

2L FIELD DEVELOPER v 11.X

Field descriptions in detail

There are 3 different kinds of elements that can be used on forms:

1. The passive elements: Text, Frame and Picture

These elements will only be shown on the screen, but have no user interaction or data set relation.

2. The data fields: Display data, Alphanumeric input, Memo input, Numeric input, Logical field, Calculated field, Selection list and Stack field

These fields normally have a data set relation.

3. The action elements: Button and Icon

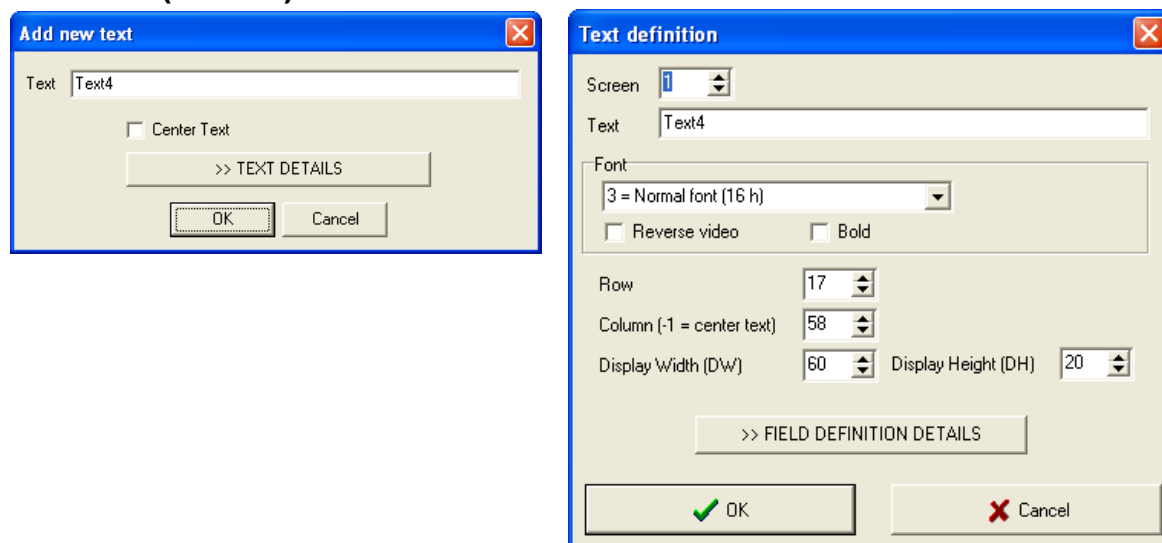
These elements must have at least a start function to work.

1. The passive elements

The passive elements consist of three types of elements: Text (T-field), Frame (F-field) and Picture (P-field). These elements can not be changed by the handheld user.

Note: Passive elements can not be used in spreadsheets.

1.1 Text (T-field)



Text can be displayed anywhere on the screen, in different font sizes, in reverse video and centered on the screen. A text field can be made by clicking with the right mouse button in the painting screen and selecting the option "textfield". A text field is recognizable by its light gray color. The position you clicked with the mouse will be the upper left corner of this text field.

When you add a new text field, you can specify;

* Text:

Here you can enter the text to be displayed on the screen.

* Center text:

Check this box to center the text horizontally.

With the ">> TEXT DETAILS" (more text details) button, more options will become available:

* Font options:

The font size:

Select size from 1= Small font (8 pixels) to 8= Giga font (96 pixels)

Reverse video:

Use text in reverse video (white text on black background)

Bold:

Use a bold font

* Display position:

Row :

Set the exact row position in pixels

Column :

Set the exact column position in pixels (use -1 to center the text)

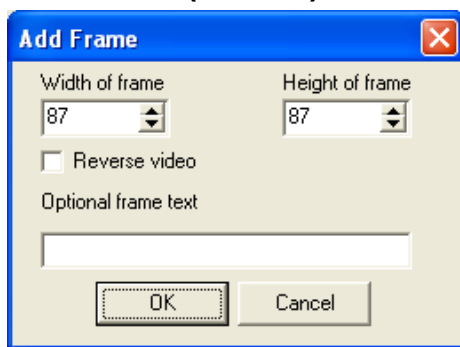
Display width :

Set the display width (in pixels) for the text

Display Height :

Set the display height (in pixels) for the text*

1.2 Frame (F-field)



A frame field is a very simple rectangular area. It can be recognized as a transparent area with a black border.

