

When creating a new form control, you can inherit from an existing control instead of starting from scratch. Inherited form controls work the same way as their parent, but you can:

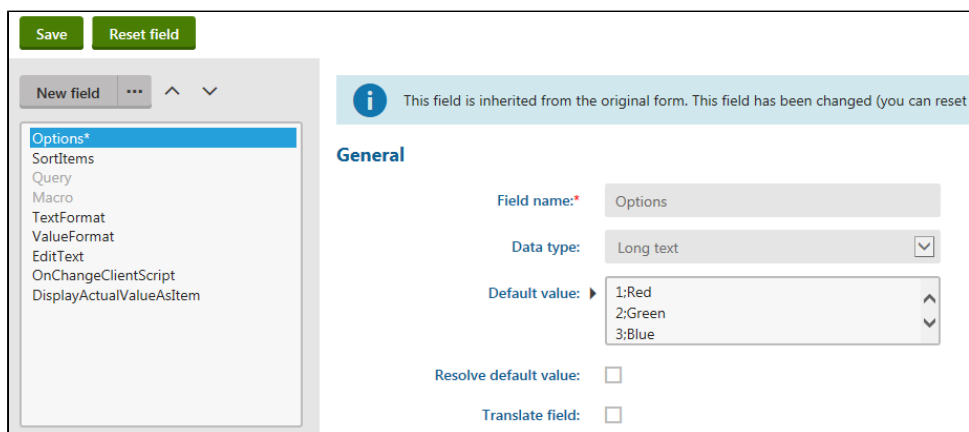
- Change the form control's general settings (i.e. set where the control can be used)
- Modify the form control's [parameters](#) and set their default values
- Assign an extender class for advanced adjustments of the parent's original functionality (see [Customizing inherited form controls using extenders](#))

Inheritance allows you to create specialized controls based on general ones. For example, specialized inherited form controls can be useful for users who create forms using the [Form builder](#).

Example – Creating an inherited form control

The following example demonstrates how to create an inherited form control that defines a reusable drop-down list with a predefined set of options.

1. Open the **Form controls** application.
2. Click **New form control**.
3. Set the following options for the new form control:
 - **Control source:** Inherit from an existing
 - **Display name:** Custom selector
 - **Type:** Selector
 - **Inherit from:** Drop-down list
4. Click **Save**.
5. Select the following options on the **General** tab:
 - **High priority:** yes (allows users to use the form control in the [Form builder](#))
 - **Use control for:** Text
 - **Show control in:** Forms (and set the **Column size** to 100)
6. Click **Save**.
7. Switch to the **Properties** tab.
8. Adjust the form control parameters according to your requirements. For example, set a default value for the **Options** parameter:
 - a. Select **Options** in the list of fields.
 - b. Type a list of *value;name* pairs into the **Default value** area.
 - c. Click **Save**.



The screenshot shows the 'Form controls' application interface. At the top, there are 'Save' and 'Reset field' buttons. Below them is a 'New field' button and a list of available fields: 'Options*', 'SortItems', 'Query', 'Macro', 'TextFormat', 'ValueFormat', 'EditText', 'OnChangeClientScript', and 'DisplayActualValueAsItem'. The 'Options*' field is selected. To the right, the 'General' tab is active, displaying the following settings: 'Field name*' is 'Options', 'Data type' is 'Long text', and 'Default value' is a list containing '1:Red', '2:Green', and '3:Blue'. There are checkboxes for 'Resolve default value' and 'Translate field', both of which are currently unchecked. A blue information banner at the top of the settings area states: 'This field is inherited from the original form. This field has been changed (you can reset)'.



Tips:

- You can customize inherited form controls by adding new fields.
- Click **Reset field** to revert all settings of a modified parameter back to the original state (the system copies the field settings from the parent form control).

See also: [Defining form control parameters](#)

You have created your own specialized drop-down list form control, which users can utilize in the [Form builder](#).

Customizing inherited form controls using extenders

Developers can adjust the functionality of inherited form controls by creating and assigning extender classes. An extender contains custom code that runs in addition to the code of the parent control. This allows more flexible customization than the configuration options provided by the parent form control's [parameters](#). For example, you can use extenders to dynamically set the form control's properties or assign handler methods to events that occur during the control's life cycle (e.g. form validation).

To develop a new extender, you need to create a class and write the required code:

1. Open your project in Visual Studio (using the **WebSite.sln** or **WebApp.sln** file).
2. Add a new class:
 - **Recommended:** Create a new assembly (*Class library* project) in your solution and include the extender class there. You need to add the appropriate references from the assembly to any required Kentico DLLs, and from the Kentico web project to the custom project.
 - OR –
 - Add the extender class to the **App_Code** folder in the Kentico web project and [register it via the API](#) (this approach is not recommended for production sites).



