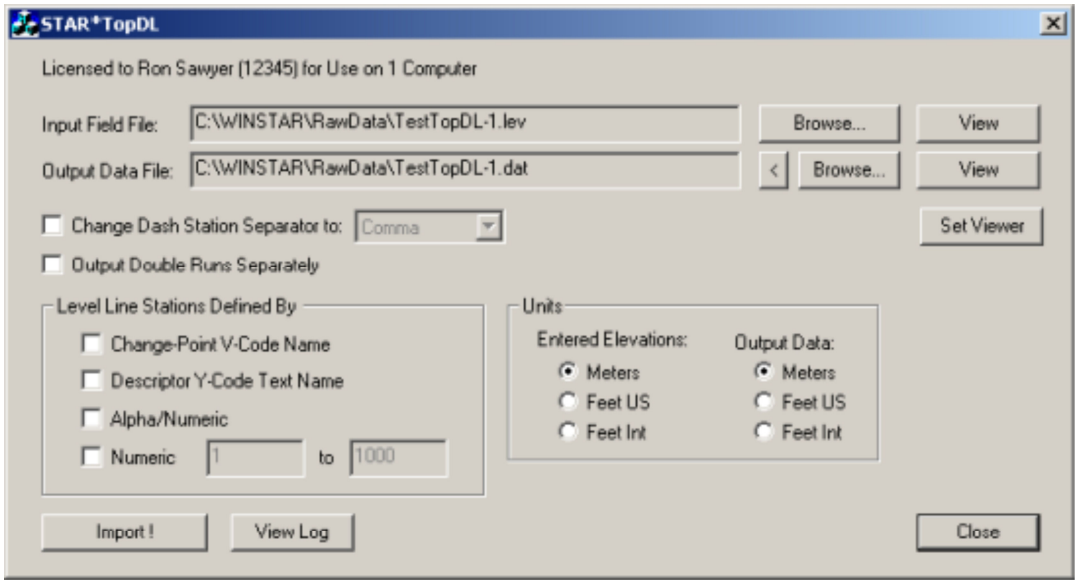
STAR*NET CONVERSION UTILTIES

STAR*TOPDL CONVERSION UTILITY

This program converts Topcon DL Level series raw field files to data formats compatible with the STAR*NET V6 suite of programs.



Running the program is easy. First browse for the input raw field file to convert, then browse for an output file (a new or existing file), set desired options and press the “Import” button. If errors or warnings are found, they are listed in a Log file. In this case, review the error or warning messages listed in the Log File, edit the raw file to make necessary corrections and re-import.

When browsing for the output file, you can press one of two buttons. The standard “Browse” button opens the output file dialog in the same directory as the raw field file and offers the same file name as the raw field file, but with a “DAT” extension. Of course you can modify the offered name and path to whatever you wish. The smaller “<” button opens the output file dialog in the same directory already shown in the field to the left – useful when you’ve stored output in a different directory during the previous run, and you want to output to that directory again but change the output file name.

A “View” button, next to each of the input and output file fields, brings up an editor. So besides viewing a file, you can also edit it. By default, the editor assigned is Windows Notepad. But just as in the STAR*NET program, you can set an editor of your choice by pressing the “Set Viewer” button and browsing for the editor program you prefer.

Setting Options

- Change Dash Station Separator to – By default, the dash (e.g. 121-122) is used for station name separators. If some of your station names already contain dashes and you wish to keep them, this option allows you to change the separator to some other character.
- Output Double Runs Separately – When your field data contains “simulated double-run” type collected data (such as. BS-FS-FS-BS or BS-BS-FS-FS) at instrument setups rather than standard BS-FS single-run data, by default the backsights and foresights are averaged and a single elevation change and distance is output. But if this option is checked, a pair of elevation change and distance lines will be output, one for each BS-FS reading allowing you to see exactly what each backsight-foresight set produced.
- Benchmark Stations Defined By – The converter utility must be told which points in the raw data are the main

level line stations (benchmarks or junctions). The utility program “adds up” elevation differences and distances through all turning points between these stations.

If you use the “Change-Point V-Code Name” or “Descriptor Y-Code Text Name” option when collecting leveling data, these codes directly define which points in the field file should be considered main level-line stations.

