Spectra Precision Geodimeter Software Tools User’s Guide

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Using Geodimeter Software Tools

(SP GST and SP Survey)

Introduction

Geodimeter Software Tools (SP GST and SP Survey) are PC-based Windows software packages that simplify communication between Geodimeter® surveying instruments and personal computers. These packages present the tools you need to transfer, edit, and convert surveying data files in a convenient, easy-to-use format.

Please Pardon Our Dust

In our continuing effort to bring you the best software products possible, we have made significant product changes. In addition to new functionality, Spectra Precision GeoTool is now named Spectra Precision Geodimeter Software Tools (SP GST). The on-line help system and other documentation have not yet been revised to reflect this name change.

Spectra Precision Geodimeter Software Tools (SP GST)

SP GST provides the ability to transfer, edit, convert and report data from Geodimeter and Geotracer RTK instruments in a convenient, easy-to-use solution. Tools provided to automate and customize your data collection include:
4 Spectra Precision Geodimeter Software Tools

- A file editor that understands the types of files used by your Spectra Precision equipment and lets you edit them in a spreadsheet format.
- Tools that enhance the display and usage of point codes, label numbers and label descriptions.
- Transfer commands to send, receive and obtain a directory for Spectra Precision instruments.
- Launch of GPS download programs directly from the SP GST Menu.
- Conversion of RAW files to ASCII point files and XYZ files.
- Conversion of XYZ files to DXF files.
- Conversion of ASCII points files to AREA files for use within the instrument.
- Generation of user-definable reports from RAW data files.

Spectra Precision Survey (SP Survey)

SP Survey combines SP GST with the CAD, Coordinate Geometry and Contour modules of Spectra Precision Terramodel® to provide a complete solution for both the field and office. This powerful system enhances your data collection and stakeout capabilities with bi-directional transfer of DXF, DWG, DGN, third party formats and ASCII files, linework and symbol creation from pcodes entered in the field, contour generation, average-end-area volume calculations, profile interpolation, coordinate system conversions, and much, much more.

Terramodel is a powerful land modeling system that enables engineers, surveyors, contractors and photogrammetrists to produce complete survey and design drawings. Terramodel is a complete CADD system with features designed specifically to unleash the power of you Geodimeter® or Geotracer® RTK.

Terramodel is a single program that is sold in modules as well as solution packs that combine modules. Each module adds access to secured commands. Adding modules requires no additional software installation so Terramodel can grow as you do. In addition to the CAD module, which is the required base module, the following modules are available: Contour, Coordinate Geometry, Roadway design, Hydrology, Sewer Design & Analysis, Image Manager, SP View and Automated Sheet Assembly and Production (ASAP). Please refer to the release notes installed with SP Survey for additional information and documentation references.
About This Guide

This guide is intended to describe how to use SP GST and SP Survey in conjunction with a Geodimeter surveying instrument to collect, transfer, edit, and convert field data. It is not intended as a comprehensive guide for the software or surveying instruments; it provides basic instructions for common situations.

Conventions and Definitions

This guide uses the following typographic conventions:

<table>
<thead>
<tr>
<th>Item</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>MENU NAMES</td>
<td>SETTINGS</td>
</tr>
<tr>
<td>Menu Selections</td>
<td>Divide Line</td>
</tr>
<tr>
<td>Command Names</td>
<td>Gridset</td>
</tr>
<tr>
<td>Dialog Box Titles</td>
<td>Layer Setup</td>
</tr>
<tr>
<td>KEYBOARD KEYS</td>
<td>(CTRL, ESC, ENTER, TAB, SHIFT)</td>
</tr>
<tr>
<td></td>
<td>KEY1 + KEY2: Press and hold KEY1 then press KEY2</td>
</tr>
<tr>
<td></td>
<td>KEY1, KEY2: Press and release KEY1, then press KEY2</td>
</tr>
<tr>
<td>Special function keys</td>
<td>[f1]</td>
</tr>
</tbody>
</table>

Installing SP GST and SP Survey

These programs can be installed on any PC where Windows 95, 98 or NT 4.0 is installed. To install SP GST or SP Survey from a CD-ROM:

1. Insert the Spectra Precision Product CD in the appropriate drive.
2. Click the Start button.
3. Click Run.
4. Type D:\SETUP in the Command Line box. (Substitute the appropriate letter if your drive address is something other than D.)
5. Click OK. The Spectra Precision Product CD screen appears.
6. Click Products to display a listing of available products.
7. If you wish to install SP GST, select SP GST. If you wish to install SP Survey, select SP Survey. Then follow the instructions on screen.

