S-6000 Dual Transceivers

Rugged Communications for Critical Platforms

IP Long Range Data Links *On-the-move*

Platforms

- UAV, RPAS, Drones
- Rotary & Fixed-Wing Platforms
- Ground Control Stations
- Handheld Units, Rovers
- Maritime Systems, Vessels
- Launchers, Balloons
- Stratospheric Platforms

Applications

- ISR Data Links
- Video Streaming
- Telemetry, Tracking & Command
- ATC Services
- Time Synchronisation
- Wireless Mesh Networks

S-6000 dual transceivers are miniaturised high-performance data links, designed to provide reliable wideband communications, under high-dynamics, for UAV, Drones and other critical platforms.

The two full-duplex channels operate at any frequency between 70 MHz and 6 GHz, with configurable data rates from 700 Kbps to 80 Mbps.

The data link has a rugged design for operating in harsh environments, featuring conduction cooling, IP67 aluminium enclosure, and vibration/shock robustness. It enables on-the-move communications for any tactical system, commercial application, or critical airborne platform.

The series includes a rack-mount unit for ground stations, with flexible interfaces, Antenna Control Units (ACUs) outputs, and a 5'' LCD touchscreen.

With the unique capabilities of the S-6000 transceivers, it is possible to setup a synchronised wireless network between distant users moving at high-speed with no additional infrastructure.

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Specifications

		U6000 Ultra-Compact	C6000 Compact	R6000 Rack Mount
Data Link				
Full Duplex Channels		2x Transceivers		
Data Rate, R_b		700 Kbps to 80 Mbps per channel		
Coverage f_{RF} = 2.3 GHz R_b = 11 Mbps	Omnidirectional	3 Km	20 Km	Up to 50 Km
	Directional, 25dBi	20 Km	Up to 200 Km	>200 Km
User Dynamics		>2000 Km/h, >10g		
Signal				
RF Frequency, f_{RF}		70 MHz to 6 GHz VHF, UHF, L, S, C		
RF Bandwidth		1 MHz - 40 MHz		
Max. Transmitted Power		15 mW	3 W	20 W
Modulation		COFDM		
Multiple Access		FDMA, TDMA, IP Multiplexing		
Data Relay		*Option*		
Time Synchronisation		Yes		
MIMO Diversity		2x2 *Option*		
Encryption		AES-128 *Option*		
Interfaces				
RF Connectors		4x SMA 50Ω	4x SMA 50Ω	4x N-type 50Ω
Ethernet Interface		1000BASE-T, RJ-45 connector		
Networking		Headers Management, IP Filtering, Network Bridge		
Circular Connector MIL-DTL D38999		6 contacts	13 contacts	-
Auxiliary Interfaces		1x SMA 50Ω	1x D-sub 9	2x D-sub 9 6x BNC 75Ω 1x BNC 50Ω
Serial Interfaces		1x RS232	2x RS232 1x RS422/485	2x RS232 1x RS422/485
AGC/AM outputs for ACUs		*Option*	*Option*	Yes
Reference Clock Output		Up to 100 MHz	*Option*	Up to 100 MHz
Input Power Supply, V_{in}		+11 to +30 VDC *2x D38999 contacts*	+24 to +30 VDC *6x D38999 contacts*	85 to 264 VAC 47 to 63 Hz
		Maximum Rating: +35VDC		
Max. Current Consumption		0.5A @28VDC	0.8A @28VDC	0.5A @230VAC
Mechanical				
Dimensions		165x110x37 mm	165x110x50 mm	228.6x203.2x88 mm
Weight		0.75 Kg	1.05 Kg	~3.5 Kg
Material		Aluminium 6061		
LCD Display		-	-	5'' Touchscreen 800×480
Environmental				
Operating Temperature		-40ºC…+85ºC	-40ºC…+75ºC	-25ºC…+70ºC
Storage Temperature		-55ºC…+100ºC	-55ºC…+85ºC	-30ºC…+85ºC
Ingress Protection Rating		IP67	IP67	-
Vibration & Shock		MIL-STD-810		
EMI/EMC		MIL-STD-461		
Voltage Transients		MIL-STD-1275, DO-160		
RoHS		Yes		
Export Classification		EAR99, NLR		

OEM version is available for integration in target platform
Options: Integration Support, Video Encoders, Antennas, External Amplifiers (HPA/LNA)

Flexibility

The two transmitter and receiver channels can be configured to setup a full duplex dual transceiver, a multi-band modem, or a 2x2 MIMO link. The RF frequency band is configurable between 70 MHz and 6 GHz. The bandwidth and throughput can be optimised to maximise coverage.

