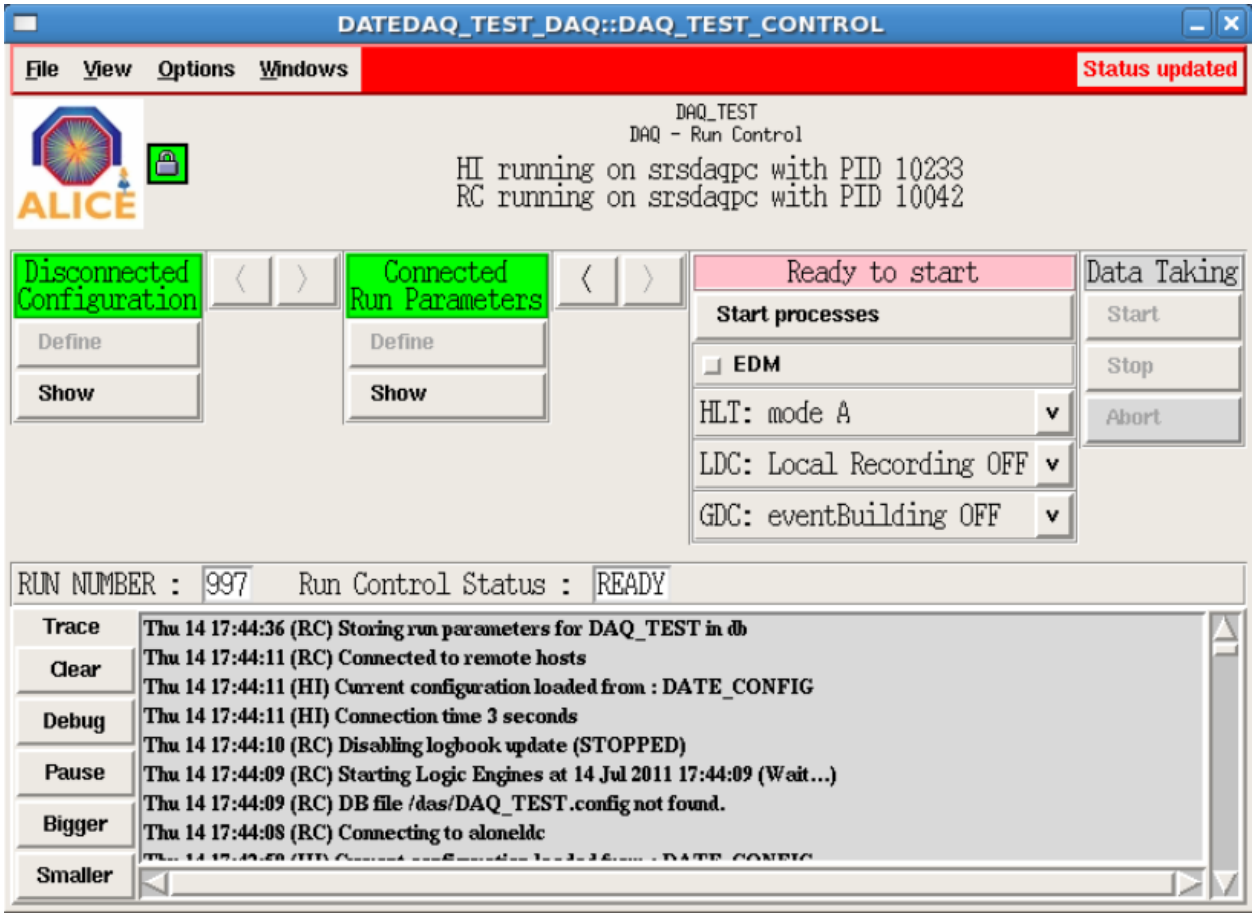
DATE for SRS

Getting Started Manual



v1.0

Notice: PRE-RELEASE for comments

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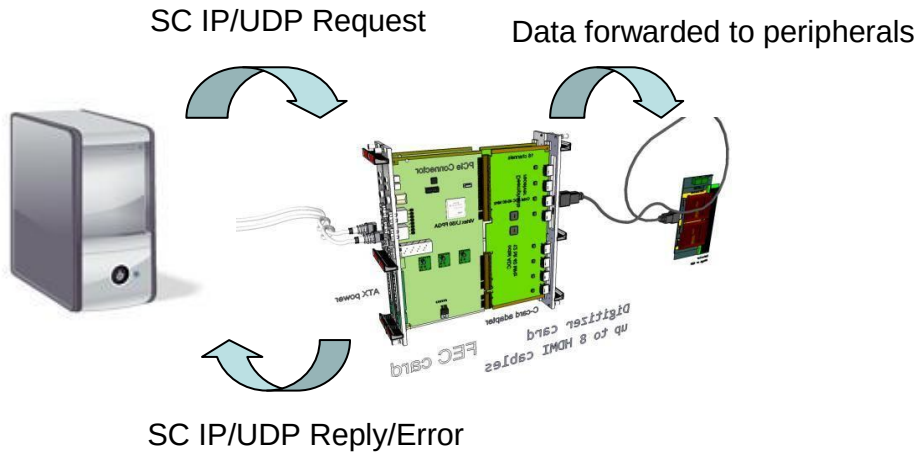
Contents

Overview

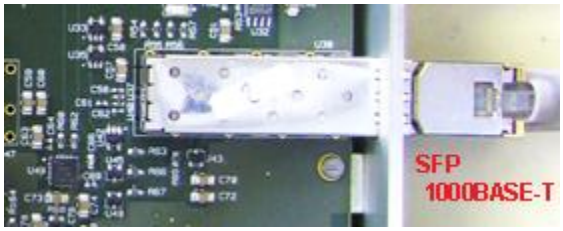
The slow-control of the SRS system is carried out using UDP over IP protocol on the available Gigabit Ethernet port of the FEC cards. When using a SRU unit to bundle many FEC cards together, the SRU will act as a packet switch, forwarding the slow-control frames to the FEC cards via the DTC links.



The components of the slow-control system are: the slow-control PC (SC-PC), the network (point-to-point connection/network switch/SRU), the FEC card and the peripherals that need to be configured. Peripherals can be either virtual devices (usually residing in the FEC firmware) or real hardware objects which are connected to the FEC FPGA, located on the FEC card, the A/B/C-Module Card or on the front-end hybrids. Generally the real peripherals have a logic interface located in the FEC firmware, which translates the slow-control commands in the format that the external device understands. The slow control protocol assures that, from the user point of view, the real or virtual attribute of a peripheral is transparent.

Getting computer ready

After connection with SRS system using SPF (see below), it is needed to configure computer to establish connection using UDP.

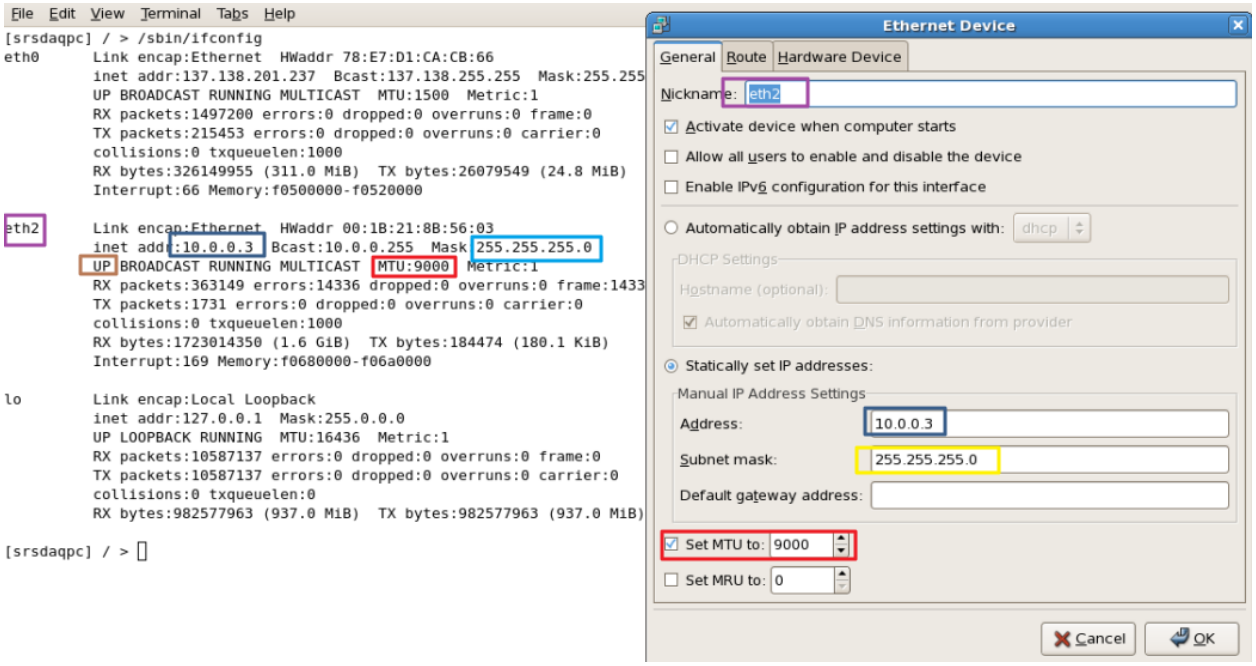


You can configure network cards of a Linux computer:

1. Using terminal
2. Using *System -> Administrator -> Network* dialog.

In the second option, you should always save the changes before apply. To apply for changes, you need to *Deactivate* and *Activate* the card again. First option saves and applies the changes automatically as you execute the commands. Below, you find the former method on the left and the latter method on the right.

The changes on Ethernet require super user privileges. To enable super user type: *su* on the terminal. You will be asked to enter the password for user.



Using Terminal to Configure

Enter super user mode and type */sbin/ifconfig* to see available devices. Note the card name you would like to use for connection. If the "UP" text inside brown box is not written on the device details, you will need to activate device by typing: */sbin/ifconfig ethernet_device_name up*.

It is needed to assign an IP at the same subnet such as 10.0.0.3 to establish a connection. To assign an IP type */sbin/ifconfig ethernet_device_name IP_address_to_be_used*. For the picture above, the command should be: */sbin/ifconfig eth2 10.0.0.3*.

To check if your changes are applied, you can type: *sbin/ifconfig ethernet_device_name* anytime. Please see image below:

```
[srsdaqpc] / > /sbin/ifconfig eth2
eth2      Link encap:Ethernet  HWaddr 00:1B:21:8B:56:03
          inet addr:10.0.0.3  Bcast:10.0.0.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:9000  Metric:1
          RX packets:363149 errors:14336 dropped:0 overruns:0 frame:14336
          TX packets:1731 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:1723014350 (1.6 GiB)  TX bytes:184474 (180.1 KiB)
          Interrupt:169 Memory:f0680000-f06a0000

[srsdaqpc] / > /sbin/ifconfig eth2 inet 10.0.0.2
[srsdaqpc] / > /sbin/ifconfig eth2
eth2      Link encap:Ethernet  HWaddr 00:1B:21:8B:56:03
          inet addr:10.0.0.2  Bcast:10.255.255.255  Mask:255.0.0.0
          UP BROADCAST RUNNING MULTICAST  MTU:9000  Metric:1
          RX packets:363149 errors:14336 dropped:0 overruns:0 frame:14336
          TX packets:1739 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:1723014350 (1.6 GiB)  TX bytes:185994 (181.6 KiB)
          Interrupt:169 Memory:f0680000-f06a0000
```

Configuring Computer for Multiple Cards

If you have more than one card, to connect your computer with multiple cards using one Ethernet and switch, plug the RJ45 connectors of all cards and computer in switch.

The cards need different IP addresses to send data at the same time. To enable this, it is needed to create aliases for each card. To create aliases, enter super user mode and type the following: */sbin/ifconfig ethernet_device_name:X IP_address_for_new_alias netmask 255.255.255.0*.

The :X part is where you create alias for your Ethernet. For instance, typing */sbin/ifconfig eth2:**0** 10.0.**1**.3 netmask 255.255.255.0* lets a second UDP connect the second card (The remote card must have 10.0.1.x IP address to be used (ping 10.0.1.x to check) and UDP setting must be checked using *editDb*). After command execution, type */sbin/ifconfig* to see changes. To change IP addresses of cards see "Connection, Programming and Testing FEC and ADC Cards" manual.

```
[srsdaqpc] /home/daqSRS/slow_control > /sbin/ifconfig eth2:0 10.0.1.3 netmask 255.255.255.0
[srsdaqpc] /home/daqSRS/slow_control > /sbin/ifconfig
eth0      Link encap:Ethernet  HWaddr 78:E7:D1:CA:CB:66
          inet addr:137.138.201.237  Bcast:137.138.255.255  Mask:255.255.0.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:35437 errors:0 dropped:0 overruns:0 frame:0
          TX packets:5478 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:7926027 (7.5 MiB)  TX bytes:1339892 (1.2 MiB)
          Interrupt:66 Memory:f0500000-f0520000

eth2      Link encap:Ethernet  HWaddr 00:1B:21:8B:56:03
          inet addr:10.0.0.3  Bcast:10.0.0.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:9000  Metric:1
          RX packets:1538424 errors:0 dropped:0 overruns:0 frame:0
          TX packets:2584 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:1085460250 (1.0 GiB)  TX bytes:1112768 (1.0 MiB)
          Interrupt:169 Memory:f0680000-f06a0000

eth2:0    Link encap:Ethernet  HWaddr 00:1B:21:8B:56:03
          inet addr:10.0.1.3  Bcast:10.0.1.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:9000  Metric:1
          Interrupt:169 Memory:f0680000-f06a0000
```

For 3rd card on SRS we would type: */sbin/ifconfig eth2:**1** 10.0.**2**.3 netmask 255.255.255.0*.

```
[srsdaqpc] /home/daqSRS/slow_control > ping 10.0.1.2
PING 10.0.1.2 (10.0.1.2) 56(84) bytes of data.
64 bytes from 10.0.1.2: icmp_seq=1 ttl=64 time=0.721 ms
64 bytes from 10.0.1.2: icmp_seq=2 ttl=64 time=0.047 ms
64 bytes from 10.0.1.2: icmp_seq=3 ttl=64 time=0.052 ms
64 bytes from 10.0.1.2: icmp_seq=4 ttl=64 time=0.047 ms
64 bytes from 10.0.1.2: icmp_seq=5 ttl=64 time=0.050 ms
64 bytes from 10.0.1.2: icmp_seq=6 ttl=64 time=0.051 ms
64 bytes from 10.0.1.2: icmp_seq=7 ttl=64 time=0.052 ms

--- 10.0.1.2 ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 6000ms
rtt min/avg/max/mdev = 0.047/0.145/0.721/0.235 ms
[srsdaqpc] /home/daqSRS/slow_control >
```

(Above, ping result for second card connectivity. Ctrl+C to stop)

The created aliases are removed at each start, if you would like to keep aliases at each reboot type `gedit /etc/rc.d/rc.local` in super user mode and copy-paste the following text to the end of the file (Do not forget to change the Ethernet name you are using for connection):

```
#setting IP alias interfaces

echo "Setting IP Aliases..."

/sbin/ifconfig eth2:0 10.0.1.3 netmask 255.255.255.0
# /sbin/ifconfig eth2:1 10.0.2.3 netmask 255.255.255.0 # uncomment for third
card.
```

To remove aliases before restart type */sbin/ifconfig eth2:**X** down*. Like all IP operations, this operation also needs super user privileges.

To continue the setup with multiple cards see the Date Configuration.

Using Network Dialog to Configure

Follow *System -> Administrator -> Network* to open Ethernet Device dialog. Double click on the device you would like to configure and choose "Statically set IP addresses" to enter the IP you would like to use to establish connection. Press Ctrl+S (or File -> Save) to save changes. Click on Deactivate and Activate again to apply for changes.

To make sure you applied for changes you can use terminal and type: *sbin/ifconfig eth2* (no SU is needed).

