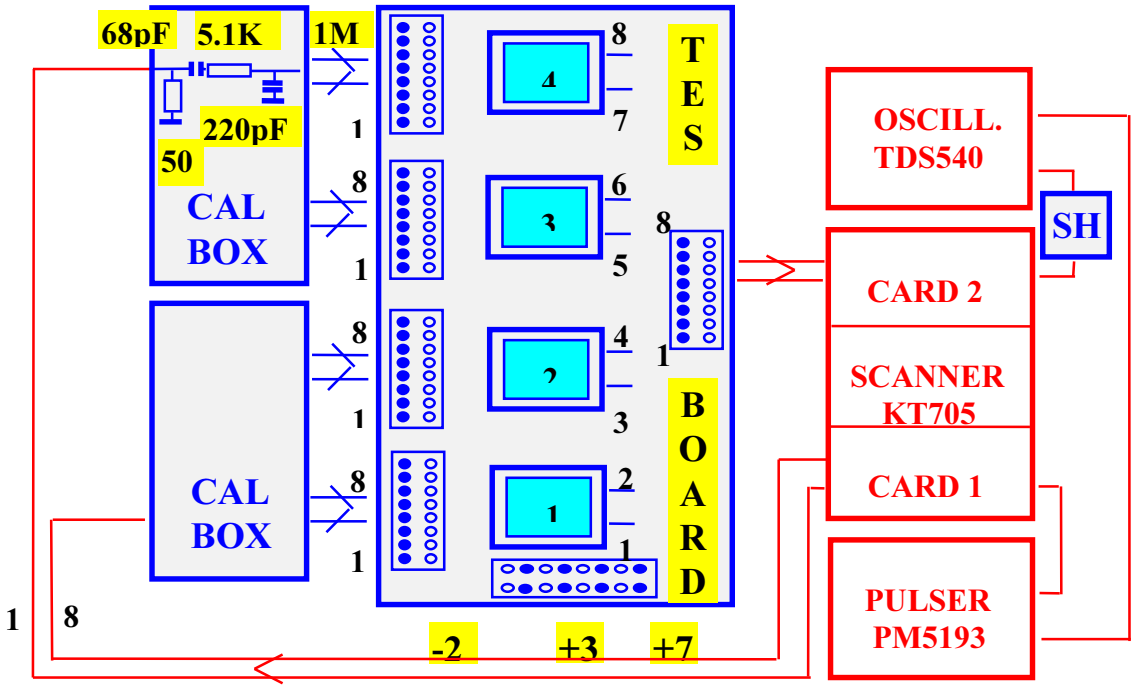
08.12.99
LARGW 12.99

HEC Electronics QC tests

L.Kurchaninov

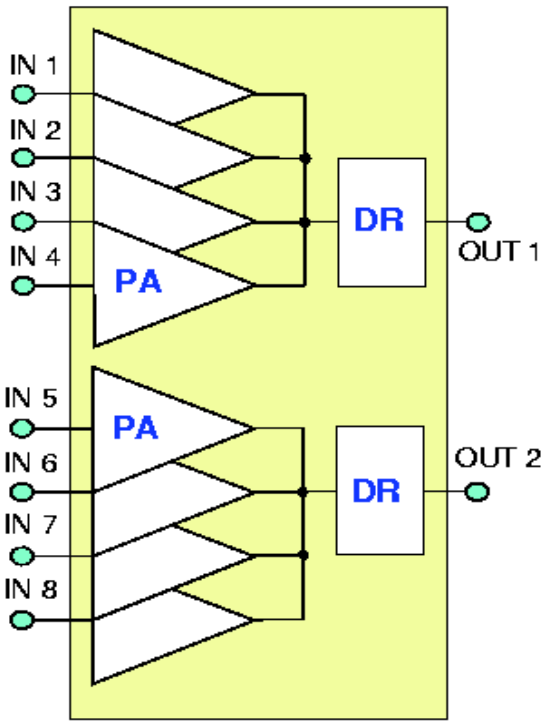
- Preamplifiers selection
- PSB production
- PSB functional tests
- PSB QC tests

