Preliminary Edition

DATATRON
Electronic Data Processing Systems

HANDBOOK

EXTERNAL SWITCHING UNIT
Model 421 and
OUTPUT SELECTOR Model 420
TABLE OF CONTENTS

EXTERNAL SWITCH

<table>
<thead>
<tr>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Description</td>
<td>1</td>
</tr>
<tr>
<td>Physical Description</td>
<td>1</td>
</tr>
<tr>
<td>Cable Connections</td>
<td>1</td>
</tr>
<tr>
<td>Operation</td>
<td>2</td>
</tr>
<tr>
<td>Command</td>
<td>2</td>
</tr>
<tr>
<td>Applications</td>
<td>3</td>
</tr>
<tr>
<td>Selector Diagram</td>
<td>5</td>
</tr>
</tbody>
</table>

OUTPUT SELECTOR SWITCH (Picture)

<table>
<thead>
<tr>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Description</td>
<td>6</td>
</tr>
<tr>
<td>Physical Description</td>
<td>7</td>
</tr>
<tr>
<td>Cable Connections</td>
<td>7</td>
</tr>
<tr>
<td>Operation</td>
<td>7</td>
</tr>
<tr>
<td>Command</td>
<td>8</td>
</tr>
<tr>
<td>Applications</td>
<td>8</td>
</tr>
</tbody>
</table>
Figure 1. External Switching Unit Model 421
GENERAL DESCRIPTION

The External Switch Model 421 provides a means of controlling external electrical devices by the DATATRON program.

Normally, the External Switch is used to control the format of printed or punch card results. However, any electrically activated device foreign to the DATATRON may be controlled by the External Switch.

PHYSICAL DESCRIPTION

The External Switch is 12" X 24" X 16". Heat dissipation is negligible.

CABLE CONNECTIONS

Two cable connections are provided with the External Switch. One is to the DATATRON and the other to the printer, card punch, or other external electrical device.

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Figure 2. Cable Connections and Control Pathway

(1)
OPERATION

Within the External Switch there are eight 6-position selectors, each separately controlled by the eight most significant digits of any word in the DATATRON storage.

COMMAND

The control of the eight 6-position selectors is as follows:

EXC † 000p 71 xxxx EXTERNAL CONTROL

Each of the selectors is under the control of the corresponding digit of the eight most significant digits of the word in storage cell xxxx.

Word in cell xxxx:

External Switch Unit:

Selector Pick-up:

Figure 3. Selector Control

The state of each selector is permanent until another EXC command alters the status of any particular selector. Any of the eight selector settings may be changed as follows:

<table>
<thead>
<tr>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>State unchanged.</td>
</tr>
<tr>
<td>1</td>
<td>Selector is normal.</td>
</tr>
<tr>
<td>2</td>
<td>Selector is transferred.</td>
</tr>
</tbody>
</table>
Example:

Storage cell 6012 contains the number 12100221--.
Command: \texttt{7} 0000 71 6012
Selector \(\frac{1}{2}\) (most significant) is normal.
Selector \(\frac{3}{4}\) transferred.
Selector \(\frac{5}{6}\) normal.
Selector \(\frac{7}{8}\) unchanged.
Selector \(\frac{9}{10}\) transferred.
Selector \(\frac{11}{12}\) normal.

The ninth and tenth digits of the word in cell 6012 have no meaning to the EXC command. If the word in cell xxxx is negative, the DATATRON will stop in the same manner as a breakpoint stop. Any selector may be reset (normal) by an external pulse, preventing a repeated external effect.

APPLICATIONS

Format control of the printer or card punch is commonly controlled by the External Switch. By inserting a desired pulse from the printer or the card punch into the common point of any of the six positions of a selector, a desired action on the printer or card punch is available to the plugboards, i.e., carriage control, printing format, space control, punch format, etc. The operation of other electrical equipment or switches not directly associated with the DATATRON system or its input-output equipment is possible. Under control of the program and as a result of a decision made by the DATATRON, alarms could be actuated, valves moved, etc.

Example:

Below is a sample wiring diagram which exhibits various controls.

