SFP-1GBT-09

SFP Copper Transceiver, 1000Base-T to GBIC with SyncE

The Bel SFP-1GBT-09 transceiver is an internally configured 1000Base-T SFP module with Synchronous Ethernet capability for GBIC host interface. The host interface transmits and receives serial data differentially at 1.25Gbps. The copper interface is advertised as full duplex and 1000Base-T wire speed.

Key Features & Benefits

- Designed with Broadcom's BCM54616S chipset
- Complies with IEEE 802.3, 802.3u, and 802.3ab specifications
- Configured for operation with a GBIC compliant host
- Supports SyncE functionality
- Conforms to Multi-Source Agreement (MSA) specifications for SFP transceivers (Exceptions for SyncE features)
- Supports IEEE 802.3u and IEEE 802.3ab auto–negotiation features to allow networking equipment to automatically determine and adjust the required settings
- Supports jumbo frames up to 10 KB
- Operates in extended temperature range of -40° to +85° C
- Automatically compensates for baseline wander by removing DC offset from the input signal
- Automatic dependent interface (DI) crossover, eliminating the need for crossover cables or cross-wire (MDIX) ports
- Bail latch provides ease of extraction
- Compact RJ45 connector assembly
- The BCM54616S physical layer IC (PHY) can be accessed via I²C interface:
  PHY address = "ACh"
  EEPROM address = "A0h"
- The SyncE feature can be accessed via I²C Interface:
  Address = "A2h"
- 128 Byte Read-Only EEPROM

Applications

- 10/100/1000 Mbps data rate in excess of 100 meters of Category 5/5e cable
- Industrial temperature environments -40° to +85° C
- Networking equipment
- Switch-to-switch interface
- Routers

Regulatory and Standards Compliance

- Compliant with IEEE 802.3:2000
- FCC Part 15, Class A
- E55024 Immunity standard and ESD

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SFP-1GBT-09 Module Specifications

Parameter	Symbol	Min	Type	Max	Units	Notes
Supply Voltage	V_{DD3}	3.13	3.3	3.46	V	VDC
Supply Current	I_S		185		mA	1000 Base-T

SFP Host Serial Interface (TX/RX)	Symbol	Min	Type	Max	Units	Notes
Line Frequency	F_{LINE}		125		MHz	
TX Output Impedance	Z_{TX_OUT}		100		Ω	Differential
RX Output Impedance	Z_{RX_IN}		100		Ω	Differential
Clock Frequency			25		MHz	
Rise/Fall Time	T_R/T_F		4		Ns	20% - 80%
RMS Phase Jitter	F_J			1.5	ps-rms	F_J = 12 kHz to 20 MHz offset frequency

SyncE	Symbol	Min	Type	Max	Units	Notes
Recovered Clock Jitter			±25ppm			
Recovered Clock	RCO		25		MHz	*(125MHz for locally generated clock)*
Primary Reference Clock	PRC		25		MHz	±25ppm

Environmental Specifications	Symbol	Min	Type	Max	Units	Notes
Operating Temp	T_{OP}	-40		+85	°C	Case temperature
Storage Temp	T_{STG}	-40		+85	°C	Ambient temperature

SFP Host Connector Electrical Interface Descriptions

Pin		Name		Descriptions
1		VeeT		Transmitter ground (common with receiver ground)
2	Normal Operation	TX Fault		▪ Not used. Internal pull down [1] (default)
	SyncE Operation	RCO		▪ 125MHz clock locally generated [2] ▪ Recovered Clock [3]: ◦ Link-down – 25 MHz clock locally generated ◦ 1000BASE-T – 25 MHz clock recovered from line-side data ◦ 100BASE-TX – 25 MHz clock recovered from line-side data ◦ 10BASE-T – 2.5 MHz clock recovered from line-side data *(note: PHY configuration also required)*
3		TX Disable		Disable PHY when logic '1'. Internal Pull Down
4		MOD-DEF2		Signal SDA (data) of the two-wire serial interface. Internal pull up
5		MOD-DEF1		Signal SCL (clock) of the two-wire serial interface. Internal pull up
6		MOD-DEF0		This pin is internally tied to transmit ground
7		Normal Operation	Rate Select	▪ Not implemented
		SyncE Operation	PRC	▪ Primary reference clock (25MHz input) *(note: PHY configuration also required)*
8		LOS		Logic '1' when no signal or linked at 10Base-T (default)
9		VeeR		Receiver ground (common with transmitter ground)
10		VeeR		Receiver ground (common with transmitter ground)
11		VeeR		Receiver ground (common with transmitter ground)
12		RD-		Differential Transmitter Output. User to terminate 100Ω differential at host. AC Coupled within SFP
13		RD+		Differential Transmitter Output. User to terminate 100Ω differential at host. AC Coupled within SFP
14		VeeR		Receiver ground (common with transmitter ground)
15		VccR		3.3V power (common with VccT)
16		VccT		3.3V power (common with VccR)
17		VeeT		Transmitter ground (common with receiver ground)
18		TD+		Differential Receiver Input. 100Ω differential termination & AC Coupling within SFP
19		TD-		Differential Receiver Input. 100Ω differential termination & AC Coupling within SFP
20		VeeT		Transmitter ground (common with receiver ground)

