

FLUKE®

DSP-FTA410

Fiber Test Adapter

Service Information Sheet

Introduction

This sheet provides the following service information for the DSP-FTA410 Fiber Test Adapter:

- Parts and warranty service information
- Specifications
- General description of the Fiber Test Adapter
- Cleaning optical connectors
- Required equipment
- Calibration software information
- Performance tests
- Calibration adjustment procedures
- Updating the EEPROM calibration date
- Parts and accessories list

For complete operating instructions, refer to the *DSP-FTA410 Fiber Test Adapter Users Manual*.

⚠ Warning

- **To avoid possible eye damage caused by hazardous laser radiation, never look directly into optical output connectors. Laser sources produce invisible radiation that can permanently damage your eyes.**
- **Use of controls, adjustments, or procedures not stated herein might result in hazardous radiation exposure.**
- **Before using the DSP-4000 test tool, read the safety information given in the *DSP-4000 Users Manual*.**

Parts and Warranty Service

The FTA is warranted to be free from defects in material and workmanship for one year, while under normal use. Parts and repairs are warranted for 90 days.

Refer to the *DSP-FTA410 Fiber Test Adapter Users Manual* for the complete warranty statement.

To order parts, or for warranty service, contact Fluke as follows:

USA: 1-888-99-FLUKE (1-888-993-5853)
Canada: 1-800-36-FLUKE (1-800-363-5853)
Europe: +31 402-678-200
Japan: +81-3-3434-0181
Singapore: +65-738-5655
Anywhere in the world: +1-425-446-5500

Visit Fluke's website at **www.fluke.com**.

Specifications

Accuracy is specified for a period of one year after calibration, at 18 °C to 28 °C (64 °F to 82 °F) with relative humidity to 90 %. Specifications are shown in Tables 1 through 5.

Table 1. General Specifications


Power supply	±6 V supplied by the DSP-4000 test tool or remote unit
Warm up time	15 minutes
Operating temperature and humidity	0 °C to +40 °C; 0 % to 75 % RH, non- condensing
Storage temperature and humidity	-10 °C to +60 °C; 0 % to 95 % RH, non-condensing
Dimensions	3.3" x 4.6" X 1.9" (8.3 cm x 11.6 cm x 4.7 cm)
Weight	7.6 oz (215 g)
Certifications	

Table 2. Optical Transmitter Specifications

Emitter type	LED
Coupling method	Pigtail to SC multimode connector
Adapter type	SC, multimode
Center wavelengths (nominal)	850 nm and 1300 nm
Power output at 850 nm	-20 dBm ±1.0 dBm (into 62.5 μm/125 μm fiber)
Power output at 1300 nm	-20 dBm ±1.0 dBm (into 62.5 μm/125 μm fiber)

Table 3. Optical Receiver Specifications

Adapter type	SC, multimode or singlemode
Coupling method	SC active device mount
Detector size and type	0.3 mm Germanium with ball lens
Calibrated wavelengths	850 nm, 1300 nm, 1310 nm, 1550 nm
Measurement range (P_{in})	-40 dBm to 0 dBm

Table 4. Length Measurement Uncertainty

Transmit to output pulse delay	200 ns
Optical input to receive pulse delay	200 ns
Optical input to receive analog pulse delay	200 ns
Pulse delay stability	±25 ns
Length measurement accuracy	±(1.5 m plus 2% of length)

Table 5. Power and Loss Measurement Uncertainty

Specification	Constant Temperature 20 °C ≤ T ≤ 26 °C T ±2 °C	Specified Temperature 23 °C ± 2 °C	Operating Temperature Range 0 °C to 40 °C
Absolute power measurement uncertainty ¹	± 0.50 dB	± 0.75 dB	±1.00 dB
Absolute power measurement uncertainty at -10 dBm ¹	±0.25 dB	±0.30 dB	±0.50 dB
Power measurement stability and linearity over any 10 dB within measurement range ^{1,2,3}	±0.25 dB ³	±0.40 dB ⁴	±0.75 dB ⁴
Optical output stability	±0.25 dB ³	±0.50 dB ⁴	±1.00 dB ⁴
1. Settling time for measurements is 2 seconds typical. 2. Stability is specified over 8 hours for any 10 dB within measurement range. 3. Reference values measured at T, the center of the Constant Temperature range. 4. Reference values measured at 23 °C ±2 °C.			

General Description

The FTA is a fiber optic testing module designed to interface with a DSP-4000 CableAnalyzer™ test tool or DSP-4000 remote unit. The FTA has 850 nm and 1300 nm LED sources and is calibrated to convert optical power to voltage at wavelengths of 850 nm, 1300 nm, 1310 nm, and 1550 nm.

The SC connector labeled OUTPUT is a multimode connector that couples the 850 nm and 1300 nm LED light from the FTA to the fiber under test. Through this connector, the FTA transmits a continuous-wave -20 dBm signal at 850 nm or 1300 nm for power and loss measurements, or a 1300 nm pulsed wave for length measurements.

The SC connector labeled INPUT couples the other end of the fiber under test to the germanium detector inside the FTA. This connector can be used with singlemode or multimode fibers.

The AMP Champ 60-pin connector connects the FTA to a DSP-4000 test tool or DSP-4000 remote unit. This connector couples the power supply voltages and control signals from the DSP-4000 unit to the FTA. The calibrated transfer function voltage, the voltage reference, and length measurement and Talk mode pulses are passed from the FTA to the DSP-4000 unit.

Cleaning Optical Connectors

Most problems with optical devices result from contaminated connectors. Therefore, always clean the connectors on your equipment and fiber patch cords before troubleshooting or calibration.

To clean an optical connector, wipe it gently with an optical-grade tissue or swab dampened with optical-grade alcohol. To remove loose dirt and dust from the connector, use filtered, compressed air.

Always cover optical connectors with dust caps when equipment is not in use.

Equipment Required for Performance Tests and Calibration

The following equipment is required for servicing the FTA:

- Pentium PC with SVGA Monitor, mouse, COM port, and Windows® 95 or Windows NT
- Fluke DSP-4000 CableAnalyzer test tool with Smart Remote
- Serial PC interface cable for the DSP-4000 test tool
- Fluke DSP-FTA410 Calibration Software (files comm.cfg and fta_cal.exe)
- Fluke 87 digital multimeter or equivalent
- Optical power meter calibrated at 850 nm, 1300 nm, and 1550 nm traceable to NIST Standards; SC connector
- 850 nm laser source; Po = -20 dBm; ST connector
- 1300 nm laser source; Po = -20 dBm; ST connector
- 1550 nm laser source: Po = -10 dBm; ST connector
- Variable optical attenuator: Multimode, 45 dB minimum, SC input connector
- Four known-good ST/SC multimode patch cords
- One known-good SC/SC multimode patch cord
- Three known-good ST/ST adapters
- Characterized 1 m ST/ST multimode fiber cable
- Characterized 20 m ST/ST multimode fiber cable
- Characterized 2000 m ST/ST multimode fiber cable

Installing the DSP-FTA410 Calibration Software

The DSP-FTA410 Calibration Software lets you remotely control the DSP-4000 test tool and attached FTA via the DSP-4000 serial port. The application initiates the fiber tests used during calibration and produces FTA control signals with the timing required to create measurable voltages at the FTA test points.

To install the Calibration Software, run the program SETUP.EXE from the software diskette. Follow the instructions given by the setup program.

The software also includes a voltage transfer function spreadsheet for Microsoft® Excel. You can use this spreadsheet instead of a calculator to calculate the voltage outputs required for calibration adjustments.

Performance Tests

Use the performance tests to confirm that the FTA is working properly. If the FTA fails any of these tests, it needs calibration adjustments or repair.

Notes

For accurate performance test results, fiber ends and adapters must be clean at all times. Always keep dust caps in place when equipment is not in use.

Always use the same patch cords and adapters for performance tests and calibration adjustments.

Position all test equipment and UUTs near each other to avoid disturbing the fiber connections during testing.

It is not necessary to turn off the DSP-4000 unit before attaching or removing the FTA.

Preparing for Performance Tests

1. Attach the UUTs to the DSP-4000 main and remote units.
2. Turn the DSP-4000 rotary switch to SETUP. Press **1** **Choice**; then make the following selections:
 - Set the **Test Standard** to **General Fiber Optic**.
 - Set the **Cable Type** to **Multimode 62.5 μm**.
3. Use **4** **Page Down** to find the **Adapter Type** setting. Set the **Adapter Type** to **ST**.

Loopback Length Measurement Verification

1. In the DSP-4000 SETUP mode, set the **Remote End Configuration** to **Loopback Mode**.
2. Use two ST/SC multimode patch cords and one ST/ST adapter to connect the UUT OUTPUT and INPUT ports together, as shown in Figure 1.
3. Turn the rotary switch to SPECIAL FUNCTIONS. Select **Set Fiber Reference**. Press **ENTER**; then press **TEST**.
4. Turn the rotary switch to SINGLE TEST; then run the **Total Length** test. Verify that the measured length is 0 m. Press **EXIT**.
5. Connect the characterized 2000 m ST/ST multimode cable between the patch cords as shown in Figure 2. Run the **Total Length** test. Verify that the length measurement is within $\pm 1.5\%$ (± 1 m) of the characterized length. Press **EXIT**.
6. Repeat step 5 using the 1 m and 20 m characterized cables.
7. Repeat steps 1 through 6 using the second DSP-FTA410 adapter.

