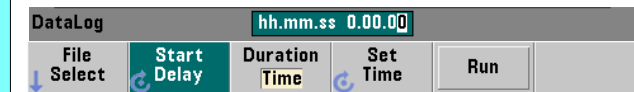## 6. Data Logging

Data Log

Use the 'Data Log' key to log readings over time or based on reading count.

Readings are saved and displayed within a trend chart as they are logged. (The application can be stopped before the duration ends.)

DataLog   hh.mm.ss 0.00.00

| File Select | Start Delay | Duration Time | Set Time | Run |

Example: - log 1,000 readings
- use default path and file name

Data Logger Application

File name: Internal\DataLog

Start Delay: 00:00:00

Duration: 1000
(Readings)

Press Run to start

DataLog   1.00□

| File Select | Start Delay | Duration Readings | Set Count | Run | View Results |

File Select - specify location of data log file (default = Internal\DataLog)

Duration Readings - set logging duration ('Readings')

Set Count - number of readings to log

Run - starts data logging (select 'Yes' to overwrite existing file)
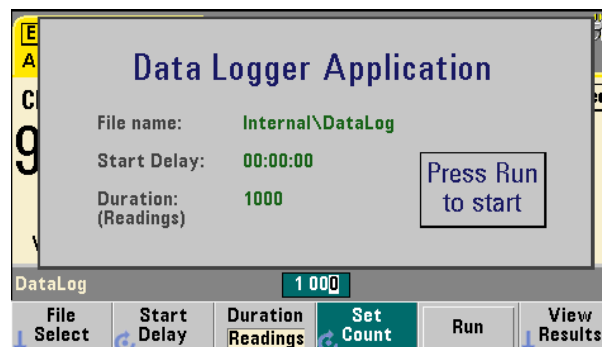
View Results - displays the trend chart when logging is complete.

7. Utility Functions

Utility

Utility functions are counter operations and settings common to multiple types of counter measurements. Below is a summary of what the utility menus provide.

Store / Recall - store and recall user-defined states, set specific power-on states, restore factory default settings

I/O Config - enable/edit LAN, USB, and GPIB interface settings

Cal / AutoCal - perform a calibration or auto-calibration, read temperature within instrument

Instr Setup - self-test, time base, measurement time out, auto-level, phase measurement format

System Setup - display control, date/time settings, folder and data/state file operations, browser control (internal and external memory)

Battery Option - battery option 300 enable and charge level (if installed)

For Further Information

1. *Keysight 53220A/53230A User's Guide*

2. *Keysight 53210A/53220/53230A Service Guide*

3. *Keysight 53220A/53230A Programmer's Reference*

4. *Keysight 53210A/53220/53230A Product Reference CD*
www.Keysight.com/find/53220A or www.Keysight.com/find/53230A
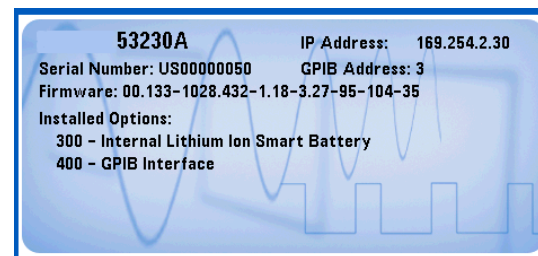

Using the 53220A/53230A Web User Interface

The Web User Interface (UI) is a built-in instrument utility that provides SCPI programming control of the instrument through its LAN interface. The Web UI uses a Java™-enabled PC Web browser and requires no external instrument drivers.
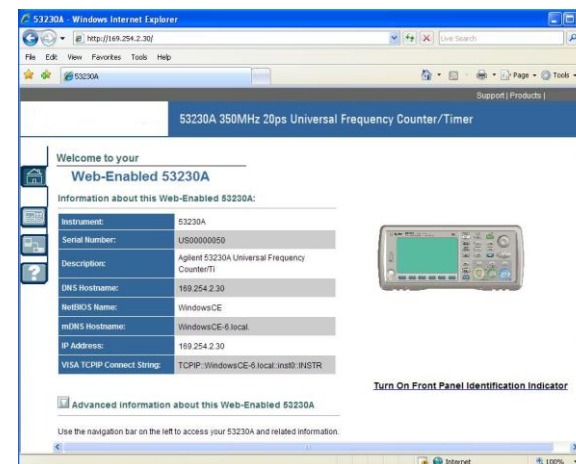
① Connect a standard LAN cable directly between the counter and the PC, or between the counter and a network switch. Open the Web browser.

