TRIPOD DATA SYSTEMS, INC.

TFR
TFR-LINK
DC-LINK
User's Manual

TFR
File Transfer

User's Manual

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FILE TRANSFER AND CONVERSION

TFR is TDS's basic transfer and file utility program. The following routines are available:

- **File transfer between TDS data collectors and your desktop PC.**
- **Coordinate and Raw data editors.**
- **Conversion between different coordinate file formats for data transfer between data collectors and COGO or CAD programs.**
- **File utility routines, including: View, Print, Copy, Delete, Merge, etc.**

This manual is designed to describe three products: TFR, TFR-Link and DC-Link. TFR-Link extends TFR by adding the ability to convert between different raw data formats. DC-Link adds the ability to transfer data from non-TDS data collectors.

INTRODUCTION

With TDS' TFR package, you have the ability to transfer coordinate and raw data files quickly between the handheld data collector and a personal computer. The TFR package uses an error-checking protocol to eliminate transmission errors. TFR works with all TDS surveying software, including the TDS-COGO48, the TDS-48, the TDS System 95, the TDS-500, the TDS System FS/2, and EASY SURVEY. In addition, you can upload or download other files, such as Point Lists and road layout files, from the data collector to the PC (and vice versa).

The TFR program allows conversion of uploaded coordinate files into a variety of different formats for compatibility with many surveying and CAD-based software packages. Within TFR, you have the ability to edit your coordinates *and* your raw data and to reprocess the raw data into coordinates after the file has been transferred to your PC. The reprocessing is done in the same manner as the TDS data collector processes the raw data generated in the field. TFR also allows you to view or print uploaded coordinate and raw data files in a format that is easy to read.

TFR's many features combine to make a very powerful tool. For example, suppose that you have performed an adjustment on your coordinates. You then discover that you need the original coordinates for some other purpose, such as to try another adjustment. With TFR, you can recreate the coordinates from the original raw data file; thereby, you ensure that you can always reproduce the original coordinates of the survey.

Or, suppose that you have returned from the field and discover that your rod man had changed the rod height during the job, but that you neglected to make that change in your data collector. All of your elevations from that point in the survey are wrong. All you need to do is download the raw data to your PC using the TFR program; edit your raw data file to change the rod height where appropriate; and, recreate the coordinates. Of course, the ability to edit the raw data file *in the PC* is not limited to rod height. Any element of the raw data file may be edited or deleted or a new element may be inserted.

From any screen or menu within the TFR package and by simply pressing **[HELP] [Shift][F1]**, you can read context-sensitive help text for all menus, screens, and commands, as well as various general topics.

Different TFR Modules

There are **three different versions** of the TFR program. They are packaged and sold as three different products. The three are :

TFR
TFR-LINK ™
DC-LINK ™

The differences between these three versions are their capabilities:

- TFR is the basic version referred to in this Introduction. All versions of TFR contain the basic TFR.
- TFR-LINK has the additional capability of converting raw data file formats from one type to another; such as to convert TDS raw data to Intergraph's ADF file format.
- DC-LINK contains all the functions in the TFR-LINK, plus the ability to communicate with certain non-TDS data collectors such as SDR, FC-4, and GRE 3. It also has the ability to convert raw data from these non-TDS data collectors to other raw data file formats.

	TFR	TFR-LINK	DC-LINK
Transfer data between TDS data collector and PC.	yes	yes	yes
Convert coordinate file to another file format.	yes	yes	yes
View and print data in any type of file.	yes	yes	yes
Edit coordinate file.	yes	yes	yes
Edit raw data file and re-generate coordinates.	yes	yes	yes
Convert TDS raw data file into other raw data file format such as Intergraph, Softdesk, etc.	no	yes	yes
Receive data from other data collectors such as SDR, FC-4, GRE 3.	no	no	yes

NOTE:

This manual is intended to be used for all of the three products. Some of the functions described in this Manual may not be available in the particular product you own. If a feature requires TFR-Link or DC-Link the Manual will notify you of this with the following symbols: TFR-Link DC-Link

Installing the TFR program

About the hardware lock

TFR-LINK and DC-LINK programs are shipped with a hardware lock. The lock is a small electronic device which looks like a bi-directional cable connector. Its function is to provide copy protection for our software product. To install this hardware lock, you first need to disconnect your printer cable from the printer port in the back of your computer. Then, you can insert the lock into the printer port and reconnect the printer cable to the other end of the lock. If your computer is already installed with another hardware lock, you can connect it either before or after the existing lock; thereby cascading them together.

NOTE:

For TFR-LINK and DC-LINK programs, the hardware lock is *required* to use their extended features. Without the hardware lock these programs will run as the Basic TFR. Access to the advanced functions will be restricted.

To install the program:

1. Place Disc #1 in your A drive.
2. Change your DOS drive prompt to A:> by typing:

   A: press **[ENTER]**

3. At the A: prompt, give the command to install by typing:

   A:> **INSTALL** press **[ENTER]**

4. When you install TFR, the line:

   SET TDS_TEMP=*path*\TDS_TEMP

   is added to your autoexec.bat file. Before TFR is Run for the first time you should reboot your system. To reboot press and hold down [Ctrl], [Alt], and [Del], all at the same time.

To RUN the program:

1. Move to the Subdirectory where TFR was installed. This is done with the Change Directory command, "CD". If TFR was installed in a directory called "TFR", then you would enter:

   C:>**CD \TFR** and press **[ENTER]**

2. Once you are in the directory where the TFR program is stored, simply enter:

   C:\TFR>**TFR** Press **[ENTER]**

In the above examples, you type into your computer only the **bold face** characters. The others are simply prompts to help you know where to enter the commands.

RULES OF THE ROAD

BASIC STRUCTURE: MENUS AND SCREENS

The TFR package has a tree-like structure of menus and screens. By selecting an item from a menu, you progress from the Main Menu (trunk of the tree), to the sub-menus (branches), and then to the screens (twigs and leaves). Menus and screens have entirely different purposes. A menu is a listing of options. A screen is like a worksheet on which data can be entered and problems can be solved.

Menus

A menu is an aid to help you navigate through the various TFR functions. Each menu contains a list of functions or operations that you may select. ***You don't solve problems in menus.***

All menus and screens within TFR branch out from and return to the Main Menu pictured below:

```
        File Transfer main menu
[A] Receive file from data collector
[B] Send file to data collector
[C] Edit coordinate file
[D] Edit/process raw data file
[E] Coordinate file format conversion
[F] Raw data file format conversion
[G] View/print file
[H] File management menu
[I] Define custom coordinate format
```

The **[F] Raw data file format conversion** line is only available in **TFR-Link** and **DC-Link**. If you are using TFR this line will not be displayed.

Screens

A screen consists of data entry and data display lines. Each line typically contains a label and a colon on the left, followed by a data display or input field. In the screens, you enter data needed to carry out a process. The Receive File screen is pictured below.

```
                Receive File
Data collector:            >TDS

Destination file name for
 non-TDS data collector:

Archive Raw data files: Yes

COM port :                 >COM1
Baud     :                 >9600
Parity   :                 >None

Store TDS coord. file as:>Sequential
```

This program uses three kinds of data fields. Two are marked with a **">" symbol** either in front of the field label or a data display field. This symbol is a **"scrolling prompt".** In front of a label, it means you can "scroll" through choices to change the label and, hence, the kind of data you will enter. When used in front of a data field, you change the selection of the data display. When the mouse is clicked on this symbol, or a **[←]** or **[→]** arrow key press on this line a small choice window is displayed over the current screen (see below):

```
                Receive File
Data collector:            >TDS

Destination file name for
 non-TDS data collector:

Archive Raw data files: Yes

COM port :                 >COM1
Baud     :                 COM1:
Parity   :                 COM2:
Store TDS coord. file as:  COM3:    1
                           COM4:
```

You can make your choice by clicking once to highlight and again to select (or double clicking), or by using the [↑] or [↓] arrow keys highlight and **[ENTER]** to select.

BASIC MOBILITY: MOUSE AND ARROW KEYS

It is easy to move around in TFR's menus, screens, and data fields. All movement can be controlled by use of the mouse, arrow keys, keyboard input, or pressing function keys at the top of your keyboard.

TFR is designed to be used with or without the mouse. Although most efficient when used with the mouse, the arrow keys allow access to any of TFR's menu or screen.

If you have used a mouse with other software packages, then you are already familiar with the mouse techniques presented in this Manual. If you have not used a mouse before, get ready for a treat; the mouse techniques are intuitive and require only the most minimal learning curve.

Using the mouse is basically a "move-and-click" operation. Move the mouse-guided curssor to the item of interest and click on it *once* to highlight it and *once* to select it. A "click" is defined as pressing the left mouse button once. Since it takes one click to highlight and one to select, you can do both simultaneously by "double clicking": making two rapid clicks of the button.

The scrolling prompt symbol is activated by clicking on it with the mouse or by highlighting the field the prompt applies to and pressing the left/right arrow keys. A small choice window will be displayed. Select your choice from among those that appear using the mouse or the arrow keys.

The softkeys displayed at the top of the screen can be activated either by pressing the appropriately numbered function key (F1 to F10 or **[SHIFT]** and F1 to F10) on your keyboard or by moving the mouse-guided cursor to the softkey label and clicking on it once.

All menu items can be selected by pressing their corresponding letter key on the keyboard or by moving the mouse-guided cursor to your choice and clicking on it once to highlight, and then once to select (or double click).

TFR contains its menus and screens in "display windows." This concept allows you to move the window to make room on the screen for something else.

This is done with the mouse by positioning the mouse-guided cursor on the top line (or title bar) of the display window. Click once at that spot. *Do not hold it down.* This "grabs" the display window, and you see only the outline. Now, drag the display window outline to the desired position on the screen and click again. The menu display is now repositioned. Any window in TFR can be moved in this manner.

With TFR's menu and screen organization, it is easy to branch out from the Main Menu. But, no matter what screen you are working in, you can always return to the Main Menu by pressing **[EXIT] [F6]**.

When you want to exit TFR, simply press **[EXIT] [F6]** from the Main Menu. The computer will prompt you to confirm that you really want to leave by presenting a YES/NO choice. To confirm, press **[Y]**. To remain in TFR, press **[N]**.

NOTE:

Before the program returns control to the operating system, it stores information about your software settings and selections in a file called SETTINGS.TDS. You should always return to the Main Menu and press [EXIT] [F6]. If you exit any other way, such as by turning your computer off, you run the risk of losing some of your changes.

BASIC FUNCTIONALITY: SOFT KEY COMMANDS

All commands within TFR are represented by the soft key labels at the top of every screen. The soft keys are grouped in an upper and lower row of ten each to give you a variety of functions or operations to perform on your data.

To execute a softkey, move the cursor to it and click on it once, or press the appropriately numbered soft key. If it's an upper row key, hold down the **[Shift]** key and press the softkey.

Each time a screen or menu appears, the soft keys are displayed in reverse video along the top of the screen.

Some keys are unique to the screens from which they operate from. Other keys are permanently defined for all the screens. The permanently available soft keys are known as the global soft keys.

The **Global softkeys** are:

1	HELP	2		3		4		5		6		7		8		9		10	
1		2		3		4		5		6	EXIT	7		8		9	CALC	10	MAIN

[HELP][Shift][F1]	Access a text file of useful information relating to your current task. A "beep" indicates no help screen is available for the current option.
[EXIT][F6]	Exit the current screen and return to the previous screen or menu. From the main menu, **[EXIT]** will exit TFR.
[CALC] [F9]	Access calculator functions via a special calculator screen. The highlighted value in the regular screen will be transferred to the calculator's screen. Upon return from the calculator, the resulting value in the calculator will be transferred back to the regular screen.
[MAIN] [F10]	Return to Main Menu.

SELECTING AN OPTION WITHIN TFR

From the TFR menu, you can use the mouse or the arrow keys to select any option. When an option is selected, it will be highlighted. Once an option is highlighted, clicking on it or pressing **[ENTER]** will execute the selected option.

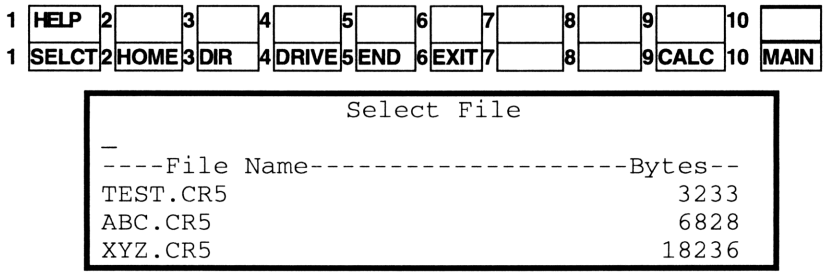
To exit from any menu or screen or to exit the program, press the **[EXIT][F6]**. If you press a soft key and are waiting for it to execute, the **[EXIT][F6]** key will abort the operation and return you to the where you were when you pressed the soft key. Note that at some prompts you have to make an entry. At these prompts, the **[EXIT][F6]** key will not abort.

At most prompts, when the computer is waiting for information to be entered, it will prompt for the necessary data. The computer will display a default answer. Press the **[ENTER]** key to accept the default answer; **[EXIT][F6]** will abort. If you type any other key, the computer will accept what you are typing as the new answer and delete the default answer.

FILE NAMES

All file names in TFR conform to DOS file naming conventions. The file name may contain just the file name itself, a path and file name or a drive, path and file name. For more details on naming files or specifying their paths or drives, see your DOS manual. Many routines within the TFR program *uses two types of files*: a source file and a destination file. A **source file** is the file from which TFR receives data. A **destination file** is the resulting file or the location of the result.

Whenever TFR is requesting a file name there is a softkey that will let you select one from a directory list. Pressing the appropriate key will bring up the following screens:



From this screen you can choose a file in several ways. Using the mouse to select a file, you click on the file to highlight it and click a second time to select it (or double click on it to do both). You can use the [↑] and [↓] arrow keys to highlight a file name and press **[SELCT] [F1]** to enter it. Or you can type it directly into the first line on this screen. The following softkeys are available from this screen:

[SELCT] Selects the highlighted file. Pressing enter or double clicking the mouse will also select a file.
[HOME] Moves the highlighted courser to the top of the list.
[END] Moves the highlighted courser to the bottom of the list.

[DIR]	Brings up the Select Directory Screen. (see below)
[DRIVE]	Brings up the Select Drive Screen. (see below)

If the file you are looking for is not listed you can change directories or drives using the [DIR] or [DRIVE]. The screens used for this purpose are displayed below. They work in the same manner as the Select File screen, first highlight the directory or drive you want and then select it.

1	2	3	4	5	6	7	8	9	10
1 HELP	2	3	4	5	6	7	8	9	10
1 SELCT	2 HOME	3	4	5 END	6 EXIT	7	8	9 CALC	10 MAIN

```
                Select Directory
Current Dir ->C:\EASY\TDS_DAT\
_
----------------Directories--------------
            .. <Up 1 Directory

          << No Sub directories >>
```

1	2	3	4	5	6	7	8	9	10
1 HELP	2	3	4	5	6	7	8	9	10
1 SELCT	2 HOME	3	4	5 END	6 EXIT	7	8	9 CALC	10 MAIN

```
                 Select Drive
Current Drive ->C:
_
-----------------Drive-----------------
              A:
              B:
               C:
```

If the source file name you entered is not found, TFR will flash a warning message that the file could not be found and prompt you for the name again. If the destination file name you enter is not found, the TFR program will create it for you. If the destination file is already present, the TFR program will warn you that the file already exists and ask if you want to overwrite the old file. If you answer "Y", the old file will be deleted, and a new file will be created. If you answer "N", the TFR program will prompt you for a new file name.

NOTE:

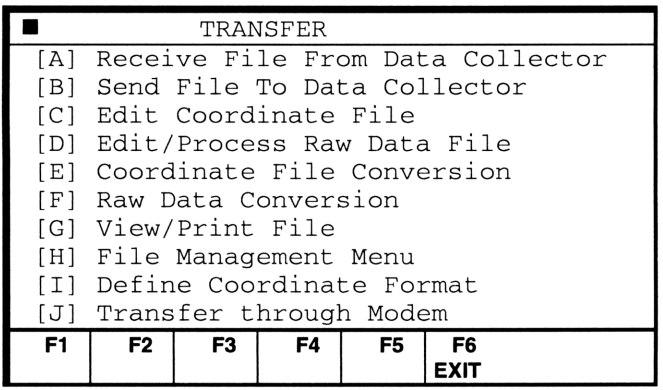
When entering a file name, you can always enter a path or sub-directory name with the file name. For example, if the source file you wanted to transfer is in a different sub-directory than you are currently in, then, when entering the file name, you would type:

C:\SUBDIRECTORY\filename.ext

This will access the file in the subdirectory you named. You can select a file in the displayed file-list by using the mouse or arrow keys to move to highlight it. Pressing the **[ENTER]** key will select the currently highlighted file. You may press the **[EXIT][F6]** key to exit without making any selection.

