AirHMI LCD DISPLAY EDITOR GUIDE

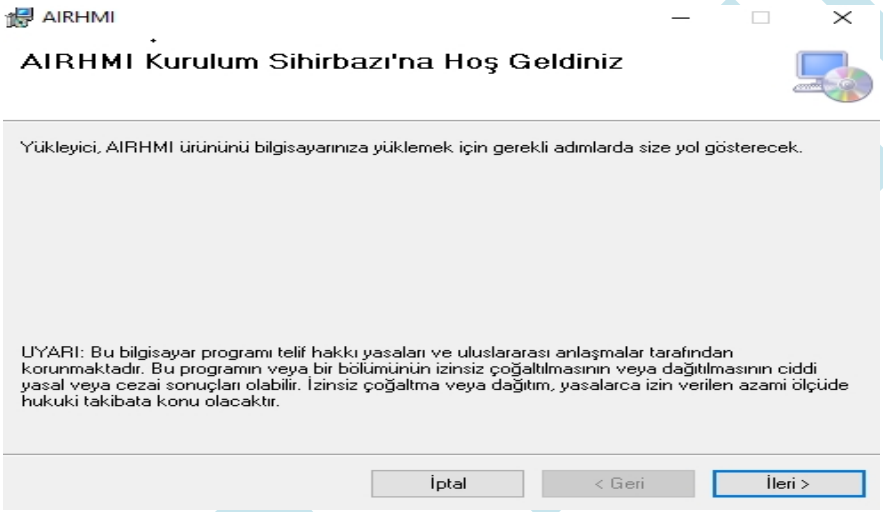
AirHMI Visual Screen Creator is designed to create Human Machine Interface GUIs for AirHMI LCD displays in the most efficient time with the highest level of design satisfaction. In the editor we have functionalities from the world of Design and Programming: In addition to the screen design support that you can be original from the visually rich object treasure and you can easily create according to your wishes, it also provides many convenience to the user in the programming part.

TABLE OF CONTENTS

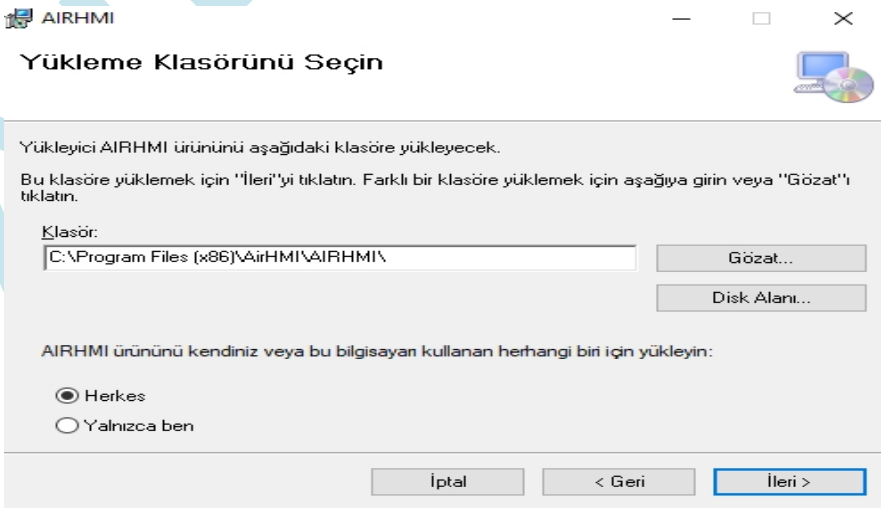
1. AirHMI Visual Screen Creator INSTALLATION

Download Link: https://www.airhmi.com/airhmi-visualcreator

Double click on AIRHMISETUP.msi to install AirHMI Editor on your computer. After that, follow the steps below.



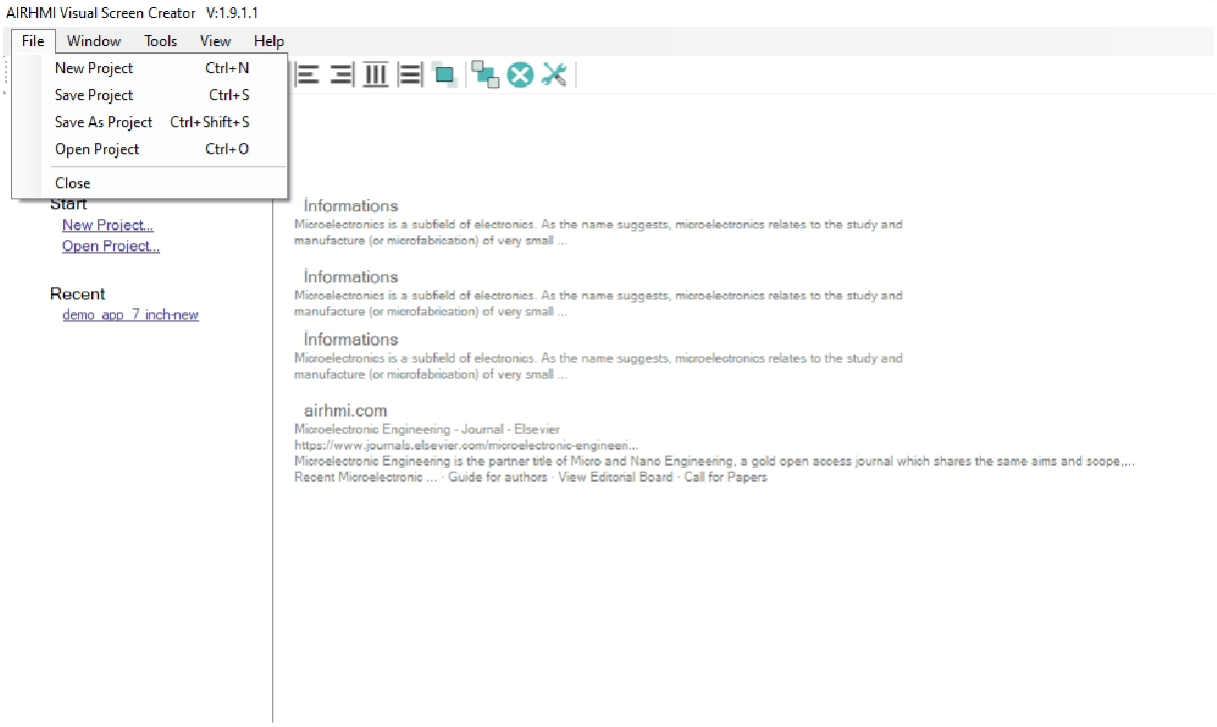
Select the installation folder and other options as desired and press next to start the installation.

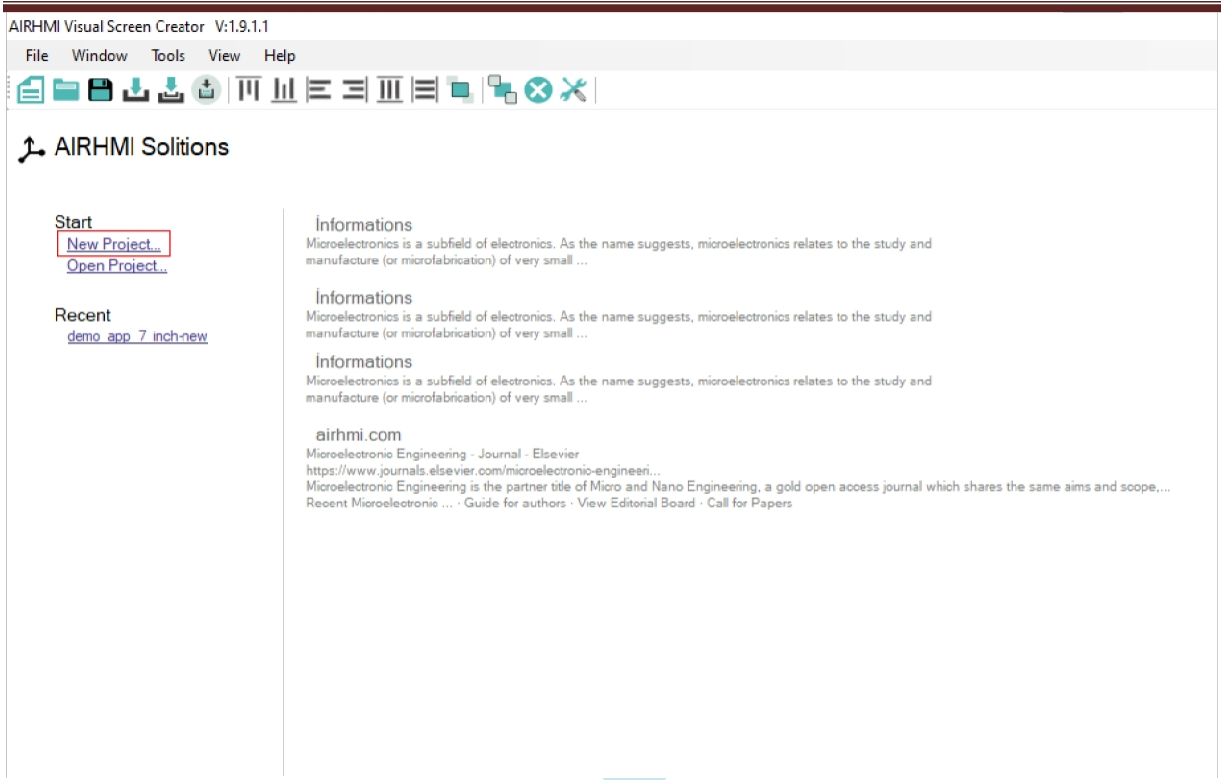


2. PROJECT CREATION

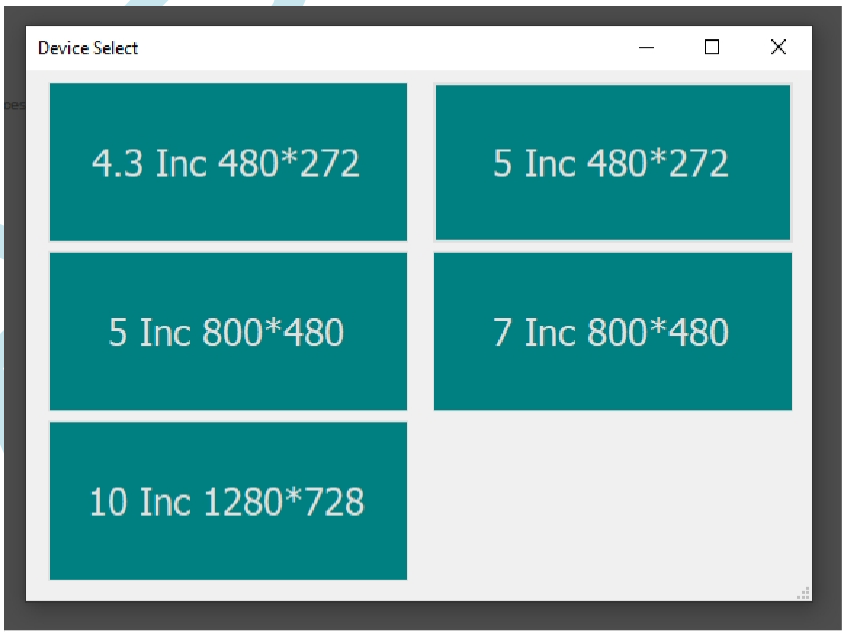
To create an interface with AirHMI, you must first download and install the AirHMI Editor program on your computer. The drag-and-drop feature in the AirHMI Editor program makes interface development easier. With AirHMI Editor, you can add buttons, pictures, text, Progress bar, Gauge, Key, Numeric inputs and outputs to see Analog and Digital values
You can add many components such as.

The program is very easy to install. After installation, you should run the AirHMI Editor program. You will see a page as shown in the pictures below. From this page, follow the File - New path in the upper left corner or the first opening of the program
You create your project by clicking on New Project from the tabs that appear on the page.





