APPLICATION NOTES

4D SYSTEMS
TURNING TECHNOLOGY INTO ART

ViSi-Genie Magic Password Implementation

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Description

This application note shows how to use Magic Objects like Magic Code and Keyboard + ColorPicker Event Magic to be able to print characters on string object from keyboard object and to create a simple Password Implemented Application .

This application note requires:

- Any of the following 4D Picaso and gen4 Picaso display modules:

gen4-uLCD-24PT	gen4-uLCD-28PT	gen4-uLCD-32PT
uLCD-24PTU	uLCD-32PTU	uVGA-III

and other superseded modules which support the ViSi Genie environment

- The target module can also be a Diablo16 display

gen4-uLCD-24D series	gen4-uLCD-28D series	gen4-uLCD-32D series
gen4-uLCD-35D series	gen4-uLCD-43D series	gen4-uLCD-50D series
gen4-uLCD-70D series		
uLCD-35DT	uLCD-43D series	uLCD-70DT

Visit www.4dsystems.com.au/products to see the latest display module products that use the Diablo16 processor. The display module used in this application note is the uLCD-32PTU, which is a Picaso display. This application note is applicable to Diablo16 display modules as well.

- 4D Programming Cable / uUSB-PA5/uUSB-PA5-II
  for non-gen4 displays(uLCD-xxx)
- 4D Programming Cable & gen4-PA, / gen4-IB / 4D-UPA
  for gen4 displays (gen4-uLCD-xxx)
- micro-SD (µSD) memory card
- Workshop 4 IDE (installed according to the installation document)
- Any Arduino board with a UART serial port
- 4D Arduino Adaptor Shield (optional) or connecting wires
- Arduino IDE
- When downloading an application note, a list of recommended application notes is shown. It is assumed that the user has read or has a working knowledge of the topics presented in these recommended application notes.

Content

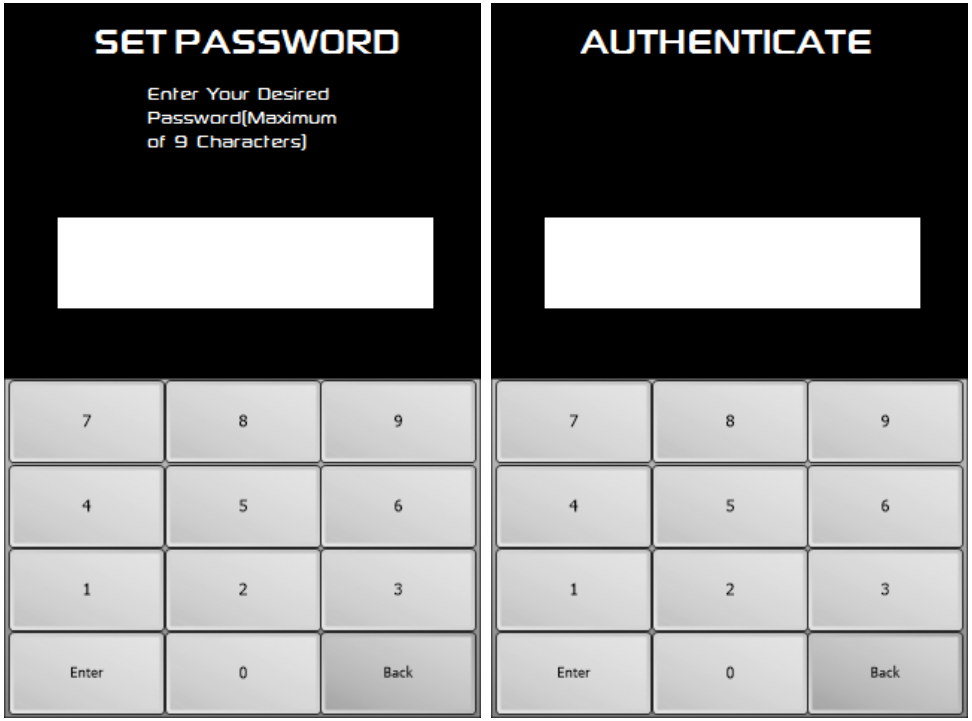
Application Overview

The application developed in this document works in two forms. First form is to Set/Save a desired password, the second form compares any inputted password to the saved password in the first form.

