

FT-FTX-6-SCAPC-V2 & FT-FTX-10-SCAPC-V2 CATV Transmitter User Manual





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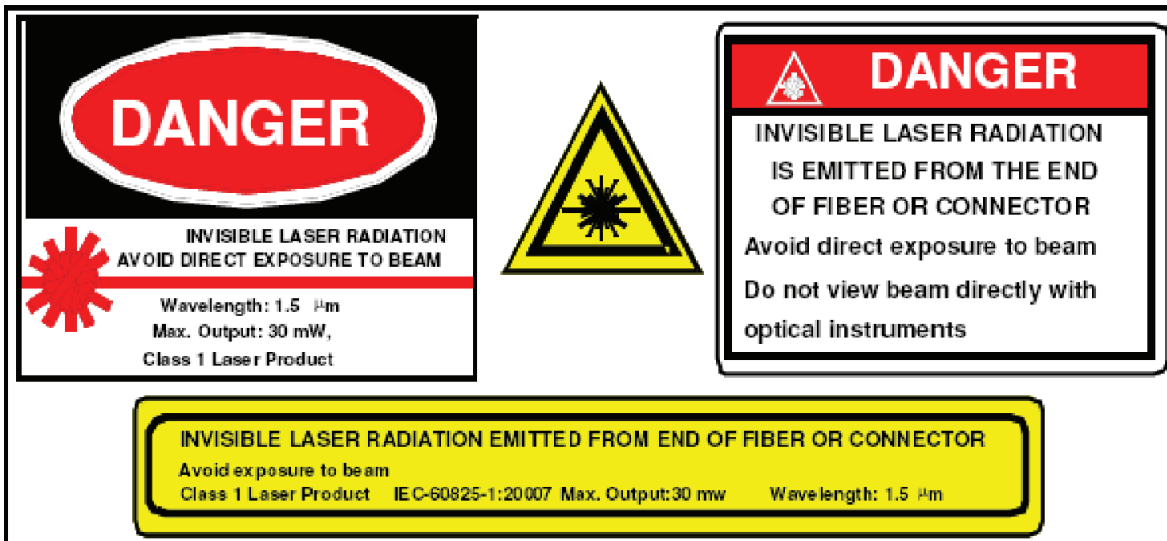


Preface

This manual is designed for the FT-FTX-*-SCAPC 1310 nm Fiber Optic Transmitter series along with a detailed description of product features, specifications, installation, adjustments and troubleshooting. To install this transmitter successfully and use it safely, users must read the manual carefully before installation, and perform their installation and adjustments according to this manual. Otherwise, some practices may lead to equipment damage or personal injury. Please contact FiberTronix if you have any questions.

Important User Information

- Caution: There are invisible laser beams from Fiber output ports, which may cause permanent injury to skin or eyes. Never look into any connector where a laser beam emits from.
- Fiber optic transmitters should be grounded before turning on the power (Grounding resistance should be less than 4Ω) to prevent the laser and user from static damage.
- UPS power supply and temperatures below 75°F are highly recommended for stable operation.



