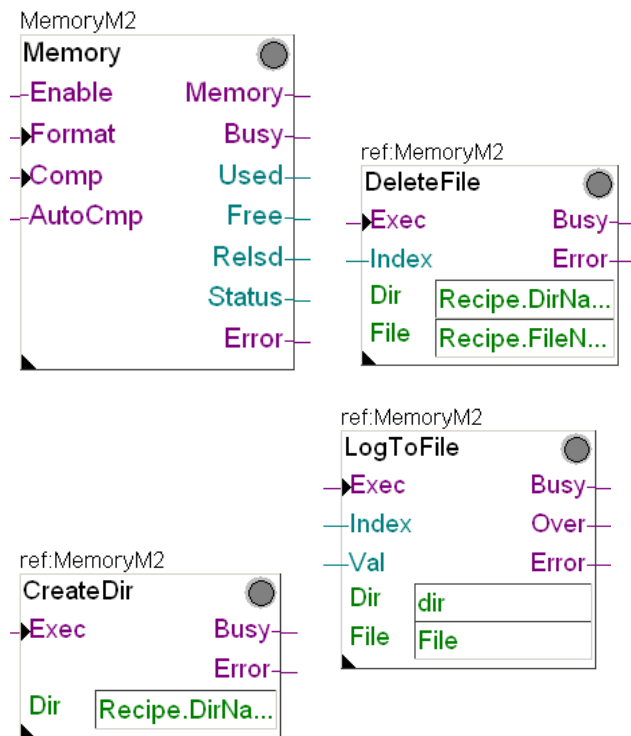


## Example for File System and EMail (Chocolat Factory)

### History:

27.09.2007 Document created first release (S.R)  
 15.02.2008 Chapter 5 Trouble shooting added (S.R)  
 27.04.2010 Import to PG5 2.0 (S.D)



This example simulates a chocolate factory. It contains FileSystem functions and E-Mailing functions. Everything is programmed in FUPLA.

It shows how to:

- Save values to the file system and restore them
- Create a logfile
- Send this logfile by e-mail
- Visualize the functions in a WebProject

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# 1 Summary

## 1.1 Functionality

This example simulates a chocolate factory. It is intended to show how to use the **File system** on the PCD in the following ways:

- Storage of documents used for the web server project
- Save several values of a recipe on the file system and restore them when needed.
- Create a logfile of the production and make it available on the Webpage.

### E-mailing:

- It shows the possibility of sending the logfile as an e-mail.

## 1.2 Possible application

This example gives an idea of an application where the file system can be useful. It can be used as base project for further application or to explain and show the possibilities of our file system and e-mailing functionality to a customer.

## 1.3 Hardware and Software used

### 1.3.1 Hardware

PCD: PCD3.M5540 Firmware 1.10.51  
Flash device: PCD7.R550M04 mounted in slot M2

### 1.3.2 Software

- Saia® PG5 2.0.110 with add on tool Saia® S-Web Editor 5.14.27 and Web Builder.
- FileSystem F-Box Library V 2.6.100
- E-Mail F-Box Library V 1.4.310
- Web browser with a Sun virtual Java Machine
- Filebrowser (p.ex. Filezilla)

## 2 Using the flash device for web server files

### 2.1 Working principle

In case the files stored on the flash device shall be available for the PCD web server they must be stored in the /WEBPAGES directory of the flash card. The web server task will then be able to access these files and provide them to the http client accessing the server.

The files to be stored on the flash card are to be downloaded by accessing the PCD3 ftp server. For generating these files please refer to the Saia® S-Web Editor documentation.

The files with the extensions \*.tcr must be present in the Web Builder project and not on the flash device. These files are used for the access to the PCD medias.

### 2.2 Storing web related files on the flash device

The files used by a web project (\*.htm, \*.teq, \*.jar, jpg etc.) can be downloaded using the ftp server of the PCD. In order to connect to this server, an ftp client software must be used. Examples therefore are the Microsoft Internet Explorer (IE), the Total Commander or Filezilla.

