LatitudeZERO User Manual

Introduction

With LatitudeZERO you can bring the world of latitude and longitude coordinates into FileMaker.

- Calculate the distance between two ZIP / postal codes
- Calculate the distance between two coordinates
- Return results in miles, kilometers or nautical miles
- Determine whether coordinates are within our outside a specified radius
- Convert distances from one unit of measure to another
- Allocate Sales Reps / Agents that service the area within a certain radius
- Sort records by distance
- … and more

LatitudeZERO is a set of Custom Functions. The Custom Functions are extremely easy to incorporate into your solutions ... you can literally be up and running within minutes.

The Custom Functions work with a standard copy of FileMaker Pro, however FileMaker Pro Advanced is required to copy and paste the Custom Functions into your solutions. Once the Custom Functions are in place, they will be available to all users.

Importing the Custom Functions

In order to install the custom functions, you will need FileMaker Pro Advanced.

Open your solution within **FileMaker Pro Advanced**.

Go to: File > Manage > Custom Functions and click on the 'Import' button.

Locate the LatitudeZERO example file **Example.fmp12** and import all the Custom Functions, then click OK.

That's it; you have installed the custom functions!

Custom Functions Summary

LatitudeZERO is a set of custom functions. The custom functions will be described in more detail on the following pages, but here is a summary of what they all do:

LatitudeZERO_Distance
Calculates the distance between two coordinates.

LatitudeZERO_WithinRadius
Determines whether two coordinates are within a specified radius.

LatitudeZERO_OutsideRadius
Determines whether two coordinates are outside a specified radius.

LatitudeZERO_UnitConversion
Converts a distance from one unit of measure to another.

LatitudeZERO_Bearing
Determines the bearing between two coordinates.

LatitudeZERO_Distance

Description
Calculates the distance between two coordinates.

Syntax
LatitudeZERO_Distance (Lat1, Lon1, Lat2, Lon2, Unit, Rounding)

Parameters

Lat1, Lon1	Latitude and Longitude of the first coordinate as a decimal value.
Lat2, Lon2	Latitude and Longitude of the second coordinate as a decimal value.
Unit	Unit of measure for the returned distance. *(M=Miles, K=Kilometers, N=Nautical Miles)*
Rounding	The number of decimal places for the returned distance.

Result
The returned value is the distance between *Lat1/Lon1* and *Lat2/Lon2*, and the distance is based on the unit of measure specified.

NOTE:
If you would like the calculation to be dynamically recalculated, you will need to turn on the "**Do not store calculation**" feature within the calculation. If on the other hand you need the calculation to be "stored", then leave this option unchecked.

LatitudeZERO_WithinRadius

Description
Determines whether two coordinates are within a specified radius.

Syntax
LatitudeZERO_WithinRadius (Lat1, Lon1, Lat2, Lon2, Unit, Radius)

Parameters

Lat1, Lon1	Latitude and Longitude of the first coordinate as a decimal value.
Lat2, Lon2	Latitude and Longitude of the second coordinate as a decimal value.
Unit	Unit of measure for the returned distance. *(M=Miles, K=Kilometers, N=Nautical Miles)*
Radius	The distance to compare whether the two coordinates are within the radius.

Result
The returned value is either 1 (true) or 0 (false). A true value means the two coordinates are within the specified radius, a false value means the two coordinates are outside the specified radius.

NOTE:
If you would like the calculation to be dynamically recalculated, you will need to turn on the "**Do not store calculation**" feature within the calculation. If on the other hand you need the calculation to be "stored", then leave this option unchecked.

Function: LatitudeZERO_OutsideRadius

Description
Determines whether two coordinates are outside a specified radius.

Syntax
LatitudeZERO_OutsideRadius (Lat1, Lon1, Lat2, Lon2, Unit, Radius)

Parameters

Lat1, Lon1	Latitude and Longitude of the first coordinate as a decimal value.
Lat2, Lon2	Latitude and Longitude of the second coordinate as a decimal value.
Unit	Unit of measure for the returned distance. *(M=Miles, K=Kilometers, N=Nautical Miles)*
Radius	The distance to compare whether the two coordinates are outside the radius.

