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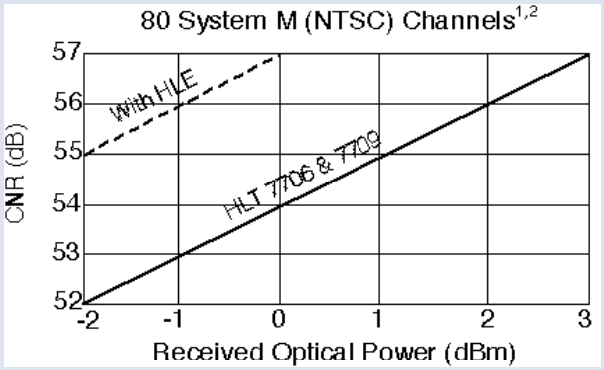
MAXLink Transmitter CNR vs. Received Optical Power



1. Specifications for 80 unmodulated System M (NTSC) channels and 200MHz at -10 dBc .
2. For System B/G, I and D(PAL), decrease CNR by approximately 1 dB (for 5 MHz video bandwidth).

Transmitter Performance[3, 4]

Carrier-to-Noise (CNR): Shown in figure above
Carrier-to-CSO: > 65 dB
Carrier-to-CTB: > 65 dB
With Harmonic Link Extender, Carrier-to-CSO: > 70 dB

Optical Outputs

Wavelength: 1535 - 1565 nm
Flatness: < 1 dB peak-to-valley
Number of outputs: 2
Optical power per fiber output:
- HLT 7706: 6 dBm (minimum)
- HLT 7709: 9 dBm (minimum)
- HLT 7711: 11dBm (minimum)

Laser shutdown: DISABLE/ENABLE switch
Eye protection: Safety shutter

SBS Suppression

HLT 7706: up to 17 dBm (50 mW) single-fiber launch power
HLT 7709: up to 14 dBm (25 mW) single-fiber launch power
HLT 7711: up to 14 dBm (25 mW) single-fiber launch power

RF Input

Input level range: 18 to 28 dBmV
Operational bandwidth: 45 to 750 MHz
RF attenuator adjustment range: 10 dB
Impedance: 75 Ω
Return loss: > 16 dB
Level control: Auto/manual

User Interface

Front panel
- Bi-state status LED: Normal = Green, Alarm = Red
- Module selection indicator: Yellow LED
- Auto/Manual LED: Auto = Yellow
- Function slide switch and set-up adjustment
- Monitor point:
  - Laser RF drive monitor
  - Flatness: ±1 dB
  - Return loss: > 16 dB
  - Connector type: Male GSK
- Rear panel:
  - Laser ENABLE switch
  - Laser enabled: Yellow LED

Element Management System - NETWatch™

HEM interface: RS-485, RS-232C connectors (in HLP 4200)
HEM carrier: 10.7 MHz (internally generated)
CNR enhancement pilot: 39 MHz (internally generated)

Power Requirements

Nominal: +24 VDC; supplied by HLP 4200 bus
Maximum: +28 VDC
Consumption: 44 Watts maximum

Environmental

Operating temperature range: 0° to 50° C / 32° to 122° F
Storage temperature range: –40° to 70° C / –40° to 158° F
Automatic three speed fan adjustment at: 40° & 50° C / 104° & 122° F
Relative humidity: Maximum 85% non-condensing
Over temperature laser protection: Software and hardware

Physical

Dimensions: 5.2″ W x 4.4″ H x 10.7″ D / 13.2 cm W x 11.2 cm H x 27.2 cm D
Weight: 8 lbs. / 3.6 kg
Mounting: HLP 4200 platform; two module slots
Optical connector type: SC/APC, E2000
Connector type: Standard F, RG-59 cable type (accepts 0.64 - 0.8 mm center conductor diameter)

3. Performance given for MAXLink transmitter + 100% fiber link + HRM3810 optical receiver with output level of 38 dBmV
4. Overall performance of a 1550 nm transmission system depends on both t ransmitter and optical amplifier performance. Consult MAXLink 1550 nm Optical Amplifier specifications and your Harmonic applications engineer for more information.

