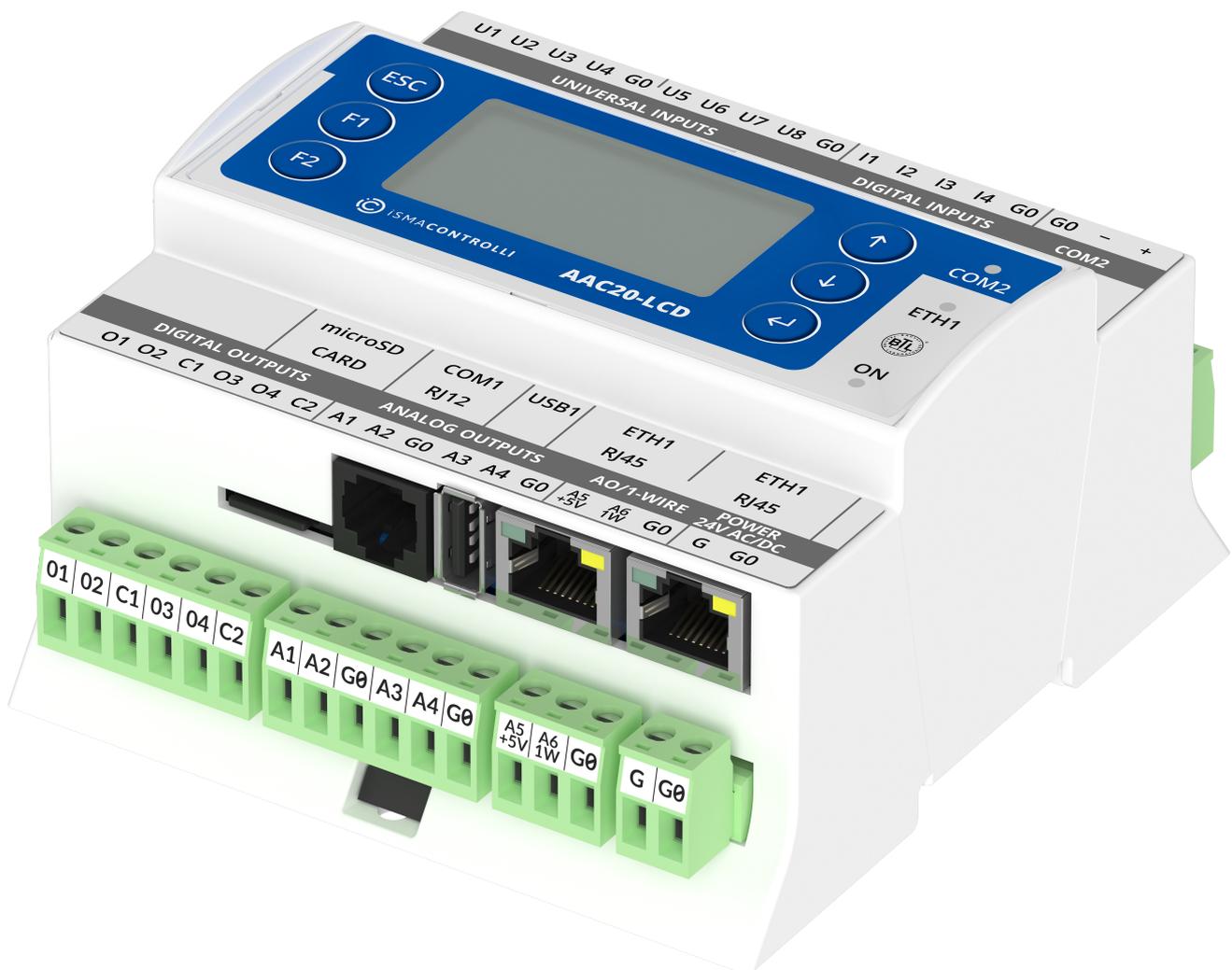


iSMA-B-AAC20

User Manual

LCD Display



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1 Introduction

This manual contains information about LCD display in the iSMA-B-AAC20 controller.

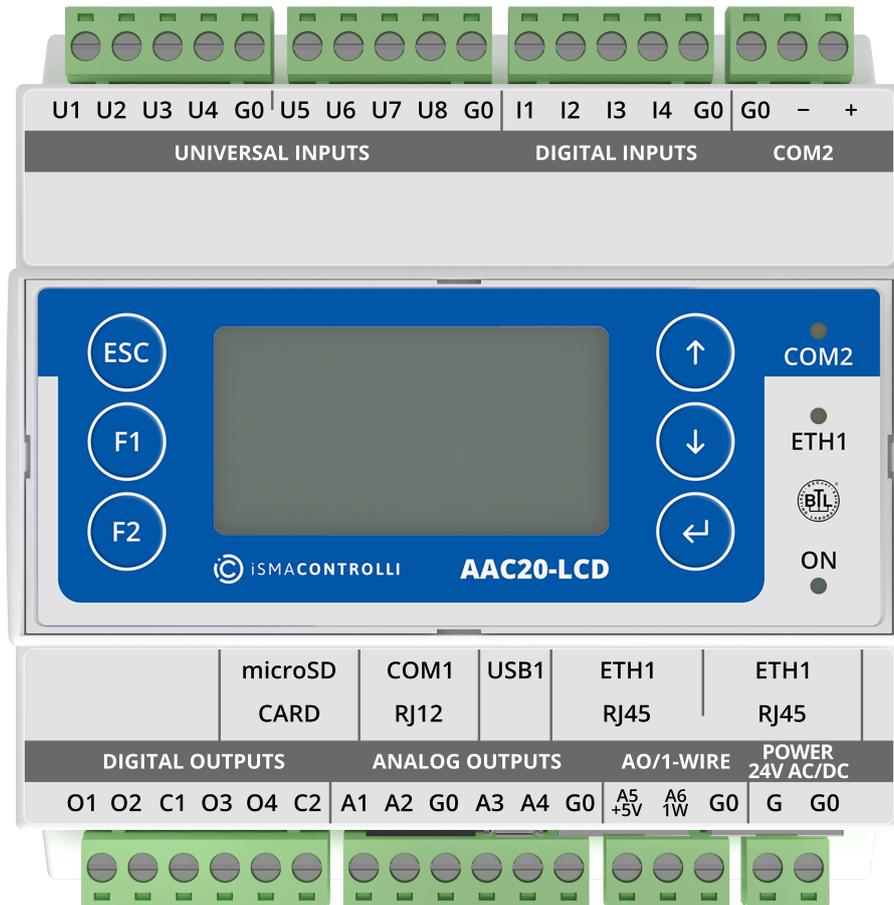


Figure 1. AAC20-LCD controller

1.1 Revision History

Rev.	Date	Description
1.1	28 Aug 2015	First edition
1.2	20 Apr 2017	Buzzer switch off Lexicon supported
1.3	27 Jan 2020	Replaced environment of programming from Workplace to iSMA Tool
1.4	21 Apr 2022	ActiveAlarmsLine component added Rebranded

Table 1. Revision history

2 Sedona LCD Display

The display can be used as an operating panel to display and manage the algorithm of the iSMA-B-AAC20 controller or to view and manage system settings.

The built-in display is a monochrome display with backlighting. It can display up to 20 characters per line and up to 7 rows on one screen. Up to 16 lines can be displayed in a single screen, and scrolling is available with up/down arrows (one line at a time) or with the keys F1/F2 (scrolling entire screens).

Note: The display supports only the basic ASCII characters.

There are 6 dedicated keys to operate the display:

- **Esc:** exit key;
- **Enter:** select, move the cursor to the right;
- **Arrow up:** add/subtract, menu navigation;
- **Arrow down:** add/subtract, menu navigation;
- **F1:** function key;
- **F2:** function key.

3 LCD System Menu

The iSMA-B-AAC20 controller with the display has an option to log in to the system menu without a necessity to add any additional components to the Sedona environment.

Log in/log out system menu process:

- Press and hold the F1 key (displays "Enter Password");
- Use the arrow keys (the change of the digital value by 1) and move through the coming fields (using the Enter key), enter the password to the system (a 4 digit number, 1000 is a default value);
- Approve the input password by pressing and holding the Enter key;
- Cancelling the login process and exiting from the system menu – press and hold the Esc key.

