GEM
Gas Flow Sensor Chassis

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GEM Gas Distribution System

• BigBite Spectrometer
  – eight input, eight output channels

• Super BigBite Spectrometer
  – 42 input, 42 output channels

• Gas Distribution System similar

See M. McMullen talk on GEM gas distribution
Rack-mountable Flow Sensor Chassis

Gas flow sensors

Gas output channels

Multiplexer

Feedthrough allows multiple chassis to be linked together to be read out by a single Raspberry Pi single board computer

Gas input channels
Chassis Design Features

• Chassis dimensions are 17.75” wide x 13” long x 3.5” tall
• Front panel is 19" wide x 3.5" tall with mounting holes for rack
• ~6” piping length for all ¼” OD Tygon tubing
• All gas lines have at least 1” bend radius
  • 1” bend radius is minimum recommended for ¼” OD Tygon tubing
• Multiplexer PCB mounted horizontally in chassis under gas lines
• Two RJ11 feedthroughs for controls cabling
  • One feedthrough is input to multiplexer
  • Other feedthrough is for controls signals
A. Front panel width = 19”
B. Rear panel/chassis width = 17.75”
C. Chassis height = 3.5” (2U)
D. Chassis length = 13”

NOTE: Actual chassis will include service loops in controls cabling to allow easier removal of PCBs
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Right Side View

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Rack-Mounted – Isometric View
Rack-Mounted – Left Side View

Rack Depth = 37.6

Chassis Length = 13

Total Height = 21
Rack-Mounted – Front View

Total Height = 21
Rack-Mounted – Back View

Total Height = 21
NOTE: Actual panel will include service loops in gas lines cabling to allow easier removal of chassis
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Flow Sensor Tubing Support

• ¼-inch Tygon tubing chassis kinks easily
  – Kinks in gas line could cut off flow to detector

• Support structure designed in NX12 sits on top of flow sensor PCB and supports Tygon tubing
  – Support would hold piping immediately after 90-degree bend

• Support will be 3D-printed using DSG's Formlabs-2 printer

Flow sensor support structure (purple) on flow sensor PCB holding Tygon tubing so it cannot exceed a 1-inch bend radius (minimum for 1/4-inch outer diameter, 3/8-inch inner diameter Tygon tubing)
Conclusion

• DSG has designed a rack-mountable chassis to house eight flow sensors and a multiplexer for the Hall A GEM Gas Distribution System
Thank You