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TaurusDiagnosis

Steps to diagnose the problem with a Taurus with or without an attached Trident.

Serial Port

The serial port is crucial in diagnosing problems with a Taurus.

- the Taurus serial port is port 3, which is only available using a Taurus three port serial cable, which is not the standard Taurus serial cable (which are 2 ports)
- serial port is raw, 9600 bps
- you must install the jumper in the two lower pins of the header in the Taurus media bay otherwise the debug console is *not* enabled
- connect the serial cable and start the serial port monitor (e.g. HyperTerminal or TeraTerm) *before* you power on the Taurus so you can capture the boot messages
- if the Taurus boots up OK, login at the prompt, and try the Linux Shell Commands (below)

Remote Access

Configure local network to allow telnet access from Nanometrics. If the problem is very difficult, then allowing the software engineers at Nanometrics to login to the Taurus from Nanometrics will help diagnose the problem.

Ping

Can you ping the Taurus? If not, use the `ping -t` command to have ping run continuously to check if the connection is intermittent or completely non-functional.

Telnet

Telnet to the Taurus. Login at the prompt and try the Linux Shell Commands (below).

Linux Shell Commands

Check Apollo Running

Use the `ps` command to check if apollo is running:

```
bash-2.05# ps -ef
UID          PID  PPID  C  STIME TTY          TIME CMD
root          1      0  0 Nov10 ?        00:00:26 init [2]
root          2      1  0 Nov10 ?        00:00:05 [keventd]
root          3      1  0 Nov10 ?        00:00:05 [ksoftirqd_CPU0]
root          4      1  0 Nov10 ?        00:01:16 [kswapd]
root          5      1  0 Nov10 ?        00:00:00 [bdflush]
root          6      1  0 Nov10 ?        00:00:11 [kupdated]
root          7      1  0 Nov10 ?        00:00:00 [mtdblockd]
root          8      1  0 Nov10 ?        00:00:00 [khubd]
root          9      1  0 Nov10 ?        00:00:18 [jffs2_gcd_mtd2]
root         33      1  0 Nov10 ?        00:00:00 /usr/bin/sntp -S -4
root         40      1  0 Nov10 ?        00:14:00 [kjournald]
root         72      1  0 Nov10 ?        00:00:00 udhpcp -n
root         74      1  0 Nov10 ?        00:00:00 /usr/sbin/xinetd -stayalive -reuse -pidfile /tmp/
root         75      1  0 Nov10 ?        00:00:00 /sbin/redir --lport=8080 --cport=80 --caddr=1.0.0
```

```

root      79      1  0 Nov10 ?      00:00:02 /sbin/syslogd -m 0
root      81      1  0 Nov10 ?      00:00:00 /sbin/klogd -2
root      95      1  0 Nov10 ?      00:00:00 /bin/sh /usr/local/bin/start_apollo
root      96      1  0 Nov10 ?      00:01:04 /usr/bin/sntp -r -P no -e 0.005 -E 1 -x 1 -l /tmp
root      97      1  0 Nov10 ?      00:00:00 login -- root
root     123     95  0 Nov10 ?      00:00:00 /bin/sh ./run
root     132    123  0 Nov10 ?      00:00:00 /sbin/redis --lport=8089 --cport=80 --caddr=1.13.
root     133    123  0 Nov10 ?      00:00:00 /sbin/redis --lport=8889 --cport=8888 --caddr=1.1
root     135    123 40 Nov10 ?      1-09:35:49 ./apollo trident=0
root    19038     97  0 15:01 ttyS0      00:00:00 -bash
root    19039 19038  0 15:01 ttyS0      00:00:00 /bin/bash /usr/local/bin/start_konqueror
root    19040 19039 22 15:01 ?          01:06:27 /usr/local/kde/bin/ppc-konqueror -qws -noswcursor
root    19042 19040  0 15:01 ?          00:01:01 /usr/local/kde/bin/ppc-konqueror -qws -noswcursor
root    25827     74  0 19:04 ?          00:00:01 in.telnetd: ott01wks0367.nanometrics.ca
root    25828 25827  0 19:04 ?          00:00:00 login -- root
root    25832 25828  0 19:04 ttyP0      00:00:00 -bash
root    27198     1  0 19:53 ?          00:00:00 /bin/bash /etc/init.d/log_manager
root    27212 27198  0 19:53 ?          00:00:00 sleep 300
root    27286 25832  0 19:57 ttyP0      00:00:01 ps -ef
root    27287 19042  0 19:57 ?          00:00:00 /usr/local/kde/bin/ppc-konqueror -qws -noswcursor
bash-2.05#

```

You should see `start_apollo` and `apollo` processes in the list.