The system menu consists of the following components:

- **Info:** provides information about your device and hardware resources;
- **Local I/O:** contains information about the current values of inputs/outputs of the physical devices and their configuration options;
- **Network Config:** changes the IP address of the device and the port and address of the Modbus TCP/IP protocol;
- **Change password:** changes the password to log in to the system menu and to the website (editing the Device Password slot in the Plat component);
- **Reboot:** restarts the device (required when you change the IP address).

4 Installation of iSMA LCD Kit

The LCD display of the iSMA-B-AAC20 controller is operated by using the components of the iSMA LCD kit. To install the iSMA LCD kit, import the kit to the iSMA Tool software (possibly as part of the package of various kits in a zip file). To do this, use an application from the Sedona -> Import Sedona Files.

After a successful import of the files, upload the files to your device using the Kit Manager application from the Sedona Tools package.

WARNING! Before programming the LCD Display, please check if you the latest kit version is used. The latest kits are available on the iSMA CONTROLLI support website ismacontrolli.com.

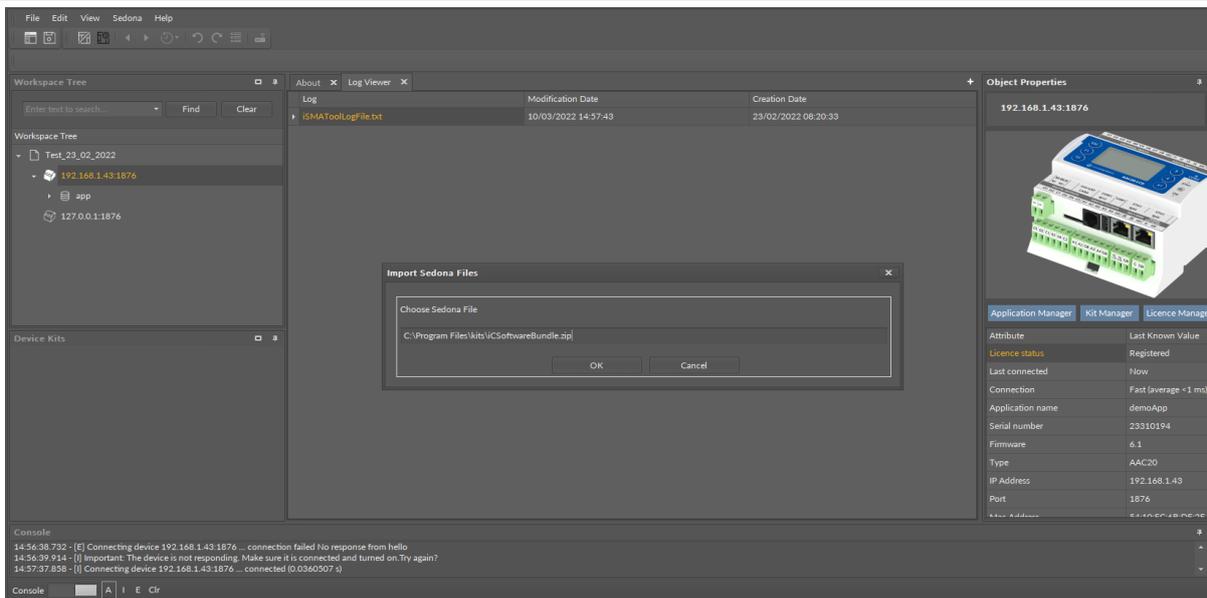


Figure 2. Sedona installer

5 LCD Components

The iSMA LCD kit is a set of elements used to support the display.

It consists of the following components:

- **Display:** the main component handling the LCD display;
- **FolderLine:** the component of the folder for grouping display components;
- **TextLine:** the component of static text;
- **NumericLine:** the component of the numeric type variable (float);
- **BoolLine:** the Boolean variable component;
- **IntLine:** the integer variable component;
- **MultiStateLine:** the integer variable with labels component;
- **Next Page:** the component of the next page;
- **BooleanScheduleLine:** the component of the Boolean Schedule editor;
- **NumericScheduleLine:** the component of the Numeric Schedule editor;
- **ActiveAlarmsLine:** the component shows a list of all alarms active in the device.

5.1 Display

The Display component is the core component for LCD. The component should be placed under the Drivers folder. All components working with the display must be placed under the Display component.

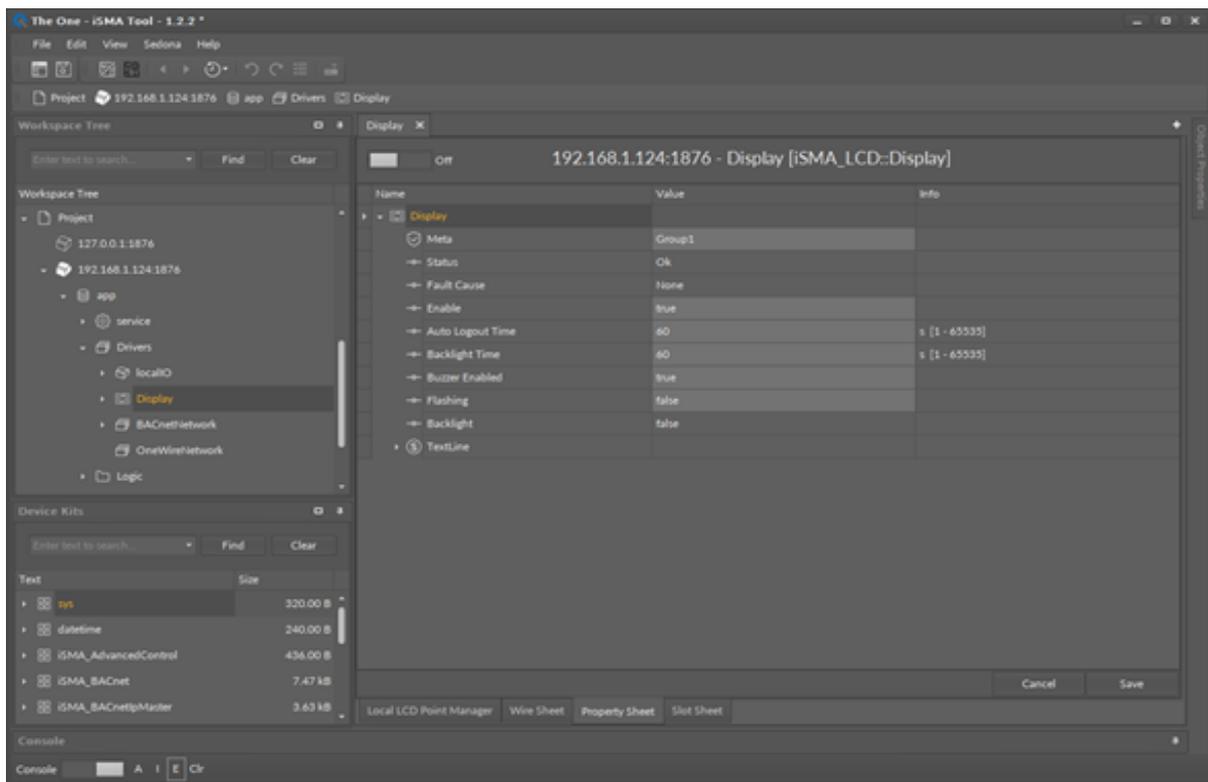


Figure 3. Display component

The Display component has the following slots:

- **Status:** the current status of the LCD display;
- **Fault Cause:** indicates the fault cause of the component;
- **Enable:** enables or disables the component;

- **Auto Logout Time:** the time after which the user will be logged out and switched to LCD's default user status (default value 60 s);
- **Backlight Time:** the time of the backlight (default value 60 s);
- **Buzzer Enabled:** enabled/disabled built-in buzzer (by default, active);
- **Flashing:** activates the flashing of the display backlight;
- **Backlight:** status of the backlight.

The Backlight slot can be used as a feedback that the display is being used manually.

Each time the LCD button is pressed, the backlight is switched on and the slot changes its value to true. The status of this slot can be saved as an alarm event or in history log using the NVBooleanWritable component.

5.1.1 FolderLine

The FolderLine component is used to group the viewed items. Adding it to the Sedona application, it appears on the display in the form of a text with the symbol >> on the right side of the screen. To enter the folder use Enter key; to go back to the parent folder, use Esc key. Using the FolderLine component, desired structures can be organized in a tree menu, where the Display component is the main element. User's current location is displayed in the form of a path at the top of the screen.

