



HEWLETT®
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Quick Reference Card

for

HP Models 6812A, 6813A, 6814B, 6834B
AC Power Source/Analyzers

and

HP Models 6841A, 6842A, 6843A
Harmonic/Flicker Test Systems
(Normal Mode Operation)

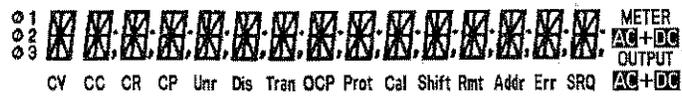


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Display Annunciators



- ϕ_1 The three phase annunciators indicate which phase is being controlled or metered. In a single-phase instrument only the Phase 1 annunciator will light. In a 3-phase instrument the Phase Select key can be used to select one of the three phases or all three phases simultaneously. When simultaneous control is selected, all three-phase annunciators are illuminated.
- ϕ_2
- ϕ_3
- CV** This annunciator is lit when the output voltage is regulated.
- CC** Indicates that the output is in rms current limit.
- CR & CP** Not used.
- Unr** Indicates that the output is unregulated.
- Dis** Indicates that the output state is OFF.
- Tran** Indicates that an output transient (step, pulse, or list) is initiated.
- OCP** Indicates that the over-current protection state is ON.
- Prot** Indicates that the output has been disabled by one of the protection features.
- Cal** Cal indicates that calibration mode is ON.
- Shift** Indicates that the Shift key has been pressed.
- Rmt** Indicates that the selected Remote programming interface (either HP-IB or RS-232) is active.
- Addr** Indicates that the interface is addressed to talk or listen.
- Err** Indicates that there is an error in the SCPI error queue.
- SRQ** Indicates that the interface is requesting service.
- Meter** Indicates the front panel measurement functions.
- Output** Indicates the output coupling.

SYSTEM Keys

Local

Press to change the ac source's selected interface from remote operation to local (front panel) operation. Pressing this key has no effect if the interface state is already Local, Local-with-Lockout, or Remote-with-Lockout.

Error
Address

Error Functions	
ERROR<value>	Displays the system error codes stored in the SCPI error queue. If no errors exist, a 0 is displayed. The Err annunciator is lit when there are errors.
Address Functions	
ADDRESS <value>	Set HP-IB address
INTF HP-IB RS232	Set interface
BAUDRATE 300 600 1200	Set baud rate
2400 4800 9600	
PARITY NONE EVEN ODD	Set parity
LANG SCPI E9012	Set language
NOUTPUTS 1 3	Select number of output phases (1)

Save
Recall

Save Functions	
Press to save an existing ac source state in nonvolatile memory. Up to 16 states can be saved (0-15).	
Recall Functions	
Press to place the ac source into a previously saved state. Up to 16 states can be recalled (0-15).	



First press and release this blue shift key to select a SHIFT function. The Shift annunciator lights when this key is pressed.

FUNCTION Keys

Harmonic

Meter

Harmonic Functions		
<reading>A I:MAG: <index>		Current harmonic magnitude
<reading> ° I:PHASE: <index>		Current harmonic phase
<reading>V V:MAG: <index>		Voltage harmonic magnitude
<reading> ° V:PHASE: <index>		Voltage harmonic phase
<reading>A N:MAG: <index>		Neutral current harmonic magnitude
<reading> ° N:PHASE: <index>		Neutral current harmonic phase
<reading> CURR: THD		Current total % harmonic distortion
<reading> VOLT: THD		Voltage total % harmonic distortion
Meter Functions		
<reading>V	<reading>Hz	rms voltage & frequency
<reading>V	<reading>A	rms voltage & rms current
<reading>A	<reading>Hz	rms current & frequency
<reading>V	<reading>W	rms voltage & power
<reading>	CREST F	Current crest factor
<reading>A	PK REP	Peak current, repetitive
<reading>A	PK NR	Peak current, non repetitive
<reading>VA		Apparent power
<reading>	VAR	Reactive power
<reading>W	TOTAL	Total power all phases (1)
<reading>	PFACTOR	Power factor
<reading>A	NEUTRAL	Neutral rms current (1)

Trigger

Trigger Control

Trigger Function	
Pressing the Shift Trigger key generates an immediate trigger.	
Trigger Control Functions	
INIT:IMMED	Initiate trigger immediately
INIT:CONT ON OFF	Initiate trigger continuously
TRIG:SOUR BUS EXT IMM	Set trigger source
DELAY <value>	Set trigger delay
ABORT	Abort all trigger sequences
SYNC:SOUR PHASE IMM	Set synchronous source
SYNC:PHAS <value>	Set synchronous phase reference

