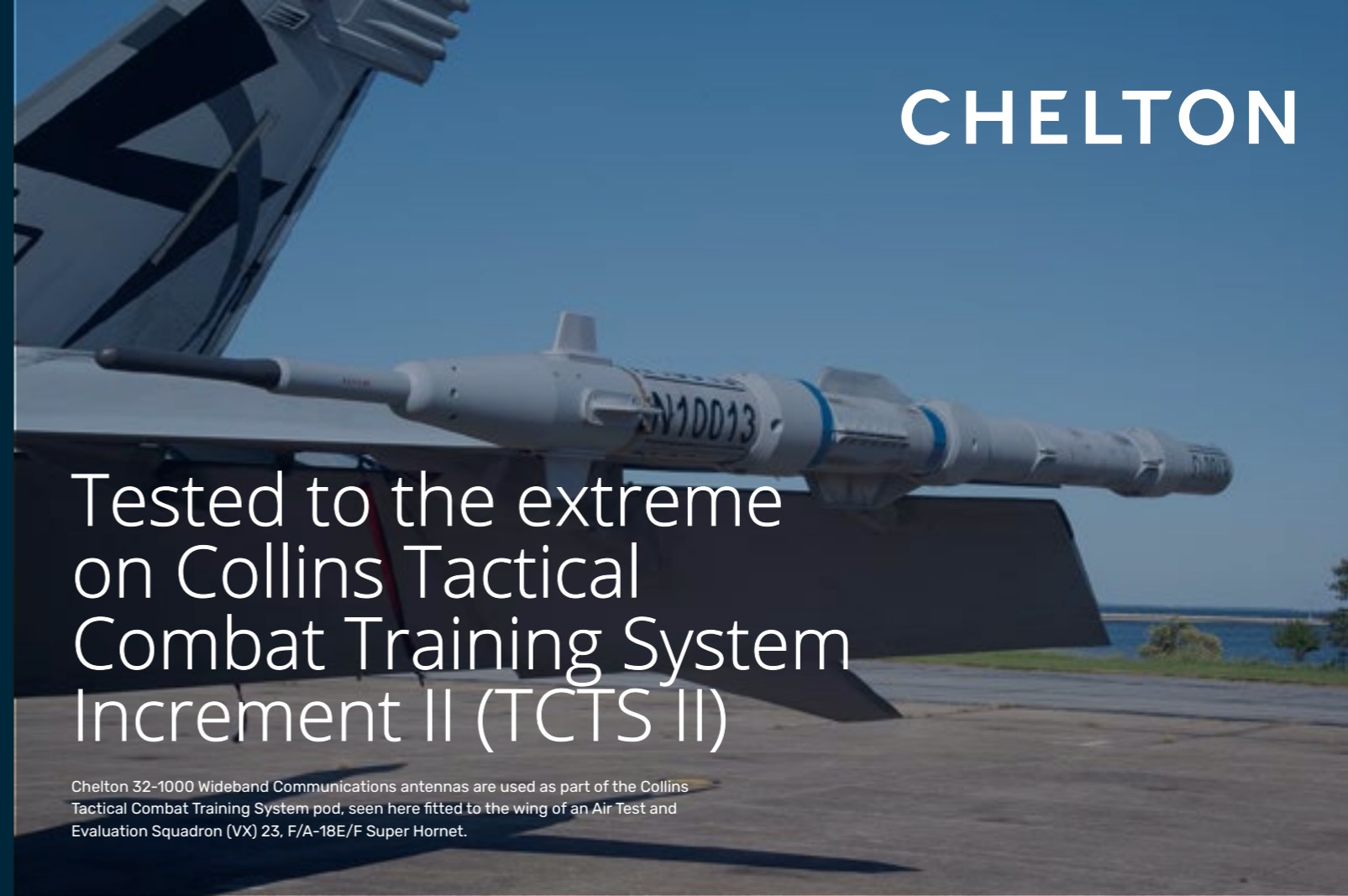
Tested to the extreme on Collins Tactical Combat Training System Increment II (TCTS II)

Chelton 32-1000 Wideband Communications antennas are used as part of the Collins Tactical Combat Training System pod, seen here fitted to the wing of an Air Test and Evaluation Squadron (VX) 23, F/A-18E/F Super Hornet.

2 Communication Passive Datalink Antennas

Datalink

A range of low size, weight and power antennas designed to support line-of-sight Tactical Military Communications, Telemetry, Datalinks and Electronic Countermeasures (ECM)



10A2

L-band Blade
960-1220MHz

Key features:

- Single port
- N type
- 4 mounting holes
- w/wo PU leading edge
- Lightning protection

The 10A2 series started as a general-purpose rugged L-band antenna. As with other L-band antenna families the main differences are footprint and connector types. The 10A2 series has no test port and an N female connector. -1 is SS leading edge, -2 is with PU leading edge.

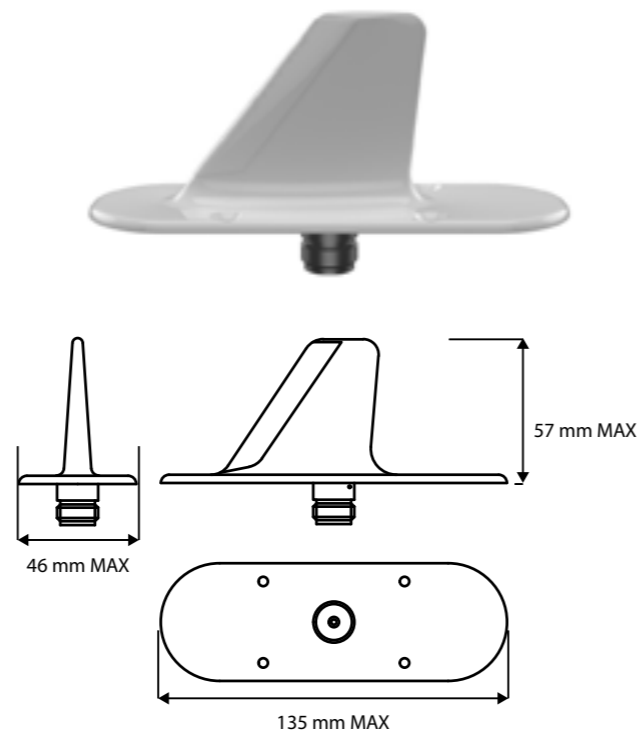
ELECTRICAL

Frequency	960-1220 MHz
Power Handling	100W c.w max
Impedance	50 Ω
VSWR	960-1220 < 1.7:1 1030 < 1.5:1 1090 < 1.5:1
Gain	> 0dBi
Polarisation	Vertical
Radiation	Omnidirectional

MECHANICAL

Dimensions (LxWxH)	135 x 46 x 57 mm
Height Above Base	57 mm
Mass	0.11 kg
Connector	Type N female
Platform(s)	Air

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ENVIRONMENTAL

Continuous Operating Temperature	- 55°C Min + 70°C Max
Altitude	50000 ft
Vibration	NT-A4-SAM-04017, Para 2.2.8.1 MIL-STD-810E, Method 514.5, Proc I, Cat 13

10A14-4

L-band Blade for IFF Transponder
950-1220MHz

Key features:

- With test port
- C type connector
- 4 hole base

The 10A14-4 is a blade antenna covering the full IFF/Tacan/DME frequency band and designed for high speed airborne applications. The antenna includes a test port.

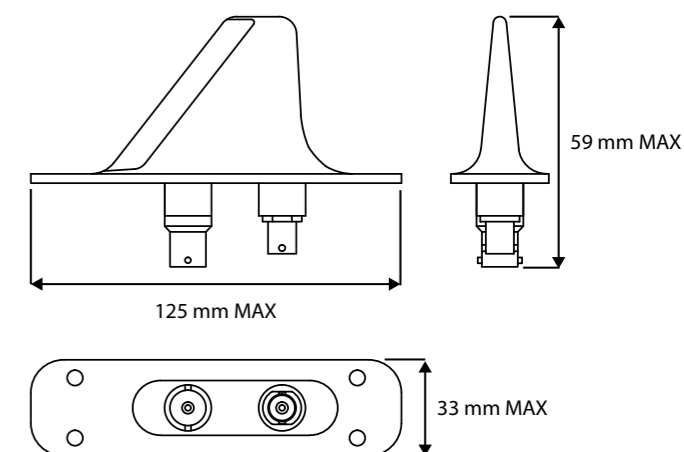
ELECTRICAL

Frequency	950-1220 MHz
Power Handling	50W mean (max) 4 kW peak (max)
Impedance	50 Ω
VSWR	≤1.7:1
Gain	≥-6 dB wrt λ/4 monopole
Polarisation	Vertical
Radiation	Omnidirectional

MECHANICAL

Dimensions (LxWxH)	125 x 33 x 59 mm
Height Above Base	59 mm
Mass	0.125 kg
Connector	Type C female (antenna) Type BNC female (test port)
Platform(s)	Air

CHELTON



ENVIRONMENTAL

Standards	MIL-STD-810
Continuous Operating Temperature	- 33°C Min + 71, 96 (Intermittent)°C Max
Altitude	55000 ft
Vibration	MIL-STD-810D Method 520.0 Procedure 3 (10 cycles)

10A21

L-Band Blade

950-1215MHz

Key features:

- Single port
- TNC connector
- 4 holes
- Low Profile
- Low Drag

Type 10A21 is a low profile and rugged L-Band antenna, designed for airborne applications, covering the frequency range 960 to 1215 MHz. Protected by a fibreglass shell.

ELECTRICAL

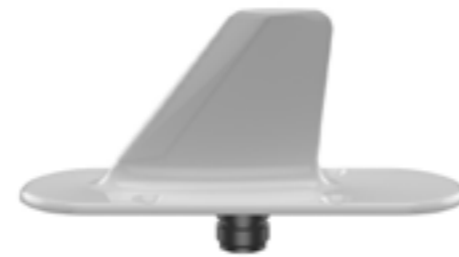
Frequency	960 - 1215 MHz
Power Handling	15 mean; 3 kW peak
Impedance	50 Ω
VSWR	960 - 1000 <1.8:1; 1000-1100 <1.4:1; 1100 - 1215 <1.8:1
Gain	≥ -3 dB relative to a resonant quarter wave monopole
Polarisation	Vertical
Radiation	Omnidirectional

MECHANICAL

Dimensions (LxWxH)	72 x 41 x 78 mm
Height Above Base	78 mm
Mass	0.085 kg
Connector	TNC Female
Platform(s)	Air

ENVIRONMENTAL

Standards	DO-160
Continuous Operating Temperature	- 40°C Min + 70°C Max
Altitude	35000 ft
Vibration	BS 3G 100 Pt. 2. Sect 3.3.1



CHELTON

10A29-22

L-Band Blade

960-1220MHz

Key features:

- Single Port
- TNC connector
- 6 holes
- Enhanced match over IFF

The 10A29-22 is an L-band antenna designed for use over the frequency range 960-1220 MHz in airborne applications. It has a single TNC RF connector and no test port.

ELECTRICAL

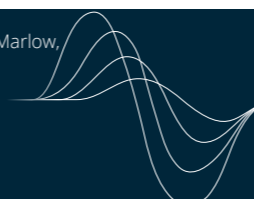
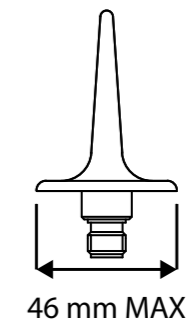
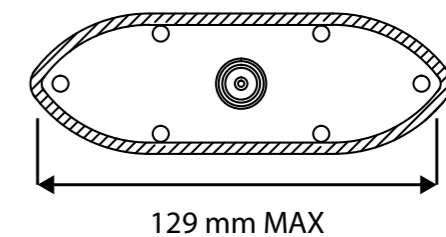
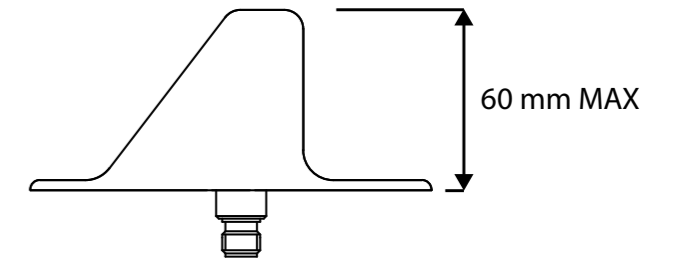
Frequency	960-1220 MHz
Power Handling	2.5 kW peak
Impedance	50 Ω
VSWR	<1.5:1 over 1000 - 1150 MHz < 2:1 over 960-1000 and 1150 - 1200 MHz
Gain	≥ -2.5 dB wrt matched monopole
Polarisation	Vertical
Radiation	Omnidirectional

MECHANICAL

Dimensions (LxWxH)	129 x 46 x 60 (mm)
Height Above Base	60 mm
Mass	0.1 kg
Connector	TNC Female
Platform(s)	Air

ENVIRONMENTAL

Standards	MIL-STD-810 MIL-E-5400
Continuous Operating Temperature	- 54°C Min + 135°C Max
Altitude	50000 ft
Vibration	MIL-STD-810B Fig 514-2 Curve H (see Figure 1 for profile)



10A5-1

CHELTON

L-band Blade

950-1220MHz

Key features:

- **Single port**
- **C type connector**
- **Available with PU leading edge**

Type 10A5 is a low profile and rugged L-Band antenna, designed for airborne applications, covering the frequency range 950 to 1220 MHz. There are variations within the type for footprint The series has a C-type female connector and no test port. -3 has PU leading edge.



ELECTRICAL

Frequency	950-1220 MHz
Power Handling	1.1 kW peak
Impedance	50 Ω
VSWR	950 - 1220 MHz < 1.7:1
Gain	950 - 1220 MHz > -3dBi
Polarisation	Vertical

MECHANICAL

Dimensions (LxWxH)	128 x 46 x 57 mm
Weight	0.11 kg
Connector	C type connector

ENVIRONMENTAL

Continuous Operating Temperature	- 55°C Min + 70°C Max
Altitude	50,000 ft
Standards	DO-160
Vibration	RTCA-DO 160D, Section 8, Cat C, Curve M

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32-2002

CHELTON

Airborne Datalink Antenna

1250-2600MHz

In development

The 32-2002 is a wideband communications antenna designed to provide connectivity for datalink systems in the band 1250 MHz to 2600 MHz which includes the L-band military networking bands and some wifi and LTE bands. It is highly robust and can operate with high transmit power. The antenna has been qualified to wide range of environmental and EMC requirements.

