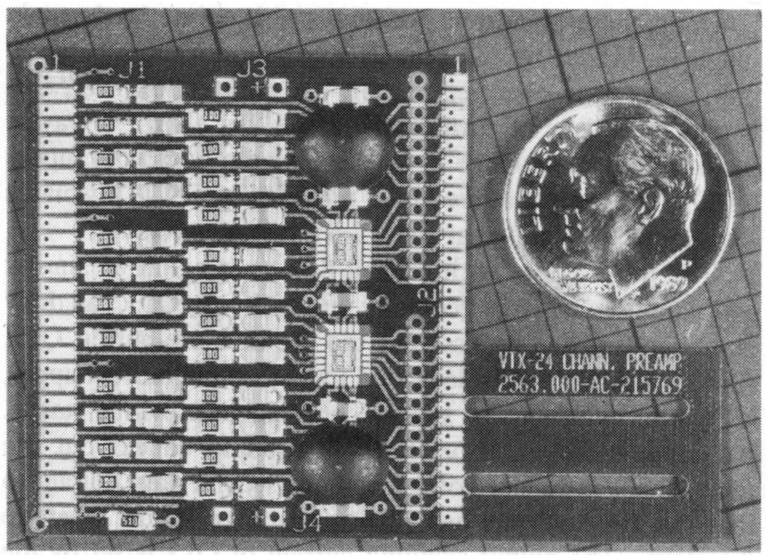
E614 Electronics - Detector Review

VTX Preamplifier Specifications

- Fermilab design has demonstrated high reliability in multi-channel spectrometers at CDF & KLOE
- Fast and Low Noise Amplification
- Low Power Consumption
- High Density and Low Cost/Channel



Characteristic	Performance
Gain	1.0 mV/fC **[1.0 mV/fC]** (50 Ohm load)
Dynamic range	-400 mV to +20 mV (linear to within 3% at the max. output)
Crosstalk	< 0.5% between any two channels
Noise	860 electrons + 47e/pF (100 MHz bandwidth)
Output risetime (10 - 90%)	5 ns **[5.8 ns]**
Output falltime (90 - 10%)	16 ns **[17.4 ns]**
Input impedance	130 Ohm
Output impedance	47 Ohm
Power dissipation	10 mW/channel
Power Supply	4 V
Channels/chip	6
Channels/package	24

[ ] Measured values

VTX Preamplifier - Adjacent Channel Crosstalk

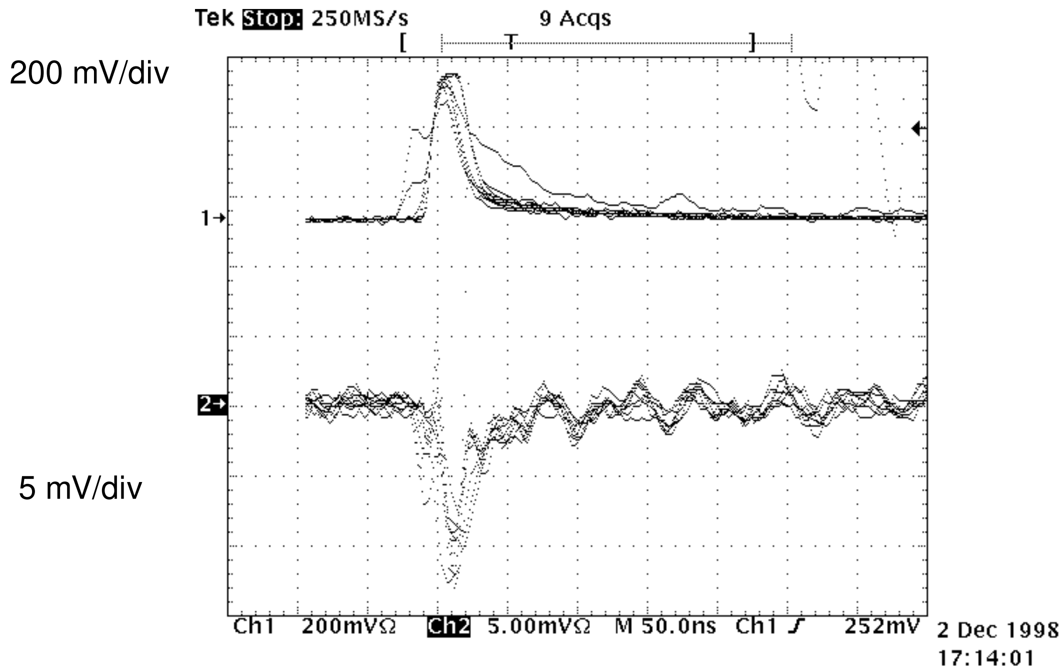


Figure 1 - Signals from ^{55}Fe source with Chamber at1850 Volts, approximating the signal from a positron