FUNCTION Keys

Status

Protect

Status Functions	
*CLS	Execute *CLS command
STATUS:PRESET	Execute STATUS:PRESET command
*ESR? <value>	Return Event Status register
*STB <value>	Return Status Byte Register
OPER:EVENT? <value>	Return STAT:OPER:EVENT?
OPER:COND <value>	Return STAT:OPER:COND?
QUES:EVENT? <value>	Return STAT:QUES:EVENT?
QUES:COND <value>	Return STAT:QUES:COND?
Protect Functions	
PROT:CLEAR	Clear latched protection
CURR:PROT ON OFF	Set over-current protection
VOLT:PROT ON OFF	Set over-voltage protection (3)
VOLT:PROT <value>	Set over-voltage protection level
DELAY <value>	Set time delay for activating protection fault

Output

Input

Output Functions	
OUTP:COUP AC DC	Set output coupling (3)
*RST	Execute *RST command
TTLT:SOUR BOT EOT LIST	Set Trigger Out source
TTLT:STATE ON OFF	Set Trigger Out state
IMP:STATE ON OFF	Set output impedance programming (3)
IMP:REAL <value>	Set real part of output impedance (3)
IMP:REAC <value>	Set reactive part of output impedance (3)
PON:STATE RST RCLO	Select power-on state
RI LATCHING LIVE OFF	Set remote inhibit mode
DFI ON OFF	Set DFI state
DFI:SOUR QUES OPER	Set DFI source
ESB RQS OFF	
Input Functions	
INP:COUP AC DC ACDC	Meter coupling
CURR:RANGE HIGH LOW	Current measurement range (3)
WINDOW KBESSEL RECT	Select harmonic measurement window

FUNCTION Keys

Current

Voltage

Current Functions	
CURR:LEV <value>	Set output rms current limit (4)
CURR:PEAK <value>	Set immediate peak current limit (3)
CURR:PEAK:T <value>	Set triggered peak current limit (3)
CURR:PEAK:M FIXED STEP PULSE LIST	Set peak current limit mode (3)
Voltage Functions	
VOLT <value>	Set AC output voltage (4)
VOLT:T <value>	Set triggered voltage (4)
VOLT:M FIXED STEP PULSE LIST	Set voltage mode (4)
RANGE 150 300	Set voltage range (2, 4)
OFFSET <value>	Set dc offset voltage (3)
OFFSET:T <value>	Set triggered dc offset voltage (3)
OFFSET:M FIXED STEP PULSE LIST	Set dc offset voltage mode (3)
SLEW <value>	Set voltage slew in V/Sec (4)
SLEW:T <value>	Set triggered voltage slew (4)
SLEW:M FIXED STEP PULSE LIST	Set voltage slew mode (4)
OFF:SLW <value>	Set immediate DC offset voltage slew V/Sec (3)
OFF:SLW:T <value>	Set triggered DC offset voltage slew (3)
OFF:SLW:M FIXED STEP PULSE LIST	Set DC offset voltage slew mode (3)
ALC INT EXT	Set voltage sense source
ALC:DET RTIME RMS	Set voltage sense detector (3)

Shape

Shape Functions	
SHAPE	SINE SQUARE Set immediate shape
	CSIN <user>
SHAPE:T	SINE SQUARE Set triggered shape
	CSIN <user>
SHAPE:M	FIXED STEP Set shape mode
	PULSE LIST
CLIP <value>	Set clipping level

FUNCTION Keys

List

Pulse

List Functions	
COUNT <value>	List repeat count
DWEL: <index><value>	Dwell list
FREQ: <index><value>	Frequency list
FSLW: <index><value>	Frequency slew rate list
IPK: <index><value>	Peak current limit list (3)
OFFS: <index><value>	DC voltage list (3)
OSLW: <index><value>	DC offset voltage slew rate list (3)
PHASE: <index><value>	Phase list(4)
SHAP: <index> SINE SQUARE CSIN <user>	List of shapes
STEP ONCE AUTO	Set response of list to triggers
TTLT: <index> ON OFF	Trigger Out pulse list
VOLT: <index><value>	AC voltage list (4)
VSLW: <index><value>	Voltage slew rate list (4)
Pulse Functions	
WIDTH <value>	Set pulse width
COUNT <value>	Set number of output pulses
DCYCLE <value>	Set pulse duty cycle
PER <value>	Set pulse period count
HOLD WIDTH DCYCLE	Set parameter held constant

Output on/off

This key toggles the Output on and off. When off, the source output is disabled and the Dis annunciator is on.

