

Sheet1

BPM data system checks
v. 1.0 / July 17 2008
T. Satogata

KEY ==>	a=average	s=status bit	T=self trig	always
	t=tbl	m=masks data	F=fixed timing	or
	at=both	d=drops data	TF=both	user request

Where checked? \ What checked?	Self trigger	Digitizer of/uf	Acorr/Bcorr	Position bound	Variance bound	FFT noise	FFT phase	Orbit/model	Diff orb	BBA offset	Time sanity	Time corr
IFE Hardware	at:sT:always	at:sT:always	---	---	---	---	---	---	---	---	---	---
IFE DSP	at:sT:always	at:sT:always	DISCUSS	DISCUSS	DISCUSS	---	---	---	---	---	DISCUSS	---
ADO	---	---	at:sF+:always at:sTF:always	at:sTF:always	DISCUSS	---	---	---	---	---	---	---
Orbit Collector (manager side)	---	---	---	---	---	---	---	---	---	---	at:dTF:always	at:dTF:always
Orbit Manager (after collection)	---	---	DISCUSS	---	---	DISCUSS	DISCUSS	DISCUSS	---	---	---	---
Application: RhicOrbitDisplay	---	---	---	at:mTF:always	a:mTF:planned	---	---	---	---	---	---	---
Application: AtrOrbitDisplay	---	---	DISCUSS	DISCUSS	---	---	---	---	---	---	---	---
Application: LOptics	---	---	??	??	??	DISCUSS	---	DISCUSS	---	---	---	---
Application: RhicBpmCheckout	---	---	at:mTF:always	at:mTF:always	---	---	---	DISCUSS	---	---	---	---
Offline Analysis	---	---	---	---	---	t:mTF:req	t:mTF:req	DISCUSS	a:mTF:req	a:mTF:req	---	---

Descriptions of checks:

Self Trigger: Status bit reflects whether peak detector fired in timing window (self-trigger mode only)
 Digitizer of/uf: Status bit reflects digitizer overflow or underflow on ADC (self-trigger mode only?)
 Position bound: Status bit reflects position measurement outside of a set tolerance (includes flatline a/b)
 Variance bound: Status bit reflects variance outside of a set tolerance (average orbit only)
 FFT noise: Status bits reflect signal/noise of FFT outside of a set tolerance (TBT mode only)
 FFT phase: A/B are 180 degrees out of phase when signal is present (TBT mode only)
 Orbit/model sanity: Orbit consistent with physical expectations from model
 Diff orb sign: Sign agreement of model/measured difference orbits
 BBA offset: BPM offset checked relative to nearby quad center
 Timestamp sanity: Timestamp is not even vaguely sane
 Timestamp correlation: Timestamps do not absolutely agree (or within tolerance of several turns?)

RhicBpmCheckout also checks for "crazy statuses"
 Most applications will mask non-good statuses as bad

Suggested status bits
 ADO: acorr/bcorr out of tolerance
 ADO: position out of tolerance
 ADO: sanity failure
 IFE: no peak detected (self trig only)
 IFE: digital overflow
 IFE: digital underflow
 IFE: computational overflow
 IFE: computational underflow (probably unnecessary)
 ADO/MAN: variance out of tolerance
 MAN: no data reported when expected
 IFE: 25%, 50%, 75% no peak detected (self trig ave orb only)