



# Tech Info Library

## Full Duplex And Half Duplex And Echoplex

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NOTE: Throughout this discussion both terminals and personal computers running terminal emulator software will be referred to as terminals. The term modem denotes any DCE device.

### BANDWIDTH

The wires used to connect the average telephone to the American telephone system can be viewed as a river with information barges on it. The river's width is limited and cannot be made wider. Similarly, the telephone wire has a limited frequency bandwidth.

### FULL DUPLEX (for modems and other data transmission devices)

A Full duplex modem can simultaneously transmit and receive on a connection. In other words, the river is divided into two channels in which information barges may travel in both directions at the same time. But some maneuvering room is required on either side of both barges to prevent collisions. This is also true of the telephone line; some of the bandwidth is needed to separate the transmit and receive channels. This space is then wasted and cannot be used to carry information. As a result in most full duplex modems have relatively slow data transmission rates.

### HALF DUPLEX (for modems and other data transmission devices)

Half duplex modems, on the other hand, use almost the entire bandwidth and so waste very little space. But because there is not then room for two channels, the information may only move one direction at a time. This means that time must be taken after each transmission to "turn around" the line, and extra interface signals are required to control which station is transmitting.

### ECHOPLEX

Echoplex is a feature designed into many modems. It enables the modem to reflect characters back to the terminal it serves, even while transmitting them to the phone line (if a phone connection has been made). With echoplex, a user can see whether his computer is communicating to the modem simply by typing a few characters. If the modem has the echoplex feature (Apple modems do), then the modem will return the typed characters to the screen. This tells the user that the data has transferred from the terminal to the modem without error.

### TERMINAL FULL AND HALF DUPLEX

Sometimes terminals (and terminal emulator software such as Access III) have

options for terminal full-duplex or terminal half-duplex to allow the terminals to support modems both with and without echoplex.

#### TERMINAL HALF DUPLEX

Terminal half duplex supports non-echoplex modems. This selection on a terminal causes the characters typed to be displayed regardless of whether or not the modem returns the characters.

If terminal half duplex is selected when using an echoplex modem, there will be two of every character typed: one from the terminal's keyboard and one from the modem.

If the modem doesn't have echoplex, it won't echo characters back to the terminal. So the only way the user can see what is being typed is if terminal half duplex is selected.

#### TERMINAL FULL DUPLEX

Terminal full duplex causes the terminal to display only the characters received from the modem (which may be those the modem has received from a remote modem across a phone connection as well as those the modem is echoing back to the terminal).

NOTE: Many people think that selecting terminal full duplex means that full duplex communication will occur across the phone connection, modem-to-modem, but this is not so. Actually the terminal full duplex option is there only to enable the terminal to support an echoplex modem.

Terminal Full Duplex enables the user to check communication between the terminal and the echoplex modem by allowing him to ensure that the characters displayed are the same as those typed.

If terminal full duplex is used with a modem or other device that does not perform echoplex, then the user will not be able to see what is typed because the characters will not be echoed back.

The table below shows the indications that will occur when the wrong terminal duplex selection is made at a terminal.

"SYMPTOM"	"PROBLEM"
CHARACTERS TYPED ARE NOT DISPLAYED WITH ECHOPLEX MODEM	MODEM NOT FUNCTIONING OR NOT CONNECTED
CHARACTERS TYPED ARE NOT DISPLAYED WITH NON-ECHOPLEX MODEM	TERMINAL SHOULD BE IN HALF DUPLEX
TWO OF EVERY CHARACTER TYPED IS DISPLAYED	TERMINAL SHOULD BE IN FULL DUPLEX BECAUSE MODEM IS ECHOPLEX

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