Notes:

- (1) Valid for Model HP 6834B only.
- (2) Valid for Models HP 6814B/6834B/6843A only.
- (3) Valid for Models HP 6812A/6813A/6841A/6842A only.
- (4) Phase selectable on HP 6834B.

FUNCTION Keys

Phase

Freq

Phase Functions	
PHASE <value>	Set output phase (4)
PHASE:T <value>	Set triggered phase (4)
PHASE:M FIXED STEP PULSE LIST	Set phase mode (4)
Frequency Functions	
FREQ <value>	Set output frequency
FREQ:T <value>	Set triggered output frequency
FREQ:M FIXED STEP PULSE LIST	Set frequency mode
SLEW <value>	Set frequency slew in Hz/sec
SLEW:T <value>	Set triggered frequency slew
SLEW:M FIXED STEP PULSE LIST	Set frequency slew mode

▼ Index

▲ Index



▼▲ Index Functions

These are Shift Index keys which are used to scroll through indexed functions. Press these keys to step through integers 0-50 for a harmonic list, or 0-99 for list points. Holding these keys down lets you rapidly scroll to any harmonic or list point.

▼▲ Functions

These keys let you move through the choices in a command list. Command lists are circular, you can return to the starting position by pressing either key.

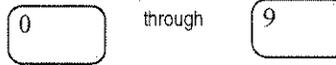
Phase Select

This key applies to 3-phase ac sources only. Pressing this key successively selects phase one first, then phase two, then phase three, and then all three phases.

ENTRY Keys



These keys let you scroll through different choices in a parameter list that apply to a specific function. If the function command has a numeric range, these keys automatically increment or decrement the existing value.



The numeric keys 0 through 9 are used to enter numeric values.



Press Shift and this key to enter a minus. Press this key alone to enter a decimal point.

Enter



Until you press the Enter key, the values or parameters you enter with the other Entry keys are displayed but not entered into the ac source.

E



Press Shift and this key to enter an exponent.

Clear Entry



Press Shift and this key to abort a keypad entry and clear the value. When editing a list, pressing Clear Entry truncates or clears the list at the presently displayed list point. Press this key alone to backspace and delete the last digit entered.

Calibration



Press Shift and this key to access the calibration menu. Refer to appendix B in the User's Guide for more information.

SCPI Commands

SCPI Common Commands

```
*CLS      *IDN?   *PSC <bool>  *SAV <value>  *TRG
*ESE <value> *OPC   *PSC?       *SRE <value>  *TST?
*ESE?     *OPC?  *RCL <value> *SRE?         *WAI
*ESR?     *OPT?  *RST       *STB?
```

ABORT

CALibrate

```
:CURRent
      :AC
      :MEASure
:DATA <n>
:IMPedance
:LEVel P1 | P2 | P3 | P4
:PASSword <n>
:PWM
      :FREQuency <n>
      :RAMP <n>
:SAVE
:STATe <bool> [, <n>]
:VOLTage
      :AC
      :DC
      :OFFSet
      :PROTection
      :RTIME
```

DATA | TRACe

```
:CATalog?
[:DATA] <trace_name>, <n> [, <n>]
:DEFine <trace_name>[, <trace_name> | 1024]
:DELete
      [:NAME] <trace_name>
```

DISPlay

```
[:WINDow]
      [:STATe] <bool>
      :MODE NORMAl | TEXT
      :TEXT
      [:DATA] <display_string>
```

SCPI Commands

INITiate

```
[:IMMediate]
      :SEQuence[113]
      :NAME TRANsient | ACQuire
:CONTinuous
      :SEQuence[1] <bool>
      :NAME TRANsient, <bool>
```

INSTRument

```
:COUple ALL | NONE
:NSElect 1|2|3
:SElect OUTPut1 | OUTPut2 | OUTPut3
```

FETCh | MEASure

```
[:SCALar]
:CURRent
      [:DC]?
      :AC?
      :ACDC?
      :AMPLitude
      :MAX?
      :CREStfactor?
      :HARMonic
      [:AMPLitude]? <n>
      :PHASe? <n>
      :THD?
:NEUTral
      [:DC]?
      :AC?
      :ACDC?
      :HARMonic
      [:AMPLitude]? <n>
      :PHASe? <n>
:FREQuency?
:POWer
      [:DC]?
      :AC
      [:REAL]?
      :APParent?
      :REACTive?
      :PFACtor?
      :TOTAl?
:VOLTage
      [:DC]?
      :AC?
      :ACDC?
      :HARMonic
      [:AMPLitude]? <n>
      :PHASe? <n>
      :THD?
```

