Identification of LCR meter

- Query Instrument Identity
  - Send: `*IDN?`
  - Receive: `Keysight Technologies, U1733C, MY58020034, 03.06`

Setting Frequency

- Valid Frequencies: 100, 120, 1k, 10k, 100k
- Example: Set frequency of LCR meter at 100Hz
  - Send: `FREQ 100`
- Example: Set frequency of LCR meter at 10kHz
  - Send: `FREQ 10k`

Setting Range

- Format: `RANG xxxxy`, where `x` represents the value (2 to 2000, depending on frequency and function), and `y` represents the unit.
- Units: `p` for pico, `n` for nano, `u` for micro, `m` for milli, `k` for kilo, `M` for mega.
- Example: Mode DCR, display like .0000 Ohms
  - Send: `RANG 20m`
- Example: Mode L, display like 0.000 mH at 100Hz
  - Send: `RANG 20m`
- Example: Mode C, display like 0.000 mF at 100Hz
  - Send: `RANG 20m`
- Example: Mode C, display like 000.0 pF at 100Hz
  - Send: `RANG 20p`
- Example: Mode C, display like 0.000 pF at 100kHz
  - Send: `RANG 20p`

Setting Functions

- Available Functions: L, R, C, Z, DCR, or ESR
- Use `FUNC` command to set LCR meter in AUTO range.
- Example: Set LCR meter in ESR mode
  - Send: `FUNC ESR`

Setting Equivalent Circuit Mode

- Modes: PAL for parallel and SER for serial
- Example: Set LCR meter in serial mode
  - Send: `MODE SER`

Configuration

- Set Configuration: `CONF` string (RES, IMP, IND, CAP, ESR, or DCR)

- Query Configuration: `CONF?`
- Example: Set LCR meter in Capacimeter mode
  - Send: `CONF CAP`
- Example: Query configuration
  - Send: `CONF?`
  - Receive: `CAP +2.000000E-08,+1.000000E-12` (LCR meter in capacitor mode, range 20nF, resolution 1pF)

Setting Second Display

- Options: DISP2, D, Q, or TH
- Example: Set second display of LCR meter for angle readings in degrees
  - Send: `DISP2 TH`

Reading Value

- Fetch Primary Display Value: `FETC?`
- Example: Fetch primary display value
  - Send: `FETC?`
  - Receive: `+2.413487E-03` (L mode at 100 Hz, returns 2.413mH)

Reading all available values in L mode, frequency 100Hz:

- Send: `FETC? ALL`
- Receive: `Rs,+4.693675E-01,Ls,+2.434658E-03,Rp,+5.449214E+00,Lp,+2.668809E-03,Z,+1.602694E+00,TH,+7.289555E+01,F,+1.000000E+02,D,+3.077255E-01,Q,+3.249650E+00`

The returned values are:

- Rs: +4.693675E-01 (equivalent serial resistor)
- Ls: +2.434658E-03 (equivalent serial inductor)
- Rp: +5.449214E+00 (equivalent parallel resistor)
- Lp: +2.668809E-03 (equivalent parallel inductance)
- Z: +1.602694E+00 (impedance)
- TH: +7.289555E+01 (angle in degrees)
- F: +1.000000E+02 (frequency of the test)
- D: +3.077255E-01 (dissipation factor)
- Q: +3.249650E+00 (quality factor)

Querying Instrument Status:

- Send: `STAT?`
- Receive: `0000P0P01010LL0SQ0A01`

The breakdown of the status string is as follows:

- a=0, 0/1 recording OFF/ON
- b=0, 0/1 relative (NULL) mode OFF/ON
- c=0, ?
- d=0, Tolerance mode: 0=tolerance OFF, 1=tolerance mode ON, reference test, 2=1%, 3=5%, 4=10%, and 5=20%
- e=P, ?
- f=0, 0/1, limit OFF/ON
- g=P, P= no limit activated or value inside limit range, H=fail to high limit, L=fail to low limit
- h=0, 0/1, HOLD button OFF/ON
- i=1, ?
- j=0, ?
- k=1, ?
- l=0, 0/1, backlight OFF/ON
- m=L, 0/1, no calibration activated / calibration in process
- n=L, function E, Z, L, C, R, D (r=resistor or l=inductor or c=capacitor in automatic detection)
- o=0, frequency, 0=100Hz, 1=120Hz, 2=1kHz, 3=10kHz, and 4=100kHz
- p=S, mode P=parallel and S=serial
- q=Q, secondary display Q=quality factor, D=dissipation factor, and T angle in degrees
- r=0, ?
- s=A, B=on battery, A=on AC adaptor, and L=low battery
- t=0, ?
- u=1, 0/1 range 0=manual/1=automatic