Smart Remote Length Measurement Verification

1. Turn the rotary switch to SETUP. Set the **Remote End Configuration** to **Smart Remote Mode**. Connect main and remote UUTs as shown in Figure 3. Turn on the remote unit.
2. Turn the rotary switch to SPECIAL FUNCTIONS. Select **Set Fiber Reference**. Press **ENTER**; then press **TEST**.
3. Turn the rotary switch to SINGLE TEST; then run the **Length** test. Verify that the measured length is 0 m. Press **EXIT**.
4. Connect the characterized 2000 m ST/ST multimode cable as shown in Figure 4. Run the **Length** test and verify that the length measurement is within $\pm 1.5\%$ (± 1 m) of the characterized length. Press **EXIT**.
5. Repeat the step 4 using the 1 m and 20 m characterized cables.

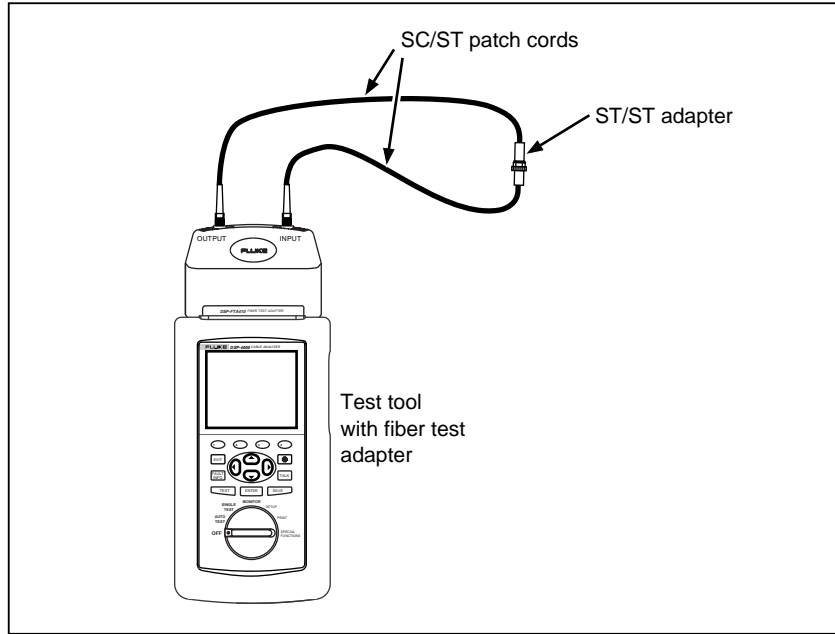


Figure 1. Setting a Reference for Loopback Mode

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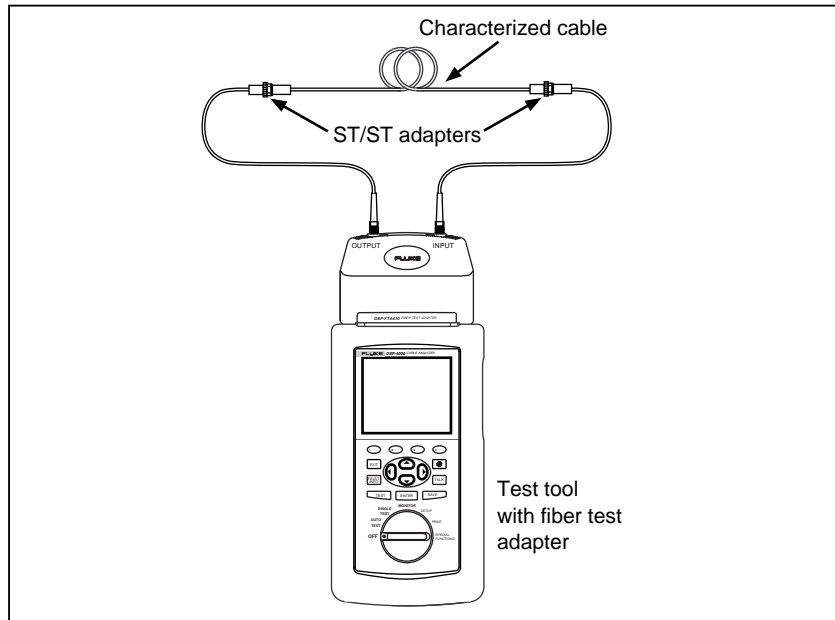


