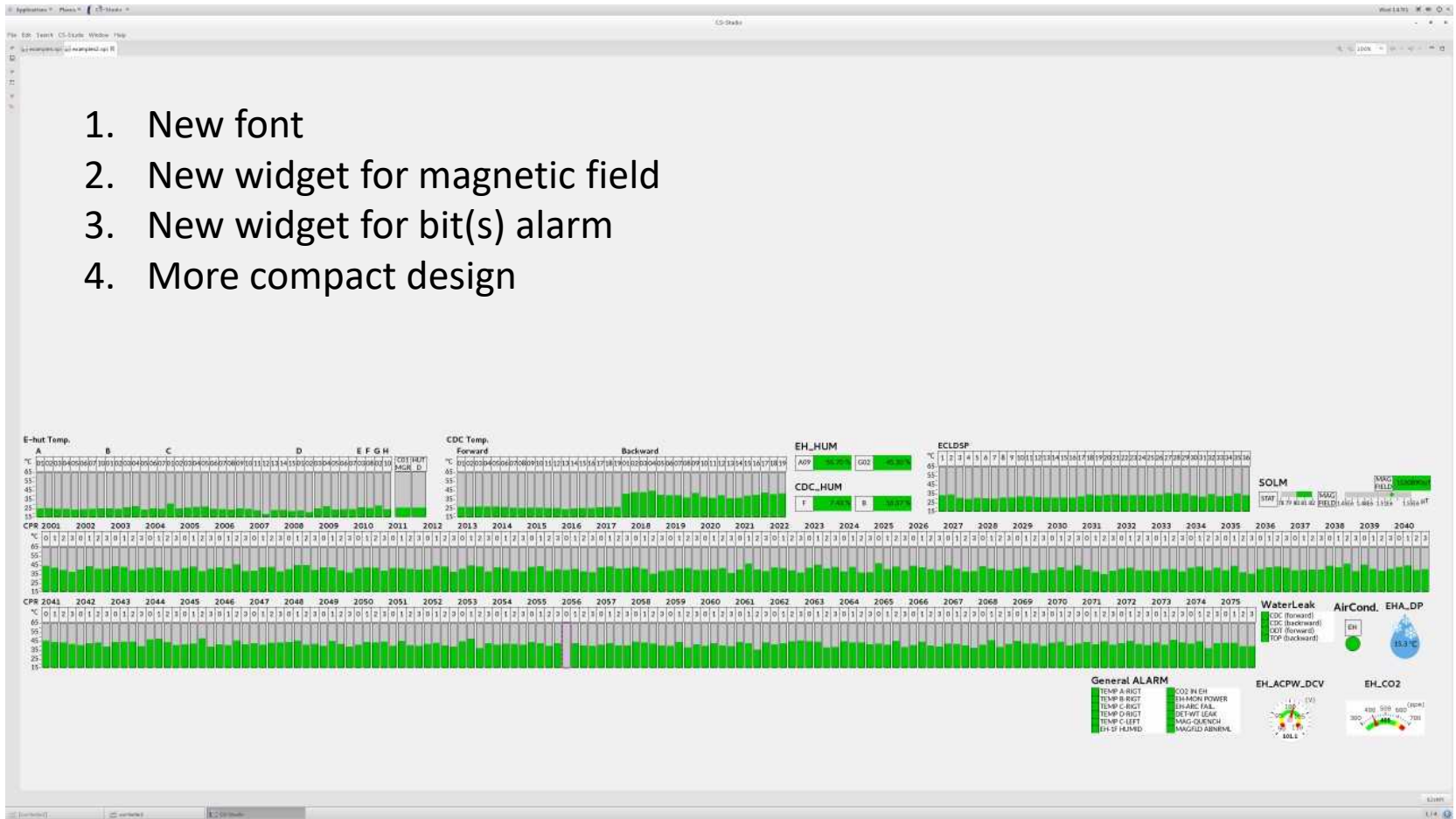# Belle II DAQ Monitoring Framework

Seokhee Park

New Widget Set
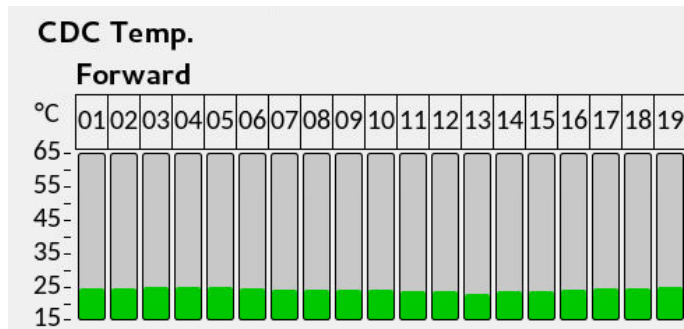
1. New font
2. New widget for magnetic field
3. New widget for bit(s) alarm
4. More compact design

DAQ Workshop in Taipei
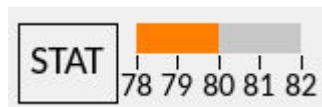
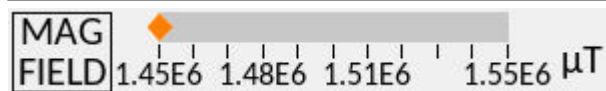# New Widget Set

- Type of panel

Bar (for temperature, condensed values)

Number (for humidity, sub-information)

Bits (for alarms)

Horizontal bar with center (for status)

Dew point

Horizontal bar (indicator, for m-field)

Meters

Widget Structure

- Panel: One of the complete set
- Parts: The most elementary structure (connected through link container)