The antenna is housed within a high strength injection-moulded composite shell and foam filled for maximum environmental protection.



ELECTRICAL

Frequency	1250-2600 MHz
Power Handling	250W Peak, 20% Duty Cycle
Impedance	50 Ω
VSWR	1250 - 2600 MHz \leq 2.0:1 (return loss \geq 10.9 dB)
Gain	1250 MHz \geq 3.5dBi 1300 MHz \geq 4.0dBi 1755 MHz \geq 5.1dBi 2100 MHz \geq 4.9dBi 2400 MHz \geq 4.8dBi 2600 MHz \geq 4.0dBi
Polarisation	Vertical

MECHANICAL

Dimensions (LxWxH)	137.4 x 24.9 x 63.5 mm
Weight	0.12 kg
Connector	TNC Female

ENVIRONMENTAL

Continuous Operating Temperature	- 54°C Min + 71°C Max
Standards	MIL-STD-810G MIL-STD-464C
Lightning	DO-160G, Sect 23, Zone 1B1B
Altitude	70,000 ft



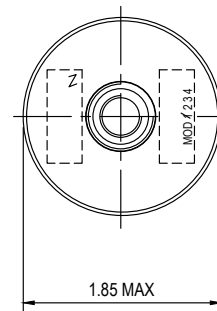
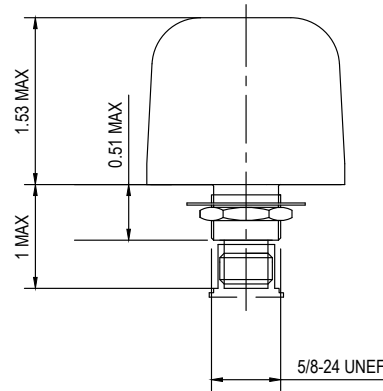
10-31

ECM Antenna

1-10GHz



CHELTON



Key features:

- Suitable for ECM and ESM applications
- Wideband
- Foam filled for high durability

The 10-31 series of antennas are linearly polarised discone antennas, operating within the frequency range 1 to 18 GHz and are intended for airborne transmit and/or receive ECM/ESM Systems.

Each antenna type comprises a Low loss, fibre glass radome which protects the discone. The antennas are filled with low loss closed-cell polyurethane foam.

Part number	Frequency	VSWR (max)	NSN Number
10-30	1 - 1.5 GHz	5.0:1	-
	2 - 10 GHz	3.0:1	
	11 - 16 GHz	5.0:1	
10-30-1	1 - 1.5 GHz	5.0:1 3.0:1 5.0:1	5865-99-643-8333
10-30-2	1 - 3 GHz	5.0:1	-
	3-18 GHz	2.0:1	
10-30-3	2.3 - 2.5 GHz	1.5:1	-
10-30-4	4.2 - 5.0 GHz	1.5:1	-
10-30-5	2.24 - 2.34 GHz	1.3:1	-
10-30-6	9.7 - 10.5 GHz	1.5:1	-
10-31	1 - 1.5 GHz	5.0:1	5865-99-643-8346
	2 - 10 GHz	2.0:1	
10-31-1	3.49 - 3.51 GHz	1.5:1	-

ELECTRICAL

Frequency	1-10GHz <i>*1-18GHz capability in development</i>
Power Handling	500 W
Impedance	50 Ω
Polarisation	Vertical, linear
Radiation	Monopole (λ/4)

MECHANICAL

Dimensions (LWH)	47 x 47 x 39 mm 1.85 x 1.85 x 1.53 "
Max Weight	0.125 kg (0.27 lbs)
Connectors	TNC Female
Mounting	1 hole, nut and washer

ENVIRONMENTAL

Temperature	-54°C to +55°C (intermittent +71°C)
Altitude	50,000 ft
Vibration	MIL-STD-BI0E, Method 514. 4, Proc I, Cat 5
Mechanical Shock	MIL-STD-BI OE, Method 516. 4, Proc I & V, Fig 516.4-4
	Functional Crash Hazard
Magnetic Effect	RTCA DO-160D, Section 15, Class Z Less than 1° deflection at 300 mm

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3 Navigation & Identification

ILS/VOR Antennas

ILS/VOR

The ILS (Instrument Landing System) requires three antenna functions: Localiser (LOC), Glideslope (GS) and Marker Beacon (MB).

Chelton half loop antennas combine the LOC and GS functionality with the VOR (VHF Omni Directional Range) navigation function. Two antennas are mounted on either side of the fuselage. A typical installation is shown on the tail of the M-346.



The antennas are fed in one of two ways;

- Cable harness (equal phase feed): Two opposite handed antennas are needed (e.g 19-85A and 19-85B or 27-3002 and 27-3003). Example part number: 37640
- Coupler (two halves fed with opposite phase). Some combine diplexers to separate the LOC/VOR and GS signals.

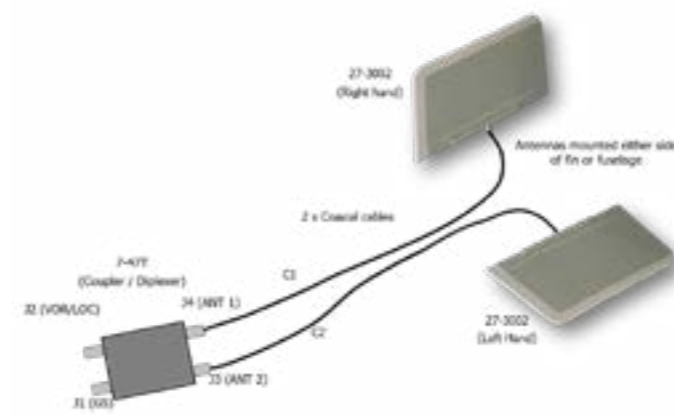
Couplers:

7-47: 180 degree splitter with diplexer

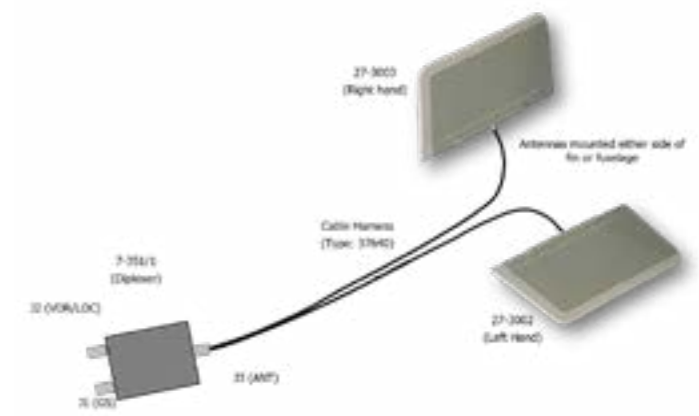
7-78: 180 degree splitter with diplexer and dual outputs

Diplexer:

7-351/1: LOC/GS Diplexer without splitter (cable harness needed)



Example with coupler/diplexer



Example with cable harness



Navigation & Identification Antennas

Quick Reference Table

Part Number	Description	Frequency MHz	Configuration
27-3002/3	VOR/LOC/GS	108 - 118 328 - 336	Blade used with coupler
19-85A/B	VOR/LOC/GS	108 - 118 328 - 336	Blade used with coupler
19-28	VOR/LOC/GS	108 - 118 328 - 336	Blade used with coupler
21-48L	VOR/LOC/GS	108 - 118 328 - 336	Half Loop used with coupler
17-210	Glideslope	328 - 336	Dipole
17-20/1	Glideslope	328 - 336	Blade
17-9	Marker Beacon	75	Blade
17-4D/1	Marker Beacon	75	Conformal
17-10	Marker Beacon	75	Blade
17-11	Marker Beacon	75	Blade
10A2	L-band	960 - 1220	Blade
10A14-2	IFF/L-band	1020 - 1040 1080 - 1100	Blade
10A14-3	IFF/L-band	1020 - 1040 1080 - 1100	Blade
10A14-4	L-band	950 - 1220	Blade
10A21	L-band	960 - 1215	Blade
10A29-22	L-band	960 - 1220	Blade
10A5-1	L-band	950 - 1220	Blade



27-3002

27-3003

CHELTON

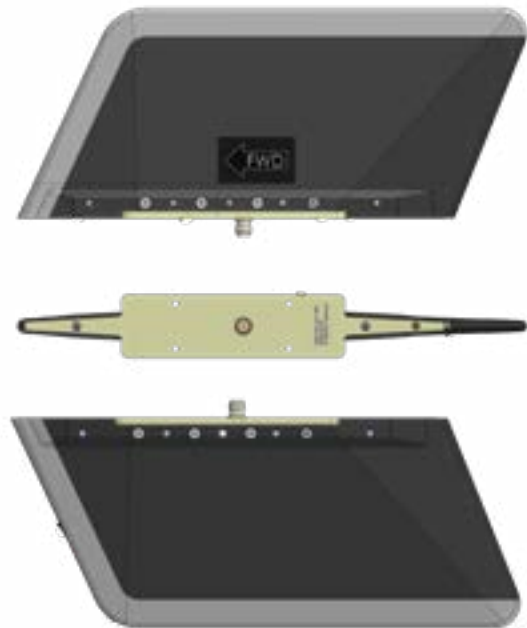
Half Loop Blade Antenna

108-118MHz, 328-336MHz

Key features:

- High strength
- Low profile
- Combined VOR, LOC and GS

The 27-3002 and 27-3003 antenna system provides for reception of VOR/localiser and glideslope signals. The system comprises two high strength blades mounted either side of the aircraft vertical stabiliser.



ELECTRICAL

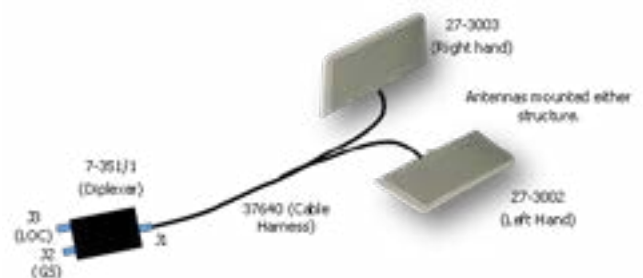
Frequency	108-118 MHz 328-336 MHz
Power Handling	
Impedance	50 Ω
VSWR	108 - 336 MHz <5:1
Gain	108 - 336 MHz <-5dbi
Polarisation	Horizontal

MECHANICAL

Dimensions (LxWxH)	367 x 47 x 151 mm
Weight	0.795 kg
Connector	TNC Female

ENVIRONMENTAL

Continuous Operating Temperature	- 54°C Min + 90°C Max
Altitude	50,000 ft



19-85A/B

CHELTON

Half Loop Blade Antenna

108-118MHz, 328-336MHz

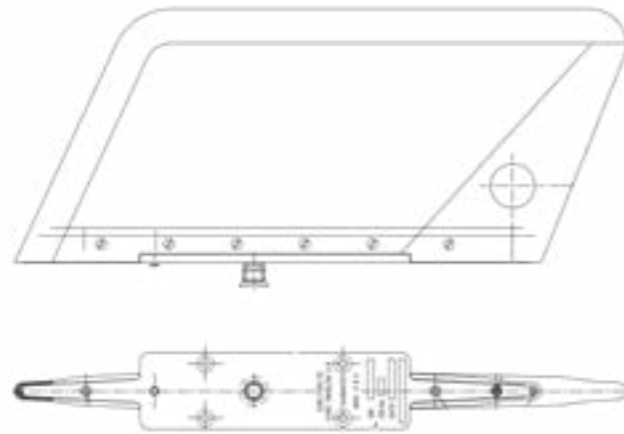
Key features:

- Self complete loop
- Horizontal mounting and polarisation
- Includes necessary coupling

The 19-85 antenna system provides for reception of localiser and glideslope signals and comprises a pair of high strength blades for horizontal opposed mounting - one on each side of the vertical stabiliser.

Each blade in a self complete loop. The 19-85B also includes the necessary coupling circuitry allowing the two antennas to be connected directly via a cable harness. The combined output can then be diplexer separated into LOC and GS signals - both of which derive equally from each half of the antenna system.

The balance loop design of the 19-85 antenna system provides a very high ratio between response to signals of the desired horizontal polarisation and to those of the unwanted vertical polarisation.



ELECTRICAL

Frequency	108-118 MHz 328-336 MHz
Power Handling	
Impedance	50 Ω
VSWR	Localiser < 5:1 Glideslope < 3:1
Gain	Localiser > -5dBi Glideslope > -5dBi
Polarisation	Horizontal

MECHANICAL

Dimensions (LxWxH)	312 x 47 x 151 mm
Weight	0.795 kg
Connector	TNC Female

ENVIRONMENTAL

Continuous Operating Temperature	- °C Min + °C Max
---	----------------------

19-28

CHELTON

Half Loop Blade Antenna

108-118MHz, 328-336MHz

Key features:

- Use with a coupler
- TNC or BNC RF connector
- Aerodynamic

The 19-28 antenna system provides for reception of VOR, LOCALISER and GLIDESCOPE signals, and comprises a pair of blades for horizontally opposed mounting, one on each side of the vertical stabiliser or fuselage, plus an appropriate antenna coupler to feed one or two VOR/LOC and glideslope receivers.