Or, you can tell the program to consider as a main level line station any point with an Alpha/Numeric name (BM135, HYDE, etc.), or any point with a Numeric name within some range of values (i.e. 500 to 10000 as illustrated later in the manual). Or set both criteria by checking both boxes so points JOHN and 234 would both be considered level line stations.

All other points found in a survey line not fitting a selected level-line station criterion will be considered turning points. Note that the first and last points in a “survey line” are always taken as main stations even if their names do not fit the naming criteria. Sideshots, data lines beginning with a “k” character, are always included in the converted data.

- Units – Here you select what the units are for any manually entered elevations, and what units you want used for the output data created for use in the STAR*NET package.

  Units for Entered Elevations: Only elevations hand-entered on “.POINT” inline options.

  Units for Output Data: This controls the units of the output data created, the “.DAT” file created for use in STAR*NET. It should noted that the actual BS/FS observation data lines collected in the field contain their own units of measurement, and therefore leveling data files recorded at different times by different crews may be recorded in different units. During conversion to STAR*NET data however, all field data will be properly converted to the same units based on your “Units for Output Data” selection.

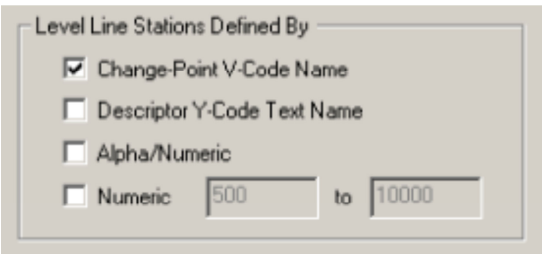
Other Notes

The program assumes that raw field files have a “LEV” extension. If you have a field file with a different extension, choose “All Files (*.*)” from the “File of type” field in the file selection dialog and then select the file you wish to convert from the complete list.

The output data file created by this routine can be moved using Windows Explorer into your project directory (if it is not already there) for use by the STAR*NET program. The entire data file can be added to the project using the “Input Data Files” dialog (see the STAR*NET manual), or by using a text editor, you can copy and paste parts of the file contents into a data file that already exists as part of your STAR*NET project.

All fields and option settings shown on the STAR*TopDL program dialog are stored in the registry when you close the program and are restored the next time you run the program.

The “Log File” is created during a run. It lists any errors and warnings produced during the run. This file has the same name as the input field file but with a “log” extension, and is always created in the same directory as the input file. Review it by pressing the “View Log” button. When errors are reported, data will not be created in the output data file and you should review the LOG file so you can correct errors and rerun. When only warnings are reported, an output data file is created but it is still important to review the messages in the LOG file to determine the reason warnings were posted.



Naming the Level Line Benchmark or Junction Stations

The ability to easily use this conversion utility is dependent on your setting up a point-naming scheme that differentiates main level line station names (benchmarks or junctions) from turning point names.

For example, the “Change-Point” method is a field collection scheme defined by Topcon. This method causes “V” lines to appear in the collection file indicating that the current foresight point is to be defined as a benchmark point. This method is illustrated in “Example Field File 1” on the following pages. This conversion utility offers three additional naming schemes that can be used to define which points you want to be defined as main benchmark (or junction) points.

Sometimes data may have been collected before a naming scheme had been established. Or in other cases, there may be certain points that don’t fit the naming scheme because existing benchmark names had to be matched. For these situations, an office-entered “.POINT” inline option may be edited-in to the field file to define a point as a level line benchmark or junction.

For simplicity, we recommend setting a naming scheme in the options dialog that works for most of your work, and then for special cases, edit in “.POINT” inlines into the raw data to handle just the special cases. The office-entered “.POINT” inline option is described later in the manual.

Example Field File 1 (Benchmark Stations Defined By: “Change-Point V-Code Name”)

This data illustrates collected field data for two leveling segments, two closed loops in this case. One sideshot (k-line) is included. All points to be considered as benchmarks in this example are defined by “Change-Point” codes (“v” lines). This code indicates that a point (foresight in previous set and backsight in following set) is to be considered a a main benchmark or junction point and be given the name shown as the tenth data item on the “v” line. Vertical changes and distances through all turning points are “added-up” between these main points. In this example, the beginning and ending points of the survey are automatically considered benchmark points.