② Obtain the IP address from the counter's 'About' window using the following keys:
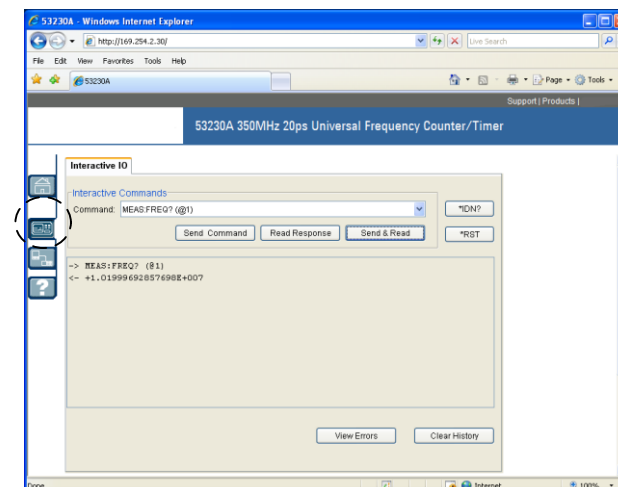
Help - open the Help topic window

About - press the About softkey

53230A   IP Address: 169.254.2.30
Serial Number: US00000050   GPIB Address: 3
Firmware: 00.133-1028.432-1.18-3.27-95-104-35
Installed Options:
300 – Internal Lithium Ion Smart Battery
400 – GPIB Interface
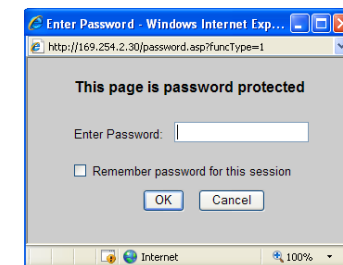
③ Enter the IP address in the browser's address window. This opens the Web UI home page.

④ Open the Interactive IO window by clicking on the 'Remote Control' menu icon.

Enter commands from the counter's SCPI command set using the 'Command' window. Query commands which include '?' return data and can be sent using **Send & Read**. Commands which do not return data are sent using **Send Command**.
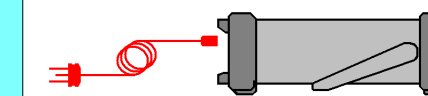
If prompted, click on 'Enter Password' to view the password protected page. When shipped from Keysight, there is no password protection.

Keysight 53220A/53230A
350 MHz Universal Frequency Counter/Timer
Quick Start Tutorial

1. Preparing for Use

Check the Web for the latest firmware

Connect the Power Cord.

Then plug in the instrument.

The Keysight 53220A/53230A counter automatically senses standard power line voltages and frequencies. There are no switches to set or fuses to change.

Adjust the Carry Handle

Grasp the handle by the sides and *pull outward:*

Adjust the handle to the desired position:
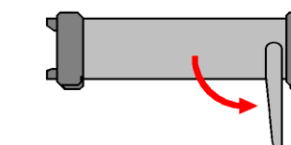
To remove, see instructions on underside of handle.

Input Terminals

Channels 1-2 BNC (f)

Channel 3 Opt. 106/115 N-Type (f)

7.5 Vpk into 50W
50V Max (AC/DC)
Damage Level: 350 Vpk

Max input +27 dBm (5 Vrms)

Battery Operation: 42V Max

Panels at a Glance

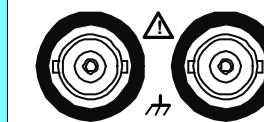**KEYSIGHT 53230A** 350 MHz 20 ps
Universal Frequency Counter / Timer — LXI

CH 1 Frequency — Gate
14.999 905 143 MHz

Vpp: 8.03 V Vmin: −4.02 V Vmax: 4.02 V

Freq / Period
Freq | Freq Ratio | Period | Time Stamp | Advanced Auto

Measure: Auto Scale, Freq Period, Time Interval, Totalize, Gate, Trigger, Back Local
View: Digits, Graph, Math, Data Log
System: Preset, Utility, Help, Shift

Channel / Setup — 1 Watt Max into 50Ω

Ch 1 Opt 201 Ch 2 (53220A/53230A Only) GP-IB

Ext Ref In Gate In/Out Opt 106/115 Opt 010 UOCXO / Opt 300 Battery / Opt 150 sw (53230A Only)
Int Ref Out Trig In USB LAN
~ Line 100-240V, 50-60 Hz / 100-127V, 400 Hz / 90VA Max

Front Panel Features
		User's Guide
A	Counter Measurements	(Chapter 3)
B	Display Control	(Chapter 6)
C	Instrument Wide	(Chapter 1)
D	Channel Configuration	(Chapter 4)
E	Triggering and Gating	(Chapter 5)
F	Soft Key Area	(all chapters)
G	On / Standby	(Chapter 1)
H	USB "Host" Port	(Chapter 7)

Rear Panel Features
		User's Guide
I	Parallel Rear Panel Inputs	(Chapter 4)
J	Remote Interface (USB, LAN)	(Chapter 2)
K	External Triggering and Gating	(Chapter 5)
L	Frequency Reference	(Chapter 3)

Front and rear panels shown with product Option 106/115 (Channel 3) and Option 400 (GPIB).

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1. Power-On, Local Control, Built-In Help, Alphanumeric Entry

Turns the counter on and off (standby). A self-test and auto-cal occurs during the power-on sequence and the counter is set to its preset settings.