A Frame can be used to visually separate or combine other field elements on the screen. The following options can be specified for a frame:

* Width:

Specify the display width of the frame.

* Height:

Specify the display height of the frame.

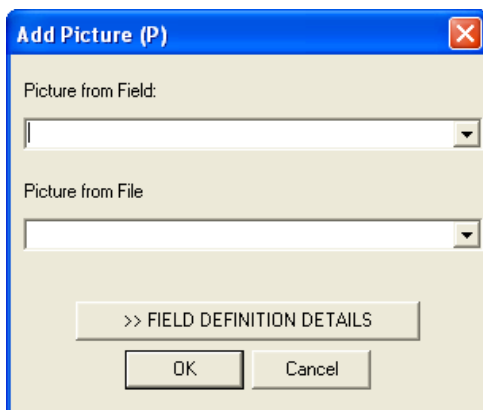
* Reverse video:

With this option checked the background will be black.

* Optional frame text

This text will be displayed in the upper left position of the frame border

1.3 Picture field (P-field)



A Picture field can display a bitmap picture (BMP-file) on your form.

When you add a New Picture (P) in the form painting screen, you can either specify a fixed picture (Picture from file) or a picture using a reference (Picture from field).

With Picture from file you select an existing BMP, a Picture field will be shown (white rectangle) sized according to the actual size of the Bitmap file.

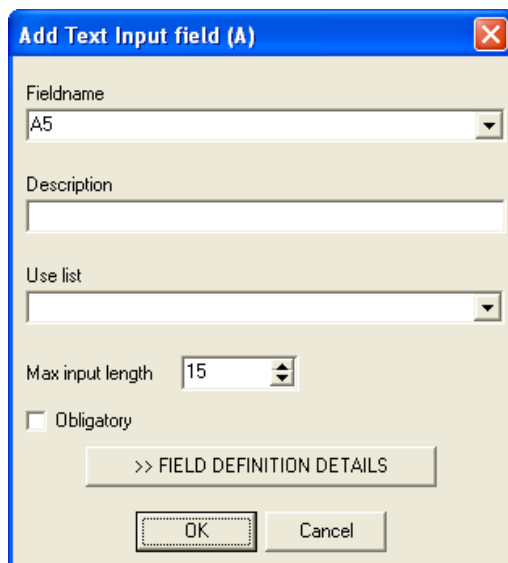
With Picture from field you can create a reference to a picture depending on the contents of the reference field.

Note: Only bitmap pictures (BMP-files) can be used to display pictures in your forms on the handheld. Other picture files can not be integrated in your form, but can be used on the handheld. To view these pictures use the RUN <picture> command.

2. The data fields

2.1 Text input field (A-field)

Text input fields, or Alphanumeric input fields, are used for displaying and editing text.



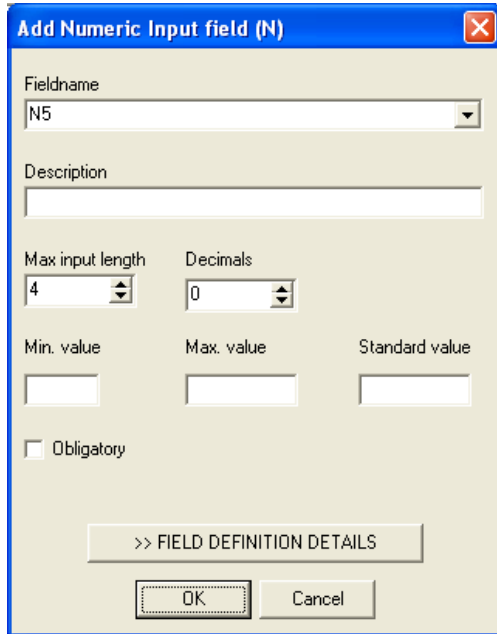
When you add an A-field a screen will pop-up where you can specify:

- * Fieldname:
this name will appear in the form painting screen, it can be used as a reference in the data set and also as a reference for commands and lists.
- * Description:
this description will be shown to the handheld user at the top of the handheld screen.
- * Use list:
here you can specify a list for the A-field (This list has to be available in the project). When the user selects an input-field with a list it will be shown. Now he can select the available values in the list. (See chapter 5)
- * Maximum input length:
this amount can vary from 0 up to 150. The minimum display width depends on the input length and the selected font size. Use Check Design to see if this could pose a problem.
- * Obligatory
if you select this option, you mark this field as mandatory: if this field is left empty during data collection, a message will appear: "Attention <field> Obl. field is empty!!!", and the handheld user first has to fill in this field before he can continue to the next record.

More options can be set in the "Field Definition Details" screen.

2.2 Numeric input field (N-field)

A Numeric input field can only be filled in with numbers, with a maximum input length and/or decimals as specified in the field definition.



When you add a new numeric input field a screen will pop-up where you can define:

* **Fieldname:**

This name will appear in the form painting screen and can be used as a reference for example in commands.

* **Description:**

This description will be shown to the handheld user at the top of the handheld screen.

* **Maximum input length:**

This amount can vary from 0 up to 20.

Note: the minimum display width depends on the input length and the selected font size. Use Check Design to see if this could pose a problem.

* **Number of decimals:**

This number can vary from 0 up to 5.

Note: The maximum input length must include the number of decimals + the decimal dot

* **Minimum value:**

The value of the number entered will be compared to the minimum value. When it is lower than the minimum value a message will appear at the top of the handheld, that the value entered is lower than the minimum value.

* **Maximum value:**

The value of the number entered will be compared to the maximum value. If the value entered is higher than the maximum value, the handheld user will be asked to confirm this number with a warning that the number entered is higher than the maximum value.

* **Standard value:**

The standard value will be prefilled in the field for every new record.

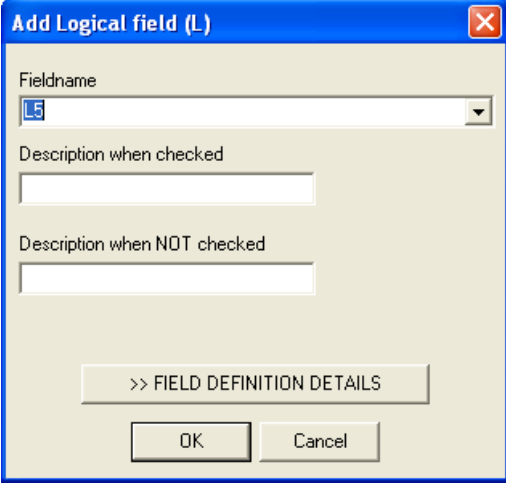
* **Obligatory**

if you select this option, you mark this field as mandatory: if this field is left empty during data collection, a message will appear: "Attention <field> Obl. field is empty!!!", and the handheld user first has to fill in this field before he can continue to the next record.

More options can be set in the "Field Definition Details" screen.

2.3 Logical field (L-field)

A logical field is displayed on the handheld screen as a check-box. Clicking on the field changes the status from tagged (logical 1) to untagged (logical 0) and so on.



When you add a new L-field a screen will pop-up from where you can specify:

* Fieldname:

This name will appear in the form painting screen and can be used as a reference for example in commands.

* Description when checked

What to display when the check-box was checked

* Description when NOT checked

What to display when the check-box was unchecked

You specify via the description for this L-field what to display when the status is tagged, and what to display when it is not tagged.

Note: When you edit a L-field and want to change the description always use a '/' between the two possibilities and always put them in the order tagged/not tagged.

A description could look like:

OK / WRONG.

If you do not specify a "Description when NOT checked", the "Description when checked" will be used for both checked and unchecked state.

If you do not specify a description at all, the fieldname will be used as description for both checked and unchecked state.