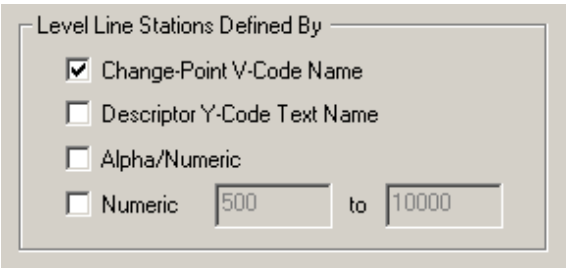
```
#Example: Two Survey Loops using Change-Point "V-Code" Name

b,18,03066-1,468,1000200,0305010856,100020,,
g,18,73120,45305,1073320,,,468,468,0906
i,18,252775,47023,820545,,,1,468,0909
g,18,47763,39588,868308,,,1,468,0912
i,18,247248,36748,621060,,,2,468,0915
g,18,49495,43375,670555,,,2,468,0917
i,18,258995,44033,411560,,,3,468,0919
g,18,79688,42895,491248,,,3,468,0922
i,18,210433,42880,280815,,,4,468,0924
g,18,162798,35958,443613,,,4,468,0930
i,18,140428,36110,303185,,,5,468,0931
v,18,468,1,0305010933,-697015,-697015,413915,413915,303185,629,
g,18,178163,21498,481348,,,5,468,0936
i,18,173345,20705,308003,,,6,468,0937
g,18,183133,18150,491136,,,6,468,0940
i,18,182358,18590,308778,,,7,468,0941
v,18,468,2,0305010941,775,-691422,36740,492858,308778,101,
g,18,162943,25108,471721,,,7,468,0944
i,18,172698,23193,299023,,,8,468,0945
v,18,468,3,0305010945,-9755,-701177,48301,541159,299023,102,
g,18,154418,58360,453441,,,8,468,0948
k,18,176332,29340,414211,,,3001,468,0947
i,18,166183,62075,287258,,,9,468,0952
g,18,195303,57393,482561,,,9,468,0957
i,18,121768,55580,360793,,,10,468,1010
```

```
g,18,264823,28500,625616,,,10,468,1013
i,18,105873,29610,519743,,,11,468,1015
g,18,236933,29060,756676,,,11,468,1017
i,18,82443,29143,674233,,,12,468,1019
g,18,234810,30220,909043,,,12,468,1022
i,18,92520,30728,816523,,,13,468,1025
g,18,226798,28715,1043321,,,13,468,1028
i,18,113150,27130,930171,,,14,468,1030
g,18,185698,17700,1115869,,,14,468,1033
i,18,115670,15998,1000199,,,15,468,1034
v,18,468,4,0305011035,701176,-1,556612,1097771,1000199,468,
t,00,03066-1,,0305011035,,,,,,,,

b,18,03066-2,555,1089700,0305011039,108970,,
g,18,112883,16195,1202583,,,555,555,1040
i,18,176523,13540,1026060,,,1,555,1042
v,18,555,AB15,0305011043,-63640,-63640,29735,29735,1026060,AB15,
g,18,147645,11800,1173705,,,1,555,1047
i,18,193038,15483,980667,,,2,555,1048
v,18,555,POST,0305011048,-45393,-109033,27283,57018,980667,POST,
g,18,211043,21765,1191710,,,2,555,1051
i,18,101970,25383,1089740,,,3,555,1052
v,18,555,555,0305011053,109073,40,47148,104166,1089740,555,
t,00,03066-2,,0305011232,,,,,,,,
```

This is how the “Benchmark Stations Defined By” dialog is set for this conversion run:



This setting means that the entire conversion will be controlled by the “Change-Point” V-Code lines which in this example defines points to be considered main benchmark or junction points and also sets their actual names to be used in the STAR*NET adjustment. Only the starting and ending points of each survey in this example retain their original names.

