

# Instructions

**Tektronix**

**A6302 Current Probe  
Transformer Replacement Kit**

**050-3109-02**

## Kit Description

This kit includes parts and instructions to replace the transformer of the A6302 Current Probe. The new transformer requires a new circuit board that has a compatible pin connector.

If the instrument serial number is greater than listed, or if this kit has been installed, disregard these instructions and use the transformer as a direct replacement.

This document supports Tektronix mods: **M81485, M82373**

## Instruments

**A6302**      B010100 – B064999

## Minimum Tool and Equipment List

Tool	Part Number
Small Pozidrive screwdriver	n/a
Desoldering tool, Solder vacuum	n/a
Solder iron, pencil type 20-25 Watt	n/a
Solder, rosin-core, electronic-grade, 60/40	n/a

## Kit Parts List

Quantity	Part Number	Description
1 ea	070-3905-04	Manual, Tech: Instructions, A6302, A6302XL
1 ea	204-0714-06	Body Half, Probe: Bottom, w/ Contacts, A6302
1 ea	334-9048-00	Label, Lexan: Identification, A6302
1 ea	120-0464-04	Transformer, Current: Upper & Lower
1 ea	_____	Circuit Board, A6302
1 ea	_____	Kit Instructions, A6302
1 ea	_____	Label: 050-kit, A6302

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## Service Safety Summary

Only qualified personnel should perform service procedures. Read this *Service Safety Summary* before performing any service procedures.

**Disconnect Power** Before disassembling the probe, remove power to the probe by disconnecting the probe from the measurement instrument.

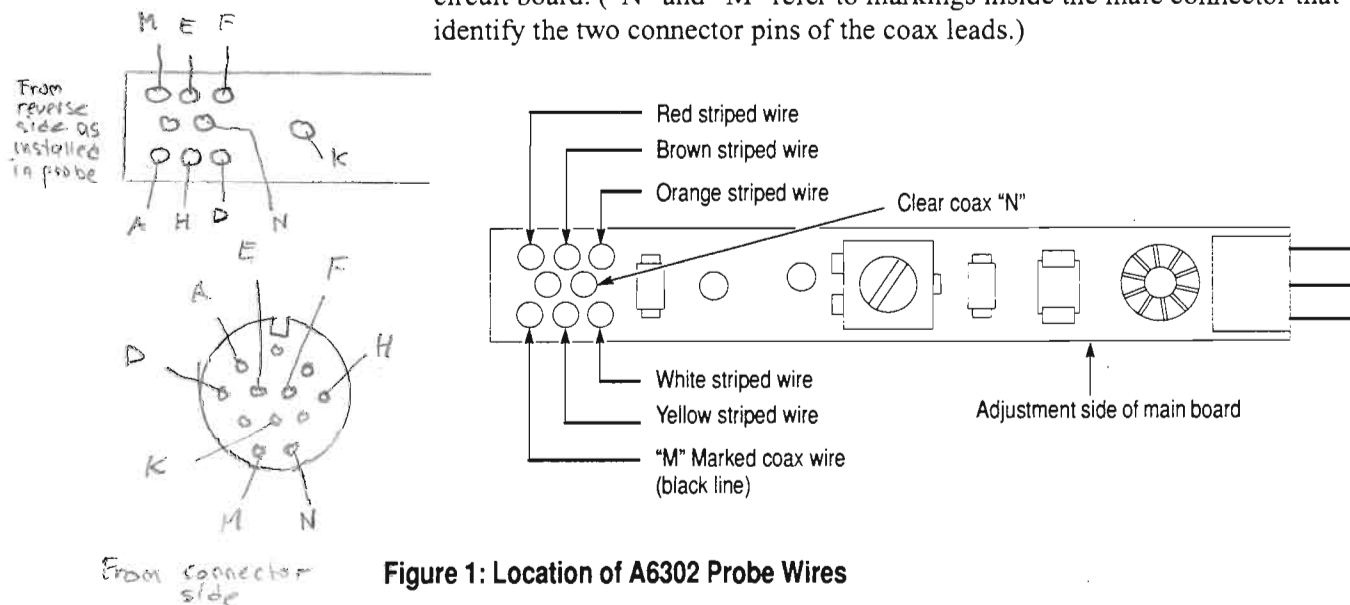
## Installation Instructions

These instructions assume a certain familiarity with the instrument. If further details are required for disassembly or assembly, refer to the A6302 & A6302XL Instructions. For assistance installing this kit, please call your nearest Tektronix, Inc., Service Center or Tektronix Factory Service.

