

## Fast Recycler Transfers Documentation

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Send suggestions and comments to [ad-pbar-tuning-adminNOSPAM@fnal.gov](mailto:ad-pbar-tuning-adminNOSPAM@fnal.gov) (remove "NOSPAM")

**Sequencer:** Pbar Annex

**Fast Recycler Aggregate:** **Fast Recycler Start**

**Previous Aggregate:** Fast Recycler Reverse Protons

**Purpose of this Aggregate:**

**How to get back to stacking form here:**

::: BEAM\_SWITCH Pbar\_Source Off .

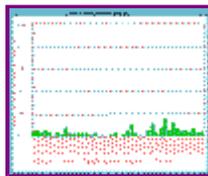
To avoid taking beam to Pbar while switching form 120GeV stacking mode to 8GeV shot mode, we take the software beam switch.

::: NOTIFY Start .

Sends a Channel 13 Notify message to [http://www-bd.fnal.gov/cgi-bin/notify\\_mes.pl?ch13=text](http://www-bd.fnal.gov/cgi-bin/notify_mes.pl?ch13=text)

::: START\_PGM SA1127 .

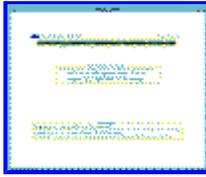
Pbar Radiation Detector Display (keeper is Tony Leveling) on comfort display 102. This SA can be used during the beam line tune-up to verify that radiation levels are not high enough to cause a radiation trip. The program emulates the actions of the radiation detector cards. It updates every 60 seconds and takes a 15 minutes rolling average of the radiation losses and normalizes each radiation detector so that a value of 1 corresponds to the radiation trip level. The parameters for the individual radiation detectors can be found on D106 ACC/DEB < 1> to < 3>. G:RA{#####} is an integrating real-time read back of the radiation detector. Every 60 seconds, which is not concurrent with the supercycle, G:RA{#####} is reset to zero and starts integrating all over again. G:RD{#####} takes the number of G:RA{#####} before it is reset and keeps that value until G:RA{#####} is reset again. When doing the reverse proton tune-up later in the shot, if any radiation detector gets near to 1 on the plot, the beam switch should be taken to avoid a radiation trip. If the SA1127 plot dies, it can be restarted by reissuing this command, or manually through Acnet page P151. A screen capture of SA1127 is shown below.



Pbar Radiation Detector Display. Click on thumbnail to view full-sized image.

::: START\_PGM P162 .

Starts the Accumulator BPM TBT Page P162 (keeper is Keith Gollwitzer). This page, as shown below, checks the status of the Accumulator BPM houses and issues resets to any house that is not online. This allows plenty of time for the BPM houses to reboot before they are need in the beam line tune-up. Upon completion, this application will self terminate and the window will close on its own.



Accumulator BPM page. Click on thumbnail to view full-sized image.

```

::: WAIT_FOR SECS 30 .
    A 30 second delay to allow the Accumulator BPM program above to
    complete its BPM house check.
::: SETIT_DEVICE V:PSHOOT =1 .
    Devices that start with V: are state parameters. State parameters
    define the operational state of a device or accelerator, allow the
    sequencers to be more automated, and prevent the different
    sequencers from getting out of sequence with each other. Often one
    sequencer waits at a certain spot until another sequencer changes a
    state parameter. V:PSHOOT is a state parameter for the Pbar
    transfer state. V:PSHOOT state 1 means "not ready for transfer."
    Later in this aggregate, V:PSHOOT is set to 4 ("Ready for Main
    Injector Tune up"). The Main Injector Shot Transfer Line Tuneup
    aggregate waits for PSHOOT to be set to 4 ("Ready for Main Injector
    Tune up") before starting its beam line tune-up.
::: SET_ENUMERATED V:APSMOD .
    V:APSMOD is a state parameter representing the operational mode of
    the Pbar Source. The set_enumerated command asks the user to
    selected from a menu of V:APSMOD state values as shown below.
    Some common values for V:APSMOD include: 7 = Stacking, 8 =
    Reverse Protons, 9 = Pbar Shots to the Tevatron, and 12 = Pbar
    Shots to the Recycler.