ELECTRICAL

Frequency	108-118 MHz 328-336 MHz
Power Handling	
Impedance	50 Ω
VSWR	108 - 336 MHz < 5:1
Radiation Pattern Azimuth	Omnidirectional
Polarisation	Horizontal

MECHANICAL

Dimensions (LxWxH)	365 x 49 x 150 mm
Weight	0.53 kg
Connector	TNC Female or BNC Female

ENVIRONMENTAL

Continuous Operating Temperature	- 50°C Min + 50°C Max
Altitude	35,000 ft
Standards	BS 3G 100

21-48L

CHELTON

VOR/LOC/GS loop antenna

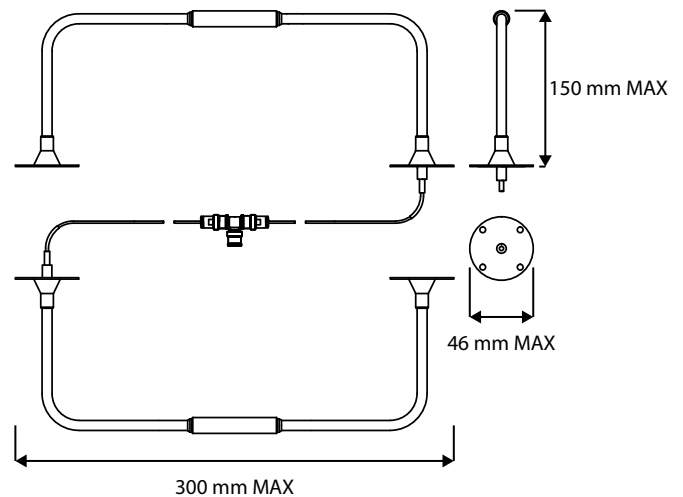
108-118MHz, 328-336MHz

Key features:

- **Lightweight**
- **Ideal for rotary wing platforms**

The 21-48L is an airborne antenna system intended for VOR/ILS and glideslope applications. Each antenna system comprises two centrally fed half loop (21-48L-1()) antennas, that when mounted on the aircraft must be fed in antiphase for correct function.

Each half loop is formed from stainless steel tubing with a fibreglass dielectric junction at its mid-point. From the mid-point a co-axial cable extends internally and exits through the mounting flange. The half loops are connected together via a T adaptor.



ELECTRICAL

Frequency	108-118 MHz 328-336 MHz
Power Handling	N/A
Impedance	50 Ω
VSWR	<5.0:1
Polarisation	Horizontal
Radiation	Omnidirectional

MECHANICAL

Dimensions (LxWxH)	300 x 46 x 150 mm
Weight	0.19 kg
Connector	BNC Female
Platform(s)	Air

ENVIRONMENTAL

Environmental	DO-160
Continuous Operating Temperature	- 40°C Min + 55°C Max
Altitude	25000 ft
Vibration	DO-160C, Sect 8, Cat Y



17-210

Glideslope antenna

328-336MHz

CHELTON

Key features:

- **Minature**
- **High efficiency**
- **Dipole**

A miniature, high efficiency glideslope dipole antenna dedicated to the 328 - 336 MHz frequency band. The antenna is designed for general airborne application and for internal installation.

ELECTRICAL

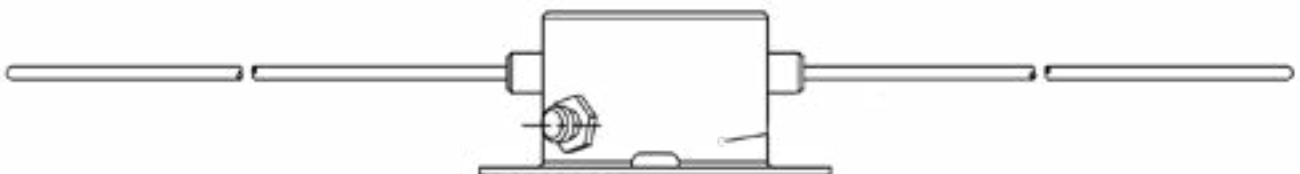
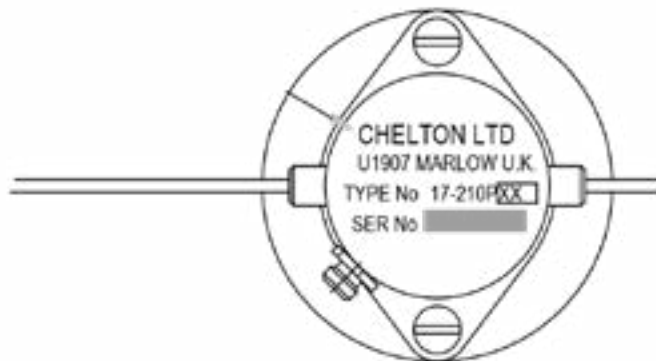
Frequency	328-336 MHz
Power Handling	N/A
Impedance	50 Ω
VSWR	328-336 MHz < 1.5:1
Gain	Typically as resonant half wave dipole (when mounted in free space)
Polarisation	Horizontal

MECHANICAL

Dimensions (LxWxH)	444 x 45 x 34 mm
Weight	0.059 kg
Connector	FP Belling-Lee

ENVIRONMENTAL

Continuous Operating Temperature	- °C Min + °C Max
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17-20 & 17-21

CHELTON

Glideslope antennas

328-336MHz

Key features:

- TSO compliant
- Available in single or twin outputs
- Lightweight

The 17-20 and 17-21 blade antennas are for use in ILS/Glidepath systems and are intended to comply with the requirements to TSO C 34c.

ELECTRICAL

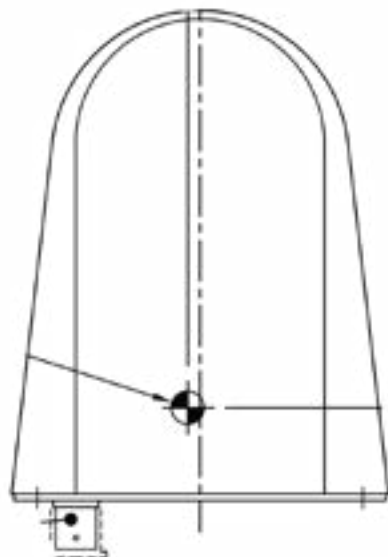
Frequency	328-336 MHz
Power Handling	N/A
Impedance	50 Ω
VSWR	328 - 336 MHz < 3:1
Gain	328 - 336 MHz >-15dBi
Polarisation	Horizontal

MECHANICAL

Dimensions (LxWxH)	115.6 x 36.5 x 153.7 mm
Weight	0.25 kg
Connector	C Female

ENVIRONMENTAL

Continuous Operating Temperature	- 55°C Min + 70°C Max
Altitude	35,000 ft





3

Navigation & Identification

Marker Beacons

Marker Beacon Blade Antenna

75MHz

Key features:

- Low profile
- Light
- High temp +135C version available



The 17-9 range of antennas is intended for use with airborne ILS marker beacon receivers.

The 17-9T variant is available with a stainless leading edge strip for supersonic use. The 17-9 antennas are configured as capacitively tuned loops.

ELECTRICAL

Frequency	75 MHz
Power Handling	N/A
Impedance	50 Ω
VSWR	3.0:1 max
Gain	<16dB below dipole
Polarisation	Horizontal, aligned to aircraft

MECHANICAL

Dimensions (LxWxH)	230 x 65 x 49 mm
Weight	0.25 kg
Connector	17-9: BNC female connector 17-9T: TNC female connector 17-9T/RF: TNC connector

Standards

Continuous Operating Temperature	- 54°C Min + 70°C Max
Altitude	55000 ft
Vibration	BS 3G100. Pt. 2. Sect.3.3.1



17-4D/1

CHELTON

Conformal ILS Marker Aerial

75MHz

Key features:

- Conformal
- Horizontally polarised

The 17-4D is intended for airborne reception of ILS Marker signals at 75 MHz. When mounted on the underside of the aircraft, the antenna has maximum response to horizontally polarised signals within a cone having approximately $\pm 45^\circ$ boundaries.

The operating bandwidth for the single frequency reception is sufficient to retain effective function within the degree of de-tuning to be expected from environmental variations.

This antenna is conformal and fits to a curved surface with a radius of 1830 mm.



ELECTRICAL

Frequency	75 MHz
Power Handling	N/A for receive only antenna
Impedance	50 Ω
VSWR	75 MHz < 1.5:1
Gain	Not less than 16 dB below that of a half wave dipole at 75 MHz within a cone $\pm 10^\circ$ perpendicular to the antenna aperture when measured on a 6' circular ground plane (nominal)
Polarisation	Horizontal

MECHANICAL

Dimensions (LxWxH)	342 x 153 x 51 mm
Weight	0.95 kg
Connector	TNC Female

ENVIRONMENTAL

Continuous Operating Temperature	- 54°C Min + 90°C Max
Altitude	50,000 ft



17-10

CHELTON

Marker Beacon Blade Antenna

75MHz

Key features:

- Very low profile (< 2inches)

The 17-10 antenna is a 75 MHz Marker Beacon Antenna. The antenna is intended to meet the minimum performance standards specified in TSO-C35d and CAP 208.



ELECTRICAL

Frequency	75 MHz
Power Handling	N/A
Impedance	50 Ω
VSWR	Mid Band <2:1; 74.8 - 75.2 <5:1
Gain	>-10 dBi
Polarisation	Horizontal

MECHANICAL

Dimensions (LxWxH)	382 x 48.8 x 34.3 mm
Mass	0.25 kg
Connector	Numerous

ENVIRONMENTAL

Environmental	DO-160
Continuous Operating Temperature	- 54°C Min + 70°C Max
Altitude	35000 ft
Vibration	RTCA DO-160C, Sect 8, Cat L



17-11

CHELTON

Marker Antenna

75MHz

Key features:

- Low profile
- With Leading Edge strip
- High operating temperature

The 17-11 antenna is intended for use with airborne ILS marker receivers.



ELECTRICAL

Frequency	75 MHz
Power Handling	N/A
Impedance	50 Ω
VSWR	3.0:1 max
Gain	>16dB below dipole
Polarisation	Horizontal

MECHANICAL

Dimensions (LxWxH)	306 x 67 x 58 mm
Weight	0.4 kg
Connector	C Female TNC Female - 17-11T

ENVIRONMENTAL

Environmental	DO-160
Continuous Operating Temperature	- 65°C Min + 90°C Max
Altitude	55000 ft
Vibration	BS 3G100. Pt. 2. Sect.3.3.1 Region A Cat. 4





3

Navigation & Identification

DME & IFF

10A2

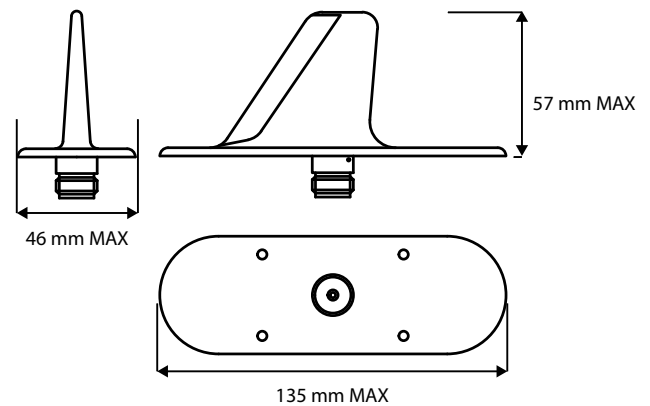
L-band Blade

960-1220MHz

Key features:

- Single port
- N type
- 4 mounting holes
- w/wo PU leading edge
- Lightning protection

The 10A2 series started as a general-purpose rugged L-band antenna. As with other L-band antenna families the main differences are footprint and connector types. The 10A2 series has no test port and an N female connector. -1 is SS leading edge, -2 is with PU leading edge.



ELECTRICAL

Frequency	960-1220 MHz
Power Handling	100W c.w max
Impedance	50 Ω
VSWR	960-1220 < 1.7:1 1030 < 1.5:1 1090 < 1.5:1
Gain	> 0dBi
Polarisation	Vertical
Radiation	Omnidirectional

MECHANICAL

Dimensions (LxWxH)	135 x 46 x 57 mm
Height Above Base	57 mm
Mass	0.11 kg
Connector	Type N female
Platform(s)	Air

ENVIRONMENTAL

Continuous Operating Temperature	- 55°C Min + 70°C Max
Altitude	50000 ft
Vibration	NT-A4-SAM-04017, Para 2.2.8.1 MIL-STD-810E, Method 514.5, Proc I, Cat 13



10A14-2

CHELTON

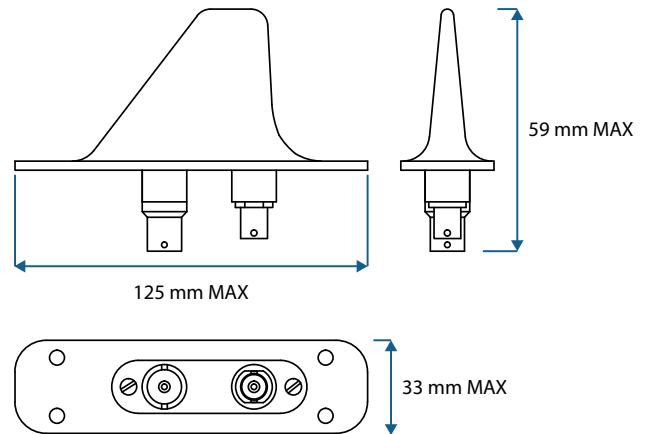
L-band Antenna for IFF transponder

1020-1040MHz, 1080-1100MHz

Key features:

- With test port
- C type connector
- 4 hole base

The 10A14-2 is a blade antenna covering the IFF frequency bands and designed for high speed airborne applications. The antenna includes a test port.



