



## 1550nm External Modulation Optical Transmitter ·MX-T8500H Series

### USER MANUAL



## Product Summary

The MX-T8500H complies with current international industry techniques and standards as a 1550nm Externally Modulated Optical Transmitter. This unit's light source adopts a narrow bandwidth (0.65MHz), low noise, continuous wave DFB laser, which is advantageous to reduce the influence of dispersion. The unit's signal modulation adopts CATV special American made LiNbO<sub>3</sub> external modulator and optimized control technology with independent intellectual property, it will attain a high index of back-to-back CNR  $\geq 54$ dB, CTB  $\leq -65$ dB, CSO  $\leq -65$ dB, SBS: 13~20dBm adjustable. The unit is equipped with a RS232 communication interface, SNMP network management, 1+1 power supply back-up, and housing temperature auto-control.

## INSTALLATION

### Transmitter Mounting and Power Connection

1. Place the unit into a 19-inch-wide rack or cabinet. Make sure to leave a 1.75-inch (about 4.5cm) space above and below the unit.
2. The MX-T8500H series 1550nm optical transmitter may operate between 0°C~50°C (32°F~122°F) temperature range. We recommend 25°C (77°F) environment temperature.

Humidity should not exceed 95%. Unit should be operated in a dust-free environment.

Power supply:

Input	94-245VAC, 50-60Hz Optional -48 VDC
Power consumption	Maximum 50W

3. The unit should be connected to proper grounding, grounding resistance <math><4\Omega</math>. Before connecting circuit, please use spec (#20AWG or more) electric wire to connect the grounding screw on the bottom and the grounding frame.

### RF connection

Connect the RF cable & the connector to the TX rear panel. RF connector is F type plug. (F-Female/F-male Optional). The resistance is 75 $\Omega$ .

### Optic connection

1. The fiber optic connectors should have covers to protect them during transportation.
2. In order to ensure proper insertion loss & return loss, the end-face of fiber optic connector should be polished SC/APC
3. Clean all fiber patch cords before connecting to the transmitter.

### Cleaning Guidelines:

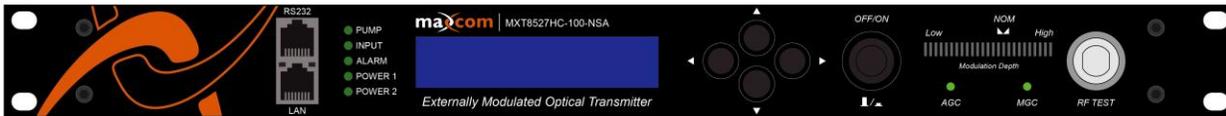
#### Fiber Patch cord connectors

- Remove the fiber connectors dust cap and wipe the fiber connector tip with a dry lint-free cloth (such as Kim wipes). Inspect for scratches or debris on connector surface by using a microscope (ie.100x or 200x).
- If no scratches or debris are detected, the connector is now clean and ready for connection. If debris or scratches are found, repeat the fiber patch cord connector cleaning guidelines.
- Clean each fiber connector according to section A of the fiber cleaning guidelines.

4. Make sure the laser key or on/off switches on the front panel of the transmitter are in the OFF position.
5. Connect a fiber patch cord from the output of the transmitter to an optical power meter.
6. Turn the transmitter laser key switch to the ON position.
7. Using the optical power meter verify the transmitter optical power is within specification.
8. Turn the transmitter laser switch to the OFF position.

## TRANSMITTER CONTROLS, INDICATORS, AND ALARMS

This section of the manual will give an overview of the available menus in the MX-T8500H series transmitter and their descriptions. All instructions in Section refer to the representation of the front panel shown in the diagram below. The user scrolls through the TX menus using the push buttons found on the front panel of the TX, these are located just to the right of the LCD screen.



### The operation of the panel

#### 1.1.1 Open menu

- A. Plug in AC power supply (Or connect optional -48 VDC PS)
- B. Turn on power switch in the rear panel (On AC models)

Front panel display "KEY OFF"

Laser	Status Lamp Red
ALarm	Status Lamp Green
LAN	Status lamp Green
POWER	Status Lamp Green

- C. Press laser start-up keyswitch

Front panel shows "**KEY ON...**", Laser status lamp turns to green from red, Unit then enters self-diagnostic mode, the unit then enters operational status, displays "Descriptor".