TFR MAIN MENU SCREEN

When the program begins, it will present you with a menu of options.



Each of these selections is explained below.

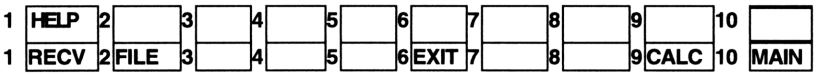
Receive File From Data Collector

This procedure is used to transfer data from a handheld unit into the PC. The routine is design to receive all data types including Coordinate data, Raw or field data, point lists, or other data collector files. For file transfers to or from the handheld unit, you should first set up the handheld unit to send or receive the file.

NOTE:

Please note that for sending or receiving to or from a data collector, the procedures on the data collector depend on the brand of data collector being used. In this Manual, we assume you use a TDS data collector.

Path: From the File Transfer menu, select **[A] Receive File From Data Collector**.




```
                Receive File
 Data collector:              >TDS

Destination file name for
non-TDS data collector:

Archive Raw data files: Yes

COM port  :                  >COM1
Baud      :                  >9600
Parity    :                  >None

 Store TDS coord. file as:>Sequential
```

<= TDS / FC-4 / SDR / GRE-3

<= Yes / No

<= COM1 to COM4
<= 300 to 19200
<= None / Even / Odd

<= Sequential / Non Seq.

Step 1: In the Data Collector field, click on the scrolling prompt (or use the left/right arrow keys) to display the options window and select the data collector you wish to communicat with.

NOTE:

DC/Link

TFR and TFR-LINK can receive data only from TDS data collectors. With DC-LINK the options are: TDS; FC-1/4; SDR; and GRE-3/4. If you have TFR or TFR-LINK, then the **shaded** lines on the above screen will not be displayed

Press the **[ENTER]** key to move to the next field.

Step 2: In the next field, if you are using a non-TDS data collector, enter the destination file name. ***If you're using a TDS data collector, you can disregard this field*** because the TFR will save the file in the PC using the same name as used in the data collector.

Step 3: The archive switch lets you select between saving a compacted backup copy of all Raw Data files down loaded to TFR. These copies will have an .AR5 suffix and can only be unarchived by the **Extract RawData from Archive** menu choice under the **File Management Menu**

Step 4: In the next field, use the scrolling prompt symbol to select the Communication Port (COM1 through COM4.) Select the Baud Rate and Parity for the transfer.

NOTE:

Make sure that the data collector is using the same baud rate and parity. For a TDS Data Collector the defaults are:

- baud rate 9600
- parity NONE

Step 4: Press **[RECV][F1]** to start receiving the file.

Step 5: On the Data Collector, press **[SEND]** for an entire file or **[SBLK]** for a block of points.

When transferring a block of points from a TDS data collector, the lowest point number must be equal to or greater than the lowest point number in the receiving file. For example, if you are going to transfer pts. 35-78 and pts. 165-456 to a file that does not exist on the PC, you must transfer pts. 35-78 first. If you transfer pts. 165-456 first you cannot have a point number lower than 165.

Step 6: TDS Data Collectors will present you with a list of all of the files of the appropriate type in the unit. Highlight the one you want to send to the PC and press **[SEL]** to select the file.

If you have the handheld unit properly connected to your PC and have executed the correct keystrokes, the PC will receive the designated file or block of points. It will be stored in a file with the *same name* as the file in the handheld unit and with the appropriate file extension: .CR5 for coordinate files; .RW5 for raw data files; .PL5 for point lists; or, .TXT for text files.

If a file with the same name as the one being transferred already exists within the active sub-directory on your PC, you will be prompted to determine if you want to overwrite the file. If you answer this prompt with "N," you will be prompted for a new file name. If a new .CR5 file is received, you can pre-designate its status as either sequential or non-sequential by choosing the option on the last line of the screen : "Store as: >Sequential."

You can always **abort a file transfer** by pressing **[ABORT]** on the handheld unit and then **[EXIT]** **[F6]** on your PC. The Data Collector should be halted first or the Data Collector could fail to respond after the interruption. **No permanent damage should be done either way.**

Send Coordinate File To Data Collector

This procedure is used to transfer data from a PC into the handheld unit. The routine is designed to send all data types including Coordinate data, Raw or field data, point lists, or other data collector files. For all file transfers to the handheld unit, you should first set up the handheld unit to receive the file.

Path:	From the File Transfer menu, select **[B] Send File to Data Collector.**

1	2	3	4	5	6	7	8	9	10
HELP									
SEND	FILE				EXIT			CALC	MAIN

```
                Send File
Data collector:                >TDS
File type:                     >Coordinate

Source file name : xxxxxx.xxx

Send entire file:              >YES
  For sending a block of
  points only
  Start point:                     1
  End point :                      1

COM port :                     >COM1
Baud     :                     >9600
Parity   :                     >None
```

<= TDS / SDR
<= Coordinate/ Pt. List
Road design / Text

<= YES / NO

<= COM1 to COM4
<= 300 to 19200
<= None / Even / Odd

Step 1: In the Data Collector field, click on the scrolling prompt (or use the left/right arrow keys) to select the type of data collector you are using.

NOTE:

DC⚡Link

TFR and TFR-LINK can only send files to TDS data collectors. DC-LINK can also send files to SDR data collectors. If you are using TFR or TFR-LINK, then **the shaded** line on the above screen will not be displayed

Step 2: In the File Type field, use the scrolling prompt to select the type of file being sent. For sending to a TDS data collector, the options are: Coordinate; point list; text; or road layout. For SDR, the only option is coordinate.

Step 3: In the File Name field, enter the name of the file to be sent. Or, you can select the file name from a directory list by pressing the **[FILE] [F2]**.

Step 4: In the Send Entire File field, you have the option of specifying YES or NO. If you are sending a coordinate file and you want to send only a block of points, specify the beginning and ending point numbers of the block in the Start/End Point fields. If you are sending the entire file, TDS will ignore the start and end points fields.

Step 5: In the COM Port field, select COM1 - COM4 as the communication device.
Select the Baud Rate and Parity for the transfer.

NOTE:

Make sure that the data collector is using the same baud rate and parity. For a TDS Data Collector, the defaults are:

- baud rate 9600
- parity NONE

Step 6: Press **[SEND][F1]** on your PC keyboard.

Step 7: On the handheld unit, press **[RECV]**.

NOTE:

When transferring a block of points, the lowest point number must be equal to or greater than the lowest point number in the receiving file

If you have the hand held unit properly connected to your PC and have executed the correct keystrokes, the PC will send the designated file or block of points. It will be stored in a data collector file with the *same name* as the file in your PC and the appropriate file extension: .CR5 for coordinate files; .PL5 for point lists; or, .TXT for text files.

If a file with the same name as the one being sent already exists within the active sub-directory on your data collector, you will be prompted to determine if you want to overwrite the file. If you answer this prompt with "N," you will be prompted for a new file name.

If a .CR5 file is sent, its status as sequential or non-sequential is not part of the information being sent out. *In order for the handheld unit to store it as a non-sequential file*, you need to create a non-sequential file in the hand held unit first; then, send the data from the PC into this existing file.

NOTE:

You can always **abort a file transfer** by pressing **[ABORT]** on the handheld unit and then **[EXIT] [F6]** on your PC. The Data Collector should be halted first or the Data Collector could fail to respond after the interruption. **No permanent damage should be done either way.**

Transfer Files through a MODEM

TFR has added a function for transferring data using a modem. With a modem, you can access your surveying data from a remote job site through the telephone line. You can also send data to the office, without the need to travel in. For sending data through the phone line, you need a modem between your data collector and the phone line.

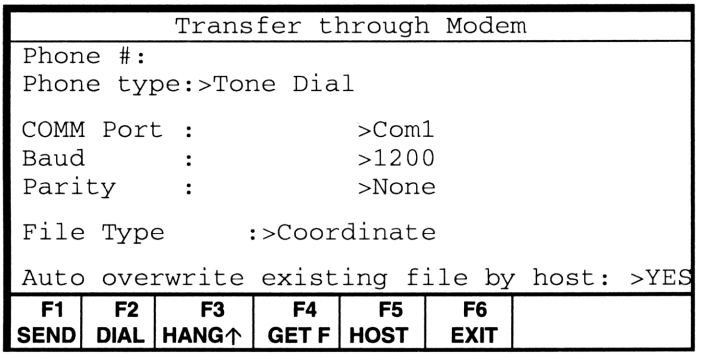
The computer in your office must have the ability to answer the phone and send and receive data. TFR, has a function for modem communication called Host mode and will answering phone calls with out operator assistance. In this mode, it will automatically pick up the phone when it rings and carry out commands from the field computer for sending and receiving data. Once set in the Host mode, you can transfer data to and from the office with out further command on you office PC.

Using the Modem Routine

Sending data over the phone lines is very similar to the transfer routine that is already used by the data collector, but two extra steps are needed. First, you must add an electronic communication device called a MODEM to both the data collector and the office PC. Any Hayes compatible modem should work but some setting of switches or modes and cable wiring maybe needed to configure some models. The modem on your PC must have Auto Answer capability. The dealer who sold you the modem should be able to provide you with the support needed to configure your modems. Once you have a properly configured modem connected to a phone line on your data collector and PC, the modems should not need to adjust again.

Second, you need to dial between these two devices and establish a connection. Before communicate over a modem can take place,

TFR on your PC must be set into a host mode so that it is waiting for your call. This can be done before you leave the office or by someone in the office just before dialing in. To set TFR to the **[HOST]** mode select **[J]** Transfer through Modem screen.



Check to see that the Port, Baud rate and Parity are properly set for your modems communication needs and press **[HOST]**. The screen should display "HOST MODE: (press ENTER to check CARRIER)" and then "OK" when it has checked the modem. The PC is now ready to send or receive data from a remote system and will wait in this mode until you **[EXIT]** from the host mode.

This **[HOST]** function is available only in TDS TFR program. The HOST softkey is NOT available on any TDS Data Collector. When **[HOST]** is hit, the modem will be set to an auto answer mode. This mode sets the PC to listen to the line for a RING. When a ring is detected, it will pick up the line, CONNECT the modems and enter the HOST mode which allows for the remote reading and writing of files. In the HOST mode, the screen will be cleared, and whatever the host is sending or receiving will be echoed to the screen. When the line is terminated, the host computer will automatically detect the loss of the CARRIER, and will re-enter the auto answer mode, ready for the next call. The only active softkey will be **[EXIT]** which allows you to exit the HOST state.

When you are ready to transfer data the data collector must dial in and establish a connection with your PC. From the data collector, select the File Transfer Screen and then the Through Modem screen. Check the COMM port, Baud rate and Parity. The parity must be the same as is set in TFR. The baud rate must be compatible with your data collectors modem but not higher than the baud rate set on the office PC. Check that the Phone Type is set properly (normally Tone Dial). Next, enter the Phone number to be dialed. and press the **[DIAL]** key. This will instruct the modem to dial the number and establish communication protocols with the office computer on the other end of the line. When the two systems are connected the screen will display "CONNECT". Hit the **[EXIT]** key to return to the File Transfer Screen.

Now, check to see that the File Type is the type you want to transfer and press the **[SEND]** or **[GET F]** key. Enter or select the file you wish to transfer and press **[ENTER]**. The file will be transferred. Another file can be transferred without re-dialing. Simply press the **[SEND]** or **[GET F]** key and select another file.

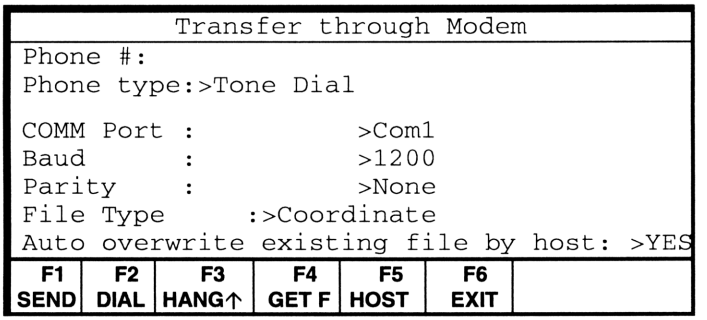
When you have completed all the transfers you want at this time press the **[HANG]** key and turn off the modem. The PC will stay in host mode ready to receive an other call at a later time. Simple repeat the calling instructions above when you want to transfer an other file.

Modem Communication

Purpose of screen: enables the machine to dial in, and send files to or get files from a host mode TFR program through a Hayes compatible modem. The KERMIT file transfer protocol is used. TFR can now become a host which allows users to call in and send or receive files. If a host mode TFR program is not

available, a server mode KERMIT program that has been set up to answer phone calls can also be used.

Path:	From the Transfer Menu, select **[J] Transfer through Modem.**



Phone#: is the number that will be dial when the **[DIAL]** key is pressed.
Phone type: the type of dial signal supported by the MODEM or phone line. It is either Tone or Pulse. The default is Tone and is usually supported.
Com Port: is the communication port(COM1 - COM4) that the modem is connected to. On all TDS Data collectors COM1 is the communications port.
Baud: is the baud rate, the speed at which data is transferred. Make sure your modem can work at the selected baud rate; this routine will not step down to find a working baud rate.
Parity: is the parity, a check to see if data has arrived correctly.
File type: is the type of file you will transfer. The option are:

.CR5 for Coordinate files;
.RW5 for Raw Data files;
.PL5 for Point Lists files;
.RD5 for Road Design files;
.TP5 for Templates; <-----only in Easy Survey Plus
.TXT for Text files.

Auto overwrite existing file by host: selects between over writing or renaming duplicate files. If set to YES a duplicate file will be overwritten. If set to NO the file will be renamed if one with the same name already exists. Two digits will be appended or replaced to its name. For instance, CURVE.CR5 will be renamed to CURVE01.CR5 up to CURVE99.CR5. **If set to NO, a files on the host machine should never be overwritten by a remote computer or data collector.**

[SEND] - sends a file from the calling modem to a system running host mode TFR or a KERMIT server. The file will be saved in the current working directory of the host computer.
[DIAL] - dials the phone number entered by the user in the Phone# field. Once connection is established, there will be "CONNECT" message displayed on the screen.
[HANG↑] - will hang up the phone by resetting the modem. It is a good practice to power off the modem after use to assure the line is disconnected.
[GET F] - gets a file from the host TFR or KERMIT server. If a file with same name already exists in the receiving directory, the user will be asked to overwrite it. There is not yet a function implemented to list the directory of the host TFR, thus the user has to remember what files the host PC has.
[HOST] sets TFR to an auto answer mode. This mode sets the PC to listen to the line for a RING. When a ring is detected, it will pick up the line, CONNECT the modems and enter the HOST mode which allows for the remote reading and writing of files. When the line is terminated, the host computer will automatically detect the loss of the CARRIER, and will re-enter the auto answer mode, ready for the next call.

Transferring data over the phone lines requires a modem on both the PC and the data collector. Configuring a modem for your office PC is usually well documented and the dealer who sold the modem should be able to answer any question you might have concerning the PC modem. The communication port on the data collector is less standard and therefore more difficulty may arise in the configuring of this modem. You may need to carefully consult you modem manual for switch setting and setup needs. There may need to be cable modifications also. For your convenience, Tripod Data Systems can provide a configured and tested modem and cable for our data collectors. Please call TDS for more information.

Edit Coordinate File

The Edit coordinate procedure allows you to add, edit or delete coordinates. There is also the ability to print the coordinate list as well as to view and search by a number of different parameters.

Path:	From the File Transfer menu, select **[C] Edit Coordinate File**.

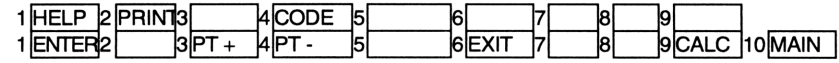
A window will appear, prompting for the name of a coordinate file. Key in a file name and press **[ENTER]** or **[F1]**. You will see a tabular listing of the coordinates and a row of soft keys on the screen. The soft keys are used to edit the coordinates.

