

PRELIMINARY Product Specification

RoHS-6 Compliant Laserwire™ XFP Adapter

FTLX0011D4BNL

PRODUCT FEATURES

- Hot-pluggable XFP footprint
- Supports Laserwire™ data rates of 9.95 Gb/s to 10.3 Gb/s
- RoHS-6 compliant (lead-free)
- Extended temperature range -5°C to 85°C
- Single 3.3V power supply
- Customizable EEPROM



Preliminary Photo

APPLICATIONS

- Adapts Laserwire™ plug for XFP ports

Finisar's FTLX0011D4BNL 10Gb/s Laserwire™ XFP Adapters are designed for use in conjunction with Finisar's Laserwire cable (Part Number: FCBP110LD1Lxx). The FTLX0011D4BNL XFP Adapter allows a Laserwire cable to be plugged into an XFP port. The XFP Adapter incorporates a customizable EEPROM. The Adapter is RoHS compliant and lead free per Directive 2002/95/EC¹, and Finisar Application Note AN-2038².

PRODUCT SELECTION

FTLX0011D4BNL

I. Background

Figure 1 illustrates the application of the FTLX0011D4BNL XFP Adapter. Pin descriptions for the FTLX0011D4BNL interface to the host board are shown in Section II. Please refer to the FCBP110LD1Lxx Laserwire datasheet for details of the interface between the FTLX0011D4BNL XFP Adapter and the Laserwire cable. The Laserwire connector pin-out is also shown in Section II for reference.

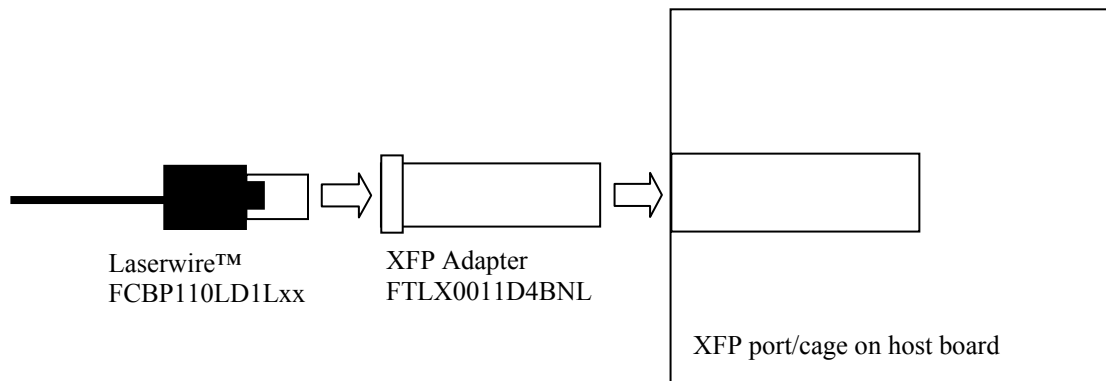


Figure 1. (Top View) From left to right: Laserwire, XFP Adapter, XFP cage on host board.

Insertion sequence: (1) XFP Adapter is plugged into XFP port; (2) Laserwire is plugged into Adapter.

Extraction sequence: (1) Depress tab on top of Laserwire plug and extract cable from Adapter; (2) Pull on Adapter bail release lever and extract Adapter from host port.

