Intensity Data in SDA

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Numerous changes were made in SDA intensity data on 8/13/02 and 8/14/02. This includes DCCT's, FBI's, toroids, and a few miscellaneous devices. (SBD intensity data will be included in the following lists at a later time.) Changes made since then are also included in this note. Some device readout times have been changed, some devices have been moved to different Cases, some devices have been deleted, some devices have been added, and some devices remain unchanged. Some devices are marked for deletion at a future date and should no longer be used. These are explicitly enumerated in this note.

The motivations for these changes are:

1) Some data was simply being collected at the wrong time.
2) I want more consistency in usage of events and delays.
3) I want data associated logically with the correct Case when possible.
4) I want a more complete data set.
5) I don't want excessive redundancy.
6) Devices were added to some new Cases.

Several timing issues still remain and will be addressed as these problems are understood:

1) Occasionally data is collected late and is invalid for that reason. For example, the MI FBI's will sometimes read ~0 in the Inject Protons Case, because they were sampled after beam transfer (I believe).
2) Occasionally data is not collected at all because the Set ended before the data could be collected (I believe). This is accompanied by an error message in SDA Viewer.
3) Perhaps other errors…….

The following table lists the proton intensity devices, their meanings, and the Cases in which they are read.

Meaning	Name	Case
MI DC intensity @ extraction during proton tuneup	I:IBEAMM	Proton Injection Tuneup
Tev DC intensity @ injection during proton tuneup	T:IBEAM	Proton Injection Tuneup
coalescing status (1=off, 2=on) during proton tuneup	V:COALP	Proton Injection Tuneup
MI narrow gate intensity @ 150 GeV injection during rev. proton tuneup	I:P1ING	Eject Protons
MI wide gate intensity @ 150 GeV injection during rev. proton tuneup	I:P1IWG	Eject Protons
MI DC intensity @ 150 GeV injection during rev. proton tuneup	I:IBEAMM	Eject Protons
A150 intensity at Tor 914 during rev. proton tuneup	I:TOR914	Eject Protons
A150 intensity at Tor 902 during rev. proton tuneup	I:TOR902	Eject Protons
Tev narrow gate intensity @ extraction during rev. proton tuneup	C:FBIPNG[1}	Eject Protons
Tev wide gate intensity @ extraction during rev. proton tuneup	C:FBIPWG[1]	Eject Protons
Tev DC intensity @ extraction during rev. proton tuneup	T:IBEAM	Eject Protons
coalescing status (1=off, 2=on) during rev. proton tuneup	V:COALP	Eject Protons
# Booster turns for proton injection	G:TURN15	Inject Protons: Booster to MI
# Booster bunches extracted to MI	G:BNCH15	Inject Protons: Booster to MI
Booster intensity at extraction	B:CHGB15	Inject Protons: Booster to MI
MI narrow gate intensity @ injection	I:P1ING	Inject Protons: Booster to MI
MI wide gate intensity @ injection	I:P1IWG	Inject Protons: Booster to MI
MI DC intensity @ injection	I:IBEAMM	Inject Protons: Booster to MI
MI narrow gate intensity @ start of flattop	I:P1ING	Accelerate Protons in MI
MI wide gate intensity @ start of flattop	I:P1IWG	Accelerate Protons in MI
MI DC intensity @ start of flattop	I:IBEAMM	Accelerate Protons in MI
MI FBI proton qualifier narrow gate intensity	T:PQNPI1	Inject Protons
MI FBI proton qualifier wide gate intensity	T:PQWPI1	Inject Protons
MI FBI proton qualifier lower limit	T:PQULL	Inject Protons
MI FBI proton qualifier upper limit	T:PQUUL	Inject Protons
MI FBI proton qualifier NG/WG lower limit	T:PQURAT	Inject Protons
MI narrow gate intensity @ extraction	I:P1ING	Inject Protons
MI wide gate intensity @ extraction	I:P1IWG	Inject Protons
MI DC intensity @ injection	I:IBEAM5	Inject protons
MI DC intensity @ extraction	I:IBEAM7	Inject Protons
Tev narrow gate intensity during proton injection	C:FBIPNG[0-36]	Inject Protons
Tev wide gate intensity during proton injection	C:FBIPWG[0-36]	Inject Protons
Tev DC intensity during proton injection	T:IBEAM	Inject Protons
Tev DC intensity during proton injection (>1E13)	T:IBEAMB	Inject Protons
Tev narrow gate intensity before opening helix	C:FBIPNG[0-36]	Proton Injection Porch
Tev wide gate intensity before opening helix	C:FBIPWG[0-36]	Proton Injection Porch
Tev DC intensity before opening helix	T:IBEAM	Proton Injection Porch
Tev DC intensity before opening helix (>1E13)	T:IBEAMB	Proton Injection Porch
Tev narrow gate intensity after opening helix	C:FBIPNG[0-36]	Pbar Injection Porch
Tev wide gate intensity after opening helix	C:FBIPWG[0-36]	Pbar Injection Porch
Tev DC intensity after opening helix	T:IBEAM	Pbar Injection Porch
Tev DC intensity after opening helix (>1E13)	T:IBEAMB	Pbar Injection Porch

