VTX Configuration Options for TWIST (E614) Spectrometer

This document explores the possible VTX distribution scenarios for the TWIST spectrometer. Table 1 shows the total number of VTX preamps in the known universe and where they are. The 80% recovery rate, shown in brackets, is only a best guess based on our latest recovery technique. However, it should be noted, that the original recovery rate quoted by Fermilab for the 24 channel VTX was only 75% and 90% for the 16 channel..

	24 Channel	16 Channel
Spares received	34	75
VTX #1 (at TRIUMF)	80	144
Present TRIUMF Total (80% rec.)	**114 (98)**	**219 (190)**
VTX #2 (at FNAL)	80	144
Universe Total (80% rec.)	**194 (162)**	**363 (305)**

Table 1

As we have 80 wires/plane in most DC planes, there are 2 - 24 channel and 2 - 16 channel preamps per plane. There is not adequate space available on the readout arc for 5 - 16 channel preamps. Therefore, at least for the DC planes, we must use this 2+2 configuration.

On the target PC planes (PC2), the central 48 wires are required to be read with both position and pulse height information. These channels require daughter cards so we would need 4 - 24 channel VTX per plane here. On the outer PC planes (PC1), it was originally decided that the central 32 wires would be read directly and the outer wires multiplexed to the remaining 48 channels of VTX, using the same readout configuration as the DC planes.

Table 2 shows two options for VTX preamp distribution. *Option 1* on this table is the original scheme using a mixture of 16 and 24 channel VTX for the PC1 and PC2 planes. *Option 2* uses 16 channel VTX exclusively for the PC readout.

It is clear from *Tables 1 and 2*, that *option 1* would be marginal with respect to 24 channel VTX without the acquisition of the second detector from FNAL and impossible without it. Without the acquisition of the second detector, *option 2* still leaves us marginal w.r.t. both 16 and 24 channel VTX. However, if our recovery rate turns out to be 75% or less, marginal would become impossible with *option 2* as well.

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