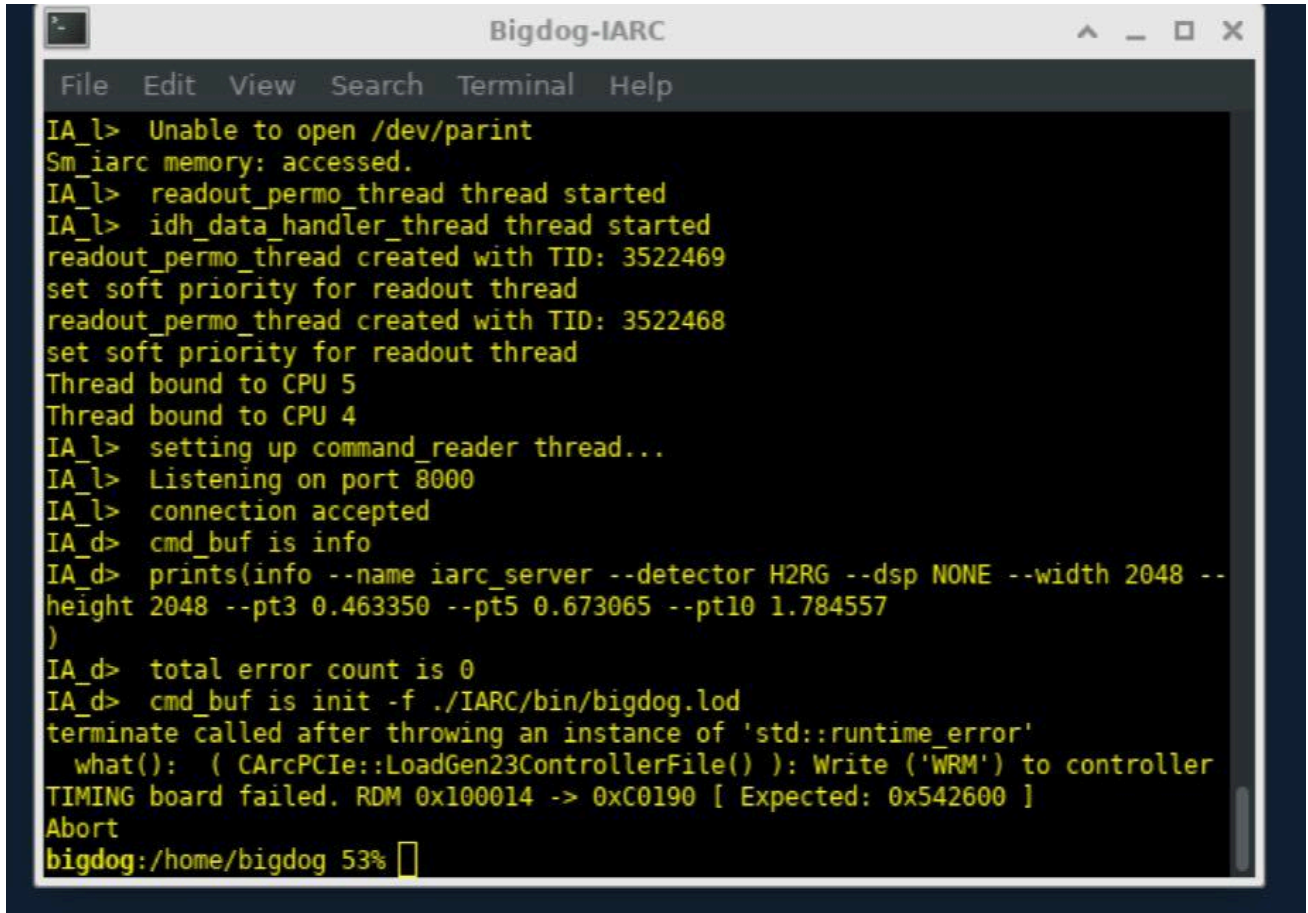


Troubleshooting Dirty Fiber Problem on SpeX

May 8, 2025

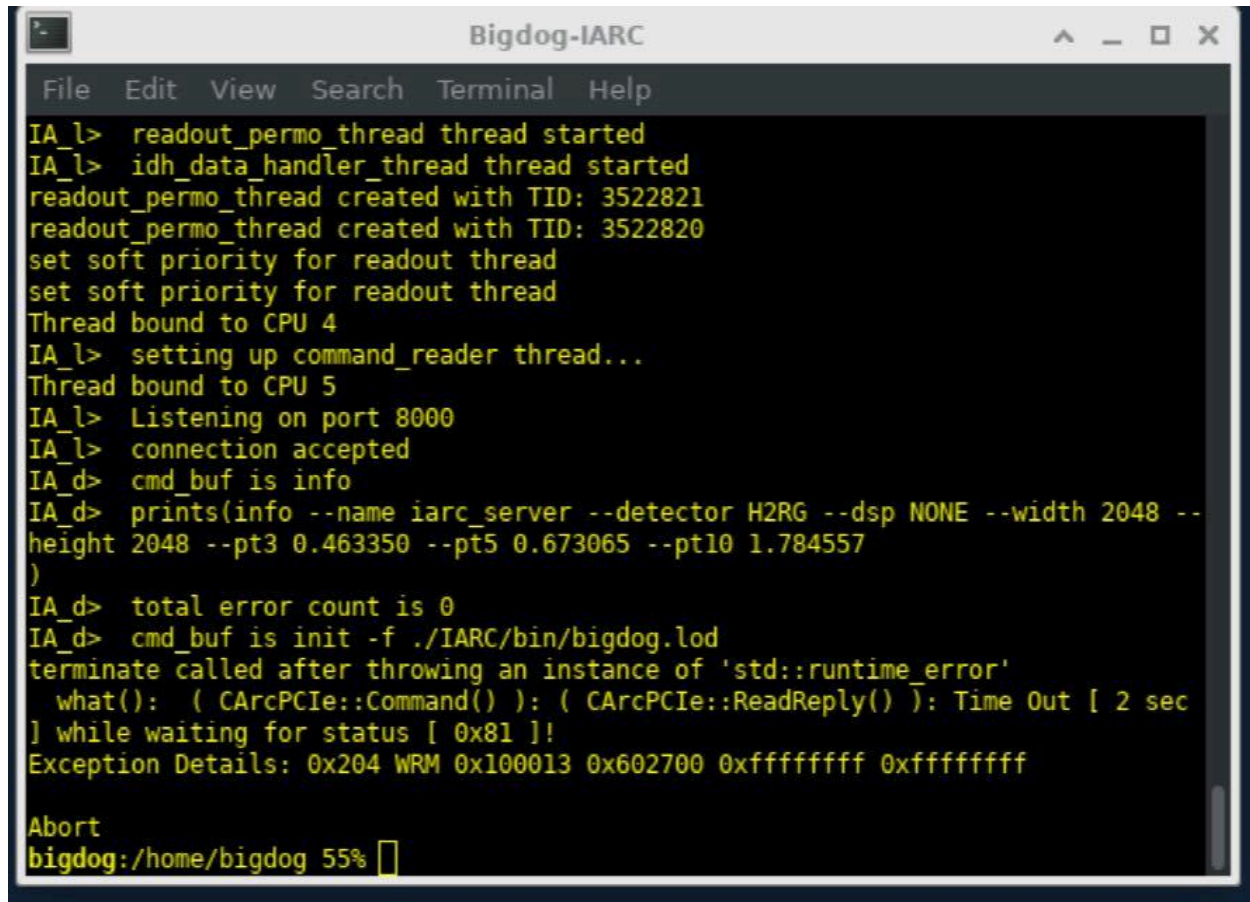
Problem: On May 8, 2025, IARC crashed upon doing a 'Go Init'.

Here are the two failure messages that we got:

