

Adjustment: AM Level	HP8648B/C/D	YO4HFU – v1.0
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Overview

This document describes the procedure to calibrate the AM Level Accuracy of the Output Module by GPIB, following the procedure specified in the HP8648 Operating and Service Guide Manual.

Applicable only to instruments fitted with “AM Level potentiometer” on A6 Output Module.
 Not used for serial prefixes $\geq 3847A/3847U$. Some instruments may not have this pot. In this case abort the test.

Reference Instructions

AM Level (8648B/C/D Only)

(Not used for serial prefixes $\geq 3847A/3847U$)

Description

This adjustment adjusts AM level accuracy on the output module. It uses the DVM to measure the dc voltages that are being adjusted on the output module.

Required Test Equipment

- Function Generator
- DVM
- J31 Test Point Extender (refer to the “Test Point Extender” section at the front of this chapter)

Procedure

Figure 7-9. AM Level Test Setup 1

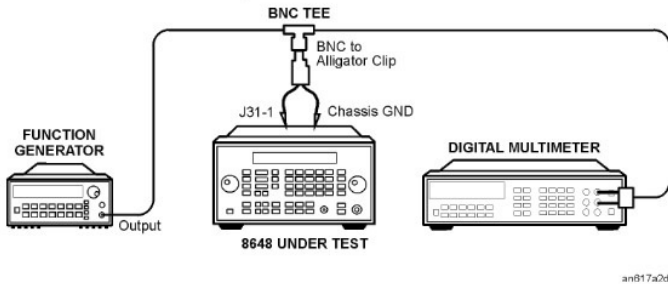
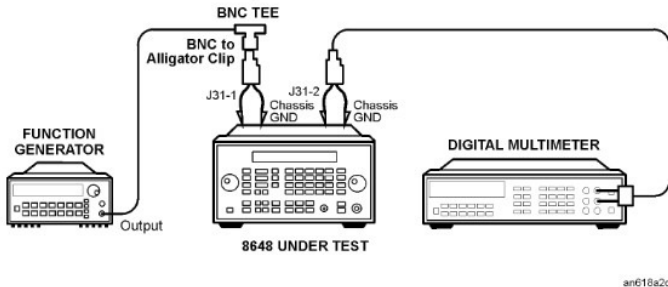
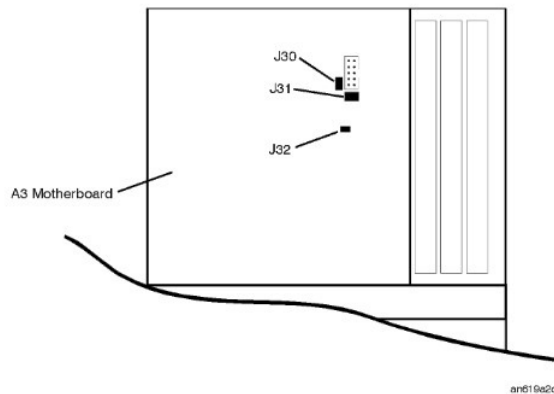


Figure 7-10. AM Level Test Setup 2



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Figure 7-11. Location of J31 and J32 on the Motherboard



1. With the line power turned off, install the Test Point Extender on J31. J31 pin 1 is the rear pin on the right edge of connector J31.
2. If jumper J32 is installed on the motherboard, remove it.
3. Turn on the line power.
4. Connect the equipment as shown above.
5. Preset all of the equipment.
6. Follow the instructions as they are displayed on the PC.

GPIB sequence according to Agilent Service Support Software

```

*IDN?
Hewlett-Packard, 8648B, 3847A02762, B.04.09
SERV:PRODUCTION:PUP
*IDN?
Hewlett-Packard, 8648B, 3847A02762, B.04.09
FREQ 100.0000000000 MHZ
POWER:ATT:AUTO 1
*IDN?
Hewlett-Packard, 8648B, 3847A02762, B.04.09
POWER:AMPL -136.0000000000
AM:STATE 0
FM:STATE 0
PM:STATE 0
OUTPUT 1
*IDN?
Hewlett-Packard, 8648B, 3847A02762, B.04.09
POWER:AMPL 0.0000000000
*IDN?
Hewlett-Packard, 8648B, 3847A02762, B.04.09
FREQ 750.0000000000 MHZ
OUTPUT 1
RESET // to Voltmeter
FUNC DCV // to Voltmeter
ARANGE ON //to Voltmeter
NDIG 3