Tev narrow gate intensity during pbar injection	C:FBIPNG[0-36]	Inject Pbars
Tev wide gate intensity during pbar injection	C:FBIPWG[0-36]	Inject Pbars
Tev DC intensity during pbar injection (includes pbars)	T:IBEAM	Inject Pbars
Tev DC intensity during pbar injection (>1E13) (includes pbars)	T:IBEAMB	Inject Pbars
Tev narrow gate intensity after pbar injection	C:FBIPNG[0-36]	Before Ramp
Tev wide gate intensity after pbar injection	C:FBIPWG[0-36]	Before Ramp
Tev DC intensity after pbar injection (includes pbars)	T:IBEAM	Before Ramp
Tev DC intensity after pbar injection (>1E13) (includes pbars)	T:IBEAMB	Before Ramp
Tev narrow gate intensity at start of acceleration	C:PNGSUM[0-36]	Pbar Injection Porch
Tev narrow gate intensity @ 160 GeV	C:FBIPNG[0-36]	Acceleration
Tev wide gate intensity @ 160 GeV	C:FBIPWG[0-36]	Acceleration
Tev DC intensity @ 160 GeV (includes pbars)	T:IBEAM	Acceleration
Tev DC intensity @ 160 GeV (>1E13) (includes pbars)	T:IBEAMB	Acceleration
Tev narrow gate intensity @ start of flattop	C:FBIPNG[0-36]	Flattop
Tev wide gate intensity @ start of flattop	C:FBIPWG[0-36]	Flattop
Tev DC intensity @ start of flattop (includes pbars)	T:IBEAM	Flattop
Tev DC intensity @ start of flattop (>1E13) (includes pbars)	T:IBEAMB	Flattop
Tev narrow gate intensity @ start of squeeze	C:PNGSUM[0-36]	Squeeze
Tev narrow gate intensity @ end of squeeze	C:FBIPNG[0-36]	Squeeze
Tev wide gate intensity @ end of squeeze	C:FBIPWG[0-36]	Squeeze
Tev DC intensity @ end of squeeze (includes pbars)	T:IBEAM	Squeeze
Tev DC intensity @ end of squeeze (>1E13) (includes pbars)	T:IBEAMB	Squeeze
Tev narrow gate intensity before initiating collisions	C:PNGSUM[0-36]	Initiate Collisions
Tev narrow gate intensity after initiating collisions	C:FBIPNG[0-36]	Initiate Collisions
Tev wide gate intensity after initiating collisions	C:FBIPWG[0-36]	Initiate Collisions
Tev DC intensity after initiating collisions (includes pbars)	T:IBEAM	Initiate Collisions
Tev DC intensity after initiating collisions (>1E13) (includes pbars)	T:IBEAMB	Initiate Collisions
Tev narrow gate intensity after scraping	C:FBIPNG[0-36]	Remove Halo
Tev wide gate intensity after scraping	C:FBIPWG[0-36]	Remove Halo
Tev DC intensity after scraping (includes pbars)	T:IBEAM	Remove Halo
Tev DC intensity after scraping (>1E13) (includes pbars)	T:IBEAMB	Remove Halo
Tev narrow gate intensity during HEP	C:FBIPNG[0-36]	HEP
Tev wide gate intensity during HEP	C:FBIPWG[0-36]	HEP
Tev DC intensity during HEP (includes pbars)	T:IBEAM	HEP
Tev DC intensity during HEP (>1E13) (includes pbars)	T:IBEAMB	HEP
Tev narrow gate intensity when HEP paused	C:FBIPNG[0-36]	Pause HEP
Tev wide gate intensity when HEP paused	C:FBIPWG[0-36]	Pause HEP
Tev DC intensity when HEP paused (includes pbars)	T:IBEAM	Pause HEP
Tev DC intensity when HEP paused (>1E13) (includes pbars)	T:IBEAMB	Pause HEP

