BLACK BOX

USER'S GUIDE

TS2002A
Fiber Optic Test Kit

TS2002A Test System

Black Box TS2002A test system performs optical power loss measurement for both multimode and single-mode LAN/WAN fiber optic installations.

The TS2002A test system consists of:

- a power meter (TS2022) to measure optical amplitude (with adapter for connecting to the TS2000 Display Headset)
- a stable optical power source (TS2023)

The TS2002A meter and source are packaged in an impact resistant molded case and placed into foam pockets. The system also contains 2 each 1m ST-ST multimode patch cables with a ST-ST mating sleeve. Five optic prep lens tissues and the User's Guide complete the system. The carrying case includes storage capability for 3 optical power sources, one power meter and 2 each 9V batteries.

Power Meter

The power meter (TS2022) is used to detect and measure optical power . The meter also determines which wavelength of light is detected and transmits this information to the display headset. The power meter is capable to detecting both multimode and single-mode fiber opticsources.

The power meter is configured with an ST connector to interface with fiber cable.

The power meter is connected to the TS2000 thr ough a pendant cable. The TS2000 pr ovides power to the meter. Power is applied to the meter as soon as the cable is connected to the display handset.

Optical Sources

- TS2023 Dual wavelength 850/1300 nm multimode LED source

The source uses an ST connector for fiber interface and is powered by a 9V alkaline battery. The battery is easily accessed through a snap fit door.

The TS2023 source has an LED to indicate power on and low battery.

- The LED will “blink” green approximately every 3 seconds to indicate the source if energized.
- The LED will “blink” red approximately every 3 seconds to indicate a low battery condition.

The multimode dual wavelength source has a four position slide switch; OFF, 850, 1300, 1310/1550.

Fiber Optical Field Calibration

The purpose of field calibration is to get a reference power measurement before a fiber is tested. Field calibration is required every 24 hours and this is tracked by the display handset. Field calibration should also be performed whenever a cable is disconnected from the TS2023 source as this can lead to incorrect measurements. The loss effects caused by the patch cable and the mating sleeve are subtracted out when a test fiber is measured. The mating sleeve loss is equivalent to one connector pair.

Before calibrating, connect the test equipment together using the calibration test connections show below.

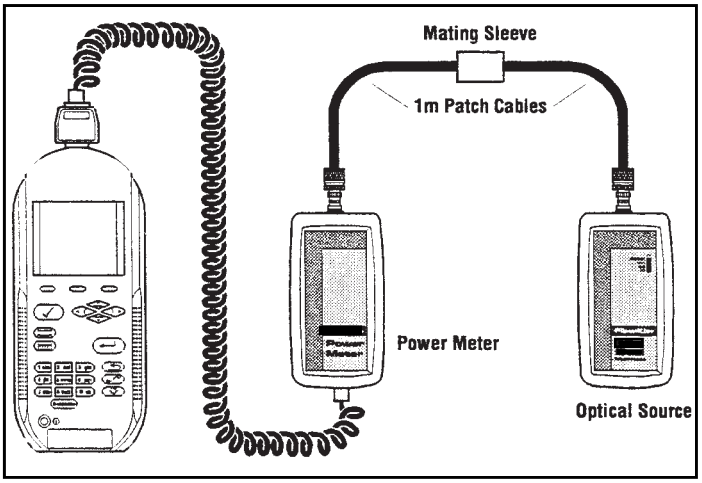
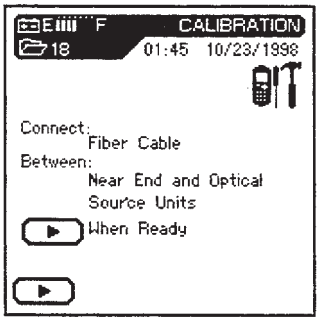


Figure 1. Fiber Optical Field Calibration Test Connections

Calibration of the TS2002A

1. From the Ready screen, select the Field Calibration Icon. The Calibration screen appears. Note that this screen may also appear if Fiber is selected from the cable type screen and calibration is required or an autotest is initiated and calibration is required.

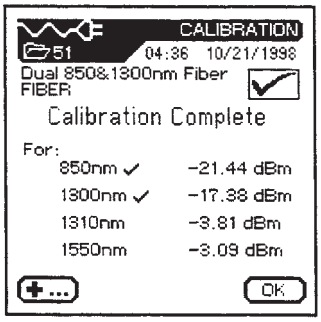


2. Press select the Run option. The test begins to calibration process.

   While tester calibration is in progress, the test displays a Wait message.

