A User's Guide to Keysight 3458A Front Panel Operation (RoHS Compliance)

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A 5-Minute Tutorial of Front Panel Operation

Example 1: Making a measurement with any function after turning on the Keysight 3458A. The ACV function serves as a typical example of the immediate execute keys found in the Function/Range key group. Connect the appropriate signal to the input terminals and press the keys shown.

Command	Key Group	Key Sequence
ACV	Function/Range	ACV

(Any other function key in the Function/Range Key Group acts similarly; the Keysight 3458A changes function, automatically ranges, and begins measurements.)

RESET	Function/Range	(blue) Reset

(RESET returns the Keysight 3458A to the powered-on state.)

Example 2: Making a precision Vdc measurement on the 10 V range.

Command	Key Group	Key Sequence
RESET	Function/Range	(blue) Reset
DCV	Function/Range	DCV
10 V Range	Function/Range	⟨ ⟩ or ⟨ ⟩

(The ⟨ ⟩ and ⟨ ⟩ keys are pressed until the desired range is displayed: in this case, XX.XXXXX V DC (X is any number).
Leading zeros are always displayed for easy range identification.)

NPLC 100	Menu	NPLC
	Numeric/User	1 0 0 Enter

(Measurement will take about 3 seconds.)

NDIG 8	Function/Range	(blue)
	Menu	N
	Numeric/User	8 Enter

(Sets the display to 8 1/2 digits.)

The shifted Menu Keys allow alphabetic access to all Keysight 3458A commands and command parameters. The commands and command parameters are scrolled from A to Z by using the Menu Scroll keys (⟨ ⟩ and ⟨ ⟩) found in the Function/Range keys. Command parameters are accessed by using the Display/Window keys ⟨ ⟩ and ⟨ ⟩, also found in the Function/Range keys, after the command is located.

Example 3: Making a very precise Vac measurement using the Synchronous ACV measurement function. (At power-on, the Keysight 3458A is set to the generally more useful Analog ACV measurement function if you select ACV, but you should use Synchronous ACV for very precise measurements of periodic waveforms.)

Command	Key Group	Key Sequence
RESET	Function/Range	(blue) Reset
ACV	Function/Range	ACV
SETACV SYNC	Function/Range	(blue)
	Menu	S
	Function/Range	⟨ ⟩ ⟨ ⟩ ⟨ ⟩
	Numeric/User	Enter

(The MORE INFO annunciator should be illuminated. The MORE INFO annunciator indicates that some part of the measurement configuration is in a non-standard state. To view this information press ⟨ ⟩. Your display should show SETACV SYNC. Now press ⟨ ⟩ again; the display is returned to the measurement state.)

RES .002	Function/Range	(blue)
	Menu	R
	Function/Range	⟨ ⟩
	Numeric/User	. 0 0 2 Enter

(The RES command sets the % resolution of the measurement. A function change causes RES to default to RES .01 (0.01%) with reading rate of 1 per 3 s.)

LFILTER ON	Function/Range	(blue)
	Menu	L
	Function/Range	⟨ ⟩ ⟨ ⟩ ⟨ ⟩
	Numeric/User	Enter

(Suggested for inputs with frequencies below 50 kHz.)

Printed in Malaysia
Edition 4, August 2019
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Auto-Calibration (ACAL)

The Keysight 3458A Auto-Calibration (ACAL) function removes measurement errors caused by component temperature and time drift. For maximum accuracy, ACAL should be performed every 24 hours. For example, additional Vdc volts gain errors due to temperature changes are reduced from 1 ppm/°C to 0.15 ppm/°C (over 6:1) using ACAL. In ACV volts, additional gain error due to temperature changes are reduced from 30 ppm/°C to less than 1 ppm/°C (over 30:1) using ACAL. The time to perform a complete ACAL is about 12 minutes. ACAL ACV takes about 1 minute, ACAL DCV takes about 2 minutes, and ACAL OHM takes about 9 minutes. For monitoring temperature changes, the Keysight 3458A provides the TEMP? command (found in the command Menu) to measure the internal instrument temperature. Refer to the User's Guide for more details.

ACAL keystroke sequence:

Auto Cal ⟨ ⟩ ⟨ ⟩ ⟨ ⟩ ⟨ ⟩ ⟨ ⟩ - 3 ⟨ ⟩ 5 ⟨ ⟩ 8 Enter

Configuration for Highly Accurate Measurements with the Keysight 3458A

(You should perform an ACAL every 24 hours for the appropriate function after the Keysight 3458A has been powered-on and in a stable temperature environment for a minimum of four hours.)

