Digital Diagnostic Monitoring Interface for XFP Opt	icai iranscei
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#### **Overview**

This Application Note defines Finisar implementation of the XFP 2-wire serial interface, which is used for serial ID, digital diagnostics, and certain control functions. The 2-wire serial interface is mandatory for all XFP modules and it is defined in the XFP MSA Specification Rev 4.5. It is modeled largely after the digital diagnostics monitoring interface proposed for the SFP and GBIC optical transceivers and defined in the SFF draft document SFF-8472 Rev 10.1, which in turn is an extension of the original serial ID systems defined for the GBIC and SFP transceivers. One major difference, however, is that the memory structure is changed to use a single 2-wire interface address.

IMPORTANT: The digital diagnostics functionality and memory maps described in this document apply to Beta-and Production-level units only. Please contact Finisar for information on Alpha-level units.

As with GBIC and SFP transceivers, the XFP serial interface uses the 2-wire serial CMOS EEPROM protocol defined for the ATMEL AT24C01A/02/04 family of components. When the serial protocol is activated, the host generates the serial clock signal (SCL pin). The positive edge clocks data into those segments of the memory map that are not write-protected within the XFP transceiver. The negative edge clocks data from the XFP transceiver. The serial data signal (SDA pin) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially. The 2-wire serial interface provides sequential or random access to 8 bit parameters, addressed from 0000h to the maximum address of the memory.

The structure of the memory map is shown in Figure 1. The normal 256-byte I2C address space is divided into lower and upper blocks of 128 Bytes. The lower block of 128 bytes is always directly available and is used for the diagnostics and control functions described in this document that must be accessed repeatedly. One exception to this is that the standard module identifier byte defined in the GBIC and SFP transceivers is located in Byte 0 of the memory map (in the diagnostics space) to allow software developed for multiple module types to have a common branching decision point. This byte is repeated in the serial ID section so that it also appears in the expected relationship to other serial ID bits.

 Multiple blocks of memories are available in the upper 128 Bytes of the address space. These are individually addressed through a table select Byte which the user enters into a location in the lower address space. Thus, there is a total available address space of 128 \* 256 = 32 Kbytes in this upper memory space.

The upper address space tables are used for less frequently to access functions such as serial ID, user writable EEPROM, reserved EEPROM, diagnostics and control spaces. The upper address space, is for future standards definition, as well as ample space for vendor specification functions. These are allocated as follows:

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Table 00h: Reserved for future diagnostic and control functions

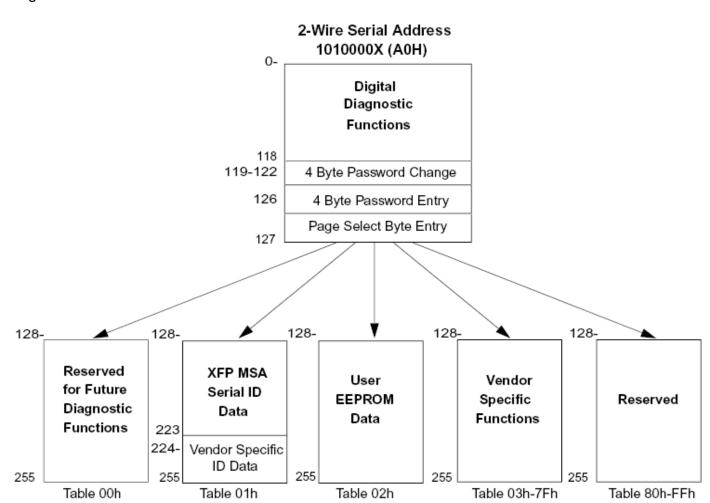
7 Table 01h: Serial ID EEPROM
 8 Table 02h: User-writable EEPROM

9 Table 03h: - 7Fh Finisar-specific internal functions (not accessible to the user)

Table 80h – FFh Reserved

10 11 12

13 14 The details of each memory space are described in the XFP MSA document. All 2-Wire registers are read with bit 7 in the MSB first.



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Figure 1: XFP 2-Wire Serial Interface Memory Map

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The memory structure also provides for an optional password entry location in the lower memory space that may be used to protect user-writable memory (Table 02h). A password is not required to read any serial ID or diagnostics information in the lower memory address space or in Tables 00h – 02h. A password is not required to write any

controls defined in the digital diagnostic functions described in the MSA document either. A password (entered into bytes 123 – 126) is required to allow <u>write</u> access to the User EEPROM Table (02h). The default password is 00001011h per the XFP MSA, and it can be changed by the host manufacturer by writing the new password into bytes 119 – 122 when the correct old password has been written into bytes 123 – 126. The host password must be in the range of 00000000h to 7FFFFFFFh.

The 2-wire serial interface address of the XFP module is 1010000X (A0h). In order to allow access to multiple XFP modules on the same 2-wire serial bus, the XFP pin-out includes a MOD\_DESEL or module deselect pin. This pin (which is pulled high or deselected in the module) must be held low by the host to select the module of interest and allow communication over the 2-wire serial interface. The module does not respond to or accept 2-wire serial bus instructions unless it is selected.

Table 1 below lists the various Finisar XFP part numbers available and the corresponding applications that they support.

#### **Table 1 XFP Part Number Designations**

Part Number	Application	Max Data	Transmitter /	Max Reach	ROHS
		Rate (Gb/s)	Receiver Type		Compliance
FTLX1411D3	10GBASE-LR/LW, 10GEthernet	10.5	1310 nm DFB uncooled / PIN receiver	10 km	Fully Compliant
FTRX1411D3	10GBASE-LR/LW, 10GEthernet ,1200-SM- LL-L 10GFC	10.5	1310 nm DFB uncooled / PIN receiver	10 km	5 of 6
FTLX1411M3	SONET OC192 SR1 SDH STMI-64.1, 10GBASE-LR LW 10GE, 1200-SM-LL-L 10G FC, G709 OUT-2, 10GBASE-LR/LW, 10GE, G709 OTU2 FEC	11.1	1310 nm DFB uncooled / PIN receiver	10 km	Fully Compliant
FTRX-1411M3	SONET OC192 SR1 SDH STMI-64.1, 10GBASE-LR LW 10GE, 1200-SM-LL-L 10G FC, G709 OUT-2, 10GBASE-LR/LW, 10GE, G709 OTU2 FEC	11.1	1310 nm DFB uncooled / PIN receiver	10 km	5 of 6
FTLX1412M3	SONET OC192 SR-1, SDH STMI-61.1, 10GBASE-LR/LW 10GE, 1200-SM-LL-L, 10GFC, 10GBASE-LR/LW +FEC, 1200-SM-LL-L, 10GFC +FEC	11.3	1310 nm DFB uncooled	10 km	Fully compliant
FTLX1412D3	10GBASE-LR/LW 10GE 1200-SM-LL-L 10GFC	10.5	1310 nm DFB uncooled	10 km	Fully Compliant



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Part Number	Application	Max Data Rate (Gb/s)	Transmitter Type	Max Reach	ROHS Compliance
FTLX1611M3	SONET OC192 IR2, SDH STMS-64.2b, SONET OC192 IR3 SDH STMS- 64.2b, ITU-T G709, 10GBASE-ER/EW, 10GBASE-ER/EW +FEC, 40km 10GFC	11.1	Temperature stabilized 1550 nm DFB	40 km	Fully Compliant
FTRX1611-3	SONET OC192 IR2, SDH STMS-64.2b, SONET OC192 IR3 SDH STMS- 64.2b, ITU-T G709, 10GBASE-ER/EW, 40km 10GFC	10.7	Temperature stabilized 1550 nm DFB	40 km	5 of 6
FTLX1811M3	SONET OC-192/SDH STM-64 ITU-T G959.1 P1L1-2D2, SONET OC192/SDH STM64 with ITU-T G709. 10GBASE- ZR/ZW 80km 10GE. Extended 80km 10GFC, 80km 10GE+ITU.T G709 +FEC	11.1	Temperature stabilized 1550 nm DFB	80 km	Fully Compliant
FTRX-1811-3	SONET OC192/SDH STM-64 ITU-T G959.1 P1L1-2D2, 10GBASE- ZR-ZW, 80km 10GE, Extended 80km 10GFC	10.7	Temperature stabilized 1550 nm DFB	80 km	5 of 6
FTRX-1911-3	20dB link budget XFP links with low dispersion and high optical power loss	11.1	Temperature stabilized 1550 nm DFB	40 km	5 of 6
FTLX3611M3	DWDM Networks SDH STMS-64.2b, 10GBASE-ER/EW, 10GBASE-ER/EW +FEC, 40km 10GFC, OC192/STM-64 with FEC	11.1	Temperature stabilized DWDM rated EML transmitter	40 km	Fully Compliant
FTLX3811M3	DWDM 10Gb/s SONET/SDH ITU-T G698.1S-D100S1-2D, DWDM 10GB/s SONET/SDH ITU-T G.709 DWDM 80km 10GE, DWDM 80km, 10GFC + FEC	11.1	Temperature stabilized DWDM rated EML transmitter	80 km	Fully Compliant
FTLX3812M3	Amplified DWDM 10G SONET SDH, Amplified DWDM 10GE	11.1	Temperature stabilized DWDM EML transmitter	80 km	Fully Compliant
FTLX3812S3	Amplified DWDM 10G SONET/SDH	10.7	Temperature stabilized DWDM EML transmitter / APD receiver	80 km	Fully Compliant
FTLX3911M3	DWDM Low Dispersion, highly attenuated applications, unamplified DWDM 10GB/s SONET/SDH DWDM 10GE, DWDM 10GFC	11.1	Temperature stabilized DWDM EML transmitter	80 km	Fully Compliant



Part Number	Application	Max Data	Transmitter	Max Reach	ROHS
		Rate (Gb/s)	Type		Compliance
FTLX4213M3	Amplified DWDM 10Gb/s	11.3	Temperature	200 km	Fully
	SONET/SDH		stabilized		Compliant
	Amplified DWDM 10GB/s		DWDM CML		
	Ethernet and 10GB/s		Transmitter		
	Fibre Channel.				
FTLX8511D3	10GBASE-SR/SW,	10.5	850nm VCSEL	300 m	Fully
	10GE, 1200-MX-SN-I				Compliant
	10G FC				

#### **Please Note**

All XFP modules that support a temperature stabilized laser, require at least 60 seconds for the laser to stabilize after power-on. Power-on condition includes a hard-reset or hot plug of the XFP module.

The host needs to wait this amount of time, before running any data traffic or checking for link status.

In addition to this, if any I2C transactions are carried out during this time, then the EEPROM contents read, do not display the actual status of the module, and instead are only the instantaneous readings.

The following pages in this Application Note display the EEPROM Memory Map contents of some of the standard Finisar XFP modules.

The part numbers described in detail in the following pages, are FTLX-1411M3, FTLX1412M3, FTLX-1611M3, FTLX-1811M3, FTLX-3811-3, FTLX3812-M3, FTLX4213, and FTLX8511D3.

Other XFP variants will follow the same EEPROM template, however there may be slightly different settings for some parameters in the XFP MSA Serial ID section.

This application note, covers existing XFP modules that have successfully completed full GR-468 qualification. The next revision of this application note, will include the next generation of XFP products once they become available.

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#### **Description of Finisar Memory Map Contents**

4 Product: FTLX-1411M3

56 Type Codes:

7 NVE: Non-volatile EEPROM. Read only by customer

VH: Volatile Host Entry Field. Set to 00h on power up or reset unless noted.

9 Read/Write by Host

VHW: Volatile Host Write Field. Set to 00h on power up or reset unless noted. Write

only by Host

12 VHR: Volatile Host Read Field. Set to 00h on power up or reset unless noted. Read

only by Host.

R: Reserved. Ignore write, Return 00h on read.

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10 11

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Lower Memory Map: I2C Addr: A0h, Bytes 0 – 127

Byte	Bit	Type	Size	Field Name	Description of Field	Value	Value Meaning
Addr	Addr	Cod	(Bytes) or				
ess	ess	e	(bits)				
0		NVE	1B	Identifier	Type of serial	06h	XFP
					transceiver		
		Signal	Conditioner	Control			
1	4-7	VH	4b	Data Rate Control		XXXXh	Ignored
	3	VH	1b	Reserved		N/A	Reserved
		W					
	2	VH	1b	Line-side Loopback Contr	ol. 1b actuates	0h	Not supported, ignore
				loopback of optical input t	o optical output.		write, read back as 0h
	1	VH	1b	XFI Loopback Control. 1	b actuates loopback of	Xh	Power up to 0b
				electrical input to electrica	ıl output		
	0	VH	1b	Signal Conditioner Contro	1	0h	Normal REFCLK, mode
							only supported. Ignore
							write, read back as 0b
		Flag T	hresholds				
2-3		NVE	2B	Temp High Alarm	Threshold for alarm	19968	78°
						d	(Assumes 3°C accuracy)
4-5		NVE	2B	Temp Low Alarm	Threshold for alarm	62208	-13°C
						d	(Assumes 3°C accuracy)
6-7		NVE	2B	Temp High Warning	Threshold for warn	19200	+75°
						d	(Assumes 5°C accuracy)
8-9		NVE	2B	Temp Low Warning	Threshold for warn	62976	-10°C
						d	(Assumes 5°C accuracy)
10-		R	8B	Reserved	Reserved	All	Ignore write; return 00h on
17						00h	read.
18-		NVE	2B	Bias High Alarm	Threshold for alarm	35000	70 mA
19						d	
20-		NVE	2B	Bias Low Alarm	Threshold for alarm	10111	20 mA
21						d	
22-		NVE	2B	Bias High Warning	Threshold for warn	32500	65 mA
23						d	
24-		NVE	2B	Bias Low Warning	Threshold for warn	12500	25 mA
25						d	

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26- 27		NVE	2B	TX Power High Alarm	Threshold for alarm	14125 d	+1.5 dBm (assumes 2 dB accuracy)
28- 29		NVE	2B	TX Power Low Alarm	Threshold for alarm	1995d	-7.0 dBm (assumes 2 dB accuracy)
30- 31		NVE	2B	TX Power High Warning	Threshold for warn	12589 d	+1.0 dBm (assumes 2 dB accuracy)
32- 33		NVE	2B	TX Power Low Warning	Threshold for warn	2239d	-6.5 dBm (assumes 2 dB accuracy)
34- 35		NVE	2B	RX Power High Alarm	Threshold for alarm	17783 d	+ 2.5 dBm (assumes 1.5 dB accuracy)
36- 37		NVE	2B	RX Power Low Alarm	Threshold for alarm	100d	-20 dBm
38- 39		NVE	2B	RX Power High Warning	Threshold for warn	15849 d	+ 2.0 dBm (assumes 1.5 dB accuracy)
40- 41		NVE	2B	RX Power Low Warning	Threshold for warn	158d	-18 dBm
42-		NVE	2B	AUX1 High Alarm	Threshold for alarm	36300 d	3.63 V
44- 45		NVE	2B	AUX1Low Alarm	Threshold for alarm	30000 d	3.00V
46- 47		NVE	2B	AUX1 High Warning	Threshold for warn	35000 d	3.50V (assumes 50mV accuracy)
48- 49		NVE	2B	AUX1Low Warning	Threshold for warn	31000 d	3.10V (assumes 50 mV accuracy)
50- 51		NVE	2B	AUX2 High Alarm	Threshold for alarm	55000 d	5.50 V
52- 53		NVE	2B	AUX2 Low Alarm	Threshold for alarm	45000 d	4.50 V
54- 55		NVE	2B	AUX2 High Warning	Threshold for warn	53000 d	5.30 V (assumes 50mV accuracy)
56- 57		NVE	2B	AUX2 Low Warning	Threshold for warn	47000 d	4.70V (assumes 50mV accuracy)
					<b>Optional VPS Contr</b>	ol Registe	ers
58	7-4	NVE	4b	VCC2 min with Reg	Min. VCC2 with Regulator	0000b	VPS not supported. Return 0000b=1.8V
	3-0	VH	4b	VCC2 Host	VCC2 Supplied by Host	0000b	Written and read by host. Ignore and return 0000b
59	7-4	VH	4b	VCC2 min in Bypass	Min. VCC2 in Regulator	0000b	VPS not supported. Return 0000b=1.8V
	3-1	VH	3b	Reserved	Reserved	All 000b	Ignore write, return 0000h on read
	0	VH	1b	Regulator Bypass Mode	Turns VPS Bypass on or off	0b	VPS not supported. Ignore write, return 0h
60- 69		R	10B	Reserved	Reserved	00h	Ignore write return 00h on read.
70		VH	1B	Acceptable BER	For FEC systems	00h	Not supported. Ignore W, return 00h
71		VH	1B	Actual BER	For FEC systems	00h	Not supported. Ignore W, return 00h
72- 73		VH	2B	Wavelength Set for tunable laser	Host wavelength set	0000h	Not supported. Ignore W, return 0000h
74- 75		VH	2B	Wavelength Error	Returned wavelength error	0000h	Not supported. Ignore W, return 00h
76		VH	1B	FEC Amplitude Adj	Set Amp Slice	00h	Not supported. Ignore W, return 00h
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77		VH	1B	FEC Phase Adj	Set Phase Slice	00h	Not supported. Ignore W, return 00h
78- 79		R	2B	Reserved	Reserved	00h	Ignore write: return 00h on read
80- 87		VHR	8B	Latched Interrupt Flag Bits	Individual bits set per XFPMSA	xb	Latched on flag condition. Cleared on host read. (See MSA)
88- 95		VH	8B	Interrupt Masking Bits	Individual bits set per XFPMSA	0b	Set and readable by host. Cleared at power-up or reset.
96- 97		VHR	2B	Temperature Readout	MSB in First Byte	xxxxh	Reported Temperature Value in Units Defined in XFP MSA 4.0
98- 99		VHR	2B	Reserved A/D Chan.	Reserved	0000h	Report 0000h on read.
100- 101		VHR	2B	TX Bias A/D Chan	MSB in First Byte	xxxxh	Reported TX Bias Value in Units Defined in MSA
102- 103		VHR	2B	TX Power A/D Chan	MSB in First Byte	xxxxh	Reported TX Power Value in Units Defined in MSA
104- 105		VHR	2B	RX Power A/D Chan	MSB in First Byte	xxxxh	Reported RX Power Value in Units Defined in MSA
106- 107		VHR	2B	AUX1 A/D Chan	MSB in First Byte	0000h	Report +3.3V Supply Voltage
108- 109		VHR	2B	AUX2 A/D Chan	MSB in First Byte	0000h	Report +5V Supply voltage
		Signal	Condition	ner Control			
110	7	VHR	1b	TX Disable State	Reports TXDIS	xb	Ignore writes. 0b = Tx ON; 1b = Tx OFF
	6	VH	1b	Soft TX Disable	OR's with input pin	Ob	Read and write by host. This bit is OR'ed with the Tx Dis hard pin. Writing "1" disables the laser. Default power up value "0"
	5	VHR	1b	MOD-NR State	Reports MOD_NR	xb	Reports state of MOD_NR hard pin, updated within 100ms of change on pin. 0b = module ready 1b = module not ready. Ignore writes
	4	VHR	1b	P_Down State	Reports P_Down	xb	Ignore writes. Reports state of P-down hard pin, 0b = power on, normal operation 1b=power down
	3	VH	1b	Soft P_Down	OR's with input pin	0b	Read and write by host, power up and reset to 0b.
	2	VHR	1b	Interrupt State	Reports Interrupt	xb	Ignore writes. Reports state of Interrupt hard pin, "0" indicates possible module operational fault or a status critical to the host system

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	1	VHR	1b	Rx_LOS State	Reports LOS	xb	Ignore writes. Reports state of Rx_LOS hard pin. Updated within 100ms of change on pin. 0=Rx_LOS is in de-asserted mode 1=Rx_LOS is asserted
111	7	VHR	1b	Data Not Ready  TX_NR	Set low when A/D ready.  Identifies TX_NR	xb	Ignore writes. Indicates transceiver has achieved power up and A/D data ready. The Data _Not_Ready bit is high during module power up and prior to the first valid A/D reading. Once the first valid A/D reading occurs, the bit is set low until the device is powered down. The bit must be set low within 1 s of power-up Ignore writes. Identifies Not
	6	VH	1b	TX_Fault	Identifies TX_Fault	0b	ready condition as specific to the Tx path  Ignore writes. Conditions for set TBD. Set at 0b for
	5	VH	1b	TX_CDR not locked	Identifies TX_LOL	xb	now. Ignores writes. Identifies Loss of Lock in Tx path CDR.
	4	VH	1b	RX_NR	Identifies RX_NR	xb	Ignores writes. Set if RX CDR loss of lock.
	3	VH	1b	RX_CDR not locked	Identifies RX_LOL	xb	Ignores writes. Identifies loss of lock in Rx path CDR
	2-0	R	3b	Reserved	Reserved	000b	Ignores writes, reports 000b.
112- 117		R	6B	Reserved		00b	Ignore W, return 00h
118	7-1	R	7b	Reserved	Reserved	00000 00b	Not supported. Ignore W, return 0000000b
	0	VH	1b	Error Checking	Switches Packet Error Checking	0b	Host sets to 1b to enable packet error checking. Power up and reset to 0b
119- 122		VH	4B	New Password entry.	Host may enter to change Password	00h	Change host password value if current correct password entered in 123-126. Power-up and reset to 00000000h.
123- 126		VH	4B	Password entry.	Host may enter Password to Access Protected Area	00h	Host may enter password to Access Protected Area. Power up and reset to 00000000h
127		VH	1B	Table Select	Host enters to select upper memory table	01h	Defines Table for subsequent upper memory map reads. Defaults to 01h on Power and reset.
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Upper Memory Map: I2C Addr: A0h, Table 1 - Serial ID Section - Read only by Host, all 2

Nonvolatile 3

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Byte Addr	Bit Addr	Size (Bytes) or	Field Name	Description of Field	Value	Value Meaning
ess	ess	(bits)				
128		1B	Identifier	Type of serial transceiver	06h	XFP
Exten	ded Ide	ntifier				
129	6-7	2b	Ext. Identifier - Module Power Class	Defines Module Power Class	XXh = 01b	Defines module power class 01= power level 2 (2.5W max)
129	5	1b	Ext. Identifier - CDR	Identifies presence of a CDR	0b	Module contains CDR function.
129	4	1b	Ext. Identifier - REFCLK	Identifies need for REFCLK	1b	Identifies need for REFCLK.  1=Synchronous Ref Clock input not required.
129	3	1b	CLEI Code Present	Indicates if CLEI Code is present in Table 2	0b	Indicates if CLEI code is present in Page 02h, 1b = CLEI code is present in page 02h
129	0-2	3b	Ext. Identifier - Reserved	Reserved	000b	Reserved
130		1B	Connector	Code for connector type	07h	LC
131-13	38	8 B	Transceiver Code f	or electronic compatibil	ity or optical co	ompatibility
		10 Gigabit	<b>Ethernet Compliance</b>			•
131	7	1b	10GBASE-SR		0b	1=support, 0=not support
	6	1b	10GBASE-LR		1b	1=support, 0=not support
	5	1b	10GBASE-ER		0b	1=support, 0=not support
	4	1b	10GBASE-LRM		0b	
	3	1b	10GBASE-SW		0b	
	2	1b	10GBASE-LW		1b	
	1	1b	10GBASE-EW		0b	
	0	1b	10GBASE - ZR		0b	1=support, 0=not support
			Fibre Channel Comp	liance Codes		
132	7	1b	1200-MX-SN-I		0b	
	6	1b	1200-SM-LL-L		1b	1=support, 0=not support
	5	1b	Extended reach 1550		0b	
	4	1b	Intermediate reach 1310nm FP		0b	
	3	1b	Reserved		0b	
	2	1b	Reserved		0b	
	1	1b	Reserved		0b	
0		1b	Reserved		0b	
100	T =		Copper Link Compli	ance Codes	Lot	
133	7	1b	Reserved		0b	
	6	1b	Reserved		0b	
	5	1b	Reserved		0b	
	4	1b	Reserved		0b	
	3	1b	Reserved		0b	
	2	1b	Reserved		0b	
	1	1b	Reserved		0b	
	0	1b	Reserved	Cadaa	0b	
124	7	Lower Spe	ed Link Compliance		0b	
134 Bev C	1	10	1000BASE-SX/1xF0	Corporation AN-2035	UU	Page 11 of 90

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6			<u> JAK</u>			
4		6	1b	1000BASE-LX/1xFC SMF	0b	
3		5	1b	2xFC MMF	0b	
2		4	1b	2xFC SMF	0b	
2		3	1b	OC-48-SR	0b	
1			1b		0b	
135						
SONET/SDH Interconnect Link Compliance Codes						
135		Ü			00	I .
Coc-192 SR-1 support, -1 d max power)	135	7			1h	(OC-192 VSR4-2 support -1dBm
Coc.   19	100	,	10	10	10	
S		6	1h	I-64 1 (P111-2D1)	1b	
S			10		10	* * * * * * * * * * * * * * * * * * *
4		5	1b	I-64.2r	0b	mun pe wer)
3						
1   1b						
1						
1						
SONET/SDH Short Haul Link Compliance Codes						
136		U			UU	
6	126	7			Ob	
S	130					
4						
3						
2						_
1						
137						
SONET/SDH Long Haul Link Compliance Codes						
137		0			0b	
Color   Colo		Ι_			Tot	
S	137					
4						
3						
2       1b       Reserved       0b         1       1b       Reserved       0b         0       1b       Reserved       0b         SONET/SDH Very Long Haul Link Compliance Codes         138       7       1b       V-64.2a       0b         6       1b       V-64.2b       0b         5       1b       V-64.3       0b         4       1b       Reserved       0b         3       1b       Reserved       0b         2       1b       Reserved       0b         1       1b       Reserved       0b         0       1b       Reserved       0b						
1         1b         Reserved         0b           SONET/SDH Very Long Haul Link Compliance Codes           138         7         1b         V-64.2a         0b           6         1b         V-64.2b         0b           5         1b         V-64.3         0b           4         1b         Reserved         0b           3         1b         Reserved         0b           2         1b         Reserved         0b           1         1b         Reserved         0b           0         1b         Reserved         0b						
0         1b         Reserved         0b           SONET/SDH Very Long Haul Link Compliance Codes           138         7         1b         V-64.2a         0b           6         1b         V-64.2b         0b           5         1b         V-64.3         0b           4         1b         Reserved         0b           3         1b         Reserved         0b           2         1b         Reserved         0b           1         1b         Reserved         0b           0         1b         Reserved         0b		2				
SONET/SDH Very Long Haul Link Compliance Codes						
138       7       1b       V-64.2a       0b         6       1b       V-64.2b       0b         5       1b       V-64.3       0b         4       1b       Reserved       0b         3       1b       Reserved       0b         2       1b       Reserved       0b         1       1b       Reserved       0b         0       1b       Reserved       0b		0			0b	
6       1b       V-64.2b       0b         5       1b       V-64.3       0b         4       1b       Reserved       0b         3       1b       Reserved       0b         2       1b       Reserved       0b         1       1b       Reserved       0b         0       1b       Reserved       0b			SONET/SI	OH Very Long Haul Link Compliance Codes		
5       1b       V-64.3       0b         4       1b       Reserved       0b         3       1b       Reserved       0b         2       1b       Reserved       0b         1       1b       Reserved       0b         0       1b       Reserved       0b	138	7	1b			
4       1b       Reserved       0b         3       1b       Reserved       0b         2       1b       Reserved       0b         1       1b       Reserved       0b         0       1b       Reserved       0b						
3     1b     Reserved     0b       2     1b     Reserved     0b       1     1b     Reserved     0b       0     1b     Reserved     0b						
2       1b       Reserved       0b         1       1b       Reserved       0b         0       1b       Reserved       0b		4	1b	Reserved	0b	
1         1b         Reserved         0b           0         1b         Reserved         0b		3	1b	Reserved	0b	
1         1b         Reserved         0b           0         1b         Reserved         0b		2	1b	Reserved	0b	
0 1b Reserved 0b		-	1b		0b	
Encoding					1	•
139 7 1b 64B/66B 1b 10GE/10GFC Coding	139	7		64B/66B	1b	10GE/10GFC Coding
U						Not used in standards but is
supported						
5 1b SONET Scrambled 1b OC-192 Coding		5	1b	SONET Scrambled	1b	
4 1b NRZ 1b NRZ only supported						
3 1b RZ 0b						July Jupported
2-0 3b Reserved 000b						
140 1B BR, minimum Minimum Supported Xxh = 63h 9900 Mbps	140	20				9900 Mbps
Bitrate (/100Mb)	110				24AH = 03H	>>00 Highs

141		1B	BR, maximum	Maximum Supported Bitrate (/100Mb)	XXh = 6Fh	11100 Mbps for FTLX versions 10700 Mbps for FTRX versions
142		1B	Length (SMF) – km	Link length supported for 9/125 um fiber, units of km	0Ah	10 km
143		1B	Length (E-50um)	Link length supported for extended bandwidth MMF, units of 2 m	00h	Not Supported
144		1B	Length (50m)	Link length supported for 50/125 mm fiber, units of 1 m	00h	Not Supported
145		1B	Length (62.5m)	Link length supported for 62.5/125 mm fiber, units of 1 m	00h	Not Supported
146		1B	Length (Copper)	Link length supported for copper, units of 1m	00h	Not supported
		Device Te	chnology			
147	4-7	4b	Transmitter Technological	ogy	0100h	1310 nm DFB laser
	3	1b	Wavelength Control		0h	No wavelength control
	2	1b	Cooled Transmitter		0h	Transmitter is not cooled
	1	1b	Detector Type		0h	0=PIN Detector
	0	1b	Tunable Transmitter		Oh	0=Transmitter not Tunable
148- 163		16B	Vendor name	SFP vendor name (ASCII) blank padded	"FINISAR CORP. "	
		CDR Sum	 nort			
164	   7	CDR Supp		5 Gb/s	1b	Supported
164	7 6	1b	CDR Support for 9.9		1b 1b	Supported Supported
164	6	1b 1b	CDR Support for 9.9 CDR Support for 10.	3 Gb/s	1b	Supported
164	6 5	1b 1b 1b	CDR Support for 9.9 CDR Support for 10. CDR Support for 10.	3 Gb/s 5 Gb/s	1b 1b	Supported Supported
164	6	1b 1b	CDR Support for 9.9 CDR Support for 10.	3 Gb/s 5 Gb/s 7 Gb/s	1b	Supported
164	6 5 4	1b 1b 1b 1b	CDR Support for 9.9 CDR Support for 10. CDR Support for 10. CDR Support for 10. CDR Support for 11. Reserved	3 Gb/s 5 Gb/s 7 Gb/s 1 Gb/s	1b 1b 1b 1b 1b Xh = 0b	Supported Supported Supported Supported for FTLX versions, not supported for FTRX (leaded)
164	6 5 4 3	1b 1b 1b 1b 1b 1b 1b	CDR Support for 9.9 CDR Support for 10. CDR Support for 10. CDR Support for 10. CDR Support for 11. Reserved Line-side Loopback	3 Gb/s 5 Gb/s 7 Gb/s 1 Gb/s Mode Supported	1b 1b 1b 1b 1b  Xh = 0b Xh = 0b	Supported Supported Supported Supported for FTLX versions, not supported for FTRX (leaded) versions
	6 5 4 3	1b 1b 1b 1b 1b 1b 1b	CDR Support for 9.9 CDR Support for 10. CDR Support for 10. CDR Support for 10. CDR Support for 11.  Reserved Line-side Loopback XFI Loopback Support	3 Gb/s 5 Gb/s 7 Gb/s 1 Gb/s Mode Supported	1b 1b 1b 1b 1b  Xh = 0b Xh = 0b Xh = 1b	Supported Supported Supported Supported for FTLX versions, not supported for FTRX (leaded) versions  0=not supported 1=Supported
164 165- 167	6 5 4 3	1b 1b 1b 1b 1b 1b 1b 1b 3B	CDR Support for 9.9 CDR Support for 10. CDR Support for 10. CDR Support for 10. CDR Support for 11.  Reserved Line-side Loopback XFI Loopback Support Vendor OUI	3 Gb/s 5 Gb/s 7 Gb/s 1 Gb/s  Mode Supported orted  SFP vendor IEEE company ID	1b 1b 1b 1b 1b  Th 1b  Xh = 0b Xh = 0b Xh = 1b  XXXXXXh = 009065h	Supported Supported Supported Supported Supported for FTLX versions, not supported for FTRX (leaded) versions  0=not supported 1=Supported IEEE assigned
165-	6 5 4 3	1b 1b 1b 1b 1b 1b 1b	CDR Support for 9.9 CDR Support for 10. CDR Support for 10. CDR Support for 10. CDR Support for 11.  Reserved Line-side Loopback XFI Loopback Support	3 Gb/s 5 Gb/s 7 Gb/s 1 Gb/s Mode Supported orted SFP vendor IEEE	1b 1b 1b 1b 1b  Xh = 0b Xh = 0b Xh = 1b	Supported Supported Supported Supported for FTLX versions, not supported for FTRX (leaded) versions  0=not supported 1=Supported
165- 167 168-	6 5 4 3	1b 1b 1b 1b 1b 1b 1b 1b 3B	CDR Support for 9.9 CDR Support for 10. CDR Support for 10. CDR Support for 10. CDR Support for 11.  Reserved Line-side Loopback XFI Loopback Support Vendor OUI	3 Gb/s 5 Gb/s 7 Gb/s 1 Gb/s Mode Supported orted SFP vendor IEEE company ID Part number provided	1b 1b 1b 1b 1b 1b  Xh = 0b Xh = 0b Xh = 1b  XXXXXXX = 009065h XXXXX = FTLX-	Supported Supported Supported Supported Supported for FTLX versions, not supported for FTRX (leaded) versions  0=not supported 1=Supported IEEE assigned
165- 167 168- 183	6 5 4 3	1b 1b 1b 1b 1b 1b 1b 1b 1b 16 16 16 16	CDR Support for 9.9 CDR Support for 10. CDR Support for 10. CDR Support for 10. CDR Support for 11.  Reserved Line-side Loopback XFI Loopback Support Vendor OUI  Vendor PN	3 Gb/s 5 Gb/s 7 Gb/s 1 Gb/s  Mode Supported orted  SFP vendor IEEE company ID Part number provided by vendor (ASCII)  Revision level for part number provided by	1b 1b 1b 1b 1b 1b  Xh = 0b Xh = 0b Xh = 1b  XXXXXXh = 009065h XXXXXh = FTLX-1411M3	Supported Supported Supported Supported for FTLX versions, not supported for FTRX (leaded) versions  0=not supported 1=Supported IEEE assigned  Finisar part number  Hardware revision level field not

