Exchange Definitions   April 26, 1957

Accept

A signal sent by the exchange to the computer acknowledging the
receipt of an instruction which can be acted upon by the exchange.
(An instruction is _not_ accepted if the I/O Unit addressed by the
instruction is in use at the time the instruction is received by the
exchange c. f. Reject.)

Assign Channel

A bit in a control word indicating that an instruction has been ac-
cepted for the corresponding I/O unit but the unit has not been
allocated to a channel.

Busy

A Status signal indicating that the I/O unit is performing an operation.

Cancel

1) A button on an I/O Unit
2) A status signal initiated by the button in 1)
3) A bit in a control word indicating that 2) has been detected. (A
   status bit)
4) A signal from the exchange to the computer indicating that the
   bit, 3), is in the one state.
N.B. Detection of 2) will cause the exchange to execute DISCONNECT,
(Def. 2)

Channel

One of ten information paths between the I/O Units and the exchange.
Any I/O Unit may be assigned to any available channel. The path
consists of all lines necessary to pass both data and control infor-
mation between the I/O Unit and the exchange.

Control

1) An instruction directing a specified I/O Unit to perform e. g. one
of the following functions: a.) Back space, b.) Rewind, c.) Turn on
Reserved light.

2) The set of signals from the exchange not conveyed over the same
lines as data, which direct an I/O Unit to perform specified func-
tions:
      a.   Control
      b.   Read

c. Write
d. Disconnect
e. Locate

3) The signal (as defined under 2) which directs as I/O Unit to execute a control instruction (as defined under 1). The function to be executed is described by information passed over the data path.

Control Word

A word containing information which directs the flow of data (continued in data words).
1) In the computer: 64 bits designating
    a)   address of Data-Word   20 bits
    b)   word count   15 bits
    c)   address of next C-wd   20 bits
    d)   ECC & G/D   2 bits
    e)   Status bits   7 bits
        (1)   Assign Channel
        (2)   Data Error
        (3)   Not ready
        (4)   Select
            (a) read
            (b) write
            (c) control
            (d) locate
2) In the exchange - all above bits plus
    a)   EOM
    b)   Op Sig
    c)   cancel
    d)   EOF

Data Error

1) A status signal from an I/O unit specifying that parity failure has been detected in information received over the data lines
2) A status bit in a control word indicating that the signal, 1), has been received by the exchange or that a data word in the exchange contains an uncorrectable error.
3) A signal from the exchange to the computer indicating that the bit, 2), is in the one state.

Data Lines

A set of 9 lines over which information is sent between the exchange and an I/O unit. There are two such sets of lines in each channel, one for input and the other for output. The ninth line is used for a parity check on the other eight.

Data Word

A word containing information to be operated upon by a program.

DATA - The inforamtion in a Data word

Disconnect

1) An instruction directing an I/O Unit to stop sending/receiving information to/from the Exchange at the end of the current cycle.
2) A signal from the Exchange to the I/O Units directing the I/O Unit to terminate its operation.

End of File

1) A status signal indicating that an I/O unit has reached a condition requiring exceptional program control.
i. e.   Tape unit - tape mark
          Printer - end of page
2) A Status bit in an exhange control word indicating that the signal, 1), was received by the exchange
3) A signal from the exchange to the computer indicating that the bit, 2), is in the one state.

End of Message

A status signal from the I/O Unit to the exchange signifying the completion of an operation. (Including improper completion).

The corresponding bit in an exchange control word.

Error

A signal sent from an I/O Unit to the Exchange signifying incorrect execution of an operation.

Exchange

A device which directs the flow of information between I/O units and memory units.

Hold Interrupt Status

A signal from the computer to the Exchange indicating that the computer can not execute interrupt procedure if requested by the exchange. When this signal is present, the exchange is directed not to reset the appropriate control word but to preserve the status bits.

Improper Instruction

A signal from an I/O Unit to the exchange indicating that the I/O Unit can not execute the instruction ordered.

I/O Unit   (Called External Unit elsewhere).
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1) Communications Tape (COT)
2) Operating Station
3) Printer
4) Card Reader
5) Card Punch
6) Disc File
7) etc.

Instruction

A word containing an operation, an address and other information

which is interpreted by the computer, in turn, to cause the computer
to operate in a specified fashion on information in the system or an
I/O unit.

I/O Instruction: Op code & modifier   26 bits
                      Word address   20 bits
                      I/O Unit   12
                      Tag   12

The following i - 's pertain to the Exchange:
1) Read
2) Write
3) Control
4) Locate
5) Transmit

Interrupt

The transfer of the computer program to a specified location ocur-
ring when specified conditions obtain in a control word in the Ex-
change Memory. Provision is made for storing the location of the
instruction which would have been executed had interrupt not occurred.

Interrupt Request

A signal from the Exchange to the computer which calls for interrupt
procedure to be initiated. This signal is generated if any of the fol-
lowing status bits are in the one state:
1) EOM
2) Operator's Signal
3) Cancel
4) End of File

Locate

1) An instruction which sends positioning information to an I/O Unit
(e. g. directs heads of disc file to proper track).

2) A signal between Exchange & I/O Unit which specifies that the information being sent over data lines is to be used for a positioning address

Normal End of Message

A signal between the exchange and the computer indicating that none of the following status bits are present in the active control word.
1) Operator's Signal
2) Data Error
3) End of File
4) Cancel

Operator's Signal

1) A status signal initiated by depression of a button on an I/O Unit. This signal is interpreted by the Exchange to initiate interrupt procedure
2) The button on an I/O Unit which initiates the status signal, 1), at the discretion of the operator.
3) A signal from the Exchange to the computer indicating that the bit, 2), is in the one state.

Read

1) An instruction calling for the movement of data from a specified I/O Unit to a position of Memory as called for by a specified control word
2) A signal from the exchange to an I/O unit directing the I/O unit to send data to the Exchange

Ready

A status signal specifying that an I/O Unit is in condition to run properly. (N.B. The inverse of this signal, not ready, is used as a status bit in the exchange control word).

Reject

A signal from the Exchange to the computer indicating that an instruction can not be acted upon by the exchange.
(c.f. ACCEPT) There are two such signals,
a) Reject with Unit Selected and
b) Reject with Unit not ready.

Reserved

A light on an I/O Unit which is turned on by a certain control instruction.

Select

Any of four bits in a control word which indicates that the corresponding I/O Unit has been issued an instruction.
Each of the bits indicates which instruction has been issued, i.e.
a) READ
b) WRITE
c) CONTROL
d) LOCATE

Service Request

A Status signal which indicates that the I/O Unit is prepared to send/or receive information. (This line controls timing "in the small").

Signal

Any single bit of information passed between two (or more) units which directs one of the units to execute a specified function or reports the accomplishment of execution of a function or the occurrence of a condition.

Status

Any one of a set of signals from an I/O unit to the exchange which reports a condition in the I/O unit.
The set of bits in a Control Word in the Exchange or in Memory which contains the information so reported.
1) Normal
2) Oper Sig
3) EOF
4) Interrupt Reg
5) Data Error
6) Cancel
7) Busy
8) Not Ready
9) Svc Reg
10) End of Message

Transmit

1) An instruction which causes the specified 64-bit word in the Exchange Memory to be sent to the Memory.
2) A signal from the computer to the exchange directing the execution of 1).

Write

An instruction directing a specified I/O Unit to receive data as called for in a specified control word.

A signal from the Exchange to an I/O Unit directing the Unit to receive data.

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