

### EXAMPLES of Programs with TIO 16 ( 3 ) .

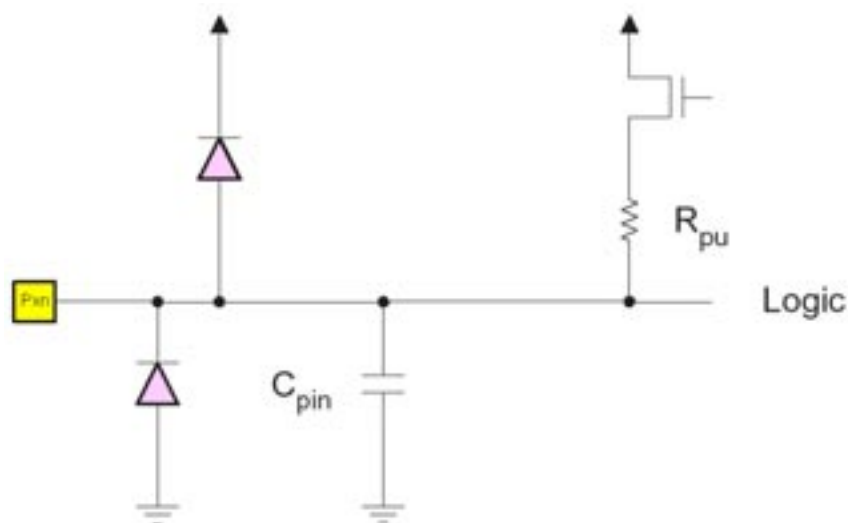
It could be useless, but also this chapter we treat the management of **I/O** lines on **TIO 16** card. We'll add an example that drives all the **16** lines available on **TIO 16** as **Output**. Then we'll continue by developing also another program that manage the **TIO 16** lines as **Input**.

The **Example.028** performs a simple **Binary Count** operation on all the **16 LEDs** of the card. This program seems very simple and it allows to discover some common but insidious features related to coordination of **Mini Module Ports** and it uses the subroutines already developed in previous examples.

By using this program, as starting point for your experiments, it will be possible to fastly test how to change some of its aspects (as for example the timings), it will be possible to change the functionalities.

The most interesting possibilities is, for example, the modifications of some functionalities as for example:

- *Invert the counting direction by starting from most to less significant.*
- *Perform the count by decreasing the first byte and increasing the second.*
- *Inverts the counting modality of previous program.*
- *Etc. etc.*



*I/O pins equivalent diagram of ATmega8L.*



The program perform a very simple operation. It acquires and shows the status of the **16 Push Buttons** connected to as many **I/O** lines programmed as **Input**.

The program continuously shows the status of the lines and so of the push button under a numeric format; the **Pressed** button are displayed as **1** and those **Released** as **0**. In order to perform this operations it is necessary to manage correctly both the **PORT** directions and the program **Flow**.

Also in this chapter some examples can use only **15** outputs, while they can support all the **16** inputs available.

## Example.028. Binary Count on 15 LED (PA+PC) of TIO 16.

### Added Definitions:

None

### Added Declarations:

None

### Added Instructions:

LOW ; HIGH

### Added Operators:

None

**Example** program **28** of **BASCOM AVR** course.

The program perform a binary count on the **15 LEDs** available on the **TIO 16** board that is connected to **I/O** connectors of **GMM TST3**.

The program describe its functionalities on a serial console provided of monitor and keyboard with a fixed physical protocol at **19-200 Baud, 8 Bit x chr, 1 Stop bit, No Parity**.

This console can be another system capable to support a serial **RS 232** communication. In order to simplify the use it can be used a **PC** provided of one **COMx** line, that execute a terminal emulation program as **HYPERTERMINAL** or the homonym modality provided by **BASCOM AVR** (see **IDE Configuration**).

The program works only when the **GMM AM08** is mounted on **Z2** socket of **GMM TST3!!**

Inside the program the terms that identify the used signals refers to electric diagram and technical manual of **GMM TST3!!**

## Example.029. TIO 16 Management. The Status of the 16 Push Buttons is Continuously Displayed on Console.

### Added Definitions:

None

### Added Declarations:

None

### Added Instructions:

None

### Added Operators:

None

**Example** program **28** of **BASCOM AVR** course.

The program acquire status of **16 push buttons** available on the **TIO 16** board that is connected to **I/O** connectors of **GMM TST3**.

The program describe its functionalities and the buttons status on a serial console provided of monitor with a fixed physical protocol at **19.200 Baud, 8 Bit x chr, 1 Stop bit, No Parity**.

This console can be another system capable to support a serial **RS 232** communication. In order to simplify the use it can be used a **PC** provided of one **COMx** line, that execute a terminal emulation program as **HYPERTERMINAL** or the homonym modality provided by **BASCOM AVR** (see **IDE** Configuration).

The program works only when the **GMM AM08** is mounted on **Z2** socket of **GMM TST3!!**

Inside the program the terms that identify the used signals refers to electric diagram and technical manual of **GMM TST3!!**