ELECTRICAL

Frequency	1020-1040 MHz 1080-1100 MHz
Power Handling	50W mean (max) 4 kW peak pulsed (max)
Impedance	50 Ω
VSWR	1.5:1 (max)
Gain	\geq -6 dB wrt $\lambda/4$ monopole
Polarisation	Vertical
Radiation	Omnidirectional

MECHANICAL

Dimensions (LxWxH)	125 x 33 x 59 mm
Height Above Base	59 mm
Weight	0.12 kg
Connector	Type C female (antenna) Type BNC female (test port)
Platform(s)	Air

ENVIRONMENTAL

Standard	MIL-STD-810
Continuous Operating Temperature	- 33°C Min + 70, 96 (Intermittent)°C Max
Altitude	55000 ft
Vibration	MIL-STD-810B Method 514.3 Procedure I

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10A14-3

CHELTON

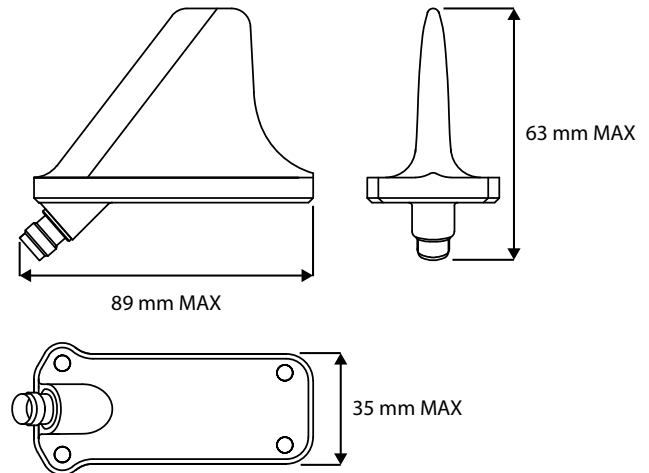
L-band Blade for IFF Transponder

1020-1040MHz, 1080-1100MHz

Key features:

- Single port
- C type connector
- 4 hole base

The 10A14-3 is a blade antenna covering the IFF frequency bands and designed for high speed airborne applications. It has a single connector (no test port).



ELECTRICAL

Frequency	1020-1040 MHz 1080-1100 MHz
Power Handling	50W mean (max) 4 kW peak pulsed (max)
Impedance	50 Ω
VSWR	1.5:1 (max)
Gain	≥ -6 dB wrt $\lambda/4$ monopole
Polarisation	Vertical
Radiation	Omnidirectional

ENVIRONMENTAL

Standards	MIL-STD-810
Continuous Operating Temperature	- 33°C Min + 71, 96 (Intermittent)°C Max
Altitude	55000 ft
Vibration	MIL-STD-810F Method 514.3 Procedure 1

MECHANICAL

Dimensions (LxWxH)	89 x 35 x 63 mm
Height Above Base	63 mm
Mass	0.16 kg
Connector	Type C female (antenna)
Platform(s)	Air



10A14-4

CHELTON

L-band Blade for IFF Transponder

950-1220MHz

Key features:

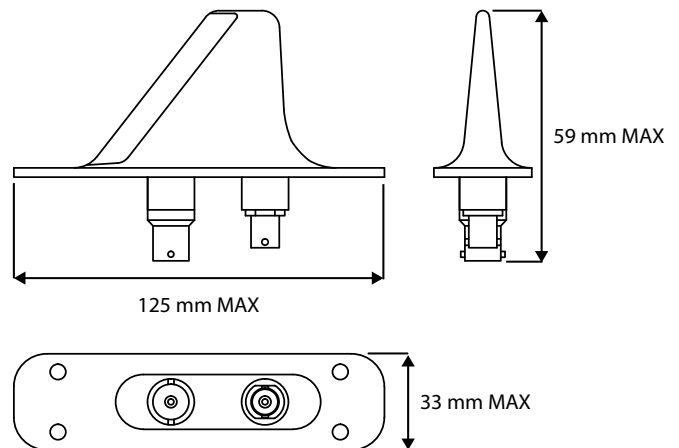
- With test port
- C type connector
- 4 hole base

The 10A14-4 is a blade antenna covering the full IFF/Tacan/DME frequency band and designed for high speed airborne applications. The antenna includes a test port.



ELECTRICAL

Frequency	950-1220 MHz
Power Handling	50W mean (max) 4 kW peak pulsed (max)
Impedance	50 Ω
VSWR	$\leq 1.7:1$
Gain	≥ -6 dB wrt $\lambda/4$ monopole
Polarisation	Vertical
Radiation	Omnidirectional

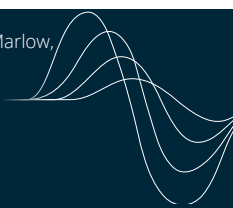


MECHANICAL

Dimensions (LxWxH)	125 x 33 x 59 mm
Height Above Base	59 mm
Mass	0.125 kg
Connector	Type C female (antenna) Type BNC female (test port)
Platform(s)	Air

ENVIRONMENTAL

Standards	MIL-STD-810
Continuous Operating Temperature	- 33°C Min + 71, 96 (Intermittent)°C Max
Altitude	55000 ft
Vibration	MIL-STD-810D Method 520.0 Procedure 3 (10 cycles)



10A21

L-Band Blade

950-1215MHz

Key features:

- Single port
- TNC connector
- 4 holes
- Low Profile
- Low Drag

Type 10A21 is a low profile and rugged L-Band antenna, designed for airborne applications, covering the frequency range 960 to 1215 MHz. Protected by a fibreglass shell.



ELECTRICAL

Frequency	960 - 1215 MHz
Power Handling	15 mean; 3 kW peak pulsed
Impedance	50 Ω
VSWR	960 - 1000 <1.8:1; 1000-1100 <1.4:1; 1100 - 1215 <1.8:1
Gain	\geq -3 dB relative to a resonant quarter wave monopole
Polarisation	Vertical
Radiation	Omnidirectional

MECHANICAL

Dimensions (LxWxH)	72 x 41 x 78 mm
Height Above Base	78 mm
Mass	0.085 kg
Connector	TNC Female
Platform(s)	Air

ENVIRONMENTAL

Standards	DO-160
Continuous Operating Temperature	- 40°C Min + 70°C Max
Altitude	35000 ft
Vibration	BS 3G 100 Pt. 2. Sect 3.3.1



10A29-22

CHELTON

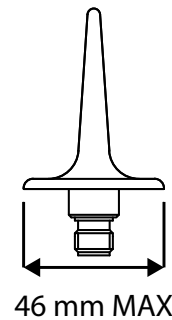
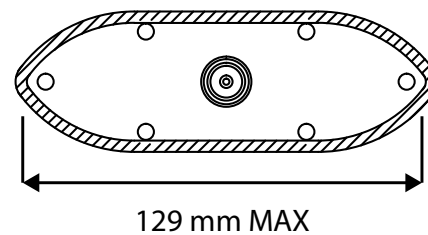
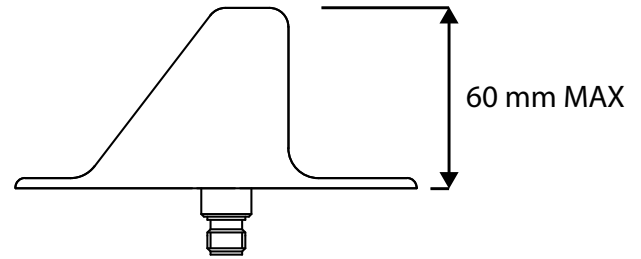
L-Band Blade

960-1220MHz

Key features:

- Single Port
- TNC connector
- 6 holes
- Enhanced match over IFF

The 10A29-22 is an L-band antenna designed for use over the frequency range 960-1220 MHz in airborne applications. It has a single TNC RF connector and no test port.



ELECTRICAL

Frequency	960-1220 MHz
Power Handling	2.5 kW peak pulsed
Impedance	50 Ω
VSWR	<1.5:1 over 1000 - 1150 MHz < 2:1 over 960-1000 and 1150 - 1200 MHz
Gain	\geq -2.5 dB wrt matched monopole
Polarisation	Vertical
Radiation	Omnidirectional

MECHANICAL

Dimensions (LxWxH)	129 x 46 x 60 (mm)
Height Above Base	60 mm
Mass	0.1 kg
Connector	TNC Female
Platform(s)	Air

ENVIRONMENTAL

Standards	MIL-STD-810 MIL-E-5400
Continuous Operating Temperature	- 54°C Min + 135°C Max
Altitude	50000 ft
Vibration	MIL-STD-810B Fig 514-2 Curve H (see Figure 1 for profile)



10A5-1

CHELTON

L-band Blade

950-1220MHz

Key features:

- **Single port**
- **C type connector**
- **Available with PU leading edge**

Type 10A5 is a low profile and rugged L-Band antenna, designed for airborne applications, covering the frequency range 950 to 1220 MHz. There are variations within the type for footprint The series has a C-type female connector and no test port. -3 has PU leading edge.



ELECTRICAL

Frequency	950-1220 MHz
Power Handling	1.1 kW peak pulsed
Impedance	50 Ω
VSWR	950 - 1220 MHz < 1.7:1
Gain	950 - 1220 MHz > -3dBi
Polarisation	Vertical

MECHANICAL

Dimensions (LxWxH)	128 x 46 x 57 mm
Weight	0.11 kg
Connector	C type connector

ENVIRONMENTAL

Continuous Operating Temperature	- 55°C Min + 70°C Max
Altitude	50,000 ft
Standards	DO-160
Vibration	RTCA-DO 160D, Section 8, Cat C, Curve M



3 Navigation & Identification GPS

About.

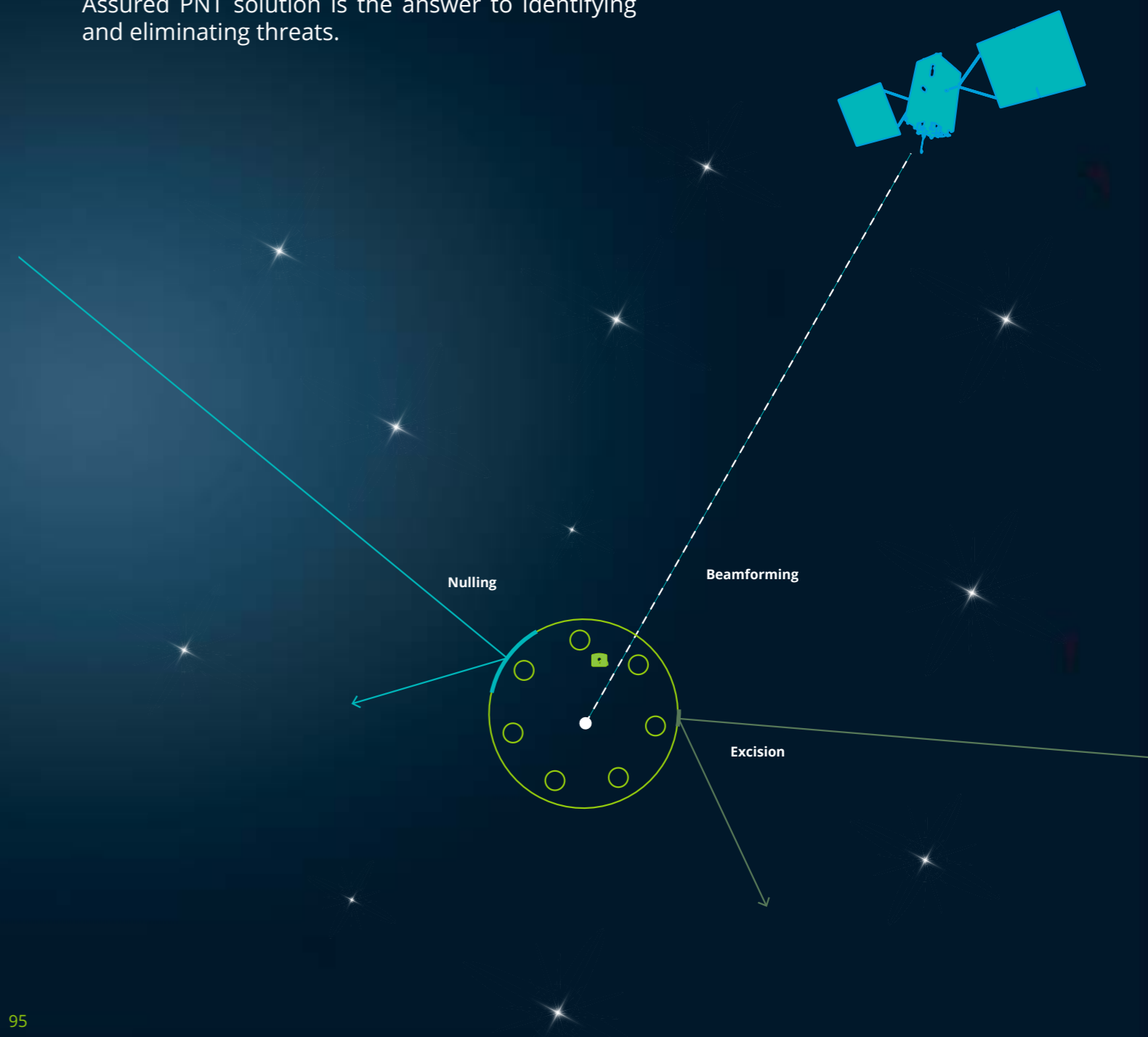
Chelton offer a wide range of L1, L2 and combined L1 & L2 band GPS FRPA (Fixed Reception Pattern Antenna) and GPS amplifier products. These can be used in conjunction with amplified splitters with up to 7 ports.

Also available is Chelton's Anti-Jam GPS Systems which offer up to 100 times more immunity to jammers than a conventional GPS antenna.

With our anti-jam GPS Systems and Anti Jamming technology, there is no compromise. Our end-to-end Assured PNT solution is the answer to identifying and eliminating threats.



Chelton selected to supply Anti-Jam GPS Solution for US Army Gray Eagle UAS



Research Contract To Protect Satellite Signals From Interference

Chelton has been awarded a contract by the UK MOD's Defence Equipment and Support (DE&S) to research Advanced Anti-Jam techniques for the protection of navigation signals received from the Global Navigation Satellite Systems (GNSS).