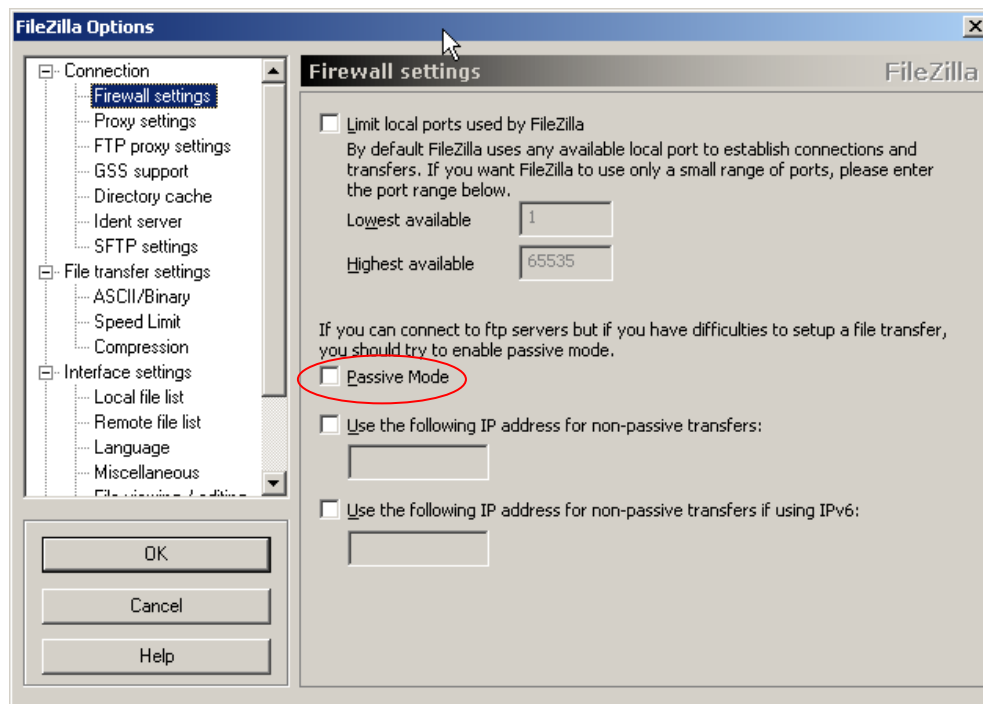
File- and directory names are not case sensitive on the PCD file system.

#### 2.2.1 Downloading the files using an ftp client

Note that ftp is only supported on Ethernet. This means that your PCD is to be equipped with an Ethernet port and must be reachable from your PC.

The required steps with the Filezilla are:

- Open Filezilla
- Deactivate the passive mode (Edit/Settings)



- Enter the address (IP address of your PCD), User: root, Password: rootpasswd, Port 21 (default) and choose Quickconnect.

- Depending on the slot where the flash is mounted the following folder is present:  
M1\_Flash     Slot M1 on PCD3.M5xxx  
M2\_Flash     Slot M2 on PCD3.M5xxx  
SL0Flash     I/O Slot 0 on PCD3.Mxxxx  
SL1Flash     I/O Slot 1 on PCD3.Mxxxx  
SL2Flash     I/O Slot 2 on PCD3.Mxxxx  
SL3Flash     I/O Slot 3 on PCD3.Mxxxx
- Files which should be accessible from the Webproject have to be in the Webpages folder.

## 3 Functionality

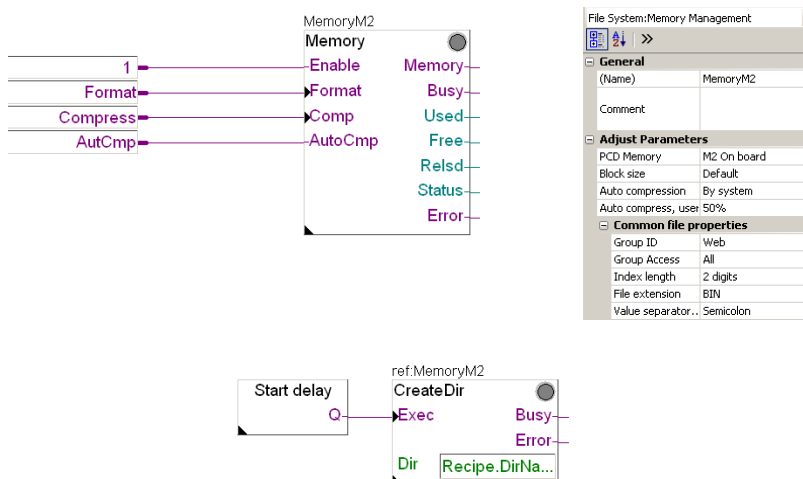
### 3.1 Device Configurator

TCP/IP has to be configured in the Device Configurator. A default router is needed to send e-mails. Your IT support will be able to tell you the default router address if you don't know it.