A screenshot of a terminal window titled "Bigdog-IARC". The window has a menu bar with "File", "Edit", "View", "Search", "Terminal", and "Help". The terminal output shows a series of status messages and a final error. The messages include: "IA_l> Unable to open /dev/parint", "Sm_iarc memory: accessed.", "IA_l> readout_permo_thread thread started", "IA_l> idh_data_handler_thread thread started", "readout_permo_thread created with TID: 3522469", "set soft priority for readout thread", "readout_permo_thread created with TID: 3522468", "set soft priority for readout thread", "Thread bound to CPU 5", "Thread bound to CPU 4", "IA_l> setting up command_reader thread...", "IA_l> Listening on port 8000", "IA_l> connection accepted", "IA_d> cmd_buf is info", "IA_d> prints(info --name iarc_server --detector H2RG --dsp NONE --width 2048 --height 2048 --pt3 0.463350 --pt5 0.673065 --pt10 1.784557)", "IA_d> total error count is 0", "IA_d> cmd_buf is init -f ./IARC/bin/bigdog.lod", and a multi-line error message: "terminate called after throwing an instance of 'std::runtime_error'", "what(): (CArcPCIE::LoadGen23ControllerFile()): Write ('WRM') to controller", "TIMING board failed. RDM 0x100014 -> 0xC0190 [Expected: 0x542600]", "Abort". The prompt "bigdog:/home/bigdog 53%" is visible at the bottom.

```
Bigdog-IARC
File Edit View Search Terminal Help
IA_l> Unable to open /dev/parint
Sm_iarc memory: accessed.
IA_l> readout_permo_thread thread started
IA_l> idh_data_handler_thread thread started
readout_permo_thread created with TID: 3522469
set soft priority for readout thread
readout_permo_thread created with TID: 3522468
set soft priority for readout thread
Thread bound to CPU 5
Thread bound to CPU 4
IA_l> setting up command_reader thread...
IA_l> Listening on port 8000
IA_l> connection accepted
IA_d> cmd_buf is info
IA_d> prints(info --name iarc_server --detector H2RG --dsp NONE --width 2048 --
height 2048 --pt3 0.463350 --pt5 0.673065 --pt10 1.784557
)
IA_d> total error count is 0
IA_d> cmd_buf is init -f ./IARC/bin/bigdog.lod
terminate called after throwing an instance of 'std::runtime_error'
what(): ( CArcPCIE::LoadGen23ControllerFile() ): Write ('WRM') to controller
TIMING board failed. RDM 0x100014 -> 0xC0190 [ Expected: 0x542600 ]
Abort
bigdog:/home/bigdog 53%
```

Figure 1: One of the error messages that we got in the IARC window

A screenshot of a terminal window titled "Bigdog-IARC". The window has a menu bar with "File", "Edit", "View", "Search", "Terminal", and "Help". The terminal output shows a series of commands and responses. It starts with "IA_l> readout_permo_thread thread started" and "IA_l> idh_data_handler_thread thread started". Then it shows "readout_permo_thread created with TID: 3522821" and "readout_permo_thread created with TID: 3522820". Next, it says "set soft priority for readout thread" twice. Then "Thread bound to CPU 4" and "IA_l> setting up command_reader thread...". This is followed by "Thread bound to CPU 5", "IA_l> Listening on port 8000", "IA_l> connection accepted", "IA_d> cmd_buf is info", and "IA_d> prints(info --name iarc_server --detector H2RG --dsp NONE --width 2048 --height 2048 --pt3 0.463350 --pt5 0.673065 --pt10 1.784557)". Then "IA_d> total error count is 0", "IA_d> cmd_buf is init -f ./IARC/bin/bigdog.lod", and "terminate called after throwing an instance of 'std::runtime_error'". The error message is: "what(): (CArcPCIE::Command()): (CArcPCIE::ReadReply()): Time Out [2 sec] while waiting for status [0x81]!". Below this is "Exception Details: 0x204 WRM 0x100013 0x602700 0xffffffff 0xffffffff". The terminal ends with "Abort" and "bigdog:/home/bigdog 55%".

```
Bigdog-IARC
File Edit View Search Terminal Help
IA_l> readout_permo_thread thread started
IA_l> idh_data_handler_thread thread started
readout_permo_thread created with TID: 3522821
readout_permo_thread created with TID: 3522820
set soft priority for readout thread
set soft priority for readout thread
Thread bound to CPU 4
IA_l> setting up command_reader thread...
Thread bound to CPU 5
IA_l> Listening on port 8000
IA_l> connection accepted
IA_d> cmd_buf is info
IA_d> prints(info --name iarc_server --detector H2RG --dsp NONE --width 2048 --
height 2048 --pt3 0.463350 --pt5 0.673065 --pt10 1.784557
)
IA_d> total error count is 0
IA_d> cmd_buf is init -f ./IARC/bin/bigdog.lod
terminate called after throwing an instance of 'std::runtime_error'
  what(): ( CArcPCIE::Command() ): ( CArcPCIE::ReadReply() ): Time Out [ 2 sec
] while waiting for status [ 0x81 ]!
Exception Details: 0x204 WRM 0x100013 0x602700 0xffffffff 0xffffffff

Abort
bigdog:/home/bigdog 55%
```

Figure 2: The other error message that we got in the IARC window

Things we tried

- Do a 'die', then restart the IC, XUI, and IARC server
- control-C in the IARC server window, and restarting the IARC server
- Check that array power is applied in the RPCM (remote power control module)
- Check array temperatures
- Power is on for the Coolracks
- Checked for duplicate processes.

