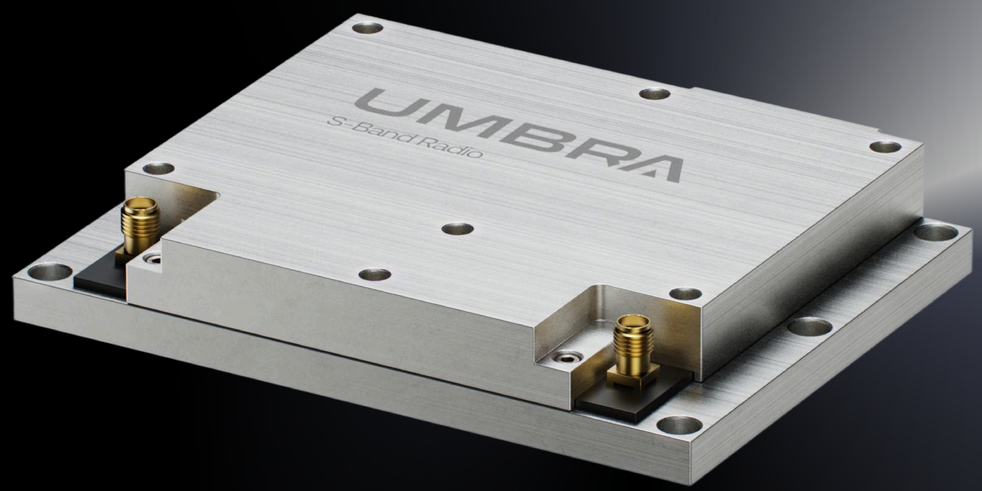
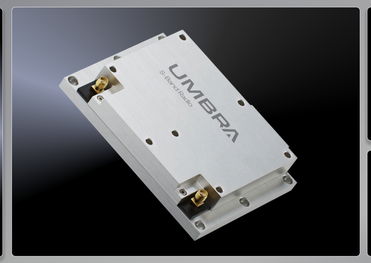
S-BAND RADIO

UMBRA

THE UMBRA S-BAND RADIO is a qualified transceiver for command and telemetry in Low Earth Orbit (LEO). It supports Unified S-Band, complies with modulation and coding standards defined by the Consultative Committee for Space Data Systems (CCSDS MODCOD), and integrates easily via an industrial Ethernet interface. With testing tailored for Falcon 9 rideshare missions, it offers post-launch configurability for flexibility on-orbit, reliable communication with commercial ground stations and compatibility with launch requirements. Above all, the Umbra S-Band Radio boasts high value and short lead times.

CCSDS COMPLIANT | LEO ENVIRONMENT | S BAND FULL SUPPORT | ON-ORBIT CONFIGURATION





GENERAL SPECIFICATIONS

MAX DIMENSIONS	4.82 in x 3.7 in x .812 in
MASS	< 300 g
BUS VOLTAGE RANGE	28 ± 4 V
BUS VOLTAGE NOMINAL	28 V
PEAK POWER	15.7 W while transmitting
AVERAGE POWER	4.4 W while receiving
ELECTRICAL INTERFACE	15-Pin Micro-D Connector
DATA INTERFACE	GigE over IX connector with Serial backup
INTENDED SPACE ENVIRONMENT	LEO
HERITAGE	Acceptance tested. First Flight Q2 2026
DESIGN LIFE	5+ Years
PRODUCTION	Assembled and tested in the USA
OUTPUT POWER	Up to 2 W
DATA RATE	1 kbps to 1 Mbps
OPERATING DOPPLER	± 100 kHz at 10 kHz/s
SENSITIVITY @ 100KBPS	-100 dBm
TRANSMIT MODCOD	OQPSK, HDLC, NRZ-L/M/S, Convolutional Encoding (k=7, ½, G2 inverted), Reed-Solomon (255,223)
RECEIVE MODCOD	BPSK, HDLC, NRZ-L/M/S
FREQUENCY RANGE	Uplink: 2025 MHz to 2110 MHz, Downlink: 2200 MHz to 2290 MHz
ACQUISITION TIME	< 3 seconds

ENVIRONMENTAL SPECIFICATIONS

RANDOM VIBE	Qualified to 14.16 G_{rms} profile enveloping GEVS, Falcon 9, SpaceX Rideshare, and Electron levels
SHOCK	Qualified to 1000g peak profile enveloping GEVS, Falcon 9, SpaceX Rideshare, and Electron levels
OPERATING TEMPERATURE	-30°C to 65°C
SURVIVAL TEMPERATURE	-40°C to 85°C
EMI/EMC	MIL-STD-461
TOTAL IONIZING DOSE DESIGN CAPABILITY	Designed to withstand at least 30 krad TID

CONFIGURATIONS

TYPE	DESCRIPTION & DETAILS	SPACE READY	TYPICAL LEAD TIME	COST
EDU	Suitable for Hardware-in-the-Loop testbeds	No	< 5 Weeks	CONTACT
FLIGHT	Acceptance Tested • Optional – Diplexer • Optional – Diplexer + Splitter	Yes	< 8 Weeks	CONTACT
CUSTOM	Umbra Space Systems offers custom modifications. Please contact.	Inquire	Inquire	CONTACT

FEATURES

ON-ORBIT FLEXIBILITY | REMOTELY CONFIGURABLE

The Umbra S-Band Radio offers unparalleled flexibility, allowing for complete reconfiguration of communication parameters after launch. This powerful capability enables on-the-fly adjustments to optimize performance and adapt to evolving mission needs throughout the satellite's operational life.

SPACE QUALIFIED | RADIO HERITAGE

Umbra's extensive history in RF payloads and high-performance downlinks has led to the design of the Umbra S-Band Radio. Fully space qualified, this design offers a full 2W output power to close demanding link budgets.

GLOBAL COMPATIBILITY | UNIFIED S-BAND & CCSDS

Engineered for full compliance with the Unified S-Band standard and Consultative Committee for Space Data Systems (CCSDS) modulation and coding schemes (MODCOD), the Umbra S-Band Radio ensures robust communication compatibility. This standard adherence simplifies operations and guarantees reliable data links with diverse systems.

WORRY-FREE TELEMETRY | SIMPLE INTEGRATION

Built on Umbra's operational experience with Telemetry, Tracking, and Control (TT&C) via commercial ground network providers. The Umbra S-Band Radio has been engineered to provide seamless integration into your spacecraft, your test Hardware-in-the-Loop testbed, and to ensure reliable connection with your chosen ground provider.

DATA SHEET 5111D0002 REV 02
PART 5111H10001-1
VALID AS OF 03.20.2026

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