The screenshot displays the Device Configurator interface. On the left, a tree view shows sections for Device, Memory Slots, Onboard Communications, and Onboard I/O Slots. The 'Device' section is expanded, showing a table with columns 'Type' and 'Description'. The 'Memory Slots' section shows a table with columns 'Slot', 'Type', and 'Description'. The 'Onboard Communications' section shows a table with columns 'Type' and 'Description'. The 'Onboard I/O Slots' section shows a table with columns 'Slot', 'Type', and 'Description'. On the right, the 'Properties' panel is open, showing the 'Onboard : Ethernet' settings. The 'General' tab is selected, showing fields for MAC Address (Not available), TCP/IP (Enabled), IP Node (0), IP Address (172.16.1.69), Subnet Mask (255.255.0.0), Default Router (172.16.1.252), Ethernet RIO Netv (No), PGU Port (No), Slave (Yes), Network groups (Default), Initialize Open Dat (No), and Telegram Reading (1000). The 'TCP/IP S-Bus Master Gateway' tab is also visible, showing fields for Channel Number (9), Use TCP/IP For Ga (No), First S-Bus Station (0), Last S-Bus Station (253), and Response Timeout (0).

### 3.2 Fupla

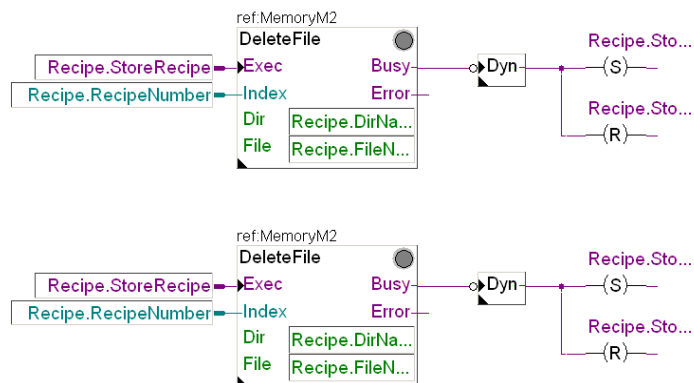
#### 3.2.1 Page 1: Memory Management



**The Memory Management F-Box** has to be enabled; otherwise no action on the file system is possible. It is recommended to initialize Format and Compress to zero to avoid a compressing or formatting after the download. This F-Box is designated for initialize and configured the file system. It has to be inserted in the project first. The following file system F-Boxes will refer to this F-Box. Therefore the name has to correspond with the reference of the other F-Boxes. The Slot, where the Flash is plugged has to be defined. Block size, Auto Compression, Group ID, Group Access, Index length, File extension and Value separator can be defined in this F-Box.

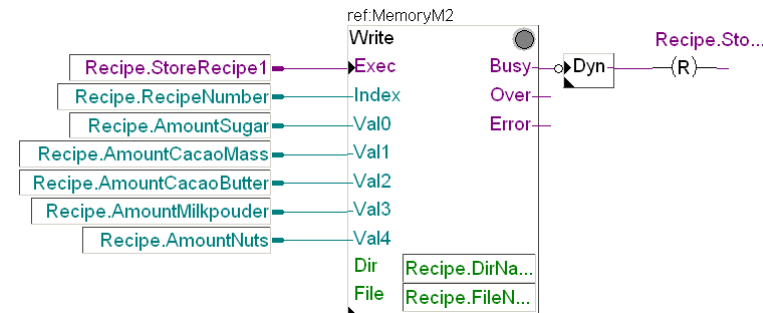
**The Create Directory F-Box** creates the directory: /Recipes after a Start delay on startup.