When all files have been copied and the installation is complete, the installation program tells you that SP GST or SP Survey was installed successfully.

User-Defined Sequence (UDS) Files

A user-defined sequence (UDS) file is a data collection program stored in the Geodimeter instrument. UDS’s are used for the registration and display of measurement, coding and administration information.

NOTE: All UDS’s used for collection routines are listed in the Appendix A of this guide.

Topographic Data

Elements of a Data File

Topographic data you collect is broken into three sections: Header/Administration data, Station Establishment data, and Sideshot data. The requirements for each of these sections are discussed below.

Header/Administration Data

Header/Administration data is general information not required to process field data. Data typically recorded in a header UDS includes: project name, operator, time, date, temperature, pressure, units, and other project-related information.
Station Establishment Data

Station Establishment data is used to set up stationing based on an instrument setup location. It is required to calculate coordinates from topographic side shots. Data can be recorded using a UDS that collects at least the following labels: 2, 3 (if elevations are to be calculated), 62, and 21. You can also use Program 20 to collect the station establishment data. The UDS you currently use is probably collecting the correct data.

Sideshot Data

Sideshot data is necessary for processing data to an ASCII points file (P,N,E,Z,D) using at least the following labels 5, 4, 6, 7, 8, 9 (Pno, Pcode, SH, HA, VA, SD). Your existing UDS’s will most likely work, without change. You will need to check your current UDS’s and settings in GST, as discussed later in this guide.

Collecting Raw Data Only

If you are going to be collecting field data without coordinates you can use the following sequence of UDS’s.

UDS 1  Administration UDS
UDS 2  Station Establishment UDS
UDS 3-4 or 5-6  Topo UDS’s

Collecting Raw Data and Coordinates

If you are going to be collecting field data coordinates you can use the following sequence of UDS’s and programs.

UDS 1  Administration UDS
PRG 20  Station Establishment Program
(You have 2 or 3 methods depending on your instruments version. They are: Known Station, Free Station, and Known Station Plus.)
UDS 3-4 or 5-6  Topo UDS’s
Collecting Data with Linework Codes (SP Survey Only)

Before you begin collecting linework in the field, you need to set certain properties in SP Survey and create a special file called a .MAP file that designates the type, layer and color of the lines that will be drafted.

Setting Map Points Properties

In SP Survey you will need to select the unique character(s) or symbols that will indicate the begin, end, intersection, and curve information that SP Survey will need to create the lines properly.

1. Start SP Survey if it is not already running.

2. From the FILE menu, select Open Project.

3. Select the TMODEL.PRO file, located in the Spectra\modwin\ directory, and click Open.

4. From the DRAFT menu, select Linework From Points. The MapPoints command bar appears near the bottom of the screen.

5. Click the Properties button. The Map Points Properties dialog box appears.
6. In the Line Identifying Symbols group, modify the Begin and End symbols to make field entry easier. Some recommendations are:

- Use `\` for the Begin and `^` for the End symbol. On the Geodimeter these characters are accessed through the Shift key while in Alpha mode on an alphanumeric keypad. For numeric keypads you will need to enter the ASCII codes (92 for `\` and 94 for `^`).

- If you want to use letters for the Line identifying symbols, you need to use letter combinations that do not appear in any description (i.e., QQ, ZZ, etc.).

- You should not need to change the Intersect symbol or any of the Arc identifying symbols.

7. Once you have made the changes, click OK.

8. From the FILE menu, select Save project to save your changes.

**Creating the .MAP File**

After you have set the map points properties, you need to create a .MAP file. This file allows you to assign the linetype, layer and color of the line(s) that will be drafted by the description of each point.
1. From the GEOFILE menu, select File Editor. This opens a blank .RAW file in a separate editor window.