- Each part has script controlled by macro in the parent panel.

7-BIT_panel.opi
ACON_panel.opi
B2SHIFTALARM_panel.opi
CDC_humi_panel.opi
CDC_temp_panel.opi
CO2_panel.opi
CPR_temp_panel.opi
CPR_temp_panel.opi
DCV_panel.opi
DP_panel.opi
ECLDSP_temp_panel.opi
EH_humi_panel.opi
EH_temp_panel.opi
General_ALARM_panel.opi

Widget Structure

- Panel: One of the complete set
- Parts: The most elementary structure (connected through link container)

- Each part has script controlled by macro in the parent panel.

label.opi

monitor_LRbar.opi

monitor_bar.opi

monitor_bar_narrow.opi

monitor_bar_narrow2.opi

monitor_bar_wide.opi

monitor_bar_wide2.opi

monitor_bit_circle_ONgreen.opi
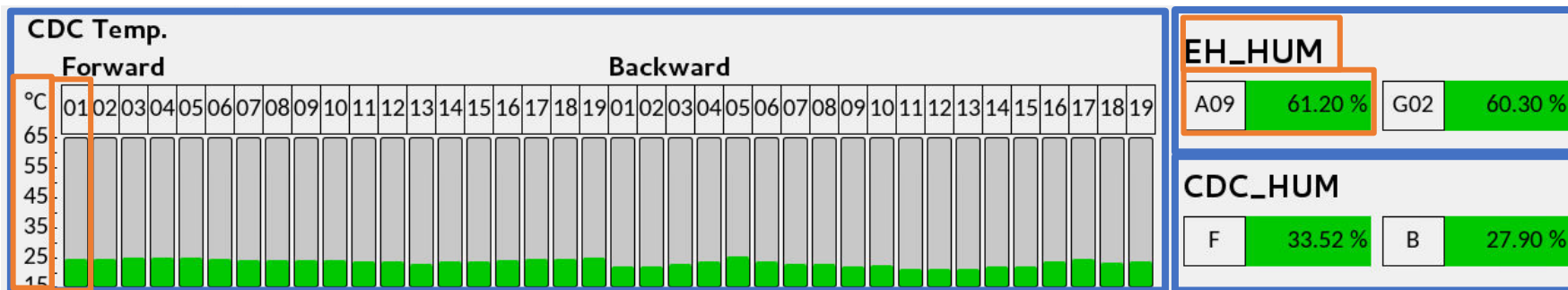
monitor_bit_circle_ONred.opi