[1] Clock Output is disable (by clear RCO Control flag in "SyncE Control")

[2] Clock Output is enable (by set RCO Control flag in "SyncE Control") and Recovered Clock is disable (by "Recovered Clock Control")

[3] Clock Output is enable (by set RCO Control flag in "SyncE Control") and Recovered Clock is enable (by "Recovered Clock Control")

Default Configuration

Part Number	Link Indicator on Rx_LOS Pin	Auto-Negotiation	SyncE	Host Interface	Duplex Mode
SFP-1GBT-09	Yes	Enabled	Disabled	GBIC	Full

The SFP-1GBT-09 will default to GBIC without SyncE support. In this mode pins 2 and 7 haveno function.

Change Configuration

Users may select various configuration options for the module by writing to a range of I2C addresses within the device.

SyncE Control*

Bit	Read/Write	Name	Description
7:3	Write only	Reserved	Write 1 only
2	Write only	RCO Control	0 = enable Clock Output (pin 2) 1 = disable Clock Output (pin 2) (default)
1	Write only	Reserved	Write 1 only
0	Write only	Clock Source Select	1 = internal 25MHz Oscillator (default) 0 = external Primary Reference Clock (pin 7) Input

** Direct access by write configuration byte to I2C device under A2h address.*

Recovered Clock Control

I2C Device Address	Control Register	Byte 1	Byte 2	Description
ACh ACh	17h 15h	0Fh 00h	44h 00h	Disable Recovered Clock (default)
ACh ACh	17h 15h	0Fh 00h	44h 10h	Enable Recovered Clock

Advertise 1000BASE-T full duplex capability and Master / Slave Configuration

I2C Device Address	Control Register	Byte 1	Byte 2	Description
ACh	09h	02h	00h	Automatic Master/Slave configuration (default)
ACh	09h	1Ah	00h	Configure SFP as Master
ACh	09h	12h	00h	Configure SFP as Slave

Interface Selection

At power up, the SFP-1GBT-09 is configured in GBIC mode. The user may select SGMII mode by writing the following two bytes to register 1Ch.

I2C Device Address	Control Register	Byte 1	Byte 2	Description
ACh	1Ch	FCh	FEh	Set mode to GBIC (default)
ACh	1Ch	FCh	FCh	Set mode to SGMII

List of Supported IEEE Defined PHY Registers – I2C Device Address ACh

Register	Name
00h	Control
01h	Status
02h-03h	PHY Identifier
04h	Auto-Negotiation Advertisement
05h	Auto-Negotiation Link Partner Ability
06h	Auto-Negotiation Expansion
07h	Next Page Transmit
08h	Link Partner Received Next Page
09h	1000Base-T Control
0Ah	1000Base-T Status
0Fh	Extended Status

PHY Register 00h: Control

Bit	Name	Description	R/W	Default
15	Reset	Software Reset 1 = PHY reset 0 = normal operation	R/W *Self-Clearing	0
14	Loopback	Internal loopback mode 1 = enable loopback mode 0 = disable loopback mode	R/W	0
13	Speed Selection (LSB)	When auto-negotiation is disabled, bits 6 and 13 can be used to manually select the speed of operation Bits [6, 13] 11 = Reserved 10 = 1000Mbps 01 = 100Mbps 00 = 10Mbps	R/W	0
12	Auto-Negotiation Enable	If enabled, Auto-Negotiation result overrides Speed Selection, Duplex Mode settings. 1 = enable Auto-Negotiation process 0 = disable Auto-Negotiation process	R/W	1
11	Power Down	Placed SFP in a low-power mode. 1 = power down 0 = normal operation	R/W	0
10	Isolate	1 = isolate 0 = normal operation	R/W	0
9	Restart Auto-Negotiation	When auto-negotiation is enabled, setting this bit restarts the Auto-Negotiation process. 1 = restart Auto-Negotiation process 0 = normal operation	R/W *Self-Clearing	0
8	Duplex Mode	1 = full duplex 0 = half duplex	R/W	1
7	Reserved	Write as 0, ignore on read	R/W	0
6	Speed Selection (MSB)	Use in conjunction with bit 13	R/W	1
5:0	Reserved	Write as zero, ignore on read	R/W	000000

