

# Datamatic

Passion for FileMaker



## Smart Ranges 1.0

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## I. Introduction.

SmartRanges 1.0 is a Filemaker plug-in which adds the powerful capability provided by the SMART Ranges technique to your applications.

SMART Ranges can be used to create multi-keys, which combined with "Database Relationships", will provide you instant, reliable and ultra-fast portal filtering which will allow you to create versatile reports for management, financial and administrative applications among others.

SmartRanges 1.0 is compatible with FileMaker Pro 4.0/5.0/5.5/6.0 and 7.0 for Macintosh and Windows and it adds five functions to the FileMaker Pro calculation engine:

- 1. SmartRange:** This function will allow you to create a range of dates, creating a serie of consecutive dates between the start date and the end date in the Filemaker number format for dates.
- 2. SmallerSmartRange:** This function will create an open range of dates which will include every date below the start date.
- 3. BiggerSmartRange:** This function will create an open range of dates which will include every date above the start date.
- 4. SmartKey:** This function creates the left side of the relationship for a Smart Range function which will match the range created with the three functions described above, making the smart ranges techniqe to work.
- 5. Version:** This function returns the plug-in version allowing the verification of the plug-in availability in the system for validation purposes and security.

### **SmartRanges 1.0 is a commercial shareware product.**

Just as any other shareware software, SmartRanges 1.0 can be fully tested before you buy it. If you find it useful and decide to keep it, you must pay for the registered version. There are several different licenses to fit your developing needs the best way possible.

- 1. Site license.** For unbounded FileMaker solutions for an unlimited number of users in a single site. A site is usually known as any machine within one organization in a 5 mile radius.
- 2. Distribution license.** For bounded and unbounded FileMaker solutions for and unlimited number of users. This is the option to choose if you decide to distribute SmartRanges with your own solution.

### **Registering your Plug-in.**

Paying the registration can be easily and securely done through the secure payment processing service, Kagi Online at:<http://order.kagi.com/?36P> or get there through our site <http://www.datamaticsoftware.com>

## II. INSTALLING THE PLUG-IN.

1. Quit FileMaker Pro.
- 2. Macintosh:** Once the file "SmartRanges\_Mac" is in your hard disk, put it into the "FileMaker Extensions" folder which is located inside the FileMaker Pro 4.0/5.0/5.5/6.0/7.0 folder.
- 3. Windows:** Once the file "SmartRanges\_Win.fmx" is in your hard disk, put it into the "System" folder which is located inside the FileMaker Pro 4.0/5.0/5.5/6.0/7.0 folder.
4. If there is a previous version of this file already installed, a dialog asking if you want to replace it with the one you are moving in might appear. In such case press the OK button. Whatsoever, file names between versions are completely different so you might need to remove previous version manually.

**IMPORTANT: If there is a DEMO version already installed, please make sure to remove it from the folder because files have different names and running FileMaker with both installed may cause a conflict.**

1. Start FileMaker Pro. SmartRanges 1.0 plug-in is ready to be used.
2. Open the file "SmartRanges\_TestFile.fp5" to test the plug-in functions and to easily configure the parameters of the user interface of SmartRanges 1.0.

Before testing the plug-in, make sure that all plug-ins used in FileMaker are enabled in the preferences dialog box with a mark in the boxes in front of their names. You can prompt this dialog in the Edit/ Preferences/ Applications/ Plug-ins in FileMaker Pro 4.0/5.0/5.5/6.0.

**IMPORTANT: There is a know problem in FileMaker 4.0v1, so you should remove all unused plug-ins from the "FileMaker Extensions" folder.**

SmartRanges 1.0 is supplied for FileMaker 4.0/5.0/5.5/6.0/7.0 on Windows or Macintosh (9 & X) platforms. In Macintosh the same file works for both Operative Systems.

### III. SmartRanges 1.0 FUNCTIONS

Most FileMaker Plug-ins provide their functions to FileMaker Pro through the FileMaker calculator engine. Therefore, to use SmartRanges functions, you should get into the FM calculation engine, select the "External functions" list within the calculation engine, and choose the SmartRanges 1.0 function that you need to use as shown below.