monitor_bit_compact_ONgreen.opi

monitor_bit_compact_ONred.opi

monitor_bit_square_ONgreen.opi

monitor_bit_square_ONred.opi

monitor_dewpoint.opi

monitor_indicator.opi

monitor_number.opi

monitor_tick.opi

title.opi
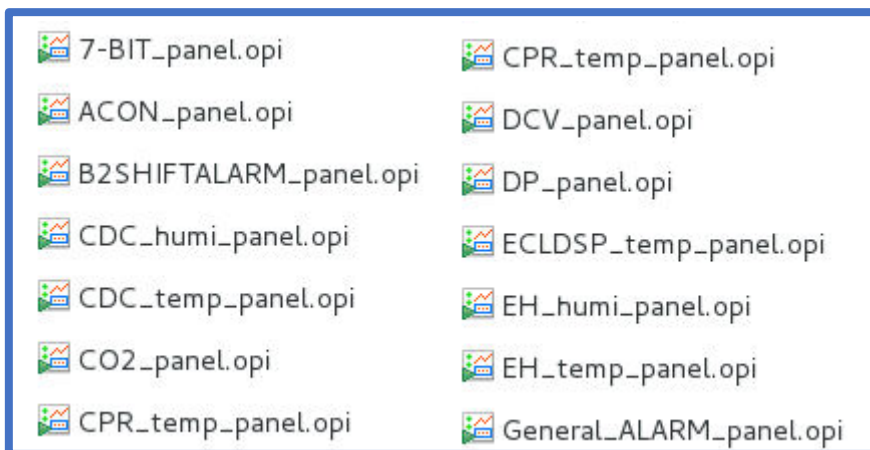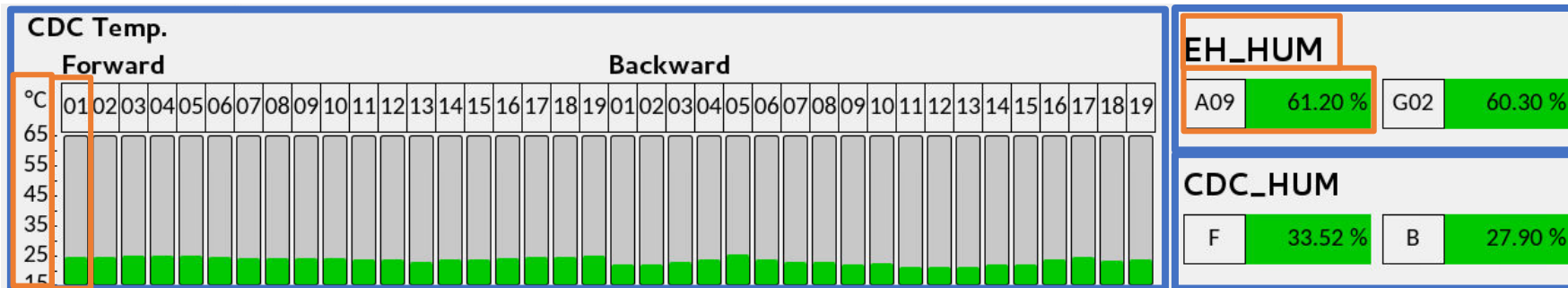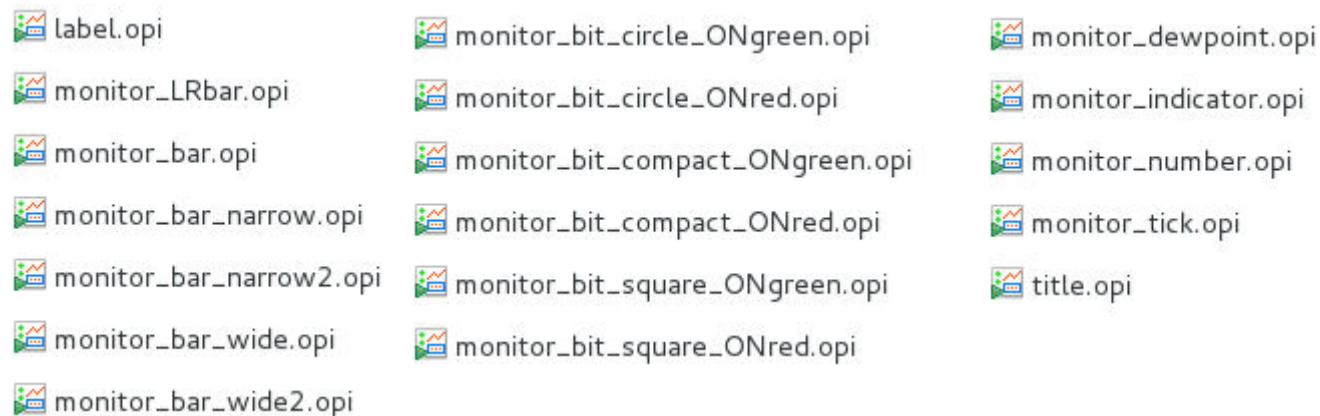
Macro of the panel and parts