		JAK		M : C	4.61	7000
190		1B	Max Case Temp	Maximum Case Temperature	46h	70°C
191		1B	CC_BASE	Check code for Base	xxh	Calculated check code, low 8 bits
171		110	CC_BASE	ID Fields (addresses	XXII	of sum of first 64 bytes of Serial
				128 to 190)		ID info.
				EXTENDED ID FIEI	DC	ID IIIIO.
192-19	95	4B	Power Supply Field	•	<i>1</i> D3	
192	<u> </u>	1B	Maximum Power Di		XXh = 7Dh	= 2500 mW
193		1B		Power-down (/10mW)	XXh = 96h	= 1500mW
194	4-7	4b	Max. Current on +5	` '	0111h	= 350 mA (actual 320 mA)
171	0-3	4b		3V Supply (/100mA)	0011h	= 300 mA (actual 265 mA)
195	4-7	4b		8V Supply (/100mA)	00000h	Not used
1)3	0-3	4b	Max. Current on -5\		0000h	Not used
196-	0.5	16B	Vendor SN	Serial number	Eg A000000	Encoded serial number
211		100	VOIGOI DIV	provided by vendor	25 7100000	Zhooded serial humber
_11				(ASCII) blank padded		
Date (	Code (v	ı endor man	nufacturing date)	(115CH) stank padded		
212-		6B	Date code - year	Vendors	Eg "030106"	yymmdd
217		U.S.		manufacturing date	28 000100	Jymmoo
				code – year. (00 =		
				2000) ASCII		
218-		2B	Lot Code	Vendor lot code	2020h	Vendor specific lot code, ASCII.
219						May be blank
	ostic M	onitoring /	/ Variable Power Suppl	y / Special Function Sup	pport	
220	7	1b	Reserved	, <u>.</u>	0b	Reserved
	6	1b	Reserved		0b	Reserved
	5	1b	Reserved		0b	Reserved
	4	1b	FEC BER Support		0b	No BER Support
	3	1b	Received power mea	asurement type	1b	Average Power.
	2	1b	Reserved	71	0b	Reserved
	1-0	2b	Reserved		00b	Will be Reserved
Enha		1		nhanced features are im		Will be Reserved
221	7	1b			0b	Not supported
<b>441</b>	6	1b	Module supports VF Soft TX DISABLE	ى ا	1b	Soft TX_DISABLE is supported
	5	1b			1b	Soft PWR_DWN is supported
	4	1b	Soft PWR_DWN Supports VPS LV R	agulatar Mada	0b	
		1b	11	<u> </u>	0b	We are not supporting VPS
	3 2	1b	Active FEC Control	ssed Regulator Mode	0b	We are not supporting VPS  Not supported.
	<u> </u>	1b			0b 0b	**
	0		Wavelength Tunabil Optional CMU Mod			Not supported
ATIV	Ŭ	1b	Optional CMU Mod	C	0b	Not supported
	Monito		Aug A/D Inquit 1		0111h	12 2V Supply Monitor on AUV
222	4-7	4b	Aux A/D Input 1			+3.3V Supply Monitor on AUX A/D 1
	0-3	4b	Aux A/D Input 2		0110h	+5V Supply Monitor on AUX A/D 2
223		1B	CC_EXT	Check code for the Extended ID Fields (addresses 192 to 222)	xxh	Calculated check code. Low 8 bits of sum of Bytes 192-222



#### **Customer Specific Fields**

Data Addr ess	Size (Bytes)	Field Name	Description of Field	Value	Value Meaning
224- 255	32	TBD	TBD	All 00h at present	

1 2

#### Upper Memory Map: I2C Address: A0h, Table 02h

User-writable EEPROM. A password (entered into bytes 123-126) is required to allow write access to this table. The default password is 00001011h per the XFP MSA, and it can be changed by the user (i.e., host manufacturer) by writing the new password into bytes 110-122 when the correct old password has been written into bytes 123-126. The host password must be in the range of 00000000h to 7FFFFFFh. This table is always readable (password not required).

#### **Upper Memory Map: I2C Address: A0h, Table 03h – 7Fh**

Used by Finisar for internal parameter storage. Not readable or writable without Finisar Password.



## **Product: FTLX-1412M3**

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Lower Memory Map: I2C Addr: A0h, Bytes 0 – 127

Byte Addr	Bit Addr	Type Cod	Size (Bytes) or	Field Name	Description of Field	Value	Value Meaning
Auur ess	ess	e	(bits)				
0	ess	NVE	1B	Identifier	Type of serial transceiver	06h	XFP
	<u>I</u>	Signal	   Conditioner	r Control	transcerver		1
1	4-7	VH	4b	Data Rate Control		XXXXh	Ignored
	3	VH W	1b	Reserved		N/A	Reserved
	2	VH	1b		Line-side Loopback Control. 1b actuates oopback of optical input to optical output.		Not supported, ignore write, read back as 0h
	1	VH	1b	XFI Loopback Control. 11	actuates loopback of	Xh	Power up to 0b
	0	VH	1b		electrical input to electrical output Signal Conditioner Control		Normal REFCLK, mode only supported. Ignore write, read back as 0b
		Flag T	Thresholds				write, read back as ob
2-3		NVE	2B	Temp High Alarm	Threshold for alarm	21248 d	83° (Assumes 3°C accuracy)
4-5		NVE	2B	Temp Low Alarm	Threshold for alarm	62208 d	-13°C (Assumes 3°C accuracy)
6-7		NVE	2B	Temp High Warning	Threshold for warn	20480 d	+80° (Assumes 5°C accuracy)
8-9		NVE	2B	Temp Low Warning	Threshold for warn	62976 d	-10°C (Assumes 5°C accuracy)
10- 17		R	8B	Reserved	Reserved	All 00h	Ignore write; return 00h on read.
18- 19		NVE	2B	Bias High Alarm	Threshold for alarm	40000 d	80 mA
20- 21		NVE	2B	Bias Low Alarm	Threshold for alarm	7500d	15 mA
22- 23		NVE	2B	Bias High Warning	Threshold for warn	37500 d	75 mA
24- 25		NVE	2B	Bias Low Warning	Threshold for warn	10000 d	20 mA
26- 27		NVE	2B	TX Power High Alarm	Threshold for alarm	14125 d	+1.5 dBm (assumes 2 dB accuracy)
28- 29		NVE	2B	TX Power Low Alarm	Threshold for alarm	1995d	-7.0 dBm (assumes 2 dB accuracy)
30- 31		NVE	2B	TX Power High Warning	Threshold for warn	12589 d	+1.0 dBm (assumes 2 dB accuracy)
32- 33		NVE	2B	TX Power Low Warning	Threshold for warn	2512d	-6 dBm (assumes 2 dB accuracy)
34- 35		NVE	2B	RX Power High Alarm	Threshold for alarm	17783 d	+ 2.5 dBm (assumes 1.5 dB accuracy)
36- 37		NVE	2B	RX Power Low Alarm	Threshold for alarm	100d	-20 dBm
38- 39		NVE	2B	RX Power High Warning	Threshold for warn	15849 d	+ 2.0 dBm (assumes 1.5 dB accuracy)
40- 41		NVE	2B	RX Power Low Warning	Threshold for warn	158d	-18 dBm

		JAI					
42- 43		NVE	2B	AUX1 High Alarm	Threshold for alarm	36300 d	3.63 V
44-45		NVE	2B	AUX1Low Alarm	Threshold for alarm	30000 d	3.00V
46- 47		NVE	2B	AUX1 High Warning	Threshold for warn	35000 d	3.50V (assumes 50mV accuracy)
48- 49		NVE	2B	AUX1Low Warning	Threshold for warn	31000 d	3.10V (assumes 50 mV accuracy)
50- 51		NVE	2B	AUX2 High Alarm	Threshold for alarm	0000b	00
52- 53		NVE	2B	AUX2 Low Alarm	Threshold for alarm	0000b	00
54- 55		NVE	2B	AUX2 High Warning	Threshold for warn	0000b	00
56- 57		NVE	2B	AUX2 Low Warning	Threshold for warn	0000b	00
5,	l .				Optional VPS Contr	al Registe	are
58	7-4	NVE	4b	VCC2 min with Reg	Min. VCC2 with	0000b	VPS not supported. Return
30					Regulator		0000b=1.8V
	3-0	VH	4b	VCC2 Host	VCC2 Supplied by Host	0000b	Written and read by host. Ignore and return 0000b
59	7-4	VH	4b	VCC2 min in Bypass	Min. VCC2 in Regulator	0000b	VPS not supported. Return 0000b=1.8V
	3-1	VH	3b	Reserved	Reserved	All 000b	Ignore write, return 0000h on read
	0	VH	1b	Regulator Bypass Mode	Turns VPS Bypass on or off	0b	VPS not supported. Ignore write, return 0h
60- 69		R	10B	Reserved	Reserved	00h	Ignore write return 00h on read.
70		VH	1B	Acceptable BER	For FEC systems	00h	Not supported. Ignore W, return 00h
71		VH	1B	Actual BER	For FEC systems	00h	Not supported. Ignore W, return 00h
72- 73		VH	2B	Wavelength Set for tunable laser	Host wavelength set	0000h	Not supported. Ignore W, return 0000h
74- 75		VH	2B	Wavelength Error	Returned wavelength error	0000h	Not supported. Ignore W, return 00h
76		VH	1B	FEC Amplitude Adj	Set Amp Slice	00h	Not supported. Ignore W, return 00h
77		VH	1B	FEC Phase Adj	Set Phase Slice	00h	Not supported. Ignore W, return 00h
78- 79		R	2B	Reserved	Reserved	00h	Ignore write: return 00h on read
80- 87		VHR	8B	Latched Interrupt Flag Bits	Individual bits set per XFPMSA	xb	Latched on flag condition. Cleared on host read. (See MSA)
88- 95		VH	8B	Interrupt Masking Bits	Individual bits set per XFPMSA	0b	Set and readable by host. Cleared at power-up or reset.
96- 97		VHR	2B	Temperature Readout	MSB in First Byte	xxxxh	Reported Temperature Value in Units Defined in XFP MSA 4.0
98- 99		VHR	2B	Reserved A/D Chan.	Reserved	0000h	Report 0000h on read.
99							

		JAI					
101							Units Defined in MSA
102- 103		VHR	2B	TX Power A/D Chan	MSB in First Byte	xxxxh	Reported TX Power Value in Units Defined in MSA
104- 105		VHR	2B	RX Power A/D Chan	MSB in First Byte	xxxxh	Reported RX Power Value in Units Defined in MSA
106- 107		VHR	2B	AUX1 A/D Chan	MSB in First Byte	0000h	Report +3.3V Supply Voltage
108- 109		VHR	2B	AUX2 A/D Chan	MSB in First Byte	0000h	Report +5V Supply voltage
109		Signal	<b>Conditioner</b>	Control			
110	7	VHR	1b	TX Disable State	Damanta TVDIC	1 <sub>a</sub>	Impara vivitas Ob — Tv ON.
110					Reports TXDIS	xb	Ignore writes. 0b = Tx ON; 1b = Tx OFF
	6	VH	1b	Soft TX Disable	OR's with input pin	0b	Read and write by host. This bit is OR'ed with the Tx Dis hard pin. Writing "1" disables the laser. Default power up value "0"
	5	VHR	1b	MOD-NR State	Reports MOD_NR	xb	Reports state of MOD_NR hard pin, updated within 100ms of change on pin. 0b = module ready 1b = module not ready. Ignore writes
	4	VHR	1b	P_Down State	Reports P_Down	xb	Ignore writes. Reports state of P-down hard pin, 0b = power on, normal operation 1b=power down
	3	VH	1b	Soft P_Down	OR's with input pin	0b	Read and write by host, power up and reset to 0b.
	2	VHR	1b	Interrupt State	Reports Interrupt	xb	Ignore writes. Reports state of Interrupt hard pin, "0" indicates possible module operational fault or a status critical to the host system
	1	VHR	1b	Rx_LOS State	Reports LOS	xb	Ignore writes. Reports state of Rx_LOS hard pin. Updated within 100ms of change on pin. 0=Rx_LOS is in de-asserted mode 1=Rx_LOS is asserted

	MI,	SAI	K				
	0	VHR	1b	Data Not Ready	Set low when A/D ready.	xb	Ignore writes. Indicates transceiver has achieved, power up and A/D data ready. The Data _Not_Ready bit is high during module power up and prior to the first valid A/D reading. Once the first valid A/D reading occurs, the bit is set low until the device is powered down. The bit must be set low within 1 s of power-up
111	7	VH	1b	TX_NR	Identifies TX_NR	xb	Ignore writes. Identifies Not ready condition as specific to the Tx path
	6	VH	1b	TX_Fault	Identifies TX_Fault	0b	Ignore writes. Conditions for set TBD. Set at 0b for now.
	5	VH	1b	TX_CDR not locked	Identifies TX_LOL	xb	Ignores writes. Identifies Loss of Lock in Tx path CDR.
	4	VH	1b	RX_NR	Identifies RX_NR	xb	Ignores writes. Set if RX CDR loss of lock.
	3	VH	1b	RX_CDR not locked	Identifies RX_LOL	xb	Ignores writes. Identifies loss of lock in Rx path CDR
	2-0	R	3b	Reserved	Reserved	000Ь	Ignores writes, reports 000b.
112- 117		R	6B	Reserved		00b	Ignore W, return 00h
118	7-1	R	7b	Reserved	Reserved	00000 00b	Not supported. Ignore W, return 0000000b
	0	VH	1b	Error Checking	Switches Packet Error Checking	Ob	Host sets to 1b to enable packet error checking. Power up and reset to 0b
119- 122		VH	4B	New Password entry.	Host may enter to change Password	00h	Change host password value if current correct password entered in 123-126. Power-up and reset to 00000000h.
123- 126		VH	4B	Password entry.	Host may enter Password to Access Protected Area	00h	Host may enter password to Access Protected Area. Power up and reset to 00000000h
127		VH	1B	Table Select	Host enters to select upper memory table	01h	Defines Table for subsequent upper memory map reads. Defaults to 01h on Power and reset.



Upper Memory Map: I2C Addr: A0h, Table 1 - Serial ID Section - Read only by Host, all 1 2

#### Nonvolatile

3

Byte	Bit	Size	Field Name	Description of Field	Value	Value Meaning				
Addr	Addr	(Bytes) or								
ess	ess	(bits)								
128		1B	Identifier	Type of serial	06h	XFP				
				transceiver						
	ded Ide		1		_					
129	6-7	2b	Ext. Identifier -	Defines Module	XXh = 01b	Defines module power class				
			Module Power	Power Class		01= power level 2 (2.5W max)				
120	-	11.	Class	I.1	OI.	Mad to continu CDD for all an				
129	5	1b	Ext. Identifier - CDR	Identifies presence of a CDR	0b	Module contains CDR function.				
129	4	1b	Ext. Identifier -	Identifies need for	1b	Identifies need for REFCLK.				
12)	7	10	REFCLK	REFCLK	10	1=Synchronous Ref Clock input				
			REI CEIL	REF CER		not required.				
129	3	1b	CLEI Code Present	Indicates if CLEI	0b	Indicates if CLEI code is present				
				Code is present in		in Page 02h, 1b = CLEI code is				
				Table 2		present in page 02h				
129	0-2	3b	Ext. Identifier -	Reserved	000b	Reserved				
			Reserved							
130		1B	Connector	Code for connector	07h	LC				
				type						
131-13	38	8 B Transceiver Code for electronic compatibility or optical compatibility								
121	T =		Ethernet Compliance	Codes	01					
131	7	1b	10GBASE-SR		0b	1=support, 0=not support				
	6	1b	10GBASE-LR		1b	1=support, 0=not support				
	5	1b 1b	10GBASE-ER 10GBASE-LRM		0b 0b	1=support, 0=not support				
	3	1b	10GBASE-LKWI 10GBASE-SW		0b					
	2	1b	10GBASE-SW		1b					
	1	1b	10GBASE-EW		0b					
	0	1b	10GBASE - ZR		0b	1=support, 0=not support				
	0		Fibre Channel Comp	liance Codes	00	1-support, 0-not support				
132	7	1b	1200-MX-SN-I	nunce coues	0b					
	6	1b	1200-SM-LL-L		1b	1=support, 0=not support				
	5	1b	Extended reach 1550	)nm	0b	T				
	4	1b	Intermediate reach 13		0b					
	3	1b	Reserved		0b					
	2	1b	Reserved		0b					
	1	1b	Reserved		0b					
	0	1b	Reserved		0b					
		10 Gigabit	Copper Link Compli	ance Codes						
133	7	1b	Reserved		0b					
	6	1b	Reserved		0b					
	5	1b	Reserved		0b					
	4	1b	Reserved		0b					
	3	1b	Reserved		0b					
	2	1b	Reserved		0b	1				
	1	1b	Reserved		0b					
	0	1b	Reserved	2 1	0b					
124	1 7	_	ed Link Compliance		OI:	1				
134	7	1b	1000BASE-SX/1xF0		0b					
Roy C	6	1b	1000BASE-LX/1xF0	Corporation AN-2035	0b	Page 20 of 90				

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		<u> JAK</u>				
	5	1b	2xFC MMF		0b	
	4	1b	2xFC SMF		0b	
	3	1b	OC-48-SR		0b	
	2	1b	OC-48-IR		0b	
	1	1b	OC-48-LR		0b	
	0	1b	Reserved		0b	
		SONET/S	DH Interconnect Link	Compliance Codes	•	
135	7	1b	I-64.1r	•	1b	(OC-192 VSR4-2 support, -1dBm max power)
	6	1b	I-64.1 (P111-2D1)		1b	(OC-192 SR-1 support, -1 dBm max power)
	5	1b	I-64.2r		0b	
	4	1b	I-64.2		0b	
	3	1b	I-64.3		0b	
	2	1b	I-64.5		0b	
	1	1b	Reserved		0b	
	0	1b	Reserved		0b	
		SONET/S	DH Short Haul Link (	Compliance Codes		
136	7	1b	S-64.1		0b	
	6	1b	S-64.2a		0b	
	5	1b	S-64.2b		0b	
	4	1b	S-64.3a		0b	
	3	1b	S-64.3b		0b	
	2	1b	S-64.5a		0b	
	1	1b	S-64.5b		0b	
	0	1b	Reserved		0b	
		SONET/S	DH Long Haul Link C	Compliance Codes		
137	7	1b	L-64.1		0b	
	6	1b	L-64.2a		0b	
	5	1b	L-64.2b		0b	
	4	1b	L-64.2c		0b	
	3	1b	L-64.3		0b	
	2	1b	Reserved		0b	
	1	1b	Reserved		0b	
	0	1b	Reserved		0b	
		SONET/S	DH Very Long Haul I	Link Compliance Codes		
138	7	1b	V-64.2a		0b	
	6	1b	V-64.2b		0b	
	5	1b	V-64.3		0b	
	4	1b	Reserved		0b	
	3	1b	Reserved		0b	
	2	1b	Reserved		0b	
	1	1b	Reserved		0b	
	0	1b	Reserved		0b	
		Encoding				
139	7	1b	64B/66B		1b	10GE/10GFC Coding
	6	1b	8B/10B		1b	Not used in standards but is supported
	5	1b	SONET Scrambled		1b	OC-192 Coding
	4	1b	NRZ		1b	NRZ only supported
	3	1b	RZ		0b	
	2-0	3b	Reserved		000b	
140		1B	BR, minimum	Minimum Supported Bitrate (/100Mb)	Xxh = 63h	9900 Mbps
141		1B	BR, maximum	Maximum Supported	XXh = 71h	11300 Mbps for FTLX versions
						*

	1 7 1 2	<u>JAIX</u>			1	T
				Bitrate (/100Mb)		
142		1B	Length (SMF) –	Link length supported	0Ah	10 km
			km	for 9/125 um fiber,		
				units of km		
143		1B	Length (E-50um)	Link length supported	00h	Not Supported
				for extended		
				bandwidth MMF,		
				units of 2 m		
144		1B	Length (50m)	Link length supported	00h	Not Supported
1		I D	Length (3011)	for 50/125 mm fiber,	OON	1 tot Supported
				units of 1 m		
145		1B	Length (62.5m)	Link length supported	00h	Not Supported
143		1D	Length (02.5111)	for 62.5/125 mm	OOII	Not Supported
				fiber, units of 1 m		
146		1B	Langth (Compan)		00h	Not aumouted
140		1 D	Length (Copper)	Link length supported	OOH	Not supported
				for copper, units of		
		D : ///	1 1	1m		
147	4-7	Device To		ogy	0100h	1310 nm DFB laser
14/			Transmitter Technol			
	3	1b	Wavelength Control		0h	No wavelength control
	2	1b	Cooled Transmitter		0h	Transmitter is not cooled
	1	1b	Detector Type		Oh	0=PIN Detector
	0	1b	Tunable Transmitter		0h	0=Transmitter not Tunable
148-		16B	Vendor name	SFP vendor name	"FINISAR	
163				(ASCII) blank padded	CORP. "	
				, , ,		
	<u> </u>	CDR Sup	port			
164	7	1b	CDR Support for 9.9	95 Gh/s	1b	Supported
101	6	1b	CDR Support for 10		1b	Supported
	5	1b	CDR Support for 10		1b	Supported
		1b	CDR Support for 10		1b	
	4		CDR Support for 11			Supported
	3	1b				C 1 C EVEL XZ '
			CDR Support for 11	.1 00/8	1b	Supported for FTLX versions, not
			CDR Support for 11	.1 00/8	16	supported for FTRX (leaded)
				.1 00/8		
	2	1b	Reserved		Xh = 0b	supported for FTRX (leaded)
	1	1b	Reserved Line-side Loopback	Mode Supported	Xh = 0b $Xh = 0b$	supported for FTRX (leaded) versions
			Reserved	Mode Supported	Xh = 0b	supported for FTRX (leaded) versions  0=not supported
	1	1b 1b	Reserved Line-side Loopback XFI Loopback Supp	Mode Supported orted	Xh = 0b $Xh = 0b$ $Xh = 1b$	supported for FTRX (leaded) versions  0=not supported 1=Supported
165-	1	1b	Reserved Line-side Loopback	Mode Supported orted SFP vendor IEEE	Xh = 0b $Xh = 0b$ $Xh = 1b$ $XXXXXXh = 0$	supported for FTRX (leaded) versions  0=not supported
167	1	1b 1b 3B	Reserved Line-side Loopback XFI Loopback Supp Vendor OUI	Mode Supported orted  SFP vendor IEEE company ID	Xh = 0b $Xh = 0b$ $Xh = 1b$ $XXXXXXh = 009065h$	supported for FTRX (leaded) versions  0=not supported 1=Supported IEEE assigned
	1	1b 1b	Reserved Line-side Loopback XFI Loopback Supp	Mode Supported orted SFP vendor IEEE	Xh = 0b $Xh = 0b$ $Xh = 1b$ $XXXXXXh = 0$	supported for FTRX (leaded) versions  0=not supported 1=Supported
167	1	1b 1b 3B	Reserved Line-side Loopback XFI Loopback Supp Vendor OUI	Mode Supported orted  SFP vendor IEEE company ID	Xh = 0b $Xh = 0b$ $Xh = 1b$ $XXXXXXh = 009065h$	supported for FTRX (leaded) versions  0=not supported 1=Supported IEEE assigned
167 168-	1	1b 1b 3B	Reserved Line-side Loopback XFI Loopback Supp Vendor OUI	Mode Supported orted  SFP vendor IEEE company ID  Part number provided	Xh = 0b $Xh = 0b$ $Xh = 1b$ $XXXXXXh = 009065h$ $XXXX = 009065h$	supported for FTRX (leaded) versions  0=not supported 1=Supported IEEE assigned  Finisar part number
167 168-	1	1b 1b 3B	Reserved Line-side Loopback XFI Loopback Supp Vendor OUI	Mode Supported orted  SFP vendor IEEE company ID  Part number provided	Xh = 0b $Xh = 0b$ $Xh = 1b$ $XXXXXXh = 009065h$ $XXXXh = FTLX-$	supported for FTRX (leaded) versions  0=not supported 1=Supported IEEE assigned
167 168- 183	1	1b 1b 3B 16B	Reserved Line-side Loopback XFI Loopback Supp Vendor OUI Vendor PN	Mode Supported orted  SFP vendor IEEE company ID  Part number provided by vendor (ASCII)	Xh = 0b Xh = 0b Xh = 1b XXXXXXh = 009065h XXXXh = FTLX-1411M3	supported for FTRX (leaded) versions  0=not supported 1=Supported IEEE assigned  Finisar part number
167 168- 183 184-	1	1b 1b 3B 16B	Reserved Line-side Loopback XFI Loopback Supp Vendor OUI Vendor PN	Mode Supported orted  SFP vendor IEEE company ID Part number provided by vendor (ASCII)  Revision level for part number provided by	Xh = 0b Xh = 0b Xh = 1b XXXXXXh = 009065h XXXXh = FTLX-1411M3	supported for FTRX (leaded) versions  0=not supported 1=Supported IEEE assigned  Finisar part number  Hardware revision level field not
167 168- 183 184- 185	1	1b 1b 3B 16B	Reserved Line-side Loopback XFI Loopback Supp Vendor OUI Vendor PN Vendor rev	Mode Supported orted  SFP vendor IEEE company ID  Part number provided by vendor (ASCII)  Revision level for part number provided by vendor (ASCII)	Xh = 0b Xh = 0b Xh = 1b XXXXXXh = 009065h XXXXh = FTLX-1411M3 3030h	supported for FTRX (leaded) versions  0=not supported 1=Supported IEEE assigned  Finisar part number  Hardware revision level field not used
167 168- 183 184- 185	1	1b 1b 3B 16B	Reserved Line-side Loopback XFI Loopback Supp Vendor OUI Vendor PN	Mode Supported orted  SFP vendor IEEE company ID Part number provided by vendor (ASCII)  Revision level for part number provided by vendor (ASCII)  Nominal Laser	Xh = 0b Xh = 0b Xh = 1b XXXXXXh = 009065h XXXXh = FTLX-1411M3	supported for FTRX (leaded) versions  0=not supported 1=Supported IEEE assigned  Finisar part number  Hardware revision level field not
167 168- 183 184- 185	1	1b 1b 3B 16B	Reserved Line-side Loopback XFI Loopback Supp Vendor OUI Vendor PN Vendor rev	Mode Supported orted  SFP vendor IEEE company ID  Part number provided by vendor (ASCII)  Revision level for part number provided by vendor (ASCII)	Xh = 0b Xh = 0b Xh = 1b XXXXXXh = 009065h XXXXh = FTLX-1411M3 3030h	supported for FTRX (leaded) versions  0=not supported 1=Supported IEEE assigned  Finisar part number  Hardware revision level field not used
167 168- 183 184- 185 186- 187	1	1b 1b 3B 16B	Reserved Line-side Loopback XFI Loopback Supp Vendor OUI Vendor PN Vendor rev	Mode Supported orted  SFP vendor IEEE company ID Part number provided by vendor (ASCII)  Revision level for part number provided by vendor (ASCII)  Nominal Laser	Xh = 0b Xh = 0b Xh = 1b XXXXXXh = 009065h XXXXh = FTLX-1411M3 3030h	supported for FTRX (leaded) versions  0=not supported 1=Supported IEEE assigned  Finisar part number  Hardware revision level field not used
167 168- 183 184- 185 186- 187	1	1b 1b 3B 16B 2B	Reserved Line-side Loopback XFI Loopback Supp Vendor OUI Vendor PN  Vendor rev  Wavelength	Mode Supported orted  SFP vendor IEEE company ID  Part number provided by vendor (ASCII)  Revision level for part number provided by vendor (ASCII)  Nominal Laser Wavelength (1/20nm)	Xh = 0b Xh = 0b Xh = 1b XXXXXXh = 009065h XXXXh = FTLX-1411M3 3030h	supported for FTRX (leaded) versions  0=not supported 1=Supported IEEE assigned  Finisar part number  Hardware revision level field not used  1310nm * (20/nm)

		JAK				
190		1B	Max Case Temp	Maximum Case Temperature	4Bh	75°C
191		1B	CC_BASE	Check code for Base ID Fields (addresses	xxh	Calculated check code, low 8 bit of sum of first 64 bytes of Serial
				128 to 190)		ID info.
		T		EXTENDED ID FIEL	LDS	
192-1	95	4B	Power Supply Fiel		1	
192		1B	Maximum Power D		XXh = 64h	8bit value *20mW= 2000mW
193		1B		n Power-down (/10mW)	XXh = 96h	8bit value *10mW= 1200mW
194	4-7	4b	Max. Current on +5		0000h	=0 mA (actual 320 mA)
	0-3	4b		.3V Supply (/100mA)	0110h	= 300 mA (actual 265 mA)
195	4-7	4b		.8V Supply (/100mA)	00000h	Not used
	0-3	4b	Max. Current on -5	V Supply (-/100mA)	0000h	Not used
196-		16B	Vendor SN	Serial number	Eg A000000	Encoded serial number
211				provided by vendor		
				(ASCII) blank padded		
Date (	Code (v	endor man	ufacturing date)	•		
212-		6B	Date code - year	Vendors	Eg "030106"	yymmdd
217				manufacturing date		
				code - year. (00 =		
				2000) ASCII		
218-		2B	Lot Code	Vendor lot code	2020h	Vendor specific lot code, ASCII.
219						May be blank
Diagn	ostic M	onitoring /	Variable Power Supp	ly / Special Function Sup	port	
220	7	1b	Reserved		0b	Reserved
	6	1b	Reserved		0b	Reserved
	5	1b	Reserved		0b	Reserved
	4	1b	FEC BER Support		0b	No BER Support
	3	1b	Received power me	asurement type	1b	Average Power.
	2	1b	Reserved	The state of the s	0b	Reserved
	1-0	2b	Reserved		00b	
D 1						Will be Reserved
				enhanced features are im	•	Tax
221	7	1b	Module supports V		0b	Not supported
	6	1b	Soft TX_DISABLE	,	1b	Soft TX_DISABLE is supported
	5	1b	Soft PWR_DWN		1b	Soft PWR_DWN is supported
	4	1b	Supports VPS LV F		0b	We are not supporting VPS
	3	1b		ssed Regulator Mode	0b	We are not supporting VPS
	2	1b	Active FEC Contro		0b	Not supported.
	1	1b	Wavelength Tunabi		0b	Not supported
	0	1b	Optional CMU Mod	de	0b	Not supported
	Monito					
222	4-7	4b	Aux A/D Input 1		0111h	+3.3V Supply Monitor on AUX A/D 1
	0-3	4b	Aux A/D Input 2		00h	Not supported AUX A/D 2
223		1B	CC_EXT	Check code for the Extended ID Fields (addresses 192 to 222)	xxh	Calculated check code. Low 8 bits of sum of Bytes 192-222



#### **Customer Specific Fields**

Data Addr ess	Size (Bytes)	Field Name	Description of Field	Value	Value Meaning
224- 255	32	TBD	TBD	All 00h at present	

1 2

#### Upper Memory Map: I2C Address: A0h, Table 02h

User-writable EEPROM. A password (entered into bytes 123-126) is required to allow write access to this table. The default password is 00001011h per the XFP MSA, and it can be changed by the user (i.e., host manufacturer) by writing the new password into bytes 110-122 when the correct old password has been written into bytes 123-126. The host password must be in the range of 00000000h to 7FFFFFFh. This table is always readable (password not required).

#### **Upper Memory Map: I2C Address: A0h, Table 03h – 7Fh**

Used by Finisar for internal parameter storage. Not readable or writable without Finisar Password.

#### **Product: FTLX-1611-3**

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This document describes the data format and contents of the FTRX-1611-3 memory map. It also adds some details about the diagnostic section. This specification is current relative to the XFP MSA rev 4.5

Lower Memory Map: I2C Addr: A0h, Bytes 0 - 127.

