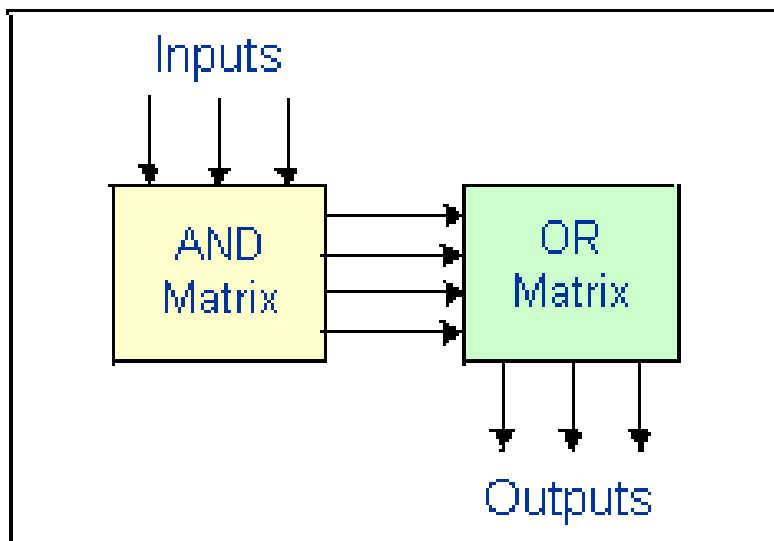


Програмируеми Логически Прибори

Programmable Logic Devices
PLD

Programmable Logic Devices

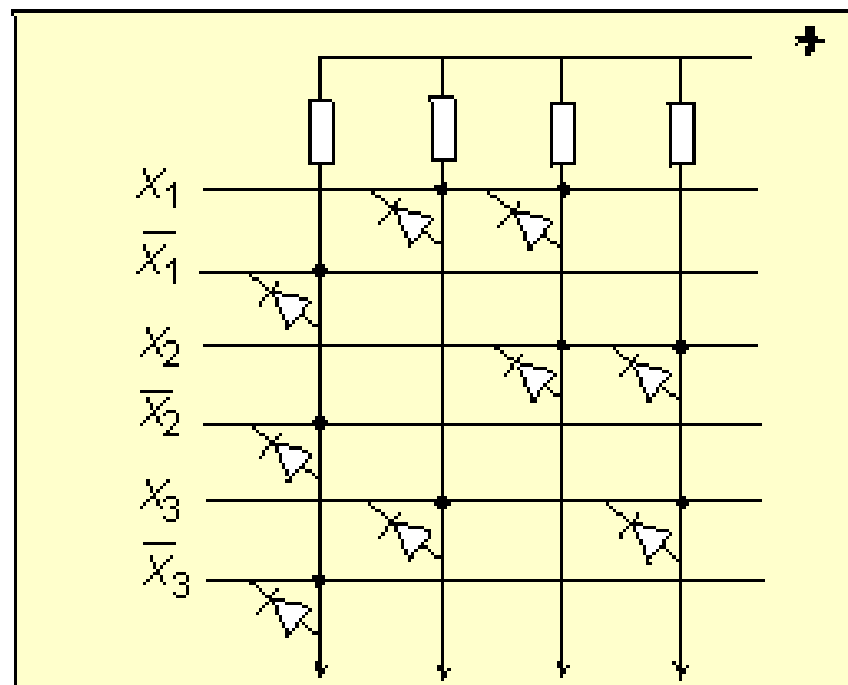
Basic Structure



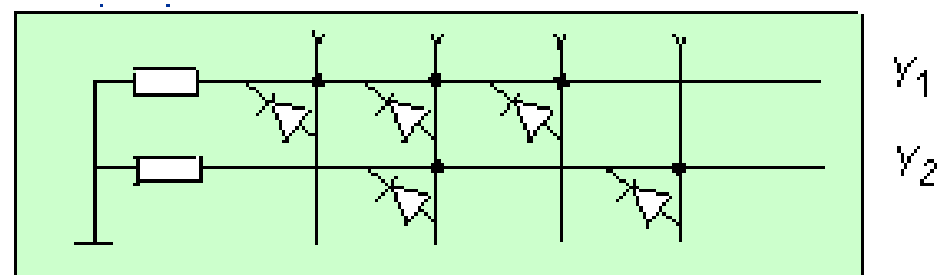
$$Y1 = P1 + P2 + P3 = \overline{X1} \cdot \overline{X2} \cdot \overline{X3} + X1 \cdot X3 + X1 \cdot X2$$