Setup for Chips Mass Measurements

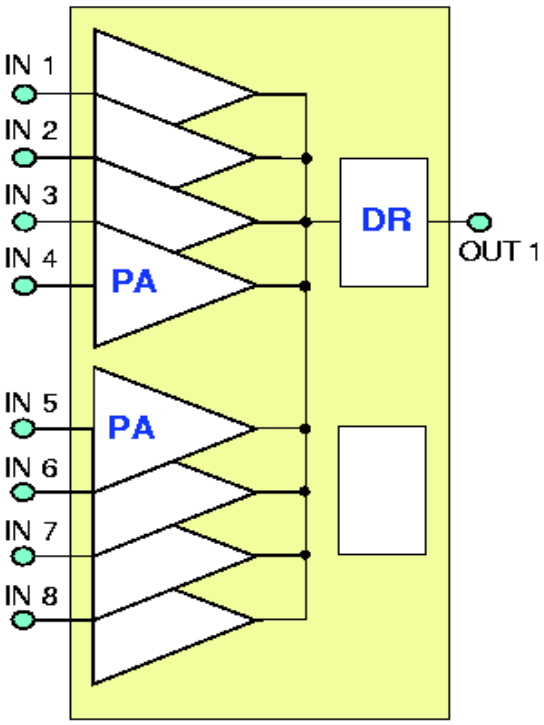


Two types of measurements, corresponding to the summing scheme:

„TEST-4“

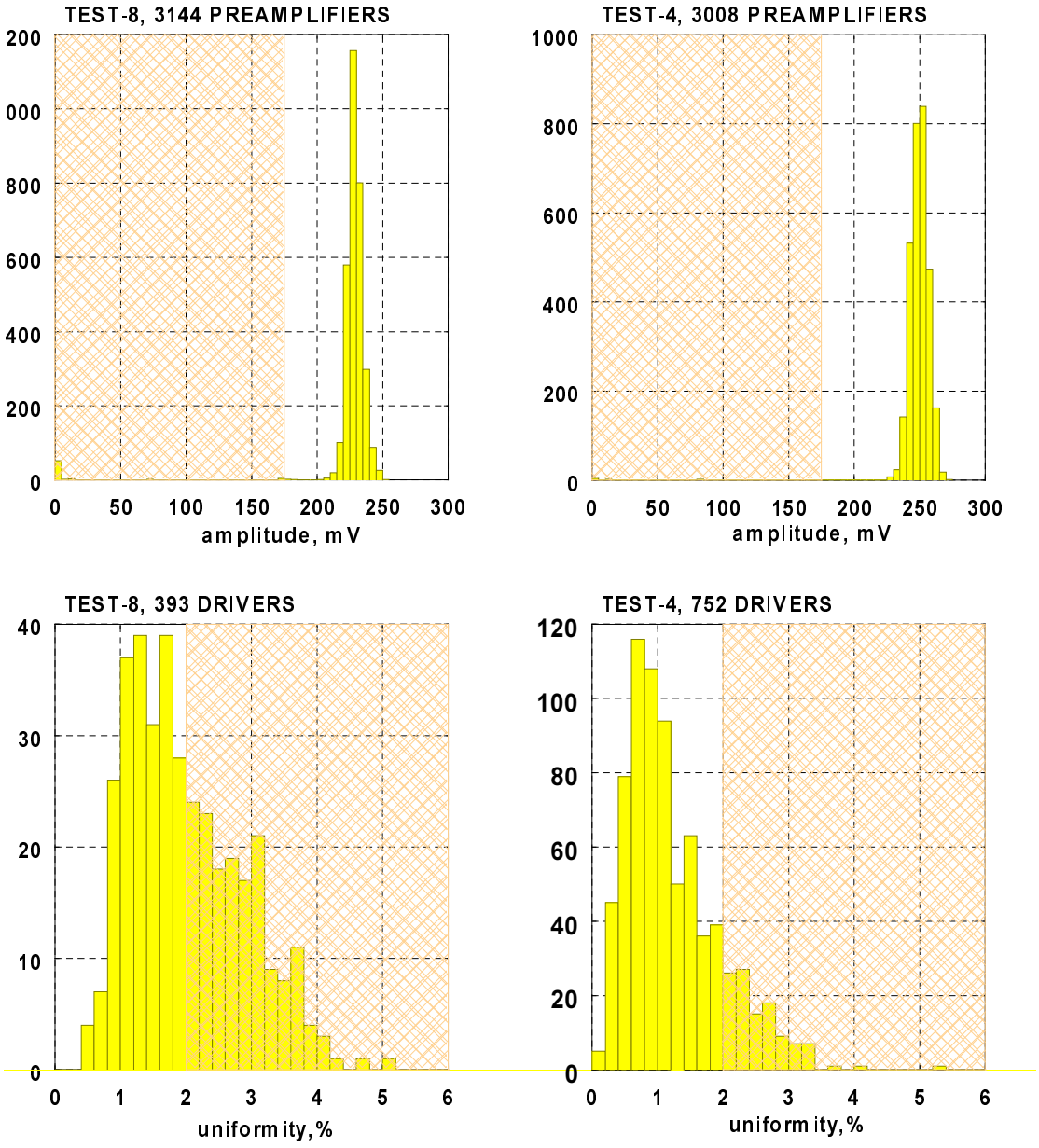


„TEST-8“



GaAs Chips. Two Tests

- Measured parameters: amplitude, peak time, noise, crosstalk
- Example: wafer #600



- On-line qualification: amplitudes, uniformity, peak time value, peak time uniformity, noise value, crosstalk value
- FAIL mainly due to uniformity

Qualification

- In each test the chip is qualified as N (not tested), D (dead, if one amplitude < 30 mV), G (good, all parameters are within specifications), and F (fail, others)

- After both tests done, each chip is qualified as: NM (not measured), NU (not to use), S4 (can be used in summing 4), and S8 (can be used to sum 8 PAs). This selection is made according to the table:

T8\T4	N	D	F	G
N	NM	NU	NM	S4
D	NU	NU	NU	NU
F	NM	NU	NU	S4
G	NM	NU	S8	S8

- Example, wafer #600

T8\T4	N	D	F	G	total
N	0	0	2	0	2
D	19	1	0	0	20
F	0	0	70	92	162
G	0	1	36	174	211
total	19	2	108	266	395

- For each wafer, 4 lists (NM, NU, S4, S8) are produced

Status

- All measurements are completed
- All data have been analyzed

wafer #	deliv quant	TEST-8	TEST-4	S8	S4	NU	NM	Yield
074	402	03.99 R.H.	02.99, L.K.	219	112	32	39	82.33%
583	424	03.99 R.H.	06.99 R.H.	297	75	50	2	87.73%
589	411	03.99 R.H.	06.99 R.H.	231	113	63	4	83.70%
590	361	03.99 R.H.	06.99 R.H.	236	83	40	2	88.37%
591	400	05.99 R.H.	12.98 L.K.	239	75	82	4	78.50%
592	384	04.99 R.H.	06.99 R.H.	162	68	145	9	59.90%
593	306	04.99 R.H.	06.99 R.H.	170	95	40	1	86.60%
594	413	04.99 R.H.	08.99 R.H.	310	79	24	0	94.19%
595	418	04.99 R.H.	12.99 R.H.	266	62	56	34	78.47%
596	446	05.99 R.H.	01.99 R.H.	332	63	46	5	88.57%
597	395	04.99 R.H.	08.99 R.H.	260	92	41	2	89.11%
598	480	04.99 R.H.	08.99 R.H.	268	104	100	8	77.50%
599	454	04.99 R.H.	09.99 R.H.	280	95	73	6	82.60%
600	395	05.99 R.H.	10.99 R.H.	210	92	91	2	76.46%
601	477	05.99 R.H.	10.99 R.H.	332	99	44	2	90.36%
602	434	05.99 R.H.	10.99 R.H.	320	69	43	2	89.63%
SUM	6600	05.99	10.99	4132	1376	970	122	83.45%

- GOOD CHIPS ----- 5508
- TOTAL NEED FOR 75 X 5 PSBS ----- 5025 CHIPS
- LARG Note “HEC Cold Electronics QC Tests. 1.GaAs Preamplifiers Selection” – to be prepared this year

PSB Production

- First production batch (Nov.-98)

A	B	C	D	E	TOTAL
3	3	3	2	2	13

- Second production batch (April-99)