Byte	Bit	Type	Size	Field Name	Description of Field	Value	Value Meaning
Addr ess	Addr ess	Code	(Bytes) or (bits)				
0	633	NVE	1B	Identifier	Type of serial	06h	XFP
		11112	115	Identifier	transceiver	Oon	741
		Signal	Conditioner	Control		ı	
1	4-7	VH	4b	Data Rate Control		0b	
	3	VHW	1b	Reserved		N/A	Reserved
	2	VH	1b	Line-side Loopback Control. 1b actuates		0b	Not supported, ignore
				loopback of optical input t	o optical output.		write, read back as 0b
	1	VH	1b	XFI Loopback Control. 11		xb	Power up to 0b
				electrical input to electrica			
	0	VH	1b	Signal Conditioner Contro	1	0b	Normal REFCLK mode
							only supported. Ignore
		T21 (I	<u> </u>				write, read back as 0b
2-3	1	NVE	Thresholds 2B	Town High Alam	Threshold for alarm	19968	+78 °C
2-3		NVE	ZD	Temp High Alarm	Threshold for alarm	d	(assumes 3°C accuracy)
4-5		NVE	2B	Temp Low Alarm	Threshold for alarm	62208	-13 °C
4-3		IVVE	20	Temp Low Alarm	Threshold for alarm	d	(assumes 3°C accuracy)
6-7		NVE	2B	Temp High Warning	Threshold for warn	19200	+75 °C
0 /		11112	2.5	Temp riigh warning	Threshold for warm	d	(assumes 5°C accuracy)
8-9		NVE	2B	Temp Low Warning	Threshold for warn	62976	-10 °C
						d	(assumes 5°C accuracy)
10-		R	8B	Reserved	Reserved	All	Ignore write; return 00h on
17						00h	read.
18-		NVE	2B	Bias High Alarm	Threshold for alarm	65500	131mA
19						d	(assumes 0.3mA accuracy)
20-		NVE	2B	Bias Low Alarm	Threshold for alarm	15000	30 mA
21						d	(assumes 0.3mA accuracy)
22-		NVE	2B	Bias High Warning	Threshold for warn	60500	121mA
23		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	25	5: 7 777	m 1 11 0	d	(assumes 0.3mA accuracy)
24-		NVE	2B	Bias Low Warning	Threshold for warn	17500	35 mA
25 26-		NVE	2B	TX Power High Alarm	Threshold for alarm	d 28184	(assumes 0.3mA accuracy) +4.5 dBm
27		NVE	2 <b>D</b>	1 A Fower High Alarm	Threshold for alarm	d	(assumes 2dB accuracy)
28-		NVE	2B	TX Power Low Alarm	Threshold for alarm	5012d	-3.0 dBm
29		11112	2.5	174 Tower Eow 7 Harm	Threshold for didini	30124	(assumes 1.5dB accuracy)
30-		NVE	2B	TX Power High Warning	Threshold for warn	25119	+4.0 dBm
31						d	(assumes 2dB accuracy)
32-		NVE	2B	TX Power Low Warning	Threshold for warn	5623d	-2.5 dBm
33							(assumes 1.5dB accuracy)
34-		NVE	2B	RX Power High Alarm	Threshold for alarm	12589	+1.0 dBm
35						d	(assumes 1.5dB accuracy)
36-		NVE	2B	RX Power Low Alarm	Threshold for alarm	50d	-23 dBm
37		<b></b>					(assumes 1.5dB accuracy)
38-		NVE	2B	RX Power High	Threshold for warn	11220	+0.5 dBm

		JAI					
39				Warning		d	(assumes 1.5dB accuracy)
40-		NVE	2B	RX Power Low Warning	Threshold for warn	63d	-22 dBm
41							(assumes 1.5dB accuracy)
42-		NVE	2B	AUX1 High Alarm	Threshold for alarm	11520	45°C
43						d	(assumes 0.5°C accuracy)
44-		NVE	2B	AUX1Low Alarm	Threshold for alarm	5120d	20°C
45							(assumes 0.5°C accuracy)
46-		NVE	2B	AUX1 High Warning	Threshold for warn	10240	40°C
47				g · · · · · · · · · · · · · · ·		d	(assumes 0.5°C accuracy)
48-		NVE	2B	AUX1Low Warning	Threshold for warn	6144d	24°C
49		1112		Tierrize w warming	Threshold for warm	01114	(assumes 0.5°C accuracy)
50-		NVE	2B	AUX2 High Alarm	Threshold for alarm	55000	5.50 V
51		INVE	2.0	AUAZ IIIgii Alailii	Threshold for alarm	d	3.30 V
52-		NVE	2B	AUX2 Low Alarm	Threshold for alarm	45000	4.50 V
		NVE	2 <b>B</b>	AUX2 Low Alarm	I hreshold for alarm		4.50 V
53		> TY TE	2.0		TTI 1 11 C	d	5 00 Y/
54-		NVE	2B	AUX2 High Warning	Threshold for warn	53000	5.30 V
55						d	(assumes 50mV accuracy)
56-		NVE	2B	AUX2 Low Warning	Threshold for warn	47000	4.70 V
57						d	(assumes 50mV accuracy)
58	7-4	NVE	4b	VCC2 min with Reg	Min. VCC2 with	0000b	VPS not supported. Return
					Regulator		0000b=1.8V
	3-0	VH	4b	VCC2 Host	VCC2 Supplied by	xxxxb	Written and read by host.
					Host		Ignore and return 0000b
59	7-4	VH	4b	VCC2 min in Bypass	Min. VCC2 in	0000b	VPS not supported. Return
	` .	,		Toolannin Dypuss	Regulator	00000	0000b=1.8V
	3-1	VH	3b	Reserved	Reserved	000b	Ignore write, return 000b
	0	VII	1b	VPS Bypass Control		0b	
	U	νп	10	VPS Bypass Collifor	Turns VPS Bypass	UD	VPS not supported. Ignore
					on or off		write, return 0b
60		D	100	D 1	D 1	A 11	T 2001
60-		R	10B	Reserved	Reserved	All	Ignore write; return 00h on
69						00h	read.
70		VH	1B	Acceptable BER	For FEC systems	00h	Not Supp. Ignore W, return
							00h.
71		VH	1B	Actual BER	For FEC systems	00h	Not Supp. Ignore W, return
							00h.
72-		VH	2B	Wavelength Set	Host wavelength set	0000h	Not Supp. Ignore write,
73							return 0000h.
74-		VH	2B	Wavelength Error	Returned	0000h	Not Supp., return 0000h.
75					wavelength error		- · · · · · · · · · · · · · · · · · · ·
76		VH	1B	FEC Amplitude Adj	Set Amp Slice	00h	Not Supp. Ignore W, return
70		V 11	110	The rampitude ray	Set ramp since	OOII	00h.
77		VH	1B	FEC Phase Adj	Set Phase Slice	00h	Not Supp. Ignore W, return
' '		νп	1D	rec rhase Auj	Set Fliase Slice	UUII	
70	-	P	AD.	D	D	A 11	00h.
78-		R	2B	Reserved	Reserved	All	Ignore write; return 00h on
79	ļ	1	0.5		T 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	00h	read.
80-		VHR	8B	Latched Interrupt Flag	Individual bits set	xb	Latched on flag condition.
87				Bits	per XFPMSA		Cleared on host read. (See
							MSA)
88-		VH	8B	<b>Interrupt Masking Bits</b>	Individual bits set	0b	Set and readable by host.
95					per XFPMSA		Cleared at power-up or
							reset
96-		VHR	2B	Temperature Readout	MSB in First Byte	xxxxh	Reported Temperature
97				F			Value in Units Defined in
-							MSA
98-	<del>                                     </del>	VHR	2B	Reserved A/D Chan.	Reserved	xxxxh	Report 0000h on read.
70-	<u> </u>	, 1117	40	Reserved A/D Chan.	reserveu	ΛΛΛΛΙΙ	Report 000011 011 Icau.

		JAI					
99							
100-		VHR	2B	TX Bias A/D Chan	MSB in First Byte	xxxxh	Reported TX Bias Value in
101							Units Defined in MSA
102- 103		VHR	2B	TX Power A/D Chan	MSB in First Byte	xxxxh	Reported TX Power Value in Units Defined in MSA
104- 105		VHR	2B	RX Power A/D Chan	MSB in First Byte	xxxxh	Reported RX Power Value in Units Defined in MSA
105		VHR	2B	AUX1 A/D Chan	MCD in First Duta	vvvvh	Report TEC temperature
107					MSB in First Byte	xxxxh	
108- 109		VHR	2B	AUX2 A/D Chan	MSB in First Byte	xxxxh	Report +5V Supply voltage.
	1	Signa	l Conditio	oner Control		-1	
110	7	VHR	1b	TX Disable State	Reports TXDIS	xb	Ignore writes
	6	VH	1b	Soft TX Disable	OR's with input pin	0b	Read and write by host,
					rr		power up and reset to 0b
	5	VHR	1b	MOD-NR State	Reports MOD_NR	xb	Ignore writes
	4	VHR	1b	P_Down State	Reports P_Down	xb	Ignore writes
	3	VH	1b	Soft P Down	OR's with input pin	0b	Read and write by host,
							power up and reset to 0b,
		THE	41			1	Do not reset
	2	VHR	1b	Interrupt State	Reports Interrupt	xb	Ignore writes
	1	VHR	1b	LOS State	Reports LOS	xb	Ignore writes
	0	VHR	1b	Data Not Ready	Set low when A/D ready.	xb	Ignore writes
111	7	VH	1b	TX_NR	Identifies TX_NR	xb	Ignore writes. Set if TX CDR loss of lock.
	6	VH	1b	TX_Fault	Identifies TX_Fault	0b	Ignore writes. Conditions for set TBD. Set at 0b for
	-	3/11	11.	TV CDD mad lander d	Idantica TV IOI	1-	now.
	5	VH VH	1b 1b	TX_CDR not locked	Identifies TX_LOL	xb	Ignore writes.
	4		10	TX_NR	Identifies TX_NR	xb	Ignore writes. Set if RX CDR loss of lock.
	3	VH	1b	TX_CDR not locked	Identifies TX_LOL	xb	Ignore writes.
	2-0	R	3b	Reserved	Reserved	000b	Ignore writes, report 000b.
112- 117		R	6B	Reserved			Ignore writes, report 00h.
118	7-1	R	7b	Reserved	Reserved	0b	Ignore writes, report 0000000b.
	0	VH	1b	Error Checking	Switches Packet Error Checking	xb	Host sets to 1b to enable packet error checking. Power up and reset to 0b.
119- 122		VH	4B	New Password entry.	Host may enter to change Password	00h	Changes host password value if current correct password entered in 123-126. Power up and reset to 00000000h.
123- 126		VH	4B	Password entry.	Host may enter Password to Access Protected Area	00h	Allows Write Access to Customer EEPROM. Power up and reset to 00000000h.

1 2 3

127	VH	1B	Table Select	Host enters to select	01h	Defines Table for
				upper memory table		subsequent upper memory
						map reads. Defaults to 01h
						on Power and reset.

#### Upper Memory Map: I2C Addr: A0h, Table 1 – Serial ID Section – Read only by Host, all Nonvolatile

Byte Addr	Bit Addr	Size (Bytes) or	Field Name	Description of Field	Value	Value Meaning
ess	ess	(bits)				
128	CSS	1B	Identifier	Type of serial transceiver	06h	XFP
129	6-7	2b	Ext. Identifier - Module Power Class	Defines Module Power Class	10b	Indicates Power Dissipation <3.5W under all specified operating conditions.
129	5	1b	Ext. Identifier - CDR	Identifies presence of a CDR	0b	Module contains CDR function.
129	4	1b	Ext. Identifier - REFCLK	Identifies need for REFCLK	1b	Module does not need REFCLK
129	3	1b	CLEI Code Present	Indicates if CLEI Code is present in Table 2	0b	To be supported on a customer basis. Value is 1b if CLEI Code is present in Table 2
129	0-2	3b	Ext. Identifier - Reserved	Reserved	2h	Power Level 3 (< 3.5W)
130		1B	Connector	Code for connector type	07h	LC
131-13	38	8 B	Transceiver Code fo	or electronic compatibil	ity or optical	compatibility
			Ethernet Compliance		<u> </u>	Ţ
131	7	1b	10GBASE-SR		0b	
	6	1b	10GBASE-LR		0b	
	5	1b	10GBASE-ER		1b	
	4	1b	Reserved		0b	
	3	1b	10GBASE-SW		0b	
	2	1b	10GBASE-LW		0b	
	1	1b	10GBASE-EW		1b	
	0	1b	Reserved		0b	
	•	10 Gigabit	Fibre Channel Comp	liance Codes	•	
132	7	1b	1200-MX-SN-I		0b	
	6	1b	1200-SM-LL-L		0b	
	5	1b	Extended reach 1550	nm	1b	
	4	1b	Intermediate reach 13	310nm	0b	
	3	1b	Reserved		0b	
	2	1b	Reserved		0b	
	1	1b	Reserved		0b	
	0	1b	Reserved		0b	
		10 Gigabit	Copper Link Compli	ance Codes		
133	7	1b	Reserved		0b	
	6	1b	Reserved		0b	
	5	1b	Reserved		0b	
	4	1b	Reserved		0b	
	2	1b	Reserved		0b	
	3					
	2	1b 1b	Reserved Reserved		0b 0b	

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	1 1 1	<u>JAIL</u>			
	0	1b	Reserved	0b	
			eed Link Compliance Codes		
134	7	1b	1000BASE-SX/1xFC MMF	0b	
	6	1b	1000BASE-LX/1xFC SMF	0b	
	5	1b	2xFC MMF	0b	
	4	1b	2xFC SMF	0b	
	3	1b	OC-48-SR	0b	
	2	1b	OC-48-IR	0b	
	1	1b	OC-48-LR	0b	
	0	1b	Reserved	0b	
	1		DH Interconnect Link Compliance Codes	1	
135	7	1b	I-64.1r	0b	
	6	1b	I-64.1	0b	
	5	1b	I-64.2r	0b	
	4	1b	I-64.2	0b	
	3	1b	I-64.3	0b	
	2	1b	I-64.5	0b	
	1	1b	Reserved	0b	
	0	1b	Reserved	0b	
	1		DH Short Haul Link Compliance Codes		
136	7	1b	S-64.1	0b	
	6	1b	S-64.2a	0b	
	5	1b	S-64.2b	1b	(OC-192 IR-2 support)
	4	1b	S-64.3a	0b	
	3	1b	S-64.3b	0b	
	2	1b	S-64.5a	0b	
	Τ.		DH Short Haul Link Compliance Codes		
	1	1b	S-64.5b	0b	
	0	1b	Reserved	0b	
125	T =		DH Long Haul Link Compliance Codes		T
137	7	1b	L-64.1	0b	
	6	1b	L-64.2a	0b	
	5	1b	L-64.2b	0b	
	4	1b	L-64.2c	0b	
	3	1b	L-64.3	0b	
	2	1b	Reserved	0b	
	0	1b	Reserved	0b 0b	
	10	1b	Reserved		
138	7	1b	DH Very Long Haul Link Compliance Code V-64.2a	Ob	
138	6	1b	V-64.2b	0b	
	5	1b	V-64.20 V-64.3	0b	
	4	1b	Reserved	0b	
	3	1b	Reserved	0b	
	2	1b	Reserved	0b	
	1	1b	Reserved	0b	
	0	1b	Reserved	0b	
-	10	Encoding		I OU	l
139	7	1b	64B/66B	1b	10GE/10GFC Coding
139	6	1b	8B/10B	1b	Not used in standards but is
		10	05/105	10	supported
	5	1b	SONET Scrambled	1b	OC-192 Coding
	4	1b	NRZ	1b	NRZ only supported
	3	1b	RZ	0b	1372 only supported
	2-0	3b	Reserved	000b	
<u> </u>	∠-0	1 30	Reserved	0000	

140		1B	BR, minimum	Minimum Supported Bitrate (/100Mb)	63h	9900 Mbps
141		1B	BR, maximum	Maximum Supported Bitrate (/100Mb)	6Fh	11100 Mbps for FTLX version 10700 Mbps for FTRX version
142		1B	Length (SMF) – km	Link length supported for 9/125 um fiber, units of km	28h	40km
143		1B	Length (E-50um)	Link length supported for extended bandwidth MMF, units of 2 m	00h	Not supported
144		1B	Length (50m)	Link length supported for 50/125 mm fiber, units of 1 m	00h	Not supported
145		1B	Length (62.5m)	Link length supported for 62.5/125 mm fiber, units of 1 m	00h	Not supported
146		1B	Length (Copper)	Link length supported for copper, units of 1m	00h	Not supported
	1	Device Tec	hnology		1	I.
147	4-7	4b	Transmitter Technological	Ogv	0111b	1550nm EML laser
	3	1b	Wavelength Control	-67	0b	No wavelength control
	2	1b	Cooled Transmitter		1b	Transmitter is cooled
	1	1b	Detector Type		0b	PIN Detector
	0	1b	Tunable Transmitter		0b	Transmitter not Tunable
148-	0	16B	Vendor name	SFP vendor name	"FINISAR	Transmitter not Tunable
163		10D	v chaor name	(ASCII) blank padded	CORP. "	
100	1	CDR Supp	ort	(115 cm) chain padded	0014.	
164	7	1b	CDR Support for 9.9	5 Gb/s	1b	
101	6	1b	CDR Support for 10.		1b	
	5	1b	CDR Support for 10.		1b	
	4	1b	CDR Support for 10.		1b	
	3	1b	CDR Support for 11.		1b	Supported for FTLX versions Not supported for FTRX versions
	2	1b	Reserved		0b	
	1	1b	Line-side Loopback	Mode Supported	0b	
	0	1b	XFI Loopback Suppo		1b	
165- 167		3B	Vendor OUI	SFP vendor IEEE company ID	009065h	IEEE assigned
168- 183		16B	Vendor PN	Part number provided by vendor (ASCII)	"FTLX-1611- 3 "	Finisar part number
184- 185		2B	Vendor rev	Revision level for part number provided by vendor (ASCII)	3030h	Hardware revision level field not used
106		2B	Wavelength	Nominal Laser Wavelength (1/20nm)	7918h	1550nm * (20/nm)
186- 187				wavelength (1/201111)		

190		JAN		Manimum Casa	46h	7000
190		1B	Max Case Temp	Maximum Case Temperature	40n	70°C
191		1B	CC_BASE	Check code for Base ID Fields (addresses 128 to 190)	xxh	Calculated check code, low 8 bits of sum of first 64 bytes of Serial ID info.
		•		EXTENDED ID FIEL	DS	•
192-1	95	4B	Power Supply Fiel	ds		
192		1B	Maximum Power D		AFh	= 3500 mW
193		1B	Max. Power Diss. I	n Power-down (/10mW)	96h	= 1500 mW
194	4-7	4b	Max. Current on +5	V Supply (/50mA)	0111b	= 350 mA
	0-3	4b	Max. Current on +3	.3V Supply (/100mA)	0100b	= 400 mA
195	4-7	4b	Max. Current on +1	.8V Supply (/100mA)	1000b	= 800 mA (actual is 750mA)
	0-3	4b		V Supply (-/100mA)	0000b	Not used
196- 211		16B	Vendor SN	Serial number provided by vendor (ASCII) blank padded	e.g., "A000000"	Encoded serial number
212- 217		6B	Date code	Vendor's manufacturing date	e.g., "030106"	yymmdd
218- 219		2B	Lot Code	Vendor lot code	2020h	May be blank
		1		 ring / Variable Power Su		
220	7	1b	Reserved		0b	Reserved
	6	1b	Reserved		0b	Reserved
	5	1b	Reserved		0b	Reserved
	4	1b	FEC BER Support		0b	No BER Support
	3	1b	Received power me	asurement type	1b	Average Power
	2	1b	Reserved		0b	Reserved
	1-0	2b	Reserved		00b	Will be Reserved
		•	Enhanced Options			
221	7	1b	Module supports V		0b	Not supported
	6	1b	Soft TX_DISABLE	,	1b	Soft TX_DISABLE is supported
	5	1b	Soft PWR_DWN		1b	Soft PWR_DWN is supported
	4	1b	Supports VPS LV F		0b	We are not supporting VPS
	3	1b		ssed Regulator Mode	0b	We are not supporting VPS
	2	1b	Active FEC Contro		0b	Not supported.
	1	1b	Wavelength Tunabi	lity	0b	Not supported
	0	1b	Optional CMU Mod	le	0b	Not supported
222	4-7	4b	Aux A/D Input 1		0100b	TEC Temperature Monitor on Aux A/D 1
	0-3	4b	Aux A/D Input 2		0110b	+5V Supply Monitor on Aux A/D
223		1B	CC_EXT	Check code for the Extended ID Fields (addresses 192 to 222)	xxh	Calculated check code. Low 8 bits of sum of Bytes 192-222



#### **Customer Specific Fields**

Data Addr	Size (Bytes)	Field Name	Description of Field	Value	Value Meaning
ess					
224- 255	32	TBD	TBD	All 00h at present	

Upper Memory Map: I2C Addr: A0h, Table 2

Customer Writable EEPROM. Writable with correct host password entry. Always readable.

Upper Memory Map: I2C Addr: A0h, Table 3-Used by Finisar for internal parameter storage. Not readable or Writable without Finisar Password.

#### Product: FTLX-1811-3

Lower Memory Map: I2C Addr: A0h, Bytes 0 – 127.

Byte	Bit	Type	Size	Field Name	Description of Field	Value	Value Meaning
Addr	Addr	Code	(Bytes) or				
ess	ess		(bits)	74 13		0.51	
0		NVE	1B	Identifier	Type of serial transceiver	06h	XFP
			Conditioner				
1	4-7	VH	4b	Data Rate Control		0b	
	3	VHW	1b	Reserved		N/A	Reserved
	2	VH	1b	Line-side Loopback Contr loopback of optical input t		0b	Not supported, ignore write, read back as 0b
	1	VH	1b	XFI Loopback Control. 11 electrical input to electrical		xb	Power up to 0b
	0	VH	1b	Signal Conditioner Contro		0b	Normal REFCLK mode
							only supported. Ignore write, read back as 0b
		Flag T	Thresholds				
2-3		NVE	2B	Temp High Alarm	Threshold for alarm	19968	+78 °C
	<u> </u>	<u> </u>				d	(assumes 3°C accuracy)
4-5		NVE	2B	Temp Low Alarm	Threshold for alarm	62208	-13 °C
						d	(assumes 3°C accuracy)
6-7		NVE	2B	Temp High Warning	Threshold for warn	19200	+75 °C
						d	(assumes 5°C accuracy)
8-9		NVE	2B	Temp Low Warning	Threshold for warn	62976	-10 °C
						d	(assumes 5°C accuracy)
10- 17		R	8B	Reserved	Reserved	All 00h	Ignore write; return 00h on read.
18- 19		NVE	2B	Bias High Alarm	Threshold for alarm	65500 d	131 mA (assumes 0.3mA accuracy)
20- 21		NVE	2B	Bias Low Alarm	Threshold for alarm	15000 d	30 mA (assumes 0.3mA accuracy)
22- 23		NVE	2B	Bias High Warning	Threshold for warn	60500 d	121 mA (assumes 0.3mA accuracy)
24-		NVE	2B	Bias Low Warning	Threshold for warn	17500	35 mA
25		NIX III	20	TOTAL DE LA	TD1 1 11 C 1	d	(assumes 0.3mA accuracy)
26-		NVE	2B	TX Power High Alarm	Threshold for alarm	44668	+6.5 dBm
27 28-	-	NVE	2B	TX Power Low Alarm	Threshold for alarm	d 6310d	(assumes 2dB accuracy) -2.0 dBm
28-		INVE	ZD ZD	IA FUWEI LOW AIAIII	THESHOLD TOT ATAITM	03100	(assumes 1.5dB accuracy)
30-	-	NVE	2B	TX Power High Warning	Threshold for warn	39811	+6.0 dBm
31		14.415	2.0	17x 1 0woi 11igii waiiiliig	THESHOR TO WALL	d	(assumes 2dB accuracy)
32-	-	NVE	2B	TX Power Low Warning	Threshold for warn	7079d	-1.5 dBm
33		1, 1,	20	1211 OWOL LOW Walling	Threshold for warli	70770	(assumes 1.5dB accuracy)
34-		NVE	2B	RX Power High Alarm	Threshold for alarm	3162d	-5.0 dBm
35				-			(assumes 1.5dB accuracy)
36- 37		NVE	2B	RX Power Low Alarm	Threshold for alarm	25d	-26 dBm (assumes 1.5dB accuracy)
38-		NVE	2B	RX Power High	Threshold for warn	2818d	-5.5 dBm
39				Warning		=3134	(assumes 1.5dB accuracy)
40- 41		NVE	2B	RX Power Low Warning	Threshold for warn	28d	-25.5 dBm (assumes 1.5dB accuracy)

		<u>JAI</u>					
42- 43		NVE	2B	AUX1 High Alarm	Threshold for alarm	11520 d	45°C (assumes 0.5°C accuracy)
44-		NVE	2B	AUX1Low Alarm	Threshold for alarm	5120d	25°C
45							(assumes 0.5°C accuracy)
46- 47		NVE	NVE 2B AUX1 High Warning Threshold for v		Threshold for warn	10240 d	40°C (assumes 0.5°C accuracy)
48- 49		NVE	2B	AUX1Low Warning	Threshold for warn	6144d	30°C (assumes 0.5°C accuracy)
50-		NVE	2B	AUX2 High Alarm	Threshold for alarm	55000	5.50 V
51		NIXIE	an.	ALINOT	TDI 1 11 C 1	d	4.50 %
52- 53		NVE	2B	AUX2 Low Alarm	Threshold for alarm	45000 d	4.50 V
54- 55		NVE	2B	AUX2 High Warning	Threshold for warn	53000 d	5.30 V (assumes 50mV accuracy)
56- 57		NVE	2B	AUX2 Low Warning	Threshold for warn	47000 d	4.70 V (assumes 50mV accuracy)
58	7-4	NVE	4b	VCC2 min with Reg	Min. VCC2 with	0000b	VPS not supported. Return
	2.0	X / X X	41	NGC2 II	Regulator		0000b=1.8V
	3-0	VH	4b	VCC2 Host	VCC2 Supplied by Host	xxxxb	Written and read by host. Ignore and return 0000b
59	7-4	VH	4b	VCC2 min in Bypass	Min. VCC2 in	0000b	VPS not supported. Return
					Regulator		0000b=1.8V
	3-1	VH	3b	Reserved	Reserved	000b	Ignore write, return 000b
	0	VH	1b	VPS Bypass Control	Turns VPS Bypass on or off	0b	VPS not supported. Ignore write, return 0b
60-		R	10B	Reserved	Reserved	All 00h	Ignore write; return 00h on
69 70		VH	1B	Acceptable BER	For FEC systems	00h	read. Not Supp. Ignore W, return
				•	•		00h.
71		VH	1B	Actual BER	For FEC systems	00h	Not Supp. Ignore W, return 00h.
72- 73		VH	2B	Wavelength Set	Host wavelength set	0000h	Not Supp. Ignore write, return 0000h.
74- 75		VH	2B	Wavelength Error	Returned wavelength error	0000h	Not Supp., return 0000h.
76		VH	1B	FEC Amplitude Adj	Set Amp Slice	00h	Not Supp. Ignore W, return 00h.
77		VH	1B	FEC Phase Adj	Set Phase Slice	00h	Not Supp. Ignore W, return 00h.
78- 79		R	2B	Reserved	Reserved	All	Ignore write; return 00h on
80-		VHR	8B	Latched Interrupt Flag	Individual bits set	00h xb	read. Latched on flag condition.
87		VIIK	OD	Bits	per XFPMSA	XD	Cleared on host read. (See MSA)
88- 95		VH	8B	Interrupt Masking Bits	Individual bits set per XFPMSA	0b	Set and readable by host. Cleared at power-up or reset
96-		VHR	2B	Temperature Readout	MSB in First Byte	xxxxh	Reported Temperature
97			2.5	Temperature readout	minot byte	AAAAII	Value in Units Defined in MSA
98- 99		VHR	2B	Reserved A/D Chan.	Reserved	0000h	Report 0000h on read.
100- 101		VHR	2B	TX Bias A/D Chan	MSB in First Byte	xxxxh	Reported TX Bias Value in Units Defined in MSA
102- 103		VHR	2B	TX Power A/D Chan	MSB in First Byte	xxxxh	Reported TX Power Value in Units Defined in MSA
103		VHR	2B	RX Power A/D Chan	MSB in First Byte	xxxxh	Reported RX Power Value
		ЯΠУ	∠ <b>D</b>	KA Power A/D Chan	MISD III FIRST BATE	ххххп	Reported KA Power value

104-							in Units Defined in MSA
105 106-		VHR	2B	AUX1 A/D Chan	MSB in First Byte	xxxxh	Report TEC temperature
107		, , , ,	ZD	ACAT A/D Chan	WISD III I list byte	AAAAII	Report The temperature
108- 109		VHR	2B	AUX2 A/D Chan	MSB in First Byte	xxxxh	Report +5V Supply voltage.
	•		l Conditio	oner Control	•		•
110	7	VHR	1b	TX Disable State	Reports TXDIS	xb	Ignore writes
	6	VH	1b	Soft TX Disable	OR's with input pin	0b	Read and write by host, power up and reset to 0b
	5	VHR	1b	MOD-NR State	Reports MOD_NR	xb	Ignore writes
	4	VHR	1b	P_Down State	Reports P_Down	xb	Ignore writes
	3	VH	1b	Soft P_Down	OR's with input pin	0b	Read and write by host, power up and reset to 0b, Do not reset
	2	VHR	1b	Interrupt State	Reports Interrupt	xb	Ignore writes
	1	VHR	1b	LOS State	Reports LOS	xb	Ignore writes
	0	VHR	1b	Data Not Ready	Set low when A/D ready.	xb	Ignore writes
111	7	VH	1b	TX_NR	Identifies TX_NR	xb	Ignore writes. Set if TX CDR loss of lock.
	6	VH	1b	TX_Fault	Identifies TX_Fault	0b	Ignore writes. Conditions for set TBD. Set at 0b for now.
	5	VH	1b	TX_CDR not locked	Identifies TX_LOL	xb	Ignore writes.
	4	VH	1b	TX_NR	Identifies TX_NR	xb	Ignore writes. Set if RX CDR loss of lock.
	3	VH	1b	TX_CDR not locked	Identifies TX_LOL	xb	Ignore writes.
	2-0	R	3b	Reserved	Reserved	000b	Ignore writes, report 000b.
112- 117		R	6B	Reserved			Ignore writes, report 00h.
118	7-1	R	7b	Reserved	Reserved	0b	Ignore writes, report 0000000b.
	0	VH	1b	Error Checking	Switches Packet Error Checking	xb	Host sets to 1b to enable packet error checking. Power up and reset to 0b.
119- 122		VH	4B	New Password entry.	Host may enter to change Password	00h	Changes host password value if current correct password entered in 123-126. Power up and reset to 000000000h.
123- 126		VH	4B	Password entry.	Host may enter Password to Access Protected Area	00h	Allows Write Access to Customer EEPROM. Power up and reset to 00000000h.
127		VH	1B	Table Select	Host enters to select upper memory table	01h	Defines Table for subsequent upper memory map reads. Defaults to 01h on Power and reset.

