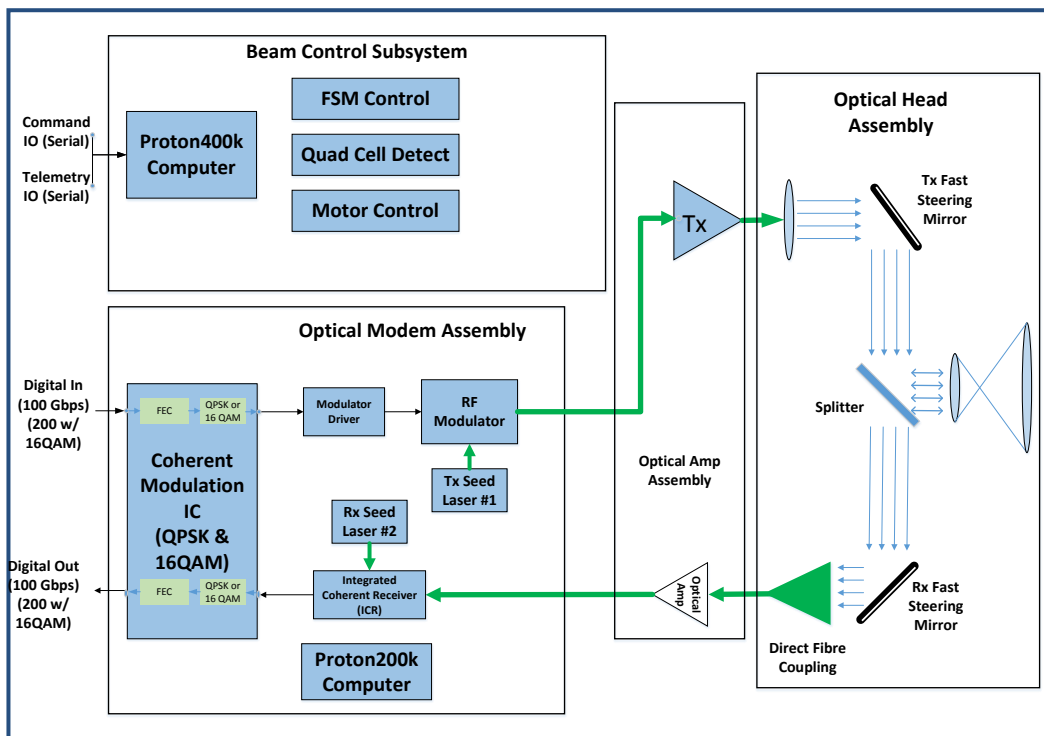


FEATURES & SPECIFICATIONS

- Very high speed communication (100 to 200 Gbps) subsystem using 1550 nm wavelength
- Coherent modulation using either QPSK or 16QAM
- Additional fiber optic wavelength division multiplexed (WDM) available, up to 5 channels
- Use of space qualified commercial 1550-nm Telcordia telecom components
 - Industry standard modulations
- Scalable optical head assembly for a range of missions (1 cm to 20 cm aperture)
- Acquisition, pointing and tracking with embedded motor control and fast steering mirrors
- Design, Form Factor, Mass and Power Consumption suitable for small or large satellites

System Block Diagram



Radiation Tolerance

Single Event Latch-up Immune
 Total Ionizing Dose
 Single Event Functional Interrupt

> 60 LET (MeV-cm²/mg)
 30 kRad (Si) or 100 kRad (Si) version available
 No SEFI

Electrical Interfaces

Operating Voltage

28 V ± 6 V DC

Mission Assurance

Temperature Range

-30°C to +65°C (Operational)
 -40°C to +75°C (Non-operational)

Parts Level Options

Commercial Space, NASA Level I, II, III

Design Life

Up to 15 years LEO/GEO

Space Micro High Efficiency Modem

- Coherent Optical Modulation
 - QPSK at 100 Gbps
 - 16QAM at 200 Gbps
- Second generation FEC & optical amps
- Deep fade FEC available for uplink/downlink
- 1550 nm laser drive electronics