A	B	C	D	E	TOTAL
5	5	5	5	5	25

- Third production batch (June-99)

A	B	C	D	E	TOTAL
21	20	20	20	20	101

- Up to now 139 PSBs have been produced,
  - 10 "reference" PSBs
  - 15 installed on HEC modules

- The last production batch is planned for Fall-1999 ... Summer-2000

A	B	C	D	E	TOTAL
46	47	47	48	48	236

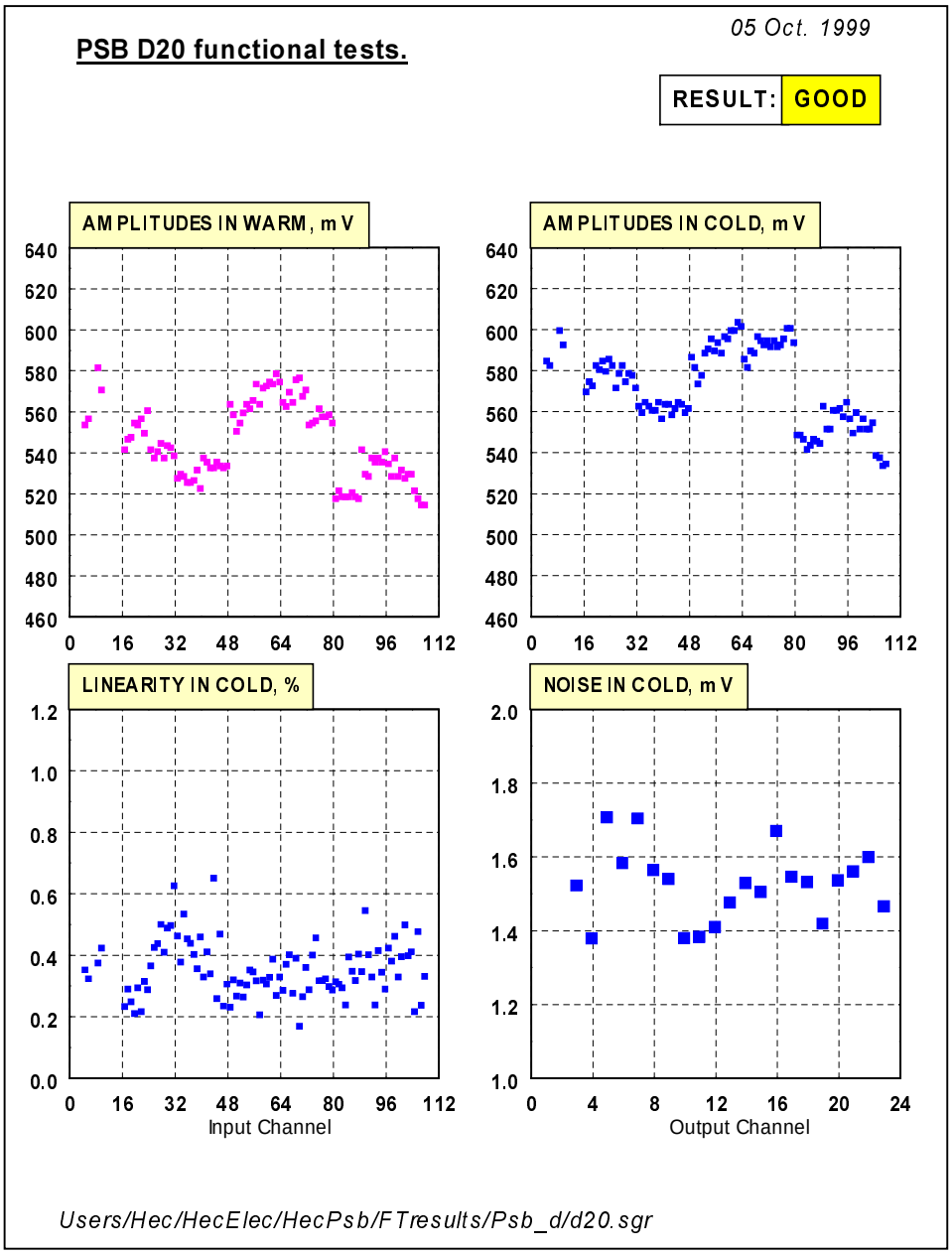
- Before QC tests, each PSB goes to "functional" tests. The goal of this test is to determine dead channels
- Up to now 139 PSBs have been produced and all of them have been measured, 10 PSBs have dead channels.

