Advanced Alarming Manual

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Version management

Version	Date	Name	Change
1	19.06.2017	Stephan Hintze	Manual issued
2	27.08.2017	Stephan Hintze	New Chapter SWeb Application

General

Advanced Alarming improves functionality and reduces engineering effort at the same time.

Organizing alarms in groups (e.g. by system) and priorities (high, medium, low) is necessary, to display and find easily important alarms in a list.

Defining alarm text during engineering time in Fupla helps to create smart templates and reduces engineering effort.

Sending alarm via eMail or SMS (or other way of communication) from PCD is getting more and more important, therefore it's mandatory to have an easy access to the information if an alarm is gone to-off-normal or back to-normal, to which group and priority this alarm belongs and the alarm text itself.

There are already some FBoxes for "Alarming 2", which supports grouping and priorities (and even more), but the engineering effort is very high, therefore nearly no one used this feature.

The Advanced Alarming is covering those requirements and comes up with new FBoxes.
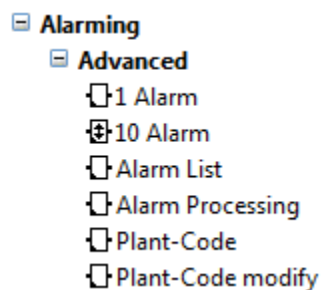
The already existing alarming FBoxes will be moved from category **Alarm** into **Alarming.Classic** and will be still available to be compatible with projects where those FBoxes are used.

FBoxes from **Classic** and **Advanced** can be used in the same device in parallel, but it is not allowed to mix FBoxes from both within one alarm list.

# Setting up an Advanced Alarm List

FBox **Alarm List Adv.** initializes in general an alarm list.

The resources for the alarm flag array must be defined in parameter **Alm**. The size of the array defines the number of alarms supported in this alarm list.

The Advanced Alarm List always uses PCD texts to provide alarm text for further action like sending via eMail or SMS. Therefore it's mandatory to define a PCD text array with the same array size of the alarm flag array for parameter **Txt**.

Parameter **Ack** can be 0, if the information, that an alarm has been acknowledged in alarm list (e.g. SWeb), is not point of interest. It the acknowledge information is required in application, an ack flag array with same size of alarm flag array must be defined. In general, we propose to do this anyway.

Parameter **Del** can be 0, if the information, that an alarm has been deleted in alarm list (e.g. SWeb), is not point of interest. If the deletion information is required in application, a del flag array with same size of alarm flag array must be defined. In general, it's not necessary.
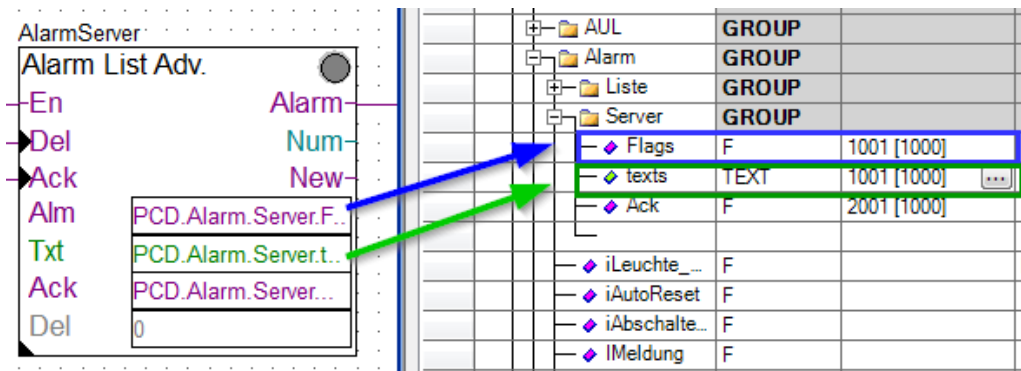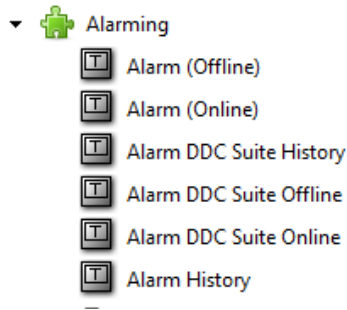

This alarm list can be used for **Alarming 1** or **Alarming 2**, depending on parameter **Use Group and Priority**
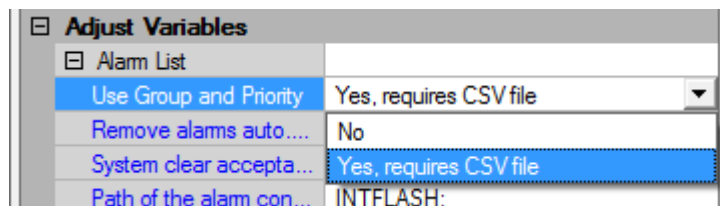
No:

- This alarm list behaves like an **Alarming 1** alarm list.

- In SWeb, the standard alarming templates should be used.

- This is basically used if alarms must not be configured for groups or priorities, but the advantage of alarm text definition for SWeb and/or PCD texts for eMail or SMS shall be used.

Yes, requires CSV file:

- This alarm list behaves like an **Alarming 2** alarm list.

- In SWeb, the alarming 2 templates should be used. At the moment, those templates are available (new templates with new style are in progress)
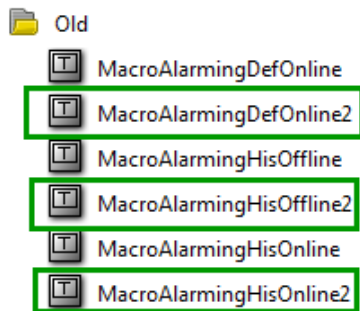
- Each alarm must be configured for group and priority.