**Example:**

External("Smrt-SmartRange", *parameter*) (US)

External("Smrt-SmartRange"; *parameter*) (Some other countries)

***IMPORTANT: List separators are different in each country. Commas are used in the US and semicolons are used in some other countries. Please use the appropriate list separator according to your FileMaker version.***

## 1. Smrt-Version

Returns the version number of the plugin.

### **IMPORTANT:**

***Always use this function in your scripts to verify that the plug-in is loaded and properly installed before you use it.***

The version function provides you a safe way to avoid problems in your application if someone remove the plug-in from the proper folder or it deactivates the plug-in even if it is properly installed.

### **FileMaker script example:**

```
If[External("Smrt-Version", 0) = "SmartRanges 1.0"]  
    SetField[myField; TextToDate(External("Smrt-GetSmartRanges", 0))]  
Else  
    ShowMessage["SmartRanges plug-in is not installed"]  
EndIf
```

In Pseudocode this means:

```
If[SmartRanges exists and it is version 1.0]  
    Use other SmartRanges functions  
Else  
    Show a message or halt your program
```

## 2. Smrt- SmartRange/SmallerSmartRange/BiggerSmartRange

The SMART ranges technique, creates a specific range of dates, using the number equivalents for the dates which FileMaker internally use for date representation, following the Smart Ranges technique.

Filemaker stores dates internally as sequential numbers, being 1st. January 0001, the number 1 and 31st December 3000, the number 1,095,727.

The SMART ranges technique was created by **Mihail Endoshin** and detailed analysis and theory can be encountered on his site: [www.onegasoft.com](http://www.onegasoft.com). We did not include detailed explanation for such technique in this guide because nobody could explain it better than its own creator.

Briefly, the SMART ranges technique selects ranges of dates, using smaller ranges of dates than sequential date filtering. This allow you the use of any date range, without the risk of overflowing the 64K limit of the Filemaker text fields.

If you provide a prefix and/or a suffix to append to the returned range, they both will be concatenated to the beginning and to the end of each date returned by the function respectively.

The SmartRange function takes several parameters after the function name. These parameters are represented in the example below with the variable "parameter". The configuration of these parameters will be viewed later in the section "SmartRanges Parameters".

### Example:

**External** ("Smrt-SmartRange", parameter)

Sometimes the functions of the plug-in can be used with FileMaker script function "SetField" in the following way.

### Example:

**SetField**[MyField, **External**("Smrt-SmartRange", parameter)]

Other option is to use the functions within a calculation field so they are updated continuously after a change in its parameters is done.

If the user pass in the parameters 730577 (2 -April-2001) as StartRange parameter and 730592 (17-April-2001), as EndRange the result would be:

```
730577
730578
730579
73058
730590
730591
730592
```

As you can notice, only seven numbers are used to create a compound key which will select on a related field 16 days being a significant saving. The saving is even more dramatic with larger ranges.

Trying to explain the way the smart ranges technique works, we could say that the number 73058 includes all the numbers in eighties range above.

This means that removing one position and using the number 73058 means that all the numbers in the range 73058(0) to 73058(9) will be included in the selection.

For example if we had removed two digits: 7305, all the numbers in the range from 7305(00) to 7305(99) would be included in the selection, having only one number "7305" to select one hundred dates or numbers.

As you can see, creating the proper SMART Range can provide you huge savings, therefore faster relationships without the hassle of the 64K overflow.

With a prefix and a suffix SMART Ranges would work in the same way as previous functions:

```
Prefix730577Suffix
Prefix730578Suffix
Prefix730579Suffix...
```

**NOTE: SMART Ranges is a powerful technique to filter data in FileMaker recommended by most FileMaker gurus. With the inclusion of the "SmartKey" function SmartRanges 1.0 will allow you to implement SMART Ranges in minutes.**

This function also generates SMART Ranges between a start and end numbers up to 9 digits, according to the smart ranges technique described above, which allow you not only to use it for date ranges but also for number ranges.