### 3.2.2 Page 2: Delete File



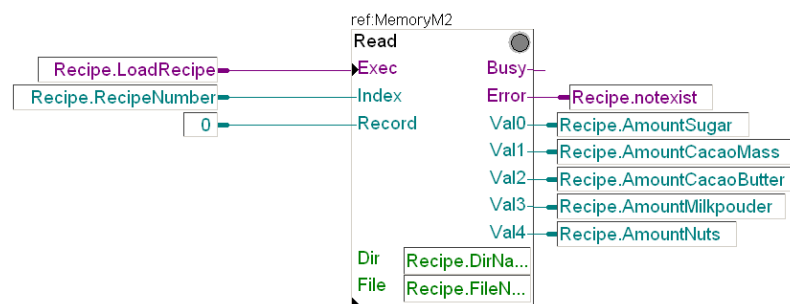
The **Delete File F-Box** deletes the Recipe-File and the Recipe-Text if they already exist. This is necessary because otherwise the new recipe will be added after the first recipe and can only be recalled using the Record input (see Read Integer F-Box). If the file does not exist, the F-Box shows an error. This is a normal behaviour and shows only that the action has not been executed because the file did not exist.

### 3.2.3 Page 3: Write File



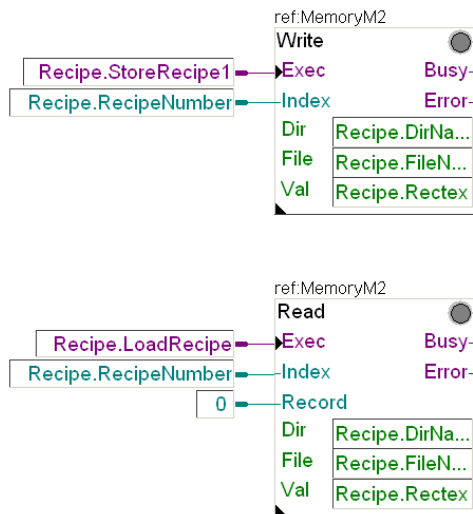
The **Write Integer F-Box** stores the five parameters (Amount Sugar, Amount Cacaomass, Amount Cacao Butter, Amount Milkpouder and Amount Nuts) on the file system as bin-file (configuration in the Memory Management F-Box). The filename is Recipe+Index. If the Index is 0 it will be stored as Recipe00, if Index is 1 as Recipe01 etc.

### 3.2.4 Page 4: ReadFile



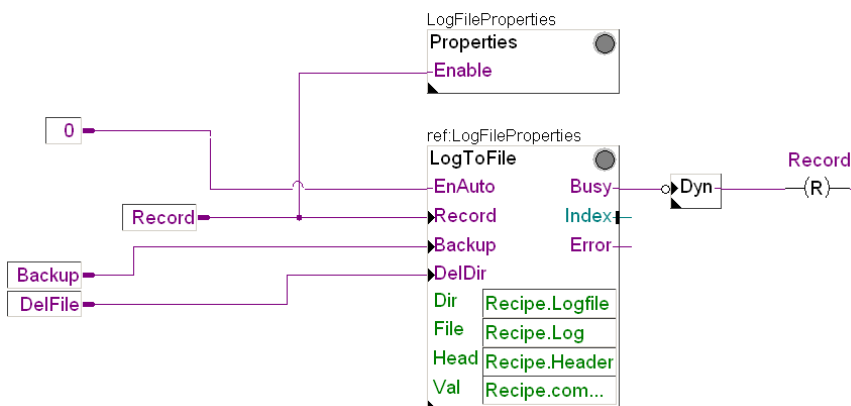
The **Read Integer F-Box** restores the five parameters from the file system. The index indicates the number of the recipe. Record is not used in this example and is therefore 0 at anytime. The record input can be used to store different recipes in the same file. The first file can be recalled with record=0, second: record=1 and so on.

### 3.2.5 Page 5: WriteText



The **F-Box Write DB/Text** writes the text to the file system as bin-file and the **F-Box Read DB/Text** restores the text from the file system. The text is stored and restored with the same command as the five values above. Filename is text00, text01 etc.

### 3.2.6 Page 6: LogtoFile



The **F-Box Properties** changes the properties defined in the Memory Management F-Box. All F-Boxes which refer to the Properties F-Box will create a csv-file, which can be opened with excel per example, instead of a bin file.