## Start-up main menu

Press ◀▶ button will display below menu in sequence.

**Menu #1 - Descriptor**

Read-only menu, indicates the equipment type

**Menu #2 - Model**

Read-only menu, indicates the equipment model

**Menu #3 - MOD S/N**

Read-only menu, indicates MOD serial-number

**Menu #4 - Date**

Read-only menu, indicates the date

**Menu #5 - Version**

Read-only menu, indicates the version

**Menu #6 - OUTPUT1**

Read-only menu, indicates the optical power out of port 1

**Menu #7 - OUTPUT2**

Read-only menu, indicates the optical power out of port 2

**Menu #8 - LD S/N**

Read-only menu, indicates laser serial-number

**Menu #9 - Laser Current**

Read-only menu, indicates laser current

**Menu #10 - Laser TEMP**

Read-only menu, indicates the laser temperature

**Menu #11 - TEC Current**

Read-only menu, indicates the TEC current

**Menu #12 - OMI Adjust**

OMI adjustable, the range is -7.3dBm~+7.3dBm, step 0.3/0.2 dBm

**Menu #13 - RF Mode**

Current RF mode, displays AGC/MGC

If the RF Mode displays AGC, the unit is in AGC mode

If the RF Mode displays MGC, the unit is in MGC mode

**Menu #14 - RF Level**

Read-only menu, displays RF level, shows LOW/NORMAL/HIGH

**Menu #15 - SBS**

Adjustable list, SBS restrain, optional 13~20dBm

**Menu #16 - SBS State**

Read-only menu, indicates situation of SBS

**Menu #17 - CSO State**

Read-only menu, indicates situation of CSO

**Menu #18 - System TEMP**

Read-only menu, indicates the system temperature

**Menu #19 - +5V Monitor**

Read only list, displays the voltage +5V

**Menu #20 - -5V Monitor**

Read only list, displays the voltage -5V

**Menu #21 - +15V Monitor**

Read only list, displays the voltage +15V

**Menu #22 - -15V Monitor**

Read only list, displays the voltage -15V

**Menu #23 - +24V Monitor**

Read only list, displays the voltage +24V

**Menu #24 - IP**

Adjustable list, displays the IP address of SNMP

**Menu #25 - Sub**

Adjustable list, displays the address of net mask

**Menu #26 - GW**

Adjustable list, displays the gateway address of SNMP

**Menu #27 - TR1**

Adjustable list, displays the TRAP1 address of SNMP

**Menu #28 - TR2**

Adjustable list, displays the TRAP2 address of SNMP

**Menu assistant manual**

Press ▼ key to amend (change) the address menu that should be amended (changed), press ◀ to choose the amend place, push ▶ currently value +1, press ▼ to the end of the address to enter, save and exit.

For example, amend IP setup menu, IP: 192.168.000.015; if changing 5 to 6, use ◀ key to choose the place of 5, then press ▶ key to change 5 to 6, then press ▼ to save amended IP:192.168.000.

## TRANSMITTER SETUP TIPS - NETWORK DESIGN

A 1550nm system can use an EDFA to extend transmission distance. When operating at 1550nm, several factors, such as Chromatic Dispersion, SBS, SPM (Self Phase Modulation) and other non-linearity effects of optic fiber need to be considered. Please observe the following simple rules when applying the transmitter.

### Choosing a SBS Value - Fiber Distance

If you want to transmit more than 100km, you need to select the 13dBm SBS suppression value. This is recommended because of SPM & Chromatic Dispersion in the fiber. If you want to choose longer distance transmission, you need to select smaller optical line band- width. 13dBm is the smallest, 16dBm is wider, and 18dBm is the widest. The following table shows the recommended fiber length in which SBS restraint status.