The Keyboard + ColorPicker Event Magic Object is used to perform gathering of input from Keyboard objects and then stores it in array. The input is also written on a string object. The Magic Object then compares two arrays and if correct it will print "Correct Password" in the string object, and if not it will print "Incorrect Password".

This application note shows how to use Keyboard + ColorPicker Event Magic Object to receive data from a key pressed in a keyboard object and then print it in a string object. The concept of deleting a printed character in a string object here uses a different approach, using a filled rectangle.

OUTPUT:



Setup Procedure

For instructions on how to launch Workshop 4, how to open a ViSi-Genie project, and how to change the target display, kindly refer to the section "**Setup Procedure**" of the application note:

ViSi Genie Getting Started – First Project for Picaso Displays (for Picaso)
or
ViSi Genie Getting Started – First Project for Diablo16 Displays (for Diablo16).

Create a New Project

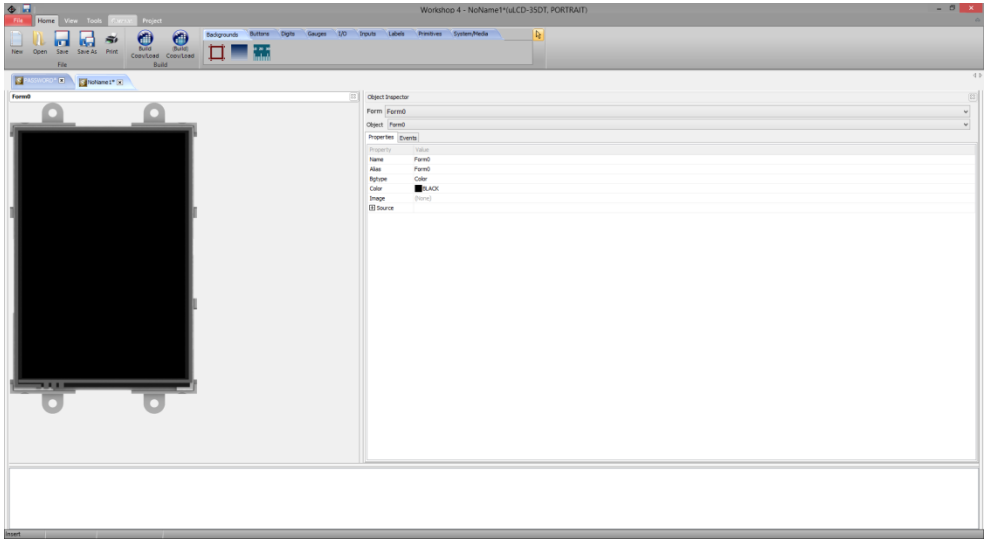
Create a New Project

For instructions on how to create a new ViSi-Genie project, please refer to the section "**Create a New Project**" of the application note