GPS Antennas Quick Reference Table

Part Number	Description	Protection	Protected Bands	Complementary Part Number
7-6005	4-Channel Nulling Anti-Jam System	Excision & STAP (nulling)	GPS L1 and/or L2 C/A, P(Y) and M Code	20-7009
7-6008	8-Channel Nulling Anti-Jam System	Excision & STAP (nulling) Direction Finding	GPS L1 and/or L2 C/A, P(Y) and M Code	20-7009
20-7009	Active GPS Patch Antenna	Excision & STAP (nulling)	GPS L1 and/or L2 C/A, P(Y) and M Code	7-6005 7-60008
7-6010	8-Channel Beamforming & Nulling Anti-Jam System	STAP (beamforming & nulling)	GPS L1 & L2 C/A and P(Y)	20-8000
20-8000	Conformal Anti-Jam GPS CRPAs	STAP (beamforming & nulling)	GPS L1 & L2 C/A and P(Y)	7-6010
20-2041	Active GPS Patch Antenna	N/A	GPS L1 and/or L2	N/A

4-Channel Anti-Jam GPS DACU

Key features:

- **M-code compliant**
- **Excision narrowband interference protection**
- **Compact and lightweight**
- **Low latency**

Chelton's 4-Channel Anti-Jam GPS system provides significant immunity to jamming compared with a conventional GPS antenna, allowing the platform to operate up to 100 times closer to the jammer and maintain reception.

The Digital Antenna Control Unit (DACU) mitigates narrow-band interference, using an excision process, and broadband interference by creating directed nulls in the antenna pattern. These techniques provide significant anti-jam protection even in highly dynamic, multi-jammer environments.

Chelton is able to provide a complete anti-jam solution for the platform. Installations can make use of a variety of CRPA options and cabling lengths, to best suit the form factor requirements of the platform. The DACU interfaces the antenna array to the GPS receiver.

The DACU is designed for size and weight constrained platforms, such as small airborne and unmanned installations. The DACU includes the ability to determine the direction of multiple spatially separated



jammers with an accuracy of better than 5 degrees when the system is calibrated to the aircraft platform.

ELECTRICAL

Impedance	50 Ω
VSWR	>2:1
Gain	The DACU is designed to operate in conjunction with a Chelton CRPA type 20-7009. The system shall provide an overall RF gain from antenna element to target GPS receiver of greater than 29.5 dB (as per DO-301 requirements) when installed with cable giving a maximum of 4.5 dB loss between the CRPA and DACU.
Nulling Capability	STAP and Excision
CRPA	20-7009
Channels	4

MECHANICAL

Dimensions (LxWxH)	231 x 125 x 60 mm (excluding connectors)
Weight	1.6kg max
Connector	Input 4 x SMA Female, Output TNC Female

ENVIRONMENTAL

Continuous Operating Temperature	- 40°C Min + 71°C Max
Altitude	50,000 ft



7-6008 DACU8

Anti-Jam GPS DACU (8-Channel)

Key features:

- Fully M-Code Compatible
- Excision narrowband interference protection
- STAP nulling broadband interference protection
- Ultra-low Latency of 29.36µs
- In use on US Army Gray Eagle

The Anti-Jam GPS DACU (Digital Antenna Control Unit), Type 7-6008, is an 8 channel GPS anti-jamming processor for use with an active controlled reception pattern array (CRPA).

The DACU mitigates narrow-band interference, using an excision process, and broadband interference by creating directed nulls in the antenna pattern. These techniques provide significant anti-jam protection even in highly dynamic, multi-jammer environments.

Chelton is able to provide a complete anti-jam solution for the platform. Installations can make use of a variety of CRPA options and cabling lengths, to best suit the form factor requirements of the platform. The DACU interfaces the antenna array to the GPS receiver.

CHELTON



The DACU is designed for size and weight constrained platforms, such as small airborne and unmanned installations. The DACU includes the ability to determine the direction of multiple spatially separated jammers with an accuracy of better than 5 degrees when the system is calibrated to the aircraft platform.



7-6008 DACU8

Anti-Jam GPS DACU (8-Channel)

ELECTRICAL

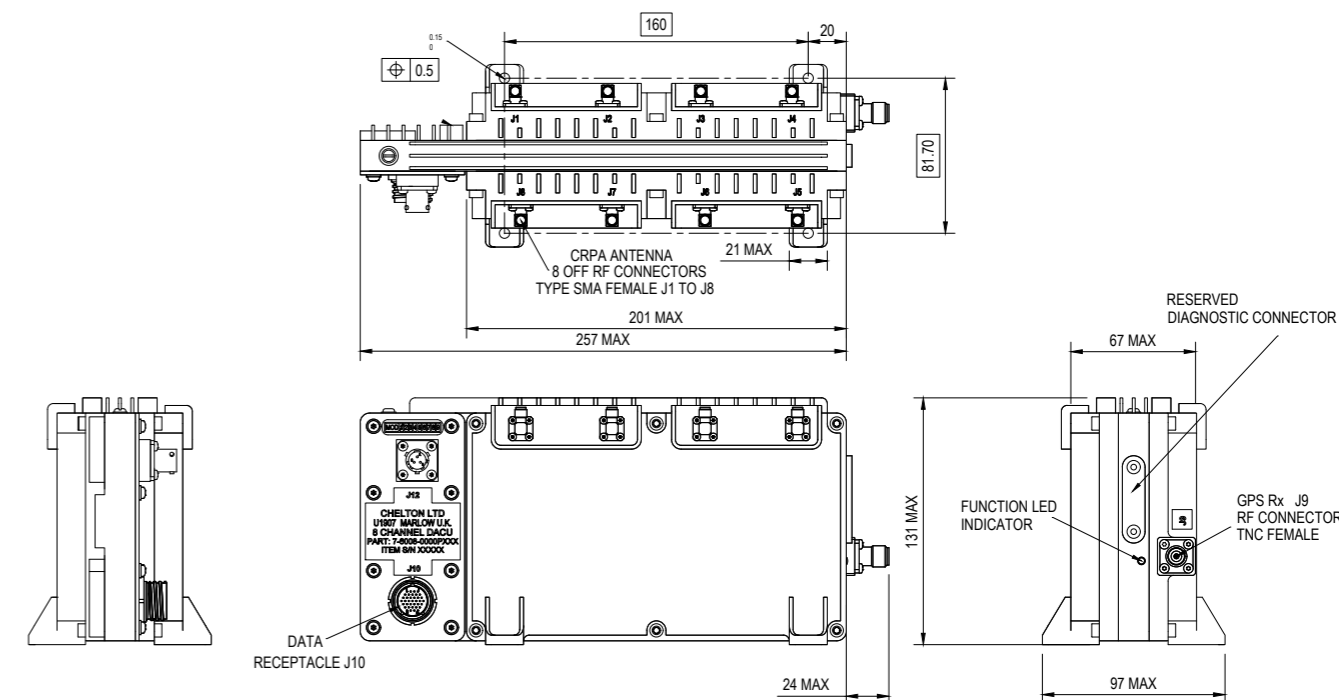
Power Consumption	< 42 W
Input Voltage	28 V dc nominal (+ 18 V to +32 V)
Noise Figure	< 4.5 dB (with 20-7009 CRPA)
Gain	> 29.5dB
Connectors	
RF In (J1-J8)	SMA Female (8 off)
RF Out (J9)	TNC Female
Power (J12)	MS3112E-8-33P
Data (J10)	Glenair 801-011-07M13-37PA. (37 way male)

MECHANICAL

Height	131 mm (5.16")
Width	97 mm (3.82")
Length	257mm (10.12")
Max Weight	2.06 kg (4.54 lbs)
Mounting	4 holes fixed location

ENVIRONMENTAL

High Temperature	MIL-STD-810G, Method 501.5, 502.5, 500.5, 507.5 Operational: +71°C
Low Temperature	MIL-STD-810G, Method 501.5, 502.5, 500.5, 507.5 Operational: -40°C
Altitude	MIL-STD-810G, Method 501.5, 502.5, 500.5, 507.5 25,000 ft (maximum)
Rate of Climb and Descent	MIL-STD-810G, Method 500.5 Max rate: 10 m/s
Waterproofness	MIL-STD-810G, Method 506.5, Procedure III, Drip Test
Salt Fog	MIL-STD-810G, Method 509.5
Acceleration	MIL-STD-810G, Method 513.6, Proc I
Vibration	MIL-STD-810G, Method 514.7, Proc I, Annex D, Cat13 (Propeller Aircraft) MIL-STD-810G, Method 514.7, Proc I, Annex D, Cat14 (Helicopter)
Shock	MIL-STD-810G, Method 516.6, Procedures I and V Operating: 20 g Crash Hazard 40 g
EMC	MIL-STD-461F CE101,CE102,CE106, RE101,RE102 CS101,CS114,CS115,CS116 RS101,RS103



20-7009

Four Element Active CRPA

GPS L1/L2 (P&M Code)

CHELTON



Key features:

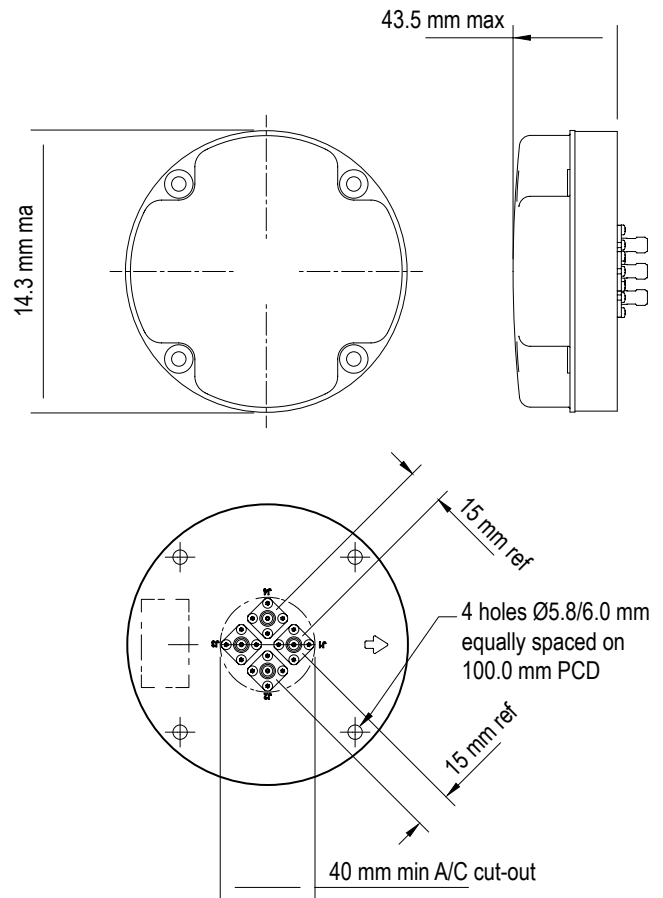
- 4 GPS Patch Elements
- Interference and Jamming Resistant
- Small and light

The 20-7009 Four Element CRPA Antenna is a miniature four element Global Positioning System (GPS) Controlled Reception Pattern Array (CRPA) antenna designed primarily for airborne rotary wing and ground-based operations.

The 20-7009 consists of four light-weight, temperature stable radiating elements which operate with nominally hemispherical coverage in the GPS L1 and L2 bands.

The array is available in a variety of options, including passive and active configurations. The active configuration contains four low-noise amplifiers protected by filters, providing rejection of unwanted out-of-band signals, and limiters which provide protection from high power signals.

The active CRPA is designed to work in conjunction with a compatible Chelton Digital Antenna Control Unit (4-channel 7-6005, 8-channel 7-6008), which houses the anti-jam electronics functionality.



ELECTRICAL

Frequency	GPS L1, L2, P, M-Code
LNA Gain	28 dB (nominal)
LNA Noise Figure	≥ 3.0 dB @ +23°C

ENVIRONMENTAL

Environmental	MIL-STD-810G
EMC	MIL-STD-461F
Lightning	MIL-STD-464A, Zone 1C

MECHANICAL

Height	43.5 mm (1.71")
Diameter	114.3 mm (4.5")
Max Weight	0.5 kg (1.1 lbs)
Connectors	SMA Female (4 off)
Mounting	4 holes fixed location



20-2041

Active TSO compliant antenna

GPS L1/L2 (M Code)

CHELTON



Key features:

- **Active GPS Antenna**
- **TSO-C190, MSO-C144 and WAAS compliant**
- **M-Code**

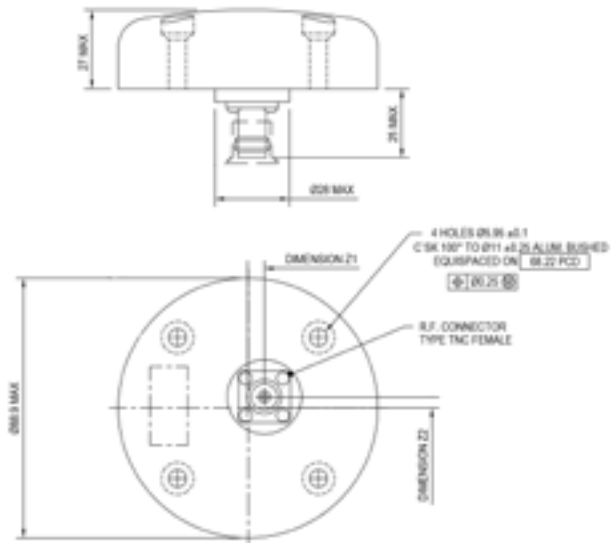
The 20-2041 active GPS antenna operates in the GPS L1 and L2 bands. The antenna is certified to military and civil operational performance standards, including WAAS operation.

The antenna operates with hemispherical coverage with Right Hand Circular Polarisation (RHCP) reception, excellent symmetry and cross-polar performance.

The low noise Antenna Electronics (AE) amplifies signals in the two GPS bands (separately for maximum performance), while rejecting out-of-band signals.

The AE also incorporates a limiter circuit protection from high power in-band signals. Power is applied to the AE on the centre conductor of the RF connector. The minimum AE gain is 26.5 dB.

The antenna element and AE are housed within a high performance shell which is sealed to an aluminium enclosure/baseplate. The shell provides protection against rain, ice, fluid contamination and lightning.