II. Pin Descriptions

| Pin | Logic | Symbol | Name/Description (per INF-8077i) | Laserwire-Adapter Interface | Adapter-XFP Port Interface | Note |
|-----|-----------|----------------|---|---|-----------------------------|------|
| 1 | | GND | Module Ground | Connected to Laserwire VEE | Grounded in adapter | 1 |
| 2 | | VEE5 | Optional -5.2 Power Supply – Not required | NC | NC | |
| 3 | LVTTL-I | Mod-Desel | Module De-select; When held low allows the module to respond to 2-wire serial interface commands | NC | Pulled high in adapter | 2 |
| 4 | | Interrupt | Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface, NOT IMPLEMENTED | NC | NC | |
| 5 | LVTTL-I | TX_DIS | Transmitter Disable; Transmitter laser source turned off, NOT IMPLEMENTED. | NC | Pulled high in adapter | 2 |
| 6 | | VCC5 | +5 Power Supply – Not used. | NC | NC | |
| 7 | | GND | Module Ground | Connected to Laserwire VEE | Grounded in adapter | 1 |
| 8 | | VCC3 | +3.3V Power Supply | Connected to Laserwire VCC pin 5 | Pass through | |
| 9 | | VCC3 | +3.3V Power Supply | Connected to Laserwire VCC pin 5 | Pass through | |
| 10 | LVTTL-I | SCL | Serial 2-wire interface clock | NC | Connected to adapter EEPROM | 3 |
| 11 | LVTTL-I/O | SDA | Serial 2-wire interface data line | NC | Connected to adapter EEPROM | 3 |
| 12 | LVTTL-O | Mod_Abs | Module Absent; Indicates adapter not present. | NC | Pulled low in adapter | 4 |
| 13 | LVTTL-O | Mod_NR | Module Not Ready | NC | Always held low | |
| 14 | LVTTL-O | RX_LOS | Receiver Loss of Signal indicator | Connected to Laserwire Fault output pin 6 | Pass through | 3 |
| 15 | | GND | Module Ground | Connected to Laserwire VEE | Grounded in adapter | 1 |
| 16 | | GND | Module Ground | Connected to Laserwire VEE | Grounded in adapter | 1 |
| 17 | CML-O | RD- | Receiver inverted data output | Laserwire RX- pin 11 | Retimed output | 5 |
| 18 | CML-O | RD+ | Receiver non-inverted data output | Laserwire RX+ pin 10 | Retimed output | 5 |
| 19 | | GND | Module Ground | Connected to Laserwire VEE | Grounded in adapter | 1 |
| 20 | | VCC2 | +1.8V Power Supply – Not used | Not used | NC | |
| 21 | LVTTL-I | P_Down/ RST | Power Down; When high, places the module in the low power stand-by mode and on the falling edge of P_Down initiates a module reset, NOT IMPLEMENTED Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle. NOT IMPLEMENTED | NC | Pulled high in adapter | |
| 22 | | VCC2 | +1.8V Power Supply – Not used | Not used | NC | |
| 23 | | GND | Module Ground | Connected to Laserwire VEE | Grounded in adapter | 1 |
| 24 | PECL-I | RefCLK+ | Reference Clock non-inverted input, AC coupled on the host board – Not required | NC | Internally terminated | 6 |
| 25 | PECL-I | RefCLK- | Reference Clock inverted input, AC coupled on the host board – Not required | NC | Internally terminated | 6 |
| 26 | | GND | Module Ground | Connected to Laserwire VEE | Grounded in adapter | 1 |
| 27 | | GND | Module Ground | Connected to Laserwire VEE | Grounded in adapter | 1 |
| 28 | CML-I | TD- | Transmitter inverted data input | Laserwire TX- pin 2 | Retimed input | 5 |
| 29 | CML-I | TD+ | Transmitter non-inverted data input | Laserwire TX+ pin 3 | Retimed input | 5 |
| 30 | | GND | Module Ground | Connected to Laserwire VEE | Grounded in adapter | 1 |

Notes:

1. Adapter circuit ground is isolated from adapter chassis ground within the adapter.
2. Pulled up with 10kΩ in adapter
3. Open collector; should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 3.15V and 3.6V.
4. Pulled low with 100Ω in adapter.
5. Per XFI electrical specs.
6. A Reference Clock input is not required. If present, it will be ignored. Differential 100Ω termination in adapter.

