

## NMR NOTES #12

### Rebooting UNIX Spectrometers

The Unix-based spectrometer systems (Unity500, Inova500, Inova500b, Inova400, Inova300, Mercury 300, VXR-300) all use a Unix workstation as the host processor and a dedicated acquisition CPU to control the acquisition console. In order for the system to work, there must be a communications link between the two computers. This communication is controlled by a firmware program in E-PROM on the acquisition console and a memory-resident daemon, called either Expproc or Acqproc depending on the system, on the Unix computer. If this communication link is lost, the Unix computer is unable to communicate in any way with the acquisition computer and the link must be re-established in order to access the acquisition console. This is most normally evidenced by error messages within Vnmr that indicate "maximum retries exceeded" or "Problem sending messages". When the system is in this state it will also be impossible to open the acqi window for interactive locking and shimming. The single best indicator of a problem is an indication of "Status: Inactive" in the Acquisition Status window. This ALWAYS indicates that there is a problem in the acquisition processor communication link.

There are two different procedures used to initialize the acquisition processor communication link. The two older spectrometers, the VXR300 and the Unity500, communicate over the SCSI bus and use one protocol. The newer Inova and Mercury systems have a dedicated ethernet interface and are somewhat easier to initialize. All of the systems use the Unix command '**su acqproc**', which is a toggle command that looks for the Acqproc daemon and either starts it if it is missing or kills it if it is present. All Unix commands are normally run in the console window since there are diagnostic messages generated by Acqproc which are sent to the console window.

In the case of the Inova spectrometers, it is possible to restart the acquisition daemon without first rebooting the acquisition console. If this is successful, then shim and lock values currently used in the acquisition console will be retained. The normal procedure for rebooting the Inova spectrometers:

1. Run **su acqproc** in the console window. It may be necessary to repeat, until the message indicates that it is starting the Expproc daemon. If this is successful, nothing more needs to be done - the acquisition console still has all of your shim and lock information.
2. If this does not restore normal operation, it is necessary to reboot the acquisition console by pressing the small white reset button labeled 'RST'. This button is located directly above the ethernet cable connection on the Acquisition CPU card, located in the far left-hand slot in the Acquisition card cage, behind the left-hand cabinet door. On the Mercury console, this button is behind the smoked plastic front door. This process is slow, requiring as much as a minute and a half to complete, so be patient. Also, once the acquisition console is rebooted, it will be necessary to re-initialize it with an '**su**' command within Vnmr. Normally, you will also want to reload your shim values at the same time by setting **load='y'** before issuing the **su** command.
3. The system should be operational at this point. It may be necessary on very rare occasions to kill and restart the Expproc process again, but not usually.

The VXR and Unity systems have a more rigidly defined protocol for restarting the acquisition communication link. If this procedure is not followed carefully, the system can be left in a hung condition. In order to reboot the acquisition processor on these systems, it is necessary to insure that the acquisition console is rebooted before the Acqproc daemon is started. If you attempt to start the daemon before the console is ready to communicate, the system will hang. In order to restart these systems follow this procedure exactly:

1. In the console window, determine whether or not there is already an Acqproc process currently running. Use the command **ps -ef | grep Acqproc** and look for an existing Acqproc process. If one is present, run **su acqproc** to kill that existing acqproc daemon. You should get a message saying "Killing acqproc". If there is already a message in the console window saying something like "Acqproc: Segmentation Violation, Core dumped", then the daemon is already terminated and this step is not necessary. Do **NOT** simply run **su acqproc** without first verifying that an Acqproc process is running - if there was no process running, this will start a new daemon and it will attempt to communicate with the (still inactive) acquisition console and hang the system.
2. Once the Acqproc daemon has been removed, reboot the acquisition console CPU by pressing the black reset switch on the front frame of the Acquisition processor chassis. This will restart the E-PROM firmware on the CPU board so that it is waiting for an Acqproc process to communicate with it.
3. In the console window, run **su acqproc** again to start a new Acqproc daemon and initiate communication between the two computers. You should get a message saying "Starting Acqproc" and after a minute or so a second message saying "Acquisition Console ready at 300 Mhz".
4. In Vnmr, type **load='y' su** to reload the shim values and reinitialize the hardware. This will be necessary before you can connect the acqi window to the acquisition processor.