

Node0615 Upgrade

Diary

Wed, Mar 21, 2001

This note is a summary of the experiences we encountered when attempting to upgrade node0615 as the first operational step in the Linac upgrade of the front-ends to a PowerPC-based version. We were allowed a 3-hour window to do this work.

Prior to this day, we had prepared node0615 by configuring its various internal tables, housed in nonvolatile memory, to be ready for the upgrade. We had also the experience of having already upgraded a test station--currently known as node0517 to be ultimately known as node0617--that is used for running the offline low-energy Linac RF station. We felt that we were ready for upgrading our first real Linac node.

As a first step, we performed DABBEL downloading of Acnet database devices extracted from those devices in node0614 and modified so that channels in the 05xx range map to the 01xx range. Also, analog control fields that reference SRM A3 were changed to SRM A1. In the new configuration for the low energy Linac nodes, the single SRM used will be A1. (If a second one is needed, it may be A4, as it is now.)

At first, after connecting to the SRM used by 0614 to reach RF5 devices, Arcnet communication did not work. The first reason was that its address A3 needed to be modified to A1. We should have remembered that.

After changing the SRM address, we observed Arcnet communication working, but not well enough. Data was being received into the Arcnet receive buffer area at 000A0000, but there was no indication of successful interpretation of same in the diagnostics record at 00001210. Also, the diagnostics of RDATA entry processing time indicated that the node was timing out awaiting valid reply data from the SRM. Then it was noticed that the reply message as found in the receive buffer showed an Acnet status word of 0002. (Normally, replies indicate a status word of 0000.) This nonzero status value is the reason why the replies were not accepted as valid. After some archaeology work, it was understood that the status 0002 meant that the SRM had more data to send back than the maximum size indicated in the request message. So it built as much of the reply data as it could within the imposed limit, returning the partial set of data with a status indication. Modifying the data access table entry to fix this was trivial. Then we had SRM data working just fine.

Checking the downloaded DABBEL channels, we noticed that the channel-associated bit numbers had not been modified from the 05xx range to the 01xx range, as we had planned. This was fixed by editing the SDDR entries for the affected devices.

We noticed that the vacuum valves were closed, so we had to manually open them. This had been serious enough to prevent beam from being enabled for NTF.

Next, we were getting alarm messages about SRM status. This channel 0040 holds combined binary status, and it had not been correctly modified. The CSTAT table holds the specifications that build the binary status words. Since it had been copied from 0614, it was not quite correct for 0615, which has only a single SRM. Then the nominal pattern and mask words had to be changed for channel 0040.

The readings for associated status from Acnet may be showing up in byte-backwards order. After some study following the completion of today's effort, we learned that a bug propagates

the single status bit of interest into two bit positions within the 32-bit reading that Acnet requests. By habit, through the years, all such basic status "attributes" have been defined to reference the bogus duplicate bit position. To fix this bug will require reentering basic status properties for all such devices, a daunting prospect. But as we upgrade each Linac station, we will make the modifications necessary for such devices in that station. The PowerPC system has no such bug.

Alarm messages were not appearing on the Acnet alarm display. This required not only declaring on page D98 that the new node is "alarmable," but also asking Kevin Cahill to assign alarms received by AEOLUS from the new node to be included in the Linac category for eligible display in the Linac portion of the Acnet alarms display.

The Linac RF power channel conversion was not working correctly. Although the proper entries were in the data access table, the newly-downloaded channels did not have the "knee" voltage housed in the D/A offset field. (This is because those channels do not have setting properties, which would be necessary to populate this field via the PDB download.) We manually entered those as used in 0614, and the RF power channel readings were again ok.

A problem occurred during database downloading in which an error was returned to the download program. This prevents further progress in downloading to that node, so it's important. After some study, a weakness in the Delete packet handling in the case that an unexpected property was as the property to be deleted. A new version of the DBDL local application that receives the downloaded information should get past this problem.

Later, we noticed that it seemed impossible to set nominal/tolerance values from Acnet. This involves the code in ACReq, which may have been insufficiently tested. Especially for this reason, we decided to revert to using node0614 and postpone the upgrade to node0615 for a future shutdown period, when we expect to be much better prepared as a result of going through this effort.

All those involved in this effort were useful in today's effort, in terms of analyzing and fixing the various problems we encountered. When we make the attempt the next time, we should try to be sure everyone is again available to help.