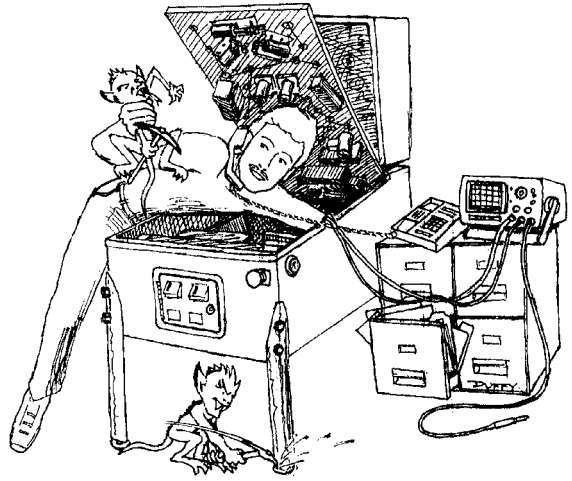# Service Bulletin Nº 87

SEGA™
PINBALL, INC.

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Technical Support

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TO: Parts & Service Managers

DATE: September 4, 1996

SUBJ: FYI: Alphanumeric & 7-Segment Display Operation

We receive calls now and then asking the following questions... "Which segment is "D" or "F" etc...?" "Which side of the glass does Pin-1 start on...?" "How does this thing work!?" Since everyone in our Tech Support Dept. has worked for an operator or distributor at one time or another and we have asked the very same questions...in response, we have dug up our scratch notes on the back pages of old manuals (just like you guys have done) and put together this comprehensive overview of a 16-Digit Alphanumeric Display. See the next page of this bulletin, for pictorials of a 16-Digit Alphanumeric Display describing all pins, digits and segments. What a great page to copy and hang on your wall for quick reference!

How It Works:

In order to display a character of data on the display glass, two things must happen:

• The correct segment drive information must be applied to the display glass, **AND**
• A Digit Strobe or Select Drive Signal must appear at the correct Digit Drive position.

The segments of each display digit correspond electrically to **CATHODES**; that is, they require a **NEGATIVE** drive voltage for operation, and each display digit connection (which are **CLEAR** conductors deposited on the **TOP** glass of the display sandwich) can be thought of as the **ANODE**, driven by a **POSITIVE** drive signal.

These drive voltages are typically on the order of +90v DC for the digits (Anodes) and -100v DC for segments (Cathodes). From a digital logic standpoint, the game CPU generates the segment information on a **PARALLEL** basis, meaning that all segment information is output **AT ONCE** to the display drivers, and digit information appears in a **SERIAL** or **SEQUENTIAL** format; such that **ONLY ONE** digit selected at a time is **EVER** active.
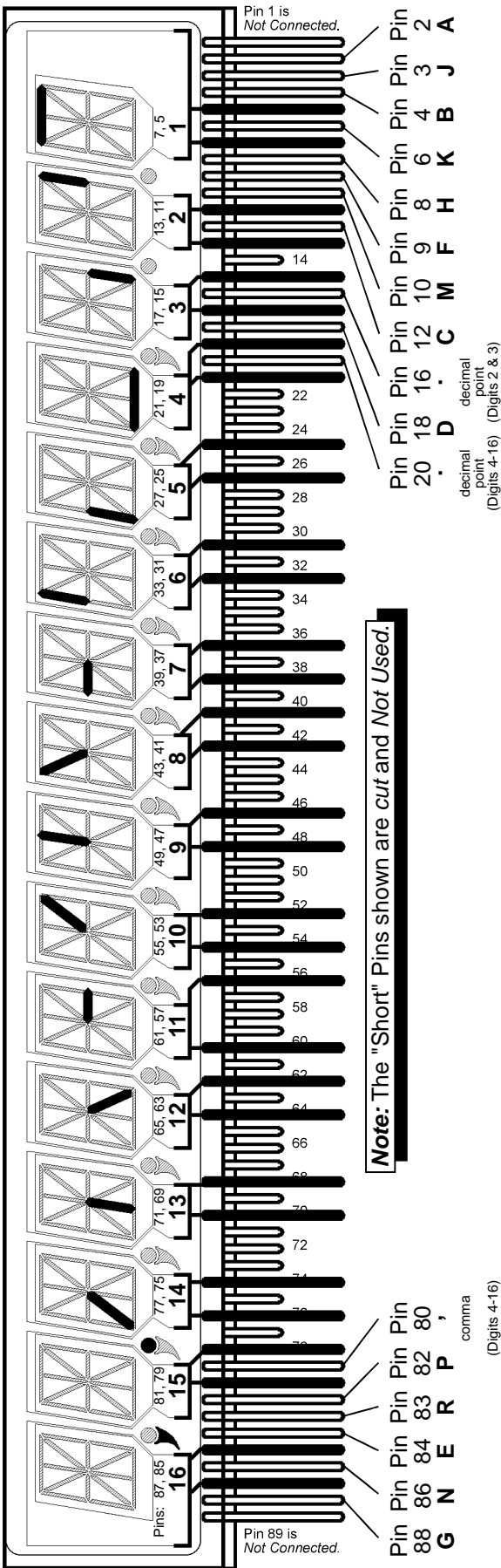
FOR EXAMPLE: To display the number "1" at digit location 2, segments "B" and "C" (Pin- 4 and Pin-12) are turned **ON** (they go to -100v DC) with all other segments turned **OFF**, and digit drive 2 (Pin-11 and/or Pin-13) goes to +90v DC.