Result
The returned value is either 1 (true) or 0 (false). A true value means the two coordinates are outside the specified radius, a false value means the two coordinates are within the specified radius.

NOTE:
If you would like the calculation to be dynamically recalculated, you will need to turn on the "**Do not store calculation**" feature within the calculation. If on the other hand you need the calculation to be "stored", then leave this option unchecked.

LatitudeZERO_UnitConversion

Description
Converts a distance from one unit of measure to another.

Syntax
LatitudeZERO_UnitConversion (Distance, fromUnit, toUnit, Rounding)

Parameters

Distance The distance that will be converted to another unit of measure.

fromUnit The originating unit of measure for the distance specified.
(M=Miles, K=Kilometers, N=Nautical Miles)

toUnit The unit of measure for the converted distance.
(M=Miles, K=Kilometers, N=Nautical Miles)

Rounding The number of decimal places for the converted distance.

Result
Returns the converted distance.

NOTE:
If you would like the calculation to be dynamically recalculated, you will need to turn on the "**Do not store calculation**" feature within the calculation. If on the other hand you need the calculation to be "stored", then leave this option unchecked.

LatitudeZERO_Bearing

Description
Determines the bearing between two coordinates.

Syntax
LatitudeZERO_Bearing (Lat1, Lon1, Lat2, Lon2)

Parameters

Lat1, Lon1	Latitude and Longitude of the first coordinate as a decimal value.
Lat2, Lon2	Latitude and Longitude of the second coordinate as a decimal value.

Result
Returns the bearing from Point A to Point B.

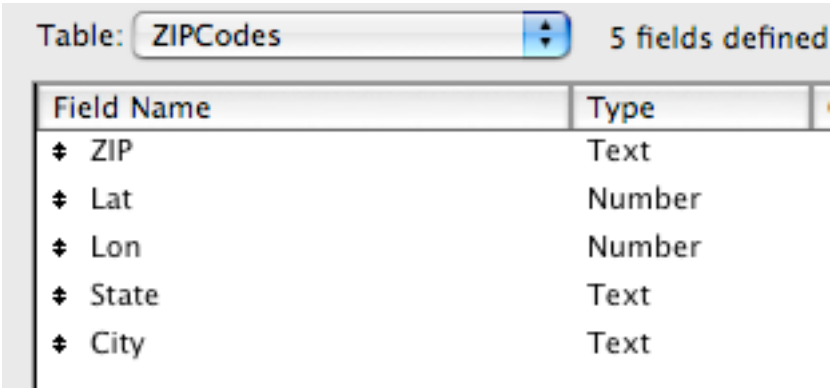
NOTE:
If you would like the calculation to be dynamically recalculated, you will need to turn on the "**Do not store calculation**" feature within the calculation. If on the other hand you need the calculation to be "stored", then leave this option unchecked.

Working with ZIP / postal codes

LatitudeZERO does not come with any ZIP / postal geocoded data. You will need to source your own data provider. Contact your local postal service provider for more information.

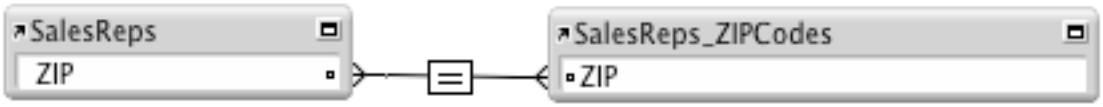
If you refer to the Examlple.fmp12, you will gain a better understanding of how it all works.

First, you will need to create the ZIPCodes table. You may copy the table from the Example.fmp12 file and paste it into your solution, or you may create the table manually.