Types 407, 402

All Cycles using the first position of all eight selectors.
11111112 Double Space
11111111 Triple Space
11111120 Space Suppress
11111200 Print Transfer
11112000 Feed and List a Card
11120000 407 Storage Register Read Out
11200000 Skip to Top of Page
12000000 Skip to Center of Page
20000000 No Printer Format Control
Type 528

All Cycles using third position of all selectors.
10000000 No Punch Format Control
21122200 Punch Format 3
21122100 Punch Format 1
21121020 Punch Format 2
22000000 Double Punch Blank Column Check
21200000 Punch Stop

Remote Pulse using sixth position of all selectors
10100000 No Remote Control
10120000 Skip Switch Off
10200000 Skip Switch On
20000000 Stop DATATRON
11111122 Alarm
SELECTORS

1. SKIP TO CENTER OF SHEET
2. SKIP TO TOP OF SHEET
3. STORAGE REGISTER READ OUT
4. FEED A CARD
5. PRINT TRANSFER
6. SPACE SUPPRESS
7. DOUBLE SPACE
8. TRIPLE SPACE
9. 407, 402 ALL CYCLES
10. DPBC.
11. STOP
12. PUNCH FORMAT #1
13. PUNCH FORMAT #2
14. PUNCH FORMAT #3
15. 528 ALL CYCLES
16. STOP DATATRON
17. SKIP SWITCH ON
18. ALARM
19. REMOTE PULSE
20. SKIP SWITCH OFF
21. REMOTE PULSE

Figure 4
GENERAL DESCRIPTION

The Output Selector Switch and External Switch Model 420, in combination with the Card Converter Model 500, selects the output medium. Under program control, a printer or card punch may be selected for a given output cycle.

Data processing standards often require printed and punched reports for a single application. The Output Selector Switch and External Switch provide facility for summary punching in conjunction with printed output.
PHYSICAL DESCRIPTION

The Output Selector Switch is 12" X 24" X 16". Heat dissipation is negligible.

CABLE CONNECTIONS

The Output Selector Switch houses two cable connections labeled "PRINT" and "PUNCH". The Summary Punch cable of the card punch is inserted in "PUNCH". The cable to the printer, supplied by the manufacturer, is inserted at "PRINT". All other connecting cables to the External Switch, Card Converter, and DATATRON are supplied with the unit.

![Diagram of cable connections](image)

Figure 6. Cable Connections and Information Pathway

OPERATION

When the selector is transferred, the information is directed to the card punch. When the selector is normal, the information is directed to the printer. Only one pathway is possible for any Card Write command. The card punch or the printer may be operated at maximum speed when one machine is used for output. Alternate printing and punching is possible, but at half the normal operating speed of each machine.
The Output Selector Switch is controlled by the DATATRON command:

\[
\text{EXC } \pm 000p \ 71 \ xxxx \ \text{EXTERNAL CONTROL}
\]

If the most significant digit of the word in memory cell xxxx is 1, the selector is set to Normal for printed output; if the most significant digit of the word in memory cell xxxx is 2, the selector is transferred for punch card output. See details of External Switch operation on Page 2.

The DATATRON command, EXTERNAL CONTROL (71), controls the External Switch only. The first position of the External Switch, in turn, controls the Output Selector Switch. If the word in cell xxxx is negative, the DATATRON will stop in the same manner as a breakpoint stop.

APPLICATIONS

Consider an inventory control problem where the balances are maintained on punch cards. Further, a printed transaction register is made for each new balance card produced.

Assume the inventory control program places the output information in cells 1000 - 1015. Cells 1000 - 1007 contain alphabetic description. Cells 1008 - 1015 contain all the numeric information required for the balance card.

The information in cells 1000 - 1015 will be printed on two lines. The information in cells 1008 - 1015 will be punched onto the new balance card.

<table>
<thead>
<tr>
<th>Location</th>
<th>Command</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>7000</td>
<td>EXC 7005</td>
<td>Set to Print</td>
</tr>
<tr>
<td>7001</td>
<td>9980 CDW 1000</td>
<td>Print Two Lines</td>
</tr>
<tr>
<td>7002</td>
<td>EXC 7006</td>
<td>Set to Punch</td>
</tr>
<tr>
<td>7003</td>
<td>9990 CDW 1008</td>
<td>Punch 1 Card</td>
</tr>
<tr>
<td>7004</td>
<td>CU</td>
<td>Return to Main Program</td>
</tr>
<tr>
<td>7005</td>
<td></td>
<td>010000000000</td>
</tr>
<tr>
<td>7006</td>
<td></td>
<td>020000000000</td>
</tr>
</tbody>
</table>

(8)