

## Agilent 4294A precision impedance analyzer

There are 6 measurement panels: Active Trace, Measurement, Entry, Marker and Instrument State.

1. Press LINE to turn power on. Warm up approximately 45 minutes before making measurements.
2. INSTRUMENT STATE > Preset – This resets all previously stored values to their default
3. MEASUREMENT > Meas >  $|Z| - \theta$ 
  - > Format > Log
  - > Display > SPLIT ON to get two displays
  - > Scale Ref > Top Value > 100 G/n This is  $100 \text{ G}\Omega = 10^{11} \Omega$
  - > Bottom Value > 10 k/m This is  $10 \text{ k}\Omega$
  - > Bw/Avg > Bandwidth > 5 PRECISE
  - > POINT AVG ON
  - > POINT AVG FACTOR > 5x1
4. STIMULUS > Sweep > NUMBER OF POINTS > 51 x1
  - > TYPE > LOG
  - > Source > LEVEL > 500 k/m x1, this is 500 mV RMS
  - >BIAS MENU > VOLTAGE LEVEL > 0 x1
5. STIMULUS > Trigger > CONTINUOUS to have the measurement repeat
  - > SINGLE to initiate one measurement
  - > Start > 100 x1
  - > Stop > 100 M/u
6. MEASUREMENT > Cal > Adaptor [1m] > 4TP 1M > SETUP > PHASE COMP When complete press done.

At this point, the instrument is measuring the impedance of the Cascade probe station. Confirm that the system  $|Z| - \theta$  vs. frequency is the same for the two measurement cases posted: OPEN – both probes up, just above the surface, SHORT – both probes on the wafer chuck and separated by one probe diameter.

7. STIMULUS > Source > LEVEL > 5 k/m x1, this reduces the oscillator level to 5 mV for device measurement
8. Null out the probe system impedance.
  - Add chuck triaxial short, lower LO probe to device common pad.
  - Position HI probe a few microns above the pad to receive bias.
  - MEASUREMENT > Cal > FIXTURE COMPEN > OPEN
  - Short HI probe to same pad as the LO probe
  - MEASUREMENT > Cal > FIXTURE COMPEN > SHORT

MARKER – use to read the values of  $Z - \theta$  – and frequency

At this point the system is calibrated and ready to proceed with measurements.

9. To save data

INSTRUMENT STATE > Save > DATA > ASCII > rotate knob to select letter F for February

SELECT LETTER > give a filename like FB28A

Choose DONE