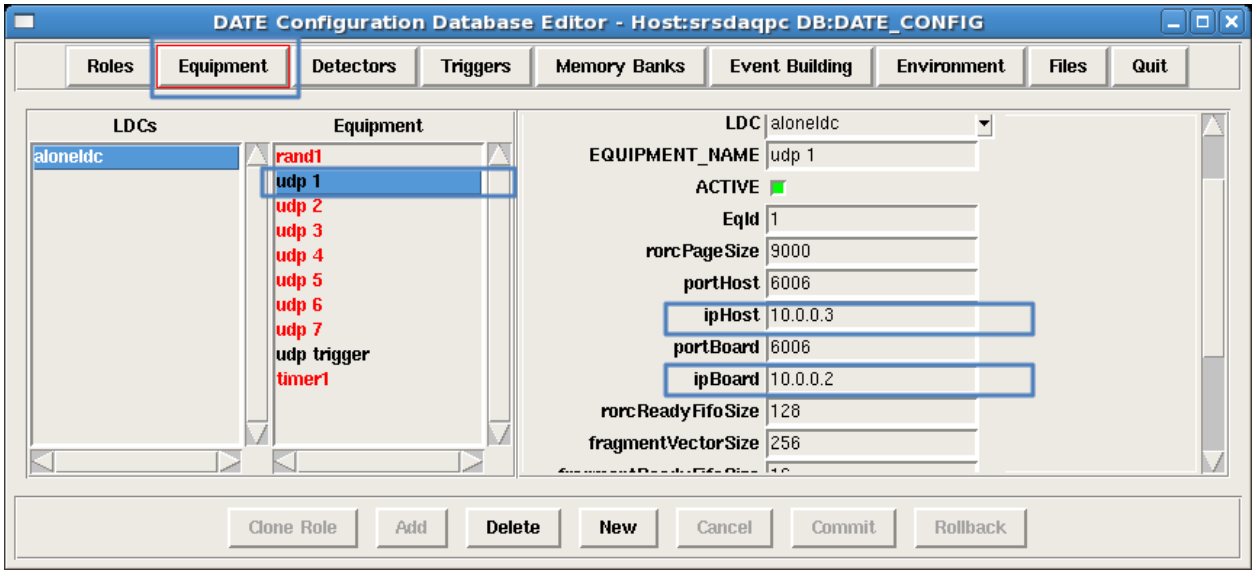
Preferably, the MTU (Maximum Transmission Unit) can be increased to allow the packet to be sent in fewer pieces. Type *sbin/ifconfig ethernet_device_name mtu desired_number* to change the MTU. For dialog, check the "Set MTU to" box and edit textbox with the desired number. After change, save changes and restart the device.

DATE Configuration

If it is the first time of using DATE or any error (in red) is shown on the log or the data is not taken, the configuration must be checked. Typing *editDb* (case sensitive) on the terminal will pop the database editor up to make changes.

```
[srsdaqpc] /home > editDb
[srsdaqpc] /home >
```

Choose *Equipment* tab and click one of the active equipments. In the following picture *udp 1* is active and chosen.



Check if *ipHost* (the computer) and *ipBoard* (destination) IPs are correct.

Please make sure that the first two parts of IP address of PC and card are the same (10.0) to use default configuration files without modification. You can also only change the third part of IP address. The last part must be 3 for PC and 2 for card. Some examples:

True		False	
Card	PC	Card	PC
10.0.0.2	10.0.0.3	10.0.0.2	10.0.1.2
10.0.5.2	10.0.5.3	10.0.0.3	10.0.2.3
10.0.10.2	10.0.10.3	10.1.0.2	10.1.0.3
10.0.3.2	10.0.3.3	10.0.3.3	10.0.3.2

Green: fixed. Orange: Must match with card and PC IP.

To check your Ethernet IP that is used to connect the card use:

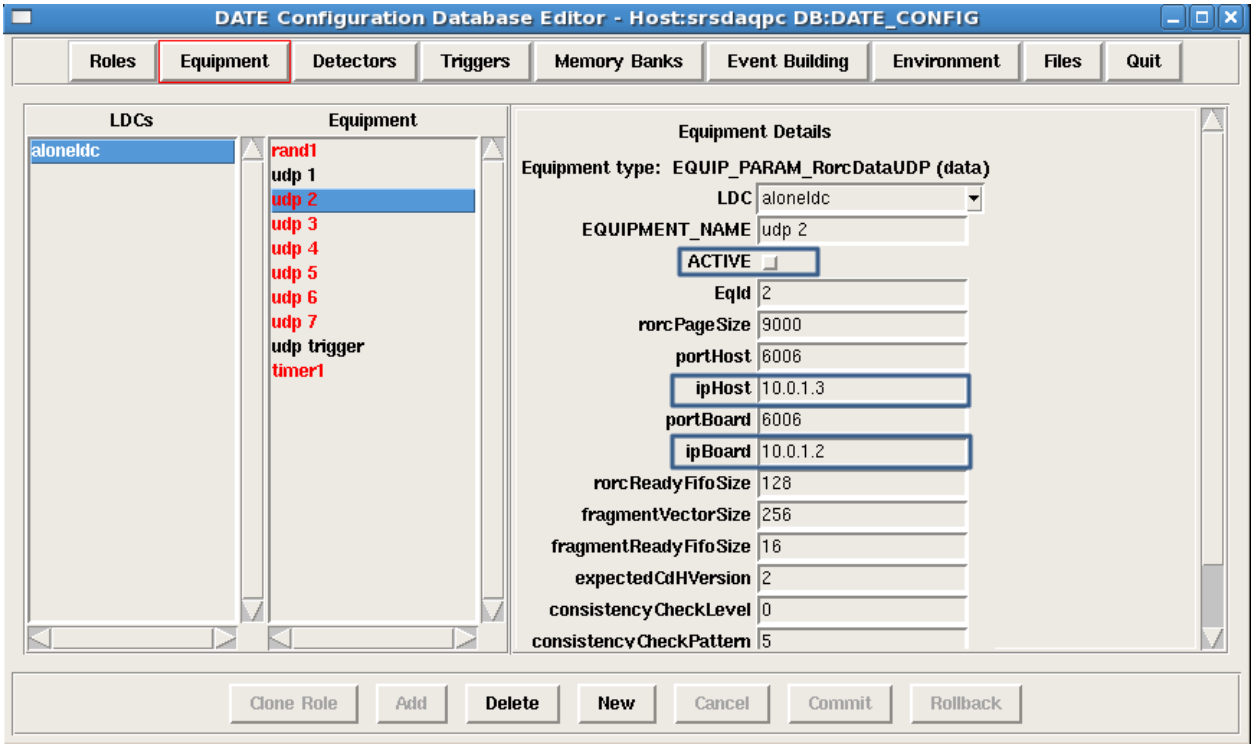
```
[srsdaqpc] / > /sbin/ifconfig
eth0      Link encap:Ethernet  HWaddr 78:E7:D1:CA:CB:66
          inet addr:137.138.201.237  Bcast:137.138.255.255  Mask:255.255.0.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:676408 errors:0 dropped:0 overruns:0 frame:0
          TX packets:68200 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:181921769 (173.4 MiB)  TX bytes:11925161 (11.3 MiB)
          Interrupt:66 Memory:f0500000-f0520000

eth2      Link encap:Ethernet  HWaddr 00:1B:21:8B:56:03
          inet addr:10.0.0.3  Bcast:10.0.0.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:9000  Metric:1
          RX packets:26057 errors:14336 dropped:0 overruns:0 frame:14336
          TX packets:1324 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:118710116 (113.2 MiB)  TX bytes:102612 (100.2 KiB)
          Interrupt:169 Memory:f0680000-f06a0000

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
```

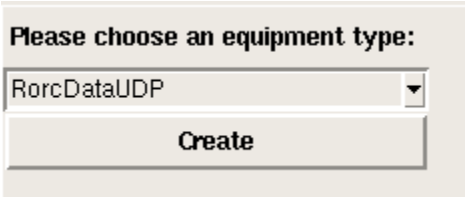
The picture shows that the computer has two active network cards. The Ethernet that is used to connect card has the IP "10.0.0.3" and is named *eth2*.

If you have other cards in SRS, you should enable the other UDPs according to your number of cards to enable connection and as it told before, you have to create alias for multiple connections. Please see the image below for second UDP settings.