- 2 files must be downloaded to the device to get the alarm list working properly. An ASV file, containing the alarm texts, which is necessary for the SWeb alarm template to show the correct alarm text and a CSV file, containing the group/priority configuration for each alarm.

- Those 2 files are generated automatically during build in PG5, by using the FBox name. In the example above, FBox has name **AlarmServer**, therefore the files **AlarmServer.CSV** and **AlarmServer_EN.ASV** will be created. Filesystem and language tag (EN, DE, ..) are defined in the adjust parameter.

Assigning alarm to the alarm list

FBox **1 Alarm Adv.** is used to assign one alarm from the application to the referenced alarm list. The connected symbol on input **Alarm** is copied into the alarm list.
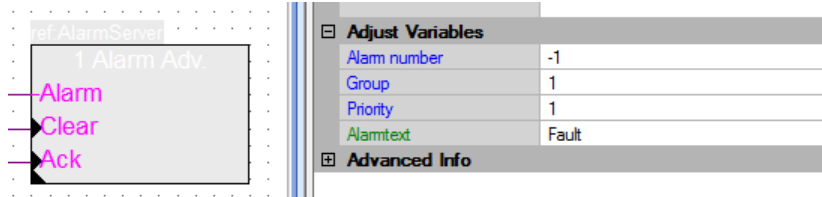

The effective alarm number in the alarm list can be specified in parameter **Alarm number**

-   -1 means: alarm number is defined automatically, will start with 1 and all alarms will be in a consecutive block. When adding or removing alarm FBoxes, alarm number may change.

-   >= 1 means: the effective alarm number in the alarm list. Adding or removing alarm FBoxes, has no effect for the alarm number in alarm list. Following FBoxes with -1 (as described before) will go on from this alarm number.

Parameter **Group** and **Priority** defines the group and priority this alarm belongs to.

Parameter **Alarmtext** is the text to be shown in the SWeb alarm list and/or to be used for sending an eMail or SMS.

FBox **10 Alarm Adv.** is similar to previous described FBox. The **Group** is valid for all alarms in this FBox and a **Prefix alarmtext** can be used if all alarms have the same prefix, e.g. Fire Damper, so the effective alarm texts will be "Fire Damper SUP01", "Fire Damper SUP02", "Fire Damper EXH67" …
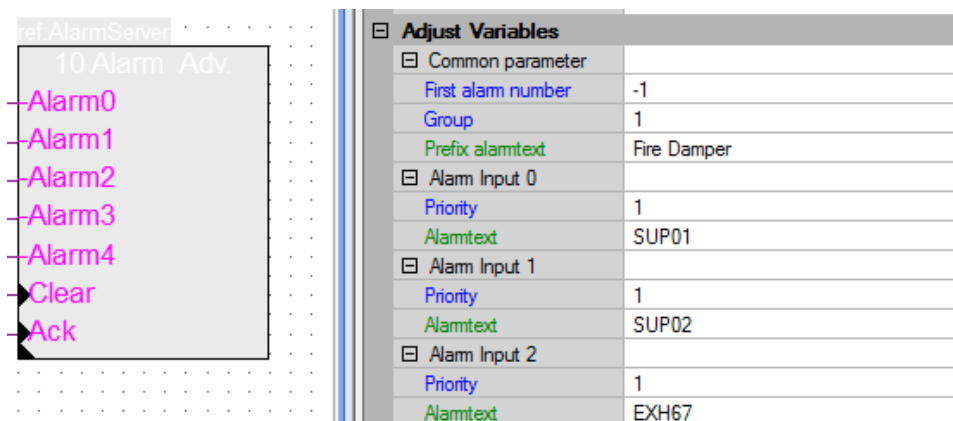

Remark: This FBox allocates always 10 alarms in the alarm list, even if it is not stretched to the maximum.

Advanced Alarm List in SWeb

During build in PG5, the alarm text defined in the FBoxes **1 Alarm Adv.** and **10 Alarm Adv.** are exported in an alarming file, named DDC_Alarming.csv to be used by any other application.

When the alarm list template is assigned to the alarm list in PLC, the alarm texts are imported automatically once into the SWeb application.

Whenever you change the alarm texts in the FBoxes and rebuild the program, SWeb Editor will promt a dialog that he detected modified alarm texts, and what to do. In general, we take over the alarm texts by pressing button **Import**.
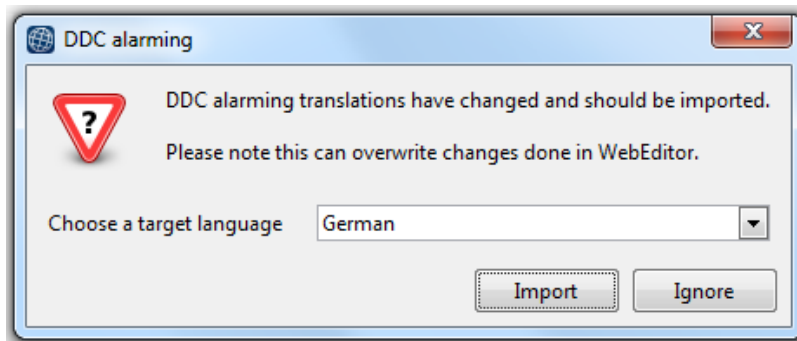
With this automatically transfer from the alarm texts from the FBoxes into the SWeb application, it's not necessary anymore to type in manually the alarm texts in Sweb Editor translation table.

Depending on the parameter **Use Group and Priority** in FBox **Alarm List Adv.** SWeb alarm template for **Alarming 1** or **Alarming 2** has to be used. View is a little bit different, but main information – the alarm texts – are shown properly. Group and Priority - if configured.

