

Channel Adapter

The following notes are intended as a basis for revising Chapter 7 of the Manual.

1. Function of Channel Adapter

The Channel Adapter contains a register and the control circuits required to operate any serial input-output or external storage unit to be attached to one Basic Exchange channel. For some simpler units the Channel Adapter may contain all the circuits needed outside the unit proper. Thus, a Channel Adapter equipped with solenoid drives will be able to run a typewriter directly as an Inquiry Station. For other units, it will be combined with a specific Unit Adapter. Thus, a Channel Adapter together with a standard Tape Adapter unit (TAU) will form a control unit to run magnetic tape; together with a standard Printer Adapter unit it will run a printer; etc.

The Channel Adapter contains:

- (a) a 9-bit register, including 8 information bits and one parity bit;
- (b) a parity checker or generator which will be set up to check or to generate parity bits depending on whether the unit provides these bits;
- (c) 4 triggers to indicate whether a Read, Write, Control, or Locate operation is taking place;
- (d) a Select trigger with two select lines going to each of two units which may be attached;
- (e) a control decoder which provides 17 possible output lines for setting up specific functions in the unit;
- (f) a Unit Signal trigger;
- (g) other control circuits needed for starting, timing, and terminating any operation.

2. Selection

The Channel Adapter is equipped to send a Select signal to one of two units which may be attached. A Select trigger is set by the low-order bit (Bit 49) of the right effective address of any Locate instruction, the remaining bits being ignored. The Select trigger and lines remain set one way or the other until another Locate is given.

The two units are connected to a common set of information and control lines. For selection to be effective, each unit must be equipped with its own set of gates which are activated by the Select line from the Channel Adapter. The Select line may also be used by the unit to turn on a Select light.

The magnetic tape units, for example, will be equipped with these gates so that one of two such units may be selected on one adapter. Inquiry stations and printers, for example, will not be so equipped, and only one such unit may be connected to one Channel Adapter. The Console with its typewriter is considered to be a single unit as far as the Locate instruction is concerned, and only one combination unit may be attached to an Adapter.

For the serial disk file, the entire right effective address is sent to the disk control unit to set up the desired access mechanism. The Select trigger is ineffective.

### 3. Control Decoder

The Channel Adapter contains a decoder which provides the control functions for all units. Control may be indicated in one of two ways:

1. A single byte of the right effective address (bits 42-49) of a CONTROL instruction.
2. Any byte transmitted during a WRITE instruction, which is coded as shown below, will be interpreted as control rather than data to be written.

The Channel Adapter will always interpret CONTROL instructions as in (1). The interpretation of data bytes as in (2) will be set up only for those units which need it, primarily the typewriter at this point.

In the table below, decimal symbols are used to indicate the coding of the eight bits as follows:

Bit	0	1	2	3	4	5	6	7
	XX		-		Y	Y		

where XX(YY) stands for the numbers 0 to 15. Thus, "01011110" is shown as "5-14".

The table below shows, on the left, the control codes as they apply to the Inquiry Station and Console during a Write Operation. The unused codes are wired to the Ignore function; only code 7-15 is recommended to be used for Ignore, so that codes 5-14 to 7-14 may be reserved for future expansion.

On the right of the table are shown a typical set of control codes for use with the Control instruction. Different units may require a different assignment, but those that are common to more than one unit will have the same codes. All unused codes will give an Exchange Program Check (EPK) indication, except that code 0-0 will be treated as No Operation and ended without the EPK.

Control Codes

<u>Code</u>	<u>WRITE</u> (Inquiry Station and Console)	<u>CONTROL</u>
0-0	Blank	No Operation
0-14	Erase	Erase Long Gap
0-15	End	Write Tape Mark
1-14	Line Feed	Rewind
1-15	Carriage Return and Line Feed	Rewind and Unload
2-14	Tabulate	Space Block
2-15	Carriage Return Only	Space File
3-14	Backspace	Backspace Block
3-15	Blank (Note 1)	Backspace File
4-14	Black Ribbon	Odd Parity
4-15	Red Ribbon	Even Parity
5-14		Sound Gong
5-15		Check Light On
6-14		Reserved Light Off
6-15		Reserved Light On
7-14		Exchange Program Check
7-15	Ignore	Exchange Program Check
8-0 to 15-15	Exchange Program Check	Exchange Program Check

Note 1: Code 3-15 is recognized by the Console display units as a Blank. The typewriter and printer will print a blank space for Code 3-15 as well as 0-0 (the collatable Blank).

#### 4. Unused Information Bits

Whenever a unit requires less than 8 information bits, the unused bits (always those on the left) are wired during writing to Exchange Program Check. The unused high-order bits should always be zero. If they are not zero, the operation is terminated with EPK immediately. Since the parity bit is forwarded to the unit unchanged, this feature will prevent writing with the wrong parity bit.

If an all-zero byte is sent to a 729 tape unit while writing in the even-parity mode, the operation is terminated with EPK.

#### 5. Unit Signal

There is only one Unit Signal trigger in the Channel Adapter. If two units are attached, no distinction is made between Unit Signal indications from either unit.

#### 6. Keys and Lights

Except for a Power On-Off switch on the Adapter, the appropriate keys and lights will generally be mounted on the units themselves. For the Inquiry Station typewriter, paper tape equipment, and all other units which are not designed to accommodate the necessary keys and lights, these will be mounted on a Key and Light Box which can be placed next to the unit. (The cable from the Adapter will first go to the Box and from there to the Unit.)

The keys on the Key and Light Box are:

Power Off  
Power On  
Ready (Note 1)  
Not Ready  
Signal-Enter (Note 2)  
End  
Erase

Note 1: As far as the Channel Adapter is concerned, the Ready key will not give Unit Signal automatically. This does not preclude the definition of a Load button on some units which automatically provides both Ready and Unit Signal.

Note 2: Signal-Enter are separate keys on the Console but have only the meaning of Signal on the other units. The keys may be combined on all units except the Console.

The lights are:

Power  
Ready  
Check  
Reserved  
Enter  
Forms (operated directly from the  
paper holder, if any, on the  
typewriter)

The Channel Adapter contains all the circuits for operating these keys and lights. Units requiring additional keys and lights must provide the circuits to operate them.

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