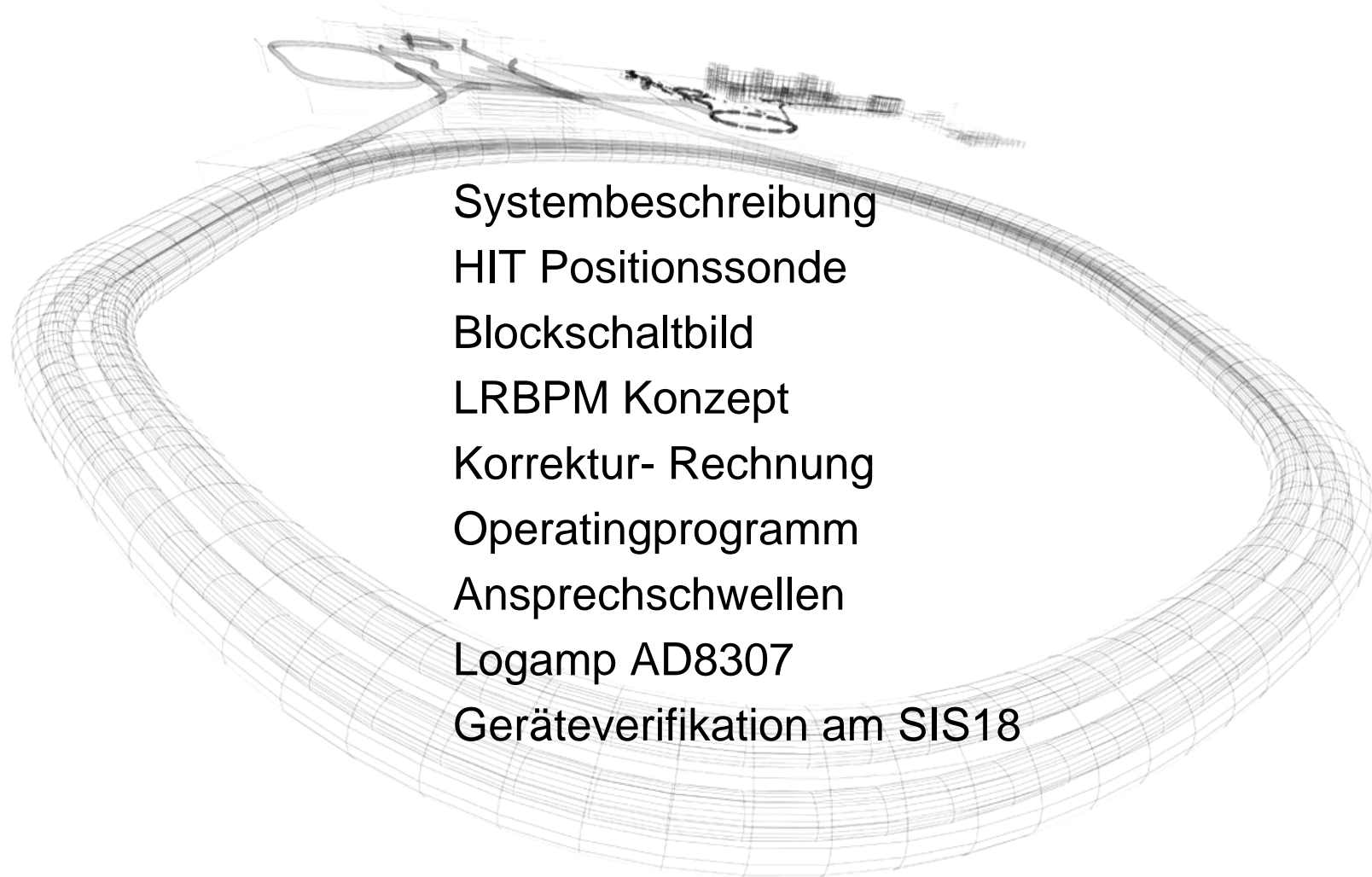


Das Positionsmssystem am HIT-Synchrotron



Systembeschreibung

6 x Schuhbox Positionssonde

24 x schaltbare Kopfverstärker als Impedanzwandler u. Leitungstreiber

Fernversorgung der Kopfverstärker

Plattensignalübertragung mittels Festmantelkabel

Sondensignale an Patchpanel im Elektronikraum erreichbar

6 x kommerzielle Positionsauswertemodule mit hoher Dynamik

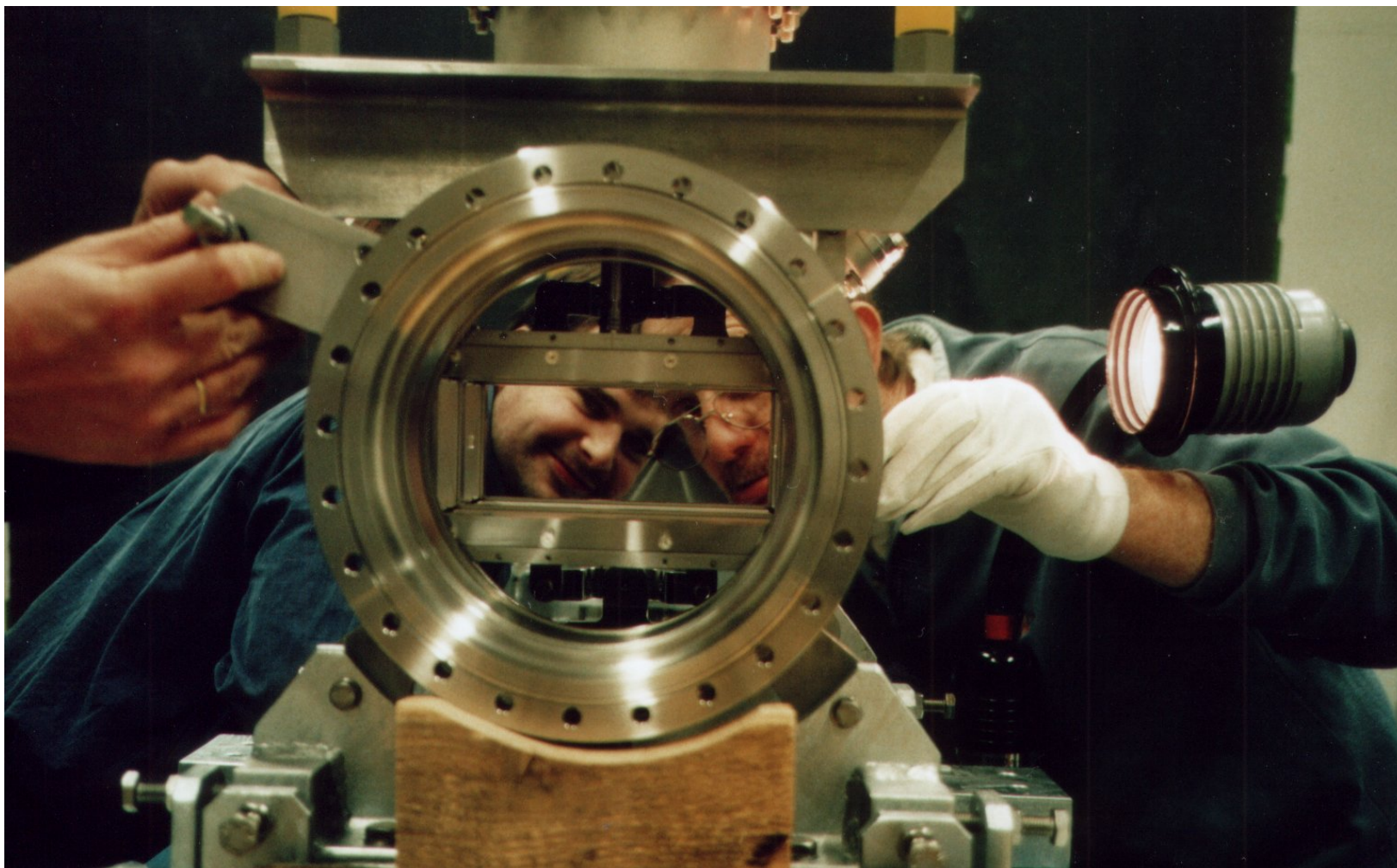
3 Ausgangssignale je Auswertemodul; horizontal, vertikal, Intensität