Check Mounted Media

Use the `mount` command to check which, if any, media is mounted. The hard disk is listed as `/dev/hda1` and the CF card is listed as `/dev/hdc1`.

```

bash-2.05# mount
rootfs on / type rootfs (rw)
/dev/mtdblock2 on / type jffs2 (rw)
/proc on /proc type proc (rw)
none on /proc/bus/usb type usbdevfs (rw)
/dev/ram0 on /tmp type ramfs (rw)
/dev/ram1 on /var type ramfs (rw)
/dev/hda1 on /mnt/ide type ext3 (rw)
/dev/hdc1 on /mnt/cf type ext3 (rw)
bash-2.05#

```

Logs

There are several logs that are useful. For small log files use `vi`, for larger log files use `tail` and `grep`.

```

bash-2.05#cd /home/taurus/logs
bash-2.05# tail Apollo_20061115.log
bash-2.05#grep Exception Apollo_20061115.log
bash-2.05#cat system
bash-2.05#cat ApolloError.log

```

For each log file, look for errors, warnings or exceptions, something that looks wrong or out of the ordinary.

The `system` log has older messages in files `system.1`, `system.2`, etc. This log is the output of the operating system commands and drivers. If there are problems with hard disks, serial ports, network cards, time services, etc., the log messages are in this file.

The `ApolloError.log` records the standard error output of the Apollo process. If there are Java virtual machine errors such as `OutOfMemory`, the log messages are in this file.

The `Apollo_YearMonthDay.log` files are the application log messages. If the Apollo application causes an exception, it is logged in these files. By default, this log only contains the messages during startup and

shutdown of Apollo, the rest of the time the messages are put in the store. To override this behaviour and force all messages to be written to the file (as well as the store), add the parameter *log=true* to the run script (/home/taurus/run).

```
...
./apollo trident=${trident} log=true > /dev/null
...
```

Stopping Apollo

To stop Apollo from running, use the `kill_apollo` script. This script shuts Apollo down nicely, and then starts the heartbeat so the Taurus will not reboot.

```
bash-2.05#kill_apollo
--20:18:29-- http://127.0.0.1/pages/taurus/exit.page?noPowerDown
=> `/dev/null'
Connecting to 127.0.0.1:80... blah blah blah
Mounting local filesystems.
Starting heart beat ... Done
bash-2.05#
```

If this command fails, or hangs, then either Apollo is not running or Apollo is in a bad state and can not be shutdown. In that case, you can try and power cycle the unit and try again. If that doesn't work, change the file /usr/local/bin/start_apollo to comment out the line `init 0` (second last line). Reboot the machine and use the `pkill` command to kill Apollo and then start the heartbeat manually, and remount the media (Apollo tries to unmount when it shuts down if Apollo failed to shutdown the media may still be mounted, but there's no harm in attempting to remount already mounted media). ⚠ Remember to uncomment out the line in /usr/local/bin/start_apollo

```
bash-2.05#pkill -9 apollo
bash-2.05#start_heartbeat
bash-2.05#/etc/init.d/mount start
```

Deleting Store

If the data in the store is not important, then deleting the store can eliminate any problems due to corruption in store. To delete the store, stop Apollo (see above) and then remove the store files. After removing the stores, reboot the Taurus to restart Apollo. (Rebooting is safest since it ensures that all necessary processes are properly running for example, it ensures the heartbeat is *not* running).

```
bash-2.05#kill_apollo
bash-2.05#cd /home/taurus/cf/store
bash-2.05#rm *.store
bash-2.05#reboot
```

Remotely Restarting Entire Taurus and Trident

The following command will reboot all processors inside and all Tridents attached to Taurus.

```
bash-2.05#curl -v -O --data-binary "" http://1.0.0.2/pwm/reboot
```

Remotely Restarting Power PC Only

To tell the ARM to power cycle the PowerPC only. This is equivalent to pushing the "Restart" button on the Shutdown page of the UI.

```
bash-2.05#curl -v -O --data-binary "" http://1.0.0.2/status/restart
```

Trident Serial Number

In order for a Trident to properly connect and stream data to a Taurus, the Taurus must know the serial number of the attached Trident. If the Trident is changed, or the Taurus is upgraded, the serial number must be corrected in the run script.

```
bash-2.05#cd /home/taurus
bash-2.05#vi run
```

Make sure the `trident` line at the top of the file contains the correct serial of the attached trident.

e.g.

```
#!/bin/sh

trident=0152      # replace 0152 with the trident serial number (should be 4 digits long)

export PATH=/usr/local/bin:$PATH
...
```

Check Trident Connection

⚠ Warning: The SOH NmxBus power is *not* reliable. We have noticed fully functioning Trident's reporting zero power. Do not use it as a measure of a correctly operating Trident.