2. From the FILE menu in the editor, select New. In the dialog box that appears, change the file type to Mapping (*.MAP) and type in a file name (i.e., TEST.MAP). Be sure to type the .MAP extension or the file editor will not open the correct grid type for the .MAP file.

3. Click the Save button to create the file. You are now ready to begin entering data for the .MAP file. The following figure shows a .MAP file with one line of data entered.

```
File Editor Mapping file - test.map

<table>
<thead>
<tr>
<th>Pt. Name</th>
<th>Line Type</th>
<th>Layer</th>
<th>Color Num</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SOLID</td>
<td>POINTS</td>
<td>63</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
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<td>4</td>
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</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

The Pt. Name indicates the Point Code(s) that the line will be drafted through. The Line Type field contains the SP Survey line type name. The Layer field indicates the layer on which you want the line drafted. (If you want the line to also be a break line when contouring, the line will need to be on the same layer as the 3D points that will be contoured.) The Color Num field indicates the color number that will be used to specify the color of the line when drafted. The color numbers can be found by using a left mouse click on the Object color control button or the Point color control dialog button.

4. When you are finished entering data into the spreadsheet, click the FILE menu and select Save.

5. Close the editor by clicking the X in the upper right corner of the dialog box.
Additional Help for Other File Formats

If you will be exporting the project data to a .DXF, .DWG, or .DGN file formats you can find additional help in the SP Survey help system.

1. From the HELP menu, select Index.
2. From the Help dialog box, select the File Menu topic.
3. In the next screen select Export.
4. Now select the appropriate export format (.dxf, .dwg, .dgn).

Collecting Field Data

After you have set your map points properties and created a .MAP file, you are ready to collect field data. The following steps indicate an example field data collection.

1. Setup the Geodimeter as described in your Geodimeter documentation.
2. Run an Administration program (optional).
3. Run a Station Establishment program (UDS or P20).
4. Run a Topography UDS (the Program 5-6 combination will be used for this example).
5. In Program 5, enter 100 when prompted for the Pno.
6. When prompted for the SH, enter the SH data you are currently reading on your Prism pole.
7. When prompted for the Pcode, enter the Pcode number or description for the point you will be collecting, but DO NOT PRESS ENT. For this example enter EP, then press the Shift key. (For System 600 CU’s press the ≤ key located next to the α key. For the 4000 CU or alpha numeric keypads for 400 and 500 instruments the shift key is the one with a solid yellow circle, next to the α key.) This activates the symbols on the bottom of the display.
8. Press the STD key to select the \ from the display. For numeric keypads you only need to enter the ASCII code 92 to get the \. The Pcode should now read EP.
9. Accept the Pcode by pressing ENT.
10. Measure and record the point.

11. After registering the point you will be prompted for the Pcode again. To continue the line, enter the next Pcode without the \\ If you are using a UDS that does not prompt you for the Pcode, change the Pcode with Function 4.

NOTE: Rules for Creating linework can be found in the Help system.

12. From the HELP menu, select Index.

13. Type in Rul to display help topics beginning with these letters. Double-click on the Rules for Creating Set Lines in the area displaying help topics.

In addition to the rules in the help system, please be aware of the following:

- If you have the Pcode conversion setting on the Geodimeter set to on (displays the Alpha text for a specific Pcode number) you will need to enter the Pcode number first followed by the Linework symbol.

- If you enter the Linework symbol first then the Pcode the text for the Pcode will not be displayed.

**Eccentric Point Data Entry**

You can use one of three different methods for collecting eccentric point data:

1. Use the onboard Eccentric Point routine (System 4000 [robotic only] and System 600 instruments only). This method will collect adjusted HA, VA and SD for the eccentric point location. It will also collect the adjusted N, E, and Z value if they are collected in the field.

2. Use Functions 72 and/or 73. This data will need to be processed by GST 2.0 to get the adjusted eccentric point location.