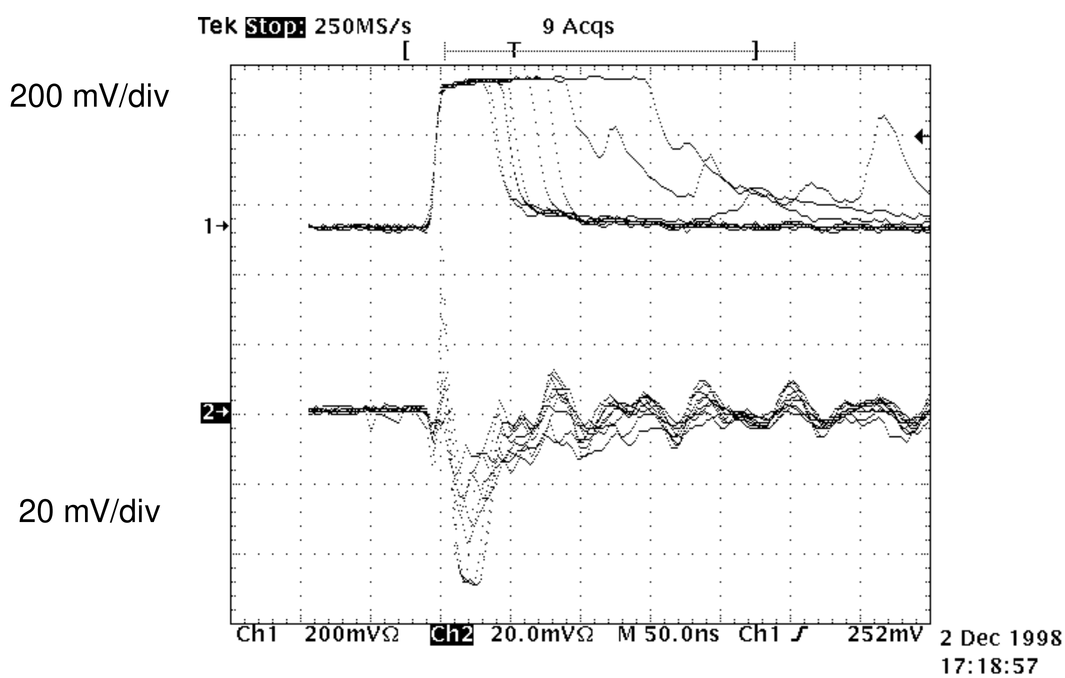


Figure 2 - Signals from ^{55}Fe source with chamber at 2350 Volts, approximating the signal from a muon at 1850 Volts

VTX Preamplifier - Crosstalk on Neighbouring Channels

Signals from ^{55}Fe source with Chamber at 1850 Volts

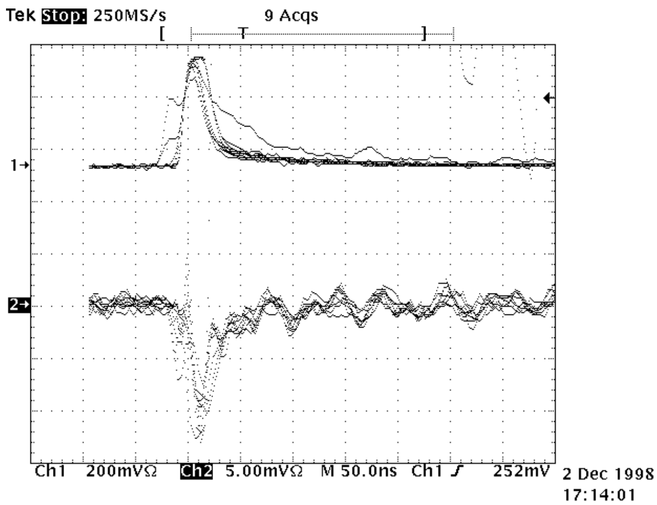


Figure 3 - Primary and adjacent channel

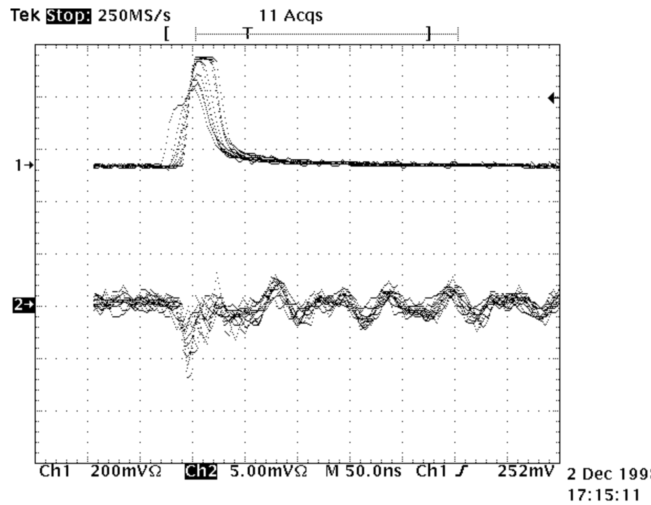