Figure 2. Verifying Length Measurements in Loopback Mode

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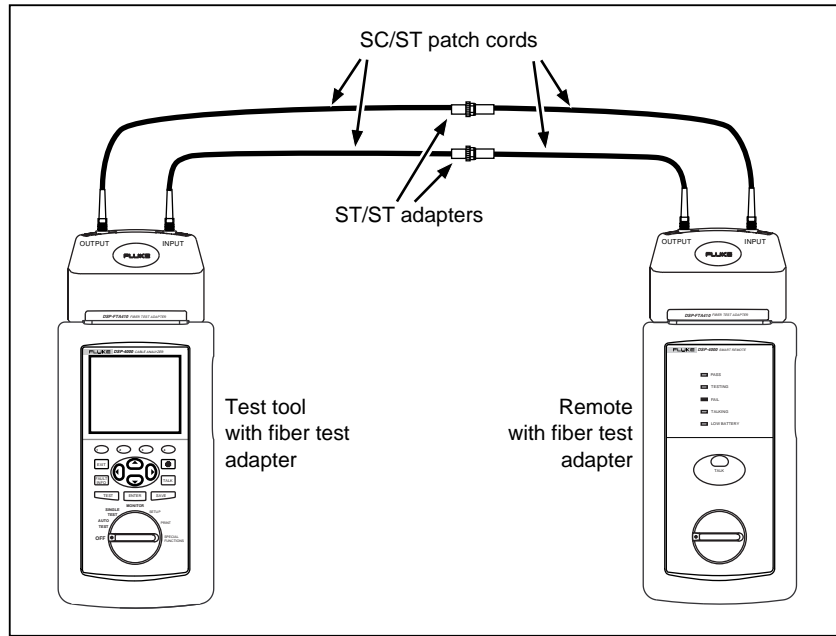


Figure 3. Setting a Reference for Smart Remote Mode

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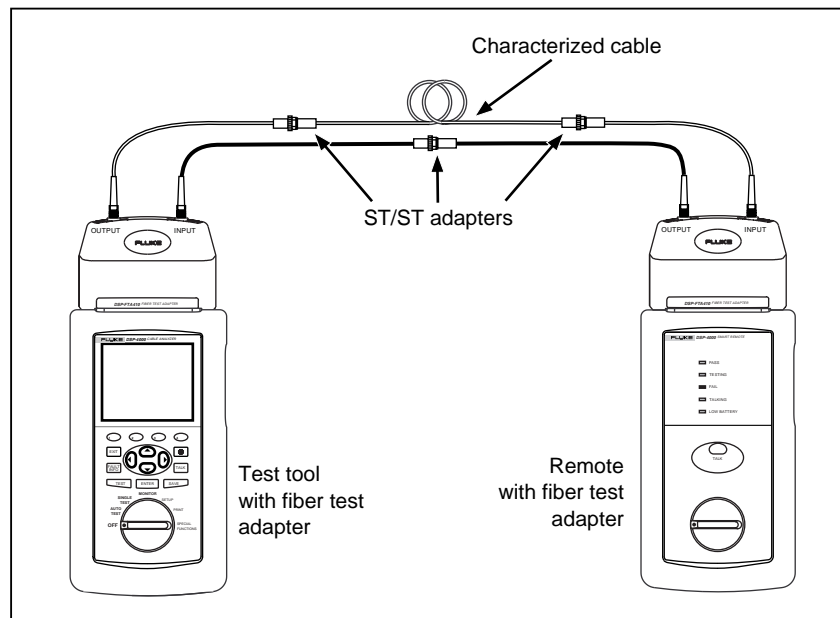


Figure 4. Verifying Length Measurements in Smart Remote Mode

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850 nm Level Measurement Verification

1. Turn the rotary switch to **SETUP**. Set the **Remote End Configuration** to **Far End Source Mode**.
2. Use an ST/SC patch cable to connect the 850 nm source to the reference power meter. Record the power reading.
3. Disconnect the cable from the meter; then connect the source to the UUT's **INPUT** connector, taking care not to disturb the connection at the source.
4. Turn the rotary switch to **MONITOR**, press **ENTER**, select **850 nm Multimode**; then press **ENTER**. Verify that the power measurement is within ± 0.25 dBm of the reference meter's reading. Press **EXIT**.
5. Disconnect the cable from the UUT; then connect the 850 nm source to the optical attenuator input. Connect the output of the attenuator to the reference power meter. Adjust the attenuator output to -45 dBm ± 0.1 dBm. Record the measurement.
6. Disconnect the cable from the meter; then connect attenuator output to the UUT's **INPUT**, taking care not to disturb the attenuator connections.
7. In the DSP-4000's **MONITOR** mode, select **850 nm Multimode**; then press **ENTER**. Verify that the power measurement is within ± 0.75 dBm of the reference meter's reading. Press **EXIT**.
8. Repeat steps 2 through 7 for the second DSP-FTA410 adapter.

