Programming the H110 module

Content

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Control Systems and Components

Project history

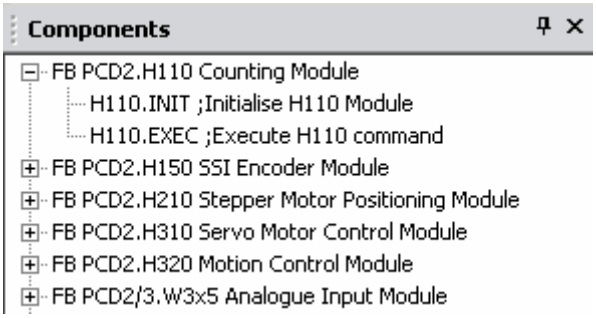
Datum	Author	Modification
18.01.2010	TCS / jc	Creation of documentation (version 1) und project for PG5 2.0.110

Introduction

This document serves as fast introduction for programming a PCD2.H110 or a PCD3.H110. For additional information please refer to the manual for the H110 (document number 26/755)

Initializing the module

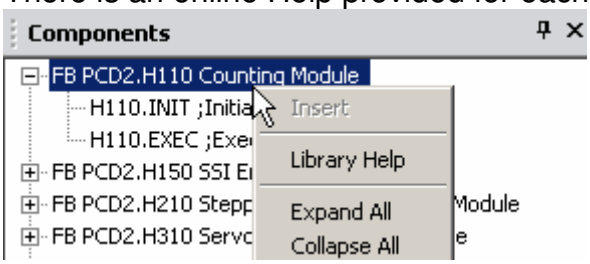
The H110 module is programmed in instruction list format (IL). PG5 2.0 already comes with ready-to-use FBs. The FB to be used is **PCD2.H110 Counting Module**. This FB also works for PCD1 and PCD3.



The H110.INIT function block is called at start-up (in XOB 16).

Sending commands to the module

When the H110.EXEC function block is called, three parameters must always be defined, even if two are sufficient. In this case, the third parameter is declared as not used ("rNotUsed") or as a dummy register.
There is an online Help provided for each FB (right-click to access).



Module addressing

When the **PCD2.H110 Counting Module** FB is used, the **D2H110_B.mba** file is added to the project automatically. This file must not be linked. In this file, you need to indicate the number of H110 modules that has been implemented as well as their respective base address.

The modules must be numbered in ascending order starting with "BA_1". For example, if 3 modules are used in the same project, they will be numbered "BA_1, BA_2 and BA_3". The user is free to decide on the location of the modules within the PCD.

Example:

```
NbrModules EQU 3  ; No of H110 modules used (0 to 16)
 ; Base addresses of the modules (only define those modules that are used)
BA_1 EQU 64       ; Base address of module 1
BA_2 EQU 208      ; Base address of module 2
BA_3 EQU 112      ; Base address of module 3
BA_4 EQU 0        ; Base address of module 4
```

Counting

(Link **Count.src** file only)

In this example, an H110 module is used in slot 0. An encoder is connected to inputs A and B of the H110 card.

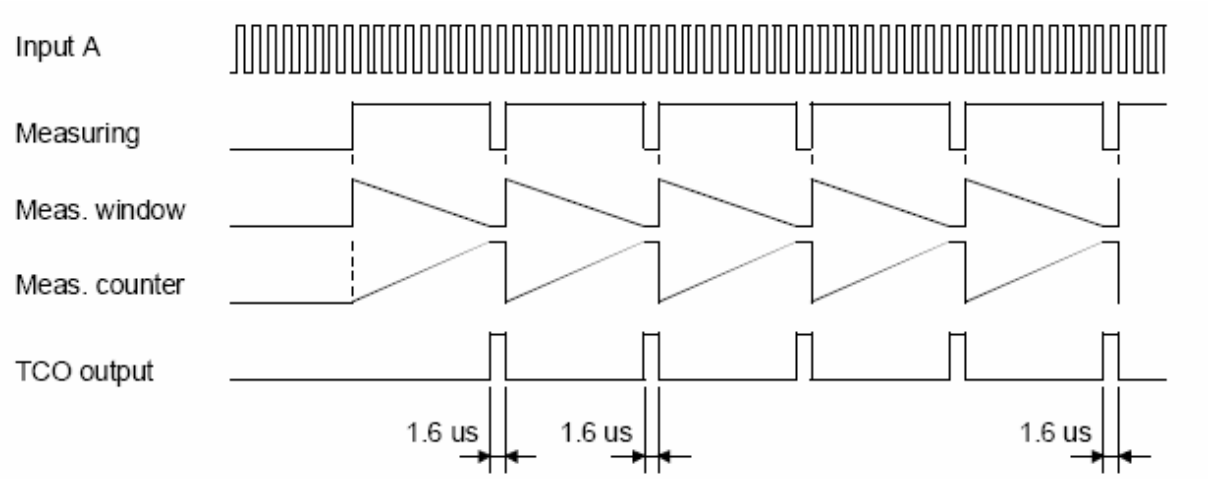
The counter is loaded with a value of zero and the preselection register with a value of 1000. To enable the counting process, the **EnC** input on the H110 card must be activated (this is determined by parameter 5 of the H110.INIT FB). The *h110.StartCt* command starts the counting process.

The value of the counter is read using the *h110.rdct* command and is stored in the *actual_value* register. Once the value of the counter reaches the value of the preselection register, the CCO output is activated (this is determined by parameter 6 of the H110.INIT FB).

