

### 74LS Series – Low Power Schottky TTL

#### INTRODUCTION

Low Power Schottky TTL offers the same speed as Standard TTL at 1/5 the power. The power savings and LSI potential result in Low Power Schottky being the preferred range in most new system designs. The series offers gate propagation delays of typically 10ns at 2 mW (1/5 of standard 74 series power). Flip Flop Toggle rate of 30 MHz and MSI 4-Bit Add Time of 21ns.

Care must be taken however when designing in 74LS as follows:

- Check the fan-out requirements at each output node where a 74LS device may have to drive a 74 device. Do not exceed five 7400 loads.
- Check the system set-up and hold times for sequential functions to ensure that data is available at the correct time for Low-Power Schottky functions. For 74LS these specifications sometimes differ slightly from those of the corresponding 74 type.
- Use standard 74 where necessary to drive capacitive loads greater than about 100 pF.

74LS does offer the following benefits when upgrading standard 74 series to 74LS:

- Elimination of heating problems in systems such as terminals, point-of-sale systems, etc. in which it is necessary to put a lot of logic in a small package. Simply plugging in 74LS cuts heat generation dramatically.
- Reduced power supply cost.
- Possibility of upgrading system capability by adding plug-in logic boards without having to redesign the power supply.

#### MAXIMUM RATINGS

Supply Voltage,  $V_{CC}$  7.0V  
 Input Voltage,  $V_{IN}$  7.0V  
 Inter Emitter Voltage 5.5V  
 Operating Temperature  $T_A$  0 to +70°C  
 Storage Temperature  $T_S$  -65 to +150°C  
 Short Circuit Output Current,  $I_{OS}$  -15 to -100 mA  
 DC Noise Margin Logic '1' 0.5V  
 Logic '0' 0.3V

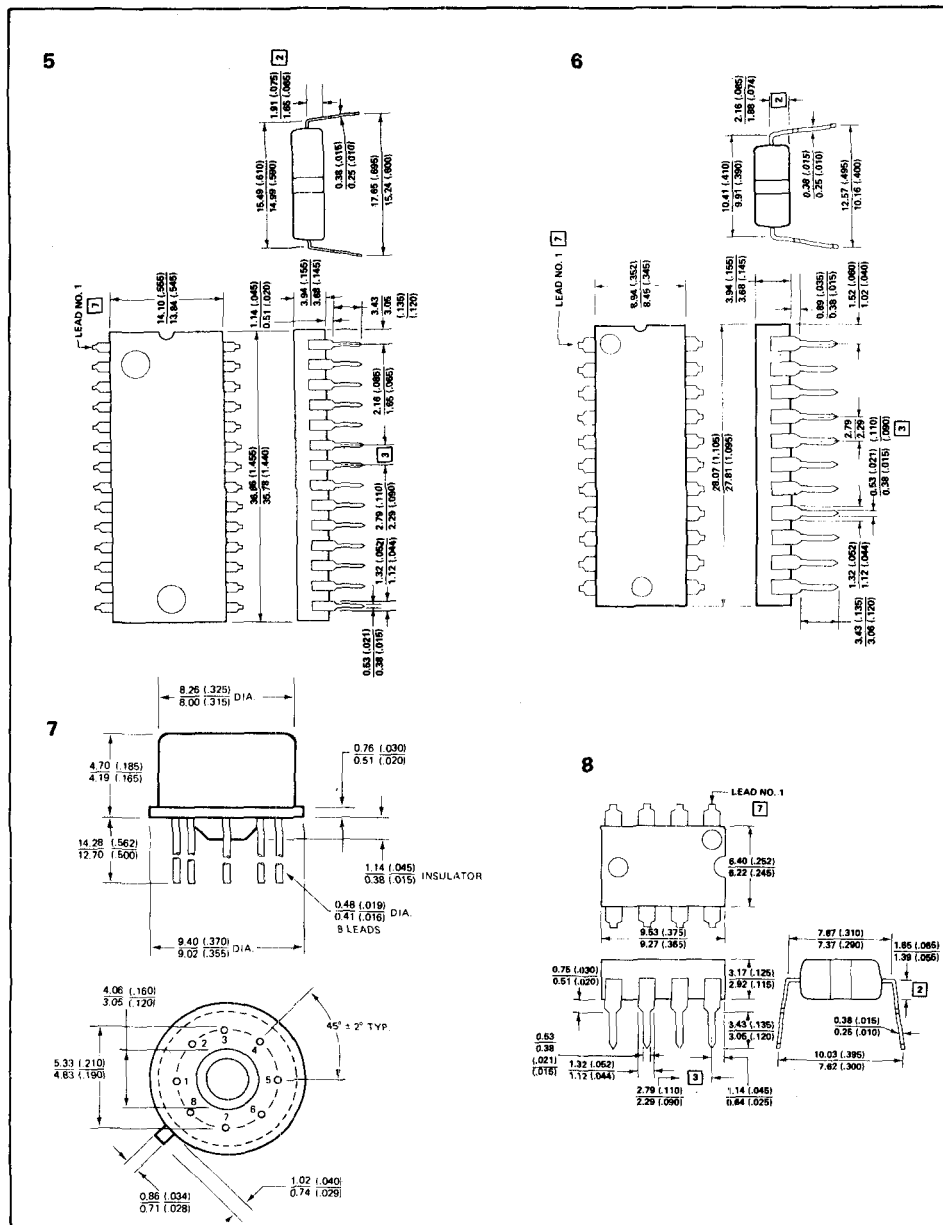
#### REFERENCE TABLE

| TYPE NO.        | DESCRIPTION                       | STOCK NO.     | OUTLINE<br>DRWG. NO. | CONNECTION<br>DIAG. NO. |
|-----------------|-----------------------------------|---------------|----------------------|-------------------------|
| <b>N74LS00N</b> | Quad 2-Input NAND Gate            | <b>55645E</b> | 1                    | B1                      |
| <b>N74LS01N</b> | Quad 2-Input NAND Gate with o/c   | <b>55646C</b> | 1                    | B2                      |
| <b>N74LS02N</b> | Quad 2-Input NOR Gate             | <b>55647A</b> | 1                    | B3                      |
| <b>N74LS03N</b> | Quad 2-Input NAND Gate with o/c   | <b>55648X</b> | 1                    | B4                      |
| <b>N74LS04N</b> | Hex Inverter                      | <b>55649H</b> | 1                    | B5                      |
| <b>N74LS05N</b> | Hex Inverter with o/c             | <b>55650X</b> | 1                    | B6                      |
| <b>N74LS07N</b> | Hex Buffer/Driver with o/c        | <b>55651R</b> | 1                    | B8                      |
| <b>N74LS08N</b> | Quad 2-Input AND Gate             | <b>55652G</b> | 1                    | B9                      |
| <b>N74LS09N</b> | Quad 2-Input AND Gate with o/c    | <b>55653E</b> | 1                    | B10                     |
| <b>N74LS10N</b> | Triple 3-Input NAND Gate          | <b>55654C</b> | 1                    | B11                     |
| <b>N74LS11N</b> | Triple 3-Input NAND Gate          | <b>55655A</b> | 1                    | B12                     |
| <b>N74LS12N</b> | Triple 3-Input NAND Gate with o/c | <b>55656X</b> | 1                    | B13                     |
| <b>N74LS13N</b> | Dual NAND Schmitt Trigger         | <b>55657H</b> | 1                    | B14                     |
| <b>N74LS14N</b> | Hex Schmitt Trigger               | <b>55658F</b> | 1                    | B15                     |
| <b>N74LS15N</b> | Triple 3-Input AND Gate with o/c  | <b>55659D</b> | 1                    | B175                    |
| <b>N74LS20N</b> | Dual 4-Input NAND Gate            | <b>55660G</b> | 1                    | B19                     |
| <b>N74LS21N</b> | Dual 4-Input AND Gate             | <b>55661E</b> | 1                    | B20                     |
| <b>N74LS22N</b> | Dual 4-Input NAND Gate with o/c   | <b>55662C</b> | 1                    | B217                    |
| <b>N74LS26N</b> | Quad 2-Input NAND Gate with o/c   | <b>55663A</b> | 1                    | B22                     |
| <b>N74LS27N</b> | Triple 3-Input NOR Gate           | <b>55664X</b> | 1                    | B23                     |
| <b>N74LS28N</b> | Quad 2-Input NOR Buffer           | <b>55665H</b> | 1                    | B24                     |
| <b>N74LS30N</b> | 8-Input NAND Gate                 | <b>55666F</b> | 1                    | B25                     |
| <b>N74LS32N</b> | Quad 2-Input OR Gate              | <b>55667D</b> | 1                    | B26                     |
| <b>N74LS33N</b> | Quad 2-Input NOR Buffer           | <b>55668B</b> | 1                    | B27                     |
| <b>N74LS37N</b> | Quad 2-Input NAND Buffer          | <b>55669X</b> | 1                    | B28                     |
| <b>N74LS38N</b> | Quad 2-Input NAND Buffer with o/c | <b>55670C</b> | 1                    | B29                     |
| <b>N74LS40N</b> | Dual 4-Input NAND Buffer          | <b>55671A</b> | 1                    | B30                     |
| <b>N74LS42N</b> | BCD-to-Decimal Decoder            | <b>55672X</b> | 2                    | B31                     |



