

# INSTALLATION TODO LIST (+ misc. stuff)

----- T minus 9 days and counting -----

Last Modified: February 1, 2011

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## Important issues:

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1. Add PMT shields for layers 5 and 6. **Done**
2. Get RG-8 cables for Right arm. (Aidan, Brad)
3. Fix veto left 22 or get a replacement.

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### Jobs list:

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Move small items from Test Lab to Hall (Left HRS side until space is available on right HRS side):

- Test Lab computer (srcdaq) **Done**
- Plastic bins and boxes with short ribbon cables (level translators to Fastbus) **Done**
- yellow/orange “anti-trip” cable bridges  
the yellow/black bridges need to be taken back to the Physics Storage building
- spare electronics in plastic bins **Done**
- signal and HV cables not in the cable wire basket **Done**
- bubbler panel **Done**
- Cable tray(s) for ribbon cables **Done**

Larger items to be moved by Techs (January 7-19):

- weldment (Jan 19) **Done**
- hadron stack (Jan. 14) **Done**  
NOTE: The re-enforcement frame will be attached in Hall A
- berth (Jan. 12) **Done**
- HAND (Jan. 7) **Done**
- wire chamber threshold and low voltage rack (Jan. 12) **Done**
- level translator rack (Jan. 12) **Done**
- cable wire basket (Jan. 12) **Done**

Items in Hall that need to be repositioned:

- HAND delay cable baskets **Done**
- shield wall blocks **Partially Done**

Arrange HAND delay cables: (January 8-9)

- rearrange HAND delay cable bundles to make easier access to connect cables to the weldment **Done**
- The cables between the left arm and weldment were measured to be about 50 m +/- 1 m.
- Make cable map for neutron detector **Done**

Mark desired weldment location on right arm side: (January 10) **Done**

- Maximum right HRS angle is 45 degs.
- Hall A radius is about 26.5 m.
- HAND will need to be placed at 15 m and 50 degs for calibration.
- We need to leave enough clearance for the HAND calibration and ability to move HAND with the cables attached to the patch panels.
- Currently we have the weldment between 80 and 93 degrees about 15 m from the pivot.

Move cables from left side of hall to right side **Done**

- We need to stay clear of the pivot area and leave room for the crane, forklift, etc to drive into the area adjacent to the RHRS
- Make sure all cables are labeled to avoid confusion and work later (Tai)
- Keep the big picture in mind when staging the cables. Ask yourself how you'll be moving from the pre-stage layout to the final layout. **Avoid tangles!!!**
- Ribbon cables need to be laid out neatly and folded back into themselves until we can stretch them to the pivot. Be careful not to crimp or otherwise damage the cables at the fold points.
- The HV and signal cables are on carts and should be easy to contract and expand when needed.

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## MISC Notes:

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### **BE VERY CAREFUL WHEN HANDLING THE RIBBON CABLE.**

- Do NOT slide the ribbon cable on the ground when positioning it. The insulation is thin, soft, and easily abrades against the concrete if there is any weight on it.

The ribbon cables will run on sheets of white poly plastic. Pull the poly sheet to move the cables, don't pull the cables directly.

Watch for loose or damaged connectors. Do NOT tolerate bad connectors, they tend to cost an enormous amount of troubleshooting later on.

- LEMO ends tend to unscrew themselves. Make sure they are tight.
- Ribbon connectors can pop open on one or both sides. The connector should probably be cut off and replaced with a new one. Talk to an expert if you're not sure.
- BNC/SHV connectors are fairly robust as long as you don't step on them.

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Jobs list: continued

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Bertha power supply:

- Need to hook up the 100A Bertha supply to outlet. **Done**
- Plug in the electronics and weldment. **Done**
- NOTE: Everything that we use plugs into the Bertha.  
All scopes, network hubs, computers, etc ... No exceptions.  
This will help avoid wasting time on ground loop noise.

Electrical Ground: **Done**

- Identify common electrical ground for when the stack moves to the pivot. **Done**  
Should the weldment, hadron stack and HAND all be connected to the same ground? (Yes)

Prior to running the cables, stage a test run of a representative set of

1. signal cables,
2. HV cables,
3. ribbon cables, and
4. low voltage cables

from the weldment to the 99 (?) degree location of the BigBite stack. Things to keep in mind:

- The cables all have to go UP into the stack when it's on its platform. Allow 15' of free cable length to account for the cable run from the floor up into the stack
- Remember BB will move from 68 through 99 degrees.  
Watch for any interference problems with that motion.
- The LHRS should be clear out to 70 degrees and the right arm to 45 degrees.  
Watch for any interference problems with that motion (i.e. cables need to be out of the way of the front bogies!)