3. If calibration is successful, a Calibration Complete symbol appears.

4. The TS2022 power meter will automatically detect the light source in use. You will need to calibrate each light source you intend to use once per day. By pressing the F1 key you will be taken back to the calibration screen where additional light sources can be calibrated. Connect each light source as shown in Figure 1 and repeat steps 1-2. Check marks adjacent to source wavelength indicate most recent field cal.

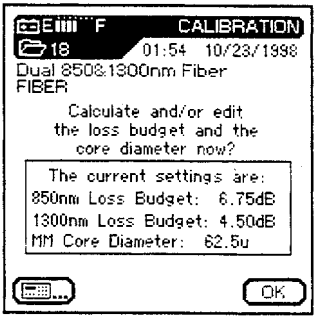


Note : If you are using a Dual Wavelength Multimode Source (TS2023), one calibration will handle both multimode wavelengths. The TS2000 can store calibration data for four wavelengths and each wavelength that is used will need to be calibrated once per day.

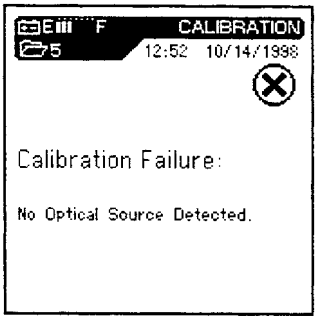
5. Pass Limits are as follows:

Multimode		**Single mode**	
• 850nm:	-10 to -27 dBm	• 1310nm:	0 to -10 dBm
• 1300nm:	-10 to -27 dBm	• 1550nm:	0 to -10 dBm

6. Press OK to display the Loss Budget screen and complete field calibration. Press ⌨ to auto-calculate budget loss. Refer to Calculating the Loss Budget section in this user guide.



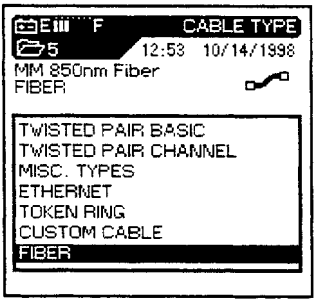
7. If calibration is unsuccessful, the tester will briefly display the following Error screen. Calibration failure could entail light source not turned on, dirty connectors, improper test connection, bad patch cable, etc.



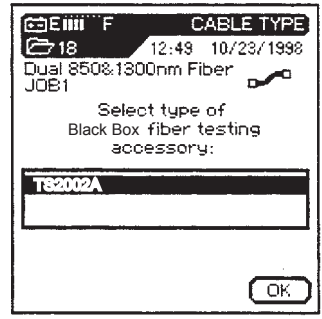
Calculating Loss Budget

1. Press the Cable Selection hard key. The Cable Types screen appears.

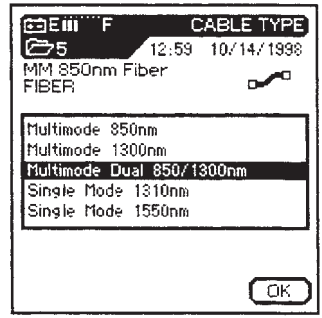
2. Position the highlighted cursor over the Fiber option and press the **Enter** key.



3. This screen will appear if TS2022 is not connected to hand set. This allows users to set budget loss without TS2022. Press (OK) to get to Cable Type screen.



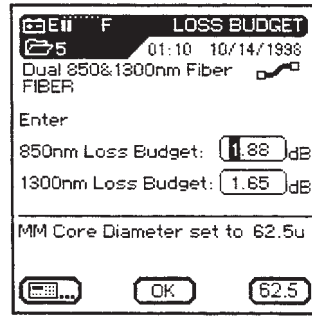
4. Select the type of fiber to configure and press the OK key.



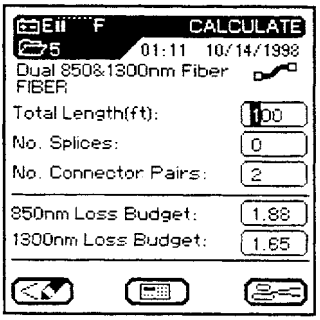
5. If the Loss Budget value is known, position the highlighted cursor on the Loss Budget filed and enter the new parameter .