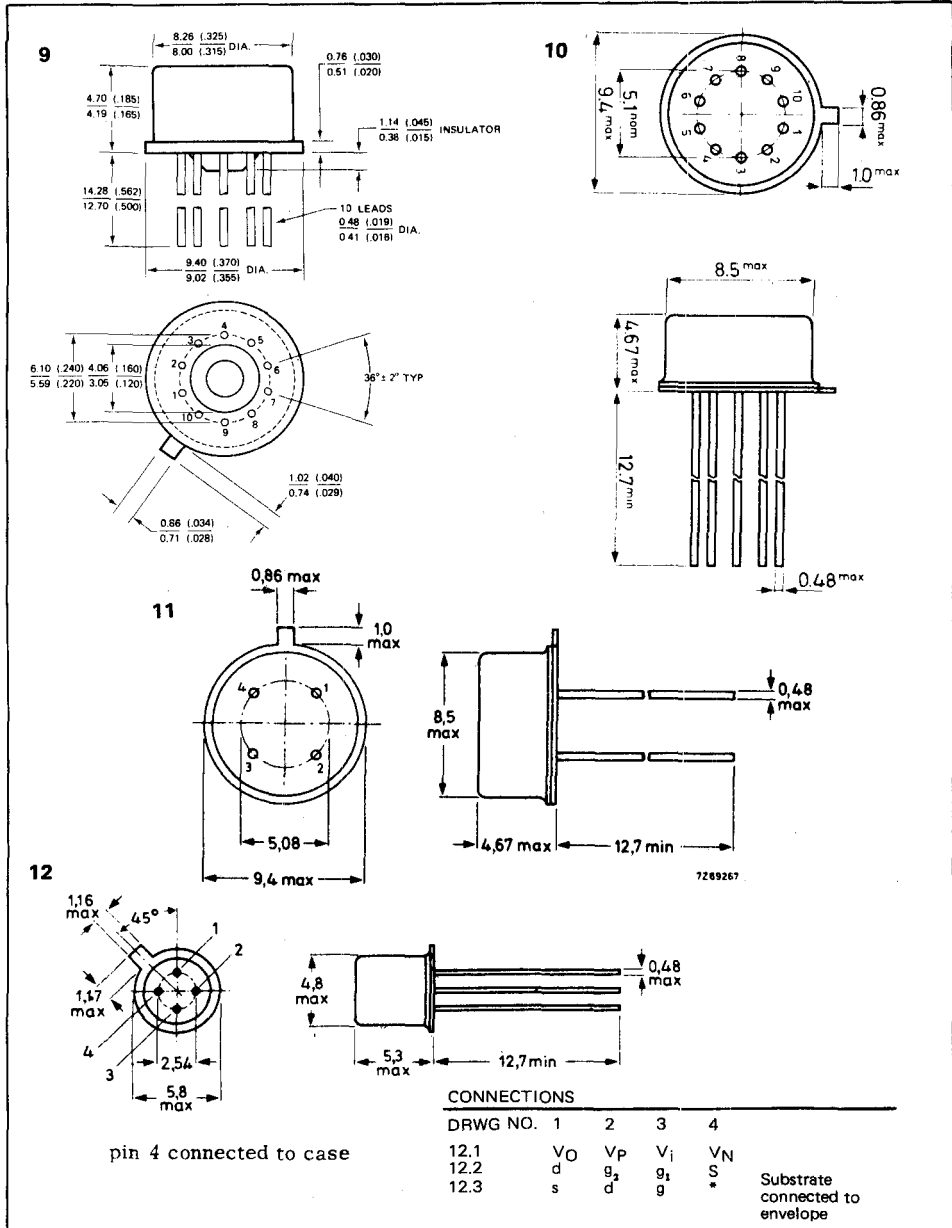
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## Outline Drawings



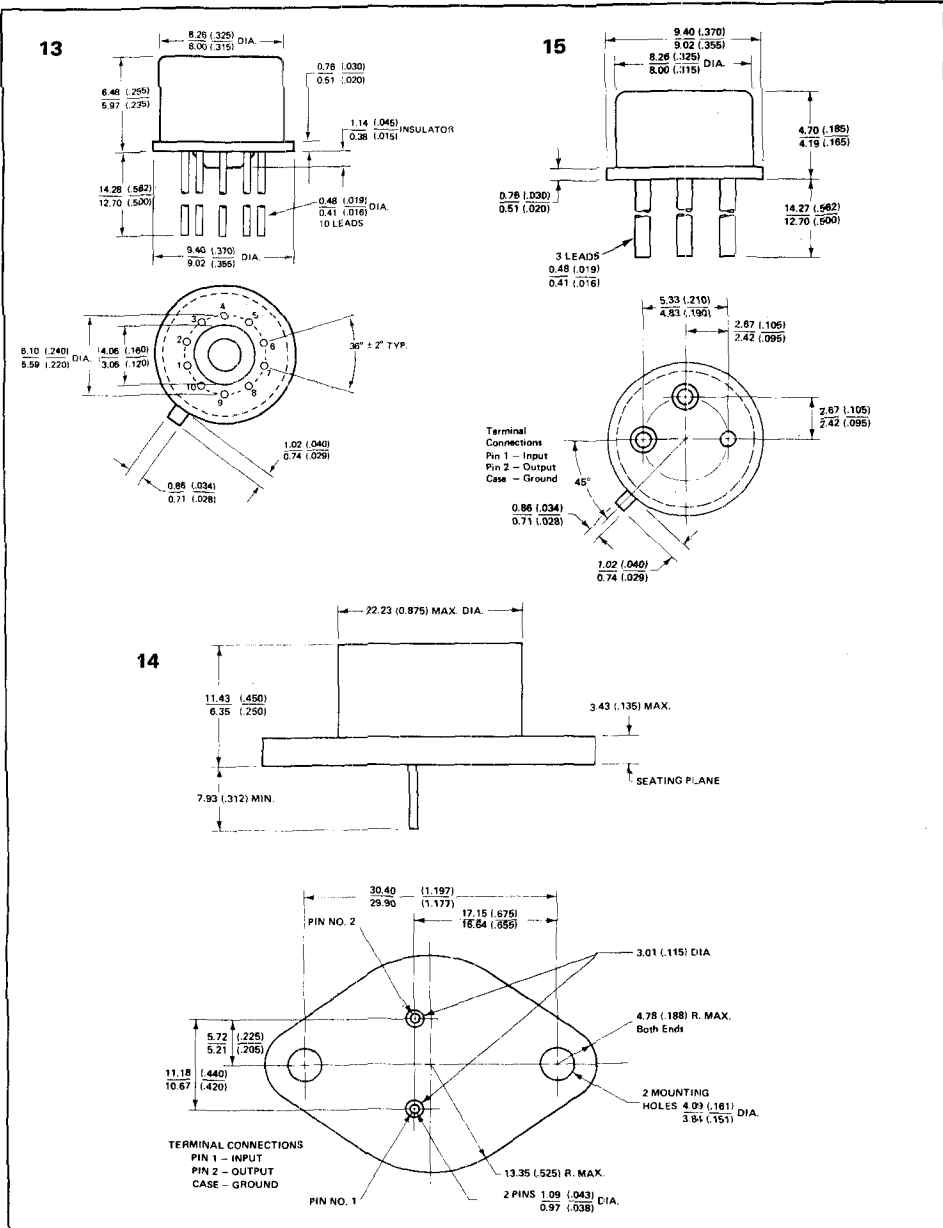
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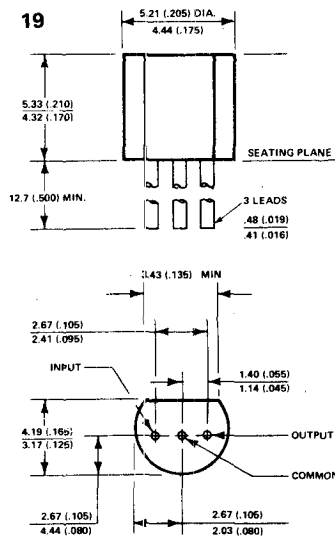
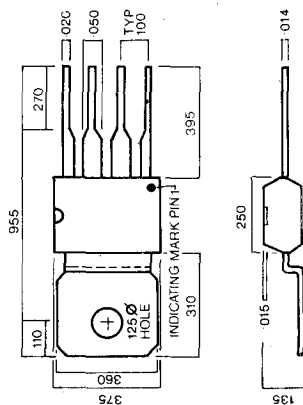
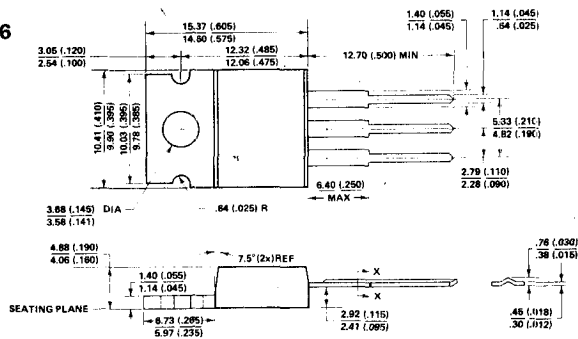
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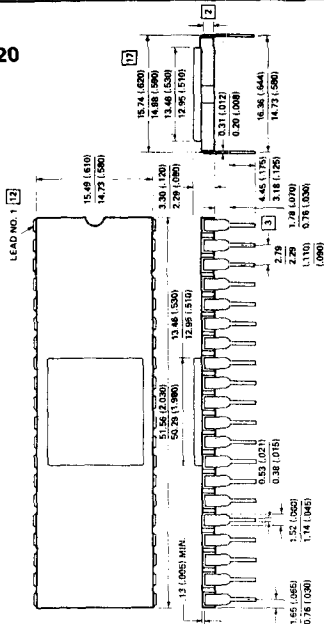