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MAXLink 1550 nm Transmitter

Product Description

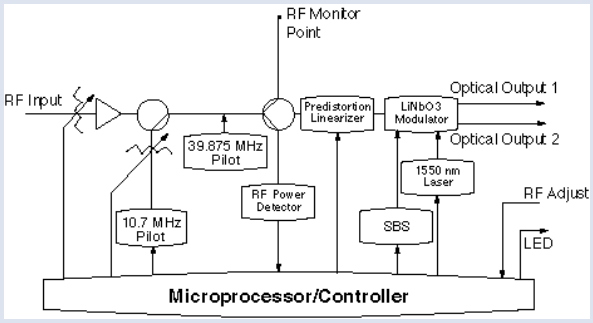
The Harmonic's MAXLink transmission system is a family of transmitters and optical amplifiers designed for 1550 nm-based network applications. The MAXLink system provides a cost-effective solution for a variety of applications and architectures, including long haul applications that are beyond the reach of 1310 nm transmitters and fiber dense architectures which take advantage of high power optical amplifiers. In addition, this system is ideally suited for new, evolving transport architectures such as redundant rings, broadcast layer transmission and hub interconnects used in broadband networks.

The MAXLink product line consists of plug-in modules for the HLP 4200 broadband platform, including dual output optical transmitters, models HLT 7706, HLT 7709 and HLT 7711 and Erbium-doped fiber optical amplifiers, models HOA 7014, HOA 7017, HOA 7020 and HOA 7021. The HLP 4200 broadband platform is a compact 5-1/4″ high rack mount housing designed to simplify headend operation. The platform provides for plug-and-play installation and operation through a user-friendly front panel display and push-button controls. As with all Harmonic products, MAXLink modules have built-in element management capabilities.

The HLT 7706 series transmitter is designed for use in supertrunk and distribution applications where it is followed immediately by one or more optical amplifiers. The HLT 7709 and HLT 7711 with their higher output powers, is designed for supertrunking or distribution without the use of optical amplifiers, or for remote distribution where the optical amplifier is located at a distance of up to 50 km from the transmitter.

In supertrunking applications, an important component of the MAXLink 1550 nm system is the Harmonic Link Extender (HLE). The HLE provides the capability to set up a push-pull transmission architecture over two fibers resulting in a CNR boost of 3 dB or more and a CSO boost of typically more than 5 dB.

Standard Configuration



Advantages

The MAXLink transmitter's advanced technology and versatility provide users with many advantages for optimizing broadband network performance while minimizing operational costs:

- Integrated element management intelligence with SNMP compatibility enables seamless communication with comprehensive network management systems.
- Microprocessor control of all key parameters provides consistent and optimum product performance and monitoring.
- Harmonic's unique, patented SBS suppression allows the highest launch power and performance available at 1550 nm in the cable and telecommunications industries:
  HLT 7706: up to 50 mW, 17 dBm
  HLT 7709: up to 25 mW, 14 dBm
  HLT 7711: up to 25 mW, 14 dBm
- MAXLink transmitter and optical amplifier modules share a common platform with Harmonic's PWRLink™ 1310 nm transmitter family, enabling seamless network management integration of diverse equipment, providing user interface commonality, and maximizing rack space efficiency.
- Dual outputs provide route diversity and cost efficiency.
- Dual complementary outputs enable push-pull operation with Harmonic Link Extender (HLE) for 3 dB or more CNR improvement.
- Harmonic's proprietary electrical linearization provides a proven, robust solution for optimal distortion performance.
- Compact, modular packaging enables cost-effective network configuration and sparing.
- Simple "plug and play" operation reduces time and cost of installation.

Harmonic