2.4 Memo input field (M-field)

A memo input field is a multi-line alphanumeric input field. Apart from the specifications of an A-field you can specify the maximum amount of input-lines in the memo-field.

Note: a memo input field cannot be combined with a list.

When you add a new M-field you can specify:

- * **Fieldname:**
This name will appear in the form painting screen and can be used as a reference for example in commands.
- * **Description:**
This description will be shown to the handheld user on top of the handheld screen.
- * **Maximum input length**
this amount can vary from 0 up to 250. The minimum display width depends on the input length and the selected font size. Use Check Design to see if this could pose a problem.
- * **Max. # lines**
the maximum number of lines that can be used in the memo field
- * **Obligatory**
if you select this option, you mark this field as mandatory: if this field is left empty during data collection, a message will appear: "Attention <field> Obl. field is empty!!!", and the handheld user first has to fill in this field before he can continue to the next record.

More options can be set in the "Field Definition Details" screen.

2.5 Stack field (S-field, with Stack option)

A selection list (S-field) with the Stack option specified is called a Stack field, they are displayed as green list-boxes

When you add a new S-field you can specify:

- * **Fieldname:**

This name will appear in the form painting screen and can be used as a reference for example in commands.

* Description:

This description will be shown to the handheld user on top of the handheld screen.

* Use list:

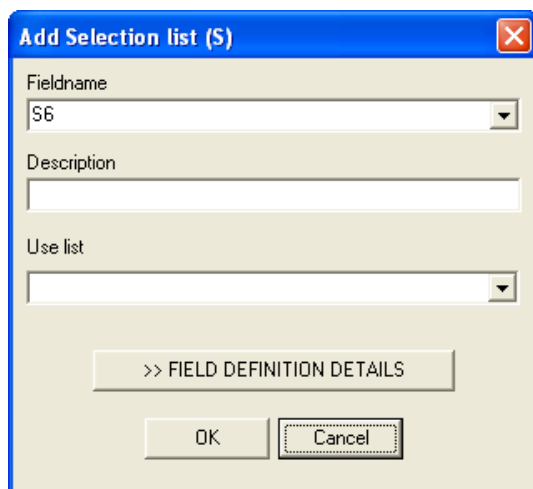
You can specify the list you want to use. (See chapter 5)

Note: the list has to be available in the project folder.

Using LIST commands the user can add items to the stack and remove items from the stack without the use of numerous new records for each stacked value. Furthermore Stack fields can be combined with calculated fields for statistical analysis (see 2.6.2).

2.6 Selection list (S-field)

A selection list is comparable to an A-field, with a list attached to it, and the option List-only. The difference is that it's easier for the user to select an item from a selection list. S-fields can be recognized by their green color. A special selection list is the Stack-field (see 2.8).



When you add a new S-field you can specify:

* Fieldname:

This name will appear in the form painting screen and can be used as a reference for example in commands.

* Description:

This description will be shown to the handheld user on top of the handheld screen.

* Use list:

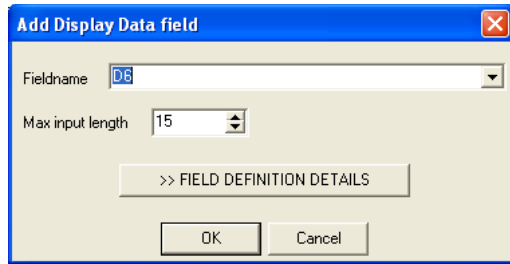
Here you can specify the list you want to use.

Note: the list has to be available in the project folder. (See chapter 5)

2.7 Display data (D-field)

A D-field is a non-editable field in which you refer to data in a data set, to be shown in the form.

The difference between a D-field and a read-only field is that an empty field in read-only mode can be filled in once (and after that it is not editable anymore) and a D-field is not editable, not even when the specific field is empty (unless you use the EDIT <field> command, to make this field temporarily editable for the present record)



When you add a new Display data field a screen will pop-up where you can specify the name of the D-field and specify the maximum input length of the D-field.