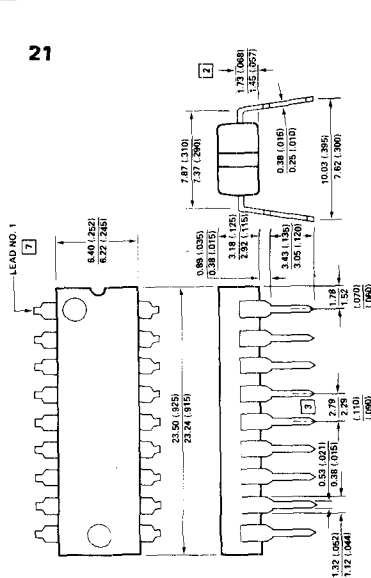
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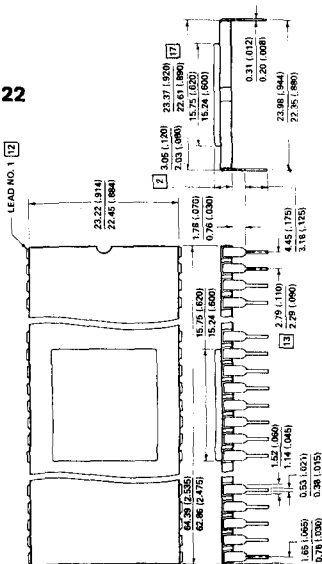
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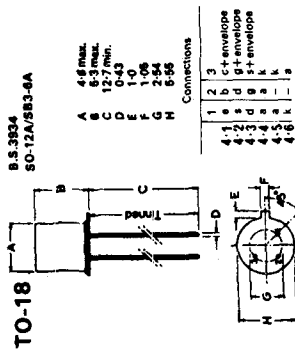
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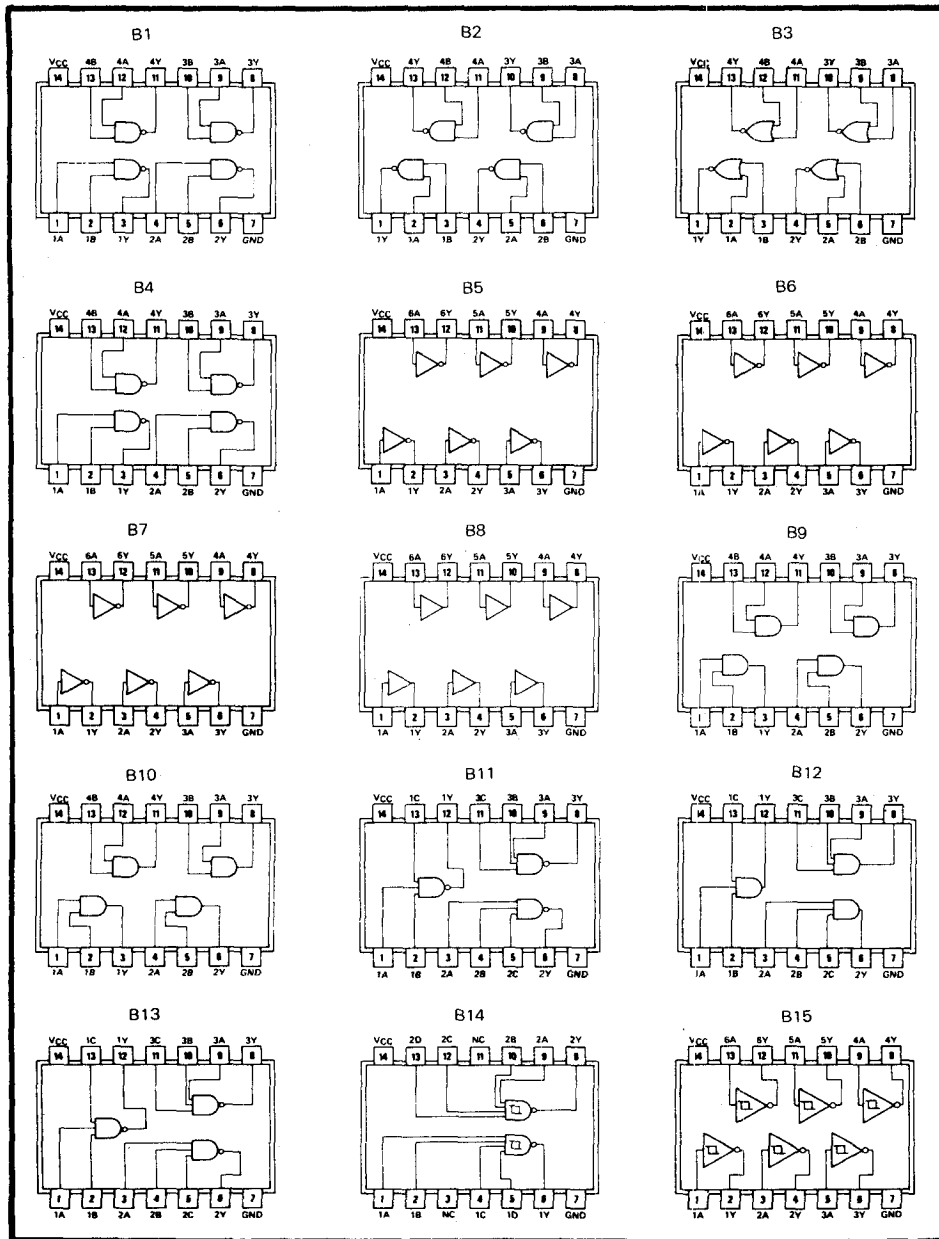


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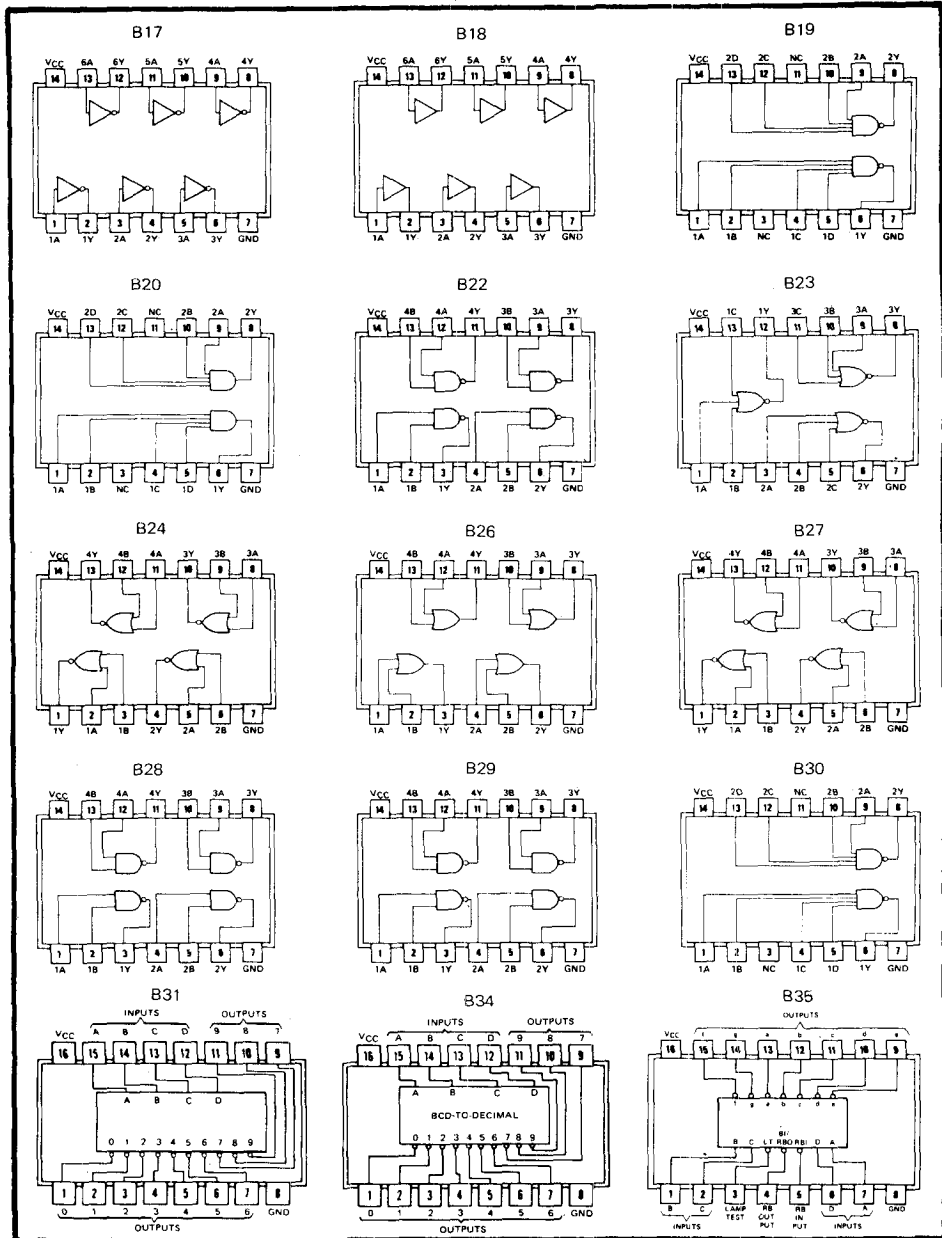


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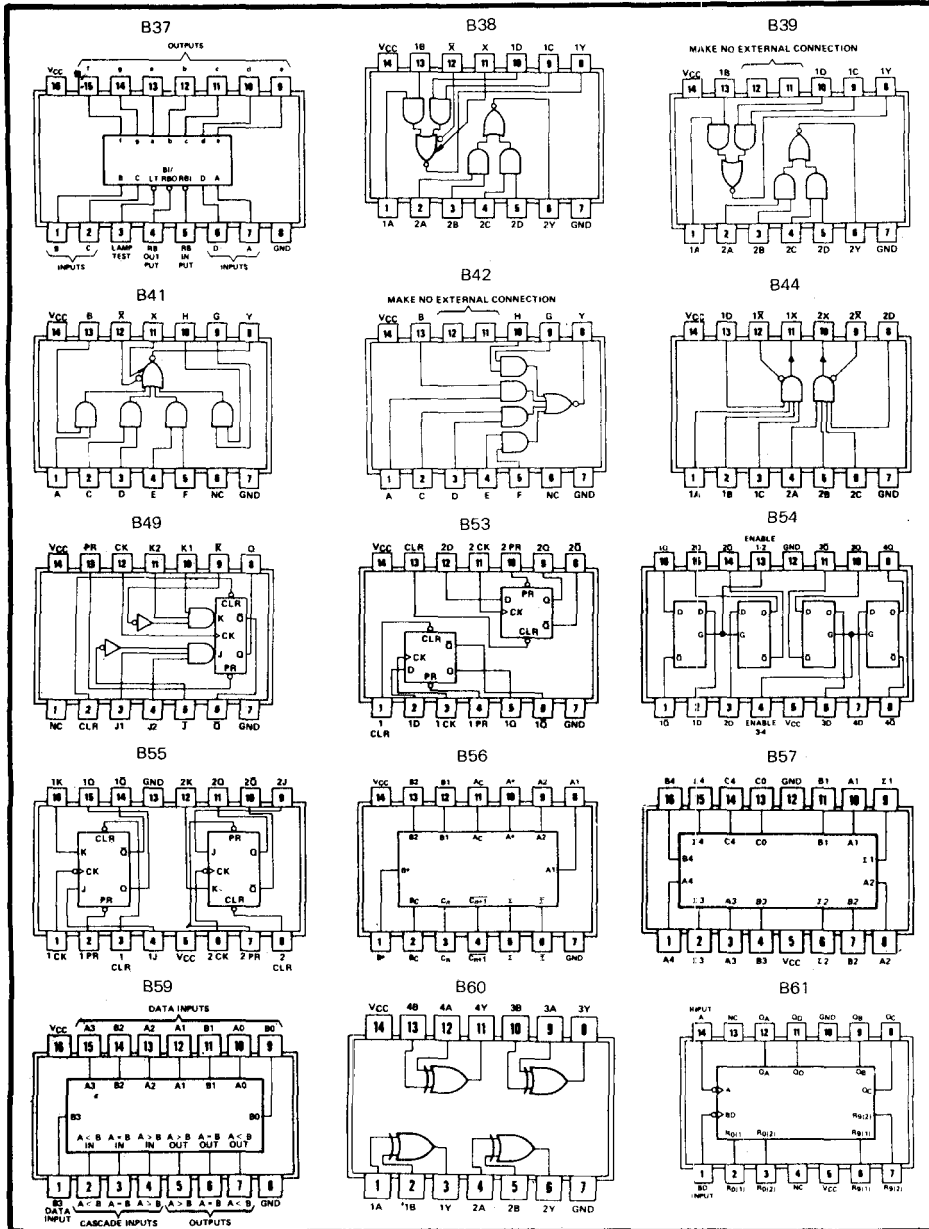
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## Connection Diagram