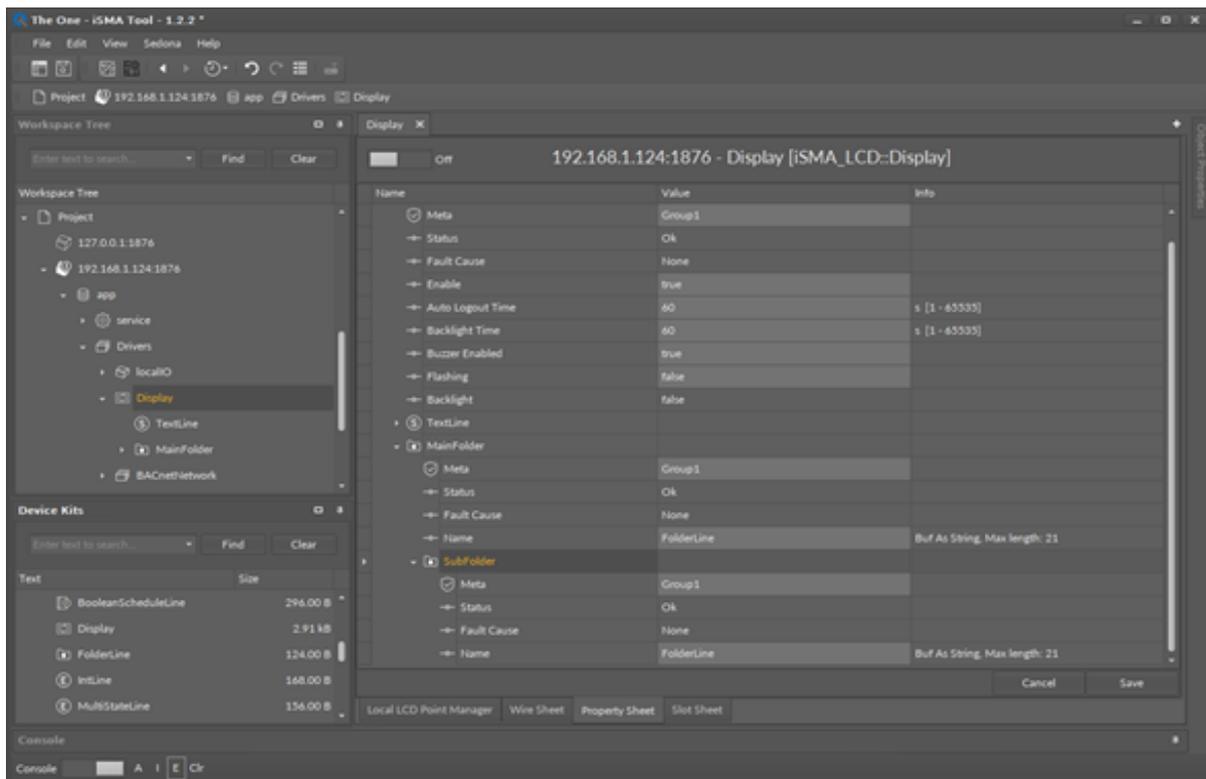


Figure 4. FolderLine component

Slots

The FolderLine component has the following slots:

- **Status:** the current status of the component;
- **Fault Cause:** indicates the fault cause of the component;

- **Name:** allows to enter the name of the folder; accepts a string value, max. of 21 characters.

5.1.2 TextLine

The TextLine is a component of the static text display on the LCD screen. It accepts up to 21 characters (ASCII base table). If the user adds the component to the application, the Text slot takes automatically the name of the component, which can be changed any time by entering any other text.

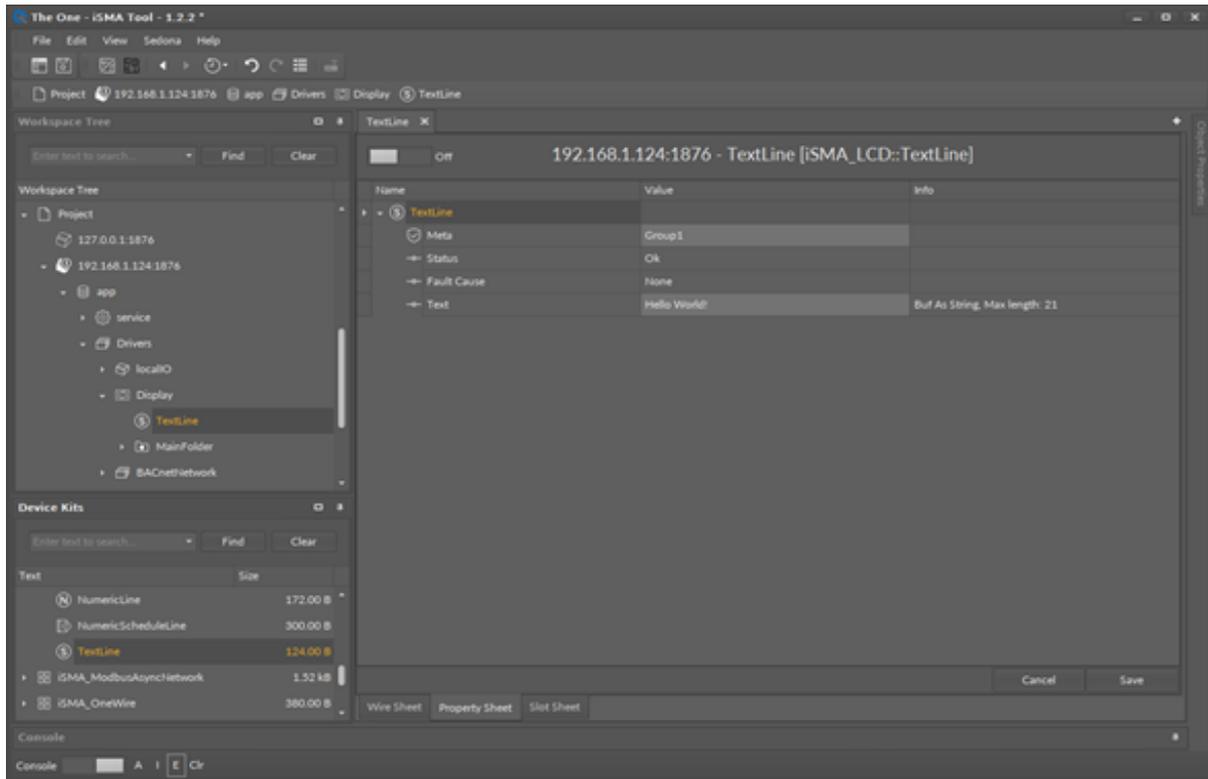


Figure 5. TextLine component

Slots

The TextLine component has the following slots:

- **Status:** the current status of the component;
- **Fault Cause:** indicates the fault cause of the component;
- **Text:** allows to enter a text shown on the LCD display; accepts a string value, max. of 21 characters.

5.1.3 NumericLine

The NumericLine component is used to display and edit the numeric (float) variables. The displayed value of the In slot may be preceded by a description on the left side (prefix), e.g., the name, as well as on the right (suffix), e.g., the units.

In order to edit the variables, it is recommended to use the NVNumericWritable components from iSMA_platAAC20 kit. To edit the value of the NumericLine component, select true in the Editable slot, and provide the user with a write access to the component. To make sure that the value on the LCD is synchronized with the changes in

the NVNumericWritable component the “link back-forward” strategy needs to be applied. There is a possibility to change the value from LCD by selecting the Set action. To do this, use the arrow up/down keys - add/subtract the value of the step. The step field value can be inputted in the application and changed by using keys F1, F2 (multiplying or dividing the step value by 10).