Fiber Length	SBS Suppression Value
< 60km	13dBm, 16dBm, 18dBm, 20dBm
< 70km	13dBm, 16dBm
< 120km	13dBm
> 120km	13dBm (CSO performance may degrade)

### Maximum Fiber Launch Power

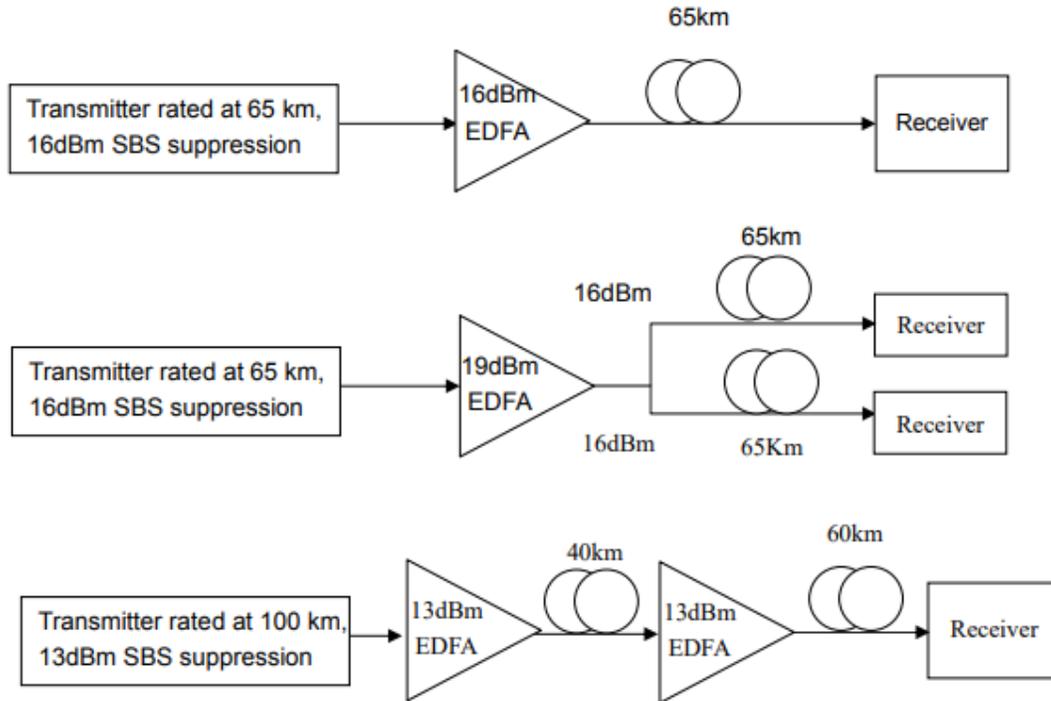
The maximum fiber Input power is limited by the SBS Suppression value. If the input power exceeds the stipulated limit, poor performance will result. The low frequency band will have 1/f noise and low channel CNR may be poor. HUM will also be worse than in normal status. The attached table shows the launch power limit value vs. SBS Suppression Value.

SBS Suppression Value	Maximum Fiber Input Power
18dBm	Max.18.4dBm
16dBm	Max.16.4dBm
13dBm	Max.13.4dBm

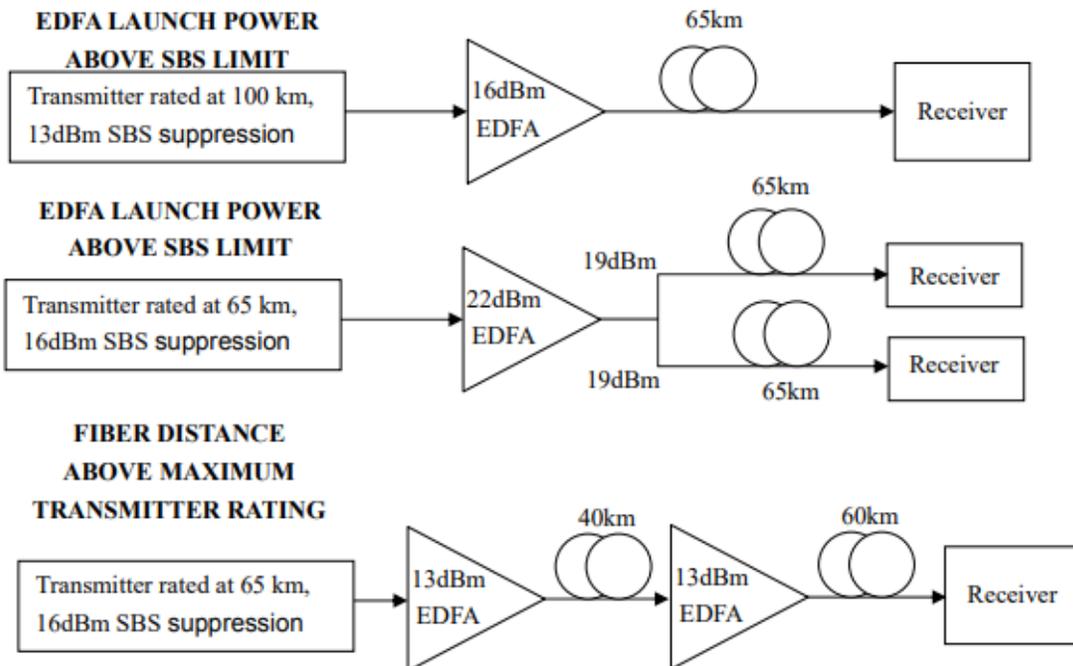
The general, the CATV operator will use a high power EDFA (such as 22dBm or higher) and use an optical splitter to distribute the power injected into the fiber. It is not a problem to do this, because the optical fiber patch cord is short. But it is necessary to note that SBS restraint setup rest with the worse situation, for example, the longest distance & the highest fiber input power launched into the optical cable.