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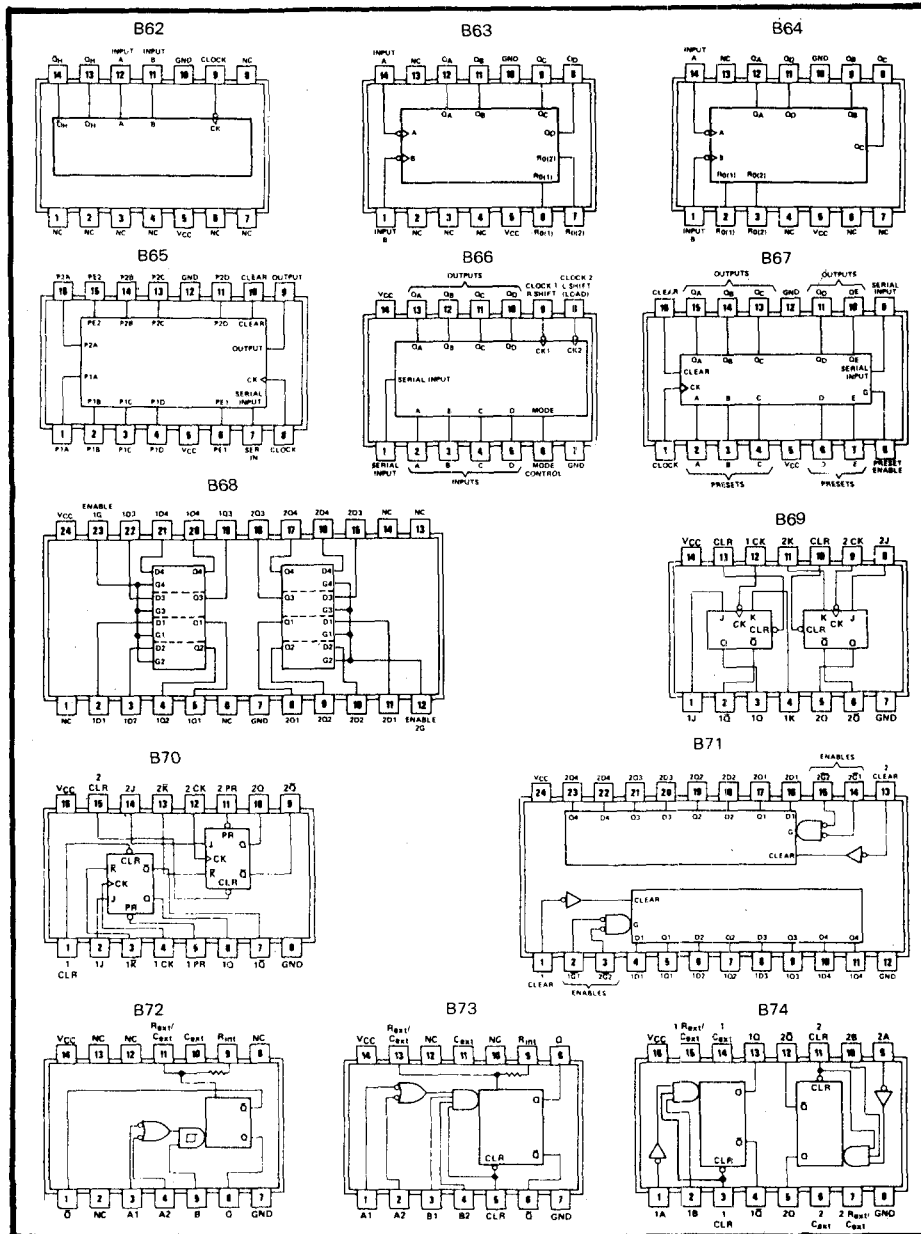


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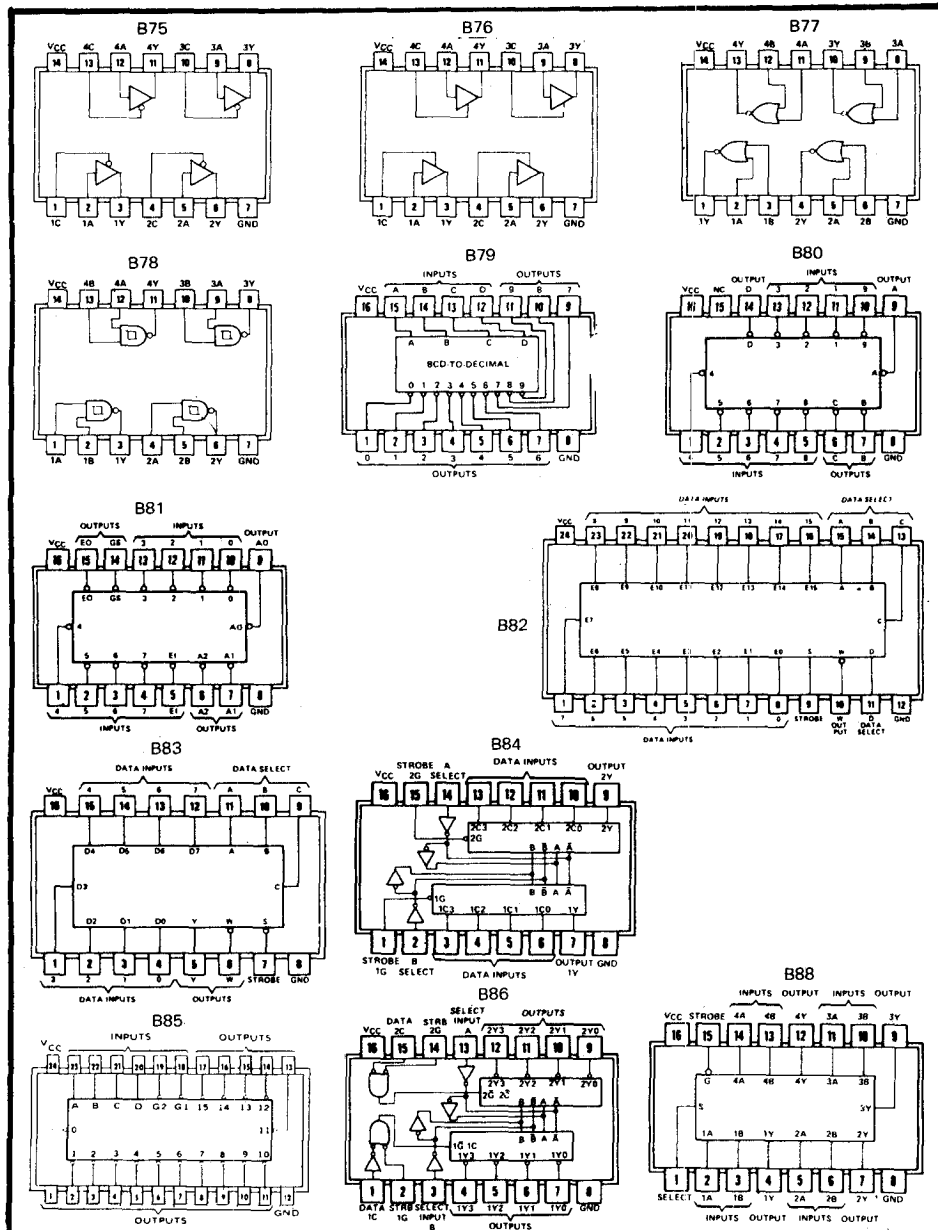


