

# NASA TECH BRIEF

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## Buffer Control Unit for Computer Communications

A buffer control unit (BCU) has been designed to perform several functions in the terminal control units (TCU) of a time-sharing computer communications network utilizing random-accessed radio channels. The BCU provides character echoing for keyboard display, parity and syndrome generation (error detection), half or full data-packet generation, automatic retransmission of packets, and keyboard lock-up.

Prior to the transmission of data packets, each character sent to the TCU from the terminal is echoed back to the display; if no characters are displayed, a keyboard lock-up is indicated. Each character received by the BCU is stripped of the start and stop bits so that only seven information bits and the parity bit are retained. Each character is counted by the BCU so that a decision on full- or half-data-packet generation can be made later, and each character is decoded to detect a carriage return character (CR) which is used to transmit a packet to the controlling minicomputer.

When the CR character is detected, the keyboard display is locked to prevent inadvertent entries, and data entered priorly is shifted to the front of the buffer register with zero bits filling the empty positions. The request-to-send control signal is routed to the modulator-demodulator (MODEM), and the header register and parity/syndrome registers are cleared. When the MODEM indicates readiness to accept data by setting a clear-to-send signal, the BCU sets the terminal identification, packet number, and full/half bit in the header register; the clear-to-send signal is delayed, and then used to start the actual transmission of the packet. Transmission involves shifting data out of the header register and buffer register serially, with the respective parity groups

appended to each register block. The data of the buffer register is looped back to be retained for retransmission.

After the entire packet has been transmitted, the BCU is set to the receive mode; if no acknowledgment is received from the controlling minicomputer, the packet is retransmitted after an almost-random delay. The operations for retransmission are the same as for initial transmission, except that the packet number is repeated rather than changed.

Upon receipt of a packet from the minicomputer, the BCU decides whether it belongs to a particular terminal by decoding the identification, packet number, and the code word (header + header parity). As the header is shifted into the header register, it is also shifted through the parity/syndrome register for error detection processing. If no errors are detected, the text portion of the packet is shifted into the buffer register, and the entire data length is unloaded to the display terminal. If an error is detected by the user, a request for retransmission is made through the user's program. Since the same buffer register is used in send and receive mode, the BCU is a half duplex system.

### Note:

Requests for further information may be directed to:

Technology Utilization Officer  
Ames Research Center  
Moffett Field, California 94035  
Reference: TSP 75-10059

### Patent status:

NASA has decided not to apply for a patent.

(continued overleaf)

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