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: > 60 LET (MeV-cm²/mg)
- Total Ionizing Dose: 30 kRad (Si) or 100 kRad (Si) version available
- Single Event Functional Interrupt: 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:
  - $+360^\circ$ Azimuth and $+30^\circ$ 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
µLCT™ 100 Gbps Lasercom Terminal

**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

![Graph showing link performance](image)

**Quad Cross Link Configuration for LEO Constellations**

µLCT-100x4™ Four Optical Head Configuration

<table>
<thead>
<tr>
<th>Component</th>
<th>100 Gbps at 1,000 km w/ 3W Amp</th>
<th>200 Gbps at 4,000 km w/ 3W Amp</th>
<th>100 Gbps at 8,000 km w/ 5W Amp</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mass (kg)</td>
<td>Size (mm)</td>
<td>Power (W)</td>
</tr>
<tr>
<td>Optical Modem</td>
<td>4.0</td>
<td>215 x 257 x 64</td>
<td>40</td>
</tr>
<tr>
<td>Beam Control System</td>
<td>7.5</td>
<td>205 x 250 x 145</td>
<td>65</td>
</tr>
<tr>
<td>Optical Power Amp</td>
<td>3.8</td>
<td>191 x 152 x 44</td>
<td>35</td>
</tr>
<tr>
<td>Optical Head Assy</td>
<td>6.4</td>
<td>264 x 200 x 200</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>21.7</td>
<td>145.0</td>
<td>23.7</td>
</tr>
</tbody>
</table>

Specifications Subject to Change Without Notice
Space Micro Proprietary, Rev3: 8/21/2019

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