3. Use UDS’s that collect HA, then VA and SD from different locations. This will collect the correct angles and distance, but no coordinates can be collected with this set of UDS’s. The data will need to be processed by GST 2.0 to get the adjusted eccentric point location.
Processing the data

After you have collected field data, you can process it in SP GST for use in SP Survey or other software packages.

1. Download data from the data collector or open an existing .RAW file
2. From the CONVERT menu, select To ASCII Points File.
3. Follow prompts to create a .PTS file. After you complete this, the information is ready to import into SP Survey or other software packages.

Traversing (SP Survey only)

Collecting Backsight (BS) and Foresight (FS) Sets

1. Setup the Geodimeter as described in your Geodimeter documentation.
2. Run Administration UDS (P1), entering applicable data when prompted.
3. Run DBAR TRAV OS UDS (P10). This UDS will prompt for the Stn (Occupied Station) and the IH (Instrument Height). After you enter the data for this UDS it will automatically link to UDS 11 for collecting the BS and FS observations.
4. DBAR TRAV BS/FS UDS begins by prompting you for the activity code (Activ=). This defines a specific survey function to the software and groups data items for that particular function. Enter 1 or BS for the backsight observation.
5. In a similar manner, enter information for the Pno (BS point number), Pcode (description for BS point (optional)), and the SH (Signal Height). After all data has been entered, you will see the HA and VA displayed on the screen.
6. Change the measuring mode to D-bar, which allows you to measure the BS in Face 2 and then in Face 1. Once the angles have been measured in both faces you can measure the distance and then press REG when you are ready to record the measurement. Once the BS has been measured you can measure the FS point.
7. At the Activ= prompt enter 2 or FS for the Foresight observation. Enter data for the remaining prompts and measure the point.
8. Repeat the preceding steps if you wish to collect another set.

NOTE: Make sure you collect an equal number of BS and FS observations or you will have problems processing the data.

9. Once all of the traverse data has been collected you can either collect your topography or move the instrument to the FS point. When you restart at the FS point you can begin right at P10 (Admin data does not need to be re-recorded).

**Eccentric Point Data Entry While Traversing**

You can only use two (2) methods for collecting eccentric point data when you process a traverse with topographic sideshots using the Field Data Editor in SP Survey. Future enhancements to the Field Data Editor will include the ability to use the Function 72 and 73 for eccentric point location.

1. Use the onboard Eccentric Point routine (System 4000 [robotic only] and System 600 instruments only). This method will collect adjusted HA, VA and SD for the eccentric point location. It will also collect the adjusted N, E, and Z value if they are collected in the field.

2. Use UDS’s that collect HA, then VA and SD from different locations. This will collect the correct angles and distance, but no coordinates can be collected with this set of UDS’s. This information will need to be processed by GST 2.0 to get the adjusted eccentric point location.

**Processing the data**

After you have collected field data, you can process it in SP GST for use in SP Survey or other software packages.

1. Download data from data collector.

2. From the CONVERT menu in SP Survey, select **RAW file to Field Data Reduction**.

3. Select the AISI (OBS) method. A .TRV file is created.

4. From the COGO menu, select **FieldD** to open the field data reductions window.
NOTE: A help window will automatically open when the field data editor is opened. Do not close this help window.

5. From the FILE menu and select Open.

6. After the file is open, return to the help window and follow the instructions, beginning with step 7.

Collecting Data for AutoDesk® Survey Products

You can perform a survey with the intention of processing the raw data within the Autodesk® Survey product (formerly known as Softdesk Survey). SP GST provides the ability to convert a raw data (*.RAW) file to a Fieldbook (*.FBK) file as required by that product family. While collecting the data, you can enter Fieldbook commands as necessary to define the connection of points with polylines.

SP GST therefore replaces the GeoLite and GeoCom DOS utilities formerly required to convert a raw file to a Fieldbook file.

Data Collection

The following procedures must be followed in collecting survey data to be converted to a Fieldbook file.

UDS Selection

