+2 to +6V HC +5V LS/HCT input gate 1 1 7400 input gate 1 2 13 input gate 4 7403 output gate 1 3 12 input gate 4 7408 input gate 2 4 11 output gate 4 7409 input gate 2 5 7432 10 input gate 3 7486 output gate 2 6 9 input gate 3 74132 8 output gate 3 ٥V Quad 2-input gates 14 +2 to +6V HC +5V LS/HCT output gate 1 1 input gate 1 2 13 output gate 4 input gate 1 3 12 input gate 4 7402 output gate 2 4 11 input gate 4 Note the input gate 2 5 10 output gate 3 unusual gate input gate 2 6 9 input gate 3 layout! 0٧ 8 input gate 3 Triple 3-input gates Dual 4-input gates 14 +2 to +6V HC +5V LS/HCT 14 +2 to +6V HC +5V LS/HCT input gate 1 1 input gate 1 1 13 input gate 2 input gate 1 13 input gate 1 input gate 1 3 12 input gate 2 input gate 2 3 12 output gate 1 7410 NC 7411 7420 input gate 2 4 11 input gate 3 input gate 1 4 11 NC 7412 7421 10 input gate 2 input gate 2 5 10 input gate 3 input gate 1 5 7427 output gate 2 6 9 input gate 3 9 input gate 2 output gate 1 6 8 output gate 2 0V 8 output gate 3 0V 7430 8-input NAND gate 14 +2 to +6V HC +5V LS/HCT input 13 NC 2 input 12 input input input 7430 11 input input 5 10 NC input 6 NC 8 output **Hex NOT gates** +2 to +6V HC input gate 1 1 +5V LS/HCT output gate 1 input gate 6 input gate 2 output gate 6 7404 output gate 2 7405 11 input gate 5 7414 input gate 3 10 output gate 5 output gate 3 input gate 4

General characteristics - There are several families of logic ICs numbered from 74xx00 onwards with letters (xx) in the middle of the number to indicate the type of circuitry, eg 74LS00 and 74HC00. The original family (now obsolete) had no letters, eg 7400.

0V

output gate 4

Quad 2-input gates

7403 quad 2-input NAND with open

7409 quad 2-input AND with open

74132 quad 2-input NAND with Schmitt

Note the unusual gate layout.

Triple 3-input gates

7412 triple 3-input NAND with open

Dual 4-input gates

7430 8-input NAND gate

Hex NOT gates

7405 hex NOT with open collector outputs

7414 hex NOT with Schmitt trigger inputs

NC = No Connection (a pin that is not used).

7400 quad 2-input NAND

7408 quad 2-input AND

7432 quad 2-input OR

7486 quad 2-input EX-OR

7402 quad 2-input NOR

7410 triple 3-input NAND

7411 triple 3-input AND

7427 triple 3-input NOR

7420 dual 4-input NAND

7421 dual 4-input AND

collector outputs

7404 hex NOT

collector outputs

collector outputs

trigger inputs

The **74LS** (Low-power Schottky) family (like the original) uses TTL (Transistor-Transistor Logic) circuitry which is fast but requires more power than later families. The 74 series is often still called the 'TTL series' even though the latest ICs do not use TTL!

CMOS ICs with the same pin arrangements as the older 74LS family. Note that 74HC inputs cannot be reliably driven by 74LS outputs because the voltage ranges used for logic 0 are not quite compatible, use 74HCT instead.

The **74HCT** family is a special version of **74HC** with **74LS** TTL-compatible inputs so **74HCT** can be safely mixed with **74LS** in the same system. In fact **74HCT** can be used as low-power direct replacements for the older **74LS** ICs in most circuits. The minor disadvantage of **74HCT** is a lower immunity to noise, but this is unlikely to be a problem in most situations.

The CMOS circuitry used in the **74HC** and **74HCT** series ICs means that they are <u>static sensitive</u>. Touching a pin while charged with static electricity (from your clothes for example) may damage the IC. In fact most ICs in regular use are quite tolerant and earthing your hands by touching a metal water pipe or window frame before handling them will be adequate. ICs should be left in their protective packaging until you are ready to use them.