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TO : Mark IV Development Group
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SUBJECT : Distributing data without a Data Distributor

This block diagram shows how to distribute signals in a 16-station correlator system with complete flexibility without the use of a Data Distributor, by using the cross-point arrays in the Station Unit and on the Correlator Boards. The 16 outputs of each SU are divided into 4 groups of 4 channels each, with each set of 4 correlator boards correlating all baselines of 4 different channels. The 4 Correlator Input Boards collect the signals from the 16 station units and pass them to the Correlator Boards via the backplane in the Correlator Crates. For a correlator with fewer than 16 stations, some connectors on the Input Boards would be unused. This arrangement would require twice as many "data links" (cables) at the Station Units and at the Correlator Crates than a system with a Data Distributor. The total number of data links does not increase, however, since all connections go directly from the SU to the CC. The number of signals on each link is reduced from 24 to 12.

This architecture is compatible with the 24:16 multiplexer and 16:24 de-multiplexer shown in Figs. 6.5.2 and 6.5.3 of Mark IV Memo #182 (NFRA-ITR 202). This multiplexer is in reality a set of 8 independent 3:2 multiplexers, and can be used as a 12:8 multiplexer.

This concept can be extended to a 32-station correlator, wherein each group of 8 correlator boards would correlate all the baselines for 2 channels (2 polarizations at the same sky frequency) from all 32 stations. Of course, this architecture precludes the use of data recirculation, which is inherent in the data-distributor concept.