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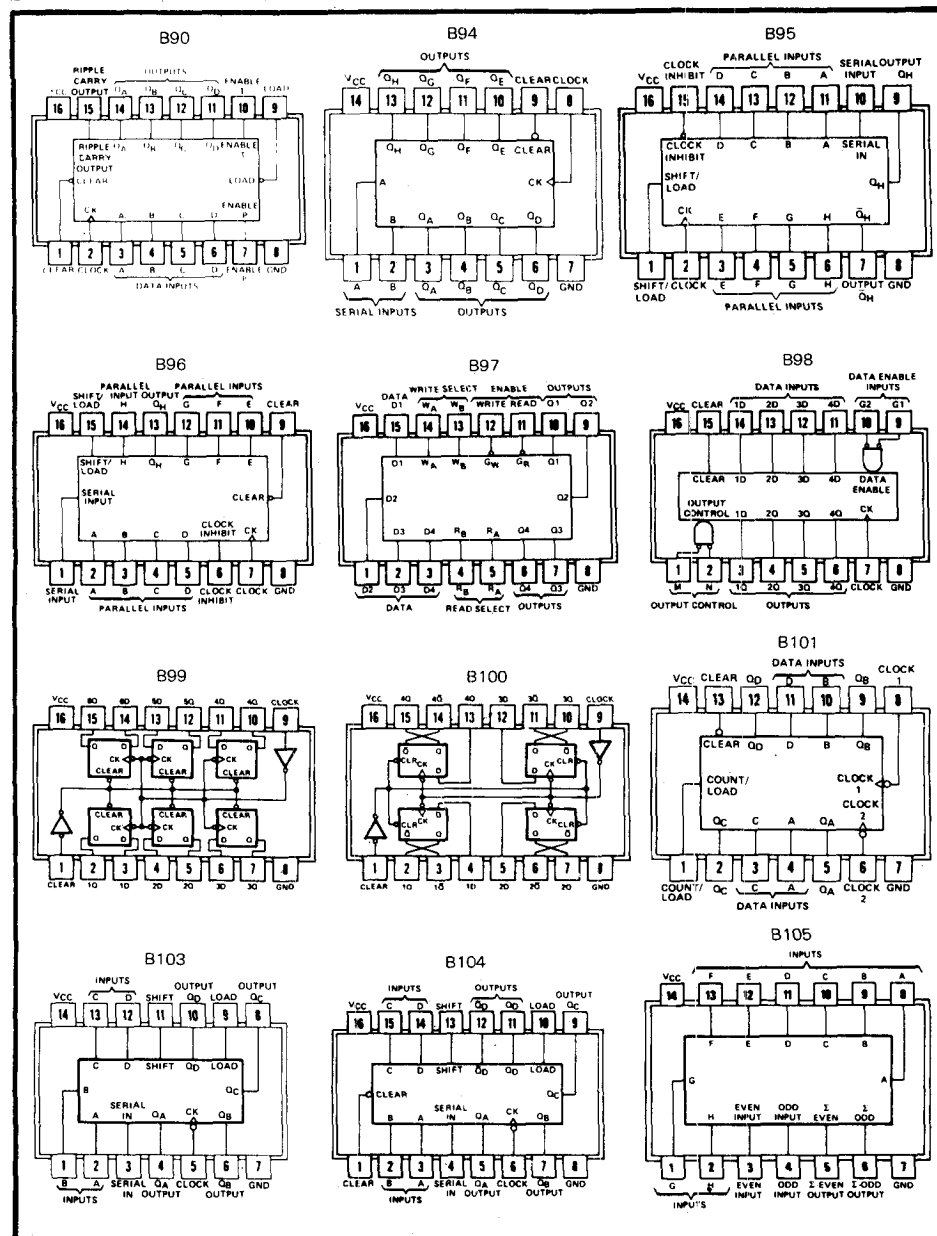
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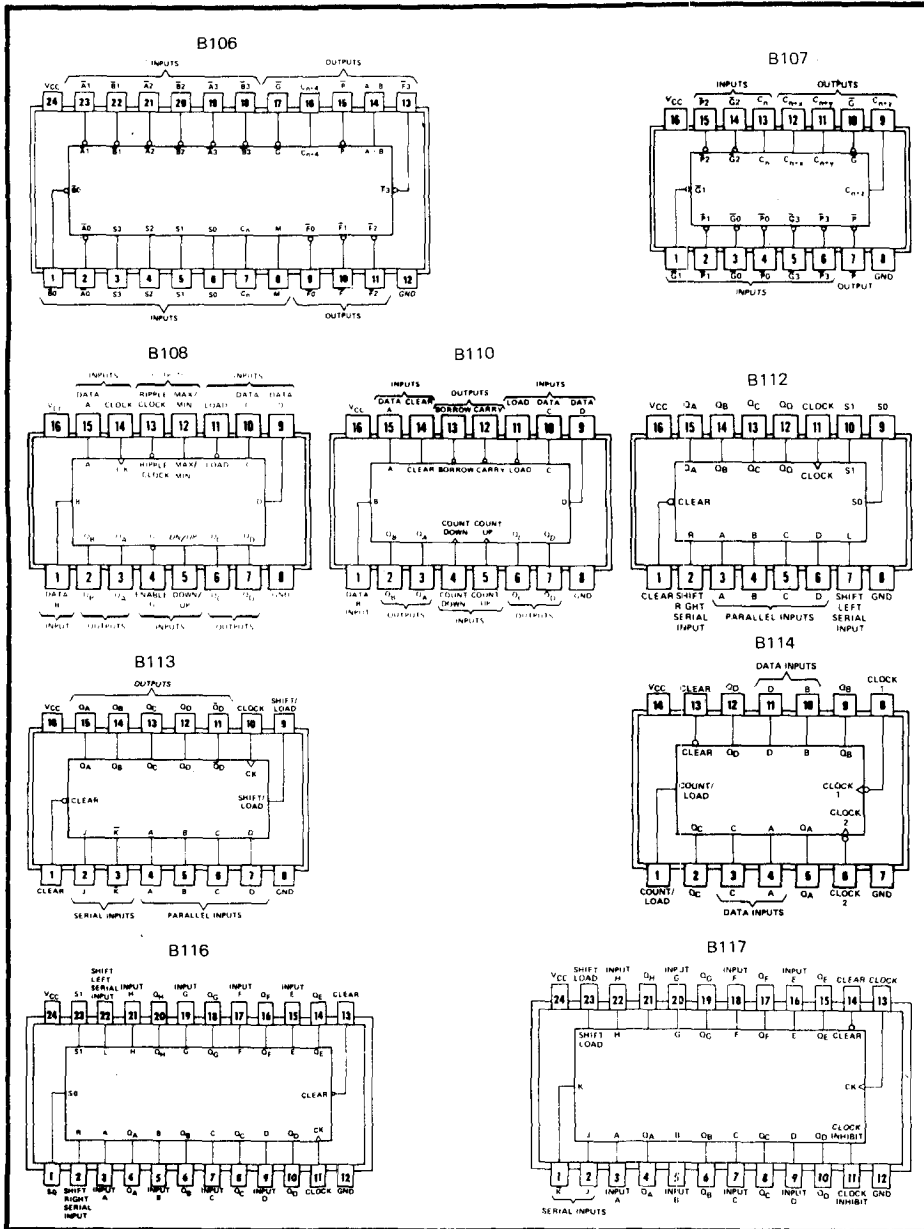
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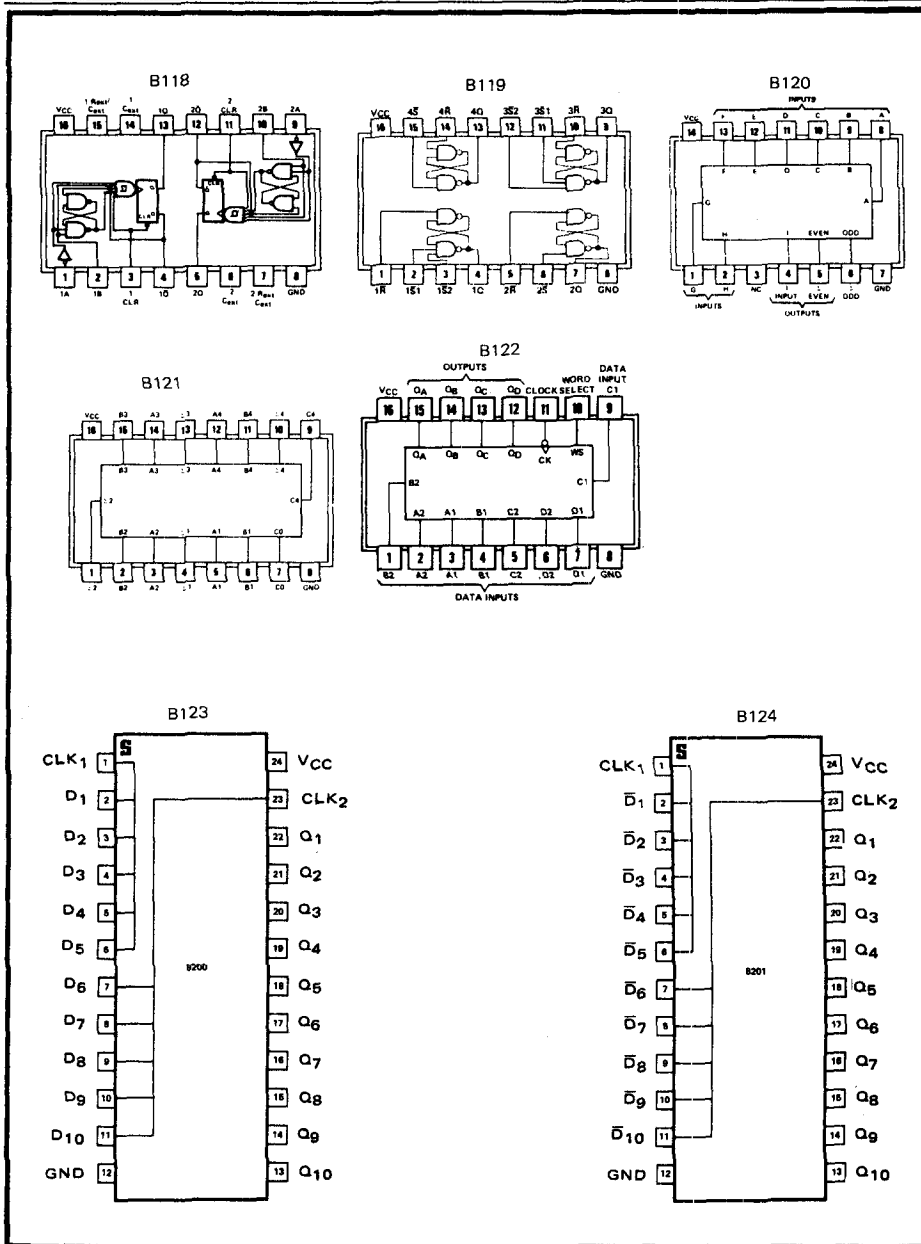
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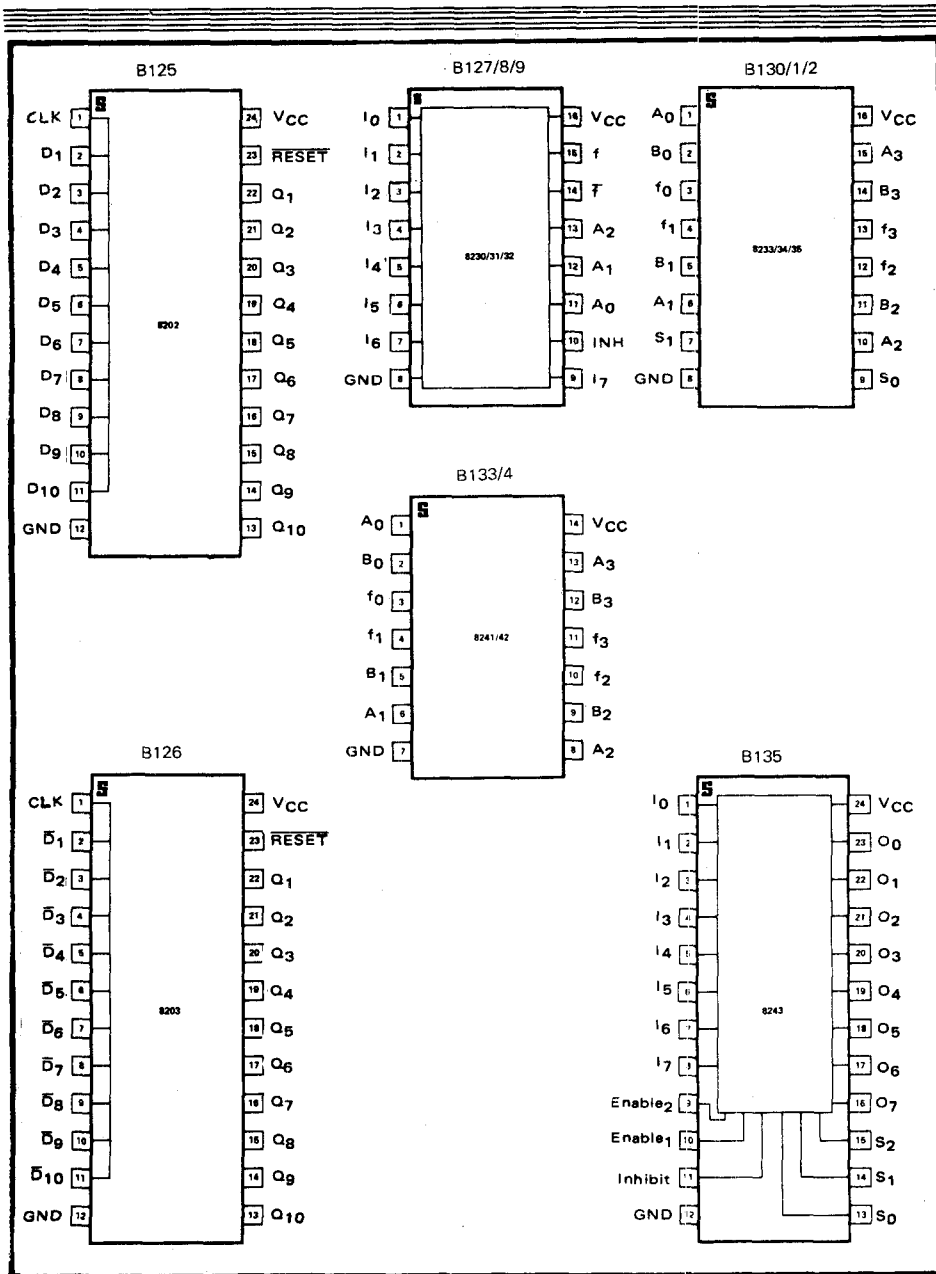
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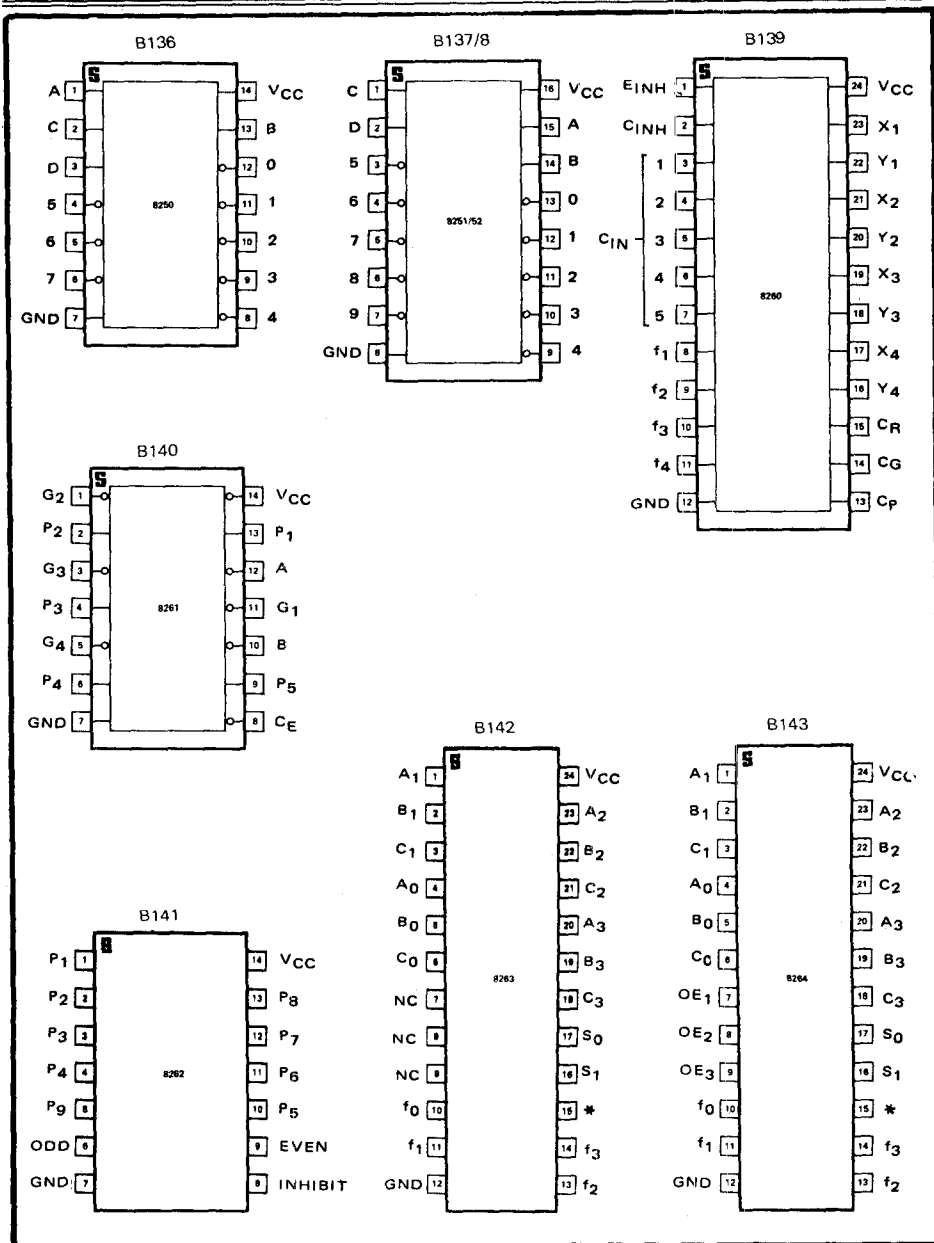
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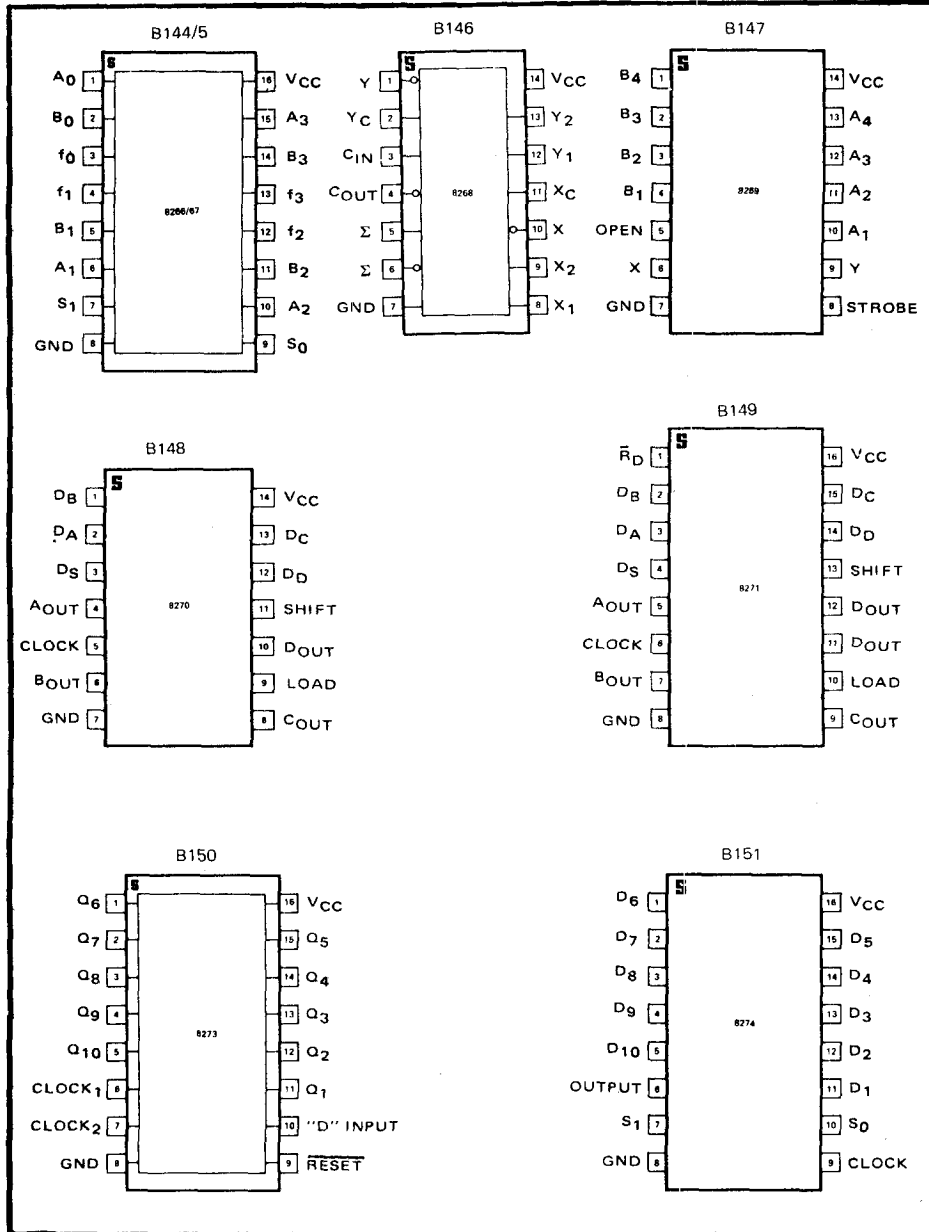
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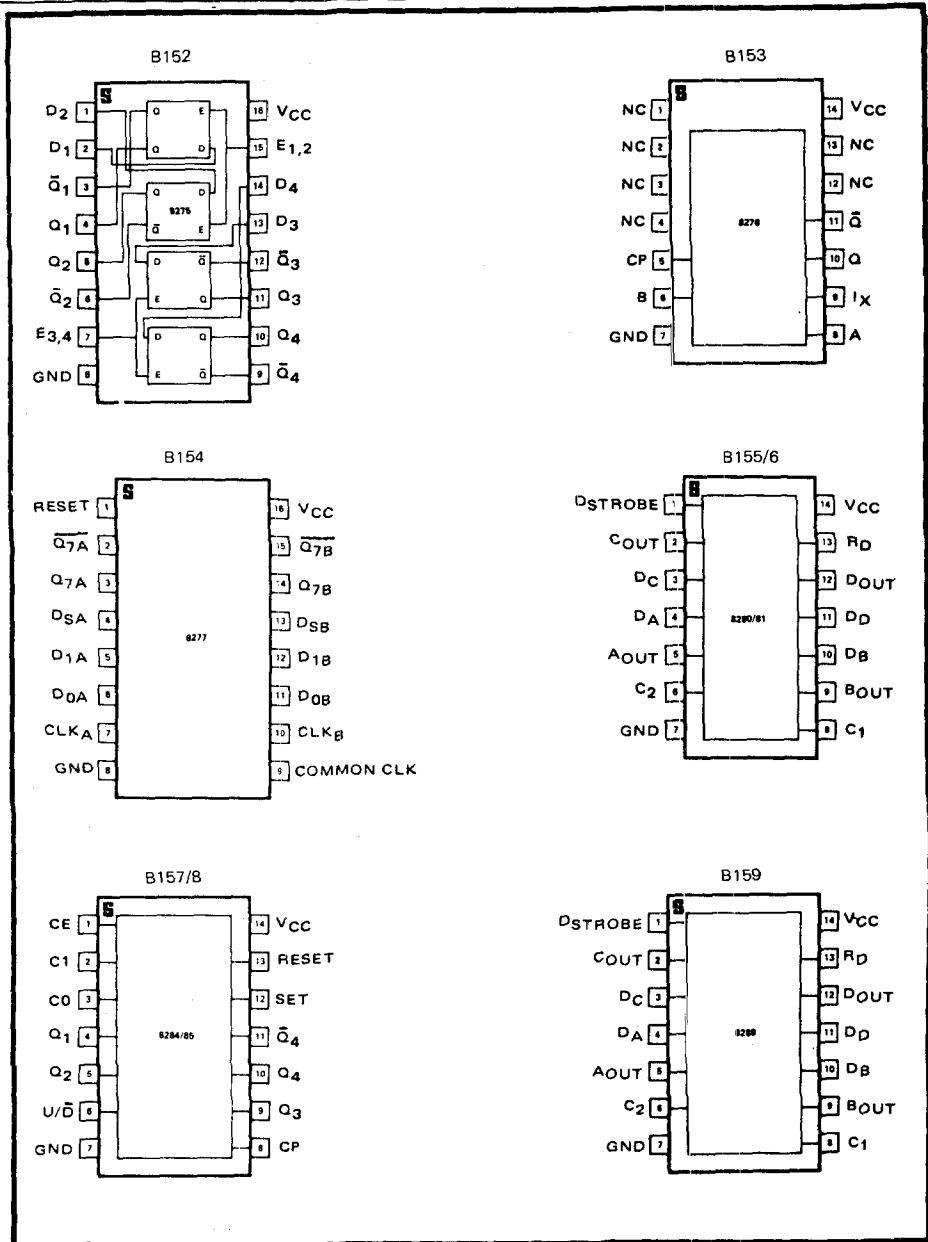
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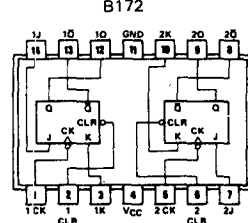
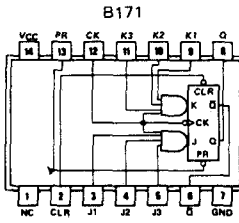
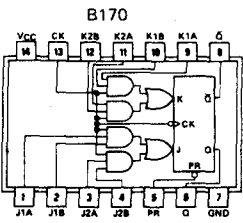
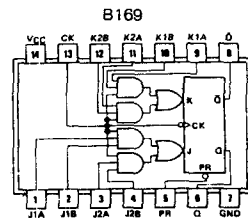
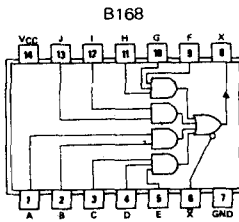
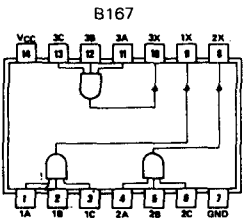
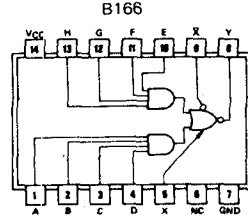
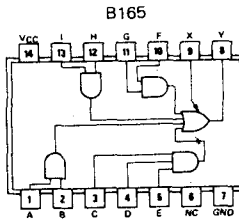
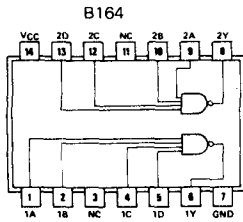
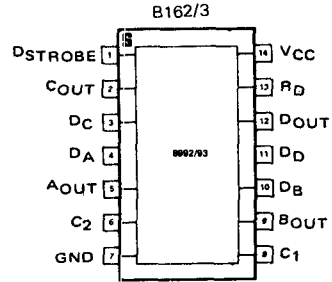
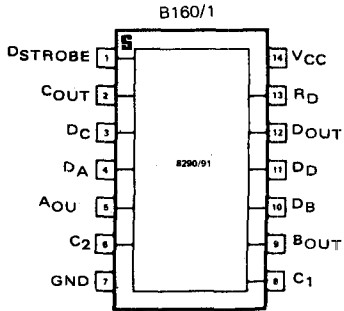
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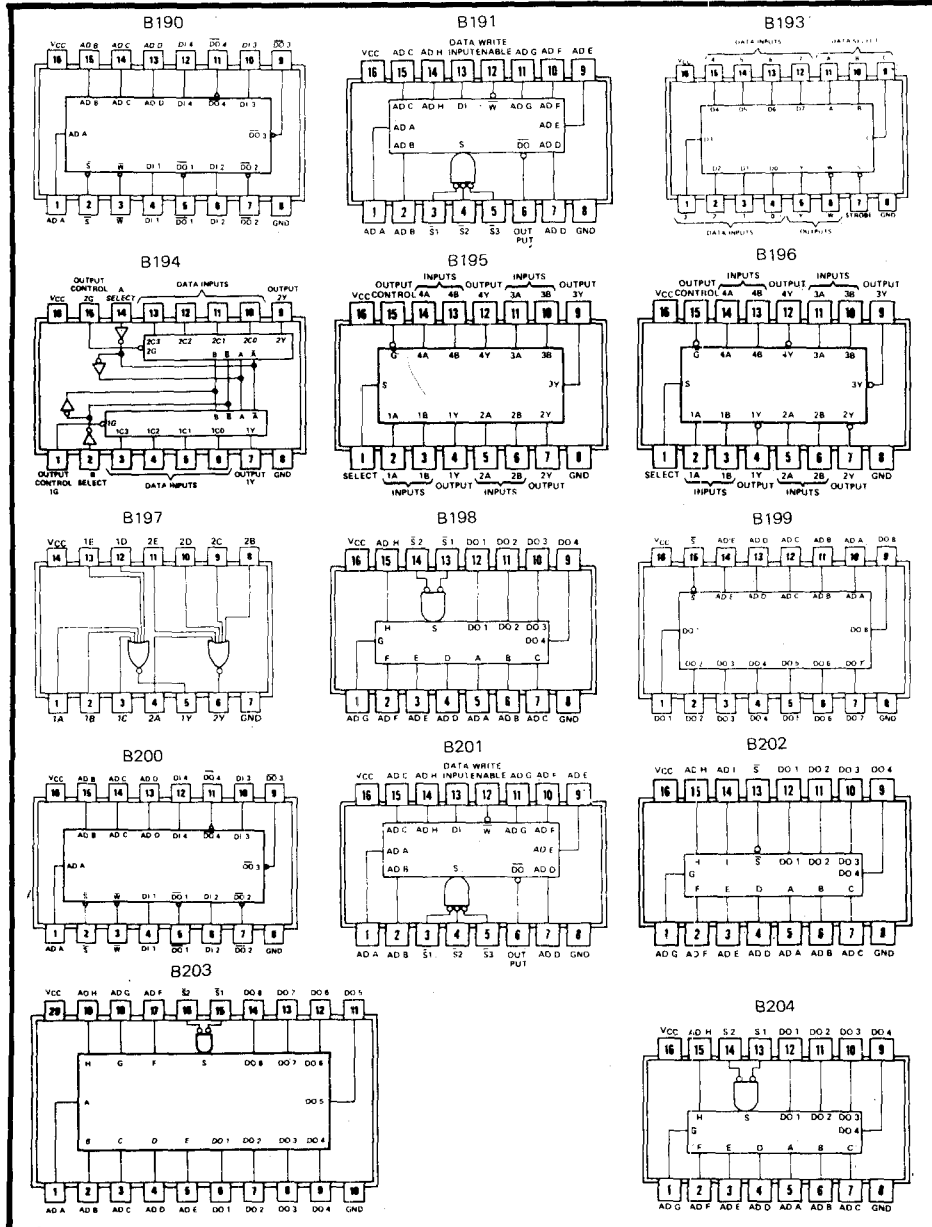
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### Connection Diagram