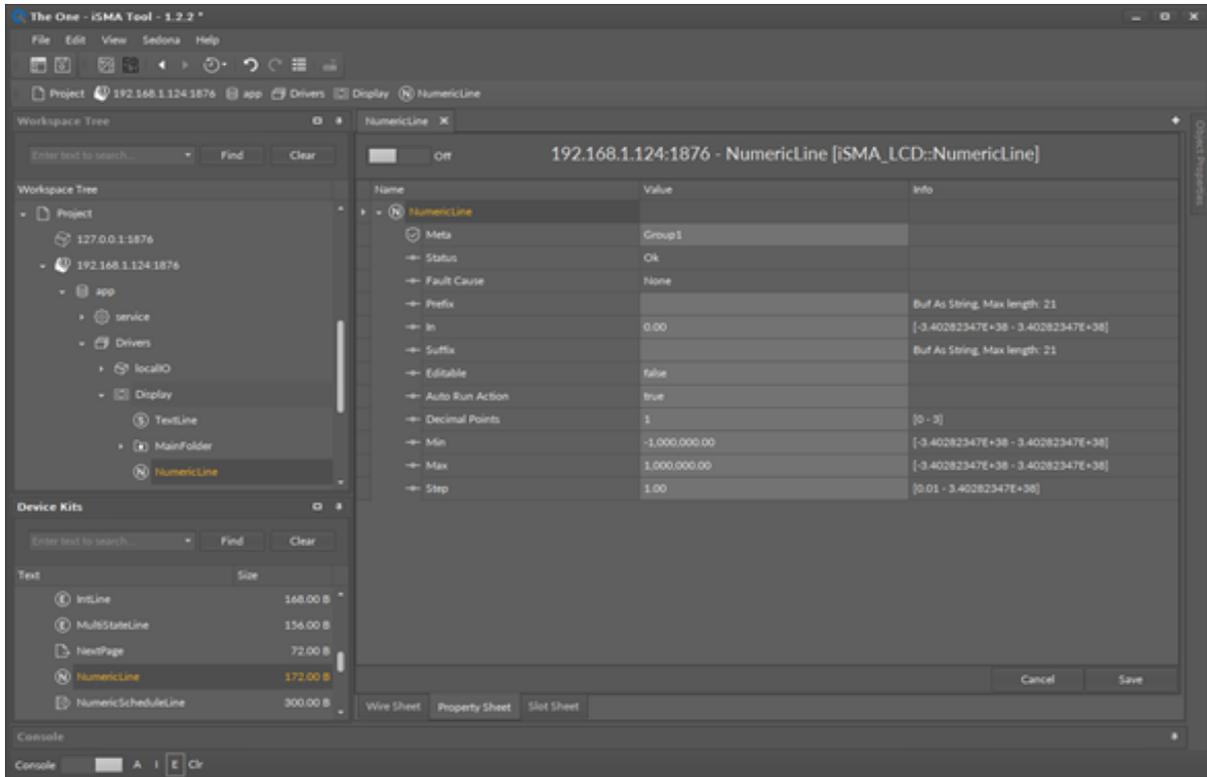


Figure 6. NumericLine component

Slots

The NumericLine component has the following slots:

- **Status:** the current status of the component;
- **Fault Cause:** indicates the fault cause of the component;
- **Prefix:** static text which is displayed before the Numerical value (left aligned);
- **In:** the numeric value;
- **Suffix:** static text which is displayed after the Numerical value (right aligned);
- **Editable:** switch on/off for editing of variables;
- **Auto Run Action:** automatically goes to editing set action, without action selection (only for components which support 1 action);
- **Decimal Points:** displays the number of decimal places;
- **Min:** minimum value of the variable that can be set;
- **Max:** maximum value of the variable that can be set;
- **Step:** single change value in editing.

5.1.4 BoolLine

The BoolLine component is used to display and edit the Boolean variables (true/false). The component offers the option to input different texts that will appear separately for

the true and false values. The displayed text may be preceded by a description on the left side (prefix), e.g., the name, as well as on the right (suffix), e.g., the units.

In order to edit the variables, it is recommended to use the NVBooleanWritable component from iSMA_platAAC20 kit. To edit the value of the BoolLine component select true in the Editable slot, and provide the user with a write access to the component. To make sure that the value on the LCD is synchronized with the changes in the NVBooleanWritable component the “link back-forward” strategy needs to be applied. There is a possibility to change the value from LCD by selecting the Set action. To do this, use the up/down arrow keys to switch between the values of true/false.

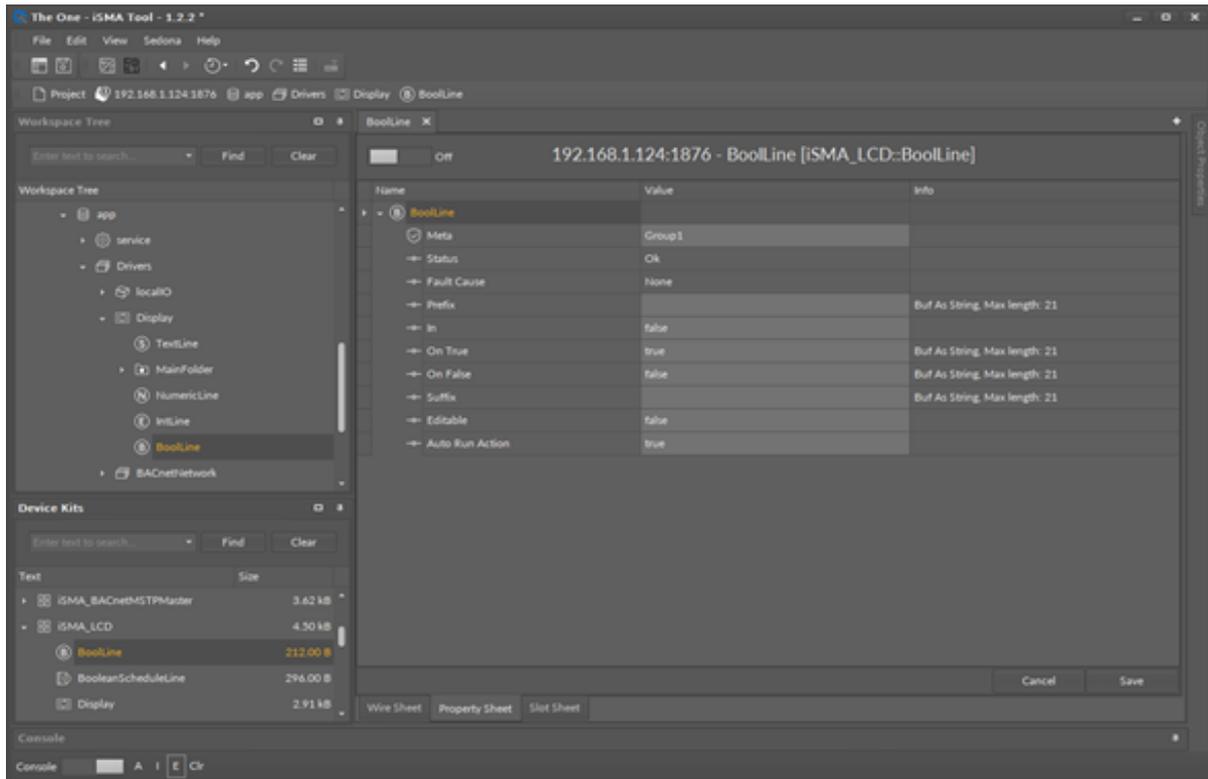


Figure 7. BoolLine component

Slots

The BoolLine component has the following slots:

- **Status:** the current status of the component;
- **Fault Cause:** indicates the fault cause of the component;
- **Prefix:** static text displayed before the text of the In slot (left-aligned);
- **In:** the input Slot;
- **On True:** text which is displayed when the In slot's value is 'true';
- **On False:** text which is displayed when the In slot's value is 'false';
- **Suffix:** static text displayed after the text of the In slot (right-aligned);
- **Editable:** switches on/off for variables editing;
- **Auto Run Action:** automatically goes to editing set action, without action selection (only for components which support 1 action).

5.1.5 IntLine

The IntLine component is used to display and edit the integer variables (integers). The In slot value may be preceded by a description on the left side (prefix), e.g., the name, as well as on the right (suffix), e.g., the units.

In order to edit the variables, it is recommended to use the NVIntegerWritable components from iSMA_platAAC20 kit. To edit the value of the IntLine component, select true in the Editable slot, and provide the user with write access to the component. To make sure that the value on the LCD is synchronized with the changes in the NVIntegerWritable component the “link back-forward” strategy needs to be applied. There is a possibility to change the value from LCD by selecting the Set action. To do this, use the up/down arrow keys to add/subtract the value of the step. The step field value can be inputted in the application and changed by using keys F1, F2 (multiplying or dividing the step value by 10).

