

**Matrix Host Mode Programming  
S7 PLC Sample Project**

Rev. 01 (27/08/2012)

## Overview

This document is a quick guide to understand and use a sample PLC project, **Matrix\_HMP\_Sample** named, about the Host Mode Programming on Datalogic Matrix devices belonging to “210/410” series.

The involved PLC is a **Siemens S7 PLC**, the fieldbus in use is **PROFIBUS**; anyway, this project can be easily adjusted in order to run over **PROFINET**; a simple modification on the HW configuration of the PLC project achieves this goal.

The basic items of this project are:

- the **DAD/DPD** FB: it's the data flow control block, the engine allowing the communication between PLC and Matrix device;
- The **RecipeExec** FB: it's the functional block that allows the execution of every single HMP command string;
- **DB#n** : every item of this DB group implements a single HMP command string. It needs to write a DB for every required HMP string.

Summarizing:

- Project Name: **Matrix\_HMP\_Sample**
- Project Type: sample for **SIEMENS STEP7–300**
- Protocol: **PROFIBUS DP**
- Target: implementing the **HOST MODE Programming for DATALOGIC Matrix 210/410 devices**

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## HMP Strings & Data Blocks

The sample project provides n. 6 DB in order to program via bus the following Matrix parameters:

Data Block	Matrix Parameter
DB1	Match Code / Status
DB2	Match Code / Symbology Check
DB3	Match Code Slot 1/ Symbology
DB4	Match Code Slot 1/ Data
DB5	Match Code Slot 2/ Symbology
DB6	Match Code Slot 2/ Data

1) DB1:

it implements the following Host Mode programming string:

**<ESC> PA1**

- **<ESC> PA:** command string selecting the Match Code / Status parameter
- **1:** data selecting the “Enabled” option<sup>1</sup>

Then, the string execution makes active this setup → Match Code / Status = Enabled

2) DB2:

**<ESC> PB1** → Match Code / Symbology Check = Enabled

3) DB3:

**<ESC> y18** → Match Code SLOT 1 / Symbology = EAN8

4) DB4:

**<ESC> z112345678** → Match Code SLOT 1 / Data = 12345678

5) DB5:

**<ESC> y27** → Match Code SLOT 2 / Symbology = EAN13

6) DB6:





**<ESC> z21234567890ab** → Match Code SLOT 2 / Data = 1234567890ab

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<sup>1</sup> Please, refer to “Matrix210\_2DImagers\_HostModeProgramming\_manual\_e”, section “4.17 Match Code”, for details about all the Host Mode Programming strings above

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Running all the strings above, the Matrix device behavior becomes as following:  
on every reading phase the device compares the read code with SLOT1 and SLOT2 content,  
then:

- if  
read code = **EAN8** typology AND data = **12345678**  
  
then  RIGHT CODE event occurs;  
  
else  WRONG CODE event occurs;
  
- if  
read code = **EAN13** typology AND data = **1234567890ab**  
  
then  RIGHT CODE event occurs;  
  
else  WRONG CODE event occurs;