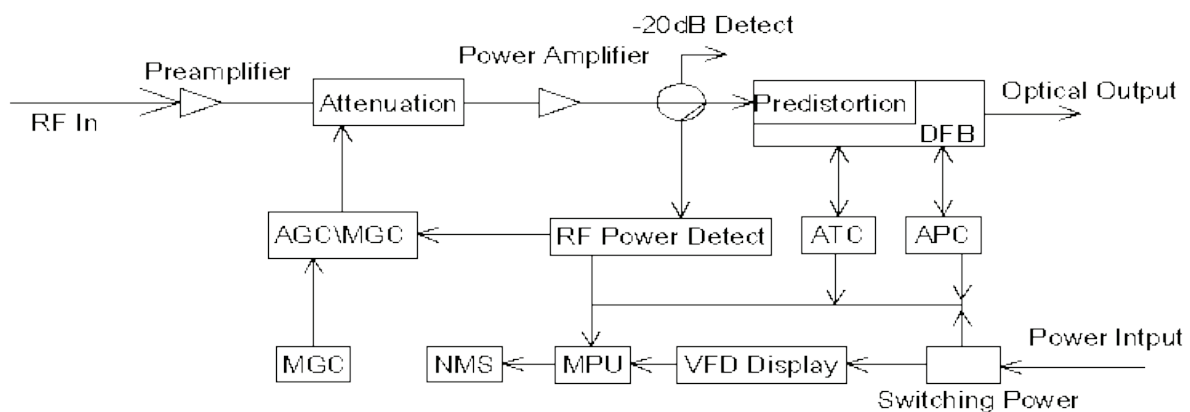
Chapter 1: Overview

The FiberTronix FT-FTX-*-SCAPC is a 1310nm DFB laser transmitter, delivering analog TV, digital TV, and data signals over long distance fiber optic links for CATV networks. This product utilizes a high-performance cooled DFB laser as a light source, RF converter and an RF predistortion circuit. The built-in microprocessor monitoring system automatically ensures consistently high performance of this transmitter.

Chapter 2: Features

- High performance DFB laser with narrow spectrum and good linearity
- RF power digital automatic processing technology
- Excellent pre-distortion technology leading to the improved CTB, CSO and C/N
- Built-in microprocessor to control both laser and RF performance
- Front panel vacuum fluorescent display (VFD) screen displaying the transmitter status
- 19" 1U standard rack with RS485 and RS232 ports for optional remote monitoring
- Optional Ethernet port for SNMP management

Chapter 3: Function Diagram





Chapter 4: Specifications

4.1 Link Test Condition

Test conditions:

Test link consists of FT-FTX-*-SCAPC transmitter, 10km single mode fiber, attenuator and standard optical receiver. Input RF channels are 77 NTSC channels. The optical receiver input power is -1dBm.

4.2 Specifications

Item	Parameter	
Optical Power	6 dBm	10 dBm
Optical Link Path Loss	7dB	11dB
Optical Wavelength	1310 ± 20nm	
Fiber Type	Single Mode	
Type of Laser	Cooled DFB laser	
Optical modulation mode	Direct Modulation	
Optical connector Type	SC/APC	
Frequency Range	45 - 1000MHz	
RF Input Level	15 - 25 dBmV	
Flatness In Band	±0.75 dB	
RF Input Impedance	75 Ω	
Input Reflection Loss	≥16 dB (47 - 1002)MHz	
C/CTB	≥67 dB	
C/CSO	≥62 dB	
C/N	≥51 dB	
AGC Control Range	0 - 15 dB	
MGC Control Range	0 - 15 dB	
Power Voltage	AC 100V - 240V (50/60 Hz)	
Power Consumption	10 W	
Operation Temperature	32 - 122°F (0 - 50°C)	
Store Temperature	-40 - 185°F (-40 - 85°C)	
Relative Humidity	Max 95% no condensation	
Dimension (L x W x H)	19 x 15 x 1.73" (483 x 381 x 44 mm)	
Weight	11.02 lbs. (5 Kg)	
Warranty	2 Year Warranty	

4.3 Optical Link C/N Table

Optical Loss(dB)	4	5	6	7	8	9	10	11	12	13	14
FT-FTX-6-SCAPC-V2	53.8	52.8	51.8	51.0	50.1	49.2	48.2				
FT-FTX-10-SCAPC-V2						52.9	51.9	51.0	50.1	49.1	48.2

Chapter 5: Functions Guide

5.1 Front Panel Guide

Test conditions:

Test link consists of FT-FTX-*-SCAPC transmitter, 10km single mode fiber, attenuator, and standard optical receiver. Input RF channels are 77 NTSC channels. The optical receiver input power is -1dBm.



1. **LED status indicator:**
Green light: normal; Red light: warning. Check VFD message to troubleshoot problem.
2. **VFD Monitor:**
Displays each status parameter, product model, serial number and other information about this transmitter.
3. **UP button:** scroll the VFD display UP to increase the setting value.
4. **Down button:** scroll the VFD display DOWN to decrease the setting value.
5. **Enter button:** MGC/AGC mode and MGC Attenuation selector.

Notice: At “AGC Status”, pressing “Enter” will switch to “MGC Status”; at “MGC Status”, pressing “Enter” will switch back to “AGC Status”.

At “AGC Status”, press the UP or DOWN button until the VFD displays ‘MOD LEVEL=XXdB-mV’, then press the “Enter” button to select. After selecting, the VFD will display ‘MOD LEVEL=XXdB- mV’ and ‘Please install...’. At this point the user can change the modulation level in 1dB increments by pressing the UP or DOWN buttons. Once you have selected the desired modulation level, press ENTER again to save it. At that time the VFD will display ‘MOD LEVEL=XXdBmV’ and the transmitter will shift back to AGC mode. For instance, if the user’s required modulating level is 38dBmV, the VFD would display “MOD LEVEL= 38dBmV “. Please consult a FiberTronix engineer for help with this feature.