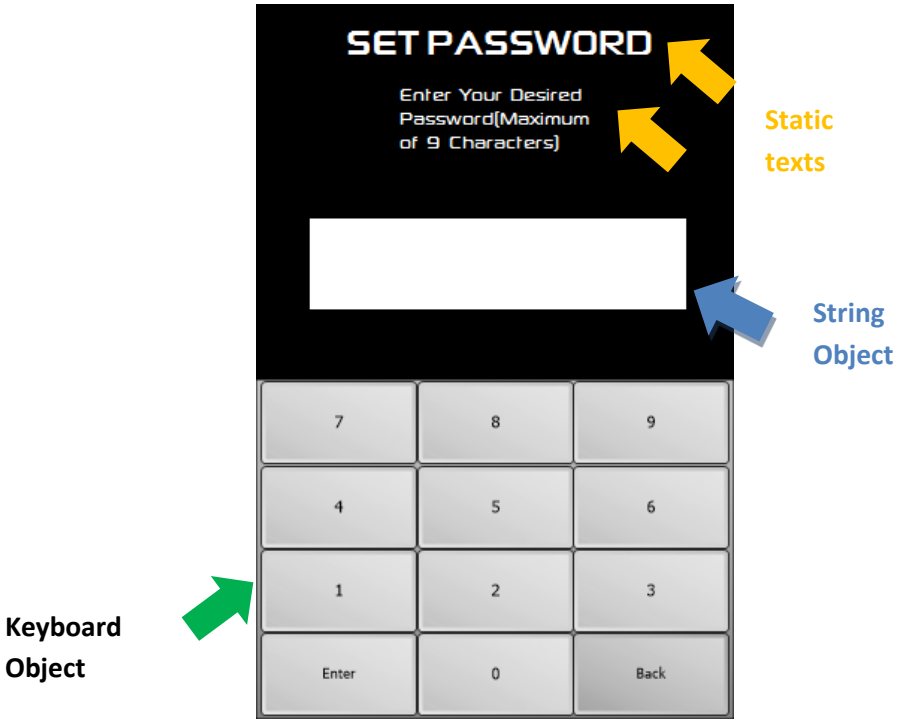
ViSi Genie Getting Started – First Project for Picaso Displays (for Picaso)
or
ViSi Genie Getting Started – First Project for Diablo16 Displays (for Diablo16).

Design the Application

Everything is now ready to start designing the project. **Workshop 4** displays an empty screen, called **Form0**. A **form** is like a page on the screen. The form can contain **widgets** or **objects**, like sliders, displays or keyboards. Below is an empty form.

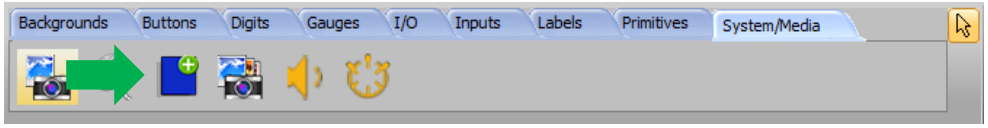


At the end of this section, the user will able to create a form with four objects. The final form will look like as shown below, with the labels excluded.