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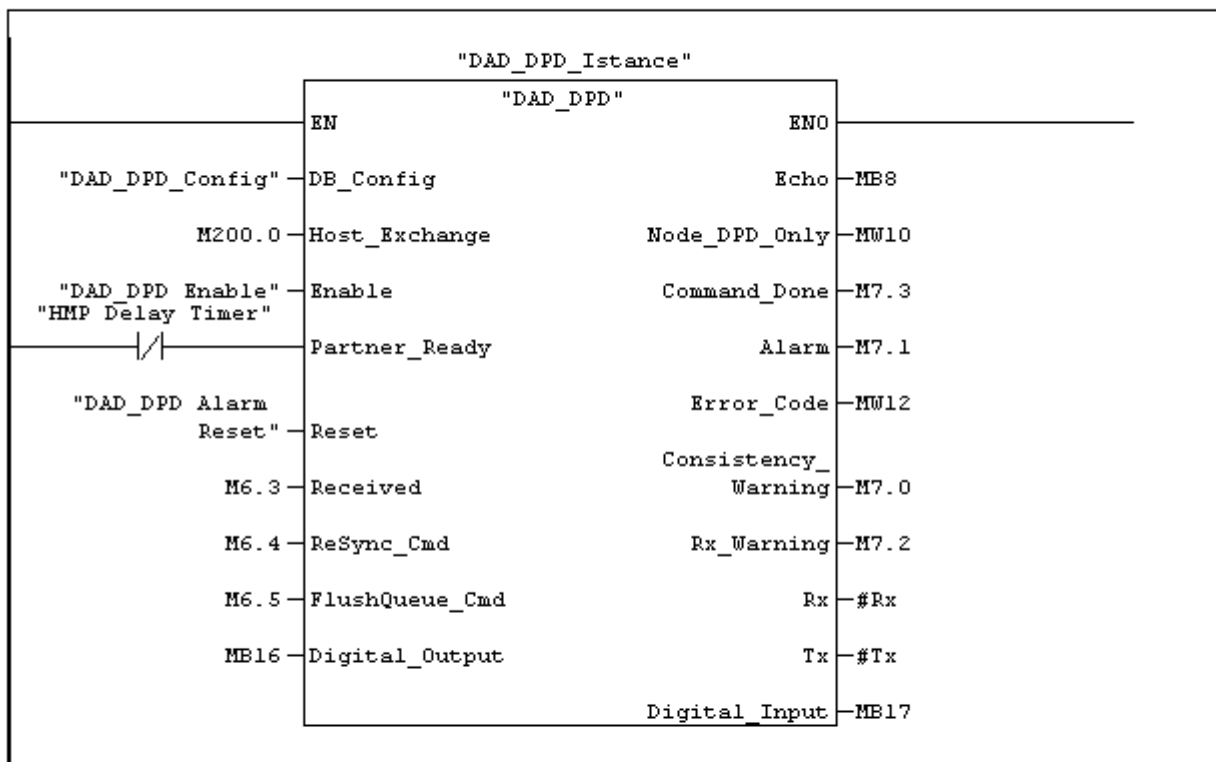
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## Functional Blocks

### 1)DAD/DPD

**Segmento 2:** DAD / DPD protocol

Data Flow Control Function Block \_ Instance


**Informazioni sul simbolo:**

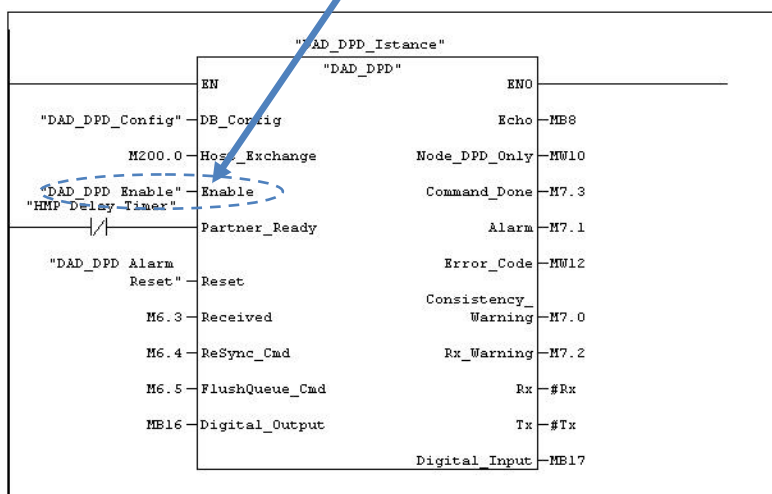
HMP Delay Timer	T0	
DAD_DPD	FB100	-- Data exchange between DAD-DPD Protocol
DAD_DPD_Instance	DB100	-- Instance DataBlock for DAD_DPD function
DAD_DPD_Config	DB103	-- DAD_DPD configuration DataBlock
DAD_DPD_Enable	M6.0	
DAD_DPD Alarm Reset	M6.2	-- Set to clear Error_Code