Figure 4 - Primary and 2 channels distant

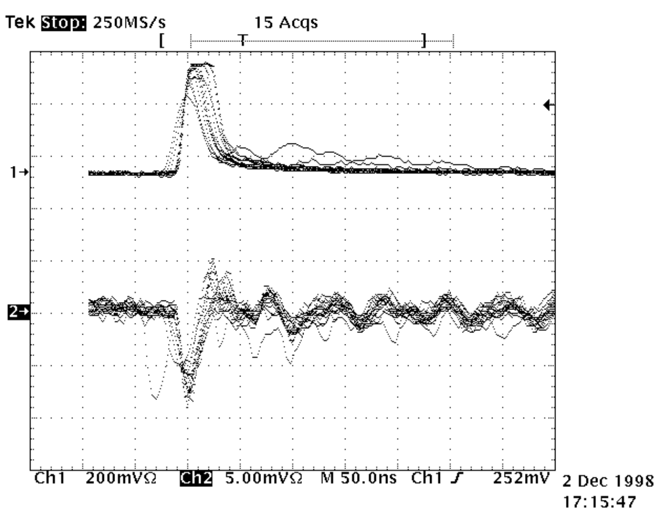


Figure 5 - Primary and 3 channels distant

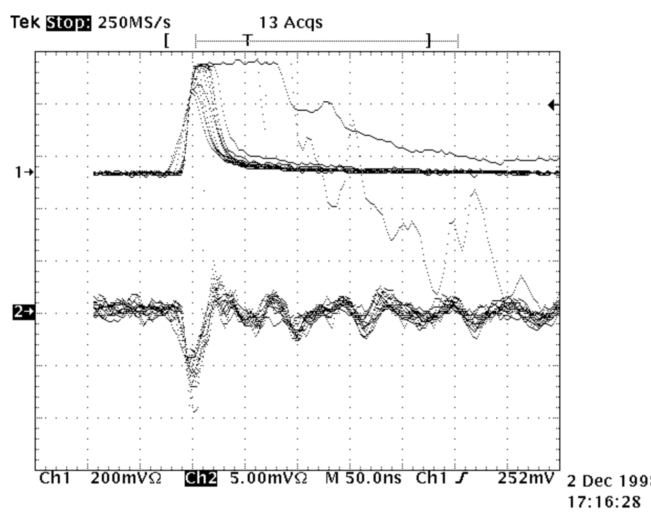


Figure 6 - Primary and 4 channels distant

VTX Preamplifier Configuration

