INVAC
CORPORATION

PHOTOELECTRIC KEYBOARDS PK-144/PK-164

FEATURES

- *Generates any eight-bit code to specification*
- *Photoelectric techniques eliminate metallic switches, contact bounce, and minimize radio frequency interference*
- *Self-contained solid state electronic circuits for compatibility with solid state interface*
- *Good keyboard "feel"*
- *Lightweight, portable, selectable keys provide flexibility*

APPLICATIONS

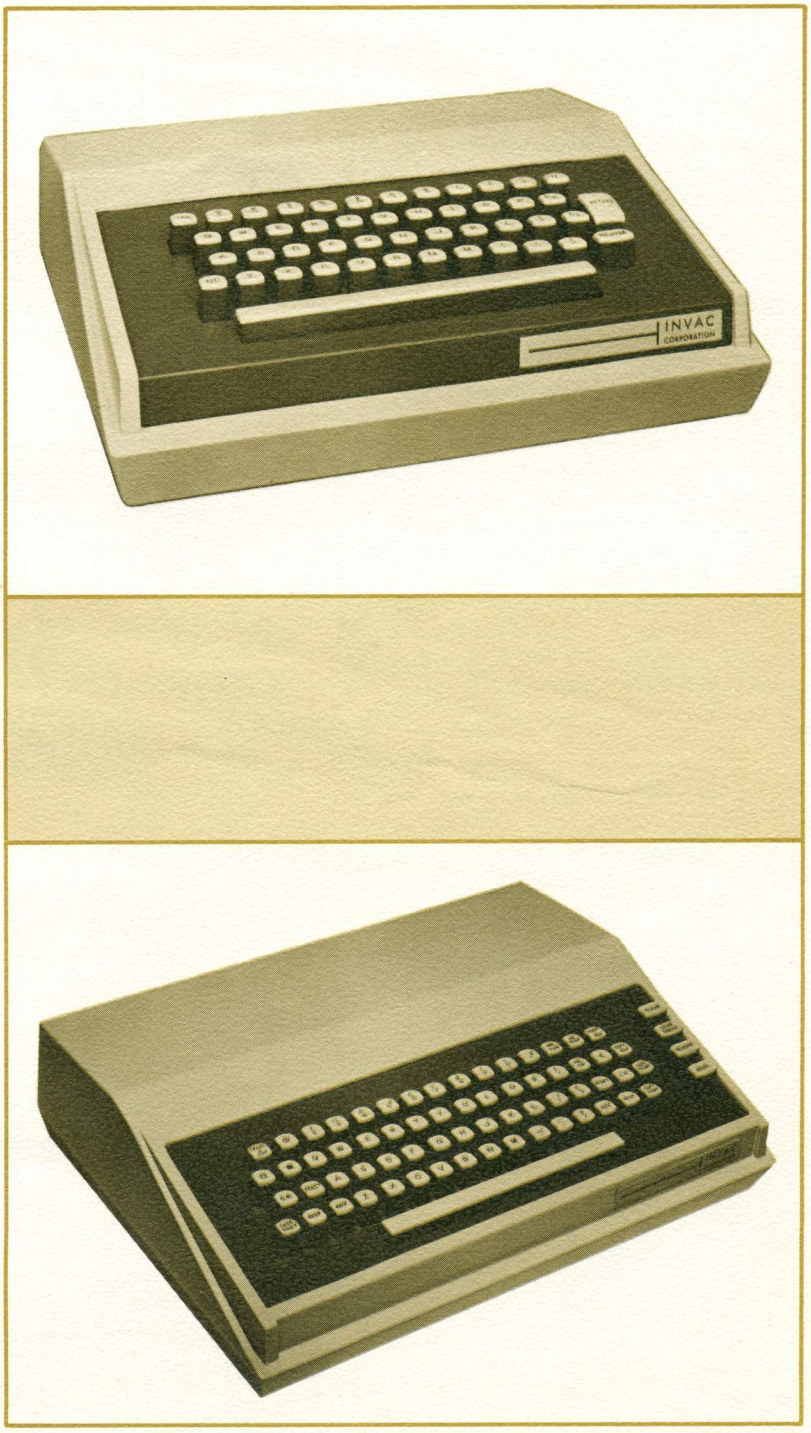
- *Data display consoles*
- *Computer programming*
- *Paper tape preparation . . . tape punch input*
- *Inquiry device for data processing and information retrieval systems*

DESCRIPTION

Invac Photoelectric Keyboards combine photoelectric encoders and power assist solenoid actuators to generate any binary code up to eight bits. Each keyboard has ten light data channels: one for power actuation, eight for data, and one spare channel.