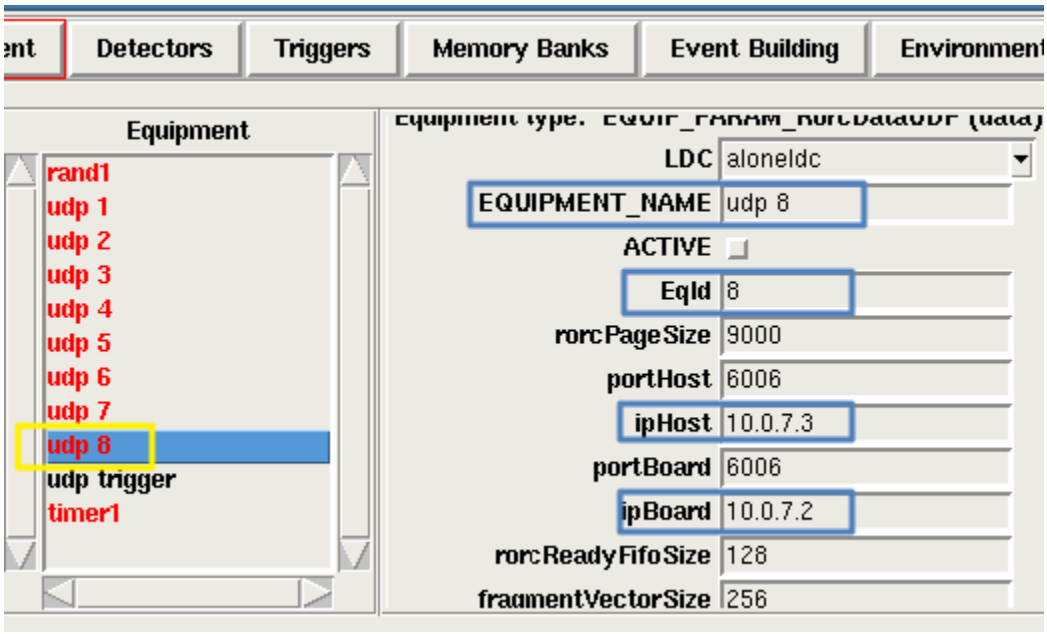


Please note that in the image, both *ipHost* and *ipBoard* addresses are changed. To configure one Ethernet for multiple cards please read Configuring Computer for Multiple Cards section.

It is possible to add more equipment by using *New* button. Choose *RorcDateUDP* to add new UDP connection equipment and click *Create*.

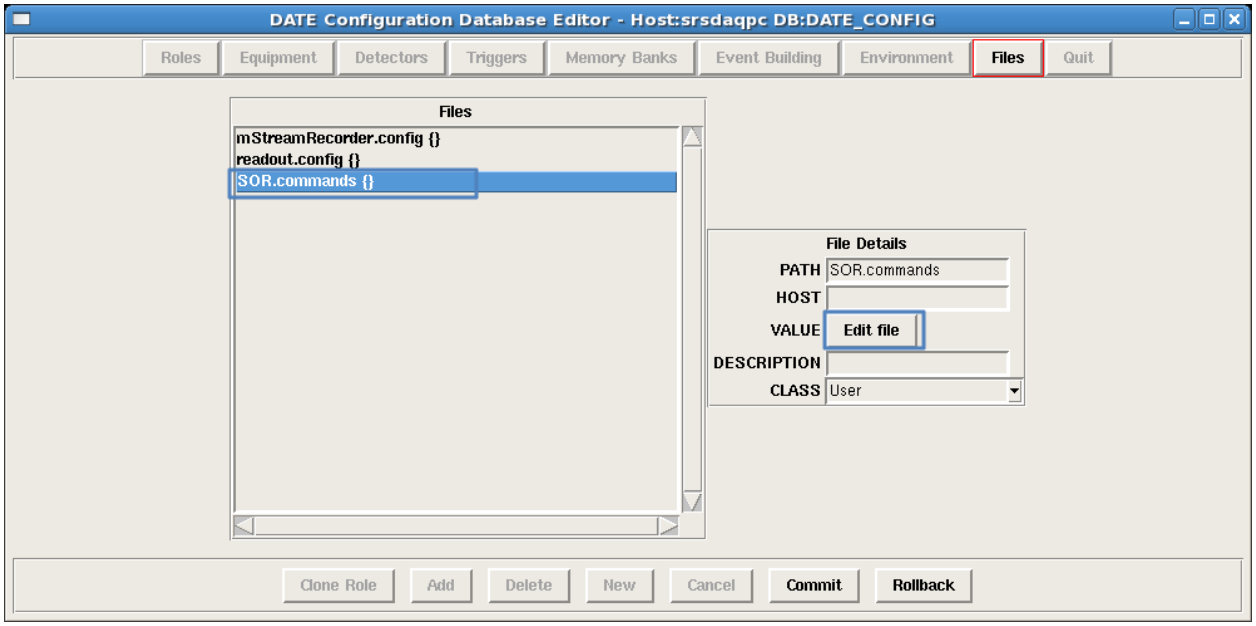


Enter an *EQUIPMENT_NAME* and an *EqId*. Change IP settings according to your card and click *Add*. Your new equipment will be listed on the left panel:

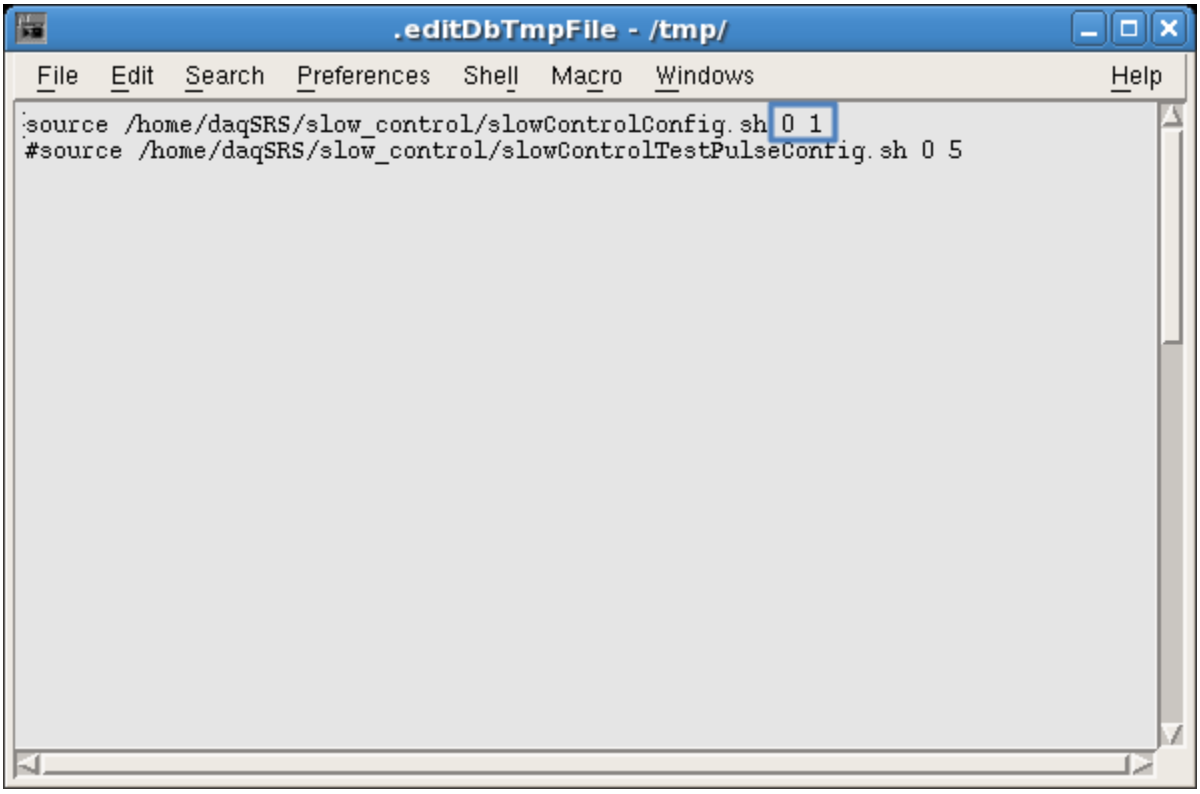


The newly added equipment will not be active after creation. You should activate before use.

Close the terminal and go to *Files* tab of database editor. Click on SOR.commands{} and *Edit file*.



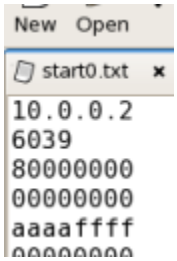
After edit file command the following editor will be shown.