### Circuit Board Replacement

Use the following procedure to replace the circuit board:

1. Remove the current transformer and circuit board assembly using the procedure in the A6302 & A6302XL Instructions.
2. Carefully desolder the probe wires from the circuit board using a desoldering tool.
3. Insert and solder the wires on the adjustment side of the circuit board as shown in Figure 1. The wires must solder to the adjustment side of the circuit board. ("N" and "M" refer to markings inside the male connector that identify the two connector pins of the coax leads.)



**Figure 1: Location of A6302 Probe Wires**

4. Refer to the A6302 & A6302XL Instructions to reassemble the probe.
5. Add the identification label (334-9048-00) to the bottom body half of the probe.
6. Add 050-kit label to the side of the probe body.

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## A6302 DC Offset Adjustment

The following adjustment procedure describes how to adjust the DC offset of the A6302 using the AM 503, AM 503A, AM 503B, AM 5030 and 11A16 current probe amplifiers. AM 503X refers to any AM 503, AM 503A, AM 503B or AM 5030 amplifier. Tolerances that are specified in these procedures apply to the current probes and do not include test equipment error.

Refer to Figure 2 for the location of the DC offset adjustment.

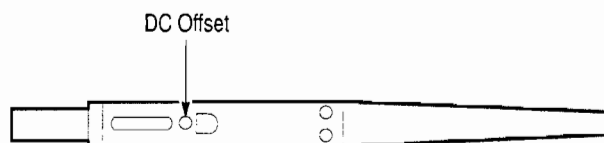


Figure 2: A6302 DC Offset Adjustment Location

### Required Test Equipment When Using an AM 503X Amplifier

To perform the adjustment procedures in this section with an AM 503, AM 503A, AM 503B or AM 5030 amplifier, you will need the test equipment listed in Table 1. The test equipment must meet or exceed the specifications listed. The test procedure may need to be changed if the recommended equipment is not used.

Table 1: Required Test Equipment

Qty	Item	Description	Recommended Equipment
1	Oscilloscope	150 MHz bandwidth	TDS 460
1	Termination <sup>1</sup>	50 $\Omega$ , BNC connector, feedthrough	011-0049-01
3	BNC Cable <sup>1</sup>	50 $\Omega$ , 1.05 m (42 in) long	012-0057-01

<sup>1</sup> Provided as a standard accessory with the AM 503X amplifier.

### Equipment Connections When Using an AM 503X Amplifier

1. Connect the AM 503X **OUTPUT** to a 50  $\Omega$  oscilloscope input using a 50  $\Omega$  BNC cable. If the input impedance of your oscilloscope is 1 M $\Omega$ , first

connect a 50  $\Omega$  feedthrough termination to the oscilloscope input. Do not connect the termination at the AM 503X output.

2. Connect the current probe to the AM 503X **INPUT** connector.
3. Do not clamp the current probe around a conductor, but make sure the jaws are locked shut.

## A6302 DC Offset Adjustment When Using an AM 503B or AM 5030

**Equipment Settings** Make or verify the equipment settings in Table 2:

**Table 2: AM 503B/AM 5030 Settings for DC Offset Adjustment**

<b>AM 503B/AM 5030</b>	
Coupling	DC
BW Limit	On (20 MHz bandwidth limit)
Current/division	10 mA/division
<b>Oscilloscope</b>	
Vertical Gain	10 mV/division
Time Base	Auto triggered 1 ms/division,
Input Coupling	Ground

- Procedure**
1. Move the oscilloscope trace to the center horizontal graticule line using the vertical position control.
  2. Set the oscilloscope input coupling to DC.
  3. Do not clamp the current probe around a conductor, but make sure the jaws are locked shut.
  4. Press the AM 503B/AM 5030 **PROBE DEGAUSS AUTOBALANCE** button. Wait for the degauss/autobalance routine to complete before proceeding. The routine is complete when the indicator light turns off.

**NOTE.** If the AM 503B/AM 5030 is not properly terminated into 50  $\Omega$ , the AM 503B/AM 5030 front panel will display error code 266 after the degauss/autobalance routine completes. Verify that the oscilloscope input is 50  $\Omega$  and set to DC coupling. If necessary, use a 50  $\Omega$  termination at the oscilloscope input.