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	5000.00000	5000.00000	100.0000	START
2	5710.23584	5040.83793	103.2864	PT 2
3	5740.53920	5497.57923	106.3649	PT 3
4	5654.96885	5679.78076	108.2213	PT 4
5	5158.39486	5658.62567	117.3596	PT 5
6	5198.24598	5438.22774	114.7919	PT 6
7	4970.31684	5385.83888	112.3029	PT 7
8	5000.08003	4999.91235	100.0001	CLOSE TO 1

```
JOB:SMITH>CR5  CONTROL                Line 1 of 5702 Lines
Curent Data Path=> C:\TDS\TDS_DAT
```

To edit a line from the file, use the mouse or the cursor key to highlight that line; then, press **[EDIT][F1]** to bring the Edit screen to the center of the display. When the Edit screen is on the display (see below), you may use the mouse or the vertical cursor keys to move the scroll bar to the line you wish to edit. Then change the contents of the line to the edited value and press **[ENTER][F1]**.
Always press the **[ENTER][F1]** key after any editing to replace the original values of the coordinate point with the values new in the edit screen.

When you press **[EXIT][F6],** the Edit Window is removed from the display. Changes made in the Edit Window are discarded and not saved to the coordinate file unless **[ENTER][F1]** is pressed first.




```
          EDIT
Point:              1
North:     5000.0000
East :     5000.0000
Elev.:      100.0000
Desc.:  START
```

Point: is the point number of the point to be edited.
Northing: is the edited northing value.
Easting: is the edited easting value.
Elevation: is the edited elevation.
Desc: is the edited point descriptor.
[PT +]: This softkey will display the current point plus one for editing. Be sure to press **[ENTER] [F1]** to store changes to the point you have just edited or your changes will not be saved.
[PT -]: This softkey will edit, the current point less one.

To access a specific point number, press **[GOTO][F3]**. The TFR program will prompt you for the point number that you want to edit. Key in the number and press **[ENTER]**. The scroll bar will automatically move to the selected point number line.

To search for a particular descriptor, press **[SERCH] [F4].** The TFR program will search the descriptor field for the prompted descriptor, and the scroll bar will automatically move to the line that contains that descriptor.

To search for an unused point number, press **[UNUSED] [F5]**. The TFR program searches from the position of the scroll bar and displays the next unused point. It then askes you if you want to prints a list of unused points, as shown in the example below.

--Unused points report beginning at Pt 1105--

1160 - 1161
1190 - 1199
1212
1257
1320
1457
14991
1500 - 5499
5644
5667
5703 - ...

The high lighted bar will be moved to the point number just before the next unused point.

You can print the coordinatethe file on the system printer at any time by pressing **[PRINT][Shift][F2]**. ***The printer must be configured beforehand*** using the setup softkey in the View / Print File menu selection.

The **[CODE][Shift][F4]** key allows you to add discriptors from a DISCRIPT.TXT file to the Desc file of the Edit Screen.

Edit/Process Raw Data File

This procedure not only lets you edit Raw Data files but will allow you to reprocess the raw data to regenerate coordinates. You can view, print or search the file using several parameters.

Path:	From the File Transfer menu, Select **[D]** **Edit/Process Raw Data File**

You will be prompted for the name of a raw data file. Key in a file name and press **[ENTER][F1]**. You will then be presented with the "Process Raw data File" menu.

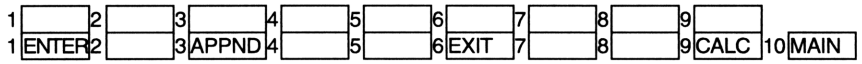
```
      Process Raw data File
[A] Edit Raw data file
[B] Generate coordinates
[C] Point list for TR/SS
```

Press **[A]**. The raw data will be displayed on the screen. Use the soft keys on the screen to edit and process the raw data file.

1	HELP	2	PRINT	3		4		5		6		7		8		9			
1	EDIT	2	DEL	3	INSRT	4	SERCH	5		6	EXIT	7		8		9	CALC	10	MAIN

```
JOB: Name SMITH Date ##-##-#### Time ##:##:##
Mode setup : North Azm, Dist ft, scale 1.000000, Earth crv OFF, offset 0.00
Store :Pt 1 N 5000.00 E 5000.00, Elv 100.00, START
Occupy :PT 1 N 5000.00 E 5000.00, Elv 100.00 START
Backsight : 1-0, BS azm 276.2315, BS cir 0.0000
HI / HR : Inst H 5.32 Rod H 6.00
Traverse : 1-2 Ang-Rt 86.5412 Zen 89.4050 SlpD 711.42 , PT 2
HI / HR : Inst H 5.43 Rod H 6.00
Traverse : 1-2 Ang-Rt 262.5448 Zen 89.3236 SlpD 457.76 , PT 3
HI / HR : Inst H 5.40 Rod H 6.00
Traverse : 1-2 Ang-Rt 208.5710 Zen 89.1803 SlpD 201.31 , PT 4
HI / HR : Inst H 5.39 Rod H 6.00
Traverse : 1-2 Ang-Rt 247.1657 Zen 88.5235 SlpD 497.12 , PT 5
HI / HR : Inst H 5.35 Rod H 6.00
Traverse : 1-2 Ang-Rt 277.4835 Zen 90.2926 SlpD 223.98 , PT 6
HI / HR : Inst H 5.40 Rod H 6.00
JOB:SMITH>CR5   CONTROL:        Line 1 of 473 Lines
Curent Data Path => C:\TDS\TDS_DAT
```

To edit a line, first use the mouse or the cursor key to highlight the line; then, press **[EDIT][F1]**. The TFR program provides an Edit Window appropriate for the line being edited. It works similarly to the Edit Window displayed for editing a coordinate file. Below is the Traverse screen. However, the particular edit screen will be different, depending on the line you are editing.




```
      Traverse
 Occupying pt:        2
 Foresight pt:        3
>Ang right :      125.4732
>Zenith ang:       89.3918
 Slope dist:       385.273
Desc:
```

Always press the **[ENTER][F1]** or **[APPND][F3]** key after any editing to enter edited data in Raw Data file. The **[ENTER][F1]** will relace the highlighted line in the Raw Data file with the edited data. The **[APPND][F3]** key will place a new line at the end of the Raw data file with the edited data. Pressing **[EXIT][F6]** removes the edit window from the display and returns to the Edit/Process Raw Data File screen.

To delete a line of raw data, move the scroll bar to the line using the mouse or the arrow keys and press **[DEL][F2]**. You can also insert a line of raw data by moving the scroll bar to the line *below* the insertion point. Press **[INSRT][F3]**. A menu is displayed which lists the kinds of raw data that can be inserted into the file. Highlight your choice by moving the scroll bar to it and pressing **[ENTER]**. An Edit Window will be displayed for you to use to create the new raw data line.

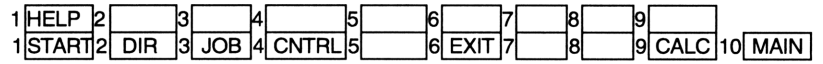
NOTE:

In the handheld unit's raw data file, backsight lines show the point numbers of the occupied points and the backsight point, as well as any value of horizontal circle angle that is set to the backsight. For backsights that are specified as actual points stored in the job, the back azimuth shown in the raw data file is actually a computed value based on the coordinates of the points. For backsights that are set to a known backsight by keying in the appropriate back azimuth or back bearing, the backsight point is shown as "0" in the raw data file. Thus, if you edit a backsight and reprocess your raw data, the TFR software will behave exactly as the hand- held unit would. For backsights to a point, the actual coordinates are used to compute a back azimuth and the value of the back azimuth shown in the edited line is ignored. If you want to edit the backsight line to a known back azimuth, you must set the back point number to "0". In this case, as in the handheld unit, the software will use the specified back azimuth. The circle angle to the backsight is used as specified in all cases.

To search for a particular point, press **[SERCH][F4]**. The TFR program searches the file for the next occurrence of the prompted point. You have the *option* of specifying that the search be done by occupied point, foresight point, backsight point, or the descriptor.

You can print the raw data file on the system printer at any time by pressing **[PRINT][Shift][F2]**. ***The printer must be configured beforehand*** using the setup softkey in the View / Print File menu selection.

To generate coordinates, press **[EXIT][F6]** to return to the "Process raw data File" Menu; then, press **[B].** TFR will generate a coordinate file based on the current contents of the raw data file.



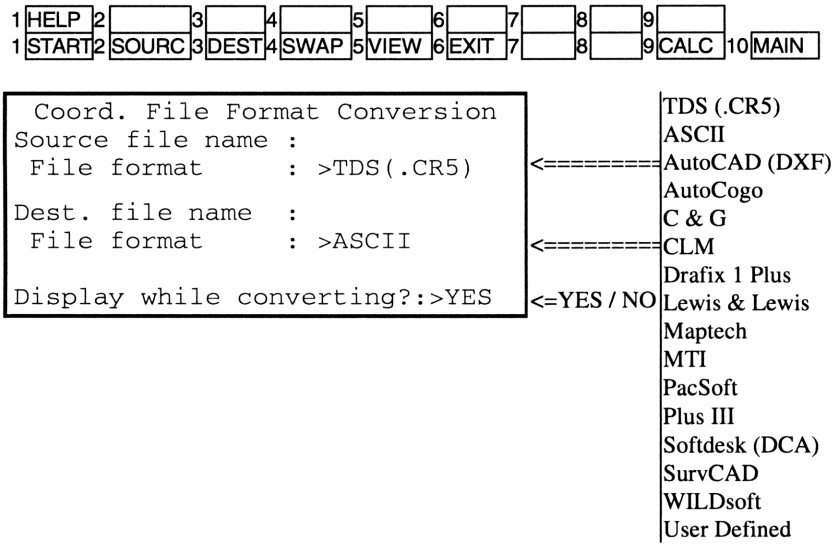

```
    Raw --> Coordinate
Data path:
C:\TDS\TDS_DAT
Job name: SMITH
Control file:

Smallest point number
  In this file:      1
Create coordinate
   file as: >Sequential     <= Sequential / Non-Seq.

What to do when OC or BS
is not defined : >PAUSE     <= PAUSE / IGNORE
```

To generate a Point List from the raw data , press **[EXIT][F6]** to return to the "Process raw data File" Menu; then, press **[C].** TFR will generate a Point List based on the contents of the raw data file. This Point List will connect the traverse points in the proper sequence with the sideshots correctly inserted. If this point list is subsequently used as the basis for an adjustment in TDS data collector, the adjustment will be based on the traverse points; the sideshot points will be adjusted based on the new coordinates of the traverse points.

Coordinate File Format Conversion

This command converts a coordinate file between different file formats so that the coordinates can be used by different surveying software.

Path:	From the File Transfer Menu, select **[E] Coordinate file format conversion**. A screen appears as shown below.



Step 1: Enter the source file name. You can select the file name from a directory list by pressing **[SOURC][F2]**. The name can be up to eight alpha/numeric characters plus three characters of the file extension.

Step 2: Click on the scrolling prompt (or use the **[→]** or **[←]** keys) to select the source format type. The available options are:

TDS(.CR5); Standard ASCII, AutoCAD DXF, AutoCogo, C&G, CLM, Drafix 1 Plus, Lewis & Lewis, Maptech, MTI, PacSoft, Plus III,Softdesk(DCA), SurvCAD, WILDsoft and User Defined.

Step 3: Enter the destination file name. You can select the file name from a directory list by pressing **[DEST][F3]**.

The source and destination files must be in the same directory, unless you have specified the full path for at least one of them.

Step 4: Click on the scrolling prompt (or use the [→] or [←] keys) to select the destination format type. The available options are the same as the source types shown in Step 2 above.

Step 5: Press **[START][F1]** to begin the conversion. If the source file is in TDS format, the TFR program will not convert any point with a point number less than 1. TDS data collectors will not allow any point numbers below 1 to be entered.

For certain software packages, additional steps need to be taken. These steps are outlined later in this chapter under the heading **FILE FORMATS**. Also, please be aware that some software manufacturers may change their format without notice. When this happens, try to use the standard ASCII format. Many software packages now have the import and export routines needed to read the simple standard ASCII format.

Once you have established two formats that you convert to and from frequently, you can use the **[SWAP] [F4]** to reverse the conversion direction. For example: If you have set the conversion source format as TDS and the destination format as ASCII, pressing the **[SWAP]** key will set the source as ASCII and the destination as TDS.

After you convert a file, you MUST make certain that the converted data file is in the data sub-directory in which your surveying program expects coordinate data files to be located. TFR tries to be as easy to use as possible. However, since many surveying packages allow their users to customize setup, you must check the data file sub-directory of your specific surveying/drafting package setup. Refer to your surveying/drafting package user's manual.

Some formats, notably CLM , may contain points with either undefined or non-numerical point numbers. CLM can have curves, lines and spirals that declare points without any point numbers. If the format contains any of these non-numeric or undefined point numbers, TFR will append them to the end of the coordinate file. It will create a cross reference file called XREF.TFR. You can print this cross-reference file to see what new point numbers were assigned to these points from the old format.

Custom Defined Format

TFR has a file conversion selection in which the user can custom define the format. This enables the conversion to or from ASCII formats that are not supported by our preprogrammed conversion routines. If the CAD or COGO software product you are trying to convert to is not on our list of conversion formats, you should try the following steps:

Step 1: Determine if your software can convert to and from any other preprogrammed format provided. If so, use that format. If not, you need to determine what ASCII format(s) your software can convert it's coordinate data to and from.

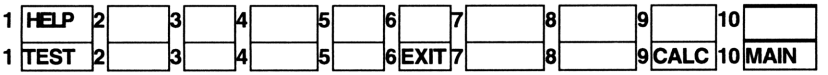
If your software cannot use one of the available formats and cannot convert to and from an ASCII file, we cannot transfer the coordinate data to that software. Try contacting the company that produced your CAD or COGO software to see if there is a new conversion routine being developed or one that you are unaware of. The possibility of designing a generic or user defined binary conversion routine is very complex and beyond the scope of TFR.

Step 2: Determine if your software can convert to and from our standard ASCII format. If so, use the standard ASCII format.

If your software cannot use the standard ASCII format, then you will need to custom define your conversion format. This process, taken one step at a time, is fairly straight-forward.

Path:	From the Main Menu, select **[I] Define User Coordinate Format.**

The Define User Coordinate Format screen shown below is filled out as if you were entering our example:




```
        Define Conversion Format
Order:>Pt     >North >East   >Elv    >Desc
No. of columns per fields: >FIXED
           -- Point Number --
>Field header/delimiter :   Store
Width of fixed columns  :     6
             -- Northing --
>Field header/delimiter :   ,
No of fractional digits :     5
Width of fixed columns  :    14
              -- Easting --
>Field header/delimiter :   ,
No of fractional digits :     5
Width of fixed columns  :    14
            -- Elevations --
>Field header/delimiter :   ,
No of fractional digits :     4
Width of fixed columns  :    10
            -- Description --
>Field header/delimiter :    *
Width of fixed columns  :    16
```

Point / Northing
Easting / Elev
<= Descrip. / None
<= FIXED /
FREE FORM
<= << No Field header/delimiter >>

<= << No Field header/delimiter >>

<= << No Field header/delimiter >>

<= << No Field header/delimiter >>

<= << No Field header/delimiter >>

Step 3: First, you need to determine which of two formats your software produces. If your software will produce more than one ASCII format, you might want to recheck to see if the TFR standard ASCII format is not already one of them. If not, then pick the one that is closest to our standard ASCII. You will need a printout of an ASCII converted file from your software that has a wide range of Northings, Eastings and Elevations (greater than a factor of ten). As you look at this listing, determine whether the decimal points line up in a column or are out of order (see below).

```
                -- FREE FORM --
|||||||||0|||||||||0|||||||||0|||||||||0|||||||||0|||||||||0|
Store   34 , 5346.1647 , 23426.4673 , 243.3452 *POB
Store   153 , 45543.2949 , 12478.244 , 98.9547 *NW Corner
Store  262 , 26298.7434 , 43245.5875 , 1243.3452 *NE Corner
Store 1673 , 986.1647 , 38126.25743 , 6.23 *SE Corner
```

```
                -- COLUMNAR --
|||||||||0|||||||||0|||||||||0|||||||||0|||||||||0|||||||||0|
Store    34,    5346.1647 ,   23426.4673 ,  243.3452 *POB
Store   153,   45543.2949 ,   12478.244  ,   98.9547 *NW Cor.
Store   262,   26298.7434 ,   43245.5875 , 1243.3452 *NE Cor.
Store  1673,     986.1647 ,   38126.25743,    6.23   *SE Cor.
```

If your data is FREE FORM, you should skip the "Number of fixed columns" setting in each field. If you set the "No. of columns for fields:" to FREE FORM, the "Number of fixed columns" line will disappear. Our example will be COLUMNAR. Therefore, we set the "No. of columns for fields:" to FIXED.