The parameters (0 1) indicate the "first card" (0) and the "last card+1" (1) to connect. The picture above explains that only one card is to be connected. For example, typing 0 3 here would result in the connections to FEC cards "**0 1 2**." The IPs of these cards should be configured 10.0.**0**.2, 10.0.**1**.2 and 10.0.**2**.2, respectively. If the first card you connect does not have 10.0.0.2 IP address, you should also change the first parameter according to your card IP (e.g. "2 3" for having one card with IP 10.0.2.2).

If the file is changed, click *Commit* to save changes and enable other tabs. If you want to undo, click *Rollback* to discard changes.

Type `[srsdaqpc] /home/daqSRS/slow_control > gedit start0.txt` to start text editor with start0.txt.



Check the IP address at the first line. It must match the IP address that your destination card has.

See Appendix – Text Files for description of file.

DATE

The software framework of the ALICE DAQ is called DATE (ALICE Data Acquisition and Test Environment).

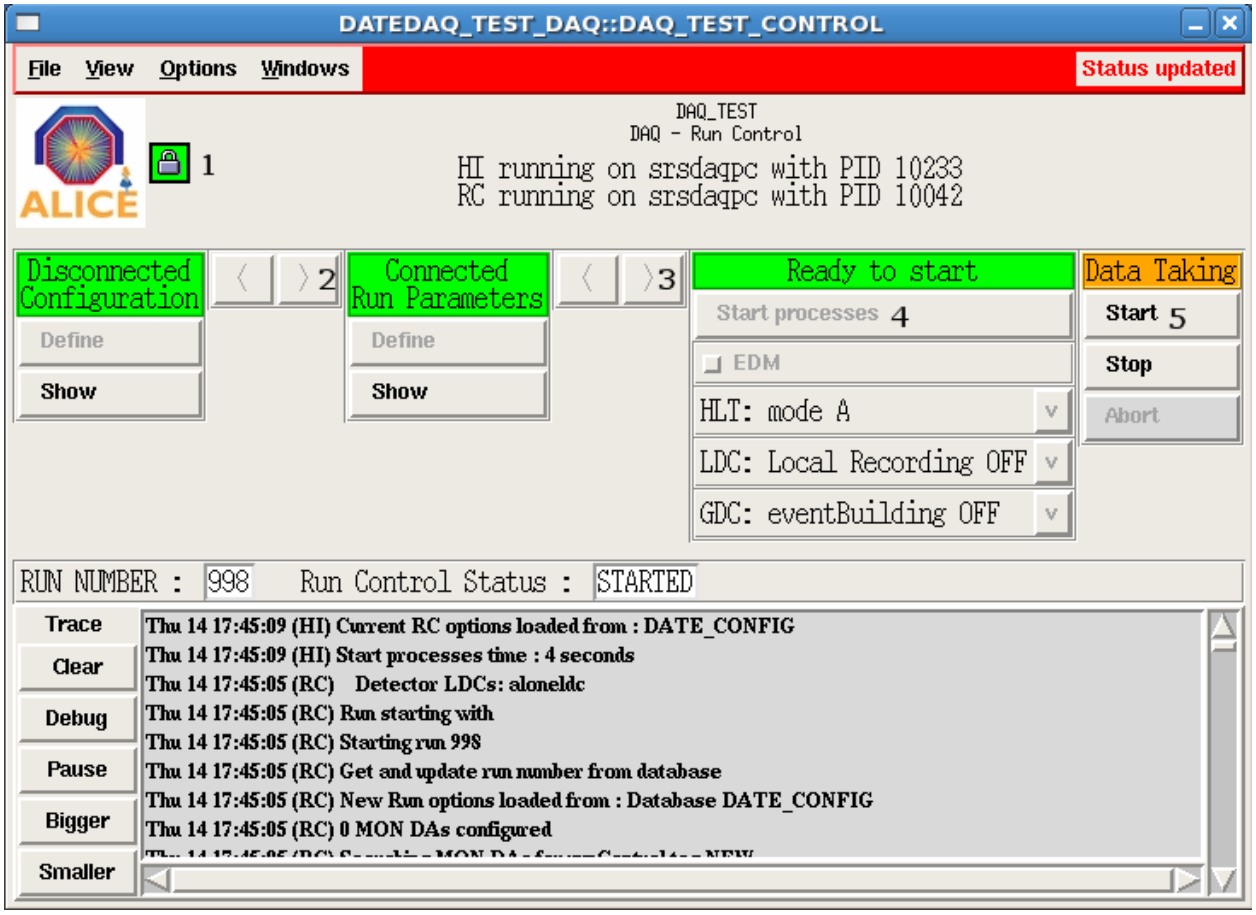
Connect the card to Ethernet port of computer and ping using terminal to check if the card is found by computer. If the IP address of card is 10.0.0.2 (default) use:

```
ping 10.0.0.2
```

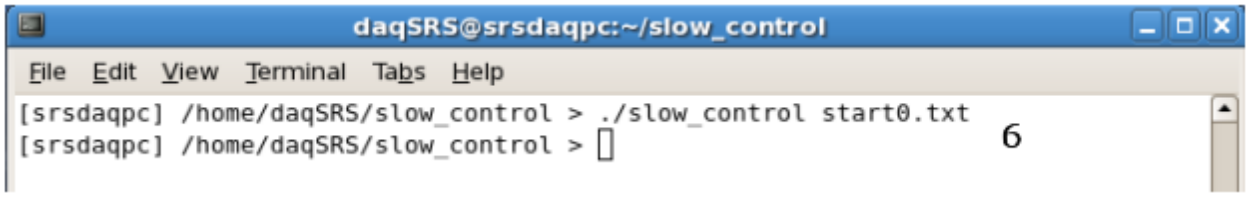
If you get any replies, the connection will be possible. If not:

- Check cable
- Check device is on (the lights inside SRS must be on)
- Check your Ethernet is configured. See above.
- Check Ethernet is active (You can activate Ethernet using System > Administrator > Network and choosing the ethernet you would like to use then clicking *Activate*.)

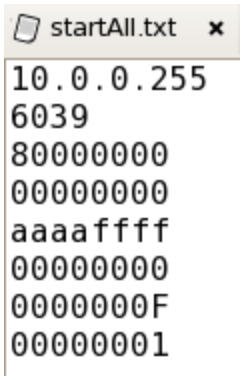
Start Data Taking



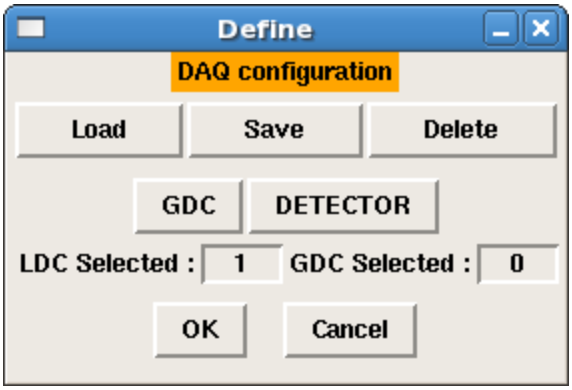
If the trigger is plugged in and settings are okay, starting data taking is possible by following 5 buttons above and later using the terminal to write:



(Note that the current directory is *home/daqSRS/slow_control* and *slow_control* has no file extension.)