$$Y2 = P2 + P4 = X1 \cdot X3 + X2 \cdot X3$$

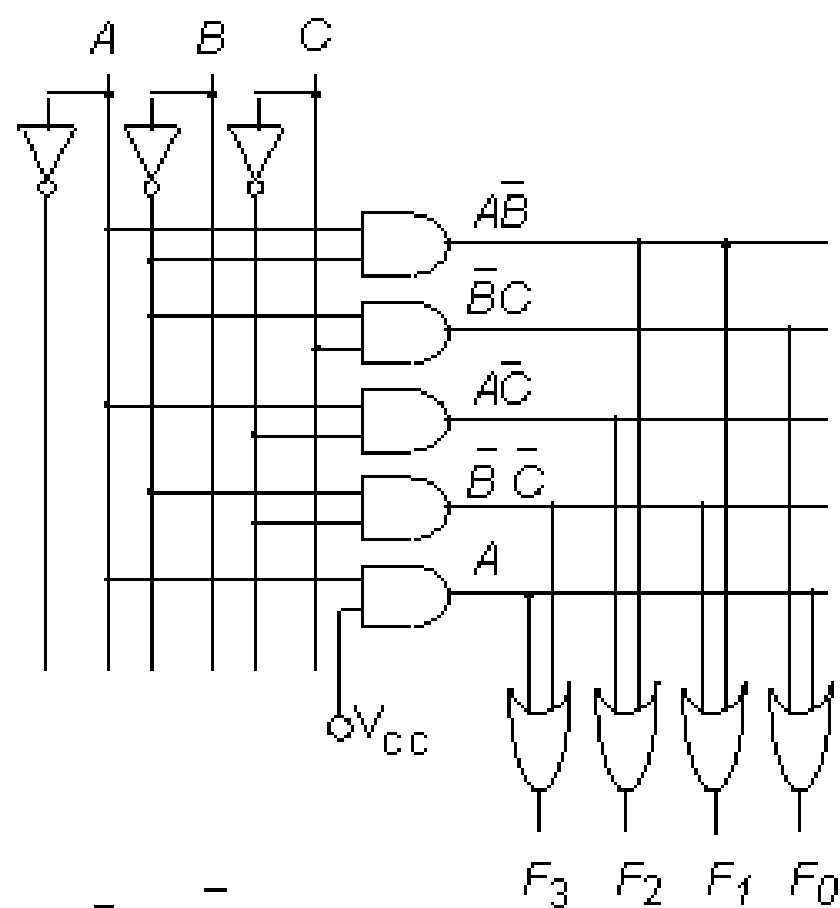
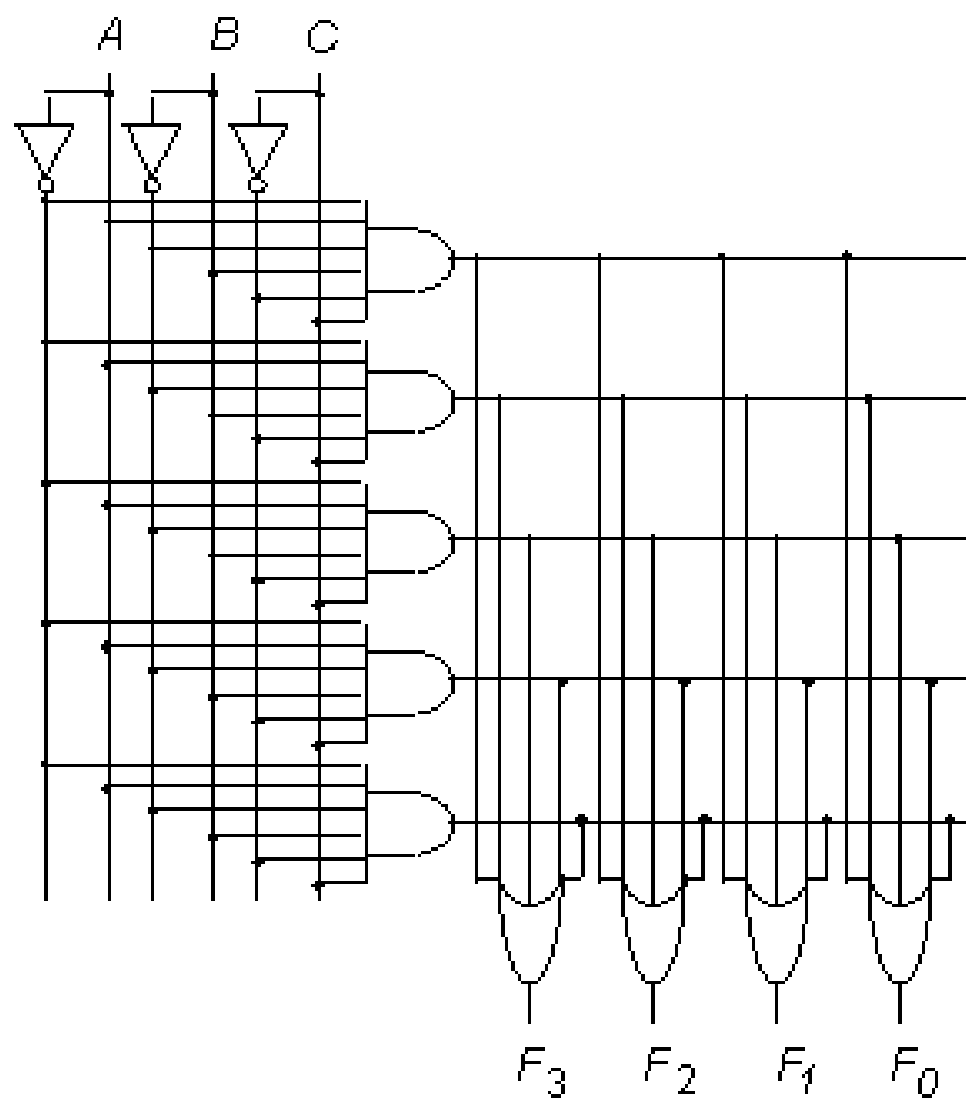
AND Matrix