Plant-Code-System

As we have seen, the alarm texts are defined directly in the alarming FBoxes. But this can force a lot of manual work if a system is copy&pasted into the same Fupla. All alarm texts will be the same. It would be necessary to modify all alarm texts, to have a prefix AHU1 for the first and AHU2 for the 2nd system.

To avoid this manual changes in a lot of FBoxes, a Plant-Code –System can be used. Plant code system means, that the alarm texts have a structure from top to bottom, like

- Level 1: SBC = location, SBC office

- Level 2: AHU1 = Air Handling Unit 1

- Level 3 .. 10: can be floor, room number, where the alarm belongs to

- And the alarm text from the FBox itself.

To introduce a PCS (=Plant-Coding-System) the FBox **PCS Alarm Adv.** has to be used, where 10 level for plant coding can be specified:
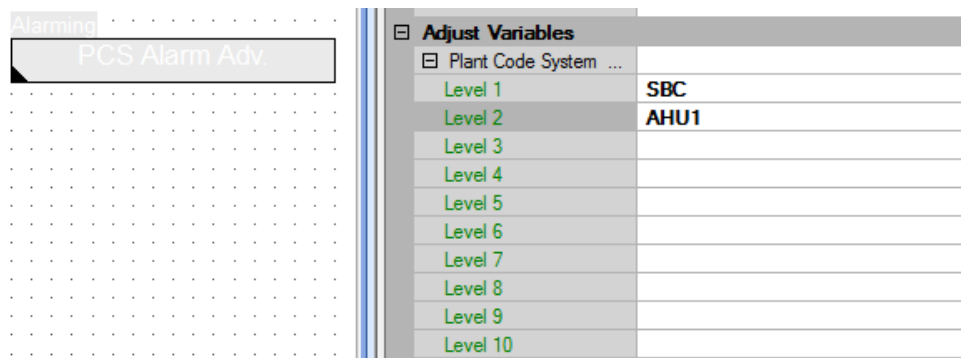

All levels are concatenated together without any additional character in between. To avoid a effective alarm text like "SBCAHU1Faul", an trailing space should be added. The result would be "SBC AHU1 Fault"

In general it makes sense to use this FBox once ate the very beginning of your application, but it can be used as often as necessary.

In our example, it has been put at the beginning of the first page of 1st system with the definitions above, so all alarms will get automatically the prefix "SBC AHU1 "(blue range).

For the 2nd system we did the same, but level 2 is specified as "AHU 2" so the result will be "SBC AHU2 " a prefix for all alarms in this system (green range).
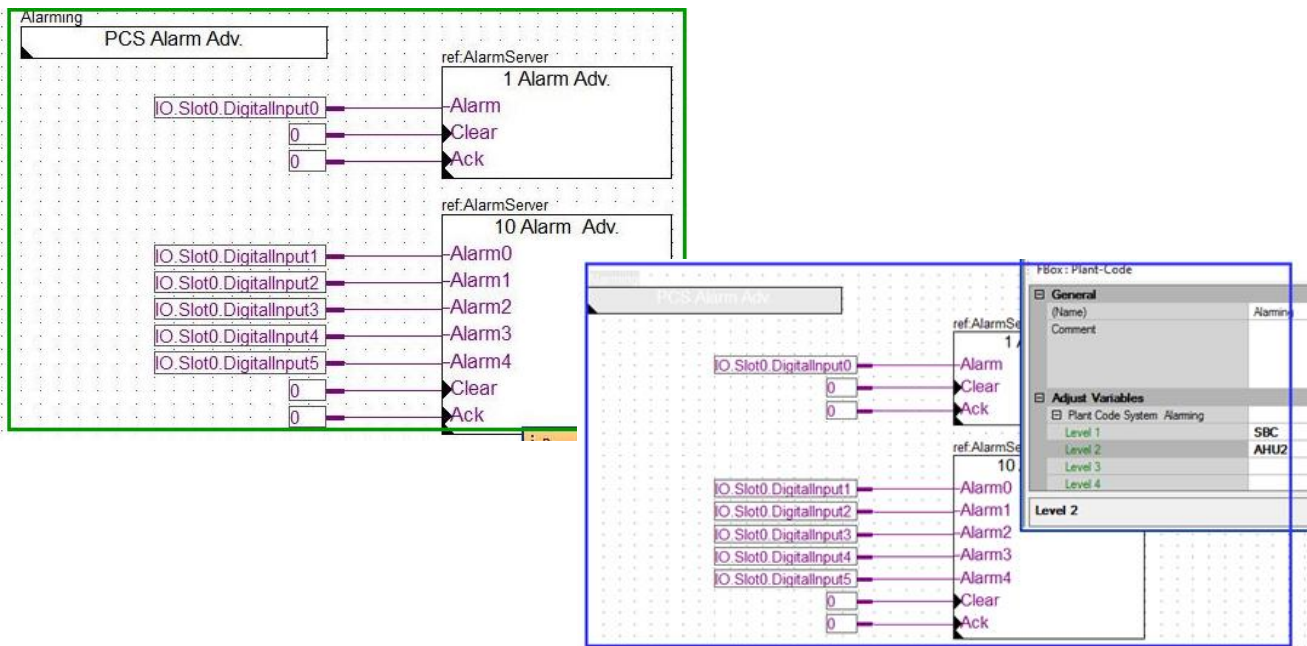
Even if the alarm texts in the 1 and 10 Alarm Adv. FBoxes are the same, the effective alarm texts will be different:

Using always the **PCS Alarm Adv.** FBox is not the most efficient way – but in general ok.

Example: the prefix **SBC** is valid for all alarms in this device, so SBC must be typed in each **PCS Alarm Adv.** FBox. If there is a renaming from **SBC** to **B01**, all FBoxes must be modified.

In this case it would be better only to modify a single level in the plant coding system. In our example, we just have to modify for 2nd system the level 2 to **AHU2** – so the level 1 "**SBC** " is only defined in the very first **PCS Alarm Adv.** FBox and therefore only once modified, if necessary.

