DATE for SRS

Getting Started Manual

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					HI runn RC runn	ing (ing (DA DAQ - 1 ON STS ON STS	Q_TEST Run Control Íagpc with PID 10233 Íagpc with PID 10042	
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								GDC: eventBuilding OFF 🔽	
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v1.0

Notice: PRE-RELEASE for comments

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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.



SC IP/UDP Reply/Error

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.

<u>File E</u> dit <u>V</u> iew <u>T</u> erminal Ta <u>b</u> s <u>H</u> elp	Ethernet Device 🗙
<pre>[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 UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1 RX packets:1497200 errors:0 dropped:0 overruns:0 frame:0 TX packets:215453 errors:0 dropped:0 overruns:0 carrier:0 collisions:0 txqueuelen:1000 RX bytes:326149955 (311.0 M1B) TX bytes:26079549 (24.8 M1B) Interrupt:66 Memory:f0500000-f0520000</pre>	General Route Hardware Device Nickname: etin2 Ø Activate device when computer starts Allow all users to enable and disable the device Enable IPv6 configuration for this interface
<pre>th2 Link encap:Ethernet HWaddr 00:1B:21:8B:56:03 inet add: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:1433 TX packets:1731 errors:0 dropped:0 overruns:0 carrier:0 collisions:0 txqueuelen:1000 RX bytes:1723014350 (1.6 G1B) TX bytes:184474 (180.1 K1B) Interrupt:169 Memory:f0680000-f06a0000</pre>	 O Automatically obtain IP address settings with: dhcp \$ DHCP Settings- Hostname (optional): ✓ Automatically obtain DNS information from provider O Statically set IP addresses:
<pre>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:10587137 errors:0 dropped:0 overruns:0 frame:0 TX packets:10587137 errors:0 dropped:0 overruns:0 carrier:0 collisions:0 txqueuelen:0 RX bytes:982577963 (937.0 MiB) TX bytes:982577963 (937.0 MiB)</pre>	Manual IP Address Settings Address: 10.0.0.3 Subnet mask: 255.255.255.0 Default gateway address:
[srsdaqpc] / > []	✓ Set MTU to: 9000 ♀ □ Set MRU to: 0 ♀ ✓ Set MRU to: ●

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: [0680000-[06a0000
```

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 <u>editDb</u>). 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	<pre>] /home/daqSRS/slow_control > /sbin/ifconfig eth2:0 10.0.1.3 netmask 255.255.255.0 1 /home/daqSBS/slow_control > /sbin/ifconfig</pre>
othe	ink energy Ethornot Weddr 79:E7:D1:CA:CB:66
ecno	Link encapierinet industry of 27.01. CALE NO
	110 DOADCASE DUMUNE MUTTALE MULLIGAA MARKADA
	OF BROADCAST RONNING HOLITCAST MID:1340 MECTIC:1
	RX packets:35437 errors:0 dropped:0 overruns:0 trame: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: 10680000-10620000
eth2:0	Link encap:Ethernet HWaddr 00:18:21:88:56:03
	ind addrild A 1 3 React 1A A 1 255 Mack 255 255 255 A
	IIID ROADCAST DINNING MILITICAST MILIGAA Metricii
	Transmithing House and According to Solo Metricia
	TUT6LLADT: T03 MemolA: 10080000-10090000

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 <u>Date Configuration</u>.

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.

	DATE C	onfiguration	Database	e Editor - Host	:srsdaq	pc DB:DA	TE_CONFIG		_	
Roles	Equipment	Detectors	Triggers	Memory Banks	Eve	nt Building	Environment	Files	Quit	
LDCs		Equipment			LDC	aloneldc				
aloneldc	A ra	nd1 lp 1		EQUIPMEN	IT_NAME ACTIVE	judp 1				
	ud	թ.Հ p3 n4		rorc	EqId Page Size	1 9000				
	ud	1p 5 1p 6		_	portHost	6006				
	ud ud	p 7 Ip trigger		L L	ortBoard	6006		1		
	tin	ner1		rorc Read	ipBoard v Fifo Size	10.0.0.2		1		
				fragmentV	ectorSize	256				$\overline{\Delta}$
	Clone	Role Add	Delet	te New	Cancel	Commi	t Rollback			

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:

Tr	ue	False		
Card	PC	Card	PC	
10.0. <mark>0</mark> .2	10.0. <mark>0</mark> .3	10.0.0.2	10.0. <mark>1.2</mark>	
10.0.5.2	10.0.5.3	10.0.0. <mark>3</mark>	10.0. <mark>2</mark> .3	
10.0.10.2	10.0.10.3	10. <mark>1</mark> .0.2	10. <mark>1</mark> .0.3	
10.0.3.2	10.0.3.3	10.0.3. <mark>3</mark>	10.0.3. <mark>2</mark>	

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

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

[srsdag	pc] / > /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 enca <u>p:Etherne</u> t 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)	1000
	Interrupt:169 Memory:f0680000-f06a0000	=
10	Link encap:Local Loopback	100
	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 10.0.3 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 <u>before</u>, you have to create alias for multiple connections. Please see the image below for second UDP settings.