When you add a new D-field you can specify:

* Fieldname:

This name will appear in the form painting screen and can be used as a reference for example in commands.

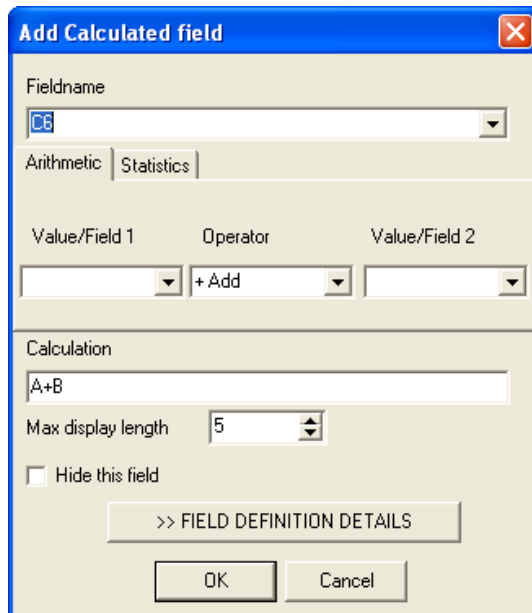
* Maximum input length

this amount can vary from 0 up to 150. The minimum display width depends on the input length and the selected font size. When you reselect the field the program will check this minimum display width, and if the actual display width is too small, the program will automatically increase this to minimum required.

Not : If the name of a D-field matches the name of a column in a data set, the contents will be displayed as a (grayed) non-editable text in a box. D-fields will never be created automatically by 2L from a data set, you always have to change a field into a D-field.

2.8 Calculated field (C-field)

These fields represent a calculated value based on the values of other (calculated) fields in the same record. Calculated fields can be recognized by their purple color The calculation for this field must be specified in the description of this element. It can be specified either as a simple formula or as a statistical function (see 2.8.2).



When you add a new calculated field a screen will pop-up from where you can choose:

* Fieldname:

this name will appear in the form painting screen and can be used as a reference for example in commands.

* Arithmetic formula (or statistical function)

* Arithmetic formula

Value/Field1:

Fill in a standard value or the name of a field used in the same form

Operator:

Select: +(add), -(subtract), /(divide), *(multiply) or &(amp;concatenate)

Value/Field2:

Fill in a standard value or the name of a field used in the same form

* Statistical function

Function:

Choose the function you want to use

Statistical Field

Choose a S(stack)-field

* Calculation:

Resulting formula which can be edited here to specify your own calculation

* Maximum display length

Use "Field definition Details" to specify conditions for number of decimals, min/max value etc..

* Hide this field:

Check this box to hide the field, useful for intermediate calculated fields

It is also possible to calculate the difference between two dates in a calculated field. Make sure you specify a correct date format via SAVETOREG DATEFORMAT so that the difference can be calculated correctly, if the date format in both fields is not the same the outcome will be 0 or a completely wrong number. The difference between two dates will always be calculated in days.

Note that if you use the input of a calculated field in another calculated field, the program will use the rounded off input from the already calculated fields depending on the amount of decimals specified for this field. E.g.: N1(=1), N2(=9) and N3(=10) are N-fields. C4 is defined as $N1/N2(=1/9=0.1111)$ and you did not specify any decimals, this will be rounded off to 0. Now C5 is defined as $C4*N3(0*10=0)$, while it should be $0.1111*10=1.111$. The only way to avoid this is by specifying the amount of decimals you want to use. The more decimals you specify the more accurate the calculation can be.

2.8.1 Simple formulas

Field	Description
C1	$N2+12.5$
CIRC	$3.14*R6$
AVG	WEIGHT/COUNT

These are examples with simple formulas. In the formula you must specify 2 fields and/or values separated by an operator.

The operator can be - (subtract), + (add), * (multiply) or / (divide).

Note: division by zero will be shown as ZZZ in the calculated field.

If you need more complex calculations, you can either:

* specify more calculated fields and refer to them as intermediate results.

The intermediate results can be specified as hidden fields if you do not want them to be shown.

