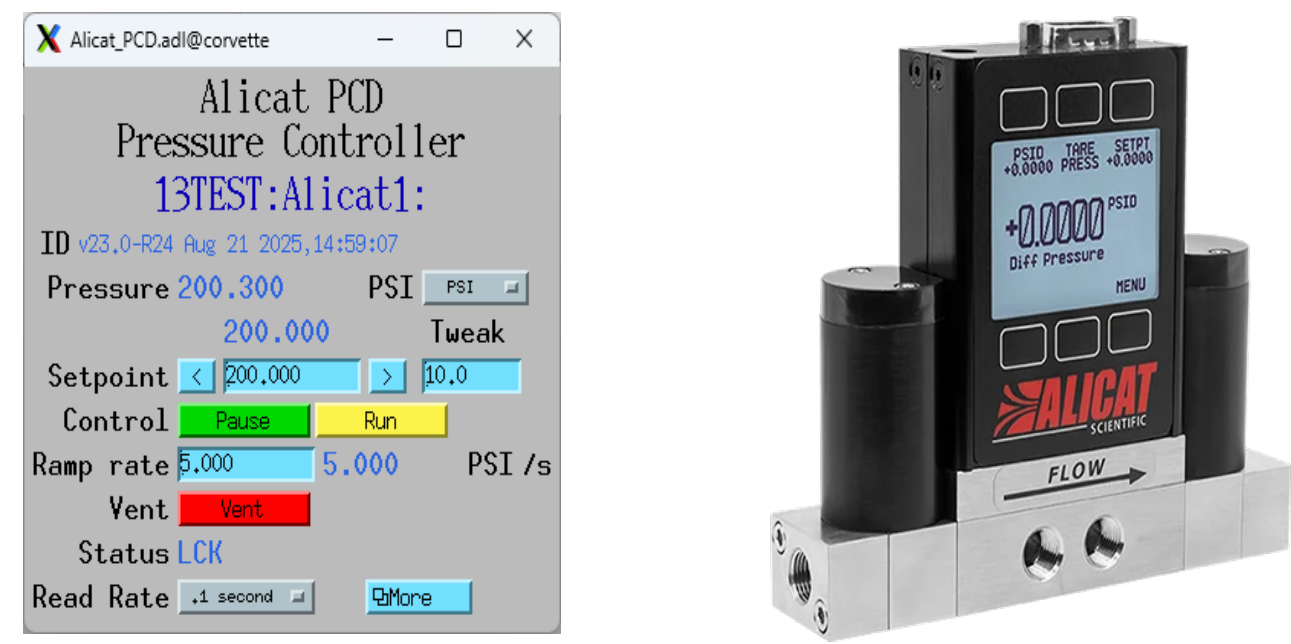


# New EPICS Support for Interesting Devices

## Mark Rivers, University of Chicago

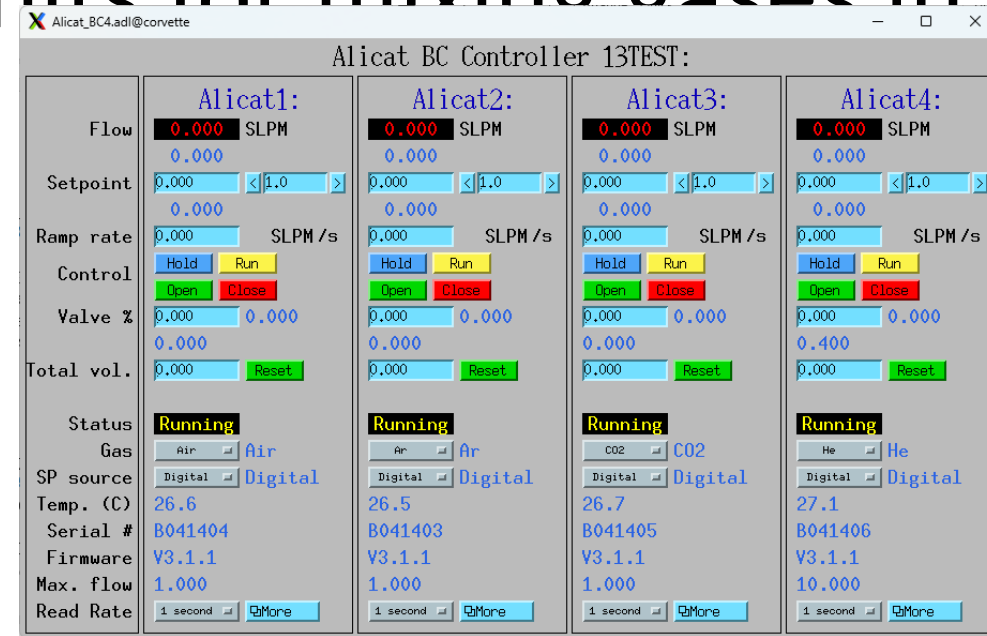
### Alicat PCD Dual-Valve Gas Pressure Controllers

