



CT2200

T-67-31-51

5-BIT BINARY TO 13-SEGMENT DECODER/DRIVER

The CT2200 is an N-channel MOS Integrated circuit, designed to directly drive two 7-segment LEDs to display the numbers 1 to 32, with leading zeros suppressed. The circuit is ideal for applications such as the programme number display of a television receiver. The display is controlled by a 5-bit binary input port, weighted so that the number shown (1-32) is one more than the binary input (0-31) to avoid programme 0. The 5 lines can come from a remote control receiver or from any other source of continuous 5-bit data.

Common anode LEDs can be driven directly with a current limiting resistor in series with each output (see Fig.5) or by using some other form of brightness control (see Fig.6). By driving each segment individually the interference problems associated with multiplexed displays are avoided.

A blanking input is provided so that the display can be turned off or can be made to flash with an external pulsed signal.

Only 13 lines are needed for two 7-segment displays because segment T_f is never lit for the numbers 1 to 32 and so does not need to be decoded and driven. Segment identification is shown in Fig.2.

The 13 outputs of the output encoder drive the gates of large output transistors to give two states: OFF and SINK CURRENT; as there can be up to 12 outputs on at once, each sinking 20mA, four 0V pins are provided to reliably carry this current. **ALL FOUR PINS (3, 7, 18, 22) MUST BE CONNECTED TO 0V.**

The number of segments required for each character is shown in Fig.3.

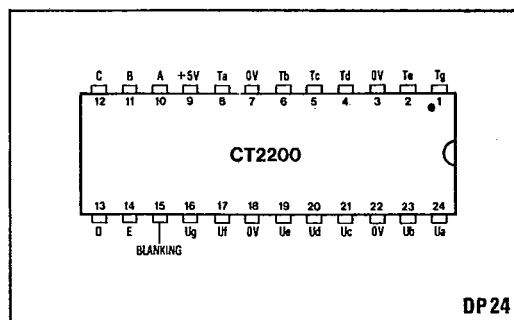


Fig.1 Pin connections - top view

FEATURES

- Direct Segment Drive — Non-Multiplexed
- 5V Supply
- Blanking Input
- Leading Zero Suppressed
- Minimum Segment Pattern per Character
- 20mA Drive per Segment
- 5-Bit Binary Input

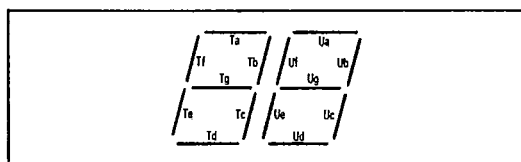


Fig.2 Segment Identification

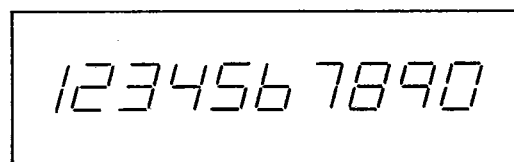


Fig.3 Character representation

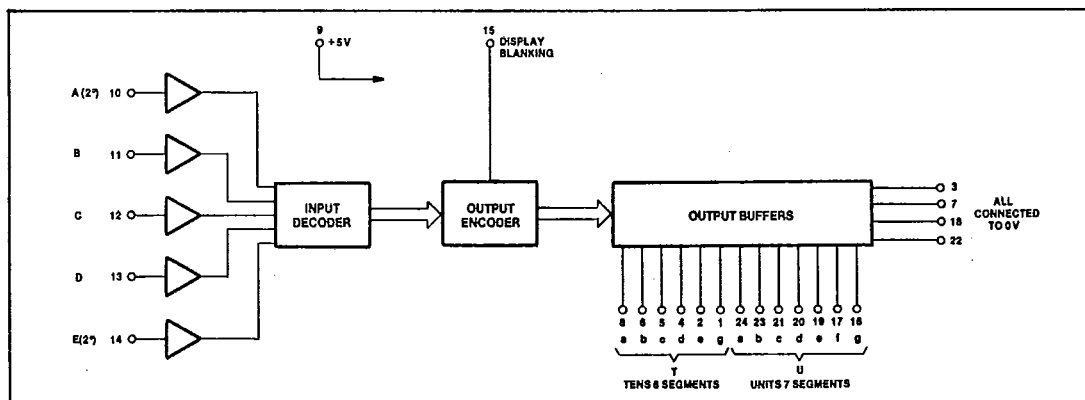


Fig.4 Block diagram

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 $T_{\text{amb}} = +25^{\circ}\text{C}, V_{\text{DD}} = +5\text{V}$

The diagram shows a 4-bit digital display circuit. A +5V supply is connected to the top of the circuit, and a 0V ground is connected to the bottom. A 4-bit input is provided by switches A, B, C, D, and E, with a BLANKING input. The CT2200 decoder is connected to these inputs. The decoder's outputs are connected to two 7-segment displays. The displays are connected to the +5V supply through resistors. The resistors are labeled as 1k, 1k x 5, 1k, 120Ω x 4, 120Ω x 3, and 120Ω x 6. The circuit is powered by a +5V supply and grounded to 0V.

Fig.5 Test circuit and application using load resistors (see also Fig.6)

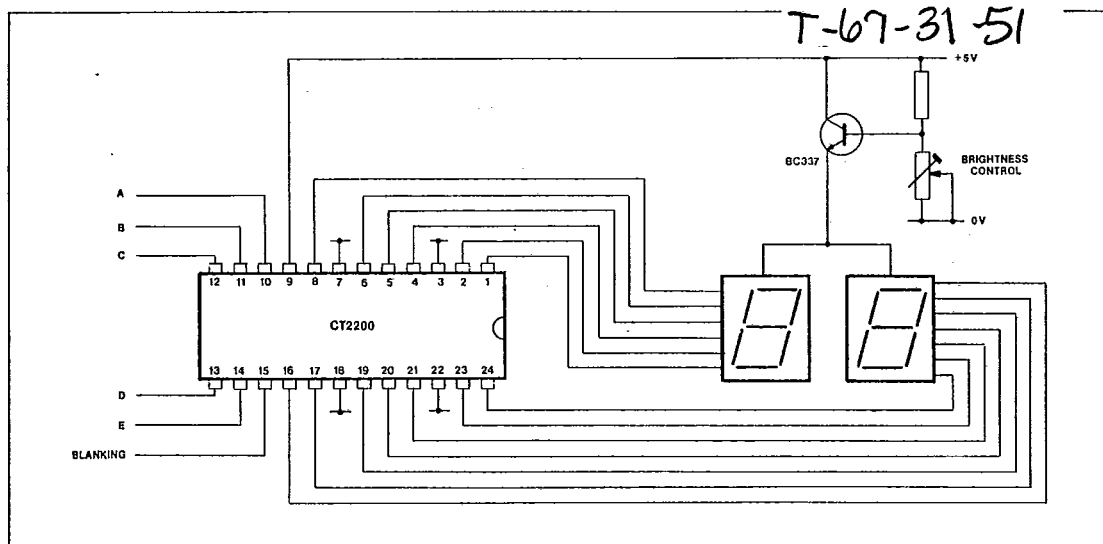


Fig.6 Minimum component application

ABSOLUTE MAXIMUM RATINGS

Supply voltage, V_{DD}	+7V
Input or output voltage	+7V
Output current	30mA
Ambient operating temperature	-10°C to +65°C
Storage temperature	-55°C to +125°C