Measuring the frequency

(Link **Freq.src** file only)

Principle



In this example, an H110 module is used in slot 0. A series of pulses is applied to input A.

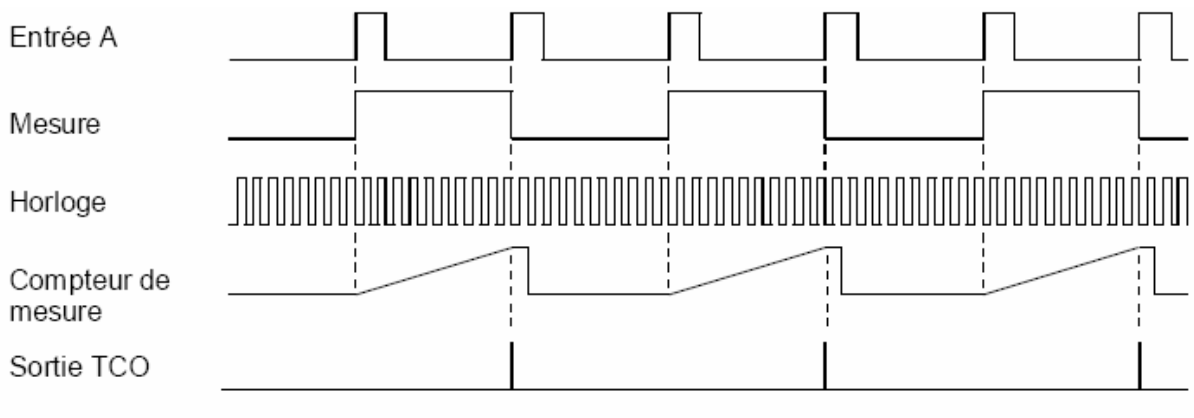
To measure a frequency, parameter 9 of the H110.INIT FB must be set to 5. To enable the measurement process, the **EnM** input for the H110 card must be activated (this is determined by parameter 11 of the H110.INIT FB). The *h110.StartMs* command starts the measurement process.
The measurement is read using the *h110.RdMsImp* command and is stored in the *measure_freq* register.

In this example, the result is displayed as count units (Hz) as the time window is adjusted to 1 sec (1000 ms). The TCO output is activated after each measurement (this is determined by parameter 12 of the H110.INIT FB).

Measuring the period

(Link **Period.src** file only)

Principle



Clock => 1 MHz

In this example, an H110 module is used in slot 0. A series of pulses is applied to input A. Measurement is always based on pulse pairs.

To measure a period, parameter 9 of the H110.INIT FB must be set to 3. To enable the measurement process, the **EnM** input for the H110 card must be activated (this is determined by parameter 11 of the H110.INIT FB). The *h110.StartMs* command starts the measurement process.

The measurement is read using the *h110.RdMsImp* command and is stored in the *measure_period* register.

The following formula is used to calculate the value that is to be input in order to define the time basis:

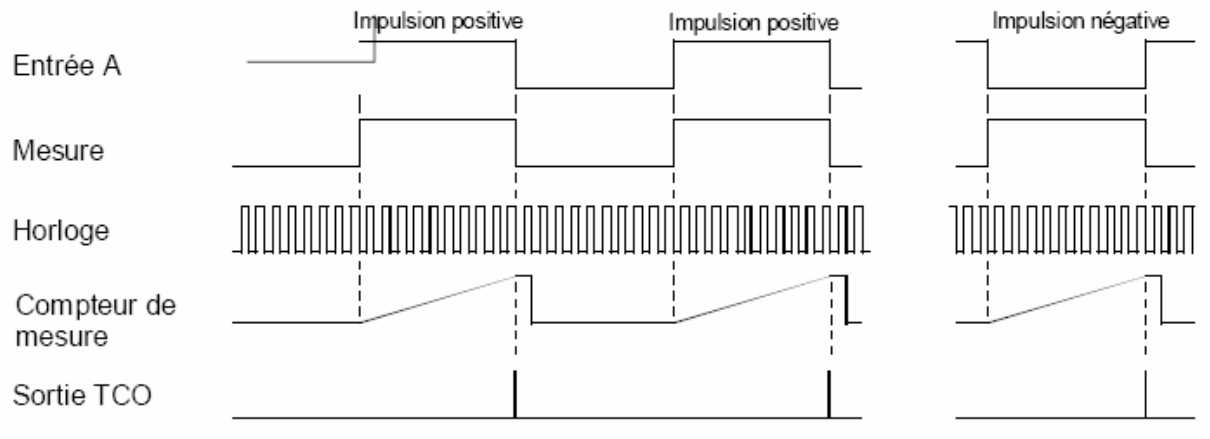
$$n = \frac{T * 10^6}{tops} - 1$$

Where: T = Duration of the period in seconds
tops = number of clock tops
n = Value to be input

Measuring the pulse duration

(Link **Pulse.src** file only)

Principle



Clock => 1 MHz

In this example, an H110 module is used in slot 0. Pulses are applied to input A.

To measure a pulse duration, parameter 9 of the H110.INIT FB must be set to 1. To enable the measurement process, the **EnM** input for the H110 card must be activated (this is determined by parameter 11 of the H110.INIT FB). The *h110.StartMs* command starts the measurement process.

The measurement is read using the *h110.RdMsImp* command and is stored in the *measure_pulse* register.

The time basis is defined using the same formula as that used to measure the period.
Where T = Pulse duration in seconds