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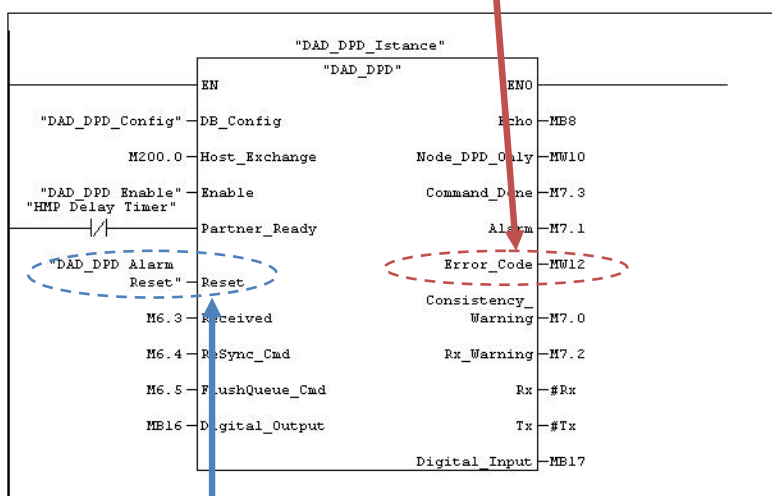
**DAD\_DPD block instance** implements the data flow control; it is necessary to handle the communication between PLC and Matrix device, also to allow the Host Mode Programming session.

This instance must be **enabled** on the PLC



while in Matrix setup must be **"CBX Gateway/ Profibus/ Data Flow Control = DAD Driver"**.

Note: in case of error condition ( $Error\_Code \neq 0$ ),



acts on "Alarm\_Reset" input to clear it.

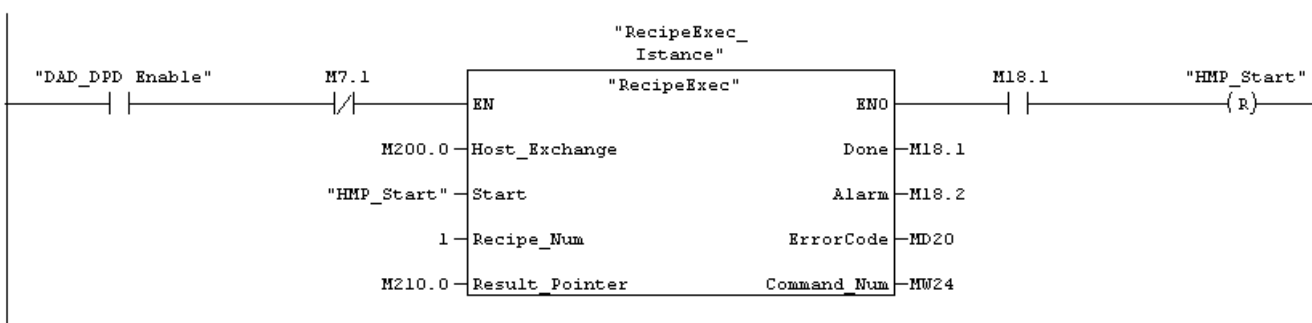
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### 2)RecipeExec

#### Segmento 3 : Recipe executor

Recipe\_Num indicates the DBNum (HMP command) ready to go

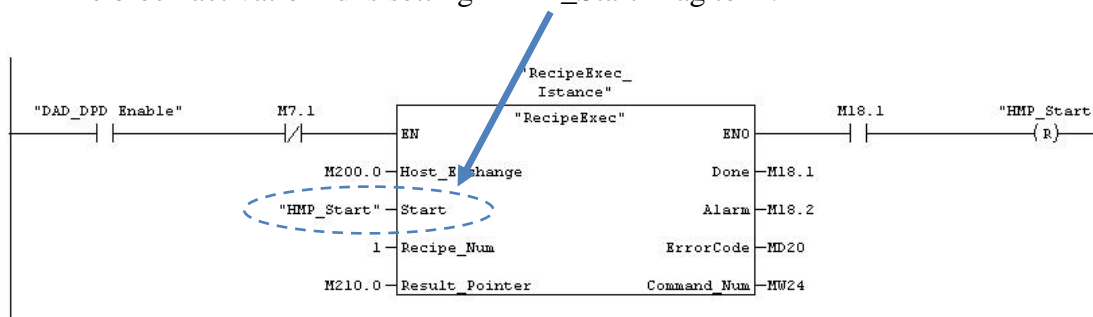


#### Informazioni sul simbolo:

DAD_DPD Enable	M6.0	
RecipeExec	FB110	-- Recipe executor
RecipeExec_Instance	DB110	-- Instance DataBlock for Recipe executor
HMP_Start	M18.0	-- Host Mode Programming start

**Recipe\_Exec block instance** implements the Host Mode command transmission: the running command has referred by DB"Recipe\_Num"; on the picture above DB1 will be executed once the Recipe\_Exec block has activated.