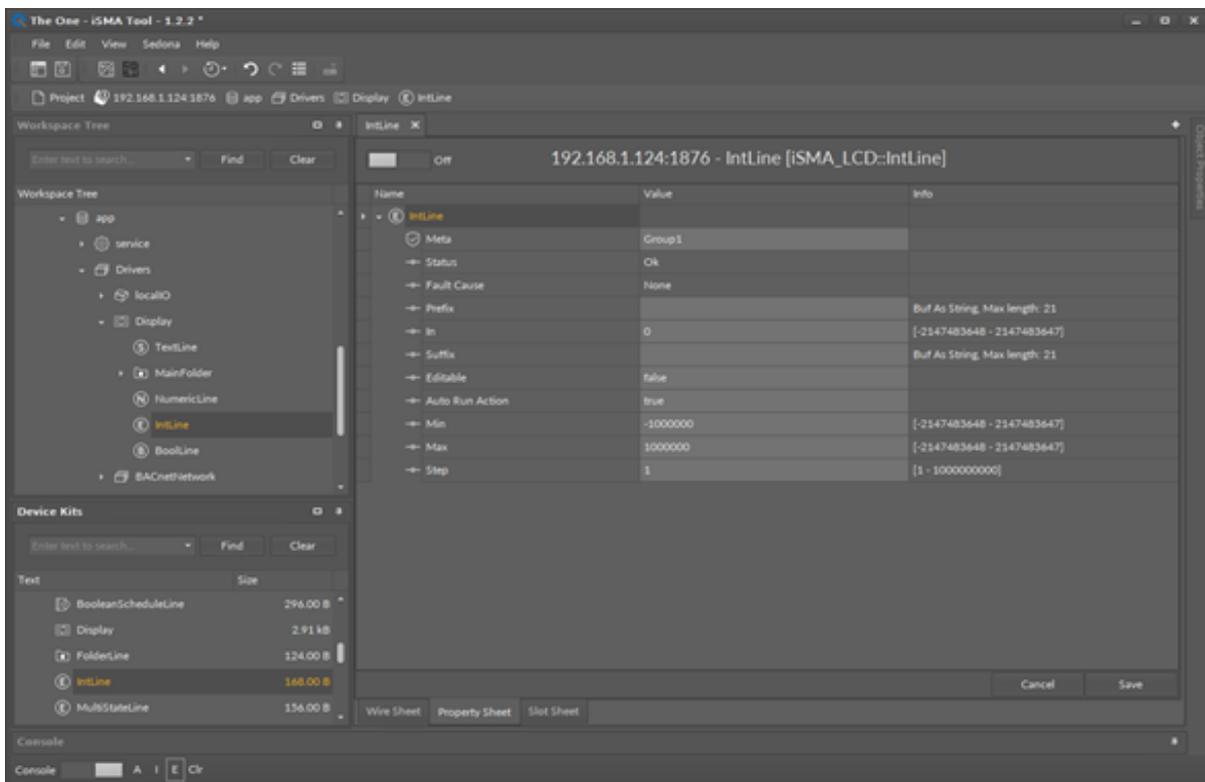


Figure 8. IntLine component

Slots

The IntLine component has the following slots:

- **Status:** the current status of the component;
- **Fault Cause:** indicates the fault cause of the component;
- **Prefix:** static text displayed before the Numerical value (left-aligned);
- **In:** the numeric value;
- **Suffix:** static text displayed after the Numerical value (right-aligned);
- **Editable:** switch on/off for variables editing;
- **Auto Run Action:** automatically go to editing set action, without action selection (only for components which support 1 action);
- **Min:** minimum value of the variable that can be set;

- **Max:** maximum value of the variable that can be set;
- **Step:** single change value in editing.

5.1.6 MultiStateLine

The MultiStateLine component is used to display and edit the integer variables with labels. The labels assigned to values can be imported to the MultiStateLine component from iSMA_platAAC20 NVMultiStateWritable component. The labels may be preceded by a description on the left side (prefix), e.g., the name, as well as on the right (suffix), e.g., the units.

To edit a value (choose label) of the MultiStateLine component, select true in the Editable slot, and provide the user with a write access to the component. To make sure that the value on the LCD is synchronized with the changes in the NVMultiStateWritable component the “link back-forward” strategy needs to be applied. There is a possibility to change the value (label) from LCD by selecting the Set action. To do this, use the up/down arrow keys.

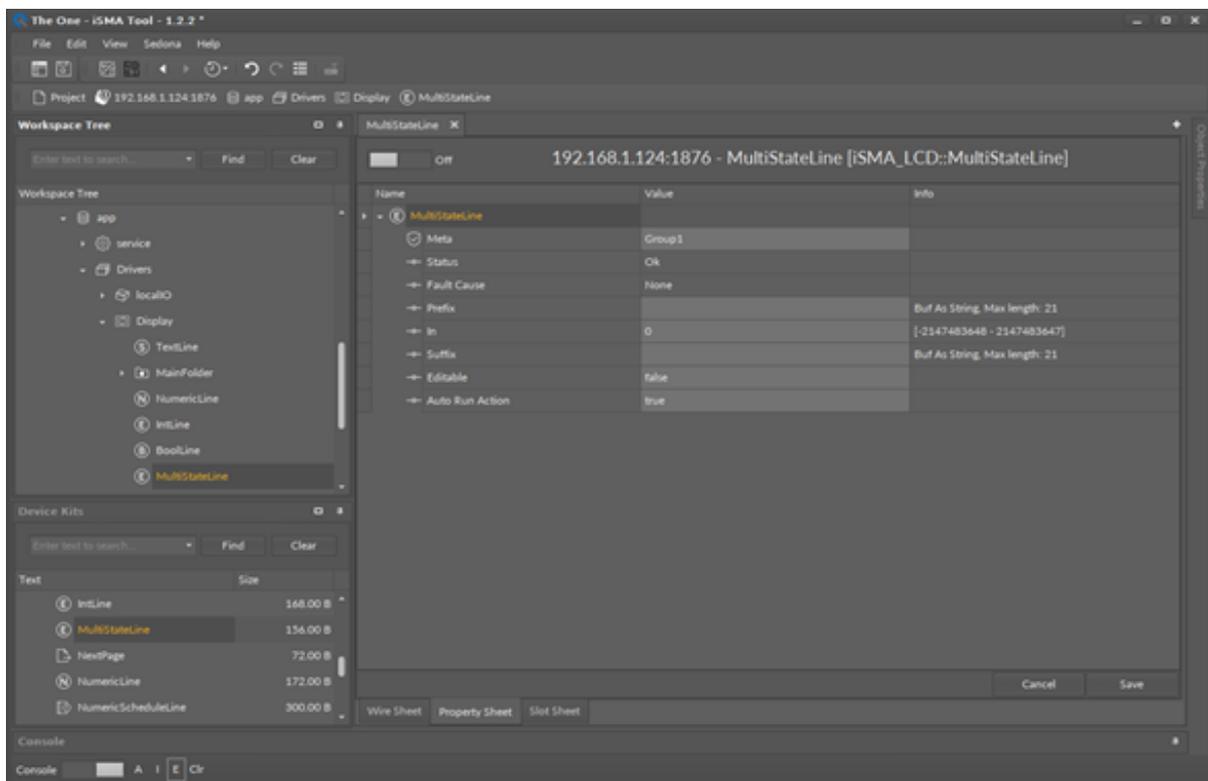


Figure 9. MultiStateLine component

Slots

The MultiStateLine component has the following slots:

- **Status:** the current status of the component;
- **Fault Cause:** indicates the fault cause of the component;
- **Prefix:** static text displayed before the numeric value (left-aligned),
- **In:** the numeric value,
- **Suffix:** static text displayed after the numeric value (right-aligned),
- **Editable:** switch on/off for variables editing,

- **Auto Run Action:** automatically goes to editing set action, without action selection (only for components which support 1 action).

5.1.7 BooleanScheduleLine

The BooleanScheduleLine component is used to display and edit the Boolean schedule. The displayed text may be preceded by a description on the left side (prefix), e.g., the name as well as on the right (suffix), e.g., the units.

To make the schedule line working, the component's input must be connected to schedule component used in application output (from the iSMA_controlApi kit) and the Editable slot must be set to true. To make sure that the value on the LCD is synchronized with the changes in the application the "link back-forward" strategy needs to be applied.