- Temperature panel
  - bar.min & bar.max: range of the bar
  - NAlo & NAhi: condition of N/A text apperance
  - label: text in a box above the bar
  - final: the final PV_name (combined by various things)
- parts/monitor_tick (left)
  - unit: unit of the value
- parts/monitor_bar
  - lo & hi: warning range
  - lolo & hihi: warning range

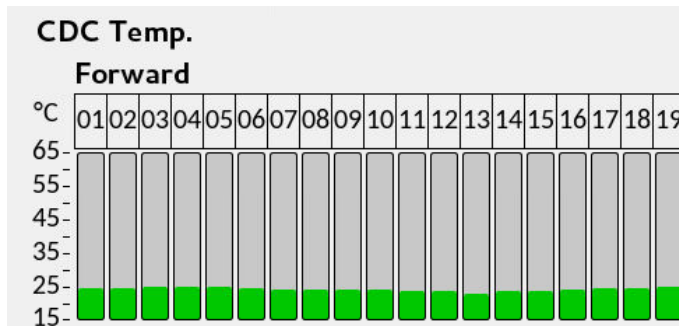| Name	Value
get	nsm://get
bar.min	sim://const(15.0)
bar.max	sim://const(65.0)
value	value
NAlo	sim://const(-10.0)
NAhi	sim://const(100.0)
NODE	KSPREADER
item.2	TEMP
item.1	CDC
label	${item.4}
front	${get}:${NODE}:
mid	${item.1}_${item.2}_${
end	:${value}
final	${front}${mid}${end}

unit	°C

Name	Value
lolo	sim://const(0.0)
lo	sim://const(0.0)
hi	sim://const(30.0)
hihi	sim://const(35.0)

CDC Temp.
Forward
°C 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19
65-
55-
45-
35-
25-
15-

Macro of the panel and parts

- Humidity panel
  - title: related with part/title.opi, text
  - n.float: precision
  - Unit: unit of the value
  - Lolo, lo, hi, hihi: warning and error range
  - Label: text of the left box
  - final: the final PV_name
    (combined by various things)

EH_HUM

A09	61.20 %

Name	Value
item.1	CDC
item.2	HUM
front	${get}:${NODE}:${item
value	value
end	:${value}
title	${item.1}_${item.2}
n.float	sim://const(2)
unit	%
lolo	sim://const(0.0)
lo	sim://const(0.0)
hi	sim://const(100.0)
hihi	sim://const(100.0)
label	${item.3}
final	${front}${item.3}${enc

Macro of the panel and parts

- Bits panel
  - final: the final PV_name (combined by various things)

- part/monitor_bit_XX_XX
  - Bit.start
  - Label: text in left

- Type of parts/monitor_bit_XX_XX
  - ONgreen: 1 = green, 0 = red
  - ONred: 1 = red, 0 = green
  - Circle: circle shape (big)
  - Square: squrare shape (big)
  - Compact: compact square with label
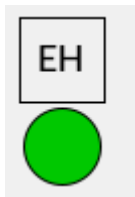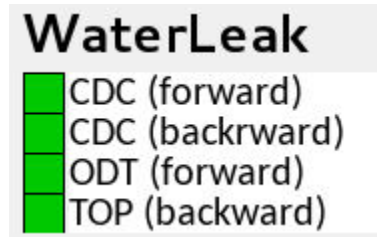
Name	Value
bit.start	sim://const(9)
label	TEMP A-RIGT

monitor_bit_circle_ONgreen.opi

monitor_bit_circle_ONred.opi

monitor_bit_compact_ONgreen.opi

monitor_bit_compact_ONred.opi

monitor_bit_square_ONgreen.opi

monitor_bit_square_ONred.opi

<Circle>

WaterLeak
CDC (forward)
CDC (backrward)
ODT (forward)
TOP (backward)