Function	Comment	Key Sequence
	DCV	
RESET	Power-on state (VDC)	(blue) Reset
NPLC 200	Integration Time [1]	NPLC 2 0 0 Enter
NDIG 8	8 1/2 Digits	(blue) N 8 Enter
	ACV	
RESET	Power-on state	(blue) Reset
ACV	Function Vac	ACV
SETACV SYNC	Synchronous AC	(blue) S ⟨ ⟩ ⟨ ⟩ ⟨ ⟩ Enter
RES .002	Max AC Reading Res.	(blue) R ⟨ ⟩ . 0 0 2 Enter
LFILTER ON	Internal LP Filter [2]	(blue) L ⟨ ⟩ ⟨ ⟩ ⟨ ⟩ Enter
	OHMS	
RESET	Power-on state	(blue) Reset
OHMF	Function Four-Wire Ohms	(blue) Reset
OCOMP ON	For R <= 100 kOhms [3]	Offset Comp Ω ⟨ ⟩ Enter
DELAY 1	Adds 1 s delay [4]	(blue) C ⟨ ⟩ ⟨ ⟩ 1 Enter
NPLC 200	Integration Time	NPLC 2 0 0 Enter

1. *Longer integration times reduce measurement noise and increase measurement resolution.*
2. *Recommended for frequencies less than 50 kHz.*
3. *OCOMP ON turns on the offset compensation feature of the Keysight 3458A. OCOMP ON minimizes the effect of any thermally generated offset voltage from creating errors in resistance measurements.*
4. *Adds 1 s settling delay to reduce effects of dielectric absorption errors of cabling and the resistor under test.*

Short Cuts

Store and Recall Instrument Setups
Store and Recall can significantly reduce the number of keystrokes necessary for a complex configuration. Simply pressing Store State, pressing a Numeric Key X (0-127) and pressing Enter, stores the state of the Keysight 3458A as a state to recall by pressing Recall State X. Shipped with the Keysight 3458A is a small plastic overlay that fits on key 5 to document your User Key and Stored State definitions. Use Example 3 and perform the following:

Command	Key Group	Key Sequence
SSTATE 1	Menu	Store State
	Numeric/User	1 Enter

(Stores the Keysight 3458A's state in stored state 1.)

RESET	Function/Range	(blue) Reset

(RESET returns the Keysight 3458A to the powered-on state.)

RSTATE 1	Menu	Recall State
	Numeric/User	1 Enter

(Returns the Keysight 3458A to stored state 1.)

User Definable Keys
In addition to the State Store and Recall commands, you can also define any of the User keys, F0-F9, in the Numeric/User Key Group to be any string of commands.
Let's use Example 3 one more time to show how this feature works.

Command	Key Sequence
DEFKEY DEFAULT	(blue) Def Key ⟨ ⟩ Enter

(Clears all previously defined User Definable keys.)

DEFKEY F0, "	0

(Ready to accept commands.)

FUNC ACV	(blue) E ⟨ ⟩ (three times) ⟨ ⟩
	⟨ ⟩ (four times) (blue) ;

(The delimiter used to separate commands is " ; ".
The delimiter used to separate parameters is " , ".)

SETACV SYNC	(blue) S ⟨ ⟩ ⟨ ⟩ ⟨ ⟩ (blue) ;
RES .002	(blue) R ⟨ ⟩ . 0 0 2 (blue) ;
LFILTER ON	(blue) L ⟨ ⟩ ⟨ ⟩ ⟨ ⟩ Enter
DEFKEY F1, "	1
MATH NULL	(blue) L ⟨ ⟩ (four times)
	⟨ ⟩ ⟨ ⟩ (eight times) Enter

(MATH NULL displays the difference between the first and subsequent measurements.)

Now Use It!

(blue) f0 Enter

(blue) f1 Enter

(Note the MATH annunciator is turned on.)

Command Recall Buffer Operation
The command recall buffer recalls previously entered commands. If you have performed the sequence in the User Definable Keys you can expect to have the results listed below.

Command	Key Group	Key Sequence
RECALL	Function/Range	(blue)
	Numeric/User	Recall

(MATH NULL should appear in the Display.)

The MENU Command
To access the commands alphabetically, you use the Menu Keys. As the Keysight 3458A is shipped, only the most commonly used commands are available in this "SHORT" menu. To access all the commands, you have to use the Menu Key with the "FULL' parameter.

Command	Key Group	Key Sequence
MENU FULL	Function/Range	(blue)
	Numeric/User	Menu
	Function/Range	⟨ ⟩
	Numeric/User	Enter