An occupied station can be established by any suitable means. The backsight on a reference object must, however, include a label 21 value, establishing the horizontal circle reading for that reference point. Sideshots must employ a label 7 value to measure the horizontal circle reading for that observation. In creating the Fieldbook command for each observation, the label 21 value from the backsight associated with the previous station establishment will be subtracted from the label 7 value of the observation. That computation results in the turned angle right, as required by the Fieldbook commands that will be used.

SP GST does not currently support the presence of multiple backsight reference objects. The last label 21 value encountered within a station establishment is that used. It also does not currently support the conversion of raw data files containing
observations performed using both face 1 and face 2 of the instrument, nor eccentric point location using labels 72 or 73.

Sideshots that employ labels 7, and 11 (horizontal angle and horizontal distance) will result in the creation of a 2D point using the AD Fieldbook command. Sideshots that employ labels 7, 8 and 9 (horizontal angle, vertical angle, and slope distance) will result in the creation of a 3D point using the AD VA Fieldbook command. A sideshot that uses labels 7, 11 and 10 (horizontal angle, horizontal distance and vertical distance) will result in the creation of a 3D point using the AD VD Fieldbook command.

### Point Descriptor Expansion (Label 4 Processing)

In creating the Fieldbook file, collected integer point descriptors (Label 4) can be expanded to their alphanumeric equivalent using SP GST’s current pcode file. See About pcodes in the on-line help system index for a complete explanation of the use of a pcode file. The help screen entitled Define the configuration files describes how you can designate a particular pcode file as the current (or active) pcode file. The help screen entitled Pcode/UDS file settings describes how you can designate that pcodes be converted, and in what fashion.

### ENHANCEMENTS PROVIDED BY THE PCODE FILE

Previous user’s of the GeoLite and GeoCom DOS utilities should note that the pcode file (*.PCO) replaces the functionality of the GeoCom.dic file used by those programs. The GeoCom.dic file mapped each numeric point descriptor to the alphanumeric descriptor to which it was to be translated. SP GST’s pcode expansion capability offers enhanced functionality over that provided in those earlier programs.

A particularly noteworthy comparison is the mechanism by which a quantitative value can be added to a descriptor. In the above noted earlier programs, descriptor number 103 might have been mapped to the word PINE. In locating an 18 inch diameter pine tree, the user might have entered 103-18, wherein GeoLite and GeoCom would translate the point descriptor as PINE18. Using SP GST’s pcode extension capability, the surveyor can configure the software to translate a similar entry in a number of other ways, as described below. A pcode extension is a quantitative number following the descriptor and separated from it using a period. You can configure SP GST to translate the entry 103.18 in a variety of ways, included those shown below.

- PINE18
- 18PINE
- 18" Pine
- 18" Pine Tree
- 18 in. dia. Pine
Fieldbook Command Entry

SP GST provides the surveyor with a means of entering specific Fieldbook commands or even comments while collecting the survey data. This is used primarily as the means of specifying Fieldbook commands to designate the connection of polylines between observed points. The recording of a Fieldbook command is accomplished by means of the manual entry of a label 0 or a label 1, followed by the Fieldbook command name. In any case, the data following either a label 0 or label 1 entry will be placed within the Fieldbook file as it is created.

You can designate shortened forms of the Fieldbook commands (or in fact any text string) to reduce data entry requirements and to allow entry on a numeric keypad. The Fieldbook command file default.fbc contains the definition of the shortened forms of command names. This file must be located within the directory in which SP GST is installed. The contents of this file, as shipped, is shown below.

1=BEGIN
2=CONT
3=START
4=END
5=RECALL
6=C3
7=PRC
8=PC
9=PT
B=BEGIN
C=CONT
S=START
E=END
R=RECALL
BEGIN=BEGIN
CONT=CONT
START=START
RECALL=RECALL

In referring to the above definitions, you can see that entry of the integer "1" or the string "B" or "BEGIN" will result in the creation of the Fieldbook BEGIN command. Entry of the integer "2" or the string "C" or "CONT" will result in the creation of the Fieldbook CONT command. String definitions are case sensitive, so entry of a 0=B will result in an entry of the BEGIN command within the Fieldbook file. Entry of 0=b
will result in an entry of a lower case "b" within the Fieldbook file. You can edit the default.fbc file, if you wish, to make both "B" and "b" result in the BEGIN command.