DATE Configuration	on Databas	e Editor - Host:sr	sdaqpc DB:DA1	E_CONFIG		. DX
Roles Equipment Detectors	Triggers	Memory Banks	Event Building	Environment	Files Quit	
LDCs Equipmer	it	Equ Equipment type: EQL	iipment Details JIP_PARAM_RorcDa LDC aloneIdc	ataUDP (data)		
udp 3 udp 4 udp 5 udp 5			IAME udp 2			
udp 7 udp trigger timer1		rorc Pag por	eSize 9000 tHost 6006			
		porti ipi	Board 6006 Board 10.0.1.2			
		rorc Ready Fif fragmentVecto	oSize 128 rSize 256			
		fragmentReadyFif expectedCdHVe consistencyCheck	oSize 16 ersion 2 Level 0			
Clone Role A	dd Dela	consistencyCheckPa ete New C	ancel Commi	t Rollback		

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

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

Please choose an equipment type:
RorcDataUDP 💌
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:

ent	Detectors	Triggers	Memory Banks	Eve	nt Building	Environmen
	Fauinment	•	сциршень куре. см	יור_רי	ากุลฺฺฺุณุา	υαιανντ (μαια)
	and1			LDC	aloneldc	•
	dp 1		EQUIPMENT_	NAME	udp 8	
u	dp 2		A	CTIVE		
u	dp 3		Г	Eqid	8	
u	dp4 dn5		rorcPag	1e Size	9000	
u	dp6		109	rtHost	6006	
u	dp 7		L. L	pHost	10.0.7.3	
u	dp 8		port	Board	6006	
u ti	dp trigger meri		in	Board	10072	
\exists			mr ReadvEi	foSize	128	
K	1		fragmentVect	nrSize	256	

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*.

Roles Equipment Detectors Triggers Memory Banks Event Building Environment Files Quit	TE Configuration Database Editor - Host:srsdaqpc DB:DATE_CONFIG	_ • ×
	nt Detectors Triggers Memory Banks Event Building Environment Files	s Quit
Files mStreamRecorder.config {} readout.config {} SOR.commands () File Details PATH SOR.commands HOST VALUE Edit file DESCRIPTION CLASS User	Files nRecorder.config {} config {} mmands {} PATH SOR.commands HOST VALUE Edit file DESCRIPTION CLASS User	

After edit file command the following editor will be shown.

.editDbTmpFile - /tmp/	
<u>File Edit Search Preferences Shell Macro Windows</u>	<u>H</u> elp
<pre>source /home/daqSRS/slow_control/slowControlConfig.sh 0 1 #source /home/daqSRS/slow_control/slowControlTestPulseConfig.sh 0 5</pre>	

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.

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

Start0.txt ★ 10.0.0.2 6039 80000000 00000000 aaaaffff 00000000

See <u>Appendix – Text Files</u> 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. <u>See above</u>.