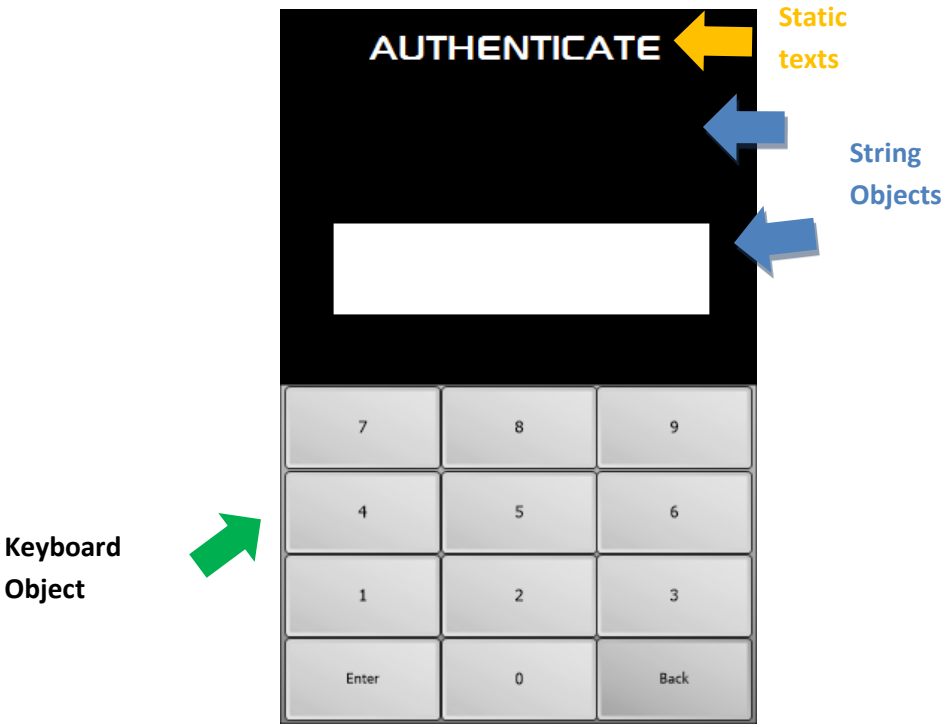


Create a new Form

The **Form** object will create a new Form. To add a FORM object, go to the **System/Media** pane and select the third icon.



At the end of this section, the user will able to create a form with four objects. The final form will look like as shown below, with the labels excluded.



Object Properties

The images shown below are the properties of the objects that are used in the project included in this application note.

StaticText0 and Statictext2

Form: Form0
Object: Statictext0

Properties | Events

Property	Value
Name	Statictext0
Alias	Statictext0
AutoSize	Yes
Caption	SET PASSWORD
Color	BLACK
⊞ Font	(WHITE, [], Sony Sketch EF, 24, [Bold])
Height	32
Left	60
Top	8
Transparent	Yes
Width	209
WordWrap	Yes

StaticText1

Form: Form0
Object: Statictext1

Properties | Events

Property	Value
Name	Statictext1
Alias	Statictext1
AutoSize	Yes
Caption	Enter Your Desired Password(Maximum of 9 Characters)
Color	BLACK
⊞ Font	(WHITE, [], Sony Sketch EF, 12, [])
Height	48
Left	96
Top	52
Transparent	Yes
Width	127
WordWrap	Yes

Strings

Form: Form0
Object: Strings0

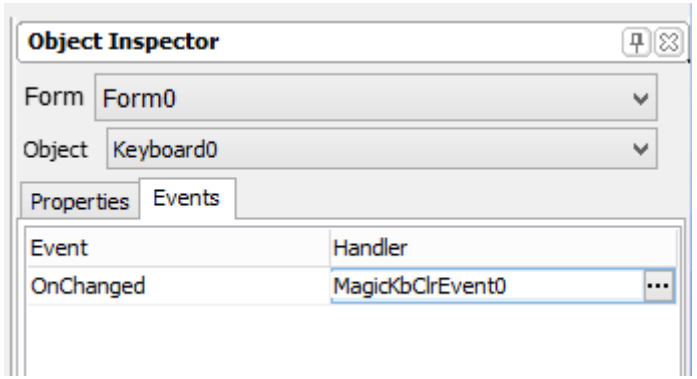
Properties | Events

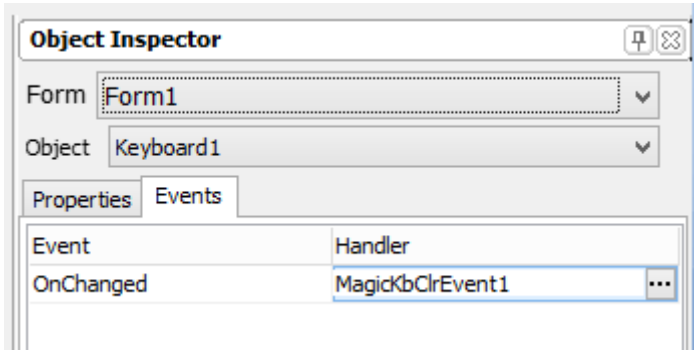
Property	Value
Name	Strings0
Alias	Strings0
Alignment	Left
BGcolor	WHITE
Height	61
FGcolor	BLACK
⊟ Font	
Bold	No
CharSet	ANSI
Italic	No
Name	Sony Sketch EF
Opaque	Yes
Size	34
Strikethrough	No
Underline	No
Left	36
Strings	\n
StringsStyle	Message
Top	144
Width	252