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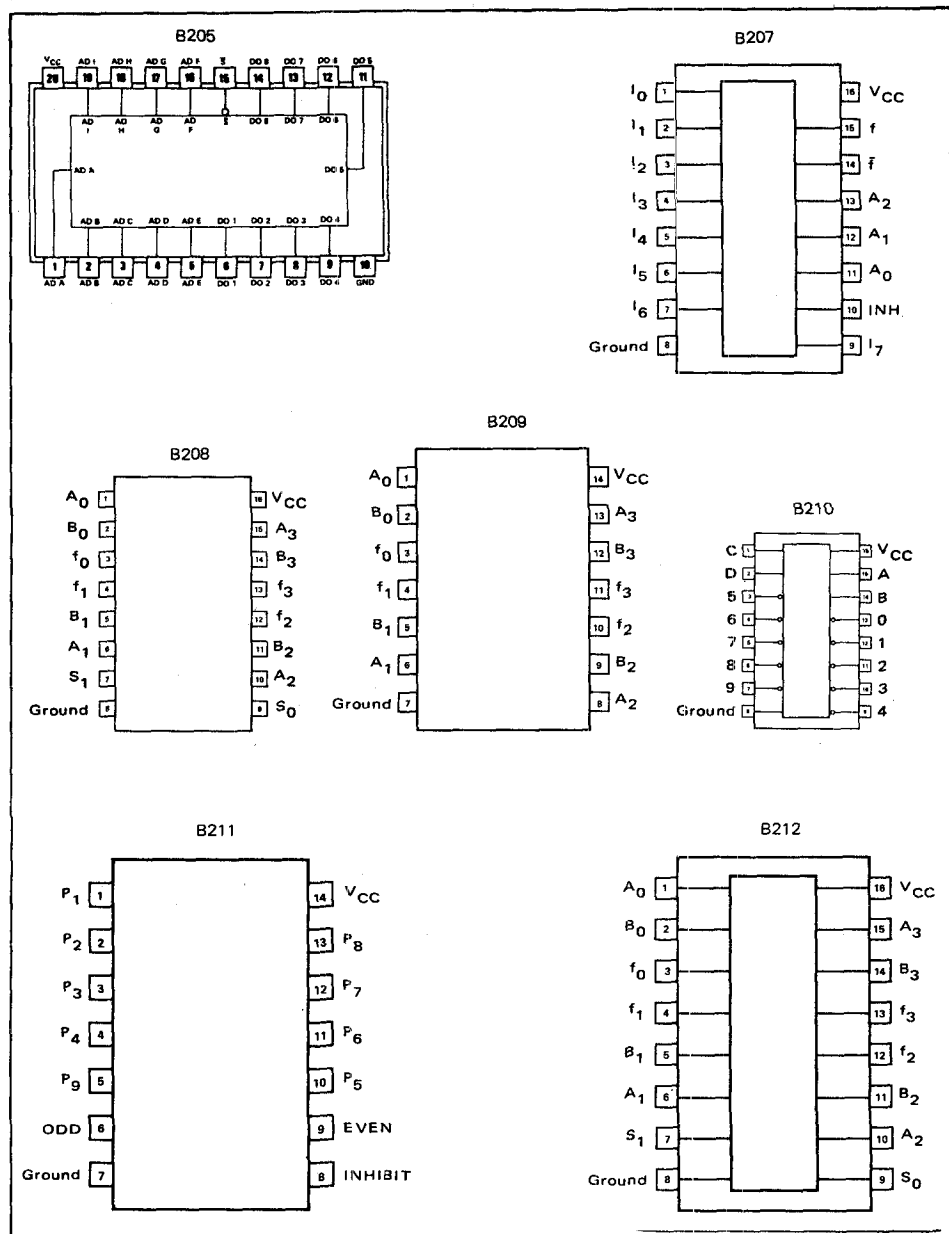


