To: Distribution

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Subject: Multics Support of IBM Binary Synchronous Communications

INTRODUCTION

The Multics Remote Concentrator (MRC), as outlined in MTB-282, makes use of a synchronous communications link between the concentrator and the Multics front-end processor. The initial line discipline supporting this link will be the IBM Binary Synchronous Communications protocol. In fact, the Multics line discipline will be a subset of the general bisync protocol. The purpose of this MTB is to define this subset, which will also support the Tymnet Host to Node protocol, and to clarify the interface between the front end processor software (hereafter referred to as MCS) and the rest of the Multics system (hereafter referred to as User). The "user", in this case, may be a user process, a Daemon process, or ring-0 routines that are utilizing the synchronous line to communicate with the MRC, Tymnet, or an IBM 2780-type terminal.

MCS/COMMUNICATIONS LINE INTERFACE

The following items define the subset that MCS will support -

- o point-to-point data link with contention. Transmission is between only two stations and each station must "bid" for the line before transmitting any data messages.

- o full or half duplex communication lines. Although Bisync is essentially a half duplex protocol, MCS will support both half and full duplex facilities.

- o EBCDIC and ASCII code sets, transparent and non-transparent data. MCS will provide four modes of data transmission, one of which must be established for a particular line before it is activated ("listen" mode signalled by user).

- o leased (nonswitched) communications lines or a switched network (dial up) will be supported.

- o WACK (Wait Before Transmit-Positive Acknowledgment) will not be sent by MCS but it will be accepted from the remote station.

- o RVI (Reverse Interrupt) will not be sent by MCS but it will be accepted.

- o TTD (Temporary Text Delay) will not be sent by MCS but it will be accepted.

- o MCS will implement all control sequences (WACK, RVI, TTD as well as others not mentioned here) as specified in the IBM publication "General Information - Binary Synchronous Communications", GA27-3004-2.

- o the physical interface to the communications line will be through an HSLA Bisync subchannel. This subchannel computes the CRC-16 error control field and recognizes special control character sequences - significant aids to MCS.

MCS/USER INTERFACE

The following items define, in general terms, the interface between the Multics "user" and the front-end processor routines.

- o MCS will accept a data message from the user and assume the responsibility of transmitting it to the remote station. This responsibility includes all response and control sequences as well as re-transmission in the event of line errors.

- MCS will accept messages from the remote station and, after all errors, format or transmission, have been corrected, send it to the user. Hence, the user will receive only "good" data messages.

- read and write aborts may be signalled, through the appropriate mechanisms, and MCS will take corrective action.

- the line mode (EBCDIC or ASCII code, transparent or non-transparent) must be set before connection is made with the remote station. This mode will prevail until the station disconnects, or "hangup" is signalled by the user.

OUTGOING MESSAGE FORMATS

The format of data messages sent by the user to MCS must be consistent with the prevailing line mode. To understand the following items defining these message formats, the reader should be familiar with the Binary Synchronous protocol.

- the user must frame a data message with the proper "starting character" sequence (SOH, STX, or DLE STX) and the proper "terminating character" sequence (ETX, ETB, DLE ETX, DLE ETB).

- a data message may contain an "intermediate transmission block" sequence (ITB, DLE ITB) provided the message format remains consistent with the line mode. In non-transparent ASCII mode, the ITB sequence will cause additional MCS overhead.

- the user must refrain from using the "forward abort" sequence (ENQ, DLE ENQ) in data messages. The presence of this sequence will cause hiatus between MCS and the remote station.

- all characters between the starting and terminating sequences (aside from ITB usage) should be data characters only. In transparent mode, DLE DLE may be used to send a DLE data character.

- MCS, through its interface with the HSLA Bisync subchannel, will be responsible for leading SYNCs, imbedded SYNC idles, CRC and LRC computation and insertion, and trailing pads.

INCOMING MESSAGE FORMATS

The format of data messages sent by MCS to the user will be consistent with the prevailing line mode. In particular -

- o messages will contain starting and terminating sequences and any ITB sequences utilized by the remote station.
- o leading SYNCs, imbedded SYNC idles, CRC and LRC characters, and trailing pads will have been stripped out of the data message by MCS (or the Bisync subchannel).
- o if appropriate, the data message will contain the DLE DLE sequence to represent a DLE data character.

SUMMARY

MCS support of a Binary Synchronous Communications line, as outlined above, will make full use of the Bisync subchannel and will allow all modes of transmission. This should provide interface capability for the current areas of interest - IBM 2780, MRC and Tymnet.

Please address comments on this MTB to Mike Grady.