

- Bunch-by-Bunch Feedback

- Collaboration:

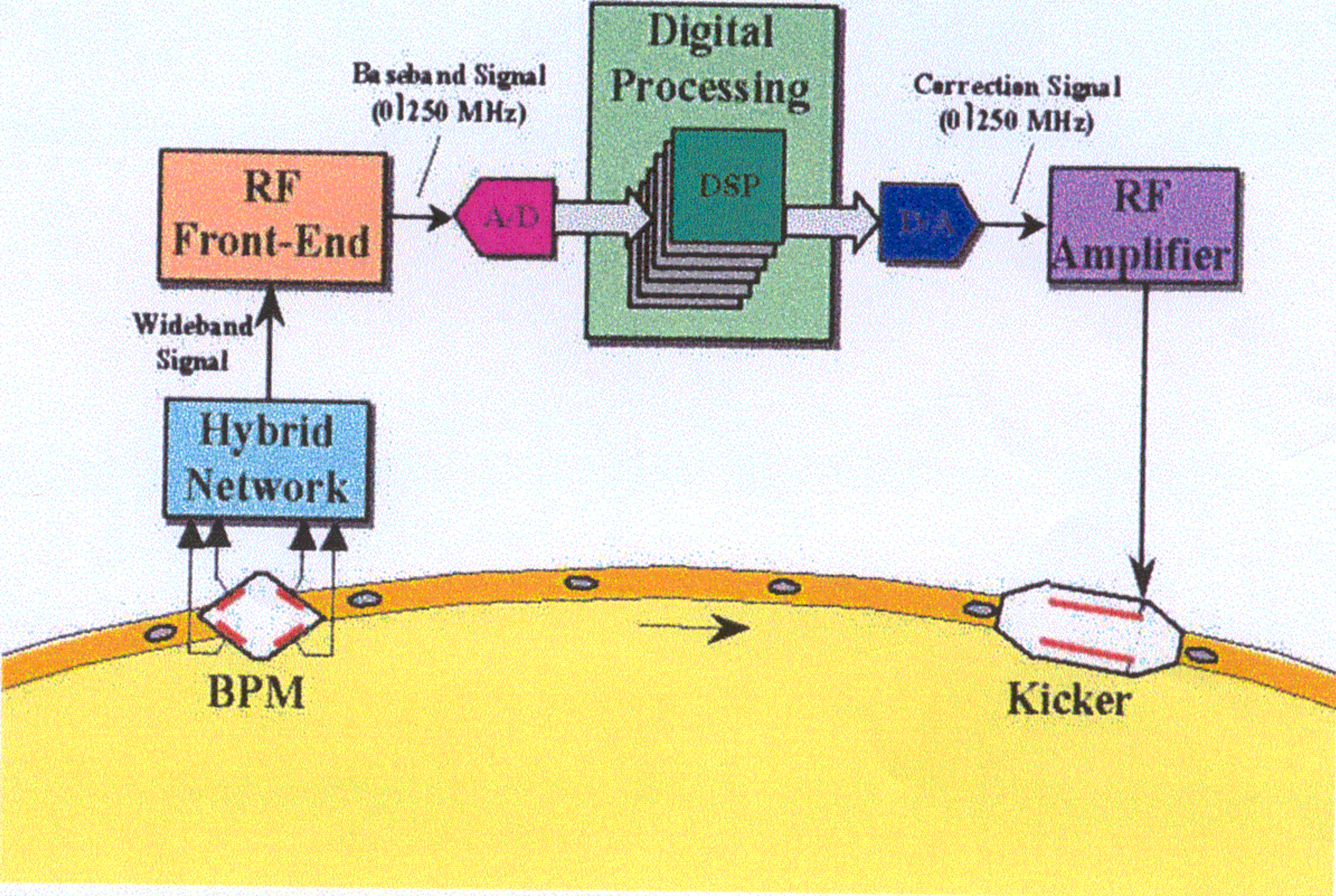
ELETTRA: D. Bulfone, M. Lonza + A. Fabris, A. Gambitta

SLS: M. Dehler, R. Ursic (*Instrumentation Technologies*)

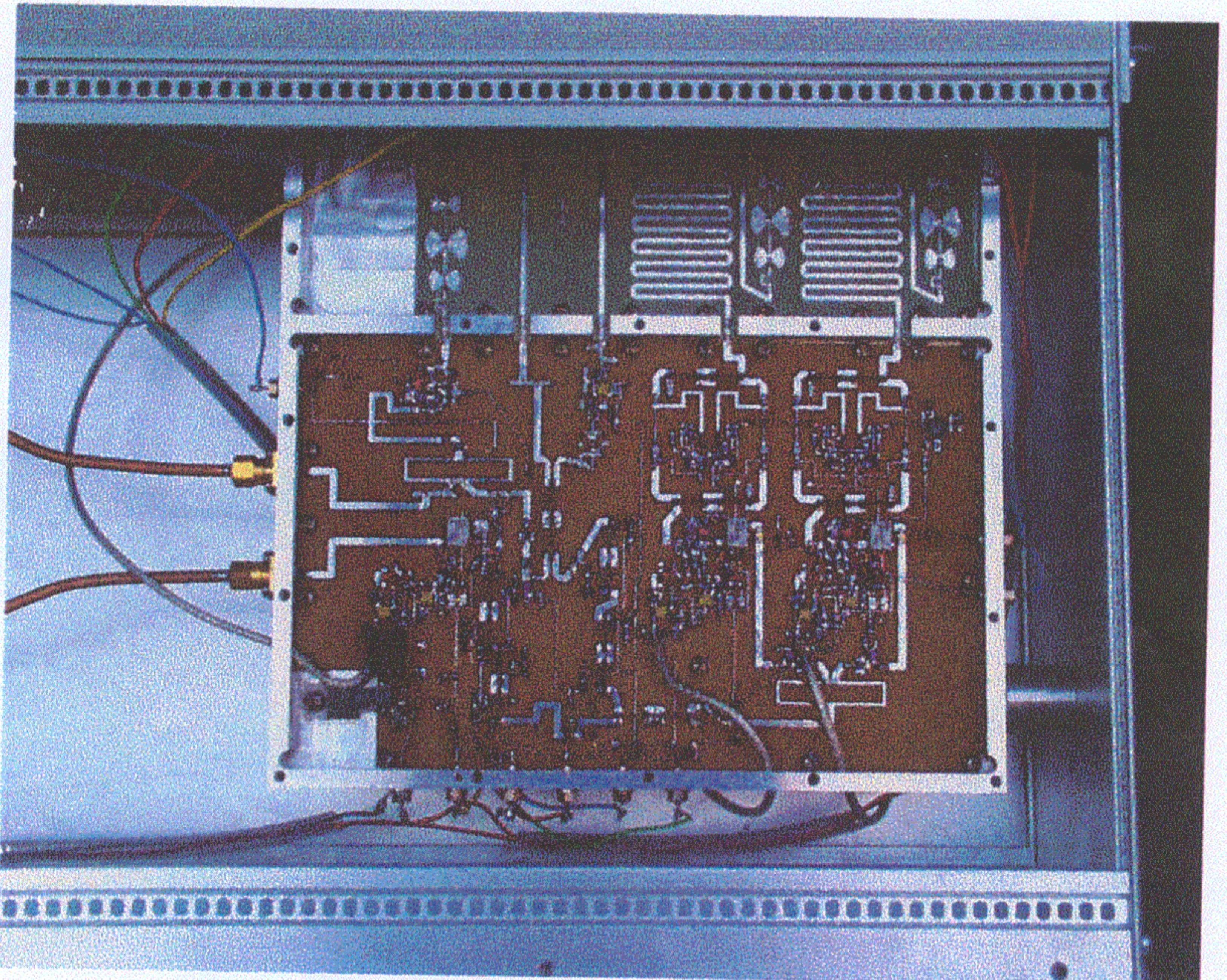
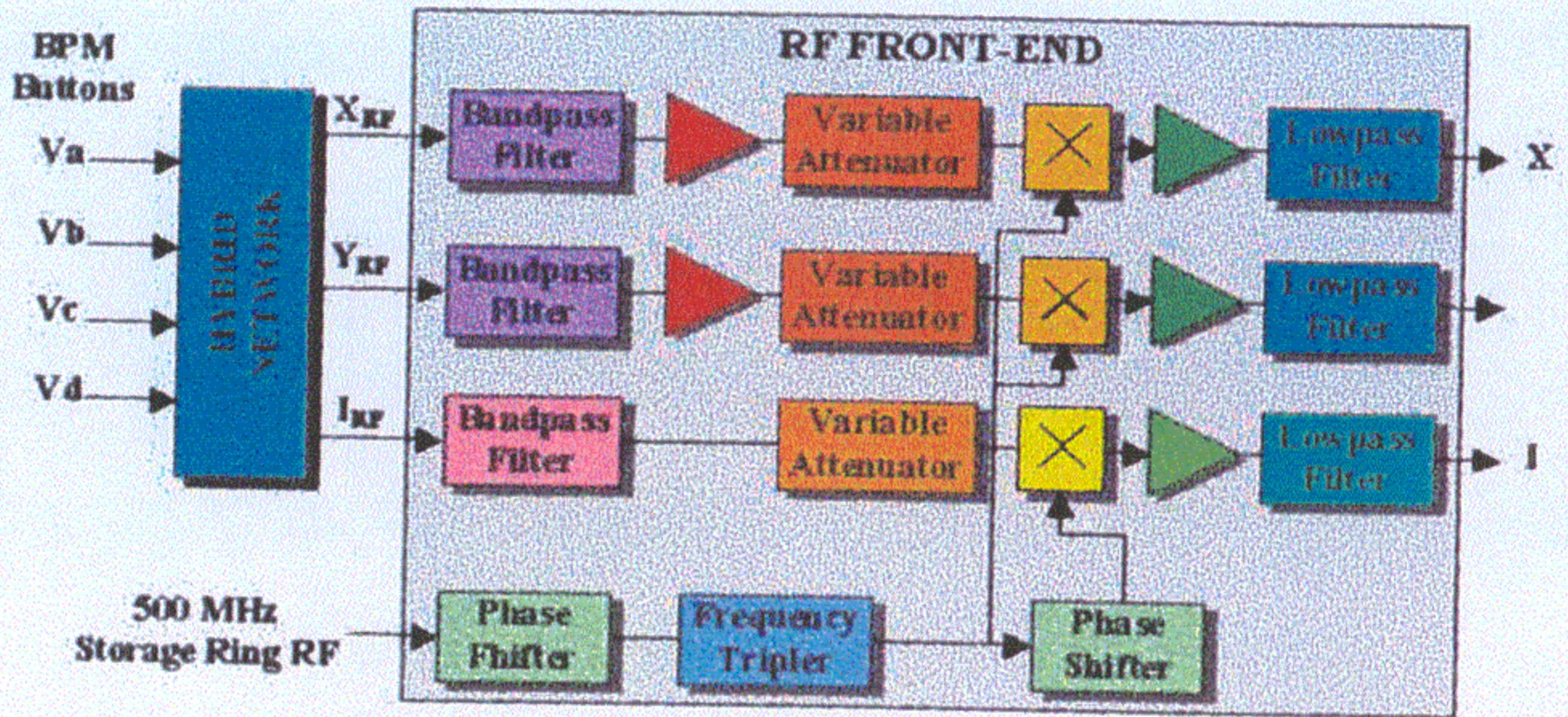
- Main Parameters:

PARAMETER	ELETTRA	SLS
Beam Current, $I_B$	400 mA	400 mA
Beam Energy, $E_B$	2.0 GeV	2.4 GeV
Number of bunches	432	480
Bunch spacing	2 ns	2 ns
Lowest Frequencies	0.34 ( $q_x=0.3$ ), 0.23 ( $q_y=0.2$ ) MHz	0.19 ( $q_x=0.18$ ), 0.08 ( $q_y=0.08$ ) MHz
Highest Frequency	250 MHz	250 MHz
$\beta_x, \beta_y$ @ BPM	5.2, 8.9 m	20, 14 m
$\beta_x, \beta_y$ @ kicker	6.5, 7.5 m	4.1, 6.1 m
Max. $Z_{RW}$ , min $\tau_{RW}$	1 MOhm/m, 2 ms (now)	7.04 MOhm/m, 0.24 ms (9 ID's)
Max. $Z_{HOM}$ , min $\tau_{HOM}$	11.2 MOhm/m, 0.12 ms	11.2 MOhm/m, 0.16 ms
Ver. Kicker Sh. Imp, $R_K$ @ DC, 250 MHz	22, 10 kOhm	22, 10 kOhm
Hor. Kicker Sh. Imp, $R_K$ @ DC, 250 MHz	15, 7.8 kOhm	15, 7.8 kOhm