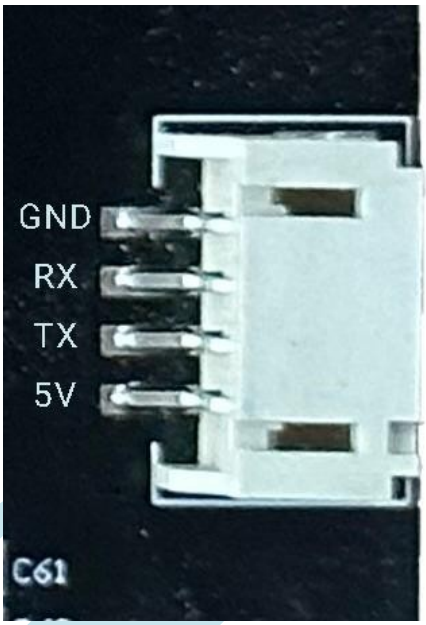
After registration, you will see a page as shown in the picture below. On the page that appears, settings related to the size and resolution of the screen should be made.



3. DEVICE CONNECTION

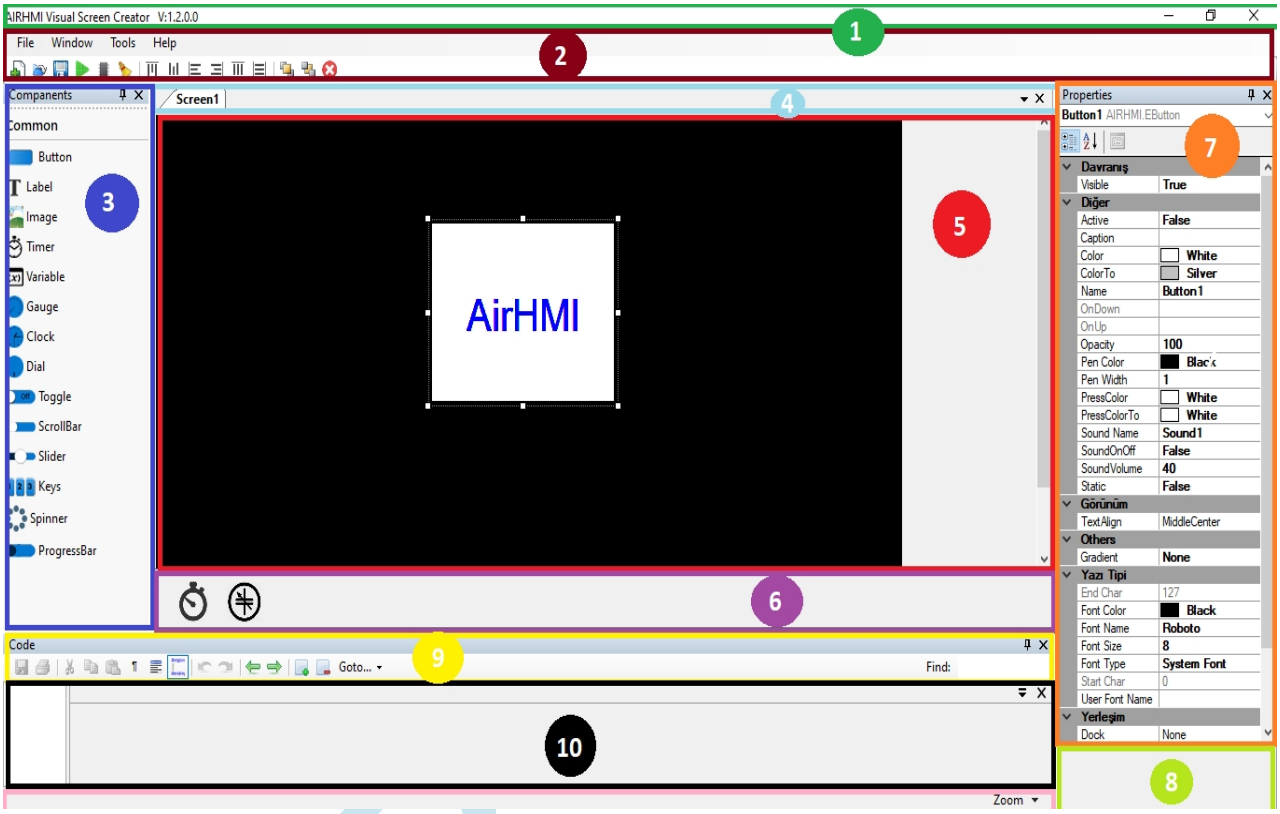
The power connector that we energize the AirHMI display has four pins. 1 and 4 are supply, the middle two pins are uart communication pins.

1) The pins of the POWER connector are as follows;



Warning: Do not reverse the 5V supply. If you reverse the supply, your screen may be damaged.

4. AirHMI EDITOR MAIN INTERFACE



4.1 TITLE BAR

The Title Bar contains the application name and version number when an AirHMI project is opened.

4.2 MAIN MENU and TOOL BARS

File Menu

For users, there are commands such as Open New Project, Save Project, Save Project As, Open an Existing Project and Exit. The important point here is that an existing project

If you want to keep the old project on the computer when you want to open a new project while it is open, or if you want to prevent the changes made from being lost, you should confirm the save message that appears on the screen.

Window

Within the window area;

- Create a new work screen in addition to the main screen used in the project (Add Screen)
- Downloading the designed interface screen to the AirHMI LCD Board via the selected USB port (Download to Flash)
- The designed interface screen can be extracted as external files to a desired file in the computer (Download to SD Card). It is used for Bootloader loading via SD Card when USB loading is not desired. When the files are copied to the SD Card and the project is run on the SD Card, the files are loaded from the SD Card as if they were loaded via USB.

Tools

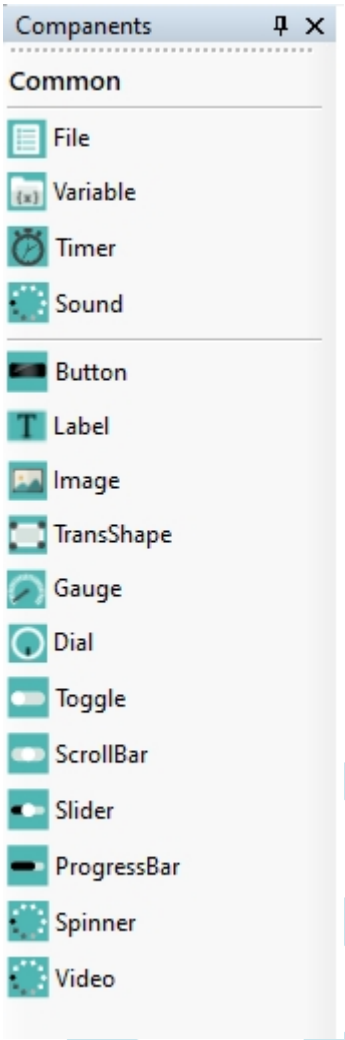
There is a port selection and baud rate setting section for USB upload in Options in Tools. Since USB upload works at many baud rates, the user can select the desired baud rate setting and perform the upload.

Alignment

Left Align**,** Right Align**,** Top Align and Bottom Align; vertically and horizontally averaging features align or center the specified objects as desired.

Bring to Front and Send to Back properties can be used to determine which of the nested objects will be in the front and used for objects that are desired to be in the background.

4.3 COMPONENTS COMPARTMENT



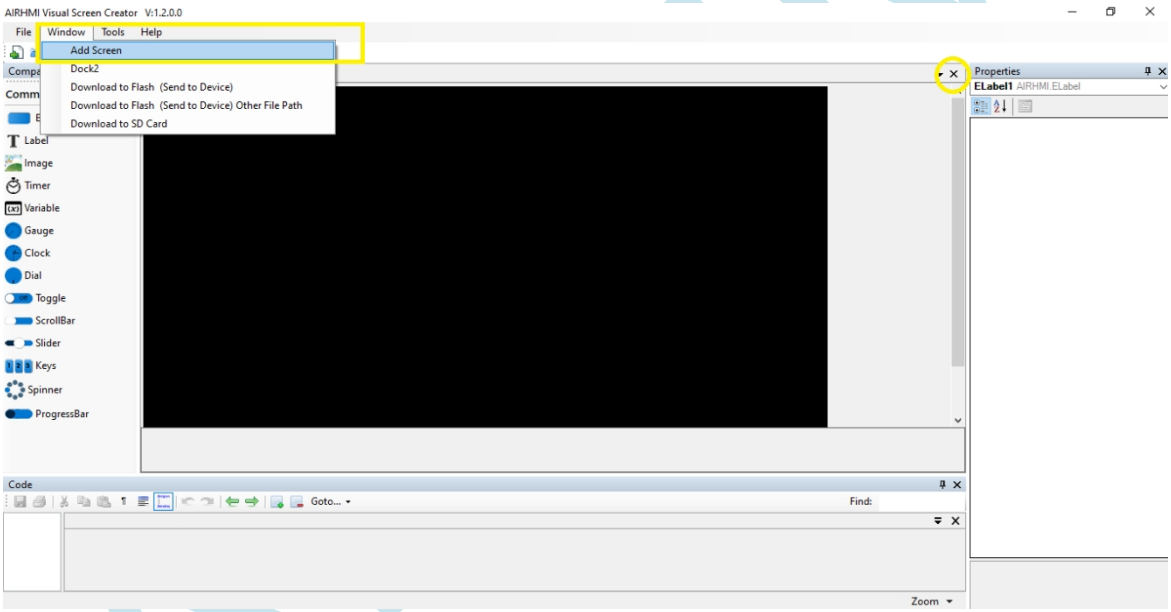
This is the section where ready-made objects to be displayed on the AirHMI LCD Design Screen are located. The object to be used is added to the project by clicking on it and dragging it to the screen area. External objects that are not shown on the screen are also in this section: Timer and Variable. These objects are displayed on the screen

field at the bottom of the Components without Images

Field section. Setting the properties of objects (position, size, name, etc...) specific to the designed project is available in the section called Objects Attribute Area.

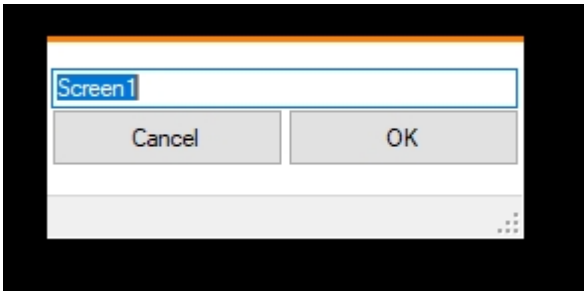
4.4 SCREEN / COMMAND TAB

Design projects are generally not used as a single screen but need different screens at the same time. Opening General Display Screen, Menu Setting Screen, Detailed Display Screen, etc... For this reason, the user can design more than one original and creative screen in the AirHMI Editor in line with their requests. With the Screen / Command Tab, the process of selecting which screen to work on is realized.



To add a new worksheet, you can use the Window/Add Screen tab or right-click on an empty space on the worksheet and select Add Screen. To delete the opened worksheet, just press the cross (x) at the end of the Screen / Command Tab line.

To change the name of the screen, right click on an empty area on the screen and click on the Rename tab. The name of the screen can be changed in the tab that opens.



4.5 DESIGN MAIN SCREEN AREA

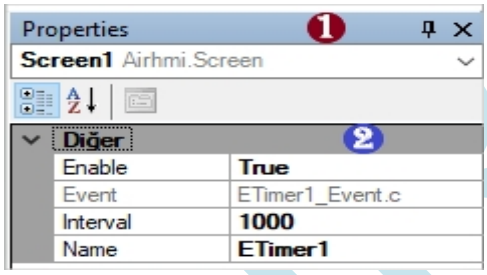
AIR HMI Designer work screen design image area. In LCD screen design, features such as which objects will be located where on the screen, their sizes, text features are shown in this area.

AHMI SCREEN EDITOR

4.6 AREA OF COMPONENTS WITHOUT VISUALS

Not all components in a project are shown on the LCD screen. There are also components that do not need to be shown on the LCD screen while performing very important tasks in the background: Timer and Variable. It is important to show the components that are not shown on the LCD screen but work in the background in the Editor for ease of use and understandability during design. The Non-Visual Components Area is the area where components such as Timer and Variable used in the project are shown.

4.7 ATTRIBUTE SPACE OF OBJECTS



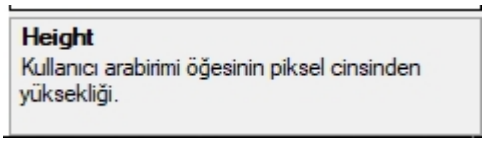
4.8 3.7.1 Display Area of Objects Used in the Project

Many objects can be used in LCD screen design. Each object has its own settings. In projects where more detail is required, it can be complicated to find the object to be adjusted from the design screen. In order to prevent this complexity, this is the area where the list of all objects used in the design is located. In this way, the desired object can be selected and its settings can be made in the Attribute area.

4.9 3.7.2 Attributes of Objects Display / Setting Area

In AirHMI Editor, objects are automatically added with their initial settings when they are included in the project. Users can edit many properties of the objects they add according to their usage purposes and requests, such as names, sizes, appearance, colors, etc. in this area.

4.10 ATTRIBUTES DESCRIPTION FIELD



The settings of the objects are performed in the attribute field. But only the attribute name is written there. In the Attribute Description field, there is a description of the attributes. It is generally explained what functions the attribute headers fulfill.

4.11 USER PROJECT CODE MENU and TOOL BARS

The most important part of the designed project is the code phase. According to the basis of the project, what will be shown on the design screen in which situations is set by the coding structure. The Code Menu contains some basic components that can help the user in writing code, such as save code, copy and paste, search for keywords in the code and so on.

4.12 USER PROJECT CODE FIELD

It contains a valid AirHMI PICOC Code Instruction for User Project Code. This section will not teach programming, but will generally help the user to add code. In this area, users will be able to write C-based codes to the events of the Timer component or the events of the objects they use on the screen. Thanks to the ready-made library codes supported by Screen Editor, the software difficulty is minimized.

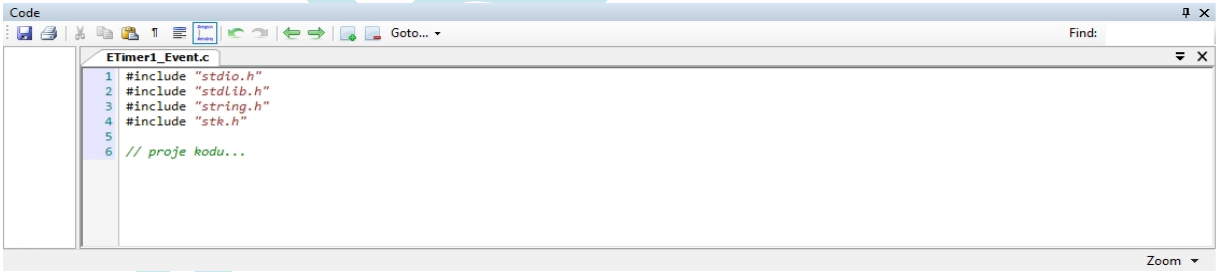
You can examine the ready-made functions for the section in detail under the third heading (3. Functions). In addition to the functions mentioned there, all of the C-based code is included in this field.

can be written and run simultaneously in the program.

4. 13CODE AREA ZOOM AREA

In the project design, in order to make the code field text size easier for the user to use is the area where you can zoom in and out to the desired extent.

4. 14CODE FIELD



In addition to the solution-oriented structure of AirHMI Editor, which aims to create a design at the most efficient point in terms of time and effort, one of the most important advantages is its easy and understandable code structure. The code structure is prepared in C programming language. However, in order to be user-oriented and to provide ease of use to the user, the necessary functions are prepared under the "stk.h" library. In this layout where the basic C libraries are attached, you can create your code using the C programming language and add the necessary functions to your code.

you can add per C function. In addition to the ready-made C functions, you can find ready-made functions with explanations on many important topics such as object control / setting functions, LCD screen sleep mode, timer code layout. The important point here is that the "stk.h" library must be added to the beginning of each code structure for these functions to work actively.

ETimer1_Event.c

```c
#include "stdio.h"
#include "stk.h"

char uartData[10];
int uartsize;
uartDataGet(uartData, &uartsize);

if(uartsize > 0)
{
    ImageSet ("EImage1" , "Visible" , "1");
    LabelSet ("ELabel1" , "Caption" , "Deneme");
    LocalIntVarSet("Varible1" , 2);

    DrawScreenGet();

}
```

The sample code structure is prepared with timer. Detailed explanation for timer code structure **2.1 TIMER**
is described under the heading.

The code structure can be in Timer according to the desired situation, as well as the code structure that we want to run when objects are touched for resistive screens. The code you will create in the Event in the Timer should be added to the OnUp section in the attribute section in the same way as the code structure you want to be active when the objects are touched while the timer interval is active in the entire program.

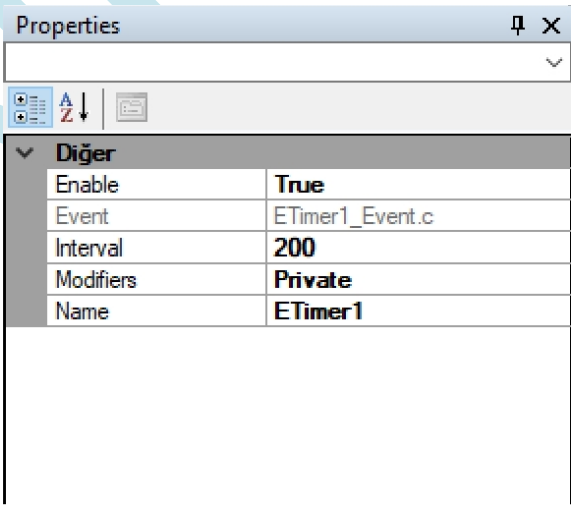
5. ARHMIC OBJECTS AND FUNCTIONS

5.1 TIMER

Perhaps the most important point in the code structure is the use of Timer. The changes that will occur in the real-time operation of the designed editor screen in the project and the intervals at which these changes will occur are set in the Timer Attributes. Enable selects whether the Timer will be active or not. Interval selects the intervals in milliseconds at which the code will be active. Name, as the name suggests, is the name of the Timer. Event section is the section to open the code section to be created for the project design. ETimer1_Event.c is the name of the C file where the generated code is saved.

In Timer usage, the code structure activates the code directory at those intervals according to the time set in the Interval, regardless of the state of the objects. If the user uses a resistive screen in his project and wants to perform an operation when an object is touched; he needs to come to the OnUp section of the object he wants to perform an operation when touched and add the code under this attribute. Thus, the code written only when that object is touched will be active regardless of the Timer.

Timer Properties Window



Feature	Option	Description
Enable	True False	Enables the timer object. Makes the timer object disable.
Name		This is the name of the object used for design. This name is used in the object name section of the code.
Event		Timer object is a software field.
Interval		Sets the timer repeat time.
Modifiers	Private Public	It is the timer that works only on this page. Timer that works on all pages.

Functions

1. TimerSet ( )

Description

It is the command that regulates the parameter settings of the button object.

Function

void TimerSet(unsigned char *name , unsigned char *type , unsigned char *value)

Parameter	Description
name	Name of the object
type	Name of the parameter of the object to be modified
value	The new value of the parameter to be modified

Enable command

TimerSet(Object name , "Enable" , "1 , 0 or True , False");

Sample Code:
ButtonSet (*"Timer1"* , *"Enable"* , "*True*");

Interval command

TimerSet(Object name , "Interval" , "Value in milliseconds."); Sample

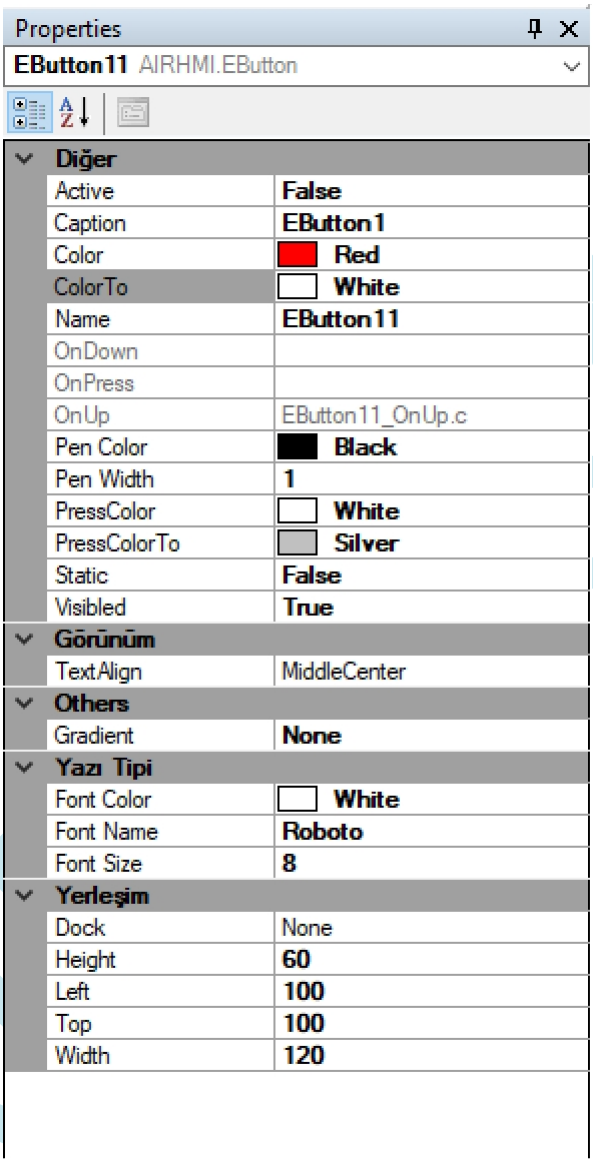
Code:
ButtonSet (*"Timer1"* , *"Interval"* , "*1000*"); // sets the interval to 1 second.

5.2 Button

A button object is an object that allows any action to be taken when it is pressed. For example, it can be used to send the data received from the user somewhere, to perform an operation with the received data or to give a message. You can drag the position of the button wherever you want and adjust its size by pulling its edges.

Button Shapes

Button Properties Window



Feature	Option	Description
Active	True False	Allows the button object to be pressed. The button object does not allow the press function.
Caption,Text		The name of the button object on the screen.
Color		Specifies the color of the button object on the screen.
ColorTo		If the Gradient property is selected, a transitional button object is created on the screen. It is used to define the transition color of this object from Color to ColorTo.
Name		The name of the object used for design. In the code section this name is used in the object name section.
OnDown		The piece of code that runs during the button object press function is written here.
OnPress		It will work as long as we keep our hand pressed on the button object is the piece of code. It works repetitively.
OnUp		Code that runs when we withdraw our hand from the button object part is written here.
Border Color		It is the color to indicate the boundaries around the Button Object in the form of a line.
Border Color		The line created around the button object thickness.
Press Color		Specifies the color of the button object on the screen when pressed.
Press ColorTo		If the Gradient property is selected, while pressed, a button object with a transition is created on the screen. To define the transition color of this object from Press Color to Press ColorTo is used.
Static		
Visible	True False	Appears when the screen first appears. The screen is not visible when it first appears.
Text Aling		It is the positioning of the text on the button object relative to the button.
Gradient	None Top to Buttom Left to Right	The Gradient feature is turned off. ColorTo and Press ColorTo are disabled. Gradient colors are applied from top to bottom. Gradient colors are applied from left to right.
Font Color		The text color of the button.
Font Name		Defining different font options for the button object It is done.
Font Size		The size of the font of the object's text.

Dock	MANUAL	The way the button object is snapped to the screen. Full screen You can make a laying process.
Height		It is the height of the object.
Left		Specifies the position on the screen. X coordinate
Top		Indicates the position on the screen. Y coordinate
Width		It is the width of the object.

Functions

2. ButtonSet ( )

Description

It is the command that regulates the parameter settings of the button object.

Function

void ButtonSet(unsigned char *name , unsigned char *type , unsigned char *value)

Parameter	Description
name	Name of the object
type	Name of the parameter of the object to be modified
value	The new value of the parameter to be modified

Visible adjustment command

ButtonSet(Object name , "Visible" , "1 , 0 or True , False");

When the Value property is set to "True" the button object appears, when it is set to "False" it does not appear.

