# SFP-10G-WA20(-T)-TAA

# SFP-10G-WB20(-T)-TAA

**10 GIGABIT SFP+ WDM-A MODULE WITH TAA COMPLIANT**

**10 GIGABIT SFP+ WDM-B MODULE WITH TAA COMPLIANT**


## FEATURES

- SFP Multi-Source Agreement Compliant
- LC Simplex Receptacle
- Support 8.5Gb/s to 11.32Gb/s Multi-Rate
- 1270nm DFB Laser Transmitter (WA Model)
- 1330nm DFB Laser Transmitter (WB Model)
- SFF-8472 Diagnostic Monitoring Interface
- Single +3.3V Power Supply
- Link Distance up to 20km
- TAA Compliant
- 5-Year Warranty

## INTRODUCTION

Antaira Technologies SFP-10G-WA20-TAA and SFP-10G-WB20-TAA Small Form Factor Pluggable SFP+ transceivers are compliant with the current SFP+ Multi-Source Agreement (MSA) Specification. The high performance uncooled 1270nm (WA20 Model) or 1330nm (WB20 Model) DFB transmitter and high sensitivity PIN receiver provide superior performance for 10G BASE Ethernet applications up to SMF 20km optical links.

## SPECIFICATIONS

### Absolute Maximum Ratings

| Parameter | Symbol | Minimum | Maximum | Unit |
|---|---|---|---|---|
| Storage Temperature | Tst | -40 | 85 | ℃ |
| Storage Relative Humidity | RH | 5 | 95 | % |
| Supply Voltage | Vcc | -0.5 | 4.0 | V |

### Recommended Operating Conditions

| Parameter | Symbol | Minimum | Type | Maximum | Unit |
|---|---|---|---|---|---|
| Case Operating Temperature (SFP-10G-WA20(WB20)-TAA) | Top | 0 | - | 70 | ℃ |
| Case Operating Temperature (SFP-10G-WA20(WB20)-T-TAA) | Top | -40 | - | 85 | ℃ |
| Supply Voltage | Vcc | 3.13 | 3.3 | 3.47 | V |

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| | | | | | |
|---|---|---|---|---|---|
| Supply Current (SFP-10G-WA20(WB20)-TAA) | Icc | | | 300 | mA |
| Supply Current (SFP-10G-WA20(WB20)-T-TAA) | Icc | | | 350 | mA |

## Transmitter Electro-Optical Characteristics

| Parameter | Symbol | Minimum | Type | Maximum | Unit | Note |
|---|---|---|---|---|---|---|
| Operating Data Rate | DR | 8.5 | 10.3125 | 11.32 | Gb/s | |
| Optical Launch Power | Po | -2 | | 3 | dBm | 1 |
| Optical Center Wavelength (WA Model) | $\lambda_C$ | 1260 | 1270 | 1280 | nm | |
| Optical Center Wavelength (WB Model) | $\lambda_C$ | 1320 | 1330 | 1340 | nm | |
| Spectral Width (-20dB) | $\Delta\lambda$ | | | 1 | nm | |
| Side Mode Suppression Ratio | SMSR | 30 | | | dB | |
| Optical Extinction Ratio | ER | | | | dB | |
| Optical Eye Mask | | IEEE 802.3ae | | | | |
| Relative Intensity Noise | RIN | | | -128 | dB/Hz | |
| Differential Data Input Swing | Vin | 180 | | 850 | mV | |
| Tx Disable Input Voltage-Low (Tx ON) | TDISVL | GND | | 0.8 | V | |
| Tx Disable Input Voltage-High (Tx OFF) | TDISVH | 2.0 | | Vcc | V | |
| Tx Fault Output Voltage-Low (Tx Normal) | TFLTVL | GND | | 0.8 | V | |
| Tx Fault Output Voltage-High (Tx Fault) | TFLTVH | 2.0 | | Vcc | V | |

