

1961

Introduction of RTL (Fairchild Semiconductor, U.S.A.)

~ Integrated Circuit ~

In 1961, Fairchild developed RTL (Resistor Transistor Logic) μ L900 family products shortly after the invention of integrated circuits which became the base technology for the development of semiconductor.

RTL is the first integrated circuit composed of resistors and bipolar transistors.

The most basic configuration of RTL has a single input resistor and a single transistor, and it has a logic function of an inverter that logically inverts an input signal and outputs it. For NOR gate which inverts logical sum of plural inputs, there are two types, one transistor type with a plurality of input resistors (Fig.1) and plural transistor type (Fig.2).

In the Apollo Guidance Computer of Apollo Project, 3-input RTL developed by Fairchild was actually used after the rigorous evaluation of the reliability.

The disadvantage of RTL is heat generation accompanying power consumption by base resistance and collector resistance when the transistor is turned ON. In addition, the number of input resistors for securing noise margin was limited. For the purpose of improving the operation speed of RTL, a method using a capacitor in combination was tried.

On the other hand, it was relatively easy to add a diode to an integrated circuit of RTL equipped with a resistor and a bipolar transistor. For this reason, RTL shifted to DTL (Diode Transistor Logic) and TTL (Transistor Transistor Logic) in a relatively short period of time, which were superior both in terms of performance and design flexibility.

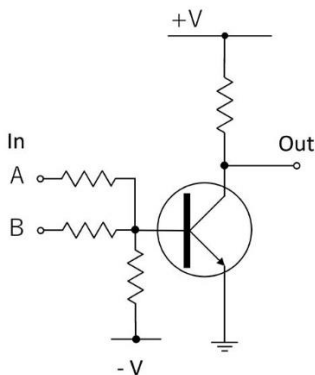


Fig.1: Circuit diagram of 2-input 1-transistor NOR gate RTL

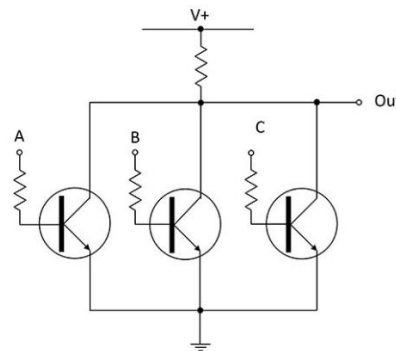


Fig.2: Circuit diagram of 3-input 3-transistor NOR gate RTL

(Used for Apollo Guidance Computer of Apollo Project)