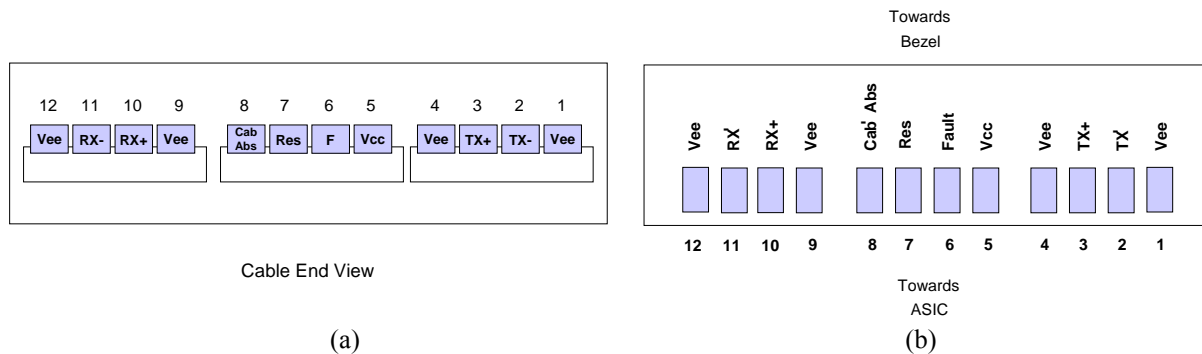


Figure 2. Pinout : (a) Laserwire cable plug end view, (b) Adapter pin-out (Laserwire port endview).

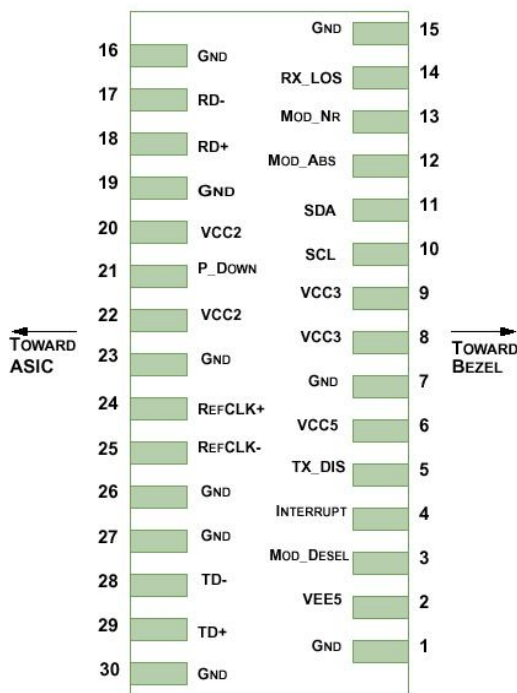


Figure 1. Diagram of Host Board Connector Block Pin Numbers and Names, for pin-out reference. Details of host-board connector specifications can be found in INF-80771³. Or refer to Finisar XFP datasheet (e.g., FTLX8511D3)

III. Absolute Maximum Ratings

Exceeding the limits below may damage the transceiver module permanently.

| Parameter | Symbol | Min | Typ | Max | Unit | Ref. |
|------------------------|-----------------|------|-----|-----|------|------|
| Maximum Supply Voltage | V _{cc} | -0.5 | | 4.0 | V | |
| Storage Temperature | T _s | -40 | | 85 | °C | |
| Relative Humidity | RH | 0 | | 85 | % | 1 |

- I. Non-condensing.

IV. Electrical Characteristics (T_{OP} = -5 to 85°C, V_{CC} = 3.14 to 3.46 Volts)

Electrical characteristics assume a Laserwire cable is inserted into the Adapter port.

| Parameter | Symbol | Min | Typ | Max | Unit | Ref. | |
|-----------------------------------|---------------------|------------------|-----|------|------|------|---|
| Supply Voltage | V _{cc} | 3.14 | | 3.46 | V | | |
| Supply Current | I _{cc} | | | 400 | mA | | |
| Transmitter (to Laserwire) | | | | | | | |
| Differential data input swing | V _{in,pp} | 120 | | 1000 | mV | | |
| Receiver (from Laserwire) | | | | | | | |
| Differential data output swing | V _{out,pp} | 600 | 650 | 800 | mV | 1 | |
| Power Supply Rejection | PSR | See Note 2 below | | | | | 2 |

Notes:

1. Into 100Ω differential termination.
2. Per Section 2.7.1 in the XFP MSA Specification INF-8077i³.

V. Environmental Specifications

The FTLX0011D4BNL XFP Adapter has an operating temperature range from -5°C to +85°C case temperature. Note that the Laserwire™ cable has an operating temperature range of 0°C to +60°C.