18 ADC Kanäle im PXI- Crate

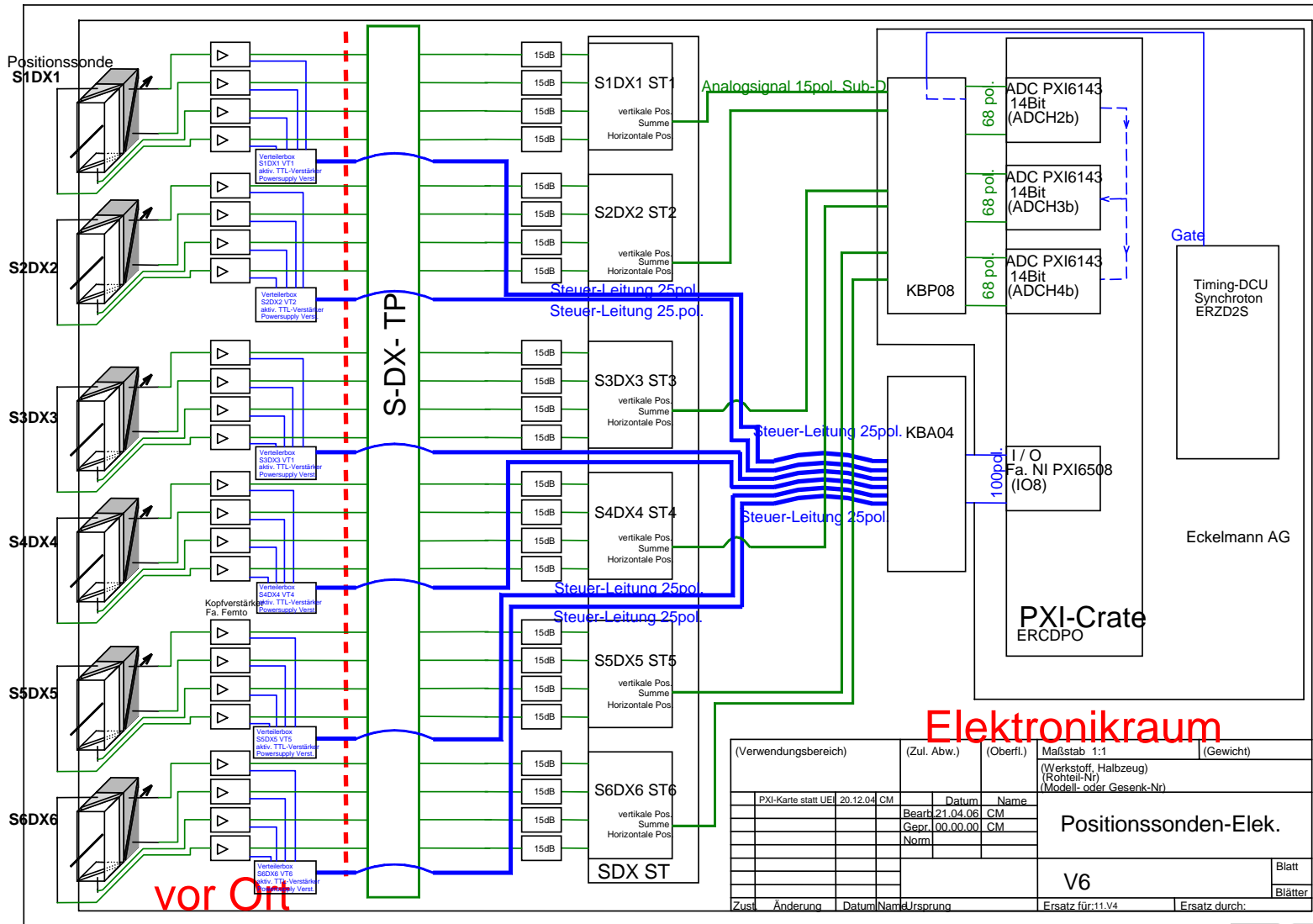
„Handbedienebene“ über LabView Applikation verfügbar