# TMBF Block Diagram



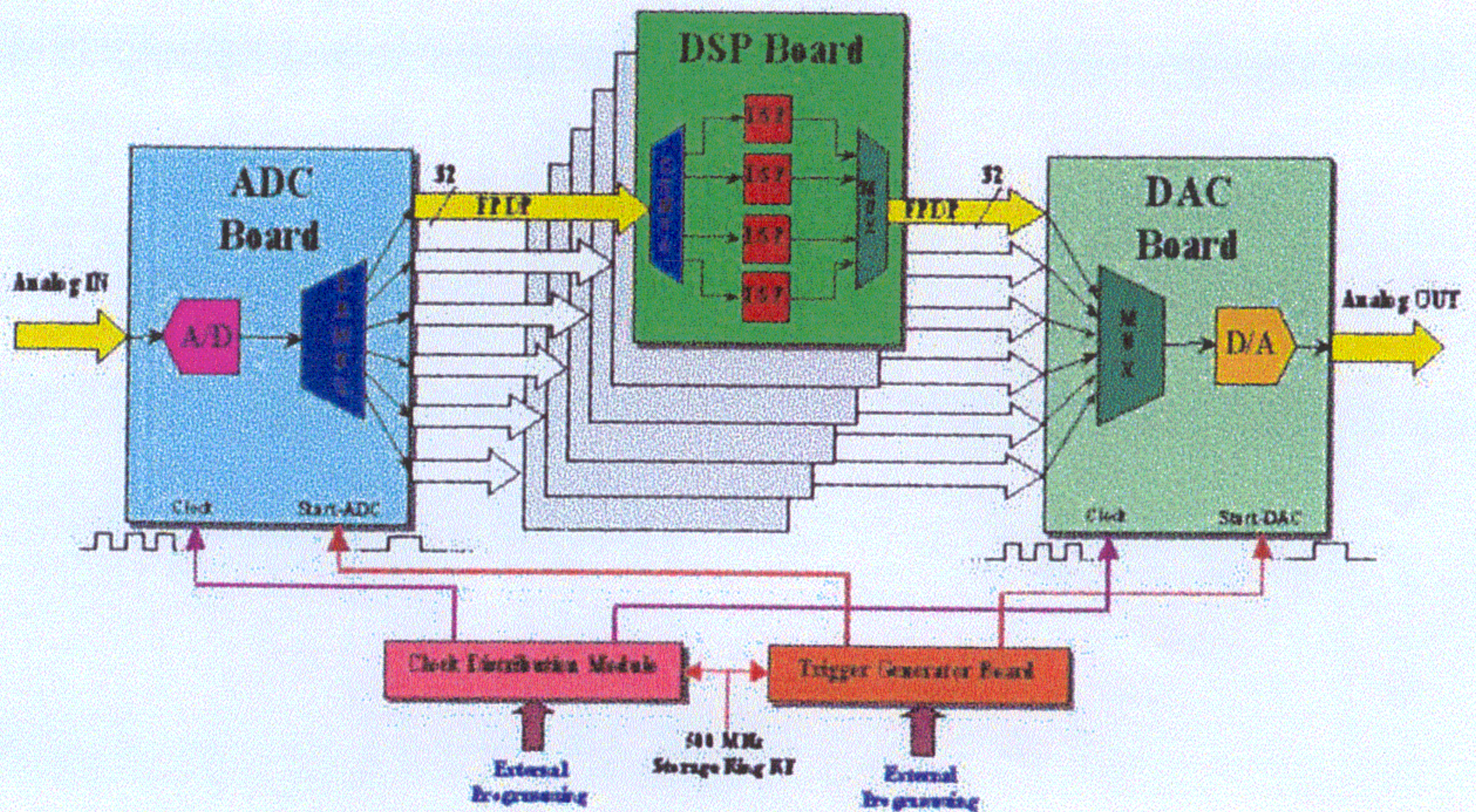
# RF Front-End



# Digital Processing Electronics

- Basic requirements:
  - provide right phase between BPM and kicker signal
  - (further) reject closed-orbit component of BPM signal
- Additional requirements:
  - Flexibility in implementing different control algorithms
    - > different filter types
    - > on-line changes of filter parameters as machine operating conditions vary (e.g. tune)
  - Run, in parallel, beam diagnostics

# ADC-DAC-Digital Processing Electronics Architecture



- Modular and open design based on VME standard, where ADC, Digital Processing and DAC are interfaced through standard high-speed interfaces (PDP, Front Panel Data Port).