Below is the data file created showing point-to-point leveling segments with the differences in vertical (to be adjusted) and the distances between benchmarks (for weighting purposes). This file will be used as input to a STAR*NET network adjustment containing level network data.

```
# STAR*TopDL Version 7.2.2
# Copyright 2012 MicroSurvey Software Inc.

# Input Field File : C:\RawData\TestTopDL-1.lev
# Date Processed   : 12-18-2008 14:30:57

.Units  Meters
.Sep    -
.3D
```

```
E  468                10.0020
E  555                10.8970

#  Elevation Difference Records
#  Stations                              Diff     Dist  Descriptor
L  468-629                            -6.97015   414
L  629-101                             0.05593    79
L  101-102                            -0.09755    48
L  102-3001                           -0.21914    88
L  102-468                             7.01176   500
L  555-AB15                           -0.63640    30
L  AB15-POST                          -0.45393    27
L  POST-555                            1.09073    47
```

Note that the “V-Code” change-point option is a method built into the Topcon level-collection software that allows the surveyor to define which points in a leveling collection are the main benchmarks or junctions rather than simply turning points.

Some users have said that using the change-point coding in the field tends to slow down the collection procedure, and that they prefer a point-naming method to define which stations are the benchmarks or junctions. Therefore the remaining examples are based on the additional custom point-naming schemes that have been also included in this converter.

Example Field File 2 (Benchmark Stations Defined By: “Descriptor “Y-Code Text Name”)

This field data illustrates collected data for the same two leveling segments. All points to be considered as benchmarks are defined by descriptor “Y-Code” text. This code indicates that a point (FS in previous set and BS in following set) is to be considered a main junction and be given the name shown on the “y” line. All other turning points are to be “added-up” between these level line points. Note that the beginning and ending foresight points of a survey line are always considered benchmark points, but the “y” code at end simply causes the point to be given the specified name. Note the single sidehot (k line) that is renamed by a following “y” line.

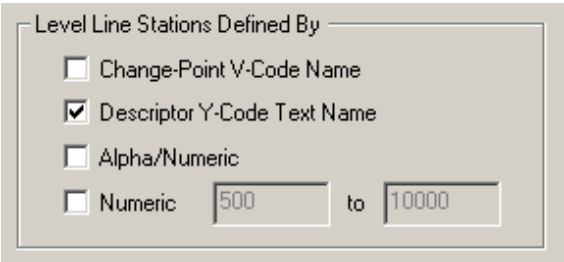
```
#Example: Two Survey Loops using Descriptor "Y-Code" Names

b,18,03066-1,468,1000200,0305010856,100020,,
g,18,73120,45305,1073320,,,468,468,0906
i,18,252775,47023,820545,,,1,468,0909
g,18,47763,39588,868308,,,1,468,0912
i,18,247248,36748,621060,,,2,468,0915
g,18,49495,43375,670555,,,2,468,0917
i,18,258995,44033,411560,,,3,468,0919
g,18,79688,42895,491248,,,3,468,0922
i,18,210433,42880,280815,,,4,468,0924
g,18,162798,35958,443613,,,4,468,0930
i,18,140428,36110,303185,,,5,468,0931
y,629,
g,18,178163,21498,481348,,,5,468,0936
i,18,173345,20705,308003,,,6,468,0937
g,18,183133,18150,491136,,,6,468,0940
i,18,182358,18590,308778,,,7,468,0941
y,101,
g,18,162943,25108,471721,,,7,468,0944
i,18,172698,23193,299023,,,8,468,0945
```

```
y,102,
g,18,154418,58360,453441,,,8,468,0948
k,18,176332,29340,414211,,,3001,468,0947
y,3333,
i,18,166183,62075,287258,,,9,468,0952
g,18,195303,57393,482561,,,9,468,0957
i,18,121768,55580,360793,,,10,468,1010
g,18,264823,28500,625616,,,10,468,1013
i,18,105873,29610,519743,,,11,468,1015
g,18,236933,29060,756676,,,11,468,1017
i,18,82443,29143,674233,,,12,468,1019
g,18,234810,30220,909043,,,12,468,1022
i,18,92520,30728,816523,,,13,468,1025
g,18,226798,28715,1043321,,,13,468,1028
i,18,113150,27130,930171,,,14,468,1030
g,18,185698,17700,1115869,,,14,468,1033
i,18,115670,15998,1000199,,,15,468,1034
y,468,
t,00,03066-1,,0305011035,,,,,,,

b,18,03066-2,555,1089700,0305011039,108970,,
g,18,112883,16195,1202583,,,555,555,1040
i,18,176523,13540,1026060,,,1,555,1042
y,AB15,
g,18,147645,11800,1173705,,,1,555,1047
i,18,193038,15483,980667,,,2,555,1048
y,POST,
g,18,211043,21765,1191710,,,2,555,1051
i,18,101970,25383,1089740,,,3,555,1052
y,555,
t,00,03066-2,,0305011232,,,,,,,
```