The following tables list how to calculate some selected proton efficiencies. Units of all devices are E9.

Meaning	Generic Formula: Device[Case]
MI accel. efficiency	I:P1IWG[Acc. P. in MI] / I:P1IWG[Inj. P.: B. to MI]
coalescing efficiency	I:P1ING[Inj. P.] / I:P1IWG[Acc. P. in MI]
MI → Tev xfer efficiency	C:FBIPNG[Inj. P.] / I:P1ING[Inj. P.]
Tev efficiency @ 150 GeV on C.O.	C:FBIPNG[P. Inj. Porch] / C:FBIPNG[P. Inj.]
Tev efficiency opening helix	C:FBIPNG[Pbar Inj. Porch] / C:FBIPNG[P. Inj. Porch]
Tev efficiency @ 150 GeV on helix	C:PNGSUM[Pbar Inj. Porch] / C:FBIPNG[Pbar Inj. Porch]
Tev acceleration efficiency	C:FBIPNG[Flattop] / C:PNGSUM[Pbar Inj. Porch]
Tev efficiency at flattop	C:PNGSUM[Squeeze] / C:FBIPNG[Flattop]
Tev efficiency in squeeze	C:FBIPNG[Squeeze] / C:PNGSUM[Squeeze]
Tev efficiency initiating collisions	C:FBIPNG[Init. Coll.] / C:PNGSUM[Init. Coll.]
Tev efficiency in remove halo	C:FBIPNG[Remove Halo] / C:FBIPNG[Init. Coll.]

Sums over *i* are from 1 to 36. "NG" means "narrow gate."