SCPI Commands

FETCh | MEASure (Continued)

```

:ARRay
  :CURRent
    [:DC]?
    :HARMonic
    [:AMPLitude]?
    :PHASe?
  :NEUTral
    [:DC]?
    :HARMonic
    [:AMPLitude]?
    :PHASe?
  :VOLTage
    [:DC]?
    :HARMonic
    [:AMPLitude]?
    :PHASe?

```

OUTPut

```

[:STATE] <bool>
:COUPLing DC | AC
:DFI
  [:STATE] <bool>
  :SOURce QUES | OPER | ESB | RQS | OFF
:IMPedance
  [:STATE] <bool>
  :REAL <n>
  :REACTive <n>
:PON
  :STATe RST | RCLD
:PROTection
  :CLEar
  :DELay <n>
:RI
  :MODE LATCHing | LIVE | OFF
:TTLTrg
  [:STATE] <bool>
  :SOURce BOT | EOT | LIST

```

SENSE

```

:CURRent
  :ACDC
  :RANGe
  [:UPPER] <n>
:SWEEP
  :OFFSet
  :POINts <n>
  :TINTerval <n>
:WINDow
  [:TYPE] KBESsel | RECTangular

```

SCPI Commands

[SOURce:]

```

CURRent
  [:LEVel]
  [:IMMediate]
  [:AMPLitude] <n>
:PEAK
  [:IMMediate] <n>
  :MODE FIXEd | STEP | PULSe | LIST
  :TRIGgered <n>
:PROTection
  :STATe <bool>

```

FREQuency

```

[:CW | :IMMediate] <n>
:MODE FIXEd | STEP | PULSe | LIST
:SLEW
  [:IMMediate] <n> | INFIInity
  :MODE FIXEd | STEP | PULSe | LIST
  :TRIGgered <n> | INFIInity
:TRIGgered <n>

```

FUNction

```

[:SHAPE]
  [:IMMediate] SINusoid | SQUare | CSINusoid | <user>
  :MODE FIXEd | STEP | PULSe | LIST
  :TRIGgered SINusoid | SQUare | CSINusoid | <user>
  :CSINusoid <n> [THD]

```

LIST

```

:COUNT <n> | INFIInity
:CURRent <n> {, <n>}
  :POINts?
:DWELl <n> {, <n>}
  :POINts?
:FREQuency
  [:LEVel] <n> {, <n>}
  :POINts?
  :SLEW <n> {, <n>}
  :POINts?
:PHASe <n> {, <n>}
  :POINts?
:SHAPE <shape> {, <shape>}
  :POINts?
:STEP ONCE | AUTO
:TTLTrg <bool> {, <bool>}
  :POINts?

```

SCPI Commands

[SOURce:] LIST (Continued)

```

:VOLTage
    [:LEVel] <n> {,<n>}
        :POINts?
    :SLEW <n> {,<n>}
        :POINts?
    :OFFSet <n> {,<n>}
        :POINts?
        :SLEW <n> {,<n>}
            :POINts?

PHASe
    [:IMMediate | :ADJust] <n>
    :MODE FIXed | STEP | PULSe | LIST
    :TRIGgered <n>

PULSe
    :COUNT <n> | INFinity
    :DCYCLe <n>
    :HOLD WIDTH | DCYCLe
    :PERiod <n>
    :WIDTh <n>

VOLTage
    [:LEVel]
        [:IMMediate]
            [:AMPLitude] <n>
            :TRIGgered
                [:AMPLitude] <n>
        :SENSe | :ALC
            :DETector RTIME | RMS
            :SOURce INT | EXT
    :MODE FIXed | STEP | PULSe | LIST
    :OFFSet <n>
        [:IMMediate] <n>
        :MODE FIXed | STEP | PULSe | LIST
        :TRIGgered <n>
        :SLEW
            [:IMMediate] <n> | INFinity
            :MODE FIXed | STEP | PULSe | LIST
            :TRIGgered <n> | INFinity

    :PROTection
        [:LEVel] <n>
        :STATe <bool>

    :RANGe 150 | 300
    :SLEW
        [:IMMediate] <n> | INFinity
        :MODE FIXed | STEP | PULSe | LIST
        :TRIGgered <n> | INFinity
    
```