To modify a single level in the plant code system, FBox **PCS Alarm Adv. mod.** Has to be used:
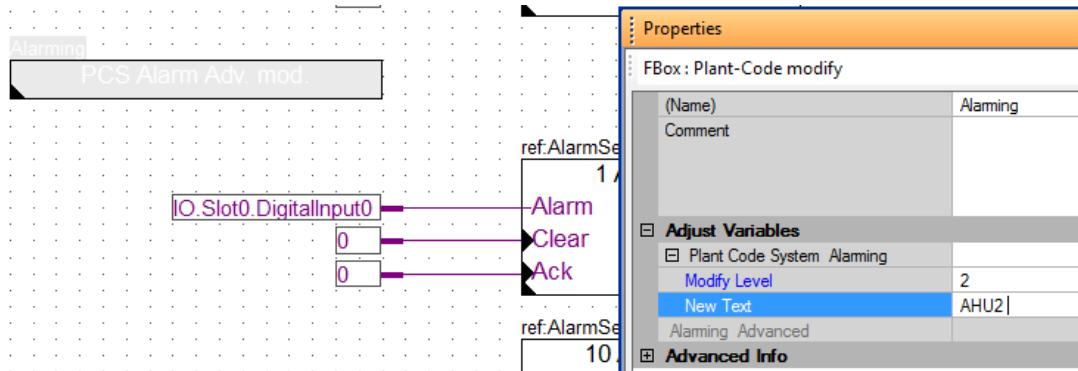
However, if you use always the FBox **PCS Alarm Adv.** or mix it with FBox **PCS Alarm Adv. mod.** –the effective alarm text is build up by the concatenation of

Plant-Code-System Level1 to 10 + (prefix in 10 Alarm Adv. FBox) + Alarmtext

Processing Alarms

Until now, the whole alarm configuration is only used in SWeb application.

Beside this, it would be nice to detect in PCD if there is a state change of any alarm and send it e.g. via eMail or SMS, depending on group and priority. Therefore we have to use the **Alarm Proc. Adv.**
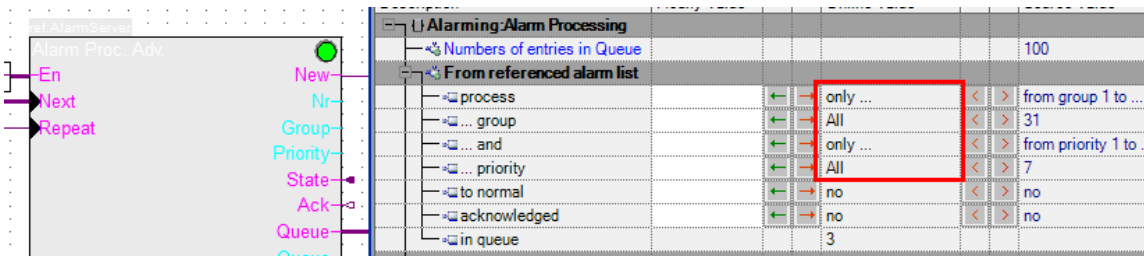
This FBox is monitoring the referenced alarm list and detects if

- An alarm changed to off-normal

- An alarm changed to-normal

And puts it into an alarm queue, which can be processed by demand.

Depending on the parameter **Use Group and Priority** in FBox **Alarm List Adv.**

- No: all alarms are put into the alarm queue. Changes in parameter **group** or **priority** have no effect.

- Yes: only alarms with corresponding **Group** and **Priority** are taken over into alarm queue.
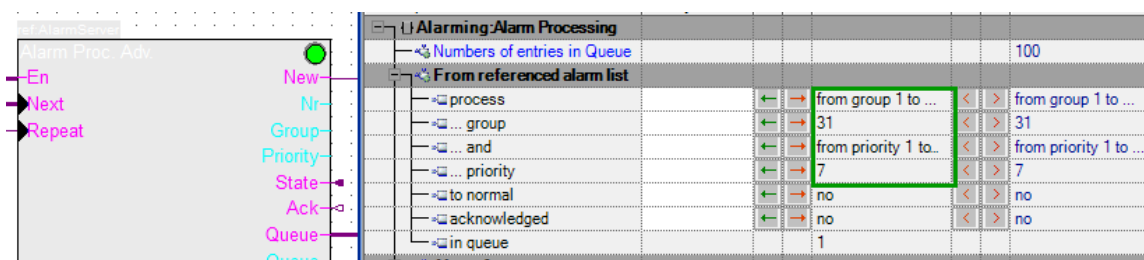
The parameter Numbers of entries in Queue specifies the max. of entries, if this exceeds, the output Full will be high. This could happen if e.g. a main fuse fails and a lot of alarms are therefore detected (alarm flood). If the queue is full, no more alarm can be stored in the que and are lost for alarm processing.

As soon an alarm has put into the alarm queue, output **Queue** (bin) is high, to indicate that there are alarms available to be processed, but nothing else happens.

Processing an alarm in queue is forced via input **Next**. The first entry in queue will be processed and the parameter of this alarm are shown at FBox outputs and can be also accessed by the predefined symbols of the FBox. The alarm is removed from the queue and all other alarms in queue are shifted one position down, so the former 2nd entry becomes the 1st. The queue working Principe is "First In – First out".

The output **New** is high for one program cycle when an alarm has been processed. This information can be used e.g. to trigger a **Send eMail** or **Send SMS** FBox.

For sending eMail or SMS, we have to have the alarm text as PCD text. This is also done by **Alarm Proc. Adv.** FBox. Configure the effective alarm text is done in parameter group **Alarm format**:

There it can be defined if date should be in alarm text, format of date, time, alarm group, alarm priority, how often the alarm has changed state to off-normal, state of the alarm (new, normal, acked) and the alar text itself.