Sample Code:
ButtonSet (*"EButton1"* , *"Visible"* , "*True"*);

Active setting command

ButtonSet(Object name , "Active" , "1 , 0 or True , False");

Sample Code:
ButtonSet("EButton1" , "Active" , "True");

Left adjustment command

ButtonSet(Object name , "Left" , "X coordinate");

Sample Code:
ButtonSet("EButton1" , "Left" , "10");

Ball adjustment command

ButtonSet(Object name , "Top" , "Y coordinate");

Sample Code:
ButtonSet("EButton1" , "Top" , "255");

Width adjustment command

ButtonSet(Object name , "Width" , "Size (0 to Screen X size)"); Sample

Code:
ButtonSet("EButton1" , "Width" , "90");

Height adjustment command

ButtonSet(Object name , "Height" , "Size (from 0 to Screen Y size)");

Sample Code:
ButtonSet("EButton1" , "Height" , "70");

Color adjustment command

ButtonSet(Object name , "Color" , "RGB Color in hex format #RRGGBB");

Sample Code:
ButtonSet("EButton1" , "Color" , "#FFA07A");

ColorTo adjustment command

ButtonSet(Object name , "Color To" , "RGB Color in hex format #RRGGBB");

Sample Code:
ButtonSet("EButton1" , "ColorTo" , "#FFA07A");

Press_Color setting command

ButtonSet(Object name , "Press Color" , "RGB Color in hex format #RRGGBB");

Sample Code:
ButtonSet(*"EButton1"* , *"Press_Color"* , "*#FFA07A"*);

Press_ColorTo adjustment command

ButtonSet(Object name , "Press ColorTo" , "RGB Color in hex format #RRGGBB"

); Sample Code:
ButtonSet(*"EButton1"* , *"Press_ColorTo"* , "*#FFA07A"*);

FontSize adjustment command

ButtonSet(Object name , "FontSize" , "Font size is set between 8-102."); Sample

Code:
ButtonSet(*"EButton1"* , *"FontSize"* , "*12"*);

Font_Color setting command

ButtonSet(Object name , "Font Color" , "RGB Color in hex format #RRGGBB");

Sample Code:
ButtonSet(*"EButton1"* , *"Font_Color"* , "*#FFA07A"*);

Caption setting command

The string expression of the button object that appears on the screen is

changed with this command. ButtonSet(Object name , "Caption and Text" ,

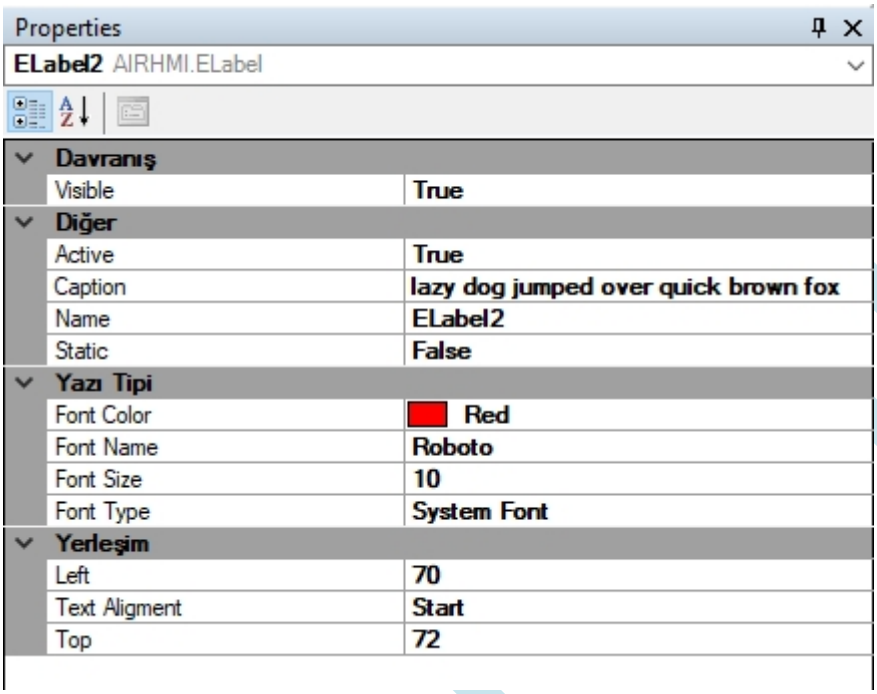
"Hello World!");

Sample Code:
ButtonSet(*"EButton1"* , *"Caption"* , *"Hello World!"*);
ButtonSet(*"EButton1"* , *"Text"* , *"Hello World!"*);

5.3 Label

It is an object used for writing on the screen. It supports font size from 8 to 102. Default Font is "Roboto".

Label Properties Window



Feature	Option	Description
Active	True False	If turned on, the keyboard will automatically appear when the label is touched. The keyboard is inactive.
Caption ,Text		The text of the Label object that appears on the screen.
Color		Specifies the color of the button object on the screen.
Visible	True False	Appears when the screen first appears. The screen is not visible when it first appears.
Name		This is the name of the object used for design. This name is used in the object name section of the code.
Static		Reserved.
Visible	True False	Appears when the screen first appears. The screen is not visible when it first appears.
Text Alingment	Start Center	Label object left justification, Label object average
Font Color		Label's text color.
Font Name		Different font options are defined for the Label object.
Font Size		The size of the font of the object's text.
Height		It is the height of the object.
Left		Specifies the position on the screen. X coordinate

Top		Indicates the position on the screen. Y coordinate
Width		It is the width of the object.

Functions

LabelSet ( )

Description

It is the command that regulates the parameter settings of the Label object.

void **LabelSet**(unsigned char *name , unsigned char *type , unsigned char *value)

Parameter	Description
name	Name of the object
type	Name of the parameter of the object to be modified
value	The new value of the parameter to be modified

Active setting command

LabelSet(Object name , "Active" , "1 , 0 or True , False");

Sample Code:
LabelSet(*"ELabel1"* , *"Active"* , "*True*");

Visible adjustment command

LabelSet(Object name , "Visible" , "1 , 0 or True , False");

Sample Code:
LabelSet(*"ELabel1"* , *"Visible"* , "*1*");

Left adjustment command

LabelSet(Object name , "Left" , "10");

Sample Code:
LabelSet(*"ELabel1"* , *"Left"* , "*10"*);

Ball adjustment command

LabelSet(Object name , "Top" , "255");

Sample Code:
LabelSet (*"ELabel1"* , *"Top"* , "*255"*);

FontSize adjustment command

LabelSet(Object name , "FontSize" , "16"

); Sample Code:
LabelSet(*"ELabel1"* , *"FontSize"* , "*16"*);

Font_Color setting command

LabelSet (Object name , "Font_Color" , "RGB Color in hex format #RRGGBB");

Sample Code:
LabelSet(*"ELabel1"* , *"Font_Color"* , "*#FFA07A"*);

Caption, Text setting command

The string expression of the Label object that appears on the screen is changed

with this command. LabelSet (Object name , "Caption and Text" , "Hello

World!");

LabelSet (*"ELabel1"* , *"Caption"* , *"Hello World!"*);
LabelSet (*"ELabel1"* , *"Text"* , *"Hello World!"*);

LabelGet()

void **LabelGet**(unsigned char *name , unsigned char *type , unsigned char *value)

Parameter	Description
name	Name of the object
type	Name of the parameter of the object to be modified
value	The new value of the parameter to be modified

Caption, Text command

The string expression of the Label object that appears on the screen is changed

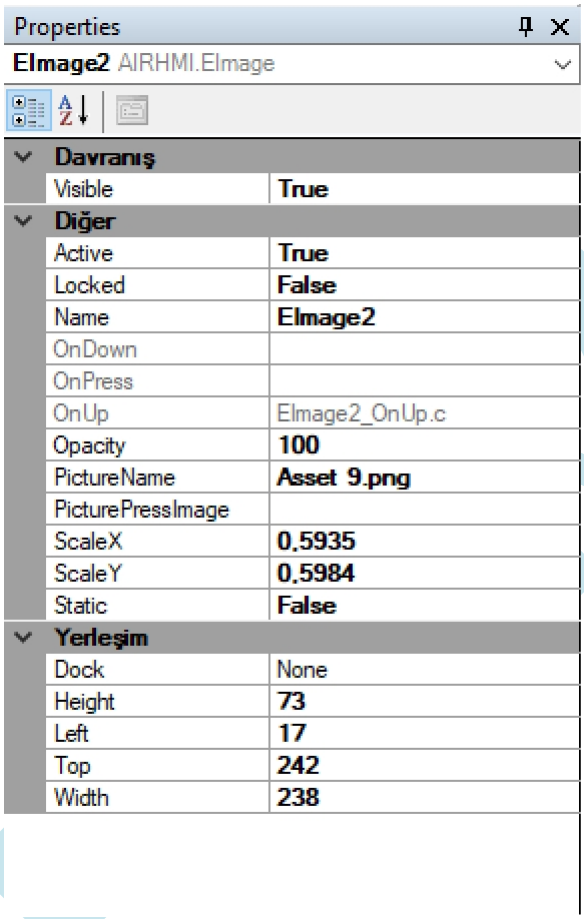
with this command. LabelGet (Object name , "Caption and Text" , char *

buffer);
Char value[20];
LabelGet(*"ELabel1"* , *"Caption"* , *value*);
LabelGet(*"ELabel1"* , *"Text"* , *value*);

5.4 Image

Image object can be used to display images and use images as buttons. With the press image property, you can assign two images to an object and change their images in normal state and press state without writing any code.

Image Properties Window



Feature	Option	Description
Active	True False	If turned on, the image can be used as a button. If it is off, it is only used as a picture.
Visible	True False	Visible when the screen first appears. Not visible when the screen first appears.
Name		The name of the object used for design. Code this name is used in the object name section.
Static		Reserved.
Locked	True False	Does not allow to change the position of the object placed on the screen. You can move the image to the desired position.
Text Alingment	Start Center	Label object left justification, Label object average
Height		It is the height of the object.
Left		Specifies the position on the screen. X coordinate
Top		Indicates the position on the screen. Y coordinate
Width		It is the width of the object.
Image File		It is the image file you need to upload from your computer.
Press Image File		The image while holding down on the Image object.
ScaleX		The magnification and reduction ratio of the image object in X dimension.
ScaleY		Zoom in and out in Y dimension of an image object is the ratio.
OnDown		The piece of code that runs during the function to print to the Image object is written here.
OnPress		As long as we keep our hand pressed on the Image object is the piece of code that will run. It runs repetitively.
OnUp		This is the code fragment that runs when the Image object is pulled.

Functions

ImageSet ( )

Description

It is the command that sets the parameter settings of the Image object.

