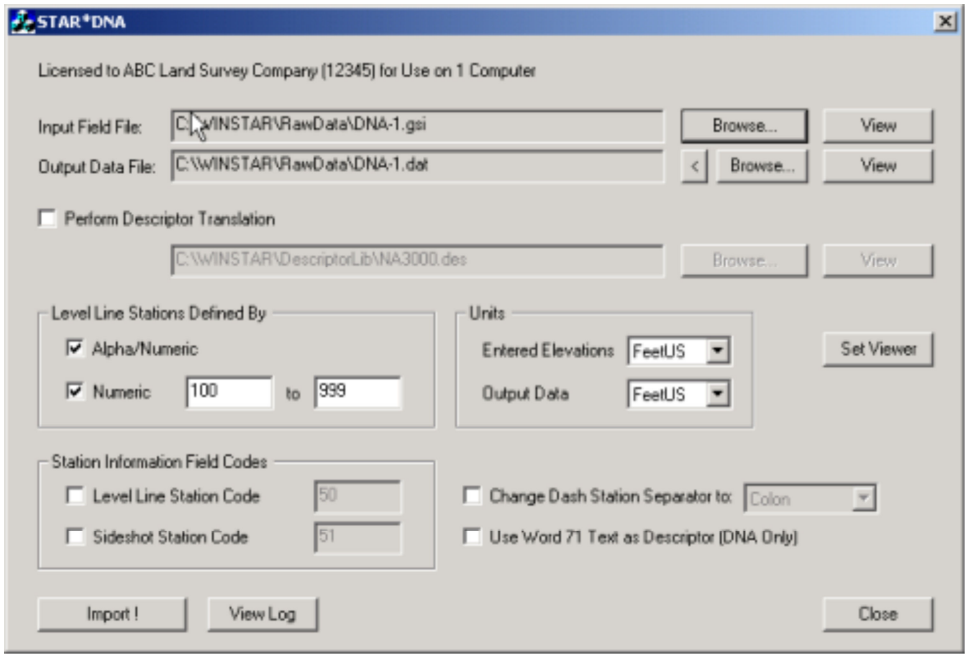
STAR*NET CONVERSION UTILTIES

STAR*DNA CONVERSION UTILITY

This program converts Leica DNA, NA3000 and NA2000 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. The Log file also shows a complete detail of all field BS/FS records used to construct the final data file when the conversion is successful.

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

- Perform Descriptor Translation – You can optionally set up one or more descriptor libraries that can be used to translate hand-entered codes in your field data (codes from 1 to 5 characters long) into longer descriptors. The program by default assumes a descriptor library will have a “DES” extension. If you want translation performed, mark the check box and then browse for a library you wish to use. Note that you can create several libraries and select a specific one for a conversion. See details about creating a descriptor library later in this manual.
- Level Line 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.

You can tell the program to consider as a main station any one with an Alpha/Numeric name (i.e. BM135, HYDE, etc.), or any point with a purely numeric name within some range of values such as 100 to 999 as illustrated in the dialog. Or you can set both criteria by checking both boxes (i.e. JOHN and 234 would both be considered main stations). Note that earlier Leica NA3000 and NA2000 series models collect numeric point numbers only.

All other points found in a survey line not fitting the “level line station naming” criteria 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 (usually called “Intermediates” in Leica documentation) are always included in the converted data no matter what their names are.

- Station Information Field Codes – While collecting data in the field, you can optionally enter “Code” lines to add information to level line stations or sideshots. This information may include a station name, an elevation and a descriptor. Entering a “Level Line Station Code” at a station is another way to tell the converter utility that the point is a benchmark or junction. Use of these field codes is explained later in the manual along with examples.
- Units – Here you select what the units are for any entered elevations, and what units you want used for the output data created for use in the STAR*NET package. Entered elevations are only those elevations that you may have entered with “Field Code” lines while in the field, or those entered using “.POINT” or “.SIDESHOT” inline options that you may have been edited into the raw file in the office. Field codes and these two inline options mentioned above are described later in this manual. Note that the actual BS/FS observation data lines collected in the field are not affected by any of these units settings as each line of field observation data already contains its own units of measurement.
- 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.
- Use Word 71 Text as Descriptor (DNA Only) – The DNA digital level allows the surveyor to enter a “Remark” during a backsight or foresight observation. This option allows the user to assign any remark text present on the raw observation line as a target descriptor.