- Controls gas pressures up to 3000 PSI.
- Very similar functionality to the GE Druck PACE5000 for less than 1/5 of the cost (~\$3,100) and much smaller.
- Applications include controls for membrane diamond anvil cells, driving high-pressure pneumatic cylinders, etc.
- Control via RS-232 or RS-485, EPICS support using Stream Device.



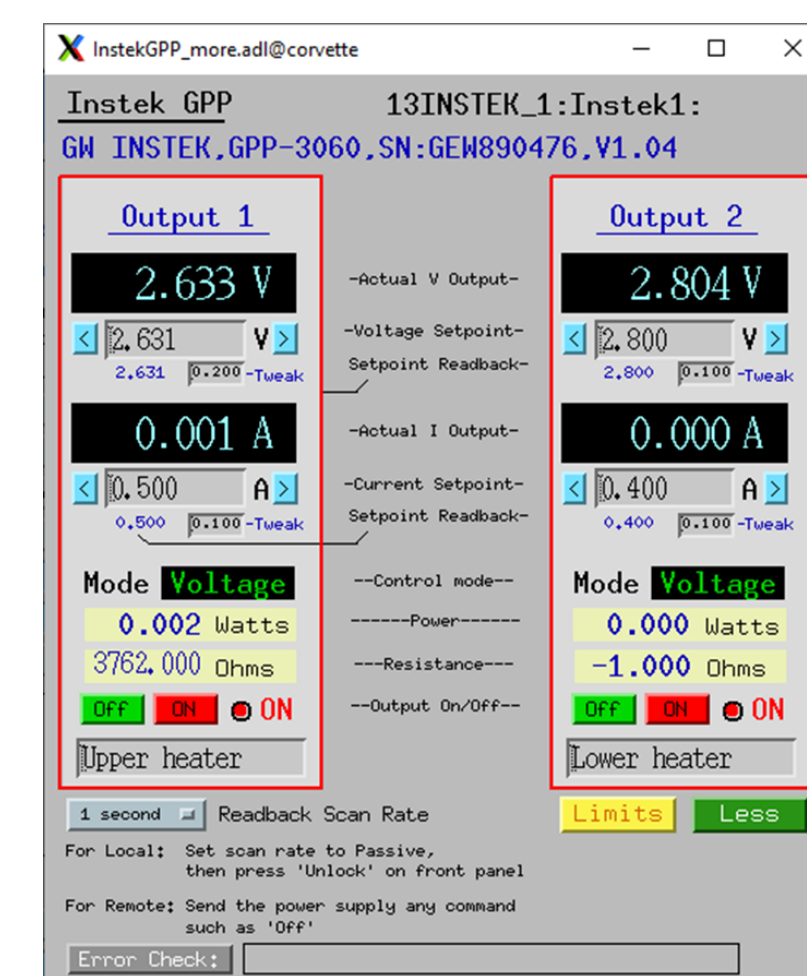
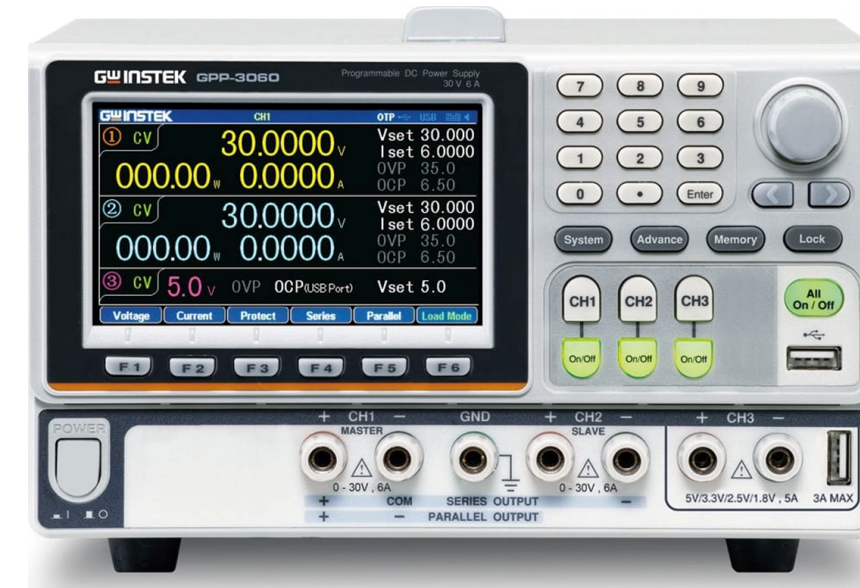
### Alicat BASIS Gas Flow Controllers