Keyboard

Form: Form0
Object: Keyboard0
Properties | Events

Property	Value
Name	Keyboard0
Alias	Keyboard0
AutoCapsDisplay	Yes
Fill	(Default)
Font	(BLACK, [], Tahoma, 8, [])
Color	BLACK
Effects	[]
Name	Tahoma
Size	8
Style	[]
Height	228
HighlightCaps	BLACK
KeyboardType	KB1
KeyDistance	0
Left	0
SmallFont	(BLACK, [], Tahoma, 7, [])
Color	BLACK
Effects	[]
Name	Tahoma
Size	7
Style	[]
Top	252
Width	320





The OnChanged Event of Keyboard0 and Keyboard1 are set to MagicKbClrEvent0 and MagicKbClrEvent1 respectively. This is for MagicKbClrEvent Object to receive key pressed on the keyboard and can be processed later on.

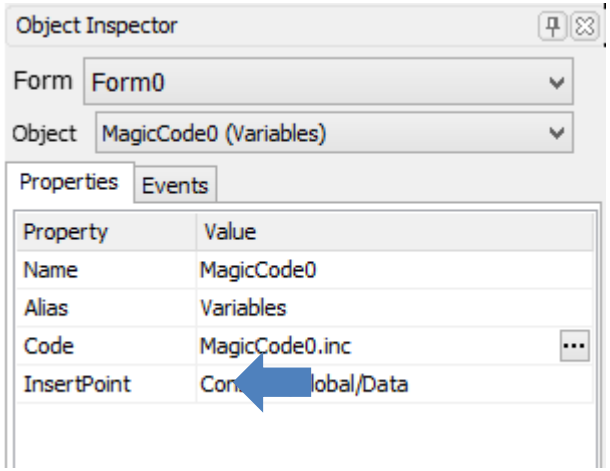
For in depth details on customizing a Keyboard object : ViSi-Genie Customised Keyboard

Adding MagicCode

To add a **MagicCode** object:

Note: To include Magic Objects, Workshop Pro must be activated.

MagicCode0



The purpose of Magic Code in this application is for the declaration of global variables. That is why 'InsertPoint' property of the MagicCode0 is set to 'Constant/Global/Data'.

```
4  // MagicCode1
5  //
6  var SetPass[9];
7  var Pass[9];
8  var counter,counter2;
9  var fontHeight,fontWidth;
10 var fontHeight2,fontWidth2;
11 var PassFlag;
12
13 #constant Str0x 36
14 #constant Str0y 144
15
16 var firstRunFlag := 1;
17
18 fontHeight := 0;
19 fontWidth := 0;
```

The content of MagicCode0 is shown in the image above. The array 'SetPass' is used to store the password set by the user. The array 'Pass' is used to store the password that will be compared to the set password during authentication. Both arrays have a size of 9 since the maximum characters that can be inputted is 9. The variable 'counter', and 'counter' to are used as an indexed for the arrays. The constant variables 'Str0x' and 'Str0y' are the left and top property of the string objects respectively. The variable fontHeight, fontWidth, fontHeight2, fontWidth2 are for coordinates when writing to a character on string objects.