Step 4: The next step is to assign the order of each data field. If the order is not correct, simply highlight the data field that needs changing and press the [→] or [←] arrow key. A selection screen will appear. Select the proper field with the [↑] or [↓] arrow key and press **[ENTER]**. Repeat the process until all the fields are in their proper order. Use the None selection to fill any unused fields at the end of the data line.

Step 5: Now you need to define each field. Each field has two or three parts that need defining. First, look to see if there are any characters in front of the first field. If there are, they should be entered at the Header/delimiter prompt. In our example, the Point Number is first and has a header of "Store"; so, type "Store" on that line. If your file does not have any characters in front of the first field, scroll this prompt to << No field Header / delimiter >>. Also, if your file does not start with point number, that is OK; but, be sure that you define the Header/ delimiter using the characters that are before the field you are defining.

Step 6: Next, you need to determine the number of character positions used for the first field. In our example, we need 6; so, enter "6" on the "Width of fixed columns" line.

```
Sp # 123456
Store    34,    5346.1647 ,   23426.4673 ,  243.3452 *POB
```

Some files will have their point numbers left-justified; that is, pushed to the left side of the field and increasing toward the right:

```
6
12
385
```

If you need to left-justify any numeric field, simply enter the width as a negative number. Entering a "-6" would be the same sized field, but left-justified. ***Remember, if your file is Free Form, you do not need to do this step.***

The third parameter would be No of fractional digits or the number of places to the right of the decimal point. However, the point number is an integer and therefore has no fractional part. If your first field is not the point number, enter the No of fractional digits.

Step 7: Repeat each of the last three steps for the second field; in our case, it is the Northing. Enter a "," for the delimiter; the "No of fractional digits" is "5"; and the "Width of fixed columns" is "14".

```
    Space # 12345678901234
Store    34,    5346.1647 ,   23426.4673 ,  243.3452 *POB
```

Notice that the "Width of fixed columns" is the total width of the data field (width of whole number + decimal point + fraction) but not including the delimiter.

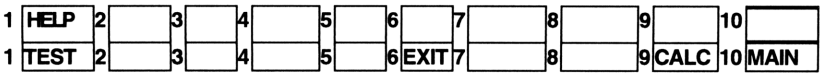
Step 8: Repeat these steps again for the remaining fields. The Easting is the same as the Northing. The elevation has "10" for a column width and "4" fractional digits. The descriptor has a Delimiter of " *" and a field width of "16". All parameters are ignored if a field is defined as None and therefore, all parameters can be left blank. When the example is completed, the Define Conversion Format screen should look like the **one displayed above**:

NOTE:

Let us highlight several points:

- Delimiters can be different between each field.
- The delimiter before the descriptor has a space in front of the "*". The Spaces character can be a part of or the whole delimiter. You cannot use control characters.
- When using the FIXED field size option, you do not need to have a delimiter between any of the fields.
- The order and parameters of the individual fields are completely independent.

If your file was a Free Form type, the screen might be completed as shown below:




```
        Define Conversion Format
Order:>Pt     >North >East   >Elv    >Desc
No. of columns per fields: >FIXED
           -- Point Number --
>Field header/delimiter :   Store

              -- Northing --
>Field header/delimiter :    ,
No of fractional digits :     5

              -- Easting --
>Field header/delimiter :    ,
No of fractional digits :     5

             -- Elevations --
>Field header/delimiter :    ,
No of fractional digits :     4

            -- Description --
>Field header/delimiter :     *
```

Point / Northing
Easting / Elev
<= Descrip. / None
<= FIXED /
FREE FORM
<= << No Field header/delimiter >>

<= << No Field header/delimiter >>

<= << No Field header/delimiter >>

<= << No Field header/delimiter >>

<= << No Field header/delimiter >>

Step 9: That completes the definition of you conversion format. Now, press [TEST] [F1] to see a sample display of the format.

```
                        ** User Format TEST **
12345678901234567890123456789012345678901234567890123456789012345678901234567890
Store    45,    5000.00000,  123456.12346,  100.0000 *Test Point Line.

Record Length = 70
                                Record Data
Point Number   = 45
Northing       = 5000.000000
Easting        = 123456.123456
Elevation      = 100.000000
Description    = Test Point Line.
```

If there are errors, go back to that line in the define conversion format screen and correct them.

Step 10: Lastly, try converting a coordinate file that is in the data collector form into the ASCII format you have just defined. Then, compare the printouts of this new file with the ASCII file that your software created. If there are differences, go back to the Define Conversion Format screen and make the necessary adjustments. When the output from the conversion matches the output from your software, the format should be correct.

NOTE:

Not all ASCII file can be converted using the Custom definable format. Below is a table that is a guide to what can and cannot be done:

	Free Form	Fixed Form
One line of data for each coordinate.	Must Have	Must Have
Lines that have information other than coordinate data. (a block of text)	Can't Have	Can't Have
All lines have the same number of fields.	Must Have	Must Have
The fields must be in the same order.	Must Have	Must Have
All field except the Desc. field must be numeric. No non-numeric information in a numeric field.	Must Have	Must Have
A different delimiter between each field.	Can Have	Can Have
Can have less than five fields.	Can Have	Can Have
Can have fields in any order	Can Have	Can Have
Between each field you must have a delimiter	Must Have	Can Have
Can left-justify numeric fields	N / A	Can Have

Raw Data File Format Conversion

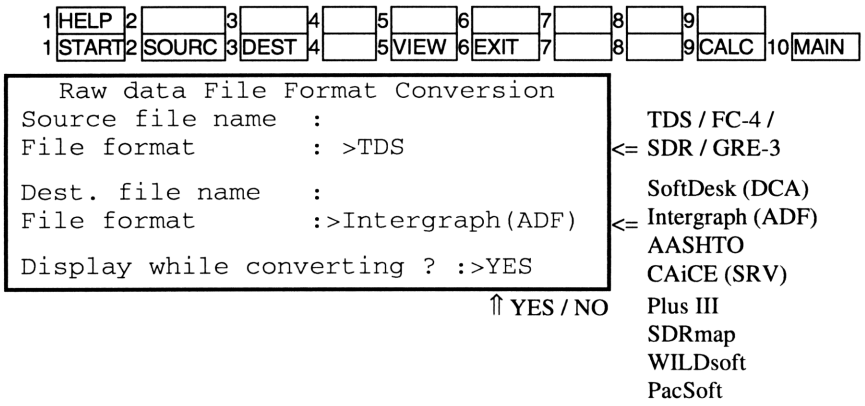
NOTE:

Only TFR-LINK and DC-LINK have the ability to convert raw data files to other software formats. If you do not have a copy of TFR-Link or DC-Link, or if your hardware lock in not attached, then this option is not available to you.

This routine converts TDS raw data into several different formats After you transfer the job file from the handheld unit to the PC, you can then convert it to another format. This allows the data to be used by various other surveying and civil engineering software.

Path: From the File Transfer menu, select **[F] Raw Data File format conversion.**

A screen appears as shown below.



Step 1: Enter the name of the raw data file to be converted. For TDS files, the extension .RW5 is automatically supplied if no other is given. For all other formats, you must give the full file name. You can select a file name from a directory list by pressing **[SOURC][F2]**.

Step 2: Click on the scrolling prompt (or use the [→] or [←] key) to select the format type of the source file. The options are : TDS; FC-4; SDR; GRE3;

If you are using TFR-Link, then only the TDS format is available. With DC-Link, all the supported data collectors formats should be listed on the choice menu.

Step 3: Enter the destination file name. A full file name with extension must be entered. You can select a file name from a directory list by pressing **[DEST][F3]**.

Step 4: Click on the scrolling prompt (or use the [→] or [←] key) to select the destination format type. Depending on the source format type, the available options for destination format type are:

- All source type can be converted to Intergraph(ADF) format.
- TDS raw data can be converted to: AASHTO; CAiCE(SRV); Plus III; SDRmap; SoftDesk; WILDsoft; PacSoft.
- FC-4, SDR, and GRE3 files can be converted to TDS raw data file format (.RW5).

Step 5: Press **[START][F1]** to begin the conversion.

For details of each of these conversions, refer to the section "Raw data file format" later in this chapter.

View / Print File

This option allows you to view or print the data stored in a file.

Path:	From the File Transfer menu, select **[G] View / Print File**

1	2	3	4	5	6	7	8	9	10
HELP									
VIEW	FILE		SETUP		EXIT			CALC	MAIN

```
       View / Print  File
File type         :  >Coordinate
File name         :
Print cut sheet   : > YES
Print elevation   : > YES
 (coordinate only)
```

Coordinate / Raw Data / <= Point List / Road Design / Text file

<= YES / NO

<= YES / NO

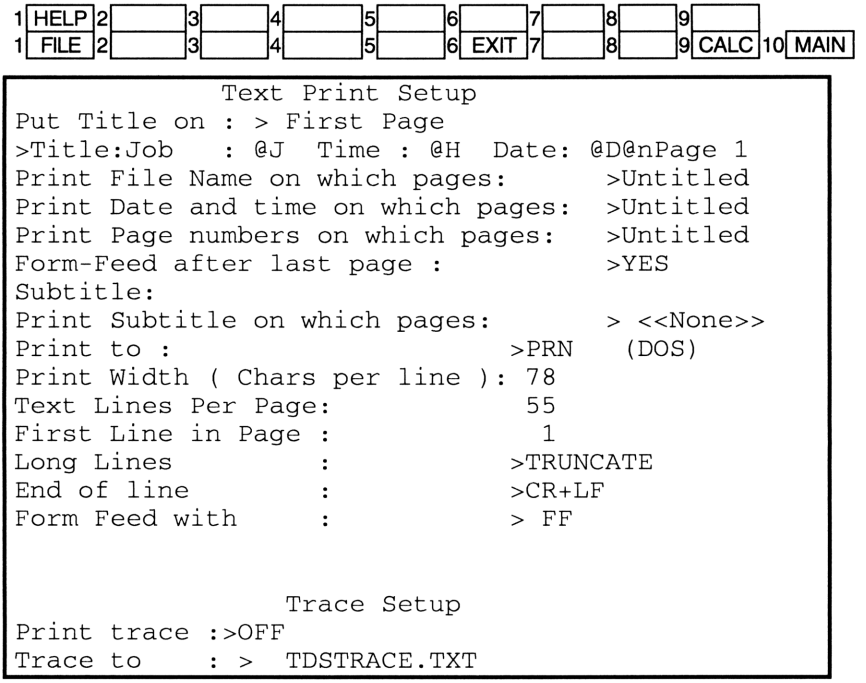
Step 1: Enter the file name. You can select a file name from the directory list by pressing **[FILE][F2]**.

Step 2: Click on the scrolling prompt or use the [→] or [←] key to select the file type. The options are : TDS Coordinate; TDS Raw data; TDS Point list; TDS Road layout; or, a Text file.

Step 3: If you are printing a raw data file, you need to set the option for printing a cut sheet. This option is meaningful only if you had setup the handheld unit to store cut sheet information while you were doing stake out.

Step 4: Press [VIEW][F1] to display your file. You can also print the file from this view screen.

The [SETUP] key is used to design your document and to set up your printer. When the key is pressed the following screen is desplayed:



The first 8 lines of the screen allow you to configure your document. Each line is described below:

Put Title on: determines on which pages, the report title will be printed. This may be the First Page, Every Page, or <<None>>

Title: or **Title File Name:** are alternate methods of selecting the title for a report. If you wish to use a title file, it should have the extension of ".TXT", and it does not need to be in your current working directory. The file may be created with any text editor, but it should contain only ASCII text. When you use a file to store the title you may use as many characters and lines as you wish. You are not limited to 40 characters, but you should not use more lines than the number of lines on a single page.

You will notice that the title text contains several of the "@" commands. These commands allow you to format and to place job specific information in the header of your reports. The file,

or the title string, may contain any of the following command codes. A complete list of the commands available is given below:

```
@N or @n ->goto the start of the next line.
@M(nn) or @m(nn) ->go to column nn, but not beyond
   the number of columns allowed by "Print Width".
@D or @d ->print the current date.
@J or @j ->print the current job file name.
@C or @c ->print the current control file name, or
   "*None*" if there is no current control file.
@R or @r ->print the current raw data status, either
   "On" or "Off".
@H or @h ->print the current time of day.
@V or @v ->print the current version of Easy Survey
   or TFR.
@T(nn) or @t(nn) ->tab over nn spaces but not beyond
   the number of columns allowed by "Print Width".
@@ ->print the "@" at the current location.
```

Print file name on which pages : selects the pages that will have the Job and Control File names printed on them following the title line. This may be "All", "<<None>>" or "Untitled". Untitled means that any pages which do not have the title line or lines printed on them will have the file names.

Print Date and time on which pages : selects the pages that will have the date and time at which the report is being printed on them . This may be "All", "<<None>>" or "Untitled". Untitled means that any pages which do not have the title line or lines printed on them will have the date and time.

Print page number on which pages : selects the pages that will have the page numbers printed on them. The page number, when it is printed, will be printed in the upper right corner of the page. This may be "All", "<<None>>" or "Untitled". Untitled means that any line which does not have the title line or lines printed on them will have the page number printed on it.

From Feed After Last Page: tells the system whether or not to send a form feed at the end of the last page of each report.

Subtitle : a single line of text which will be printed following any of the other lines selected, and before the report itself.

Print Subtitle on which pages: selects the pages that will have the subtitle printed on them. The subtitle, when it is printed, will be printed following any of the other lines selected, and before the report itself. This may be "All", "<<None>>" or "Untitled". Untitled means that any line which does not have the title line or lines printed on them will have the subtitle printed on it.

The next group of line deals with the way your printer is configuared.

Print to: this line lets you tell the system where to print : either to the DOS PRN: printer, a printer on a parallel port, to a file named TDS_PRN.TXT under the sub directory \TDS\TDS_SYS, or to ask for a file name each time a report is printed. If your system has a single parallel port with a printer connected to it, and you want reports to be sent to the printer, you should set the "Print To" line to "PRN:". If you have more than one parallel port on your system, you may use the "LPT1" or "LPT2" options to send the report ot the desired printer. If you want to send reports to a file, so that you may use them later, you should select either "Ask for file" or "TDS_PRN.TXT". Selecting "Ask for File" will cause Easy Survey to prompt you for a file name each time a report is printed, while "TDS_PRN.TXT" will save all reports printed in a file, TDS_PRN.TXT in your \tds\tds_sys subdirectory.

Print Width: this is the number of characters per line.

Text Lines Per Page: is the number of lines of text, including the header, per page.

First Line in Page: allows you to tell the system at which line to start the beginning of the pages.

Long Lines: this is how lines longer than the Print width are handled. This will be either "Wrap", print the rest of the text on the following line(s), or "Truncate", do not print the remainder of the line.

End Of Line: you can set this field to either carriage return *and* line feed **or** *just* carriage return.

Form feed with: determines the way in which a form feed is accomplished, either with a single ASCII FormFeed character, or with multiple ASCII LineFeed characters. If you are using Multiple LineFeeds you will also need to set the "Page Length" This should be the number of lines which could be printed on a single page. For example, if you are using a type font that yeilds 6 lines per inch, and your paper is 11 inches long, then the "Page Length" should be set to 66.

The last line deal with the print trace.

Print trace: when set **ON**, will assume that a printer is connected to the Easy Survey System and will print out the data as the calculations are made.

Trace to: this line lets you tell the system where to store the Print Trace, either in a file or to the printer. When the option is trace to **TDSTRACE.TXT**, it will go to a file named TDSTRACE.TXT under the sub directory \TDS\TDS_SYS. When the option is printer, the output will be sent to the printer selected by the "Print to" line above.

The **[FILE][F1]** key will allow you to select the name of the title file. This must be a file with an extension of ".TXT".

Once you have setou your text print configuration, you may begin printing reports.