If you have any questions or concerns, please feel free to call us at 1-800-542-5377 or 708-345-7700.

16-Digit (14 Segment) Alphanumeric Display

Each Segment Drive is shown lit below in each Digit (Character) for demonstration of the segment position within the Digit.

Digit 1 shows Segment A
Digit 2 shows Segment B
Digit 3 shows Segment C
Digit 4 shows Segment D
Digit 5 shows Segment E
Digit 6 shows Segment F
Digit 7 shows Segment G
Digit 8 shows Segment H
Digit 9 shows Segment J
Digit 10 shows Segment K
Digit 11 shows Segment M
Digit 12 shows Segment N
Digit 13 shows Segment P
Digit 14 shows Segment R
Digit 15 shows Segment Dec. Point
Digit 16 shows Segment Comma

Pin 1 is *Not Connected.*

Pin 2 A
Pin 3 J
Pin 4 B
Pin 6 K
Pin 8 H
Pin 9 F
Pin 10 M
Pin 12 C
decimal point (Digits 2 & 3)
Pin 16 . D
Pin 18 .
Pin 20 . decimal point (Digits 4-16)

Note: The "Short" Pins shown are *cut* and *Not Used.*

Pin 80 , comma (Digits 4-16)
Pin 82 P
Pin 83 R
Pin 84 E
Pin 86 N
Pin 88 G
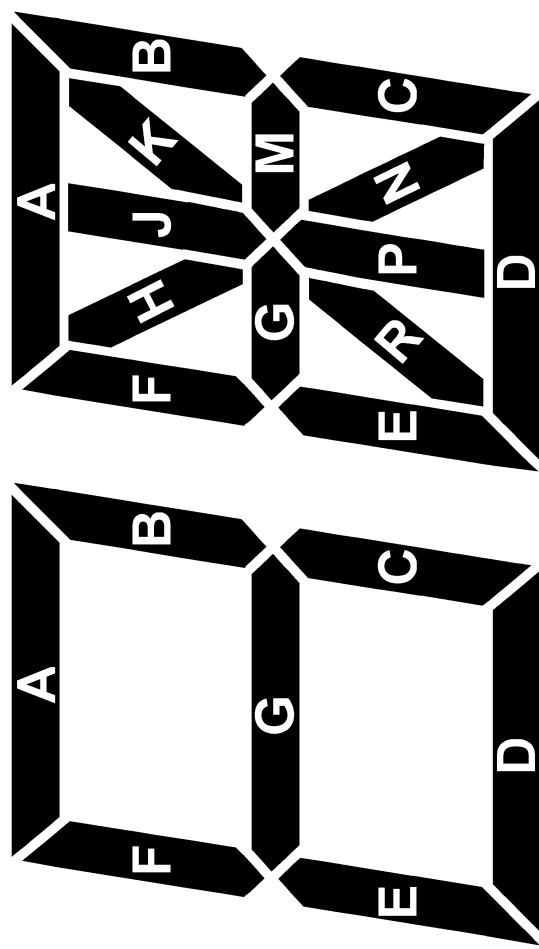Pin 89 is *Not Connected.*

These Pins (*shown black*) are the **DIGIT DRIVES;** This is the **Anode** side, which is **POSITIVE.**

These Pins (*shown white*) are the **SEGMENT DRIVES;** This is the **Cathode** side, which is **NEGATIVE.**

14-Segment

7-Segment

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