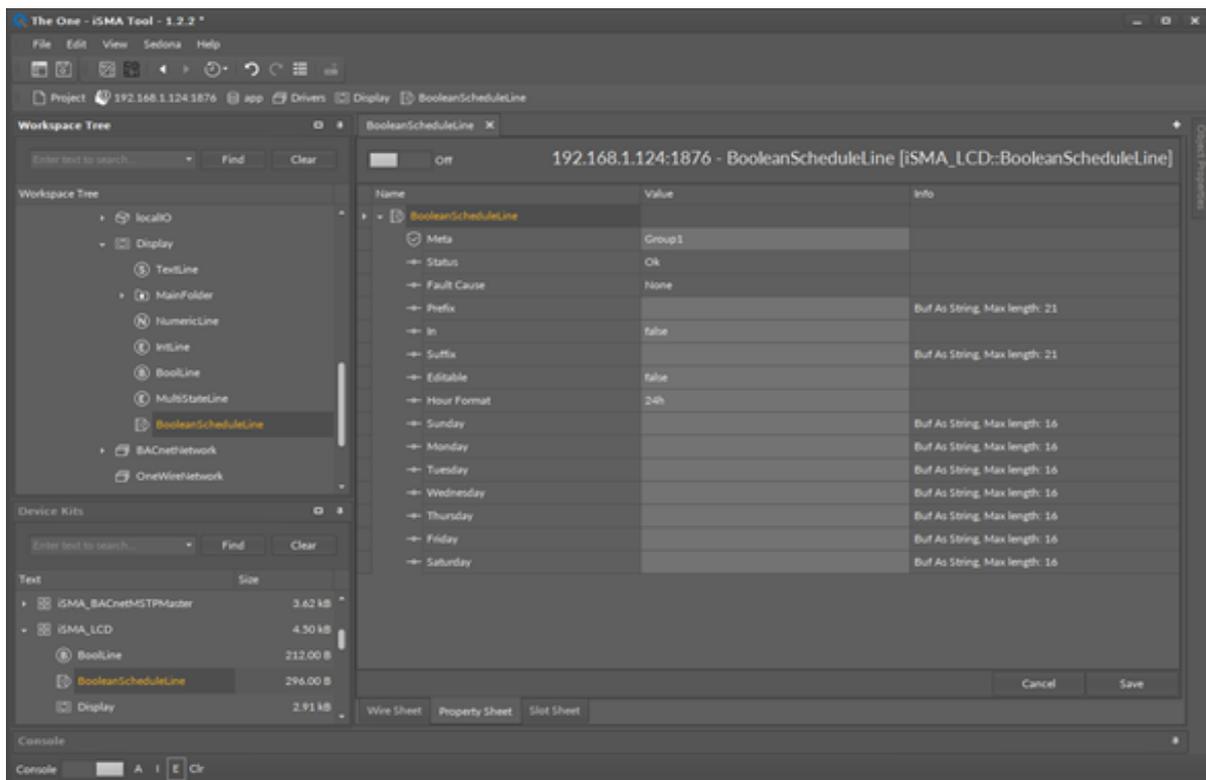


Figure 10. BooleanScheduleLine component

Slots

The BooleanScheduleLine component has the following configuration slots:

- **Status:** the current status of the component;
- **Fault Cause:** indicates the fault cause of the component;
- **Prefix:** static text displayed before the numeric value (left-aligned);
- **In:** schedule current output value;
- **Suffix:** static text displayed after the numeric value (right-aligned);
- **Editable:** switches on/off for variables editing;
- **Hour format:** changes hour display format (24h or AM/PM),
- **Slots from Sunday to Saturday:** define days names; if the slot is empty, the display will take English day names.

LCD Schedule Lines

The users can edit schedules added in the Sedona application from the iSMA_controlApi kit available in firmware version 5.0 and above. To make schedules editable, first, add the schedule component to the application, then add corresponding schedule component line under LCD display and make connection link between them. Each schedule can have up to 8 events per day.

Nan and Null Values

If the event has null or nan value, it means that the schedule will take the default output value. For example, the user wants to set up the numeric schedule the following day events:

Start	End	Value
00.00	07.00	16
07.00	13.00	18
13.00	14.00	16
14.00	16.00	21
16.00	00.00	16

Table 2. An example of a numeric schedule

The recommended settings for the above schedule are the following:

- schedule default value: 16;
- Ev1: time 07.00, value 18 (start first event);
- Ev2: time 13.00, value nan (finish the first event and go to the default value);
- Ev3: time 14.00, value 21 (start second event);
- Ev4: time 16.00, value nan (finish the second event and go to the default value).

Editing Schedules from LCD Display

To display and edit a schedule by the display schedule line, the component must have the Editable slot set to true, and a logged-in user must have a read/write access.

A first screen of the schedule line shows weekdays, which the user can enter and invoke the following actions:

- **Ev1-Ev8:** edit time and value of scheduled events;
- **Copy from other day:** copy all events' times and values from the other day,
- **Clean day:** clear all events in the chosen day.

After entering the event edit screen, the user can:

- move between values using the enter button;
- use up and down arrows to edit values;
- to confirm and save press and hold the enter button.

In the numeric schedule, it is possible to change a step value (divide or multiply step by 10) using F1 and F2 keys.

WARNING! To set or remove null or nan value, press and hold the F2 key.

Going to the next page (after Saturday) the configuration page becomes available.

The configuration page has the following slots:

- **Def value:** edits the schedule output default value;
- **Hour format:** changes the hour display format (24h or AM/PM);
- **Decimal Points (only numeric):** displays the number of decimal places;
- **Clean weekly schedule:** clears all events in the schedule.

5.1.8 NumericScheduleLine

The NumericScheduleLine component is used to display and edit the numeric schedule. The displayed text may be preceded by a description on the left side (prefix), e.g., the name as well as on the right (suffix), e.g., the units.

To make the schedule line working, the component input must be connected to schedule component used in application output (from the iSMA_controlApi kit), and the Editable slot must be set to true. To make sure that the value on the LCD is synchronized with the changes in the application the “link back-forward” strategy needs to be applied.

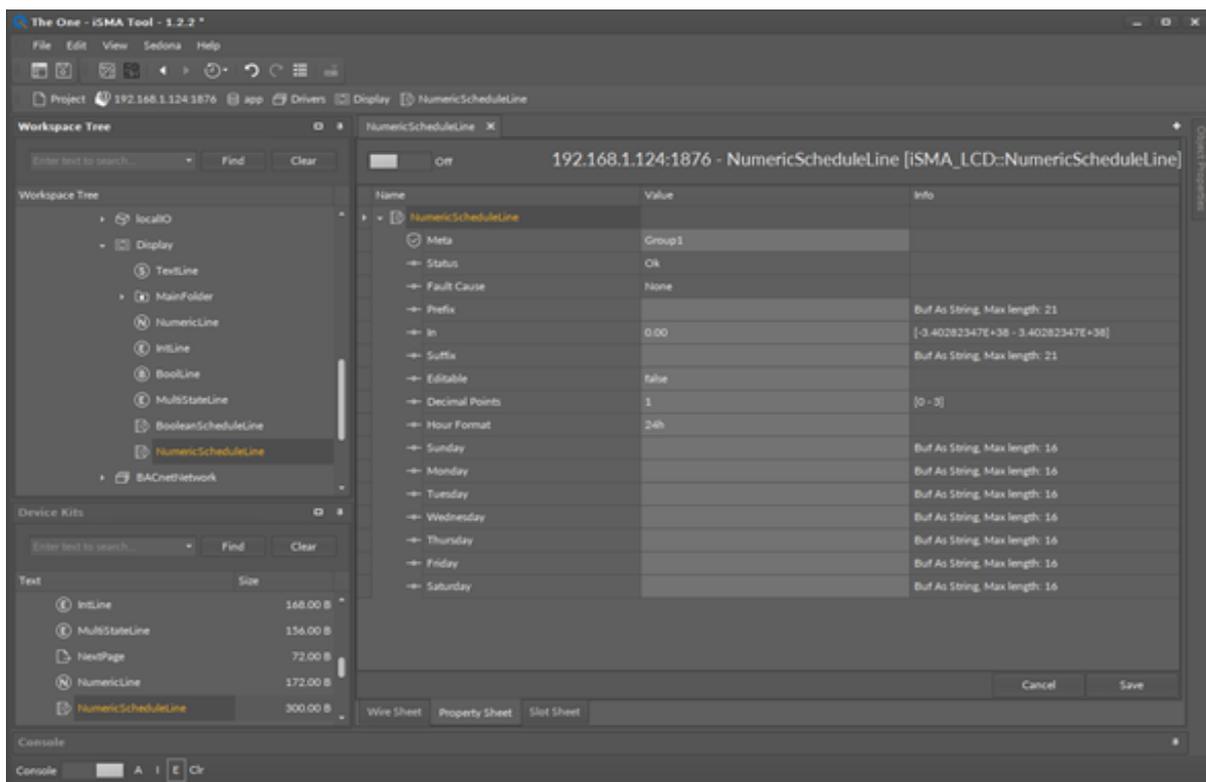


Figure 11. NUmERICScheduleLine component

Slots

The NumericScheduleLine component has the following configuration slots:

- **Status:** the current status of the component;
- **Fault Cause:** indicates the fault cause of the component;
- **Prefix:** static text displayed before the numeric value (left-aligned);
- **In:** schedule current output value;

- **Suffix:** static text displayed after the numeric value (right-aligned);
- **Editable:** switches on/off for variables editing;
- **Decimal Points:** displays the number of decimal places;
- **Hour Format:** changes hour display format (24h or AM/PM),
- **Slots from Sunday to Saturday:** define days names; if the slot is empty, the display will take English day names.