PHY Register 01h: Status

Bit	Name	Description	R/W	Default
15	100BASE-T4	100BASE-T4 protocol is not supported. 0 = not capable to perform 100BASE-T4	RO	0
14	100BASE-TX Full Duplex	1 = capable to perform full duplex 100BASE-TX 0 = not capable to perform full duplex 100BASE-TX	RO	1
13	100BASE-TX Half Duplex	1 = capable to perform half duplex 100BASE-TX 0 = not capable to perform half duplex 100BASE-TX	RO	1
12	10Base-T Full Duplex	1 = capable to operate at 10Base-T in full duplex mode 0 = not capable to operate at 10Base-T in full duplex mode	RO	1
11	10Base-T Half Duplex	1 = capable to operate at 10Base-T in half duplex mode 0 = not capable to operate at 10Base-T in half duplex mode	RO	1
10	100BASE-T2 Full Duplex	100BASE-T2 protocol is not supported. 0 = not capable to perform full duplex 100BASE-T2	RO	0
9	100BASE-T2 Half Duplex	100BASE-T2 protocol is not supported. 0 = not capable to perform half duplex 100BASE-T2	RO	0
8	Extended Status	1 = extended status information in register 0Fh	RO	1
7	Reserved	Ignore on read	RO	1
6	MF Preamble Suppression	1 = PHY will accept management frames with preamble suppressed 0 = PHY will not accept management frames with preamble suppressed	RO	1
5	Auto-Negotiation Complete	1 = Auto-Negotiation process completed 0 = Auto-Negotiation process not completed	RO	0
4	Remote Fault	1 = remote fault condition detected 0 = no remote fault condition detected	RO	0
3	Auto-Negotiation Ability	1 = capable to perform Auto-Negotiation	RO	1
2	Link Status	1 = link is up 0 = link is down	RO	0
1	Jabber Detect	1 = jabber condition detected 0 = no jabber condition detected	RO	0
0	Extended Capability	1 = extended register capabilities 0 = basic register set capabilities only	RO	1

PHY Register 02h-03h: PHY Identifier

Bit	Name	Description	R/W	Default
15:0	Address 02h: PHY ID (MSB)	MSB of PHY Identifier	RO	0362h
15:0	Address 03h: PHY ID (LSB)	LSB of PHY Identifier (* - PHY Rev Number)	RO	5D1*h

PHY Register 04h: Auto-Negotiation Advertisement

Bit	Name	Description	R/W	Default
15	Next Page	1 = Next Page capable 0 = no Next Page capability	R/W	0
14	Reserved	Write as zero, ignore on read	R/W	0
13	Remote Fault	1 = remote fault supported 0 = no remote fault	R/W	0
12	Reserved	Write as zero, ignore on read	R/W	0
11	Asymmetric Pause	1 = advertise asymmetric pause 0 = advertise no asymmetric pause	R/W	0

Bit	Name	Description	R/W	Default
10	Pause Capable	1 = capable of full duplex pause operation 0 = not capable of pause operation	R/W	0
9	100BASE-T4 Capable	100BASE-T4 protocol is not supported. Do not write 1. 0 = not capable to perform 100BASE-T4	R/W	0
8	100BASE TX Full Duplex Capable	1 = 100BASE-TX full duplex capable 0 = Not 100BASE-TX full duplex capable	R/W	0
7	100BASE-TX Half Duplex Capable	1 = 100BASE-TX half duplex capable 0 = Not 100BASE-TX half duplex capable	R/W	0
6	10BASE-T Full Duplex Capable	1 = 10BASE-T full duplex capable 0 = Not 10BASE-T full duplex capable	R/W	0
5	10BASE-T Half Duplex Capable	1 = 10BASE-T half duplex capable 0 = Not 10BASE-T half duplex capable	R/W	0
4:0	Selector Field	Selector Field mode: 00001 = IEEE 802.3	R/W	00001

