

The transfer of a single byte of data takes a minimum of 8 interactions on the I/O Bus.

The I/O Bus provides for up to 64 Input/Output Channels (IOCs) which are independent logical transfer paths, a single coupler may have more than one IOC.

Each IOC is defined to have a set of 4 output registers which are written to by the Control Processor and a set of 4 input registers which are read by the Control Processor. Access to these registers is controlled by the Function and Function Qualifier lines.

The Control Processor can select a particular IOC by writing the IOC number to one of the output registers (Come On Line) and the selected IOC will then remain 'On Line' until 'Offline' is set or another IOC is selected.

The Control Processor will initiate the transfer of a block of data by writing to the Control Word register of the selected IOC. Thereafter the transfers of the command, data and status bytes for the block of data are initiated by an interrupt from the IOC.

There is a single bussed interrupt line which is set by an IOC requesting service. A 'daisy chained' Interrupt Acknowledge line will cause the highest priority interrupting IOC to place its IOC number on the data lines.

The Control Processor will bring the interrupting IOC Online and read from the input registers the interrupt type, associated data and the assigned partition number. The Control Processor will then write any output data to the output registers. Finally, the Control Processor will clear the interrupt by writing to the Clear Interrupt register and set the IOC Offline.

2.2.3 Disc Bus: The Disc Bus is driven by the Disc Controller and is used as the transfer path for control information to Disc Adaptors, and as a block multiplexing interface for the transfer of data to or from Disc Adaptors. It consists of

- 8 Bussed Bidirectional Data lines
- 1 Bussed Control line
- 1 Select line to each Adaptor
- 1 Service Request line from each Disc Adaptor
- 1 Strobe line.

The Disc Bus consists of one or more physically separate segments, each driven by one Disc Controller.

Each Disc Adaptor contains a buffer which is used to store the disc transfer parameters sent across the data lines by the Disc Controller.

When the Disc Adaptor is ready to transfer a block of data, it requests service from the Disc Controller. The Disc Controller will initiate a data transfer operation and the block of data is transferred across the disc bus in synchronism with the Strobe line at 3Mbytes/s.

2.3 External Peripheral Interfaces

2.3.1 MTIOC Interface: The MTIOC interface (Multi Terminal Input Output Channel) is the main interface for connecting slow peripherals onto System 25, and has been carried over from System Ten. Up to 10 terminals may be multi-dropped onto a single twisted pair cable which can be up to 1500m long.

Data is transmitted bit-serially as 7 data bits and two check bits at a bit rate of 28kHz or 56kHz, using frequency modulated encoding. The equivalent byte rate is nominally 1500 or 2700 characters transferred per second. Successful transmission of a byte of data in one direction is followed by an Acknowledge transmission in the other direction. If no acknowledgment is detected, the data byte is automatically retransmitted.

The protocol of the MTIOC interface allows for four commands:- Read, Write, Read Control and Write Control. Interpretation of the commands depends on the particular peripheral. In between transfers, the terminals are polled in sequence. The selected terminal will acknowledge the poll if it requires service.

Electrical isolation of the interface is achieved by transformer coupling at the terminal.

2.3.2 MDIOC Interface: The MDIOC interface (Multi Device Input Output Channel) is used for connecting Point-of-Sale or Factory Data Collection terminals into System 25 via the D coupler (see Fig. 1). It allows the connection of a single terminal up to 12000m from System 25 via a single twisted pair. The data transfer rate depends on the direction of the transfer and length of line and can be set to the following data rates (in characters per second).

Output to Terminal	Input from Terminal	Maximum Line Length
120	1200	12000m
1200	3600	6000m
2400	4800	1000m

Data is transmitted as 7 data bits and one parity bit using an asynchronous transmission protocol. Optical couplers in the D Coupler give electrical isolation. The terminal provides the line current which is modulated by the terminal for input data, and the impedance at the D Coupler is modulated for output data.

The coupler contains a multiplexor for the connection of up to 16 lines into a single IOC, and two IOCs with a total connection capability of 32 lines.

2.3.3 Communication Interfaces: CCITT V24 interfaces are provided for the connection of modems and associated communications lines. System 25 will support a variety of protocols, including: