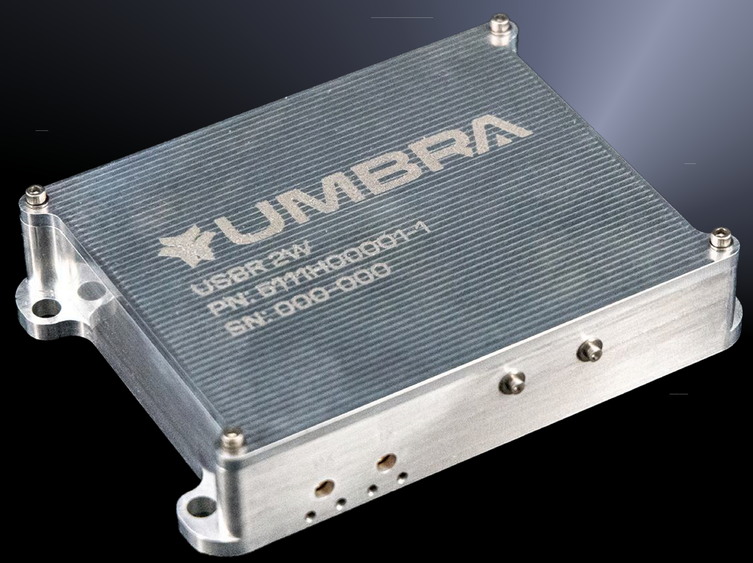
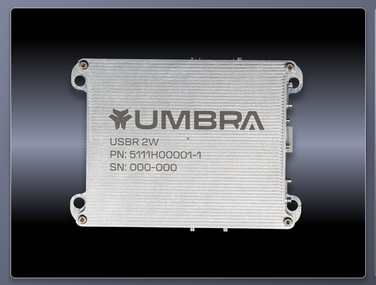
S-BAND RADIO

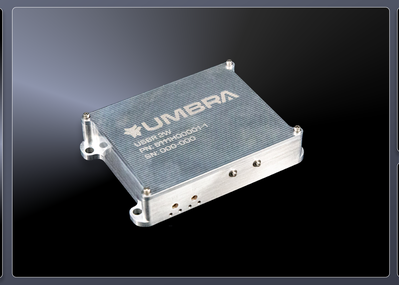
UMBRA

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	6.6" x 4.6" x 1.3"
MASS	0.59 kg
BUS VOLTAGE RANGE	22V to 32V
BUS VOLTAGE NOMINAL	28V
PEAK POWER	15.7W while transmitting
AVERAGE POWER	4.4W 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 Q4-2025
DESIGN LIFE	5+ Years
PRODUCTION	Assembled and tested in the USA
OUTPUT POWER	Up to 2 W
DATA RATE	1kbps to 1Mbps
DOPPLER CORRECTION	100kHz at 10kHz/s
SENSITIVITY @ 100KBPS	-100dBm
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: 2025MHz to 2110MHz, Downlink: 2200MHz to 2290MHz
ACQUISITION TIME	< 3 seconds

ENVIRONMENTAL SPECIFICATIONS

RANDOM VIBE	Qualified to 14.16 gRMS 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 80°C
SURVIVAL TEMPERATURE	-40°C to 90°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	LEAD TIME	COST
EDU	Includes Kratos qRadio modem configuration xml	No	5-Week Lead Time	CONTACT
FLIGHT	• Optional – Diplexer + splitter • Optional – Diplexer	Yes	8-Week Lead Time	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 V.2.0-2025.08.01
PART UMB-SBAND-RADIO-5111H0001-1
VALID AS OF 08.01.2025

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