FLUKE®

HP 3458A/HFL

Special Laboratory Digital Multimeter

Instruction Sheet

Introduction

The Fluke HP 3458A/HFL (hereafter referred to as “the meter”) uses a high-stability voltage reference and an ultra-stable resistor reference. This improves the standard meters 90-day and 1-year drift performance for dc voltage and four-wire ohms functions. These tightened specifications are reflected in the tables present in this document. No other specifications are affected.

The meter also includes a pre-programmed keypad to access commonly used functions of the calibration laboratory. These functions include simple access to the most accurate ac voltage measurements, statistics, scaling, and a numeric offset. See the “Operation” section of this document for operating instructions.

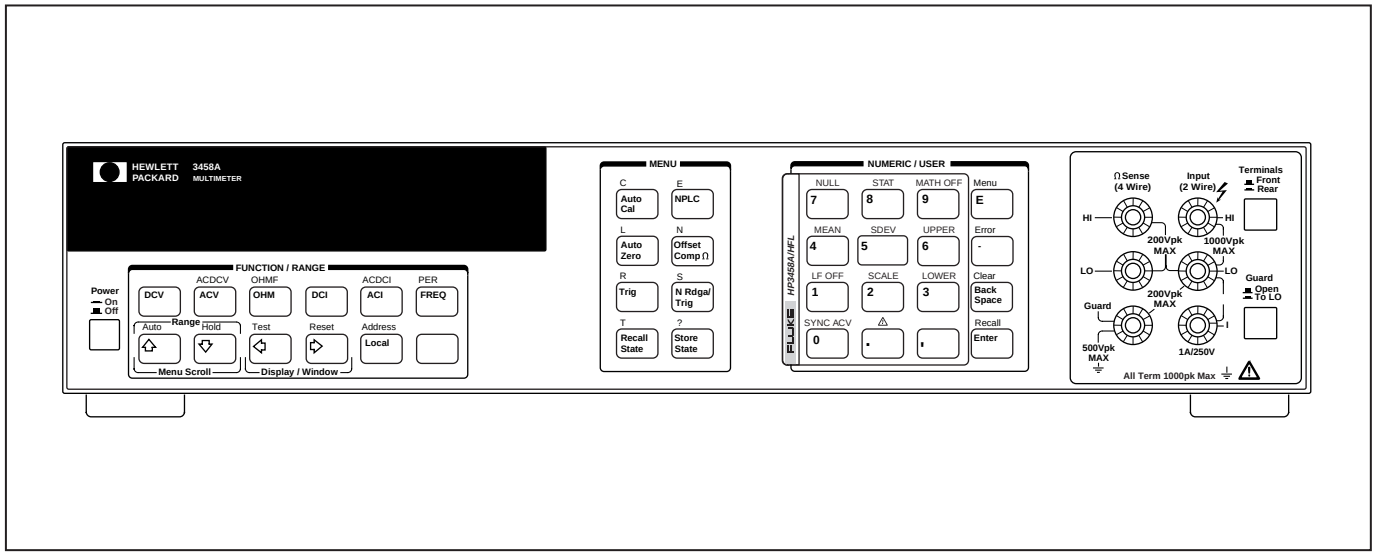

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Figure 1. HP 3458A/HFL Special Laboratory Digital Multimeter

PN 1281487
September 1999

Contact Information

To contact Fluke, call one of the following telephone numbers:

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

Or, visit Fluke's Web site at www.fluke.com**.**

Specifications

Except for the improved specifications of the dc voltage and four-wire ohms functions, all specifications to the standard HP 3458A apply to the Fluke HP 3458A/HFL.

The following accuracy specification tables replace the dc voltage and resistance accuracy tables of the HP 3458A. No other specifications are affected. Refer to the *HP 3458A Operating, Programming, and Configuration Manual* for complete performance specifications; all data sheet footnotes still apply.