<Compact>

Macro of the panel and parts

- NMR_panel.opi
  - Final: the final PV_name (combined by various things)
  - Title: title (connected with parts/title.opi

- Parts/monitor_LRbar.opi
  - Bar.min, bar.max: range
  - Bar.origin: center of bar
  - Label: text in a left box
  - Lolo, lo, hi, hihi: warning and error range
  - Need to add the text label (on and off)

- Parts/monitor_indicator.opi
  - Bar.min, bar.max: range
  - Bar.origin: center of bar
  - Label: text in a left box
  - Lolo, lo, hi, hihi: warning and error range
  - Need to change the unit ($\mu T \rightarrow T$)
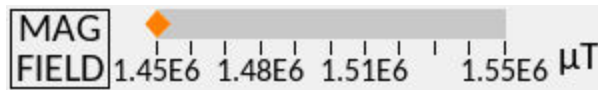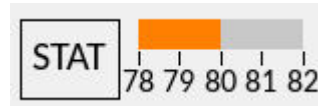
Name	Value
bar.min	sim://const(78)
bar.max	sim://const(82)
bar.origin	sim://const(80)
item.2	STATUS
label	STAT
lolo	sim://const(0.0)
lo	sim://const(80.0)
hi	sim://const(100.0)
hihi	sim://const(100.0)

Alarm Daemon and GUI

- Alarm daemon is written based on RunControl template (Thanks to Konno-san!) then the list of the alarm is controlled by daqdb system (daqdbcreate kinds of things)

- Before start phase 2, I will upload my code on git repository.

- Need to modification
  - Sysetm.nvar: number of variable
  - System.expert: entire list who need to get alarm (used in sending email)
  - Var[n].node: NSM node
  - Var[n].item: specific name of value
  - Var[n].order
    - 1: only for upper bound error
    - -1: only for lower bound error
    - 0: both side error
  - Var[n].lolo, lo, hi, hihi: warning and error range
  - Var[n].expert: list who need to get alarm for the variable (used in writing log)

```
13 system.reset          : 0
14 system.mute1          : 0
15 system.mute2          : 0
16 system.nvar           : 38
17 system.sound          : 0
18 system.expert         : nanae,psh
19 system.count          : 0
20 system.send_notice    : 0
21 system.send_remind    : 0
22 system.send_report    : 0
23
24 var[0].node           : KSPREADER
25 var[0].item           : CDC_TEMP_F01.value
26 var[0].order          : 1
27 var[0].bit            : -1
28 var[0].lolo           : 0.0
29 var[0].lo             : 0.0
30 var[0].hi             : 30.0
31 var[0].hihi           : 35.0
32 var[0].warn           : 0
33 var[0].mute1          : 0
34 var[0].mute2          : 0
35 var[0].email          : 1
36 var[0].expert         : psh,nanae
```

Alarm Daemon and GUI

- GUI structure
  - Parts/alarm_head.opi
  - Parts/alarm_content.opi
  - Macro
    - NODE: node name
    - Varno: number of variable (var[varno] in database/b2shiftalarm.conf)
  - (Plan) source will be uploaded on git repository with database/b2shiftalarm.conf skeleton.
    - The complete database/b2shiftalarm.conf will be maintained through confluence for convenient.

Plan

- Write confluence
- Remote control for shifter PCs
- Beep alarm script and button for run control GUI
- Complete set of monitoring GUI, alarm system, and the archiver
  - Fill the empty area
  - Make a button related with archived history
  - Make password authentication with the archiver
- Test GUI for maintenance
  - Sending email, generate beep, etc.