#### Upper Memory Map: I2C Addr: A0h, Table 1 - Serial ID Section - Read only by Host, all Nonvolatile

Byte Addr ess	Bit Addr ess	Size (Bytes) or (bits)	Field Name	Description of Field	Value	Value Meaning
128		1B	Identifier	Type of serial transceiver	06h	XFP
129	6-7	2b	Ext. Identifier -	Defines Module	10b	Indicates Power Dissipation

1 2

129			Module Power	Power Class		<3.5W under all specified
129						
129			Class			operating conditions.
1	5	1b	Ext. Identifier - CDR	Identifies presence of a CDR	0b	Module contains CDR function.
129	4	1b	Ext. Identifier - REFCLK	Identifies need for REFCLK	1b	Module does not need REFCLK
129	3	1b	CLEI Code Present	Indicates if CLEI Code is present in Table 2	0b	To be supported on a customer basis. Value is 1b if CLEI Code is present in Table 2
129	0-2	3b	Ext. Identifier - Reserved	Reserved	000ь	
130		1B	Connector	Code for connector type	07h	LC
131-13	8	8 B	Transceiver Code fo	or electronic compatibil	ity or optical	compatibility
		10 Gigabit	Ethernet Compliance	Codes	_	
131	7	1b	10GBASE-SR		0b	
-	6	1b	10GBASE-LR		0b	
-	5	1b	10GBASE-ER		0b	
-	4	1b	Reserved		0b	
-	3	1b	10GBASE-SW		0b	
-	2	1b	10GBASE-LW		0b	
-	1	1b	10GBASE-EW		0b	
-	0	1b	Reserved		0b	
		10 Gigabit	Fibre Channel Comp	liance Codes	•	<u> </u>
132	7	1b	1200-MX-SN-I		0b	
	6	1b	1200-SM-LL-L		0b	
-	5	1b	Extended reach 1550	nm	0b	
-	4	1b	Intermediate reach 13	310nm	0b	
-	3	1b	Reserved		0b	
-	2	1b	Reserved		0b	
-	1	1b	Reserved		0b	
-	0	1b	Reserved		0b	
		10 Gigabit	Copper Link Compli	ance Codes		
133	7	1b	Reserved		0b	
	6	1b	Reserved		0b	
	5	1b	Reserved		0b	
	4	1b	Reserved		0b	
	3	1b	Reserved		0b	
	2	1b	Reserved		0b	
	1	1b	Reserved		0b	
	0	1b	Reserved		0b	
		Lower Speed Link Compliance Codes   1b   1000BASE-SX/1xFC MMF   0b				
134	7	1b	1000BASE-SX/1xFC MMF			
	6	1b	1000BASE-LX/1xFC SMF		0b	
	5	1b	2xFC MMF		0b	
	4	1b	2xFC SMF		0b	
	3	1b	OC-48-SR		0b	
	2	1b	OC-48-IR		0b	
	1	1b	OC-48-LR		0b	
	0	1b Reserved			0b	
		SONET/SD	H Interconnect Link	<b>Compliance Codes</b>		
135	7	1b	I-64.1r		0b	
	6	1b	I-64.1		0b	
<u> </u>	5	1b	I-64.2r		0b	
	4	1b	I-64.2		0b	

		DAK				
	3	1b	I-64.3		0b	
	2	1b	I-64.5		0b	
	1	1b	Reserved		0b	
	0	1b	Reserved		0b	
		SONET/SI	OH Short Haul Link C	Compliance Codes		
136	7	1b	S-64.1	ompilaree codes	0b	
100	6	1b	S-64.2a		0b	
	5	1b	S-64.2b		0b	(OC-192 IR-2 support)
	4	1b	S-64.3a		0b	(GC 192 IX 2 support)
	3	1b	S-64.3b		0b	
	2	1b	S-64.5a		0b	
	1	1b				
	0	1b	Reserved		0b 0b	
	SONET/SDH Long Haul Link Compliance Codes				00	
137	7	1b	L-64.1	omphance Codes	0b	<u> </u>
137	6	1b	L-64.2a		0b	
		1b	L-64.2b		0b	
	5	1b			0b	
	4		L-64.2c			
	3	1b L-64.3		0b	N. TENT I COL CIDIT C. 1 1	
	2	1b	G959.1 P1L1-2D2		1b	New ITU-T 80km SDH Standard (2003)
	1	1b	Reserved		0b 0b	
	0	1b	Reserved			
		SONET/SI		ink Compliance Codes		
138	7	1b	V-64.2a		0b	
	6	1b	V-64.2b		0b	
	5	1b	V-64.3		0b	
	4	1b	Reserved		0b	
	3	1b	Reserved		0b	
	2	1b	Reserved		0b	
	1	1b	Reserved		0b	
	0	1b	Reserved		0b	
		Encoding	II.		l	
139	7	1b	64B/66B		1b	10GE/10GFC Coding
	6	1b	8B/10B		1b	Not used in standards but is
						supported
	5	1b	SONET Scrambled		1b	OC-192 Coding
	4	1b	NRZ		1b	NRZ only supported
	3	1b	RZ		0b	J. Lipping
	2-0	3b	Reserved		000b	
140	-	1B	BR, minimum	Minimum Supported Bitrate (/100Mb)	63h	9900 Mbps
141		1B	BR, maximum	Maximum Supported Bitrate (/100Mb)	6Fh	11100 Mbps for FTLX version 10700 Mbps for FTRX version
142		1B	Length (SMF) – km	Link length supported for 9/125 um fiber, units of km	50h	80km
143		1B	Length (E-50um)	Link length supported for extended bandwidth MMF, units of 2 m	00h	Not supported
1.4.4		1B	Length (50m)	Link length supported for 50/125 mm fiber,	00h	Not supported
144				units of 1 m		

		<u>JAK</u>				
				for 62.5/125 mm		
				fiber, units of 1 m		
146		1B	Length (Copper)	Link length supported for copper, units of 1m	00h	Not supported
	-1	Device T	echnology			1
147 4-7		4b	Transmitter Techno	logy	0111b	1550nm EML laser
	3	1b	Wavelength Contro		0b	No wavelength control
	2	1b	Cooled Transmitter		1b	Transmitter is cooled
	1	1b	Detector Type		1b	APD Detector
	0	1b	Tunable Transmitte	r	0b	Transmitter not Tunable
148- 163		16B	Vendor name	SFP vendor name (ASCII) blank padded	"FINISAR CORP."	
	•	CDR Su	pport	<u> </u>	1	•
164	7	1b	CDR Support for 9.	95 Gb/s	1b	
	6	1b	CDR Support for 10		1b	
	5	1b	CDR Support for 10		1b	
	4	1b	CDR Support for 10		1b	
	3	1b	CDR Support for 11		1b	Supported for FTLX versions
			The state of the s			Not supported for FTRX versions
	2	1b	Reserved		0b	11
	1	1b	Line-side Loopback	Mode Supported	0b	
	0	1b	XFI Loopback Supp		1b	
165- 167		3B	Vendor OUI	SFP vendor IEEE company ID	009065h	IEEE assigned
168- 183		16B	Vendor PN	Part number provided by vendor (ASCII)	"FTLX-1811-3"	Finisar part number
184- 185		2B	Vendor rev	Revision level for part number provided by vendor (ASCII)	3030h	Hardware revision level field not used
186- 187		2B	Wavelength	Nominal Laser Wavelength (1/20nm)	7918h	1550nm * (20/nm)
188- 189		2B	Wavelength Tolerance	+/- Wavelength (1/200nm)	0DACh	17.5nm * (200/nm). Corresponds to 1530-1565nm range.
190		1B	Max Case Temp	Maximum Case Temperature	46h	70°C
191		1B	CC_BASE	Check code for Base ID Fields (addresses 128 to 190)	xxh	Calculated check code, low 8 bits of sum of first 64 bytes of Serial ID info.
				EXTENDED ID FIEL	DS	•
192-1	95	4B	Power Supply Fiel	ds		
192		1B	Maximum Power D		AFh	= 3500 mW
193		1B		n Power-down (/10mW)	96h	= 1500 mW
194	4-7	4b	Max. Current on +5		0111b	= 350 mA
	0-3	4b		.3V Supply (/100mA)	0100b	= 400 mA
195	4-7	4b		.8V Supply (/100mA)	1000b	= 800 mA (actual is 750mA)
-	0-3	4b		V Supply (-/100mA)	0000b	Not used
196- 211		16B	Vendor SN	Serial number provided by vendor (ASCII) blank padded	e.g., "A000000"	Encoded serial number
212- 217		6B	Date code	Vendor's manufacturing date	e.g., "030106"	yymmdd
218- 219		2B	Lot Code	Vendor lot code	2020h	May be blank
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			Diagnostic Monitor	ing / Variable Power Su	pply / Specia	l Function Support	
220	7	1b	Reserved		0b	Reserved	
	6	1b	Reserved		0b	Reserved	
	5	1b	Reserved		0b	Reserved	
	4	1b	FEC BER Support		0b	No BER Support	
	3	1b	Received power mea	surement type	1b	Average Power	
	2	1b	Reserved		0b	Reserved	
	1-0	2b	Reserved		00b	Will be Reserved	
			Enhanced Options				
221	7	1b	Module supports VP	S	0b	Not supported	
	6	1b	Soft TX_DISABLE	**		Soft TX_DISABLE is supported	
	5	1b	Soft PWR_DWN			Soft PWR_DWN is supported	
	4	1b	Supports VPS LV Ro			We are not supporting VPS	
	3	1b	Supports VPS Bypas	sed Regulator Mode	0b	We are not supporting VPS	
	2	1b	Active FEC Control		0b	Not supported.	
	1	1b	Wavelength Tunabil	ity	0b	Not supported	
	0	1b	Optional CMU Mode	e	0b	Not supported	
222	4-7	4b	Aux A/D Input 1		0100b	TEC Temperature Monitor on	
						Aux A/D 1	
	0-3	4b	Aux A/D Input 2		0110b	+5V Supply Monitor on Aux A/D 2	
223		1B	CC_EXT	Check code for the Extended ID Fields (addresses 192 to 222)	xxh	Calculated check code. Low 8 bits of sum of Bytes 192-222	

**Customer Specific Fields** 

Data Addr	Size (Bytes)	Field Name	Description of Field	Value	Value Meaning
ess					
224-	32	TBD	TBD	All 00h at present	
255					

**Upper Memory Map: I2C Addr: A0h, Table 2**Customer Writable EEPROM. Writable with correct host password entry. Always readable.

Upper Memory Map: I2C Addr: A0h, Table 3-

Used by Finisar for internal parameter storage. Not readable or Writable without Finisar Password.

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#### **Product: FTLX-3811-3**

Lower Memory Map: I2C Addr: A0h, Bytes 0 – 127.

Byte	Bit	Type	Size	Field Name	Description of Field	Value	Value Meaning
Addr	Addr	Code	(Bytes) or		Description of Tieta	, 411110	, will menting
ess	ess		(bits)				
0		NVE	1B	Identifier	Type of serial	06h	XFP
					transceiver		
	I	Signal	Conditioner	Control		1	1
1	4-7	VH	4b	Data Rate Control		xxxxb	Ignore for Intel or Gennum
	3	VHW	1b	Reserved		N/A	Reserved
	2	VH	1b	Line-side Loopback Contr	ol. 1b actuates	0b	Not supported, ignore write,
				loopback of optical input t			read back as 0b
	1	VH	1b	XFI Loopback Control. 11	b actuates loopback of	xb	Power up to 0b
				electrical input to electrica	l output		
	0	VH	1b	Signal Conditioner Contro	1	0b	Normal REFCLK mode
							only supported. Ignore
							write, read back as 0b
			Thresholds				
2-3		NVE	2B	Temp High Alarm	Threshold for alarm	19968	+78 °C
						d	(assumes 3°C accuracy)
4-5		NVE	2B	Temp Low Alarm	Threshold for alarm	62208	-13 °C
						d	(assumes 3°C accuracy)
6-7		NVE	2B	Temp High Warning	Threshold for warn	19200	+75 °C
						d	(assumes 5°C accuracy)
8-9		NVE	2B	Temp Low Warning	Threshold for warn	62976	-10 °C
						d	(assumes 5°C accuracy)
10-		R	8B	Reserved	Reserved	All	Ignore write; return 00h on
17		NIX III	an.	D: 11: 1 41	TTI 1 11 C 1	00h	read.
18-		NVE	2B	Bias High Alarm	Threshold for alarm	65500	131 mA
19		NIXE	an.	D' 1 11 C 1		d	(assumes 0.3mA accuracy)
20-		NVE	2B	Bias Low Alarm	Threshold for alarm	15000	30 mA
21 22-		NIXE	2B	Disa Hish Wassins	Threshold for warn	d 60500	(assumes 0.3mA accuracy) 121 mA
23		NVE	2B	Bias High Warning	I nresnoid for warn	d	
24-		NVE	2B	Bias Low Warning	Threshold for warn	17500	(assumes 0.3mA accuracy) 35 mA
25		INVE	2 <b>D</b>	Bias Low Waining	Threshold for warm	d	(assumes 0.3mA accuracy)
26-		NVE	2B	TX Power High Alarm	Threshold for alarm	31623	+ 5 dBm
27		ITTE	ZD	17X T OWEI THIGH 7 HATHI	Threshold for didini	d	(assumes 2dB accuracy)
28-		NVE	2B	TX Power Low Alarm	Threshold for alarm	5012d	-3.0 dBm
29				222 2000 2000 7 1141111	- Interior of minim	55120	(assumes 1.5dB accuracy)
30-		NVE	2B	TX Power High Warning	Threshold for warn	28184	+ 4.5 dBm
31				<i>gg</i>		d	(assumes 2dB accuracy)
32-		NVE	2B	TX Power Low Warning	Threshold for warn	5623d	-2.5 dBm
33							(assumes 1.5dB accuracy)
34-		NVE	2B	RX Power High Alarm	Threshold for alarm	3162d	-5.0 dBm
35							(assumes 1.5dB accuracy)
36-		NVE	2B	Rx Power Low Alarm	Threshold for alarm	25d	-26dBm (assumes 1.5dB
37		1111	20	TATOWEI LOW AIGHI	Threshold for alailli	250	accuracy)
51		NVE	2B	RX Power High	Threshold for warn	2818d	-5.5 dBm
38-		1111	20	Warning	Threshold for waill	20100	(assumes 1.5dB accuracy)
39							(assumes 1.5 ab accuracy)
40-		NVE	2B	RX Power Low Warning	Threshold for warn	28d	-25.5 dBm
41					- Interior of main		(assumes 1.5dB accuracy)
42-		NVE	2B	AUX1 High Alarm	Threshold for alarm	11520	45°C
	1		<u> </u>				_ · · · ·

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43						d	(assumes 0.5°C accuracy)
44-		NVE	2B	AUX1Low Alarm	Threshold for alarm	5120d	25°C
45							(assumes 0.5°C accuracy)
46-		NVE	2B	AUX1 High Warning	Threshold for warn	10240	40°C
47						d	(assumes 0.5°C accuracy)
48-		NVE	2B	AUX1Low Warning	Threshold for warn	6144d	30°C
49		1,,2		Tierrie w warming	1111 0511010 101 11 11	01	(assumes 0.5°C accuracy)
50-		NVE	2B	AUX2 High Alarm	Threshold for alarm	55000	5.50 V
51		IVIL	20	AOA2 High Alarm	Threshold for alarm	d	3.30 V
52-		NVE	2B	AUX2 Low Alarm	Threshold for alarm	45000	4.50 V
53		INVE	2.0	ACAZ LOW Alarin	Thicshold for alarm	d	4.50 V
54-		NIX/E	2B	ALIVO III al Warmin a	Threshold for warn	53000	5.30 V
		NVE	2 <b>D</b>	AUX2 High Warning	Threshold for warm		
55		> TY TE	27			d	(assumes 50mV accuracy)
56-		NVE	2B	AUX2 Low Warning	Threshold for warn	47000	4.70 V
57						d	(assumes 50mV accuracy)
58	7-4	NVE	4b	VCC2 min with Reg	Min. VCC2 with	0000b	VPS not supported. Return
					Regulator		0000b=1.8V
	3-0	VH	4b	VCC2 Host	VCC2 Supplied by	xxxxb	Written and read by host.
					Host		Ignore and return 0000b
59	7-4	VH	4b	VCC2 min in Bypass	Min. VCC2 in	0000b	VPS not supported. Return
					Regulator		0000b=1.8V
	3-1	VH	3b	Reserved	Reserved	000b	Ignore write, return 000b
	0	VH	1b	VPS Bypass Control	Turns VPS Bypass	0b	VPS not supported. Ignore
				J 1	on or off		write, return 0b
60-		R	10B	Reserved	Reserved	All	Ignore write; return 00h on
69			102	110501700	110501100	00h	read.
70		VH	1B	Acceptable BER	For FEC systems	00h	Not Supp. Ignore W, return
70		V 11	1B	Acceptable BER	Tor The systems	Oon	00h.
71		VH	1B	Actual BER	For FEC systems	00h	Not Supp. Ignore W, return
							00h.
72-		VH	2B	Wavelength Set	Host wavelength set	0000h	Not Supp. Ignore write,
73							return 0000h.
74-		VH	2B	Wavelength Error	Returned	0000h	Not Supp., return 0000h.
75				8	wavelength error		TI '
76		VH	1B	FEC Amplitude Adj	Set Amp Slice	00h	Not Supp. Ignore W, return
, 0		, 11	12	1 20 mpmae maj	Section Silve	0011	00h.
77		VH	1B	FEC Phase Adj	Set Phase Slice	00h	Not Supp. Ignore W, return
, ,		V 11	110	The Thase Maj	Set I hase since	OOH	00h.
78-		R	2B	Reserved	Reserved	All	Ignore write; return 00h on
79		IX.	2.0	Reserved	Reserved	00h	read.
80-		VHR	8B	Latched Interrupt Flag	Individual bits set	xb	Latched on flag condition.
87		V 111X	OD	1 -		XU	Cleared on host read. (See
0/							
				Bits	per XFPMSA		
		7/17	O.D.			01	MSA)
88-		VH	8B	Interrupt Masking Bits	Individual bits set	0b	MSA) Set and readable by host.
		VH	8B			0b	MSA)
88- 95				Interrupt Masking Bits	Individual bits set per XFPMSA		MSA) Set and readable by host. Cleared at power-up or reset
88- 95		VH	8B 2B		Individual bits set	0b xxxxh	MSA) Set and readable by host. Cleared at power-up or reset Reported Temperature
88- 95				Interrupt Masking Bits	Individual bits set per XFPMSA		MSA) Set and readable by host. Cleared at power-up or reset  Reported Temperature Value in Units Defined in
88- 95 96- 97		VHR	2B	Interrupt Masking Bits  Temperature Readout	Individual bits set per XFPMSA  MSB in First Byte	xxxxh	MSA) Set and readable by host. Cleared at power-up or reset  Reported Temperature Value in Units Defined in MSA
88- 95 96- 97 98-				Interrupt Masking Bits	Individual bits set per XFPMSA		MSA) Set and readable by host. Cleared at power-up or reset  Reported Temperature Value in Units Defined in
88- 95 96- 97 98- 99		VHR	2B 2B	Interrupt Masking Bits  Temperature Readout  Reserved A/D Chan.	Individual bits set per XFPMSA  MSB in First Byte  Reserved	xxxxh 0000h	MSA) Set and readable by host. Cleared at power-up or reset Reported Temperature Value in Units Defined in MSA Report 0000h on read.
88- 95 96- 97 98- 99 100-		VHR	2B	Interrupt Masking Bits  Temperature Readout	Individual bits set per XFPMSA  MSB in First Byte	xxxxh	MSA) Set and readable by host. Cleared at power-up or reset  Reported Temperature Value in Units Defined in MSA Report 0000h on read.  Reported TX Bias Value in
88- 95 96- 97 98- 99 100- 101		VHR VHR VHR	2B 2B 2B	Interrupt Masking Bits  Temperature Readout  Reserved A/D Chan.  TX Bias A/D Chan	Individual bits set per XFPMSA  MSB in First Byte  Reserved  MSB in First Byte	xxxxh 0000h	MSA) Set and readable by host. Cleared at power-up or reset  Reported Temperature Value in Units Defined in MSA Report 0000h on read.  Reported TX Bias Value in Units Defined in MSA
98- 99 100- 101 102-		VHR	2B 2B	Interrupt Masking Bits  Temperature Readout  Reserved A/D Chan.	Individual bits set per XFPMSA  MSB in First Byte  Reserved	xxxxh 0000h	MSA) Set and readable by host. Cleared at power-up or reset  Reported Temperature Value in Units Defined in MSA Report 0000h on read.  Reported TX Bias Value in Units Defined in MSA Reported TX Power Value
88- 95 96- 97 98- 99 100- 101		VHR VHR VHR	2B 2B 2B	Interrupt Masking Bits  Temperature Readout  Reserved A/D Chan.  TX Bias A/D Chan	Individual bits set per XFPMSA  MSB in First Byte  Reserved  MSB in First Byte	xxxxh 0000h xxxxh	MSA) Set and readable by host. Cleared at power-up or reset  Reported Temperature Value in Units Defined in MSA Report 0000h on read.  Reported TX Bias Value in Units Defined in MSA

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105								in Units Defined in MSA
106- 107		VHR	2B	AUX1 A/D Chan		MSB in First Byte	xxxxh	Report TEC temperature
108- 109		VHR	2B	AUX2 A/D Chan		MSB in First Byte	xxxxh	Report +5V Supply voltage.
	•	Signal	Condition	oner Control	•		- 1	
110	7	VHR	1b	TX Disable State		Reports TXDIS	xb	Ignore writes
	6	VH	1b	Soft TX Disable		OR's with input pi	n Ob	Read and write by host, power up and reset to 0b
	5	VHR	1b	MOD-NR State		Reports MOD_NR	xb	Ignore writes
	4	VHR	1b	P_Down State		Reports P_Down	xb	Ignore writes
	3	VH	1b	Soft P_Down		OR's with input pi	n Ob	Read and write by host, power up and reset to 0b, Do not reset
	2	VHR	1b	Interrupt State		Reports Interrupt	xb	Ignore writes
	1	VHR	1b	LOS State	LOS State		xb	Ignore writes
	0	VHR	1b	Data Not Ready		Reports LOS Set low when A/D ready.	xb	Ignore writes
111	7	VH	1b	TX_NR		Identifies TX_NR	xb	Ignore writes. Set if TX CDR loss of lock.
	6	VH	1b	TX_Fault		Identifies TX_Fau	lt Ob	Ignore writes. Conditions for set TBD. Set at 0b for now.
	5	VH	1b	TX_CDR not locked	TX_CDR not locked		_ xb	Ignore writes.
	4	VH	1b	TX_NR		Identifies TX_NR	xb	Ignore writes. Set if RX CDR loss of lock.
	3	VH	1b	TX_CDR not locked	d	Identifies TX_LOI	_ xb	Ignore writes.
	2-0	R	3b	Reserved		Reserved	000b	Ignore writes, report 000b.
112- 117		R	6B	Reserved				Ignore writes, report 00h.
118	7-1	R	7b	Reserved		Reserved 0b		Ignore writes, report 0000000b.
	0	VH	1b	Error Checking		Switches PEC	xb	Host sets to 1b to enable packet error checking. Power up and reset to 0b.
119- 122		VH	4B	New Password entry	<b>y</b> .	Host may enter to change Password	00h	Changes host password value if current correct password entered in 123-126. Power up and reset to 000000000h.
123- 126		VH	4B	Password entry.		Host may enter Password to Acces Protected Area		Allows Write Access to Customer EEPROM. Power up and reset to 000000000h.
127		VH	1B	Table Select		enters to select er memory table	01h	Defines Table for subsequent upper memory map reads. Defaults to 01h on Power and reset.

#### Upper Memory Map: I2C Addr: A0h, Table 1 - Serial ID Section - Read only by Host, all Nonvolatile

Byte Addr ess	Bit Addr ess	Size (Bytes) or (bits)	Field Name	Description of Field	Value	Value Meaning
128		1B	Identifier	Type of serial transceiver	06h	XFP
129	6-7	2b	Ext. Identifier -	Defines Module	10b	Indicates Power Dissipation

		<u> JAIX</u>								
			Module Power	Power Class		<3.5W under all specified				
			Class			operating conditions.				
129	5	1b	Ext. Identifier - CDR	Identifies presence of a CDR	0b	Module contains CDR function.				
129	4	1b	Ext. Identifier - REFCLK	Identifies need for REFCLK	1b	Module does not need REFCLK				
129	3	1b	CLEI Code Present	Indicates if CLEI Code is present in Table 2	0b	To be supported on a customer basis. Value is 1b if CLEI Code is present in Table 2				
129	0-2	3b	Ext. Identifier - Reserved	Reserved	000ь					
130		1B	Connector	Code for connector type	07h	LC				
131-1	38	8 B	Transceiver Code fo	or electronic compatibil	ity or optical	l compatibility				
		8 B Transceiver Code for electronic compatibility or optical compatibility 10 Gigabit Ethernet Compliance Codes								
131	7	1b	10GBASE-SR		0b					
	6	1b	10GBASE-LR		0b					
	5	1b	10GBASE-ER		0b					
	4	1b	Reserved		0b					
	3	1b	10GBASE-SW		0b					
	2	1b	10GBASE-LW		0b					
	1	1b	10GBASE-EW		0b					
	0	1b	Reserved		0b					
	1 -		it Fibre Channel Comp	liance Codes						
132	7			0b						
	6	1b	1200-SM-LL-L							
	5	1b	Extended reach 1550	nm	0b 0b					
	4	1b	Intermediate reach 13		0b					
	3	1b	Reserved	510IIII	0b					
	2	1b	Reserved		0b					
	1	1b	Reserved		0b					
	0	1b	Reserved		0b					
	1 -		oit Copper Link Compli	ance Codes						
133	7	1b	Reserved		0b					
	6	1b	Reserved		0b					
	5	1b	Reserved		0b					
	4	1b	Reserved		0b					
	3	1b	Reserved		0b					
	2	1b	Reserved		0b					
	1	1b	Reserved		0b					
	0	1b	Reserved		0b					
	<u> </u>		peed Link Compliance (	Codes	1	1				
134	7	1b	1000BASE-SX/1xF0		0b					
15 !	6	1b	1000BASE-LX/1xF0		0b					
	5	1b	2xFC MMF	<i>5</i> 51/11	0b					
	4	1b	2xFC SMF		0b					
	3	1b	OC-48-SR		0b					
	2	1b	OC-48-IR		0b					
	1	1b	OC-48-LR		0b					
	0	1b	Reserved		0b					
			SDH Interconnect Link	Compliance Codes	1 00	I				
135	7	1b	I-64.1r	Compilative Codes	0b					
133	6	1b	I-64.1		0b					
	5	1b	I-64.2r		0b					
	4	1b	I-64.2		0b					
	1 .	10	1 0 1.2		00					

		<u> JAK</u>				
	3	1b	I-64.3		0b	
	2	1b	I-64.5		0b	
	1	1b	Reserved		0b	
	0	1b	Reserved		0b	
	1	SONET/S	DH Short Haul Link	Compliance Codes		
136	7	1b	S-64.1		0b	
100	6	1b	S-64.2a		0b	
	5	1b	S-64.2b		0b	
	4	1b	S-64.3a		0b	
	3	1b	S-64.3b		0b	
	2	1b	S-64.5a		0b	
	1	1b	S-64.5b		0b	
	0	1b	Reserved		0b	
	U		DH Long Haul Link (	Compliance Codes	00	_L
137	7	1b	L-64.1	compnance codes	0b	
137	6	1b	L-64.2a		0b	
	5	1b	L-64.2b		0b	
	4	1b	L-64.2c		0b	
	3	1b	L-64.3		0b	
	2	1b	G.959.1 P1L1-2D2		1b	
	1	1b	Reserved		0b	
	0	1b	Reserved		0b	
	U			Link Compliance Codes	00	
138	7	1b	V-64.2a	Link Comphance Codes	0b	1
136	6	1b	V-64.2b		0b	+
	5	1b	V-64.3		0b	+
		1b			0b	
	4		Reserved		0b	
	3	1b	Reserved			
	2	1b	Reserved		0b	
	1	1b 1b	Reserved		0b	
	0		Reserved		0b	
120	7	Encoding	(4D/((D		11	10GE/10GEG G 1'
139	7	1b	64B/66B		1b	10GE/10GFC Coding
	6	1b	8B/10B		1b	Not used in standards but is
		11.	SONET Scrambled		11.	supported OC-192 Coding
	5	1b	I .		1b	
	4	1b	NRZ		1b	NRZ only supported
	3	1b	RZ		0b	
1.40	2-0	3b	Reserved	Marine Comment 1	000b	0000 MI
140		1B	BR, minimum	Minimum Supported Bitrate (/100Mb)	63h	9900 Mbps
141		1B	BR, maximum	Maximum Supported Bitrate (/100Mb)	6Fh	11100 Mbps for FTLX versions 10700 Mbps for FTRX versions
142		1B	Length (SMF) –	Link length supported	50h	80km
			km	for 9/125 um fiber, units of km		
143		1B	Length (E-50um)	Link length supported	00h	Not supported
				for extended bandwidth MMF,		
				units of 2 m		
144		1B	Length (50m)	Link length supported	00h	Not supported
1 7 7		110	Lengui (Join)	for 50/125 mm fiber,		That supported
				units of 1 m		
145		1B	Length (62.5m)	Link length supported	00h	Not supported
1.5			20118011 (02.5111)	for 62.5/125 mm		or outported
	1	1	ı	-01 02.0/120 IIIII	J	_1

		JAK		fiber, units of 1 m		
146		1B	Length (Copper)	Link length supported for copper, units of 1m	00h	Not supported
		Device T	echnology			
147	4-7	4b	Transmitter Techno	logy	0111b	1550nm EML laser
	3	1b	Wavelength Control	1	0b	No wavelength control
	2	1b	Cooled Transmitter		1b	Transmitter is cooled
	1	1b	Detector Type		1b	APD Detector
	0	1b	Tunable Transmitte	r	0b	Transmitter not Tunable
148- 163		16B	Vendor name	SFP vendor name (ASCII) blank padded	"FINISAR CORP. "	
		CDR Su	pport		•	
164	7	1b	CDR Support for 9.	95 Gb/s	1b	
	6	1b	CDR Support for 10	).3 Gb/s	1b	
	5	1b	CDR Support for 10	).5 Gb/s	1b	
	4	1b	CDR Support for 10	).7 Gb/s	1b	
	3	1b	CDR Support for 11		1b	Supported for FTLX version Not supported for FTRX version
	2	1b	Reserved		0b	
	1	1b	Line-side Loopback	Mode Supported	0b	
	0	1b	XFI Loopback Supp		1b	
165-		3B	Vendor OUI	SFP vendor IEEE	009065h	IEEE assigned
167				company ID		
168- 183		16B	Vendor PN	Part number provided by vendor (ASCII)	"FTRX-3811- 3xx "	Finisar part number
184- 185		2B	Vendor rev	Revision level for part number provided by vendor (ASCII)	3030h	Hardware revision level field not used
186- 187		2B	Wavelength	Nominal Laser Wavelength (1/20nm)	xxxxh	15xx.xx nm * (20/nm)
188- 189		2B	Wavelength Tolerance	+/- Wavelength (1/200nm)	14h	0.1nm * (200/nm).
190		1B	Max Case Temp	Maximum Case Temperature	46h	70°C
191		1B	CC_BASE	Check code for Base ID Fields (addresses 128 to 190)	xxh	Calculated check code, low 8 bits of sum of first 64 bytes of Serial ID info.
		T		EXTENDED ID FIEL	DS	T
192-19	<u>95</u>	4B	Power Supply Field		L . ****	2500 ***
192	1	1B	Maximum Power D		AFh	= 3500 mW
193	ļ	1B		n Power-down (/10mW)	96h	= 1500 mW
194	4-7	4b	Max. Current on +5	11 7	0111b	= 350 mA
167	0-3	4b		.3V Supply (/100mA)	0100b	= 400 mA
195	4-7	4b		.8V Supply (/100mA)	1000b	= 800 mA (actual is 750mA)
	0-3	4b		V Supply (-/100mA)	0000b	Not used
196- 211		16B	Vendor SN	Serial number provided by vendor (ASCII) blank padded	e.g., "A000000"	Encoded serial number
212- 217		6B	Date code	Vendor's manufacturing date	e.g., "030106"	yymmdd
		100	Lat Cada	Vendor lot code	2020h	May be blank
218- 219		2B	Lot Code	vendor for code	202011	Way be blank

220	7	1b	Reserved		0b	Reserved	
	6	1b	Reserved		0b	Reserved	
	5	1b	Reserved		0b	Reserved	
	4	1b	FEC BER Support		0b	No BER Support	
	3	1b	Received power mea	surement type	1b	Average Power	
	2	1b	Reserved		0b	Reserved	
	1-0	2b	Reserved		00b	Will be Reserved	
			Enhanced Options				
221	7	1b			0b	Not supported	
	6	1b	Soft TX_DISABLE		1b	Soft TX_DISABLE is supported	
	5	1b	Soft PWR_DWN Supports VPS LV Regulator Mode Supports VPS Bypassed Regulator Mode		1b	Soft PWR_DWN is supported	
	4	1b			0b	We are not supporting VPS	
	3	1b			0b	We are not supporting VPS	
	2	1b	Active FEC Control	-	0b	Not supported.	
	1	1b	Wavelength Tunabili	ity	0b	Not supported	
	0	1b	Optional CMU Mode	2	0b	Not supported	
222	4-7	4b	Aux A/D Input 1		0100b	TEC Temperature Monitor on Aux A/D 1	
	0-3	4b	Aux A/D Input 2		0110b	+5V Supply Monitor on Aux A/D 2	
223		1B	CC_EXT	Check code for the Extended ID Fields (addresses 192 to 222)	xxh	Calculated check code. Low 8 bits of sum of Bytes 192-222	

**Customer Specific Fields** 

Data Addr ess	Size (Bytes)	Field Name	Description of Field	Value	Value Meaning
224- 255	32	TBD	TBD	All 00h at present	

**Upper Memory Map: I2C Addr: A0h, Table 2**Customer Writable EEPROM. Writable with correct host password entry. Always readable.

Upper Memory Map: I2C Addr: A0h, Table 3

1

#### **Product: FTLX-3812-M3**

Lower Memory Map: I2C Addr: A0h, Bytes 0 - 127.