Operatingprogramm

HIT Positionssonde



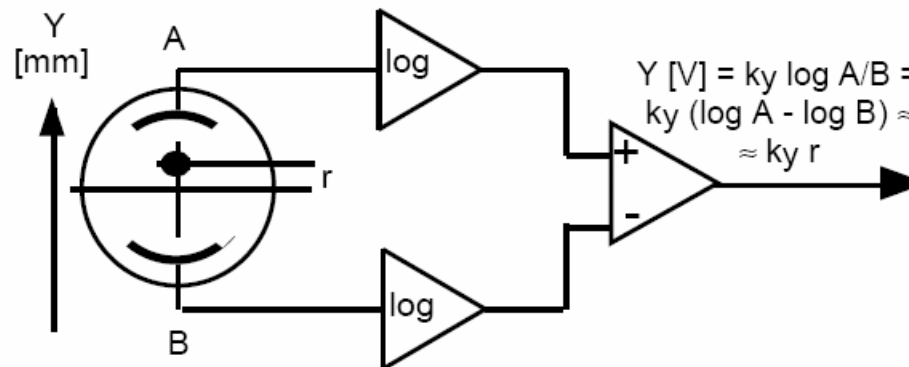
Blockschaltbild



LRBPM Konzept

LogRatioBeamPositionMonitor

Schematic representation of the log-ratio BPM, an original concept of Robert E. Shafer:

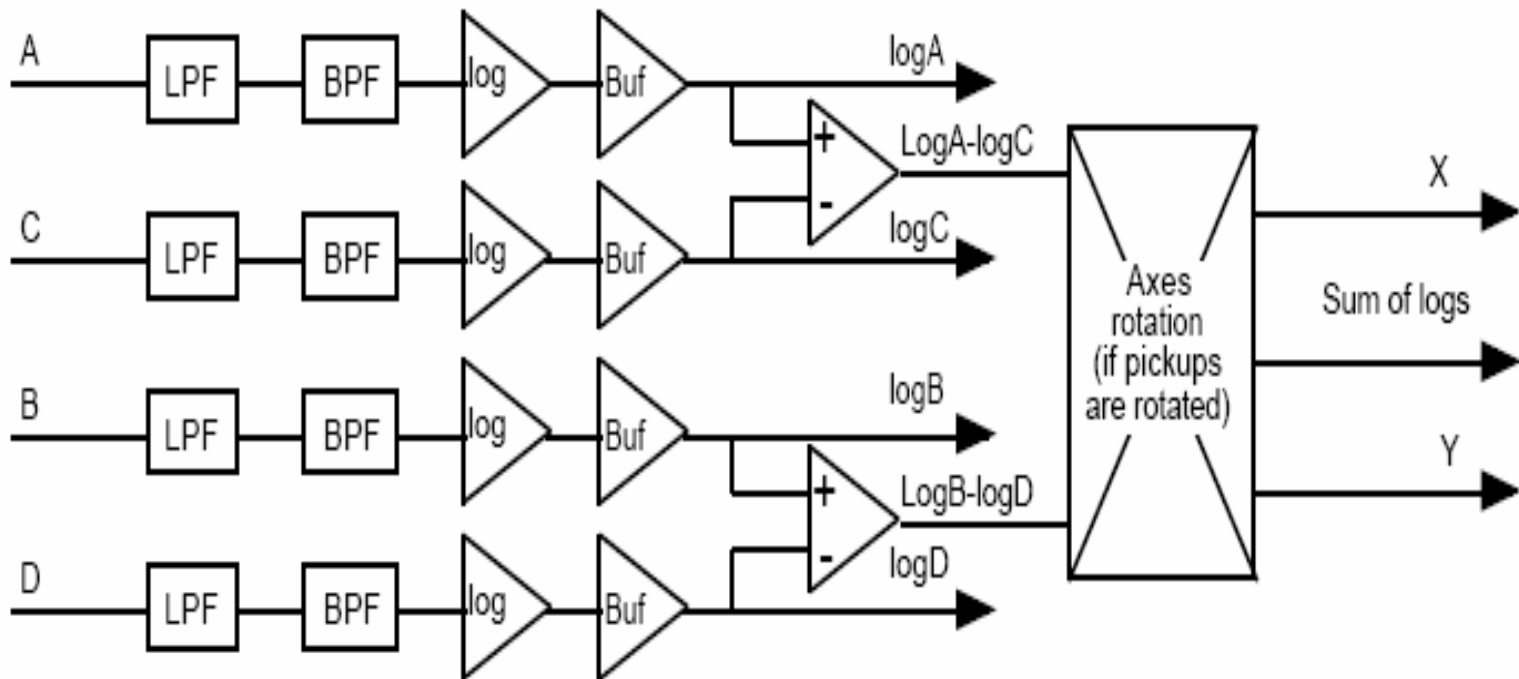


Position measured by this method is more linear, over a wider range, than difference-over-sum.

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LRBPM Konzept

LogRatioBeamPositionMonitor



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Korrekturrechnung

LRBPM ist skaliert auf 55,5mV / 1dB Plattensignalunterschied.

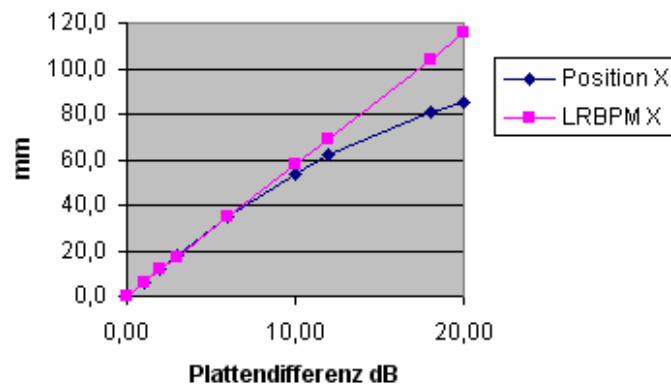
Schuhbox-Positionssonde liefert lineare Positionsabhängigkeit.
Positionsauswertung erfolgt mit Rechnung Differenz / Summe.

Mittels Korrekturrechnung erfolgt die notwendige Anpassung.