Remote, Before the next B2GM

- Update GUI based on suggestions

In KEK, After the next B2GM

- Tsukuba B3 setting up

Backup

DAQ Workshop in Taipei

Backup
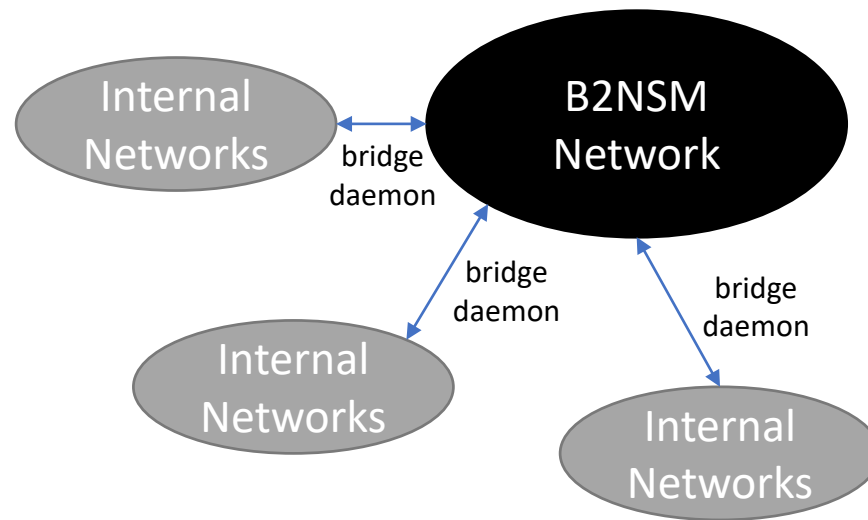
Monitoring GUI on CSS

○ Focused specifications

- Color unification
  - normal = green
  - warning = orange
  - severe = red

- Readability on monitoring PC (4K res., 40inch)

- Reusable naming structure with CSS macro feature

- Not using same shape of widget on different type of value

- Minimizing empty room in the case of similar information
  - Temperatures or multiple bits...

Archiving System

o EPCIS Archiver Appliance is used.

o Features of the archiver

- Web based management UI

EPICS Archiver Appliance for Belle II DAQ

Home   Reports   Metrics   Storage   Appliances   Integration   Help

This is the archiver for Belle II DAQ. If you have any questions, please contact the Belle II DAQ group.

To check the status of or to archive some PV's, please type in some PV names here.

[Check Status] [Archive] [Archive (specify sampling period)] [Lookup] [Pause] [Resume]

Archiving System

○ Features of the archiver

- Archived data can be read on CSS or web browser
  - The data is provided on daqnet from b2db server.

Archiving System

o Features of the archiver

- Retrieving data type: txt, raw (pbraw://), json (web browser)
  - Developer says that csv, svg, mat(matlab) also available.

- Data is stored of text file on the below directory structure
  - "$sts/B2_nsm/get/KSPREADER/CDC_TEMP_B01/####.pb"

- Three kinds of storage depends on the time

STS (short term)	→	MTS (medium term)	→	LTS (long term)

- ~ day
- Fast but small storage is efficient

- ~ week ~ month

- ~ month ~ year
- Large but slow storage is efficient
- Compression option

Alarm Daemon and GUI

- Alarm daemon is currently working without any error.
- Email and sound alarm is provided.
- Currently the alarm is provided only for CDC.

- Email types

Notice (1st warn.→3 min)	Reminder (every even hour)	Report (every day)
• Collect normal→warning	• Unsolved warn. State is sent.	• Every 10 AM(?)
Shifter can check "do not send email" on CSS		• All warning log on yesterday is sent
• After 3 min., new email is sent for other warning.		

			warn. mute	error mute	send email
☐ reset	☑ All warning mute	☑ All error mute			
☐ KSPREADER	CDC_TEMP_F01.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_F02.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_F03.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_F04.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_F05.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_F06.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_F07.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_F08.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_F09.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_F10.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_F11.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_F12.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_F13.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_F14.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_F15.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_F16.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_F17.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_F18.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_F19.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_B01.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_B02.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_B03.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_B04.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_B05.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_B06.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_B07.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_B08.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_B09.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_B10.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_B11.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_B12.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_B13.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_B14.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_B15.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_B16.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_B17.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_B18.value		☐	☐	☑
☐ KSPREADER	CDC_TEMP_B19.value		☐	☐	☑
☐ MWREADER	CDC_WL_NO.value		☐	☐	☑