Things Charles said to check

- Bigdog PC fiber card, on the PC where the fiber comes into the PC. Check if there is a red light on the fiber card. Confirm that we're getting signal on the back of the Bigdog PC, by looking at the fiber card on the back of the Bigdog PC. Normally no lights should be on. If the array controller is on, then the fiber transmitter laser is on also. In that case, the PCI card in the PC will receive signal. When we turned off power to the array controller, then we got a red light on the fiber card.

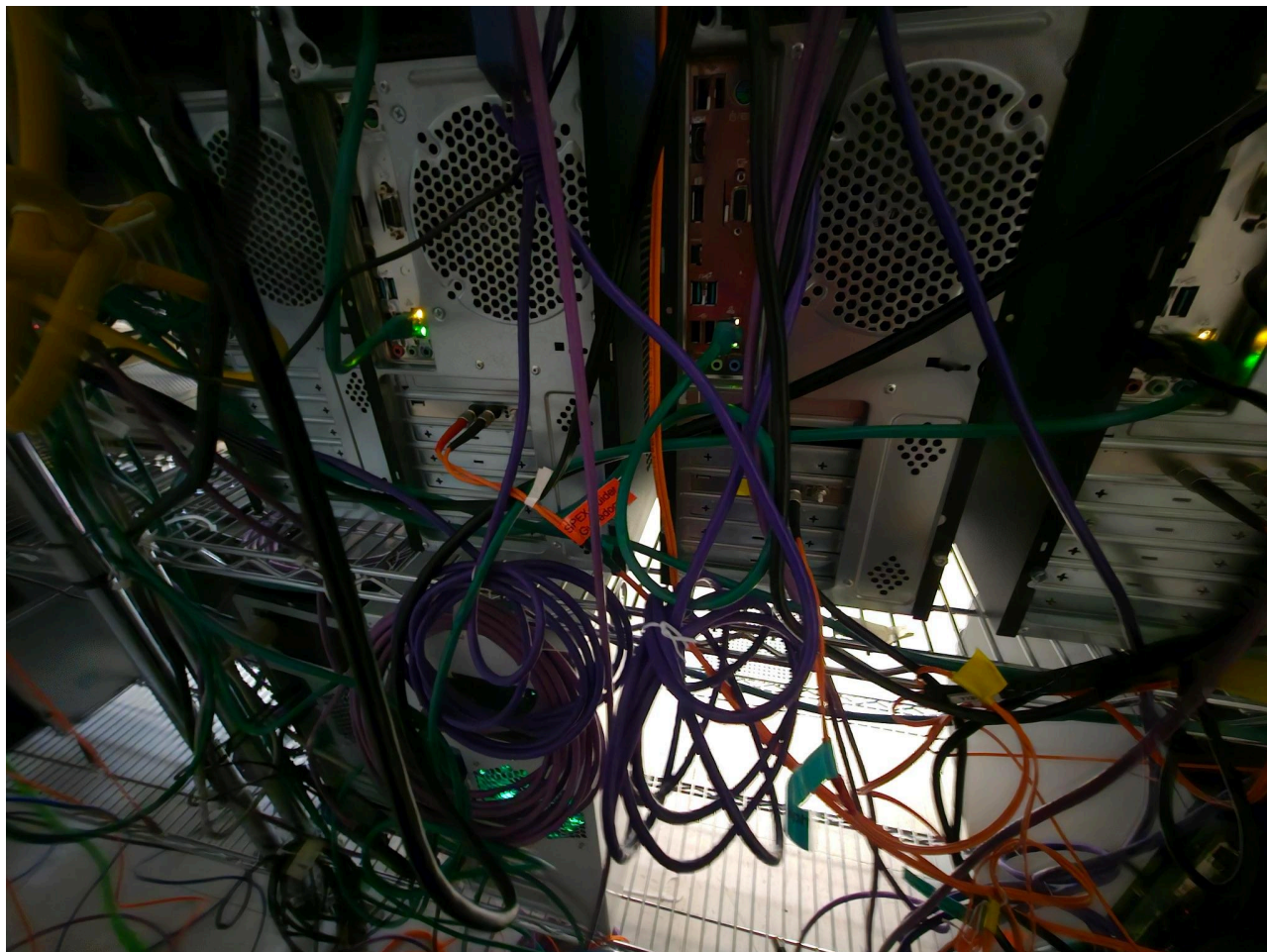


Figure 3: Back of the SpeX PCs where the fibers go in.