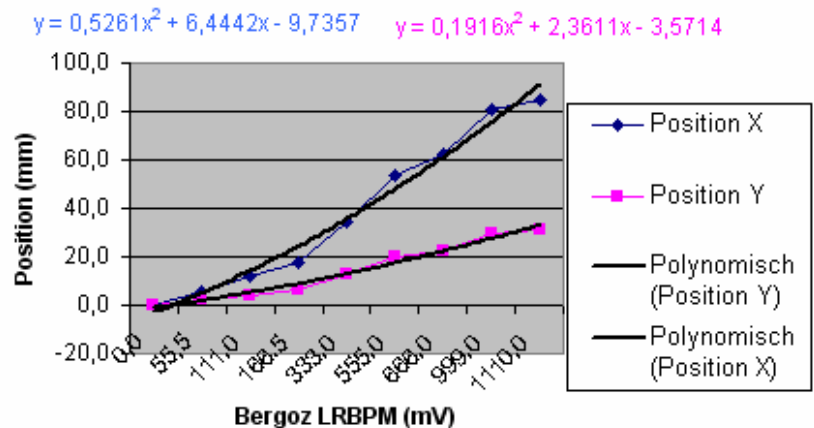
Korrekturrechnung

	A	B	C	D	E	F	G	H	I
4									
5	Positionssonden-Plattensignaldifferenz	Rechnung	Bergoz LRBPM	Abweichung	Position X	Position Y	LRBPM X	LRBPM Y	
6	dB	Faktor	Δ/Σ	mV	%	mm (k=104)	mm (k=38)	mm (k=104)	mm (k=38)
7	0,00	1,00	0,0	0,0	0,0	0,0	0,0	0,0	0,0
8	1,00	1,12	56,6	55,5	-2,0	5,9	2,1	5,8	2,1
9	2,00	1,26	115,0	111,0	-3,6	11,9	4,4	11,5	4,2
10	3,00	1,41	170,0	166,5	-2,1	17,7	6,5	17,3	6,3
11	6,00	2,00	333,0	333,0	0,0	34,6	12,6	34,6	12,6
12	10,00	3,16	519,0	555,0	6,9	53,9	19,7	57,7	21,0
13	12,00	4,00	600,0	666,0	11,0	62,4	22,8	69,3	25,3
14	18,00	8,00	777,0	999,0	28,6	80,8	29,5	103,9	37,9
15	20,00	10,00	818,0	1110,0	35,7	85,1	31,1	115,4	42,2