- Use of Commercial Off-The-Shelf (COTS) components.

- Implement feedback & diagnostic functions by software.

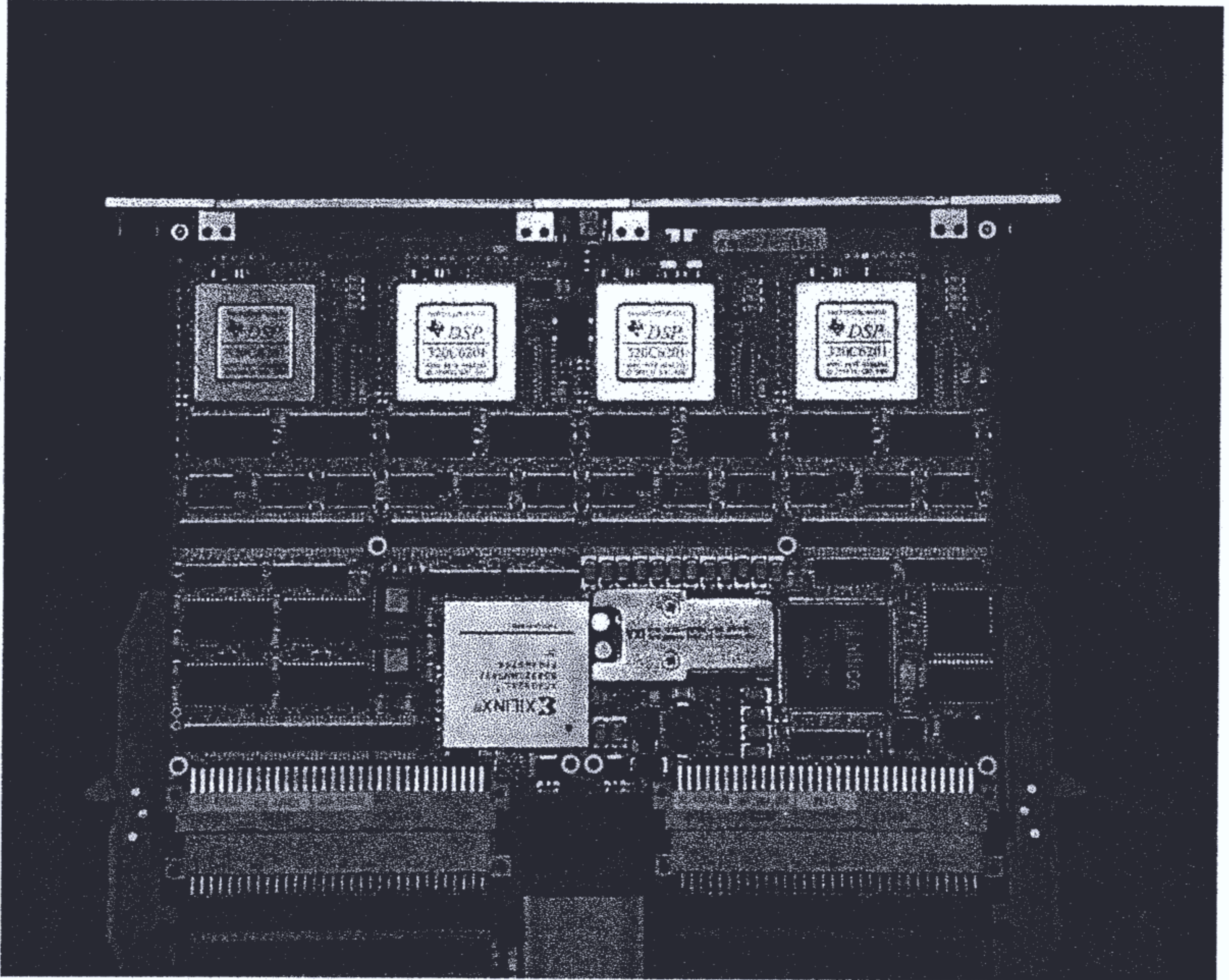
- Side products:

- same blocks for different accelerators

- **same blocks for Longitudinal feedback**

*DSP int. mem. → 268 Mwords/sec  
 128 KB SBRAM → 1700 "  
 16 MB DRAM → 140 000 "*

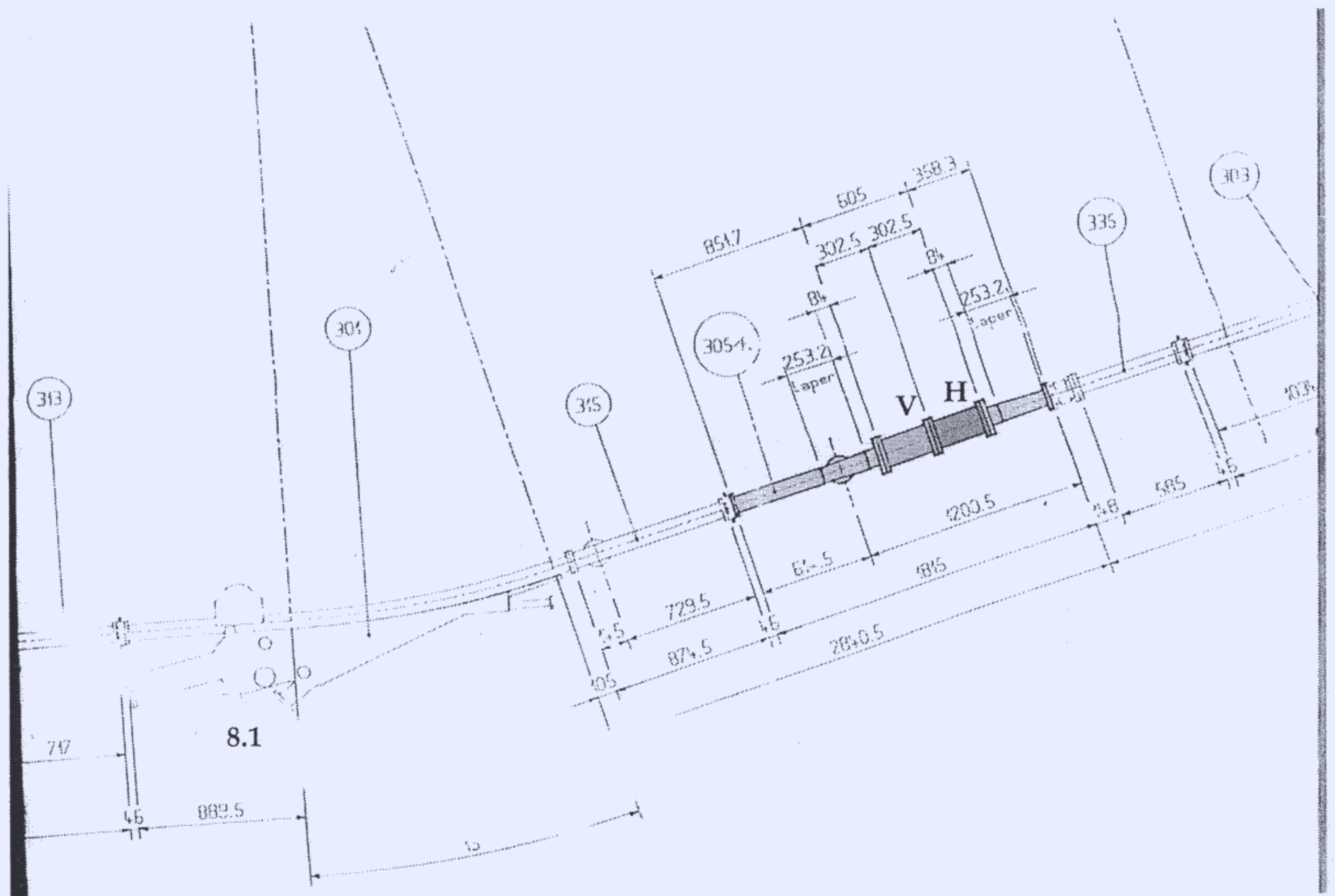
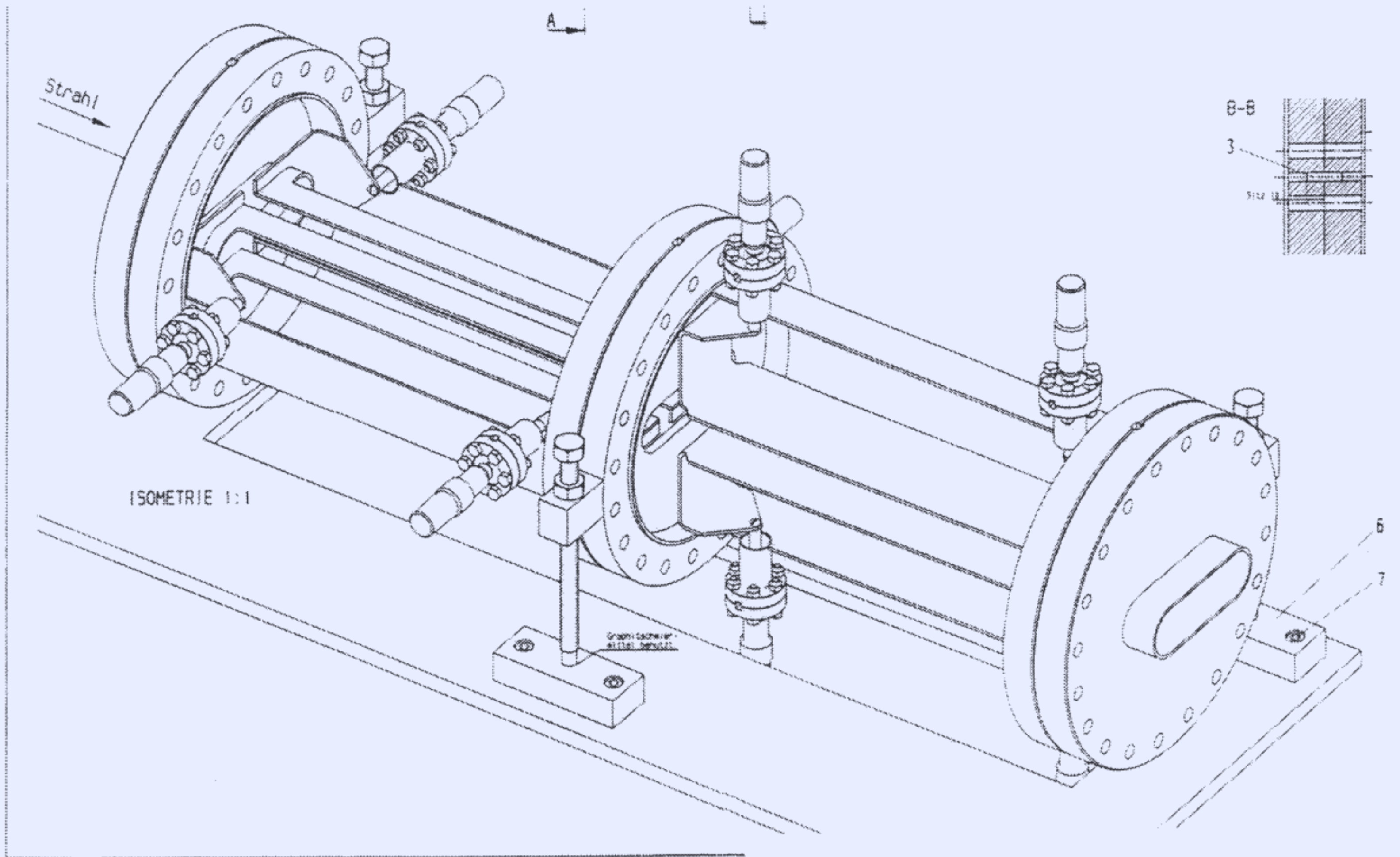
# DSP Board