OR Matrix

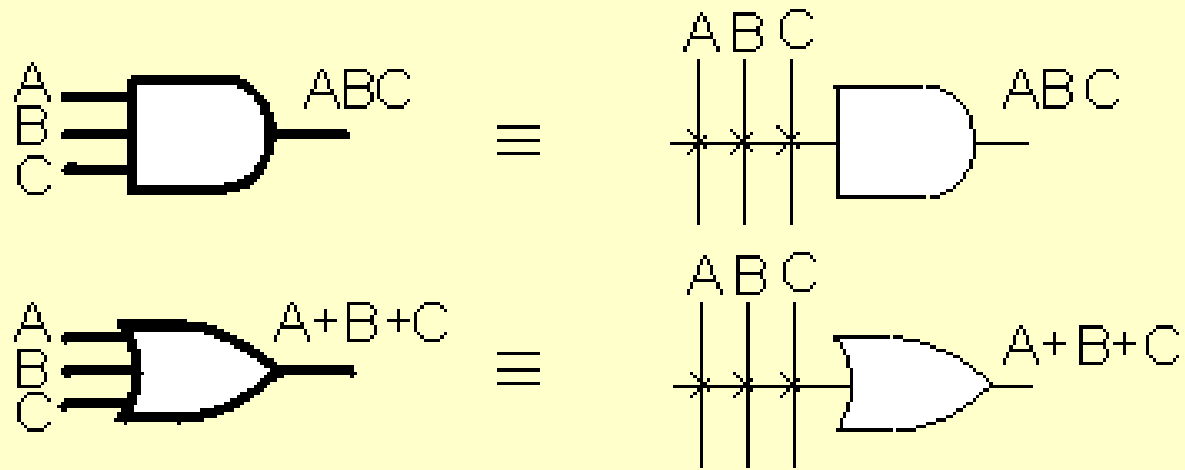


Implementation Boolean Equations - an Example

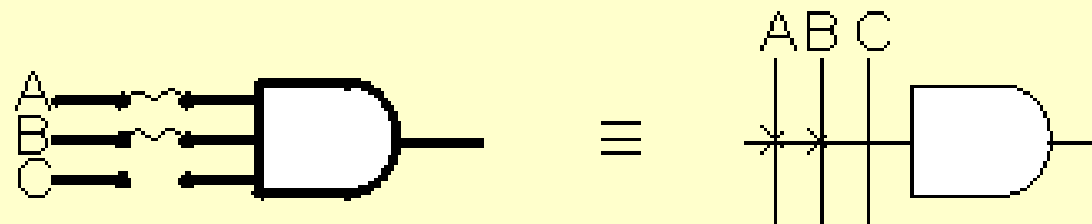


$$\begin{aligned}
 F_0 &= \bar{B}\bar{C} + A \\
 F_1 &= A\bar{B} + \bar{B}\bar{C} \\
 F_2 &= AB + AC \\
 F_3 &= \bar{B}\bar{C} + A
 \end{aligned}$$