Positionsauswertung



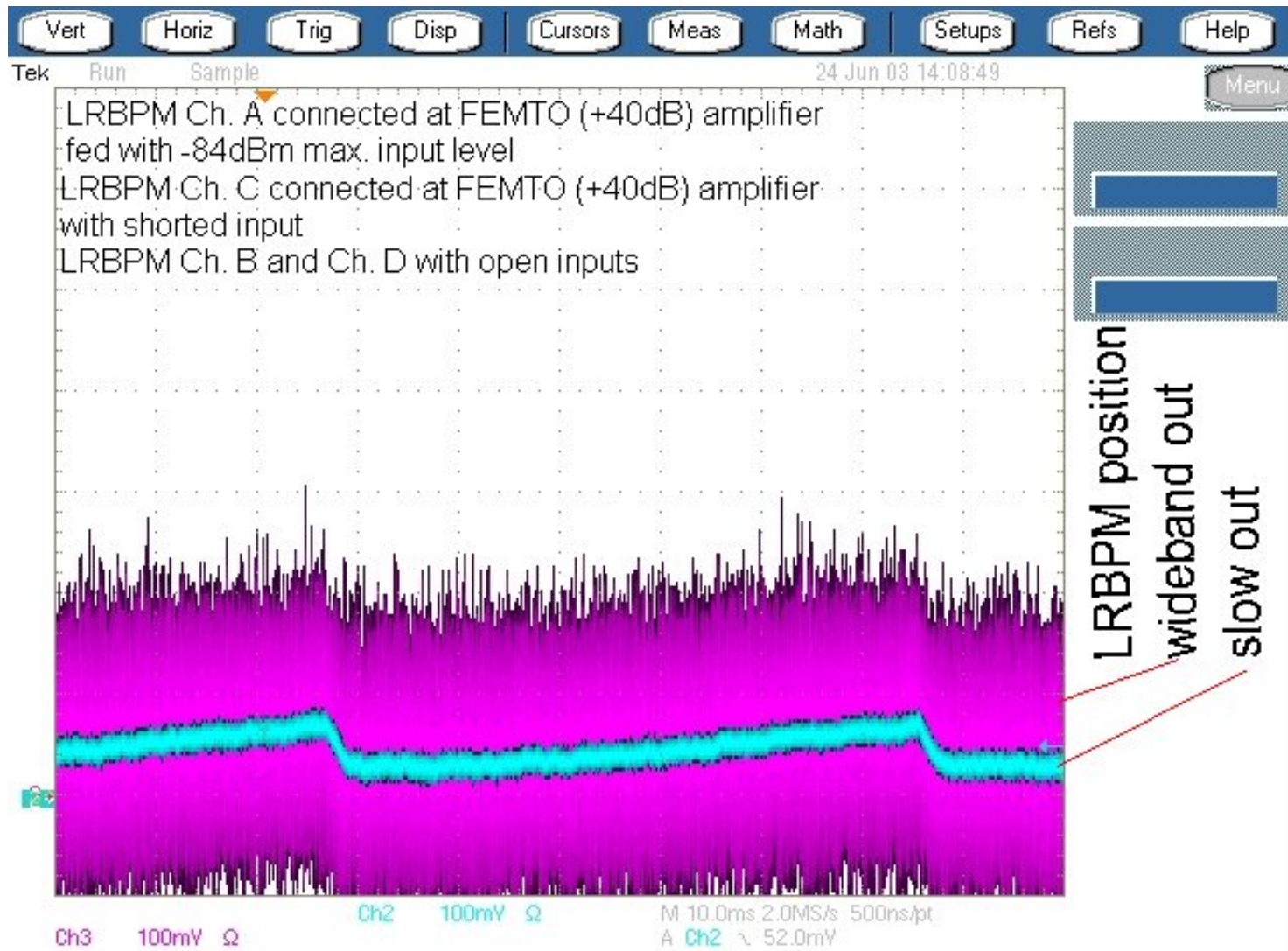
Korrekturfunktionen



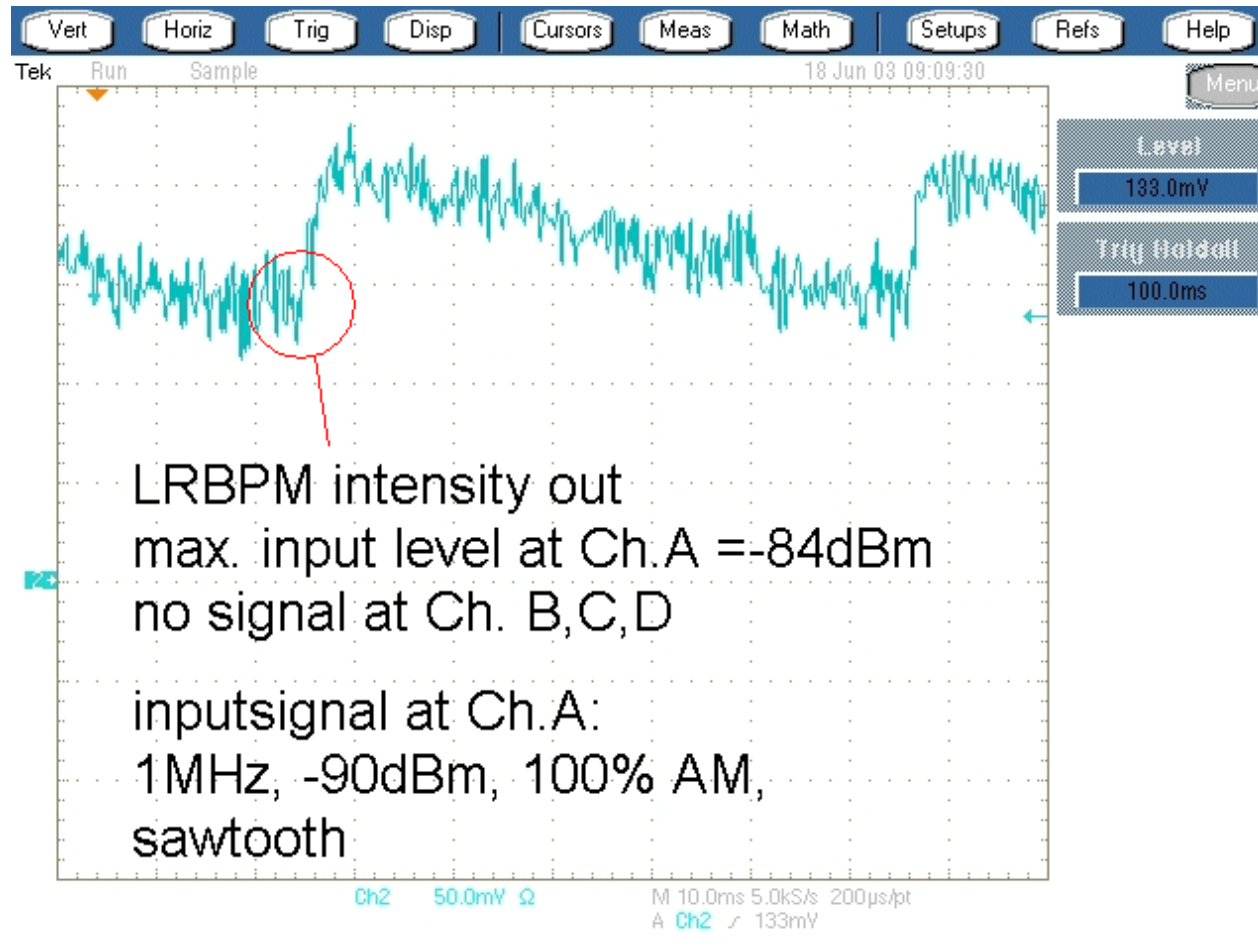
Operatingprogramm



Ansprechschwelle (Position) mit Kopfverstärker



Ansprechschwelle (Sum of logs)

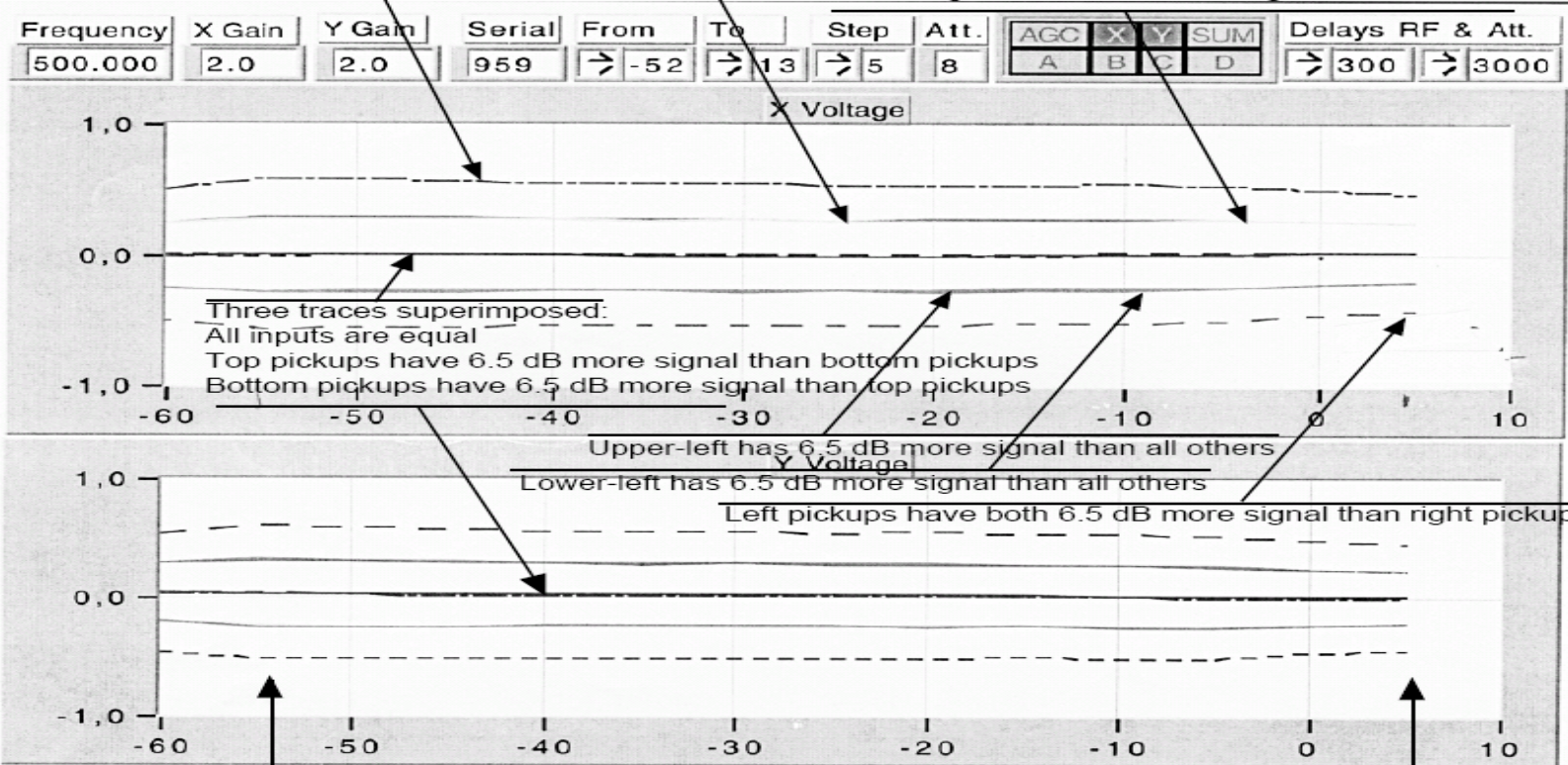


Intensitätsgang der Positionsauswertung

Right pickups have both 6.5 dB more signal than left pickups.