At “MGC Status”, press the UP or DOWN button until the VFD displays ‘MGC ATT=XXdB’, then press the “Enter” button to select. After selecting, the VFD will display ‘MGC ATT=XXdBmV’ and ‘Please install...’. At this point the user can change the modulation level in 1dB increments by pressing the UP or DOWN buttons. For instance, the MGC ATT decrease 3dB will increase the MOD LEVEL by 3dB. Once you have selected the desired MGC ATT value, press ENTER again to save it.

Notes: At “AGC Status”, the RF power setting of the laser is locked, and is not dependent on the input RF level and channel number. At “MGC Status”, the total RF power to the laser will vary with the input RF level and channel number. The default control mode of the FT-FTX-*-SCAPC transmitter is AGC.

6. **RF input test port:** Standard 75Ω style F-style test port for RF signal in-line test. The level tested from this port is 20dB lower than the actual RF drive level to the laser.

5.2 Rear Panel Guide

Test conditions:

Test link consists of FT-FTX-*-SCAPC transmitter, 10km single mode fiber, attenuator and standard optical receiver. Input RF channels are 77 NTSC channels. The optical receiver input power is -1dBm.



7. **RF input port: Standard 75Ω F-type coaxial port**
Input level range is between 15dBmV and 25dBmV. Optimum input level is 17dBmV
8. **Optical signal output:** Optical output port, SC/APC
***Caution.** Do not look directly into the optical output since it can damage your eye
9. **RS-232 standard network management port (optional):** Allows for the connection of equipment With an RS-232.
10. **Network management indicator**
11. **RS-485 standard network management port (optional):** Allows for the connection of equipment with an RS-485 port.
12. **LAN network management port (optional):** Allows connection of the fiber transmitter with an Ethernet SNMP network management server.
13. **Power in:** AC power connection.
14. **Fuse:** AC fuse
15. **AC Power switch:** Turn ON or turn OFF the power.
16. **Case grounding nut:** Provided for connecting the transmitter to ground.



5.3 Parameter Display

5.3.1 Turning on power display

When the transmitter is first powered on, the VFD will display 'Initialize...' for 2 seconds and the buzzer will briefly tweet one time indicating that the transmitter has initialized successfully.

5.3.2 Status display

5.3.3 After the transmitter has been powered ON and initialized, pressing the UP or DOWN button on the front panel will scroll the VFD to display the following:

1. **“Welcome**
2. **AGC Status (Press “Enter” will switch to “MGC Status”, press “Enter” again to go back to AGC)**
3. **“S/N: xxxx-xx-xxxx”**: equipment serial number
4. **“MOD LEVEL= XXdBmV”**: modulating level value
(Pressing “Enter” at “AGC Status” will increase or decrease the RF level to the laser)
5. **“AGC ATT= XXdB”**: attenuation value at “AGC Status”
(Pressing “Enter” at “MGC ATT=XXdB” will increase or decrease the RF level to the laser)
6. **“INPUT RF= XXdBmV”**: RF input level
7. **“BIAS= XX mA”**: bias current of the laser
8. **“TEMP=XX.X °C”**: internal temperature value of the laser
9. **“POWER=XX.X mW”**: output power, unit mW
10. **“FT-FTX-*-SCAPC”**: module name, N indicates built-in SNMP Network Interface Board

Display Message	Alarm Status	System Indication
Warning...!!! Input RF is low	Input RF is too low	Status indicator red light flashes
Warning... !!! Input RF is high	Input RF is too high	Status indicator red light flashes



Chapter 6 Installation & Adjustment

6.1 Opening the cover

- 6.1.1 Inspect the package. If the packaging has been damaged, or shows signs of water damage, please contact FiberTronix
- 6.1.2 After unpacking, check the equipment and accessories according to the packing list. If there are any questions, please contact FiberTronix.
- 6.1.3 If you think the equipment has been damaged, please do not turn on the power to avoid damage. Please contact FiberTronix.