This is how the “Benchmark Stations Defined By” dialog is set for this conversion run:



This setting means that the conversion will be controlled by the “DescriptorY-Code Text Name” lines that will define which points are to be considered benchmark (or main junction) points and also sets their actual names to be used in the STAR*NET adjustment. Only the starting points of each survey in this example retains their original names. This method is similar to the “V-Code” method, except using the “Descriptor “Y-Code” method is an easier field procedure!

And below is the data file created showing point to point leveling segments with the differences in vertical (to be adjusted) and the distances between benchmarks (for weighting purposes). This file will be used as input to a STAR*NET network adjustment containing level network data.

```
# STAR*TopDL Version 1.0
```

```
# Copyright 2008 Starplus Software, Inc.

# Input Field File : C:\STARPLUS-1\Disks\Link-TOPCON-LEV\TestTopDL-2.lev
# Date Processed   : 12-18-2008 13:22:02

.Units  Meters
.Sep    -
.3D

E  468               10.0020
E  555               10.8970

#  Elevation Difference Records
#  Stations                          Diff    Dist  Descriptor
L  468-629                        -6.97015   414
L  629-101                         0.05593    79
L  101-102                        -0.09755    48
L  102-3333                       -0.21914    88
L  102-468                         7.01176   500
L  555-AB15                       -0.63640    30
L  AB15-POST                      -0.45393    27
L  POST-555                        1.09073    47
```

The method of using “Descriptor Y-Code” to define points as main level line stations is a feature in this converter, not a Topcon feature. It is similar to the Topcon “V-Code method described in the first example, but some users feel this method is much easier and faster field procedure.

The remaining examples are based on “point-naming” schemes for defining whch points are the main level-line stations that have been also included in this converter.

Example Field File 3 (Benchmark Stations Defined By: “Alpha/Numeric or Numeric”)

This field file illustrates the same two leveling loops as illustrated in the previous examples. However in this example, the original “V” or “Y code lines have been removed and certain point names in the field file have been edited to illustrate the concept of basing which points are benchmarks entirely on the attributes of the point names. Of course, using this method in the field, you would be entering the proper naming while collecting, not by editing in-house!

Note that this field file is a bit shorter that the field file containing the “V” or “Y” code lines previously illustrated. This scheme is based entirely on the attributes of the point numbers or names to indicate which are the main network points.