Upper-right has 6.5 dB more signal than all others

Lower-right has 6.5 dB more signal than all others



This plot is taken with an LR-BPM configured for rotated pickups.

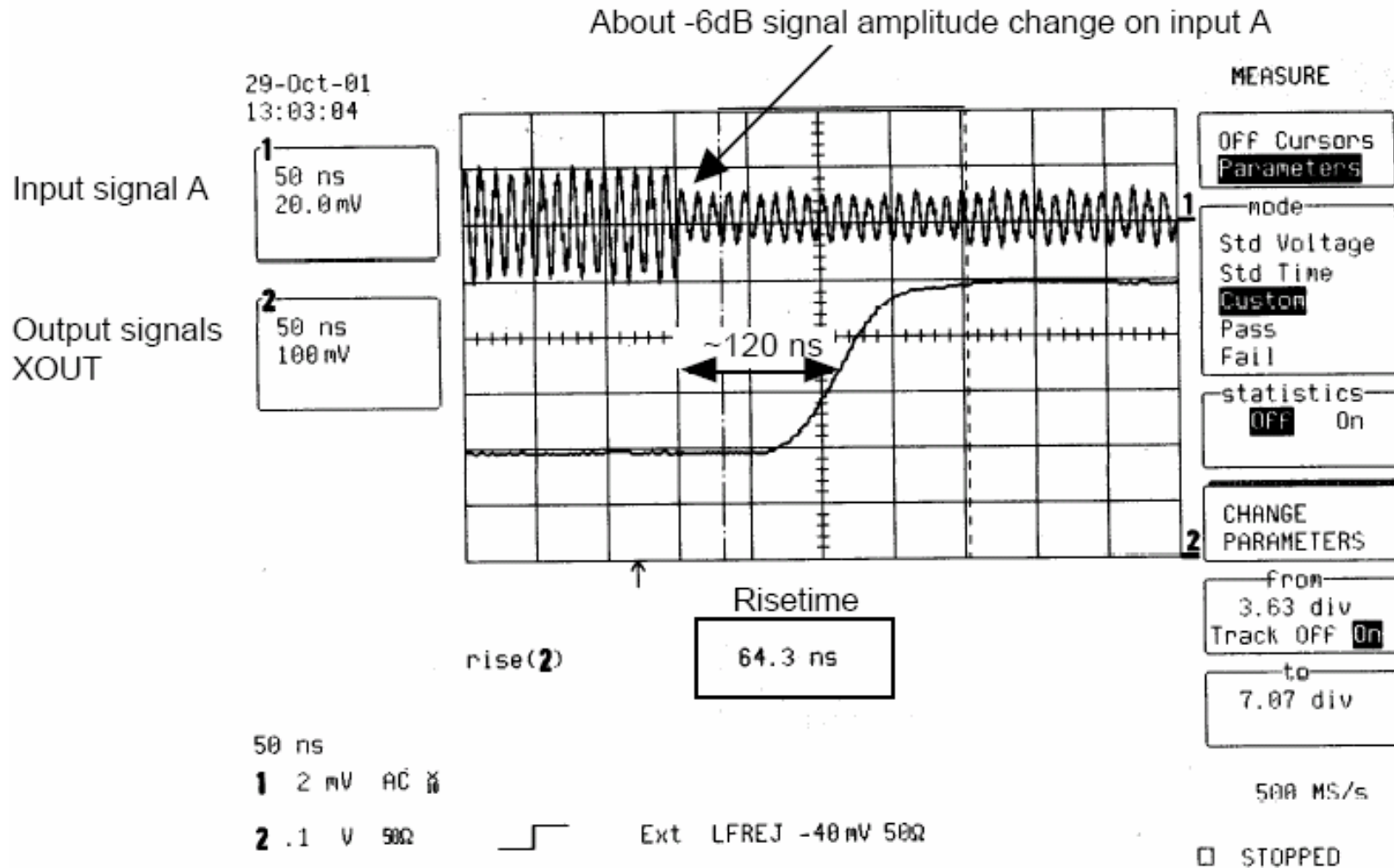
In a hypothetical 1-MHz *f*rev synchrotron with
 1-cm buttons in 4-cm dia. vacuum chamber...