Byte	Bit	Type	Size	Field Name	Description of Field	Value	Value Meaning
Addr	Addr	Code	(Bytes) or		Description of 1 teta	, artic	, will menting
ess	ess		(bits)				
0	033	NVE	1B	Identifier	Type of serial	06h	XFP
		1,,2	12		transceiver	0011	
	1	Signal	Conditioner	· Control		1	
1	4-7	VH	4b	Data Rate Control		xxxxb	Ignore for Intel or Gennum
	3	VHW	1b	Reserved		N/A	Reserved
	2	VH	1b	Line-side Loopback Contr	ol. 1b actuates	0b	Not supported, ignore write,
				loopback of optical input t			read back as 0b
	1	VH	1b	XFI Loopback Control. 11		xb	Power up to 0b
				electrical input to electrica			1
	0	VH	1b	Signal Conditioner Contro		0b	Normal REFCLK mode
							only supported. Ignore
							write, read back as 0b
		Flag T	hresholds				
2-3		NVE	2B	Temp High Alarm	Threshold for alarm	19968	+78 °C
						d	(assumes 3°C accuracy)
4-5		NVE	2B	Temp Low Alarm	Threshold for alarm	62208	-13 °C
						d	(assumes 3°C accuracy)
6-7		NVE	2B	Temp High Warning	Threshold for warn	19200	+75 °C
						d	(assumes 5°C accuracy)
8-9		NVE	2B	Temp Low Warning	Threshold for warn	62976	-10 °C
						d	(assumes 5°C accuracy)
10-		R	8B	Reserved	Reserved	All	Ignore write; return 00h on
17						00h	read.
18-		NVE	2B	Bias High Alarm	Threshold for alarm	65500	131 mA
19						d	(assumes 0.3mA accuracy)
20-		NVE	2B	Bias Low Alarm	Threshold for alarm	15000	30 mA
21		NIX III	an.	D: 11: 1 111 :	TT1 1 11 C	d	(assumes 0.3mA accuracy)
22-		NVE	2B	Bias High Warning	Threshold for warn	60500	121 mA
23		NIXE	2D	D'a La Wanta	Th 1 . 1 . 1	d	(assumes 0.3mA accuracy)
24- 25		NVE	2B	Bias Low Warning	Threshold for warn	17500	35 mA
26-		NVE	2B	TV Dayyan High Alama	Threshold for alarm	d 35481	(assumes 0.3mA accuracy) +5.5 dBm
27		NVE	2 <b>D</b>	TX Power High Alarm	Threshold for alarm	d	(assumes a 2dB accuracy)
28-		NVE	2B	TX Power Low Alarm	Threshold for alarm	3162d	-5.0 dBm
29		14.415	20	171 OWCI LOW AIGHI	Threshold for afaill	3102u	(assumes 1.5dB accuracy)
30-		NVE	2B	TX Power High Warning	Threshold for warn	31623	+ 5 dB (assumes 2dB
31					- Interior of main	d	accuracy)
32-		NVE	2B	TX Power Low Warning	Threshold for warn	3548d	-4.5 dBm
33						1	(assumes 1.5dB accuracy)
34-	1	NVE	2B	RX Power High Alarm	Threshold for alarm	3162d	-5.0 dBm
35							(assumes 1.5dB accuracy)
36-	-	NVE	2B	Rx Power Low Alarm	Threshold for alarm	25d	-26dBm (assumes 1.5dB
30- 37		INVE	2 <b>D</b>	KA FUWEI LUW AIAIIII	THESHOLD TOT ALATIN	23 <b>u</b>	accuracy)
31	<del>                                     </del>	NVE	2B	RX Power High	Threshold for warn	2818d	-5.5 dBm
38-		INVE	40	Warning	THESHOW IOI WALL	2010U	(assumes 1.5dB accuracy)
39				maining			(assumes 1.5ab accuracy)
40-		NVE	2B	RX Power Low Warning	Threshold for warn	28d	-25.5 dBm
41		1,47	20	Tariowa Low Waining	Threshold for wall	200	(assumes 1.5dB accuracy)
42-	<u> </u>	NVE	2B	AUX1 High Alarm	Threshold for alarm	11520	45°C
12	1	1111	217	710711 111gii 711diilii	Threshold for didiffi	11320	1.0 0

		JAI					
43						d	(assumes 0.5°C accuracy)
44-		NVE	2B	AUX1Low Alarm	Threshold for alarm	5120d	25°C
45							(assumes 0.5°C accuracy)
46-		NVE	2B	AUX1 High Warning	Threshold for warn	10240	40°C
47						d	(assumes 0.5°C accuracy)
48-		NVE	2B	AUX1Low Warning	Threshold for warn	6144d	30°C
49		1,,2		Tierrie w warming	1111 0511010 101 11 11	01	(assumes 0.5°C accuracy)
50-		NVE	2B	AUX2 High Alarm	Threshold for alarm	55000	5.50 V
51		IVIL	20	AOA2 High Alarm	Threshold for alarm	d	3.30 V
52-		NVE	2B	AUX2 Low Alarm	Threshold for alarm	45000	4.50 V
53		INVE	2.0	ACAZ LOW Alarin	Thicshold for alarm	d	4.50 V
54-		NIX/E	2B	ALIVO III al Warmin a	Threshold for warn	53000	5.30 V
		NVE	2 <b>D</b>	AUX2 High Warning	Threshold for warm		
55		> TY TE	27			d	(assumes 50mV accuracy)
56-		NVE	2B	AUX2 Low Warning	Threshold for warn	47000	4.70 V
57						d	(assumes 50mV accuracy)
58	7-4	NVE	4b	VCC2 min with Reg	Min. VCC2 with	0000b	VPS not supported. Return
					Regulator		0000b=1.8V
	3-0	VH	4b	VCC2 Host	VCC2 Supplied by	xxxxb	Written and read by host.
					Host		Ignore and return 0000b
59	7-4	VH	4b	VCC2 min in Bypass	Min. VCC2 in	0000b	VPS not supported. Return
					Regulator		0000b=1.8V
	3-1	VH	3b	Reserved	Reserved	000b	Ignore write, return 000b
	0	VH	1b	VPS Bypass Control	Turns VPS Bypass	0b	VPS not supported. Ignore
				J 1	on or off		write, return 0b
60-		R	10B	Reserved	Reserved	All	Ignore write; return 00h on
69			102	110501700	110501100	00h	read.
70		VH	1B	Acceptable BER	For FEC systems	00h	Not Supp. Ignore W, return
70		V 11	1B	Acceptable BER	Tor The systems	Oon	00h.
71		VH	1B	Actual BER	For FEC systems	00h	Not Supp. Ignore W, return
							00h.
72-		VH	2B	Wavelength Set	Host wavelength set	0000h	Not Supp. Ignore write,
73							return 0000h.
74-		VH	2B	Wavelength Error	Returned	0000h	Not Supp., return 0000h.
75				8	wavelength error		TI '
76		VH	1B	FEC Amplitude Adj	Set Amp Slice	00h	Not Supp. Ignore W, return
, 0		, 11	12	120111111111111111111111111111111111111	Section Silve	0011	00h.
77		VH	1B	FEC Phase Adj	Set Phase Slice	00h	Not Supp. Ignore W, return
, ,		V 11	110	The Thase Maj	Set I hase since	OOH	00h.
78-		R	2B	Reserved	Reserved	All	Ignore write; return 00h on
79		IX.	2.0	Reserved	Reserved	00h	read.
80-		VHR	8B	Latched Interrupt Flag	Individual bits set	xb	Latched on flag condition.
87		V 111X	OD	1 -		XU	Cleared on host read. (See
0/							
				Bits	per XFPMSA		
		7/17	O.D.			01	MSA)
88-		VH	8B	Interrupt Masking Bits	Individual bits set	0b	MSA) Set and readable by host.
		VH	8B			0b	MSA)
88- 95				Interrupt Masking Bits	Individual bits set per XFPMSA		MSA) Set and readable by host. Cleared at power-up or reset
88- 95		VH	8B 2B		Individual bits set	0b xxxxh	MSA) Set and readable by host. Cleared at power-up or reset Reported Temperature
88- 95				Interrupt Masking Bits	Individual bits set per XFPMSA		MSA) Set and readable by host. Cleared at power-up or reset  Reported Temperature Value in Units Defined in
88- 95 96- 97		VHR	2B	Interrupt Masking Bits  Temperature Readout	Individual bits set per XFPMSA  MSB in First Byte	xxxxh	MSA) Set and readable by host. Cleared at power-up or reset  Reported Temperature Value in Units Defined in MSA
88- 95 96- 97 98-				Interrupt Masking Bits	Individual bits set per XFPMSA		MSA) Set and readable by host. Cleared at power-up or reset  Reported Temperature Value in Units Defined in
88- 95 96- 97 98- 99		VHR	2B 2B	Interrupt Masking Bits  Temperature Readout  Reserved A/D Chan.	Individual bits set per XFPMSA  MSB in First Byte  Reserved	xxxxh 0000h	MSA) Set and readable by host. Cleared at power-up or reset Reported Temperature Value in Units Defined in MSA Report 0000h on read.
88- 95 96- 97 98- 99 100-		VHR	2B	Interrupt Masking Bits  Temperature Readout	Individual bits set per XFPMSA  MSB in First Byte	xxxxh	MSA) Set and readable by host. Cleared at power-up or reset  Reported Temperature Value in Units Defined in MSA Report 0000h on read.  Reported TX Bias Value in
88- 95 96- 97 98- 99 100- 101		VHR VHR VHR	2B 2B 2B	Interrupt Masking Bits  Temperature Readout  Reserved A/D Chan.  TX Bias A/D Chan	Individual bits set per XFPMSA  MSB in First Byte  Reserved  MSB in First Byte	xxxxh 0000h	MSA) Set and readable by host. Cleared at power-up or reset  Reported Temperature Value in Units Defined in MSA Report 0000h on read.  Reported TX Bias Value in Units Defined in MSA
98- 99 100- 101 102-		VHR	2B 2B	Interrupt Masking Bits  Temperature Readout  Reserved A/D Chan.	Individual bits set per XFPMSA  MSB in First Byte  Reserved	xxxxh 0000h	MSA) Set and readable by host. Cleared at power-up or reset  Reported Temperature Value in Units Defined in MSA Report 0000h on read.  Reported TX Bias Value in Units Defined in MSA Reported TX Power Value
88- 95 96- 97 98- 99 100- 101		VHR VHR VHR	2B 2B 2B	Interrupt Masking Bits  Temperature Readout  Reserved A/D Chan.  TX Bias A/D Chan	Individual bits set per XFPMSA  MSB in First Byte  Reserved  MSB in First Byte	xxxxh 0000h xxxxh	MSA) Set and readable by host. Cleared at power-up or reset  Reported Temperature Value in Units Defined in MSA Report 0000h on read.  Reported TX Bias Value in Units Defined in MSA

		JAI	1				
105							in Units Defined in MSA
106- 107		VHR	2B	AUX1 A/D Chan	MSB in First Byte	xxxxh	Report TEC temperature
108- 109		VHR	2B	AUX2 A/D Chan	MSB in First Byte	xxxxh	Report +5V Supply voltage.
		Signal	Condition	oner Control		•	
110	7	VHR	1b	TX Disable State	Reports TXDIS	xb	Ignore writes
	6	VH	1b	Soft TX Disable	OR's with input pin	0b	Read and write by host, power up and reset to 0b
	5	VHR	1b	MOD-NR State	Reports MOD_NR	xb	Ignore writes
	4	VHR	1b	P_Down State	Reports P_Down	xb	Ignore writes
	3	VH	1b	Soft P_Down	OR's with input pin	0b	Read and write by host, power up and reset to 0b, Do not reset
	2	VHR	1b	Interrupt State	Reports Interrupt	xb	Ignore writes
	1	VHR	1b	LOS State	Reports LOS	xb	Ignore writes
	0	VHR	1b	Data Not Ready	Set low when A/D ready.	xb	Ignore writes
111	7	VH	1b	TX_NR	Identifies TX_NR	xb	Ignore writes. Set if TX CDR loss of lock.
	6	VH	1b	TX_Fault	Identifies TX_Fault	0b	Ignore writes. Conditions for set TBD. Set at 0b for now.
	5	VH	1b	TX_CDR not locked	Identifies TX_LOL	xb	Ignore writes.
	4	VH	1b	TX_NR	Identifies TX_NR	xb	Ignore writes. Set if RX CDR loss of lock.
	3	VH	1b	TX_CDR not locked	Identifies TX_LOL	xb	Ignore writes.
	2-0	R	3b	Reserved	Reserved	000b	Ignore writes, report 000b.
112- 117		R	6B	Reserved			Ignore writes, report 00h.
118	7-1	R	7b	Reserved	Reserved	0b	Ignore writes, report 0000000b.
	0	VH	1b	Error Checking	Switches PEC	xb	Host sets to 1b to enable packet error checking. Power up and reset to 0b.
119- 122		VH	4B	New Password entry.	Host may enter to change Password	00h	Changes host password value if current correct password entered in 123-126. Power up and reset to 000000000h.
123- 126		VH	4B	Password entry.	Host may enter Password to Access Protected Area	00h	Allows Write Access to Customer EEPROM. Power up and reset to 00000000h.
127		VH	1B	Table Select	Host enters to select upper memory table	01h	Defines Table for subsequent upper memory map reads. Defaults to 01h on Power and reset.

#### Upper Memory Map: I2C Addr: A0h, Table 1 - Serial ID Section - Read only by Host, all Nonvolatile

Byte Addr ess	Bit Addr ess	Size (Bytes) or (bits)	Field Name	Description of Field	Value	Value Meaning
128		1B	Identifier	Type of serial transceiver	06h	XFP
129	6-7	2b	Ext. Identifier -	Defines Module	10b	Indicates Power Dissipation

		<u>JAK</u>				
			Module Power	Power Class		<3.5W under all specified
			Class			operating conditions.
129	5	1b	Ext. Identifier - CDR	Identifies presence of a CDR	0b	Module contains CDR function.
129	4	1b	Ext. Identifier - REFCLK	Identifies need for REFCLK	1b	Module does not need REFCLK
129	3	1b	CLEI Code Present	Indicates if CLEI Code is present in Table 2	0b	To be supported on a customer basis. Value is 1b if CLEI Code is present in Table 2
129	0-2	3b	Ext. Identifier - Reserved	Reserved	000b	
130		1B	Connector	Code for connector type	07h	LC
131-1	38	8 B	Transceiver Code fo	or electronic compatibil	ity or optical co	mpatibility
		10 Gigabit	Ethernet Compliance	Codes		
131	7	1b	10GBASE-SR		0b	
	6	1b	10GBASE-LR		0b	
	5	1b	10GBASE-ER		0b	
	4	1b	Reserved		0b	
	3	1b	10GBASE-SW		0b	
	2	1b	10GBASE-LW		0b	
	1	1b	10GBASE-EW		0b	
	0	1b	Reserved		0b	
	1	10 Gigabit	Fibre Channel Comp	liance Codes	•	
132	7	1b	1200-MX-SN-I		0b	
	6	1b	1200-SM-LL-L		0b	
	5	1b	Extended reach 1550	)nm	0b	
	4	1b	Intermediate reach 13		0b	
	3	1b	Reserved		0b	
	2	1b	Reserved		0b	
	1	1b	Reserved		0b	
	0	1b	Reserved		0b	
	1	10 Gigabit	Copper Link Compli	ance Codes		1
133	7	1b	Reserved		0b	
	6	1b	Reserved		0b	
	5	1b	Reserved		0b	
	4	1b	Reserved		0b	
	3	1b	Reserved		0b	
	2	1b	Reserved		0b	
	1	1b	Reserved		0b	
	0	1b	Reserved		0b	
	1	Lower Spec	ed Link Compliance	Codes	•	
134	7	1b	1000BASE-SX/1xF0		0b	
	6	1b	1000BASE-LX/1xF0		0b	
	5	1b	2xFC MMF		0b	
	4	1b	2xFC SMF		0b	
	3	1b	OC-48-SR		0b	
	2	1b	OC-48-IR		0b	
	1	1b	OC-48-LR		0b	
	0	1b	Reserved		0b	
	1 -		H Interconnect Link	Compliance Codes	1	
135	7	1b	I-64.1r	F	0b	
	6	1b	I-64.1		0b	
	. ~					
	5	1b	I-64.2r		0b	

	1 1 1	<u> JAIL</u>				
	3	1b	I-64.3		0b	
	2	1b	I-64.5		0b	
	1	1b	Reserved		0b	
	0	1b	Reserved		0b	
		SONET/SI	DH Short Haul Link	Compliance Codes	•	
136	7	1b	S-64.1		0b	
	6	1b	S-64.2a		0b	
	5	1b	S-64.2b		0b	
	4	1b	S-64.3a		0b	
	3	1b	S-64.3b		0b	
	2	1b	S-64.5a		0b	
	1	1b	S-64.5b		0b	
	0	1b	Reserved		0b	
	U		DH Long Haul Link	Compliance Codes	1 00	
137	7	1b	L-64.1	compnance codes	0b	
137	6	1b	L-64.2a		0b	+
		1b			0b	
	5	1b	L-64.2b			
	4	1b	L-64.2c		0b	
	3		L-64.3		0b	
	2	1b	G.959.1 P1L1-2D2		1b	
	1	1b	Reserved		0b	
	0	1b	Reserved		0b	
	Т_			Link Compliance Codes	T	1
138	7	1b	V-64.2a		0b	
	6	1b	V-64.2b		0b	
	5	1b	V-64.3		0b	
	4	1b	Reserved		0b	
	3	1b	Reserved		0b	
	2	1b	Reserved		0b	
	1	1b	Reserved		0b	
	0	1b	Reserved		0b	
		Encoding				
139	7	1b	64B/66B		1b	10GE/10GFC Coding
	6	1b	8B/10B		1b	Not used in standards but is
		41	GOVEEN G 11 1		41	supported
	5	1b	SONET Scrambled		1b	OC-192 Coding
	4	1b	NRZ		1b	NRZ only supported
	3	1b	RZ		0b	
	2-0	3b	Reserved		000b	
140		1B	BR, minimum	Minimum Supported Bitrate (/100Mb)	63h	9900 Mbps
141		1B	BR, maximum	Maximum Supported Bitrate (/100Mb)	6Fh	11100 Mbps for FTLX version. 10700 Mbps for FTRX version
142		1B	Length (SMF) – km	Link length supported for 9/125 um fiber, units of km	50h	80km
143		1B	Length (E-50um)	Link length supported for extended bandwidth MMF, units of 2 m	00h	Not supported
144		1B	Length (50m)	Link length supported for 50/125 mm fiber, units of 1 m	00h	Not supported
145		1B	Length (62.5m)	Link length supported for 62.5/125 mm	00h	Not supported

		JAK		fiber, units of 1 m		
146		1B	Length (Copper)	Link length supported for copper, units of 1m	00h	Not supported
		Device T	echnology			
147	4-7	4b	Transmitter Techno	logy	0111b	1550nm EML laser
	3	1b	Wavelength Contro	1	0b	No wavelength control
	2	1b	Cooled Transmitter		1b	Transmitter is cooled
	1	1b	Detector Type		1b	APD Detector
	0	1b	Tunable Transmitte	r	0b	Transmitter not Tunable
148- 163		16B	Vendor name	SFP vendor name (ASCII) blank padded	"FINISAR CORP. "	
		CDR Su	pport		1	
164	7	1b	CDR Support for 9.	95 Gb/s	1b	
	6	1b	CDR Support for 10		1b	
	5	1b	CDR Support for 10		1b	
	4	1b	CDR Support for 10		1b	
	3	1b	CDR Support for 11		1b	Supported for FTLX version. Not supported for FTRX version.
	2	1b	Reserved		0b	The state of the s
	1	1b	Line-side Loopback	Mode Supported	0b	
	0	1b	XFI Loopback Supp	* *	1b	
165-		3B	Vendor OUI	SFP vendor IEEE	009065h	IEEE assigned
167				company ID		_
168- 183		16B	Vendor PN	Part number provided by vendor (ASCII)	"FTLX-3812- M3xx "	Finisar part number
184- 185		2B	Vendor rev	Revision level for part number provided by vendor (ASCII)	3030h	Hardware revision level field not used
186- 187		2B	Wavelength	Nominal Laser Wavelength (1/20nm)	xxxxh	15xx.xx nm * (20/nm)
188- 189		2B	Wavelength Tolerance	+/- Wavelength (1/200nm)	14h	0.1nm * (200/nm).
190		1B	Max Case Temp	Maximum Case Temperature	46h	70°C
191		1B	CC_BASE	Check code for Base ID Fields (addresses 128 to 190)	xxh	Calculated check code, low 8 bits of sum of first 64 bytes of Serial ID info.
		T		EXTENDED ID FIEL	DS	1
192-19	95	4B	Power Supply Fiel		T . —	2700 775
192	1	1B	Maximum Power D		AFh	= 3500 mW
193	1	1B		n Power-down (/10mW)	96h	= 1500 mW
194	4-7	4b	Max. Current on +5	11 7	0111b	= 350 mA
	0-3	4b		.3V Supply (/100mA)	0100b	= 400 mA
195	4-7	4b		.8V Supply (/100mA)	1000b	= 800 mA (actual is 750mA)
	0-3	4b		V Supply (-/100mA)	0000b	Not used
196- 211		16B	Vendor SN	Serial number provided by vendor (ASCII) blank padded	e.g., "A000000"	Encoded serial number
212-		6B	Date code	Vendor's manufacturing date	e.g., "030106"	yymmdd
		•	1	manuracturing date	030100	
217 218- 219		2B	Lot Code	Vendor lot code	2020h	May be blank

220	7	1b	Reserved		0b	Reserved
	6	1b	Reserved		0b	Reserved
	5	1b	Reserved		0b	Reserved
	4	1b	FEC BER Support		0b	No BER Support
	3	1b	Received power mea	surement type	1b	Average Power
	2	1b	Reserved		0b	Reserved
	1-0	2b	Reserved		00b	Will be Reserved
			<b>Enhanced Options</b>			
221	7	1b	Module supports VP	S	0b	Not supported
	6	1b	Soft TX_DISABLE		1b	Soft TX_DISABLE is supported
	5	1b	Soft PWR_DWN		1b	Soft PWR_DWN is supported
	4	1b	Supports VPS LV Re	egulator Mode	0b	We are not supporting VPS
	3	1b	Supports VPS Bypas	sed Regulator Mode	0b	We are not supporting VPS
	2	1b	Active FEC Control		1b	Supported.
	1	1b	Wavelength Tunabili	ity	0b	Not supported
	0	1b	Optional CMU Mode	2	0b	Not supported
222	4-7	4b	Aux A/D Input 1		0100b	Laser Temperature Monitor on Aux A/D 1
	0-3	4b	Aux A/D Input 2		0110b	+5V Supply Monitor on Aux A/D 2
223		1B	CC_EXT	Check code for the Extended ID Fields (addresses 192 to 222)	xxh	Calculated check code. Low 8 bits of sum of Bytes 192-222

**Customer Specific Fields** 

Data Addres s	Size (Byt es)	Field Name	Description of Field	Value	Value Meaning
224- 255	32	Vendor Specific EEPROM	TBD	All 00h at present	

**Upper Memory Map: I2C Addr: A0h, Table 2**Customer Writable EEPROM. Writable with correct host password entry. Always readable.

**Upper Memory Map: I2C Addr: A0h, Table 3** 

Used by Finisar for internal parameter storage. Not readable or Writable without Finisar Password.

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#### **Product: FTLX-3812-S3**

Lower Memory Map: I2C Addr: A0h, Bytes 0 - 127.

Byte	Bit	Type	Size	Field Name	Description of Field	Value	Value Meaning
Addr	Addr	Code	(Bytes) or		Description of 1 teta	, artic	, will menting
ess	ess		(bits)				
0		NVE	1B	Identifier	Type of serial	06h	XFP
					transceiver		
	l	Signal	Conditioner	Control			1
1	4-7	VH	4b	Data Rate Control		xxxxb	Ignore for Intel or Gennum
	3	VHW	1b	Reserved		N/A	Reserved
	2	VH	1b	Line-side Loopback Contr	ol. 1b actuates	0b	Not supported, ignore write,
				loopback of optical input t			read back as 0b
	1	VH	1b	XFI Loopback Control. 11	actuates loopback of	xb	Power up to 0b
				electrical input to electrica	l output		
	0	VH	1b	Signal Conditioner Contro	1	0b	Normal REFCLK mode
							only supported. Ignore
							write, read back as 0b
			Thresholds				
2-3		NVE	2B	Temp High Alarm	Threshold for alarm	19968	+78 °C
						d	(assumes 3°C accuracy)
4-5		NVE	2B	Temp Low Alarm	Threshold for alarm	62208	-13 °C
						d	(assumes 3°C accuracy)
6-7		NVE	2B	Temp High Warning	Threshold for warn	19200	+75 °C
						d	(assumes 5°C accuracy)
8-9		NVE	2B	Temp Low Warning	Threshold for warn	62976	-10 °C
						d	(assumes 5°C accuracy)
10-		R	8B	Reserved	Reserved	All	Ignore write; return 00h on
17						00h	read.
18-		NVE	2B	Bias High Alarm	Threshold for alarm	65500	131 mA
19		NIX III	an.	D: 1 11	TT 1 11 C 1	d	(assumes 0.3mA accuracy)
20-		NVE	2B	Bias Low Alarm	Threshold for alarm	15000	30 mA
21		NIXE	an.	D: 11: 1 XV :	TD1 1 11 C	d	(assumes 0.3mA accuracy)
22-		NVE	2B	Bias High Warning	Threshold for warn	60500	121 mA
23 24-		NIXE	2B	Diag Lass Warning	Threshold for warn	d 17500	(assumes 0.3mA accuracy) 35 mA
25		NVE	2 <b>B</b>	Bias Low Warning	I nresnoid for warn	d	(assumes 0.3mA accuracy)
26-		NVE	2B	TX Power High Alarm	Threshold for alarm	31623	+5 dBm
27		INVE	20	1 A Fower High Alarm	Tilleshold for alarm	d	(assumes 2dB accuracy)
28-		NVE	2B	TX Power Low Alarm	Threshold for alarm	5012d	-3.0 dBm
29		1,47	20	171 OWOL LOW AIGHI	Theonord for arailli	3012 <b>u</b>	(assumes 1.5dB accuracy)
30-		NVE	2B	TX Power High Warning	Threshold for warn	28184	+4.5 dBm
31					- Interior of main	d	(assumes 2dB accuracy)
32-		NVE	2B	TX Power Low Warning	Threshold for warn	5623d	-2.5 dBm
33							(assumes 1.5dB accuracy)
34-		NVE	2B	RX Power High Alarm	Threshold for alarm	3162d	-5.0 dBm
35							(assumes 1.5dB accuracy)
36-	-	NVE	2B	Rx Power Low Alarm	Threshold for alarm	25d	-26dBm (assumes 1.5dB
30- 37		INVE	2 <b>D</b>	KA FUWEI LUW AIAIIII	THESHOLD TOT ALATIN	23 <b>u</b>	accuracy)
31	<del>                                     </del>	NVE	2B	RX Power High	Threshold for warn	2818d	-5.5 dBm
38-		INVE	40	Warning	THESHOW IOI WALL	2010U	(assumes 1.5dB accuracy)
39				maining			(assumes 1.5ab accuracy)
40-		NVE	2B	RX Power Low Warning	Threshold for warn	28d	-25.5 dBm
41		1,47	20	Tariowa Low Waining	Threshold for wall	200	(assumes 1.5dB accuracy)
42-		NVE	2B	AUX1 High Alarm	Threshold for alarm	11520	45°C
	I				- III COLLOIG FOT WIWIIII	11020	1

43 44- 45 46- 47 48- 49 50- 51 52- 53 54- 55 56- 57 58 7-4 3-0	VH	2B 2B 2B 2B 2B 2B 2B 4b 4b	AUX1Low Alarm  AUX1 High Warning  AUX1Low Warning  AUX2 High Alarm  AUX2 Low Alarm  AUX2 High Warning  AUX2 Low Warning  VCC2 min with Reg	Threshold for alarm Threshold for warn Threshold for warn Threshold for alarm Threshold for alarm Threshold for warn Threshold for warn Threshold for warn Min. VCC2 with	d 5120d 10240 d 6144d 55000 d 45000 d 53000 d 47000 d	(assumes 0.5°C accuracy)  25°C (assumes 0.5°C accuracy)  40°C (assumes 0.5°C accuracy)  30°C (assumes 0.5°C accuracy)  5.50 V  4.50 V  5.30 V (assumes 50mV accuracy)  4.70 V
45 46- 47 48- 49 50- 51 52- 53 54- 55 56- 57 58 7-4 3-1 0	NVE NVE NVE NVE NVE VH VH	2B 2B 2B 2B 2B 2B 4b	AUX1 High Warning  AUX1Low Warning  AUX2 High Alarm  AUX2 Low Alarm  AUX2 High Warning  AUX2 Low Warning  VCC2 min with Reg	Threshold for warn  Threshold for alarm  Threshold for alarm  Threshold for warn  Threshold for warn  Threshold for warn	10240 d 6144d 55000 d 45000 d 53000 d 47000	(assumes 0.5°C accuracy)  40°C (assumes 0.5°C accuracy)  30°C (assumes 0.5°C accuracy)  5.50 V  4.50 V  5.30 V (assumes 50mV accuracy)
46- 47 48- 49 50- 51 52- 53 54- 55 56- 57 58 7-4 3-0	NVE NVE NVE NVE VH VH	2B 2B 2B 2B 2B 4b	AUX1Low Warning  AUX2 High Alarm  AUX2 Low Alarm  AUX2 High Warning  AUX2 Low Warning  VCC2 min with Reg	Threshold for warn  Threshold for alarm  Threshold for alarm  Threshold for warn  Threshold for warn	d 6144d 55000 d 45000 d 53000 d 47000	40°C (assumes 0.5°C accuracy) 30°C (assumes 0.5°C accuracy) 5.50 V  4.50 V  5.30 V (assumes 50mV accuracy)
46- 47 48- 49 50- 51 52- 53 54- 55 56- 57 58 7-4 3-0	NVE NVE NVE NVE VH VH	2B 2B 2B 2B 2B 4b	AUX1Low Warning  AUX2 High Alarm  AUX2 Low Alarm  AUX2 High Warning  AUX2 Low Warning  VCC2 min with Reg	Threshold for warn  Threshold for alarm  Threshold for alarm  Threshold for warn  Threshold for warn	d 6144d 55000 d 45000 d 53000 d 47000	40°C (assumes 0.5°C accuracy) 30°C (assumes 0.5°C accuracy) 5.50 V  4.50 V  5.30 V (assumes 50mV accuracy)
48- 49 50- 51 52- 53 54- 55 56- 57 58 7-4 3-0	NVE NVE NVE NVE VH VH	2B 2B 2B 2B 4b	AUX1Low Warning  AUX2 High Alarm  AUX2 Low Alarm  AUX2 High Warning  AUX2 Low Warning  VCC2 min with Reg	Threshold for warn  Threshold for alarm  Threshold for alarm  Threshold for warn  Threshold for warn	d 6144d 55000 d 45000 d 53000 d 47000	30°C (assumes 0.5°C accuracy) 5.50 V  4.50 V  5.30 V (assumes 50mV accuracy)
48- 49 50- 51 52- 53 54- 55 56- 57 58 7-4 3-0	NVE NVE NVE NVE VH	2B 2B 2B 2B 4b	AUX2 High Alarm  AUX2 Low Alarm  AUX2 High Warning  AUX2 Low Warning  VCC2 min with Reg	Threshold for alarm  Threshold for alarm  Threshold for warn  Threshold for warn	55000 d 45000 d 53000 d 47000	30°C (assumes 0.5°C accuracy) 5.50 V  4.50 V  5.30 V (assumes 50mV accuracy)
49       50-       51       52-       53       54-       55       56-       57       58     7-4       3-0       59     7-4       3-1     0	NVE NVE NVE NVE VH	2B 2B 2B 2B 4b	AUX2 High Alarm  AUX2 Low Alarm  AUX2 High Warning  AUX2 Low Warning  VCC2 min with Reg	Threshold for alarm  Threshold for alarm  Threshold for warn  Threshold for warn	55000 d 45000 d 53000 d 47000	(assumes 0.5°C accuracy) 5.50 V  4.50 V  5.30 V (assumes 50mV accuracy)
50- 51 52- 53 54- 55 56- 57 58 7-4 3-0 0	NVE NVE NVE VH VH	2B 2B 2B 4b	AUX2 Low Alarm  AUX2 High Warning  AUX2 Low Warning  VCC2 min with Reg	Threshold for alarm  Threshold for warn  Threshold for warn	d 45000 d 53000 d 47000	5.50 V 4.50 V 5.30 V (assumes 50mV accuracy)
51 52- 53 54- 55 56- 57 58 7-4 3-0 0	NVE NVE NVE VH VH	2B 2B 2B 4b	AUX2 Low Alarm  AUX2 High Warning  AUX2 Low Warning  VCC2 min with Reg	Threshold for alarm  Threshold for warn  Threshold for warn	d 45000 d 53000 d 47000	4.50 V  5.30 V (assumes 50mV accuracy)
52- 53 54- 55 56- 57 58 7-4 3-0 59 7-4	NVE NVE NVE VH VH	2B 2B 4b	AUX2 High Warning  AUX2 Low Warning  VCC2 min with Reg	Threshold for warn  Threshold for warn	45000 d 53000 d 47000	5.30 V (assumes 50mV accuracy)
53 54- 55 56- 57 58 7-4 3-0 59 7-4 3-1 0	NVE NVE NVE VH VH	2B 2B 4b	AUX2 High Warning  AUX2 Low Warning  VCC2 min with Reg	Threshold for warn  Threshold for warn	d 53000 d 47000	5.30 V (assumes 50mV accuracy)
54- 55- 56- 57- 58- 7-4- 3-0 59- 7-4	NVE NVE VH VH	2B 4b	AUX2 Low Warning  VCC2 min with Reg	Threshold for warn	53000 d 47000	(assumes 50mV accuracy)
55 56- 57 58 7-4 3-0 59 7-4 3-1 0	NVE NVE VH VH	2B 4b	AUX2 Low Warning  VCC2 min with Reg	Threshold for warn	d 47000	(assumes 50mV accuracy)
56- 57 58 7-4 3-0 59 7-4 3-1 0	NVE VH VH	4b	VCC2 min with Reg		47000	
57 58 7-4 3-0 59 7-4 3-1 0	NVE VH VH	4b	VCC2 min with Reg			1 4.70 V
58 7-4 3-0 59 7-4 3-1 0	VH VH			Min VCC2 with	l d	
3-0 59 7-4 3-1 0	VH VH			Min VCC2 with		(assumes 50mV accuracy)
59 7-4 3-1 0	VH	4b			0000b	VPS not supported. Return
59 7-4 3-1 0	VH	4b		Regulator		0000b=1.8V
3-1			VCC2 Host	VCC2 Supplied by	xxxxb	Written and read by host.
3-1				Host		Ignore and return 0000b
0	VH	4b	VCC2 min in Bypass	Min. VCC2 in	0000b	VPS not supported. Return
0	VH			Regulator		0000b=1.8V
0		3b	Reserved	Reserved	000b	Ignore write, return 000b
	VH	1b	VPS Bypass Control	Turns VPS Bypass	0b	VPS not supported. Ignore
	V 11	10	VI 5 Dypass Control	on or off	00	write, return 0b
611	R	10B	Reserved	Reserved	All	Ignore write; return 00h on
60-	K	100	Reserved	Reserved		•
69	X / T T	10	A (11 DED	E EEC (	00h	read.
70	VH	1B	Acceptable BER	For FEC systems	00h	Not Supp. Ignore W, return 00h.
71	VH	1B	Actual BER	For FEC systems	00h	Not Supp. Ignore W, return
	****	20	W. 1 1 0	***	00001	00h.
72-	VH	2B	Wavelength Set	Host wavelength set	0000h	Not Supp. Ignore write,
73						return 0000h.
74-	VH	2B	Wavelength Error	Returned	0000h	Not Supp., return 0000h.
75				wavelength error		
76	VH	1B	FEC Amplitude Adj	Set Amp Slice	00h	Not Supp. Ignore W, return
						00h.
77	VH	1B	FEC Phase Adj	Set Phase Slice	00h	Not Supp. Ignore W, return
						00h.
78-	R	2B	Reserved	Reserved	All	Ignore write; return 00h on
79					00h	read.
80-	VHR	8B	Latched Interrupt Flag	Individual bits set	xb	Latched on flag condition.
87		0.2	Bits	per XFPMSA	110	Cleared on host read. (See
0,			Bits	per mi mism		MSA)
88-	VH	8B	Interrupt Masking Bits	Individual bits set	0b	Set and readable by host.
95	V 11	OD	interrupt Wasking Bits	per XFPMSA	00	Cleared at power-up or reset
93				per All MSA		Cleared at power-up of reset
06	VHR	2B	Tamporatura D J t	MCD in Final Data	vv1.	Papartad Tammanatana
96-	VHK	2 <b>B</b>	Temperature Readout	MSB in First Byte	xxxxh	Reported Temperature
97						Value in Units Defined in
					0.5	MSA
98-	VHR	2B	Reserved A/D Chan.	Reserved	0000h	Report 0000h on read.
99					ļ	
100-	VHR	2B	TX Bias A/D Chan	MSB in First Byte	xxxxh	Reported TX Bias Value in
101						Units Defined in MSA
102-	VHR	2B	TX Power A/D Chan	MSB in First Byte	xxxxh	Reported TX Power Value
104-						in Units Defined in MSA
102-		2B	RX Power A/D Chan	MSB in First Byte	xxxxh	1