```

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```

*rst          // to Function Generator
APPL:DC       // to Function Generator

DIAG:LATCH:SELECT "out_carrier_level_DAC"
DIAG:LATCH:VAL #H800
SOUR:VOLT:OFFS -2.000000
SOUR:VOLT:OFFS -1.980000

*IDN?
Hewlett-Packard, 8648B, 3847A02762, B.04.09
TRIG AUTO
-1.9800+00
TRIG AUTO
-1.9800+00

SOUR:VOLT:OFFS -2.990000
*IDN?
Hewlett-Packard, 8648B, 3847A02762, B.04.09
TRIG AUTO
-2.9900+00
TRIG AUTO
-2.9900+00

SOUR:VOLT:OFFS -3.495000
*IDN?
Hewlett-Packard, 8648B, 3847A02762, B.04.09
TRIG AUTO
-4.000+00      // Target voltage achieved
TRIG AUTO
-4.000+00

DIAG:LATCH:SELECT "out_service_mux"
DIAG:LATCH:VAL #H03

TRIG AUTO
0.000+00
TRIG AUTO
0.000+00
SERV:PRODUCTION:PUP
*IDN?
Hewlett-Packard, 8648B, 3847A02762, B.04.09
FREQ 100.0000000000 MHZ
POWER:ATT:AUTO 1
*IDN?
Hewlett-Packard, 8648B, 3847A02762, B.04.09
POWER:AMPL -136.0000000000
AM:STATE 0
FM:STATE 0
PM:STATE 0
OUTPUT 1
*rst

```

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Procedure Overview

1. Initial Hookup Summary

During power OFF state, remove J32 jumper located on motherboard.

Connect the Function Generator and DC Voltmeter to J31 pin 1 (signal) and chassis ground.

Set the HP8648 generator to 750MHz, CW, RF output ON, 0dBm.

Set the Function Generator dc voltage mode, output $-2.000V / 50 \Omega$. The actual voltage at the output will be approximately double due to the high-impedance load.

The algorithm will adjust the Function Generator output voltage until the DVM (used as a monitor) reads $-4.0000V \pm 0.0025V$.

The sequence will continue only after the target voltage has been achieved.

2. Set Output MUX

Disconnect the voltmeter from J31 pin 1 and connect it to J31 pin 2. Keep the Function Generator output connected to J31 pin 1.

The DVM is now used to measure the voltage routed through "out_service_mux" from the U6 Output Module to Motherboard test point J31 pin 2.

```
DIAG:LATCH:SELECT "out_service_mux"
DIAG:LATCH:VAL #H03
```

3. AM Level potentiometer adjustment

Adjust the AM Level Potentiometer located in the 3rd access hole from the back of the A6 Output Module until the DVM reads $0.000V \pm 0.002V$.

This completes the AM Level Accuracy adjustment.

4. Reboot instrument

Reboot command `SERV:PRODUCTION:PUP`

Power OFF HP8648 and reinstall J32 jumper.

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Remarks

As a side note, the high-cost HP3458A DVM and HP33120A Function Generator are the only instruments supported by Agilent Service Software. For example, HP34401A DVM is not compatible, as it uses different SCPI commands. GPIB emulation of the HP3458A was necessary to enable the Service Software to operate correctly, utilizing AR488 interface and a custom sketch.

Conclusion:

GPIB commands are used solely to switch the output MUX, without writing any calibration constants to EEPROM. Adjustment is made manually with a screwdriver.

AM Level adjustment can be simplified by using a stable -4.0000V power supply instead of the Function Generator, together with an accurate DC voltmeter ($4\frac{1}{2}$ digits or higher). The power supply can be any good voltage regulator trimmed to $-4.0000\text{V} \pm 0.0025\text{V}$. The required output current is extremely small.

Ensure that the J32 jumper is removed (open) during the AM Level adjustment.

Apply the external negative voltage (-4.0000V) to the J31 pin 1 test point header located on the motherboard.

Connect the monitoring voltmeter to J31 pin 2, and set the "out_service_mux" latch to value H03 via GPIB.

Adjust the AM Level Potentiometer (3rd potentiometer counting from the back of the A6 Output Module) until the voltmeter reads $0.000\text{V} \pm 0.002\text{V}$. This completes the AM Level Accuracy adjustment.

Reinstall the J32 jumper.

73's de Robert YO4HFU