The **F-Box LogToFile** writes to a log file if the input record becomes high. Since the file should be available from the web project it has to be stored in the webpages folder. Therefore the directory is: /Webpages. The filename is Logf. It is possible to define a header line which is inserted in the file after each new start of the PCD. In the example the header is: "Logfile of the chocolate production<CR><LF>Date;Time;Chocolate Type;Message;Recipe Number;Amount produced;Sugar;Cacao Mass;Cacao Butter;Milkpouder;Nuts<CR><LF>" The text entered in the Val field will be written to the file every time when the record input becomes high. In the example it is:

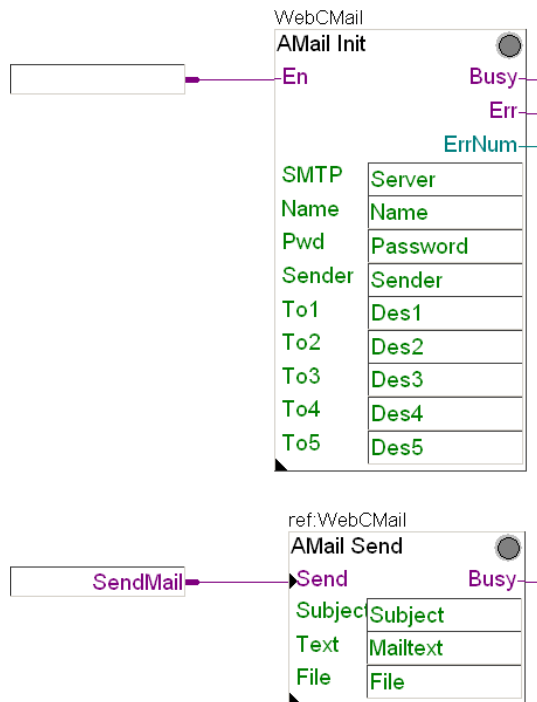
"\$d;\$H;\$L4900;Production finished;\$R0000;\$R0006 pc.;\$R0001 g; \$R0002 g;\$R0003 g;\$R0005 g;\$R0004<CR>

Date, Time, recipe text, Production finished, content of register 0, 6, 1, 2, 3, 5 and 4. This Log file can be opened from the web browser:

Date	Time	Chocolate	Message	Recipe Nu	Amount pr	Sugar	Cacao Ma	Cacao But	Milkpoude	Nuts
25.09.2007	16:23:54	WhiteChoc	Production	1	3 pc.	30 g	0 g	20 g	20 g	30
25.09.2007	16:24:36	MilkChoc	Production	2	4 pc.	30 g	10 g	20 g	20 g	20
25.09.2007	16:25:13	BlackChoc	Production	3	2 pc.	20 g	40 g	20 g	10 g	10



### 3.2.7 Page 7:SendMail



This part of the project is sending an e-mail with the log file created on page 6.

**The F-Box Adv. Text Mail Initialisation** has to be placed first and defines all needed parameters:

SMTP defines the Mail-Server: "212.227.15.183"  
 Name defines the user name for the authentication: "[test@sh-msr.de](mailto:test@sh-msr.de)"  
 Pwd defines the password for the authentication: "saiasaia"  
 Sender must contain a valid address: "[sonja.riedo@saia-burgess.com](mailto:sonja.riedo@saia-burgess.com)"  
 To1 to To5 contains the destinations to send: "[saia\\_pcd@hotmail.com](mailto:saia_pcd@hotmail.com)"

**The F-Box Adv. Send Text Mail** sends an e-mail if the Send input becomes high.

Subject contains the Subject of the e-mail: "Test"  
 Text contains the text to send: "Logfile from chocolate factory"  
 File contains the path of the file to attach: "M2\_FLASH:/Webpages/logf.csv"