+5 dBm power level at inputs corresponds to ~200 mA stored beam

-55 dBm power level at inputs corresponds to ~200 uA stored beam

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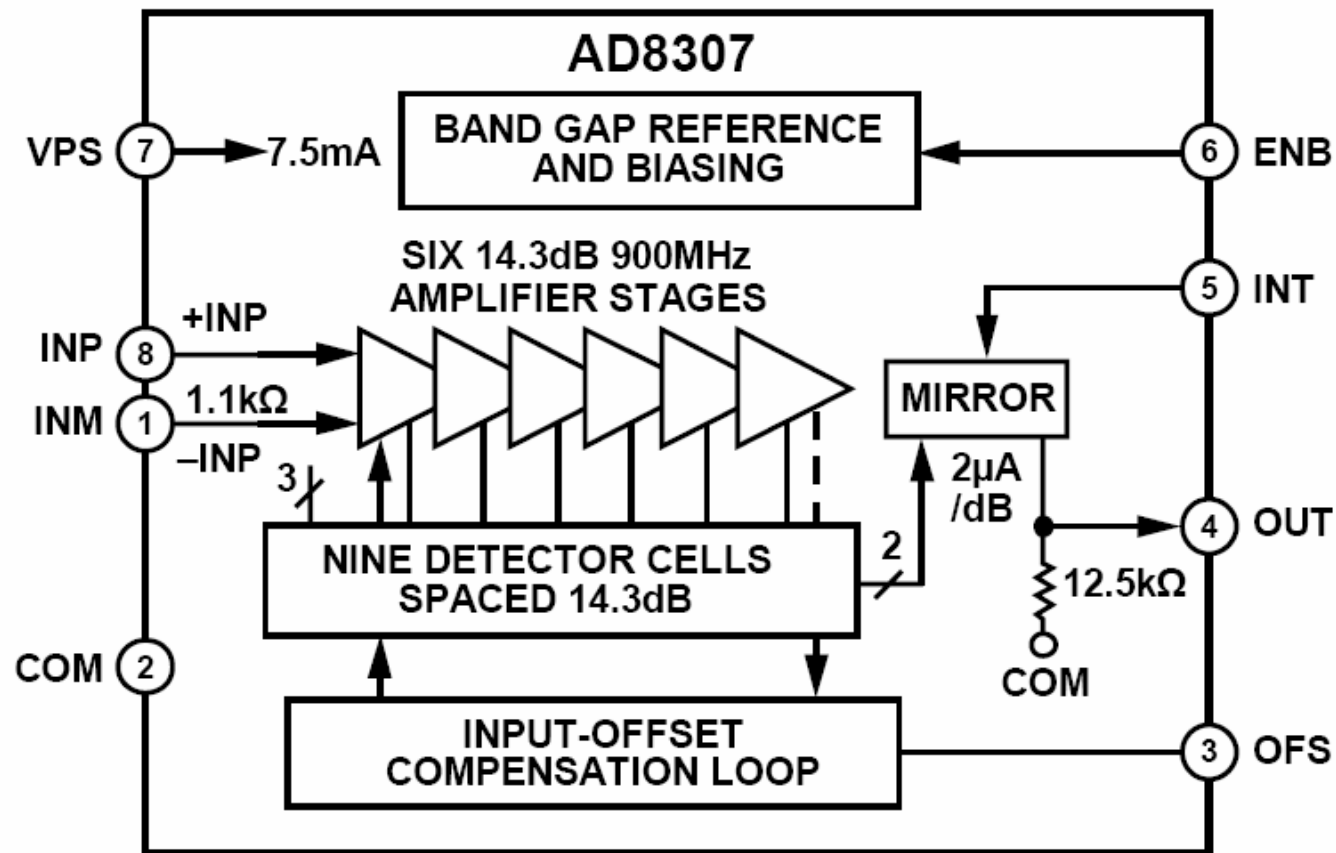
Auswerteverzögerung



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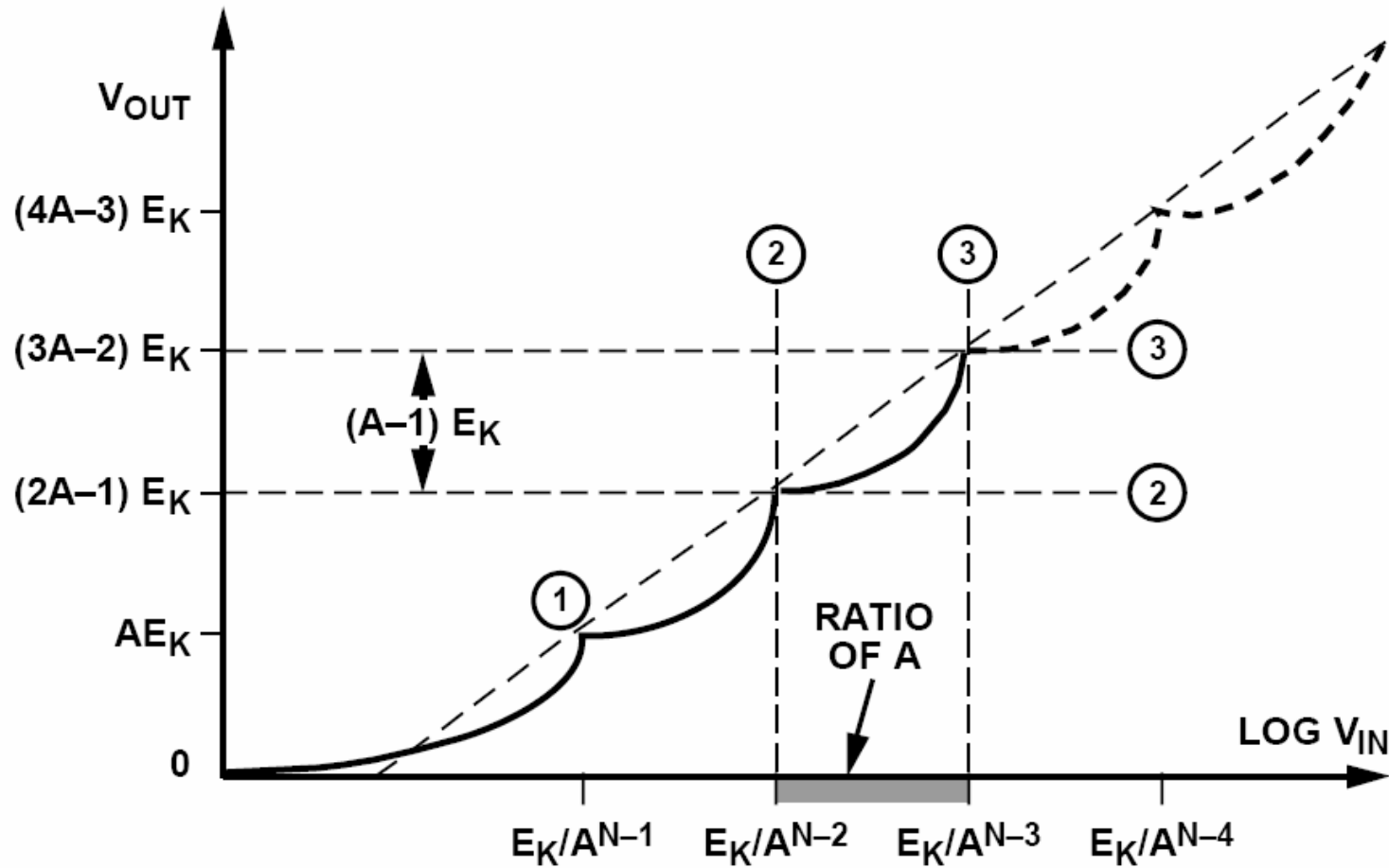
Logamp AD8307