6.2 Required supplies & tools.

- A. An optical power meter
- B. A digital multimeter
- C. A Cable TV RF meter or spectrum analyzer with a dBmV scale
- D. A standard fiber test jumper (SC/APC)
- E. Denatured or 99% pure isopropyl alcohol and lint-free fiber optic cleaning wipes

6.3 Installation

- a. Mount the equipment in the rack and ground the chassis.
- b. Check the input voltage using a digital multimeter in accordance with power requirement. Then turn on power.
- c. Check the message on the VFD and the status of the front panel LED indicator. Push the UP and DOWN button to check each parameter, ensuring that the transmitter is operating normally. (If there is no RF input, the red LED will flash, and the VFD will display "input RF is low".)
- d. Connect a single mode SC/APC fiber test cable to the transmitter's optical signal output. Measure the output optical power and confirm that the output optical power is the same as the value displayed on the VFD. (When measuring the optical power, make sure that the optical power meter is set for 1310nm wavelength and that the fiber test jumper connectors are clean.)



- e. Measure the input RF signal level with a Cable TV meter or a spectrum analyzer, making sure that input RF signal is in the range of 15~25dBmV (optimum value 17dBmV). At this time, you can now connect the RF signal to the RF signal input port of the equipment. This time the front panel LED will turn to green and the VFD displays the RF input value as "RF INPUT = XXdBmV". The internal RF power detector is calibrated for 77 analog NTSC channels, so the displayed value may not be correct, depending upon your actual channel plan. It is possible to correct the displayed value to read your measured RF level by pressing the UP or DOWN button to scroll the VFD until it displays 'RF LEVEL=XXdBmV', and then press ENTER. The VFD will now display 'MOD LEVEL=XXdBmV' and 'Please install...', and the user can now set the RF input level in 1 dBmV increments by pressing the UP or DOWN buttons. When the displayed value is equal to your tested value, press ENTER to save it, and at that time the VFD will display 'RF LEVEL=XXdBmV'. Example: If the real RF input level is 20dBmV, the VFD would display "RF LEVEL= 20dBmV" after the steps shown above.
- f. Re-measure the optical output power, making sure that the optical output power is correct, remove the fiber test jumper and optical power meter, connect the equipment to the network.

Chapter 7 SNMP Management

With a built-in SNMP interface board, the FT-FTX-*-SCAPC can be controlled and monitored using SNMP software via the RJ-45 port at the rear panel.

7.1 IP Address

7.1.1 The FT-FTX-*-SCAPC transmitter default IP address for SNMP management is "192.168.1.20". The Ethernet Interface hardware and TCP/IP features are as follows:

Interface Type	RJ45
Speed Rate	10Mbps
Default IP Address	192.168.1.20
Default Mask	255.255.255.0
Default Gateway	192.168.1.1

7.1.2 SNMP Agent Network Management System The standard SNMPv1 agent is provided in the built-in SNMP interface board, which can be accessed by the standard SNMP network management tools. SNMPv2 is optional. The parameters of the FT-FTX-*-SCAPC can be read by SNMP software with a management information base (MIB), including the RF parameters, power information, temperature etc..

7.2 Setting a Private IP Address

The user can change the FT-FTX-*-SCAPC IP address as follows

7.2.1 Telnet Management

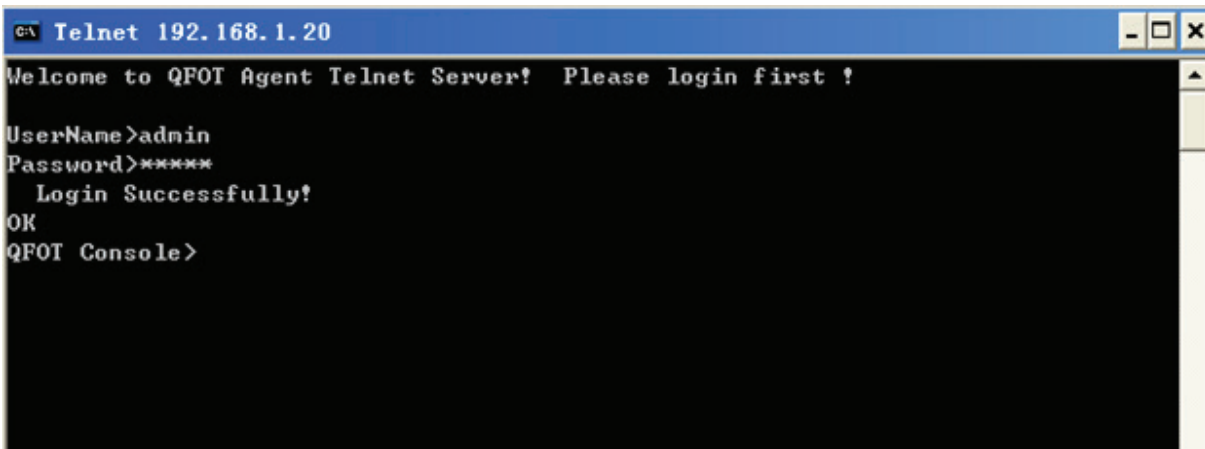
The FiberTronix FT-FTX-*-SCAPC transmitter supports TELNET management. When the FT-FTX-*-SCAPC is connected to a computer via RJ-45, the computer's IP address should be on the same subnet. EX; "192.168.1.19". After connecting your PC to the transmitter, the user can enter the command line in the DOS window:

"telnet 192.168.1.20", where the "192.168.1.20" is the default IP address of FT-FTX-*-SCAPC.

After a successful connection, the user name and password are required.

The default username: admin

The default password: 12345



```
C:\> Telnet 192.168.1.20
Welcome to QFOT Agent Telnet Server! Please login first !

UserName>admin
Password>*****
  Login Successfully!
OK
QFOT Console>
```



Commands	Parameter	Description	Appendix
Exit	/	Exit the management console	
Carrier Return	/	Indicate the command was entered	
Admin	/	This is only valid for username prompt	The device has only one username: admin
12345	/	This is only valid for password prompt	The device has only one password: 12345
Logout	/	Logout of the console	
Help	/	Show the help window	
?	/	Same as command: "help"	
Ver	/	Show the version information of device	
Set	Ip xxxxxxxx Gateway xxxxxxxx Mask xxxxxxxx	Set IP address Set Gateway address Set Mask	"xxxx" is the IP address or mask, they can be like this: 192.168.1.2 255.255.255.0
Show	/	Show basic information of the device	
Set	Model "xxxxxx" Model	Set the Model View the Model	When setting the model, the string must include quotation mark, and the max string length is 12
Set	Location "xxxxxx" Location	Set the location of the device View the location	When setting the location string, the string must include quotation mark, and the max string length is 12
Reboot	/	Reboot the device	

Notice:

- All commands must be uppercase
- The FT-FTX-*-SCAPC can only supports one TELNET session at a time.
- The device will disconnect a TELNET session when it is idle for 5 minutes.
- The user can close the TELNET session in two ways: 1. input the "quit" command; 2: either ctrl-x or ctrl-d or ctrl-c is OK to close this session
- If the TELNET session was closed abnormally, the user must wait for 5 minutes to reconnect the device with TELNET

7.2.2 Console Management

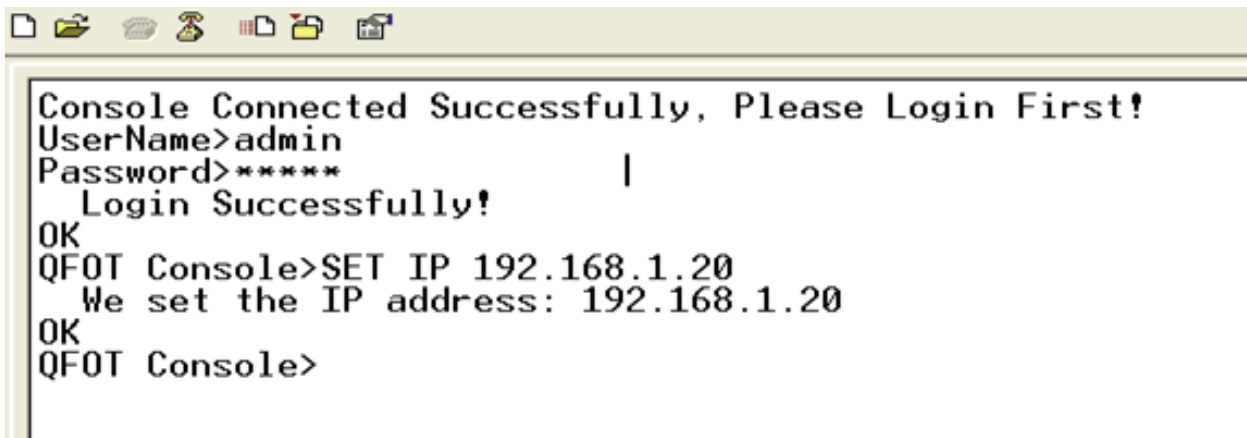
The FT-FTX-*-SCAPC transmitter provides console management with an RS232 port.