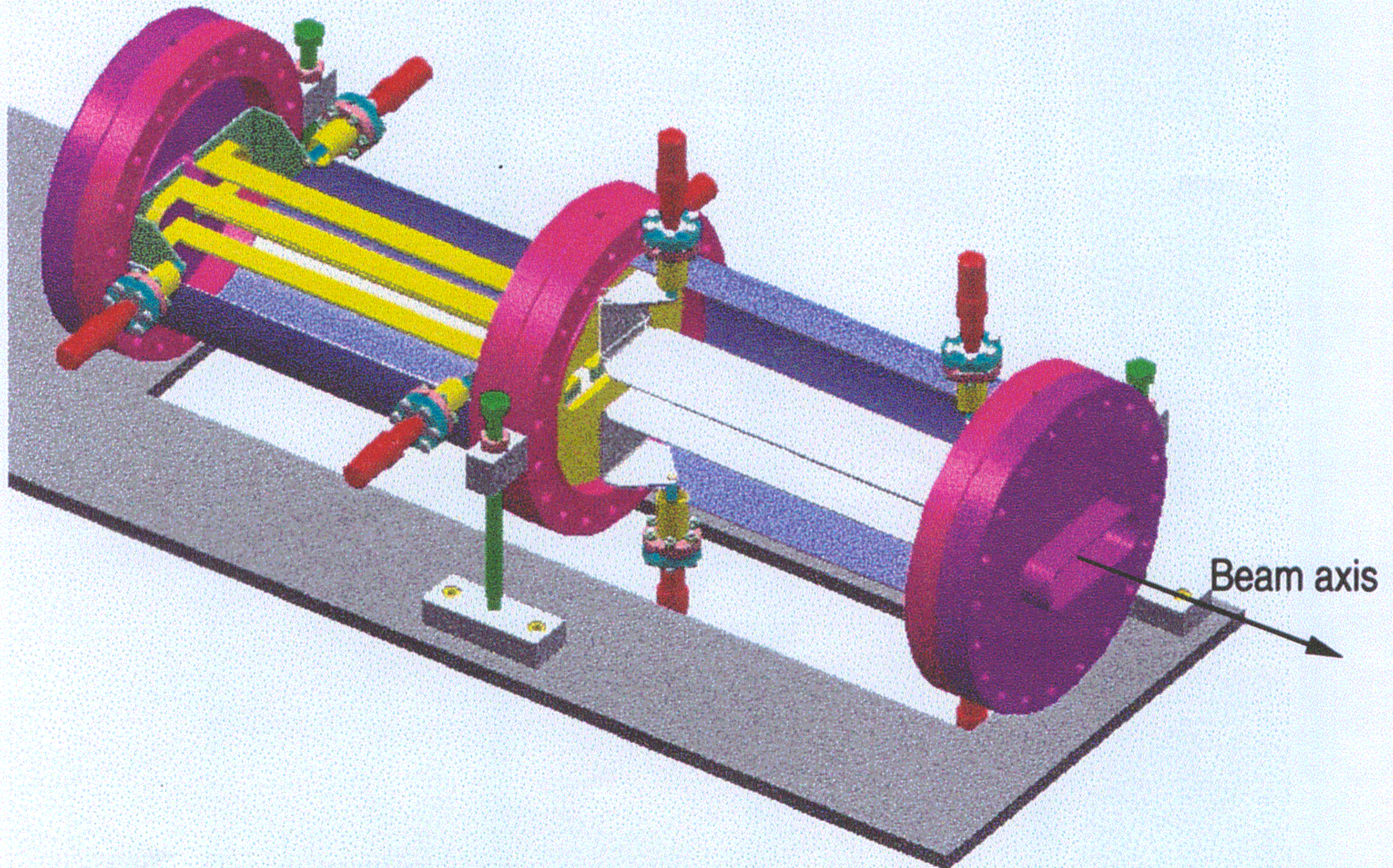
- VME board with four TI-TMS320C6201 fixed point 1600 Mips DSPs.

- ADC and DAC FPDP ports interfaced to the DSPs via a mezzanine board working as a programmable bi-directional switch.

# Kicker



# Transverse Multibunch Feedback Microwave kicker ensemble





## Status

- RF Front-End: installed
- ADC & DAC: delivery this week
- DSP boards: final order to be placed.
- RF Amplifiers: 2 \* AR 250A250AM3 ordered. Delivery end of March.
- Kicker: ready, installation April shut-down
- Installation of kickers + tapers, RF amplifiers, part of digital electronics (timing, ADC/DAC, first DPS boards) during next shutdown.
- Start complete system tests: end of June.