| Parameter | Symbol | Min | Typ | Max | Units | Ref. |
|----------------------------|------------------|-----|-----|-----|-------|------|
| Case Operating Temperature | T _{op} | -5 | | 85 | °C | |
| Storage Temperature | T _{sto} | -40 | | 85 | °C | |

VI. Regulatory Compliance

| Feature | Agency | Standard | Certificate # |
|-------------------|--------|--------------------------------|---------------|
| Electrical Safety | TÜV | EN 60950 | TBD |
| Electrical Safety | UL/CSA | CLASS 3862.07 CLASS 3862.87 | TBD |

Copies of the referenced certificates are available at Finisar Corporation upon request.

VII. Mechanical Specifications

Finisar's Laserwire XFP Adapters are compatible with the dimensions defined by the XFP Mechanical Specifications in INF-8077i³, with the exception of the port design to accommodate the Laserwire plug.

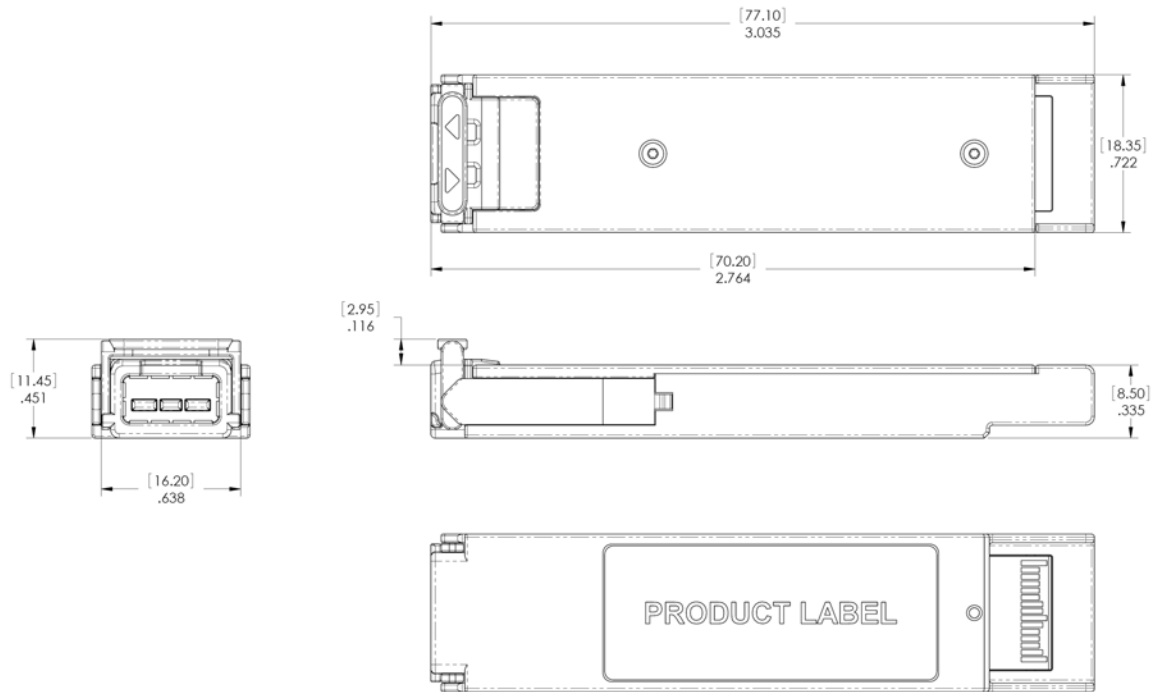


Figure 2. FTLX0011D4BNL Mechanical Dimensions.