Other Notes

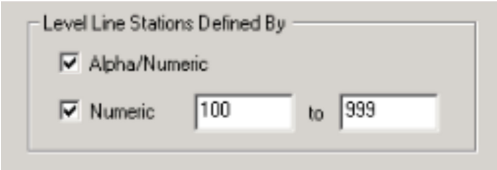
The program assumes that raw field files have a “GSI” or “RAW” extension. If you have a field file with a different extension, choose “All Files (*.*)” from the “File of type” field in the file selection dialog and then select the file you wish to convert from the complete list.

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*DNA 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 an important file that is created during a run. It lists any errors and warnings produced during the run, and when a conversion run is successful, it contains a summary of all observations used to create the resulting data file. This file has the same name as the input field file but with a “log” extension, and it 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 the warnings were posted.

Naming the Level Line Benchmark or Junction Stations



The ability to most 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, to use the scheme illustrated by the dialog, you might set your instrument up to use small numbers as the normal numbering of turning points and then override this numbering when sighting benchmark points by entering point numbers between 100 and 999, or by entering alpha/numeric point names. You need to decide on your own naming scheme and then let the surveyors know before they go to the field to collect data.

Sometimes data may have been collected before a naming scheme had been established. Or in other cases, there may be a few benchmarks or junctions that don't fit the naming scheme, possibly because of client requirements or because an existing benchmark name had to be matched. For these situations, a field-entered "Code" line or an office-entered ".POINT" inline option may be used 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 our work, and then for special cases, use the field-entered "Code" lines, or later in the office, edit in ".POINT" inlines into the raw data to handle just the special cases. The field-entered "Code" option line and the office-entered ".POINT" inline along with other special code and inline options are described in the manual after the first example.

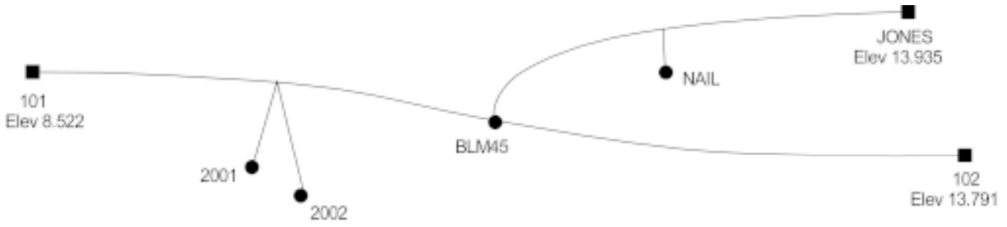
The following field file is included on your diskette. Data in this file illustrates a naming scheme consistent with the "Level Line Stations Defined By" settings shown in the example dialog on the first page – stations numbered between 100 and 999, plus those with Alpha/Numeric names will be considered benchmark or junctions. And all other level line points will be considered turning points. Sideshots are <u>always</u> converted no matter what their names are.

Blank lines and comments have been edited in to make the example more readable. (Blank lines and comments, lines beginning with the # character, are ignored.) The converter ignores all data lines (those beginning with "11") that are not backsight/foresight observation lines. Therefore, for sake of clarity, some lines that are ignored anyway have been edited out of the sample files.