5. If no error codes are displayed after the degauss/autobalance routine completes, no offset adjustment is necessary. If any of the error codes listed in Table 3 are displayed, continue with the procedure:

**Table 3: AM 503B/AM 5030 Error Codes Requiring DC Offset Adjustment**

Error Code	Meaning
580	Unable to complete negative offset adjustment
581	Unable to complete positive offset adjustment

6. Press and hold the **20 MHz BW LIMIT** button, and while holding it, press the **PROBE DEGAUSS AUTOBALANCE** button. This sets the front panel display to  $-00$  and puts the AM 503B/AM 5030 into an internal test mode.
7. Press the **CURRENT/DIVISION**  $\leftrightarrow$  button until the front panel display reads  $-52$ .
8. Press and release the **20 MHz BW LIMIT** button. The AM 503B/AM 5030 will degauss itself; wait until the DEGAUSS light goes out.
9. Adjust the DC Offset control so that the oscilloscope trace is on the center graticule line (zero offset),  $\pm 2$  divisions.
10. Press and release the **20 MHz BW LIMIT** button, then press and release the **COUPLING** button. This exits the AM 503B/AM 5030 test mode.



## A6302 DC Offset Adjustment When Using an AM 503A

**Equipment Settings** Make or verify the equipment settings in Table 4:

**Table 4: AM 503A Settings for DC Offset Adjustment**

<b>AM 503A</b>	
Coupling	DC
BW Limit	On (20 MHz bandwidth limit)
Current/division	10 mA/division
<b>Oscilloscope</b>	
Vertical Gain	10 mV/division
Time Base	Auto triggered 1 ms/division,
Input Coupling	Ground

- Procedure**
1. Move the oscilloscope trace to the center horizontal graticule line using the vertical position control.
  2. Set the oscilloscope input coupling to DC.
  3. Do not clamp the current probe around a conductor, but make sure the jaws are locked shut.
  4. Press the AM 503A **PROBE DEGAUSS AUTOBALANCE** button. Wait for the degauss/autobalance routine to complete before proceeding. The routine is complete when the indicator light turns off.

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**NOTE.** *If the AM 503A is not properly terminated into 50  $\Omega$ , the AM 503A front panel will display error code 54 after the degauss/autobalance routine completes. Verify that the oscilloscope input is 50  $\Omega$  and set to DC coupling. If necessary, use a 50  $\Omega$  termination at the oscilloscope input.*

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5. If no error codes are displayed after the degauss/autobalance routine completes, no offset adjustment is necessary. If any of the error codes in Table 5 are displayed, continue with the rest of this procedure.

5. If no error codes are displayed after the degauss/autobalance routine completes, no offset adjustment is necessary. If any of the error codes listed in Table 3 are displayed, continue with the procedure:

**Table 3: AM 503B/AM 5030 Error Codes Requiring DC Offset Adjustment**

Error Code	Meaning
580	Unable to complete negative offset adjustment
581	Unable to complete positive offset adjustment

6. Press and hold the **20 MHz BW LIMIT** button, and while holding it, press the **PROBE DEGAUSS AUTOBALANCE** button. This sets the front panel display to  $-00$  and puts the AM 503B/AM 5030 into an internal test mode.
7. Press the **CURRENT/DIVISION**  $\leftrightarrow$  button until the front panel display reads  $-52$ .
8. Press and release the **20 MHz BW LIMIT** button. The AM 503B/AM 5030 will degauss itself; wait until the DEGAUSS light goes out.
9. Adjust the DC Offset control so that the oscilloscope trace is on the center graticule line (zero offset),  $\pm 2$  divisions.
10. Press and release the **20 MHz BW LIMIT** button, then press and release the **COUPLING** button. This exits the AM 503B/AM 5030 test mode.

## A6302 DC Offset Adjustment When Using an AM 503A

**Equipment Settings** Make or verify the equipment settings in Table 4:

**Table 4: AM 503A Settings for DC Offset Adjustment**

<b>AM 503A</b>	
Coupling	DC
BW Limit	On (20 MHz bandwidth limit)
Current/division	10 mA/division
<b>Oscilloscope</b>	
Vertical Gain	10 mV/division
Time Base	Auto triggered 1 ms/division,
Input Coupling	Ground

- Procedure**
1. Move the oscilloscope trace to the center horizontal graticule line using the vertical position control.
  2. Set the oscilloscope input coupling to DC.
  3. Do not clamp the current probe around a conductor, but make sure the jaws are locked shut.
  4. Press the AM 503A **PROBE DEGAUSS AUTOBALANCE** button. Wait for the degauss/autobalance routine to complete before proceeding. The routine is complete when the indicator light turns off.