Back Local Transfers instrument control from the remote interface (LAN, USB, GPIB) to the front panel. Also displays the previous softkey menu.

Help Displays help topics which can be selected using the rotary knob. Press and hold any function key or softkey to display help for that key or feature.

Use the rotary knob and arrows to cycle through and enter alphanumeric characters and to navigate through files and folders when browsing the file system.

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2. Setting the Measurement Function

Preset Place the counter in a known state before selecting the measurement.

Select a measurement function by pressing the corresponding key within the 'Measure' column. Select a specific measurement using the softkeys below the display.

Use Auto Scale (signals > 100 Hz) to automatically detect the input signal and set the range and trigger threshold.
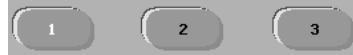
Internal triggering automatically starts the measurements.

Measure: Auto Scale, Freq Period, Time Interval, Totalize

Freq / Period Key
Freq | Freq Ratio | Period | Time Stamp | Advanced Auto

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3. Channel Selection

Use the channel number keys to select the active input channel and display the channel configuration softkeys:

1 | 2 | 3

Example (Ch.1): - DC coupling
- 50Ω impedance
- 2.0V trigger threshold

Chan 1 Setup
Coupling AC **DC** | Impedance 1MΩ **50Ω** | Range **5V** 50V | Level Setup | BW Limit **Off** 100k | Probe **None** 10:1

Chan 1 Setup — **+2.000 V**
Auto Level Off On | Level | Slope **Pos** Neg | NoiseRej **Off** On

Shift **Tip**: numeric values can also be entered using the "shifted" numeric keys.

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4. Triggering and Gating

Trigger Use the 'Trigger' key to select the trigger configuration softkeys (source, readings per trigger, delay), or to issue a manual trigger.

Example: - trigger source 'Manual' ('Trigger' key)
- 1000 readings per trigger (use shifted numeric keys)

Trigger Setup — **1 000**
Source **Manual** | Rdgs/ Trigger | Trig Delay

Gate Use the 'Gate' key and gate softkeys to specify gate time, gate delay, and other gate parameters.

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5. Math, Graphics, Reading Storage

Math

Math Use the 'Math' key to view the math functions available through the softkeys. 'All Math' plus the selected function must be **On**.

Math
All Math Off **On** | Smoothing | Null / Scale | Statistics | Limits

Math — Math On
Statistics Off **On** | Show P–P **Allan** | Reset Stats

Example: - compute statistics of 1,000 readings.

Trigger Press the 'Trigger' key to send a single trigger and start the measurements (Steps 2-4).

⬆ ƒ 2.000 V
DC 50Ω 5V
CH 1 Frequency — Wait For Trig
10.019 969 816 MHz
Mean: 10.019 150 241 MHz | Max: 10.019 970 055 MHz
StdDev: 3.151 498 375 8 kHz | Min: 9.999 969 850 4 MHz
Count: 1 000 | Allan Deviation: 432.306 796 29 Hz

Trigger Setup — **1 000** — Math On
Source **Manual** | Rdgs/ Trigger | Trig Delay

Graphics

Graph Use the 'Graph' and related softkeys to select a trend chart or enable a histogram for graphical representations of the measurements.

Graph — Math On
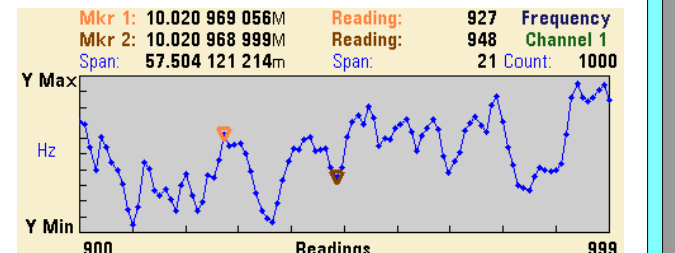Trend Chart | Histogram

Trend Chart Use the 'Trend Chart' softkey to view a chart of the readings taken, or currently being taken.

Graph — Math On
Chart Off **On** | Options | Save Readings | Zoom & Markers | Clear Readings

Example: - trend chart of 1,000 readings
- view last 100 readings
- open Zoom & Markers menu

Mkr 1: 10.020 969 056M | Reading: 927 | Frequency
Mkr 2: 10.020 968 999M | Reading: 948 | Channel 1
Span: 57.504 121 214m | Span: 21 | Count: 1000
Y Max / Hz / Y Min
900 — Readings — 999

Graph — 927 — Math On
Marker1 | Marker2 | LockMrkrs Off On | Zoom | Pan | Show All

Reading Storage

Save Readings / **Export Readings** Use the 'Save Readings' and 'Export Readings' softkeys within the trend chart or histogram menus to save data internally or to an external USB device.

Use the front panel knob and arrows to create file names and browse through the file system.

Action: Export data
Path: Internal
File: DATA_1

Graph
Action: Export | Browse | Path \ File | Export Readings