1300 nm Level Measurement Verification

1. Verify that the **Remote End Configuration** in the **MONITOR** mode is set to **Far End Source Mode**.
2. Use an ST/SC patch cable to connect the 1300 nm source to the reference power meter. Record the power reading.
3. Disconnect the cable from the meter; then connect the source to the UUT's **INPUT** connector, taking care not to disturb the connection at the source.
4. Turn the rotary switch to **MONITOR**, press **ENTER**, select **1300 nm Multimode**; then press **ENTER**. Verify that the power measurement is within ± 0.25 dBm of the reference meter's reading. Press **EXIT**.
5. Connect the 1300 nm source to the optical attenuator. Connect the output of the attenuator to the reference power meter. Adjust the attenuator output to -45 dBm ± 0.1 dBm. Record the measurement.
6. Disconnect the cable from the meter; then connect attenuator output to the UUT's **INPUT** connector, taking care not to disturb the attenuator connection.
7. In the DSP-4000's **MONITOR** mode, select **1300 nm Multimode**; then press **ENTER**. Verify that the power measurement is within ± 0.75 dBm of the reference meter's reading. Press **EXIT**.
8. Repeat steps 2 through 7 for the second DSP-FTA410 adapter.

1550 nm Level Measurement Verification

1. Turn the rotary switch to SETUP. Press **1** **Choice**; then make the following selections:
 - Set the **Test Standard** to **General Fiber Optic**.
 - Set the **Cable Type** to **Singlemode**.
2. Verify that the **Remote End Configuration** is set to **Far End Source Mode**.
3. Use an ST/SC patch cable to connect the 1550 nm source to the reference power meter. Record the power reading.
4. Disconnect the cable from the meter; then connect the source to the UUT's INPUT connector, taking care not to disturb the connection at the source.
5. Turn the rotary switch to MONITOR, press **ENTER**, select **1550 nm Singlemode**; then press **ENTER**. Verify that the power measurement is within ± 0.25 dBm of the reference meter's reading. Press **EXIT**.
6. Connect the 1550 nm source to the optical attenuator. Connect the output of the attenuator to the reference power meter. Adjust the attenuator output to -45 dBm ± 0.1 dBm. Record the measurement.
7. Disconnect the cable from the meter; then connect attenuator output to the UUT's INPUT connector, taking care not to disturb the attenuator connections.
8. In the DSP-4000's MONITOR mode, select **1550 nm Singlemode**; then press **ENTER**. Verify that the power measurement is within ± 0.75 dBm of the reference meter's reading. Press **EXIT**.
9. Repeat steps 3 through 8 with the second DSP-FTA410 adapter.

Output Level Verification

1. Turn the rotary switch to SETUP. Press **1** **Choice**; then make the following selections:
 - Set the **Test Standard** to **General Fiber Optic**.
 - Set the **Cable Type** to **Multimode 62.5 μ m**.
2. Set the **Remote End Configuration** to **Loopback Mode**.
3. Connect the UUT's OUTPUT connector to the reference power meter. Set the power meter to measure 850 nm.
4. Turn the rotary switch to SINGLE TEST; then select **Send 850 nm**. Verify that the power meter reads -20 dBm ± 1 dBm. Press **EXIT**.
5. Set the power meter to measure 1300 nm. Select **Send 1300 nm**. Verify that the power meter reads -20 dBm ± 1 dBm. Press **EXIT**.
6. Repeat steps 3 through 5 for the second DSP-FTA410 adapter.

Talk Mode Verification

1. Attach one UUT to the DSP-4000 main unit and the other UUT to the remote. Use two patch cords and two adapters to connect the main unit OUTPUT and INPUT ports to the remote INPUT and OUTPUT ports, respectively. Connect the headsets to the headset jacks on the main and remote units.
2. Press **TALK** on the main unit; then talk into the main unit microphone and verify that you can hear yourself in both earpieces.
3. Talk into the remote microphone and verify that you can hear yourself in both earpieces.