LCD Schedule Lines

The users can edit schedules added in the Sedona application from the iSMA_controlApi kit available in firmware version 5.0 and above. To make schedules editable, first, add the schedule component to the application, then add corresponding schedule component line under LCD display and make connection link between them. Each schedule can have up to 8 events per day.

Nan and Null Values

If the event has null or nan value, it means that the schedule will take the default output value. For example, the user wants to set up the numeric schedule the following day events:

Start	End	Value
00.00	07.00	16
07.00	13.00	18
13.00	14.00	16
14.00	16.00	21
16.00	00.00	16

Table 3. An example of a numeric schedule

The recommended settings for the above schedule are the following:

- schedule default value: 16;
- Ev1: time 07.00, value 18 (start first event);
- Ev2: time 13.00, value nan (finish the first event and go to the default value);
- Ev3: time 14.00, value 21 (start second event);
- Ev4: time 16.00, value nan (finish the second event and go to the default value).

Editing Schedules from LCD Display

To display and edit a schedule by the display schedule line, the component must have the Editable slot set to true, and a logged-in user must have a read/write access.

A first screen of the schedule line shows weekdays, which the user can enter and invoke the following actions:

- **Ev1-Ev8:** edit time and value of scheduled events;
- **Copy from other day:** copy all events' times and values from the other day,
- **Clean day:** clear all events in the chosen day.

After entering the event edit screen, the user can:

- move between values using the enter button;
- use up and down arrows to edit values;
- to confirm and save press and hold the enter button.

In the numeric schedule, it is possible to change a step value (divide or multiply step by 10) using F1 and F2 keys.

WARNING! To set or remove null or nan value, press and hold the F2 key.

Going to the next page (after Saturday) the configuration page becomes available.

The configuration page has the following slots:

- **Def value:** edits the schedule output default value;
- **Hour format:** changes the hour display format (24h or AM/PM);
- **Decimal Points (only numeric):** displays the number of decimal places;
- **Clean weekly schedule:** clears all events in the schedule.

5.1.9 NextPage

The NextPage component allows inserting blank lines until the end of the screen. It ensures order and clean lines, and increases the readability of the displayed lines. Using the NextPage component, switching between screens (set of 7 lines) is performed by using arrows (line by line) or by whole screen - F1 and F2 keys.

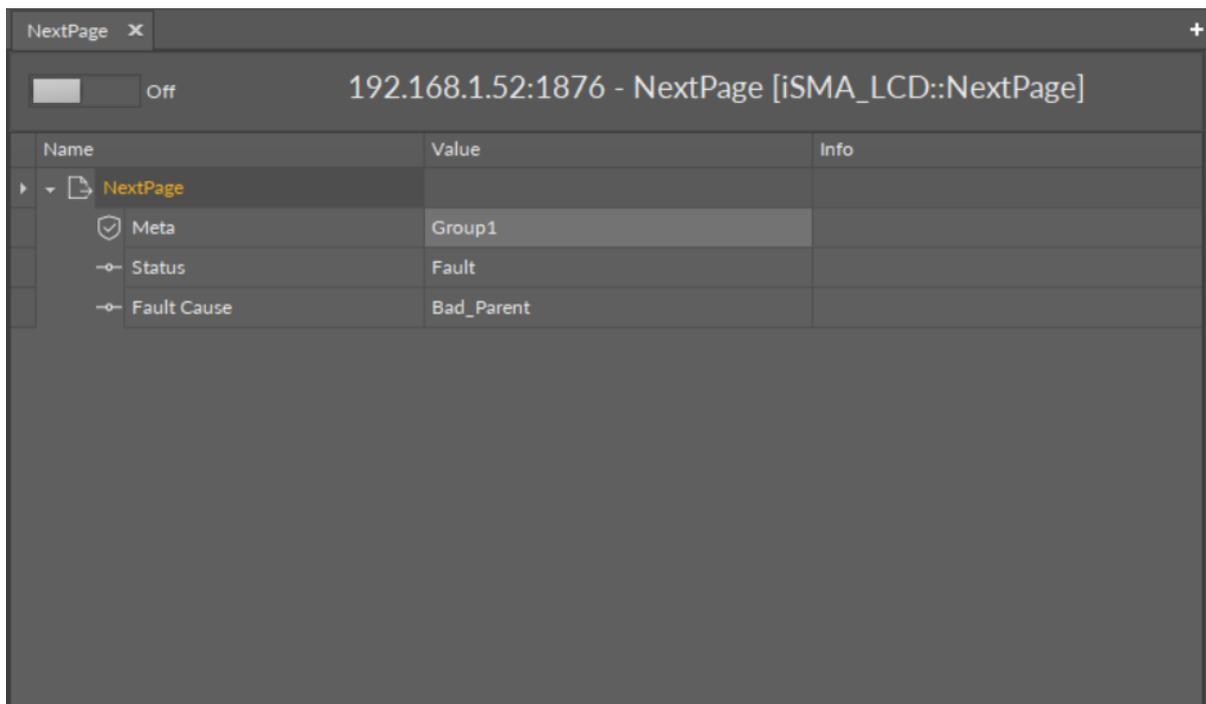


Figure 12. NextPage component

Slots

The NextPage does not have any editable slots, just two read-only slots:

- **Status:** the current status of the component;
- **Fault Cause:** indicates the fault cause of the component.

5.1.10 ActiveAlarmsLine

The ActiveAlarmsLine component is a plug&play component, which shows a list of all alarms active in the device. The following information is available for each listed alarm:

- source name;
- timestamp;
- current out value;
- alarm class.

The component has to be placed under the Display component.

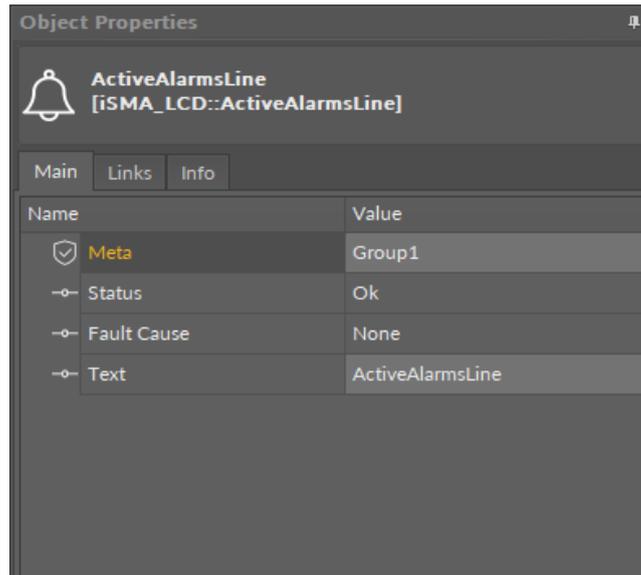


Figure 13. FolderLine component

Slots

The ActiveAlarmsLine component has the following slots:

- **Status:** the current status of the component;
- **Fault Cause:** indicates the fault cause of the component;
- **Text:** allows to enter a text shown on the LCD display, accepts a string value, max. of 21 characters.

5.2 Users

The LCD Display uses the Sedona users, from the Sedona application user service. These user accounts can be used to log in to the LCD display and to display or edit values according to their access right. All LCD components can be assigned to up to 4 groups and each user has a defined access right to these groups. The minimum access right to display line is read, the user without the read access cannot display lines. The users with read and write access can display and edit values from lines.