Though intended as a means of allowing Fieldbook commands to be entered on numeric keypads, or shortening their entry on alphanumeric keypads, you can edit the default.fbc file to map any alphanumeric text that you may wish to insert within a Fieldbook file to a shortened alphanumeric entry to be entered in the job file. Previous user's of the GeoLite and GeoCom DOS utilities will recognize that the described functionality of the default.fbc file was previously offered within the Geocom.dic file. The difference is that those programs used both an integer mapping to Fieldbook commands, as defined in the Geocom.dic file, and a single alpha character mapping that was hard coded in the program. In SP GST, all shortened forms of command names, or of other textual entries, must be defined within the default.fbc file. Additionally, the former GeoCom.dic file served a dual role by also mapping integer point descriptors to expanded alphanumeric descriptors. As described in the previous section, that function is carried out in SP GST by the current pcode file.

Within the job file and the resulting raw file, a label 0 or label 1 entry can be entered anywhere within the set of data items associated with a sideshot observation. That sideshot data will result in the creation, within the Fieldbook file, of a point location command, such as an AD, AD VA, or an AD VD command. Those commands will contain the appropriate data, as derived from the raw file, to locate the observed point. Use of a label 0 will result in the entry of the indicated text in front of such a point location command. Use of label 1 will result in the entry of the indicated text after the associated point location command. If you wish that a sideshot point start a new polyline, you should enter a 0=BEGIN entry, or its associated shortened version, i.e., 0=1, or 0=B. The Fieldbook BEGIN command will then be issued before the associated AD, AD VA, or AD VD command. If you desire that a sideshot point end the current polyline, you should enter a 1=END entry or its associated shortened version. The Fieldbook END command will then be issued after the associated AD, AD VA, or AD VD command.

Polyline Creation

SP GST maintains an internal list of the names of open polylines, and the name of a single current polyline. When the raw file contains a 0=BEGIN entry within the set of labels defining a sideshot, a BEGIN command will be issued before the associated AD, AD VA, or AD VD command in the Fieldbook file. The BEGIN command must contain an argument naming the polyline. That argument will be taken from the point descriptor (label 4) assigned to the sideshot point with which the BEGIN command is associated. The user therefore can not explicitly assign a polyline name. Within Fieldbook files created by SP GST, the polyline name is always taken as the name of the points on which it is based, and all points associated with a polyline must be named the same, unless placed in that polyline by the RECALL command.
The following is an example of a side shot entry within a raw file.

\[\begin{align*}
61 & = 3 \\
5 & = 2810 \\
4 & = \text{EOP1} \\
0 & = B \\
7 & = 13.5958 \\
8 & = 90.4746 \\
9 & = 234.56
\end{align*}\]

The corresponding entry within the translated Fieldbook file is shown below.

\begin{verbatim}
BEGIN EOP1
AD VA 2810 398.0453 234.56 90.4746 "EOP1"
\end{verbatim}

This places the polyline "EOP1" within the list of open polylines and makes it the current polyline. As long as subsequent sideshots are also described as "EOP1", the polyline of that name will remain the current polyline, and will connect to those points. Whenever a point with a descriptor other than "EOP1" is encountered, SP GST will automatically place an \texttt{END} command before it within the Fieldbook file. In that case, the polyline named "EOP1" will no longer be the current polyline, though it will still be an open polyline.

If the descriptor assigned to the above noted differently named point does not match the name of any polyline in the list of open polylines, no line will connect to that point. If, however, its name does match that of an open polyline, SP GST will automatically issue a within the Fieldbook file to continue the previous polyline. The open polyline of that name will therefore connect from its last defined point to the current point. As a result, all points with a descriptor name matching that of an open polyline will automatically extend that polyline. In order to prevent that, the user must explicitly end the polyline.