Very important is that you always have to position the calculations in the order they should be calculated. So if field Cx refers to field Cy, the field Cy should be positioned above field Cx.

* specify a complex formula:

use () to specify deviations from the common calculation precedence

example $(WEIGHT*1.2 - 0.12)/COUNT$

* use a calculation command file

break down your complex formula into a series of less complex formulas and enter these formulas in a calculation command file. Specify the command CMD <calculation command file> as the start function of the calculated field.

Press Field definition details, or Edit Field to specify the number of decimals. (See Chapter 4)

2.8.2 Statistical functions

Instead of a formula, a calculated field can have a statistical function based on the values in a stack field.

Function

CNT (count)

counts the number of measurements in the stack field.

CUM (cumulative value)

adds all the values of the measurements in the stack field.

AVG (average value)

average adds all the values of the measurements in the stack and divides them by the number of measurements in the stack

MIN (minimum value)

shows the lowest value of the measurements in the stack.

MAX (maximum value)

shows the highest value of the measurements in the stack.

SD (standard deviation)

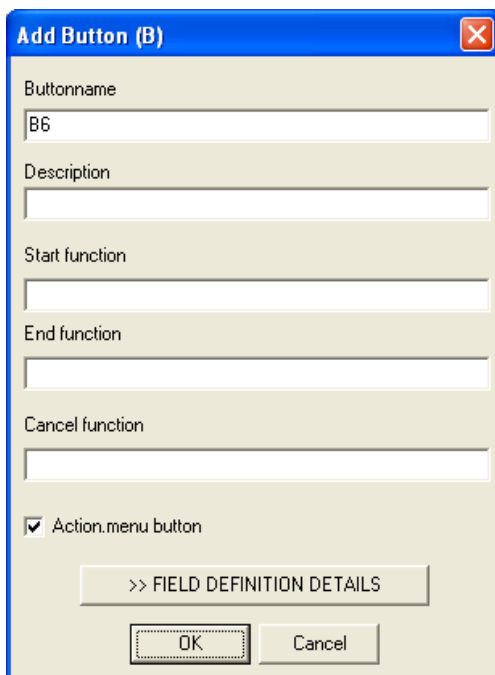
calculates the standard deviation of the measurements in the stack.

3. Buttons and Icons

All buttons and icons are non-editable elements, with a user interaction based on a start function. Icons can be seen as a special button with a picture on it.

3.1 Standard Button

A standard Button (B-field) can be defined anywhere on the screen, they have a characteristic gray color Buttons will only work when there is a valid command specified as start function. Buttons can also have an end function and a cancel function.



When you add a new button field you can specify:

* **Buttonname:**

The name that will refer to the button.

* **Description:**

The description that will be shown on the button

If no description is given, the Button name will be used as description.

* **Start function:**

This function will be carried out when the button is pressed, double click this field to choose a command from the list of valid commands.

* End function:

This function will be carried out when the start function has been carried out, double click this field to choose a command from the list of valid commands.

* Cancel function:

This function will be carried out when the start and/or end function failed (were not carried out properly).

Double click this field to choose a command from the list of valid commands.

* Action menu button:

Check this box to make this an action menu button (see 3.2)

A list of valid commands is available as a separate document.

The start function is the command that is to be carried out when the user presses the button.

If this start function could be carried out properly, the end function (if specified) will be carried out consequently.

If however the start function (or the end function) failed the cancel function will be carried out (e.g. an ALERT or ERROR command).

If you have created a form with more than one screen, and buttons with f.e. record scroll functions, it is very easy to display these Buttons on all your pages (specify the Page mode option for these buttons).

