Manual Supplement

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This supplement contains information necessary to ensure the accuracy of the above manual.

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Change #1

On page 8-3, add the following section to the bottom of the page:

8.2.4 Active Heads

A range of Active Heads are available for the 9500B Oscilloscope calibrator. Active head connector wear can seriously impact product specifications. Fluke recommends that connectors are inspected for wear or damage before use. The recommended interval for connector replacement based on average use is every two years, and once per year for Active heads with higher than average use.

Contact a Fluke authorized service center for replacement. Attempts to change connectors without the correct tools, training or calibration system is not recommended.

On page 10.6-1, under **9510/9530/9550/9560 Head Calibration Procedures** replace the second paragraph with the following:

The list of topics above are placed in the order in which the 9500B Head functions should be calibrated. Head calibration requires the use of a verified 9500B Mainframe.

On page 10.6-6, under **10.6.2.8 Calibration Procedure**, add the following note:

Note

The 9560 can only operate with the 9500B mainframe. It also requires the 9500B/3200 frequency configuration. The 9500 oscilloscope calibrator is not compatible with the 9560. Neither are mainframes configured with frequency bandwidth less than 3200 MHz

On page 10.6-7, under **10.6.3.1 Summary**, replace the paragraph with the following:

The Edge Function is calibrated by applying risetime corrections in the sequences given in *paras 10.6.3.4* through *10.6.3.12*. Equipment requirements are given in *para 10.6.3.2; para 10.6.3.3* describes the Calibration Setup.

Under **10.6.3.2 Equipment Requirements**, replace the entire section with the following:

- The UUT Active Head, connected to a verified Model 9500B Mainframe.
- High-bandwidth sampling oscilloscope with bandwidth ≥6GHz for Risetime measurements.(≥20GHz for 9550 and 9560)

  Example: Tektronix Model TDS820 with an 80E01 series plug or Agilent 86100 Digitizing Oscilloscope with a HP83489A or 54752A 50GHz Sample Head.
- 50Ω SMA – SMA co-axial ‘Trigger’ cable for trigger inputs to the high-bandwidth oscilloscope.

Note

Calibrating the 25 ps edge risetime of the 9550 requires the use of a short (no longer than 19.5 inches or 0.5 m), high quality, trigger cable fitted with SMA connectors. This insures a trigger signal with timing that is compatible with certain models of high speed sampling oscilloscopes.

Example: Fluke part number 2636395 (supplied with 9550 or available as a spare part)

- High-bandwidth coaxial attenuator may be required if 9500B edge output voltage exceeds oscilloscope input capability.

Example: HP8493C opt 20 26.5GHz 3.5mm 20 dB attenuator.

On page 10.6-12, **under 10.6.3.12 Calibration Procedure: 25ps Edge: Speed** replace the entire section with the following and add figure 10.6.3.2 and delete Table 10.6.3.9:

1. Ensure that the 9500B is connected to the oscilloscope as shown in figure 10.6.3.2 and that both instruments are powered on and warmed up. (Be sure to use the appropriate connector adapter as necessary to connect the 9550's SMA output connector to the input connector of the oscilloscope.)

Basic Setup

1.1 Recommended Settings for the Sampling Oscilloscope:

Channel Setup

Scale 100mV/div
External Scale 0dB
Units Volts
Bandwidth >20GHz
Offset -220 mV

Timebase

Scale 50pS/div
Reference Center
Windowing Disabled
Position 25 ns

Trigger

Source Channel 2
Slope Positive Edge

Acquisition

Averaging Off

Fast Edge Rise time & Fall time Measurement Procedure

2.1 Press the MODE function key to access the main menu screen.

2.2 From the main menu screen selection, select the MANUAL Mode of operation

2.3 Using the major function keys, select the Edge function

2.4 From the screen menu, select FAST edge, followed by the 25ps pulse function

Note

On the earlier 9500 models the 25 ps function is accessible through AUX key on the front panel.

2.5 To insure the 9500B is properly configured for calibration, the TRIGGER CHANNEL and CABLE SELECT must match and be different from the SIGNAL CHANNEL settings. Use the following key sequence.