```

```

1  Shutdown
2  Access
3  Diagnosing Failure
4  Repairing Failure
5  Recovery / Turn On
6  Standby
7  Stacking
8  Reverse Protons
9  Pbar Shots to the Tevatron
10 Deceleration
11 Store
12 Pbar Shots to the Recycler

```

```

::: SET_DEVICE A:APSHOT +=1 .
    Increments the Pbar transfer series number by one. This number is
    incremented before and after any Pbar transfer from the Accumulator
    to the Tevatron or Accumulator to the Recycler.
::: ACL WAIT_FOR_READING_MATCH .
    Runs an Accelerator Command Language (ACL) script called
    WAIT_FOR_READING_MATCH that waits for "SDA Shot/Store #" (A:FILE)
    to read the same value as the Pbar transfer series number
    (A:APSHOT). More information on ACL scripts can be found at
    http://adcon.fnal.gov/userb/www/controls/clib/intro\_acl.html.
::: SET_DEVICE A:SHTNUM =0 .
    Sets the "Pbar transfer series Shot #" parameter (A:SHTNUM) to
    zero. Later on A:SHTNUM is incremented by one for every Pbar
    transfer.
::: SET_DEVICE V:CASPBT =1 .
    The "Pbar transfer SDA case trigger" state (V:CASPBT) is set to 1,
    which represents "Set up." Possible values for this state parameter
    include: 1 = Set up, 2 = Unstack Pbars, 3 = Transfer Pbars from
    Accumulator to Main Injector, 4 = Accelerate Pbars in the Main

```

```

Injector, 5 = Coalesce Pbars in the Main Injector.
::: SET_DEVICE V:SETPBT =1 .
    Sets the "Pbar transfer SDA set in case" state device to 1. D88
    currently shows no state information descriptions for the different
    states of this parameter.
::: CHECK_DEVICE A:APSHOT READING .
    Prints the value of the "Pbar Transfer Series Number" parameter
    (A:APSHOT) in the message window at the bottom of the sequencer in
    the following format.
    COM: A:APSHOT present value = #####.00000
::: SHOT_LOG CHAPTER .
    Starts a new shot log chapter in the Recycler shot scrapbook at
    http://www-bd.fnal.gov/cgi-mach/machlog.pl?nb=rscrap04&load=no.
    The shot scrapbook header lists the time, date and shot number
    (A:APSHOT which was incremented above). Any writes to the
    Recycler shot scrapbook prior to this command would go in the
    previous shot scrapbook chapter.
::: SHOT_LOG COMMENT .
    Adds the following comment to the Pbar portion of the shot log
    chapter started in the previous command.
    ● {Time}- Beginning shots to the Recycler, the starting stack size is ###.#####. -
    Sequencer
::: CTLIT_DEVICE D:BSC925 OFF .
::: ABORT_MASK PBAR_SOFT ENABLED .
    The following three ABORT_MASK commands toggle the P67 abort masks from
    the stacking configuration to the shots configuration. This command un masks the
    Pbar Software Abort.
::: ABORT_MASK AP1_120_PS ENABLED .
    The P67 abort for 120 GeV power supplies is masked since we will be
    running 8 GeV beam.
::: ABORT_MASK AP1_8_PS DISABLED .
    The P67 abort for 8 GeV power supplies is unmasked to prepare for 8
    GeV operation.
::: INSTRUCT 206 .

```

```

    The next steps set up the AP1 and AP3 lines for 8 GeV reverse
    proton operation. Alarms are also set up.

    Interrupt anywhere in this box to continue.

```

```

::: ALARM_LIST PBAR 2 .
    Bypasses the D59 alarm list entitled "AP1 120".

```



Pbar alarm list 2 after it has been bypassed by the Pbar Sequencer.. Click on thumbnail to view full-sized

```

::: SET_SEQ_FILE 37 .
    File #37 turns off AP1 120Gev Supplies. All of the devices in
    this list are located in F23 service building.
M:HV100  TURN DEVICE OFF      ok
M:Q101   TURN DEVICE OFF      ok
M:Q102   TURN DEVICE OFF      ok
M:HV102  TURN DEVICE OFF      ok
M:Q103   TURN DEVICE OFF      ok
M:Q104   TURN DEVICE OFF      ok

```

```

M:Q105   TURN DEVICE OFF      ok
M:V105   TURN DEVICE OFF      ok
M:Q106   TURN DEVICE OFF      ok
M:Q107   TURN DEVICE OFF      ok
M:Q108   TURN DEVICE OFF      ok
M:Q109I  TURN DEVICE OFF      ok
M:Q109V  TURN DEVICE OFF      ok
::: INSTRUCT 307 .

```

The next steps restore AP1/3 settings from a Recycler Shots save file. Choose SHOTS file #1149. This is the current default for Fast Recycler Shots.