SCPI Commands

STATus

```

:OPERation
    [:EVENT]?
    :CONDition?
    :ENABle <n>
    :NTRansition <n>
    :PTRansition <n>

:PRESet
:QUESTionable
    [:EVENT]?
    :CONDition?
    :ENABle <n>
    :NTRansition <n>
    :PTRansition <n>
    :INSTrument

:SUMmary
    [:EVENT]?
    :CONDition?
    :ENABle <n>
    :NTRansition <n>
    :PTRansition <n>
    
```

SYSTem

```

:CONFigure
    :NOUTputs 1 | 3

:ERRor?
:VERsion?
:LANGuage SCPI | E9012
:LOCal
:REMote
:RWLock
    
```

TRIGger

```

[:TRANsient | :SEquence1]
    [:IMMediate]
    :SOURce BUS | EXTernal | IMMEDIATE
    :DELay <n>

:SYNChonize | :SEquence2
    :SOURce PHASe | IMMEDIATE
    :PHASe <n>

:ACQuire | :SEquence3
    [:IMMediate]
    :SOURce BUS | EXTernal | TTLTrg

:SEquence1
    :DEFine TRANsient

:SEquence2
    :DEFine SYNChonize

:SEquence3
    :DEFine ACQuire
    
```

Error Messages

Error	Description	Error	Description
0	No error	1	Non-volatile RAM RDO section checksum failed
-100	Command error	2	Non-volatile RAM CONFIG section checksum failed
-101	Invalid character	3	Non-volatile RAM CAL section checksum failed
-102	Syntax error	4	Non-volatile RAM WAVEFORM section checksum failed
-103	Invalid separator	5	Non-volatile RAM STATE section checksum failed
-104	Data type error	6	Non-volatile RAM LIST section checksum failed
-105	GET not allowed	10	RAM selftest
-108	Parameter not allowed	11 - 31	DAC selftest error, expected <n>, read <value>
-109	Missing parameter	40	Voltage selftest error, output 1
-112	Program mnemonic too long	41	Voltage selftest error, output 2
-113	Undefined header	42	Voltage selftest error, output 3
-121	Invalid character in number	43	Current selftest error, output 1
-123	Numeric overflow	44	Current selftest error, output 2
-124	Too many digits	45	Current selftest error, output 3
-128	Numeric data not allowed	70	Fan voltage failed
-131	Invalid suffix	80	Digital I/O selftest error
-138	Suffix not allowed	200	Outgrd not responding
-141	Invalid character data	201	Front panel not responding
-144	Character data too long	210	Ingrd receiver framing error
-148	Character data not allowed	211	Ingrd uart overrun status
-150	String data error	212	Ingrd received bad token
-151	Invalid string data	213	Ingrd receiver buffer overrun
-158	String data not allowed	214	Ingrd input buffer overrun
-160	Block data error	215	Outgrd output buffer overrun
-161	Invalid block data	216	RS-232 receiver framing error
-168	Block data not allowed	217	RS-232 receiver parity error
-170	Expression error	218	RS-232 receiver overrun error
-171	Invalid expression	219	Ingrd inbuf count sync error
-178	Expression data not allowed	220	Front panel uart overrun
-200	Execution error	221	Front panel uart framing
-221	Settings conflict	222	Front panel uart parity
-222	Data out of range	223	Front panel buffer overrun
-223	Too much data	224	Front panel timeout
-224	Illegal parameter value	401	CAL switch prevents calibration
-225	Out of memory	402	CAL passcode is incorrect
-270	Macro error	403	CAL not enabled
-272	Macro execution error	404	Computed readback cal constants are incorrect
-273	Illegal macro label	405	Computed programming cal constants are incorrect
-276	Macro recursion error	406	Incorrect sequence of calibration commands
-277	Macro redefinition not allowed	600	Systems in mode:list have different list lengths
-310	System error	601	Requested voltage and waveform exceeds peak voltage capability
-350	Too many errors	602	Requested voltage and waveform exceeds xtmr volt-second rating
-400	Query error	603	Command only applies to RS-232 interface
-410	Query INTERRUPTED	604	Trigger received before requested number of pre-trigger readings.
-420	Query UNTERMINATED	605	Requested RMS current too high for voltage range
-430	Query DEADLOCKED	606	Waveform data not defined
-440	Query UNTERMINATED after indefinite response	607	VOLT, VOLT:SLEW, and FUNC:SHAPE modes incompatible

Status Model