The backsight or foresight observation lines that define stations as benchmarks, because of the naming scheme set in the options dialog, are shown in bold type. Note that the field data includes sideshots that are always converted to STAR*NET data.

```
# Sample Field File DNA-1.gsi
# Start leveling line at junction 101, pass thru junction BLM45, and
# end at the leveling line at junction 102

410001+?......1
110003+00000101 32..01+00172640 331101+00004574
110004+00000001 32..01+00172110 332101+00005532 83..01+00007564
110005+00000001 32..01+00125460 331101+00007674
# Sideshots to points 2001 & 2002
110006+00002001 32..01+00034680 333101+00004600 83..01+00010638
110007+00002002 32..01+00055580 333101+00008400 83..01+00003838
110008+00000002 32..01+00161450 332101+00006759 83..01+00008479
110009+00000002 32..01+00164530 331101+00005507
110010+000BLM45 32..01+00113060 332101+00004977 83..01+00009009
110011+000BLM45 32..01+00151480 331101+00005423
110012+00000003 32..01+00148290 332101+00004300 83..01+00010132
110013+00000003 32..01+00150890 331101+00005823
110014+00000004 32..01+00150890 332101+00004131 83..01+00011823
```

```
110015+00000004 32..01+00147380 331101+00005938
110016+00000102 32..01+00148920 332101+00003974 83..01+00013787

# Start new leveling line at junction BLM45 and end at JONES

410017+?......1
110019+000BLM45 32..01+00162640 331101+00005565
110020+00000001 32..01+00162110 332101+00004532 83..01+00007564
# Sideshot to point NAIL
110021+0000NAIL 32..01+00133430 333101+00002430 83..01+00010638
110022+00000001 32..01+00155460 331101+00007654
110023+000JONES 32..01+00151450 332101+00003768 83..01+00008479
```



The following is the converted data file in STAR*NET format. All that needs to be done before using it in STAR*NET is to edit in any elevations to be used as fixed control.

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

# Input Field File : C:\RawData\DNA-1.gsi
# Date Processed   : 02-05-2004 12:39:59

.Units  FeetUS
.Sep    -
.3D

#  Elevation Difference Records
#  Stations                          Diff    Dist  Descriptor
L  101-2001                        2.11600   505
L  101-2002                       -1.68400   526
L  101-BLM45                       0.48700   909
L  BLM45-102                       4.77900   898
L  BLM45-NAIL                      3.13500   296
L  BLM45-JONES                     4.91900   632
```

This is the “Log” file. Although it is not used as data by STAR*NET, it can be reviewed to see how the data shown above was created. The “Line” value indicates the actual sequential line in the data file so it can be easily found with a text editor. The “B”, “F” or “S” type code indicates whether an observation is a Backsight, Foresight or Sideshot.

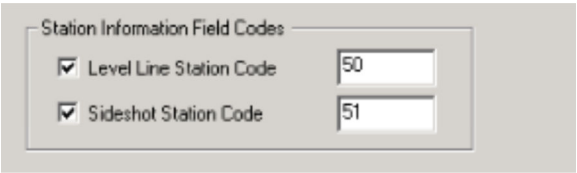
```
STAR*DNA Version 7.2.2
Copyright 2012 MicroSurvey Software Inc.

Input Field File : C:\RawData\DNA-1.gsi
Output Data File : C:\RawData\DNA-1.dat
Date Processed   : 02-05-2004 12:39:59
```

```
Line  Point            Type       E        D        Sum E      Sum D  Desc
6     101              B       4.5740  172.6400     0.0000     0.0000
7                      F       5.5320  172.1100    -0.9580   344.7500
8                      B       7.6740  125.4600
10    2001             S       4.6000   34.6800     2.1160   504.8900
11    2002             S       8.4000   55.5800    -1.6840   525.7900
12                     F       6.7590  161.4500    -0.0430   631.6600
13                     B       5.5070  164.5300
14    BLM45            F       4.9770  113.0600     0.4870   909.2500

Line  Point            Type       E        D        Sum E      Sum D  Desc
15    BLM45            B       5.4230  151.4800     0.0000     0.0000
16                     F       4.3000  148.2900     1.1230   299.7700
17                     B       5.8230  150.8900
18                     F       4.1310  150.8900     2.8150   601.5500
19                     B       5.9380  147.3800
20    102              F       3.9740  148.9200     4.7790   897.8500