Beside this, between all those data, any text can be typed in, to be used as delimiter, seperatur or just to have more transparency.

A prefix and suffix text can be used to define general stuff e.g. location.

⊟ Alarm format	
Prefix text	
1. Date	**DD.MM.YYYY**
... text	-
2. Time	HH:MM:SS
... text	**- (CNT:**
3. Count	Used
... text	**/ GRP:**
4. Group	Used
... text	**/ PRI:**
5. Priority	Used
... text	**) -**
6. State	Used
... to off normal	NEW
... to normal	OK
... acknowledged	ACK
... text	-
7. Alarm text	Used
Suffix text	

The alarm text is assembled by the FBox and stored in a predefined symbol [FBoxGroup].TxtAlarm. For individual assembly of alarm text, additional symbols are available:

- [FBoxGroup].TxtDate contains the date as configured

- [FBoxGroup].TxtTime contains the time as configured

- [FBoxGroup].TxtState contains the State as configured

- [FBoxGroup].TxtText contains the pure alarm text

The alarm text, configured as above described, will look like this:

21.06.2017 - 09:10:56 - (CNT: 2 / GRP: 1 / PRI: 1) - NEW - SBC AHU1 Fault

21.06.2017 - 09:09:45 - (CNT: 4 / GRP: 1 / PRI: 1) - OK - SBC AHU1 Fire Damper SUP01

So with the output **New** and the assembled alarm text, it's easy to feed an Send eMail or Send SMS FBox:
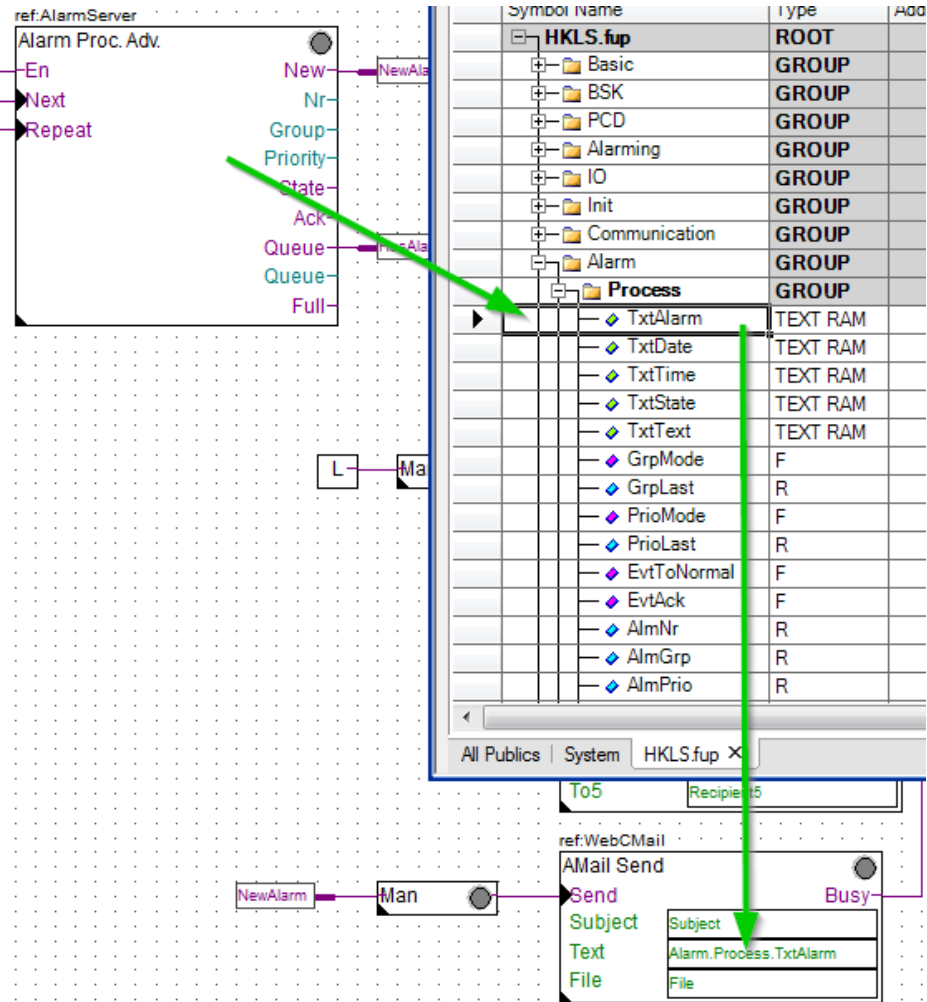
After sending an eMail or SMS, the next alarm has to be processed. This can be usually triggered via the output **Busy** of the communication driver FBox:
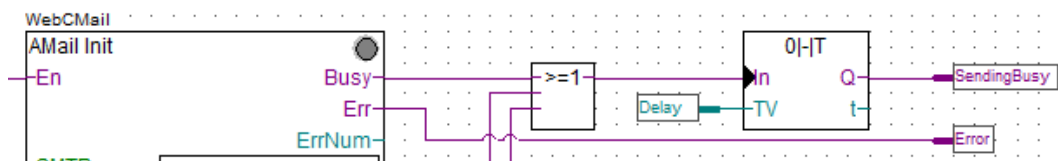
If sending was not successful, the currently processed alarm should be repeated. This can be done via input **Repeat** . This will put the currently processed alarm back into the alarm queue at last position. If input **Next** and **Repeat** are High in parallel, Repeat is execute first and then next alarm is processed.
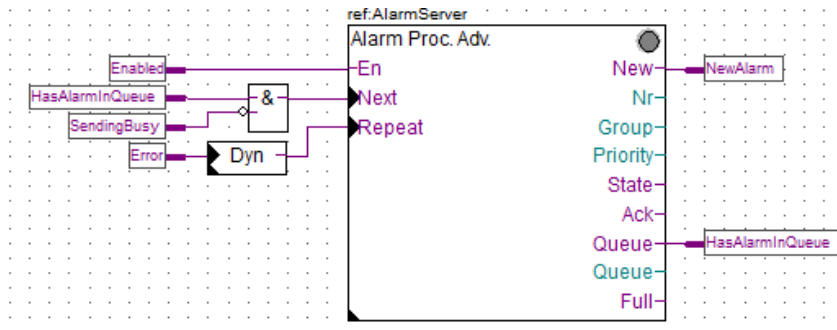
Assigning alarm to the alarm list with DDC Suite 2.7