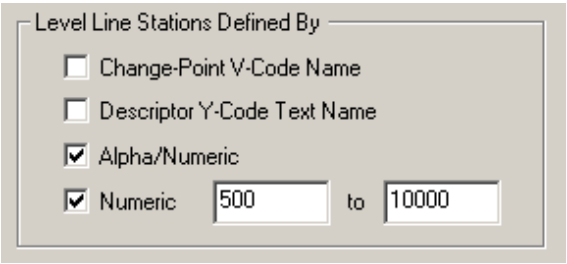
```
#Example: Two Loops using Name-Size or Name-Alpha as Bench Points

b,18,03066-1,1468,1000200,0305010856,100020,,
g,18,73120,45305,1073320,,,1468,1468,0906
i,18,252775,47023,820545,,,1,1468,0909
g,18,47763,39588,868308,,,1,1468,0912
i,18,247248,36748,621060,,,2,1468,0915
g,18,49495,43375,670555,,,2,1468,0917
i,18,258995,44033,411560,,,3,1468,0919
g,18,79688,42895,491248,,,3,1468,0922
i,18,210433,42880,280815,,,4,1468,0924
```

```
g,18,162798,35958,443613,,,4,1468,0930
i,18,140428,36110,303185,,,1005,1468,0931
g,18,178163,21498,481348,,,1005,1468,0936
i,18,173345,20705,308003,,,6,1468,0937
g,18,183133,18150,491136,,,6,1468,0940
i,18,182358,18590,308778,,,1007,1468,0941
g,18,162943,25108,471721,,,1007,1468,0944
i,18,172698,23193,299023,,,1008,1468,0945
g,18,154418,58360,453441,,,1008,1468,0948
k,18,176332,29340,414211,,,3001,1468,0947
i,18,166183,62075,287258,,,9,1468,0952
g,18,195303,57393,482561,,,9,1468,0957
i,18,121768,55580,360793,,,10,1468,1010
g,18,264823,28500,625616,,,10,1468,1013
i,18,105873,29610,519743,,,11,1468,1015
g,18,236933,29060,756676,,,11,1468,1017
i,18,82443,29143,674233,,,12,1468,1019
g,18,234810,30220,909043,,,12,1468,1022
i,18,92520,30728,816523,,,13,1468,1025
g,18,226798,28715,1043321,,,13,1468,1028
i,18,113150,27130,930171,,,14,1468,1030
g,18,185698,17700,1115869,,,14,1468,1033
i,18,115670,15998,1000199,,,1468,1468,1034
t,00,03066-1,,0305011035,,,,,,,

b,18,03066-2,555,1089700,0305011039,108970,,
g,18,112883,16195,1202583,,,555,555,1040
i,18,176523,13540,1026060,,,AB15,555,1042
g,18,147645,11800,1173705,,,AB15,555,1047
i,18,193038,15483,980667,,,POST,555,1048
g,18,211043,21765,1191710,,,POST,555,1051
i,18,101970,25383,1089740,,,555,555,1052
t,00,03066-2,,0305011232,,,,,,,
```

This is how the “Benchmark Stations Defined By” dialog is set for this conversion run:



Here we have selected both “Alpha/Numeric” and “Numeric” options, and have turned off any other options used in the earlier examples. Setting these two options means that the entire conversion run will be controlled by the attributes of the point names.

And below is the data file created showing point to point leveling segments with the differences in vertical (to be adjusted) and the distances between bechmarks (for weighting purposes). This file will be used as input to a STAR*NET network adjustment containing level network data.

```
# STAR*TopDL Version 7.2.2
```

```
# Copyright 2012 MicroSurvey Software Inc.

# Input Field File : C:\RawData\TestTopDL-3.lev
# Date Processed   : 12-18-2008 13:32:00

.Units  Meters
.Sep    -
.3D

E  1468              10.0020
E  555               10.8970

#  Elevation Difference Records
#  Stations                          Diff    Dist  Descriptor
L  1468-1005                      -6.97015   414
L  1005-1007                       0.05593    79
L  1007-1008                      -0.09755    48
L  1008-3001                      -0.21914    88
L  1008-1468                       7.01176   500
L  555-AB15                       -0.63640    30
L  AB15-POST                      -0.45393    27
L  POST-555                        1.09073    47
```

Note that the vertical differences and distance values in this conversion are the same as the those created by the Example 1 and 2 conversions - only the main level line names have changed.

Example Field File 4 (Benchmark Stations Defined By: The ".POINT" Inline Option)

This file illustrates the ".POINT" inline option using only the first survey loop illustrated in previous examples. In this file, all the original "V-Code" and "Y-Code" lines have been removed and only the ".POINT" (or simply ".P") inlines have been inserted to define which points are to be considered the benchmark or junction stations. In this case, there are no options set in the "Benchmark Stations Defined By" dialog as illustrated on the next page.

Since no "coding" or "point naming" need be done in the field (except for notes defining which points are what), this method of defining which stations are the main benchmark or junction points is very flexible - yet most laborious as it requires office editing of the field file. These inline ".POINT" options are simply edited into the field file between sets (to define the preceding foresight and next backsight point), and can be placed before the first backsight or after the last foresight in a survey as illustrated in this edited field file.