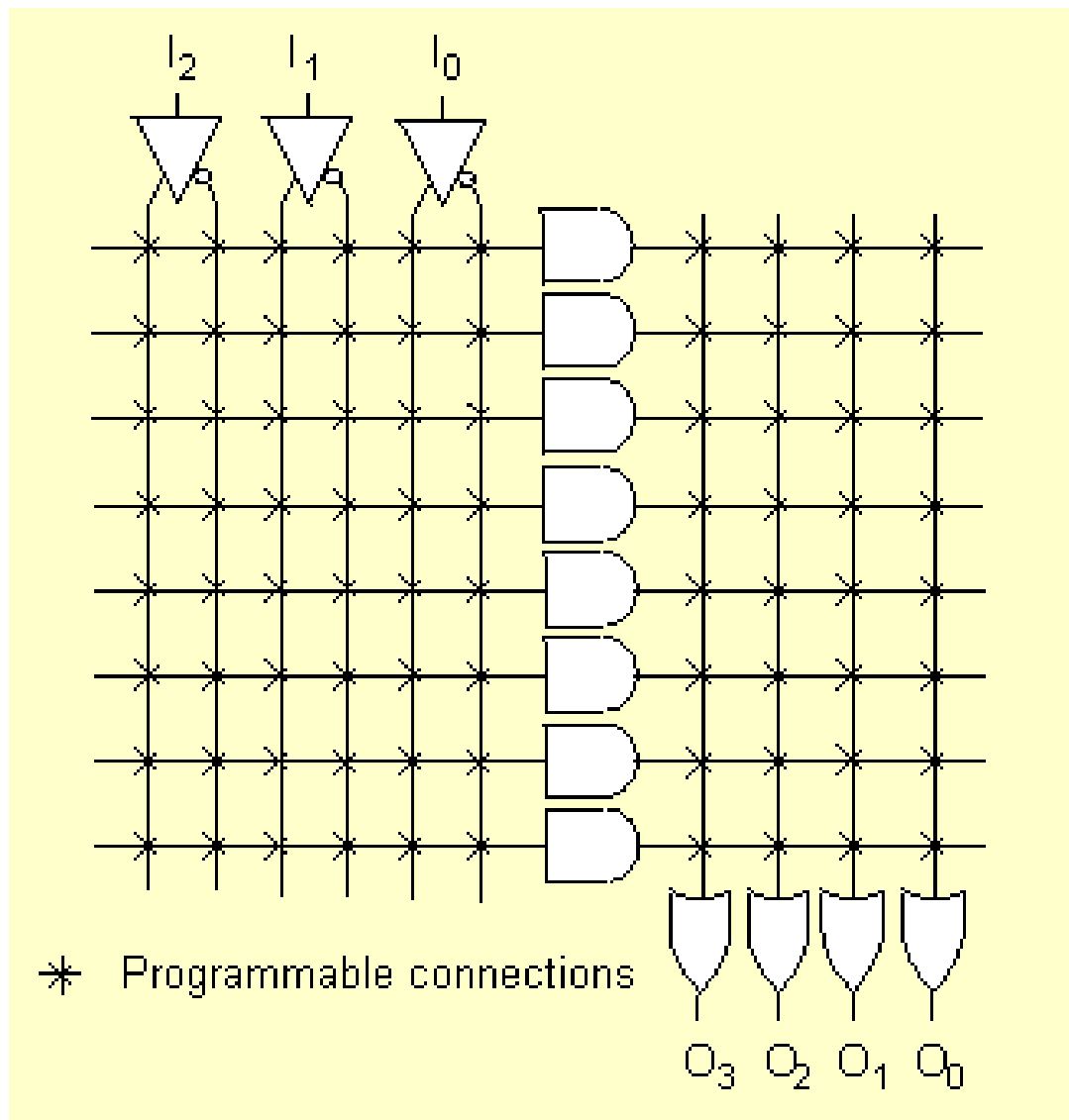
PLD Standard Notations



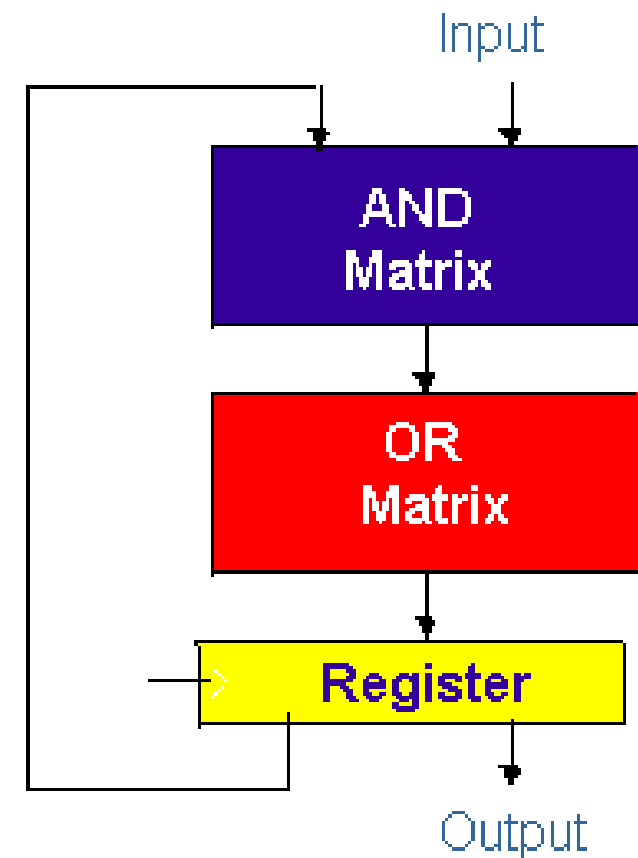
Programmable Connections



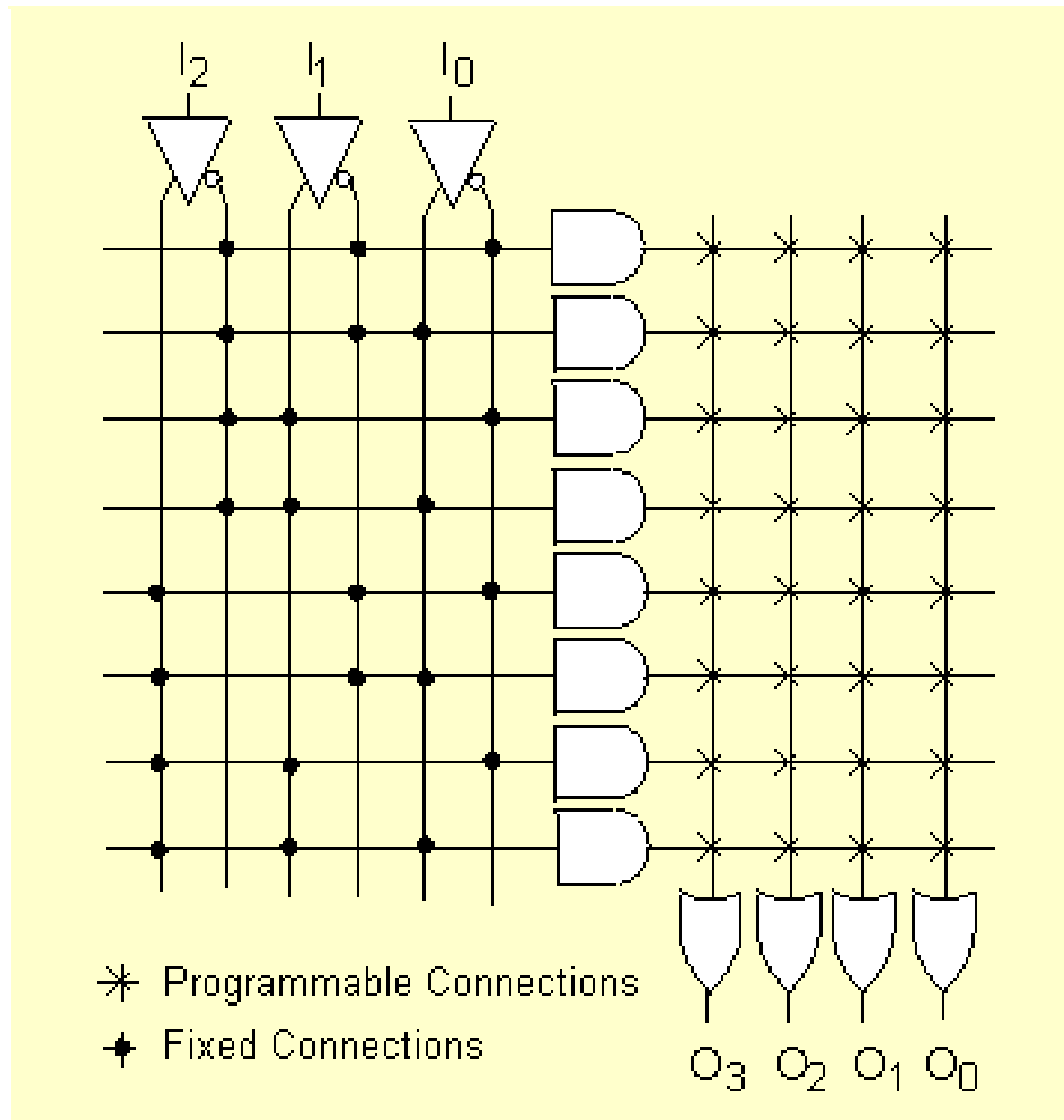
PLA Matrix



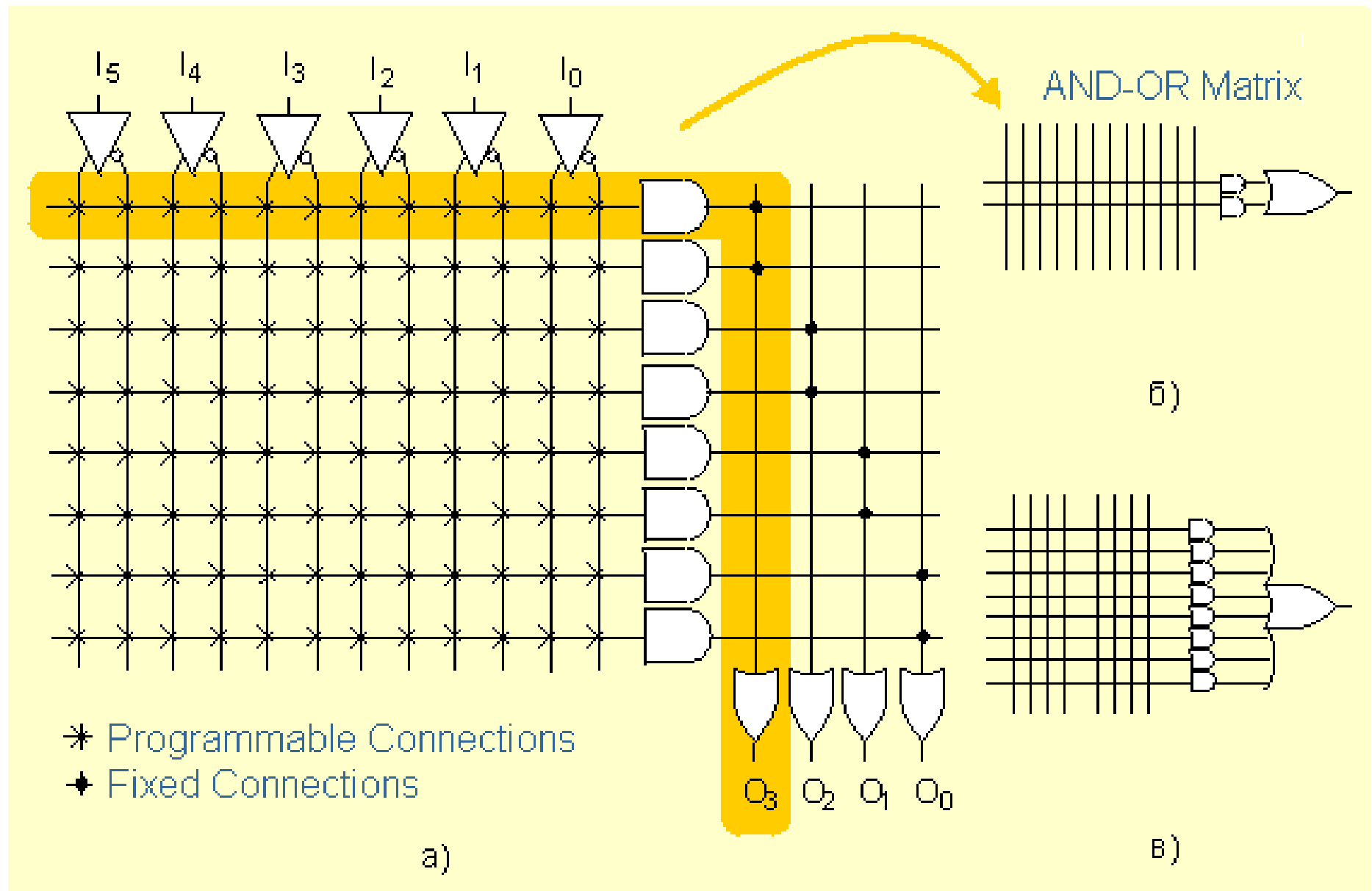
PLD with Register