- Press the CHANNEL SELECT selection,
- Select the proper SIGNAL CH setting as connected to the 9550 Head being calibrated – (select among CH1 to CH5 alternatives),
- Press the TRIGGER CHANNEL selection,
- Select the proper TRIGGER CH setting as connected with the external trigger cable – (select among CH1 to CH5 alternatives),
- Confirm the wording Trigger Cable is displayed on the same channel as connected with external trigger cable. If not, then push the CABLE SELECT soft key and then match the CABLE CH setting to the correct trigger channel, and push EXIT,
- Press the TRIGGER RATIO selection, and
- Select the desired signal to trigger ratio (typically divide by 10).

2.6 Return to the 25 ps FAST Edge screen by pressing EXIT twice

2.7 Prepare to measure the 9550's rising edge transition time. On the 9500B confirm operation with the settings at an Amplitude of 500mV, Frequency at 1MHz, Rising Edge, and OUTPUT ON.

2.8 Adjust Oscilloscope Channel Offset and Timebase Position to center the displayed waveform.

2.9 Set the oscilloscope to average 256 samples.

2.10 Select on the oscilloscope the appropriate edge transition (rising or falling) corresponding to what is being measured.

2.11 Record the measured edge speed as observed on the oscilloscope.

2.12 The measured edge rise time value is the average of 8 separate measurements. Use the following sequence for measuring the remaining measurement values

- Press the calibrator OUTPUT OFF button,
- Press the calibrator OUTPUT ON button,
- Repeat the measurement and record the measured rise time.
- Repeat this sequence in step 2.12 until you have recorded a total of 8 measurements.

2.13 Calculate the average of these 8 measurements to a precision of 2 decimal places. This is the calculated average rise time of the combined 9550 signal rise time and the oscilloscope response rise time.

2.14 Using the following formula, determine the 9550's calibrated edge rise time by subtracting the measured (or calibrated) oscilloscope measurement response rise time from your calculated average.

$$\text{Edge Rise Time} = \sqrt{\left((\text{Calculated Average Rise Time})^2 - (\text{Scope Rise Time})^2\right)}$$

2.15 Save this calculated edge rise time value for later use in calibrating the head.

2.16 Prepare to measure the 9550's falling edge transition time by selecting the falling edge with the soft key. On the 9500B confirm operation with the settings at an Amplitude of 500mV, Frequency at 1MHz, Falling Edge, and OUTPUT ON.

2.17 Repeat steps 2.8 to 2.15 for the 9550's falling edge time measurement.

2.18 Turn the OUTPUT OFF

Save Calibration Data to Active Head

3.1 Insure the rear-panel Calibration Enable switch is in the "ENABLE" position.

3.2 Press the MODE function key to access the main menu screen.

3.3 Press the CALB Key on the main menu.

3.4 Enable changing calibration constants by entering a valid password to access the Calibration Mode display screen.

3.5 From the main menu screen selection, select the HEAD CAL Mode of operation.

3.6 Confirm the CHANNEL SELECT settings are appropriate, then select EDGE and 25pS.

3.7 Select TARGET 1

3.8 Refer to the Rising Edge speed as calculated in the previous section and enter this value into the edge speed field on the display screen. Press ACCEPT CAL.

3.9 Select TARGET 2 and similarly enter calculated Falling Edge speed value. Press ACCEPT CAL followed by EXIT.

3.10 Select STORE HEAD CAL and follow on screen instructions to:

- Select the warning period before recalibration is due (leave at default 30 days unless otherwise requested).
- Modify the calibration due date (default 1 year from calibration date)

3.11 Select STORE. Use the CHANNEL SELECT softkey to change to the appropriate Active Head to save any unsaved data until the NONE indicator is displayed.

3.12 Select EXIT to step back through the menus to the main Calibration Mode menu, then press the MODE key to exit calibration mode.