- Control gas flows of 9 common gases (air, Ar, CO<sub>2</sub>, N<sub>2</sub>, O<sub>2</sub>, N<sub>2</sub>O, H<sub>2</sub>, He, CH<sub>4</sub>).
- Models with full scale flow rate from 0.1 to 100 l/min.
- Control flow rate, ramp rate, open/close, and total volume.
- \$400-\$500 depending on the flow range.
- Control via RS-232 or RS-485, can be daisy-chained.
- EPICS support using StreamDevice.
- Great for controlling gas flow rate, and when using multiple units for mixing gases in precise proportions.



### Instek GPP Power Supplies

- Many models
  - 1-3 output channels, 200-400W, 30-60V
- We have GPP-3060, ~\$1000
  - Channels 1&2: 0-30V/0-6A
  - Channel 3: 1.8V, 2.5V, 3.3V, 5V / 5A
- Control voltage or current.
- Automatically switches to limiting mode.
- Limits on voltage, current, and power
- Ethernet Connection, VXI-11 protocol
- EPICS support using StreamDevice.
- We use with EPICS epid record for 2-channel temperature control feedback.

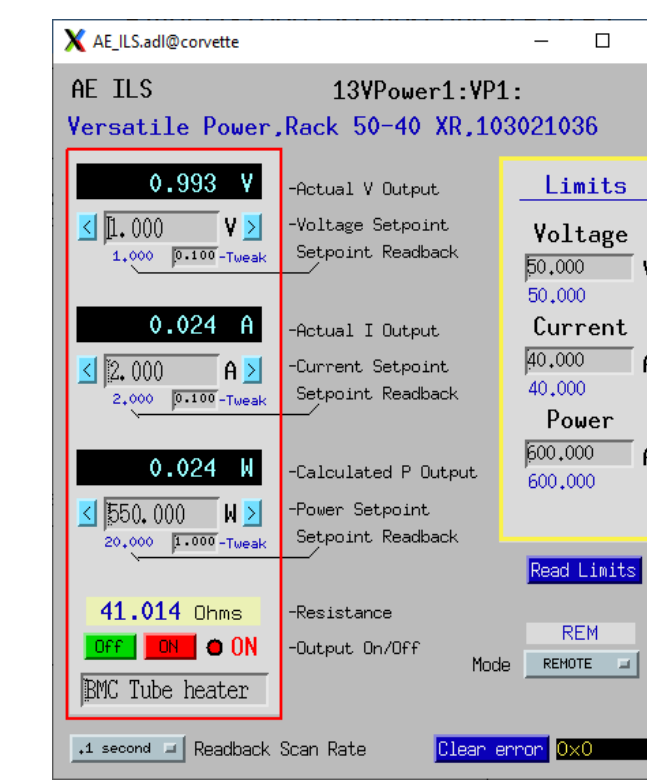


### Power Supplies from Versatile Power

#### RACK XR Series 1500W LXI Certified Programmable Power Supplies

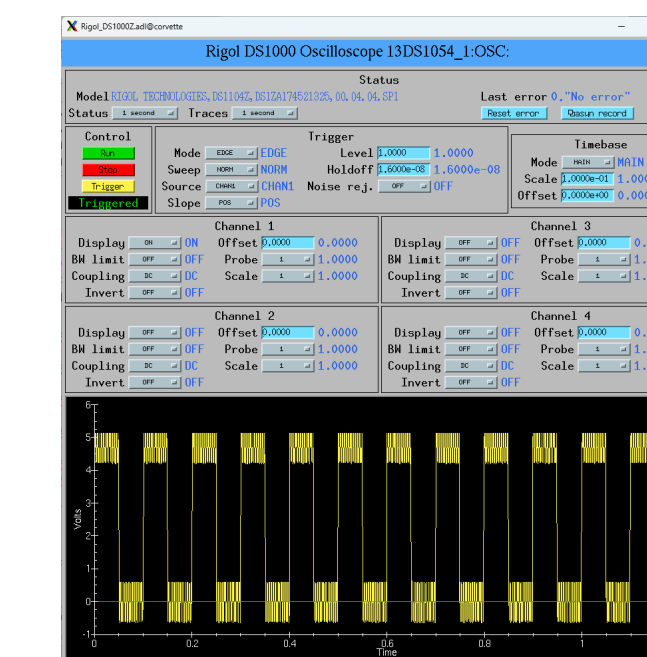
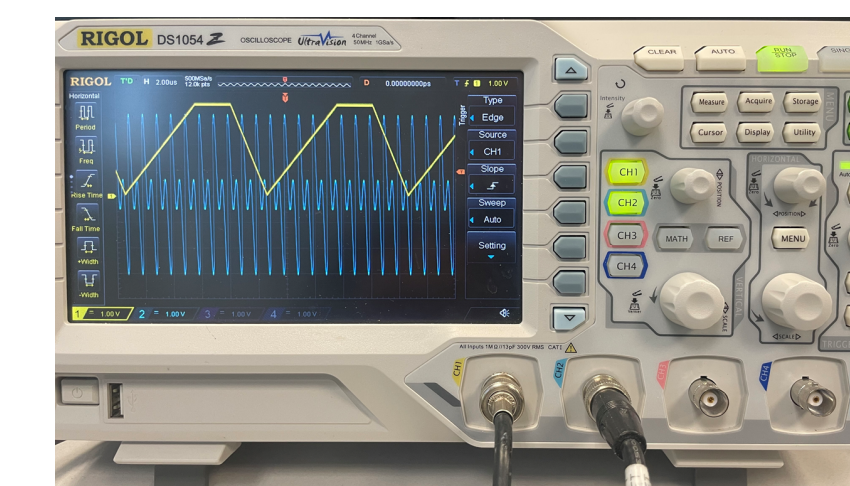
RACK XR MODEL:	30-70 XR	50-40 XR	100-20 XR	200-10 XR	400-5R XR
Output <sup>1</sup>					
Voltage, Volts	30 V	50 V	100 V	200 V	400 V
Current, Amps	70 A	40 A	20 A	10 A	5 A
Power, Watts <sup>2</sup>	1500 W	1500 W	1500 W	1500 W	1500 W

- All are rated at 1500 W, ~\$2,500
- We have 50-40 XR: 50 volts, 40 amps
- Ethernet Connection, VXI-11 protocol
- EPICS support using StreamDevice.
- Control voltage, current, or power.
- Automatically switches to limiting mode
- Limits on voltage, current, and power
- Thanks to Kurt Goetz for similar support that I copied and modified!