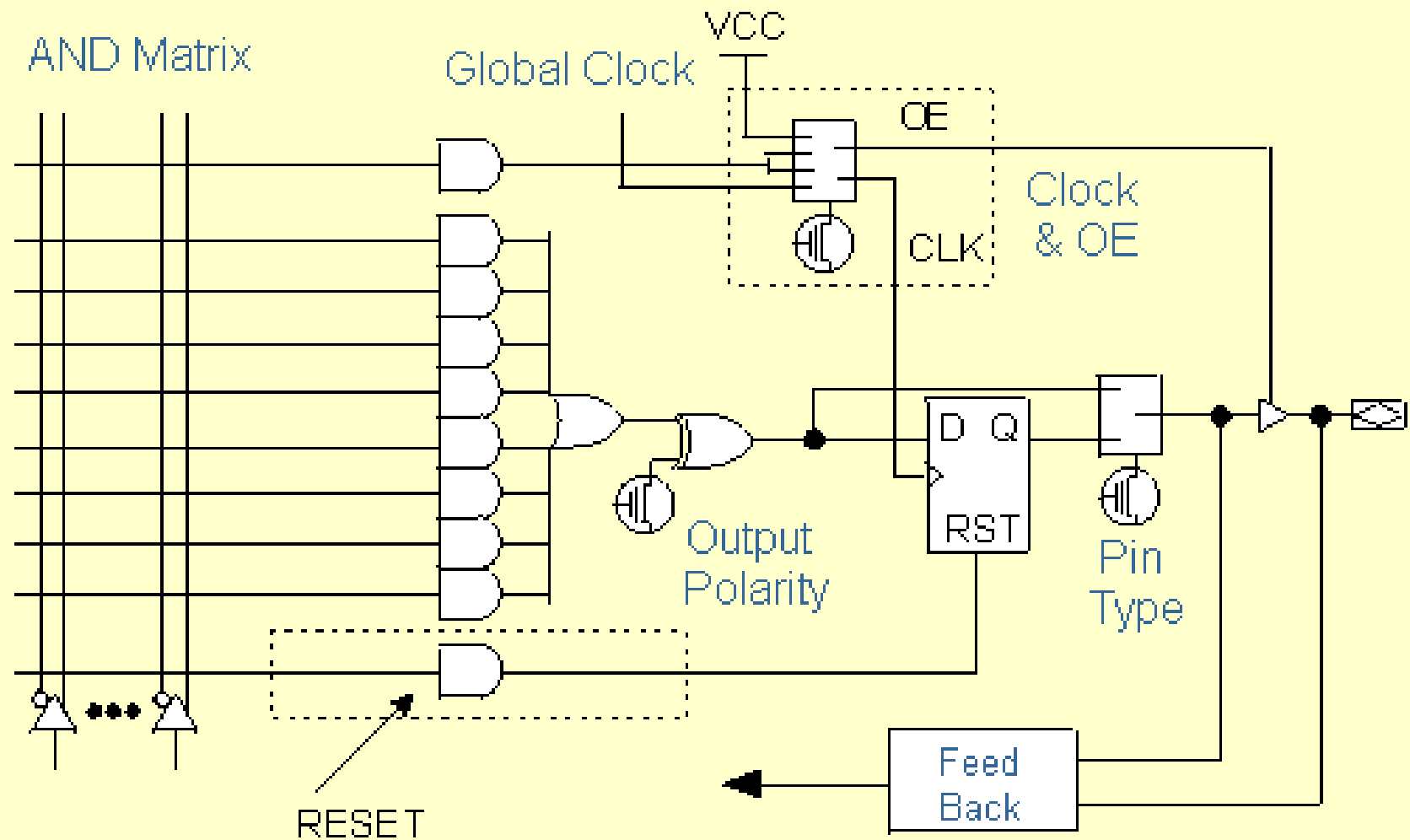
PROM Architecture



PAL Architecture



Input Output Macrocell



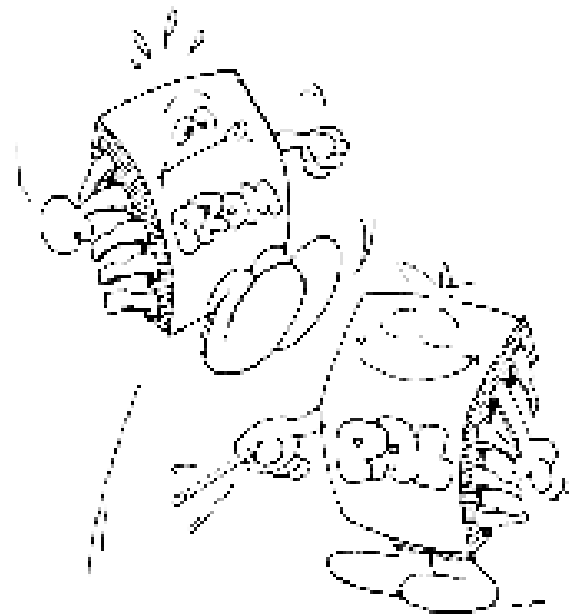
PAL - Advantage & Disadvantage

Disadvantages

- Not possible to use the same connection in two outputs
- Number of connections in a function is limited by the number of AND lines, connected to the OR gate in the output

Advantages

- PALs are faster than PLAs
- PALs have more inputs than PROMs
- Architecture facilities
 - ✓ Programmable input/output pins
 - ✓ Output & feedback registers
 - ✓ Programmable output polarity
 - ✓ Macrocell



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Означения на PAL ИС

Пример T1B PAL16L8-10MJ

T1B PAL – Производител (Texas Instruments) и фамилия (биполярни PAL)