Extender naming convention: We recommend using the *Extender* suffix in the name of the class and the corresponding file.

3. Make the class inherit from the **ControlExtender<FormEngineUserControl>** base class (located under the **CMS.Base.Web.UI** namespace).
4. Override the **OnInit()** method in the extender class.
 - You can add any custom code, for example assign handler methods to form events.
 - You can access the control instance through the **Control** property of the extender class.

```
using CMS.Base.Web.UI;
using CMS.FormEngine.Web.UI;

public class CustomExtender : ControlExtender<FormEngineUserControl>
{
    public override void OnInit()
    {
    }
}
```

5. Add any other code required to implement your custom functionality (such as the handler methods assigned to events in the *OnInit* method).
6. Save the file (build your custom project, or the entire solution if using a Kentico web application project).

To assign the extender to your inherited form control:

1. Open the **Form controls** application.
2. Edit the inherited form control.
3. On the **General** tab, select your extender class in the **Control extender** section:
 - **Assembly name** – the name of the assembly where the extender is implemented.
 - **Class** – the exact class that defines the extender's functionality (including any namespaces).
4. Click **Save**.

The extender code now runs when displaying any form containing a field with the given inherited form control.

Example

The following example demonstrates how to create an extender for a form control inherited from the *Drop-down list*. The example sets the value of the form control's *options* parameter (defines the options available in the selector) and performs custom validation for the value of the given form field.

Prepare a separate project for custom classes in your Kentico solution:

1. Open your Kentico solution in Visual Studio.
2. Create a new *Class Library* project in the Kentico solution named **CustomExtenders**.
3. Add references to the required Kentico libraries (DLLs) for the new project:
 - a. Right-click the project and select **Add -> Reference**.
 - b. Click the **Assemblies -> Framework** tab in the **Reference manager** dialog and select the **System.Web** assembly.
 - c. Switch to the **Browse** tab, click **Browse**, and navigate to the **Lib** folder of your Kentico web project.
 - d. Add references to the following libraries:
 - **CMS.Base.dll**
 - **CMS.Base.Web.UI.dll**
 - **CMS.Core.dll**
 - **CMS.FormEngine.dll**
 - **CMS.FormEngine.Web.UI.dll**
4. Reference the *CustomExtenders* project from the Kentico web project (*CMSApp* or *CMS*).

Continue by adding the extender class:

1. Create a new class under the *CustomExtenders* project, inheriting from **ControlExtender<FormEngineUserControl>**:

```
using System;
using System.Collections.Generic;

using CMS.Base.Web.UI;
using CMS.FormEngine.Web.UI;

namespace CustomExtenders
{
    public class CustomSelectorExtender : ControlExtender<FormEngineUserControl>
    {
        // Adds custom code that runs when the extended form control is loaded
        // into a form
        public override void OnInit()
        {
            // Assigns a handler to the form control's initialization event
            Control.Init += Control_Init;

            // Sets the value of the form control's "options" parameter
            // This defines the options available in the selector
            var optionValues = new List<string>
            {
                "(select a value)",
                "value1;Name 1",
                "value2;Name 2",
                "value3;Name 3"
            };
            Control.SetValue("options", String.Join(Environment.NewLine,
optionValues));
        }

        // Handler method that runs during the initialization of the form control
        private void Control_Init(object sender, EventArgs e)
```



```

    {
        // Checks that the control is loaded within a Kentico form (BasicForm)
        if (Control.Form != null)
        {
            // Assigns a handler to the validation event of the form
containing the control
            Control.Form.OnItemValidation += Form_OnItemValidation;
        }
    }

    // Handler method for the validation event of the related form
    private void Form_OnItemValidation(object sender, ref string errorMessage)
    {
        // Ensures that the custom validation only applies to fields using
the extended form control
        // (the event is triggered for all items within the given form)
        if (sender == Control)
        {
            // Displays a validation error message if the form control's
value is empty
            // (if the first '(select a value)' option is selected)
            if (String.IsNullOrEmpty(Convert.ToString(Control.Value)))
            {
                errorMessage = "Please select a value.";
            }
        }
    }
}

```

2. Save all changes and **Build** the *CustomExtenders* project.

To apply the extender to the form control:

1. Open the **Form controls** application.
2. Edit the inherited form control.
3. On the **General** tab, select your extender class in the **Control extender** section:
 - **Assembly name:** CustomExtenders
 - **Class:** CustomExtenders.CustomSelectorExtender
4. Click **Save**.

If you [assign the inherited form control to a form field](#) and view the resulting form, the extender ensures sets the options available in the selector and adds custom validation that prevents users from saving an empty value (i.e. the "(select a value)" option).