Line  Point            Type       E        D        Sum E      Sum D  Desc
25    BLM45            B       5.5650  162.6400     0.0000     0.0000
26                     F       4.5320  162.1100     1.0330   324.7500
28    NAIL             S       2.4300  133.4300     3.1350   296.0700
29                     B       7.6540  155.4600
30    JONES            F       3.7680  151.4500     4.9190   631.6600

Process completed with 0 errors and 0 warnings.
```

Using the Optional “Station Information Field Codes”

While collecting data in the field, you can optionally enter field codes to add information about level line stations or sideshots. By entering a level line station code, you also force that station to be handled as a main level line station (rather than a turning point). Therefore, you can use a “Level Line Station Code” in conjunction with a naming scheme set on the program dialog, or as the sole method for defining which points are to be considered benchmarks or junctions. Procedures for entering field codes vary depending whether you are using the NA2000, NA3000 or the newer DNA equipment, therefore refer to Leica manuals for detailed instructions.

If you want to use field codes, decide which code numbers you want to use. Level Line Station Codes and Sideshot Station Codes must be different values. In the example below, we have chosen to use both types of coding, and have specified codes 50 and 51 respectively:



A Level Line Station Code can appear before or after a “Set” of observations. A “Set” includes all the backsights and foresights taken at a single turning point. A normal mode sets contain BF sequences; “double-run” mode sets contain BFFB sequences.

When a Level Line Station Code appears before a set, the backsight point in the set will be handled a level line station. And when the code appears after a set, the foresight point in the set will be handled as a level line station. Therefore, if the code appears between two sets, the foresight of the first set and the backsight of the next set will be handled as a level line station.

Here are some example locations of Level Line Station Codes in BF and BFFB mode sequences. These codes indicate that the adjacent points are level line stations (benchmarks or junctions). And depending on what additional information is present in the code line, a different point name, fixed elevation and/or point descriptor may be assigned.

```
(50)  BF BF BF BF BF  (50)  BF BF BF BF  (50) BF BF BF etc.

(50) BFFB BFFB BFFB BFFB  (50)  BFFB BFFB BFFB  (50) BFFB BFFB etc.
```

Sideshots are always converted to STAR*NET data. Therefore when a Sideshot Station Code is entered in the field, the purpose is only to change the name of the point, assign a fixed elevation and/or to assign a descriptor. A Sideshot Station Code is always entered directly following the sideshot. The letter “S” in the sequences below indicates a sideshot observation.

```
(50)  BF BF BS(51)S(51)F BF BF  (50)  BF BF BS(51)F BF  (50) BF BF BF etc.
```

A Level Line Code data line may contain up to three types of information, a station name, an elevation and a descriptor. These items are always entered in this order. Below is how a field-entered code line might appear assuming code “50” was used to enter all three items: a name, an elevation and/or a descriptor for a benchmark:

```
410123+000000 50 42....+0000 1004 43....+00 194750 44....+000 12345
```

This example Code “50” line would define the benchmark station name as “1004”, its elevation as 194.750 feet (or 19.4750 meters) and a descriptor as 12345.

Note that when entering an elevation on these code lines, enter 3 places of precision if you are entering elevations in feet, or 4 places, in meters. If you are entering elevation data using the newer Leica DNA equipment, you can include a decimal character in an elevation to define the exact value – no assumption of decimal precision is made in this case.

Here are some additional rules of data entry in a Level Line Code data line:

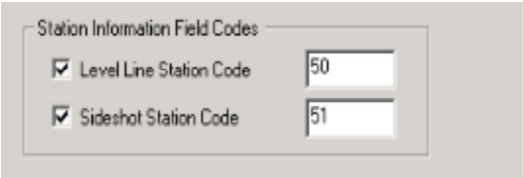
1. When a “Code” line is entered with no other data, the station it defines is considered a level line station benchmark or junction, and the point name from the observation line will be used as the station name whether it fits any given naming scheme or not.
2. A zero value entered in the name or elevation field acts as a placeholder when you want to enter data only in a following field.
3. A descriptor entered on a Code “50” line will override a descriptor defined by a “Word 71” remark (DNA only) as described in “Setting Options” on page 2.

Examples: The first example Code “50” line says that the point being defined will be considered a benchmark or junction, and the name will be taken from the observation line. The second line illustrates using a “0” placeholder in the name field. This benchmark will use the name on the observation line and it will be assigned an elevation of 194.750 (assuming units are feet). And the third line assigns point 1004 as the junction name and a “12345” descriptor. Note that when using the Leica DNA, alpha/numeric values can be entered in these fields.

