

## Mid-1960s

### TTL appears (Texas Instruments, U.S.A., and others)

#### ~ Integrated Circuit ~

In the digital IC, TTL appeared following RTL and DTL. TTL was invented by TRW's James L. Buie in 1961, and Sylvania launched the first commercial product TTL in 1963. TTL had the merit of faster switching speed than RTL and DTL.

Subsequently TI released the 5400 series and 7400 series. The 5400 series were the MIL spec products, and the 7400 series were made as the consumer version of 5400 with a general quality assurance standard, which became the de facto standard. TI made nearly 100 different products in 7400 series, and they were 5V single power supply products in dual-in-line plastic packages. They were widely used because of its low price and easiness of use. Japanese manufacturers, one after another, also launched 7400 series compatible TTL products.

The CPUs for the minicomputers at that time consisted of TTL. Also, TTL became popular with the spread of applications of early microprocessors. In addition to the standard series, the 7400 series expanded product varieties such as high-speed versions, low power consumption versions, high-speed and low-power versions later, and in the 1980s, advanced Schottky type 74AS/ALS was also released.

Although TTL was widely used, since it used bipolar transistors, the power consumption was high and not suitable for high integration and high speed, and it gave the mainstream position of logic IC/LSI to CMOS along with the development of CMOS logic IC technology.

Fig. Example of TTL Circuit

Two-input TTL NAND gate with  
a simple output stage (simplified)