Meaning	Specific Formula: Device[element][Case][Set]
total # protons injected into MI	SUM_i{I:P1IWG[Acc. P. in MI][i]}
MI accel. efficiency for proton bunch i	I:P1IWG[Acc. P. in MI][i] / I:P1IWG[Inj. P.: B. to MI][i]
average MI accel. efficiency for protons	SUM_i{I:P1IWG[Acc. P. in MI][i]}/ SUM_i{I:P1IWG[Inj. P.: B. to MI][i]}
total # protons accelerated to 150 GeV	SUM_i{I:P1IWG[Acc. P. in MI][i]}
coalescing efficiency for proton bunch i	I:P1ING[Inj. P.][i] / I:P1IWG[Acc. P. in MI][i]
average coalescing efficiency	SUM_i{I:P1ING[Inj. P.][i]}/ SUM_i{I:P1IWG[Acc. P. in MI][i]}
total # protons coalesced in MI	SUM_i{I:P1ING[Inj. P.][i]}
MI → Tev xfer efficiency for proton bunch i	C:FBIPNG[i][Inj. P.][i] / I:P1ING[Inj. P.][i]
average MI → Tev xfer efficiency	SUM_i{C:FBIPNG[i][Inj. P.][i]}/ SUM_i{I:P1ING[Inj. P.][i]}
total # NG protons injected into Tevatron	SUM_i{C:FBIPNG[i][Inj. P.][i]}
Tev efficiency @ 150 GeV on C.O. for proton bunch i	C:FBIPNG[i][P. Inj. Porch] / C:FBIPNG[i][P. Inj.][i]
average Tev efficiency @ 150 GeV on C.O.	C:FBIPNG[0][P. Inj. Porch]/ SUM_i{C:FBIPNG[i][Inj. P.][i]}
total # NG protons before opening helix	C:FBIPNG[0][P. Inj. Porch]
Tev efficiency opening helix for proton bunch i	C:FBIPNG[i][Pbar Inj. Porch] / C:FBIPNG[i][P. Inj. Porch]
average efficiency opening helix	C:FBIPNG[0][Pbar Inj. Porch] / C:FBIPNG[0][P. Inj. Porch]
total # NG protons after opening helix	C:FBIPNG[0][Pbar Inj. Porch]
Tev efficiency @ 150 GeV on helix for proton bunch i	C:PNGSUM[i][Pbar Inj. Porch] / C:FBIPNG[i][Pbar Inj. Porch]
average efficiency @ 150 GeV on helix	C:PNGSUM[0][Pbar Inj. Porch] / C:FBIPNG[0][Pbar Inj. Porch]
total # NG protons after injecting pbars	C:PNGSUM[0][Pbar Inj. Porch]
Tev acceleration efficiency for proton bunch i	C:FBIPNG[i][Flattop] / C:PNGSUM[i][Pbar Inj. Porch]
average acceleration efficiency	C:FBIPNG[0][Flattop] / C:PNGSUM[0][Pbar Inj. Porch]
total # NG protons at start of flattop	C:FBIPNG[0][Flattop]
Tev efficiency at flattop for proton bunch i	C:PNGSUM[i][Squeeze] / C:FBIPNG[i][Flattop]
average efficiency at flattop	C:PNGSUM[0][Squeeze] / C:FBIPNG[0][Flattop]
total # NG protons at start of squeeze	C:PNGSUM[0][Squeeze]
Tev efficiency in squeeze for proton	C:FBIPNG[i] [Squeeze] / C:PNGSUM[i] [Squeeze]

bunch i	
average efficiency in squeeze	C:FBIPNG[0] [Squeeze] / C:PNGSUM[0] [Squeeze]
total # NG protons at end of squeeze	C:FBIPNG[0] [Squeeze]
Tev efficiency initiating collisions for proton bunch i	C:FBIPNG[i] [Init. Coll.] / C:PNGSUM[i] [Init. Coll.]
average efficiency initiating collisions	C:FBIPNG[0] [Init. Coll.] / C:PNGSUM[0] [Init. Coll.]
total # NG protons after initiating collisions	C:FBIPNG[0] [Init. Coll.]
Tev efficiency in remove halo for proton bunch i	C:FBIPNG[i] [Remove Halo][1] / C:FBIPNG[i] [Init. Coll.]
average efficiency removing halo	C:FBIPNG[0] [Remove Halo][1] / C:FBIPNG[0] [Init. Coll.]
total # NG protons after remove halo	C:FBIPNG[0] [Remove Halo][1]

The following table lists the antiproton intensity devices, their meanings, and the Cases in which they are read.