PSB Functional Tests

- One PSB per load, measurement steps:

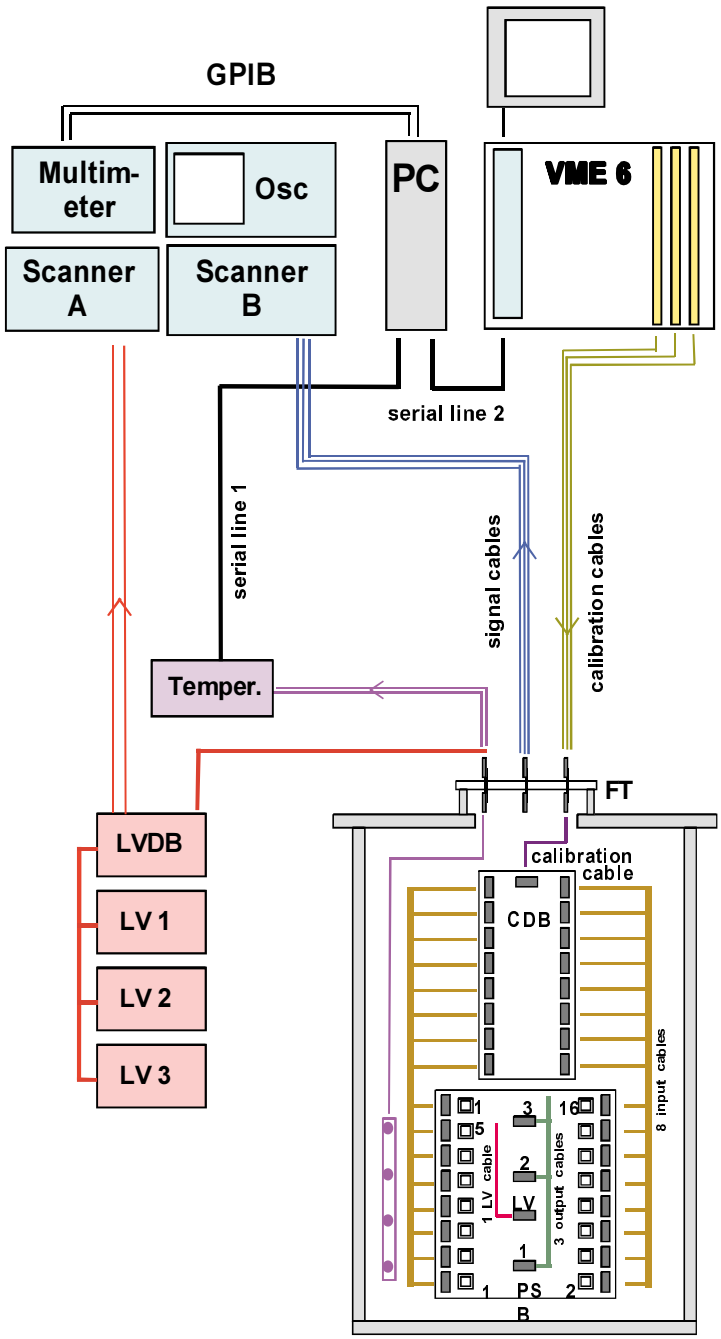
Step	Signals	Noise	Linearity	Xtalk
Typ. time	½ h	½ h	2 h	6-7 h
In warm	+	+	-	-
In cold	+	+	+	-+