Calibration Adjustments

To ensure that the UUT performs to specifications, calibrate it annually using the procedure that follows.

Always perform the complete calibration adjustment procedure.

Refer to Figure 5 for locations of measurement and adjustment points.

Step 1: Preparing for Calibration

Notes

For precise calibration adjustments, fiber ends and adapters must be clean at all times. Always keep dust caps in place when equipment is not in use.

Always use the same patch cords and adapters for performance tests and calibration adjustments.

Position all test equipment and UUTs near each other to avoid disturbing the fiber connections during calibration.

Before calibration, warm up the equipment and start the Calibration Software as follows:

- 1-1. Turn on the 850 nm, 1300 nm, and 1550 nm light sources. Let the sources warm up for 15 minutes.
- 1-2. Disassemble the UUT by removing the top and bottom covers and both endplates.
- 1-3. Attach the UUT to a DSP-4000 main unit. Turn on the DSP-4000.
- 1-4. Connect the DMM's ground lead to the J4 GND test point. All voltage measurements will be made in reference to this point.
- 1-5. Use the DMM to measure the +5 V at J1 pin 8 and -5 V at J1 pin 9 and verify the voltages are within the ± 0.25 V of nominal values.
- 1-6. Use the serial PC interface cable to connect the DSP-4000 to a PC.
- 1-7. Let the UUT warm up for at least 15 minutes.
- 1-8. Run the DSP-FTA410 Calibration Program. Verify that the box in the lower right corner of the window is green. If the box is red, use the Setup menu to change the serial port configuration.