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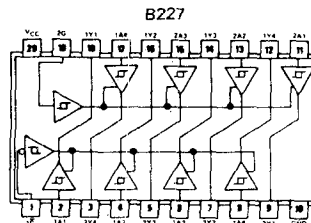
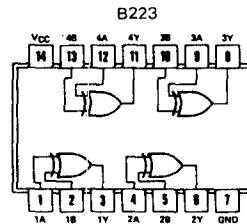
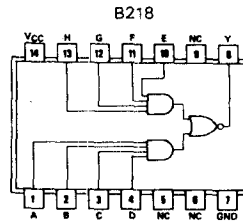
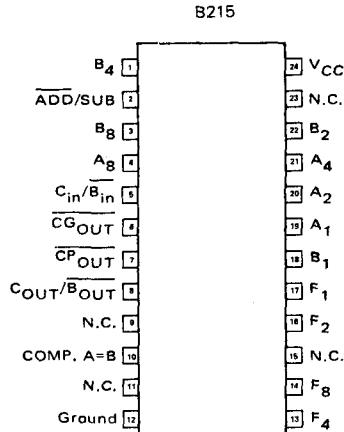
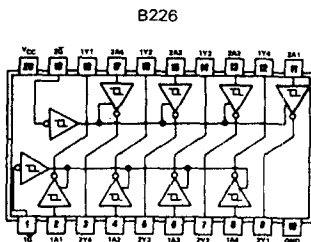
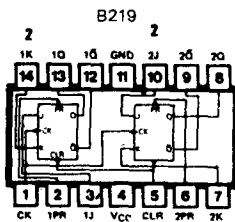
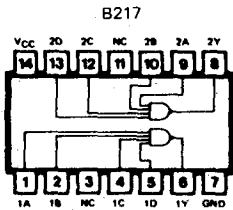
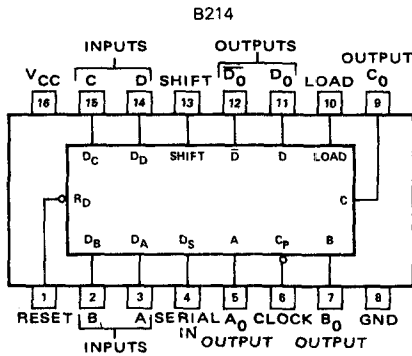
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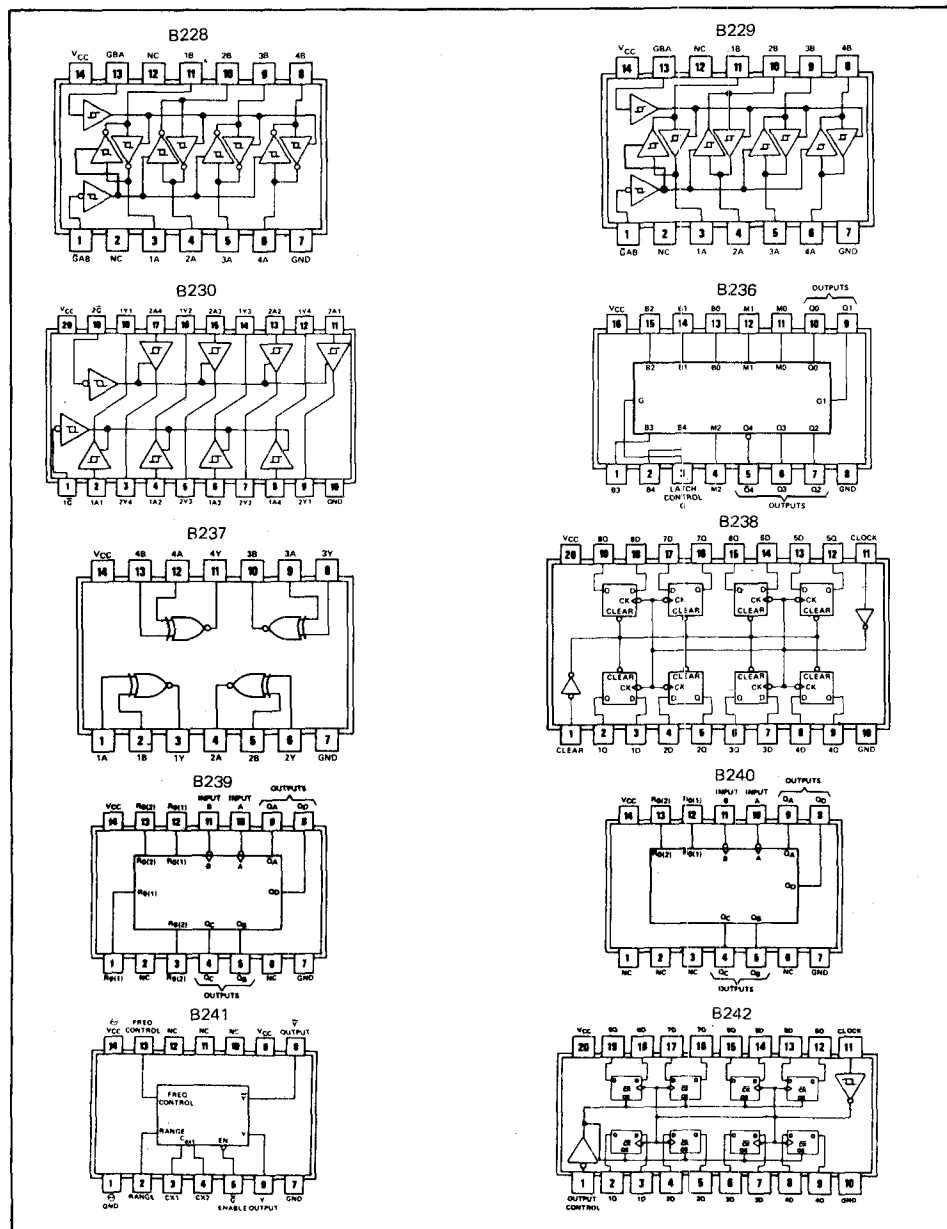