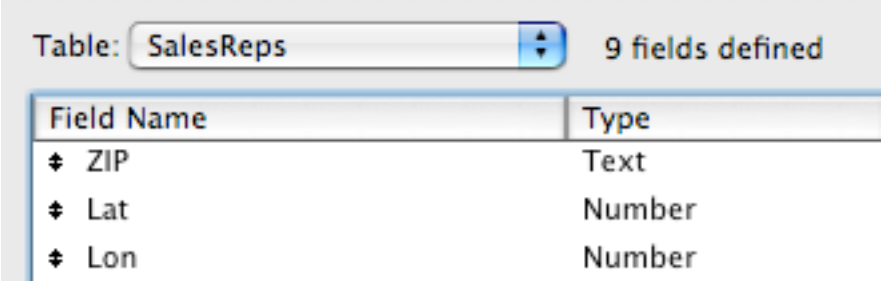
You will need 5 fields as shown above.

Next, you will need to create a relationship between your main table i.e. SalesReps and ZIPCodes so that you can references the appropriate coordinates. The relationship is simply ZIP to ZIP as show bellow:



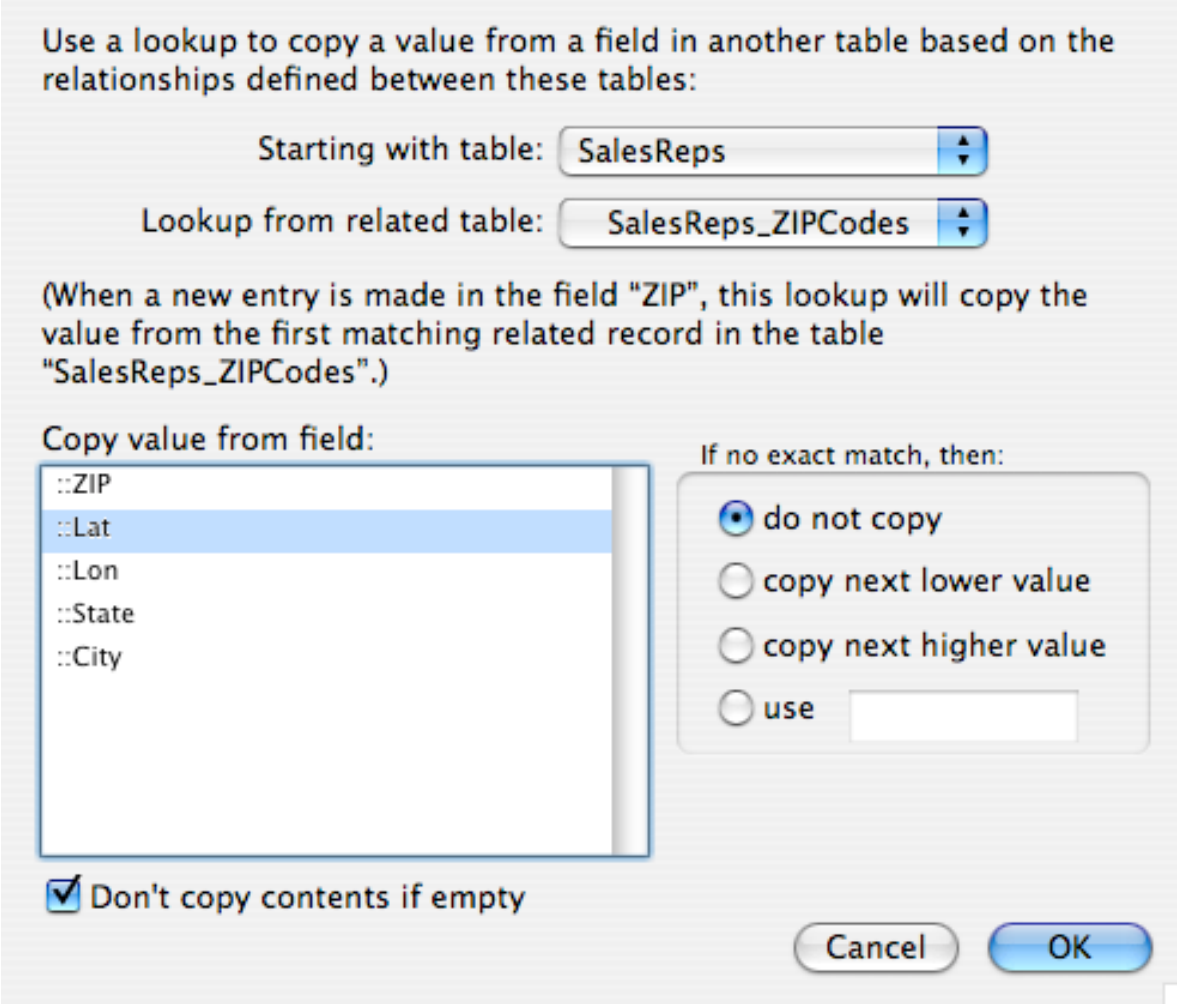
You now have a link within your main table (i.e. SalesReps) to ZipCodes. Please note that SalesReps_ZIPCodes shown above is a table occurrence referencing the ZIPCodes base table.