The PK-144 (see photograph) is equipped with a 45-key alphanumeric keyboard. In addition, provision is made for a space bar and two large keys for such functions as carriage return or case shift. A key interlock to prevent actuating more than one key at a time is included. A photoelectric shutter and light technique provides for both power actuation and binary encoding. The PK-164 is equipped with a 63-key alphanumeric keyboard and a space bar. Major functional assemblies of the keyboards are:

a. *Photoelectric encoder consisting of ten light channels, a light source and a photocell assembly. Eight light channels can be used for data and logic functions in any combination. One light channel is used for power actuation and strobing of data.*
b. *Power-assist solenoid actuator consisting of two solenoids operating a common bail. The bail locks the key lever and shutter while data is strobed, thereby preventing any ambiguities.*



c. *Keylevers and corresponding code shutters.*
d. *Keyboard control and strobe printed circuit module.*
e. *Keyboard amplifier printed circuit module.*

OPERATION

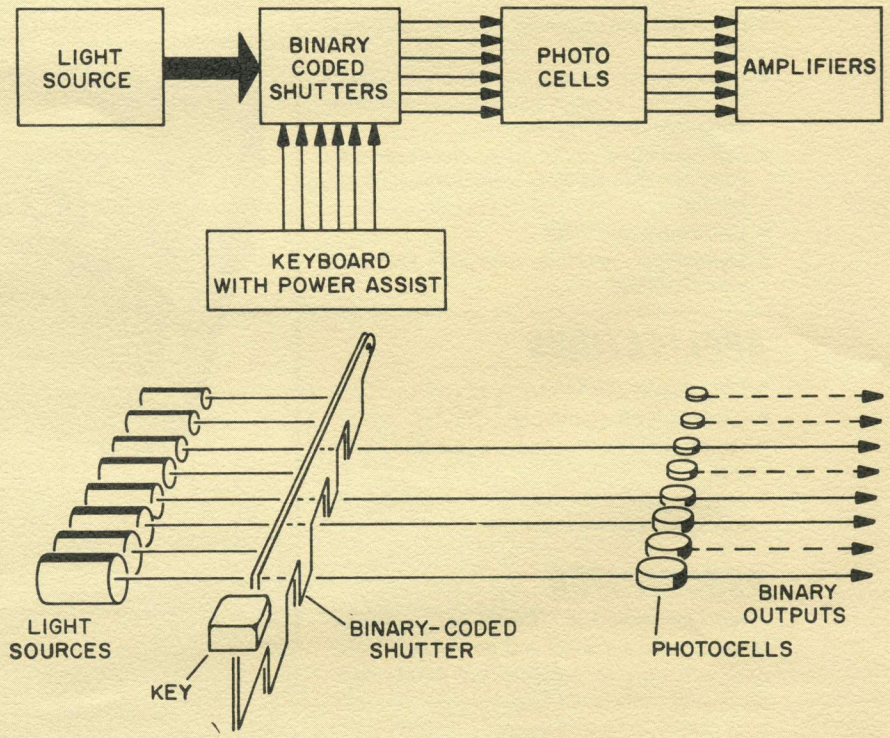
The PK-144 and PK-164 each consist of a keyboard, ten light channels, a bank of ten photocells, a light source, two solenoid power assist actuators, an actuator control circuit, and a ten stage output amplifier circuit. As shown in the block diagram, when a key is depressed by the operator, a binary-coded shutter intercepts the light source causing a resistive change in a photocell. This change is applied to the keyboard control circuit to energize the power assist solenoids. The solenoids are connected to a common bail. When the solenoids become energized, the bail engages the keylever and the motion of the depressed key is continued. The resulting binary coded light data produces resistive changes in a corresponding bank of photocells. The amplifier converts these signals into output voltages compatible with computer logic. A logical ONE (0 vdc) condition exists when a key is depressed; a logical ZERO (—12 vdc) condition exists when the keyboard is inactive and no key is depressed.

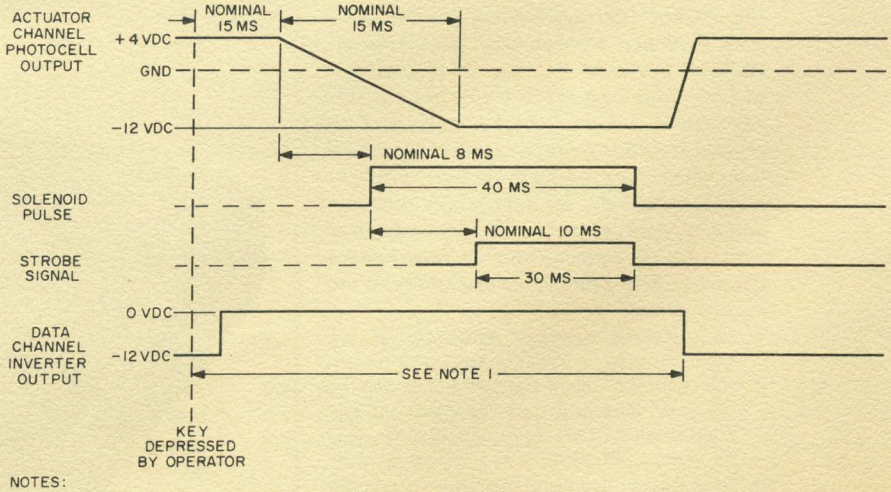
KEYBOARD CONTROL

The actuator control circuit performs two functions . . . power assist solenoid control and strobe pulse generation.