PHY Register 05h: Auto-Negotiation Link Partner Ability

Bit	Name	Description	R/W	Default
15	Next Page	1 = link partner capable of Next Page 0 = link partner not capable of Next Page	RO	0
14	Acknowledge	1 = link partner has received link code word 0 = link partner has not received link code word	RO	0
13	Remote Fault	1 = link partner has detected remote fault 0 = link partner has not detected remote fault	RO	0
12	Reserved	Write as zero, ignore on read	RO	0
11	Asymmetric Pause	1 = link partner wants asymmetric pause 0 = link partner does not want asymmetric pause	RO	0
10	Pause Capable	1 = link partner is capable of pause operation 0 = link partner is not capable of pause operation	RO	0
9	100BASE-T4 Capable	1 = link partner is 100BASE-T4 capable 0 = link partner is not 100BASE-T4 capable	RO	0
8	100BASE-TX Full Duplex Capable	1 = link partner is 100BASE-TX full duplex capable 0 = link partner is not 100BASE-TX full duplex capable	RO	0
7	100BASE-TX Half Duplex Capable	1 = link partner is 100BASE-TX half duplex capable 0 = link partner is not 100BASE-TX half duplex capable	RO	0
6	10BASE-T Full Duplex Capable	1 = Link partner is 10BASE-T full duplex capable 0 = Link partner is not 10BASE-T full duplex capable	RO	0
5	10BASE-T Half Duplex Capable	1 = link partner is 10BASE-T half duplex capable 0 = link partner is not 10BASE-T half duplex capable	RO	0
4:0	Protocol Selector Field	Link partner protocol selector field	RO	00000

PHY Register 06h: Auto-Negotiation Expansion

Bit	Name	Description	R/W	Default
15:7	Reserved	Write as zero, ignore on read	RO	000000000
6	Receive Next Page Location Able	1 = bit 5 determines Next Page receive location. 0 = bit 5 does not determine Next Page receive location.	RO	1
5	Received Next Page Storage Location	1 = link partner Next Pages are stored in Register 8 0 = link partner Next Pages are stored in Register 5	RO	1
4	Parallel Detection Fault	1 = a fault has been detected via the Parallel Detection function 0 = a fault has not been detected via the Parallel Detection function	RO	0
3	Link Partner Next Page Able	1 = link Partner is Next Page able 0 = link Partner is not Next Page able	RO	0

Bit	Name	Description	R/W	Default
2	Next Page Able	1 = local Device is Next Page able 0 = local Device is not Next Page able	RO	1
1	Page Received	1 = a New Page has been received 0 = a New Page has not been received	RO	0
0	Link Partner Auto-Negotiation Able	1 = link Partner is Auto-Negotiation able 0 = link Partner is not Auto-Negotiation able	RO	0

PHY Register 07h: Next Page Transmit

Bit	Name	Description	R/W	Default
15	Next Page	1 = additional Next Pages to follow 0 = last Next Page	R/W	0
14	Reserved	Write as zero, ignore on read	RO	0
13	Message Page	1 = message page 0 = unformatted page	R/W	1
12	Acknowledge 2	1 = complies with message 0 = cannot comply with message	R/W	0
11	Toggle	Toggles between exchanges of different Next Pages	RO	0
10:0	Message/Unformatted Code field	Next Page message code or unformatted data	R/W	00000000001

PHY Register 08h: Link Partner Received Next Page

Bit	Name	Description	R/W	Default
15	Next Page	1 = additional Next Pages to follow 0 = last Next Page	RO	0
14	Acknowledge	1 = acknowledge 0 = no acknowledge	RO	0
13	Message Page	1 = message page 0 = unformatted page	RO	0
12	Acknowledge 2	1 = complies with message 0 = cannot comply with message	RO	0
11	Toggle	Toggles between exchanges of different Next Pages	RO	0
10:0	Message Code field	Next Page message code or unformatted data	RO	00000000000