- PSB qualification: GOOD or FAIL



Setup for QC tests

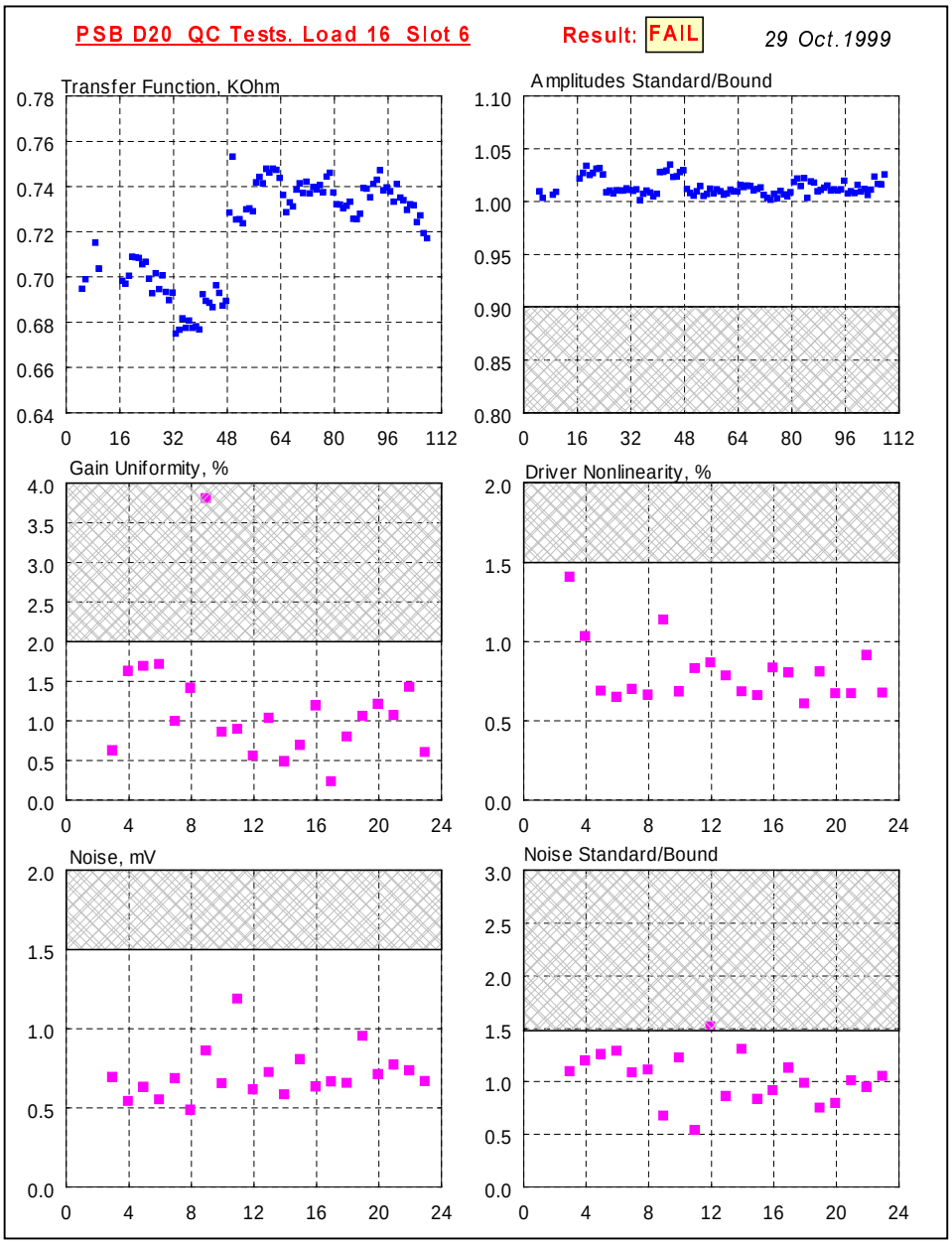
- 6 PSBs per loading
- Calibration system in VME crate steered by RAID
- Readout by digital oscilloscope through scanner
- Voltages and currents by multimeter through scanner
- Control from PC



- Up to now 77 PSBs have been measured
- Analysis is in progress
- Results will go to HEC database

PSB QC Measurements

- Up to now 132 PSBs have been measured, 106 – GOOD, 26 – FAIL. (mainly in the beginning of the tests)
- PSB qualification:



- Main problem – instability of calibration generators, PSBs are FAIL due to bad measurements. In the last loadings signals have been measured 3-4 times, one of the measurement is chosen for analysis.

Status Dec. 1999

Item	Need	Quantity	Done
Chips production		6600	100%
Chips tests	6600	6478	*100%
Chips for PSBs	5025	5025	100%
PSB production and FT	375	139	37.1%
QC tests	375	106	28.3%