With DDC Suite 2.7 it's already possible to organize alarms by system and alarm groups (see also documentation DDC Suite 2.7 / Functions):
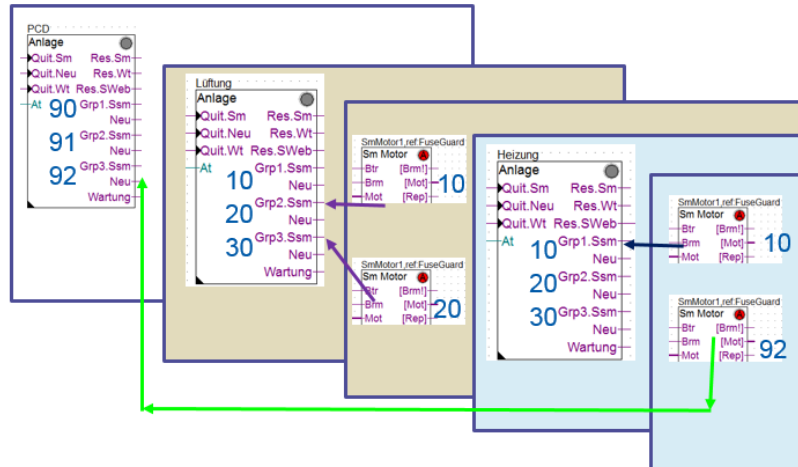

So the alarms are associated into one of 5 alarm groups. The alarm groups usually used to collect important alarms in one group – e.g. to stop the system – other alarms in another alarm group, just to control the alarm light, and other alarms into another alarm group.

So we can say that the alarm groups are equal to the priority in alarming 2. The FBox SystemAlarm supports up to 5 alarm groups, alarming 2 support 7 priorities, so this is very close together and we can use the alarm group number as priority number.

The alarms of a system are usually collected in one SystemAlarm FBox, but there is no parameter in the FBox, which can be used as group (=system) in alarming 2.

Therefore the SystemAlarm FBox has to be improved with a group identifier and the former alarm groups 1 to 5 should be renamed into priority 1 to 5.

With that tiny changes, the FBox establishes all necessary information to be compatible with alarming 2.
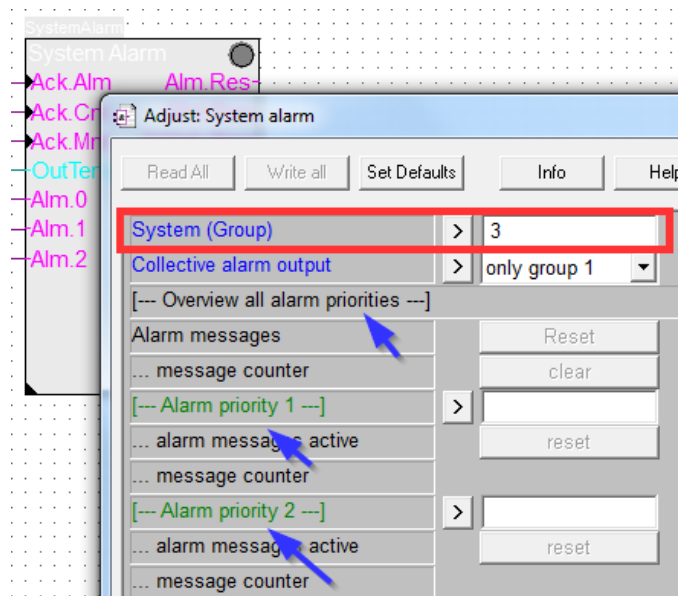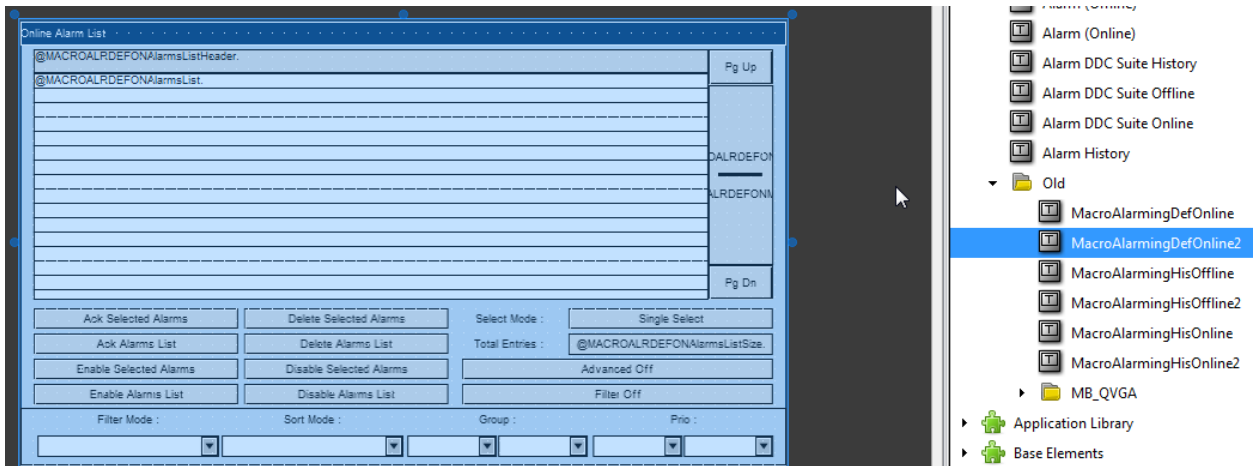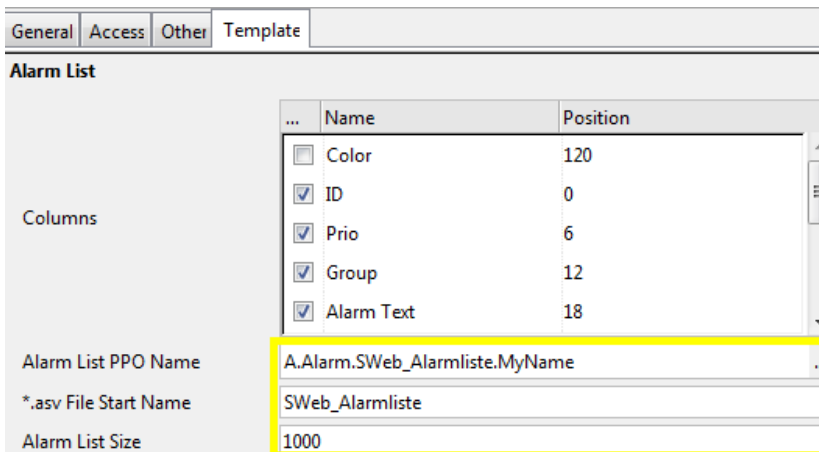
SWeb Application