```
410123+00000050

410123+00000050 42....+00000000 43....+00194750

410123+00000050 42....+00001004 43....+00000000 44....+00012345
```

Entering Sideshot Station Codes follows the same rules as the Level Line Station Codes except that data items entered for the Sideshots Station Codes are entered only to define information about the station, such as to rename the point or to assign an elevation and/or descriptor. Sideshots are always converted to STAR*NET data. The Sideshot Station Code line below, for example, renames the sideshot as 4007, sets the elevation of the point as 200.533 (assuming elevations are being entered as feet), and assigns a “54321” descriptor.

```
410123+00000051 42....+00004007 43....+00200533 44....+00054321
```



This example field file illustrates extensive use of field coding to define points to be handled as level line stations, and to add elevations and/or descriptors to these points. In this example, the Level Line Station Code is set to “50” and the Sideshot Station Code is set to “51” as illustrated by the settings shown on the dialog.

Note that in this field file, no level line “naming scheme” was set in the program dialog nor used in the field - point numbering simply begins at “1” and increments as if all were turning points. All level line stations are defined by Code “50” data entered in the field. Code “51” also illustrated, adds a descriptor to one sideshot and changes the name of another.

```
# Example File DNA-2.gsi - Using Field Codes "50" and "51" to define
# level line station and sideshot information.

410001+?......1
410002+00000050 42....+00ABC101 43....+0008.522 44....+00012345
110003+00000001 32..01+00172640 331101+00004574
110004+00000002 32..01+00172110 332101+00005532 83..01+00007564
110005+00000002 32..01+00125460 331101+00007674
110006+00002001 32..01+00034680 333101+00004600 83..01+00010638
110007+00002002 32..01+00055580 333101+00008400 83..01+00003838
410008+00000051 42....+00000000 43....+00000000 44....+LOST PIN
110009+00000003 32..01+00161450 332101+00006759 83..01+00008479
110010+00000003 32..01+00164530 331101+00005507
110011+00000004 32..01+00113060 332101+00004977 83..01+00009009
410012+00000050 42....+000BLM45
110013+00000004 32..01+00151480 331101+00005423
110014+00000005 32..01+00148290 332101+00004300 83..01+00010132
110015+00000005 32..01+00150890 331101+00005823
110016+00000006 32..01+00150890 332101+00004131 83..01+00011823
110017+00000006 32..01+00147380 331101+00005938
110018+00000007 32..01+00148920 332101+00003974 83..01+00013787
```

```
410019+00000050 42....+00555555 43....+0013.791 44....+00LELAND

410020+?......1
410021+00000050 42....+000BLM45
110022+00000001 32..01+00162640 331101+00005565
110023+00000002 32..01+00162110 332101+00004532 83..01+00007564
110024+00002003 32..01+00133430 333101+00002430 83..01+00010638
410025+00000051 42....+0000NAIL
110026+00000002 32..01+00155460 331101+00007654
110027+00000003 32..01+00151450 332101+00003768 83..01+00008479
410028+00000050 42....+000JONES 43....+0013.935
```

The resulting data file now includes “E” lines with fixed elevations and/or descriptors.

```
# Input Field File : C:\RawData\DNA-2.gsi
# Date Processed   : 02-05-2004 12:39:59

.Units  FeetUS
.Sep    -
.3D

#  Elevation Records
#  Station             Elev    StdErr  Descriptor
E  ABC101               8.52200      ! '12345
E  555555              13.79100      ! 'LELAND
E  JONES               13.93500      !
E  2002                              'LOST PIN

#  Elevation Difference Records
#  Stations                            Diff    Dist  Descriptor
L  ABC101-2001                         2.11600   505
L  ABC101-2002                        -1.68400   526 'LOST PIN
L  ABC101-BLM45                        0.48700   909
L  BLM45-555555                        4.77900   898 'LELAND
L  BLM45-NAIL                          3.13500   296
L  BLM45-JONES                         4.91900   632
```

And the resulting log file details all the observations used to create the data file.

