Handix OPCRDS: open issues

# Electronics

1. Need circuit board (CB) layout to design Front Panel Express electronics box.
2. Eliminate ports and power for met station.
3. Include the CB for Buck chilled mirror hygrometer in electronics box. The Buck CR-5 chilled mirror hygro can be found here: http://www.hygrometers.com/products/cr-5/
4. Add ports for Buck on electronics box (connect the CB to the measurement cell).
5. Add power for Buck: 3A @ 24V (let’s go 4-5 A to be conservative). Output is RS-232.
6. Add power, plugs, cabling for fans venting the electronics compartment within the OPCRDS enclosure? Not sure on this, but may need small fan on OPCRDS skin.
7. Tim needs fan model number and vendor for fans used with Dan’s new fan controller CB. Tim or Dan to order Handix fans?
8. Add power, plugs, cabling for fans venting the main OPCRDS enclosure. Assuming the fans on Dan’s new fan controller CB are same flow rate (need to verify) as the 12V Newark ones on the NOAA OPCRDS (9x6cfm), we could use something like this from McMaster: [1939K67](http://www.mcmaster.com/#1939K67).
9. Dan to source a waterproof on/off switch+LED for exterior of OPCRDS enclosure.
10. Eliminate anemometer (and associated port and power on CB) and replace with LED (on exterior of OPCRDS) to show that fans are running. Any fail-safe here to guarantee light can be trusted? If Dan doesn’t have a better solution, we can buy this hot-wire anemometer (~$425) from Omega: FMA903R-V1-S (this is the model that measures 0-5V for 0-2000 ft/min (10 m/s) with the short (3.75 inch) probe. See: http://www.omega.com/Manuals/manualpdf/M5010.pdf
11. Add a tee inside the electronics box so we can monitor the ringdown signal with a scope as well as with the Labview software. Add port for this on electronics box.
12. ~~Add ports, power and DAQ for Rotronic. 4.5mA @3.3V (need stable 3.3V to be accurate). We will use HC2-S probe and E2-02XXS Passive Cbl-black 2m, HC2 Pbe/Tinned Ends short barrel.~~ [~~http://www.rotronic-usa.com/products/meteorology/hc2-s3/~~](http://www.rotronic-usa.com/products/meteorology/hc2-s3/)
13. Need power and port for heated sample line from duct to Buck. Line will be custom made by Clayborn Lab. Estimate 35W-50W max power; thus, 2A @24V should do it. See: http://www.claybornlab.com/heated\_sample\_line\_overview.html
14. Need power, controller (voltage can be adjusted to change flow rate on the KNF pump # DC-B 6V UNMP015 B) and port for vacuum pump (6 V) for Buck. The NMP015B is the brushless DC version of this pump with 4 wire leads.  6V is needed for the pump supply voltage and 0-5V is the speed control voltage.  5V=full speed and 0V stops the pump – however the supply voltage must be 6VDC.
15. Need to add ports, power and signal processing for two additional temperature measurements: one more to go in the duct and one will be mounted on outside of OPCRDS. The one on the outside will probably be another Rotronic HC2-S RH sensor in a shroud. However, it would probably be smart to build in capability for plugging in both an RTD and thermistor. Still deciding on exact sensors.
16. May want to include Hart platinum RTD. If so, uses 1A @12VDC (or 120VAC possible). Output is RS-232.

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1. Honeywell thermistors?
2. Eliminate neph ports, power? Or should we re-purpose? Or keep in case we need to use neph again in future?

# Software

1. Eliminate met station DAQ.
2. Acquire RS-232 from Buck chilled mirror hygrometer and integrate data reporting into a single OPCRDS output file (rather than the two separate files we had before for the neph and OPCRDS).
3. Add display for Buck in GUI.
4. Need PID controller for heated sample line. Need to maintain ambient+10 C.
5. DAQ and display in GUI for temp/RH measurements: Vaisala inside duct, Vaisala outside OPCRDS enclosure, two thermistors in duct.
6. May swap out existing anemometer for new one: FMA903 R-V1-S (this is the model that measures 0-5V for 0-2000 ft/min (10 m/s) with the short (3.75 inch) probe. See: http://www.omega.com/Manuals/manualpdf/M5010.pdf
7. Add switch in software that turns off the main OPCRDS fan (that exhausts the whole enclosure) when CRD is zeroing.
8. Eliminate neph? Or if we retain, integrate data collection so that we don’t generate two separate files.
9. Tweaks to existing GUI to improve functionality and convenience. For example, we need to include different levels of password protected access for different users (operator vs. technician).
10. Possible to download data from OPCRDS remotely? Would be useful during field deployments. How big are data files?