The block activation runs setting 'HMP\_Start' flag to 1 .



In short, to run DB#n:

- set to #n the Recipe\_Num value; set to 1 the HMP\_Start flag.

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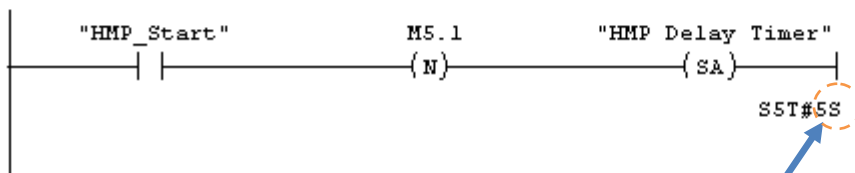
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### Note: the Restart Delay ladder step

After every HM command execution, it needs waiting for some seconds to allow the Matrix restart: that's why the segment below.

#### Segmento 4 : Restart Delay

After a HMP sequence the node reboots, then the D&D/DPD protocol activation has to be delayed



#### Informazioni sul simbolo:

HMP_Start	M18.0	-- Host Mode Programming start
HMP Delay Timer	T0	

The sample current value of HMP Delay Timer is 5 seconds.

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### How to read(or write) a HMP Data Block

I.e. DB5

It is implementing the following HMP command:

&lt;ESC&gt; y27 → Match Code SLOT 2 / Symbology = EAN13

Here is the DB5 data view:

Indirizzo	Nome	Tipo	Valore	Valore attuale	Commento
0.0	Start.FunctionCode	BYTE	B#16#1	B#16#1	Function code (StartConfiguration) - DON'T MODIFY ! -
1.0	Start.Enable	BOOL	TRUE	TRUE	Enable to execute this command
2.0	Start.Address	CHAR	'0'	'0'	Address parameter
4.0	Set_Int.FunctionCode	BYTE	B#16#3	B#16#3	Function code (SetInteger) - DON'T MODIFY ! -
5.0	Set_Int.Enable	BOOL	TRUE	TRUE	Enable to execute this command
6.0	Set_Int.Address	CHAR	'0'	'0'	Address parameter
7.0	Set_Int.Chr1	CHAR	' '	'y'	
8.0	Set_Int.Chr2	CHAR	' '	'2'	
10.0	Set_Int.Depth	INT	0	2	
12.0	Set_Int.Data	STRING [	' '	'7'	
30.0	Save.FunctionCode	BYTE	B#16#D	B#16#D	Function code (SaveConfiguration) - DON'T MODIFY ! -
31.0	Save.Enable	BOOL	TRUE	TRUE	Enable to execute this command
32.0	Save.Address	CHAR	'0'	'0'	Address parameter
33.0	Save.Mode	CHAR	' '	' '	Save mode: '!' = RAM only / ' '(space) = RAM + FLASH
34.0	Close.FunctionCode	BYTE	B#16#E	B#16#E	Function code (StopConfiguration) - DON'T MODIFY ! -
35.0	Close.Enable	BOOL	TRUE	TRUE	Enable to execute this command
36.0	Close.Address	CHAR	'0'	'0'	Address parameter

- ❖ On **address 7.0** the element “**Set\_Int\_Chr1**” indicates the CHR1 element of the HMP string:

7.0	Set_Int.Chr1	CHAR	' '	'y'	
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the current value is “y”, it refers the Match Code Slot (see Host Mode manual, pagg. 68 69 70 )

- ❖ On **address 8.0** the element “**Set\_Int\_Chr2**” indicates the CHR2 element of the HMP string:

8.0	Set_Int.Chr2	CHAR	' '	'2'	
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the current value is “2”, it refers the slot number #2(see Host Mode manual, pagg. 68 69 70 )



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- ❖ On **address 12.0** the element “**Set\_Int\_Data**” indicates the Data element of the HMP string:

12.0	Set_Int.Data	STRING [	'	'7'	
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the current value is “7”, it refers the EAN13 symbology (see Host Mode manual, pagg. 68 69 70)

**To conclude:**

**A DB implements a single HMP command string.**

**If the user needs to set another Matrix software parameter via a HMP string, then he needs to write a new DB for that new required HMP string.**