```
STAR*DNA Version 7.2.2
Copyright 2012 MicroSurvey Software Inc.

Input Field File : C:\RawData\DNA-2.gsi
Output Data File : C:\RawData\DNA-2.dat
Date Processed   : 02-05-2004 12:39:59
```

```
Line  Point           Type       E        D        Sum E      Sum D  Desc
8     ABC101          B       4.5740  172.6400     0.0000     0.0000
9                     F       5.5320  172.1100    -0.9580   344.7500
10                    B       7.6740  125.4600
11    2001            S       4.6000   34.6800     2.1160   504.8900
12    2002            S       8.4000   55.5800    -1.6840   525.7900 LOST PIN
14                    F       6.7590  161.4500    -0.0430   631.6600
15                    B       5.5070  164.5300
16    BLM45           F       4.9770  113.0600     0.4870   909.2500

Line  Point           Type       E        D        Sum E      Sum D  Desc
18    BLM45           B       5.4230  151.4800     0.0000     0.0000
19                    F       4.3000  148.2900     1.1230   299.7700
20                    B       5.8230  150.8900
21                    F       4.1310  150.8900     2.8150   601.5500
22                    B       5.9380  147.3800
23    555555          F       3.9740  148.9200     4.7790   897.8500 LELAND

Line  Point           Type       E        D        Sum E      Sum D  Desc
28    BLM45           B       5.5650  162.6400     0.0000     0.0000
29                    F       4.5320  162.1100     1.0330   324.7500
30    NAIL            S       2.4300  133.4300     3.1350   296.0700
32                    B       7.6540  155.4600
33    JONES           F       3.7680  151.4500     4.9190   631.6600

Process completed with 0 errors and 0 warnings.
```

Editing in Optional Station Information using “Inline” Options

The “.POINT” and “.SIDESHOT” inline options are provided so you can easily edit station information directly into a raw field file. These inline options are identical in functionality to the Station Information Field Codes described in the previous section, except these inline options are edited into a raw field file while in the office. These inline options allow you to add information about level line stations. The “.POINT” inline also forces the point to be handled as a level line station (rather than a turning point). Therefore, you can use the “.POINT” inline in conjunction with a naming scheme set on the program dialog, or as the sole method of defining which points are to be considered level line stations.

The formats of these inline options are described below and later illustrated in a raw field file. Just like all inline options, they can be abbreviated to as little as one character (i.e. “.P”) as long as they can be differentiated from other inline options available within the program.

Inline Option: .POINT [*name* [*elevation*]] ['*descriptor*]

Inline Option: .SIDESHOT [*name* [*elevation*]] ['*descriptor*]

The “.POINT” inline option can be inserted before or after a “Set” of observations. A “set” is the sequence of backsights and foresights taken at a single turning point. Normal mode sets contain BF sequences; “double-run” mode sets contain BFFB sequences.

When this inline appears before a set, the backsight point in the set will be handled as level line station. And when the inline appears after a set, the foresight point in the set will be handled as a level line station. Therefore, if this single inline appears between two sets, the foresight of the first set and the backsight of the next set will be handled as the same level line station.

Example locations of “.POINT” inlines in BF and BFFB mode sequences:

```
.POINT  BF BF BF BF BF  .POINT  BF BF BF BF  .POINT  etc.

.POINT  BFFB BFFB BFFB BFFB  .POINT  BFFB BFFB BFFB  .POINT  etc.
```

When the inline is entered without parameters as in the first example below, the name of the station in the raw field file is retained as the station name. When a point name is the only parameter entered, that name is assigned to the station. To enter a control elevation, but not a name, enter a zero as the name as a placeholder. (In this case the name existing in the raw field file is still taken as the station name). To assign a descriptor, always enter it as the last item on the option line and begin it with a single or double quote character.