VIII. EEPROM Table (Address A0h)

| Byte Addr | Hex | LSB | Bit Size | Name | Description | Value | Hex Value |
|-----------|-----|-----|----------|--------------------------------|----------------------------------|---|-----------|
| 128 | 80 | 0 | 8 | Identifier | Type of serial transceiver | XFP | 6 |
| 129 | 81 | 0 | 3 | RESERVED | RESERVED | | |
| 129 | 81 | 3 | 1 | CLEI code present in Table 02h | CLEI code present in Table 02h | No CLEI code present in Table 02h | 0 |
| 129 | 81 | 4 | 1 | TX Ref Clock Input Required | TX Ref Clock Input Required | Not Required | 1 |
| 129 | 81 | 5 | 1 | Module with CDR | Module with CDR | with CDR | 0 |
| 129 | 81 | 6 | 2 | Ext.Identifier | Defines Module Power Class | Power level 1 (< 1.5W power dissipation) | 0 |
| 130 | 82 | 0 | 8 | Connector | Code for connector type | Unknown | 0 |
| 131 | 83 | 0 | 1 | RESERVED | RESERVED | | |
| 131 | 83 | 1 | 1 | 10GBASE-EW | 10GBASE-EW | FALSE | 0 |
| 131 | 83 | 2 | 1 | 10GBASE-LW | 10GBASE-LW | FALSE | 0 |
| 131 | 83 | 3 | 1 | 10GBASE-SW | 10GBASE-SW | TRUE | 1 |
| 131 | 83 | 4 | 1 | 10GBASE-LRM | 10GBASE-LRM | FALSE | 0 |
| 131 | 83 | 5 | 1 | 10GBASE-ER | 10GBASE-ER | FALSE | 0 |
| 131 | 83 | 6 | 1 | 10GBASE-LR | 10GBASE-LR | FALSE | 0 |
| 131 | 83 | 7 | 1 | 10GBASE-SR | 10GBASE-SR | TRUE | 1 |
| 132 | 84 | 0 | 4 | RESERVED | RESERVED | | |
| 132 | 84 | 4 | 1 | Intermediate Reach 1300 nm | Intermediate Reach 1300 nm FP | FALSE | 0 |
| 132 | 84 | 5 | 1 | Extended Reach 1550 nm | Extended Reach 1550 nm | FALSE | 0 |
| 132 | 84 | 6 | 1 | 1200-SM-LL-L | 1200-SM-LL-L | FALSE | 0 |
| 132 | 84 | 7 | 1 | 1200-MX-SN-I | 1200-MX-SN-I | TRUE | 1 |
| 133 | 85 | 0 | 8 | RESERVED | RESERVED | | |
| 134 | 86 | 0 | 1 | RESERVED | RESERVED | | |
| 134 | 86 | 1 | 1 | OC-48-LR | Lower speed link compliance code | FALSE | 0 |
| 134 | 86 | 2 | 1 | OC-48-IR | Lower speed link compliance code | FALSE | 0 |
| 134 | 86 | 3 | 1 | OC-48-SR | Lower speed link compliance code | FALSE | 0 |
| 134 | 86 | 4 | 1 | 2xFC SMF | Lower speed link compliance code | FALSE | 0 |
| 134 | 86 | 5 | 1 | 2xFC MMF | Lower speed link compliance code | FALSE | 0 |
| 134 | 86 | 6 | 1 | 1000BASE-LX/1xFC SMF | Lower speed link compliance code | FALSE | 0 |