FUNCTIONAL BLOCK DIAGRAM



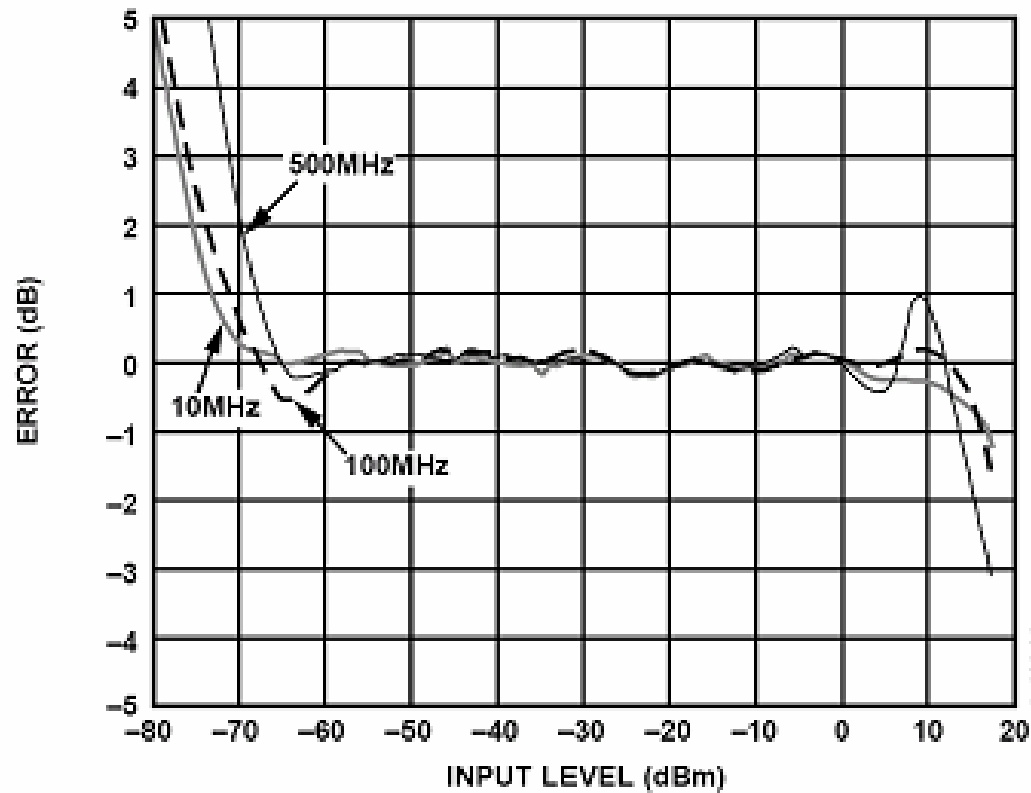
Low Cost DC-500 MHz, 92 dB
Logarithmic Amplifier

Logamp Verstärkungscharakteristik



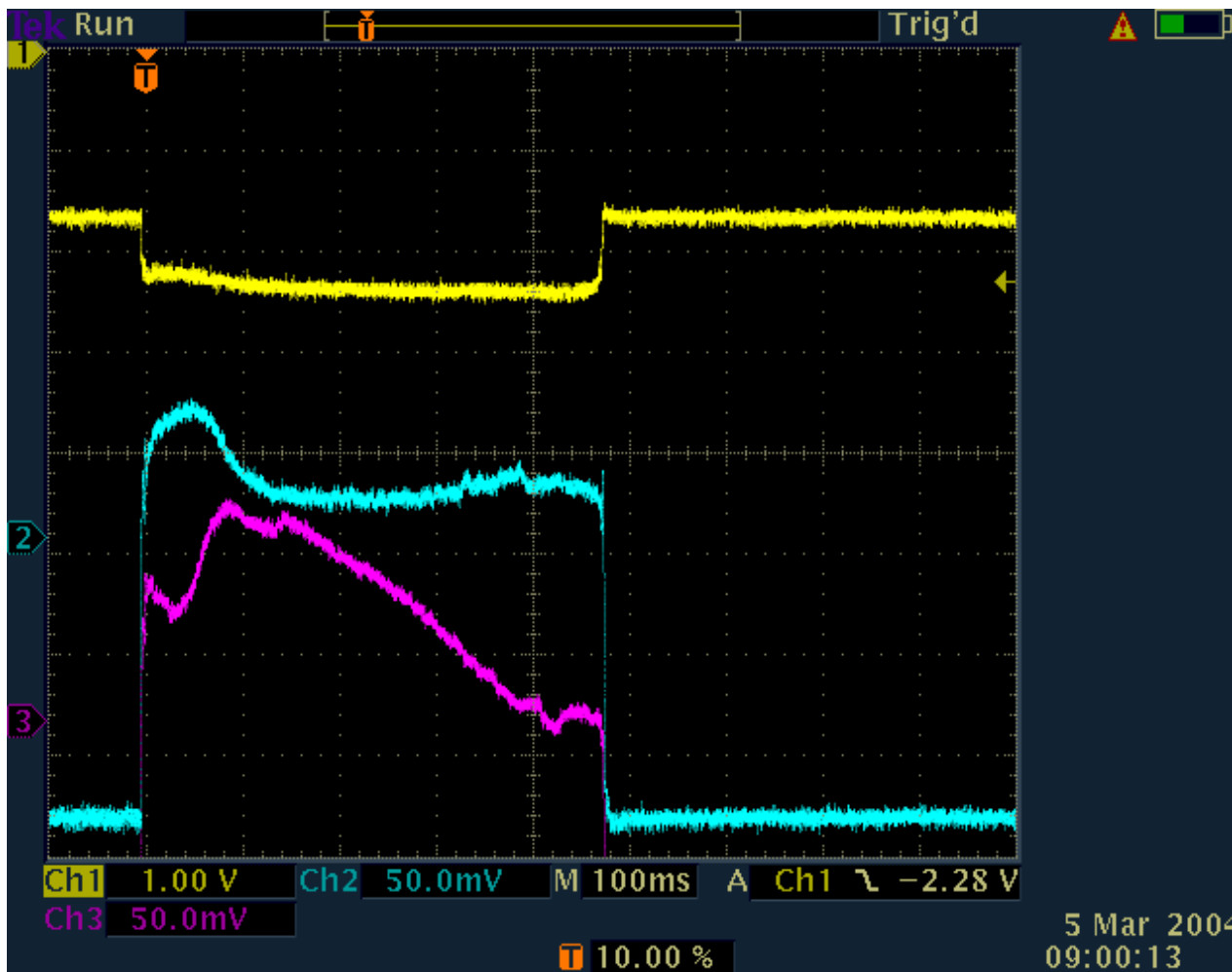
Verstärkungsfehler AD8307

Log Response at 10 MHz, 100 MHz, and 500 MHz



Logarithmic Law Conformance at 10 MHz, 100 MHz, and 500 MHz

Geräteverifikation am SIS18



Sonde: S11DX
Kopfverstärker: 20dB
S09DTML=190 μ A
H=4

gelb: Intensität
blau: Vertikalposition
pink: Horizontalposition