Function

void ImageSet(unsigned char *name , unsigned char *type , unsigned char *value)

Parameter	Description
name	Name of the object
type	Name of the parameter of the object to be modified
value	The new value of the parameter to be modified

Example code

Visible adjustment command

ImageSet(Object name , "Visible" , "1 , 0 or True , False");

Sample Code:
ImageSet(*"EImage1"* , *"Visible"* , "*True*");

Left adjustment command

ImageSet(Object name , "Left" , "Left Position");

Sample Code:
ImageSet (*"EImage1"* , *"Left"* , "*10*");

Ball adjustment command

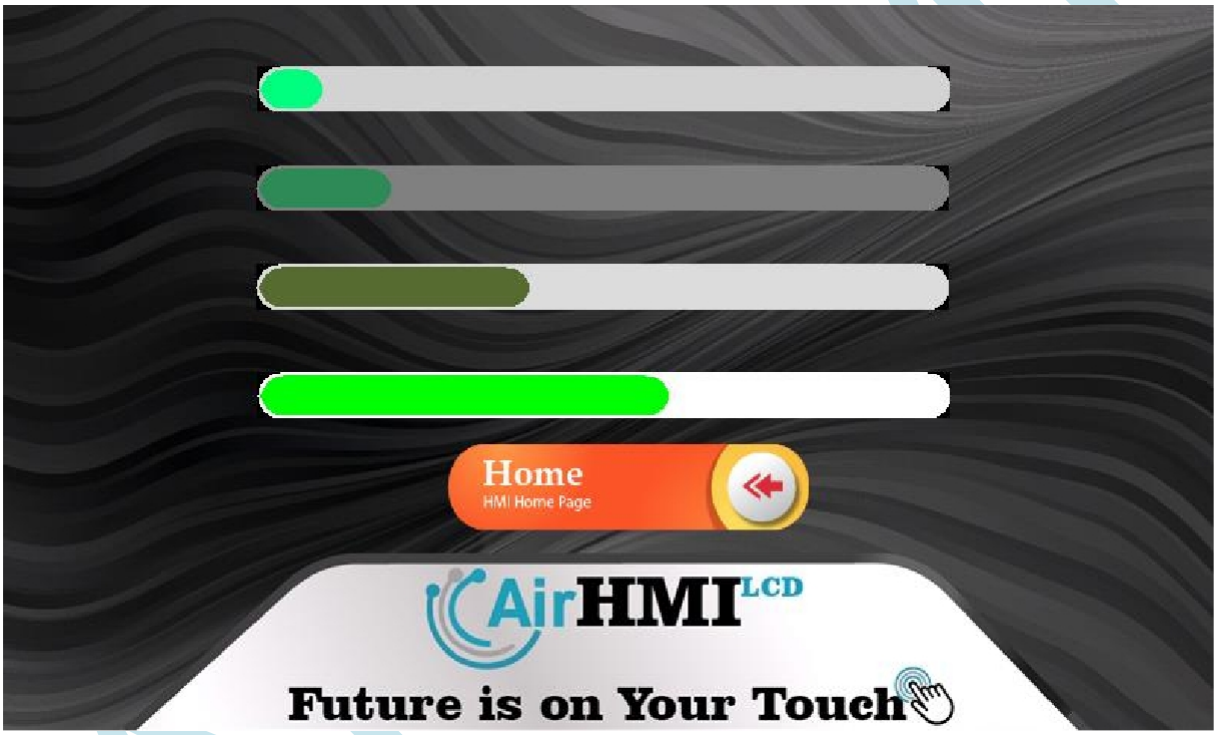
ImageSet(Object name , "Ball" , "Ball Position");

Sample Code:
ImageSet (*"EImage1"* , *"Top"* , "*255"*);

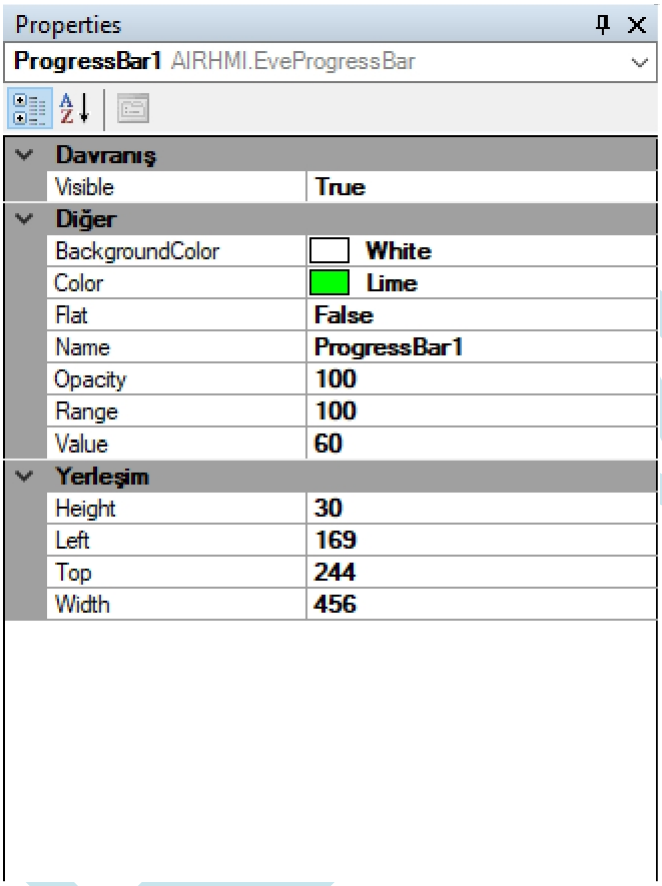
5.5 ProgressBar

Progress Bar means "progress bar" in Turkish. It is used when the execution stages of a long process need to be shown graphically. An example of using Progress Bar: a video or audio file that is being played

time on the Progress Bar, graphical representation of the fill rate of a fuel tank using the Progress Bar.



ProgressBar Properties Window



Feature	Option	Description
Visible	True False	Appears when the screen first appears. The screen is not visible when it first appears.
Name		It is the name of the object used for design. This name is used in the object name section of the code.
Color		The middle part of the progressbar object indicates the color.
BackgroundColor		Specifies the background color of the Progressbar object.
Range		Progress bar specifies how many values there will be in total.
Value		Specifies what percentage the progressbar will start at when it is loaded on the first screen.
Height		It is the height of the object.
Left		Specifies the position on the screen. X coordinate
Top		Indicates the position on the screen. Y coordinate
Width		It is the width of the object.

Functions

ProgressBarSet ( )

Description

It is the command that regulates the parameter settings of the Progress Bar object.

Function

void ProgressBarSet(unsigned char *name , unsigned char *type , unsigned char *value)

Parameter	Description
name	Name of the object
type	Name of the parameter of the object to be modified
value	The new value of the parameter to be modified

Example code

Visible adjustment command

ProgressBarSet(Object name , "Visible" , "1 , 0 or True , False");

Sample Code:
ProgressBarSet(*"ProgressBar1"* , *"Visible"* , "*False*");

Left adjustment command

ProgressBarSet(Object name , "Left" , "X coordinate position on the screen"

); Sample Code:
ProgressBarSet(*"ProgressBar1"* , *"Left"* , "*10*");

Ball adjustment command

ProgressBarSet(Object name , "Top" , "Y coordinate position on the screen");

Sample Code:
ProgressBarSet(*"ProgressBar1"* , *"Top"* , "*255"*);

Color adjustment command

ProgressBarSet(Object name , "Color" , "RGB Color in hex format #RRGGBB");

Sample Code:
ProgressBarSet(*"ProgressBar1"* , *"Color"* , "*255"*);

BackGround_Color setting command

ProgressBarSet(Object name , "BackGround_Color" , "RGB Color in hex format #RRGGBB");

Sample Code:
ProgressBarSet(*"ProgressBar1"* , *"BackGround_Color"* , "*1458269"*);

Range adjustment command

ProgressBarSet(Object name , "Range" , "Range (numeric)"

); Sample Code:
ProgressBarSet(*"ProgressBar1"* , *"Range"* , "*100"*);

Value setting command

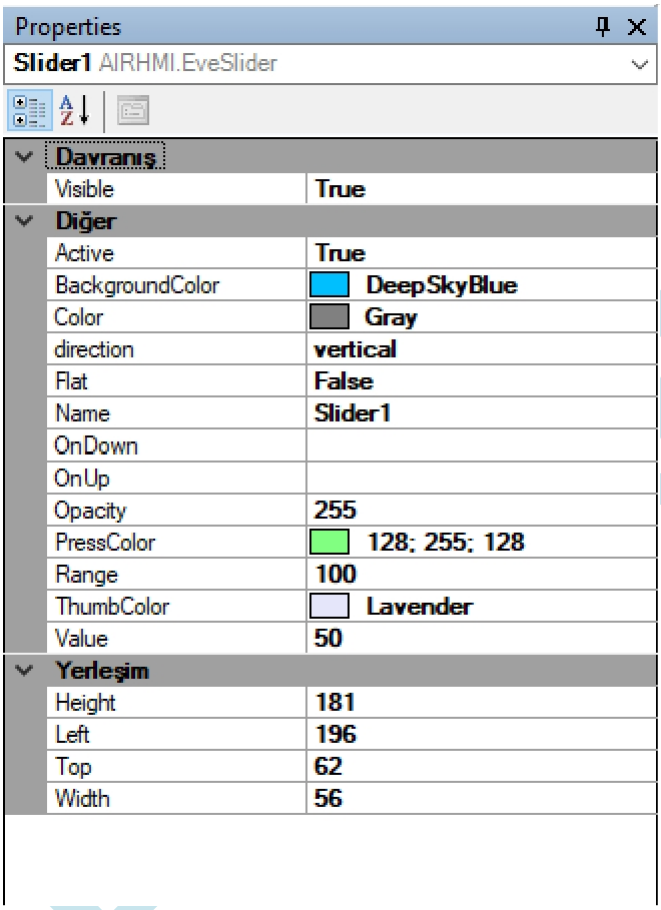
ProgressBarSet(Object name , "Value" , "Value (numeric)"

); Sample Code:
ProgressBarSet(*"ProgressBar1"* , *"Value"* , "*50"*);

5.6 Slider

A slider or trackbar is a graphical control element where the user can set a value by moving an indicator horizontally or vertically. In some cases, the user can also click a point on the slider to change the setting.

Slider Properties Window



Feature	Option	Description
Visible	True False	Appears when the screen first appears. The screen is not visible when it first appears.
Active	True False	Allows press function on the slider object. The slider object does not allow the press function.
Name		The name of the object used for design. Code this name is used in the object name section.
Color		The color of the back part of the slider object.
BackgroundColor		Specifies the background color of the slider object.
ThumpColor		The color of the round part on the slider object.
PressColor		When the slider object is pressed, the round changes the color of the part.
Range		Progress bar specifies how many values there will be in total.
Value		Specifies what percentage the progressbar will start at when it is loaded on the first screen.
Direction		Control the Vertical, Horizontal Slider object on the screen direction.
Height		It is the height of the object.
Left		Specifies the position on the screen. X coordinate
Top		Indicates the position on the screen. Y coordinate
Width		It is the width of the object.

SliderSet ( )

Description

It is the command that regulates the parameter settings of the slider object.

Function

void SliderSet(unsigned char *name , unsigned char *type , unsigned char *value)

Parameter	Description
name	Name of the object
type	Name of the parameter of the object to be modified
value	The new value of the parameter to be modified

Visible adjustment command

SliderSet(Object name , "Visible" , "1 , 0 or True , False"

); Sample Code:

```
SliderSet("Slider1" , "Visible" , "1");
```

Left adjustment command

SliderSet(Object name , "Left" , "X coordinate position on the

screen"); Sample Code:

```
SliderSet("Slider1" , "Left" , "10");
```

Ball adjustment command

SliderSet(Object name , "Top" , "Y coordinate position on the

screen"); Sample Code:

```
SliderSet("Slider1" , "Top" , "255");
```

SliderGet ( )

Description

It is the command to get the parameter settings of the slider object.

Function

void SliderGet(unsigned char *name , unsigned char *type , unsigned char *value)

Parameter	Description
name	Name of the object
type	Name of the parameter of the object to be modified
value	The new value of the parameter to be modified

Value command

SliderGet(Object name , "Value" , "char * buffer"

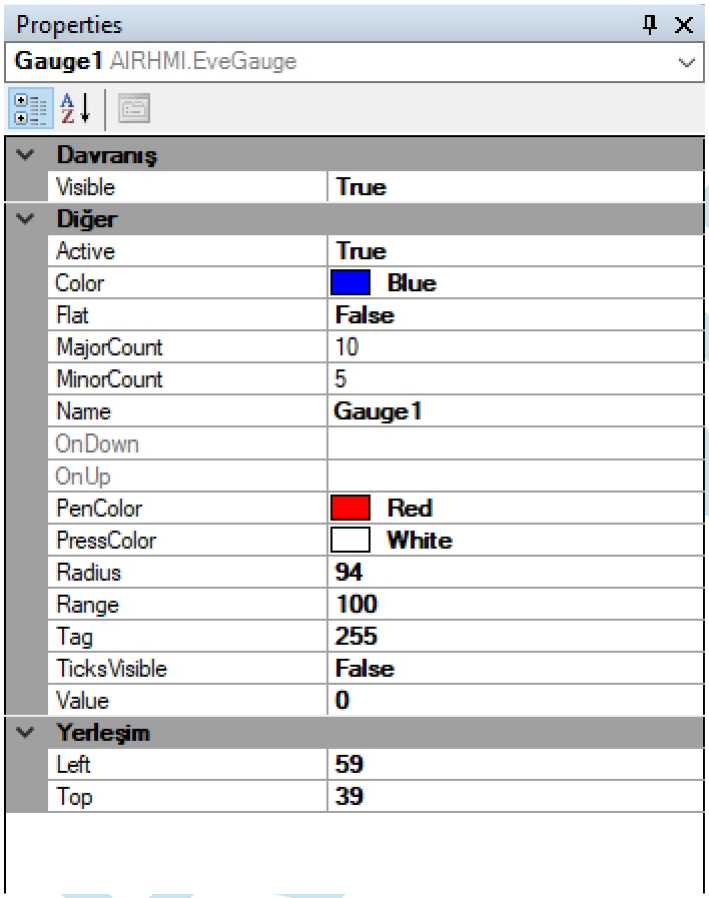
); Sample Code:

```
char buffer[20];
SliderGet("Slider1" , "Value" , buffer);
```

5.7 Gauge

The Gauge object is an effective object for displaying analog values. It is also used as a speedometer.

