Interoffice

COG Memo No. 32

National Radio Astronomy Observatory

Charlottesville, Virginia

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To: COG Committee

From: Art Shalloway

Subject: Interface Between the NRAO Digital Data Switch and Terminals, Computers, Modems, Word Processors, and Statistical Multiplexers

This memo describes the interface connections and operation for the digital data switch (DDS) presently being designed. The interface as planned is dictated by the software capability as described to me by programmers. The system will work under normal conditions, but certain problems can occur in cases of power outages as will be described.

All terminals will have only a transmit, receive and two ground connections to the DDS. All computers will have a RI (RING INDICATOR), DTR (DATA TERMINAL READY) and CD (CARRIER DETECT) as well as the transmit, receive and ground connected to the DDS. In the following discussion, the levels discussed (up and down - high and low) are the RS232 levels.

DESCRIPTION AND OPERATION

I. Terminals-to-Computers. Call Originated by Terminal

After DDS decides which computer port to use for the terminal, the DDS pulses the computer ring indicator (RI) line. The computer raises the DTR (Data Terminal Ready) line. The DDS then raises the CD (Carrier Detect) line to the computer and informs the terminal that it may start transmitting.

II. Modem-to-Computer

The modem must first communicate with the DDS to request a connection; therefore, the DDS looks like a computer to the modem and the operation is as described above with the DDS playing the part of the computer and the modem playing the part of the terminal. After the DDS gets the modem's connection request, the DDS goes through the same procedure as described in paragraph I.

III. Computer-to-Computer

In this case, the operation is the same as paragraph II with the originating computer taking the place of the modem.

IV. Computer-to-Modem

As in paragraph III for the computer. The modems will be the new type with built-in automatic dialing.

V. Word Processor-to-Word Processor or Computer-to-Word Processor

Same as paragraph III is the present assumption, but I am awaiting further word from IBM.

VI. Anything Through a Statistical Multiplexer

In this case, DTR will be passed from one statistical multiplexer to the other. This is required for disconnecting connections as described below.

DISCONNECT DESCRIPTION

When a device logs off from a computer or word processor, the computer or word processor which was called originally drops the DTR line. This tells the DDS that the connection should be disconnected. The DDS will then drop CD.

In the case of a terminal calling a terminal or some special device, there is normally no DTR line and each case will be dealt with individually by Gene Runion or Chuck Broadwell when such operation is required.

PROBLEMS THAT CAN OCCUR

If power goes off to the computer and/or the DDS, a problem develops in the computer. Consider the four cases:

I. Computer-Power On DDS-Power On

Everything fine.

II. Computer-Power Off DDS-Power On

This will bring all of the DTR lines from the computer to the DDS down and the DDS will accept this as a signal to disconnect all of these ports. When power returns, everyone will have to ask to be reconnected, but they will very likely get reconnected to a different port on the computer. In a computer like the IBM, the data working space will have been saved, but since it is associated with a particular port, the wrong terminal will now be communicating with the wrong work space.

III. Computer-Power On DDS-Power Off

This will bring all of the CD signals from the DDS to computers down. All computers will then drop their DTR and when power returns to the DDS, it will disconnect everything to all computers. We then have the same problem as in paragraph II.

IV. Computer-Power Off DDS-Power Off

Same as paragraphs II and III combined.

If the above is not acceptable, the software will have to be changed as there is no way to change the hardware that will solve the problem. The ideal way would be a connection between the DDS and computer that would not require handshaking on connection of the terminal to the computer, but just one line from the computer to the DDS that would supply a positive going pulse when the switch is to disconnect a terminal.

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