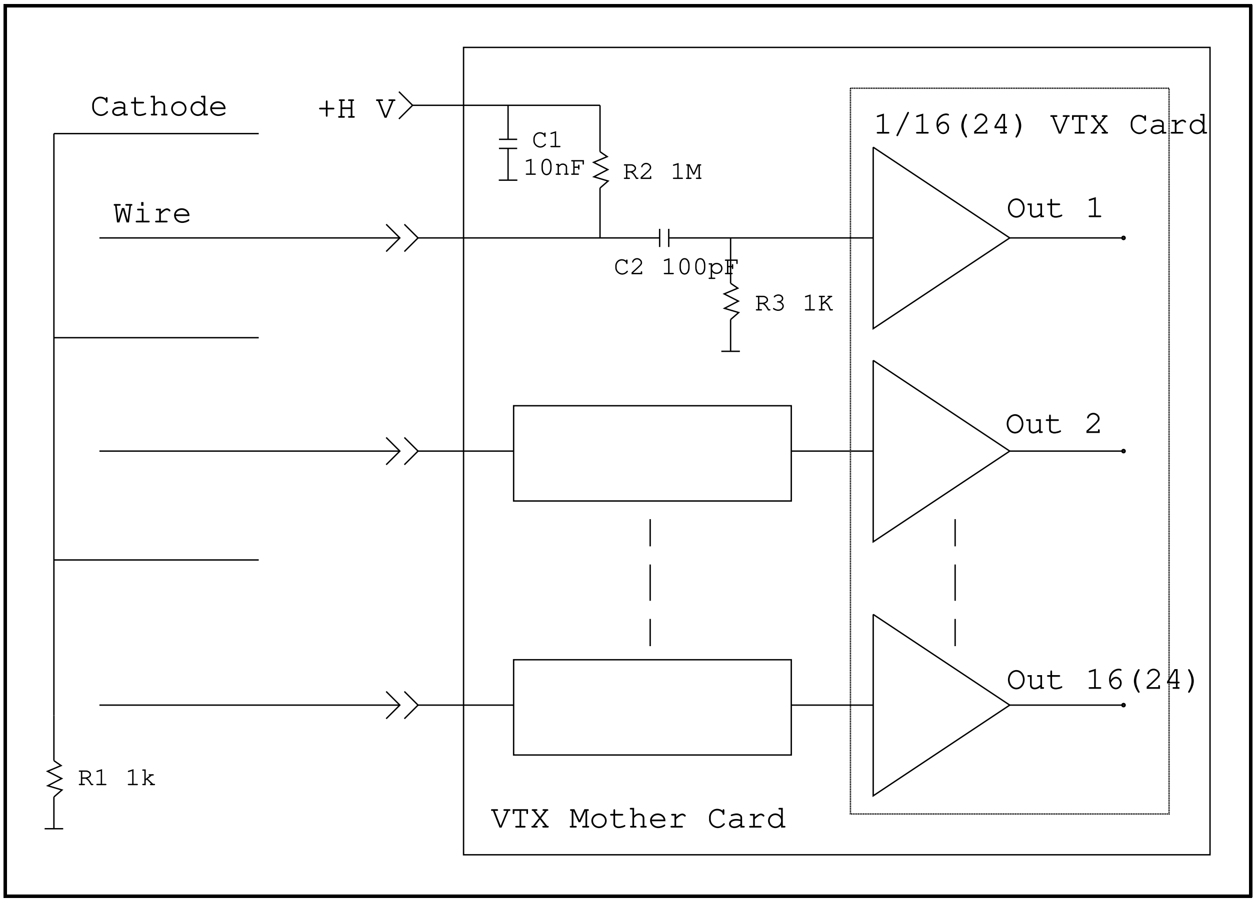


Figure 7 - VTX Configuration for +HV

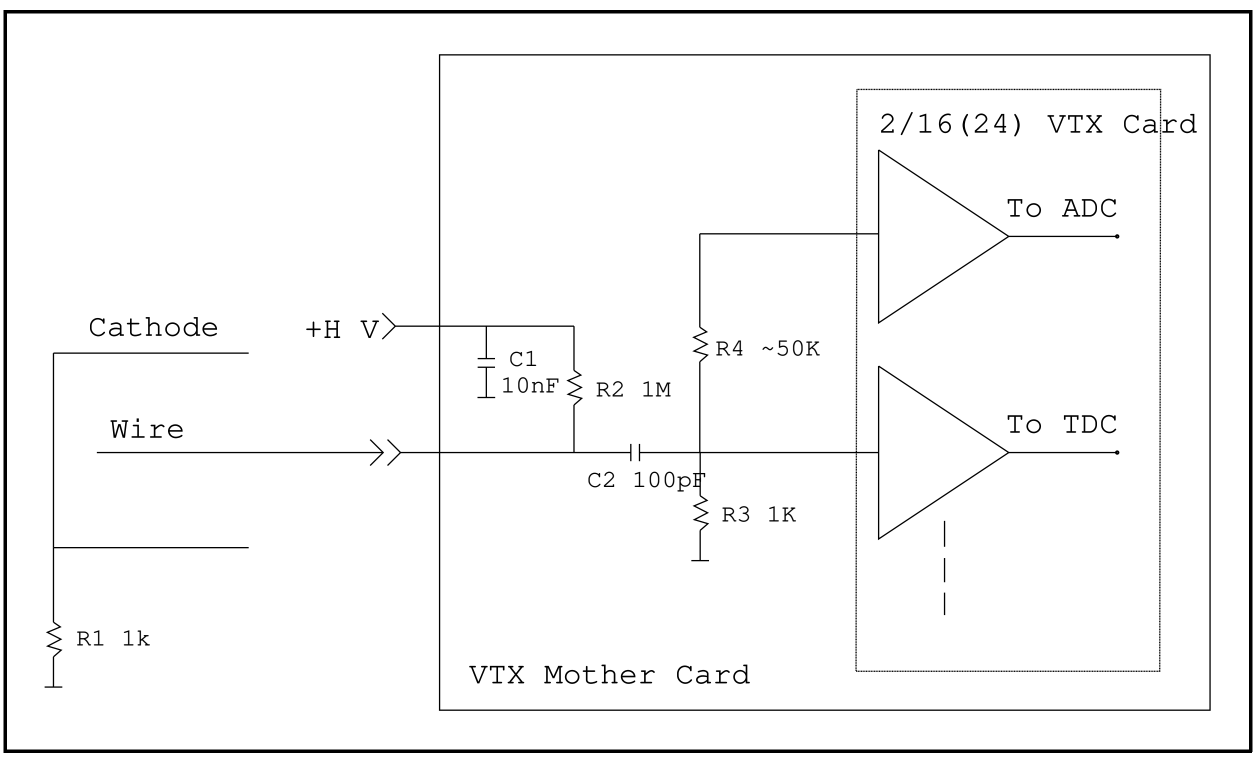


Figure 8 - VTX Configuration for TDC/ADC Signal Split

Post Amplifier/Discriminator (Prototype)