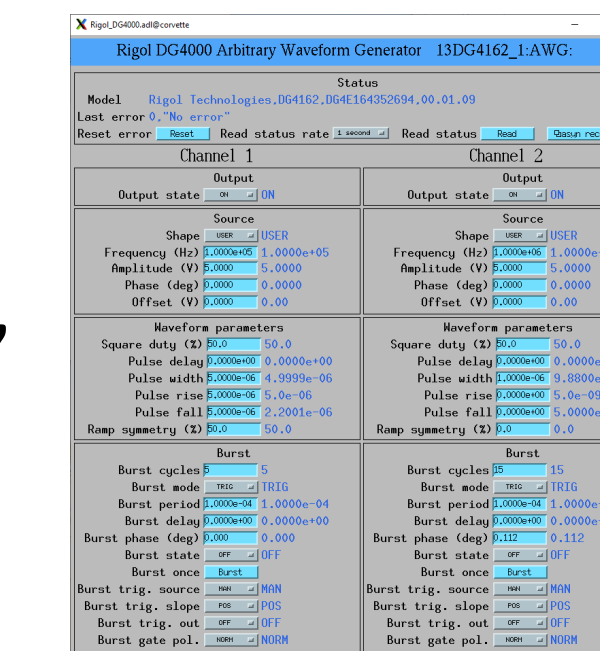
### Rigol DS1000 Digital Oscilloscopes

- 7 models, 50 MHz-200 MHz
  - 2 or 4 input channels, ~\$300 - \$700
- We have DS-1054Z, 50 MHz, ~\$350
- Ethernet Connection, VXI-11 protocol
- EPICS support using StreamDevice.
- Supports most common functions for trigger, time base, up to 4 input traces.
- Traces read into EPICS waveform record



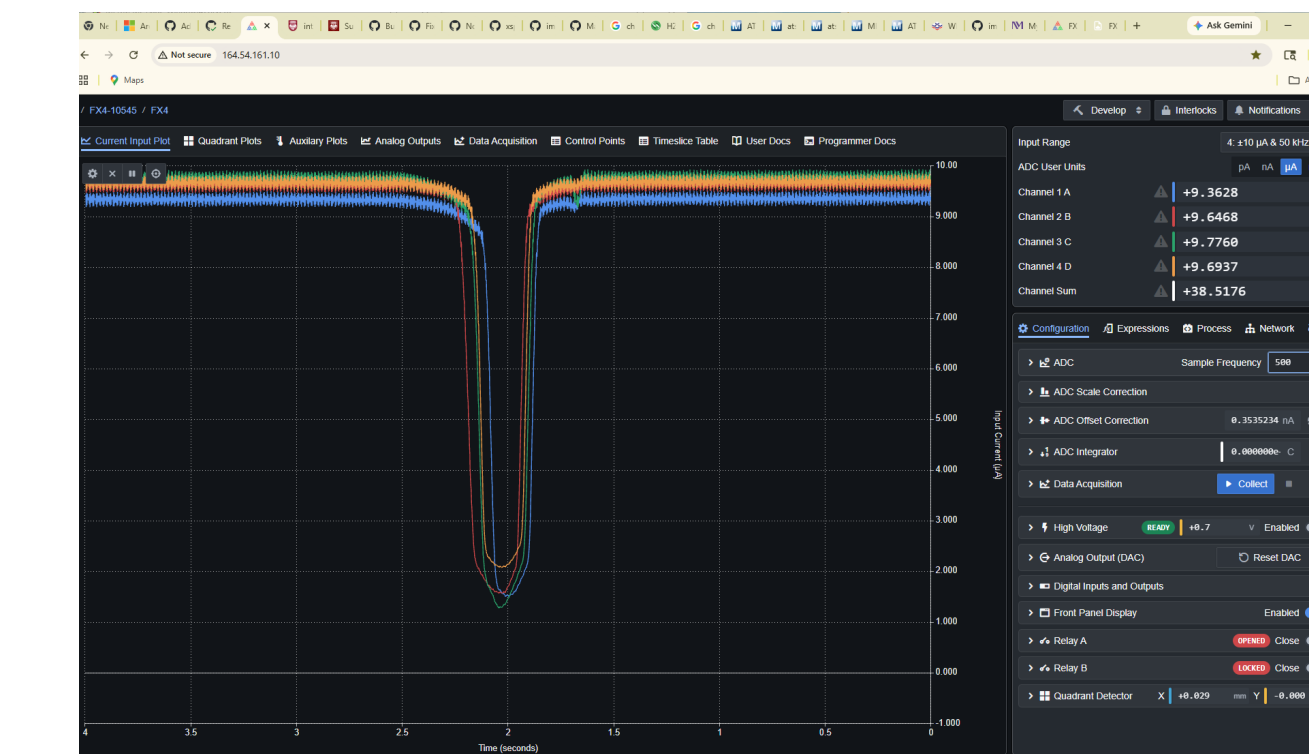
### Rigol DG4000 Arbitrary Waveform Generators