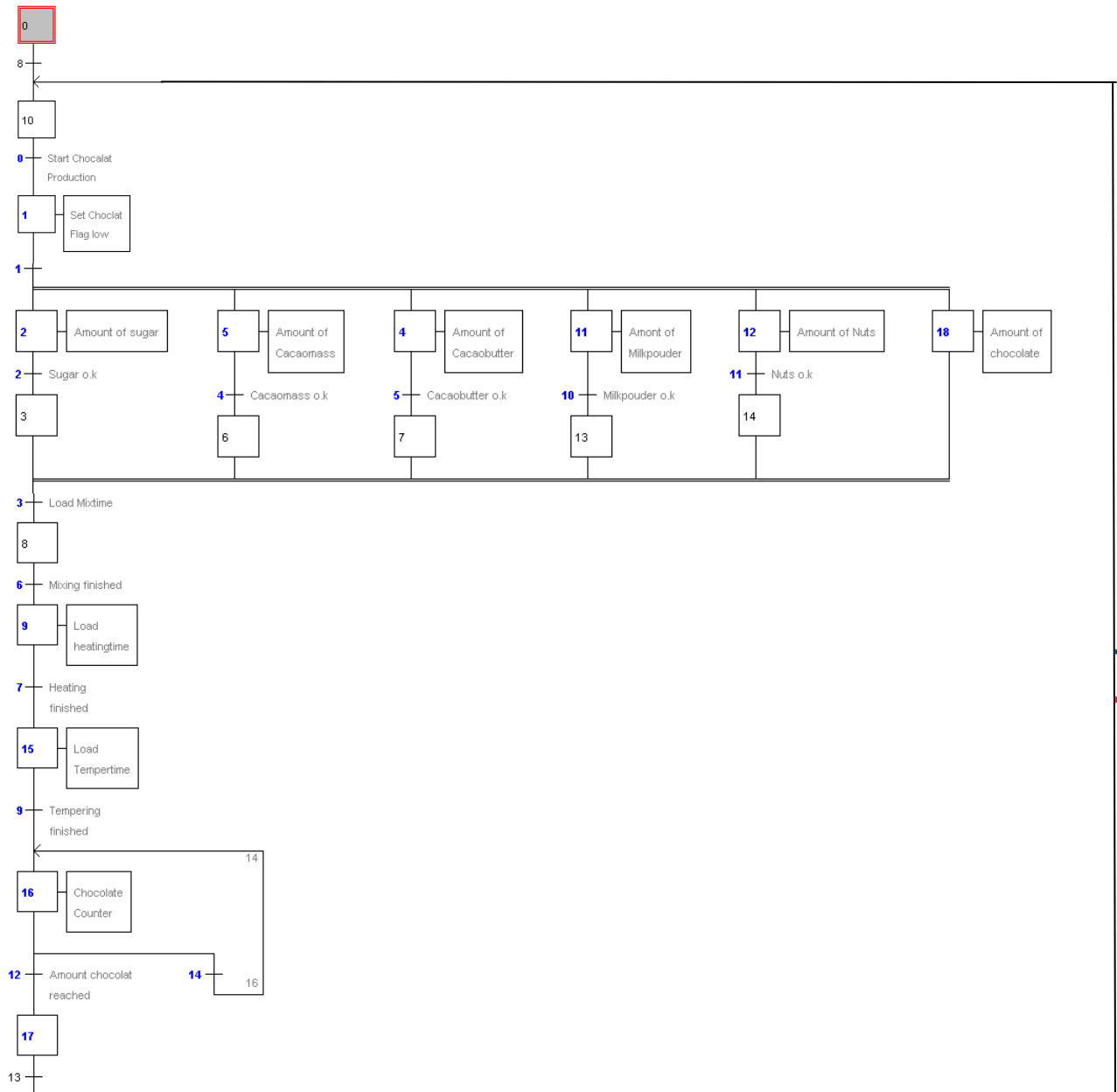
This server and e-mail addresses should only be used for test purposes. For a running project another Mail-Server and e-mail address should be used. Your IT support can tell you the needed addresses and passwords of your e-mail server.

If the destination e-mail address does not exist, the sender e-mail address will receive an error message.



The above mentioned Email account is a test server which must not be used for productive applications. The login name and the password will change without previous information.

### 3.3 Graftec



This Graftec structure simulates the production of the chocolate.

A timer is loaded with the amount of sugar, cacaomass, cacaobuter, milkpouder and nuts. The amount of chocolates is loaded to a counter. First the Mix time is loaded and runs out, afterwards the heating time is loaded and runs out. At the end the tempering time is loaded and runs out. Now the chocolate mass is ready to produce the chocolate. Therefore the amount of chocolates to produce is loaded to a counter. This counter counts down and at the end the record flag is set high to create a log file. During the whole graftec structure there is an activity register which changes his value. This register is used to show in the WebProject which part of the program is currently executed.