Meaning	Name	Case
Accumulator intensity just before unstacking	A:IBEAMB	Unstack Pbars
Requested unstacking fraction	A:BMFRAC	Unstack Pbars
Accumulator intensity just before extraction	A:IBEAMB	Transfer Pbars from Accum to MI
Accumulator intensity just after extraction (S/H)	A:IBEAM2	Transfer Pbars from Accum to MI
Requested unstacking fraction	A:BMFRAC	Transfer Pbars from Accum to MI
Intensity in AP3 line	D:TOR910	Transfer Pbars from Accum to MI
Intensity in AP1 line	M:TOR105	Transfer Pbars from Accum to MI
Intensity in P2 line	I:TORF1S	Transfer Pbars from Accum to MI
Intensity in P1 line	I:TOR714	Transfer Pbars from Accum to MI
Intensity in P1 line	I:TOR702	Transfer Pbars from Accum to MI
Intensity in MI injection channel	I:TOR521	Transfer Pbars from Accum to MI
MI DC intensity @ injection	I:IBEAMS	Transfer Pbars from Accum to MI
MI batch 1 narrow gate intensity @ injection	I:A1ING	Transfer Pbars from Accum to MI
MI batch 2 narrow gate intensity @ injection	I:A2ING	Transfer Pbars from Accum to MI
MI batch 3 narrow gate intensity @ injection	I:A3ING	Transfer Pbars from Accum to MI
MI batch 4 narrow gate intensity @ injection	I:A4ING	Transfer Pbars from Accum to MI
MI sum narrow gate intensity @ injection	I:ANGSUM	Transfer Pbars from Accum to MI
MI batch 1 wide gate intensity @ injection	I:A1IWG	Transfer Pbars from Accum to MI
MI batch 2 wide gate intensity @ injection	I:A2IWG	Transfer Pbars from Accum to MI
MI batch 3 wide gate intensity @ injection	I:A3IWG	Transfer Pbars from Accum to MI
MI batch 4 wide gate intensity @ injection	I:A4IWG	Transfer Pbars from Accum to MI
MI sum wide gate intensity @ injection	I:AWGSUM	Transfer Pbars from Accum to MI
MI DC intensity @ start of flattop	I:IBEAMS	Accelerate Pbars in the MI
MI batch 1 narrow gate intensity @ start of flattop	I:A1ING	Accelerate Pbars in the MI
MI batch 2 narrow gate intensity @ start of flattop	I:A2ING	Accelerate Pbars in the MI
MI batch 3 narrow gate intensity @ start of flattop	I:A3ING	Accelerate Pbars in the MI
MI batch 4 narrow gate intensity @ start of flattop	I:A4ING	Accelerate Pbars in the MI
MI sum narrow gate intensity @ start of flattop	I:ANGSUM	Accelerate Pbars in the MI
MI batch 1 wide gate intensity @ start of flattop	I:A1IWG	Accelerate Pbars in the MI
MI batch 2 wide gate intensity @ start of flattop	I:A2IWG	Accelerate Pbars in the MI
MI batch 3 wide gate intensity @ start of flattop	I:A3IWG	Accelerate Pbars in the MI
MI batch 4 wide gate intensity @ start of flattop	I:A4IWG	Accelerate Pbars in the MI
MI sum wide gate intensity @ start of flattop	I:AWGSUM	Accelerate Pbars in the MI
Accumulator intensity just before extraction	A:IBEAMB	Inject Pbars
Accumulator intensity just after extraction (S/H)	A:IBEAM2	Inject Pbars
MI batch 1 narrow gate intensity before extraction	I:A1ING	Inject Pbars
MI batch 2 narrow gate intensity before extraction	I:A2ING	Inject Pbars
MI batch 3 narrow gate intensity before extraction	I:A3ING	Inject Pbars
MI batch 4 narrow gate intensity before extraction	I:A4ING	Inject Pbars
MI sum narrow gate intensity before extraction	I:ANGSUM	Inject Pbars
MI batch 1 wide gate intensity before extraction	I:A1IWG	Inject Pbars
MI batch 2 wide gate intensity before extraction	I:A2IWG	Inject Pbars
MI batch 3 wide gate intensity before extraction	I:A3IWG	Inject Pbars
MI batch 4 wide gate intensity before extraction	I:A4IWG	Inject Pbars
MI sum wide gate intensity before extraction	I:AWGSUM	Inject Pbars
MI DC beam intensity at injection	I:IBEAM3	Inject Pbars
MI DC beam intensity at FT	I:IBEAM6	Inject Pbars
MI DC beam intensity before extraction	I:IBEAMS	Inject Pbars