This is very useful to create multi-keys to select ranges of numbers (like amounts in invoices, order numbers, etc.) because its capability to deal with numbers up to 9 digits.

*Within a Calculation field:*

**If**(IsEmpty(StartNumExample) or IsEmpty(EndNumExample), "",  
**External**("Smrt-SmartRange", "|StartRange=" & StartNumVariable &  
 "|EndRange=" & EndNumVariable))

*(In a calculation field, the result is re-calculated when there is any change in the parameters)*

If you pass StartRange=730577 and EndRange=730592, you will get :

```
730577
730578
730579
73058
730590
730591
730592
```

These numbers above are the FileMaker number equivalents for the dates 2-April-2001 and 17-April-2001 and the range returned is the SMART range for the dates between them.

In the same way, if StartNum=1000 and EndNum=10000 are passed to the function it will create a SMART range that will filter (for example) invoices with amounts included in such range or whatever you need.

As before, a prefix and/or a suffix can be added to this function:

```
Prefix730577Suffix
Prefix730578Suffix
Prefix730579Suffix
...
```

## Number of positions on a Smart Range.

As can be seen from the Smart Ranges theory, the number of positions in the numbers generated within a smart range play a very important role. As we discuss it above it is not the same for a Smart Range 11 (eleven) than 011 (eleven with a zero before).

For example, If you are dealing with a three digit key, 11 on the left side of the relationship will match with all the numbers from 110 to 119 on the right side, matching 10 numbers. If you have a three digit key and you need to match the number eleven only, you will need to have 011.

On the other hand, if you are dealing with a two number key, 11 will match only 11 (one record).

SmartRanges 1.0 has both, automatic size management and manual size management.

Automatic size management means that if the Start Number (StartNum) and the End Number (EndNum) have different sizes, the smallest is filled with zeroes to make them both the same size and have a usable smart range.

For example, if you pass StartNum=11 and EndNum=190, internally the smart range will be created from 011 to 190 to fulfill all the requirements of the smart ranges theory and have a useful smart range.

Whatsoever, some times you need to force the number of positions that will be used to create the smart range, to make sure that they will match in every case all the records you need in a given range.

Therefore the "SmartSize" parameter is available for the all three SmartRanges functions and SmartKey function, then in the case above, if you pass the following parameters StartNum=11, EndNum=190 and SmartSize=4 you will have a range from 0011 to 0190 giving you the opportunity to have on the right side of the relationship numbers from 0000 to 9999.

**NOTE: To cover all dates within FileMaker, the SmartSize should be 7.**

### 3. Smrt- SmartKey

The SmartKey function will give you the capability to implement SMART Ranges in a couple of minutes instead of hours if you programm them directly within FileMaker.

Even more, with the SmartKey function, you won't need to get into the complexities of SMART Ranges, you won't even need to understand how they really work.

According to the SMART Ranges technique, to achieve what we called a "compression of dates" if you need to select, for example, numbers from 1357(00) to 1357(99) only the number 1357 will be created to select the whole one hundred numbers, but on the right side of the relationship, to have a relationship match, you need to create a list, separated by returns, for each of the categories that you number belongs to.

For example, if you have a number: 135763

To find such number with SMART Ranges, you need to have the numbers for each of the categories it belongs to (tens, hundreds, thousands, etc.)

Therefore you need to have such number in this form:

```
135763
13576
1357
135
13
1
```

This means that if a SMART Range is created to select numbers from 1357(00) to 1357(99), as we explained above, only the number 1357 will be created by the SMART Ranges function but on the right side, the SmartKey function will provide all the categories from which this number can make a match.

Example:

**External**("Smrt-SmartKey", "|StartNum=" & Date & "|Suffix=" & Status & "|Prefix=" & Company)

The SmartKey function also simplifies the addition of a Prefix and a Suffix.

Another feature of the SmartKey function is the capability to automatically create the number of positions of the number passed in the StartRange parameter.