ELECTRICAL

Frequency	L1: 1575.42 MHz ± 12 MHz L2: 1227.60 MHz ± 12 MHz
Primary Power	4.5 V to 14.4 V, 60 mA maximum
Polarisation	Predominantly RHCP (Axial Ratio ≤ 3 dB on boresight.)
Impedance	50 ohm (nominal)
VSWR (Return Loss)	2.0:1 (≥ 9.5 dB)

MECHANICAL

Height	27 mm (1.06")
Diameter	88.9 mm (3.5")
Max Weight	0.25 kg (0.55 lbs)
Connectors	TNC Female
Mounting	4 holes fixed location

ENVIRONMENTAL

MSO for L1 and L2	MSO-C144
TSO (L1 band only)	ETSO-C190
MOPS - Active Airborne Global Navigation Satellite System (GNSS) Antenna	RTCA DO-301
MOPS - WAAS	RTCA DO-229
Environmental Performance	RTCA DO-160E, MIL-STD-810G
Direct Lightning	EUROCAE ED-84 Zone 2A2A



Anti-Jam GPS DACU (8-Channel)

Key features:

- Nulling and beamsteering
- GPS L1 L2 P(Y) code

The DACU8b mitigates broadband interference by creating directed nulls and steered beams in the antenna pattern. These techniques provide significant anti-jam protection even in highly dynamic, multi-jammer environments.

The DACU8b can be customised to suit a variety of EGI interfaces in order to received the required information for beam steering control. The DACU8b is in use on KAI KF-21 (formerly known as KF-X), using a Honeywell EGI.

The DACU is designed for size and weight constrained platforms, such as small airborne and unmanned installations, but is suited to larger sized aircraft. The DACU includes the ability to determine the direction of multiple spatially separated jammers with an accuracy of better than 5 degrees when the system is calibrated to the aircraft platform.

Chelton is able to provide a complete anti-jam solution for the platform. Installations can make use of a variety of CRPA options and cabling lengths, to best suit the form factor requirements of the



platform. The DACU interfaces the antenna array to the GPS receiver.

The 7-6010 DACU operates alongside the 20-8000 conformal CRPA for which the design will be dependent and individual to the needs of the aircraft.

Anti-Jam GPS DACU (8-Channel)

ELECTRICAL

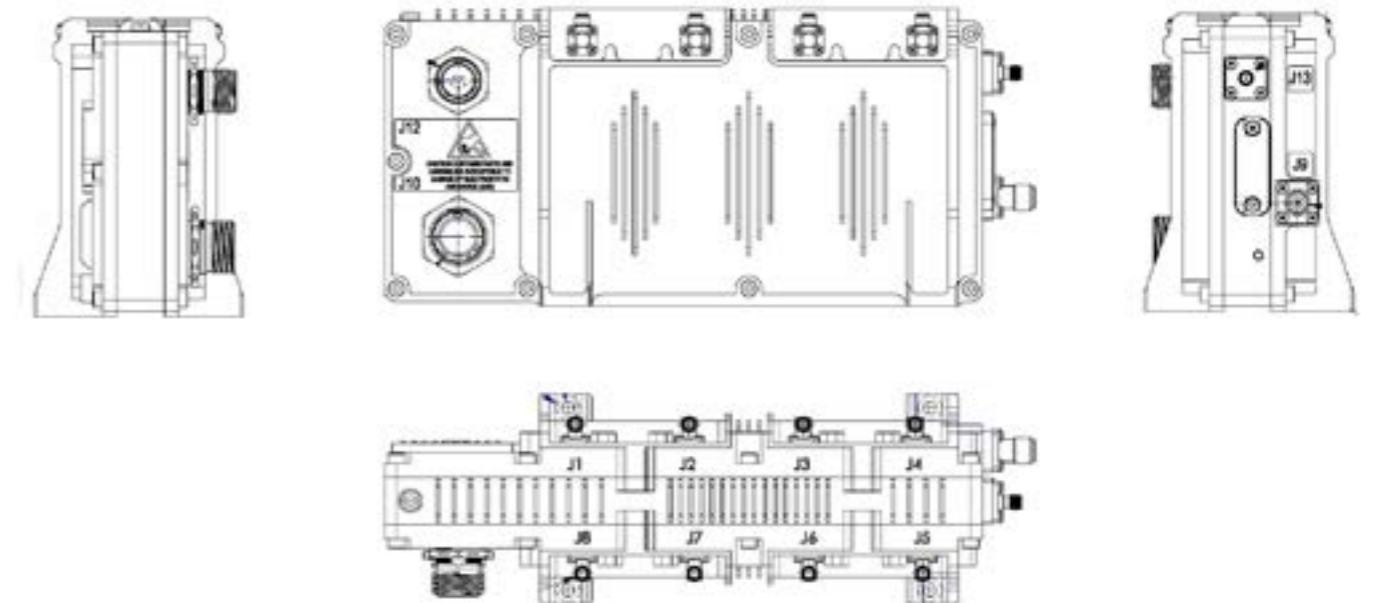
Power Consumption:	< 50 W
Input Voltage	28 V dc (nominal)
Maximum RF Input:	< -10 dBm
VSWR (I/P and O/P)	Better than 2:1
Noise Figure	< 4 dB
Gain	+15 dB to +35 dB
Connectors	
RF In	SMA Female (8 off)
RF Out	TNC Female
Power	D38999/24FB5PN
Data	D38999/24FC35PN

MECHANICAL

Height:	128 mm (5.04")
Width:	86 mm (3.39")
Length:	256mm (10.08")
Max Weight:	2.25 kg (4.96 lbs)
Mounting:	4 holes fixed location

ENVIRONMENTAL

High Temperature:	MIL-STD-810G_CHG-1, Meth 501.6 Operational: +71°C Storage: +90°C
Low Temperature:	MIL-STD-810G_CHG-1, Meth 502.6 Operational: -40°C Storage: -54°C
Altitude:	MIL-STD-810G_CHG-1, Meth 500.6 55,000 ft (maximum)
Temperature Shock:	MIL-STD-810G_CHG-1, Meth 503.6
Contamination by Fluids	MIL-STD-810G_CHG-1, Meth 504.2
Waterproofness	MIL-STD-810G_CHG-1, Meth 506.6
Fungus Resistance	MIL-STD-810G_CHG-1, Meth 508.7
Salt Fog	MIL-STD-810G_CHG-1, Meth 509.6
Dust	MIL-STD-810G_CHG-1, Meth 510.6
Acceleration	MIL-STD-810G_CHG-1, Meth 513.7
Vibration	MIL-STD-810G_CHG-1, Meth 514.7
Mechanical Shock	MIL-STD-810G_CHG-1, Meth 516.7
EMC	MIL-STD-461G CE101, CE102, RE101, RE102, CS101, CS114, CS115, CS116, CS118, RS101, RS103



20-8000

8-element passive CRPA

GPS L1/L2 (P&M Code)

Key features:

- Fully conformal
- M-code compliant
- GNSS, GPS L1, L2

With a trend for operators requesting smaller Anti-Jam GPS CRPA antennas to reduce drag, aircraft manufacturers are turning to Chelton for conformal GPS CRPA antenna solutions.

Conformal antennas fit seamlessly into the skin of the aircraft, are non-protruding and can arbitrarily take any shape on the surface they are fitted onto, like the full suite of conformal antennas we developed for the next generation of Korean Fighter Jets, or the conformal GPS CRPA for Eurofighter. Even anti-jam GPS for munitions.

**Please note, these antennas are conformal and so will be dependent on the geometry of each aircraft.*

CHELTON



ELECTRICAL

Frequency	L1: 1575.42 MHz \pm 12 MHz L2: 1227.60 MHz \pm 12 MHz
Power Handling	Request information at info@chelton.com
Impedance	50 Ω
VSWR	\leq 2:1
Gain	L1: 1563.42 MHz \geq 60% L1: 1565.42 MHz \geq 60% L1: 1575.42 MHz \geq 75% L1: 1585.42 MHz \geq 60% L1: 1587.42 MHz \geq 60% L2: 1215.6 MHz \geq 60% L2: 1217.6 MHz \geq 60% L2: 1227.6 MHz \geq 75% L2: 1237.6 MHz \geq 60% L2: 1239.6 MHz \geq 60%
Polarisation	Predominantly RHCP

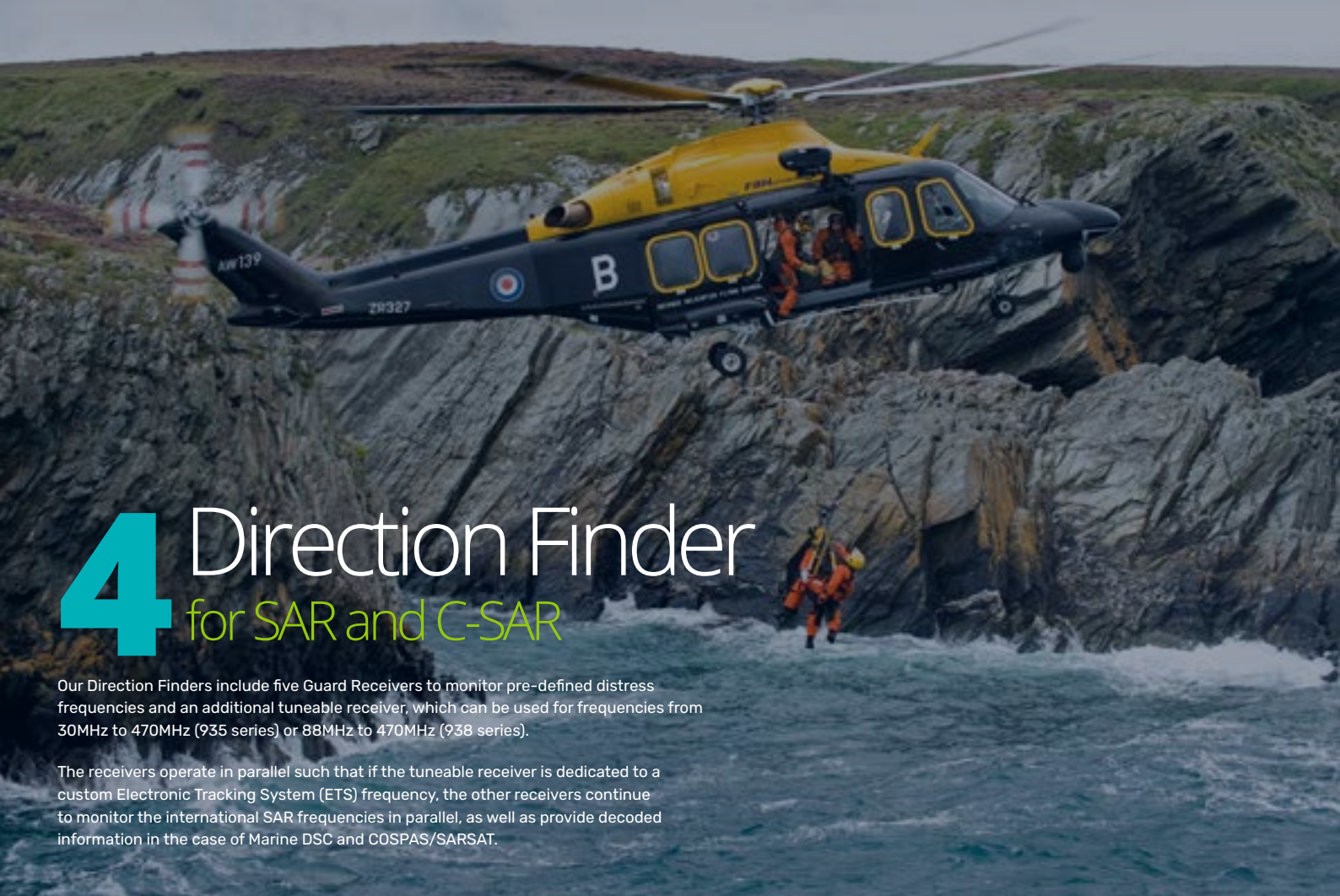
MECHANICAL

Dimensions (LxWxH)	Approx 270 x 265 x 36 mm
Weight	2.3kg max
Connectors	TNC Female

ENVIRONMENTAL

Altitude	50,000 ft
Continuous Operating Temperature	-62°C to +89°C, short term +107 C for 10 min





4 Direction Finder for SAR and C-SAR

Our Direction Finders include five Guard Receivers to monitor pre-defined distress frequencies and an additional tuneable receiver, which can be used for frequencies from 30MHz to 470MHz (935 series) or 88MHz to 470MHz (938 series).

The receivers operate in parallel such that if the tuneable receiver is dedicated to a custom Electronic Tracking System (ETS) frequency, the other receivers continue to monitor the international SAR frequencies in parallel, as well as provide decoded information in the case of Marine DSC and COSPAS/SARSAT.

Direction Finding Quick Reference Table

Part Number	Description	Frequency (MHz)	Complementary Part Number
938	Tactical Direction Finder	30 - 470	715-40
715-40	Direction Finding Controller	N/A	938
938	Civil Direction Finder	88 - 470	718-40
718-40	Direction Finding Controller	N/A	935

Direction Finding Systems

Directions Finding (DF) Systems for all Search & Rescue (SAR) Missions

SAR Requirements

The location of persons in distress needs to be quickly and accurately determined in order to maximise the chance of rescue success regardless of the prevailing conditions or the theatre of operation. Despite the improvements made in the COSPAS/SARSAT system, Search and Rescue crews on-board aircraft still rely on Direction Finding (DF) equipment to guide them in the last miles of the search, and indeed for much greater distances should the survivor not have a GNSS-based beacon.

The Solution:

The 935- Series of Tactical Direction Finders provide a range of integrated solutions for bus-controlled (1553B) and stand-alone direction finding systems in both SAR and CSAR environments. The 938- Series of Civil Direction Finders provide solutions for SAR only requirements. The DFs in both families include an integral synthesised receiver (covering 30-470MHz for the 935-series, and 88-470MHz for the 938 series), together with five Guard receivers to monitor pre-defined distress frequencies. Bearings are taken on all six receivers simultaneously. Data decoding is provided for COSPAS-SARSAT messages and for marine DSC messages via the associated Guard receivers. Stand-alone installations typically control the DF via RS422 using a Chelton-supplied



CDU, but the command interface protocol is available for customers to interface their own control interface as required.

The Chelton range of DF equipment utilises DSP (software defined) receiver technology and is designed for both military and civil use. The members of the DF family provide single box solutions, COSPAS/SARSAT compliant and compatible with the requirements of the Global Maritime Distress and Safety System (GMDSS).