- 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

		DATED	AQ_TEST_DAQ::D	AQ_TEST_CONTROL	_×_
<u>F</u> ile <u>V</u> iev	/ <u>O</u> ptions	<u>W</u> indows			Status updated
	<mark>/</mark> 1		u HI running on RC running on	DAQ_TEST HAQ - Run Control srsdaqpc with PID 10233 srsdaqpc with PID 10042	
Disconn Configur	ation	$2 \frac{Cor}{Run P}$	arameters	3 Ready to start Start processes 4	Data Taking Start 5
Define		Defir	ne	EDM	Stop
Show		Show	v	HLT: mode A 🗸 🗸	Abort
				LDC: Local Recording OFF v	
				GDC: eventBuilding OFF 🗸 v	Ī
RUN NUME	ER : 998	Run Contr	rol Status : STA	RTED	
Trace	Thu 14 17:4	45:09 (HI) Current H	RC options loaded from :	DATE_CONFIG	\Box
Clear	Thu 14 17:4 Thu 14 17:4	45:09 (HI) Start pro 45:05 (RC) Detect	cesses time : 4 seconds or LDCs: aloneldc		
Debug	Thu 14 17:4	45:05 (RC) Run star 15:05 (RC) Starting	ting with 998		
Pause	Thu 14 17:4	45:05 (RC) Get and	update run number from (database	
Bigger	Thu 14 17:4 Thu 14 17:4	45:05 (RC) New Ru 45:05 (RC) 0 MON I	n options loaded from : D)As configured	Database DATE_CONFIG	
Smaller		18.08 /D/% 01	- MON DA-6		

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:

	daqSRS@srsdaqpc:~/slow_control		
<u>F</u> ile	<u>E</u> dit <u>V</u> iew <u>T</u> erminal Ta <u>b</u> s <u>H</u> elp		
[srs [srs	daqpc] /home/daqSRS/slow_control > ./slow_control start0.txt daqpc] /home/daqSRS/slow_control > []	6	

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



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:

🗖 Def	ine (_X)	
/DET	ECTOR		
Select all Desel		ત્રા	
	EST		aloneldc



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 <u>using data</u>. If you do not see any changes, make sure is trigger plugged in and see Date <u>Configuration</u>.

DAQ_TI	EST _X
LDC status	s display
LDC name host	aloneldc localhost
Current Trigger rate	2.000
Average Trigger rate	0.718
Number of sub-events	28
Sub-event rate	2
Sub-events recorded	30
Sub-event recorded rate	2
Bytes injected	2248432
Byte injected rate	160.592 KB/s
Bytes recorded	2248432
Byte recorded rate	160.592 KB/s
Nb. evts w/o HLT decision	0
mem allocation failed	0
average time bmAllocate	

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:

DAQ_TI	EST _X
LDC status	s display
LDC name host	aloneldc localhost
Current Trigger rate	0.000
Average Trigger rate	0.870
Number of sub-events	47
Sub-event rate	0
Sub-events recorded	49
Sub-event recorded rate	0
Bytes injected	3774056
Byte injected rate	0 B/s
Bytes recorded	3774056
Byte recorded rate	0 B/s
Nb. evts w/o HLT decision	0
mem allocation failed	0
average time bmAllocate	

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 1000 th data after executing the command into binary file named <i>data</i> in folder /tmp/
eventDump /tmp/data > /tmp/data_ascii	Convert data binary file into data_ascii format to make readable.

Common Errors

			L.	ATEDAQ_TEST_	DAQ::DAQ_	TEST_CONTROL	
<u>F</u> ile	<u>V</u> iew	<u>O</u> ptions	<u>W</u> indows				Status updated
		<u></u>		HI runn RC runn	DAQ - IAQ on srs ing on srs	ao_TEST Run Control daqpc with PID 28063 daqpc with PID 27864	
Disc	onnec	ted	$\left \right\rangle$	Connected	$\langle \rangle$	Ready to start	Data Taking
Loni	igura	<u>110n</u>		Run Parameters		Start processes	Start
Der	ine	_		Define		_ EDM	Stop
Sho	w			Show		HLT: mode A 🗸	Abort
						LDC: Local Recording OFF v	<u> </u>
						GDC: NO Recording •	ĺ
RUN	NUMBE	R:[Run Cor	ntrol Status :	DISCONNECT	ED	
Tra	ice	Wed 13 14:	44:24 (HI) (Current configuration l	oaded from : D#	ATE_CONFIG	
Cle	ar	Wed 13 14: Wed 13 14:	44:23 (RC) : 44:23 (RC) :	shutdown (DATEDAQ shutdown (DATEDAO	TEST_CONTI TEST_CONTI	ROL_1) ROL)	
Del	bug	Wed 13 14:	44:23 (RC)	Disabling logbook upda	ate (DISCONNE	CTED)	_
Pa	use	Wed 13 14: Wed 13 14:	44:23 (RC) (44:23 (RC) (Connection problem w There are DEAD rcSe	ith ALONELDC		
Die		Wed 13 14:	44:23 (RC)	RCSERVER dead on A	LONELDC		
Big	ger	Wed 13 14:	44:22 (RC) :	Starting Logic Engines	at 13 Jul 2011 1	(4:44:22 (Wait)	
Sm	aller	\triangleleft					

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). DATE for SRS Volkan Gezer – volkangezer@gmail.com *The easiest way to solve connection problem errors* is to check the <u>configuration of your Ethernet</u> and <u>DATE configuration</u>.