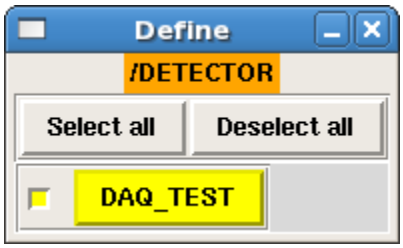


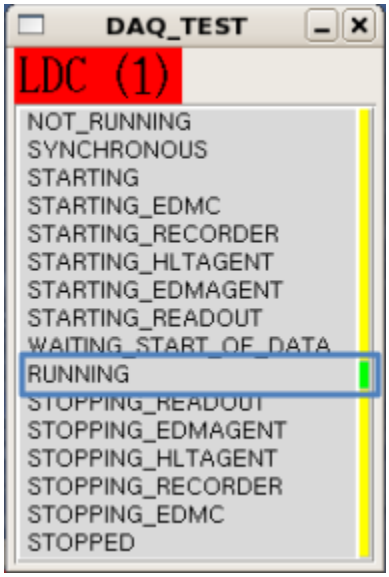
If you have multiple cards, you should start them at the same time to prevent errors. To start all cards type: *./slow_control startAll.txt*



After step 1, clicking *Define* in *Disconnected Configuration* shows the following dialog that helps select detectors:

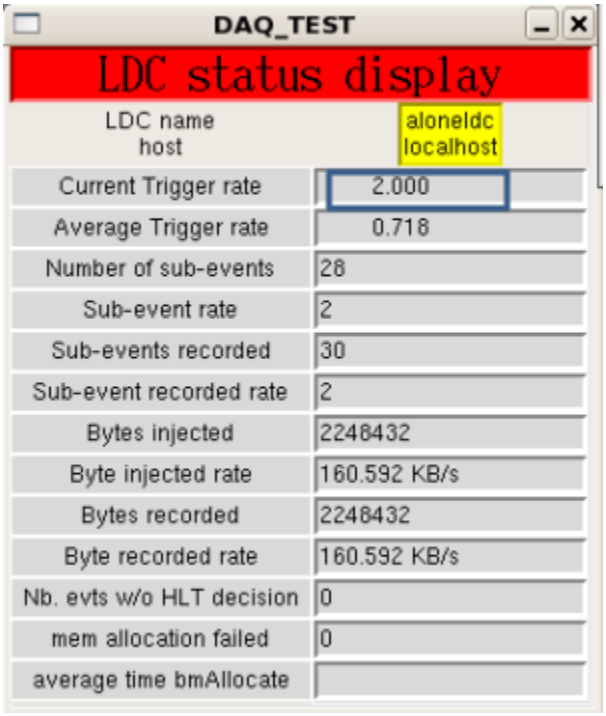
Clicking on *DETECTOR* will show the available detectors shown in the picture below:





After step 2, another window should show the current status of LDC (Local Data Concentrator). On the left, LDC is running (the picture is taken after step 4):

Current Trigger Rate should increase on *LDC Status Display* window (see below). See using data. If you do not see any changes, make sure is trigger plugged in and see Date Configuration.



Stop Data Taking

To stop data taking:

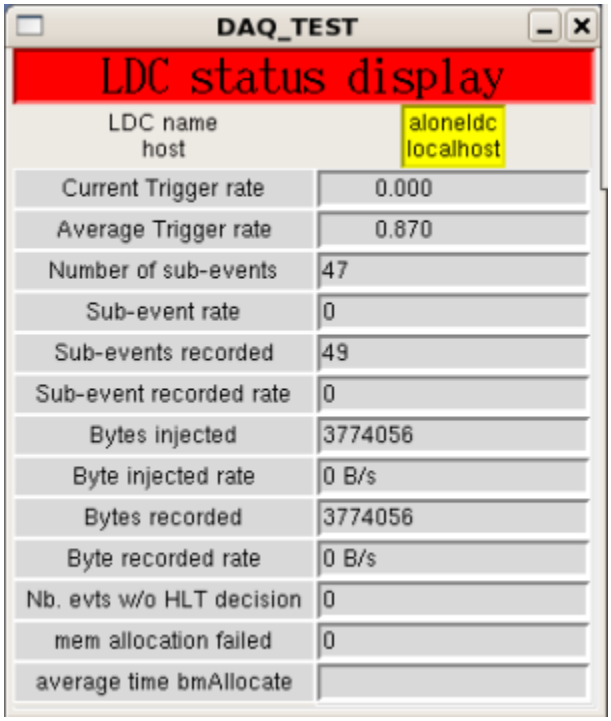
If you have one card, first, type the following:

```
[srsdaqpc] /home/daqSRS/slow_control > ./slow_control stopTest.txt
[srsdaqpc] /home/daqSRS/slow_control >
```

at the same directory.

If you have multiple cards type: *./slow_control stopAll.txt*

The LDC status display should show that current trigger rate is decreasing:



Then click *Stop* on main window of DATE. It is possible to leave trigger plugged in.

Using Data

The taken data can be seen on-the-fly or can be written to file. To see available commands with dump data just type:

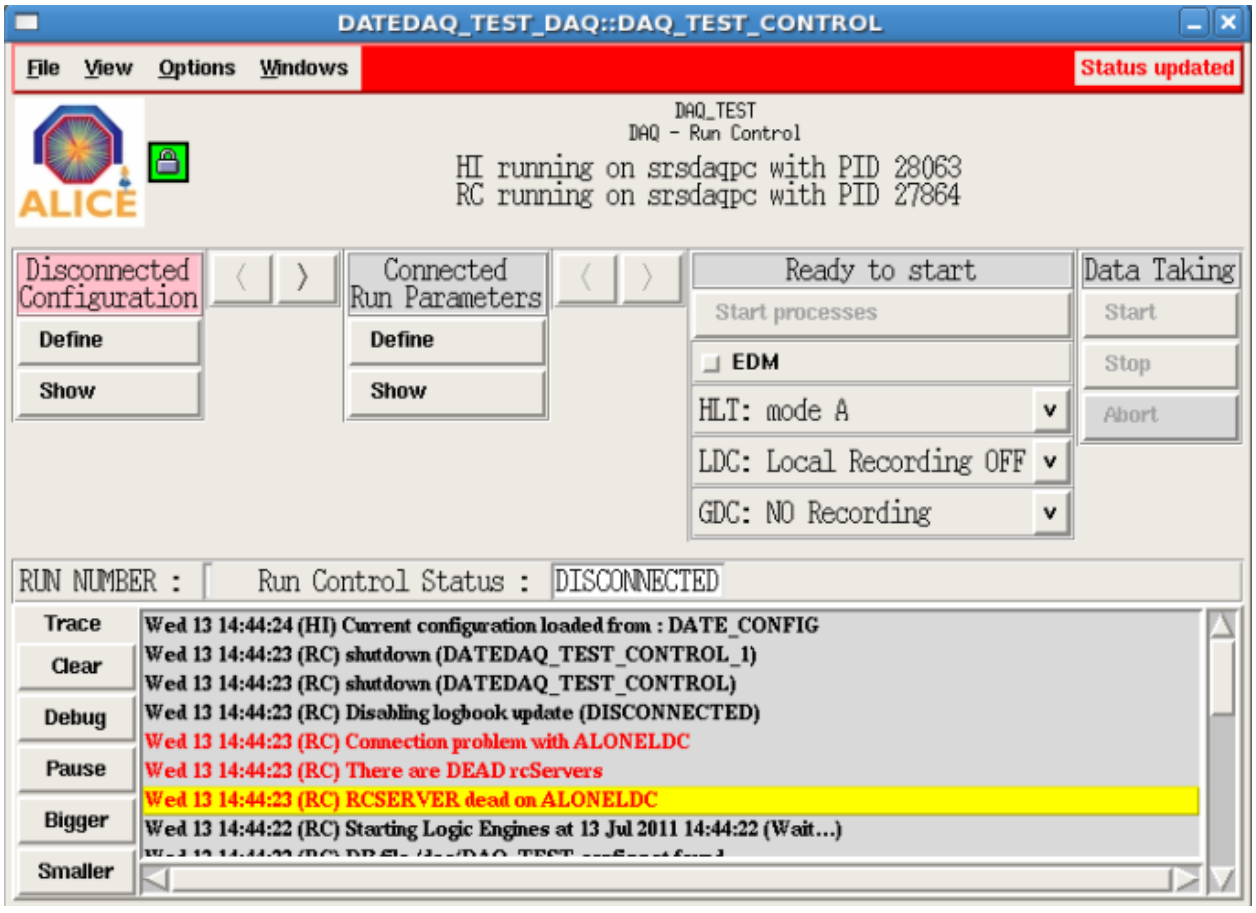
```
[srsdaqpc] /home/daqSRS > eventDump @aloneldc: -h
Usage: /date/monitoring/Linux/eventDump [-b][-c][-s][-a][-i][-N #][-f "filename"
][-n number][-t "table"][-T "table"][-# [b|t|n|e]number] dataSource
        -b: brief output (skip long events)
        -S: silent
        -c: check event data
        -s: use static data buffer
        -a: use asynchronous reads
        -i: interactive
        -N: use the given timeout (Network only)
        -f: write selected events to raw file
        -n: maximum number of events to process
        -t: monitoring table to be used (e.g. -t "ALL yes SOB no")
        -T: as "-t" but the table is extended
                (e.g. -T "All yes 1 4 Phy y 1 5|2 SOB NO 1&5 3")
        -e: dump content of equipment header
        -D: dump content of common data header (implies "-e")
        -#: wait for given event
                (b:bunchCrossing o:orbit e:orbit-bunchCrossing <nothing>:serial
number)
```

The *aloneldc* on the command parameter is the name of the LDC that is also shown on the *LDC Status display* window.