**Notes:**

1. The optical power is launched into a 9/125µm single mode fiber.

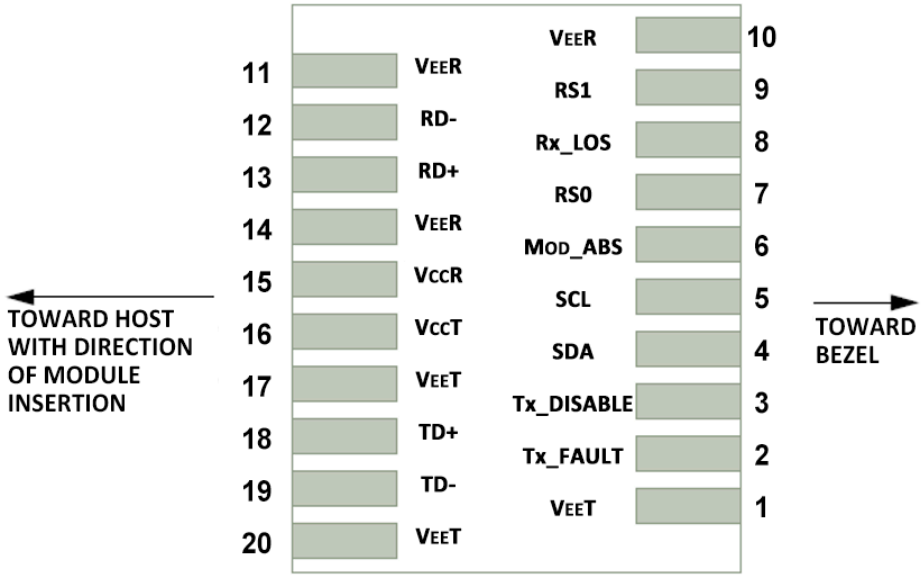
## Receiver Electro-Optical Characteristics

| Parameter | Symbol | Minimum | Type | Maximum | Unit | Note |
|---|---|---|---|---|---|---|
| Operating Data Rate | DR | 8.5 | 10.3125 | 11.32 | Gb/s | |
| Receiver Sensitivity | SEN | | | -14.5 | dBm | 1 |
| Maximum Receive Power | $P_{RX\_MAX}$ | 0.5 | | | dBm | 1 |
| Optical Center Wavelength | $\lambda_C$ | 1260 | 1270 | 1280 | nm | |
| LOS De-Assert | $LOS_D$ | | | -15.5 | dBm | |
| LOS Assert | $LOS_A$ | -30 | | | dBm | |
| LOS Hysteresis | $LOS_{HY}$ | 0.5 | | | dB | |
| Differential Data Output Swing | $V_{OUT}$ | 300 | | 900 | mV | |
| Receiver LOS Signal Output Voltage-Low | $LOSV_L$ | GND | | 0.8 | V | |
| Receiver LOS Signal Output Voltage-High | $LOSV_H$ | 2.0 | | Vcc | V | |

**Notes:**

1. Measured with a PRBS 231 -1 test pattern @10.3125Gbps BER < $10^{-12}$

## PIN DESCRIPTION




**Host PCB SFP+ Pad Assignment Top View**

| Pin Number | Name | Function / Description | Note |
|---|---|---|---|
| 1 | VeeT | Transmitter Ground | |
| 2 | TX_FAULT | Transmitter Fault Indication | 1 |
| 3 | TX_DISABLE | Transmitter Disable - Turns off transmitter laser output | 2 |
| 4 | SDA | 2-wire Serial Interface Data Line (SDA: Serial Data Signal) | 3 |
| 5 | SCL | 2-wire Serial Interface Data Line (SCL: Serial Clock Signal) | 3 |
| 6 | MOD_ABS | Module Absent, connected to VeeT or VeeR in the module | 3 |
| 7 | RS0 | Rate Select 0, optional | 5 |
| 8 | Rx_LOS | Receiver Loss of Signal Indication | 4 |
| 9 | RS1 | Rate Select 1, optional | 5 |
| 10 | VeeR | Receiver Ground | |
| 11 | VeeR | Receiver Ground | |
| 12 | RD- | Receiver Inverted Data output, AC coupled | |
| 13 | RD+ | Receiver Non-Inverted Data output, AC coupled | |
| 14 | VeeR | Receiver Ground | |
| 15 | VccR | Receiver 3.3V Power Supply | |
| 16 | VccT | Transceiver 3.3V Power Supply | |
| 17 | VeeT | Transmitter Ground | |
| 18 | TD+ | Transmitter Non-Inverted Data Input, AC coupled | |

| | | | |
|---|---|---|---|
| 19 | TD- | Transmitter Inverted Data Input, AC coupled | |
| 20 | VeeT | Transmitter Ground | |

**Notes:**

1. Tx Fault is open collector/drain output which should be pulled up externally with a 4.7K~10KΩ resistor on the host board to supply <VccT+0.3V or VccR+0.3V. When high, this output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to <0.8V.
2. Tx Disable input is used to shut down the laser output per the state table below. It is pulled up within the module with a 4.7K~10KΩ resistor. 1) Low(0~0.8V): Transmitter on; 2) Between(0.8V and 2V): Undefined; 3) High (2.0~ VccT): Transmitter Disabled; 4) Open: Transmitter Disabled.
3. These are the module definition pins. They should be pulled up with a 4.7K~10KΩ resistor on the host board to supply less than VccT+0.3V or VccR+0.3V. MOD_ABS is grounded by the module to indicate that the module is present.
4. Rx_LOS (Loss of signal) is an open collector/drain output which should be pulled up externally with a 4.7K~10KΩ resistor on the host board to supply <VccT+0.3V or VccR+0.3V. When high, this output indicates the received optical power is below the worst case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to <0.8V.
5. Tied to ground through a 30K ohm resistor.