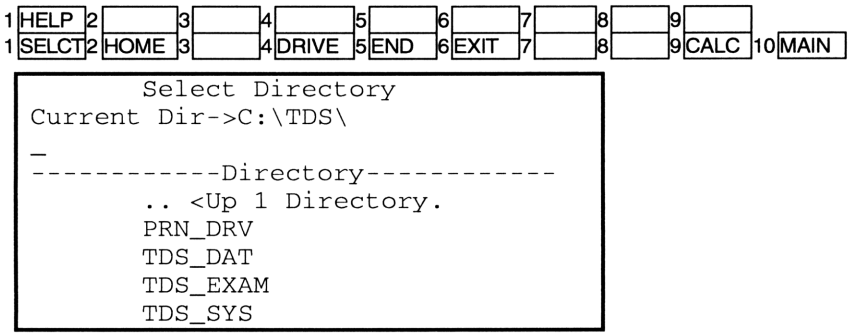
File Management Menu

From this menu, you can perform a variety of standard DOS commands. This is a quick way for you to function in the DOS world without exiting the File Transfer program. File Management Menu is shown below.

```
        File Management Menu
[A]: Change data path
[B]: Make directory
[C]: Remove directory
[D]: Copy file
[E]: Rename file
[F]: Delete file
[G]: Merge two files
[H]: Copy / Move a group of points
[I]: Extract RawData from Archive
```

Change Data Path

With this option, you can change the default directory path for storing and retrieving files. When you select **[A]** from the File Management Menu, the Select Directory screen will be displayed:



This screen will display all subdirectories under the current Directory. The mouse or [↑] or [↓] arrow keys move the scroll bar "up" or "down" the list. Then, press **[SELCT][F1]** to change the default directory. The ".. < Up 1 Directory will

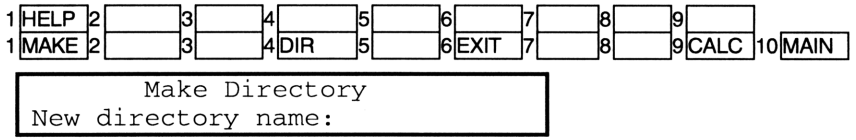
move you *back* one directory toward the Root directory. If the subdirectory you are looking for is not listed, try pressing **[DRIVE][F4]** to change drives.

NOTE:

For convenience in orienting your self the current directory is always displayed at the bottom of the screen

Make Directory

By selecting [B] from the File Management Menu, you can make a new directory on any drive. The Make Directory screen appears and prompts you for a New Directory Name.



Enter the New Directory Name. It can be up to eight alpha/numeric characters with a three-character extension.

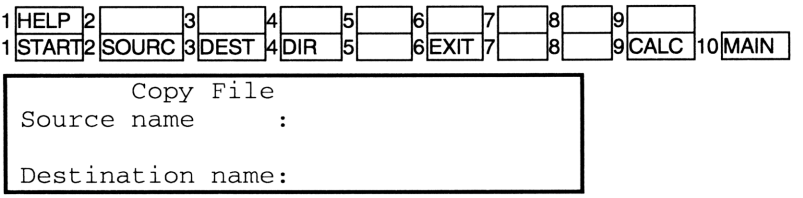
Press **[MAKE][F1]** to execute the command.

Remove Directory

This command will delete an existing directory. It works precisely like the Make Directory command. When **[C]** is selected from the File Management Menu, the Remove Directory screen appears. Enter the Directory Name and press **[DEL][F1]**. The directory will be deleted. ***The TFR program will not allow you to delete a directory that contains files.*** You must first delete the files using the **[F]** option; then, return to the Remove Directory screen to delete the directory.

Copy File

This command allows you to copy a file to a new or existing file. When you select **[D]** from the File Management Menu, the Copy File screen appears.

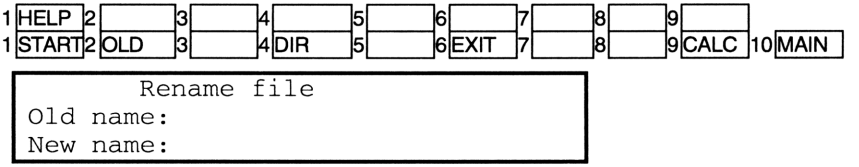


Enter the Source Name for the file you are going to copy. Include the file extension. If you use a wild-card in the file name or press **[SOURC] [F2]** or **[DEST] [F3]** softkeys, the current directory will be displayed listing all files that match the wild- card and extension. The full path can be entered in either source or destination fields if the file is not in the current directory.

Enter the Destination Name. This is the name used to copy the source file. Press **[COPY][F1]** to execute the command. If a file of that name already exists, the program will display a prompt indicating this and asking whether or not you want to overwrite the existing file. Respond "Y" or "N."

Rename File

This command allows you to rename an existing file. When you select **[E]** from the File Management Menu, the Rename File screen appears:

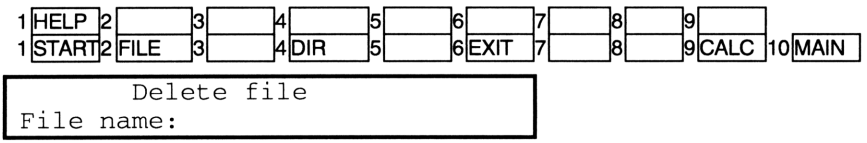


Enter the Old (current) name of the file you want to rename. Include the extension. If you use a wild card or press **[OLD] [F2]**, a directory will be shown listing all file names that match the extension. You can then select the old name from the list. The full path can be entered in either old or new fields if the file is not in the current directory

Enter the New name, including the extension, and press **[START][F1]**.

Delete File

To delete a file, select **[F]** from the File Management Menu. The Delete File screen appears:

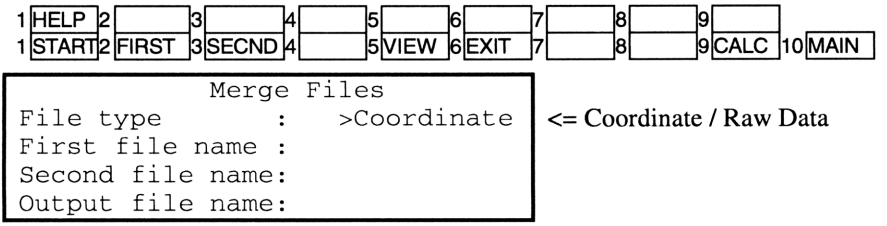


Enter the File name, including the extension. Again, if a wild-card is used or **[FILE] [F2]** is pressed, the current directory will be displayed listing all files that match the extension. Press **[DEL] [F1]** to delete the file.

Merge Two Coordinate Files

You can merge two TDS coordinate or TDS raw data files by selecting **[G]** from the File Management Menu. The TFR program will detect any overlapping points in the two files. It will also locate any "holes" with no defined points between the end of one file and the beginning of the next file.

When this option is selected, the Merge Files Screen appears, as shown below.



Use the mouse or arrow keys on the scrolling prompt symbol to select the File Type as coordinate or raw data. Enter the First and Second file names. **The first file named *must be the file with smallest point number.*** Enter the Output file name. This is the name under which the merged file will be stored. **It must be different** from **both** the first and second file names.

To initiate the merge, press **[START][F1]**. The TFR program will then automatically verify that the first file contains the lowest point number. If the merge routine detects **duplicate points** (a point from each file with the same point number), it will prompt you for the file from which the result will be taken

.

Copy / Move a Group of Points

This routine is designed to copy or move a block of points in a coordinate file. Copy / Move a group of points will not transfer points from one file to another, but only within a single file. By selecting **[H]** from the File Management Menu, the Copy / Move a group of points screen will appear as shown below:


```
  Copy / Move a group of points
Coordinate file:
From point:
To point:

>Start storing at pt:
output cross ref.    : >YES
```

Start storing at pt /
<= Pt number offset
<= YES /NO

The "Coordinate file" field identifies the file within which the points will be copied or moved. The file name can be entered directly into screen field or press **[FILE] [F4]** to display a directory list from which a file can be selected.

The points to be transferred are entered in the From point To point fields. Enter the first point number in the "From point" and the last point number in the "To point" fields.

Next you need to advise TFR as to where you want the group of points to be moved. If you want the points renumbered, use the "Pt number offset" option. This choice will simply add the amount in this field to the existing point numbers and store them. If you want to rearrange a group of points and store them as a block, use the "Start storing at pt" option. The result of this action will be to take each point in your group of points and store them sequentially starting at the point specified. The points will be moved or copied to a continuous block beginning at that specified starting point. If

you are using a point list with more than one reference to a point, each reference will produce a copy of the point.

The "Start Storing at pt" or "Pt number offset" may move the group of points to an area with a point number less than the start of the group. This will not cause the loss of data even if the area moved to overlaps the area moved from. Caution should be taken if you are copying because the resultant points will overwrite the source were they overlap. Again, no data will be completely lost because they will be moved or copied to their proper place in the coordinate file before they are overwritten. But, if they overlap, copying will not produce two complete sets of the group of points. See the examples below.

The point number offset can be a negative number. **No point may have a number less than 1.** The "Start Storing at pt" may be less than the current first point in the file, but cannot be less than 1.

If you set "Output Cross ref." to "yes", a listing of the points copied or moved and where they were copied or moved to will be output to a file "REF.TXT" in the current working directory.

You are now ready to move a group of points. To copy the group, press **[COPY] [F1];** to move it, press **[MOVE] [F3].** The difference between "moving" and "copying" points is the following: if you **"move"** the point, the old point number is removed from the coordinate file; if you **"copy"** points, they are not removed. Rather, new points are created.

[COPY] From point :13 START Storing at :15
To Point :18

Original File		Resulting File
10, north,east,elv,PT #10		10, north,east,elv,PT #10
11, north,east,elv,PT #11		11, north,east,elv,PT #11
12, north,east,elv,PT #12		12, north,east,elv,PT #12
13, north,east,elv,PT #13		13, north,east,elv,PT #13
14, north,east,elv,PT #14		14, north,east,elv,PT #14
16, north,east,elv,PT #16		15, north,east,elv,PT #13
17, north,east,elv,PT #17		16, north,east,elv,PT #14
18, north,east,elv,PT #18		17, north,east,elv,PT #16
19, north,east,elv,PT #19		18, north,east,elv,PT #17
20, north,east,elv,PT #20		19, north,east,elv,PT #18
21, north,east,elv,PT #21		20, north,east,elv,PT #20
22, north,east,elv,PT #22		21, north,east,elv,PT #21
		22, north,east,elv,PT #22

Notice the absents of point 15.	A point 15 now exists. Original points 13 & 14 have 2 copies. Original points 18 & 19 no longer exist.

[MOVE] From point :13 Pt Number Offset : 2
To Point :18

Original File		Resulting File
10, north,east,elv,PT #10		10, north,east,elv,PT #10
11, north,east,elv,PT #11		11, north,east,elv,PT #11
12, north,east,elv,PT #12		12, north,east,elv,PT #12
13, north,east,elv,PT #13		15, north,east,elv,PT #13
14, north,east,elv,PT #14		16, north,east,elv,PT #14
16, north,east,elv,PT #16		18, north,east,elv,PT #16
17, north,east,elv,PT #17		19, north,east,elv,PT #17
18, north,east,elv,PT #18		20, north,east,elv,PT #18
19, north,east,elv,PT #19		21, north,east,elv,PT #21
20, north,east,elv,PT #20		22, north,east,elv,PT #22
21, north,east,elv,PT #21		
22, north,east,elv,PT #22		

Notice the absents of point 15.	There are no points 13 or 14 now. Original point 13 is now 15. Notice the absents of point 17. Original pts 18, 19 & 20 no longer exist.

COORDINATE FILE FORMATS

The coordinate file formats that the TFR program recognizes when it performs file format conversion are discussed below. Please be aware that some software manufacturers may change their format without notice. Fortunately, the use of a simple ASCII file format is getting more popular every day. Today, many software packages have the ability to read or write this type of file. The routine usually is named "Import" or "Export". If the file output by the TFR program is no longer recognized by your software, please consult the manual of your software and look for information on accessing these import or export routines.

Standard ASCII format

The Standard ASCII format is a generic coordinate format that is becoming a standard. Many software products can import and export in a form that is similar to this format. This format, is a comma delimited ASCII file with five data fields. The fields are:

Point Number, Northing, Easting, Elevation, and Descriptor

All five fields must be in each line. Each line is written with the coordinate data of one point as displayed below. A line will be read with all characters between commas as a field. Therefore extra spaces will be ignored. If the software you are using will import and export in a comma delimited ASCII format, chances are it will work with TDS's Standard ASCII routine.

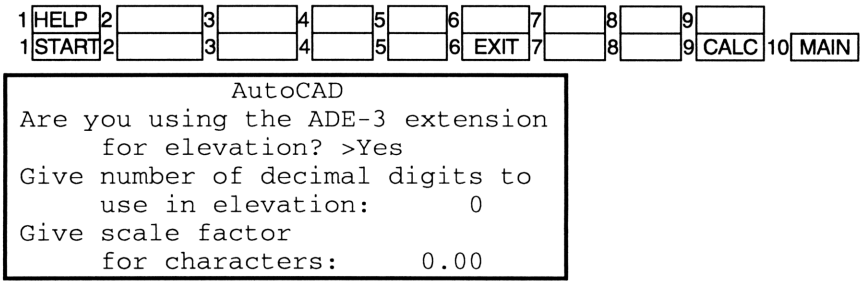
Field	Position	Length
Point number	1-5	5
comma	6	1
Northing	7-19	13
comma	20	1
Easting	21-33	13
comma	34	1
Elevation	35-47	13
comma	48	1
Description	49++	variable
<CR>+<LF>		2

AutoCAD DXF format

AutoCAD's graphic files are not in ASCII, but can output and input through an interchange file called a .DXF file. The procedure for converting between the TDS coordinate and AutoCAD .DXF file is outlined below.

Convert coordinate file to AutoCAD file

Step 1: From the Coordinate File Format screen, when converting to a DXF format, as you press [START] the following screen will be displayed.



Use the up and down arrows to select option you want to change. Answer ***yes*** to the first prompt, ***only*** if you have the extended 3 dimensional version of AutoCAD. Answering yes to this question will cause the TFR program to transfer elevation information. If you answer yes and do not have the ADE-3 package, AutoCAD will not be able to read the DXF file.

Specify the number of decimal digits that you want in the elevation. For example, 3 will give elevations with 3 digits after the decimal place.

The scale factor gives the size of characters when writing point numbers, elevations, and note information. The larger the scale factor, the larger

the character size. The following chart shows the relationship between character scale factor, AutoCAD scale and plotted character sizes:

Char. Scale	AutoCAD Scale	Char. size
1	1"=100'	.02"
1	1"=50'	.04"
3	1"=100'	.06"
3	1"=50'	.12"

Start the conversion by pressing **[F1][START]**.

NOTE:

If you have trouble getting AutoCAD to read in the DXF file and you answered Yes to the above question, then try the conversion again and answer the question No.

Step 2: Create and load a new work file into AutoCAD. Use the command DXFIN to input the newly-created DXF file. Refer to the AutoCAD documentation for more information on the DXFIN command.

The TFR program puts the coordinate labels and note information on separate levels. You can choose to display or not display these.

Step 3: The following layers are used in AutoCAD.

Layer #	Objects
0	Point marker
1	Point number (Text)
2	Note (Text)
3	Elevation (Text)

Step 4: Save the new work file in AutoCAD.

Convert AutoCAD file to another coordinate file format

Step 1: Load the AutoCAD file into AutoCAD.

Step 2: Use the command DXFOUT to create a DXF file.

Step 3: Run the TFR program to convert the new DXF file to the coordinate file format you choose.

The AutoCAD DXF format has now become something of a standard for CAD packages and various CAD support packages. You may be able to import and export the DXF format into a CAD packages other than AutoCAD. The format is beyond the scope of this manual. Refer to the AutoCAD manual for an explanation of the DXF file format.

AutoCogo file format

Use the standard procedure for converting file formats. No extra steps need to be taken.

The AutoCogo format is a space delimited ASCII file. Each line in this format contains coordinates of one point.

Field	Position	Length
Point number	1-4	4
space	5	1
Easting	6-19	14
space	20	1
Northing	21-34	14
space	35	1
Elevation	36-49	14
space	50	1
Description	51++	variable
<CR>+<LF>		2

If the format you are using has the same ordering of its fields, this format may work with other space separated files.