Interrupt anywhere in this box to continue.

```

::: SET_SEQ_FILE_SR 79 .
File #79 restores AP1 line 8 GeV device settings from a D1 file.
The Pbar Sequencer Operator is prompted to chose a shot setup
file. Unless told otherwise, the Pbar Sequencer Operator should
always select file 1149 from the D1 category "SHOTS."
M:HV200  RESTORE (D1 file)  SETTING  1149
ok
M:HT100  RESTORE (D1 file)  SETTING  1149
ok
M:HT100  RESTORE (D1 file)  ANL ALARM 1149
ok
M:Q201   RESTORE (D1 file)  SETTING  1149
ok
M:VT101  RESTORE (D1 file)  SETTING  1149
ok
M:VT101  RESTORE (D1 file)  ANL ALARM 1149
ok
M:VT101A RESTORE (D1 file)  SETTING  1149
ok
M:VT101A RESTORE (D1 file)  ANL ALARM 1149
ok
M:Q102R  RESTORE (D1 file)  BASIC STS 1149
ok
M:Q202   RESTORE (D1 file)  SETTING  1149
ok
M:HV202  RESTORE (D1 file)  SETTING  1149
ok
M:Q203   RESTORE (D1 file)  SETTING  1149
ok
M:Q204   RESTORE (D1 file)  SETTING  1149
ok
M:Q205   RESTORE (D1 file)  SETTING  1149
ok
M:V205   RESTORE (D1 file)  SETTING  1149
ok
M:HT105  RESTORE (D1 file)  SETTING  1149
ok
M:HT105  RESTORE (D1 file)  ANL ALARM 1149
ok
M:Q206   RESTORE (D1 file)  SETTING  1149
ok
M:Q207   RESTORE (D1 file)  SETTING  1149
ok
M:HT107  RESTORE (D1 file)  SETTING  1149

```

```

ok
M:HT107 RESTORE (D1 file) ANL ALARM 1149
ok
M:Q208 RESTORE (D1 file) SETTING 1149
ok
M:VT108 RESTORE (D1 file) SETTING 1149
ok
M:VT108 RESTORE (D1 file) ANL ALARM 1149
ok
M:Q209 RESTORE (D1 file) SETTING 1149
ok
File #79 also restores AP1 diagnostics setups for SEMs, Toroids,
Loss Monitors and the AP0 Wall Current Monitor.
M:SMA1S RESTORE (D1 file) SETTING 1149
ok
M:SMA1S1 RESTORE (D1 file) SETTING 1149
ok
M:SMA1C RESTORE (D1 file) SETTING 1149 ok
M:SMA1C1 RESTORE (D1 file) SETTING 1149
ok
D:TRSM1S RESTORE (D1 file) SETTING 1149
ok
D:TRSM1R RESTORE (D1 file) SETTING 1149
ok
D:TRSM1C RESTORE (D1 file) SETTING 1149
ok
D:TRSM1D RESTORE (D1 file) SETTING 1149
ok
M:TR109S RESTORE (D1 file) SETTING 1149
ok
M:TR109T RESTORE (D1 file) SETTING 1149
ok
M:LMHLD RESTORE (D1 file) SETTING 1149
ok
M:LMHLD S RESTORE (D1 file) SETTING 1149
ok
M:AP1WCS RESTORE (D1 file) SETTING 1149 ok
M:AP1WCT RESTORE (D1 file) SETTING 1149
ok
M:TR105S RESTORE (D1 file) SETTING 1149
ok
M:TR105T RESTORE (D1 file) SETTING 1149 ok
Note that device names that appear in lower case are marked "out of
service" and are in effect bypassed from the list.
d:h926rp RESTORE (D1 file) SETTING 1149 ok
d:h926pb RESTORE (D1 file) SETTING 1149 ok
m:v105rp RESTORE (D1 file) SETTING 1149 ok
m:v105pb RESTORE (D1 file) SETTING 1149 ok
::: SET_SEQ_FILE_SR 87 .

```

**File #87 restores AP3 line device settings from a D1 file. The Pbar Sequencer Operator is prompted to chose a shot setup file.** Unless told otherwise, the Pbar Sequencer Operator should always select file 1149 from the D1 category "SHOTS."

```

D:Q901 RESTORE (D1 file) SETTING 1149
ok
D:Q901 RESTORE (D1 file) ANL ALARM 1149
ok

```

D:V901	RESTORE (D1 file)	SETTING	1149	
	ok			
D:V901	RESTORE (D1 file)	ANL ALARM	1149	
	ok			
D:VS901	RESTORE (D1 file)	SETTING	1149	
	ok			
D:VS901	RESTORE (D1 file)	ANL ALARM	1149	
	ok			
D:HT901	RESTORE (D1 file)	SETTING	1149	
	ok			
D:HT901	RESTORE (D1 file)	ANL ALARM	1149	
	ok			
D:Q903	RESTORE (D1 file)	SETTING	1149	
	ok			
D:Q903	RESTORE (D1 file)	ANL ALARM	1149	
	ok			
D:VS904	RESTORE (D1 file)	SETTING	1149	
	ok			
D:VS904	RESTORE (D1 file)	ANL ALARM	1149	
	ok			
D:HT906A	RESTORE (D1 file)	SETTING	1149	
	ok			
D:HT906A	RESTORE (D1 file)	ANL ALARM	1149	
	ok			
D:VT906	RESTORE (D1 file)	SETTING	1149	
	ok			
D:VT906	RESTORE (D1 file)	ANL ALARM	1149	
	ok			
D:HT906B	RESTORE (D1 file)	SETTING	1149	
	ok			
D:HT906B	RESTORE (D1 file)	ANL ALARM	1149	
	ok			
D:Q907	RESTORE (D1 file)	SETTING	1149	
	ok			
D:Q907	RESTORE (D1 file)	ANL ALARM	1149	
	ok			
D:Q909	RESTORE (D1 file)	SETTING	1149	
	ok			
D:Q909	RESTORE (D1 file)	ANL ALARM	1149	
	ok			
D:HT910	RESTORE (D1 file)	SETTING	1149	
	ok			
D:HT910	RESTORE (D1 file)	ANL ALARM	1149	
	ok			
D:Q913	RESTORE (D1 file)	SETTING	1149	
	ok			
D:Q913	RESTORE (D1 file)	ANL ALARM	1149	ok
D:QS915	RESTORE (D1 file)	SETTING	1149	
	ok			
D:QS915	RESTORE (D1 file)	ANL ALARM	1149	
	ok			
D:Q914	RESTORE (D1 file)	SETTING	1149	
	ok			
D:Q914	RESTORE (D1 file)	ANL ALARM	1149	
	ok			
D:H914	RESTORE (D1 file)	SETTING	1149	
	ok			
D:H914	RESTORE (D1 file)	ANL ALARM	1149	
	ok			