105		JAI					in Units Defined in MSA
106-		VHR	2B	AUX1 A/D Chan	MSB in First Byte	xxxxh	Report TEC temperature
107						XXXXII	
108- 109		VHR	2B	AUX2 A/D Chan	MSB in First Byte	xxxxh	Report +5V Supply voltage.
		Signal	Condition	oner Control			•
110	7	VHR	1b	TX Disable State	Reports TXDIS	xb	Ignore writes
	6	VH	1b	Soft TX Disable	OR's with input pin	0b	Read and write by host, power up and reset to 0b
	5	VHR	1b	MOD-NR State	Reports MOD_NR	xb	Ignore writes
	4	VHR	1b	P_Down State	Reports P_Down	xb	Ignore writes
	3	VH	1b	Soft P_Down	OR's with input pin 0b		Read and write by host, power up and reset to 0b, Do not reset
	2	VHR	1b	Interrupt State	Reports Interrupt	xb	Ignore writes
	1	VHR	1b	LOS State	Reports LOS	xb	Ignore writes
	0	VHR	1b	Data Not Ready	Set low when A/D ready.	xb	Ignore writes
111	7	VH	1b	TX_NR	Identifies TX_NR	xb	Ignore writes. Set if TX CDR loss of lock.
	6	VH	1b	TX_Fault	Identifies TX_Fault 0b		Ignore writes. Conditions for set TBD. Set at 0b for now.
	5	VH	1b	TX_CDR not locked	Identifies TX_LOL	xb	Ignore writes.
	4	VH	1b	TX_NR	Identifies TX_NR	xb	Ignore writes. Set if RX CDR loss of lock.
	3	VH	1b	TX_CDR not locked	Identifies TX_LOL	xb	Ignore writes.
	2-0	R	3b	Reserved	Reserved	000b	Ignore writes, report 000b.
112- 117		R	6B	Reserved			Ignore writes, report 00h.
118	7-1	R	7b	Reserved	Reserved	0b	Ignore writes, report 0000000b.
	0	VH	1b	Error Checking	Switches PEC	xb	Host sets to 1b to enable packet error checking. Power up and reset to 0b.
119- 122		VH	4B	New Password entry.	Host may enter to change Password	00h	Changes host password value if current correct password entered in 123-126. Power up and reset to 000000000h.
123- 126		VH	4B	Password entry.	Host may enter Password to Access Protected Area	00h	Allows Write Access to Customer EEPROM. Power up and reset to 00000000h.
127		VH	1B	Table Select	Host enters to select upper memory table	01h	Defines Table for subsequent upper memory map reads. Defaults to 01h on Power and reset.

#### Upper Memory Map: I2C Addr: A0h, Table 1 - Serial ID Section - Read only by Host, all Nonvolatile

Byte Addr ess	Bit Addr ess	Size (Bytes) or (bits)	Field Name	Description of Field	Value	Value Meaning
128		1B	Identifier	Type of serial transceiver	06h	XFP
129	6-7	2b	Ext. Identifier -	Defines Module	10b	Indicates Power Dissipation

		DAK				
			Module Power	Power Class		<3.5W under all specified
			Class			operating conditions.
129	5	1b	Ext. Identifier - CDR	Identifies presence of a CDR	0b	Module contains CDR function.
129	4	1b	Ext. Identifier - REFCLK	Identifies need for REFCLK	1b	Module does not need REFCLK
129	3	1b	CLEI Code Present	Indicates if CLEI Code is present in Table 2	0b	To be supported on a customer basis. Value is 1b if CLEI Code is present in Table 2
129	0-2	3b	Ext. Identifier - Reserved	Reserved	000ь	
130		1B	Connector	Code for connector type	07h	LC
131-13	38	8 B	Transceiver Code fo	or electronic compatibil	ity or optical	compatibility
		10 Gigabit	Ethernet Compliance	Codes		
131	7	1b	10GBASE-SR		0b	
	6	1b	10GBASE-LR		0b	
	5	1b	10GBASE-ER		0b	
	4				0b	
	3	1b	10GBASE-SW		0b	
	2	1b	10GBASE-LW		0b	
	1	1b	10GBASE-EW		0b	
	0	1b	Reserved		0b	
		10 Gigabit	Fibre Channel Comp	liance Codes		·
132	7	1b	1200-MX-SN-I		0b	
	6	1b	1200-SM-LL-L		0b	
	5	1b	Extended reach 1550	nm	0b	
	4	1b	Intermediate reach 13	310nm	0b	
	3	1b	Reserved		0b	
	2	1b	Reserved		0b	
	1	1b	Reserved		0b	
	0	1b	Reserved		0b	
		10 Gigabit	Copper Link Complia	ance Codes		
133	7	1b	Reserved		0b	
	6	1b	Reserved		0b	
	5	1b	Reserved		0b	
	4	1b	Reserved		0b	
	3	1b	Reserved		0b	
	2	1b	Reserved		0b	
	1	1b	Reserved		0b	
	0	1b	Reserved		0b	
		Lower Spec	ed Link Compliance (			
134	7	1b	1000BASE-SX/1xF0		0b	
	6	1b	1000BASE-LX/1xF0	C SMF	0b	
	5	1b	2xFC MMF		0b	
	4	1b	2xFC SMF		0b	
	3 1b OC-48-SR 2 1b OC-48-IR			0b		
					0b	
	1	1b	OC-48-LR		0b	
	0	1b	Reserved		0b	
	1		H Interconnect Link	<b>Compliance Codes</b>	1	
135	7	1b	I-64.1r		0b	
	6	1b	I-64.1		0b	
	5	1b	I-64.2r		0b	
	4	1b	I-64.2		0b	

		<u> JAK</u>				
	3	1b	I-64.3		0b	
	2	1b	I-64.5		0b	
	1	1b	Reserved		0b	
	0	1b	Reserved		0b	
	1	SONET/S	DH Short Haul Link	Compliance Codes		
136	7	1b	S-64.1		0b	
100	6	1b	S-64.2a		0b	
	5	1b	S-64.2b		0b	
	4	1b	S-64.3a		0b	
	3	1b	S-64.3b		0b	
	2	1b	S-64.5a		0b	
	1	1b	S-64.5b		0b	
	0	1b	Reserved		0b	
	U		DH Long Haul Link (	Compliance Codes	00	_L
137	7	1b	L-64.1	compnance codes	0b	
137	6	1b	L-64.2a		0b	
	5	1b	L-64.2b		0b	
	4	1b	L-64.2c		0b	
	3	1b	L-64.3		0b	
	2	1b	G.959.1 P1L1-2D2		1b	
	1	1b	Reserved		0b	
	0 1b Reserved			0b		
	SONET/SDH Very Long Haul Link Compl				00	
138	7	1b	V-64.2a	Link Comphance Codes	0b	1
136	6	1b	V-64.2b		0b	+
	5	1b	V-64.3		0b	+
		1b			0b	
	4		Reserved		0b	
	3	1b	Reserved			
	2	1b	Reserved		0b	
	1	1b 1b	Reserved		0b	
	0		Reserved		0b	
120	7	Encoding	(4D/((D		11	10GE/10GEG G 1'
139	7	1b	64B/66B		1b	10GE/10GFC Coding
	6	1b	8B/10B		1b	Not used in standards but is
		11.	SONET Scrambled		11.	supported OC-192 Coding
	5	1b	I .		1b	
	4	1b	NRZ		1b	NRZ only supported
	3	1b	RZ		0b	
1.40	2-0	3b	Reserved	Marine Comment 1	000b	0000 MI
140		1B	BR, minimum	Minimum Supported Bitrate (/100Mb)	63h	9900 Mbps
141		1B	BR, maximum	Maximum Supported Bitrate (/100Mb)	6Fh	11100 Mbps for FTLX versions 10700 Mbps for FTRX versions
142		1B	Length (SMF) –	Link length supported	50h	80km
			km	for 9/125 um fiber, units of km		
143		1B	Length (E-50um)	Link length supported	00h	Not supported
				for extended bandwidth MMF,		
				units of 2 m		
144		1B	Length (50m)	Link length supported	00h	Not supported
1 7 7		110	Longui (Join)	for 50/125 mm fiber,		That supported
				units of 1 m		
145		1B	Length (62.5m)	Link length supported	00h	Not supported
1.5			20118011 (02.5111)	for 62.5/125 mm		or outported
	1	1	ı	-01 02.0/120 IIIII	J	_1

	1115	JAK				
				fiber, units of 1 m		
146		1B	Length (Copper)	Link length supported for copper, units of 1m	00h	Not supported
	<u> </u>	Device Te	 chnology	1 1111	1	
147	4-7	4b	Transmitter Technol	OgV	0111b	1550nm EML laser
± .,	3	1b	Wavelength Control	<u> </u>	0b	No wavelength control
	2	1b		Cooled Transmitter		Transmitter is cooled
	1	1b	Detector Type			APD Detector
	0	1b	Tunable Transmitter		0b	Transmitter not Tunable
148-		16B	Vendor name	SFP vendor name	"FINISAR	
163				(ASCII) blank padded	CORP. "	
		CDR Sup	port			
164	7	1b	CDR Support for 9.9	95 Gb/s	1b	
	6	1b	CDR Support for 10.		1b	
	5	1b	CDR Support for 10.		1b	
	4	1b	CDR Support for 10.		1b	
	3	1b	CDR Support for 11.	.1 Gb/s	1b	Supported for FTLX versions. Not supported for FTRX versions
	2	1b	Reserved		0b	
	1	1b	Line-side Loopback	Mode Supported	0b	
	0	1b	XFI Loopback Supp		1b	
165- 167		3B	Vendor OUI	SFP vendor IEEE company ID	009065h	IEEE assigned
168-		16B	Vendor PN	Part number provided	"FTRX-3811-	Finisar part number
183				by vendor (ASCII)	3xx "	
184- 185		2B	Vendor rev	Revision level for part number provided by vendor (ASCII)	3030h	Hardware revision level field not used
186- 187		2B	Wavelength	Nominal Laser Wavelength (1/20nm)	xxxxh	15xx.xx nm * (20/nm)
188- 189		2B	Wavelength Tolerance	+/- Wavelength (1/200nm)	14h	0.1nm * (200/nm).
190		1B	Max Case Temp	Maximum Case Temperature	46h	70°C
191		1B	CC_BASE	Check code for Base ID Fields (addresses 128 to 190)	xxh	Calculated check code, low 8 bits of sum of first 64 bytes of Serial ID info.
		1 .		EXTENDED ID FIEL	DS	T
192-19	95	4B	Power Supply Field		1	
192		1B	Maximum Power Di		AFh	= 3500 mW
193	<u> </u>	1B		Power-down (/10mW)	96h	= 1500 mW
194	4-7	4b	Max. Current on +5V		0111b	= 350 mA
10-	0-3	4b		3V Supply (/100mA)	0100b	= 400 mA
195	4-7	4b		8V Supply (/100mA)	1000b	= 800 mA (actual is 750mA)
105	0-3	4b	Max. Current on -5V		0000b	Not used
196- 211		16B	Vendor SN	Serial number provided by vendor (ASCII) blank padded	e.g., "A000000"	Encoded serial number
212- 217		6B	Date code	Vendor's manufacturing date	e.g., "030106"	yymmdd
218- 219		2B	Lot Code	Vendor lot code	2020h	May be blank

			Diagnostic Monitor	ring / Variable Power Su	Diagnostic Monitoring / Variable Power Supply / Special Function Support				
220	7	1b	Reserved		0b	Reserved			
	6	1b	Reserved		0b	Reserved			
	5	1b	Reserved		0b	Reserved			
	4	1b	FEC BER Support		0b	No BER Support			
	3	1b	Received power mea	asurement type	1b	Average Power			
	2	1b	Reserved			Reserved			
	1-0	2b	Reserved		00b	Will be Reserved			
			<b>Enhanced Options</b>						
221	7	1b Module supports VPS		PS	0b	Not supported			
	6	1b	Soft TX_DISABLE		1b	Soft TX_DISABLE is supported			
	5	1b	Soft PWR_DWN		1b	Soft PWR_DWN is supported			
	4	1b	Supports VPS LV R	egulator Mode	0b	We are not supporting VPS			
	3	1b	Supports VPS Bypas	ssed Regulator Mode	0b	We are not supporting VPS			
	2	1b	Active FEC Control		0b	Not supported.			
	1	1b	Wavelength Tunabil	ity	0b	Not supported			
	0	1b	Optional CMU Mod	e	0b	Not supported			
222	4-7	4b	Aux A/D Input 1		0100b	TEC Temperature Monitor on			
						Aux A/D 1			
	0-3	4b	Aux A/D Input 2		0110b	+5V Supply Monitor on Aux A/D 2			
223		1B	CC_EXT	Check code for the Extended ID Fields (addresses 192 to 222)	xxh	Calculated check code. Low 8 bits of sum of Bytes 192-222			

**Customer Specific Fields** 

Data Addr	Size (Bytes)	Field Name	Description of Field	Value	Value Meaning				
ess									
224- 255	32	TBD	TBD	All 00h at present					

Upper Memory Map: I2C Addr: A0h, Table 2

Customer Writable EEPROM. Writable with correct host password entry. Always readable.

Upper Memory Map: I2C Addr: A0h, Table 3

Lower Memory Map: I2C Addr: A0h, Bytes 0 – 127.

Byte Addr ess	Bit Addr ess	Type Code	Size (Bytes) or (bits)	Field Name	Description of Field	Value	Value Meaning
0		NVE	1B	Identifier	Type of serial transceiver	06h	XFP
		Signal	Conditioner	r Control			
1	4-7	VH	4b	Data Rate Control		xxxxb	Ignore for Intel or Gennum
	3	VHW	1b	Reserved	Reserved		Reserved
	2	VH	1b	Line-side Loopback Control loopback of optical input to		0b	Not supported, ignore write, read back as 0b
	1	VH	1b	XFI Loopback Control. 1 electrical input to electrical		xb	Power up to 0b
	0	VH	1b	Signal Conditioner Contro	ol .	0b	Normal REFCLK mode only supported. Ignore write, read back as 0b

2-3			hresholds	Tama III ah Alama	Thurshald for alarms	10069	+78 °C
2-3		NVE	2B	Temp High Alarm	Threshold for alarm	19968	
4-5	-	NVE	2B	T 1 11	Threshold for alarm	d 62208	(assumes 3°C accuracy)
4-3		NVE	2 <b>B</b>	Temp Low Alarm	I hreshold for alarm	d	(assumes 3°C accuracy)
6-7	-	NVE	2B	Temp High Warning	Threshold for warn	19200	+75 °C
0-7		NVE	Z <b>D</b>	Temp Figh Warning	Threshold for warm		
8-9		NVE	2B	Temp Low Warning	Threshold for warn	d 62976	(assumes 5°C accuracy) -10 °C
0-9		NVE	ZD	Temp Low warning	Threshold for warm	d	(assumes 5°C accuracy)
10-		R	8B	Reserved	Reserved	All	Ignore write; return 00h on
17		IX.	оъ	Reserved	Reserved	00h	read.
18-		NVE	2B	Bias High Alarm	Threshold for alarm	65500	131 mA
19		ITTE	20	Dias High Marin	Threshold for diarm	d	(assumes 0.3mA accuracy)
20-		NVE	2B	Bias Low Alarm	Threshold for alarm	15000	30 mA
21		ITTE	20	Dias Low Marin	Threshold for alarm	d	(assumes 0.3mA accuracy)
22-		NVE	2B	Bias High Warning	Threshold for warn	60500	121 mA
23		ITTE	20	Dias High Warning	Threshold for warm	d	(assumes 0.3mA accuracy)
24-		NVE	2B	Bias Low Warning	Threshold for warn	17500	35 mA
25		ITTE	20	Dias Low Warning	Threshold for warm	d	(assumes 0.3mA accuracy)
26-		NVE	2B	TX Power High Alarm	Threshold for alarm	35481	+15.5 dBm
27		ITTE	20	17X T OWEI THIGH 7 Marini	Threshold for alarm	d	(assumes a 2dB accuracy)
28-		NVE	2B	TX Power Low Alarm	Threshold for alarm	3162d	-5.0 dBm
29		1112	20	171 OWEL DOW THAIN	Threshold for didini	31024	(assumes 1.5dB accuracy)
30-		NVE	2B	TX Power High Warning	Threshold for warn	31623	+ 15 dB (assumes 2dB
31		1112	20	171 0 wei ingh wanning	Threshold for warm	d	accuracy)
32-		NVE	2B	TX Power Low Warning	Threshold for warn	3548d	-4.5 dBm
33		1,,5		Title wer new warming	Threshold for warm	33.104	(assumes 1.5dB accuracy)
34-		NVE	2B	RX Power High Alarm	Threshold for alarm	3162d	-5.0 dBm
35		1,,5		Tarrower riight rhaim	Threshold for ulum	31024	(assumes 1.5dB accuracy)
		) IX /ID	an	D D 1 11	TD1 1 11 C 1	27.1	**
36-		NVE	2B	Rx Power Low Alarm	Threshold for alarm	25d	-16dBm (assumes 1.5dB
37		) IX /ID	an	DVD III I	TD1 1 11 C	20101	accuracy)
38-		NVE	2B	RX Power High	Threshold for warn	2818d	-5.5 dBm
39		NIXE	AD.	Warning	T11.1.1.C	20.1	(assumes 1.5dB accuracy)
40-		NVE	2B	RX Power Low Warning	Threshold for warn	28d	-15.5 dBm
41		NIXE	AD.	ATIVATICAL ALCON	T11.1.C1	11520	(assumes 1.5dB accuracy) 45°C
42- 43		NVE	2B	AUX1 High Alarm	Threshold for alarm		
44-		NVE	2B	AUX1Low Alarm	Threshold for alarm	d 5120d	(assumes 0.5°C accuracy) 25°C
44-		NVE	Z <b>D</b>	AUXILOW Alarin	Threshold for alarm	3120d	(assumes 0.5°C accuracy)
46-		NVE	2B	AUX1 High Warning	Threshold for warn	10240	40°C
47		INVE	2D	AOAI Iligii Waliilig	Threshold for warm	d	(assumes 0.5°C accuracy)
48-		NVE	2B	AUX1Low Warning	Threshold for warn	6144d	30°C
49	1	14 4 17	20	AUXILOW Walling	Threshold for walli	01 <del>44</del> u	(assumes 0.5°C accuracy)
50-	+	NVE	2B	AUX2 High Alarm	Threshold for alarm	55000	5.50 V
51	1	14 4 15	20	71072 High Alann	The short for araill	d	3.30 ¥
52-	+	NVE	2B	AUX2 Low Alarm	Threshold for alarm	45000	4.50 V
53	1	14 4 15	20	ACAZ LOW AIGHI	Threshold for alarill	d	₹.50 ¥
54-	+	NVE	2B	AUX2 High Warning	Threshold for warn	53000	5.30 V
55	1	1,17	2.0	110712 High Warning	The short for warm	d	(assumes 50mV accuracy)
56-	+	NVE	2B	AUX2 Low Warning	Threshold for warn	47000	4.70 V
57	1	1,,,,		110112 Dow Walling	Threshold for warm	d	(assumes 50mV accuracy)
58	7-4	NVE	4b	VCC2 min with Reg	Min. VCC2 with	0000b	VPS not supported. Return
	′ - ¯	1,,,,		, CC2 mm with Reg	Regulator	00000	0000b=1.8V
	3-0	VH	4b	VCC2 Host	VCC2 Supplied by	xxxxb	Written and read by host.
	] 3-0	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	10	VCC2 1103t	Host	ΛΛΛΛΟ	Ignore and return 0000b
		1	<u> </u>	L	11031	1	1511010 and 10turn 00000

59	7-4	VH	4b	VCC2 min in Bypass	Min. VCC2 in	0000b	VPS not supported. Return 0000b=1.8V
	3-1	VH	3b	Reserved	Regulator Reserved	000b	Ignore write, return 000b
	0	VH	1b	VPS Bypass Control	Turns VPS Bypass	0b	VPS not supported. Ignore
	U	VII	10	V13 Bypass Control	on or off	Ob	write, return 0b
60-		R	10B	Reserved	Reserved	All	Ignore write; return 00h on
69						00h	read.
70		VH	1B	Acceptable BER	For FEC systems	00h	Not Supp. Ignore W, return 00h.
71		VH	1B	Actual BER	For FEC systems	00h	Not Supp. Ignore W, return 00h.
72- 73		VH	2B	Wavelength Set	Host wavelength set	0000h	Not Supp. Ignore write, return 0000h.
74- 75		VH	2B	Wavelength Error	Returned wavelength error	0000h	Not Supp., return 0000h.
76		VH	1B	FEC Amplitude Adj	Set Amp Slice	00h	Not Supp. Ignore W, return 00h.
77		VH	1B	FEC Phase Adj	Set Phase Slice	00h	Not Supp. Ignore W, return 00h.
78- 79		R	2B	Reserved	Reserved	All 00h	Ignore write; return 00h on read.
80-		VHR	8B	Latched Interrupt Flag	Individual bits set	xb	Latched on flag condition.
87				Bits	per XFPMSA		Cleared on host read. (See MSA)
88- 95		VH	8B	Interrupt Masking Bits	Individual bits set per XFPMSA	0b	Set and readable by host. Cleared at power-up or reset
96- 97		VHR	2B	Temperature Readout	MSB in First Byte	xxxxh	Reported Temperature Value in Units Defined in MSA
98- 99		VHR	2B	Reserved A/D Chan.	Reserved	0000h	Report 0000h on read.
100- 101		VHR	2B	TX Bias A/D Chan	MSB in First Byte	xxxxh	Reported TX Bias Value in Units Defined in MSA
102- 103		VHR	2B	TX Power A/D Chan	MSB in First Byte	xxxxh	Reported TX Power Value in Units Defined in MSA
104- 105		VHR	2B	RX Power A/D Chan	MSB in First Byte	xxxxh	Reported RX Power Value in Units Defined in MSA
106- 107		VHR	2B	AUX1 A/D Chan	MSB in First Byte	xxxxh	Report TEC temperature
108- 109		VHR	2B	AUX2 A/D Chan	MSB in First Byte	xxxxh	Report +5V Supply voltage.
		Signa	l Condition	er Control	1		•
110	7	VHR	1b	TX Disable State	Reports TXDIS	xb	Ignore writes
	6	VH	1b	Soft TX Disable	OR's with input pin	0b	Read and write by host, power up and reset to 0b
	5	VHR	1b	MOD-NR State	Reports MOD_NR	xb	Ignore writes
	4	VHR	1b	P_Down State	Reports P_Down	xb	Ignore writes
	3	VH	1b	Soft P_Down	OR's with input pin	0b	Read and write by host, power up and reset to 0b, Do not reset
	2	VHR	1b	Interrupt State	Reports Interrupt	xb	Ignore writes
	1	VHR	1b	LOS State	Reports LOS	xb	Ignore writes
	0	VHR	1b	Data Not Ready	Set low when A/D ready.	xb	Ignore writes

111	7	VH	1b	TX_NR	Identifies TX_NR	xb	Ignore writes. Set if TX CDR loss of lock.
	6	VH	1b	TX_Fault	Identifies TX_Fault	0b	Ignore writes. Conditions for set TBD. Set at 0b for now.
	5	VH	1b	TX_CDR not locked	Identifies TX_LOL	xb	Ignore writes.
	4	VH	1b	TX_NR	Identifies TX_NR	xb	Ignore writes. Set if RX CDR loss of lock.
	3	VH	1b	TX_CDR not locked	Identifies TX_LOL	xb	Ignore writes.
	2-0	R	3b	Reserved	Reserved	000b	Ignore writes, report 000b.
112- 117		R	6B	Reserved			Ignore writes, report 00h.
118	7-1	R	7b	Reserved	Reserved	0b	Ignore writes, report 0000000b.
	0	VH	1b	Error Checking	Switches PEC	xb	Host sets to 1b to enable packet error checking. Power up and reset to 0b.
119- 122		VH	4B	New Password entry.	Host may enter to change Password	00h	Changes host password value if current correct password entered in 123-126. Power up and reset to 00000000h.
123- 126		VH	4B	Password entry.	Host may enter Password to Access Protected Area	00h	Allows Write Access to Customer EEPROM. Power up and reset to 00000000h.
127		VH	1B	Table Select	Host enters to select upper memory table	01h	Defines Table for subsequent upper memory map reads. Defaults to 01h on Power and reset.

#### Upper Memory Map: I2C Addr: A0h, Table 1 – Serial ID Section – Read only by Host, all Nonvolatile

Byte Addr ess	Bit Addr ess	Size (Bytes) or (bits)	Field Name	Description of Field	Value	Value Meaning
128		1B	Identifier	Type of serial transceiver	06h	XFP
129	6-7	2b	Ext. Identifier - Module Power Class	Defines Module Power Class	10b	Indicates Power Dissipation <3.5W under all specified operating conditions.
129	5	1b	Ext. Identifier - CDR	Identifies presence of a CDR	0b	Module contains CDR function.
129	4	1b	Ext. Identifier - REFCLK	Identifies need for REFCLK	1b	Module does not need REFCLK
129	3	1b	CLEI Code Present	Indicates if CLEI Code is present in Table 2	0b	To be supported on a customer basis. Value is 1b if CLEI Code is present in Table 2
129	0-2	3b	Ext. Identifier - Reserved	Reserved	000ь	
130		1B	Connector	Code for connector type	07h	LC
131-13	38	8 B		or electronic compatibil	ity or optical	compatibility
			Ethernet Compliance	Codes		
131	7	1b	10GBASE-SR		0b	
	6	1b	10GBASE-LR		0b	
	5	1b	10GBASE-ER		0b	

		<u> JAK</u>					
	4	1b	Reserved	0b			
	3	1b	10GBASE-SW	0b			
	2	1b	10GBASE-LW	0b			
	1	1b	10GBASE-EW	0b			
	0	1b	Reserved	0b			
		10 Gigabit	Fibre Channel Compliance Codes	<u></u>			
132	7	1b	1200-MX-SN-I	0b			
	6	1b	1200-SM-LL-L	0b			
	5	1b	Extended reach 1550nm	0b			
	4	1b	Intermediate reach 1310nm	0b			
	3	1b	Reserved	0b			
	2	1b	Reserved	0b			
	1	1b	Reserved	0b			
	0	1b	Reserved	0b			
			t Copper Link Compliance Codes	00			
133	7	1b	Reserved	0b			
133	6	1b	Reserved	0b			
	5	1b	Reserved	0b			
	4	1b	Reserved	0b			
	3	1b	Reserved	0b			
	2	1b	Reserved	0b			
	1	1b	Reserved	0b			
	0	1b	Reserved	0b			
	U		eed Link Compliance Codes	1 00			
134	7	1b	1000BASE-SX/1xFC MMF	0b			
134	6	1b	1000BASE-LX/1xFC SMF	0b			
	5	1b	2xFC MMF	0b			
	4	1b	2xFC SMF	0b			
	3	1b	OC-48-SR	0b			
	2	1b	OC-48-IR	0b			
	1	1b	OC-48-LR	0b			
	0	1b	Reserved	0b			
	U		DH Interconnect Link Compliance Codes	1 00			
135	7	1b	I-64.1r	0b			
133	6	1b	I-64.1	0b			
	5	1b	I-64.2r	0b			
	4	1b	I-64.2	0b			
	3	1b	I-64.3	0b			
	2	1b	I-64.5	0b			
	1	1b	Reserved	0b			
	0	1b	Reserved	0b			
	U		DH Short Haul Link Compliance Codes	1 00	1		
136	7	1b	S-64.1	0b			
150	6	1b	S-64.2a	0b			
	5	1b	S-64.2b	0b			
	4	1b	S-64.3a	0b			
	3	1b	S-64.3b	0b			
	2	1b	S-64.5a	0b			
	1	1b	S-64.5b	0b			
	0	1b	Reserved	0b			
	U			Ι UU			
SONET/SDH Long Haul Link Compliance Codes							
137	6	1b 1b	L-64.1 L-64.2a	0b 0b			
		1b		0b			
	5		L-64.2b				
<u> </u>	4	1b	L-64.2c	0b			

		DAK				
	3	1b	L-64.3		0b	
	2	1b	G.959.1 P1L1-2D2		1b	
	1	1b	Reserved		0b	
	0	1b	Reserved		0b	
	_			ink Compliance Codes		1
138	7	1b	V-64.2a		0b	
130	6	1b	V-64.2b		0b	
	5	1b	V-64.3		0b	
	4	1b	Reserved		0b	
	3	1b	Reserved		0b	
	2	1b	Reserved		0b	
	1	1b	Reserved		0b	
	0	1b	Reserved		0b	
	U		Reserved		UU	
120		Encoding	(AD/CCD		11	100E/100E0 G 1
139	7	1b	64B/66B		1b	10GE/10GFC Coding
	6	1b	8B/10B		1b	Not used in standards but is
				ONET C. 11.1		supported
	5	1b	SONET Scrambled		1b	OC-192 Coding
	4	1b	NRZ		1b	NRZ only supported
	3	1b	RZ		0b	
	2-0	3b	Reserved	T	000b	
140		1B	BR, minimum	Minimum Supported Bitrate (/100Mb)	63h	9900 Mbps
141		1B	BR, maximum	Maximum Supported Bitrate (/100Mb)	6Fh	11100 Mbps
142		1B	Length (SMF) – km	Link length supported for 9/125 um fiber, units of km	50h	80km
143		1B	Length (E-50um)	Link length supported for extended bandwidth MMF, units of 2 m	00h	Not supported
144		1B	Length (50m)	Link length supported for 50/125 mm fiber, units of 1 m	00h	Not supported
145		1B	Length (62.5m)	Link length supported for 62.5/125 mm fiber, units of 1 m	00h	Not supported
146		1B	Length (Copper)	Link length supported for copper, units of 1m	00h	Not supported
		Device Tec				
147	4-7	4b	Transmitter Technolo	ogy	0111b	1550nm EML laser
	3	1b	Wavelength Control		0b	No wavelength control
	2	1b	Cooled Transmitter		1b	Transmitter is cooled
	1	1b	Detector Type	<del></del>	1b	APD Detector
	0	1b	Tunable Transmitter		0b	Transmitter not Tunable
148- 163		16B	Vendor name	SFP vendor name (ASCII) blank padded	"FINISAR CORP. "	
		CDR Supp	ort	, , , <u>F</u>		•
164	7	1b	CDR Support for 9.9	5 Gb/s	1b	
10.	6	1b	CDR Support for 10.		1b	
	5	1b	CDR Support for 10.		1b	+
	4	1b	CDR Support for 10.		1b	
	3	1b	CDR Support for 11.		1b	Supported on FTLX version, not supported on FTRJ version
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		<u> </u>			_	<u></u>	
	2	1b	Reserved		0b		
	1	1b	Line-side Loopback	Mode Supported	0b		
	0	1b	XFI Loopback Suppo	orted	1b		
165-		3B	Vendor OUI	SFP vendor IEEE	009065h	IEEE assigned	
167		1.60	** 1 P)*	company ID	(/ETED X 2011		
168- 183		16B	Vendor PN	Part number provided by vendor (ASCII)	"FTRX-3811- S3xx "	Finisar part number	
184-		2B	Vendor rev	Revision level for part	3030h	Hardware revision level field not	
185			vendor rev	number provided by vendor (ASCII)	303011	used	
186-		2B	Wavelength	Nominal Laser	xxxxh	15xx.xx nm * (20/nm)	
187		2.6	wavelength	Wavelength (1/20nm)	AAAAII	1344.44 IIII (20/IIII)	
188-		2B	Wavelength	+/- Wavelength	14h	0.1nm * (200/nm).	
189			Tolerance	(1/200nm)		(2007)	
190		1B	Max Case Temp	Maximum Case	46h	70°C	
				Temperature			
191		1B	CC_BASE	Check code for Base	xxh	Calculated check code, low 8 bits	
				ID Fields (addresses		of sum of first 64 bytes of Serial	
				128 to 190)		ID info.	
		•		EXTENDED ID FIEL	DS		
192-19	95	4B	Power Supply Field	s			
192		1B	Maximum Power Dis	ssipation (/20mW)	AFh	= 3500 mW	
193		1B		Power-down (/10mW)	96h	= 1500 mW	
194	4-7	4b	Max. Current on +5\	1 /	0111b	= 350 mA	
-, .	0-3	4b	Max. Current on +3.	11 7	0100b	= 400  mA	
195	4-7	4b	Max. Current on +1.8		1000b	= 800 mA (actual is 750mA)	
173	0-3	4b	Max. Current on -5V		0000b	Not used	
196-	0-3	16B	Vendor SN	Serial number	e.g.,	Encoded serial number	
211		ТОБ	vendor 51v	provided by vendor (ASCII) blank padded	"A000000"	Encoded serial number	
212- 217		6B	Date code	Vendor's manufacturing date	e.g., "030106"	yymmdd	
218- 219		2B	Lot Code	Vendor lot code	2020h	May be blank	
219			Diagnostic Monitor	ing / Variabla Powar Su	ıpply / Special Function Support		
220	7	1b	Reserved	ing / variable i ower bu	0b	Reserved	
220	6	1b			0b	Reserved	
	5	1b	Reserved		0b	Reserved	
			Reserved			Reserved	
	4	1b	FEC BER Support	correct to the correc	0b 1b	No BER Support	
	3	1b	Received power mea	isurement type		Average Power	
	2	1b	Reserved		0b	Reserved	
	1-0	2b	Reserved		00b	Will be Reserved	
	1	1	<b>Enhanced Options</b>		T		
221	7	1b	Module supports VP	S	0b	Not supported	
	6	1b	Soft TX_DISABLE		1b	Soft TX_DISABLE is supported	
	5	1b	Soft PWR_DWN	1. 37.1	1b	Soft PWR_DWN is supported	
	4	1b	Supports VPS LV Re		0b	We are not supporting VPS	
	3	1b	Supports VPS Bypas	ssed Regulator Mode	0b	We are not supporting VPS	
	2	1b	Active FEC Control		1b	Supported.	
	1	1b	Wavelength Tunabili	ity	0b	Not supported	
	0	1b	Optional CMU Mode	e	0b	Not supported	
	-						

	0-3	4b	Aux A/D Input 2		0110b	+5V Supply Monitor on Aux A/D
223		1B	CC_EXT	Check code for the Extended ID Fields	xxh	Calculated check code. Low 8 bits of sum of Bytes 192-222
				(addresses 192 to 222)		-

**Customer Specific Fields** 

	Customer Specific Freign									
Data Addres s	Size (Byt es)	Field Name	Description of Field	Value	Value Meaning					
224- 255	32	Vendor Specific EEPROM	TBD	All 00h at present						

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 Upper Memory Map: I2C Addr: A0h, Table 2

Customer Writable EEPROM. Writable with correct host password entry. Always readable.