- 4 models, 60 MHz-200 MHz
  - 2 output channels, ~\$1,000 - \$2,000
  - 16K waveform length
- We have DG-4162, 160 MHz, ~\$1400
- Pre-defined (sin, square, ramp, pulse, noise, harmonic), or user-defined waveforms
- Control frequency, amplitude, offset, phase
- Burst mode with control of external, internal, manual triggering.
- Ethernet Connection, VXI-11 protocol
- EPICS support using StreamDevice.
- We will use for modulation of 200W lasers for heating in diamond anvil cell.



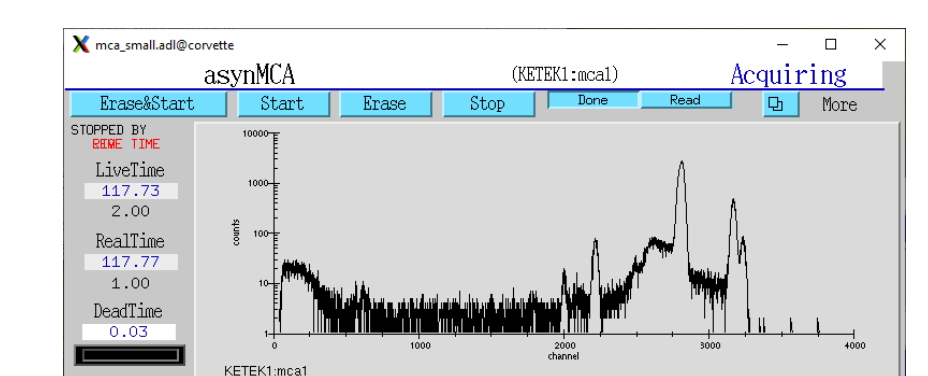
### Pyramid FX4 Quad Electrometer

- 4-channel quad electrometer, similar to TetrAMM but with many more features.
- \$6,685 with High Voltage option, 50% less than TetrAMM.
- Excellent Web interface with live data display
- 8 current ranges from ± 100 nA to ± 10 mA
  - TetrAMM is limited to 2
- Built in EPICS channel access server, all parameters are available as EPICS PVs
- All parameters also accessible using REST API
- Data streamed using Websockets, very fast and flexible.
- EPICS quadEM driver coming soon!



### Ketek SDD Detector with Integrated DSP MCA

- High-performance digital pulse processor DPP3 with peaking time down to 25 ns
- Latest Generation 3.0 Preamp technology
- Input count rate up to 4 million counts/s
- FWHM < 133 eV @ 1 μs peaking time for Mn Kα
- 1 μm and 165 nm graphene windows available
- Small form factor: 81 × 61 × 36 mm<sup>3</sup>
- Ethernet and USB 2.0 Type-C interface
- 3 data collection modes:
  - Normal MCA
  - Sync (mapping mode with external driver)
  - Diagnostic trace (digital scope)
- EPICS driver based on MCA record and areaDetector



Mapping Mode Performance

MCA Channels	BytesPerBin=1 KETEK specification	BytesPerBin=1 measured	BytesPerBin=2 KETEK specification	BytesPerBin=2 measured	BytesPerBin=3 KETEK specification	BytesPerBin=3 measured
512	2127	1200	1666	1550	N.A.	1000
1024	1666	900	833	500	N.A.	400
2048	833	500	454	350	N.A.	300
4096	454	350	232	225	N.A.	160
8192	232	225	119	120	N.A.	120