D:Q916	RESTORE (D1 file)	SETTING	1149	
ok				
D:Q916	RESTORE (D1 file)	ANL ALARM	1149	
ok				
D:Q917	RESTORE (D1 file)	SETTING	1149	
ok				
D:Q917	RESTORE (D1 file)	ANL ALARM	1149	ok
D:QS917	RESTORE (D1 file)	SETTING	1149	
ok				
D:QS917	RESTORE (D1 file)	ANL ALARM	1149	
ok				
D:VT917	RESTORE (D1 file)	SETTING	1149	
ok				
D:VT917	RESTORE (D1 file)	ANL ALARM	1149	
ok				
D:Q919	RESTORE (D1 file)	SETTING	1149	
ok				
D:Q919	RESTORE (D1 file)	ANL ALARM	1149	
ok				
D:QS919	RESTORE (D1 file)	SETTING	1149	
ok				
D:QS919	RESTORE (D1 file)	ANL ALARM	1149	
ok				
D:VT925	RESTORE (D1 file)	SETTING	1149	
ok				
D:VT925	RESTORE (D1 file)	ANL ALARM	1149	ok
D:Q924	RESTORE (D1 file)	SETTING	1149	
ok				
D:Q924	RESTORE (D1 file)	ANL ALARM	1149	
ok				
D:QS925	RESTORE (D1 file)	SETTING	1149	
ok				
D:QS925	RESTORE (D1 file)	ANL ALARM	1149	
ok				
D:HS925	RESTORE (D1 file)	SETTING	1149	
ok				
D:HS925	RESTORE (D1 file)	ANL ALARM	1149	
ok				
D:Q926	RESTORE (D1 file)	SETTING	1149	
ok				
D:Q926	RESTORE (D1 file)	ANL ALARM	1149	
ok				
D:QS926	RESTORE (D1 file)	SETTING	1149	
ok				
D:QS926	RESTORE (D1 file)	ANL ALARM	1149	ok
D:H926RP	RESTORE (D1 file)	SETTING	1149	ok
D:H926PB	RESTORE (D1 file)	SETTING	1149	ok
D:H926	RESTORE (D1 file)	SETTING	1149	
ok				
D:H926	RESTORE (D1 file)	ANL ALARM	1149	
ok				
D:QS928	RESTORE (D1 file)	SETTING	1149	
ok				
D:QS928	RESTORE (D1 file)	ANL ALARM	1149	
ok				
A:EKIKP	RESTORE (D1 file)	SETTING	1149	ok

File #87 also restores analog alarms limits for the core horizontal and vertical trombones.

```

A:CH1T2  RESTORE (D1 file)  ANL ALARM 1149
ok
A:CH2T2  RESTORE (D1 file)  ANL ALARM 1149
ok
A:CH3T2  RESTORE (D1 file)  ANL ALARM 1149
ok
A:CV1T2  RESTORE (D1 file)  ANL ALARM 1149
ok
A:CV2T2  RESTORE (D1 file)  ANL ALARM 1149
ok
A:CV3T2  RESTORE (D1 file)  ANL ALARM 1149          ok
::: SET_SEQ FILE 41 .
File #41 resets AP1 8 GeV devices.  This will clear any trip
status before turning these supplies on.  I:F17B3 is located in the
F2 service building, and the rest of the devices in this list are
located in the F23 service building.
I:F17B3  RESET DEVICE
ok
M:HV200  RESET DEVICE          ok
M:Q201   RESET DEVICE
ok
M:HV202  RESET DEVICE
ok
M:Q203   RESET DEVICE
ok
M:Q204   RESET DEVICE
ok
M:Q205   RESET DEVICE          ok
M:V205   RESET DEVICE
ok
M:Q206   RESET DEVICE
ok
M:Q207   RESET DEVICE
ok
M:Q208   RESET DEVICE          ok
M:Q209   RESET DEVICE          ok
::: SET_SEQ FILE 42 .
File #42 turns on AP1 8 GeV devices.  I:F17B3 is located in the F2
service building, and the rest of the devices in this list are
located in the F23 service building.
I:F17B3  TURN DEVICE ON
ok
M:HV200  TURN DEVICE ON
ok
M:Q201   TURN DEVICE ON
ok
M:VT101  TURN DEVICE ON
ok
M:VT101A TURN DEVICE ON
ok
M:Q102R  SET NEGATIVE
ok
M:Q202   TURN DEVICE ON
ok
M:HV202  TURN DEVICE ON
ok
M:Q203   TURN DEVICE ON
ok
M:Q204   TURN DEVICE ON
ok