Gauge Properties Window



Feature	Option	Description
Visible	True False	Appears when the screen first appears. The screen is not visible when it first appears.
Name		It is the name of the object used for design. This name is used in the object name section of the code.
Color		The portion of the back of the gauge object is the color.
BackgroundColor		Specifies the background color of the slider object.
PressColor		When the slider object is pressed, the round changes the color of the part.
Range		Progress bar specifies how many values there will be in total.
Value		From what percentage when the progressbar is loaded on the first screen will start.
Radius		Sets the diameter of the gauge object.
TicksVisible		Turns the lines around the Gauge object on and off.
Left		Specifies the position on the screen. X coordinate
Top		Indicates the position on the screen. Y coordinate

Functions

GaugeSet ( )

Description

This command sets the parameter settings of the Gauge object.

Function

void GaugeSet(unsigned char *name , unsigned char *type , unsigned char *value)

Parameter	Description
name	Name of the object
type	Name of the parameter of the object to be modified
value	The new value of the parameter to be modified

Example code

Visible adjustment command

GaugeSet(Object name , "Visible" , "1 , 0 or True , False");

Sample Code:

```
GaugeSet("Gauge1" , "Visible" , "1");
```

Left adjustment command

GaugeSet(Object name , "Left" , "X coordinate position on the screen");

Sample Code:

```
GaugeSet("Gauge1" , "Left" , "10");
```

Ball adjustment command

GaugeSet(Object name , "Top" , "Y coordinate position on the screen");

Sample Code:
GaugeSet("Gauge1" , "Top" , "255");

Color adjustment command

GaugeSet(Object name , "BackGround_Color" , "RGB Color in hex format #RRGGBB");

Sample Code:
GaugeSet("Gauge1" , "Color" , "#ffaa02");

Value setting command
GaugeSet(Object name , "Value" , "Value (numeric)");

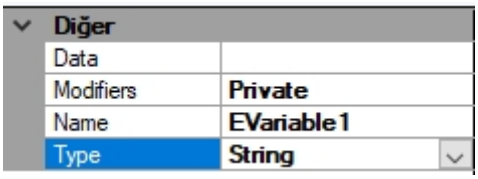
Sample Code:
GaugeSet("Gauge1" , "Value" , "100");

Range adjustment command

GaugeSet(Object name , "Range" , "Value (numeric)"

); Sample Code:
GaugeSet("Gauge1" , "Range" , "30");

5.8 VARIABLE



Variables play a very important role in the code structure for situations where it is desired that the last values of the variables or the value of the variables in each edit in the code are not lost. Since the code structure is generally compiled and re-run every time the timer is active or when the touch is active in resistive screen projects, the normal variables created in it reset themselves. This poses major problems for the user when data from the previous position or state is to be used. To prevent such a problem, variables come into play. The name of the variables is given from the Attributes section with the Name heading. The type of the variable to be used should be selected under the Type heading as String if it is char and Integer if it is a numeric value. Another feature, Modifiers, should be selected from the Attributes section to select whether the variable we want to use will be Private (local) or Public (global). Local-global distinction is made in projects where more than one screen design will be used. If work will be performed on a single screen, the Private (local) variable can realize the desired state. However, in projects where it is desired to use more than one screen, for example, if a value on the second screen is desired to be used when switching to the first screen, the Public (Global) variable should be used here. Explanations on the use of variables in the code structure are given below.

```
GlobalStdVarGet("EVariable1" , "string");
1  2  3        4          5
```

Variable:

1. Global or Local
2. String or Integer

3. Set or Get the value
4. Name.
5. The desired function should be used according to

the state of the variable to get the new value or the old

value.

```
int value;
LocalStdVarSet("EVariable1" , "string");      // Set String variable that is local
GlobalIntVarGet("EVariable2", &value);   //   Get Integer variable that is global
```

LocalStdVarGet ( )

Description

Local is a string data read command.

Function

void LocalStdVarGet(unsigned char *name , unsigned char *value)

Parameter	Description
name	Name of the local variable
value	String to assign the local variable to

Example code

```
#include "stdio.h"

#include "stk.h"
char data[200];
```

```
LocalStdVarGet("EVariable1" , data);     // Get String variable that is local
```

LocalStdVarSet ( )

Description

Local is a string value assignment command.

Function

void LocalStdVarSet(unsigned char *name , unsigned char *value)

Parameter	Description
name	Name of the local variable
value	The string that the local variable will take

Example code

```
#include "stdio.h"

#include "stk.h"

LocalStdVarSet("EVariable1" , "string");      // Set String variable that is local
```

LocalIntVarGet ( )

Description

Local is a command to read integer data.

Function

void LocalIntVarGet(unsigned char *name , int *value)

Parameter	Description
name	Name of the local variable
value	Integer to assign the local variable to

Example code

```
#include "stdio.h"

#include "stk.h"

int value;

LocalIntVarGet("EVariable2", &value);   //   Get Integer variable that is local
```

LocalIntVarSet ( )

Description

Local is an integer value assignment command.

Function

void LocalIntVarSet(unsigned char *name , int value)

Parameter	Description
name	Name of the local variable
value	Integer that the local variable will take

Example code

```
#include "stdio.h"

#include "stk.h"

int value = 5;

LocalIntVarSet("EVariable2", value);    //  Set Integer variable that is local
```

GlobalStdVarGet ( )

Description

Global string is a data read command.

Function

void GlobalStdVarGet(unsigned char *name , unsigned char *value)

Parameter	Description
name	Name of the global variable
value	The string to assign the global variable to

Example code

```
#include "stdio.h"

#include "stk.h"

GlobalStdVarGet("EVariable1" , "string"); // Get String variable that is global
```

GlobalStdVarSet ( )

Description

Global string value assignment command.

Function

void GlobalStdVarSet(unsigned char *name , unsigned char *value)

Parameter	Description
name	Name of the global variable
value	The string that the global variable will take

Example code

```
#include "stdio.h"

#include "stk.h"

GlobalStdVarSet("EVariable1" , "string"); // Set the global String variable
```

GlobalIntVarGet ( )

Description

Global integer data read command.

Function

void GlobalIntVarGet(unsigned char *name , int *value)

Parameter	Description
name	Name of the global variable
value	Integer to assign the global variable to

Example code

```
#include "stdio.h"

#include "stk.h"

int value = 5;

GlobalIntVarGet("EVariable2", &value);    // Get the global Integer variable
```

GlobalIntVarSet ( )

Description

Global integer value assignment command.

Function

void GlobalIntVarSet(unsigned char *name , int value)

Parameter	Description
name	Name of the global variable
value	Integer that the global variable will take

Example code

```
#include "stdio.h"

#include "stk.h"

int value = 10;

GlobalIntVarSet("EVariable2", value);    // Set a global Integer variable
```

VariableSave( )

Description

Saves the variable in the memory inside the screen. In this way, even if the screen is turned off and on, this variable value is kept in memory permanently. After making changes in the variable content, the same function is called again to save it again. Maximum 256 variables can be saved in memory.

Function

void VariableSave(unsigned char *name)

Parameter	Description
name	variable name

Example code

```
#include "stdio.h"

#include "stk.h"

VariableSave("EVariable1"); //
```

LocalStdVarGet ( )

Description

Local is a string data read command.

Function

void VarGet(unsigned char *name , void *value)

Parameter	Description
name	Name of the local variable
value	Pointer value according to variable type

Example code

```
#include "stdio.h"

#include "stk.h"
char data[200];
int varint;
double varDouble;
VarGet("EVariable1" , data);
VarGet("EVariable2" , &varint);
VarGet("EVariable3" , &varDouble);
```

If we give NULL to the value part of the *VarGet function, it returns the content of the variable from the serial port.

```
VarGet("EVariable3" , NULL);
```

Function

void VarSet(unsigned char *name , void *value)

Parameter	Description
name	Name of the local variable
value	Pointer value according to variable type

Example code

```
#include "stdio.h"

#include "stk.h"
char data[200];
int varint=5;
double varDouble = 2.15;
VarSet("EVariable1" , data);
VarSet("EVariable2" , &varint);      // The value of EVariable2 becomes 5.
VarSet("EVariable3" , &varDouble);    // The value of EVariable3 becomes 2.15.
```

Function

void VarSet(unsigned char *name , int value)

Parameter	Description
name	Name of the local variable
value	Integer variable value

This function is used to assign an integer value directly to the variable. In the varSet function we need to pass an integer value as an address parameter, whereas in the varSet function we can give this value directly.

Example code

```
#include "stdio.h"

#include "stk.h"

VarSeti("EVariable1" , 15);

Int a = 5;

VarSeti("EVariable1" , a);
```

Function

void VarSets(char *name , char *value)

Parameter	Description
name	Name of the local variable
value	String pointer variable

Example code

```
#include "stdio.h"

#include "stk.h"

VarSets("EVariable1" , "Hello World!"); Char

*data = "Hello World!";

VarSets("EVariable1" , data);
```

Function

void VarSetf(char *name , double value)

Parameter	Description
name	Name of the local variable
value	double variable value

Example code

```
#include "stdio.h"

#include "stk.h"

VarSetf("EVariable1" , 3.14);

double var = 3.14;

VarSets("EVariable1" , var);
```

5.9 Delay( )

Description

It is the command that waits for the specified time on the line it is used.

Function

void Delay (int ms)

Parameter	Description
ms	Specifies the time period

Example code

```
#include "stk.h"

Delay(1000);
```

5.10 uartDataGet ( )

Description

According to the data coming from the UART, operations can be performed on the AMHI Editor screen. It is the command to receive data from the UART in the code layout.

Function

void uartDataGet(char *value , int *uartsize)

Parameter	Description
value	String to store the data from the UART
uartsize	Size of the data from the UART

Example code

```
#include "stdio.h"

#include "stk.h"

char uartData[3000];                    // Store the data coming from the Uart
string

int uartsize;                            //   Size of the data coming from the Uart

uartDataGet(uartData , &uartsize);      //   Reading data from Uart
```

5.11 ChangeScreenSet ( )

Description

It is the command that allows switching between the screens in the code.

Function

void ChangeScreenSet(unsigned char *value)

Parameter	Description
value	Name of the screen to switch to

Example code

```
#include "stk.h"

ChangeScreenSet("Screen1");
```

5.12 dateSet ( )

Description

Command to refresh/set date data in the RTC.

Function

void dateSet (unsigned char *days , unsigned char *months , unsigned char *years)

Parameter	Description
days	Day
months	Moon
years	Year

Example code

```
#include "stdio.h"

#include "stk.h"

unsigned char day, month, year;          // Sample Date-Time variables in the code directory

day    = 10;
month = 2;
year   = 19;

dateSet(&day, &month , &year);          // Set date data from RTC
```

5.13 timeSet ( )

Description

Command to refresh/set clock data in RTC.

Function

void timeSet(unsigned char *hours , unsigned char *mins)

Parameter	Description
hours	Clock
mins	Minute

Example code

```
#include "stdio.h"
#include "stk.h"

unsigned char hour, min;          // Sample Date-Time variables in the code directory

hour = 16;
min  = 30;

timeSet(&hour , &min);            // Refresh/set clock data in RTC
```

5.14 dateGet ( )

Description

Command to get date data from the RTC.

Function

void dateGet(unsigned char *days , unsigned char *months , unsigned char *years)

Parameter	Description
days	Day
months	Moon
years	Year

Example code

```
#include "stdio.h"
#include "stk.h"
unsigned char day, month, year;          // Sample Date-Time variables in the code directory
dateGet(&day, &month , &year);           // Get date data from RTC
```

5.15 timeGet ( )

Description

Command to receive clock data from the RTC.