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:	[F/	AILE	D]			
rm: cannot remove `/var/lock/subsys/iptables': Permission denied						
[srsdaqpc] / > su						
Password:						
[srsdaqpc] / > /etc/init.d/iptables stop						
Flushing firewall rules:	[0K]			
Setting chains to policy ACCEPT: filter	[0K]			
Unloading iptables modules:	[0K]			
[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 🖉 🗖 🗙					
<u>Q</u> uit <u>A</u> rchi	Quit Archive Filters Export					
Severity	_ Level _	Date 👅 Time 🚺 deci	mals 👅 Host 🔄	 Role 🔄 Pid 🔄 Username 🔄 System 📕 Facility 🔄 Detector 🔄 Partition 📑 Stream 🔄 Run 📑 ErrCode 📑 ErrLine 📑 ErrSource 🖡	Message	
Severity	Time	Host	Facility	Message		
Info	16:31:35	srsdagne	run Control	Starting run 994	— T	
Info	16:31:35	srsdagne	runControl	Bun starting with		
Info	16:31:35	srsdagpc	runControl	Detector LDCs: aloneldc		
Info	16:31:36	srsdagpc	dateRec	dateRec setup completed nCh:1 nChLocal:0 nChRemote:0 writeTo:local localSet:(nil) remoteSet:(nil) localRecordingDevice:[/dev/null] re	emotel	
Info	16:31:37	srsdagpc	ReadoutShell	Writing /date Site/configuration Files/SOR.commands		
Info	16:31:37	srsdagpc	ReadoutShell	ERROR 1146 (42S02) at line 1: Table DATE CONFIG.DETECTOR CFG TST doesn't exist		
Info	16:31:37	srsdagpc	ReadoutShell	Readout starting, launching "/date/readout/Linux/readout UDP" (2011-06-22 15:52:29.000000000 +0200) from directory "/dateSite/tmp/a	aloneld	
Info	16:31:37	srsdaqpc	readout	Something wrong reading the FILE CDH.config (errorcode=2170): CDH detector messages disabled		
Info	16:31:37	srsdaqpc	ReadoutShell	====== CONFIGURATION OF SRS CARD 0		
Info	16:31:37	srsdaqpc	ReadoutShell	set 10.0.0.2 -> 10.0.0.3		
Info	16:31:37	srsdaqpc	ReadoutShell	ADC_0 config		
Info	16:31:37	srsdaqpc	ReadoutShell	FEC_0 config		
Info	16:31:38	srsdaqpc	ReadoutShell	APV_0 config		
Info	16:31:38	srsdaqpc	ReadoutShell	PLL_0 config		
Info	16:31:38	srsdaqpc	ReadoutShell	END OF INITIALISATION		
Info	16:31:38	srsdaqpc	equipmentList_	equipmentList version 2.10		
Info	16:31:38	srsdaqpc	equipmentList_	Arming RorcData: source = detector electronics through Gb ethernet. eqld=1 sockindex=1 ip socket=10.0.0.3 ip readout client=10.0.0.2		
Info	16:31:38	srsdaqpc	equipmentList_	Arming RorcData: eqId=1 socket created (UDP RECVBUF SIZE 33552000 - UDP PACKET 30), binded to IP 10.0.0.3 PORT 6006 sending d	data te	
Info	16:31:38	srsdaqpc	readout	EQUIPMENT/s armed		
Info	16:31:39	srsdaqpc	runControlHI	Start processes time : 4 seconds		
Info	16:31:39	srsdaqpc	runControlHi	Current RC options loaded from : DATE_CONFIG		
Info	16:32:00	srsdaqpc	runControl	Starting Data Taking for run 994		
RIIR	- 	KIK		· M		
_		- 	- 			
	e	Seventy Log level	Hostname Ro	Jiename Username System Facility Detector Partition Run Message	ary	
min.	match				ino	
max.	exclude		1			
Browse error	Browse errors: << < > Messages: Clean now Auto scroll Auto clean					
Status : Connected						
Query : On	Guery : Online data - from 14/07/2011 16:18:24					
22 messages					Find	

(infoBrowser Main Window)

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

Into	16:20:11	srsdaqpc	equipmentList_	equipmentList version 2.10
Info	16:20:11	srsdaqpc	equipmentList_	Arming RorcData: source = detector electronics through Gb ethernet. eqld=1 soch
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	run Control	READOUT start phase timeout on ALONELDC
Info	16:20:14	srsdaqpc	run Control	Aborting from STARTING_LDCS
Info	16:20:15	srsdaqpc	recorder	recorder exited with status: 0
Info	16:20:16	srsdaqpc	run Control	Disabling logbook update (STOPPED)
Info	16:20:16	srsdaqpc	run Control	Run stopped
Info	16:20:16	srsdaqpc	run Control HI	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	run Control	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	run Control	END_of_RUN request with ERROR received by Logic Engine
Info	16:24:35	srsdaqpc	run Control	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.