From the Taurus (either via telnet or the serial console) use the `ping` command to check if a Trident is attached. The IP address of the Trident is `1.13.0.x` where `x` is the serial number of the Trident. If the serial number is greater than 254, then the IP address is `1.13.x.y` where `x` is the serial number / 256 and `y` is the serial number mod (remainder) 256.

```
bash-2.05#ping 1.13.0.152
```

If the Trident does not respond to ping, then the IP routes may not be setup properly. The route is initially set by the run script.

```
bash-2.05#route
Kernel IP routing table
Destination      Gateway          Genmask          Flags Metric Ref    Use Iface
199.71.138.0    *                255.255.255.0   U      0      0      0 eth0
1.0.0.0          *                255.0.0.0       U      0      0      0 nmx0
default         199.71.138.2    0.0.0.0         UG     0      0      0 eth0
```

Use the `ifconfig` command to check that the ethernet (`eth0`) and NmxBus (`nmx0`) networks are up and running:

```
bash-2.05# ifconfig
eth0      Link encap:Ethernet  HWaddr 00:11:40:02:00:3B
          inet addr:199.71.138.135  Bcast:199.71.138.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:5391062 errors:2 dropped:0 overruns:0 frame:2
          TX packets:730375 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:436312240 (416.0 MiB)  TX bytes:38282584 (36.5 MiB)
          Base address:0xe00

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:9074 errors:0 dropped:0 overruns:0 frame:0
          TX packets:9074 errors:0 dropped:0 overruns:0 carrier:0
```

```

collisions:0 txqueuelen:0
RX bytes:5857331 (5.5 MiB) TX bytes:5857331 (5.5 MiB)

nmx0    Link encap:UNSPEC HWaddr 15-59-00-00-00-00-00-00-00-00-00-00-00-00-00-00
inet addr:1.0.0.1 Bcast:1.255.255.255 Mask:255.0.0.0
UP BROADCAST RUNNING MULTICAST MTU:500 Metric:1
RX packets:1246801 errors:0 dropped:0 overruns:0 frame:0
TX packets:966511 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:10
RX bytes:302592756 (288.5 MiB) TX bytes:80401558 (76.6 MiB)
Base address:0x3f00

bash-2.05#

```

Note that the nmx0 Mask should be 255.0.0.0, not 255.255.255.0 for Trident to work properly.

Check Trident Firmware

To check the firmware version of the Trident, use a browser and go to http://taurus_ip:8089/firmware/

If that does not work, make sure the `redir` is properly setup on the Taurus. The `redir` processes are started in the run script. Use the `ps` command to check if the `redir` processes are running:

```

bash-2.05#ps -ef | grep redir
root      75      1   0 Nov10 ?          00:00:00 /sbin/redir --lport=8080 --cport=80 --caddr=1.0.0.1
root     132     123   0 Nov10 ?          00:00:00 /sbin/redir --lport=8089 --cport=80 --caddr=1.13.0.1
root     133     123   0 Nov10 ?          00:00:00 /sbin/redir --lport=8889 --cport=8888 --caddr=1.13.0.1
bash-2.05#

```

Restart Trident

If the Taurus is properly configured for the Trident serial number (see above) and does not respond, try restarting the Trident. To restart the Trident, you must cycle the power to the Trident. Locally, simply unplug/plug in the NmxBus cable. Remotely, you can cycle the power by telnetting to the Taurus and sending the NmxBus power off/on commands.

```

bash-2.05#curl -v -O --data-binary "" http://1.0.0.2/status/power?nmxbus=off
bash-2.05#curl -v -O --data-binary "" http://1.0.0.2/status/power?nmxbus=on

```

Check Version Numbers

To check the version numbers without using the Apollo firmware page, use the following methods:

- Taurus version number see file `/home/taurus/.taurus_version`
- Apollo version number see file `/home/taurus/.apollo_version`
- Taurus ARM, DSP, Power Manager see http://taurus_ip:8080/firmware/
- Trident ARM, DSP, Power Manager see http://taurus_ip:8089/firmware/
- Root file system see file `/etc/rootfs_version`
- Konqueror version see file `/etc/taurusapp_version`
- Linux uBoot, Kernel version see file `/tmp/ppcFirmwareInfo.txt`

Check Active Taurus Directory

To check which Taurus directory is actively being used and what is the default, check these files:

- `/home/taurus/.activeApollo`
- `/home/taurus/.defaultApollo`

If the active and default do *not* match then the Taurus upgrade has *not* been committed.

Check Apollo Configuration

The Apollo configuration is stored as a file here:

- /home/taurus/config.ttl

The contents of this file are text RDF triples in Turtle format. To check a configuration value, find the name of the configuration parameter, then there should be a "value" predicate followed by a value followed by a semi-colon (;) and a period (.).

e.g.

```
<http://example.org/taurus_0113/store/totalSize>
<http://www.w3.org/1999/02/22-rdf-syntax-ns#value> "100";
.
<http://example.org/taurus_0113/store/media>
<http://www.w3.org/1999/02/22-rdf-syntax-ns#value> "IDE";
```

In this example the total size of the store is 100 MB and the media for the store is IDE (hard drive).