High-Dynamics

Advanced proprietary algorithms allow stable communications under high-dynamic conditions (>2000 Km/h, >10g).

Networking

As a network element, the transceiver implements a wireless node to send and receive TCP/UDP IP data packets.

A caching system manages data peaks over the maximum bandwidth, ensuring stable communications of variable data flows (e.g. video streaming).

Low SWaP-C

The units have been designed to minimise size, weight, power and cost, while ensuring performance and robustness for airborne systems.

Ruggedisation

S-6000 transceivers have a rugged design for operating in harsh environments, including conduction cooling, IP67 aluminium enclosure, and vibration-shock robustness.

AGC/AM outputs for ACUs

The transceivers may output AGC/AM signals to feed Antenna Control Units based on Conical Scan.

Time Synchronisation

The transceivers provide precise time synchronisation across users. Advanced algorithms achieve carrier and sampling frequency alignment, distributing a common reference through the wireless network. It enables applications such as clock distribution, payload data tagging, moving target identification, or measurement dating.

Regenerative Data Relay

Any transceiver in the network can be configured as a regenerative data relay, extending the point-to-point network coverage.

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Data Link

S-6000 dual transceivers are designed to establish reliable long-range communications under high velocity, acceleration, jerk, and shock conditions.

The flexible data link allows the selection of the RF frequency, data rate, transmitted power, and antennas; meeting any coverage, platform, and regulatory requirements.

U6000/C6000 airborne units are rugged, miniaturised transceivers for aerial platforms, while R6000 is a rackmount equipment for ground control stations. The two transceivers per unit, the combination of multiplexing schemes, and the IP capabilities enable:

- Up to two full duplex communication channels.
- A multi-band modem with configurable RF frequencies.
- The use of air vehicles as regenerative data relays.
- Controlling any number of air vehicles simultaneously from a ground station using IP multiplexing.
- Simultaneous reception of two or more telemetry data streams in a single ground station.

Interfaces

Data Ports

The units are connected directly to the Gigabit Ethernet interface to transfer IP data packets through the wireless link (telemetry, video, audio, commands), working as a network bridge transparent to the user.

RS232/422/485 or UART data interfaces are also available using D-sub or circular connectors.

Power Supply

For airborne units, input DC power supply is provided through the circular connector (default) or using the auxiliary D-sub interface. It includes EMI filtering, overcurrent, and reverse voltage protections. The transceiver withstands voltage transients (spikes, surge) according to MIL-STD-1275 and DO-160.

R6000 VAC input power supply features overcurrent and short circuit protections.

Outputs

The transceivers provide the following configurable outputs through the D-sub, BNC, and RF interfaces:

- DC voltages to supply external devices (V_{in}, 5V).
- Reference clock signals up to 100MHz.
- AGC/AM outputs for Antenna Control Units.
- Custom CMOS/TTL/LVDS and analogue signals.

Environment

S-6000 airborne terminals and ground stations are qualified communication systems for Drones, UAVs, helicopters, fixed-wind aircrafts, and launchers; delivering superior performance in harsh environments with optimised size, weight, and power consumption.

They are the best solution in the market for aerial platforms with limited payload capabilities and cost budget, but demanding coverage, environmental, and reliability requirements.

The extended operating temperature range is based on a conduction-cooled design, that allows IP67 airborne enclosures as per IEC 60529 specification.

The units are compliant with MIL-STD-461 (EMI/EMC) and MIL-STD-810 (Vibration & shock) standards.

Configuration & Status Monitoring

A proprietary IP protocol allows configuration and status monitoring of the transceivers, both locally through the Ethernet interface, and remotely via the wireless link.

The protocol may be used to configure network parameters, tune RF output power and centre frequency, or turn on/off the transceivers. Periodic monitoring includes signal performance (EVM, Eb/N0, BER, RSSI) and system status indicators.

R6000 units include a 5'' sunlight readable touchscreen for configuration and status monitoring, including real-time plots of the received constellations. Touchscreen is synchronised with local and remote commands, ensuring parameters integrity within the wireless network.

Integration Support

BERTEN provides dedicated on-site service for a fast deployment of the data link in your platform. It may include integration support, antennas procurement, and RF components selection, interfacing and cabling.

Qualified airborne and ground station antennas (Omnidirectional, Hemispherical, Sector, or Directional) are available to deliver a complete long-range communication solution.

Integration support also includes the definition and adaptation of the interfaces with other payload elements, including autopilots, cameras, gimbals, on-board computers, and control units. The S-6000 transceivers implements configurable standards to interface with a wide range of airborne and ground equipment.

R6000 Dual Transceiver – Rear Panel

S-6000 Dual Transceivers & Antennas

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