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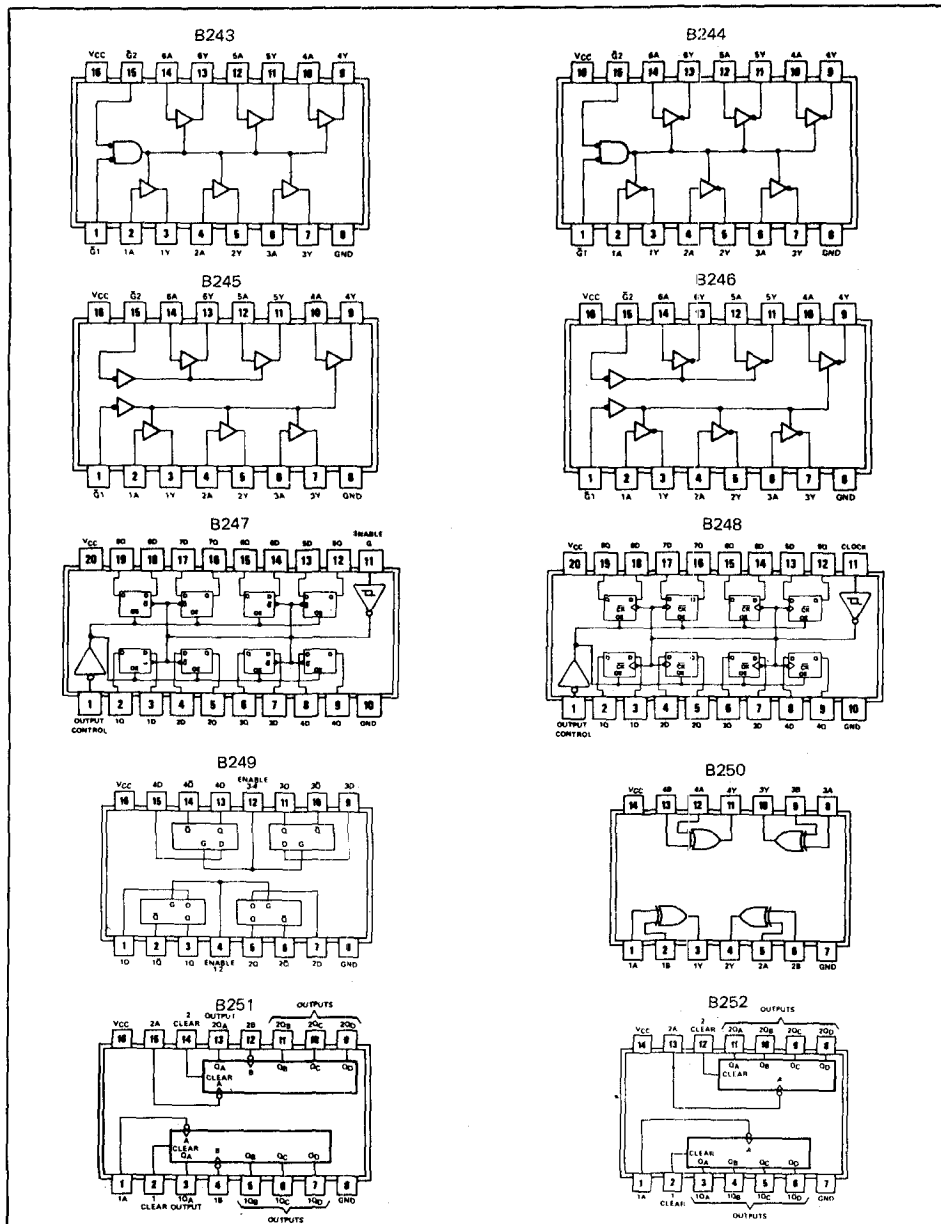


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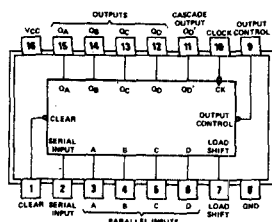
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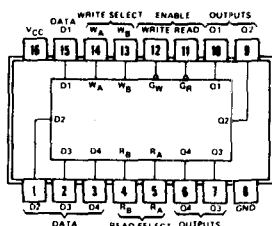
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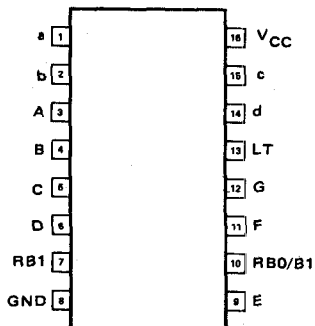
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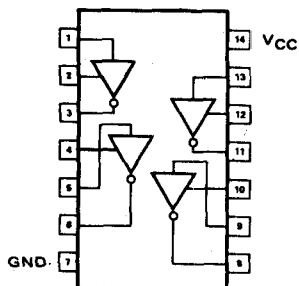
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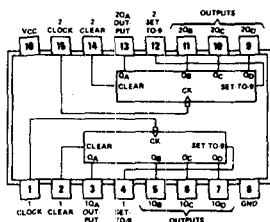
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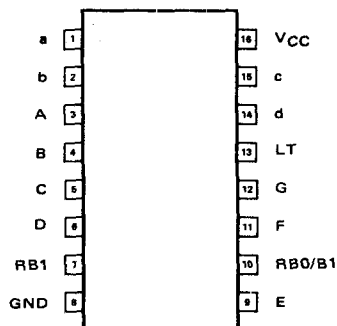
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