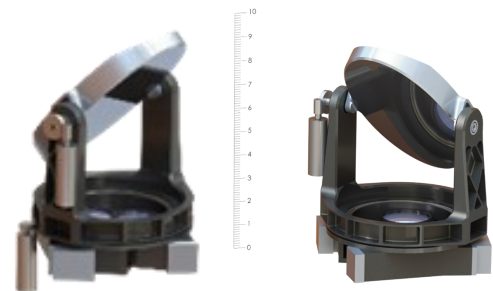
Point and Track Electronics

- Proton400k™ computer controller
- 2-axis motor control (Azimuth & Elevation)
- High accuracy fast-steering mirror control
- Optical tracking
 - LEO/GEO to Ground
 - LEO Intra-Plane
- Closed loop quad cell filtering

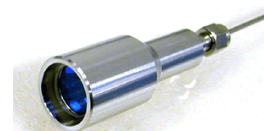


Optical Head & Pointing Assembly

- Dual Optics Provide High Performance
- Aperture sizes 1 cm to 20 cm
- Field of Regard:
 - $\pm 360^\circ$ Azimuth and $\pm 30^\circ$ Elevation
- Jitter suppression available with isolators
- Precision Encoding
- Capable of Communication with Sun in FOV
- Affordable/Repeatable



Temperature Compensated Fiber Collimating Optics



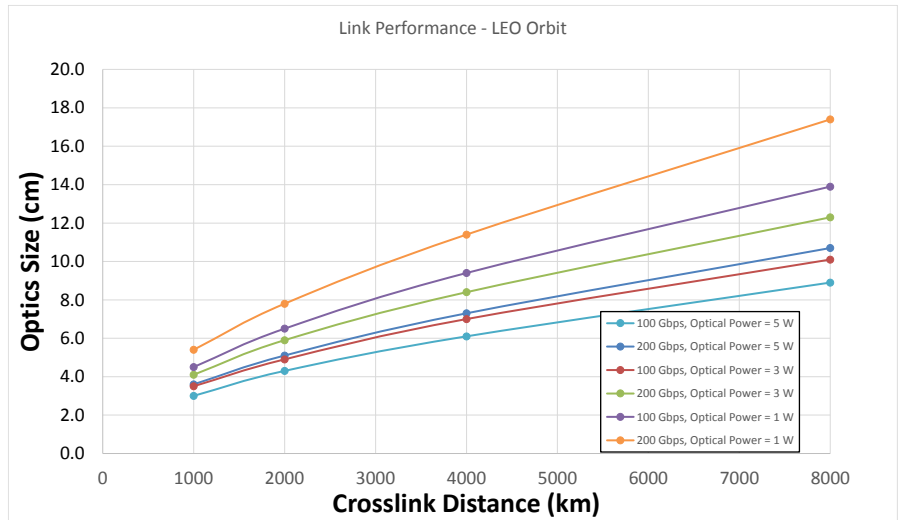
Optical Amplifier

- Erbium Doped Fiber Amplifier (EDFA)
- Booster amplifier with 1 to 7 watts power
- High input receiver sensitivity pre-amplifier



SIZE, WEIGHT & POWER

- μLCT-100™ terminals vary in SWaP based on data rate, link distance, optics size, optical power and atmospheric loss (if a downlink)
- Sample link performance for different optics and power in a typical LEO cross link are provided below
- Scalable Optical Head design for short distance LEO or long distance GEO cross links
- Programmable optical power amp levels, from 1 to 7 watts
- Tunable 1550 nm wavelengths
- Two-tone beacon acquisition and tracking architecture
- WDM available to combine multiple modems for data rates >1 Tbps
- Dual or quad crosslink configurations with more efficient SWaP



Component	100 Gbps at 1,000 km w/ 3W Amp			200 Gbps at 4,000 km w/ 3W Amp			100 Gbps at 8,000 km w/ 5W Amp		
	Mass (kg)	Size (mm)	Power (W)	Mass (kg)	Size (mm)	Power (W)	Mass (kg)	Size (mm)	Power (W)
Optical Modem	4.0	215 x 257 x 64	40	4.0	215 x 257 x 64	45	4.0	215 x 257 x 64	40
Beam Control System	7.5	205 x 250 x 145	65	7.5	205 x 250 x 145	65	7.5	205 x 250 x 145	65
Optical Power Amp	3.8	191 x 152 x 44	35	3.8	191 x 152 x 44	35	3.8	191 x 152 x 44	55
Optical Head Assy	6.4	264 x 200 x 200	5	8.4	343 x 265 x 265	5	12.7	517 x 400 x 400	5
Total	21.7		145.0	23.7		150.0	28.0		165.0

QUAD CROSS LINK CONFIGURATION FOR LEO CONSTELLATIONS

μLCT-100x4™ Four Optical Head Configuration