Adding Keyboard + ColorPicker Event Magic Object

To add a **Keyboard + ColorPicker Event Magic** object:

MagicKbClrEvent0

```
func rMagicKbClrEvent0(var reportID, var objType, var objHash, var value)
    txt_FontID(hFonts[0]) ;
    txt_FGcolour(BLACK);
    txt_BGcolour(WHITE);
    if((value>=48) && (value<=57) && counter <9)    //check of characters a
        SetPass[counter] := value;
        if(firstRunFlag)
            firstRunFlag := 0;
        endif
        if(counter>0)
            fontWidth  := fontWidth + charwidth(SetPass[counter - 1]);
        else if(counter == 0)
             fontWidth:=0;
        endif
        putchXY(Str0x + fontWidth, Str0y,SetPass[counter]);
        counter++;
```

This part of the code checks if the key pressed are from 0 to 9. In ASCII Code, the decimal value of '0' is 48 and '9' is 57. The array SetPass will then store the key pressed 'value'. The variable value is the report message of keyboard object to the MagicKbClrEvent. After the value is stored it will then print using putchXY. The variable counter increments every time a key is pressed and is used for the index of the SetPass array. The next key pressed after the first, the program will then compute the total font width of the strings printed. This will be used for deleting a character using filled rectangle that will be discussed later on.

```
else if(value == 8)
    if(counter)
        gfx_RectangleFilled(Str0x + fontWidth,Str0y,Str0x + fontWidth + charwidth(SetPass[counter - 1])
        ,Str0y + charheight(SetPass[counter - 1]) , WHITE);
        fontWidth  := fontWidth - charwidth(SetPass[counter - 2]);
        counter--;
        SetPass[counter] := 0;
    endif
```

The this part of the program checks if the keypressed is 'Back'. In ASCII Code the decimal value of 'backspace' is 8. A rectangle filled will be placed on the latest printed character on the string object. The dimensions of the rectangle is based on the latest printed characters font width and height.

```
else if(value == 13)
    fontWidth := 0;
    counter := 0;
    WriteObject(tForm,1,0);

endif
```

This part of the program checks if the key pressed is 'Enter'. In ASCII Code the decimal value of 'backspace' is 8. If Enter is pressed it will procees to the next form, the AUTHENTICATION part.

MagicKbClrEvent1

For the authentication part, the same process with the MagicKbClrEvent0 will be done if a number is pressed or Back. The difference is when 'Enter' is pressed.

```
else if(value == 13)
    txt_FontID(hFonts[2]) ; //set to font of Strings2
    gfx_MoveTo(64, 76); //set cursor to position of Strings2
    txt_FGcolour(WHITE);
    txt_BGcolour(BLACK);
    gfx_RectangleFilled(64,76,64+fontWidth2,76+fontHeight2,BLACK);

    for(counter2 := 0; counter2 <= (counter-1) ; counter2++)
        if(Pass[counter2] == SetPass[counter2])
            PassFlag := 1;
        else
            PassFlag := 0;
        endif

        if(PassFlag == 0)
            break;
        endif
    next
```

This part of the program compares the contents of SetPass array with Pass array. The SetPass array holds the value of the user's input from Form0 where the user will decide his/her desired password. The Pass array holds user password input.

```
if(PassFlag == 1)
    print("CORRECT PASSWORD");
    fontWidth2 := strwidth("CORRECT PASSWORD");
    fontHeight2 := strheight();
    pause(2000);
    gfx_RectangleFilled(64,76,64+fontWidth2,76+fontHeight2,BLACK);
else
    print("INCORRECT PASSWORD");
    fontWidth2 := strwidth("INCORRECT PASSWORD");
    fontHeight2 := strheight();
    pause(2000);
    gfx_RectangleFilled(64,76,64+fontWidth2,76+fontHeight2,BLACK);
endif
```

This part of the program prints to the String2. If the password inputted is the same as the password that was set, then it will print "CORRECT PassWord" else it will print "INCORRECT PASSWORD".

Build and Upload the Project

For instructions on how to build and upload a ViSi-Genie project to the target display, please refer to the section "**Build and Upload the Project**" of the application note

ViSi Genie Getting Started – First Project for Picaso Displays (for Picaso)
or
ViSi Genie Getting Started – First Project for Diablo16 Displays (for Diablo16).

The uLCD-32PTU and/or the uLCD-35DT display modules are commonly used as examples, but the procedure is the same for other displays.

Proprietary Information

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