## DIGITAL DIAGNOSTIC FUNCTIONS

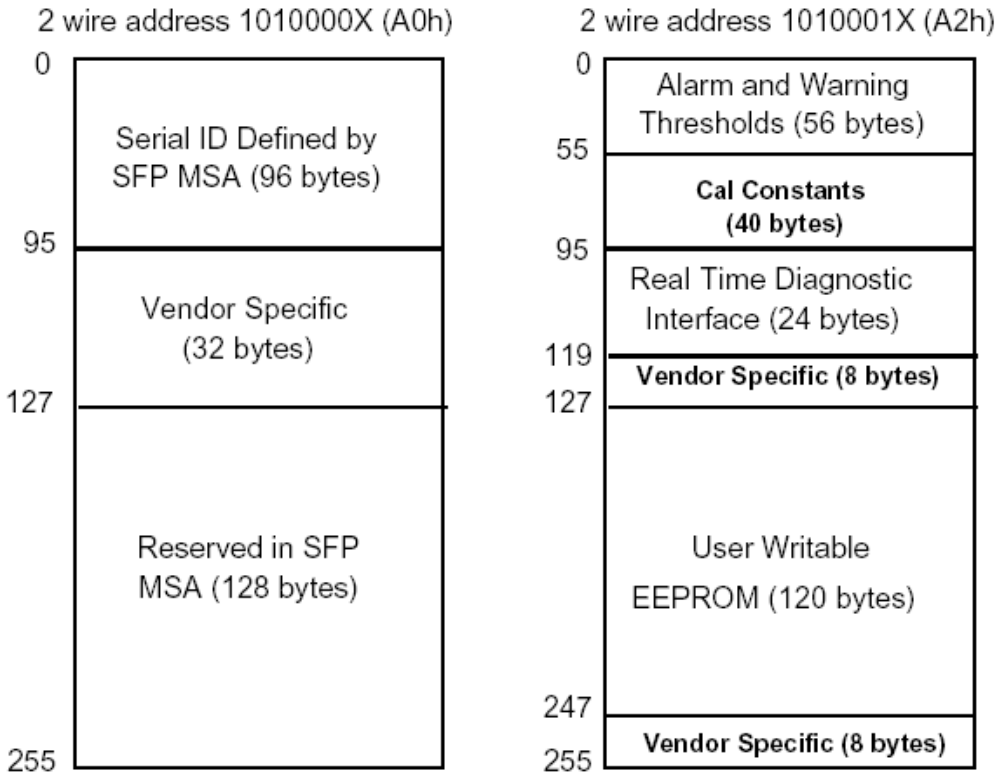
As defined by the SFP MSA (SFF-8472) Ficer's SFP+ transceivers provide digital diagnostic functions via a 2-wire serial interface, which allows real-time access to the following operating parameters:

- Transceiver temperature
- Laser bias current
- Transmitted optical power
- Received optical power
- Transceiver supply voltage

It also provides a sophisticated system of alarm and warning flags, which may be used to alert end-users when particular operating parameters are outside of a factory set normal range.

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Controller (DDC) inside the transceiver, which is accessed through the 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL pin) is generated by the host. The positive edge clocks data into the SFP+ transceiver into those segments of its memory map that are not write-protected. The negative edge clocks data from the SFP+ 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. For more detailed information including memory map definitions, please see the SFP MSA (SFF 8472) Specification.