CLM format

Use the standard procedure for converting file formats. No extra steps need to be taken.

The CLM format is a space delimited ASCII file. In this format, each line contains the data of a point as follows:

Field	Position	Length
"PNT"	1-3	3
space	4	1
Point number	5-8	4
space	9	1
Easting	10-26	17
space	27	1
Northing	28-44	17
<CR>+<LF>	45-46	2

C&G format

C&G's internal coordinate file is not in ASCII. However, C&G has provided a way to input ASCII coordinate files into their internal format. There is also a way to output the coordinate data to an ASCII file. The ASCII file used by C&G's software has the extension of ".ASC". You don't need to enter this file extension when you enter the C&G file name. It is assumed or added automatically by the TFR program.

For transferring data between another coordinate file and the C&G software, you need to complete the following procedures:

Convert DC file to C&G coordinate file

1. Run the TFR program to convert a coordinate file to C&G file. The file will be formatted as follows:

Field	Position	Length
Point number	1-4	4
space	5	1
Easting	6-19	14
space	20	1
Northing	21-34	14
space	35	1
Elevation	36-49	14
space	50	1
Description	51++	variable
<CR>+<LF>	2	

2. Run the "SU" program of the C&G's software.
3. In the main menu of the "SU" program, type in "V" for selecting the con**V**ert option.
4. In the CONVERT menu, type in "I" for selecting: "Input ASCII text file INTO .CRD file"
5. In the Available Formats Menu, type in "1" for selecting: "1-from AutoCogo (# East North Elevation Description<CR><LF>)"
6. The program will now prompt: Enter path where ASCII files are stored.
   Type in: \SU\DATA\ (This assumes that you have a standard setup for the C&G package).
7. Next you will be prompted: Enter next file to convert (or press **[ENTER]** to begin):
   Type in the name of the file that you wish converted.
8. You will again see the Enter next file to convert (or press **[ENTER]** to begin) prompt. This time press the **[ENTER]** key.
9. You will now be prompted: How do you wish to handle duplicate points?
   Ignore

Overwrite
Ask before overwrite

Press I for Ignore. The C&G software will now convert the file.

10. After completion, press **[Esc]** to exit.

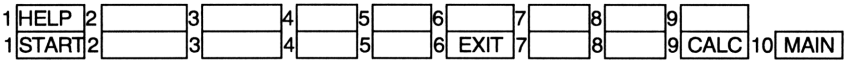
Convert C&G coordinate file to another coordinate file format

1. Run the "SU" program of the C&G's software.
2. In the main menu of the "SU" program, type in "V" for selecting the conVert option.
3. In the CONVERT menu, type in "O" for selecting: "Output ASCII text file FROM .CRD file"
4. In the available formats menu, type in "3" for selecting: "3- to Autocogo (# East North Elevation Description<CR><LF>)"
5. The program will now prompt: Enter path where ASCII files are to be placed.
   Type in: \SU\DATA\ (This assumes that you have a standard setup for the C&G package).
6. Next you will be prompted: Enter next file to convert (or press ENTER to begin).
   Type in the name of the file that you wish converted.
7. You will again see the Enter next file to convert (or press **[ENTER]** to begin) prompt. This time, press the **[ENTER]** key.
8. After completion, press **[Esc]** to exit.
9. Run the TFR program to convert the C&G ASCII file to a another coordinate file.

SoftDesk (DCA) format

SoftDesk has provided a way to input ASCII coordinate files and to output coordinate data to an ASCII file. Refer to the SoftDesk manual on methods to import and export ASCII coordinate files.

The program will prompt you for the following screen:




```
          Softdesk (DCA)
Do you want to transfer
   elevations?              >Yes
Give number of decimal digits
   to have in elevation:     3
```

You can choose whether or not to have elevations in the SoftDesk (DCA) coordinate file by using the arrow keys to toggle to 'YES' or 'NO' and then pressing <ENTER>.

If elevations are to be transferred, give the number of decimal digits. For example, 3 will give elevations with 3 digits after the decimal place.

Start the conversion by pressing [F1][START].

The DCA format is a comma delimited ASCII file with 5 fields. The order of the fields are as follows:

Point, East, North, Elevation, Description

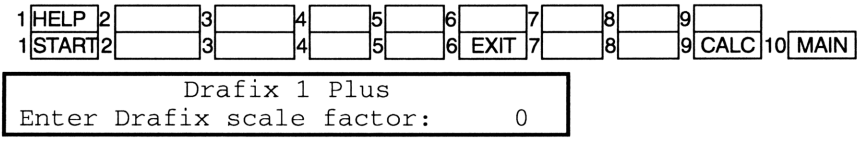
All the values are free form, separated by a comma. For display purposes, the elevation is truncated to a specified number of digits.

Drafix 1 Plus format

For transferring data between a coordinate file and the Drafix 1 Plus format, you need to complete the following procedures.

Convert coordinate file to Drafix format

1. Run the TFR program to convert a coordinate file to Drafix DAF file. As the conversion routine begins you are prompted with the following screen.



   Enter a Scale factor and press **[START]**.

2. Run the DFXPORT program supplied with the Drafix software.
3. Select the "I" for Import option in the DFXPORT program.
4. The DFXPORT program will prompt for an optional blank template file. Press the **[ENTER]** key to ignore this.
5. Next, the DFXPORT program will prompt for the ASCII file name to import. Type in the name of the file created by the TFR program (with the DAF extension).

Convert Drafix File to another coordinate file

1. Run the DFXPORT program supplied with the Drafix software.
2. Select the "E" for Export option in the DFXPORT program.
3. The DFXPORT program will prompt for the name of the drawing file to convert. Type in the name of the drawing file that you wish to convert; including the DWG extension.

4. The program will now prompt for the output ASCII file name. Type in the name of the file you wish it saved to (include the DAF extension).
5. Run the TFR program to convert the Drafix file into the desired coordinate file.

Plotting in Drafix

To be able to plot the drawing file in Drafix, follow these steps:

1. When you enter Drafix and have the drawing loaded, select display extents.
2. Select check coordinates. Find the coordinate that you would like to be the lower left of your drawing.
3. Select parameters scale. Change to the scale that you want.
4. Select parameters sheet origin select. Then press "c" for coordinate entry. Enter the coordinates from step 2 as negative numbers separated by a comma. For example:

For step 2, you found the coordinates to be 5030 and 580. For step 4, enter -5030, -580 <CR> (carriage return). Finally, click the mouse button.

You should see the drawing on the screen. You may want to repeat step 4 in order to gain a more precise alignment. To do this, first select parameters sheet origin center. Then, repeat step 4.

Scale Setting

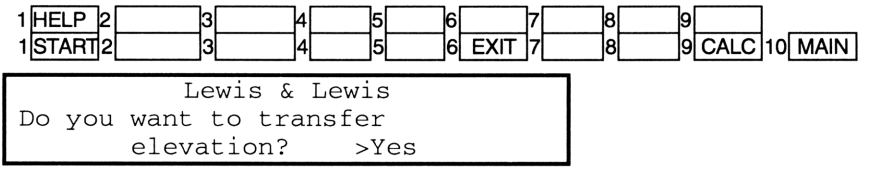
You may want to experiment with the scale setting in the TFR program and the Drafix program. If you are going to enter 1:20 in Drafix, then enter 20 at the scale prompt in TFR. You can use this to change character size for various scale drawings. Refer to the Drafix Manual for more information on DAF files.

Lewis & Lewis format

Lewis & Lewis' internal coordinate file is not in ASCII. However, Lewis & Lewis has provided a way to input an ASCII coordinate file into their internal format and also to output the coordinate data to an ASCII file. To transferr data between another coordinate file and the LEWIS software, you need to complete the following procedures.

Convert another coordinate file to LEWIS coordinate file

1. Run the TFR program to convert a DC file to LEWIS file.



Select elevation option and press [START]. A comma delimited file will be created using the following format:

Field	Position	Length
Point number	1-5	5
comma	6	1
Northing	7-19	13
comma	20	1
Easting	21-33	13
comma	34	1
Elevation	35-47	13
comma	48	1
Description	49++	variable
<CR>+<LF>	2	

2. Run the "IMPORT" program of the LEWIS software.
3. After completion, enter + and hit the carriage return at the "Input File:" prompt.

Convert LEWIS coordinate file to another coordinate file

1. Run the "EXPORT" program of the LEWIS software.

2. After completion, enter + and hit the carriage return at the "3D Input File:" prompt.
3. Run the TFR program to convert a LEWIS file to a coordinate file.

Maptech format

Use the standard procedure for converting file formats. No extra steps need to be taken.

Maptech's coordinate file is in ASCII. It is not identified by its file extension. A coordinate file is indicated by the first line in the file. The first line has the following format:

Position	Description
1 - 5	"COORD", indicates coordinate file
6 - 11	integer number of points in file
12	comma
13 - 17	starting point number
18	comma
19 - 28	text desc. on field book (10 chars)
29 -104	text description of file (76 chars)
105 -118	required blanks (14 chars)

All remaining lines in the file contains coordinates for a point in the following format.

Field	Position	Length
Northing	1-17	17
space	18	1
Easting	19-35	17
space	36	1
Elevation	37-47	11
space	48	1
Description	49-58	10
<CR>+<LF>	59-60	2

MTI format

Refer to the MTI Manual for procedures for importing and exporting ASCII coordinate files.

In the MTI format, the coordinates are free-form and separated by a comma. The note is at the end of each line of coordinate information and has double quotes surrounding it. The format is as follows:

Point, East, North, Elevation, "Description"

PacSoft format

PacSoft runs on a co-processor board that plugs into the PC. This allows Rocky Mountain Basic to run. After the TFR program creates the PacSoft file, follow the steps in the co-processor board's manual for transferring a PC file to HP formatted directories. When in the directory, you can import the file into the PacSoft software.

In the PacSoft format, coordinates are referenced by their placement on the data line. Except for their position on the line, there are no separators between the coordinate information.

Field	Position	Length
Point	1-5	5
Northing	6-19	14
Easting	20-33	14
Elevation	34-47	14
space	48	1
Description	49	variable
<CR>+<LF>	variable	2

Plus III format

The Standard ASCII format is compatible with PLUS III's software. Follow the standard conversion procedure. No extra steps need to be taken.

Field	Position	Length
Point number	1-5	5
comma	6	1
Northing	7-19	13
comma	20	1
Easting	1-33	13
comma	34	1
Elevation	35-47	13
comma	48	1
Description	49++	variable
<CR>+<LF>		2

WILDsoft format

WILDsoft has an ability to read an ASCII coordinate file. Follow the normal conversion process. No extra steps need to be taken.

WILDsoft is free-form in length, with values being separated by commas:

Point, Northing, Easting, Elevation, description

Survcad format

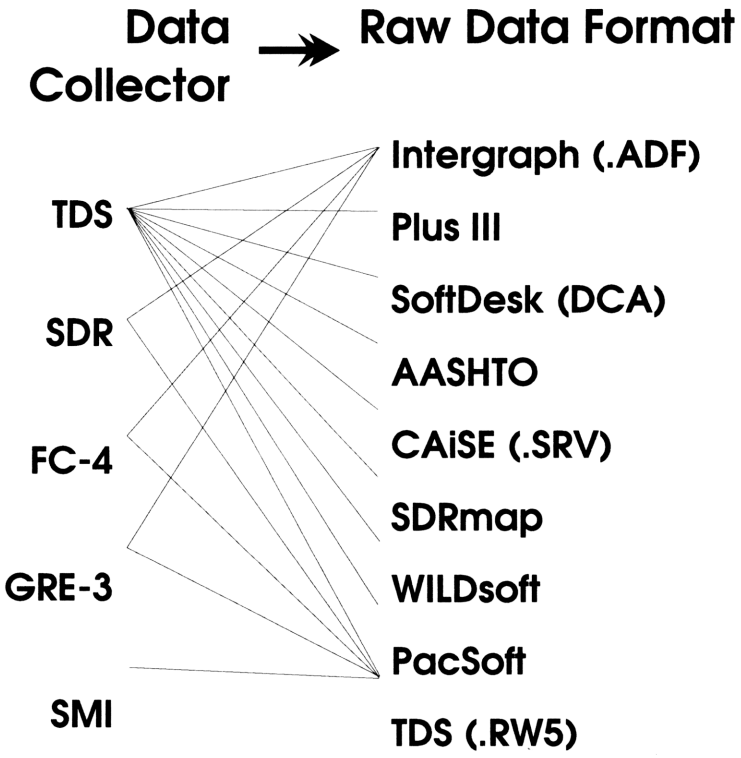
The Survcad file format that TDS will convert to, is an AutoCAD DXF format with a different order to its layers:

Layer #	Object
0	Point marker
1	Point number (text)
2	Elevation (text)
3	Descriptor (text)

See the AutoCAD conversion section for more details.

RAW DATA FILE FORMAT CONVERSION

TFR-LINK and DC-LINK can convert TDS's raw data file to various formats used by other surveying or civil engineering software. DC-LINK can also convert files from other data collectors to these file formats. Following is the chart to show this conversion matrix.



TDS Raw Data to Intergraph ADF format

This program converts a TDS raw data file into Intergraph's ADF file format. If TDS linework commands were not used in the raw data file, the conversion will only generate POINT, DISTANCE and ANGLE data in the ADF file. In order to generate the LINE data in the ADF file, raw data must contain a "BEG" command in the record just before the first point of a line is defined. Refer to Appendix A at the end of this manual for a complete discussion of the linework commands.

This conversion will not recognize any ETI codes in the TDS raw data file. In order to generate line work in the ADF file, TDS line work commands must be used.

The conversion also produces an ICS file that contains an AUTO PLOT and STORE FIGURE record that correspond to each LINE in the ADF file. The ICS file will have the same name as the ADF file, but with an extension of .ICS . At this time, Intergraph's InRoads program does not recognize the LINE records in an ADF file. To import line information into InRoads, the ICS file can be loaded.

See Appendix B for instructions on loading an ADF file into InRoads.

TDS Raw Data to AASHTO format

TDS raw data is converted into an AASHTO SDMS Combined Task data file. The project data item in the AASHTO file will be the name of the TDS raw data file.

TDS raw data to CAiSE (SRV) format

TDS raw data is converted into an ASCII text file (SRV) that will interface with CAiSE.

Two input files are required: the raw data file and its corresponding coordinate file. The coordinate file must have the same name as the raw data file, but with the extension .CR5.

Chains will be included in the SRV file only if TDS linework commands were used when the data was collected. See Appendix A at the end of this Manual for a listing of the TDS linework commands.

TDS raw data to SoftDesk (DCA) format

TDS raw data can be converted into a SoftDesk DCA Field Book File. The auto-plotting data may be collected using either TDS's linework commands or SoftDesk's Field Book Commands. Data should be collected using either one set of commands or the other, not a mixture of them. Refer to Appendix A at the end of this manual for a listing of the TDS linework commands. Refer to SoftDesk documentation for a description of their commands.

NOTE:

1. The TDS linework commands that are converted are: BEG, C3, END, JFS, JN, JPS, JT, JP and SS.

2. When using SoftDesk linework commands:

   a. You must issue a BEG <polyline> before the first point of a line is shot. If you do not enter <polyline> with the BEG command, the name of the line will be taken from the note field of the next point shot.

b. It is not necessary to issue a CONT <polyline> command every time an existing line is resumed. The conversion program will insert CONT <polyline> when it detects that a point shot is in a line, but is not in the same line as the preceding point shot.

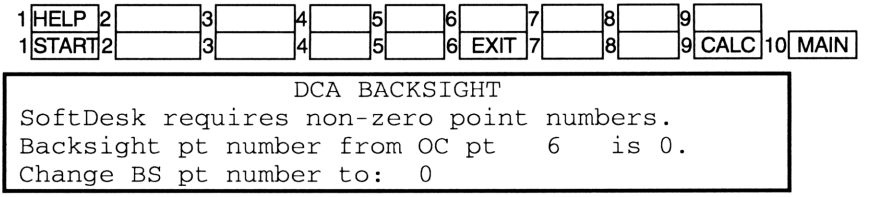
c. The Note field of a point must have its <polyline> name in it.

To convert a TDS Raw Data file into a SoftDesk field book file and import it into SoftDesk:

1. In TFR, convert the TDS file into SoftDesk DCA file format. The SoftDesk filename should have the extension .FBK.
   job.RW5 --> Job.FBK
2. Exit TFR.
3. Have the field book file in the project directory as job.FBK.
4. Start SoftDesk.
   a. select OPEN or NEW for project.
   b. select SURVEY module.
   c. select COLLECT from menu.
   d. select IMPORT FIELDBOOK from Collect Menu.
   e. select job.FBK.