HAND (Larry, Or, Igor)

- Cable up the detector **Done**
- Complete and verify the cable map for all the electronics and delay cables. **Done**
- Update Podd database using HAND library. **Done**
- Hook up gas system for the veto bars (Albert).

Run RG8, RG58 and shielded ribbon cables from the LHRS **Done**

Run cables from RHRS to weldment **Done**

Repair connectors on Right arm coax cables between left and right arms.

MWDC (Tai): **Done**

- Cable up the wire chambers **Done**
- Complete and verify the map for the FB crates, level translators, etc. **Done**
- Update Podd database. **Done**
- Includes low voltage and threshold connections with CAMAC.

#### Gas System for MWDC (Jack):

- Connect chambers to gas shed system including bubbler. **Done**
- Verify bubblers have enough oil. **Done**
- Ar/Ethane 50-50 bottles have been ordered.  
Jack will keep us stocked for the experiment.
- Need to find a permanent location for the camera to view bubblers upstairs.
- We will need to flush the chambers for 1-2 days before turning HV on with Ar/Ethane to flush the line from upstairs. **Done**

#### Hadron trigger planes (dE/E):

- Cable up the HV and signal cables **Done**
- Do we need a source calibration of the dE plane or are cosmics good enough?
- Sr-90 was used in the Test Lab for the E plane
- NOTE: Make sure the ADC structure you use to gain-match is close to the energies we will see during the experiment
- Determine discriminator thresholds for the planes; 900 MeV/c protons will be very close to MIP particle energy depositions. Hence we do not want to cut out our real signal. Previously (e,e'd) 100 and 300 mV were used for the dE and E planes, respectively.

#### Cosmics Tests: **Done**

1. Full checkout of BB DAQ using local trigger supervisor. **Done**
2. HAND with full electronics check out (ADC and TDC). **Done**
3. Check operation of MWDC and reduce noise to acceptable level. **Done**
4. dE/E planes verify signals in all ADC and TDC channels. **Done**

#### HAND preparation: (Eli's list)

1. Turn H.V one by one on a single tube and check **Done**  
In the weldment that we have good signal in the correct place.

Estimate time : 1 day

Resources needed : control of the HV crate

Extensive excess to the weldment

2. Get ADC/TDC spectra for all elements with cosmic **Done**

Check them and the assignment

Estimate time : 1-2 day

Resources needed : good cosmic flux

Trigger of OR of as many counters –at least a layer

DAQ system

Limited control of the HV crate

Limited excess to the weldment

3. Install the mu metal shields on all counters **Done**

Estimate time : 2-3 hours

Resources needed : excess to the upper tubes

4. Fix problems with individual channels **In progress**  
Estimate time : ?  
Resources needed : excess to the upper tubes

5. adjust the HV to appropriate MeVee threshold **In progress**  
calibrate time and position

Estimate time : 2-3 days

Resources needed : good cosmic flux  
Trigger: OR of a layer  
External counter (10x10)  
DAQ system  
control of the HV carte  
Limited excess to the weldment

6. check integration with the full DAQ system to be used  
for the beam time

Estimate time : ?

Resources needed : full DAQ system  
DAQ experts

dE & E planes: (Tai's list)

- (**Done**) 1. Signal checking for dE & E.  
needed: Slow control for HV (computer)  
Oscilloscope.  
right side of the weldment.

- (**Done**) 2. Trigger check.

- (**In progress**) 3. scaler.  
needed: src computer control & weldment access.

4. ADC check for cross talk as mention by Miha.

(need to be rechecked) 5. Gate for the signal.

6. gain matching for dE & E and super E plane.

(using dE) 7. additional cables for super-E plane. both signal and HV.  
we have the HV crate.

8. TDC setting scan.

9. fixing problem.

(ongoing) 10. check the electronics for dE & E  
10.1 threshold setting.

(set) 10.2 gate setting.

MWDC:

1. Signal check for MWDC.  
needed: Coda control at the beginning and the end of the run (computer).  
Cosmic ray (specifically night time). The chamber is so sensitive.
  - 1.1 without HV and threshold
  - (done) 1.2 without HV but threshold  
result: just three noise channels from the overnight run. When approach the day, more noise in most of the planes.
  - 1.3 with both HV and low threshold
  - 1.4 with both HV and high threshold
2. Scanning for HV and Threshold.

Tracking checkout using cosmics with fully hooked up MWDCs

- Time offset (T0) calibration. **Done**
- confirm wire map database is correct using event display and coarse track information.
- test tracking code.