The RS232 Interface is:

Item	Value
Interface	RS232
Type	DB9-Female
Baud Rate	9600bps
Data Bit	8
Stop Bit	1
Parity	None
Data Flow Control	None

Notice:

- Open the HyperTerminal window of the computer and disconnect the connection at this window. Set the COM port parameter as above and re-connect Hyper Terminal.
- When the FT-FTX-*-SCAPC is connected to a computer, “9600 8-N-1” will appear at the bottom of Hyper Terminal window
- Press “Enter” 3 times to enter into the user and password prompt window
- Input the username “admin” and password “12345”
- All commands listed in 7.2.1 are accepted.



```

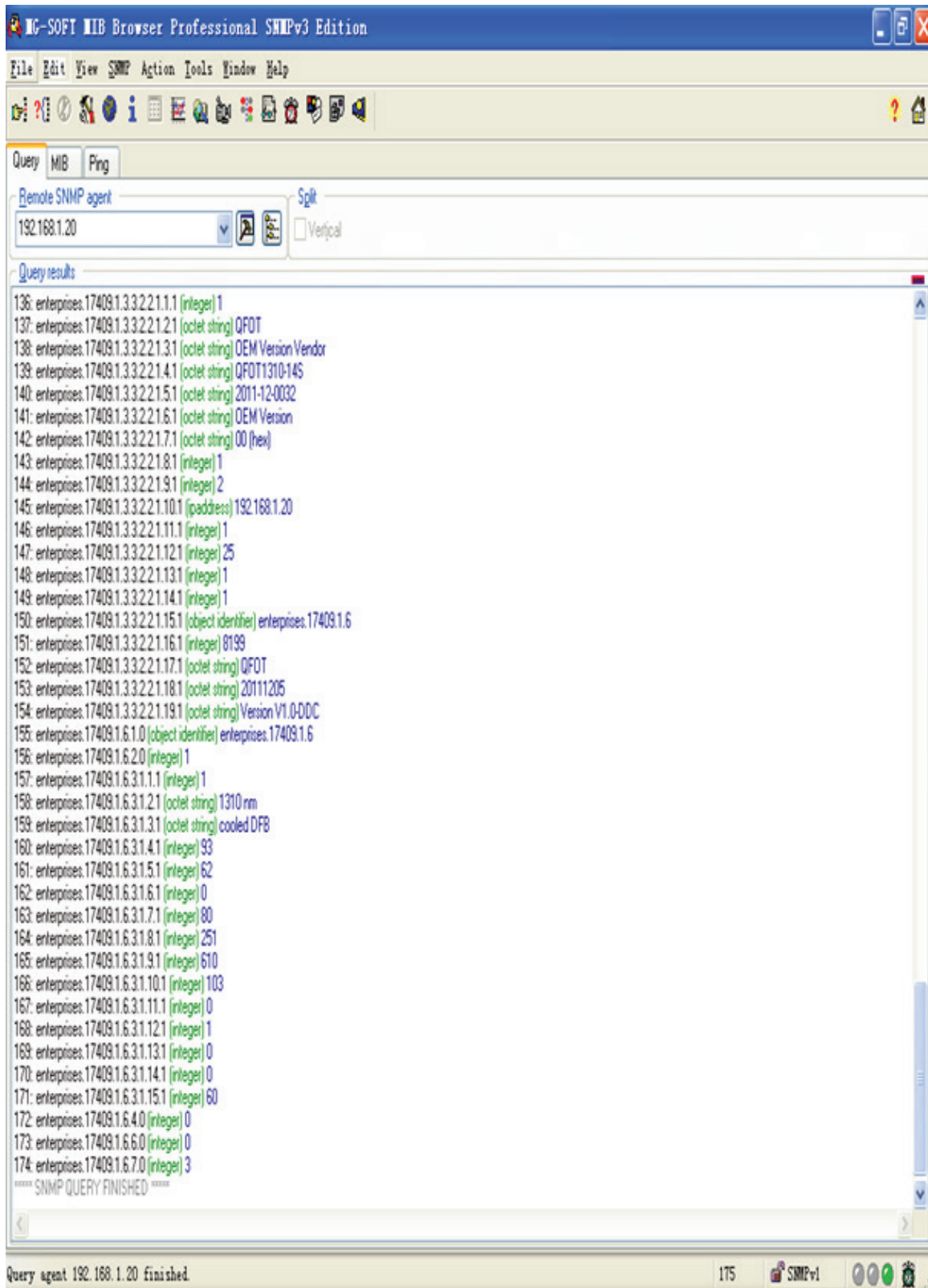
Console Connected Successfully, Please Login First!
UserName>admin
Password>*****
Login Successfully!
OK
QFOT Console>SET IP 192.168.1.20
We set the IP address: 192.168.1.20
OK
QFOT Console>
  