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**NOTE.** *If the AM 503A is not properly terminated into 50  $\Omega$ , the AM 503A front panel will display error code 54 after the degauss/autobalance routine completes. Verify that the oscilloscope input is 50  $\Omega$  and set to DC coupling. If necessary, use a 50  $\Omega$  termination at the oscilloscope input.*

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5. If no error codes are displayed after the degauss/autobalance routine completes, no offset adjustment is necessary. If any of the error codes in Table 5 are displayed, continue with the rest of this procedure.

**Table 5: AM 503A Error Codes Requiring DC Offset Adjustment**

<b>Error Code</b>	<b>Meaning</b>
46	Unable to complete positive coarse offset adjustment
47	Unable to complete negative coarse offset adjustment
48	Unable to complete positive fine offset adjustment
49	Unable to complete negative fine offset adjustment

6. Press and hold the **20 MHz BW LIMIT** button, and while holding it, press the **PROBE DEGAUSS AUTOBALANCE** button. This sets the front panel display to 00 and puts the AM 503A into an internal test mode.
7. Rotate the **CURRENT/DIVISION** knob until the front panel display reads **21**.
8. Press and release the **20 MHz BW LIMIT** button. This sets the AM 503A internal offsets to zero.
9. Adjust the A6302 DC Offset control so that the oscilloscope trace is on the center graticule line (zero offset),  $\pm 2$  divisions.
10. Press and release the **20MHz BW LIMIT** button, then press and release the **DC COUPLING** button. This exits the AM 503A test mode.

## A6302 DC Offset Adjustment When Using an AM 503

**Equipment Settings** Make or verify the equipment settings in Table 6:

**Table 6: AM 503 Settings for DC Offset Adjustment**

<b>AM 503</b>	
Coupling	CAL DC LEVEL
BW Limit	On (5 MHz bandwidth limit)
Current/division	10 mA/division
<b>Oscilloscope</b>	
Vertical Gain	10 mV/division
Time Base	Auto triggered 1 ms/division
Input Coupling	Ground

- Procedure**
1. Move the oscilloscope trace to the center horizontal graticule line using the vertical position control.
  2. Set the oscilloscope input coupling to DC.
  3. Move the oscilloscope trace to the center horizontal graticule line using the AM 503 DC LEVEL control.
  4. Do not clamp the current probe around a conductor, but make sure the jaws are locked shut.
  5. Press and release the DEGAUSS button.
  6. Set the AM 503 input coupling to DC.
  7. Set the AM 503 BALANCE adjustment to mid-position.
  8. Adjust the A6302 DC Offset control so that the oscilloscope trace is on the center graticule line (zero offset),  $\pm 2$  divisions.
  9. Press and release the DEGAUSS button.
  10. If necessary, readjust the A6302 DC Offset control so that the oscilloscope trace is on the center graticule line (zero offset),  $\pm 2$  divisions.

## A6302 DC Offset Adjustment When Using an 11A16

**Equipment Settings** Make or verify the equipment settings in Table 7:

**Table 7: Settings for DC Offset Adjustment**

11A16	
Channel Selection	CH1
Coupling	Off
Vert Size	10 mA/div

- Procedure**
1. Connect the A6302 to CH 1 on the 11A16.
  2. Adjust the Vert Offset to position the trace at the graticule center.
  3. Set Coupling back to DC.
  4. Degauss the probe by pressing the CH 1 DEGAUSS button.
  5. Select Extended Diagnostics from the Utility major menu.
  6. Select Right 11A16 Plug-in Subsystem or Block, the CH1 CAL B Area, and the AUTO BAL Routine.
  7. Select Run and record the value from the ACTUAL column (+1000 to -1000 milliunits).
  8. Exit the Extended Diagnostics menu.
  9. Adjust the A6302 DC Offset control based on the value recorded in Step 7 as follows:
    - If the recorded value (X) is negative, adjust the A6302 DC Offset control to bring the trace down (X milliunits/2) mA.
    - If the recorded value (X) is positive, adjust the A6302 DC Offset control to bring the trace up (X milliunits/2) mA.
  10. Degauss the probe again by pressing the CH 1 DEGAUSS button.
  11. Repeat Steps 5 through 10 until the value obtained in the diagnostic test (Step 7) is less than 100 milliunits.