AMPLIFIER

The amplifier circuit contains 10 identical stages (one stage is not used), each containing a voltage divider network and a transistor inverter.





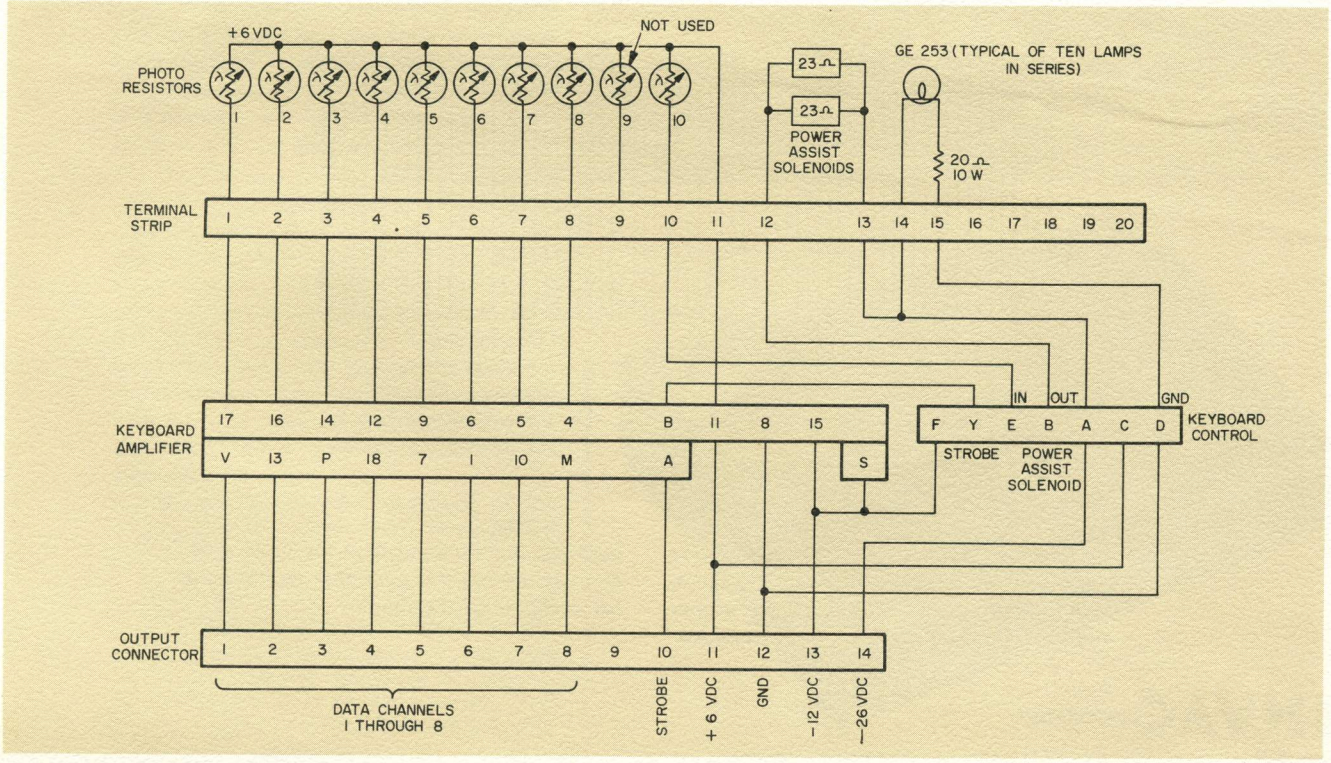
NOTES:

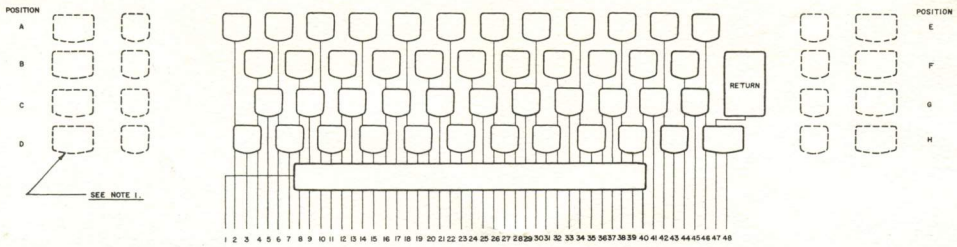
1. DATA PULSE WIDTH SHOWN FOR MINIMUM DURATION OF KEY DEPRESSION. IF KEY IS HELD DOWN IN EXCESS OF 70 MILLISECONDS THEN THE DATA OUTPUT WILL LAST UNTIL THE KEY IS RELEASED.
2. GATING OF DATA WITH STROBE SIGNAL TO BE EXTERNAL TO KEYBOARD.