Tev narrow gate intensity before injection (for background check)	C:ANGSUM[0-36]	Inject Pbars
Tev narrow gate intensity @ injection	C:FBIANG[0-36]	Inject Pbars
Tev wide gate intensity @ injection	C:FBIAWG[0-36]	Inject Pbars
Tev narrow gate intensity before ramp	C:FBIANG[0-36]	Before Ramp
Tev wide gate intensity before ramp	C:FBIAWG[0-36]	Before Ramp
Tev narrow gate intensity @ start of ramp	C:FBIANG[0-36]	Pbar Injection Porch
Tev wide gate intensity @ start of ramp	C:FBIAWG[0-36]	Pbar Injection Porch
Tev narrow gate intensity @ 160 GeV	C:FBIANG[0-36]	Acceleration
Tev wide gate intensity @ 160 GeV	C:FBIAWG[0-36]	Acceleration
Tev narrow gate intensity @ start of flattop	C:FBIANG[0-36]	Flattop
Tev wide gate intensity @ start of flattop	C:FBIAWG[0-36]	Flattop
Tev narrow gate intensity @ start of squeeze	C:ANGSUM[0-36]	Squeeze
Tev narrow gate intensity @ end of squeeze	C:FBIANG[0-36]	Squeeze
Tev wide gate intensity @ end of squeeze	C:FBIAWG[0-36]	Squeeze
Tev narrow gate intensity before initiating collisions	C:ANGSUM[0-36]	Initiate Collisions
Tev narrow gate intensity after initiating collisions	C:FBIANG[0-36]	Initiate Collisions
Tev wide gate intensity after initiating collisions	C:FBIAWG[0-36]	Initiate Collisions
Tev narrow gate intensity after removing halo	C:FBIANG[0-36]	Remove Halo
Tev wide gate intensity after removing halo	C:FBIAWG[0-36]	Remove Halo
Tev narrow gate intensity during HEP	C:FBIANG[0-36]	HEP
Tev wide gate intensity during HEP	C:FBIAWG[0-36]	HEP
Tev narrow gate intensity when HEP paused	C:FBIANG[0-36]	Pause HEP
Tev wide gate intensity when HEP paused	C:FBIAWG[0-36]	Pause HEP

The following tables list how to calculate some selected antiproton efficiencies and losses. A:IBEAMB, A:IBEAM2, and I:IBEAMS have units E10. All other devices have units E9.

Meaning	Generic Formula: Device[Case]
Accumulator unstacking efficiency	A:IBEAMB[Tr. pbars Accum. to MI] / A:IBEAMB[Unstack Pbars]
Accumulator → MI xfer efficiency	I:AWGSUM[Tr. Pbars Accum. to MI] / (A:IBEAMB[Tr. Pbars Accum. to MI] - A:IBEAM2[Tr. Pbars Accum. to MI])
Accumulator → MI xfer efficiency (DC beam)	I:IBEAMS[Tr. Pbars Accum. to MI] / (A:IBEAMB[Tr. Pbars Accum. to MI] - A:IBEAM2[Tr. Pbars Accum. to MI])
MI accel. efficiency	I:AiIWG[Acc. Pbars in MI] / I:AiIWG[Tr. Pbars Accum. to MI]
coalescing efficiency	I:AiING[Inj. Pbar] / I:AiIWG[Acc. Pbars in MI]
MI → Tev xfer efficiency	C:FBIANG[Inj. Pbar] / I:AiING[Inj. Pbar]
Tev efficiency @ 150 GeV on helix	C:FBIANG[Pbar Inj. Porch] / C:FBIANG[Inj. Pbars]
Tev acceleration efficiency	C:FBIANG[Flattop] / C:FBIANG[Pbar Inj. Porch]
Tev efficiency at flattop	C:ANGSUM[Squeeze] / C:FBIANG[Flattop]
Tev efficiency in squeeze	C:FBIANG[Squeeze] / C:ANGSUM[Squeeze]
Tev efficiency initiating collisions	C:FBIANG[Init. Coll.] / C:ANGSUM[Init. Coll.]
Tev efficiency in remove halo	C:FBIANG[Remove Halo] / C:FBIANG[Init. Coll.]