```

```

M:Q205  TURN DEVICE ON
ok
M:HT105  TURN DEVICE ON
ok
M:V205  TURN DEVICE ON
ok
M:Q206  TURN DEVICE ON
ok
M:Q207  TURN DEVICE ON
ok
M:HT107  TURN DEVICE ON
ok

M:Q208  TURN DEVICE ON
ok
M:VT108  TURN DEVICE ON
ok
M:Q209  TURN DEVICE ON
ok
::: SET_SEQ FILE 47 .
File #47 resets AP3 line devices.  This will clear any trip status
before trying to turn the supplies on.  Devices in this list are
located in AP30 (D:Q901, D:V901, D:Q903, D:Q907, and D:Q909), F27
(D:Q913, D:Q914, D:Q916, D:Q917, and D:Q919), and AP0 (D:H914,
D:Q924, D:Q926 and D:H926).
D:Q901  RESET DEVICE
ok
D:V901  RESET DEVICE
ok
D:Q903  RESET DEVICE
ok
D:Q907  RESET DEVICE
ok
D:Q909  RESET DEVICE
ok
D:Q913  RESET DEVICE
ok
D:Q914  RESET DEVICE
ok
D:H914  RESET DEVICE
ok
D:Q916  RESET DEVICE
ok
D:Q917  RESET DEVICE
ok
D:Q919  RESET DEVICE
ok
D:Q924  RESET DEVICE
ok
D:Q926  RESET DEVICE
ok
D:H926  RESET DEVICE
ok
::: SET_SEQ FILE 48 .
File #48 turns on AP3 line devices.  Devices in this list are located in AP30
(D:Q901, D:V901, D:Q903, D:Q907, and D:Q909), F27 (D:Q913, D:Q914,
D:Q916, D:Q917, and D:Q919), and AP0 (D:H914, D:Q924, D:Q926 and D:H926).
D:Q901  TURN DEVICE ON
ok
D:V901  TURN DEVICE ON
ok
D:HT901  TURN DEVICE ON
ok

```

```

D:Q903   TURN DEVICE ON
ok
D:HT906A TURN DEVICE ON
ok
D:VT906   TURN DEVICE ON
ok
D:HT906B TURN DEVICE ON
ok
D:Q907   TURN DEVICE ON
ok
D:Q909   TURN DEVICE ON
ok
D:HT910   TURN DEVICE ON
ok
D:Q913   TURN DEVICE ON
ok
D:Q914   TURN DEVICE ON
ok
D:H914   TURN DEVICE ON
ok
D:Q916   TURN DEVICE ON
ok
D:Q917   TURN DEVICE ON
ok
D:VT917   TURN DEVICE ON
ok
D:Q919   TURN DEVICE ON
ok
D:Q924   TURN DEVICE ON
ok
D:Q926   TURN DEVICE ON
ok
D:H926   TURN DEVICE ON
ok
D:VT925   TURN DEVICE ON
ok
::: ALARM_LIST PBAR 12 .

```

Enables the D59 alarm list entitled “AP3”. This list consists of two lists “AP3 DGTL” and “AP3 ANLG.”



14 after they have been enabled by the Pbar Sequencer.. Click on thumbnails to view full-sized images.

```

::: EVENT 91 DISABLE .
::: WAIT_FOR SECS 10 .
::: CTL_DEVICE M:Q102 RESET .

```

M:Q102 was already issued a "reset" and "on" in file 41 above; however, it has a transfer switch that takes a finite amount of time to switch over. This command and the command that follows makes sure that M:Q102 is on before 8 GeV beam is run in the AP1 line.

```

::: CTLIT_DEVICE M:Q202 ON .

```

M:Q102 was already issued a "reset" and "on" in file 41 above; however, it has a transfer switch that takes a finite amount of time to switch over. This command and the command that follows makes sure that M:Q102 is on before 8 GeV beam is run in the AP1 line.

```

::: ALARM_LIST PBAR 3 .
    Enables the D59 alarm list entitled "AP1 8GeV".