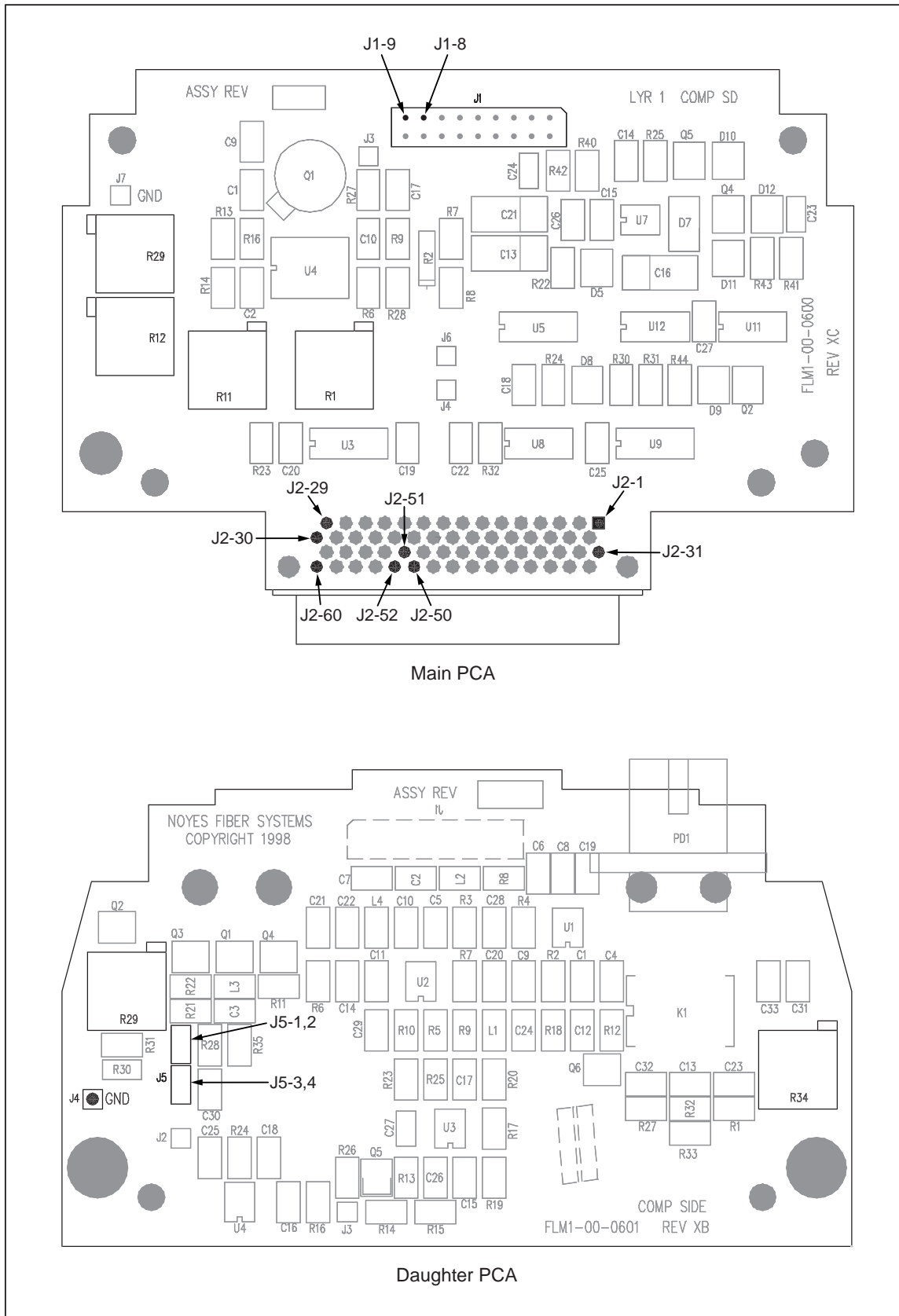


Figure 5. Measurement and Adjustment Points

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Step 2: 1300 nm Calibration Adjustment

- 2-1. In the Calibration Software window, select **1300nm Adj.**; then click on **START**.
- 2-2. Connect the 1300 nm laser source to the reference power meter. Set the meter to measure 1300 nm. Record the source's output as P_{in} for use in step 2-6.
- 2-3. Without disturbing the connection to the laser source, disconnect the patch cord from the power meter; then connect the cord to the UUT INPUT.
- 2-4. On the UUT's main PCA, measure at U4 pin 13. Adjust potentiometer R11 until pin 13 reaches $0.540\text{ V} \pm 0.01\text{ V}$.
- 2-5. Measure and record VREF at J2 pin 50. (Typical value is 0.53 V.)
- 2-6. Use P_{in} from step 2-2, VREF from step 2-5, and the following transfer function to calculate V_{out} :

$$V_{out} = \frac{V_{REF}}{53\text{ dBm}} \times (3\text{ dBm} - P_{in})$$

- 2-7. On the UUT's main PCA, measure at J2 pin 51. Adjust potentiometer R11 until pin 51 reads $V_{out} \pm 0.0005\text{ V}$.
- 2-8. Without disturbing the connection to the source, disconnect the patch cord from the UUT; then connect the source to the input of the optical attenuator. Use a second patch cord to connect the output of the attenuator to the reference power meter.
- 2-9. Adjust the attenuator output to $-45.0\text{ dBm} \pm 0.1\text{ dBm}$. Record this value as P_{in} for use in the next step.
- 2-10. Use P_{in} from step 2-9 and VREF from step 2-5 in the transfer function given in step 2-6 to calculate V_{out} .
- 2-11. Without disturbing the connections at the laser source, disconnect the patch cord from the power meter; then connect the cord to the UUT INPUT.
- 2-12. Measure at J2 pin 51. Adjust R1 for the V_{out} calculated in step 2-10 $\pm 0.0005\text{ V}$.
- 2-13. Repeat steps 2-2 through 2-12 until the UUT meets or exceeds the specified accuracy at the -20 dBm (adjusting R11) and -45 dBm (adjusting R1) calibration points.
- 2-14. In the Calibration Software window, click on **STOP**.

Step 3: 850 nm Calibration Adjustment

- 3-1. In the Calibration Software window, click on **850nm Adj.**; then click on **START**.
- 3-2. Set the reference power meter to measure 850 nm. Connect the 850 nm laser source to the reference power meter. Record the source's output as P_{in} for use in the next step.
- 3-3. Use P_{in} from step 3-2 and VREF from step 2-5 in the transfer function below to calculate V_{out} :

$$V_{out} = \frac{V_{REF}}{53\text{ dBm}} \times (3\text{ dBm} - P_{in})$$

- 3-4. Without disturbing the connection to the laser source, disconnect the patch cord from the power meter; then connect the cord to the UUT INPUT.
- 3-5. On the UUT's main PCA, measure at J2 pin 51. Adjust R29 for V_{out} (as calculated in step 3-3) $\pm 0.0005\text{ V}$.
- 3-6. In the Calibration Software window, click on **STOP**.

Step 4: 1550 nm Calibration Adjustment

- 4-1. In the Calibration Software window, click on **1550nm Adj.**; then click on **START**.
- 4-2. Set the reference power meter to measure 1550 nm. Connect the 1550 nm laser source to the reference power meter.
- 4-3. Adjust the 1550 nm source to -10 dBm \pm 0.05 dBm. Record this level as P_{in} .
- 4-4. Use P_{in} from step 4-3, V_{REF} from step 2-5, and the transfer function below to calculate V_{out} :

$$V_{out} = \frac{V_{REF}}{53 \text{ dBm}} \times (3 \text{ dBm} - P_{in})$$

- 4-5. Without disturbing the connection to the laser source, disconnect the patch cord from the power meter; then connect the cord to the UUT INPUT.
- 4-6. On the UUT main PCA, measure J2 pin 51. Adjust R12 for V_{out} (as calculated in step 4-4) \pm 0.0005V.
- 4-7. In the Calibration Software window, click on **STOP**.