3.13 Disconnect 9550 from 9500B Base Unit.

Add the following Figure 10.6.3.2

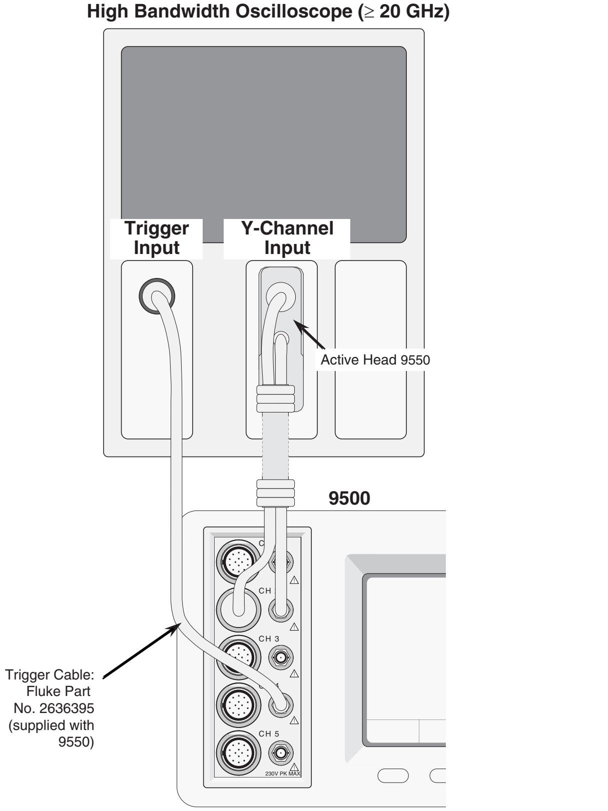

Fig 10.6.3.2 25 ps Edge Function Calibration – Interconnections

Change #2

On page 7-5, under ***Table 7.6.1*** change the following:

From: Frequency Uncertainty ≥12kHz ±0.25ppm, <12kHz ±3ppm

To: Frequency Uncertainty >15kHz ±0.25ppm ±12mHz, ≤15kHz ±3ppm

On page 9-22, under ***Table 9.9.1.1*** replace the entire Table with the following:

Table 9.9.1.1. Sine Verification into 50Ω Load

Please copy the following table. Enter the measurements in the Measured Value column on the copy and calculate as shown:

Verif. Point	**Freq.**	**Output Voltage (pk-pk)**	**Tolerance Limits (pk-pk)**		**Output Voltage (RMS)**	**Tolerance Limits (RMS)**		**Measured Value (RMS)**	**Calculated Value**
			Lower	**Higher**		**Lower**	**Higher**		
SGN1	1kHz	1.0000V	-0.020V	0.020V	0.35355V	-7.07mV	7.07mV		SGN8- SGN1
SGN2	1kHz	300.00mV	-6.0mV	6.0mV	106.066mV	-2.12mV	2.12mV		SGN9- SGN2
SGN3	1kHz	100.00mV	-2.0mV	2.0mV	35.3553mV	-0.71mV	0.71mV		SGN10- SGN3
SGN4	45kHz	1.0000V	-0.020V	0.020V	0.35355V	-7.07mV	7.07mV		SGN8- SGN4
SGN5	45kHz	300.00mV	-6.0mV	6.0mV	106.066mV	-2.12mV	2.12mV		SGN9- SGN5
SGN6	45kHz	100.00mV	-2.0mV	2.0mV	35.3553mV	-0.71mV	0.71mV		SGN10- SGN6
SGN7	50kHz	3.0000V	2.940V	3.060V	1.06066V	1.03945V	1.08187V		NA
SGN8	50kHz	1.0000V	0.980V	1.020V	0.35355V	0.34648V	0.36062V		NA
SGN9	50kHz	300.00mV	294.0mV	306.0mV	106.066mV	103.945mV	108.187mV		NA
SGN10	50kHz	100.00mV	98.0mV	102.00mV	35.3553mV	34.6482mV	36.0625mV		NA
SGN11	50kHz	30.000mV	29.40mV	30.60mV	10.6066mV	10.3945mV	10.8187mV		NA