Type `[srsdaqpc] /home/daqSRS > eventDump @aloneldc:` to dump all events on the terminal (Use Ctrl+C to stop). Below, find some commands to use the data:

Command	Description
eventDump @aloneldc: | less	Show data until screen fills. Press enter or space to see more.
eventDump @aloneldc: -f /tmp/data -n 1000	Save first 1000th data after executing the command into binary file named *data* in folder /tmp/
eventDump /tmp/data > /tmp/data_ascii	Convert data binary file into data_ascii format to make readable.

Common Errors



The picture above shows that the *destination is unreachable*. It may be turned off or configured incorrectly.

If you are having problems with getting data or the log has red entries, the DATE might encounter error(s).

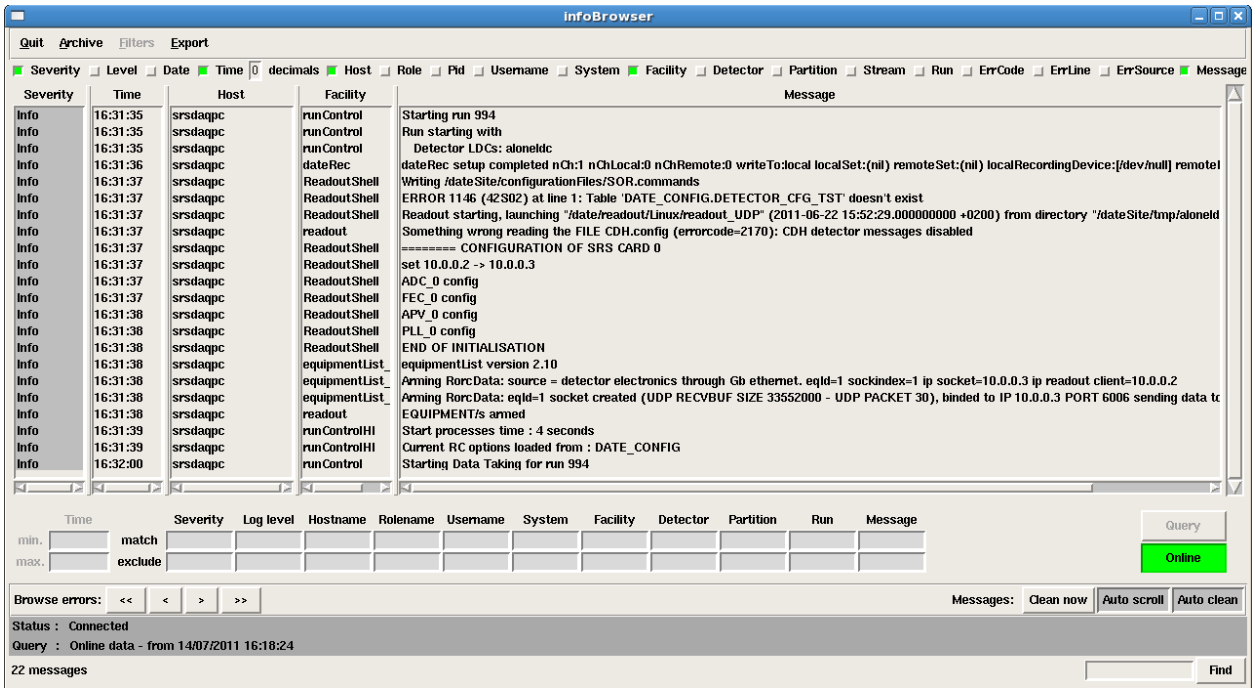
The easiest way to solve connection problem errors is to check the configuration of your Ethernet and DATE configuration.

If you can contact the SRS, but cannot receive any data, the port you are trying to connect can be blocked. Try to disable firewall by typing: */etc/init.d/iptables stop*. This will allow all ports to be reachable (You need super user privileges to disable firewall). The firewall will be enabled automatically after rebooting the system.

```
[srsdaqpc] / > /etc/init.d/iptables stop
Unloading iptables modules:                                [FAILED]
rm: cannot remove `/var/lock/subsys/iptables': Permission denied
[srsdaqpc] / > su
Password:
[srsdaqpc] / > /etc/init.d/iptables stop
Flushing firewall rules:                                   [  OK  ]
Setting chains to policy ACCEPT: filter                    [  OK  ]
Unloading iptables modules:                                [  OK  ]
[srsdaqpc] / >
```

You can use Wireshark to check if packets are being sent by your computer and/or the card. To run Wireshark type *wireshark* on the terminal. Wireshark needs su password to run. If you are using a switch, it is also possible to understand that data taking is started via blinking switch leds.

The details about errors can be seen by typing *infoBrowser*. InfoBrowser also logs all messages including errors. By default, it is enabled. If not, click *Online* to activate. Using *infoBrowser*, you can also export messages and make searches for previous messages. Making it offline enables to filter the messages by filling the fields at the bottom of the window.



(infoBrowser Main Window)

If you receive "*not responding error*" like the picture below you should check your network settings and UDP configuration in *editDb*. You should also check *SOR.Commands* file to make sure that available cards in SRS are between parameter range.

Info	16:20:11	srsdaqpc	equipmentList_	equipmentList version 2.10
Info	16:20:11	srsdaqpc	equipmentList_	Arming RorcData: source = detector electronics through Gb ethernet. eqId=1 soc
Info	16:20:11	srsdaqpc	equipmentList_	Arming RorcData: eqId=1 socket created (UDP RECVBUF SIZE 33552000 - UDP P
FATAL	16:20:13	srsdaqpc	equipmentList_	Arming RorcData: (ERROR 12204) the readout board (10.0.0.2) is not responding
ERROR	16:20:13	srsdaqpc	readout	Error 12204 in routine ArmHw active equipment 2
FATAL	16:20:13	srsdaqpc	readout	Fatal error in SOR phases, see details above
ERROR	16:20:14	srsdaqpc	runControl	READOUT start phase timeout on ALONELDC
Info	16:20:14	srsdaqpc	runControl	Aborting from STARTING_LDCS...
Info	16:20:15	srsdaqpc	recorder	recorder exited with status: 0
Info	16:20:16	srsdaqpc	runControl	Disabling logbook update (STOPPED)
Info	16:20:16	srsdaqpc	runControl	Run stopped
Info	16:20:16	srsdaqpc	runControlHI	Current RC options loaded from : DATE_CONFIG

(Not responding error)

If you are getting *Trigger Lost* error, you might not have been started the cards at the same time. Try to stop data taking using *StopAll.txt*. On the main window of DATE, click *Start Processes* and start the data taking again then use *startAll.txt* file.

Info	16:16:35	srsdaqpc	runControl	Starting Data Taking for run 1038
ERROR	16:16:43	srsdaqpc	equipmentList_	Event received by 1
ERROR	16:16:43	srsdaqpc	equipmentList_	Event received by 2
ERROR	16:24:35	srsdaqpc	equipmentList_	Trigger Lost STOP THE RUN
FATAL	16:24:35	srsdaqpc	readout	Readout asks to stop the run: Error 12354 in routine ReadEvent active equipment 2
ERROR	16:24:35	srsdaqpc	rcServer	ALONELDC-End of run requested with error
ERROR	16:24:35	srsdaqpc	runControl	END_of_RUN request with ERROR received by Logic Engine
Info	16:24:35	srsdaqpc	runControl	Run 1038 - DAQ_TEST - started 20 Jul 2011 16:16, stopped 20 Jul 2011 16:24

If you are getting "*LOCKEDBY*" error, try to restart DATE again.