Direction Finding Systems

Directions Finding (DF) Systems for all Search & Rescue (SAR) Missions



Combat SAR (CSAR):

In Military applications, the DF is required to interface to a CSAR beacon interrogator that initiates transmission from the rescue beacon in order to facilitate covert rescue. The Chelton 935 DF is designed to interface to suitable interrogators and to be able to take bearings in the brief period of beacon response. CSAR beacon compatibility is available for typical beacons including PRC112G, PRC434 and URX3000.

Civil SAR

To respond to customers wishing to deploy DFs on civil aircraft, Chelton have released an ITAR free version of the popular 935-series, known as the 938-series. This civil variant retains the majority of the features of the 935 system, with the exception of those specifically designed for military customers.

931 Series & System 7

Whilst the 935-and 938-series of DF represent the standard product range, Chelton continue to support the 931-series and 7-series DF systems.

Unlike the 935- or 938- which embody integrated receivers, the 931-series are antenna/processor devices that require connection to separate receivers which may already be on the aircraft platform. Bearing display is accomplished via serial interfaces including ARINC429 and ARINC407. If required, Chelton can also provide a range of Guard receivers to monitor the standard international distress frequencies, including a variant that provides decode of COSPAS/SARSAT distress messages.

The System 7 Direction Finder is a legacy stand-alone product with embedded receivers that (along with its associated 400-047992 controller) provides a complete small-size system that provides relative bearing information, COSPAS-SARSAT decodes, and can also provide bearing information output via ARINC429.

935

Tactical Direction Finders

30-470MHz

The location of persons in distress needs to be quickly and accurately determined in order to maximise the chances of a successful rescue, regardless of the prevailing conditions or the theatre of operation.

The 935 Series of tactical Direction Finders (DF) provides a range of integrated DF solutions for bus-controlled and stand-alone direction finding systems. 935 DFs include an integral synthesised receiver covering the frequency range 30 MHz - 470 MHz, together with five Guard Receivers to monitor pre-defined distress frequencies. Bearings may be taken on all six receivers simultaneously. Data decoding is provided for COSPAS-SARSAT messages and for marine DSC messages on the associated Guard Receivers. There is also the option to select sonobuoy bandwidth for DF to sonobuoys.

When used with a Personnel Locator System (PLS) Interrogator, a 935 DF system has the capability to operate with Personnel Survival Radios (PSR), such as the AN/PRC-112 and PRC-434, to provide range and bearing information. In addition, the system can provide the bearing coordinates from an embedded Global Positioning System (GPS) in the URX3000 PSR. Bearings are taken in one of two Customer selectable modes: Search and Rescue (SAR) and Combat SAR (CSAR).

CHELTON



Discrete outputs are provided for on-top position indication (OTPI) and distress alert. The Main synthesised receiver may be tuned in 1 kHz steps.

The Guard Receivers may be tuned in 1 kHz steps across the frequency ranges shown in the following table:

Receiver	Band	Frequency Range (MHz)
Guard RX0	VHF	120.000 - 130.000
Guard RX1	Maritime	150.000 - 160.000
Guard RX2	UHF	240.000 - 250.000
Guard RX3	COSPAS-SARSAT	Main channel preset to 406.048 (see text below)
Guard RX4	GMDSS DSC	156.525 (CH70)

The VHF, Maritime and UHF Guard Receivers have a Main channel and an associated Auxiliary channel. The Main frequencies are pre-programmed, while the auxiliary channels can be programmed by the Customer. Such an arrangement allows distress monitoring to take place on the Main frequencies and training to be carried out on selectable Auxiliary frequencies.

935

Tactical Direction Finders

30-470MHz

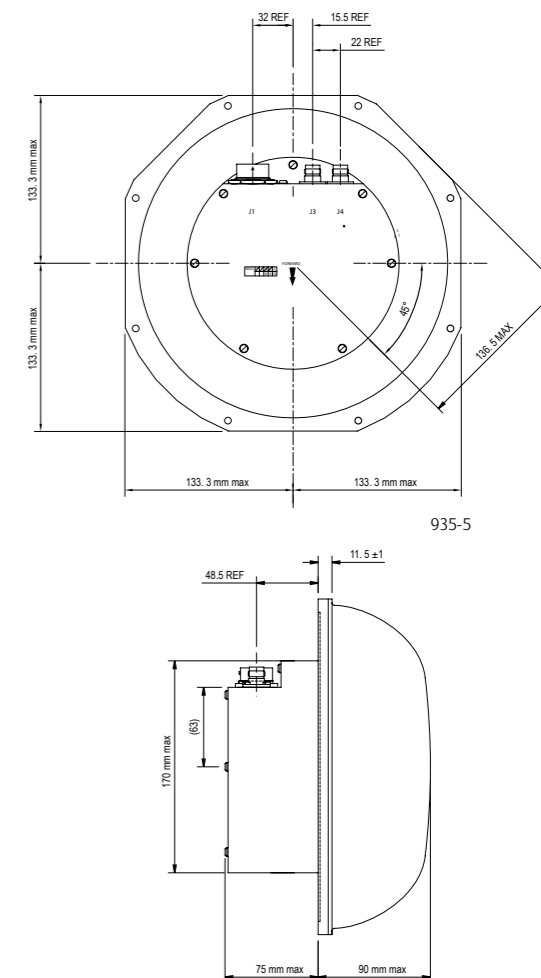
The GMDSS DSC Guard Receiver is pre-programmed to the VHF DSC Channel 70. The system may be programmed to monitor and report Distress Alerts, All-Ships Calls, Selective Calls and either Distress or Urgency categories. Full reporting of the vessels MMSI, Nature of Distress and GPS coordinates is made available to the user.

The COSPAS/SARSAT Guard Receiver embodies a unique technique that enables it to receive and decode SARSAT message data over the full range of standard frequencies from 406.025 MHz to 406.070 MHz without the need for scanning or operator intervention. The Auxiliary channel can be tuned to cover frequencies down to 399 MHz, or up to 406.10 MHz, if required.

This enables the DF to cover all channels currently listed by the COSPAS/SARSAT organisation (C/S T.012 Issue 1 - Rev 9 October 2013). The COSPAS/SARSAT decoded messages are reported on the control bus, for display on the controller.

The HEX ID of the beacon, together with any GPS position data is reported for display. In addition, the latitude and longitude data of the most recently decoded beacon is output on the ARINC429 bus.

CHELTON



Tactical Direction Finders

30-470MHz

ELECTRICAL

Frequency Range	30 MHz - 470 MHz
Primary Power	16.0 to 31.5 V d.c., 1.6 A max
Operational Performance	Accuracy: Better than 5 rms (dependent on installation)

MECHANICAL

Dimensions (mm)	286 x 286 x 90 (maximum)
Weight (kg)	3.8 (maximum)
Connectors	MS3114-16-26P GB711 5009-1 GB711 5009-2

ENVIRONMENTAL

Mounting Attitude	In line with airframe, normal or inverted
Mounting Method	Rigid
Temperature Altitude	EUROCAE ED-14C/RTCA DO-160C Section 4 Cat B2 25,000 feet
Temperature Variation	EUROCAE ED-14C/RTCA DO-160C Section 5
Vibration	EUROCAE ED-14C/RTCA DO-160C Section 8 Cat L Fixed Wing Cat Y Helicopter
Shock	EUROCAE ED-14C/RTCA DO-160C Section 7 Normal operation: 6 g, 11 ms ½ sine Crash Condition: 15 g, 11 ms ½ sine Sustained (Acceleration): 12 g, 3 secs in 6 directions
EMC	DEF-STAN 59-41, Part 3, Issue 5 Categories: DCE01, DCE02, DCE03, DRE01, DRE02, DCS01, DCS02, DCS03, DCS04, DCS10, DRS01, DRS02
Humidity	EUROCAE ED-14C/RTCA DO-160C Section 6 Cat C External
Magnetic Influence	EUROCAE ED-14C/RTCA DO-160C Section 15 Class Z 0.3 m
Waterproofness	EUROCAE ED-14C/RTCA DO-160C Section 10, Cat R
Fluid Contamination	EUROCAE ED-14C/RTCA DO-160C Section 11, Cat F
Antenna Type	Modified annular slot with a cardioid receiving pattern



715-40

CHELTON

DF Controllers

The 715-40 Controller Series provides the dedicated control and display interface for Chelton Antenna Systems 935 Series Tactical Direction Finders (DF).

The unit provides the controls to select the operating mode and frequency, and displays the received signal strength, relative bearing information, age, and digital data as decoded from receivers dedicated

to the COSPAS/SARSAT frequency and the Marine DSC Channel.

The amber, monochromatic, electroluminescent screen has a viewable area of approximately 160 pixels x 120 pixels (62.3 mm x 46.7 mm).

An integral filter enables its use in Night Vision Goggle (NVG) applications. Green backlighting of the selector switch legend is provided via the aircraft instrument panel

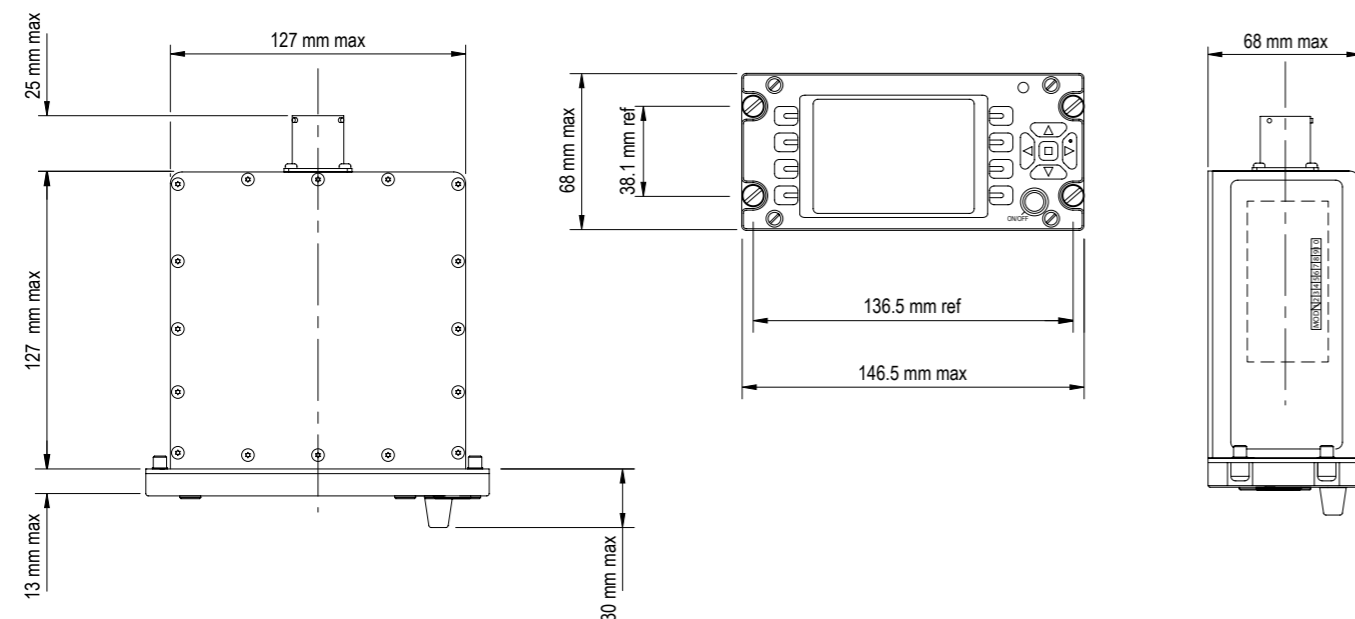


lighting bus.

The front panel offers a rotary selector switch with built-in ON/OFF push button, eight menu-allocated 'soft' keys and a navigation array of five keys.

The Dzus rail mounted controller housing is constructed from a single cavity aluminium box with a top fitted lid and a front mounted, control and display panel.

The 715-40 Controller Series includes variants designed to interface with the variants of the 935 Series DFs. Variants are described via numeric suffixes to the Type number.



715-40

CHELTON

DF Controllers

ELECTRICAL

Operating Voltage	28 V dc (nominal) (16 V to 32 V)
Input Current	500 mA (maximum) (18 V to 32 V operational)
Panel Dimming Input Voltage	0 V to 28 V dc
Panel Dimming Input Current	60 mA (maximum) (aircraft light bus, isolated)
Power Consumption	Main Supply: 7 W (maximum) Light Bus: 1.5 W (maximum)
Connectors	PVXTOW14-19U(N)

MECHANICAL

Dimensions	68 x 146.5 x 157 mm max
Weight	0.92kg max
Display Active Area	160 pixels x 120 pixels (62.3 mm x 46.7 mm)

ENVIRONMENTAL

Temperature	RTCA DO-160C, Section 4, Category B1 modified Operational: -20°C to +55°C Short Time: +70°C Ground Survival: -40°C to +85°C
Altitude	7,620 m
Temperature Variation	RTCA DO-160C, Section 5, Category B
Shock	RTCA DO-160C, Section 7, Category B
Vibration	RTCA DO-160C, Section 8, Categories B,M,N
Explosion Proofness	RTCA DO-160C, Section 4, Category B
Waterproofness	RTCA DO-160C, Section 10, Category W (front panel only)
Fluids Susceptibility	RTCA DO-160C, Section 11, Category X
Sand and Dust	RTCA DO-160C, Section 12, Category X
Fungus Resistance	RTCA DO-160C, Section 13, Category X
Salt Spray	RTCA DO-160C, Section 14, Category X
Magnetic Effect	RTCA DO-160C, Section 15, Zone Z Less than 0.3 m
NVIS Compatibility	MIL-STD-3009, Type II, Class B
EMC	DEF STAN 59-41 (Part 3), Issue 5 DCE01, DCE02, DCE03, DCS01, DCS02, DCS03, DCS04, DCS10, DRE01, DRE02, DRS01, DRS02

Civil Direction Finders

88-470MHz

The location of persons in distress needs to be quickly and accurately determined in order to maximise the chances of a successful rescue, regardless of the prevailing conditions or the theatre of operation.