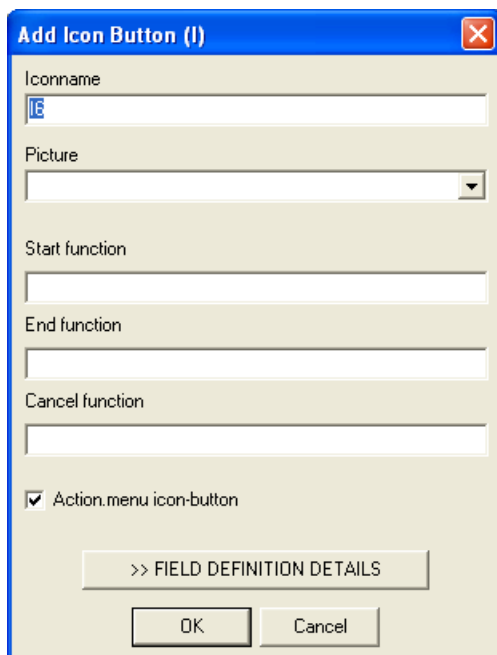
3.2 Action Menu Button

An Action Menu button (B1-button) is a standard button, with two additional features:

1. If you have disabled editing in this form, you can still use Action Menu buttons (you cannot use standard buttons in Read-only forms).
2. If you have enabled a menu in your form, the Button can also be activated from the menu (Extra section).

3.3 Standard Icon

A standard Icon is an extension of a standard Button, with a Bitmap picture instead of a Button text. The Picture must be available as Bitmap file in the project folder. If not the Icon will be shown as a standard Button.



When you add a new Icon you can specify;



- * Iconname:
The name that will refer to the icon.
- * Picture:
This Picture will be shown on the Icon on the handheld
- * Start function:
This function will be carried out when the button is pressed, double click this field to choose a command from the list of valid commands.
- * End function:
This function will be carried out when the start function has been carried out, double click this field to choose a command from the list of valid commands.
- * Cancel function:
This function will be carried out when the start and/or end function were not carried out properly, double click this field to choose a command from the list of valid commands.
- * Action menu icon-button:
Check this box to make this an action menu button (see 3.4).

For the rest, an Icon works exactly the same as a Button.

3.4 Action Menu Icon

Just like an Action Menu Button (B1-field), an Icon can also be specified as Action Menu icon (I1-field).

4 Field Definition Details

Input fields, buttons and icons have a number of settings that you can specify in the field definition details screen. This screen will pop-up when you select an element in the form painting screen, press the right mouse button and select Edit.

Depending on the type of element (Basic field type) you can change some or all of the following specifications:

- * Screen
Specify or change the screen number on which the field will be placed.
- * Fieldname
Specify/change the field name or text for this element.
- * Description
Specify/change the description for this element
- * Row
The exact pixel in the row where the element should be placed.
- * Column
The exact pixel in the column where the element should be placed.
- * Disp. format (W)
The exact display width in pixels for the element.
- * Disp. format (H)
The exact display height in pixels of the field.
- * Input format (L)
The maximum input length (valid only for fields).
- * Input format (D/N)
 - * The number of decimals that can be used for "decimal input fields : calculated fields (C-field) or numeric input fields (N field).
 - * The maximum number of lines for memo fields (M-fields).

Note: for decimal fields, the maximum input length must includes the decimal point and the negative sign!!
So a 5.2 field can have a maximum value of 99.99 and a minimum of -9.99.
- * Start function
This function will be performed when the input field is activated or the button/icon is pressed.
- * End function
This function will be performed when the input on this field has been concluded, or the button/icon start-function was carried out correctly.
- * Cancel function
This button/icon function will be carried out if the start function or the end function failed

- * List name
Specify the file to be used as selection list for this input field (A, N or S-field)
- * Minimum Value
Sets a minimum value for this field (N or C field).
If a value less than this minimum is entered, the user must confirm to accept this value
- * Maximum Value
Sets a maximum value for this field (N or C field).
If a value larger than this maximum is entered, the user must confirm to accept this value.
- * Standard Value
You can specify a standard value to prefill this field with the specified standard (A, N, M fields).
The standard value will be applied when:
 - * a new record is created or
 - * the user double-clicks this input field when it is still empty

Font related items:

- * Font
Specify the font size: 1= Small font to 8= Giga font to be used for this element
- * Reverse Video
With this option checked the background will be black and the text will be white.
- * Bold
Use a bold font for this element

Select the field type

- * T = Display text
- * D = Display data
- * A = Text input field
- * N = Numeric input field
- * M = Memo/multi-line input field
- * S = Stack field / Selection list
- * C = Calculated field
- * L = Logical field (tag-field)
- * B = Button (Standard button)
- * B1 = Button (Action Menu button)
- * I = Icon field (Standard button with icon)
- * I1 = Icon field (Action Menu button with icon)
- * F = Frame (boundary / line / inverse block)
- * P = Picture (BMP file)

Depending on the field type one or more additional specifications can be selected.