To connect the Advanced Alarmlist from Fupla in SWeb Application, a few steps have to be done:
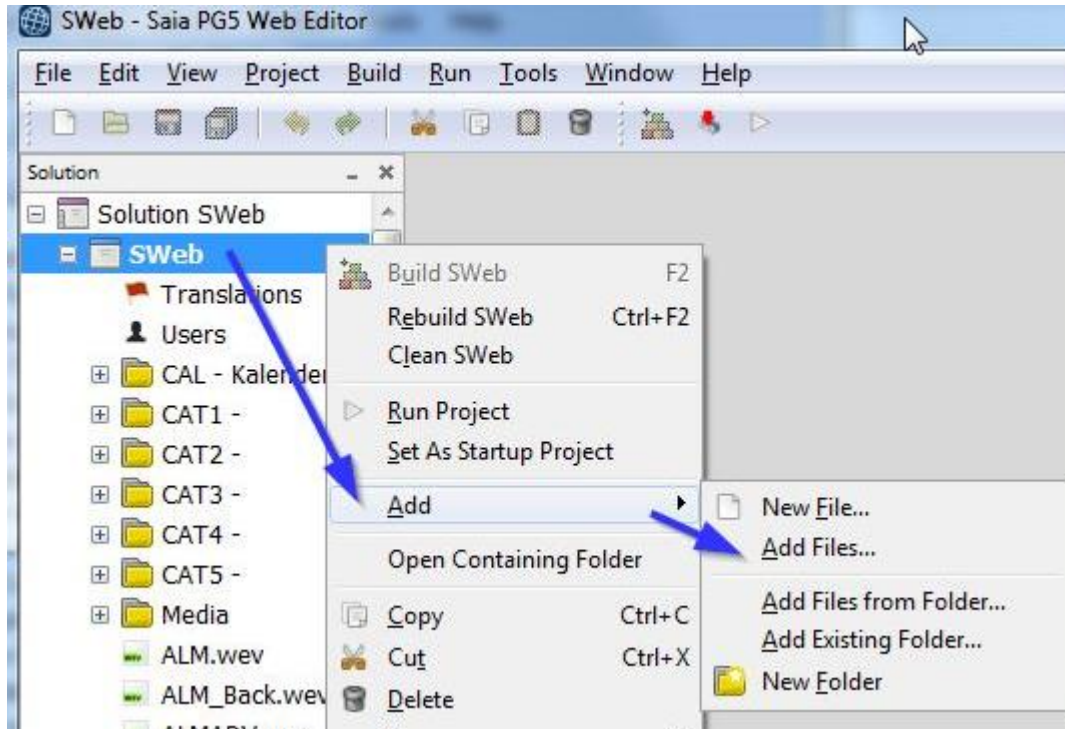
1. Open SWeb Editor

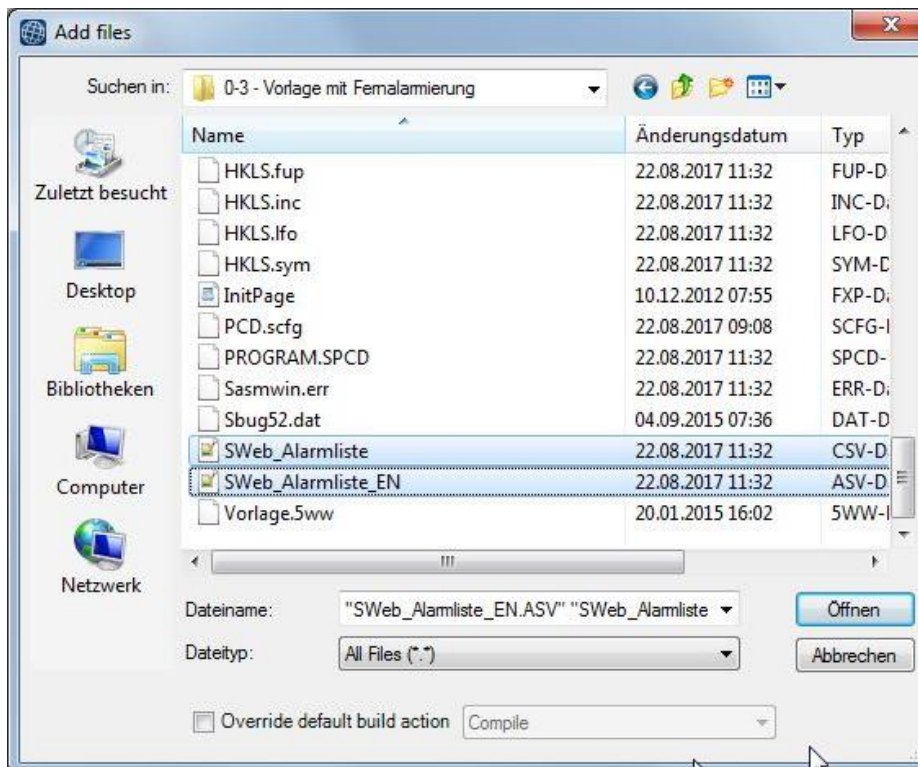2. Create a page for the alarm list and use "MacroAlarmingDefOnline2"