```



Pbar alarm list 3 after it has been enabled by the Pbar Sequencer. Click on thumbnail to view full-sized image.

```

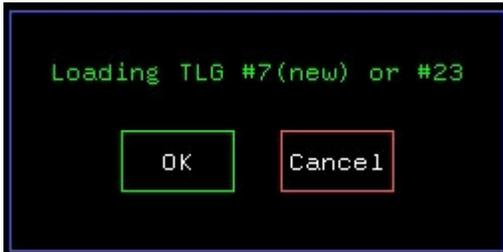
::: ACL COMPARE_10_DEVICES .
    Runs an Accelerator Command Language (ACL) script called
    COMPARE_10_DEVICES. The script verifies that all 8GeV values are
    the same on all cycles for ramped P1 and P2 line devices. The
    following 3 sequencer commands run the same script to check the 8
    GeV ramps on other P1 and P2 line devices. More information on ACL
    scripts can be found at
    http://adcon.fnal.gov/userb/www/controls/clib/intro\_acl.html.

```

```

::: ACL COMPARE_10_DEVICES .
::: ACL COMPARE_10_DEVICES .
::: ACL COMPARE_10_DEVICES .
::: WAIT_FOR SECS 3 .
::: ACKNOWLEDGE .

```



```

::: LOAD_TLG 7 REPEAT .
    Loads TLG #7
::: WAIT_DEVICE G:TLGSEQ .
    Waits for TLG #7 to load.
::: EVENT 88 TRIGGER .
::: BOOST_INTENSITY EVT16 2 .
::: SETIT_DEVICE V:PSHOOT =4 .
::: BEAM_SWITCH Pbar_Source On .
::: ALARM_LIST PBAR 52 .

```

Bypasses the D59 alarm list entitled "ARF1".



Pbar alarm list 52 after it has been bypassed by the Pbar Sequencer.. Click on thumbnail to view full-sized image.

```

::: WAIT_FOR SECS 3 .
::: ALARM_LIST PBAR 23 .

```

Bypasses the D59 alarm list entitled "PULSED" (pulsed devices).



Pbar alarm list 23 after it has been bypassed by the Pbar Sequencer. Click on thumbnail to view full-sized image.

```

::: SET_SEQ FILE 1 .

```

```

File #1 first turns off the pulsed devices.
D:LNVTURN DEVICE OFFok
D:PMAGVTURN DEVICE OFFok
D:ISEPVTURN DEVICE OFFok
D:IKIKTURN DEVICE OFFok
D:EKIKTURN DEVICE OFFok
D:EKIKQTURN DEVICE OFFok
D:ESEPVTURN DEVICE OFFok
A:ISEP1VTURN DEVICE OFFok
A:ISEP2VTURN DEVICE OFFok
A:IKIKTURN DEVICE OFFok
File #1 then turns off ARF1.
A:R1L1AMTURN DEVICE OFFok
A:R1L2AMTURN DEVICE OFFok
A:R1HLSCTURN DEVICE OFFok
File #1 then disables the A:EXTRAT Pbar extraction parameter and
sets Accumulator extraction kicker timing.
A:EXTRAT EVENT DISABLEok
A:EKIKTG SET DEVICE13.8365ok
File #1 then turns off some AP2 line devices.
D:Q701TURN DEVICE OFFok
D:Q702TURN DEVICE OFFok
D:H704TURN DEVICE OFFok
::: SET_SEQ FILE 83 .
File #83 sets core horizontal and vertical cooling to gate off for
three seconds during reverse proton events injections.
A:CBPON SET DEVICE3
ok
A:CBPOFF SET DEVICE0
ok
A:CBPON SET TIMER REFER99
ok
A:CBPOFF SET TIMER REFER99
ok
A:CBPON EVENT ENABLE
ok
A:CBPOFF EVENT ENABLEok
::: SET_SEQ FILE 85 .
File #85 is labeled RunIIb Misc. settings. It sets up the ARF1
fanback voltage and phase read back sample and hold trigger timers
both to be 1.575 seconds after a an Accumulator to Main Injector
transfer event $9A.
A:R1HLT1 SET DEVICE1.575ok
A:R1HLT1 SET TIMER REFER9A
ok
A:R1HLT1 EVENT ENABLE
oksets
A:R1HLT2 SET DEVICE1.575
ok
A:R1HLT2 SET TIMER REFER9A
ok
A:R1HLT2 EVENT ENABLEok
File #85 also sets up the ARF1 Accumulator to Main Injector
frequency track and hold timers to be zero seconds and 0.000211
seconds after a an Accumulator to Main Injector transfer event
$9A.
A:R1LLT3 SET DEVICE0
ok
A:R1LLT3 SET TIMER REFER9A
ok