| 134 | 86 | 7 | 1 | 1000BASE-SX/1xFC MMF | Lower speed link compliance code | FALSE | 0 |
| 135 | 87 | 0 | 2 | RESERVED | RESERVED | | |
| 135 | 87 | 2 | 1 | I-64.5 | Sonet codes | FALSE | 0 |
| 135 | 87 | 3 | 1 | I-64.3 | Sonet codes | FALSE | 0 |
| 135 | 87 | 4 | 1 | I-64.2 | Sonet codes | FALSE | 0 |
| 135 | 87 | 5 | 1 | I-64.2r | Sonet codes | FALSE | 0 |
| 135 | 87 | 6 | 1 | I-64.1 | Sonet codes | FALSE | 0 |
| 135 | 87 | 7 | 1 | I-64.1r | Sonet codes | FALSE | 0 |
| 136 | 88 | 0 | 1 | RESERVED | RESERVED | | |
| 136 | 88 | 1 | 1 | S-64.5b | Sonet Short Haul Link codes | FALSE | 0 |
| 136 | 88 | 2 | 1 | S-64.5a | Sonet Short Haul Link codes | FALSE | 0 |
| 136 | 88 | 3 | 1 | S-64.3b | Sonet Short Haul Link codes | FALSE | 0 |
| 136 | 88 | 4 | 1 | S-64.3a | Sonet Short Haul Link codes | FALSE | 0 |
| 136 | 88 | 5 | 1 | S-64.2c | Sonet Short Haul Link codes | FALSE | 0 |
| 136 | 88 | 6 | 1 | S-64.2a | Sonet Short Haul Link codes | FALSE | 0 |
| 136 | 88 | 7 | 1 | S-64.1 | Sonet Short Haul Link codes | FALSE | 0 |
| 137 | 89 | 0 | 1 | RESERVED | RESERVED | | |
| 137 | 89 | 1 | 1 | DWDM | DWDM | FALSE | 0 |
| 137 | 89 | 2 | 1 | G.959.1 P1L1-2D2 | Sonet Long Haul Link codes | FALSE | 0 |
| 137 | 89 | 3 | 1 | L-64.3 | Sonet Long Haul Link codes | FALSE | 0 |
| 137 | 89 | 4 | 1 | L-64.2c | Sonet Long Haul Link codes | FALSE | 0 |
| 137 | 89 | 5 | 1 | L-64.2b | Sonet Long Haul Link codes | FALSE | 0 |
| 137 | 89 | 6 | 1 | L-64.2a | Sonet Long Haul Link codes | FALSE | 0 |
| 137 | 89 | 7 | 1 | L-64.1 | Sonet Long Haul Link codes | FALSE | 0 |
| 138 | 8A | 0 | 5 | RESERVED | RESERVED | | |
| 138 | 8A | 5 | 1 | V-64.3 | Sonet Very Long Haul Link codes | FALSE | 0 |
| 138 | 8A | 6 | 1 | V-64.2b | Sonet Very Long Haul Link codes | FALSE | 0 |
| 138 | 8A | 7 | 1 | V-64.2a | Sonet Very Long Haul Link codes | FALSE | 0 |
| 139 | 8B | 0 | 3 | RESERVED | RESERVED | | |
| 139 | 8B | 3 | 1 | RZ | Encoding Support | FALSE | 0 |
| 139 | 8B | 4 | 1 | NRZ | Encoding Support | TRUE | 1 |
| 139 | 8B | 5 | 1 | Sonet Scrambled | Encoding Support | TRUE | 1 |
| 139 | 8B | 6 | 1 | 8B/10B | Encoding Support | TRUE | 1 |
| 139 | 8B | 7 | 1 | 64B/66B | Encoding Support | TRUE | 1 |