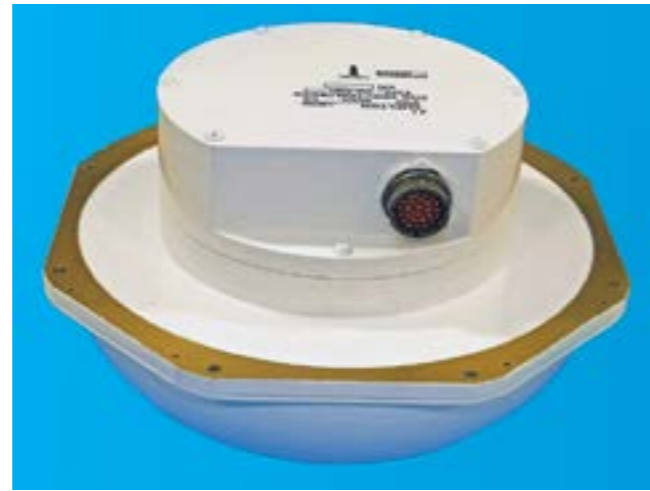
The 938 Series of civil Direction Finders (DF) provide a range of integrated DF solutions for bus-controlled and stand-alone direction finding systems. 938 DFs include an integral synthesised receiver covering the frequency range 88 MHz - 470 MHz, together with 5 Guard Receivers to monitor pre-defined distress frequencies. Bearings may be taken on all 6 receivers simultaneously. Data decoding is provided for COSPAS-SARSAT messages and for marine DSC messages on the associated Guard Receivers. There is also the option to output On Top Position Indication (OTPI).

The receivers may be tuned in in 1 kHz steps across the following frequency ranges:

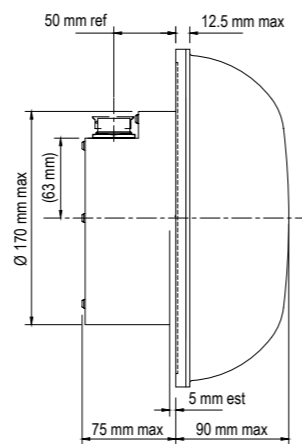
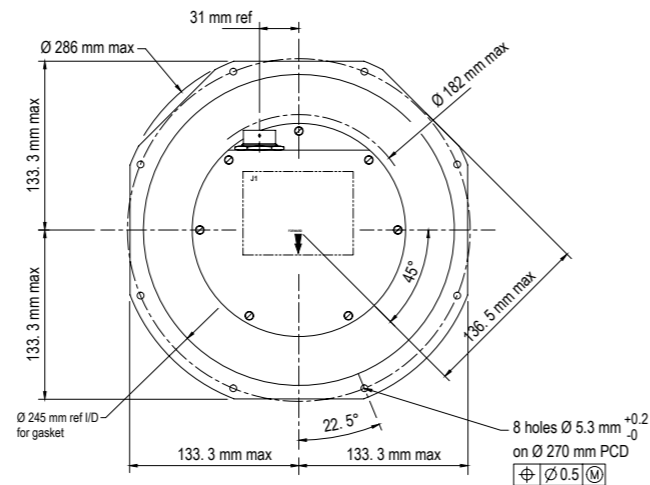
The VHF, Maritime and UHF Guard Receivers have a Main channel and an associated

Receiver	Band	Frequency Range (MHz)
Main	VHF/UHF	88.000 - 470.000
Guard RX0	VHF	120.000 - 130.000
Guard RX1	Maritime	150.000 - 160.000
Guard RX2	UHF	240.000 - 250.000
Guard RX3	COSPAS-SARSAT	Main channel preset to 406.048 (see text opposite)
Guard RX4	GMDSS DSC	156.525 (CH70)

Auxiliary channel. The Main channels are pre-programmed, while the Auxiliary channels can be programmed by the Customer. Such an arrangement allows distress monitoring to take place on the Main frequencies and training to be carried out on selectable Auxiliary frequencies.



The GMDSS DSC Guard Receiver is pre-programmed to the VHF DSC Channel 70. The system may be programmed to monitor and



Civil Direction Finders

88-470MHz

report Distress Alerts, All-Ships Calls, Selective Calls and either Distress or Urgency categories. Full reporting of the vessels MMSI, Nature of Distress and GPS coordinates is made available to the user.

The COSPAS/SARSAT Guard Receiver embodies a unique technique that enables it to receive and decode SARSAT message data over the full range of standard frequencies from 406.025 MHz to 406.070 MHz without the need for scanning or operator intervention. The Auxiliary channel can be tuned to cover frequencies down to 399 MHz, or up to 406.10 MHz, if required. This enables the DF to cover all channels currently listed by the COSPAS/SARSAT organisation (C/S T.012 Issue 1 - Rev 9 October 2013). The COSPAS/SARSAT decoded messages are reported on the control bus, for display on the controller. The HEX ID of the beacon, together with any GPS position data is reported for display. In addition, the latitude and longitude data of the most recently decoded beacon is output on the ARINC429 bus.

ELECTRICAL

Frequency	88 MHz - 470 MHz
Primary Power	18.0 to 31.5 V dc, 1.5 A max (750 mA typical at 28 V)
Operational Performance Accuracy:	Better than 5 rms (dependent on installation)

MECHANICAL

Dimensions (LxWxH)	286 x 286 x 90 mm (maximum)
Weight	3.4 (maximum)
Mounting	PVXT7W-16-26UP2N

ENVIRONMENTAL

Mounting Attitude	In line with airframe, normal or inverted
Mounting Method	Rigid
Temperature Altitude	EUROCAE ED-14G/RTCA DO-160G Sect 4, Cat B3, 7620 m
Temperature Variation	EUROCAE ED-14G/RTCA DO-160G Sect 5, Cat A External
Vibration	EUROCAE ED-14G/RTCA DO-160G Sect 8, Cat S, Curve L modified Fixed Wing Curve U2 Helicopter
Shock	EUROCAE ED-14G/RTCA DO-160G Sect 7 Normal operation: Paragraph 7.2.1 (6 g) Crash Condition: Paragraph 7.3.1 (20 g) Sustained: Paragraph 7.3.3 (20 g) (Acceleration)
Humidity	EUROCAE ED-14G/RTCA DO-160G Sect 6, Cat C External
Waterproofness	EUROCAE ED-14C/RTCA DO-160G Sect 10, Cat R
Fluids Susceptibility	EUROCAE ED-14G/RTCA DO-160G Sect. 11, Cat. F
Magnetic Effect	EUROCAE ED-14G/RTCA DO-160G Sect 15, Cat Z
Power Input	EUROCAE ED-14G/RTCA DO-160G, Sect 16, Cat BX (28 V)
Salt Spray	RTCA/DO160C, Section 14, Category X
Voltage Spike	EUROCAE ED-14G/RTCA DO-160G, Sect 17, Cat B
AF Conducted Susceptibility - Power Inputs	EUROCAE ED-14G/RTCA DO-160G, Sect 18, Cat B
Induced Signal Susceptibility	EUROCAE ED-14G/RTCA DO-160G, Sect 19, Cat AC
RF Susceptibility (Radiated and Conducted)	EUROCAE ED-14G/RTCA DO-160G, Sect 20, Cat S
Emission of Radio Frequency	EUROCAE ED-14G/RTCA DO-160G, Sect 21, Cat B
Antenna Type	Modified annular slot with a cardioid receiving pattern



718-40

CHELTON

DF Controllers

The 718-40 Controller Series provides the dedicated control and display interface for Chelton Antenna Systems Type 938 Series Direction Finders (DF).

The unit provides the controls to select the operating mode and frequency, and displays the received signal strength, relative bearing information, age, and digital data as decoded from receivers dedicated to the COSPAS-SARSAT frequency and the Marine DSC Channel.

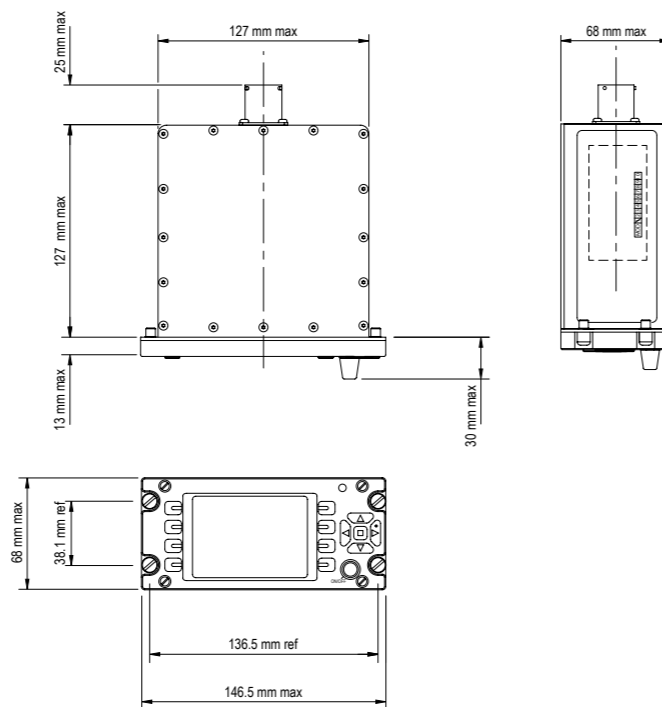
The amber, monochromatic, electroluminescent screen has a viewable area of approximately 160 pixels x 120 pixels (62.3 mm x 46.7 mm).

An integral filter enables its use in Night Vision Goggle (NVG) applications. Green backlighting of the selector switch legend is provided via the aircraft instrument panel lighting bus.

The front panel offers a rotary selector switch with built-in ON/OFF push button, eight menu-allocated 'soft' keys and a navigation array of five keys.

The Dzus rail mounted controller housing is constructed from a single cavity aluminium box with a top fitted lid and a front mounted, control and display panel.

The 718-40 Series includes variants designed to interface with the variants of the 938 Series DFs. Variants are described via numeric suffixes to the Type number.



718-40

CHELTON

DF Controllers

ELECTRICAL

Operating Voltage	28 V dc (nominal) (16 V to 32 V)
Input Current	500 mA (maximum) (18 V to 32 V operational)
Panel Dimming Input Voltage	Both 0 V to 28 V dc and 0 V to 5 V dc supported
Panel Dimming Input Current	60 mA (maximum) (aircraft light bus, isolated)
Power Consumption	Main Supply: 7 W (maximum) Light Bus: 1.5 W (maximum)
Connectors	PVXTOW14-19U{N}

MECHANICAL

Dimensions (LxWxH)	68 x 146.5 x 157 mm (maximum)
Weight	0.92 kg (maximum)
Display Active Area	160 pixels x 120 pixels (62.3 mm x 46.7 mm)

ENVIRONMENTAL

Temperature and Altitude	RTCA DO-160C, Section 4, Category B1 modified Operational: -20°C to +55°C Short Time: +70°C Ground Survival: -40°C to +85°C
Altitude	Altitude: 7,620 m
Temperature Variation	RTCA DO-160C, Section 5, Category B
Shock	RTCA DO-160C, Section 7, Category B
Vibration	RTCA DO-160C, Section 8, Categories B,M,N
Explosion Proofness	RTCA DO-160C, Section 4, Category B
Waterproofness	RTCA DO-160C, Section 10, Category W (front panel only)
Fluids Susceptibility	RTCA DO-160C, Section 11, Category X
Sand and Dust	RTCA DO-160C, Section 12, Category X
Fungus Resistance	RTCA DO-160C, Section 13, Category X
Salt Spray	RTCA DO-160C, Section 14, Category X
Magnetic Effect	RTCA DO-160C, Section 15, Zone Z
Voltage Spike	RTCA DO-160G, Sect 17, Cat B
AF Conducted Susceptibility - Power Inputs	RTCA DO-160G, Sect 18, Cat B
Induced Signal Susceptibility	RTCA DO-160G, Sect 19, Cat AC
RF Susceptibility (Radiated, Conducted)	RTCA DO-160G, Sect 20, Cat S
Emission of RF	RTCA DO-160G, Sect 21, Cat B

Airborne Antennas Frequency Table

Communication		
Frequency MHz	Part No.	Page
HF		
2 - 30	435	10
	455	10
	465	10
	475	10
	485	10
V/UHF		
30 - 600 960 - 1220	12-190-160	17
	12-190-530LP	18-19
	12-190-6/1	20
	12-190-60	21
	12-190-61	22
	12-4004	23
	12-224	24
	12-5002	25
	12-5008	26
	10-3003-X	27
10-3003-X	28	
VHF Only		
30 - 300	19-415	32-33
	9-33-32	34
	16-21	35
UHF Only		
225 - 512	16-1	37
	16-3	38
	16-11	39
	16-16	40
	16-39	41
	21-174	42

UHF SATCOM/MUOS		
225 - 400	19-4001	44
	19-430-10	45-45
	19-440	47-48
	19-440-10	47-48
	19-450-10	49-50
	19-470-10	51
Wideband & Multiband		
	20-200-20	53
	16-113	54
	9-33-30	55-56
	12-512	57
	12-231	58
	9-33-26	59
	12-59	60
ELT		
121.5 243 406	25-1000	62
Datalinks		
950 - 1220	10A2	65
	10A14-4	66
	10A21	67
	10A29-22	68
	10A5-1	69
1250 - 2600	32-2002	70
1 - 10	10-30 / 10-31	71

Navigation		
Frequency MHz	Part No.	
VOR/LOC/GS		
108 - 336	27-3002	75
	27-3003	75
	19-85A	76
	19-85B	76
	19-28	77
	21-48L	78
	17-210	79
	17-20	80
17-21	80	
Marker Beacon		
75	17-9	82
	17-4D/1	83
	17-10	84
	17-11	85
DME / IFF		
950 - 1220	10A2	87
	10A14-2	88
	10A14-3	89
	10A14-4	90
	10A21	91
	10A29-22	92
	10A5-1	93
GPS Anti-Jam		
L1, L2, P, M-Code	20-7009	100
	20-2041	101
	20-8000	104
Direction Finder		
Frequency MHz	Part No.	
DF		
30-470	935	108-110
88 - 470	938	113-114