Efficiency scan for MWDCs (Tai)

- vs. high voltage
- vs. threshold

Right arm work: (Zhihong, David, Bob)

- Test and replace HV crate. (Vince, Jack) **Done**
- Reconnect BCM signals to scalers (copy also exists in Left HRS).
- Reconnect BPM and raster signals to ADC (separate copy in LHRS).
- Connect trigger latch pattern to TDC from TS.
- Add scaler in ROC 2(?)
- Connect fast clock (104 kHz) to ROC 1 and ROC 2 scalers.
- Setup ETDM pulser
- Verify scalers and decoding of scalers in right HRS
- Helicity signals in right HRS (TS and ADCs)?
- Add a copy of relevant triggers, L1A, strobe in TDC
- Setup T2 trigger **Done**
- Setup retiming **Done**
- For S1 and S2m are we using a 1877 or a 1875? **1875**

Left arm work: (Zhihong, David, Bob)

- Verify all relevant signals exist scalers, TDCS, trigger latch pattern
- BCM, BPM and raster
- Setup ETDM pulser
- Verify T4 works **Done**
- Verify retiming is working **Done**
- Verify/add all important signals exists in TDCs and scalers.
- For S1 and S2m are we using a 1877 or a 1875? **1875**

FPP: (Jack, Aidan, Kai and Bogdan)

- Jack will perform the installation and gas system hook up **Done**
- Need to add 1877's for the FPP in ROC 3 **Done**
- Complete and verify the detector map
- Update the Podd database
- Cosmic checkout of the FPP

Status of 1458 HV crates:

- We gain two HV crates that were used and tested during DVCS
- One of these is needed for the weldment, the other can be used as a spare.
  - HAND HV channels (288, 24 cards)
  - dE/E plane HV channels (96, 8 cards)
  - MWDC HV channels (8, 1 card)
  - Total of 392 channels or 33 cards, which implies we need three HV crates
- Do we need to consider additional HV crate spares? (Yes)
  - Check two crates in Physics Storage

Confirm spares:

- Update module inventory
- power supplies:
  - low voltage for thresholds
  - low voltage to power level translators
  - port-servers
  - network switch?
  - HV crates (see above for 1458 crates)

Update Podd databases with corrected:

- positions for detector elements
- drift time calibration for chambers

Measure/confirm TDC calibration of v1190 (and F1s?)

Stress tests of the full DAQ (i.e. high trigger rate, high deadtime)

- measure ROC event times and cross check with measured DAQ deadtime

EDTM pulser set-up and connected to Hadron stack DAQ:

- Work out correct relative delay timing so we can use the EDTM pulser to simulate HRS + HRS + BB (HRS + HRS + HAND) coincidence.
- Need to verify measurements of all cable and module delays. ( $^3\text{He}$ , e'd) delays should be a good starting point.

Coincidence timing, ADC gate timing, and TDC trigger timing in the circuit:

- MWDC (FB): trigger timing
- HAND (FB): ADC gates and trigger timing
- Hadron VME: ADC gates, TDC triggers, reference channels for 1190 (and F1s?)

Software:

- Scaler display for ND (Larry) **In progress**
- collect all software we need and make sure it works on adaqlX **In progress**
  - threshold changing software **Done**
  - FB crate reboot software
  - analyzer code
  - event displays
  - scaler displays
  - software for updating MWDC wire-map database (Xin's software)?
  - MWDC database tuning software

Safety Documentation (needed 10 days before experiment starts) **In progress**

- COO, ESAD, RSAD documentation must be completed by February 1 for all experiments
  - February 1 for N-Delta (E08-010)

Hall A Hardware list:

- Moeller -- wanted? (only needed by Deuteron Threshold)
- Harp scanners -- should be functional
- OTR -- must be OUT of the beam for production
- Compton -- not needed (from Doug)
- Hall A ARC -- not needed (from Doug)
- BPMs/Raster -- Needed by all experiments
- BCMs -- Needed by all experiments

Shielding:

- Green blocks between BB DAQ and pivot
  - need to confirm with Ed **Done**
- Do we need blocks between BB DAQ and beam-line quads, moeller, etc (Yes)  
This was necessary on the left HRS side

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Before the experiment starts

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- Test motion of BB sieve plate
- Make sure all necessary surveys are completed (Detectors, sieves, spectrometers, etc)

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Misc stuff:

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- Web site work:
  - shift worker How-To's (Larry) **In progress**
  - Runsheets (Aidan) **In progress**
  - shift checklists (Aidan) **In progress**
- Analyzer work:
  - online histogram display
  - FPP software (Kai, Aidan)
  - run database scripts
  - detector database updates

- Update Miha's analytic model for BB optics and optics matrix