| Byte Addr | Hex | LSB | Bit Size | Name | Description | Value | Hex Value |
|-----------|-----|-----|----------|---|--|--------------------------------------|-----------|
| 140 | 8C | 0 | 8 | BR, minimum | Minimum Supported Bitrate (/100Mb) | 99 | 63 |
| 141 | 8D | 0 | 8 | BR, maximum | MaximumSupported Bitrate (/100Mb) | 105 | 69 |
| 142 | 8E | 0 | 8 | Length(SMF)-km | Length (standard singlemode fiber)-km | 0 | 0 |
| 143 | 8F | 0 | 8 | Length(EMM-50um)-meter | Length (extended b/w 50 um MMF) (/2m) | 15 | 0F |
| 144 | 90 | 0 | 8 | Length(50)-meter | Length (50um MMF) (/1meter) | 30 | 1E |
| 145 | 91 | 0 | 8 | Length(62.5)-meter | Length (62.5um MMF) (/1meter) | 30 | 1E |
| 146 | 92 | 0 | 8 | Length(Copper)-km | Length (Copper) (/1meter) | 0 | 0 |
| ... | | | | | | | |
| 164 | A4 | 0 | 1 | XFI Loopback Supported | CDR support | TRUE | 1 |
| | | | | Lineside Loopback Mode Supported | CDR support | FALSE | 0 |
| 164 | A4 | 2 | 1 | RESERVED | RESERVED | | |
| 164 | A4 | 3 | 1 | CDR support for 11.1 Gb/s | CDR support | FALSE | 0 |
| 164 | A4 | 4 | 1 | CDR support for 10.7 Gb/s | CDR support | FALSE | 0 |
| 164 | A4 | 5 | 1 | CDR support for 10.5 Gb/s | CDR support | TRUE | 1 |
| 164 | A4 | 6 | 1 | CDR support for 10.3 Gb/s | CDR support | TRUE | 1 |
| 164 | A4 | 7 | 1 | CDR support for 9.95 Gb/s | CDR support | TRUE | 1 |
| ... | | | | | | | |
| 190 | BE | 0 | 8 | Max Case Temp | Max Case Temp. | 85 | 55 |
| 191 | BF | 0 | 8 | CC_BASE | Checksum (128 to 190) | TBC | TBC |
| 192 | C0 | 0 | 8 | Maximum Power | Maximum Power Dissipation, Max power is 8 bit value * 20 mW. | 75 | 4B |
| 193 | C1 | 0 | 8 | Max Power in Power Down Mode | Maximum Total Power Dissipation in Power Down Mode, Max Power is 8 bit value * 10 mW. | 150 | 96 |
| 194 | C2 | 0 | 4 | Max Current +3.3v | Maximum current required by +3.3V Supply. Max current is 4 bit value * 100 | 3 | 3 |
| 194 | C2 | 4 | 4 | Max Current +5v | Maximum current required by +5V Supply. Max current is 4 bit value * 50 | 0 | 0 |
| 195 | C3 | 0 | 4 | Max Current -5v | Maximum current required by -5.2V Supply. Max current is 4 bit value * 50 mA. [500 mA max] | 0 | 0 |
| 195 | C3 | 4 | 4 | Max Current +1.8v | Maximum current required by +1.8V Supply. Max current is 4 bit value * 100 | 0 | 0 |
| ... | | | | | | | |
| 220 | DC | 0 | 3 | RESERVED | RESERVED | | |
| 220 | DC | 3 | 1 | Received power meas. Type | Special functions | Average power | 1 |
| 220 | DC | 4 | 1 | FEC BER support | Special functions | FALSE | 0 |
| 220 | DC | 5 | 1 | RESERVED | RESERVED | | |
| 220 | DC | 6 | 1 | RESERVED | RESERVED | | |
| 220 | DC | 7 | 1 | RESERVED | RESERVED | | |
| 221 | DD | 0 | 1 | Optional CMU support mode | Enhanced Options | FALSE | 0 |
| 221 | DD | 1 | 1 | Wavelength Tunability implemented | Enhanced Options | FALSE | 0 |
| 221 | DD | 2 | 1 | Active FEC control function implemented | Enhanced Options | FALSE | 0 |
| 221 | DD | 3 | 1 | Support VPS bypass regulator mode | Enhanced Options | FALSE | 0 |
| 221 | DD | 4 | 1 | Support VPS LV regulator mode | Enhanced Options | FALSE | 0 |
| 221 | DD | 5 | 1 | Soft P_Down | Enhanced Options | FALSE | 0 |
| 221 | DD | 6 | 1 | Soft TX_DISABLE | Enhanced Options | FALSE | 0 |
| 221 | DD | 7 | 1 | Variable Power Supply Support | Enhanced Options | FALSE | 0 |
| 222 | DE | 0 | 4 | Aux A/D Input 2 | Enhanced Options | Auxiliary monitoring not implemented | 0 |
| 222 | DE | 4 | 4 | Aux A/D Input 1 | Enhanced Options | Auxiliary monitoring not implemented | 0 |
| ... | | | | | | | |

IX. References

1. Directive 2002/95/EC of the European Council Parliament and of the Council, “on the restriction of the use of certain hazardous substances in electrical and electronic equipment”. January 27, 2003.
2. “Application Note AN-2038: Finisar Implementation Of RoHS Compliant Transceivers”, Finisar Corporation, January 21, 2005.
3. ”10 Gigabit Small Form Factor Pluggable Module”, SFF Document Number INF-8077i, Revision 4.5, August 31, 2005.

X. For More Information

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