DC Voltage Accuracy (ppm of Reading + ppm of Range)

Range	24 Hour	90 Day	1 Year	2 Year
100 mV	2.5 + 3	3.0 + 3	4 + 3	10 + 3
1 V	1.5 + 0.3	2.6 + 0.3	3 + 0.3	10 + 0.3
10 V	0.5 + 0.05	2.1 + 0.05	3 + 0.05	10 + 0.05
100 V	2.5+ 0.3	4.0 + 0.3	5 + 0.3	10 + 0.3
1000 V	2.5 + 0.1	4.0 + 0.1	5 + 0.1	10 + 0.1

Four-wire Ohms Accuracy (ppm of Reading + ppm of Range)

Range	Transfer[1]	24 Hour	90 Day	1 Year	2 Year
10 Ω	1 + 0.8	5 + 3	8 + 5	10 + 5	20 + 10
100 Ω	0.5 + 0.8	3 + 3	7 + 5	8 + 5	20 + 10
1 kΩ	0.5 + 0.1	2 + 0.2	6 + 0.5	7.5 + 0.5	15 + 1
10 kΩ	0.5 + 0.1	2 + 0.2	6 + 0.5	7.5 + 0.5	15 + 1
100 kΩ	0.1 + 0.1	2 + 0.2	6 + 0.5	7.5 + 0.5	15 + 1
1 MΩ	1 + 0.3	10 + 1	12 + 2	15 + 2	20 + 4
10 MΩ	5 + 1	50 + 5	50 + 10	50 + 10	75 + 10
100 MΩ	50 + 5	500 + 10	500 + 10	500 + 10	0.1 % + 10
1 GΩ	0.05 %+ 5	0.5 %+ 10	0.5 %+ 10	0.5 % + 10	1 % + 10

1. Valid over 10 minutes, with < 0.5 °C change from starting ambient temperature (following a 4-hour warm-up). Full scale to 10 % of full scale. Measurements are made on fixed range (> 4 min.) using accepted metrology practices.

Calibration

Due to the exacting specifications of the meter, Fluke strongly recommends it be certified by the Fluke Primary Standards Laboratory located in Everett, Washington; The Fluke Service Center located in Kassell, Germany; or Hewlett-Packard at its U.S. production facility. It is further recommended to protect any warranty, either written or implied, repairs should be performed only by Hewlett-Packard's U.S. production facility.

The Fluke Primary Standards Laboratory address is:

Fluke Primary Standards Laboratory
6920 Seaway Blvd.
Everett, WA 98206

The Fluke Service Center at Kassell, Germany address is:

Fluke Deutschland GMBH
Dienstleistungs - Zentrum
Customer Support Services
D-34123 Kassell, Germany

To schedule service or calibration, contact the Hewlett-Packard repair coordinator at this address:

LMC Repair Coordinator
Hewlett-Packard Company
815 14th Street S.W.
Loveland, Colorado
80537, USA

Or phone (800) 258-5165

Operation

The Fluke HP 3458A/HFL has 10 pre-programmed keys for easy access to common functions. The pre-programmed keys are numbered 0 to 9, and have the functions labeled over the corresponding number. To activate any of the 10 functions, press the number, followed by the **Enter** key.