- * Obligatory:
if you select this option, you mark this field as mandatory: if this field is left empty during data collection, a message will appear: "Attention <field> Obl. field is empty!!!", and the handheld user first has to fill in this field before he can continue to the next record.
Obligatory fields can be recognized by their red text color. (N, A, S, M, D, C)
- * ABC Uppercase:
All inputs will automatically be converted to capitals (uppercase). (A, M)
- * List-only:
Only input from the list will be accepted into this field. If something else is entered by the handheld user a message will appear:
"Attention [xxxx] not in list"
the user cannot continue until he selects an item from the list. (A, N)
- * Numbers-only:
This specification will ensure that only numbers and no text can be entered into an A-field.
This is often used with barcodes. (A)
- * Date-stamp:
- * Time-stamp:
This will make sure that the field will be stamped with date and or time.
Normally the date will be entered as either DD-MM-YYYY (Dutch language selection in 2L) or MM-DD-YYYY (English language selection in 2L).

- To change the normal settings for date stamping you can use SAVETOREG DATEFORMAT <formatting> in which formatting is the format used for the date e.g. DD.MM.YYYY, YYYY/MM/DD etc. Likewise you can use SAVETOREG TIMEFORMAT <formatting> to change the time format from HH:MM:SS (A)
- * Copy-mode:
This means that the last (pre)filled input of this field will be copied automatically to the next new record. (N, A, M, S)
 - * Inc-mode:
The Inc-mode is an addition to Copy-mode: it copies the actual value of the field to a new record and increases the number with one (+1). (N)
 - * Hide field:
The element will not be shown on the form (N, A, C, M, S, L, B, I)
 - * Stack field:
Stack Several values in one field. (S)
 - * Unique:
Specify Unique to make sure this input field will have a unique input for this record within the dataset. If the input is not unique and already has been added to the dataset a message will appear on the handheld screen:
"Attention <field> [xxxx] is not unique".
The handheld user can not continue until he has changed the value of this field into a unique value. This option can be useful for things like Id numbers. (N, A)
 - * Read-only:
With this option an input field can be filled in once if it was still empty. (Pre)filled values cannot be changed anymore. (N, A, M, L)
 - * Fixed:
Option not used at present
 - * Page-mode:
This is useful if you use create forms with more than one screen, and if you want to some elements on each screen.
Note: position all of your Page-mode fields at the top of the screen, this will permit normal scrolling through the fields on the screen. And position the Page-mode buttons/icons at the bottom of the screen. (ALL)
 - * Q-mode:
With this mode selected the value entered for this field will be displayed as ****.
Note: Q-Mode only works in form-mode and not in spreadsheet-mode. (N, A, M)

5 List file

In the previous chapters the term list was mentioned. This is how to create a list. Choose Files from the menu on the form designer screen. Here you choose New list file. In the screen that pops up you can enter the items you want in the list. If you press OK the new list file will be saved in the project folder you are working in with the extension LST. (The list file has to be available in the project folder.)

5.1 Coded list

It is also possible to use a coded lists.
A coded list is a list file, in which each line consists of a code followed by a description.
To make a coded list, you have to change the input length (L) to match the length of the codes in the coded list. The codes MUST be of equal length matching the maximum input length of the input field. Alternatively the code part in the coded list is separated by a # sign from the description part/

Only the code selected will be stored in the dataset, the code + description will be shown in the pull-down list.



5.2 List width at runtime

During data collection in forms mode, the visible width of a pull-down list can be increased to match the display width of the handheld. Just open the list and press "ctrl + l" on the keyboard, this makes the width of the list as wide as your screen Pressing "ctrl + s" will reset the width of the list to it's original size.