```
.P # Defines station as benchmark
.P  BM1933# Assigns new Name only
.P  'West Main# Descriptor only
.P  BM1933  'West Main# Name and descriptor
.P  0  39.720 # Elevation only
.P  BM1933  39.720  'West Main# Name, Elevation and Descriptor
```

The ".SIDESHOT" inline option affects only sideshots. Sideshots are always converted to data regardless of their point names. This inline is entered directly after a sideshot observation line in the field file. For example, the following sequence illustrates the location of sideshots observations indicated by "S" characters and the ".SIDESHOT" inlines that affect them:

```
... BFFB BFFB BFFB S .SIDESHOT S .SIDESHOT BFFB BFFB etc.
```

This inline is used only to change the sideshot name or to assign an elevation and/or descriptor to the sideshot station. The format and contents of the ".SIDESHOT" inline option is identical to that of the ".POINT" inline option described previously.

This example field file illustrates use of the ".POINT" inline option to define which stations are to be handled as level line stations, and to add elevations and/or descriptors to some of these points. The ".SIDESHOT" inline adds a descriptor to one sideshot and changes the name of another. No level line naming scheme was used in the field nor set in the program dialog - point numbering simply begins at "1" and increments as if all were turning points.

This field file is identical to that shown on page 8 except ".POINT" and ".SIDESHOT" inlines edited into the field file are used rather than field codes entered while surveying. Also the output data and log files created are identical to those as shown earlier.

```
# Example File DNA-3.gsi - Using ".POINT" and ".SIDESHOT" Inlines to
# define level line station and sideshot information.

410001+?......1
.P ABC101 8.522 '12345
110003+00000001 32..01+00172640 331101+00004574
110004+00000002 32..01+00172110 332101+00005532 83..01+00007564
110005+00000002 32..01+00125460 331101+00007674
110006+00002001 32..01+00034680 333101+00004600 83..01+00010638
```

```
110007+00002002 32..01+00055580 333101+00008400 83..01+00003838
.S 'LOST PIN
110008+00000003 32..01+00161450 332101+00006759 83..01+00008479
110009+00000003 32..01+00164530 331101+00005507
110010+00000004 32..01+00113060 332101+00004977 83..01+00009009
.P BLM45
110011+00000004 32..01+00151480 331101+00005423
110012+00000005 32..01+00148290 332101+00004300 83..01+00010132
110013+00000005 32..01+00150890 331101+00005823
110014+00000006 32..01+00150890 332101+00004131 83..01+00011823
110015+00000006 32..01+00147380 331101+00005938
110016+00000007 32..01+00148920 332101+00003974 83..01+00013787
.P 555555 13.791 'LELAND

410017+?......1
.P BLM45
110019+00000001 32..01+00162640 331101+00005565
110020+00000002 32..01+00162110 332101+00004532 83..01+00007564
110021+00002003 32..01+00133430 333101+00002430 83..01+00010638
.S NAIL
110022+00000002 32..01+00155460 331101+00007654
110023+00000003 32..01+00151450 332101+00003768 83..01+00008479
.P JONES 13.935
```

Repeat Measurements

The NA2002 and NA3003 digital levels allow “repeat” measurements to be made when a previous measurement is bad. The repeated measurement is basically a correction to the original. The original bad measurement still appears in the raw file, but the repeated or corrected measurement appears after a record containing a “!” as the sixth character in the line.

The converter automatically detects these repeats and properly makes the correction. In the example below, the converter causes the data following the line with the “!” character to replace the prior data of the same type. This all happens automatically requiring no effort on your part.