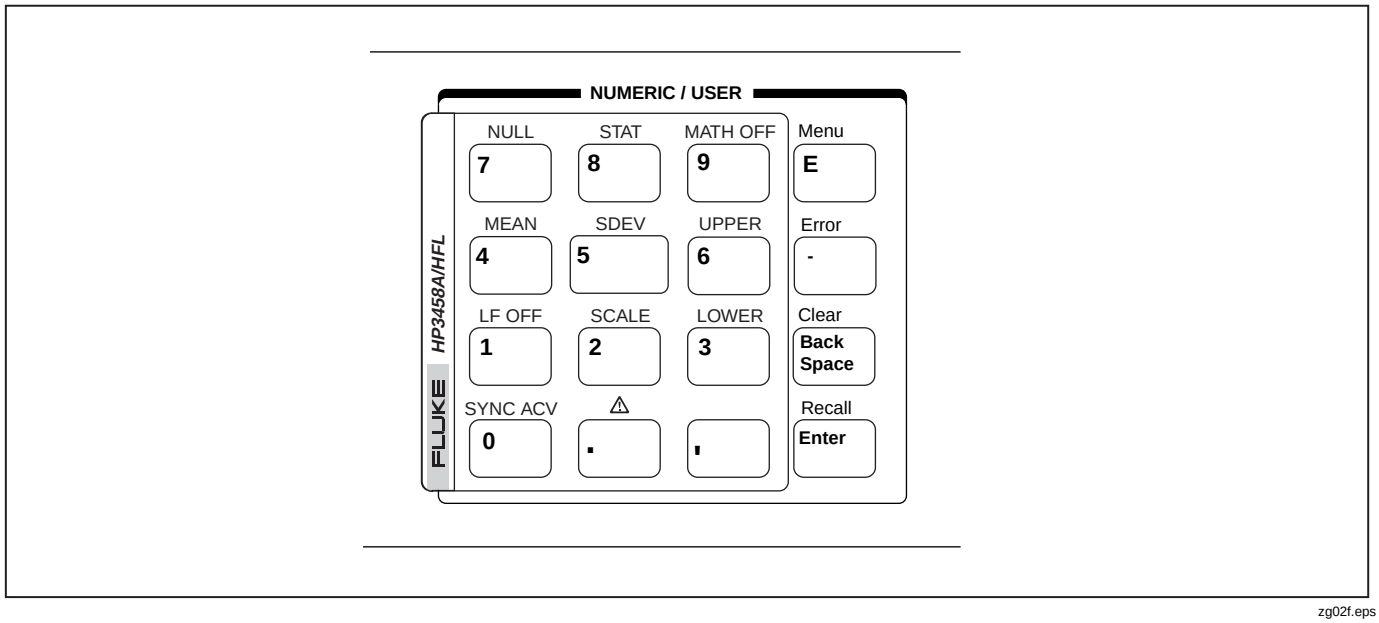

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Figure 2. HP 3458A/HFL Pre-programmed Keys

Pre-programmed Key Description

Refer to Figure 2 when reading the following pre-programmed key descriptions.

Key	Function Description
SYNC ACV (0)	Places the meter into the most accurate AC voltage measurement mode, where the meter uses proprietary sampling to obtain accuracies as low as 90 ppm. After activation, the "MORE INFO" indicator is on. When in this mode, the specifications pertaining to "Synchronous ACV" apply. See the *HP 3458A Operators Manual* for complete details. Resolution is set to "RES .002" and the low pass filter (LFILTER), which ensures proper triggering (for signals ≤ 50 kHz), is ON.
LF OFF (1)	When using "Sync ACV" for signals > 50 kHz, the low pass filter (LFILTER) should be OFF. Pressing this key turns LFILTER OFF. For measuring signals ≤ 50 kHz, press "Sync ACV", which re-programs LFILTER to ON.
SCALE (2)	Scales the displayed reading to "1.0". After activation, the "MATH" indicator is on. This function is useful for making transfer measurements using the meter. For example, to transfer the accuracy of a 10 kΩ standard to the meter, take a reading of the 10 kΩ standard. The meter may not read nominal (e.g. 9.999987 kΩ). Pressing SCALE normalizes the display to 1.0. Subsequent measurements of other 10 kΩ resistors can now be made relative to the 10 kΩ standard. If the "NULL" function is also activated, the displayed reading = (actual reading – NULL value) / SCALE value. Note that the "units" annuciator and the position of the decimal point should be ignored when SCALE is activated.
NULL (7)	Subtracts the displayed reading from subsequent readings. After activation, the "MATH" indicator is on. The NULL function is similar to the "offset" and "relative" functions commonly found in digital multimeters. It is used for nulling the effects of lead resistance in two-wire ohms, or removing offets in dc measurements or four-wire ohms.
STAT (8)	Activates the meter's statistics functions. After activation, the "MATH" indicator is on. Four of these statistics parameters are made available in the Fluke HP 3458A/HFL pre-programmed key : **MEAN (4)** — Displays the average of all readings taken after "STAT" is turned on. After activating "MEAN", to resume meter operation, press the FUNCTION key that is presently activated (e.g. DCV). The statistics function continues to record data until "MATH OFF" is activated (see below). **SDEV (5)** — Displays the standard deviation of all readings taken after "STAT" is turned on. After activating "SDEV", to resume meter operation, press the FUNCTION key that is presently activated (e.g. DCV). The statistics function continues recording data until "MATH OFF" is activated (see below). **UPPER (6)** — Displays the highest value of all readings taken after "STAT" is turned on. After activating "UPPER", to resume meter operation, press the FUNCTION key that is presently activated (e.g. DCV). The statistics function continues to record data until "MATH OFF" is activated (see below). **LOWER (3)** — Displays the lowest value of all readings taken after "STAT" is turned on. After activating "LOWER", to resume meter operation, press the FUNCTION key that is presently activated (e.g. DCV). The statistics function continues to record data until "MATH OFF" is activated (see below).
MATH OFF (9)	Turns off any of the "MATH" functions previously activated. SCALE, STAT, and NULL are math functions that can be turned off using "MATH OFF"