If the user wishes to end a polyline, such that a subsequent instance of a point of that same name does not result in an automatic continuation of that polyline, he must explicitly provide a 1=END entry as the last point on the polyline is defined. In doing so, an \texttt{END} command will be placed after the associated \texttt{AD}, \texttt{AD VA}, or \texttt{AD VD} command. In that case, the current polyline will also be removed from the list of open polylines.

After having explicitly ended a polyline, as described above, the user can still explicitly enter 0=CONT in the job file. That will produce the Fieldbook command \texttt{CONT name}, where \texttt{name} is the point descriptor assigned to the associated point, as derived from the related label 4 entry. When explicitly continuing a polyline in this manner, the user must assure that a previously defined polyline actually exists with a name matching that point descriptor. Issuing a \texttt{CONT} command in this manner places the indicated polyline name back in the list of open polylines.
In a similar manner, entry of 0=START within the job file will result in a **START** command in the Fieldbook file. This will connect the beginning of the like named polyline to the subject point, as opposed to connecting from its end. Again, the polyline name argument associated with the **START** command will be that of the associated point descriptor, and the user must assure that a previously defined polyline with a name matching that point descriptor actually exists.

The **C3, PC, PT, and PRC** Fieldbook commands can be issued with a label 0 entry. The *defaults.fbc* file, as shipped, contains integer short forms for these commands, allowing entry from a numeric keypad. Since the command names themselves are so short, shortened alphabetical terms are not defined in that file, though you can define such if desired. Otherwise, just enter 0=C3, 0=PRC, etc.

The Fieldbook **RECALL** command allows you to connect the current polyline to a previously defined point. Entry of that command involves a specialized syntax in which both the command and its point number argument are designated. The command name, or its shortened form, must be followed by a period, and then the point number of the point being recalled. In the following examples, point number 208 is recalled, designating the **RECALL** command by three different methods.

\[
\begin{align*}
0 &= \text{RECALL.208} \\
0 &= \text{R.208} \\
0 &= 5.208
\end{align*}
\]

In these cases, the Fieldbook command file, *default.fbc*, designates the integer "5" and the character "R" as shortened forms of the **RECALL** command name.

## Creating a Fieldbook File

The following procedure is used to convert a raw file to a Fieldbook file.

1. Download data from the data collector or open an existing .RAW file
2. From the CONVERT menu, select To Softdesk Fieldbook File.
3. Follow prompts to create an .FBK file. After you complete this, that file is ready to import into the Autodesk® Survey product family.
## Appendix A

### UDS Files

<table>
<thead>
<tr>
<th>UDS 1</th>
<th>UDS 2</th>
<th>UDS 3</th>
<th>UDS 4</th>
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<tbody>
<tr>
<td>42=1</td>
<td>42=2</td>
<td>42=3</td>
<td>42=4</td>
</tr>
<tr>
<td>43=ADMIN DATA</td>
<td>43=STA ESTAB</td>
<td>43=SET FAST TOPO</td>
<td>43=FAST TOPO</td>
</tr>
<tr>
<td>79=10</td>
<td>79=10</td>
<td>79=10</td>
<td>5=4</td>
</tr>
<tr>
<td>54=1</td>
<td>2=1</td>
<td>5=2</td>
<td>4=3</td>
</tr>
<tr>
<td>53=1</td>
<td>3=1</td>
<td>4=2</td>
<td>6=3</td>
</tr>
<tr>
<td>52=0</td>
<td>62=1</td>
<td>6=2</td>
<td>5=8</td>
</tr>
<tr>
<td>51=0</td>
<td>21=1</td>
<td>79=7/4</td>
<td>4=8</td>
</tr>
<tr>
<td>55=0</td>
<td>79=6</td>
<td></td>
<td>6=8</td>
</tr>
<tr>
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<tr>
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</tr>
<tr>
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<td></td>
<td>9=0</td>
<td></td>
</tr>
<tr>
<td>23=0</td>
<td></td>
<td>37=0 or 8</td>
<td></td>
</tr>
<tr>
<td>79=6</td>
<td></td>
<td>38=0 or 8</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>39=0 or 8</td>
<td></td>
</tr>
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<td></td>
<td></td>
<td>79=5</td>
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<tr>
<td>UDS 5</td>
<td>UDS 6</td>
<td>UDS 10</td>
<td>UDS 11</td>
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<tr>
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<td>42=6</td>
<td>42=10</td>
<td>42=11</td>
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<tr>
<td>43=SET PCODE TOPO</td>
<td>43=PCODE TOPO</td>
<td>43=DBAR TRAV OS</td>
<td>43=DBAR TRAV BS/FS</td>
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<td>3=1</td>
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<tr>
<td>79=7/6</td>
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<td>16=0</td>
</tr>
<tr>
<td>79=5</td>
<td>25=0</td>
<td>19=0</td>
<td>79=5</td>
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