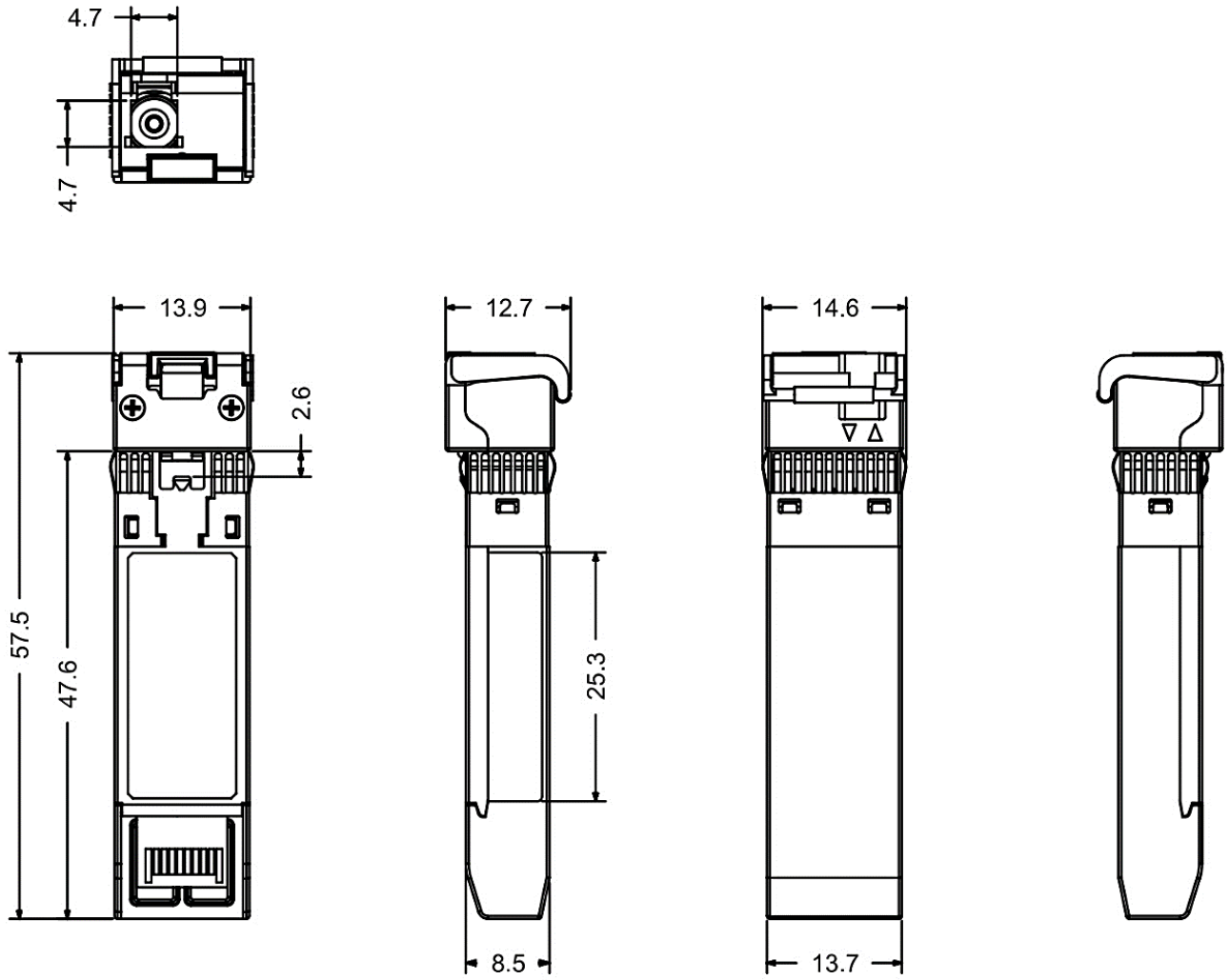
## DIGITAL DIAGNOSTIC MEMORY MAP



## DIGITAL DIAGNOSTIC MONITORING CHARACTERISTICS

| Parameter | Accessory | Unit | Note |
|---|---|---|---|
| Temperature | ±3 | °C | Internal Calibration |
| Supply Voltage | ±0.1 | V | Internal Calibration |
| Tx Bias Current | ±5 | mA | Internal Calibration |
| Tx Output Power | ±3 | dB | Internal Calibration |
| Rx Received Optical Power | ±3 | dB | Internal Calibration |

## DIMENSIONS




**(All Dimensions are ±0.20mm Unless Otherwise Specified, Unit: mm)**

# ORDERING INFORMATION

## SFP Models

| Part Number | Description |
|---|---|
| SFP-10G-WA20-TAA | 10G SFP+ Transceiver, WDM-A, Single-Mode 20km / LC / TX: 1270nm RX: 1330nm, 0~70°C, with TAA Compliant |
| SFP-10G-WA20-T-TAA | 10G SFP+ Transceiver, WDM-A, Single-Mode 20km / LC / TX: 1270nm RX: 1330nm, -40~85°C, with TAA Compliant |
| SFP-10G-WB20-TAA | 10G SFP+ Transceiver, WDM-B, Single-Mode 20km / LC / TX: 1330nm RX: 1270nm, 0~70°C, with TAA Compliant |
| SFP-10G-WB20-T-TAA | 10G SFP+ Transceiver, WDM-B, Single-Mode 20km / LC / TX: 1330nm RX: 1270nm, -40~85°C, with TAA Compliant |



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