16 – брой на изводите, които могат да се използват като входове

L – изходите са инвертирани (Други възможни типове изходи са: R – регистрови, H – неинвертирани, V – макроклетки в изходите)

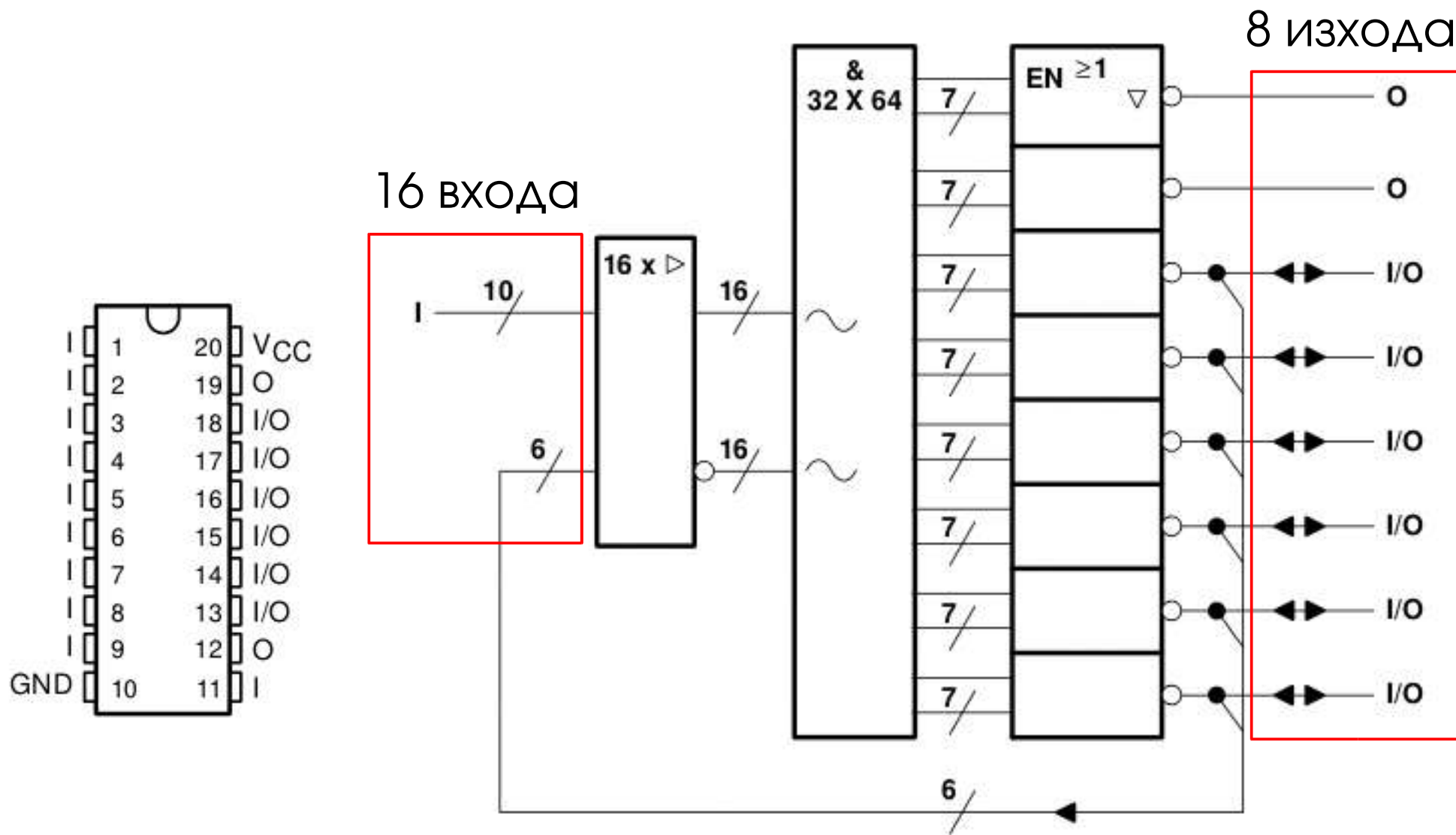
8 – брой на изводите, които могат да се използват като изходи

10 – клас на бързодействие (Означенията са специфични за всеки производител. В конкретния пример 10 е закъснението PAL-а в нано секунди.)

M – температурен диапазон ("C" съответства на диапазон от 0 до 75 градуса, а за "M" диапазонът е от -55 до 125 градуса.)

J – тип корпус (Означенията са специфични за всеки производител.)

Диаграма и корпус на PAL 16L8



Част от изходите са двупосочни и затова се броят и при входовете и при изходите. Това обяснява защо сумата 16 + 8 е по-голяма от общия брой на крачетата на PAL-а.

Край