```

7.2.3 Parameters in SNMP

SNMP software with transmitter MIB can read the parameters from FT-FTX-*-SCAPC.

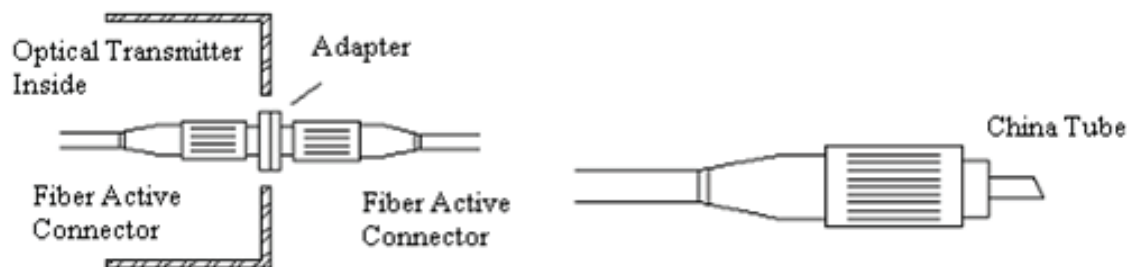
Here is the typical MIB tree.





Chapter 8 Cleaning & Maintenance

Fiber connectors can become contaminated by dust or dirt, which can result in increased optical link loss, or a degraded carrier-to-noise ratio. If you find that the optical receive power or RF output level of the optical receiver has declined, you should disconnect the power, then clean and maintain the fiber connectors. The cleaning method is recommended below:



- Carefully unplug the fiber connector from the adapter, while being careful to avoid aiming the fiber connector at the body or eye.
- Use a lint-free fiber optic wipe saturated with alcohol to clean the connector carefully. Once finished, wait 1~2 minutes until the connector surface is dry.
- When the cleaned optical connector is reconnected to the adapter, please do not over-tighten or force the connector, to avoid damage to the ceramic ferrule.
- The fiber connector should be cleaned on both ends. If the optical power is still low after cleaning both ends, it is recommended that you clean the inner adapter.
- Use compressed air or a lint-free wipe to clean the adapter carefully. When using compressed air, aim the nozzle at the ceramic ferrule of the adapter, cleaning the ferrule with compressed air.

Notice:

- Avoid aiming the optical output or fiber connector at the body or eyes.
- Assemble the fiber adapter gently and carefully to prevent damage to the ceramic ferrule inside the adapter.

Chapter 9 After-sale Customer Service

- If the equipment has failed, please immediately contact FiberTronix at (610) 429-1821
- Do not attempt to repair the problem without the help from a FiberTronix technician.
- Notice: Any unauthorized removal of the security tape seal by the user will void the warranty.