#### **Product: FTLX8511D3**

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1 2

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# FINISAR° Lower Memory Map: I2C Addr: A0h, Bytes 0 – 127.

Byte Addr	Bit Addr	Type Code	Size (Bytes) or	Field Name	Description of Field	Value	Value Meaning
ess	ess	Coue	(bits)				
0		NVE	1B	Identifier	Type of serial	06h	XFP
					transceiver		
		Signal	Conditioner	Control			
1	4-7	VH	4b	Data Rate Control		0000h	
	3	VHW	1b	Reserved		0h	Reserved
	2	VH	1b	Line-side Loopback Control. 1b actuates loopback of optical input to optical output.		Oh	Follow MSA definition.  Power up or reset to 0b = no optical loopback.
	1	VH	1b	XFI Loopback Control. 1b actuates loopback of electrical input to electrical output		0h	Power up or reset to 0b = no optical loopback.
	0	VH	1b	Signal Conditioner Contro	1	Oh	The module should default to asynchronous reference clock.

	Flag T	Thresholo	ds			
2-3	NVE	2B	Temp High Alarm	Threshold for alarm	19968	+78 °C
					b	(assumes 3°C accuracy)
4-5	NVE	2B	Temp Low Alarm	Threshold for alarm	63488	-8 °C
					b	(assumes 3°C accuracy)
6-7	NVE	2B	Temp High Warning	Threshold for warn	18688	+73 °C
					b	(assumes 5°C accuracy)
8-9	NVE	NVE 2B Temp Low Warning Threshold for warn		Threshold for warn	64768	-3 °C
					b	(assumes 5°C accuracy)
10-	R	8B	Reserved	Reserved		Ignore write; return 00h on
17						read.
18-	NVE	2B	Bias High Alarm	Threshold for alarm	6000b	12 mA
19						(assumes 0.3mA accuracy)
20-	NVE	2B	Bias Low Alarm	Threshold for alarm	2000b	4 mA
21						(assumes 0.3mA accuracy)
22-	NVE	2B	Bias High Warning	Threshold for warn	5500b	11 mA
23						(assumes 0.3mA accuracy)
24-	NVE	2B	Bias Low Warning	Threshold for warn	2500b	5 mA
25						(assumes 0.3mA accuracy)
26-	NVE	2B	TX Power High Alarm	Threshold for alarm	15849	+ 2dBm
27					b	(assumes 2dB accuracy)
28-	NVE	2B	TX Power Low Alarm	Threshold for alarm	1995b	-7 dBm (assumes 2 dB
29						accuracy)
30-	NVE	2B	TX Power High Warning	Threshold for warn	12589	+1 dBm
31					b	(assumes 2dB accuracy)
32-	NVE	2B	TX Power Low Warning	Threshold for warn	2512b	-6 dBm
33						(assumes 2 dB accuracy)
34-	NVE	2B	RX Power High Alarm	Threshold for alarm	17783	+ 2.5 dBm
35					b	
36-	NVE	2B	RX Power Low Alarm	Threshold for alarm	275b	-15.6 dBm
37						
38-	NVE	2B	RX Power High	Threshold for warn	15849	+2 dBm
39			Warning		b	
40-	NVE	2B	RX Power Low Warning	Threshold for warn	347b	-14.6 dBm
41						
42-	NVE	2B	AUX1 High Alarm	Threshold for alarm	36300	3.63V
43					b	

		JAI					
44- 45		NVE	2B	AUX1Low Alarm	Threshold for alarm	30000 h	3V
46- 47		NVE	2B	AUX1 High Warning	Threshold for warn	35000 h	3.5V
48- 49		NVE	2B	AUX1Low Warning	Threshold for warn	31000 h	3.1V
50- 51		NVE	2B	AUX2 High Alarm Threshold for alarm		0000h	
52- 53		NVE	2B	AUX2 Low Alarm	Threshold for alarm	0000h	
54- 55		NVE	2B	AUX2 High Warning	Threshold for warn	0000h	
56- 57		NVE	2B	AUX2 Low Warning	Threshold for warn	0000h	
31				0	ptional VPS Contr	ı ol Regis	ıters
58	7-4	NVE	4b	VCC2 min with Reg	Min. VCC2 with Regulator	0000h	VPS not supported. Return 0000b=1.8V
	3-0	VH	4b	VCC2 Host	VCC2 Supplied by Host	0000h	Written and read by host. Ignore and return 0000b
59	7-4	VH	4b	VCC2 min in Bypass	Min. VCC2 in Regulator	0000h	VPS not supported. Return 0000b=1.8V
	3-1	VH	3b	Reserved	Reserved	000h	Reserved
	0	VH	1b	Regulator Bypass Mode	Turns VPS Bypass on or off	Oh	VPS not supported. Value shall be set to "0",
60- 69		R	10B	Reserved	Reserved	00h	0b=turns VPS Bypass off Reserved
70		VH	1B	Acceptable BER	For FEC systems	00h	Not required
71		VH	1B	Actual BER	For FEC systems	00h	Not required
72- 73		VH	2B	Wavelength Set for tunable laser	Host wavelength set	0000h	Not required
74- 75		VH	2B	Wavelength Error	Returned wavelength error	0000h	Not required
76		VH	1B	FEC Amplitude Adj	Set Amp Slice	00h	Not required
77		VH	1B	FEC Phase Adj	Set Phase Slice	00h	Not required
78- 79		R	2B	Reserved	Reserved	00h	Not required
80- 87		VHR	8B	Latched Interrupt Flag Bits	Individual bits set per XFPMSA	xh	See XFP MSA 4.0 Table 39, the latched flags are cleared on the read of the corresponding byte, as described in XFP MSA.
88- 95		VH	8B	Interrupt Masking Bits	Individual bits set per XFPMSA	Oh	See XFP MSA 4.0 Table 40, mask bits shall be non-volatile and power-up in the unmasked state (i.e. bits set to 0).
96- 97		VHR	2B	Temperature Readout	MSB in First Byte	xxxxh	Reported Temperature Value in Units Defined in XFP MSA 4.0
				†	1	00001	
98- 99		VHR	2B	Reserved A/D Chan.	Reserved	0000h	Reserved
98-		VHR VHR	2B 2B	Reserved A/D Chan.  TX Bias A/D Chan	MSB in First Byte	xxxxh	Reported TX Bias Value in Units Defined in MSA

	111	<u> </u>				1	TT   P   1   2   2
103		171TD	ap.	DV D + 75 CI	MOD ' E' E		in Units Defined in MSA
104- 105		VHR	2B	RX Power A/D Chan	MSB in First Byte	xxxxh	Reported RX Power Value in Units Defined in MSA
106- 107		VHR	2B	AUX1 A/D Chan	MSB in First Byte	0000h	Report TEC temperature is not required
108- 109		VHR	2B	AUX2 A/D Chan	MSB in First Byte	0000h	Report +5V Supply voltage, is not required.
		Gener	al Control	Status Bits			
110	7	VHR	1b	TX Disable State	Reports TXDIS	xh	Ignore writes. 0b = Tx ON; 1b = Tx OFF
	6	VH	1b	Soft TX Disable	OR's with input pin	Oh	This bit is OR'ed with the Tx Dis hard pin. Writing "1" disables the laser. Default power up value "0"
	5	VHR	1b	MOD-NR State	Reports MOD_NR	xh	Reports state of MOD_NR hard pin, updated within 100ms of change on pin. 0b = module ready 1b = module not ready
	4	VHR	1b	P_Down State	Reports P_Down	xh	Reports state of P-down hard pin, 0b = power on, normal operation 1b=power down
	3	VH	1b	Soft P_Down	OR's with input pin	Oh	"Not required", if module vendor implements the feature, the register state shall not affect the P_down state of the module with hard pin control
	2	VHR	1b	Interrupt State	Reports Interrupt	xh	Reports state of Interrupt hard pin, "0" indicates possible module operational fault or a status critical to the host system
	1	VHR	1b	Rx_LOS State	Reports LOS	xh	Reports state of Rx_LOS hard pin. Updated within 100ms of change on pin. 0=Rx_LOS is in deasserted mode 1=Rx_LOS is asserted
	0	VHR	1b	Data Not Ready	Set low when A/D ready.	xh	Indicates transceiver has achieved, power up and A/D data ready. The Data _Not_Ready bit is high during module power up and prior to the first valid A/D reading. Once the first valid A/D reading occurs, the bit is set low until the device is powered down. The bit must be set low within 1 s of power-up
111	7	VH	1b	TX_NR	Identifies TX_NR	xh	Identifies Not ready condition as specific to the Tx path

	6	VH	1b	TX_Fault	Identifies TX_Fault	Oh	Identifies laser fault condition, generated by laser safety system.  0=Tx normal  1=Tx Fault
	5	VH	1b	TX_CDR not locked	Identifies TX_LOL	xh	Identifies Loss of Lock in Tx path CDR.
	4	VH	1b	RX_NR	Identifies RX_NR	xh	Set if RX CDR loss of lock.
	3	VH	1b	RX_CDR not locked	Identifies RX_LOL	xh	Identifies loss of lock in Rx path CDR
	2-0	R	3b	Reserved	Reserved	000h	Reserved
112- 117		R	6B	Reserved		00h	Reserved
118	7-1	R	7b	Reserved	Reserved	00000 00h	Reserved
	0	VH	1b	Error Checking	Switches Packet Error Checking	Oh	Value shall be set at 0b=disable packet error checking
119- 122		VH	4B	New Password entry.	Host may enter to change Password	00h	Change host password value if current correct password entered in 123-126. Power-up and reset to 000000000h.
123- 126		VH	4B	Password entry.	Host may enter Password to Access Protected Area	00h	Host may enter password to Access Protected Area.
127		VH	1B	Table Select	Host enters to select upper memory table	01h	Defines Table for subsequent upper memory map reads. Defaults to 01h on Power and reset.

#### Upper Memory Map: I2C Addr: A0h, Table 1 - Serial ID Section - Read only by Host, all Nonvolatile

Byte Addr	Bit Addr	Size (Bytes) or	Field Name	Description of Field	Value	Value Meaning
ess	ess	(bits)	T.1	TD 6 : 1	0.61	YZED
128		1B	Identifier	Type of serial transceiver	06h	XFP
Exte	nded I	dentifier				
129	6-7	2b	Ext. Identifier - Module Power Class	Defines Module Power Class	XXh = 00	Defines module power class 00= power level 1 (1.5W max) 01= power level 2 (2.5W max) 10= power level 3 (3.5W max) 11 = power level 4 (4.5W max)
129	5	1b	Ext. Identifier - CDR	Identifies presence of a CDR	Oh	Module contains CDR function.
129	4	1b	Ext. Identifier - REFCLK	Identifies need for REFCLK	1h	Identifies need for REFCLK. 0=Synchronous Ref Clock input required 1=Synchronous Ref Clock input not required.

		DAK				
129	3	1b	CLEI Code Present	Indicates if CLEI Code is present in	Oh	Indicate if CLEI code is present in Page 02h, 1b = CLEI code is
				Table 2		present in page 02h
129	0-2	3b	Ext. Identifier - Reserved	Reserved	000h	Reserved
130		1B	Connector	Code for connector type	07h	LC
131-1	38	8 B	Transceiver Code fo	or electronic compatib	ility or ontical	 Leomnatihility
131-1	<del></del>		it Ethernet Compliance		mity of optical	Compatibility
131	7	1b	10GBASE-SR	Coucs	1h	1=support, 0=not support
101	6	1b	10GBASE-LR		0h	1=support, 0=not support
	5	1b	10GBASE-ER		Oh	1=support, 0=not support
	4	1b	10GBASE-LRM		Oh	
	3	1b	10GBASE-SW		1h	
	2	1b	10GBASE-LW		0h	
	1	1b	10GBASE-EW		0h	
	0	1b	10GBASE - ZR		Oh	1=support, 0=not support
	•	10 Gigabi	it Fibre Channel Comp	liance Codes	•	
132	7	1b	1200-MX-SN-I		1h	
	6	1b	1200-SM-LL-L		0h	1=support, 0=not support
	5	1b	Extended reach 1550		Oh	
	4	1b	Intermediate reach 1	310nm FP	0h	
	3	1b	Reserved		0h	
	2	1b	Reserved		0h	
	1	1b	Reserved		0h	
	0	1b	Reserved		0h	
			it Copper Link Compli	ance Codes		
133	7	1b	Reserved		0h	
	6	1b	Reserved		0h	
	5	1b	Reserved		0h	
	4	1b	Reserved		0h	
	3	1b	Reserved		0h	
	2	1b	Reserved		0h	
	1	1b	Reserved		0h	
	0	1b	Reserved	0 1	0h	
124	7	Lower Sp	eed Link Compliance	Codes	01:	
134		1b 1b	1000BASE-SX/1xF0 1000BASE-LX/1xF0	ZIMIVIF	0h 0h	
	5	1b	2xFC MMF	SIVIF	Oh	
	4	1b	2xFC MMF		0h	
	3	1b	OC-48-SR		0h	
	2	1b	OC-48-IR		0h	
	1	1b	OC-48-LR		Oh	
	0	1b	Reserved		Oh	
	10		SDH Interconnect Link	Compliance Codes	OII	I
135	7	1b	I-64.1r	compnance codes	0h	
	6	1b	I-64.1 (P111-2D1)		Xh	SR-1, 1=support, 0=no support
	5	1b	I-64.2r		0h	, or FF and a september of
	4	1b	I-64.2		0h	
	3	1b	I-64.3		0h	
	2	1b	I-64.5		0h	
	1	1b	Reserved		0h	
	0	1b	Reserved		0h	
	•		SDH Short Haul Link (	Compliance Codes	·	
136	7	1b	S-64.1	•	0h	

		<u> JAK</u>				
	6	1b	S-64.2a		Oh	
	5	1b	S-64.2b		0h	
	4	1b	S-64.3a		0h	
	3	1b	S-64.3b		0h	
	2	1b	S-64.5a		0h	
	1	1b	S-64.5b		0h	
	0	1b	Reserved		0h	
			DH Long Haul Link (	Compliance Codes		
137	7	1b	L-64.1		0h	
	6	1b	L-64.2a		Oh	
	5	1b	L-64.2b		0h	
	4	1b	L-64.2c		0h	
	3	1b	L-64.3		0h	
	2	1b	Reserved		0h	
	1	1b	Reserved		0h	
	0	1b	Reserved		0h	
	U			Link Compliance Codes	Oli	
138	7	1b	V-64.2a	Emik Compilance Codes	Oh	
150	6	1b	V-64.2b		Oh	+
	5	1b	V-64.3		Oh	+
	4	1b	Reserved		Oh	
	3	1b	Reserved		Oh	
	2	1b	Reserved		Oh	
	1	1b	Reserved		Oh	
	0	1b	Reserved		Oh	
	U	Encoding	Reserved		OII	
139	7	1b	64B/66B		1h	10GE/10GFC Coding
139	6	1b	8B/10B		1h	100E/100FC Coding
	5	1b	SONET Scrambled		1h	OC-192 Coding
	4	1b	NRZ		1h	NRZ only supported
	3	1b	RZ		0h	NKZ only supported
	2-0	3b	Reserved		000b	
140	2-0	1B	BR, minimum	Minimum Supported	Xxh = 63h	9900 Mbps
			ŕ	Bitrate (/100Mb)		•
141		1B	BR, maximum	Maximum Supported Bitrate (/100Mb)	XXh = 4Bh	10500 Mbps
142		1B	Length (SMF) – km	Link length supported for 9/125 um fiber,	XXh	0 km
			Kill	units of km		
143		1B	Length (E-50um)	Link length supported	XXh = 96h	300m
1.0			Zengui (Z coum)	for extended	721211	
				bandwidth MMF,		
				units of 2 m		
144		1B	Length (50m)	Link length supported	XXh = 52h	Upto 300m with 2000 MHz/km
			Zengui (e em)	for 50/125 mm fiber,		ope com war 2000 ming an
				units of 1 m		
145		1B	Length (62.5m)	Link length supported	XXh = 1Ah	Upto 33m with 200 MHz/km
1 15		12	Zengui (oz.om)	for 62.5/125 mm	747411 17411	opto 35 in with 200 Mills kin
				fiber, units of 1 m		
146		1B	Length (Copper)	Link length supported	00h	Not supported
1.0				for copper, units of		sappostes
				1m		
	1	Device Te	chnology		1	
147	4-7	4b	Transmitter Techno	logv	0000h	850 nm VCSEL
- 17	3	1b	Wavelength Control		Oh	No wavelength control
	2	1b	Cooled Transmitter	=	xh	Transmitter is not cooled
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		<u>JAK</u>				
	1	1b	Detector Type		xh	0=PIN Detector
						1=APD Detector
	0	1b	Tunable Transmitte	er	Oh	0=Transmitter not Tunable 1=Transmitter is Tunable
148- 163		16B	Vendor name	SFP vendor name (ASCII) blank padded	"FINISAR CORP."	
		CDR Su	pport	, ,		1
164	7	1b	CDR Support for 9	95 Gb/s	Xh = 1h	Supported
10.	6	1b	CDR Support for 1		Xh = 0h	Not Supported
	5	1b	CDR Support for 1		Xh = 1h	Supported
	4	1b	CDR Support for 1		Xh = 0h	
	3	1b	CDR Support for 1		Xh = 0h	Not supported
	2	1b	Reserved		Xh = 0h	The state of the s
	1	1b	Line-side Loopbacl	Mode Supported	Xh = 0h	
	0	1b	XFI Loopback Sup		Xh = 1h	0=not supported 1=Supported
165-		3B	Vendor OUI	SFP vendor IEEE	XXXXXXXh =	IEEE assigned
167		36	Vendor o'er	company ID	009065h	TEED ussigned
168-		16B	Vendor PN	Part number provided	XXXXh =	Finisar part number
183		102	, endor III	by vendor (ASCII)	FTLX-	Timour part name of
				59 . 5555 51 (5 55 5 55)	8511D3-CS	
184- 185		2B	Vendor rev	Revision level for part number provided by vendor (ASCII)	XXXXh	
186- 187		2B	Wavelength	Nominal Laser Wavelength (1/20nm)	XXXXh = 4268h	850nm * (20/nm) = 17000
188-		2B	Wavelength	+/- Wavelength	XXXXh	Guaranteed range of laser
189			Tolerance	(1/200nm)		wavelength (+/-value) from Nominal Wavelength (wavelength tol = value/200 in nm) = 20nm
190		1B	Max Case Temp	Maximum Case Temperature	46h	70°C
191		1B	CC_BASE	Check code for Base ID Fields (addresses 128 to 190)	xxh	Calculated check code, low 8 bits of sum of first 64 bytes of Serial ID info.
				EXTENDED ID FIEL	LDS	
192-1	95	4B	Power Supply Fiel			
192		1B	Maximum Power D	Dissipation (/20mW)	XXh = 4Bh	Max value is 8 bit value *20mW = 1500mW/20mW= 75
193		1B	Max. Power Diss. I	n Power-down (/10mW)	XXh = 96h	Max value is 8 bit value *10mW = 150mW
194	4-7	4b	Max. Current on +5	SV Supply (/50mA)	XXXXh = 0h	Not used - Max current is 4 bit value*50mA [500mA max]
	0-3 4b Max. Current on -		Max. Current on +3	3.3V Supply (/100mA)	XXh = 4h	Max current is 4 bit value*100mA [500mA max] = 600 mA
195	4-7	4b	Max. Current on +1	.8V Supply (/100mA)	XXh = 00000h	Not used – Max current is 4 bit value*100mA
	0-3	4b	Max. Current on -5	V Supply (-/100mA)	XXh = 0000h	Not used - Max current is 4 bit value*50mA [500mA max]
196- 211		16B	Vendor SN	Serial number provided by vendor (ASCII) blank padded	XXh	Format LLLYYWWSSSS, see Section 0 for more details. The information shall be left justified starting at address 196, with the
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		JAR				unused upper address locations filled by 0x20h (corresponding to the ASC11 space characters)
Date	e Code	(vendor	manufacturing date	<b>e</b> )		
212- 213		2B	Date code - year	Vendors manufacturing date code – year. (00 = 2000) ASCII		
214- 215		2B	Date code - month	Vendors manufacturing date code month		
216- 217		2B	Date code day	Vendor's manufacturing day of month		yymmdd
218- 219		2B	Lot Code	Vendor lot code		Vendor specific lot code, ASCII
Diag	nostic	Monitor	ring / Variable Powe	r Supply / Special F	unction Su	ıpport
220	7	1b	Reserved		0b	Reserved
	6	1b	Reserved		0b	Reserved
	5	1b	Reserved		0b	Reserved
	4	1b	FEC BER Support		0b	No BER Support
	3	1b	Received power mea	asurement type	1b	Average Power. Cisco requires the vendor to always report average power
	2	1b	Reserved		0b	Reserved
	1-0	2b	Reserved		00b	Will be Reserved
Enh	anced	Options,	, Indicated which op	tional enhanced feat	ures are ii	mplemented
221	7	1b	Module supports VP	PS .	0b	Not required
	6	1b	Soft TX_DISABLE		1b	Soft TX_DISABLE is supported
	5	1b	Soft PWR_DWN		1b	Soft PWR_DWN is supported
	4	1b	Supports VPS LV R	egulator Mode	0b	We are not supporting VPS
	3	1b		ssed Regulator Mode	0b	We are not supporting VPS
	2	1b	Active FEC Control		0b	Not supported.
	1	1b	Wavelength Tunabil	ity	0b	Not supported
	0	1b	Optional CMU Mod	·	0b	Not supported
AUX	K Mon	itoring	· •			
222	4-7	4b	Aux A/D Input 1		000h	Not required
	0-3	4b	Aux A/D Input 2		000h	Not required
223		1B	CC_EXT	Check code for the Extended ID Fields (addresses 192 to 222)	xxh	Calculated check code. Low 8 bits of sum of Bytes 192-222
	1	_1		r Specific ID Fields	1	ı

### **Vendor Specific ID Fields**

Data Addr ess	Size (Bytes)	Field Name	Description of Field	Value	Value Meaning
224	1	Reserved			
225	1	Reserved			
226	1	Vendor Specific			

1 2

227- 242	16	Vendor Specific		
243- 251	9	Reserved (9 bytes)		
252- 255	4	4 byte CRC		This is standard Ethernet packet CRC function. Pass it in the entire 28 bytes of the field.

1 2

Table A2h

	Table A2h									
Data Addr	Size (Byte	Field Name	Description of Field	Value	Value Meaning					
128- 137	s) 10	User EEPROM		0	CLEI code 10 characters, alphanumeric represented as ASCII. The CLEI will be provided by Cisco to approved vendors.					
138- 147	10	User EEPROM		0000000000						
148- 151	4	User EEPROM		0000						
152	1	User EEPROM (Temp Range)		01h	Operating (case) temperature range of the device.  00h=unknown or unspecified  01h=COM, commercial -5C  to 70C  02h=EXT, extended -5 to 85C  03h=IND, industrial -40 to 85  C					
153- 160	8	Reserved		00000000h	Reserved. These bytes must be set to 0x0h					
161	1	CC_USER		(Variable)	Check code for the user EEPROM fields from address 128 to 160, inclusive.					
162- 167	6	User EEPROM Read/Write Access Required		000000h	Reserved. These bytes must be set to 0x0h					
168- 169	2	User EEPROM (LBC_SCA LE_NEG40 C)		(Variable)	If -40°C is supported, otherwise 0 if not. Unsigned fixed-point temperature adjustment data for LBC & LBC[0] at -5°C. Byte 168 is MSB. Byte 169 is LSB.					
170- 171	2	User EEPROM (LBC_SCA LE_NEG5C )		(Variable)	Unsigned fixed-point temperature adjustment data for LBC & LBC[0] at -5°C. Byte 170 is MSB. Byte 171 is LSB.					
172-	2	User		(Variable)	Unsigned fixed-point					

173		EEPROM (LBC_SCA LE_20C)		temperature adjustment data for LBC & LBC[0] at 20°C. Byte 172 is MSB. Byte 173 is LSB
174- 175	2	User EEPROM (LBC_SCA LE_45C)	(Variable)	Unsigned fixed-point temperature adjustment data for LBC & LBC[0] at 45°C. Byte 174 is MSB. Byte 175 is LSB
176- 177	2	User EEPROM (LBC_SCA LE_70C)	(Variable)	Unsigned fixed-point temperature adjustment data for LBC & LBC[0] at 70°C. Byte 176 is MSB. Byte 177 is LSB
178- 179	2	User EEPROM (LBC_SCA LE_85C)	(Variable)	If 85°C is supported, otherwise 0 if not. Unsigned fixed-point temperature adjustment data for LBC & LBC[0] at 85°C. Byte 178 is MSB. Byte 179 is LSB.
180- 181	2	User EEPROM (TEMP[0])	(Variable)	This is the value of the internal transceiver temperature measured at BOL (time of manufacturing) and under nominal conditions.  Represented as 16 bit, signed two's complement value in increments of 1/256 degrees Celsius. Accuracy shall be within +/-3°C
182-183	2	User EEPROM (LBC[0])	(Variable)	This is the value of LBC in uA measured at BOL (time of manufacturing) and under nominal conditions at transceiver temperature of TEMP[0]. Stored as a 16 bit unsigned integer with current defined as full 16 bit value (0-65525), with LSB equal to 2uA.
184- 185	2	User EEPROM (OPT[0])	(Variable)	This is the value of the Tx output power measured at BOL (time of manufacturing) and under nominal conditions. Stored as full 16 bit value (0-65535) with the LSB equal to 0.1uW. This yields a total measurement range of 0 to 6.5525mW (~-40 to +8.2 dBm). Accuracy shall be within +/-1dB.
186	1	User EEPROM Read/Write	0	Reserved
		Access required		

		EEPROM CC_Vendor				fields from addresses 162 to 186, inclusive
188- 189	2	User EEPROM (OPR[0] Read/Write Access required			0	Module vendor shall write 0x0h into these bytes at time of manufacturing.
190	1	User EEPROM Read/Write Access Required			00ь	Reserved.
191	1	User EEPROM Read/Write access required			Check sum variable	Check code for Extended ID fields from addresses 188 to 190.
192- 211	20	User EEPROM Read/write access required			Ob	
212- 222	11	User EEPROM Read/Write Access Required			ОЬ	Reserved
223		1B	CC_EXT	Check code for the Extended ID Fields (addresses 192 to 222)	xxh	Calculated check code. Low 8 bits of sum of Bytes 192-222

**Customer Specific Fields** 

	Customer Specific 11000									
Data Addres s	Size (Byt es)	Field Name	Description of Field	Value	Value Meaning					
224- 255	32	Vendor Specific EEPROM	TBD	All 00h at present						

**Upper Memory Map: I2C Addr: A0h, Table 2** 

Customer Writable EEPROM. Writable with correct host password entry. Always readable.

### **Product: FTLX4213\_4 channel**

Lower Memory Map: I2C Addr: A0h, Bytes 0 - 127.