		10.44.00	localiost	runcona or	connecting to appreciate
ERROF	3	16:44:55	localhost	run Control	rcServer aloneldc is LOCKEDBY=SERVICE(DATEDAQ_TEST_DAQ::DAQ_TEST_CONTROL_PID&10042@srsdaqpc)
ERROF	3	16:44:55	localhost	runControl	Bad DAQ configuration
ERROF	8	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
ERROF	3	16:45:07	localhost	runControl	rcServer aloneldc is LOCKEDBY=SERVICE(DATEDAQ_TEST_DAQ::DAQ_TEST_CONTROL_PID&10042@srsdaqpc)
ERROF	8	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	run Control	READOUT start phase timeout on ALONELDC
Info	10:42:02	srsdaqpc	run Control	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:

3124	2316	158	70					
CMD	CMD TYPE	CMD_LE	ENGTH*					
CMD INFO								

* Not yet implemented, set to hFFFF

Command	CMD	CMD TYPE	CMD INFO	Description
	(hex)	(hex)		
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	l/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)

Namo	Address	Byte	dofault	Description	
Name	(hex)	count	delault	Description	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	
	02	2	40000	Period of the trigger sequencer.	
BCLK_FREQ	02	2	(0x9C40)		
	02	2	256	Delay between the external/internal trigger	
DCLK_INGDELAT	05	2	(0x100)	and the APV trigger	
	04	2	128	Delay between the external/internal trigger	
DCLK_IPDELAT	04	2	(0x80)	and the APV test-pulse	
	05	2	300	Delay between the external/internal trigger	
BCLK_ROSTINC	05	2	(0x12C)	and the start of data recording	
	00	2		Channel mask for the data transmission. Even	
	08	2	0,1111	bits are masters and odd bits are slaves	
EVBLD DATALENGTH	09	2	3000	Length of the data capture window	
			(0x <mark>0BB8)</mark>		
				Event Builder mode register.	
EVBLD_MODE	0A	1	0	Bit 0 = use 32-bit framecounter	
				Bit 1 = use 24-bit timestamp	2.05
EVBLD_EVENTINFOTYPE	OB	1	0	Controls the data format.	
EVBLD_EVENTINFODATA	0C	4	0xAABB0BB8	Data for the optional info-filed in the data format	
	OF		0	Readout Enable register (bit 0). Triggers are	2.01
			Ŭ.	accepted for acquisition when this bit is 1	
RST REG	FFFFFFF			Reset register.	2.02
				Bit 0 = APV sync reset	

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

Ele	<u>E</u> dit	٧	ew	<u>S</u> ear
New	Ope	7 en	•	🛄 Save
🗍 st	art0.t	ĸt	×	🗍 sto
10.	0.0.	2		
603	9			
800	0000	0		
000	0000	0		
aaa	afff	ff		
000	0000	0		
000	0000)F		
000	0000)1		

- 1. Destination IP: 10.0.0.2
- 2. Connection port: 6039 (decimal)
- 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 connections¹:

Name	Port (hex)	Port (dec)	Use	l/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	12C	Access to the I2C registers of the APV chip	user
ADCCARD_PORT	1977	6519	runtime	12C	I2C registers of the ADC CCARD.	user

¹Source: SRS Slow Control Manual