Function

void timeGet(unsigned char *hours , unsigned char *mins)

Parameter	Description
hours	Clock
mins	Minutes

Example code

```
#include "stdio.h"
#include "stk.h"

unsigned char hour, min;                // Sample Date-Time variables in the code directory
timeSet(&hour , &min);                  // Reading Clock data in RTC
```

5.16 AudioPlay( )

Description

After the user adds the audio file they want to play to the project via AirHMI Editor, they can play it with this function.

Function

void AudioPlay(unsigned char *audioname , unsigned char volume)

Parameter	Description
audioname	Audio file name
volume	Sound level

Example code

```
#include "stdio.h"

#include "stk.h"

int volume;    // Volume

AudioPlay("AudioFileName"  , volume );
```

5.17 AudioStop( )

Description

Used to terminate the currently playing sound process.

Function

void AudioStop ();

Parameter	Description

Example code

```
#include "stdio.h"

#include "stk.h"

AudioStop();
```

5.18 AudioStatusGet( )

Description

Sets whether the audio file is currently being played.

Function

void AudioStatusGet(int *value)

Parameter	Description
value	Player status (1 audio file is still playing, 0 audio file has finished playing.

Status query command

AudioStatusGet(int *value);

When the Value property is set to "True" the button object appears, when it is set to "False" it does not appear.

Sample Code:
int value;
AudioStatusGet(&value);

5.19 File_write ( )

Description

It is a command to write to Flash.

Function

void File_write(unsigned char *name , void *buffer ,int size , int nmemb)

Parameter	Description
name	Name of the .txt file to use
buffer	String array name
size	Size of the array to write
nmemb	1

Example code

```
#include "stdio.h"
#include "stk.h"
char x_file[200];
memset(x_file , 0x00 , sizeof(x_file));
sprintf(x_file , "%s" , "Hello World !!!");

File_write("Message.txt" , x_file , sizeof(x_file), 1);

// A file named Message.txt was created in Flash and x_file data was written
into this file as sizeof(x_file).
```

5.20 File_read( )

Description

It is a command to read from Flash.

Function

void File_read(unsigned char *name , void *buffer ,int size , int nmemb)

Parameter	Description
name	Name of the .txt file to use
buffer	String array name
size	Reading size
nmemb	1

Example code

```
#include "stdio.h"
#include "stk.h"

char x_file[200];
memset(x_file , 0x00 , sizeof(x_file));

File_write("Message.txt" , x_file , sizeof(x_file), 1);

// The sizeof(x_file) of the data in a file named Message.txt in Flash is read into
the x_file variable.
```

5.21 File_size( )

Description

Command to learn file size.

Function

void File_size(unsigned char *name ,int *size)

Parameter	Description
name	Name of the file to use
size	An integer variable to hold the file size in

Example code

```
#include "stdio.h"
#include "stk.h"

int f_size;

File_size("Message.txt" , &f_size);        // Learn the size of the Message.txt file in
Flash.
```

5.22 GPIO_Write( )

Descriptio

n

Function

void GPIO_Write(unsigned char *portName ,int value)

Parameter	Description
portName	Gpio port
value	1 or 0

Example code

GPIO write command

GPIO_Write(GPIO name , 1 or 0);

Sample Code:
GPIO_Write("GPIO_1" , 1);
GPIO_Write("GPIO_1" , 0);

5.23 GPIO_Read( )

Descriptio

n

Function

void GPIO_ Read(unsigned char *portName ,int *value)

Parameter	Description
portName	Gpio port
value	1 or 0

Example code

GPIO read command

GPIO_Read(GPIO name , int *);

Sample Code:
int value;
GPIO_Read("GPIO_1" , &value);

5.24 PWM_Set( )

Description

There are 2 pwm outputs on the Airhmi display. With this function pwm frequency duty is adjusted.

Function

void PWM_Set(int ch , int freq , int duty);

Parameter	Description
ch	Pwm channel 1 or 0
freq	Pwm frequency
duty	Pwm 1 is the percentage of 0. Its value is given as 0-100.

Example code

PWM command

PWM_Set(int ch , int freq , int duty);

Sample Code:

```
PWM_Set( 0,1000000, 50 ); // Channel 0, 1Mhz 50% duty.
PWM_Set( 1,2000000, 70 ); // Channel 0 , 2Mhz 70% duty.
```

5.25 BuzzerSet( )

Description

The Airhmi display has a built-in buzzer.

Function

void BuzzerSet(int interval)

Parameter	Description
interval	Buzzer ring time in milliseconds.

Example code

Buzzer command

void BuzzerSet(int interval)

Example Code:
BuzzerSet(100); // 100 ms buzzer is set.

5.26 I2C_Write( )

Description

The Airhmi display has i2c capability.

Function

void I2C_Write(int speed , int deviceAddress , char *data , int dataLen)

Parameter	Description
speed	i2c communication speed
deviceAddress	i2c Slave device address
data	data
dataLen	Data length

Example code

I2C_Write command

void I2C_Write(int speed , int deviceAddress , char *data , int dataLen)

Sample Code:

Char data[] = {0xaa,0xbb,0xcc};

I2C_Write(10000, 0x55 , data , 3);

5.27 I2C_Read ( )

Description

The Airhmi display has i2c capability.

Function

void I2C_Read(int speed , int deviceAddress , char *data , int dataLen)

Parameter	Description
speed	i2c communication speed
deviceAddress	i2c Slave device address
data	data
dataLen	Data length

Example code

I2C_Read command

void I2C_Read(int speed , int deviceAddress , char *data , int dataLen)

Sample Code:

Char data[3];

I2C_Read(10000, 0x55 , data , 3);

5.28 millis( )

Description

The millis function allows the program to keep track of how long it takes to perform a certain function. For example, if it takes a certain amount of time to read data from a sensor and perform an action, this time can be tracked using the millis function. The millis function is simple to use. The function call returns the number of milliseconds elapsed since the start of the program. This value can be used by assigning it to a variable or used directly in a comparison expression.

Function

void millis(int *value)

Parameter	Description
value	It gives the elapsed time.

Example code

millis command

```
int startTime;

millis(&beginningTime); // Saves the start time

// Operations are

performed int

bitisZamani;

millis(&bitisTime);

if(endTime - startTime > 5000) {

// 5 seconds passed

}
```

5.29 KeypadAlpha( )

Description

Used to retrieve data from the user during the software. A full page keyboard appears on the screen. The user enters data here using the keyboard and the keyboard return is assigned to a separate pointer.

Function

void KeypadAlpha(char *inData , char *outData)

Parameter	Description
inData	Text to be edited when the keyboard is opened,
outData	Keyboard return data.
data	data
dataLen	Data length

Example code

millis command

```
char data[100]; KeypadAlpha("Hello
Dunya!",data);

printf("You Wrote %s.\n",data);
```

5.30 Modbus_ReadHoldingRegisters( )

Description

In Modbus RTU protocol, function code "03" is used to read the holding registers of the device. This function code reads a subset of the holding registers starting from a specific starting address at a specified device address. The Modbus message used for this operation can be as follows:

For example, the following Modbus message can be used to read the 10 holding register of device 1 from address 4000:

Address: 01

Function Code: 03

Start Address: 4000 (0x0FA0)

Number of Holding Register to be read: 10 (0x000A)

After sending this message, the device's response is a Modbus message containing the values of the specified holding registers.

Function

void Modbus_ReadHoldingRegisters(unsigned char id, int address,int quantity, unsigned short * data, int timeout_ms);

Parameter	Description
id	Modbus id (0-255)
address	Modbus Slave Register Address
quantity	How many data to read

data	Modbus data
timeout_ms	Timeout value

Example code

```
#include "stk.h"
#include "stdio.h"

unsigned short data[2];

Modbus_ReadHoldingRegisters(1,4000,2,data,1000);

char resData[200];
sprintf(resData,"%04x - %04x",data[0],data[1]);
LabelSet("ELabel8", "Caption", resData );
```

5.31 Modbus_WriteSingleRegister( )

Description

In Modbus protocol, function code "06" is used to write a single register value in a device. This function code writes a single data value to a specific register address at a specified device address.

The Modbus message used for function code "06" in Modbus RTU protocol is as follows:

Address: Device address Function Code: 06
Register Address: register address to write to
Value to Write: 16 bit data to write to the register

For example, the following Modbus message can be used to write the value 1234 to address 4000 of device 1:

Address: 01
Function Code: 06
Register Address: 4000 (0x0FA0)

Value to Write: 1234 (0x04D2)

After sending this message, the device's response will not be a Modbus message. However, a confirmation message or error message can be received to make sure that the message has been sent.

Function

void Modbus_WriteSingleRegister(unsigned char id, int address ,unsigned short data, unsigned short *response, int timeout_ms);

Parameter	Description
id	Modbus id (0-255)
address	Modbus Slave Register Address
data	Modbus data
response	Modbus Slave device answer
timeout_ms	Timeout value

Example code

```
#include "stk.h"
#include "stdio.h"

unsigned short data[20];
Modbus_WriteSingleRegister(1,4000,1234,data,1000);
```

5.32 Modbus_WriteMultipleRegisters( )

Description

In the Modbus protocol, function code "16" is used to write multiple register values. This function code writes multiple data values to a consecutive series of register addresses starting from a specific register address at a specified device address.

The Modbus message used for function code "16" in Modbus RTU protocol is as follows:

Address: Device
address Function
Code: 16
Start Address: record address to write to
Number of Records to Write: total number of records to write
Bytes to Write: the size in bytes of the number of data to write
carp Data: all register values to be written encoded in bytes sent consecutively
et

For example, starting from address 4000 of device 1, the 5 register values are respectively 1234,
The following Modbus message can be used to write 5678, 9101, 1121 and 3141:

Address: 01

Function Code 16

Start Address: 4000 (0x0FA0) Number

of Registers to Write: 5 (0x0005)

Number of Bytes to Write: 10 (0x0014)

Data: 04 D2 16 2E 23 29 04 49 0B 71

Function

void Modbus_WriteMultipleRegisters(unsigned char id, int address , int quantity, unsigned short *data, unsigned char *response, int timeout_ms);

Parameter	Description
id	Modbus id (0-255)
address	Modbus Slave Register Address
qauantity	Number of data to be written to Modbus
data	Modbus data
response	Modbus Slave device answer
timeout_ms	Timeout value

Example code

```
#include "stk.h"
#include "stdio.h"

char data[20];
unsigned short modbusData[2];

modbusData[0] = 10;
modbusData[1] = 11;
Modbus_WriteMultipleRegisters(1,4000,2,modbusData,data,1000);
```

5.33 Modbus_ReadInputRegisters( )

Description

In Modbus protocol, function code "04" is used to read input registers in a device. This function code reads a consecutive sequence of input registers starting from a specific input register address at a specified device address.

The Modbus message used for function code "04" in Modbus RTU protocol is as follows:

Address: Device address
Function Code: 04
Start Address: login registration address to be read
Number of Records to Read: total number of input records to read

For example, the following Modbus message can be used to read 5 input registers starting at address 10001 of device 1:

Address: 01
Function Code: 04
Start Address: 10001 (0x2711) Number
of Registers to Read: 5 (0x0005)

The device response will be a Modbus message containing the values of the requested input registers. The size of this message may vary depending on the number of input registers requested and the specific device features using the Modbus RTU protocol.

Function

void Modbus_ReadInputRegisters(unsigned char id, int address , int quantity, unsigned short *data, int timeout_ms);

Parameter	Description
id	Modbus id (0-255)
address	Modbus Slave Register Address

qauantity	Number of data to be written to Modbus
data	Modbus data
timeout_ms	Timeout value

Example code

```
#include "stk.h"
#include "stdio.h"

unsigned short data[20];
Modbus_ReadInputRegisters(1,5000,2,data,1000);
```

6. Ethernet

6.1 Dhcp & Static ip identification

Description

DHCP (Dynamic Host Configuration Protocol) and static IP addresses are two different methods of assigning IP addresses used in computer networks. Here is how both methods work and their advantages:

DHCP (Dynamic Host Configuration Protocol):

DHCP is a protocol that automatically assigns IP addresses to devices on the network. Here is how it works:

When a device is connected to the network, network configuration information such as IP address, subnet mask, default gateway and DNS server address are automatically assigned to the device by the DHCP server.

The DHCP server manages IP addresses on the network and allows devices to dynamically obtain IP addresses.