```

```

A:R1LLT3 EVENT ENABLE
ok
A:R1LLT4 SET DEVICE          .000211
ok
A:R1LLT4 SET TIMER REFER    94
ok
A:R1LLT4 EVENT ENABLE
ok
File #85 also sets the A:IBMS1 sample time to be .1 seconds after
an Unstack TCLK event ($91) or a Pbar Production TCLK event
($80).
A:IBMS1 SET DEVICE          .1
ok
A:IBMS1 SET TIMER REFER    91 80
ok
A:IBMS1 EVENT ENABLE
ok

File #85 also sets the A:IBMS1 sample time to be 1 second after an
Injected Pbar synch event ($94) or a Pbar Production TCLK event
($80).
A:IBMS2 SET DEVICE          1
ok
A:IBMS2 SET TIMER REFER    94 80
ok
A:IBMS2 EVENT ENABLE
ok
File #85 also sets the AP3 SEM clear timer. The 14 6 errors says
that the requested data has not changed. This is probably due to
the fact that the $9A event is already present and the $E1 event is
not present. As a result the timer is already in the correct
configuration before the commands are run.
D:SMB2C ADD TIMER EVENT    9A          14
6
D:SMB2C REMOVE TIMER EVNT  E1          14
6
File #85 also sets the Debuncher Extraction kicker septa charge
timer. It changes it from $80 + 0.4 seconds to $90 + 0.00001
seconds.
D:ESEPC SET DEVICE          .00001
ok
D:ESEPC ADD TIMER EVENT    90
ok
D:ESEPC REMOVE TIMER EVNT  80          ok
File #85 also changes the DRF1 Master Trigger time to trigger zero
seconds after a TCLK event $02, which goes out every five
seconds. This keeps the DRF1 cavities in tune during the shot
setup process. When return to stacking the DRF1 master trigger
will be returned to triggering off of a MIBS $79 event.

D:R1LLMT EVENT DISABLE
ok
D:R1LLTT SET TIMER REFER    02
ok
D:R1LLTT SET DEVICE          0
ok
D:R1LLTT EVENT ENABLE
ok
::: CTL_DEVICE A:ISHUTO OFF .
Turns off the accumulator injection shutter open timer. The
Accumulator injection shutter will now not be told to open.
::: CTL_DEVICE A:ESHUTO OFF .
Turns off the accumulator extraction shutter open timer. The
Accumulator extraction shutter will now not be told to open.

```

```
::: CTL_DEVICE A:ISHUTC ON .
```

Turns on the accumulator injection shutter close timer. The shutter open timer was disabled and the shutter closed timer was enabled. This ensures that the Accumulator Injection shutter stays closed. The Accumulator injection shutter position can be verified by looking at A:ISHTST. A reading of 1 means open and a reading of 2 means closed. The Accumulator injection shutter controller is located in the top of rack B17R01 at AP10 as shown below.



Click on thumbnail to view full-sized image

```
::: CTL_DEVICE A:ESHUTC ON .
```

Turns on the accumulator extraction shutter close timer. The shutter open timer was disabled and the shutter closed timer was enabled. This ensures that the Accumulator Extraction shutter stays closed. The Accumulator extraction shutter position can be verified by looking at A:ESHTST. A reading of 1 means open and a reading of 2 means closed. The Accumulator extraction shutter controller is located in the middle of rack B17R01 at AP10 as shown below.

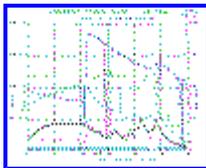


Click on thumbnail to view full-sized image.

```
::: START_PGM SA1144 .
```

```
::: START_PGM SA1144 .
```

Starts the Stack-o-meter SA (keeper is David Sutherland) on comfort display console 101. If this plot dies, it can easily be restarted as follows. From CNS1, do a CNTL-SHIFT-4 to get to the CNS101 comfort display. Go to P69 and then click PLOT!! under the lifetime category.



Pbar Life-o-Meter. Click on thumbnail to view full-sized image.

```
::: INSTRUCT 302 .
```

```
Start the VSA display on this console using slot C.
Select concole [Lc1] and target slot GxSC.
```

```
Interrupt anywhere in this box to continue.
```

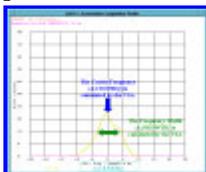
```
::: START_PGM SA1136 D
```

This command is bypassed, and would start the old VSA SA. The VSA code has been updated on SA1156, which is the next command below. This command is left in place in case we ever need to revert back to the old code.

```
::: START_PGM SA1156 .
```

Accumulator Momentum profile using the VSA (keeper is Dave McGinnis). This

is normally run on the SC screen of the console that runs the Pbar Sequencer, and can be restarted from P142. SA1136 calculates the center frequency (A:CENFRQ) and frequency width (A:FRWDTH) of the Accumulator beam. If the momentum cooling is being run too hard, you will see a coherent spike on the display. If bad enough, the coherent spike can be larger than the plot scale. This is in indication of an instability, and it also effects the VSA calculations (for example, it makes the frequency width artificially small). If coherent spikes are seen on the trace, you can lower the 2-4GHz momentum power until the spike goes away. A:SPIKE is a datalogged parameter that measures how bad the coherent spike is on the VSA display. Values above 20% can indicate excessive coherent spikes on the display. Below is a typical SA1136 display that is not exhibiting coherent spike problems.