Step 5: Verifying Calibration

- 5-1. Follow the procedures given in the earlier section "Performance Tests".
- 5-2. Apply insulating varnish, such as red GLPT, to R1, R11, R12, and R29.

Step 6: Output Level Adjustment

- 6-1. Connect the reference power meter to the UUT OUTPUT port. Set the meter to measure 1300 nm.
- 6-2. In the Calibration Software window, click on **1300nm LED**; then click on **START**.
- 6-3. On the UUT daughter PCA, adjust R29 until the reference power meter reads -20.0 dBm \pm 0.1 dBm.
- 6-4. In the Calibration Software window, click on **STOP**.
- 6-5. Disconnect the DMM's leads from the UUT. Set up the DMM to measure less than 300 mA.
- 6-6. Remove the jumper from J5 pins 1 and 2. Connect the DMM's negative lead to J5 pin 1; connect the positive lead to J5 pin 2.
- 6-7. In the Calibration Software window, click on **1300nm LED**; then click on **START**. Verify that the LED current is less than 60 mA.
- 6-8. In the Calibration Software window, click on **STOP**. Disconnect the DMM; then reinstall the jumper.
- 6-9. Set the reference power meter to measure 850 nm. In the Calibration Software window, click on **850nm LED**; then click on **START**. On the daughter PCA, adjust R34 until the meter reads -20.0 dBm \pm 0.1 dBm.
- 6-10. Remove the jumper from J5 pins 3 and 4. Connect the DMM's negative lead to J5 pin 4; connect the positive lead to J5 pin 5.
- 6-11. In the Calibration Software window, click on **850nm LED**; then click on **START**. Verify that the LED current is less than 50 mA.
- 6-12. In the Calibration Software window, click on **STOP**. Disconnect the DMM; then reinstall the jumper.
- 6-13. Apply insulating varnish, such as red GLPT, to R29 and R34. Then reassemble the UUT.
- 6-14. Repeat steps 1-1 through 6-13 for the second DSP-FTA410 adapter.

Updating the EEPROM Calibration Date

After a UUT passes the performance tests, verify the UUT's serial number and enter the calibration date in the UUT's EEPROM, as follows:

1. Record the UUT serial number from the tag on the case near the 60-pin connector. Attach the UUT to the DSP-4000 test tool. Connect the test tool to the PC serial cable.
2. Start the Calibration Software; then click on **Setup, UUT Cal Date**.
3. Verify that the serial number shown matches the UUT's serial number.
4. In the calibration date box, enter the new calibration date; then click on **OK**.
5. Turn off the test tool; then turn it on again. Use the Calibration Software to verify that the UUT serial number and calibration date were correctly stored in the EEPROM.
6. Repeat steps 1 through 5 for the second DSP-FTA410 adapter.

Parts and Accessories

Table 6 shows the replacement parts and accessories available from Fluke for the DSP-FTA410 Fiber Test Adapter.

Table 6. Fluke Replacement Parts and Accessories for the DSP-FTA

Description	Fluke Part Number
ST/SC multimode patch cord	FOC-ST/SC
ST/ST multimode patch cord	FOC-ST/ST
ST/ST adapter	NF300SM
SC/SC adapter	NF310SM
ST/SC adapter	670015
Dust cap for the SC connector on the DSP-FTA410 Fiber Test Adapter	669991
Optical assembly	670018
PIN diode	669994
LED, 850 nm	670023
LED, 1300 nm	670026
Rubber pad	670013
ST connector	670000
Relay	670007
LS-1310/1550 Laser Source	LS-1310/1550
FOS-850/1300 Fiber Optic Source (multimode)	FOS-850/1300
DSP-FTA410 Users Manual, English	691656
DSP-FTA410 Users Manual, French	691659
DSP-FTA410 Users Manual, Spanish	691698
DSP-FTA410 Users Manual, Italian	691667
DSP-FTA410 Users Manual, German	691664
DSP-FTA410 Users Manual, Portuguese	691706
DSP-FTA410 Users Manual, Simplified Chinese	691683
DSP-FTA410 Users Manual, Japanese	691691