```
110018+00000008 32..01+00147380 331101+00005938
110019+00000009 32..01+00148920 332101+00003974 83..01+00013787
410020+!....332
110021+00000009 32..01+00148880 332101+00003975 83..01+00013788
```

The newer Leica DNA series digital levels automatically handles “repeat” data in the collectors memory by removing data that is to be replaced. Therefore the raw data appearing in the field file will contain only the final corrected data.

Early NA2000 and NA3000 series levels allowed a just-recorded observation to be immediately reobserved as a method of correction. Therefore if two observations with the same station name and observation type (backsight or foresight) are found directly following each other in the field file, the converter uses only the last observation line and the previous is ignored.

The “.DATA ON|OFF” Inline Option

The STAR*DNA converter program supports the same “.DATA ON/OFF” inline option that is used in the STAR*NET package and in other converter programs.

The “.DATA ON/OFF” inline can be used to exclude blocks of data from being processed by the converter program. This can be very useful when you want part of your data excluded, but wish to leave it remaining in the raw file for historical purposes. Simply place a “.DATA OFF” line before and a “.DATA ON” line after any group of lines you want ignored.

The “.NA3000” Inline Option for Old Converter Compatability

An older converter named “NA3000” used only the “.POINT” inline option and the “Code-50” field code. There was no built-in “naming scheme” as offered by the current STAR*DNA conversion utility. The older utility also required the “.POINT” inline or Code-50 field code to be used to cause sideshots to be converted. The “.NA3000” inline is provided so that existing raw field files created with the old coding system (and perhaps not converted yet) can be converted successfully with this utility. Simply add the “.NA3000” inline to the top of a raw field file and run the STAR*DNA converter. Any options set in the “Level Line Stations Defined By” and “Station Information Field Codes” dialog boxes will be ignored.

Setting Up a Descriptor Library (Optional)

If you use descriptor codes in your collected field file, these short codes are automatically used as descriptors in the data created for STAR*NET by the STAR*DNA program. However if you create an optional “Descriptor Library” file, any of these short descriptor codes found in the library will be translated into expanded text descriptors. Here's how to do this.

To create a descriptor translation file, use a text editor to create a file with a “DES” extension. This file may be located in any directory you feel convenient. Edit a list of your own descriptors into this file. Each line should contain a code followed by the text you want used as the expanded descriptor. The code may be from 1 to 5 characters long, and it may be a number or text. The descriptor text may be up to 45 characters long. Separate the code from the descriptor by one or more spaces or tabs. Blank lines in the file as well as lines beginning with a # character will be ignored. Here's how a short descriptor library file might look:

```
#File WAYNE.DES - Wayne's Descriptors
101Benchmark
102Edge of Pavement
103Fire Hydrant
104Wood Stake
WSWood Stake
201Oak 12” Diameter
205Big Pine Tree
etc...
```

As described in earlier parts of this manual, descriptors can be entered in the raw field file by entering field codes while in field surveying or by editing “.POINT” or “.SIDESHOT” inline options into the raw file back in the office.

Whenever the “Perform Descriptor Translation” box is checked, the program checks any entered descriptor that is 5 characters long or less against the codes in the descriptor library file. When a match is found, the expanded descriptor in the library is assigned. (Text codes may be upper or lower case; case is ignored by the STAR*DNA program.)

```
.POINT 1001 87.234 '102(assigns Fire Hydrant)
.POINT 1012 '104(assigns Wood Stake)
.POINT 1012 'ws(assigns Wood Stake also)
.SIDESHOT '205(assigns Big Pine Tree)
```

Whether a descriptor is specified by a field code line or office-entered inline option, whenever the descriptor is longer than 5 characters, or whenever your numeric or text descriptor text is not found in the descriptor library file, the original descriptor will be printed as the actual descriptor. This allows you to make up special numeric codes in the field, say perhaps 99001, which may have special meaning to your job.

Leica GSI-8 and GSI-16 Field File Formats

The STAR*DNA converter utility handles both Formats. The newest DNA digital levels can store field data in either format. The older NA2000/NA3000 series levels only store field data in the shorter GSI-8 format. Data lines in GSI-16 format are each prefixed with a “*” character.

The STAR*DNA utility also supports the “alternate” observation recording modes available with the newer equipment. Both single run (BF) and double run (BFFB) modes are detected from the field data and automatically handled.

The BF alternate order would look like this: BF FB BF FB BF FB …

And the BFFB alternate order like this: BFFB FBBF BFFB FBBF BFFB …