Product Guide
Optical Amplifiers and Gateways for Oil, Gas, and Mining Operations

FINISAR
Extraction sites for oil, gas, and other natural resources are increasingly located in remote areas. However, the need to provide reliable and continuous communications, remote monitoring and crew-related services remains. Typically, these extraction sites in remote unpopulated areas are linked to operation centers via fiber links, which are installed at the same time piping is deployed. The amount of data exchanged for all the uses mentioned above is significant, as well as the need for uninterrupted, reliable service, that only an optical fiber infrastructure can guarantee.

As the world’s largest and most innovative optical components and subsystems manufacturer, Finisar is best positioned to provide turn-key optical amplification solutions capable of bridging the lengths involved in these applications.

**Evolution of Oil, Gas and Mining Operations**

Driven by ever-increasing global demand, the oil and gas industry has been rapidly expanding its operations to extraction sites in very remote and unpopulated areas. The need for real-time monitoring of the extraction facilities, communications, and crew services (such as entertainment and telephony) have equally increased, making dedicated optical fiber links from the extraction site to centralized monitoring centers a necessity. Such fiber optics links support very large bandwidth, reliability, and immunity to electrical noise.

Given the trend of using fiber optics for monitoring, and communications, combined with the increasing length of these dedicated fiber optics links, it can be difficult, with conventional optical transport equipment, to bridge those distances while guaranteeing a reliable connection with sufficient bandwidth.

Finisar’s UltraSpan® line of optical amplification products help bridge these challenging links in a reliable and cost-effective manner, complementing existing optical transport systems, or as stand-alone solutions.

Finisar’s UltraSpan products offer a consistent user interface, can be remotely managed from a single site, and are fully qualified.
UltraSpan® Gateway

The UltraSpan Gateway is a full turnkey solution for long links. It includes up to 4 client interfaces at 2.5 Gb/s and, through 3R conversion (receive, regenerate and retransmit), turning them into a transmission format that supports reliable, error-free transmission over ultra-long links up to 350 km. An UltraSpan Gateway is located at each end of the fiber and provides direct interface to the client network on either end.

UltraSpan Long Haul Gateway ensures ease of installation and provisioning of reliable links between control and extraction sites.

Reach can be extended to up to 500 km by adding Co and Counter-Raman units.

UltraSpan 1RU Amplifiers and Power Boosters

Finisar’s UltraSpan 1RU EDFAs and Power Boosters represent a reliable, full turnkey solution for optical amplification. They can interoperate with any existing transmission system and be integrated in the control architecture through the standard LAN interface.

UltraSpan products are fully qualified, certified, and ensure optical safety to the end user. Output power up to 26dBm based on the system configuration can be achieved.

UltraSpan 1RU Raman pump units

Finisar’s UltraSpan 1RU Raman and ROPA pump units complement the Amplifiers and Gateway solutions for links where superior OSNR and signal integrity is required, especially for ultra-long links up to 450Km.

These units launch up to 800mW of Raman/ROPA power in the transmission fiber, providing up to 15dB of optical gain (for G.652 fiber).

UltraSpan 3RU Raman pump units

Finisar’s UltraSpan 3RU Raman and ROPA pump units complement the Amplifiers and Gateway solutions for links where superior OSNR and signal integrity is required, especially for ultra-long links above 500 km.

These units launch up to 2W of Raman/ROPA power in the transmission fiber, providing up to 30dB of optical gain (for G.652 fiber).

Selection Guide

<table>
<thead>
<tr>
<th>Application / Reach</th>
<th>Suggested Finisar Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 350 Km (66dB span loss)</td>
<td>UltraSpan Gateway</td>
</tr>
<tr>
<td>350 to 375 Km (up to 71dB span loss)</td>
<td>UltraSpan Gateway + PowerBooster</td>
</tr>
<tr>
<td>375-400 Km (up to 76dB span loss)</td>
<td>UltraSpan Gateway + PowerBooster + 3U Counter-Raman</td>
</tr>
<tr>
<td>400-500 Km (up to 88dB span loss)</td>
<td>UltraSpan Gateway + 3U Co-Raman + 3U Counter-Raman</td>
</tr>
</tbody>
</table>
Example of Finisar Solutions for Ultra-long Links

**UltraSpan® at the Monitoring Site**

The UltraSpan product family is a powerful enabler for long-distance error-free, optical transmission. UltraSpan Gateway together with Raman units easily and reliably extends the reach of conventional transmission systems up to 450+ km without the need of intermediate amplification sites. Optional ROPA (Remote, Optically Pumped Amplifiers) installed as splice boxes in the fiber can further increase the reach beyond 500km.

UltraSpan units are network-interfaced for ease of control and integration. Control and supervision of remote units deployed in the field is readily available via a dedicated optical interfaced in-band OSC.

**Link Details**

<table>
<thead>
<tr>
<th>Fiber type</th>
<th>SMF28-ULL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client Data Rate</td>
<td>Fast Ethernet (125 Mb/s), GbE (1 Gb/s), STM-1 to 16, OC-3 to 48</td>
</tr>
<tr>
<td>Line Data Rate</td>
<td>2.7 Gb/s with FEC</td>
</tr>
<tr>
<td>Distance</td>
<td>500+ km</td>
</tr>
</tbody>
</table>

**UltraSpan in the Field**

UltraSpan units in the field can be controlled from the remote monitoring site using a dedicated optical channel (OSC) and locally through a simple LAN interface via authenticated Admin users at the remote site.

UltraSpan units are designed to provide very high reliability and ease of use.