PHY Register 09h: 1000Base-T Control

Bit	Name	Description	R/W	Default
15:13	Test mode bits	000 = normal operation 001 = test mode 1—Transmit waveform test 010 = test mode 2—Master transmit jitter test 011 = test mode 3—Slave transmit jitter test 100 = test mode 4—Transmitter distortion test 101, 110, 111 = reserved	R/W	000
12	Master/Slave Manual Config Enable	1 = manual Master/Slave configuration 0 = automatic Master/Slave configuration	R/W	0
11	Master/Slave Config Value	1 = configure PHY as Master 0 = configure PHY as Slave This bit is ignored if bit 12 = 0.	R/W	0
10	Port type	1 = indicate the preference to operate as multiport device 0 = indicate the preference to operate as single-port device	R/W	0

Bit	Name	Description	R/W	Default
9	1000BASE-T Full Duplex	1 = advertise 1000BASE-T full duplex capability 0 = advertise no 1000BASE-T full duplex capability	R/W	1
8	1000BASE-T Half Duplex	1 = advertise 1000BASE-T half duplex capability 0 = advertise no 1000BASE-T half duplex capability	R/W	1
7:0	Reserved	Write as 0, ignore on read.	R/W	00000000

PHY Register 0Ah: 1000Base-T Status

Bit	Name	Description	R/W	Default
15	Master/Slave configuration fault	1 = Master/Slave configuration fault detected 0 = no Master/Slave configuration fault detected	RO	0
14	Master/Slave configuration resolution	1 = local transmitter is Master 0 = local transmitter is Slave	RO	0
13	Local Receiver Status	1 = local receiver OK 0 = local receiver not OK	RO	0
12	Remote Receiver Status	1 = remote Receiver OK 0 = remote Receiver not OK	RO	0
11	LP 1000T FD	1 = link partner is capable of 1000BASE-T full duplex 0 = link partner is not capable of 1000BASE-T full duplex	RO	0
10	LP 1000T HD	1 = link partner is capable of 1000BASE-T half duplex 0 = link partner is not capable of 1000BASE-T half duplex	RO	0
9:8	Reserved	Write as zero, ignore on read	RO	00
7:0	Idle Error Count	Indicate the idle Error count, since last read	RO *Self-Clearing	00000000

PHY Register 0Fh: Extended Status

Bit	Name	Description	R/W	Default
15	1000BASE-X Full Duplex	1 = 1000BASE-X full duplex capable 0 = Not 1000BASE-X full duplex capable	RO	0
14	1000BASE-X Half Duplex	1 = 1000BASE-X half duplex capable 0 = Not 1000BASE-X half duplex capable	RO	0
13	1000BASE-T Full Duplex	1 = 1000BASE-T full duplex capable 0 = Not 1000BASE-T full duplex capable	RO	1
12	1000BASE-T Half Duplex	1 = 1000BASE-T half duplex capable 0 = Not 1000BASE-T half duplex capable	RO	1
11:0	Reserved	Write as zero, ignore on read	RO	000000000000

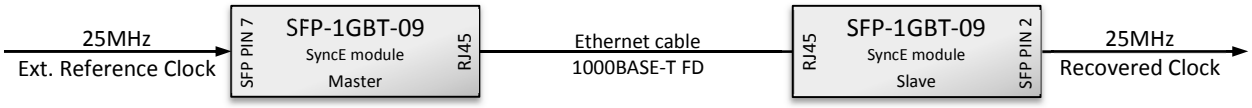
EEPROM Data Fields – Read Only; I2C Device Address A0h

Address	Name of Field	Data Value	Note
00h	Identifier	03h	
01h	Ext. Identifier	04h	
02h	Connector	00h	
03h	Reserved	00h	
04h	Sonet Codes	00h	
05h	Sonet Codes	00h	
06h	GbE Code	08h	
07h	Fibre Code	00h	