5.2.1 User Service

The User Service is a service responsible for user management. It allows to add and remove users and specify access to components. Each application component in Sedona

has a Meta slot that allows to assign one or more groups it to. Sedona has 4 predefined groups.

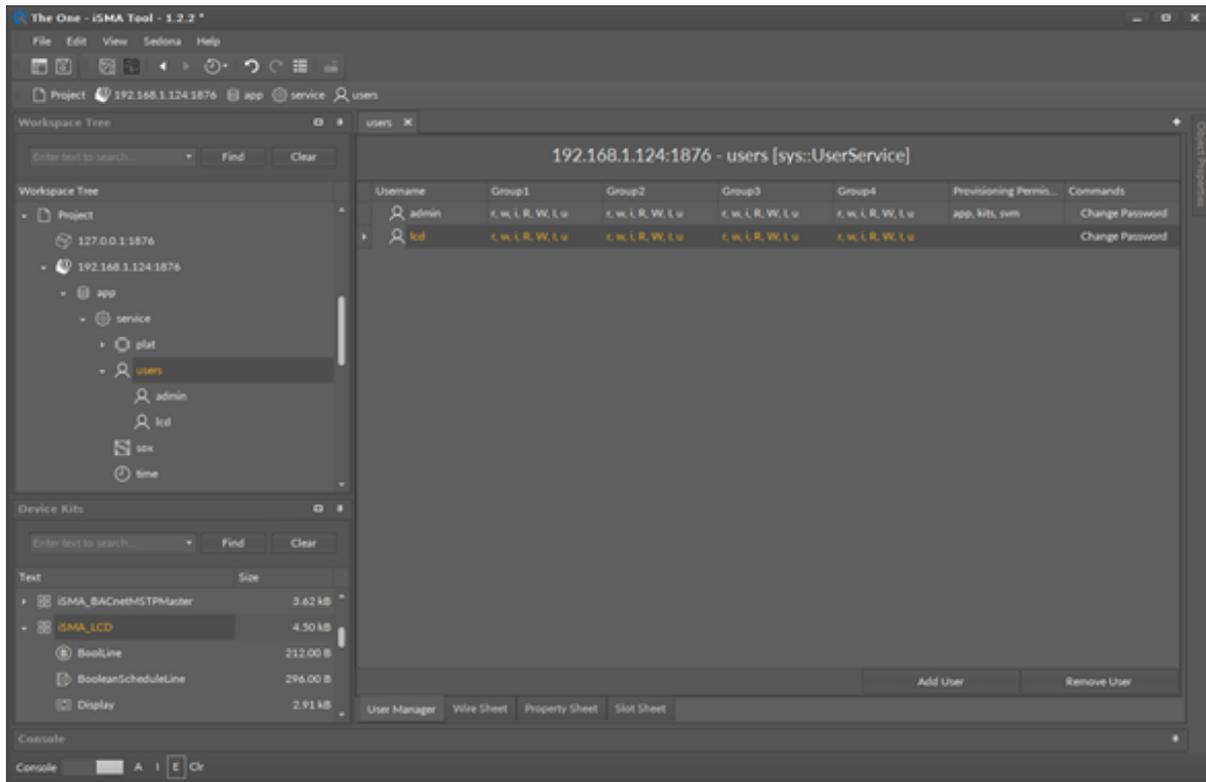


Figure 14. User Service component

The users can have the following type of permissions:

- **Operator Read:** read components, read values of operator properties;
- **Operator Write:** change the values of operator properties;
- **Operator Invoke:** invoke operator actions;
- **Admin Read:** read values of properties, read links, generate components links;
- **Admin Write:** change values properties, add components, sort components, rename components, generate links to the components, delete links to the components;
- **Admin Invoke:** invoke admin actions of the components;
- **Admin User:** user management (read, write, edit, delete).

Provisioning Permissions:

- Can provision app: can read/write app.sab file;
- Can provision app: can read/write kits.scode file;
- Can provision app: can read/write SVM files.

5.2.2 User LCD Login / Switching Between Users

By default, the display logs in to the Sedona system using an LCD user. To switch to another user (with different access rights to application components), hold the F2 key - the list of users of the Users Service becomes available. Use the up/down arrows to select the desired user and then confirm by hitting Enter.

5.2.3 Using User Permission to Build LCD Menu

Building the display structure is closely related to the user rights to the components of the LCD. Each component in the Sedona environment is assigned to at least one of 4 groups, and each user has the defines rights for each group. User access rights to groups are defined in the User Service.

For a user to display the component, the access rights to the group of this component cannot be lower than 'Read'.

For a user to edit a value of the component, assign the user to the group of this component with the reading access (component must be displayed) and also with the writing access to make and store the changes. Assigning components to the groups and giving users access rights, a single menu for many users can be built, where users have access to the selected items.

6 Reordering

Items on the display are arranged in the chronological order, in which they were added. To change the displayed order, use the Reorder function. To do this, go to the Wire Sheet view of the component in which the displayed items are located (Display main component or the FolderLine components). Then under the right-click on an empty space on the screen, there is a list of all the components of the given page in the order they are displayed on the LCD. To change the order of the lines, select the component you want to move and change its position on the list using the buttons on the right side of the window.

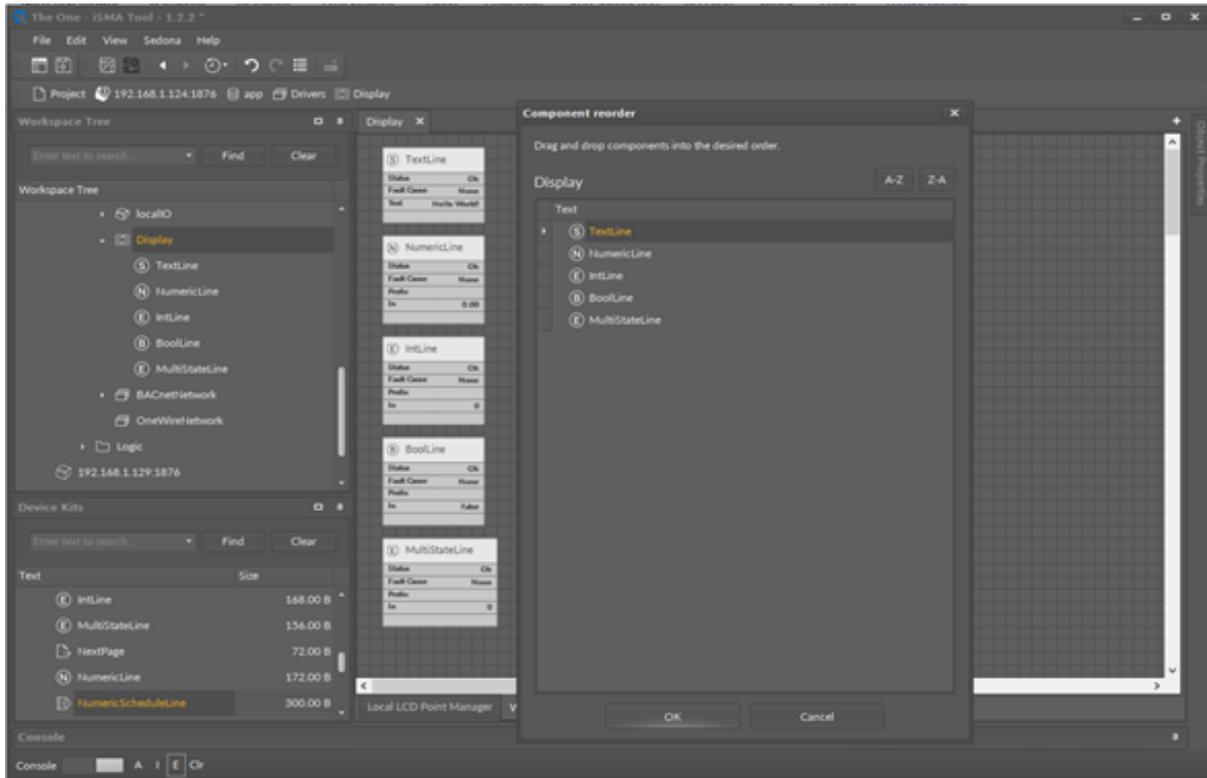


Figure 15. Reordering