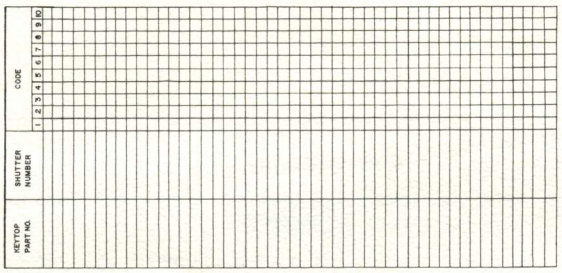
SPECIFICATIONS

PHOTOELECTRIC KEYBOARD PK-144/PK-164

Alphanumeric Keys	*45 for PK-144; 63 for PK-164*
Other Keys	*Shift, Carriage Return, selected machine functions for PK-144; with space bar only for PK-164*
Key Interlock	*prevents depression of more than one key at a time*
Keyboard Lock	*provisions for a remotely controlled keyboard lock are included*
Light Channels	*10 total; one for power actuation and strobe, eight for data, one not used*
Binary Codes	*available in any binary code combination up to 9 bits. Special Keyboards available for binary code combinations up to 18 bits*
Outputs	
Photocells	*500K ohms to 2 megohms for logical ONE; 800 ohms to 2K ohms for logical ZERO*
Amplifiers	*—12 vdc for logical ZERO, 0 vdc for logical ONE*
Output Drive Capabilities	*up to seven 10K ohm loads per channel*
Voltage Requirements	*— 26 vdc, 2 amperes (40 ms.), — 12 vdc, 60 ma, + 6 vdc, 5 ma*
Connector Type	*Amphenol 57-40360 (See wiring diagram for connections.)*
Overall Dimensions	*12-5/8 in. wide, 12-3/8 in. deep, 5-1/2 in. high for PK-144; 16-1/2 in. wide, 14-1/16 in. deep, 4-11/16 in. high for PK-164.*
Weight	*20 pounds for PK-144; 30 pounds for PK-164*



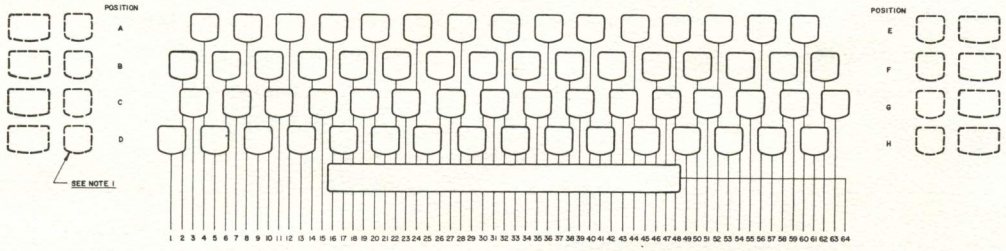


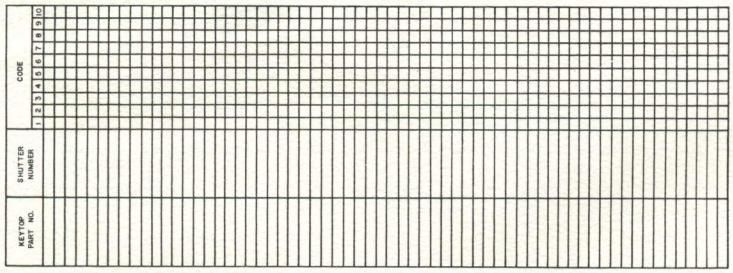


CUSTOMER	CUSTOMER ORDER NO.	DATE	CUSTOMER APPROVAL

NOTES:

1. EIGHT POSITIONS ARE AVAILABLE FOR PHOTO-ELECTRIC SWITCHES IN TWO KEYTOP SIZES AS SHOWN.
2. CHANNEL 10 IS FOR POWER ASSIST AND STROBE.





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The keylever positions for a Model PK-144 and PK-164 Keyboard are shown in the figure. Each shutter is notched to provide the proper output code. There are 256 shutter combinations possible for an eight — bit binary code. Each shutter has the applicable shutter number stamped on the shutter.

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