Key Programming Commands

This section describes how to re-program the numeric keypad in case it inadvertently gets programmed to do something else. To program any key, first press the following key sequence:

1. blue shift key
2. "."
3. key number
4. "Enter"
5. Press "key number" followed by the exact commands in the table below. Complete details are in the *HP 3458A Operators Manual*.

Table 1. Key Programming Commands

Key to be Programmed	Command
SYNC ACV (0):	SETACV SYNC; RES .002; LFILTER ON; FUNCTION ACV
LF OFF (1)	LFILTER OFF
SCALE (2)	SMATH 11,1E6;MATH 13;T 3;SMATH 11;T 1
LOWER (3)	RMATH LOWER
MEAN (4)	RMATH MEAN
SDEV (5)	RMATH SDEV
UPPER (6)	RMATH UPPER
NULL (7)	MATH NULL
STAT (8)	MATH STAT
MATH OFF (9)	SMATH OFFSET, 0; MATH OFF

An excerpt from a Microsoft Visual Basic program that programs all of the Fluke HP 3458A/HFL key configurations is shown below. The program was written using Microsoft Visual Basic 5.0 for the National Instruments AT-GPIB/TNT (Plug and Play) IEEE card. For complete program details, consult the IEEE card vendor.

```
Private Sub Command1_Click()
Dim 3458 As String
3458A$ = Space$(&H11)
Dim Add%(2)
Add%(1) = 2
Add%(2) = NOADDR
Call Meter_Init
3458A = Val(3458A$)

Call ibsic(0)
Call ibclr(0)
Call SendIFC(0)
Call DevClear(0, FLUKE%)

Rem These cammands will restore the defined function keys to the factory setting

Call EnableRemote(0, Add%)
Call Send(0, FLUKE%, "DEFKEY DEFAULT", NLend)
Call Send(0, FLUKE%, "DEFKEY 0,'SETACV SYNC;RES .002;LFILTER ON;FUNC ACV'", NLend)
Call Send(0, FLUKE%, "DEFKEY 1,'LFILTER OFF'", NLend)
Call Send(0, FLUKE%, "DEFKEY 2,'SMATH 11,1E6;MATH 13;T 3;SMATH 11;T 1'", NLend)
Call Send(0, FLUKE%, "DEFKEY 3,'RMATH LOWER'", NLend)
Call Send(0, FLUKE%, "DEFKEY 4,'RMATH MEAN'", NLend)
Call Send(0, FLUKE%, "DEFKEY 5,'RMATH SDEV'", NLend)
Call Send(0, FLUKE%, "DEFKEY 6,'RMATH UPPER'", NLend)
Call Send(0, FLUKE%, "DEFKEY 7,'MATH NULL'", NLend)
Call Send(0, FLUKE%, "DEFKEY 8,'MATH STAT'", NLend)
Call Send(0, FLUKE%, "DEFKEY 9,'SMATH 7,0;MATH OFF'", NLend)
End
End Sub
```