Accumulator Momentum Distribution. Click on thumbnail to view full-sized image.

The VSA display can also be viewed on CATV Pbar #16 as shown here.



The hp 89440A VSA is located in the AP10 control room in rack A14R04 as shown here.



Click on thumbnail to view full-sized image.

**What if the VSA plot dos not start?** Occasionally the VSA will not start. When that is the case, follow the directions in the Pbar Elog at [http://www-bd.fnal.gov/cgi-mach/machlog.pl?](http://www-bd.fnal.gov/cgi-mach/machlog.pl?nb=pbar04&action=view&page=19&anchor=174245&hilite=17:42:45-%20target=_top)

[nb=pbar04&action=view&page=19&anchor=174245&hilite=17:42:45-%20target=\\_top](http://www-bd.fnal.gov/cgi-mach/machlog.pl?nb=pbar04&action=view&page=19&anchor=174245&hilite=17:42:45-%20target=_top) to configure the VSA.

```

::: WAIT_FOR SECS 15 .
    Delay to allow SA1156 to start.
::: ACL SET_FROM_READING .
::: SET_DEVICE A:VSAFWD --5 .
    Lowers the desired accumulator frequency width by 5Hz.
::: SETIT_DEVICE A:VSAFWM =15 D
::: SETIT_DEVICE A:DTMHVE =.5 .
    Sets the horizontal minus vertical emittance difference for VSA
    vertical thermostat. If the VSA is in momentum and vertical
    thermostat mode (A:VSARST = 7), then this parameter would be used
    to determine when to turn off the vertical cooling. When running
    in this mode, if the difference between the horizontal and vertical
    emittances becomes greater than A:DTMHVE, then the vertical cooling
    is gated off.
::: CHECK_DEVICE A:VSAFWS READING .
::: INSTRUCT 303 .

```

```

STOP! The VSA and cooling have been set up as a function of stack
size by setting A:VSAFWD 5 Hz less than A:VSAFWS (the suggested
VSAFWD based on stack size).
If studies are being conducted with a large stack, it is
is necessary to set the desired frequency, A:VSAFWD, to a more
more resonable value of at least 25.

```

```

Regularly monitor the emittances, frequency width, and stack
size to ensure stability using the plot started next.

```

```

Interrupt anywhere in this box to continue.

```

```

::: AUTO_PLOT Core Emittances .
::: INSTRUCT 213 D
::: START_PGM P194 D
::: SPECTRUM_LOAD 2 7 .
::: SEQ_PGM REQUEST AP0 Scope .
::: CHECK_DEVICE A:R2DDS1 SAVE_SET .
::: CHECK_DEVICE A:R2LLAM SAVE_SET .
::: CHECK_DEVICE A:DPHATT SAVE_SET .
::: CUSTOM COOL_GAIN .
::: SET_DEVICE A:DPHATT =5 .
::: SEQ_PGM REQUEST Acc Gap Mon .
::: CHECK_DEVICE A:SCRES SAVE_SET .
::: SET_DEVICE A:SCRES +=1.8 .
::: ALARM_LIST PBAR 76 .

```

Bypasses the D59 alarm list entitled “DEB COOL” (Debuncher Cooling). This list contains a number of other lists.



Pbar alarm list 76 after it has been enabled by the Pbar Sequencer. Click on thumbnail to view full-sized image.

```

::: SET_SEQ_FILE 92 .

```

File #92 opens the Debuncher cooling PIN switches to turn off the Debuncher cooling during the shot setup.

```

D:H1PS1  TURN DEVICE OFF      ok
ok
D:H2PS1  TURN DEVICE OFF
ok
D:H3PS1  TURN DEVICE OFF
ok
D:H4PS1  TURN DEVICE OFF      ok
D:V1PS1  TURN DEVICE OFF
ok
D:V2PS1  TURN DEVICE OFF
ok
D:V3PS1  TURN DEVICE OFF
ok
D:V4PS1  TURN DEVICE OFF      ok

D:P1PS1  TURN DEVICE OFF
ok
D:P2PS1  TURN DEVICE OFF
ok
D:P3PS1  TURN DEVICE OFF

```

ok  
D:P4PS1 TURN DEVICE OFF ok  
ok INSTRUCT 309 .

```
Move on to the next aggregate, Fast Recycler Reverse Protons.  
  
Interrupt anywhere in this box to continue.
```

**Fast Recycler Aggregate: Fast Recycler Start** has been completed.  
**Next Aggregate:** Fast Recycler Reverse Protons  
**How to get back to stacking form here:**