6. If the Loss Budget parameter was manually entered, Press (OK) to return to the Ready scr een, Autotest may now be run.

7. If you want the TS2000, or "certifier" to calculate the Loss Budget, pr ess (...) o calculate the value. The Calculate scr een is displayed.



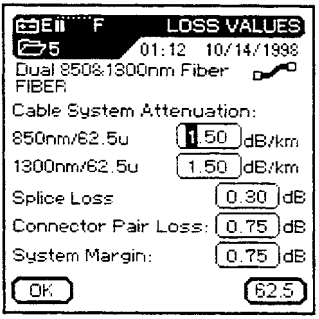
8. Enter the Total Length, No. Splices, and No. Connector Pairs parameters.



Note: The number of connectors must be 1 or greater, length must be greater than 0.

9. Press Enter to return to the Ready Screen in preparation to run an Autotest.

10. Press ✎ to edit or view default loss values. The Loss Values screen is displayed.



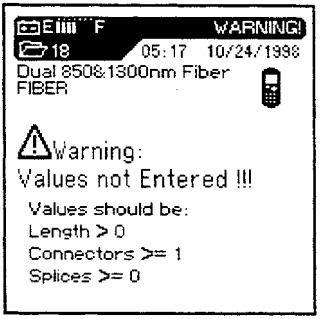
11. To change a value, position the highlighted cursor on the desired parameter an enter a new parameter.

12. Use the F3 key (62.5) to toggle the setup of the tester for either a 62.5µm multimode cable core (US), or a 50µm multimode cable core (Europe).

13. Press ↩ or (OK) to return to the Calculate screen.

14. Press Enter to return to the Ready screen. Autotest with the current loss Values may now be run.

15. A warning screen will appear if you attempt to exit the Calculate screen with invalid field entries.



To run a Fiber Autotest

Pass/Fail criteria is based on power loss. Loss budget consisting of passive losses (cable, connectors, and splices), repair margins (splices), and operating margin. Loss budget data is entered during the calibration process.

1. To run Autotest, connect the test equipment together using the connections show below.

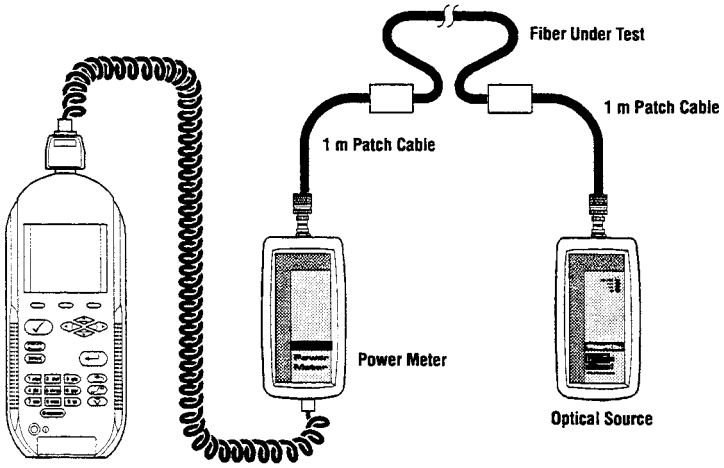
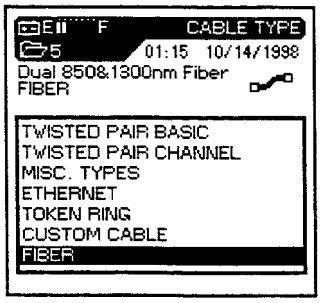


Figure 2. Fiber Test Connections

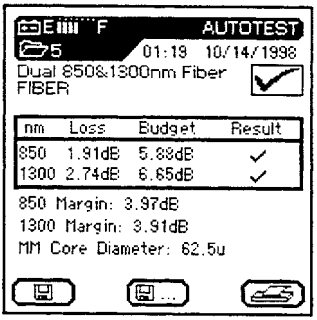
2. Press the Cable Selection hard key. The Cable Types scr een appears.