This simplifies the management of IP addresses in large networks and allows devices to join the network automatically.

Static IP Addresses:

Static IP addresses are IP addresses that are manually assigned to each device and remain fixed without being changed. Here's how it works:

The network administrator or users assign an IP address, subnet mask, default gateway and DNS server addresses specifically for each device.

As these IP addresses are manually configured, each device has a fixed IP address and is not changed.

Function

void EthernetInit_DHCP();

Parameter	Description

Example code

```
#include "stk.h"
EthernetInit_DHCP();
```

Function

void EthernetInit_Static(char *ip , char *gw , char *netmask);

Parameter	Description
IP address	An IP address (Internet Protocol Address) is a unique identifier used for network communication between computers and other devices.
Gateway	Gateway, which enables data transmission between devices on a network is an important network device. Gateway facilitates data communication between two different networks or communication protocols.
Netmask	Netmask is a value used to distinguish between the network portion of an IP address and the portion of a device or subnet.

Example code

```
#include "stk.h"
EthernetInit_Static("192.168.1.150","192.168.1.1","255.255.255.0");
```

6.2 IP Address Inquiry

Description

An IP address (Internet Protocol Address) is an identifier used to communicate between computers and other network devices. IP addresses are used as part of the TCP/IP (Transmission Control Protocol/Internet Protocol) network protocol to ensure that devices can be found and communicate on the network. In networks such as the Internet and local area networks, each device has a unique IP address. IP addresses usually consist of four parts, and each part can have a value between 0 and 255. These four parts are written in dotted decimal format. For example, "192.168.1.1" is an example of an IPv4 (Internet Protocol version 4) IP address.

There are two basic types of IP addresses:

IPv4 (Internet Protocol version 4): This is the most commonly used type of IP address. IPv4 addresses are a 32-bit number and consist of 4 separate parts (each part has a value between 0 and 255). For example, "192.168.1.1" is an IPv4 IP address. However, as IPv4 addresses are running out, the transition to IPv6 has begun.

IP addresses ensure that devices are uniquely identified on the network and that data is routed correctly. In addition, IP addresses help the process of communicating on the network and enable important network functions such as access to the internet to take place.

Function

void EthernetGet_IP(char *ip_adress);

Parameter	Description
ip_adress	Airhmi is the ip address that the display receives from the server.

Example code

```
char data[100];

EthernetGet_IP(data);
```

6.3 MAC Address Inquiry

Description

The MAC address (Media Access Control Address) is a unique identifier that represents the hardware identification number of network devices. The MAC address is physically assigned on the network card or network interface and is usually 48 bits (6 bytes) long. The MAC address is used to identify devices during data transmission at the network level.

The MAC address is usually written in hexadecimal base and consists of six even digits. An example MAC address is as follows: "00:1A:2B:3C:4D:5E."

Function

void EthernetGet_MAC(char *mac_address);

Parameter	Description
mac_addres	The mac address of the Airhmi Ethernet interface.

Example code

```
char data[100];

EthernetGet_MAC(data);
```

6.4 Ethernet TCP Socket Connection

Description

Airhmi display can be used as static or DHCP.

Function

SocketTCP_Create("char * ip, int port);

Parameter	Description
IP address	An IP address (Internet Protocol Address) is a unique identifier used for network communication between computers and other devices.
Port Number	TCP Socket port number.

Example code

```
#include "stk.h"

SocketTCP_Create("192.168.1.49",8000);
```

6.5 Ethernet TCP Socket Send Receive

Description

TCP socket is the function of sending and receiving data to and from the server.

Function

Void SocketTCP_SendReceive(char *sendData,char *rcvData);

Parameter	Description
sendData	The data we want to send to the TCP socket.
rcvData	TCP is the data received from the socket.

Example code

```
#include "stk.h"

char DATA[1024];
SocketTCP_SendReceive("GET {path} HTTP/1.1$0d$0aHost:
{host}$0d$0a$0d$0a$0d$0a",DATA); printf("DATA:%s\n",DATA);
```

6.6 Send Ethernet TCP Socket

Description

TCP socket is the function of sending data to the server.

Function

```
Void SocketTCP_Send(char *SendData,int len);
```

Parameter	Description
sendData	The data we want to send to the TCP socket.
len	Data length

Example code

```
#include "stk.h"
#include "stdio.h"

SocketTCP_Send("AIRHMI",6);
```

6.7 Ethernet TCP Socket Al

Description

TCP socket is the function of receiving data from the server.

Function

```
Void SocketTCP_Receive(char rcvData);
```

Parameter	Description
rcvData	Data received from a TCP socket.

Example code

```
#include "stk.h"
#include "stdio.h"

char rcv[100];

SocketTCP_Receive(rcv);
printf("Data:%s\n",rcv);
```

6.8 Ethernet TCP Socket Close

Description

TCP is a socket closure function.

Function

```
Void SocketTCP_Close();
```

Parameter	Description

Example code

```
#include "stk.h"
#include "stdio.h"

SocketTCP_Close();
```

6.9 Ethernet TCP Socket Status Query

Description

Used for Airhmi TCP socket status query.

Function

```
Int SocketTCP_GetStatus();
```

Parameter	Description
10	Connected.
Others	Not connected

Example code

```
#include "stk.h"
#include "stdio.h"

int status = SocketTCP_GetStatus(); if(

status == 10 )
    LabelSet("ELabel3" , "Text" , "Connected." );
else
    LabelSet("ELabel3" , "Text" , " Not Connected." );
```

6.10 http post and get

Description

HTTP (Hypertext Transfer Protocol) is a protocol for communication between web browsers and web servers. HTTP provides two basic methods: GET and POST. These two methods are used for receiving, sending and processing web pages.

GET Method:

GET is used to make a request to the server to retrieve a specific resource (usually a web page).

A GET request is transmitted via URL and transfers data with query parameters added to the end of the URL.

A GET request does not send information to the server, it is only used to retrieve information.

If the GET request is reloaded in the browser or a link is clicked, the same request is repeated. Therefore, a GET request is idempotent, meaning that the result does not change when the same request is repeated.

The GET request appears in the browser history, so the data sent in the URL is clearly visible.

An example GET request with URL is as follows:

GET http://example.com/page.php?param1=value1&param2=value2

POST Method:

POST is used to send data to the server or update a resource.

A POST request adds the data to the body of the HTTP request, so it carries data in the body of the request, not through the URL.

Since POST request is used to transmit data, it is often preferred to securely send confidential information such as username, password and other sensitive information.

The POST request is not visible in the browser history, so the data sent is stored more securely.

A POST request is not idempotent, meaning that the result may change when the

same request is repeated. An example POST request looks like this:

POST http://example.com/submit.php

Body:

param1=value1&param2=value2

Both HTTP methods serve different purposes in web applications. GET is usually used to retrieve information, while POST is used to send data and perform operations. The use of both methods depends on the needs of the application and security requirements.

7. Libraries

7.1 stdio.h

The "stdio" (Standard Input/Output) library is a widely used library in the C language. This library provides the tools needed for standard input/output functions. The functions in this library are used to input data from devices such as the keyboard and mouse, or to output data to the screen or to files. It is also used to handle and manage standard error and information messages.

int printf(char *, ...);

int fprintf(FILE *, char *, char

*, ...); int sprintf(char *, char

*, ...);

int snprintf(char *, int, char *, ...);

7.2 stdlib.h

The "stdlib" (Standard Library) library is a widely used library in the C and C++ programming languages. This library contains various functions and is mainly used for memory management, conversion operations, random number generation, program termination, file operations and other auxiliary functions.

The "stdlib" library is used in conjunction with the standard C library and is considered a standard library in the C programming language. It can also be used in C++.

Here are some of the functions included in this library:

Memory management functions (malloc, calloc, realloc, free)

Conversion functions (atoi, atof, itoa)

Random number generation function (rand)

Other helper functions (abs, exit, qsort)

These functions are common functions in the C language and are used in many programs. The "stdlib" library is a useful tool to improve code readability and speed up the development process.

```
float atof(char *);

float strtod(char *,char **);

int atoi(char *);

int atol(char *);

int strtol(char *,char **,int);

int strtoul(char *,char **,int);

void *malloc(int);

void *calloc(int,int);

void *realloc(void *,int);

void free(void *);
```

```
int rand();

void srand(int);

int abs(int);

int labs(int);
```

7.3 math.h

The "math" library is a widely used library in the C programming language. This library provides the tools needed for mathematical operations.

The functions in this library are used for trigonometric operations, exponential functions, logarithms, root calculations, range checking, number rounding and other mathematical operations.

Here are some of the functions available in the math library:

sin, cos, tan: Used for trigonometric operations. pow:

Used to calculate the exponent of a number. sqrt: Used

to calculate the square root of a number. exp: Used to

calculate the e^x of a number.

log, log10: Used to calculate the natural or decimal logarithm of a number. ceil,

floor: Used to round a number to the upper or lower integer.

fabs: Used to calculate the absolute value of a number.

These functions are used in many C programs that involve mathematical operations. math library is a useful tool to improve code readability and speed up the development process.

float acos(float);

float asin(float);

float atan(float);

float atan2(float, float);

float ceil(float);

float cos(float);

float cosh(float);

float exp(float);

float fabs(float);

float floor(float);

float fmod(float, float);

float frexp(float, int *);

float ldexp(float, int);

float log(float);

float log10(float);

float modf(float, float *);

float pow(float,float);

float round(float);

float sin(float);

float sinh(float);

float sqrt(float);

float tan(float);

float tanh(float);

7.4 string.h

The "string" library is a widely used library in the C programming language. This library provides the tools needed for string operations.

The functions in this library are used for operations related to character strings. These operations include concatenation, comparison, copying, length calculation and other operations.

Here are some of the functions available in the string library:

strcpy: Used to copy a string of characters to another string of characters. strcat:
Used to concatenate two strings of characters.
strlen: Used to calculate the length of a string. strcmp: Used to compare
two strings.
strchr: Used to search for a specific character in a character sequence.
strstr: Used to search for a specific substring in an array of characters.
These functions are frequently used in the C programming language for operations with strings. The string library is a useful tool to improve the readability of code and speed up the development process.

Sample Program:

```c
#include <stdio.h>
#include <string.h>

int main() {
   char string1[20] = "Merhaba";
   char string2[20] = "dünya";
   char string3[40];

   // string1 ve string2 karakter dizilerini birleştirir
   strcat(string1, string2);

   // Birleştirilmiş karakter dizisini string3'e kopyalar
   strcpy(string3, string1);

   printf("Birleştirilmiş karakter dizisi: %s\n", string1);
   printf("Kopyalanan karakter dizisi: %s\n", string3);

   // string1 karakter dizisinde "dünya" alt dizisi aranır
   if (strstr(string1, "dünya") != NULL) {
      printf("string1 karakter dizisinde 'dünya' bulundu.\n");
   } else {
      printf("string1 karakter dizisinde 'dünya' bulunamadı.\n");
   }

   // string1 ve string3 karakter dizileri karşılaştırılır
   if (strcmp(string1, string3) == 0) {
      printf("string1 ve string3 karakter dizileri eşittir.\n");
   } else {
      printf("string1 ve string3 karakter dizileri eşit değildir.\n");
   }

   return 0;
}
```

Program Output:

```
Birleştirilmiş karakter dizisi: Merhabadünya
Kopyalanan karakter dizisi: Merhabadünya
string1 karakter dizisinde 'dünya' bulundu.
string1 ve string3 karakter dizileri eşittir.
```

void *memcpy(void *,void *,void
*,int); void *memmove(void *,void
*,void *,int); void *memchr(char
*,int,int);
int memcmp(void *,void
*,int); void *memset(void
*,int,int); char *strcat(char
*,char *); char *strncat(char
*,char *,int); char *strchr(char
*,int);
char *strrchr(char *,int);
int strcmp(char *,char *);
int strncmp(char *,char *,int);
int strcoll(char *,char *);
char *strcpy(char *,char *);
char *strncpy(char *,char *,int);
char *strerror(int);
int strlen(char *);
int strspn(char *,char *);
int strcspn(char *,char *);
char *strpbrk(char *,char *);
char *strstr(char *,char *);
char *strtok(char *,char *);
int strxfrm(char *,char *,int);