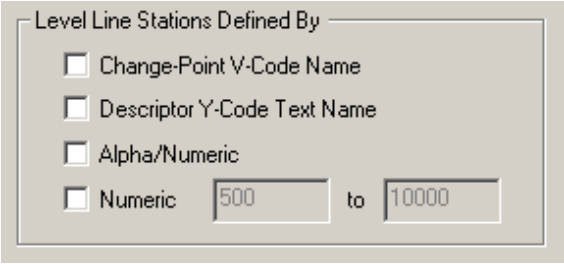
If you want to simply "rename" a sideshot station name, you can enter a ".Sideshot" (or ".S") inline option following the sideshot "k" line as illustrated below.

```
#Example: A survey using ".POINT" inlines

b,18,03066-1,468,1000200,0305010856,100020,,
.P Hello
g,18,73120,45305,1073320,,,468,468,0906
i,18,252775,47023,820545,,,1,468,0909
g,18,47763,39588,868308,,,1,468,0912
i,18,247248,36748,621060,,,2,468,0915
g,18,49495,43375,670555,,,2,468,0917
i,18,258995,44033,411560,,,3,468,0919
g,18,79688,42895,491248,,,3,468,0922
```

```
i,18,210433,42880,280815,,,4,468,0924
g,18,162798,35958,443613,,,4,468,0930
i,18,140428,36110,303185,,,5,468,0931
.P Alpha
g,18,178163,21498,481348,,,5,468,0936
i,18,173345,20705,308003,,,6,468,0937
g,18,183133,18150,491136,,,6,468,0940
i,18,182358,18590,308778,,,7,468,0941
.P WoodPost
g,18,162943,25108,471721,,,7,468,0944
i,18,172698,23193,299023,,,8,468,0945
.P 998877
g,18,154418,58360,453441,,,8,468,0948
k,18,176332,29340,414211,,,3001,468,0947
.S OldWell
i,18,166183,62075,287258,,,9,468,0952
g,18,195303,57393,482561,,,9,468,0957
i,18,121768,55580,360793,,,10,468,1010
g,18,264823,28500,625616,,,10,468,1013
i,18,105873,29610,519743,,,11,468,1015
g,18,236933,29060,756676,,,11,468,1017
i,18,82443,29143,674233,,,12,468,1019
g,18,234810,30220,909043,,,12,468,1022
i,18,92520,30728,816523,,,13,468,1025
g,18,226798,28715,1043321,,,13,468,1028
i,18,113150,27130,930171,,,14,468,1030
g,18,185698,17700,1115869,,,14,468,1033
i,18,115670,15998,1000199,,,15,468,1034
.P Hello
t,00,03066-1,,0305011035,,,,,,,
```

This is how the “Benchmark Stations Defined By” dialog is set for this conversion run:



All options are turned off since the “.POINT” inline 100% controls the benchmark or main junction determination in this example.

And below is the data file created showing point to point leveling segments with the differences in vertical (to be adjusted) and the distances between benchmarks (for weighting purposes). This file will be used as input to a STAR*NET network adjustment containing level network data.

```
# STAR*TopDL Version 7.2.2
# Copyright 2012 MicroSurvey Software Inc.

# Input Field File : C:\RawData\TestTopDL-4.lev
# Date Processed   : 12-18-2008 13:52:22
```

```
.Units  Meters
.Sep    -
.3D

E  Hello              10.0020

#  Elevation Difference Records
#  Stations                          Diff    Dist  Descriptor
L  Hello-Alpha                    -6.97015   414
L  Alpha-WoodPost                  0.05593    79
L  WoodPost-998877                -0.09755    48
L  998877-OldWell                 -0.21914    88
L  998877-Hello                    7.01176   500
```

The ".POINT" inline can be used with a given name (as illustrated in the example field file such as ".P Alpha") or without a name (for example ".P"). If the inline is used without a given name, the existing name in the field data will be used.

Note that the vertical differences and distance values for the single loop in this conversion are the same as the those created for the same loop in Example 1, 2 and 3 conversions - only the benchmark names have changed as given by the ".POINT" inlines.