ERROR	16:44:55	localhost	runControl	rcServer aloneldc is LOCKEDBY=SERVICE(DATEDAQ_TEST_DAQ::DAQ_TEST_CONTROL_PID&10042@srsdaqpc)
ERROR	16:44:55	localhost	runControl	Bad DAQ configuration
ERROR	16:44:55	localhost	runControl	Try to get access to the locked rcServers
Info	16:44:57	localhost	runControl	OBJ: DATE_RCSERVERS::ALONELDC_FWM is locked by 10042@srsdaqpc
Info	16:45:07	localhost	runControl	Connecting to aloneldc
ERROR	16:45:07	localhost	runControl	rcServer aloneldc is LOCKEDBY=SERVICE(DATEDAQ_TEST_DAQ::DAQ_TEST_CONTROL_PID&10042@srsdaqpc)
ERROR	16:45:07	localhost	runControl	Bad DAQ configuration - Cannot get locked rcServers

If you are getting "*No data generating equipment*" error, you do not have active equipments. Activate using *editDb* and *Equipments* tab.

Info	10:42:02	srsdaqpc	ReadoutShell	END OF INITIALISATION
ERROR	10:42:02	srsdaqpc	readout	Error 11 in routine ArmHw - No data generating equipment
FATAL	10:42:02	srsdaqpc	readout	Fatal error in SOR phases, see details above
ERROR	10:42:02	srsdaqpc	runControl	READOUT start phase timeout on ALONELDC
Info	10:42:02	srsdaqpc	runControl	Aborting from STARTING_LDCS...

Appendix – Text Files

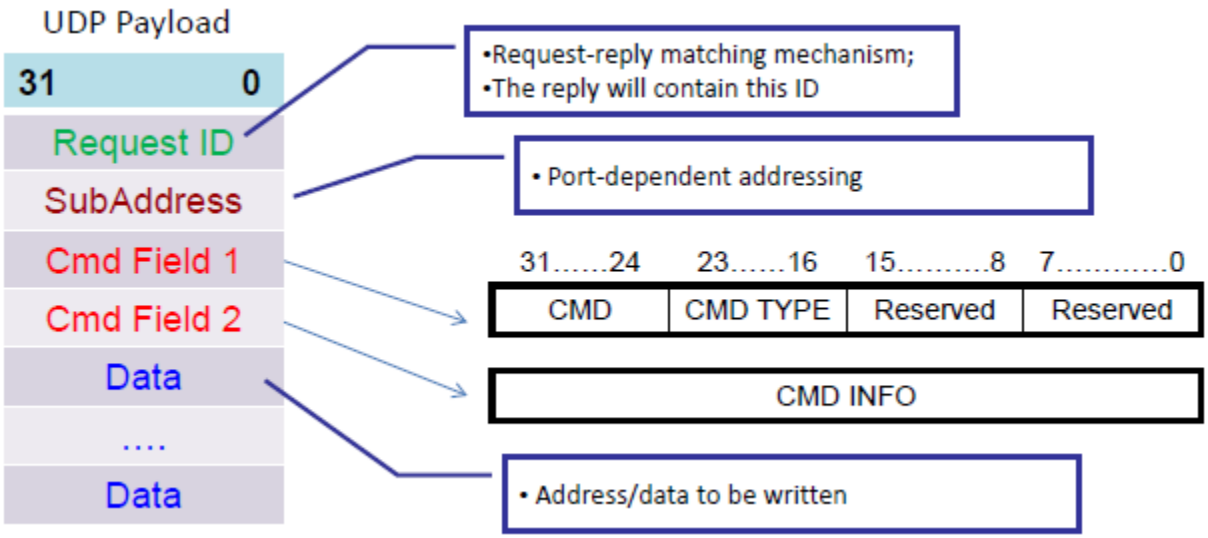
In this chapter, the structure of a text file will be explained briefly.

The following text file has SCS request format and used to start first card:

Line 1: Destination IP address

Line 2: Port number to be connected

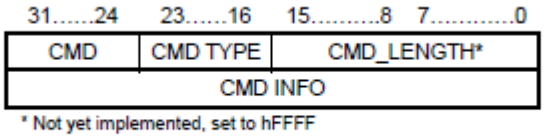
The following lines after 2nd have 32-bit length.



The *Request ID* is used to match the request with reply.

SubAddress has to be written if the port requires this address. See below.

For *Cmd Field 1* and *2* see the picture below:



* Not yet implemented, set to hFFFF

Command	CMD (hex)	CMD TYPE (hex)	CMD INFO	Description
Write Pairs	AA	AA	Not used	Command is followed by address & data pairs
Write Burst	AA	BB	First address to write to	Followed by data fields to be written at consecutive addresses starting with tge address in CMD INFO field
Read Burst	BB	BB	First address to be read	Not yet implemented
Read Pairs	BB	AA	Not used	Not yet implemented
Reset				Not yet implemented

For instance, to write pairs it is needed to write AAAA for 31…16 and FFFF for 15...0 (since *CMD_LENGTH* is not implemented).

Since *CMD info* is not used for write pair command, it is possible to write 00000000 (8xzeros) for *Cmd field 2.*

Since the *write pairs* command is followed by address & data pairs, you could give registers addresses and values to change their values.

The port we are currently using in DATE is 6039.

Name	Port (hex)	Port (dec)	Use	I/F type	Description	User level
APVAPP_PORT	1797	6039	runtime	reg	APV Application registers. APV trigger sequencer and event builder	user

The following table shows the register addresses after connection to 6039 port:

APV Application Registers (port 6039)

Subaddress : not used (anything)

Name	Address (hex)	Byte count	default	Description	Fw. ver.
BCLK_MODE	00	1	b00000111 (0x7)	Controls the trigger sequencer for the APV. See table below for details	
BCLK_TRGBURST	01	1	4	controls how many time slots the APV chip is	

				reading from its memory for each trigger	
BCLK_FREQ	02	2	40000 (0x9C40)	Period of the trigger sequencer.	
BCLK_TRGDELAY	03	2	256 (0x100)	Delay between the external/internal trigger and the APV trigger	
BCLK_TPDELAY	04	2	128 (0x80)	Delay between the external/internal trigger and the APV test-pulse	
BCLK_ROSYNC	05	2	300 (0x12C)	Delay between the external/internal trigger and the start of data recording	
EVBLD_CHMASK	08	2	0xFFFF	Channel mask for the data transmission. Even bits are masters and odd bits are slaves	
EVBLD_DATALENGTH	09	2	3000 (0x0BB8)	Length of the data capture window	
EVBLD_MODE	0A	1	0	Event Builder mode register. Bit 0 = use 32-bit framecounter Bit 1 = use 24-bit timestamp	2.05
EVBLD_EVENTINFOTYPE	0B	1	0	Controls the data format.	
EVBLD_EVENTINFODATA	0C	4	0xAABB0BB8	Data for the optional info-filed in the data format	
RO_ENABLE	0F		0	Readout Enable register (bit 0). Triggers are accepted for acquisition when this bit is 1	2.01
RST_REG	FFFFFFFF			Reset register. Bit 0 = APV sync reset	2.02

The *start0.txt* file and descriptions as text (starting from the first line):

1. Destination IP: 10.0.0.2
2. Connection port: 6039 (decimal)
3. Request ID: 10000000000000000000000000000000 (2^{31})
4. Subaddress: 0 (anything for this port)
5. Command: Write pairs: aa-aa-ffff (cmd-cmd type-cmd length)
6. Cmd info: 0 (not used for this command)
7. Address of register: 0F (RO_ENABLE, See table above)
8. Value of register: 1 (Triggers are accepted for acquisition)

See below for all available port connections[1]:

Name	Port (hex)	Port (dec)	Use	I/F type	Description	User level
SYS_PORT	1777	6007	runtime	reg	System registers. Dynamic control of IP	expert

					address, MAC address, GbE parameters, ...	
FEC_BI2C_PORT	1787	6023	debug setup	I2C	Access to the FEC I2C line B. Used to program the on-board EEPROM	expert
APVAPP_PORT	1797	6039	runtime	reg	APV Application registers. APV trigger sequencer and event builder	user
APV_PORT	1877	6263	runtime	I2C	Access to the I2C registers of the APV chip	user
ADCCARD_PORT	1977	6519	runtime	I2C	I2C registers of the ADC CCARD.	user

[1]Source: SRS Slow Control Manual