NOTE 1: SoftDesk does not recognize 0 as a point number. When an Azimuth or Bearing is used as a backsight, TDS data collectors will store a backsight point number of 0. If the TDS raw data file has a 0 for a BS point number, (whenever you use a BS Azm. or BS Br), the 0 must be replaced with some other, unused point number.

If during conversion a BS point number of 0 is read, then the user is prompted to substitute a non-zero unique point number with the following screen:



After entering the desired point number, press [F1][START] to continue the conversion.

NOTE 2: SoftDesk requires that the starting and closing point numbers, of a closed traverse, be the same number. TDS closure software requires a different point number for the beginning and ending points. Therefore our data collector manuals will instruct you to use a different point number for the closing shot to the beginning point.

If you are generating data that will be transferred to DCA the data must be collected in the form that DCA requires, independent of the data collector. i.e. You must use the same point number for the beginning and ending points. Be aware that if you do use the same point number for the beginning and ending point, only the coordinates of the ending point are retained in the TDS coordinate file. However the raw data for both shots will be stored in the raw data file.

TDS raw data to PLUS III raw data format

TDS raw data is converted into a PLUS III FieldT .TRV format.

NOTE: 1. The FieldT program requires that traverse data be collected in the same order as the traverse. For example, if a traverse goes from point 9 to 10 to 15 to 21 to 9, then the shots must be taken in that order. The FieldT program will not give correct results if, for example measurements are taken as 9 to 10, 15 to 21, and then back to 10 to 15 and then 21 to 9.

2. The fieldT program requires that the initial backsight with unknown coordinates has 0 as its point number.

TDS raw data to SDRmap raw data format

This program converts a TDS raw data file into an ASCII file that can be imported into SDRmap. TDS linework commands are converted into SDR Control Codes.

To import a file into SDRmap (Version 3.10):

Step 1: From the Main Menu select:
[1] Job creation and selection.

Step 2: From the Job Control Menu select:
[1] Start a new job.

Step 3: From the Job Initialization Details Menu specify:
Job identifier,
Directory to store job in,
etc.

Step 4: From the Main Menu select:
[2] SDR menu.

Step 5: From the SDR Menu select:
[1] Receive data from SDR.

Step 6: From the Receive data from SDR Menu select:
[F4] Import data file as SDR file.
Enter file name.

TDS raw data to WILDsoft raw data format

This program converts raw data collected using a TDS data collector into a WILD ASCII collection file. Data may be collected using either TDS linework commands or any of the WILDsoft Data Collection Codes.

If data is collected using TDS linework commands, it is assumed that the linework is collected in the same way it would be collected if WILDsoft's Data Collection Codes were used. This limits the TDS linework commands that can be used to the following:

BEG to start a line,
END to interrupt a line,
JPS to continue a line, and
C3 for 3 points of an arc .

These commands correspond to WILDsoft's Data Collection Codes 70, 71, 72 and 73.

If data is collected using WILDsoft Collection Codes, WILDsoft codes 1 to 999 will be read with their info fields 1-4 and output to a WILD code block record.

1. The codes are input as W### or w### in the TDS note record, where ### is the WILDsoft data collection code.

2. Info fields, INFO1-INFO4, are input following the code. There must be a space between info fields. An optional info field may be omitted by inputting a zero. An info field may have a maximum of 8 characters; any more will be truncated.

Example:

TDS Note Record: (The second info field is omitted.)

--W145 fence 0 24

Corresponding WILD record:

410006+00000145 42....+000fence 43....+00000000
44....+00000024

To convert a TDS Raw Data File into a WILDsoft Collection File and import it into WILDsoft:

Step 1: In TFR, convert TDS file into a WILDsoft ASCII collection file.

***job*.RW5 --> *job*.WLD**

Step 2: Exit TFR.

Step 3: Run the stand-alone WILDsoft program, COLLFIX, to convert the WILDsoft ASCII collection file, ***job*.WLD**, into the non-ASCII collection file format that WILDsoft reads.

a. At the DOS prompt, type COLLFIX.
b. Specify option **2) PREPARE FILE FOR WILDSOFT CONVERSION.**
c. At the 'File to Edit' prompt, give the name of the WILDsoft ASCII collection file, ***job*.WLD**.

Step 4: Rename the file so it has the extension .COL that WILDsoft looks for.

REN job.WLD job.COL

Step 5: To Process the collection file, run WILDsoft:

- Give the name of the job when Job File Name is requested.
- From the Main Menu, select:
  3.) ELECTRONIC DATA COLLECTION.
- From the Electronic Data Collection Menu, select
  1.) CHANGE FILE AND JOB CONFIGURATION
  From this screen, select:
  1.) CHANGE JOB FILE.
  Give job name and create other files used.
  6.) CHANGE JOB CONFIGURATION.
  1.) UNITS FOR I/O.
  Set appropriate angle and distance units.
  2.) METHOD OF MEASUREMENT.
  1.)REPS-REPETITIONS
  or **3.)1ANG-SINGLE**
  5.)EDM
  9.) SAVE CONFIGURATION.
- From the Electronic Data Collection Menu, select
  4.) COLLECTION FILE PROCESSING.
  3.) CHANGE MEASUREMENT SEQUENCE
  to be B-F-F-B or B-F-B-F.
  4.) CHANGE BEGINNING POINT ID'S
  to be "Use Points from Measurement Blocks"
  1.) BEGIN PROCESSING COLLECTION FILE INTO FIELD DATA FILE.

TDS raw data to PacSoft raw data format

This program converts raw data collected by a TDS data collector into an ASCII file that can be read by DesignMaster. In DesignMaster, the file is converted into a PacSoft .FLD binary file.

To import the ASCII file to DesignMaster:

Step 1: From the DesignMaster Menu:

- choose: **0 FILES**

Step 2: From the Files screen:

- specify the default directory.
- choose: **1 OPEN FILES**
- specify coordinate file
- exit to DesignMaster Menu

Step 3: From the DesignMaster Menu:

- choose: **3 SURVEYING**

Step 4: From the Surveying screen:

- choose: **1 FIELD SURVEY**
- give name of FIELD NOTE FILE. (This is the binary .FLD file.)
- give FILE size.

Step 5: From FIELD NOTE screen:

- choose: **6 IMPORT FROM ASCII**
- select: **0 CIRCLE READING** (for horizontal angle mode)
- select: **0 RAW** (for distance mode)
- give ASCII FILE NAME (The name of the ASCII file generated by TFR LINK.)

TDS linework commands are not interpreted. They are written in the Note Record of the PacSoft file. PacSoft has no linework commands.

DATA COLLECTOR CONVERSION FORMATS

GRE 3 raw data to TDS raw data format

Data collected with the Wild GRE 3 data collector is converted into a TDS raw data file.

The conversion program assumes that the data collector was set to use the Wild "Standard Measurement Format" and that Intergraph's ETI codes were used when the data was collected.

Refer to the next section, GRE 3 to ADF, for notes on collecting ETI codes and limitations of the conversion routine.

GRE 3 raw data to Intergraph's ADF format

The conversion routine will read a raw data file from a Wild GRE 3 data collector; reduce the measurements in accordance with the ETI codes in the raw file; and, output the POINT, LINE, ANGLE and DISTANCE data to the ADF file.

The conversion also produces an ICS file that contains an AUTO PLOT and STORE FIGURE record that correspond to each LINE in the ADF file. The ICS file will have the same name as the ADF file, but with an extension of .ICS . At this time, Intergraph's InRoads program does not recognize the LINE records in an ADF file. To import line information into InRoads, the ICS file can be loaded. See Appendix B for instructions on loading an ADF file into InRoads.

The user should refer to Intergraph's "MGE ETI Reference Manual", March 1992, for a complete discussion of the use of ETI codes.

When collecting the data, ETI codes are input to the Wild GRE 3 by using the CODE function key. The data collector will prompt you to input each of the ETI data fields. If you want to skip a data field, select the RUN key without entering any data. The data collector will automatically enter zeros in any skipped data field. A zeroed field is always interpreted as having no data and a default value is taken. If a value of zero is actually required, an approximate, non-zero value should be entered. For example, when using Code 2, in order to enter an Azimuth of zero, you could enter either 360 or 00000001.

NOTES:

1. No corrections or adjustments are done to the data. For example, if a Code 22-Crosstie Shot is issued, the measurements are reduced and output to the ADF file as ANGLE and DISTANCE data, but the traverse point is not adjusted.

2. The number of points in one network (collected with Code 23 - Foresight to Network Point) is limited to 20. However, there may be any number of networks in a file.

3. The number of linear figures in any one Profile template (collected with Code 24 - Profiles by Cross-Section) is limited to 20. However, the number of shots taken is not limited.

4. Defaults for optional data fields in an ETI code record are implemented in the conversion program as specified in the definitions of the ETI codes (See Intergraph's "MGE ETI Reference Manual", March 1992) except:

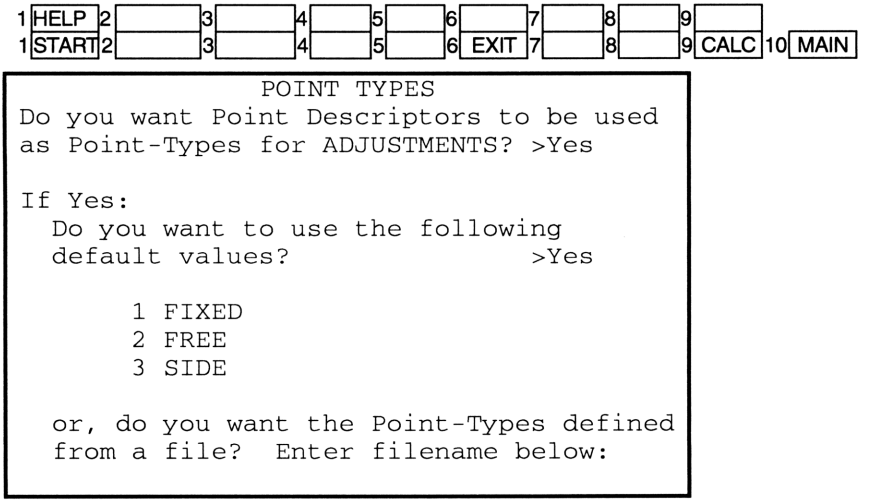
    a. where the default value is taken from the "next" available value for that field. For example, with Code 14, the Figure Number, Field 2, must be specified.

b. where the default value is taken from the "eti.par" file. There is no user-defined file with default values and parameters comparable to Intergraph's eti.par file used when the data is converted. Consequently, any optional field in an ETI code record that can be taken from the eti.par file must be specified. For example, when using Code 7, the measurement mode, Field 3, must always be entered.

5. ETI code 27 can be used in two ways: to associate a Descriptor with a point or to associate a Point-Type keyword, FIXED, FREE or SIDE, with a point. Point-Types are used for adjustments.

   If code 27 is to be used to define Point-Types for adjustments, then a number has to be associated with each keyword since you cannot input alpha characters into the GRE3. To do this you can either use the default equivalents or define them yourself by means of an ASCII file.

   The first time an ETI code 27 (Point Descriptor) is read, the following window will appear.



The user is asked to choose how field 2 (Descriptor) is to be interpreted, either as a Point Descriptor or Point-Type for adjustments.

If field 2 is to be interpreted as Point-Type for Adjustments, you can use either the predefined default values to equate field 2 with the 3 recognized Point-Types

1 for FIXED
2 for FREE
3 for SIDE

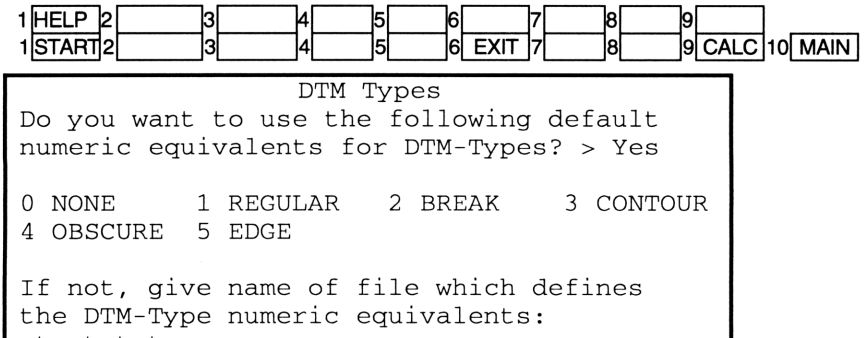
or, a user defined ASCII file to equate field 2 with the 3 Point-Types.

For example, with the following ASCII file:

11 FIXED
22 FREE
33 SIDE

A raw data record 410001+00000027 42....+00000054 43....+00000011 will set the Point-Type to be FIXED.

6. ETI code 31 is used to define points that are to be loaded into a surface. The first time an ETI code 31 (DTM-type) is read, the following screen will appear:



The user is asked to choose how field 1 (DTM feature) is to be interpreted. The choices are:

a. Use predefined defaults to equate field 1 of code 31 with the 6 recognized DTM types.

    0 NONE
    1 REGULAR
    2 BREAK
    3 CONTOUR
    4 OBSCURE
    5 EDGE

    A raw data record 410000+00000031 42....+00000001 will set the DTM-Type to be REGULAR.

b. Use a user defined ASCII file to equate field 1 of code 31 with the 6 recognized DTM types. For example, with the following ASCII file:

    10 NONE
    11 REGULAR
    12 BREAK
    13 EDGE
    14 CONTOUR
    100 EDGE

    A raw data record 410000+00000031 42....+00000100 will set the DTM-Type to be EDGE.

SDR raw data to TDS raw data format

Data collected with the Sokkia SDR data collector is converted into a TDS raw data file. It is assumed that data is collected using the SDR data collection program.

SDRmap feature codes are converted. The following should be noted:

1. The description field of each SDR observation record is transferred directly into the corresponding TDS record NOTE field. SDR allows multiple point codes for a point; TDS does not. Only the first point code will be used as the point's feature code when TDS linework is done.

2. The following SDR linework control codes are converted into their corresponding TDS linework command: BEGIN, ST, START, JP, JN, JNS, JFS and JPT.

   The curve control codes, PC, PT, NEWCV, ENDCV, STCV and EC are converted into C2 or C3. TDS linework will only draw curves of 2 or 3 points, whereas SDR allows multiple point curves. A multiple point curve can be achieved in TDS by collecting consecutive 2 or 3 point curves. The points of a curve must be shot consecutively.

   Linework Example:

SDR data:

```
09F10001100722.200000089.997222242.5861111CURB1 FCE ST PC
09F10001100822.993000089.986111124.6844444CURB1 FCE PT
```

is converted to:

```
--BEG
--C2
SS,OP1,FP1007,AR42.5861,ZE89.9972,SD22.2000,--CURB1 FCE ST PC
SS,OP1,FP1008,AR24.6844,ZE89.9861,SD22.9930,--CURB1 FCE PT
```

SDR raw data to Intergraph's ADF format

The conversion routine will read a raw data file from a Sokkia SDR data collector; reduce the measurements in accordance with the ETI Codes in the file; and, output POINT, LINE, ANGLE and DISTANCE data to the ADF file.

The conversion also produces an ICS file that contains an AUTO PLOT and STORE FIGURE record that correspond to each LINE in the ADF file. The ICS file will have the same name as the ADF file, but with an extension of .ICS . At this time, Intergraph's InRoads program does not recognize the LINE records in an ADF file. To import line information into InRoads, the ICS file can be loaded. See Appendix B for instructions on loading an ADF file into InRoads.

The conversion routine assumes that the data has been collected with the SDR program either with or without Intergraph's ETI Codes. Refer to the Intergraph's "MGE ETI Reference Manual", March 1992, for a complete discussion of the ETI Codes.

The ETI Codes are entered with the Note function. Each field in the Code record is separated by a space. To leave a field blank, enter an extra space. For example, entering a Code 7 with no blank field would be done as follows:

NOTE 7 *Space* **10** *Space* **5.14** *Space* **0** *Space* **6**

To leave field 3 blank in order to use a default value for the instrument height, the data would be entered as follows:

NOTE 7 *Space* **10** *Space Space Space* **0** *Space* **6**

NOTES:

1. No corrections or adjustments are done to the data. For example, if a Code 22-Crosstie Shot is issued, the measurements are reduced and output to the ADF file as ANGLE and DISTANCE data, but the traverse point is not adjusted.

