

National Radio Astronomy Observatory
Charlottesville, Virginia

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To: R. Burns

COG Memo No. 27

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Subject: Preliminary Specifications of NRAO Data Switch

The following specifications are being submitted to stimulate your mind and investigation to allow me to come up with a firm set of specifications.

I. Hardware

- A. Maximum number of input-output lines = 64 input and 64 output per module.

Example: If a device had a transmit line, a receive line and an output data terminal ready line (DTR), it would require two input lines to the switch and one output line from the switch. In one module this would leave 62 input lines and 63 output lines.

- B. Maximum number of modules = 4.
- C. Maximum transmission speed = 4800 bps per input or output line. 9600 bps require 2 input and 2 output lines, etc. If control lines (DTR, DSR, CTS, etc.) can stand one or two bit times delay - which should be the case - they will only require one line at any speed.
- D. Location in Charlottesville = telephone room.
- E. Connection between computers and switch = multi-pair cable from computer to switch. The cable may pass through terminal boards.
- F. Connection between terminals and switch = in some cases, presently installed wires; others through two unused pair in each telephone cable to a terminal board in the telephone room. The wires would connect to the switch from the terminal board via multiconductor connectors - more pins than type D connectors.
- G. The system will be located in the Stat Mux. rack.

II. Software

- A. A terminal would make the switch connection by transmitting a special character.
- B. The switch would answer "Number Please."
- C. The terminal would send the number of the device it wants to be connected to.
- D. The switch would make the connection.

Example: After connecting to the IBM, the switch would then send the message to the terminal = "Ready." If the device requested by the terminal is busy, the switch would send the message = "Busy, do you want to be put in a que line? Y or N." If the answer is "N," the connection is broken. If the answer is "Y," the switch sends a message = "OK" and when the connection is made, the terminal sends the message "Ready" and rings the bell.

- E. Termination of communications and disconnection by the switch must be accomplished in one of two ways:
 - 1. The computer would lower an EIA line - for example, DTR.
 - 2. A separate port on the computer would be devoted to the switch. Whenever a communications path is "logged off," the computer sends a message to the switch on the dedicated line to disconnect that particular connection.
- F. It is up to the operator of a terminal to ensure that the terminal's parameters are compatible with the device to which it is to be connected.

III. Switch Central

There will be a switch dedicated terminal. This will be used for:

- A. Programming the switch.
- B. Diagnostics.
- C. Supervisory information.
- D. Switching connections of synchronous devices.

IV. Electrical Specifications

- A. The switch will be transparent to the devices.
- B. The maximum jitter plus delay of signals from input to output < 14 microseconds. This is composed of 13.02 μ s delay and < 200 ns jitter. These maximum values are very good for 4800 baud, quite satisfactory for 9600 baud, and I believe just acceptable for 19,200 baud.