Sums over *j* are from 1 to 9. Sums over *i* are from 1 to 36. *k* index (pbar batch in MI) goes from 1 to 4. MI pbar widegate FBI signals are too noisy for accurate calculations. Replace I:AWGSUM with I:IBEAMS in table below. I:AkIWG signals are not useful as scalers.

Meaning	Specific Formula: Device[element][Case][Set]
total # pbars extracted from Accum. core	A:IBEAMB[Unstack Pbars][1] - A:IBEAM2[Tr. Pbars Accum. to MI][9]
Accumulator unstacking efficiency for shot j	A:IBEAMB[Tr. Pbars Accum. to MI][j] / A:IBEAMB[Unstack Pbars][j]
average Accumulator unstacking efficiency	SUMj{A:IBEAMB[Tr. Pbars Accum. to MI][j]}/ SUMj{A:IBEAMB[Unstack Pbars][j]]}
Accumulator → MI xfer efficiency for shot j	I:AWGSUM[Tr. Pbars Accum. to MI][j] / (A:IBEAMB[Tr. Pbars Accum. to MI][j] - A:IBEAM2[Tr. Pbars Accum. to MI][j])
average Accumulator → MI xfer efficiency	SUMj{I:AWGSUM[Tr. Pbars Accum. to MI][j]}/ SUMj{(A:IBEAMB[Tr. Pbars Accum. to MI][j] - A:IBEAM2[Tr. Pbars Accum. to MI][j])}
Accumulator → MI xfer efficiency for shot j (DC beam)	I:IBEAMS[Tr. Pbars Accum. to MI][j] / (A:IBEAMB[Tr. Pbars Accum. to MI][j] - A:IBEAM2[Tr. Pbars Accum. to MI][j])
average Accumulator → MI xfer efficiency (DC beam)	SUMj{I:IBEAMS[Tr. Pbars Accum. to MI][j]}/ SUMj{(A:IBEAMB[Tr. Pbars Accum. to MI][j] - A:IBEAM2[Tr. Pbars Accum. to MI][j])}
total # pbars injected into MI	SUMj{I:IBEAMS[Tr. Pbars Accum. to MI][j]}
MI accel. efficiency for pbar batch k, shot j	I:AkIWG[Acc. Pbars in MI][j] / I:AkIWG[Tr. Pbars Accum. to MI][j]
average MI accel. efficiency	SUMj{I:AWGSUM[Acc. Pbars in MI][j]}/ SUMj{I:AWGSUM[Tr. Pbars Accum. to MI][j]}
total # pbars accelerated in MI	SUMj{I:AWGSUM[Acc. Pbars in MI][j]}
coalescing efficiency for pbar batch k, shot j	I:AkING[Inj. Pbar][j] / I:AkIWG[Acc. Pbars in MI][j]

average MI coalescing efficiency	SUMj{I:ANGSUM[Inj. Pbar][j]}/ SUMj{I:AWGSUM[Acc. Pbars in MI][j]}
total # pbars coalesced in MI	SUMj{I:ANGSUM[Inj. Pbar][j]}
MI → Tev xfer eff. for pbar bunch i (shot j, batch k)	C:FBIANG[i][Inj. Pbar][j] / I:AkING[Inj. Pbar][j]
average MI → Tev xfer efficiency	SUMi{C:FBIANG[i][Inj. Pbar][j(i)]}/ SUMj{I:AWGSUM[Acc. Pbars in MI][j]}
total # NG pbars injected into Tevatron	SUMi{C:FBIANG[i][Inj. Pbar][j(i)]}
Tev efficiency @ 150 GeV on helix for pbar bunch i	C:FBIANG[i][Pbar Inj. Porch] / C:FBIANG[i][Inj. Pbars][j(i)]
average Tev efficiency @ 150 GeV on helix	C:FBIANG[0][Pbar Inj. Porch] / SUMi{C:FBIANG[i][Inj. Pbars][j(i)]}
total # NG pbars at start of acceleration	C:FBIANG[0][Pbar Inj. Porch]
Tev acceleration efficiency for pbar bunch i	C:FBIANG[i][Flattop] / C:FBIANG[i][Pbar Inj. Porch]
average Tev acceleration efficiency	C:FBIANG[0][Flattop] / C:FBIANG[0][Pbar Inj. Porch]
total # NG pbars at start of flattop	C:FBIANG[0][Flattop]
Tev efficiency at flattop for pbar bunch i	C:ANGSUM[i][Squeeze] / C:FBIANG[i][Flattop]
average Tev efficiency at flattop	C:ANGSUM[0][Squeeze] / C:FBIANG[0][Flattop]
total # NG pbars at start of squeeze	C:ANGSUM[0][Squeeze]
Tev efficiency in squeeze for pbar bunch i	C:FBIANG[i][Squeeze] / C:ANGSUM[i][Squeeze]
average Tev efficiency in squeeze	C:FBIANG[0][Squeeze] / C:ANGSUM[0][Squeeze]
total # NG pbars at end of squeeze	C:FBIANG[0][Squeeze]
Tev efficiency initiating collisions for pbar bunch i	C:FBIANG[i][Init. Coll.] / C:ANGSUM[i][Init. Coll.]
average Tev efficiency initiating collisions	C:FBIANG[0][Init. Coll.] / C:ANGSUM[0][Init. Coll.]
total # NG pbars after initiating collisions	C:FBIANG[0][Init. Coll.]
Tev efficiency in remove halo for pbar bunch i	C:FBIANG[i][Remove Halo][1] / C:FBIANG[i][Init. Coll.]
average Tev efficience in removing halo	C:FBIANG[0][Remove Halo][1] / C:FBIANG[0][Init. Coll.]
total # NG pbars after removing halo	C:FBIANG[0][Remove Halo][1]

The indices, *i* = pbar bunch # in the Tevatron (1-36), *j* = pbar shot # (1-9), and *k* = pbar batch # in the MI (1-4), are related in the following way:

i	j	k
1	1	1
2	1	2
3	1	3
4	1	4
5	4	1
6	4	2
7	4	3
8	4	4
9	7	1
10	7	2
11	7	3
12	7	4
13	2	1
14	2	2
15	2	3
16	2	4
17	5	1
18	5	2
19	5	3
20	5	4
21	8	1
22	8	2
23	8	3
24	8	4
25	3	1
26	3	2
27	3	3
28	3	4
29	6	1
30	6	2
31	6	3
32	6	4
33	9	1
34	9	2
35	9	3
36	9	4

The following table lists intensity devices which are currently in SDA but will be deleted soon.

Meaning	Name	Case
Accumulator intensity before 1st shot (broken)	A:STACKB	Unstack Pbars
C:FBIPNG duplicate	C:PNGSUM	Proton Injection Porch
C:FBIPNG duplicate	C:PNGSUM	Inject Protons
Accumulator intensity (S/H) (broken)	A:IBEAM1	Transfer Pbars from Accum to MI
Pbar intensity in P2 line	I:TORF1S	Inject Pbars
Pbar intensity in AP3 line	D:TOR910	Inject Pbars
Pbar intensity in AP1 line	M:TOR105	Inject Pbars