3. In property window, tab "Template", assign the Alarm List PPO Name, FBox Name of Advanced Alarm List and the size of the alarm list:
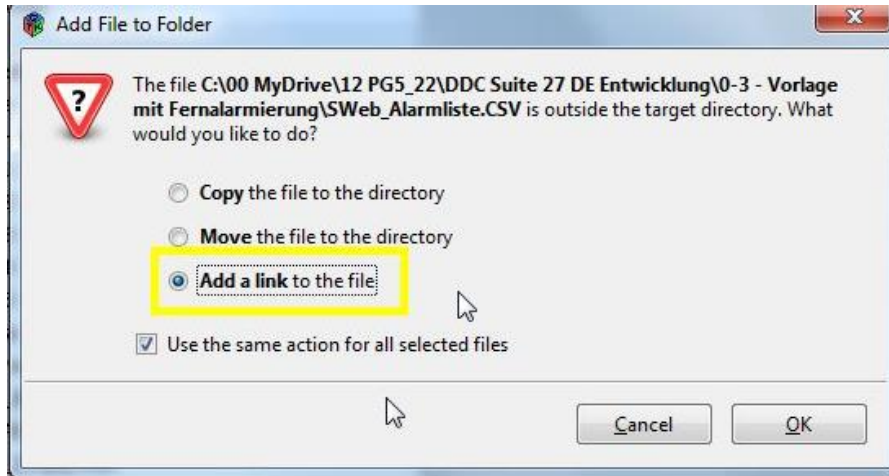
4. Now we have to add the CSV and ASV file to the Web project

5. Browse to the Device folder and select both files:

6. A dialog is shown, select "Add a link to the file", because changing alarm text, group or priority in FBoxes lead into new CSV and ASV files at next build, so WebEditor should use the files always from the Device folder, where they are always up to date:

7. After the files are listed in solution list, set on both files the properties Build action to "None" and Copy to output directory to "Copy if newer"
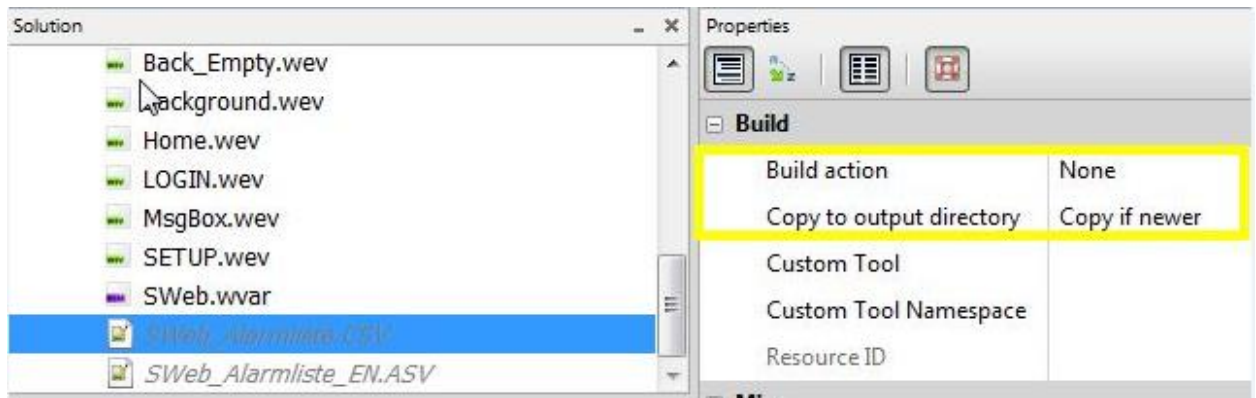
That's it. A build in WebEditor will allways use the newest CSV and ASV files, so you don't have to think to copy the files manually via FTP on your device.

Good to know

Advanced Alarming is quite complex and a lot of stuff is generated by the FBoxes during build to be used for SWeb or sending eMail or SMS. Therefore some strict rules must be respected:

1. Classic Alarming and Advanced Alarming FBoxes cannot be mixed within one alarm list

2. One alarm list can be done with classic FBoxes, another alarm list with advanced FBoxes in same device

3. When using DDC Suite FBoxes to assign alarms into an advanced alarm list, FBox **1 Alarm Adv.** and **10 Alarm Adv.** from Advanced Alarming library con not be used in same alarm list.

4. When using Groups and Priorities, take care that the .CSV and .ASV files are downloaded into device on specified flash file system.

5. The CSV file containing the configuration for groups and priorities is only executed when PCD is restarted (cold/warm start). If this file has been changed and downloaded via WebEditor, PCD must be restarted or program must be downloaded to take over the changes.