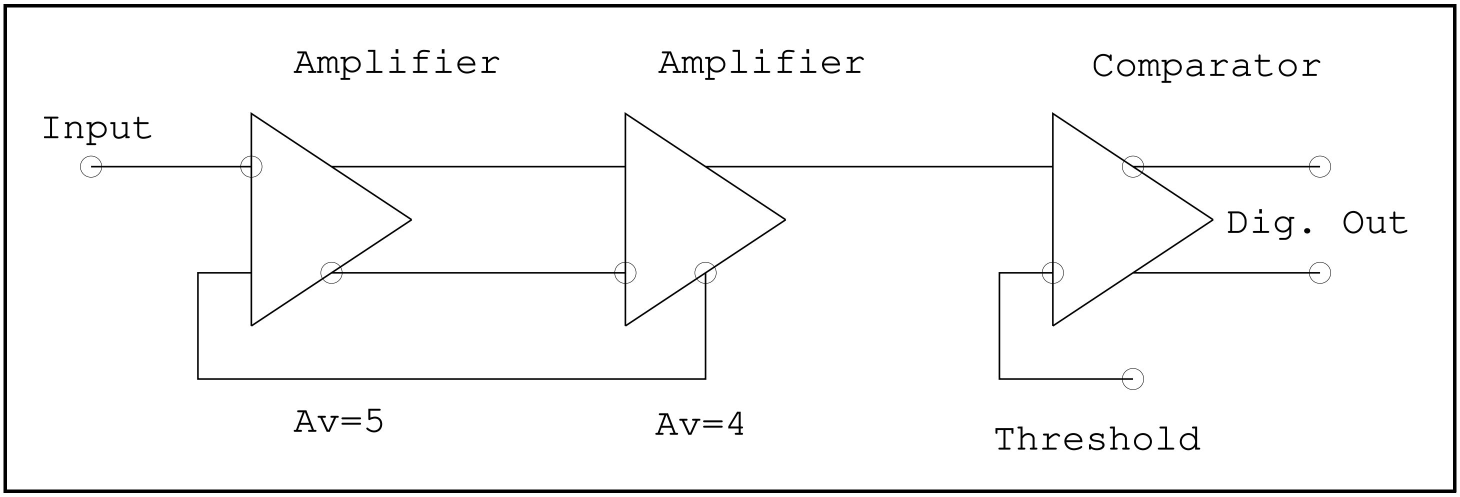
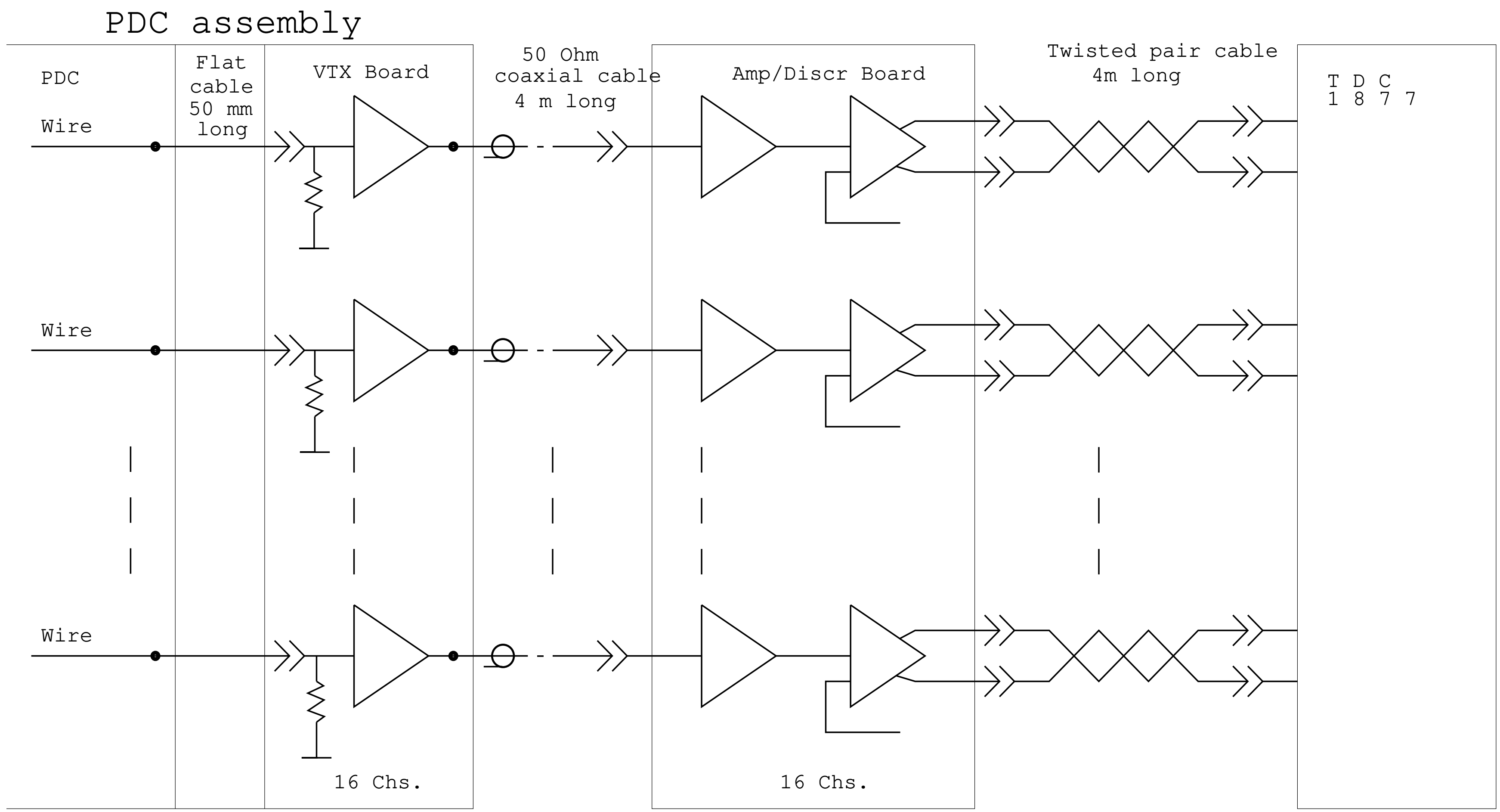


Figure 9 - Post Amp/Discr Prototype Block Diagram

Voltage gain (comparator input)	~ 20
Output risetime	~ 6 ns
Dynamic range	~ 400 mV
Digital out	differential ECL, ~ 110 Ohm
Number of channels	16 (32)
Package	CAMAC (VME 6U)



1. VTX boards are fixed at PDC assembly
2. Amplifier & Dicriminator boards put in CAMAC crate

Figure 10 - Test Run Circuit

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