Byte Addr	Bit Addr	Type Code	Size (Bytes) or	Field Name	Description of Field	Value	Value Meaning
ess	ess		(bits)				
0		NVE	1B	Identifier	Type of serial	06h	XFP

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2 3 4

5 6 7

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9 10

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		<u>SAI</u>	<b>X</b>				
					transceiver		
		Signal	<b>Conditione</b>				
1	4-7	VH	4b	Data Rate Contro	1	xxxxb	Ignore for Intel or Gennum
	3	VHW	1b	Reserved		N/A	Reserved
	2	VH	1b		ack Control. 1b actuates al input to optical output.	0b	Not supported, ignore write, read back as 0b
	1	VH	1b	XFI Loopback Co	ontrol. 1b actuates loopback	of xb	Power up to 0b
				electrical input to		0b	
	0	VH	1b	Signal Condition	Signal Conditioner Control		Normal REFCLK mode only supported. Ignore write, read back as 0b
		Flag T	Thresholds	•		<b>.</b>	
2-3		NVE	2B	Temp High Alarm	Threshold for alarm	19200d	+75 °C (assumes 3°C accuracy)
4-5		NVE	2B	Temp Low	Threshold for alarm	62976d	-10 °C
				Alarm			(assumes 3°C accuracy)
6-7		NVE	2B	Temp High Warning	Threshold for warn	18688d	+73 °C (assumes 5°C accuracy)
8-9		NVE	2B	Temp Low	Threshold for warn	63488d	-8 °C
				Warning			(assumes 5°C accuracy)
10-		R	8B	Reserved	Reserved	All 00h	Ignore write; return 00h on
17							read.
18-		NVE	2B	Bias High Alarm	Threshold for alarm	62500d	125 mA
19 20-	+	NVE	2B	Bias Low Alarm	Threshold for alarm	10000d	(assumes 0.3mA accuracy) 20 mA
20-		INVE	2 <b>D</b>	Dias Low Alarin	Threshold for alarm	100000	(assumes 0.3mA accuracy)
22-		NVE	2B	Bias High	Threshold for warn	55000d	110 mA
23				Warning			(assumes 0.3mA accuracy)
24- 25		NVE	2B	Bias Low Warning	Threshold for warn	15000d	30 mA (assumes 0.3mA accuracy)
26-		NVE	2B	TX Power High	Threshold for alarm	63096d	+7.95 dBm
27		INVL	20	Alarm	Threshold for diarm	030700	(assumes a 2dB accuracy)
28-		NVE	2B	TX Power Low	Threshold for alarm	3981d	-4.0 dBm
29 30-		NVE	2D	Alarm	There is a 1 d for a second	200114	(assumes 1.5dB accuracy)
31		NVE	2B	TX Power High Warning	Threshold for warn	39811d	+ 6 dB (assumes 2dB accuracy)
32-		NVE	2B	TX Power Low	Threshold for warn	6310d	-2.0 dBm
33				Warning			(assumes 1.5dB accuracy)
34- 35		NVE	2B	RX Power High Alarm	Threshold for alarm	3981d	-4.0 dBm (assumes 1.5dB accuracy)
36-		NVE	2B	Rx Power Low	Threshold for alarm	13d	-28.8dBm (assumes 1.5dB
37		IVL	2.0	Alarm	Threshold for diarm	130	accuracy)
		NVE	2B	RX Power High	Threshold for warn	2512d	-6 dBm
38- 39				Warning			(assumes 1.5dB accuracy)
40-		NVE	2B	RX Power Low	Threshold for warn	20d	-27 dBm
41		TAAE	20	Warning	THICSHOIG IOI WAIII	200	(assumes 1.5dB accuracy)
42-		NVE	2B	AUX1 High	Threshold for alarm	35640d	3.564 V
43		NVE	2B	Alarm AUX1Low	Threshold for alarm	30360d	3.036 V
45		14.415	20	Alarm	Threshold for alalili	30300 <b>u</b>	
46-		NVE	2B	AUX1 High	Threshold for warn	34650d	3.465 V
47				Warning			
48- 49		NVE	2B	AUX1Low Warning	Threshold for warn	31350d	3.135 V
50-	+	NVE	2B	AUX2 High	Threshold for alarm	54000d	5.40 V
Day	1	1 . , , ,		@2000 Finiage Cor			20 70 of 00

		<u>JAI</u>					
51				Alarm			
52- 53		NVE	2B	AUX2 Low Alarm	Threshold for alarm	46000d	4.60 V
54- 55		NVE	2B	AUX2 High Warning	Threshold for warn	52500d	5.25 V (assumes 50mV accuracy)
56- 57		NVE	2B	AUX2 Low Warning	Threshold for warn	47500d	4.75 V (assumes 50mV accuracy)
58	7-4	NVE	4b	VCC2 min with Reg	Min. VCC2 with Regulator	0000b	VPS not supported. Return 0000b=1.8V
	3-0	VH	4b	VCC2 Host	VCC2 Supplied by Host	xxxxb	Written and read by host. Ignore and return 0000b
59	7-4	VH	4b	VCC2 min in Bypass	Min. VCC2 in Regulator	0000ь	VPS not supported. Return 0000b=1.8V
	3-1	VH	3b	Reserved	Reserved	000b	Ignore write, return 000b
	0	VH	1b	VPS Bypass Control	Turns VPS Bypass on or off	0b	VPS not supported. Ignore write, return 0b
60		R	2B	LFL1	Laser First Frequency (THz)	All 00h	00h on read.
62		R	2B	LFL2	Laser First Frequency (GHz*10)	All 00h	00h on read.
64		R	2B	LFH1	Laser Last Frequency	All 00h	00h on read.
66		R	2B	LFH2	Laser Last Frequency (GHz*10)	All 00h	00h on read.
68		R	2B	LGrid	Laser maximum supported grid spacing (GHz*10)	All 00h	00h on read.
70		VH	1B	Acceptable BER	Acceptable BER reported by the FEC to the module	00h	00h.
71		VH	1B	Actual BER	Actual BER reported by the FEC to the module	00h	00h.
72- 73		VH	2B	Wavelength Set MSB	User Input of wavelength set point (units of 0.05nm)	0000h	0000h.
74- 75		VH	2B	Wavelength Error LSB	User Input of wavelength set point (units of 0.05nm)	0000h	0000h.
76		VH	1B	FEC Amplitude Adjustment	Relative amplitude of receive quantization threshold	00h	00h.
77		VH	1B	FEC Phase Adjustment	Phase of receive quantization	00h	00h.
78- 79		R	2B	Reserved	Reserved	All 00h	Ignore write; return 00h on read.
80	7			L-Temp High Alarm	Latched Temperature High Alarm	FALSE	Latched on flag condition. Cleared on host read. (See MSA)
	6			L-Temp Low Alarm	Latched Temperature Low Alarm	FALSE	Latched on flag condition. Cleared on host read. (See MSA)
	5			L-Vcc High Alarm	Latched Vcc High Alarm	FALSE	Latched on flag condition. Cleared on host read. (See MSA)
	4			L-Vcc Low Alarm	Latched Vcc Low Alarm	FALSE	Latched on flag condition. Cleared on host read. (See MSA)
	3			L-Tx Bias High	Latched Tx Bias High	FALSE	Latched on flag condition.

	NISAI				
		Alarm	Alarm		Cleared on host read. (See MSA)
	2	L-Tx Bias Low Alarm	Latched Tx Bias Low Alarm	FALSE	Latched on flag condition. Cleared on host read. (See MSA)
	1	L-Tx Power High Alarm	Latched Tx Power High Alarm	FALSE	Latched on flag condition. Cleared on host read. (See MSA)
	0	L-Tx Power Low Alarm	Latched Tx Power Low Alarm	FALSE	Latched on flag condition. Cleared on host read. (See MSA)
81	7	L-Rx Power High Alarm	Latched – Rx Power High Alarm	FALSE	Latched on flag condition. Cleared on host read. (See MSA)
	6	L-Rx Power Low Alarm	Latched Rx Power Low Alarm	FALSE	Latched on flag condition. Cleared on host read. (See MSA)
	5	L-AUX1 High Alarm	Latched AUX 1 High Alarm	FALSE	Latched on flag condition. Cleared on host read. (See MSA)
	4	L-AUX1 Low Alarm	Latched AUX1 Low Alarm	FALSE	Latched on flag condition. Cleared on host read. (See MSA)
	3	L-AUX 2 High Alarm	Latched AUX2 High Alarm	FALSE	Latched on flag condition. Cleared on host read. (See MSA)
	2	L-AUX 2 Low Alarm	Latched AUX2 Low Alarm	FALSE	Latched on flag condition. Cleared on host read. (See MSA)
	1	RESERVED	RESERVED		
	0	RESERVED	RESERVED		
82	7	L-Temp High Warning	Latched High Temperature Warning	0h	FALSE
	6	L-Temp Low Warning	Latched Low Temperature Warning	0h	FALSE
	5	L-Vcc High Warning	Latched High Vcc Warning	0h	FALSE
	4	L-Vcc Low Warning	Latched Low Vcc Warning	0h	FALSE
	3	L-Tx Bias High Warning	Latched Tx Bias High Warning	0h	FALSE
	2	L-Tx Bias Low Warning	Latched Tx Bias Low Warning	0h	FALSE
	1	L-Tx Power High Warning	Latched Tx Power High Warning	0h	FALSE
	0	L-Tx Power Low Warning	Latched Tx Power Low Warning	0h	FALSE
83	7	L-Rx Power High	Latched Rx Power High Warning	0h	FALSE
	6	L-Rx Power Low	Latched Rx Power Low Warning	0h	FALSE
	5	L-AUX1 High Warning	Latched High AUX1 Monitor	0h	FALSE
	4	L-AUX 1 Low Warning	Latched Low AUX1 monitor	0h	FALSE
	3	L-AUX 2 High	Latched High AUX2	0h	FALSE

Warning   monitor	
Warning   monitor	
RESERVED   RESERVED   Oh   FALSE	
RESERVED   RESERVED   Oh   FALSE	
RESERVED   RESERVED   Oh   FALSE	
Second State   Seco	
L-Tx_Fault  Latched Laser Fault Condition. Generated by Laser Safety  L-Tx CDR not locked Lock  L-Rx_NR  Latched Rx_NR status L-LOS  Latched Mirror of LOS pin (Rx optical loss of signal)  L-Rx CDR not Locked Lock  L-Rx CDR not Latched Rx CDR Loss of Noh FALSE Locked Lock  L-MOD_NR Latched Mirror of Noh FALSE  L-MOD_NR Latched Mirror of Noh FALSE Noh FALSE Locked Lock  L-MOD_NR Latched Mirror of Noh FALSE Noh FALSE Locked Lock  Latched Mirror of Noh FALSE Noh FALSE Noh FALSE Locked Lock Lock Lock Lock Latched Mirror of Noh FALSE Noh FALSE Noh FALSE Latched Reset Complete Noh FALSE	
Condition. Generated by Laser Safety  Laser Safety  Latched TxCDR Loss Of Oh FALSE locked Lock  L-Rx_NR Latched Rx_NR status Oh FALSE L-LOS Latched Mirror of LOS Oh FALSE  L-Rx CDR not Latched Rx CDR Loss of signal)  L-Rx CDR not Latched Rx CDR Loss of Oh FALSE Locked Lock  L-MOD_NR Latched Mirror of Oh FALSE  L-Reset Latched Reset Complete Oh FALSE	
Laser Safety  L-Tx CDR not Latched TxCDR Loss Of Oh FALSE locked  Lock  Lock  L-Rx_NR Latched Rx_NR status Oh FALSE  L-LOS Latched Mirror of LOS pin (Rx optical loss of signal)  L-Rx CDR not Latched Rx CDR Loss of Oh FALSE Locked  Locked Lock  L-MOD_NR Latched Mirror of Oh FALSE MOD_NR pin  L-Reset Latched Reset Complete Oh FALSE	
5 L-Tx CDR not locked Lock  4 L-Rx_NR Latched Rx_NR status 0h FALSE  3 L-LOS Latched Mirror of LOS pin (Rx optical loss of signal)  2 L-Rx CDR not Latched Rx CDR Loss of Locked Lock  1 L-MOD_NR Latched Mirror of Oh FALSE  0 L-Reset Latched Reset Complete 0h FALSE	
locked   Lock	
4 L-Rx_NR Latched Rx_NR status 0h FALSE 3 L-LOS Latched Mirror of LOS 0h FALSE pin (Rx optical loss of signal) 2 L-Rx CDR not Latched Rx CDR Loss of 0h Locked Lock 1 L-MOD_NR Latched Mirror of 0h FALSE MOD_NR pin 0 L-Reset Latched Reset Complete 0h FALSE	3
L-LOS Latched Mirror of LOS oh FALSE pin (Rx optical loss of signal)  L-Rx CDR not Latched Rx CDR Loss of Locked Lock  Locked Lock  L-MOD_NR Latched Mirror of Oh FALSE MOD_NR pin  L-Reset Latched Reset Complete Oh FALSE	3
pin (Rx optical loss of signal)  L-Rx CDR not Latched Rx CDR Loss of Oh FALSE Locked Lock  L-MOD_NR Latched Mirror of MOD_NR pin  L-Reset Latched Reset Complete Oh FALSE	3
Signal   S	
2 L-Rx CDR not Latched Rx CDR Loss of Oh FALSE Locked Lock 1 L-MOD_NR Latched Mirror of Oh FALSE MOD_NR pin 0 L-Reset Latched Reset Complete Oh FALSE	
Locked Lock  L-MOD_NR Latched Mirror of Oh FALSE MOD_NR pin  L-Reset Latched Reset Complete Oh FALSE	
1 L-MOD_NR Latched Mirror of Oh FALSE MOD_NR pin 0 L-Reset Latched Reset Complete Oh FALSE	,
MOD_NR pin  U-Reset Latched Reset Complete Oh FALSE	
0 L-Reset Latched Reset Complete 0h FALSE	
85 7 L-APD Supply Latched APD Supply 0h FALSE	
Fault Fault	
6 L-TEC Fault Latched TEC Fault 0h FALSE	
5 L-Wavelength Latched Wavelength Oh FALSE	
Unlocked Unlocked	'
4 L-Bad Channel Latched BAD channel Oh FALSE	
3 L- New Channel Latched New Channel Oh FALSE	
Acquired Acquired	
2 L-Unsupported Latched Unsupported Tx Oh FALSE	
Tx Dither	l .
1 RESERVED RESERVED Oh FALSE	
0 RESERVED RESERVED Oh FALSE	<u> </u>
86 RESERVED RESERVED	
87 RESERVED RESERVED	
88 7 M-Temp High Masking bit for high Oh FALSE	ı
Alarm temperature alarm	
6 M-Temp Low Masking bit for Low 0h FALSE	•
Alarm temperature Alarm	
5 M-Vcc High Masking bit for High Vcc Oh FALSE	•
Alarm   Alarm	
4 M-Vcc Low Masking bit for Low Vcc Oh FALSE	
Alarm   Alarm	
3 M-Tx Bias High Masking bit for High Tx Oh FALSE	
Alarm bias	
2 M-Tx Bias Low Masking bit for Low Tx Oh FALSE	
Alarm bias bias	'
1 M-Tx Power Masking bit for high Tx Oh FALSE	
High Alarm power	•
0 M-Tx power Masking bit for low Tx Oh FALSE	
Low Alarm power power	
89 7 M-Rx Power Masking bit for High Rx Oh FALSE	
	I and the second
High power  M. D. Dawer Marking his faul and Dr. Col. FALCE	
6 M-Rx Power Masking bit for Low Rx Oh FALSE	(
Low power	
5 M-AUX 1 High Masking bit for High Oh FALSE	

	MOAK				
		Alarm	AUX 1		
	4	M-AUX 1 Low Alarm	Masking bit for Low AUX 1	0h	FALSE
	3	M-AUX 2 High Alarm	Masking bit for high AUX 2	0h	FALSE
	2	M-AUX 2 Low	Masking bit for low AUX	0h	FALSE
		Alarm	2		
	1	RESERVED	RESERVED	0h	FALSE
	0	RESERVED	RESERVED	0h	FALSE
90	7	M-Temp High Warning	Masking bit for High Temperature Warning	0h	FALSE
	6	M-Temp Low Warning	Masking bit for Low Temperature	0h	FALSE
	5	M-Vcc High Warning	Masking bit for high Vcc	0h	FALSE
	4	M-Vcc Low Warning	Masking bit for Vcc Low warning	0h	FALSE
	3	M-Tx Bias high	Masking bit for Tx Bias	0h	FALSE
	2	M-Tx Bias Low	high warning  Masking bit for Tx Bias Low Warning	0h	FALSE
	1	M-Tx Power High	Masking bit for high Tx power	0h	FALSE
	0	M-Tx power Low	Masking bit for low Tx power	0h	FALSE
91	7	M-Rx power High	Masking bit for Rx power High Warning	0h	FALSE
	6	M-Rx Power Low	Masking bit for Rx power Low Warning	0h	FALSE
	5	M-AUX 1 High	Masking bit for high AUX 1	0h	FALSE
	4	M-AUX 1 Low Warning	Masking bit for Low AUX 1	0h	FALSE
	3	M-AUX 2 High Warning	Masking bit for High AUX 2 Warning	0h	FALSE
	2	M-AUX 2 Low Warning	Masking bit for Low AUX 2	0h	FALSE
	1	RESERVED	RESERVED	0h	FALSE
	0	RESERVED	RESERVED	0h	FALSE
92	7	M-Tx_NR	Masking bit for Tx_NR Status	0h	FALSE
	6	M_Tx_Fault	Masking bit for Laser Fault condition. Generated by laser	Oh	FALSE
	5	M-Tx CDR Not Locked	Masking bit for TX CDR Loss of Lock	0h	FALSE
	4	M-RX_NR	Masking bit for Rx_NR status	0h	FALSE
	3	M-LOS	Masking bit for mirror of LOS pin (Rx optical loss of signal)	Oh	FALSE
	2	M-Rx CDR not locked	Masking bit for Rx CDR loss of lock	0h	FALSE
	1	M-MOD_NR	Masking bit for Mirror of MOD_NR	0h	FALSE
	0	M-Reset	Masking bit for Reset	0h	FALSE

	INISA	Complete	Complete		
93	7		Complete  Masking bit for APD	Oh	FALSE
93	/	M-APD Supply Fault	Supply	On	FALSE
	6	M-TEC Fault	Masking bit for TEC	0h	FALSE
	0	WI-TEC Fault	Fault	OII	PALSE
	5	M-Wavelength	Masking bit for	0h	FALSE
		Unlocked	Wavelength Unlocked	011	TAESE
		- I moeked	Condition		
	4	M-Bad Channel	Masking bit for bad	0h	FALSE
			channel		-
	3	M-New Channel	Masking bit for new	0h	FALSE
			channel		
	2	M-Unsupported	Masking bit for	0h	FALSE
		Tx	Unsupported Tx		
	1	RESERVED	RESERVED	0h	FALSE
	0	RESERVED	RESERVED	0h	FALSE
94		RESERVED	RESERVED		
95		RESERVED	RESERVED		
96		Temperature	Internally measured		
		MSB	module temperature		
97		Temperature	Internally measured		
		LSB	module temperature		
98		Vcc MSB	Internally measured		
			supply voltage in		
00		V. ICD	transceiver		
99		Vcc LSB	Internally measured		
			supply voltage in		
100		Tx Bias MSB	transceiver		
100		1 x Bias MSB	Internally measured Tx Bias		
101		Tx Bias LSB	Internally measured Tx		
101		1 x Blas LSB	Bias		
102		Tx power MSB	Measured Tx output		
102		TX power MSB	power		
103		Tx power LSB	Measured Tx Output		
100		I mpe wer 202	Power		
104		Rx power MSB	Measured Rx output		
		'	power		
105		Rx power LSB	Measured Rx output		
			power		
106		AUX 1 MSB	Auxiliary measurement		
			defined in Byte 222 page		
			01h		
107		AUX 1 LSB	Auxiliary measurement		
			defined in byte 222 page		
400			01h	ļ	
108		AUX 2 MSB	Auxiliary measurement 2		
			defined in Byte 222 Page		
100		ALIVALOD	01h	1	
109		AUX 2 LSB	Auxiliary measurement 2		
			defined in Byte 222 page 01h	1	
110	7	Tx Disable State	Digital state of the Tx		
110	'	1 x Disable State	Digital state of the 1x Disable Input Pin.		
			Updated within 100ms of		
			Change on Pin		
	1		1 Change on I in	1	l

		JAI			
	6		Soft Tx Disable	Read/write bit that allows	
				software disable of laser.	
				Writing '1' disables laser.	
				Turn on/off time is	
				100msec max from	
				acknowledgement of	
				serial byte transmission.	
				This bit is "OR"d with the	
				hard TX_DISABLE pin	
				value. Note, per SFP	
				MSA TX_DISABLE pin	
				is default enabled unless	
				pulled low by hardware.	
				If Soft TX Disable is not	
				implemented, the	
				transceiver ignores the	
				value of this bit. Default	
				power up value is 0.	
	5		MOD_NR State	Digital state of the	
				MOD_NR Pin. Updated	
				within 100msec of change	
				on pin	
	4		P_Down State	Digital state of the	
			[ -	P_Down Pin. Updated	
				within 100msec of change	
				on pin	
	3		Soft P_Down	Read/write bit that allows	
				the module to be placed in	
				the power down mode.	
				This is identical to the	
				P_Down hardware pin	
				function except that it	
				does not initiate a system	
				reset	
	2		Interrupt	Digital state of the	
	_		Interrupt	Interrupt output pin	
	1		LOS	Indicates Optical Loss of	
	1		Les	Signal (per relevant	
				optical link standard).	
				Updated within 100msec	
				of change on pin	
	0		Data_Not_Ready	Indicates transceiver has	
			Zuiu_1 tot_Ready	achieved power up and	
				data is ready. Bit remains	
				high until data is ready to	
				be read at which time the	
				device sets the bit low.	
111	7		Tx_NR State	Identifies Not Ready	
111	'		17_111 51110	Condition as specific to	
				the tx path	
	6		Tx Fault State	Identifies Not Ready	
			1 x 1 auit State	condition as specific to	
				the Tx path	
	5		Tx_CDR Not	Identifies Loss of Lock in	
	ر				
	4		Locked  Dr. ND State	Tx Identifies Not Boody	
	4		Rx_NR State	Identifies Not Ready	
				Condition as specific to	

	116				
			the Tx path		
	3	Rx_CDR Not	Identifies Loss Of Lock in		
		Locked	Rx path CDR		
	2	Tx_Tune	Identifies Tx Not Ready		
			due to tuning		
	1	Tx Dither	"1" Disables Dither, "0"		
			Enables Dither		
	0	RESERVED	RESERVED		
112		Channel # Set	User Input of Channel #,		
			which is an integer 1 to N		
			(N= # of Chins.)		
113		Channel # Set	User Input of Channel #,		
			which is an integer 1 to N		
			(N= # of Chans.)		
114		Frequency Error	Frequency error reported		
			in 16 bit signed integer		
			with LSB= 0.1GHz		
115		Frequency Error	Frequency error reported		
			in 16 bit signed integer		
			with LSB = $0.1 \text{ GHz}$		
116		RESERVED	RESERVED		
117		RESERVED	RESERVED		
118	0	Error Checking	Error Checking	00h	Packet Error
	1-7	RESERVED	RESERVED		
119		New Password	Location of Entry of New	00h	0
		Entry	Optional Password		
120		New Password	Location of Entry of New	00h	0
		Entry	Optional Password		
121		New Password	Location of Entry of New	00h	0
		Entry	Optional Password		
123		Password Entry	Location for Entry of	00h	0
			Optional Password		
124		Password Entry	Location for Entry of	00h	0
			Optional Password		
125		 Password Entry	Location for Entry of	00h	0
			Optional Password		
126		Password Entry	Location for Entry of	00h	0
			Optional Password		
127		Table Select	Entry Location for Table	01h	1
			Select		

### Upper Memory Map: I2C Addr: A0h, Table 1 - Serial ID Section - Read only by Host, all Nonvolatile

Byte	Bit	Size	Field Name	Description of Field	Value	Value Meaning
Addr	Addr	(Bytes) or				
ess	ess	(bits)				
128		1B	Identifier	Type of serial	06h	XFP

		JAK				
				transceiver		
129	7-6	2b	Ext. Identifier -	Defines Module	10b	Power Level 4 (> 3.5 W)
			Module Power	Power Class		
			Class			
129	5	1b	Ext. Identifier -	Identifies presence of	0b	With CDR
			CDR	a CDR		
129	4	1b	Ext. Identifier -	Identifies need for	1b	Not Required
			REFCLK	REFCLK		
129	3	1b	CLEI Code Present	Indicates if CLEI	0b	No CLEI code present in Table
				Code is present in		02h
				Table 2		
129	0-2	3b	RESERVED	Reserved	000b	
130		1B	Connector	Code for connector	07h	
				type		
131-13	38	8 B	· ·	or electronic compatibil	ity or optical co	ompatibility
			<b>Ethernet Compliance</b>	Codes	1	
131	7	1b	10GBASE-SR		0b	False
	6	1b	10GBASE-LR		0b	False
	5	1b	10GBASE-ER		0b	False
	4	1b	10GBASE-LRM		0b	False
	3	1b	10GBASE-SW		0b	False
	2	1b	10GBASE-LW		0b	False
	1	1b	10GBASE-EW		0b	False
	0	1b	Reserved		0b	False
		10 Gigabit	<b>Fibre Channel Comp</b>	liance Codes		
132	7	1b	1200-MX-SN-I		0b	False
	6	1b	1200-SM-LL-L		0b	False
	5	1b	Extended reach 1550	)nm	0b	False
	4	1b	Intermediate reach 1	310nm	0b	False
	3	1b	Reserved		0b	RESERVED
	2	1b	Reserved		0b	RESERVED
	1	1b	Reserved		0b	RESERVED
	0	1b	Reserved		0b	RESERVED
		10 Gigabit	Copper Link Compli	ance Codes		
133	7	1b	Reserved		0b	RESERVED
	6	1b	Reserved		0b	RESERVED
	5	1b	Reserved		0b	RESERVED
	4	1b	Reserved		0b	RESERVED
	3	1b	Reserved		0b	RESERVED
	2	1b	Reserved		0b	RESERVED
	1	1b	Reserved		0b	RESERVED
	0	1b	Reserved		0b	RESERVED
		Lower Spe	ed Link Compliance	Codes		
134	7	1b	1000BASE-SX/1xF0		0b	False
	6	1b	1000BASE-LX/1xF0	C SMF	0b	False
	5	1b	2xFC MMF		0b	False
	4	1b	2xFC SMF		0b	False
	3	1b	OC-48-SR		0b	False
	2	1b	OC-48-IR		0b	False
	1	1b	OC-48-LR		0b	False
	0	1b	Reserved		0b	False
		SONET/SI	OH Interconnect Link	<b>Compliance Codes</b>		
135	7	1b	I-64.1r	-	0b	False
	6	1b	I-64.1		0b	False
	5	1b	I-64.2r		0b	False
		•			1	

		DAK				
	4	1b	I-64.2		0b	False
	3	1b	I-64.3		0b	False
	2	1b	I-64.5		0b	False
	1	1b	Reserved		0b	False
	0	1b	Reserved		0b	False
	1 0		OH Short Haul Link (	Compliance Codes	100	Tuise
136	7	1b	S-64.1		0b	False
150	6	1b	S-64.2a			False
	5	1b	S-64.2b		0b 0b	False
	4	1b	S-64.3a		0b	False
	3	1b	S-64.3b		0b	False
	2	1b	S-64.5a		0b	False
	1	1b	S-64.5b		0b	False
	0	1b	Reserved		0b	False
	10		THE CONTRACT THE PROPERTY OF T	Compliance Codes	00	1 disc
137	7	1b	L-64.1	Compliance Codes	0b	False
137	6	1b	L-64.2a		0b	False
	5	1b	L-64.2b		0b	False
	4	1b	L-64.2c		0b	False
					0b	False
	3	1b	L-64.3 G.959.1 P1L1-2D2			
	2	1b			1b	False
	1	1b	Reserved		0b	False
	0	1b	Reserved		0b	False
120	T 7			Link Compliance Codes	01	I P 1
138	7	1b	V-64.2a		0b	False
	6	1b	V-64.2b		0b	False
	5	1b	V-64.3		0b	False
	4	1b	Reserved	C1 1// 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0b	False
	3	1b	113)	y Channel#, byte 112-	0b	True
	2	1b	Tunable DWDM (in 73)	50 pm steps, byte 72-	0b	False
	1	1b	Reserved		0b	False
	0	1b	Reserved		0b	False
	1	Encoding			1	-
139	7	1b	64B/66B		1b	10GE/10GFC Coding is supported
	6	1b	8B/10B		1b	Supported
	5	1b	SONET Scrambled		1b	Supported
	4	1b	NRZ		1b	NRZ only supported
	3	1b	RZ		0b	Not supported
	2	1b	Tx Dither Supported	1	000b	Not Supported
	1-0	2b	RESERVED		0b	RESERVED
140		1B	BR, minimum	Minimum Supported Bitrate (/100Mb)	63h	9900 Mbps
141		1B	BR, maximum	Maximum Supported Bitrate (/100Mb)	71h	11300 Mbps for FTLX version.
142		1B	Length (SMF) – km	Link length supported for 9/125 um fiber, units of km	C8h	200km
143		1B	Length (E-50um)	Link length supported for extended bandwidth 50µm	00h	Not supported
144		1B	Length (50m)	Link length supported for 50/125 mm fiber,	00h	Not supported

		JAK				
				units of 1 m		
145		1B	Length (62.5m)	Link length supported for 62.5/125 mm	00h	Not supported
				fiber, units of 1 m		
146		1B	Length (Copper)	Link length supported for copper, units of 1m	00h	Not supported
		Device T	echnology	1	I	
147	4-7	4b	Transmitter Techno	logy	0111b	1550nm EML laser
	3	1b	Wavelength Contro		0b	Wavelength control
	2	1b	Cooled Transmitter		1b	Transmitter is cooled
	1	1b	Detector Type		1b	APD Detector
	0	1b	Tunable Transmitte	r	1b	Transmitter is Tunable
148-		16B	Vendor name	SFP vendor name	"FINISAR	
163		102	, endor name	(ASCII) blank padded	CORP. "	
	1	CDR Sup	nort	(* 22 2 2 2 ) * 2 2 2 2 2 2 2 2 2 2 2 2 2		
164	7	1b	CDR Support for 9.	95 Gh/s	1b	Supported
101	6	1b	CDR Support for 10		1b	Supported
	5	1b	CDR Support for 10		1b	Supported
	4	1b	CDR Support for 10		1b	Supported
	3	1b	CDR Support for 11		1b	Supported
	2	1b	Reserved	1.1 00/8	0b	Supported
	1	1b	Line-side Loopback	Mada Supported	0b	False
	0	1b	XFI Loopback Supp		1b	True
1.65	U		1 11			
165- 167		3B	Vendor OUI	SFP vendor IEEE company ID	009065h	IEEE assigned
168- 183		16B	Vendor PN	Part number provided by vendor (ASCII)	"FTLX4213M xxxx "	Finisar part number
184- 185		2B	Vendor rev	Revision level for part number provided by vendor (ASCII)	3030h	Hardware revision level field not used
186- 187		2B	Wavelength	Nominal Laser Wavelength (1/20nm)	0000h	15xx.xx nm * (20/nm)
188- 189		2B	Wavelength Tolerance	Guaranteed range of laser wavelength +/- value from nominal Wavelength	0008h	0.1nm * (200/nm) = 8
190		1B	Max Case Temp	Maximum Case Temperature	46h	70°C
191		1B	CC_BASE	Check code for Base ID Fields (addresses 128 to 190)	xxh	Calculated check code, low 8 bits of sum of first 64 bytes of Serial ID info.
		_		EXTENDED ID FIEL	DS	
192-1	95	4B	Power Supply Fiel			
192		1B	Maximum Power D		C8h	= 4000  mW
193		1B		n Power-down (/10mW)	96h	= 1500 mW
194	4-7	4b	Maximum current r Supply.Max current [500 mA max]	equired by +5V t is 4 bit value * 50 mA.	0A	=500mA
	0-3	4b	Maximum current r Supply. Max curren mA.	equired by +3.3V tt is 4 bit value * 100	0111b	= 700mA
195	4-7	4b	Maximum current r Supply. Max curren mA.	equired by +1.8V tt is 4 bit value * 100	000b	= 00
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	0-3	4b	Maximum current re		0000b	0
			[500 mA max]	is 4 bit value * 50 mA.		
196- 211		16B	Vendor SN	Serial number provided by vendor (ASCII) blank padded	e.g., "A000000"	Encoded serial number
212- 217		6B	Date code	Vendor's manufacturing date	e.g., "030106"	yymmdd
218- 219		2B	Lot Code	Vendor lot code	2020h	May be blank
		•	Diagnostic Monitor	ring / Variable Power Su	pply / Special F	unction Support
220	7	1b	Reserved		0b	Reserved
	6	1b	Reserved		0b	Reserved
	5	1b	Reserved		0b	Reserved
	4	1b	FEC BER Support		0b	No BER Support
	3	1b	Received power mea	Received power measurement type		Average Power
	2	1b	Reserved		0b	Reserved
	1-0	2b	Reserved		00b	Will be Reserved
			<b>Enhanced Options</b>			
221	7	1b	Module supports Va	riable Power Supply	0b	Not supported
	6	1b	Soft TX_DISABLE		1b	Soft TX_DISABLE is supported
	5	1b	Soft PWR_DWN		1b	Soft PWR_DWN is supported
	4	1b	Supports VPS LV Re		0b	We are not supporting VPS
	3	1b		ssed Regulator Mode	0b	We are not supporting VPS
	2	1b	Active FEC Control		1b	Supported.
	1	1b	Wavelength Tunabil	v	1b	Supported
	0	1b	Optional CMU Mod	e	0b	Not supported
222	4-7	4b	Aux A/D Input 1		0111b	+3.3V Supply Monitor on AUX A/D 1
	0-3	4b	Aux A/D Input 2		0110b	+5V Supply Monitor on Aux A/D 2
223		1B	CC_EXT	Check code for the Extended ID Fields (addresses 192 to 222)	xxh	Calculated check code. Low 8 bits of sum of Bytes 192-222

1 2

**Customer Specific Fields** 

Data Addres s	Size (Byt es)	Field Name	Description of Field	Value	Value Meaning
224- 255	32	Vendor Specific	TBD	All 00h at present	
		EEPROM			

3 4

5

6 7

#### **Upper Memory Map: I2C Addr: A0h, Table 2**

Customer Writable EEPROM. Writable with correct host password entry. Always readable.

#### Upper Memory Map: I2C Addr: A0h, Table 3

Used by Finisar for internal parameter storage. Not readable or Writable without Finisar Password.

8 9 10

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