Chapter 10 Troubleshooting

Symptom	Fault	Action
No VFD or LED display after turning on the power	No input power or a problem with the internal switching power supply.	Check input AC voltage to the power supply (AC90V~250V), if the voltage is normal, the internal switching power supply may have failed; Contact FiberTronix for assistance.
After turning on power, VFD monitor and LED normal, but optical output power low.	<ol style="list-style-type: none"> 1. Check jumper quality 2. Contaminated optical active connector or adapter 3. Damaged ceramic ferrule in adapter 	<ol style="list-style-type: none"> 1. Swap to a good test jumper 2. Clean contaminated fiber active connector or adapter 3. Swap the damaged adapter
After connecting to the distribution backbone, all TV channels have noise	<ol style="list-style-type: none"> 1. Low received optical power, causing poor C/N. 2. RF input level too low for sufficient laser modulation. 3. System link path C/N too low. 4. Back-reflection from bad or dirty optical connectors 	<ol style="list-style-type: none"> 1. Clean fiber active connector or adapter (Chapter 7 Cleaning and maintenance). 2. Check RF input levels to transmitter. (15-25dBmV) 3. Check link loss. 4. Use only single mode angled (SC/APC) optical connectors or fusion splice where necessary.
After connecting to the distribution backbone, some TV channels have a degraded CNR.	Some channels CNR too low.	Check the individual channel CNR. Check the flatness of the RF input signal
After connecting to the distribution backbone, some TV channels have ripple, beats, lines, or distortions	<ol style="list-style-type: none"> 1. Optical input power to the receiver too high. 2. RF modulation too high. 3. RF input drive to transmitter too high. 	<ol style="list-style-type: none"> 1. Check input power at optical receiver and pad if necessary. 2. Check optical transmitter modulation level parameter, and readjust if too high 3. Make sure the RF input level is within the range (15-25dBmV)



Chapter 10 FIBERTRONIX 2-Year Limited Warranty

FIBERTRONIX. (the “Company”) warrants to the Original Purchaser that the item purchased is free from defects in workmanship or material under normal use. This warranty starts on the date of shipment of the hardware to the Original Purchaser.

During the warranty period, the Company agrees to repair or replace, at its sole option, without charge to Original Purchaser, any defective component. To obtain service, the Original Purchaser must return the item to the Company properly packaged for shipping. All defective products must be returned to the Company within thirty (30) days of failure. Products must be returned with a description of the failure and Return Merchandise Authorization (RMA) number supplied by the Company. To receive a RMA number and a return shipping address on where to deliver the hardware, call 610-429-1821. The shipping, and insurance charges incurred in shipping to the Company will be paid by Original Purchaser, and all risk for the hardware shall remain with the Original Purchaser until such time as Company takes receipt of the hardware. Upon receipt, the Company will promptly repair or replace the defective unit, and then return said unit to Original Purchaser, shipping prepaid. The Company may use reconditioned or like-new parts or units, at its sole option, when repairing any hardware. Repaired products shall carry the same amount of outstanding warranty as from original purchase. Any claim under the warranty must include dated proof of purchase or invoice. In any event, the Company’s liability for defective hardware is limited to repairing or replacing the hardware.

This warranty is contingent upon proper use of the hardware by Original Purchaser and does not cover: if damage is due to Acts of God (including fire, flood, earthquake, storm, hurricane or other natural disaster), accident, unusual physical, electrical, or electromechanical stress, modifications, neglect, misuse, operation with media not approved by the Company, tampering with or altering of the hardware, riot, war, invasion, act of foreign enemies, hostilities (regardless of whether war is declared), civil war, rebellion, revolution, insurrection, military or usurped power or confiscation, terrorist activities, nationalization, government sanction, blockage, embargo, labor dispute, strike, lockout or interruption or failure of electricity, air conditioning, or humidity control, Internet, network, or telephone service.

The warranties given herein, together with any implied warranties covering the hardware, including any warranties of merchantability or fitness for a particular purpose, are limited in duration to one year from the date of shipment to the Original Purchaser. Jurisdictions vary with regard to the enforceability of warranty limitations, and you should check the laws of your local jurisdiction to find out whether the above limitation applies to you.



The Company shall not be liable to your for loss of data, loss of profits, lost savings, special, incidental, consequential, indirect, or other similar damages arising from breach of warranty, breach of contract, negligence, or other legal action even if the Company or its agent has been advised of the possibility of such damages, or for any claim brought against your by another party. Jurisdictions vary with regard to the enforceability of provisions excluding or limiting liability for incidental or consequential damages. You should check the laws of your local jurisdiction to find out whether the above exclusion applies to you.

This warranty allocates risks of product failure between Original Purchaser and the Company. The Company's hardware pricing reflects this allocation of risk and the limitations of liability contained in this warranty. The warranty set forth above is in lieu of all other express warranties, whether oral or written. The agents, employees, distributors, and dealers of the Company are not authorized to make modification to this warranty, or additional warranties binding on the Company. Accordingly, additional statements such as dealer advertising or presentations, whether oral or written, do not constitute warranties by the Company and should not be relied upon.

This warranty gives you specific legal rights. You may also have other rights which vary from one jurisdiction to another.