- Check the LEDs on the top of the array controller. A full set of green LEDs means that it's working. A partial set means that it's failing to load the firmware.

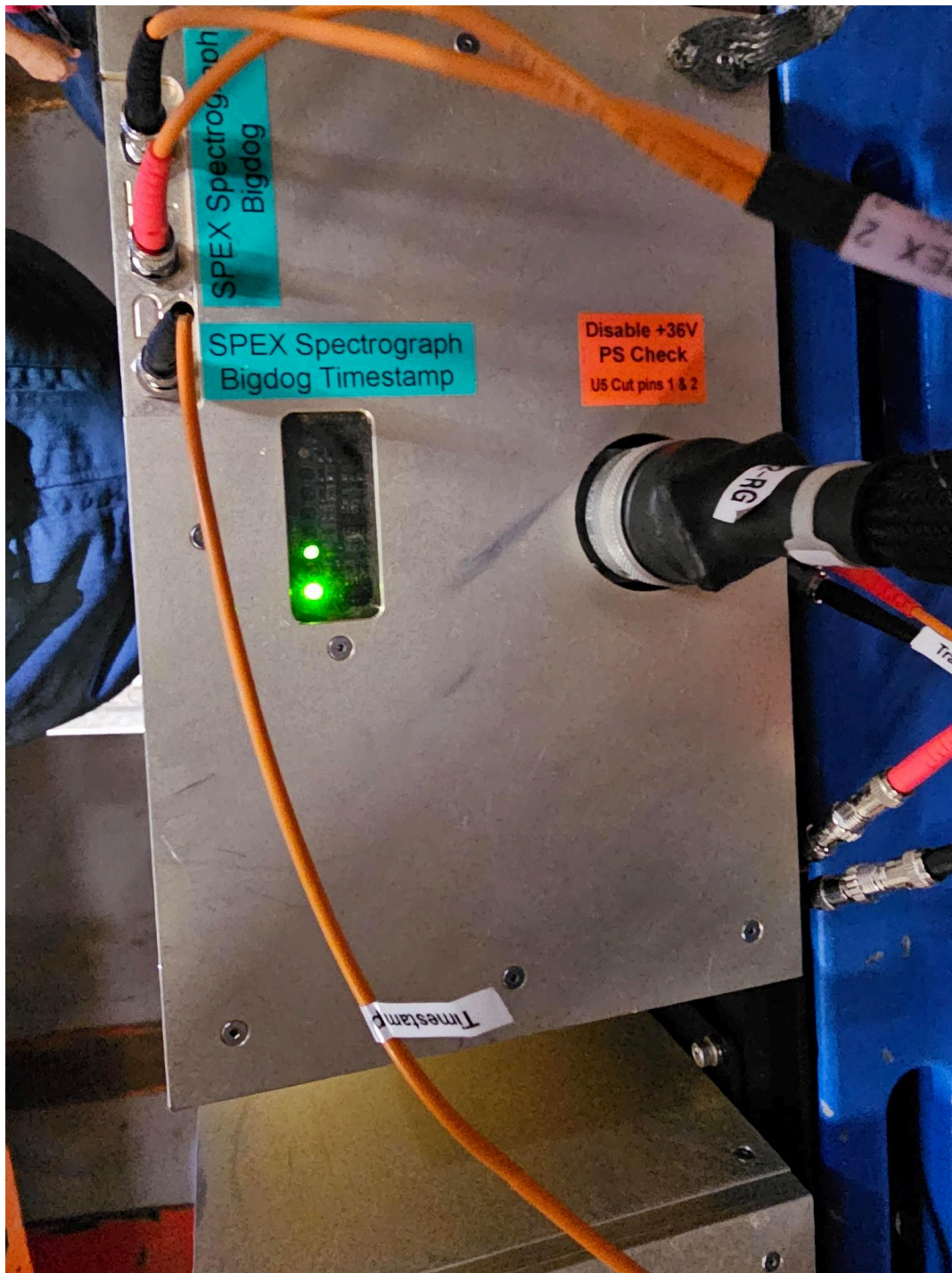


Figure 4: The top of the Spex/Bigdog array controller. Only some of the green LEDs are on, which means that it's not loading the firmware.

This troubleshooting showed:

- It's not a software problem.
- The PCs are getting signal from the controllers, and the controllers are transmitting.
- The controllers aren't getting the firmware commands

This led us to think that the fibers were dirty, specifically the fiber that transmits the firmware to the controller. Once the fibers were cleaned, Bigdog worked normally.