3. Position the highlighted cursor over the Fiber option and press the Enter key.

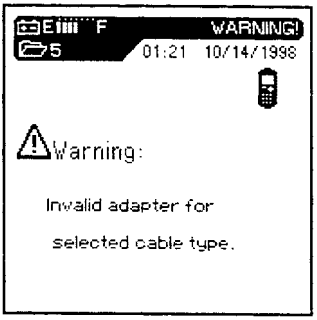


4. Press ✓ start Autotest.

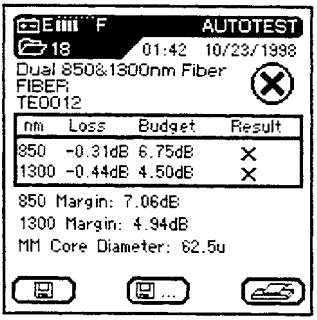
5. The Autotest Results screen in displayed.



6. If you attempt to perform an Autotest with the wrong adapter a warning screen will appear.



7. A failed Autotest with negative loss indicates a gain. This means ref cal measurement was taken improperly. Re-do field cal setup and measurement.



Analyze Fiber Testing

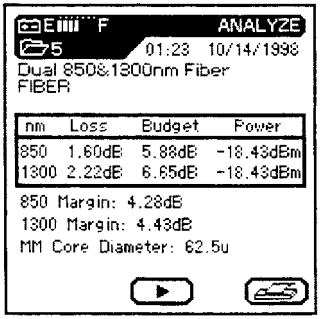
Fiber testing in analyze mode is identical to testing in Autotest mode. To run Fiber Analyze tests, connect the test equipment together using the connections shown in Figure 2.

1. From the Ready screen, select the Analyze icon. The power loss measurement is run.

2. Press the run button to continuously monitor power loss. Press the stop button to discontinue testing.

3. Press the button to print the Loss table.

4. Press to Exit Analyze test.



Specifications

TS2022 Power Meter	
PARAMETER	**SPECIFICATION**
Detector Type	Germanium
Calibrated Wavelengths	850, 1300, 1310, and 1550 nm
Fiber Connector	ST
Fiber Types	62.5µm/125µm multimode, 50µm/125µm multimode, 9 µm/125µm single-mode
Dynamic Range	+3 dBm to -60 dBm single-mode
Accuracy (dB)	±0.25
Resolution (dB)	0.01
Measurement Time (s)	≤2

TS2023 Multimode Optical Source		
PARAMETER	**850 nm**	**1300 nm**
Type	LED	LED
Fiber Connector	ST	ST
Power Requirements	9V battery, 20 hrs	9V battery, 20 hrs
Wavelength (nm)	850 ± 20	1320 ± 30
Power Output (dBm) (into 62.5 µ)	Typ. -20 Min. -23	Typ. -20 Min. -23
Stability (over 10 hr in dB)	±0.1	±0.1
Temperature Stability (dB/°C)	±0.5	±0.5

BLACK BOX Standard Warranty Policy

BLACK BOX warrants that all Products manufactured or procured by BLACK BOX conform to BLACK BOX's published specification and are free from defects in materials and workmanship for a period of one (1) year from the date of delivery to the original Buyer , when used under normal operating conditions and within the service conditions for which they were designed. This warranty is not transferrable and does not apply to used or demonstration products.

The obligation of BLACK BOX arising from a BLACK BOX claim shall be limited to repairing, or at its option, replacing without charge, any assembly or component (except batteries) which in BLACK BOX's sole opinion proves to be defective within the scope of the Warranty. In the event BLACK BOX is not able to modify, repair or replace nonconforming defective parts or components to a condition as warranted within a reasonable time after receipt thereof, Buyers shall receive credit in the amount of the original invoiced price of the product.

BLACK BOX must be notified in writing of the defect or nonconformity within the Warranty period and the affected Product returned to BLACK BOX's factory, designated Service Provider, or Authorized Service Center within thirty (30) days after discovery of such defect or nonconformity. Buyer shall prepay shipping charged and insurance for Products returned to BLACK BOX or its designated Service Provider for warranty service. BLACK BOX or its designated Service Provider shall pay costs for return of Products to Buyer.

BLACK BOX shall have no responsibility for any defect or damage caused by improper storage, improper installation, unauthorized modifications, misuse, neglect, inadequate maintenance, accident or for any Product which has been repaired or altered by anyone other than BLACK BOX or its authorized representative or not in accordance with instructions furnished by BLACK BOX.

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