2. The number of points in one network (collected with Code 23 - Foresight to Network Point) is limited to 20. However, there may be any number of networks in a file.

3. The number of linear figures in any one Profile template (collected with Code 24 - Profiles by Cross-Section) is limited to 20. However, the number of shots taken is not limited.

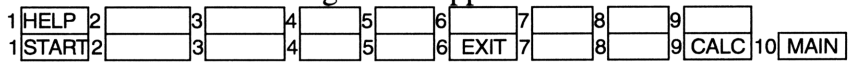
4. Defaults for optional data fields in an ETI code record are implemented in the conversion program as specified in the definitions of the ETI codes (See Intergraph's "MGE ETI Reference Manual", March 1992) except:

    a. where the default value is taken from the "next" available value for that field. For example, with Code 14, the Figure Number, Field 2, must be specified.

    b. where the default value is taken from the "eti.par" file. There is no user-defined file with default values and parameters comparable to Intergraph's eti.par file used when the data is converted. Consequently, any optional field in an ETI code record that can be taken from the eti.par file must be specified. For example, when using Code 7, the measurement mode, Field 3, must always be entered.

5. ETI code 31 is used to define points that are to be loaded into a surface. To save the user from having to type in the whole DTM-type word, abbreviations can be used. The

first time an ETI code 31 (DTM-type) is read in the raw data file the following screen appears.




```
                    DTM Types
Do you want to :
1) use these defaults for DTM-Types ? >Yes

N NONE        R REGULAR      B BREAK
O OBSCURE     C CONTOUR      E EDGE

or
2) define DTM-Types from a file ?     >Yes
   If so, give the name of the file:
 text.txt

If you choose 'No' for both of the above,
the DTM-Type will be taken as it appears
in the raw data file.
```

The user is asked to choose how field 1 (DTM feature) is to be interpreted. The choices are:

a. Use predefined defaults to equate field 1 of code 31 with the 6 recognized DTM types.

N NONE	O OBSCURE
R REGULAR	E EDGE
B BREAK	C CONTOUR

A raw data record 13NM31 R will be interpreted as if it were 13NM31 REGULAR

b. Use a user defined ASCII file to equate field 1 of code 31 with the 6 recognized DTM types. For example, with the following ASCII file:

0 NONE	E EDGE
1 REGULAR	5 CONTOUR
2 BREAK	99 EDGE

A raw data record 13NM31 99 will be interpreted as if it were 13NM31 EDGE

c. Read field 1 directly as the DTM feature.

FC-4 raw data to TDS raw data format

Data collected with the TOPCON FC-4 data collector is converted into a TDS raw data file. It is assumed that TOPCON's Field Management Program was used when the data was collected.

FC-4 raw data to Intergraph's ADF format

Data collected with the TOPCON FC-4 data collector is converted into an ADF file which has POINT, LINE, ANGLE and DISTANCE data.

The conversion also produces an ICS file that contains an AUTO PLOT and STORE FIGURE record that correspond to each LINE in the ADF file. The ICS file will have the same name as the ADF file, but with an extension of .ICS . At this time, Intergraph's InRoads program does not recognize the LINE records in an ADF file. To import line information into InRoads, the ICS file can be loaded. See Appendix B for instructions on loading an ADF file into InRoads.

The conversion routine assumes that TOPCON's Field Management Program was used when data was collected. ETI Codes are not used.

SMI raw data to TDS raw data format

Data collected with the SMI data collector is converted into TDS raw data.

APPENDIX A

MGE ETI Reference Card

Code	Code Description	Fields	
1	Start of Job	f1	Job number 1.
		f2	Job number 2 / crew number.
2	Starting Point and Azimuth	f1	Starting point. Default value is specified in the *eti.par* file.
		f2	Azimuth
		f3	Backsight Point. Default: next available point number.
3	Coordinate Translations	f1	Northing / Southing.
		f2	Easting / Westing.
4	Enter Coordinates	f1	Point number.
		f2	Northing / Southing. Default: 0.
		f3	Easting / Westing. Default: O.
		f4	Elevation. Default: 0.
5	Height of Prism	f1	Height of foresight target prism. Default: specified in the *eti.par* file.
		f2	Height of Backsight target prism.
6	Add to Next Shot	f1	Plus or minus additive distance.
		f2	Plus or minus offset distance.
		f3	Plus or minus additive target height.
7	Occupy New Point	f1	Occupied point. Default: previous foresight point.
		f2	Height of instrument. Default: current height of instrument.
		f3	Traverse measurement mode.
		f4	Instrument ID number.
8	Foresight to Side Traverse Point	f1	Side traverse number.
		f2	Side traverse foresight point. Default: next available point number.
		f3	Height of target. Default: current target height.
		f4	Backsight point. Default: previously occupied point number.

9	Foresight to Main Traverse Point	f1	Point sighting. Default: next available point number.
		f2	Height of target. Default: current height of target.
		f3	Backsight point. Default: previously occupied point number.
10	Foresight to Turn point	f1	Foresight turn point. Default: next available point number.
		f2	Height of target. Default current target height.
11	Backsight to Turn joint	f1	Backsight turn point.
		f2	Elevation at Backsight turn point.
		f3	Height of target.
		f4	Backsight point when at closing point
12	Start Radial Points	f1	Backsight point. Default: test direction of last measurement set.
		f2	Backsight azimuth
13	Point Feature	f1	Feature name or number.
		f2	Starting point. Default: next available point number.
14	Linear Feature	f1	Feature name or number.
		f2	Figure number.
		f3	Starting point.
15	Mid Are Point	Use Code 15 to insert an arc at any time while locating a linear feature.	
16	Curve Feature	f1	Feature name or number.
		f2	Figure number.
		f3	Starting point. Default: next available point number.
17	Recover Shot	f1	Point to recover. Default: last side shot (f2, f3, f3 also).
		f2	Second point ID.
		f3	Third point ID.
		f4	Fourth point ID.
18	Closing Point and Azimuth	f1	Closing point, Default: starting point number on the main traverse.
		f2	Closing azimuth.
		f3	Control point sighted. Default: next available point number.
		f4	Backsight point, Default: last occupied station,
19	Close Side	f1	Close point.

	Traverse	f2	Final point,
		f3	Last sighted point.
		f4	Side traverse number.
20	User ID and Date	f1	Time.
		f2	User name.
		f3	Weather.
		f4	Date.
21	Adjustment Method	f1	Type adjustment.
		f2	Linear tolerance.
		f3	Angular tolerance,
		f4	Vertical tolerance.
22	Cresstie Shot	f1	Point sighting. Default: next available point number.
		f2	Height of target. Default: current height of target.
		f3	Backsight point. Default: previously occupied point.
23	Foresight to Network Point	f1	Network point.
		f2	Target height of f1.
		f3	Second network point.
		f4	Target height of f3.
24	Profiles by cross-section	f1	Cross-Section Template ID.
		f2	Cross-Section measurement mode.
		f3	Starting figure number.
25	Atmospheric Parameters	f1	Temperature.
		f2	Barometric pressure.
		f3	Relative humidity.
26	Prism specification for Target Points	f1	Target point ID.
		f2	Prism ID number.
		f3	Target point ID.
		f4	Prism ID number.
27	Point Descriptor	f1	Point number.
		f2	Descriptor.
28	Figure Descriptor	f1	Figure number.
		f2	Descriptor.
29	Differential Leveling Backsight	f1	Backsight point,
		f2	Rod reading,
		f3	Upper wire.
		f4	Lower wire.

30	Differential Leveling Foresight	f1	Foresight point.
		f2	Rod reading.
		f3	Upper wire.
		f4	Lower wire.
31	DTM Surface Feature	f1	DTM Surface feature.

APPENDIX B

IMPORTING AN ADF FILE INTO INROADS

Version 04.01.0#.00 April, 92 to Sept., 93

TFR-Link and DC-Link can convert raw data from a TDS, SDR, GRE3 or FC-4 data collector into an Intergraph ADF (ASCII Data Format) file. An ICS file, with just STORE FIGURE records, is also produced during the conversion.

The ADF files can be loaded into InRoads to produce surfaces and to do adjustments. The shortened ICS file can be loaded to bring in lines.

To import an ADF file into InRoads for Adjustments:

1. Start InRoads
2. Select the InRoads command from the menu.
3. Select the PROJECT command from the InRoads menu panel and "Create Project" or "Load Project" from the PROJECT COMMANDS tutorial. Name your project.
4. Select the ADJUST command from the menu and "Create Adjust. Project" or "Load Adjust. Project". Name your adjustment project.
5. From the ADJUSTMENT PROJECT COMMANDS tutorial, select ADJ. This will bring you into the ADJUSTMENT MANIPULATION COMMANDS tutorial.
6. In the ADJUSTMENT MANIPULATION COMMANDS tutorial, select "Create Adjust." Give a name for the adjustment.

7. In the ADJUSTMENT MANIPULATION COMMANDS tutorial, select "Load from ADF". Enter the ADF file name, filename.adf.
8. In the ADJUSTMENT MANIPULATION COMMANDS tutorial, select "Export to .TDP" and then select <D>. The command line will say "nnn Points Added to Alignment CoGo".
9. From the InRoads Menu Panel, select the CoGo command to adjust and display the data.

To import an ADF file into InRoads for Surfaces:

1. Start InRoads.
2. Select the InRoads command from the menu.
3. Select the PROJECT command from the InRoads menu panel and "Create Project" or "Load Project" from the PROJECT COMMANDS tutorial. Name your project.
4. Select the SURFACE command from the InRoads menu panel.
5. Select the LOAD command from the InRoads menu panel.
6. Select "Load .ADF File" from the tutorial.
7. At the command line prompt, key in the surface number and then the ADF file name.
8. After the message "Surface Loaded", select "Triangulate" command and then <D>.
9. The surface can be viewed by selecting the DISPLAY command.

To import an ICS file for lines:

After the points have been loaded into InRoads from the ADF file, you can bring in the lines by loading the corresponding ICS file. This ICS file was created by TFR when the ADF was created. It has only the line (STORE FIGURE) information in it.

1. Select the COGO command from the InRoads menu panel.
2. Select the CONTROL command from the InRoads menu panel.
3. From the tutorial, select "Input File".
4. On the command line, key in: 0 filename.ics and then select <D>.

APPENDIX C

AUTO LINEWORK

Feature codes are user-defined codes that identify the kind of point you have shot; for example, a fence, edge of pavement, etc. Command codes are system-defined and tell the auto map routine how to connect points to form the linework.

Feature Codes

Feature codes are used to group a series of points or lines. They can be up to 16 alpha/numeric characters or symbols. Feature codes are not case sensitive, so can use upper or lower case letters. Whether you enter a name as "fence" or "Fence", the code "FENCE" will be used.

A feature code cannot include a space as part of the code. So, if you want to join two words as a feature code, use the "-" or "_" keys between the words. For example, FENCE WIRE and FENCE POST would be interpreted as the same code : "FENCE". But, FENCE-WIRE or FENCE_POST are valid, two-word feature codes. If you use a space between two words, the information after the space can be used as a descriptor, but only the characters up to the space will be recognized as the feature code.

Feature codes are not job-specific. Any feature code created for one job can be used on another job.

Command Codes

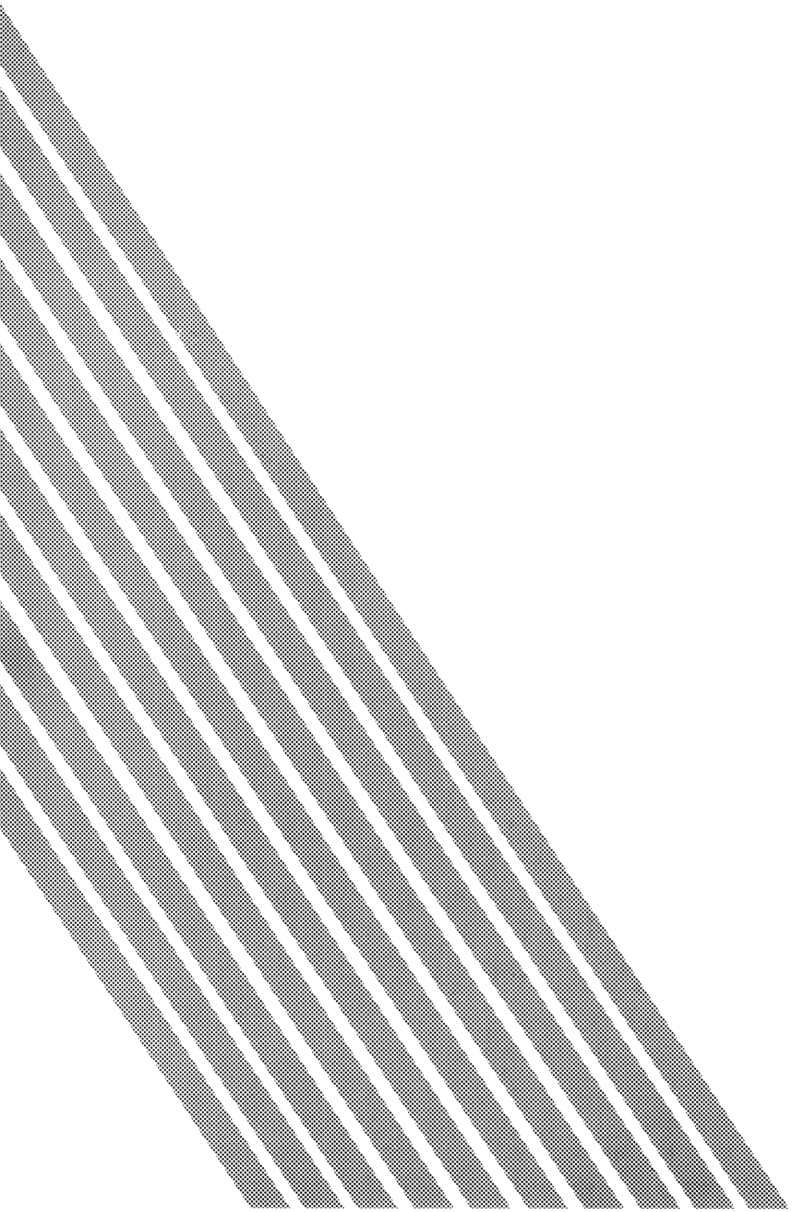
Command codes tell the auto-mapping routine when to pick up the pen, which points to join and where, where to start and end a line, which points to connect in a curve, and so on.

The command codes are system defined as described below.

BEG	Starts a line segment. Lifts the pen at the previous point and lowers it at the next observed point.
BC	Begins a Slpine curved line. All points with the same feature code, that are shot between the BC and EC command codes, will have a spline curve drawn through them. The slope of the curve at its begining and end, are defined by the slope of the line leading into and out of the curve
C2 C2###.###	The next two points are the beginning and end points of a curve. When the radius [###.###] is not specified, the two points are assumed to be tangents (PC and PT of the curve). C2 does not lift or lower the pen (unless BEG is also specified).
C3	The next three points are the beginning, middle, and end points of a curve. C3 does not lift or lower the pen (unless BEG is also specified).
CP1 CP2 CP3	The first point of a 3 point curve. The second point of a 3 point curve. The third point of a 3 point curve. These commands produce the same kind of curve as a C3 command. The difference is that the 3 points do not have to be shot one after another. The points must have the same feature code and be shot in order.
EC	Ends a Slpine curved line. (See BC)

END	Ends the line segment and lifts the pen.
JFS	Joins the current point to the first point in the same feature code. JFS does not lift the pen.
JN	Joins the next two observed points, regardless of the code, without lifting the pen.
JNS	Joins the next observed point to the nearest point of same code, without lifting the pen.
JP####	Joins the next observed point to the specified [####] point, regardless of the code. It lifts the pen to the specified point and lowers the pen to draw a line to the next observed point.
JPS	Joins the next observed point to the previous point of the same code. It lifts the pen to the previous point and lowers the pen to draw a line to the next observed point .
JT####	Joins the current point to the specified [####] point, regardless of the code, and does not lift the pen.
R3	The next three points are three consecutive points of a rectangle. Auto linework will draw the rectangle defined by these three point. R3 does not lift or lower the pen.
SS	Indicates a side shot taken from the last point.

In summary, the feature codes tell how to group the points, and the command codes tell how to connect the points. With this information, the auto-mapping routine is able to draw lines automatically.



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