This means if you have a three digit number in StartRange, you will get three digit number function, but if you pass a four digit number you will get four digit numbers.

For example:

0546

Will return:

0546  
054  
05  
0

But if you pass a number like  
134567

You will get

134567  
13456  
1345  
134  
13  
1

This mean that numbers won't be forced to have seven digits, saving on several occasions a lot of space. For example, if you will deal with ages, you know that it won't need numbers larger than 3 digits.

### **VERY IMPORTANT:**

**The SMART Ranges technique works with positions, so you need to have the same number of digits on both sides of the relationship. Therefore if you are dealing with, let's say, 7 digits for dates and your right side number is only three digits, you need to stuff some zeroes with the "SmartSize" parameter to make the relationship work.**

Therefore, the SmartKey function also would need to use the parameter SmartSize, with the same number than the matching functions, to make the match.

Example:

**External**("Smrt-SmartKey", "|StartNum=7865|SmartSize=6|Prefix=Yes\_")

Will return:

```
Yes_007865
Yes_00786
Yes_0078
Yes_007
Yes_00
Yes_0
```

This parameter is esencial to have smart ranges working because it puts all the records on the same size and if the same SmartSize function is used on the left side of the relationship in the function SmartRange, then the matching is possible.

#### **IV. SmartRanges TestFile.**

SmartRanges comes together with a file called "SmartRanges\_TestFile.fp5", where the code for use and test the functions in the plug-in can be seen.

The SmartRanges Test file has two parts: Examples and Tour.

##### **Quick Tour.**

It explains in only 4 brief steps the options available in SmartRanges 1.0, so you can have a quick overview of them.

One of the steps, will take you to the plug-in functions.

##### **Examples.**

This section includes several examples to learn how to use the plug-in functions.

## V. Smart Ranges Parameters.

### 1. Prefix and Suffix.

For any of the range generation functions, a prefix and a suffix can be defined. The prefix will be located before each date created in the series and the suffix will be after each date.

The prefix and the suffix can be, at most, 30 characters long and they are used to provide further sub-filtering to the already filtered subset.

For example, if you select a range from September 1st, 2002 to October 31st, 2002, you will get a subset which includes each record of your data with dates in that range, let's say 200 records. Now, if you type a suffix to be concatenated in front of each date in the range, for example "Smith" from the salesman field, you will get only the records which has that suffix from within those 200 records. You will get the sales made by Smith from september 1st to October 31 st 2002.

### 2. Start Range and End Range.

These parameters are used to create de desired range. The start and end numbers can be 9 characters long, allowing to deal with numbers up to 999999999.

### 3. SmartSize.

The SmartSize parameter will define the number of positions used to generate the smart range.

**IMPORTANT: commas nor any other thousand separator should be used when passing Start and End ranges.**

There are a few syntax rules used to create the parameter sentence.

- Parameters always start with a pipe (|), even the first parameter.
- A parameter name should follow the pipe without a space.
- Parameter names always start with upper case letters.
- An equal sign (=) follows the name of the parameters.(no space).
- Parameters can be on any order.
- The information passed for a particular parameter follows the equal sign without any space.
- The StartRange and EndRange should be 9 characters long at most.
- You may not use all the parameters.

There are a few words used to create the parameter sentence. These words are reserved for the parameters and the options you can use for any of them.

## **VI. SUPPORT**

There is a small FAQ section in our site with a few scripts to solve some common requirements our customers have needed.

Whatsoever, we will be glad to assist you in: [support@datamaticsoftware.com](mailto:support@datamaticsoftware.com)

## **VII. FINAL CONSIDERATIONS**

Please read carefully this manual and the user license agreement before using the plug-in. By using it you fully agree with the terms of conditions of such agreement.

This plug-in has been thoroughly tested by Datamatic, whatsoever, Datamatic is not responsible for any damage resulting from the use or test of this software. It should be tested on a test database as some conditions in your system (unknown to us) could interfere in the proper functioning of the plug-in. Use it at your own risk.