Now that your relationship is set, you need to create Latitude and Longitude fields (i.e. Lat & Lon) within your main table (i.e. SalesReps). As shown bellow:

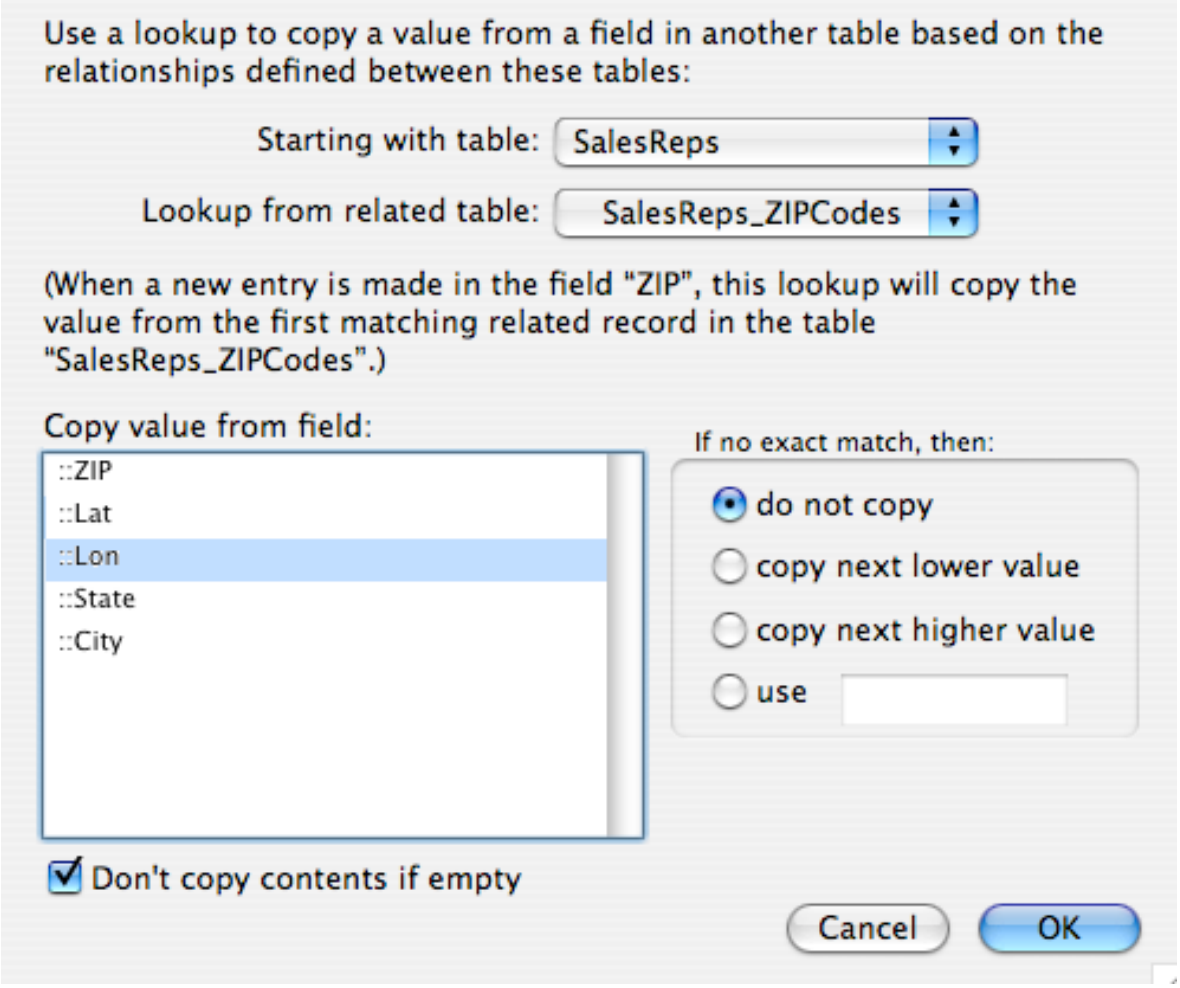


Note: The Latitude and Longitude fields will be used to look up the coordinates so that they are stored locally within the main table, allowing faster computation later on.

Next, you need to set up a lookup for both latitude and longitude fields. To set up the lookup, double click the Latitude (i.e. Lat) field and specify the lookup as show bellow:



Now repeat the process for the longitude field (i.e. Lon) and set the lookup as follows:



If you're installing LatitudeZERO within an existing solution which contains data, you will need to bring the coordinates data over to your main table (i.e. SalesReps) so that each record will contain the appropriate coordinates.

First you will need to select "Show All Records" from the Records menu while you're on a layout assigned to your main table. This will ensure all your records will be updated.

Next, click inside the ZIP code field and select "Relookup Field Contents" from the Record menu. Your main table now contains the appropriate coordinates for each ZIP code.

Before you can do anything meaningful with LatitudeZERO, you will need to create two global fields within your main table (i.e. SalesReps) as shown below.

Field Name	Type	Options
gZIP	Text	Global
gRadius	Number	Global

Next, you will also need a calculation field called cRadiusStatus as shown bellow:

Field Name	Type
cRadiusStatus	Calculation

The calculation formula might look something like this:

cRadiusStatus =

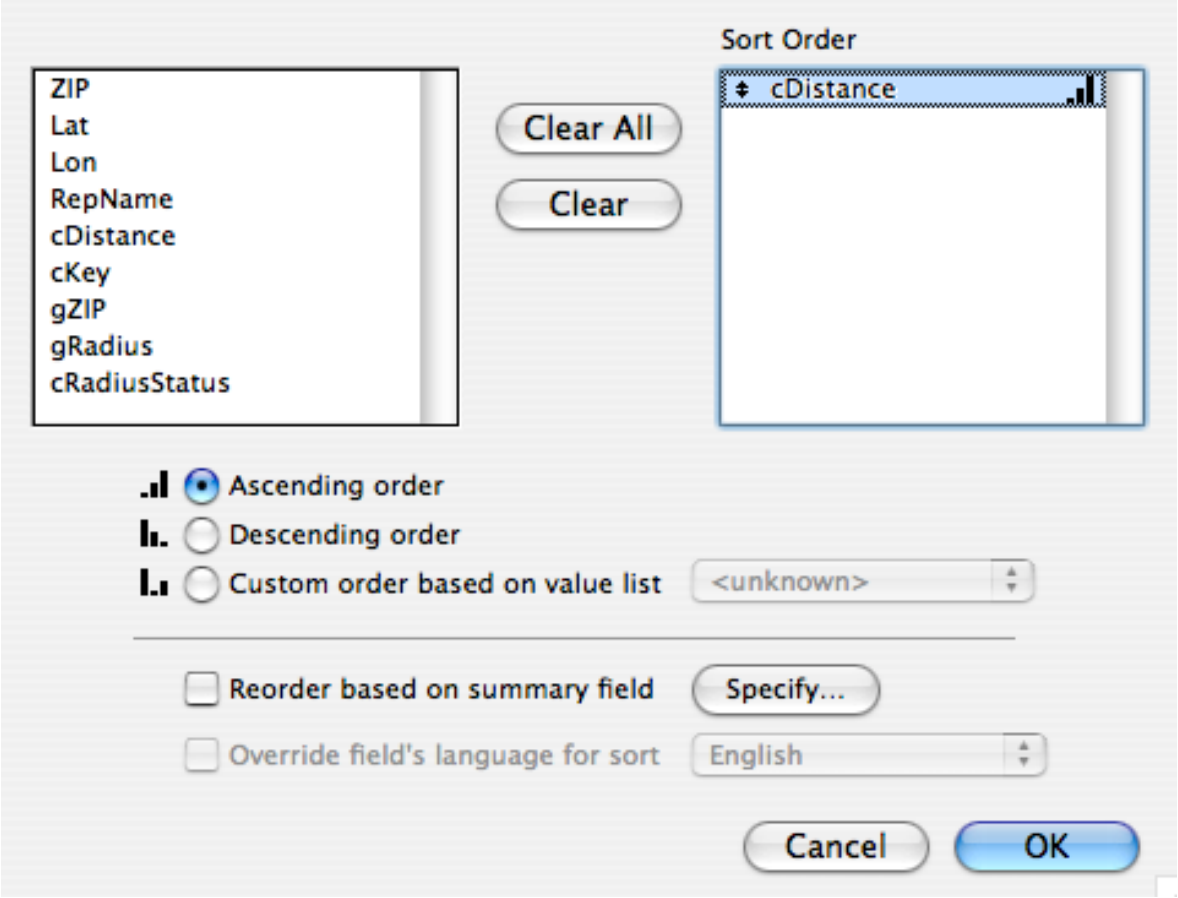
```
Case(cDistance > gRadius;
   TextColor("Outside Radius"; RGB(170;0;0));
   TextColor("Within Radius"; RGB(0;102;0))
)
```

You may modify the calculation to suit your needs

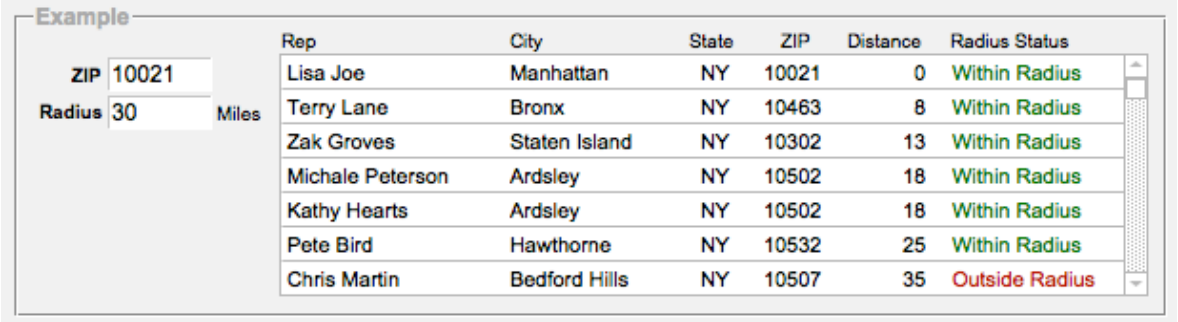
And finally you will need to decide where to create an interface for all these components. If you refer to the Example.fmp12 file, you will find that we have a table called AllocateSalesRepExample that relates to the SalesReps table via a Cross-Join (i.e. matching all records).

The Cross-Join [X] relationship allows us to display all of the sales reps and sort by distance, i.e. showing the closes sales reps first.

The portal should be sorted by the cDistance calculation field, as shown bellow:



When all strung together, the end result may look something like this:



Please refer to the Example.fmp12 file to get a better understanding of how it works.