## 3.4 Web Editor Project

### 3.4.1 ChocolateFac1

Start Teq with three buttons.

“**New Recipe**” will jump to the ChocolateFac3.teq where a new recipe can be created.

“**Start Production**” jumps to ChocolateFac4.teq where the chocolate production is handled.

“**Production Report**” jumps to ChocolateFac5.teq where the production report can be opened and send by e-mail.

### 3.4.2 ChocolateFac3

This page offers the possibility to create a new recipe. The name, recipe number and the amounts of the different ingredients can be adjusted. The button “Create Recipe” stores the recipe on the file system.

### 3.4.3 ChocolateFac4

A Recipe can be loaded. If it does not exist a message shows up and a button offers the possibility to jump to the “New Recipe” page. The amounts are displayed and the user has the possibility to choose the amount of chocolates to produce. “Chocolates to produce” shows a counter with the amount left to produce. The field “Actual status” indicates which action is executed at the moment.

### 3.4.4 ChocolateFac5

“Show Production Report” opens the log file on the file system.

“Send Report by e-mail” is sending an e-mail to [saia\\_pcd@hotmail.com](mailto:saia_pcd@hotmail.com)

## 3.5 Web Builder Project and files to transfer to the file system

Just the ChocolateFac.itq , ChocolateFac.tcr and the start.htm have to be downloaded to the PCD with the Webbuilder. All other files can as well be copied to the flash module over ftp:

180px-Chocolate02.gif

250px-Chocolate.gif

ChcolateFac1.teq

ChcolateFac3.teq

ChcolateFac4.teq

ChcolateFac5.teq

e\_mail\_111.gif

e\_mail\_036.gif

IMasterSaia5\_14\_27

Status.csv

In this example project all necessary files are downloaded to the PCD with the Webbuilder.

## 4 Important Points

- The texts containing the filenames have to be default and not fixed to a length. If a text is left open “” it has to be fixed on a specific length.

## 5 Trouble Shooting

### 5.1 Errors on compiling

If the reference of a file system F-Box does not correspond to the Memory Management F-Box Name, the following error appears:

Assembling: LogFile.fbd

Error 165: LogFile.fbd: Line 69: File system: Management Fbox with name MemoryM1 not found., in Block: BL 0, Page: 1, FBox: Create Directory

### 5.2 F-Box indicates an error

- The **"Create Directory"** F-Box indicates an error. Creation of the directory failed.  
Possible reasons:
  - The filename is not correct. Note that there has to be a slash before the filename p.ex. /Recipes
- The **"Delete File"** F-Box indicates an error. Deleting file failed.  
Possible reasons:
  - The file does not exist. This is usually the case in this project, the first time this F-Box is activated.
  - File name is wrong.
- The **"Write Integer"** or **"Read Integer"** F-Box indicates an error. Writing/Reading failed.  
Possible reasons:
  - File name is set to a fixed length instead of default. It has to be default.
- The **"Log to file advanced"** F-Box indicates an error. Log not executed.  
Possible reasons: The file name text size is set to fixed. It has to be default.
- The **"Adv. Text Mail Initialisation"** F-Box is indicating the following error:
  - 25 Server rejects SMTP "MAIL FORM" command  
Possible reason: Sender e-mail address is not a valid / existing e-mail address. It has to be an existing e-mail address.
  - 29 Server rejects "AUTH" command  
Possible reason: Password of the mail server is not correct
  - 108 File open command  
Possible reason: The file path is not correct. It has to be: "M2\_FLASH:/Webpages/logf.csv"

### 5.3 CPU goes in Halt

After the download the following error message appears:



Possible reason: In the "Write DB/Text" F-Box the VAL "Rectex" is written from the Web-Application and is therefore downloaded as empty text. If this text size is defined as default it leads to this error. Empty texts need a fixed length.

After the download the following error message appears:



Possible reason: One or several destination texts in the Adv. Text Mail Initialisation are empty and the text size is set to default. It has to be fixed on a certain value.