Address	Name of Field	Data Value	Note
08h	Fibre Code	00h	
09h	Fibre Code	00h	
0Ah	Fibre Code	00h	
0Bh	Encoding	01h	
0Ch	BR. Normal	0Dh	
0Dh	Reserved	00h	
0Eh	Length 9m-Km	00h	
0Fh	Length 9m	00h	
10h	Length 50m	00h	
11h	Length 62.5m	00h	
12h	Length Copper	64h	
13h	Reserved	00h	
14h	Vendor Name	42h	ASCII: “B”
15h	Vendor Name	45h	ASCII: “E”
16h	Vendor Name	4Ch	ASCII: “L”
17h	Vendor Name	2Dh	ASCII: “-“
18h	Vendor Name	46h	ASCII: “F”
19h	Vendor Name	55h	ASCII: “U”
1Ah	Vendor Name	53h	ASCII: “S”
1Bh	Vendor Name	45h	ASCII: “E”
1Ch	Vendor Name	20h	ASCII: Space
1Dh	Vendor Name	20h	ASCII: Space
1Eh	Vendor Name	20h	ASCII: Space
1Fh	Vendor Name	20h	ASCII: Space
20h	Vendor Name	20h	ASCII: Space
21h	Vendor Name	20h	ASCII: Space
22h	Vendor Name	20h	ASCII: Space
23h	Vendor Name	20h	ASCII: Space
24h	Reserved	00h	
25h	Vendor OUI	00h	
26h	Vendor OUI	00h	
27h	Vendor OUI	00h	
28h	Vendor PN	31h	ASCII: “1”
29h	Vendor PN	47h	ASCII: “G”
2Ah	Vendor PN	42h	ASCII: “B”
2Bh	Vendor PN	54h	ASCII: “T”
2Ch	Vendor PN	2Dh	ASCII: “-“
2Dh	Vendor PN	53h	ASCII: “S”
2Eh	Vendor PN	46h	ASCII: “F”
2Fh	Vendor PN	50h	ASCII: “P”
30h	Vendor PN	30h	ASCII: “0”
31h	Vendor PN	39h	ASCII: “9”
32h	Vendor PN	20h	ASCII: Space
33h	Vendor PN	20h	ASCII: Space
34h	Vendor PN	20h	ASCII: Space
35h	Vendor PN	20h	ASCII: Space
36h	Vendor PN	20h	ASCII: Space

Address	Name of Field	Data Value	Note
37h	Vendor PN	20h	ASCII: Space
38h	Vendor Rev	41h-5Ah	
39h	Vendor Rev	20h	ASCII: Space
3Ah	Vendor Rev	20h	ASCII: Space
3Bh	Vendor Rev	20h	ASCII: space
3Ch	Laser Wavelength	00h	
3Dh	Laser Wavelength	00h	
3Eh	Reserved	00h	
3Fh	CC_Base		Checksum (00h - 3Eh)
40h	Reserved	00h	
41h	Options	12h	
42h	BR. Max	00h	
43h	BR. Min	00h	
44h	Vendor SN	30h-39h	
45h	Vendor SN	30h-39h	
46h	Vendor SN	30h-39h	
47h	Vendor SN	30h-39h	
48h	Vendor SN	30h-39h	
49h	Vendor SN	30h-39h	
4Ah	Vendor SN	30h-39h	
4Bh	Vendor SN	30h-39h	
4Ch	Vendor SN	30h-39h	
4Dh	Vendor SN	30h-39h	
4Eh	Vendor SN	30h-39h	
4Fh	Vendor SN	30h-39h	
50h	Vendor SN	30h-39h	
51h	Vendor SN	30h-39h	
52h	Vendor SN	30h-39h	
53h	Vendor SN	30h-39h	
54h	Year	31h-32h	
55h	Year	30h-39h	
56h	Week	30h-35h	
57h	Week	30h-39h	
58h	Date Code	20h	space
59h	Date Code	20h	space
5Ah	Date Code	20h	space
5Bh	Date Code	20h	space
5Ch	No Diag	00h	
5Dh	Enhanced Features	00h	
5Eh	No Diag	00h	
5Fh	CC_EXT		Checksum (40h - 5Eh)
60h-7Fh	Not Used	00h	

SyncE Configuration



Enable Primary Reference 25MHz Clock input on pin 7 for the SFP in Master mode - SyncE Configuration Sequence

Device Address	Control Register / Config. Byte	Byte 1	Byte 2	Description
A2h	FEh	-	-	Enable external Primary Reference Clock Input (pin 7)
ACh	09h	1Ah	00h	Advertise 1000BASE-T full duplex capability and configure SFP as Master
ACh	00h	13h	40h	Restart Auto-Negotiation

Enable Recovery Clock Output on pin 2 for the SFP in Slave mode – SyncE Configuration Sequence

Device Address	Control Register / Config. Byte	Byte 1	Byte 2	Description
ACh ACh	17h 15h	0Fh 00h	44h 10h	Enable Recovered Clock
A2h	FBh	-	-	Enable Clock Output (pin 2)
ACh	09h	12h	00h	Advertise 1000BASE-T full duplex capability and configure SFP as Slave
ACh	00h	13h	40h	Restart Auto-Negotiation

Mechanical