# TRANSMITTER AND EDFA SYSTEM DEPLOYMENT

Examples of the **Correct** link for transmitter & EDFA:



Sample **incorrect** link for transmitter & EDFA:



## SBS adjustment process

The MX-T8500H external modulation transmitter offers special technology. It may allow the user to adjust the SBS critical value on the spot. The default SBS restraint value is 16.0Bm when leaving the factory. The user may adjust it as required. The adjustment process should be according to the real requirement of system:

Select "SBS=16.5dBm" menu.

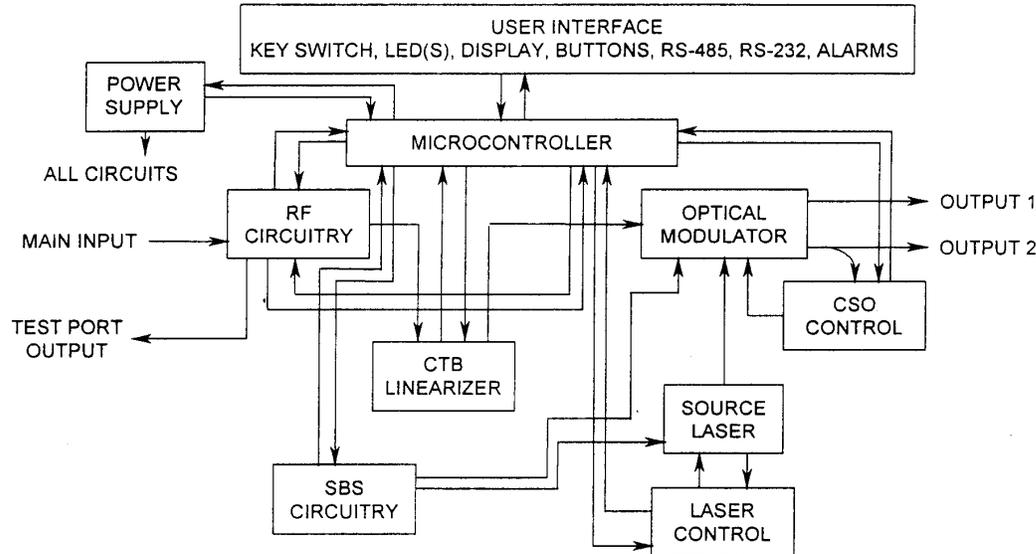
Press ▼ button, start to edit the value of SBS.

Use ◀\▶ button, select the SBS critical value as desired

Press ▼ button again for confirmation.

## EQUIPMENT OPERATION PRINCIPAL

MX-T8500H series 1550 nm optical transmitter principal frame as shown in figure 5.0. Input RF signal is verified at the AGC circuit unit will have an effect on the optical modulator that modulates the CW light, which is output from a 1550nm laser module. A small sample output light is partially checked, then fed back to modulator circuit to control the modulation gain & modulation distortion gain.



MX-T8500H series optic TX operation principal frame

