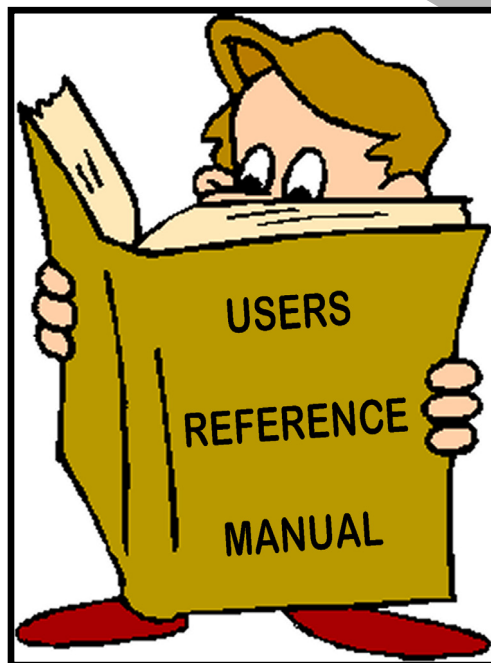


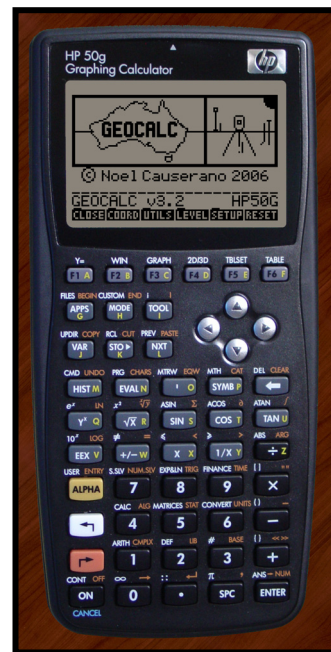
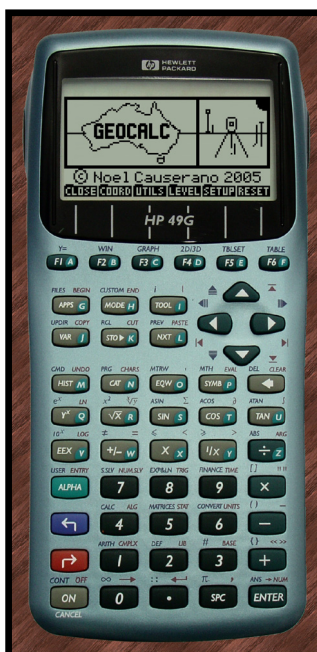
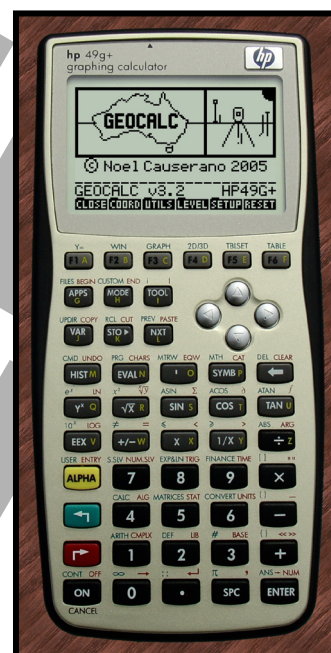
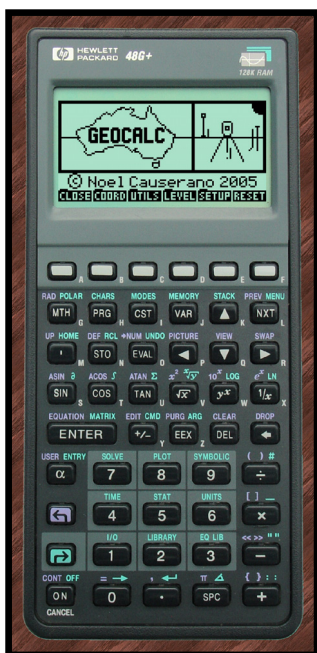
GEOCALC

VERSION 3.2



**Australian
Cadastral & Engineering
Software for the
HP48, HP49 & HP50
(HP48GX, HP48G+, HP49G,
HP48GII, HP49G+, HP50G)**

**Program and
Documentation**
© Noel Causerano 2010



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Manual for Version 3.2, 3.1b
August 2006

SAMPLE



DISCLAIMER

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ACKNOWLEDGEMENTS

- ❑ Noel Causerano would like to thank all his surveying colleagues including staff and surveying students at USQ (Toowoomba, QLD, 1990-1992); staff and fellow surveyors at Capricorn Survey Consultants PTY LTD (Rockhampton, QLD, 1992-1994); staff and fellow surveyors at C&B Group PTY LTD (Cairns, QLD, 1990-2000); and staff and fellow surveyors at Cairns City Council (Cairns, QLD, 2001-2007).
- ❑ Noel Causerano would like to thank **Mr Steve Pryor**, Licensed Surveyor who wrote the popular HP42 survey program for Sokkia for his support, advice and suggestions for the GEOCALC program (1997-1998).
- ❑ Noel Causerano would also like to thank his wife Silvia for all her support and patience and helping make this all possible.
- ❑ The following reference is a letter from a fellow friend and former employer **Robert Lago**. On a sad note, Robert delivered this letter to me 3 weeks prior to him passing away. Robert was a Licensed Surveyor, Director and Office Manager of the Tully and Innisfail offices of the C&B Group Pty Ltd, North Queensland. Robert gave me the inspiration in late 1996 to collaborate my surveying programs into one package. I put my efforts together and created GEOCALC for Australian Surveyors.



Our Ref: Admin/RAL

4th June 2001

Noel Causerano
PO Box 386E
EARLVILLE QLD 4870

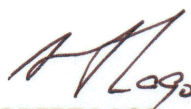
Dear Noel

Re: **Australian Cadastral & Engineering Software for the HP48 & HP49 Calculator**

In reference to the above I wish to congratulate you on a magnificent product. Your surveying program is so easy to use and being designed by a Surveyor, there now exists a product which is practical to us Surveyors.

Once again, congratulations on your surveying program.

Yours faithfully
C&B GROUP


ROBERT LAGO
LICENCED SURVEYOR/DIRECTOR

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1. INTRODUCTION

The Hewlett Packard HP48G series, HP49G series and HP50G programmable hand-held calculators have been a breakthrough in technological advancements throughout the HP family of calculators. They have advanced strongly since their introduction leaving behind their predecessors, the HP41 series & HP42 calculators.

Although this advancement has been impressive there is much discouragement amongst surveyors to move to this series because of little useful software at reasonable prices. The HP48, HP49 & HP50 calculators use the same operating logic as many of the HP family of calculators, RPN (Reverse Polish Notation). The programming language of the HP48 & HP49 is much different to the familiar HP41 programming. With the discontinuation of the HP41 series and HP42 models many survey programs created for these models are now obsolete.

The GEOCALC program is aimed at giving surveyors the basic although essential programs needed for both Cadastral and Engineering field surveying. The GEOCALC program is designed to be as user friendly as possible with the use of a menu system.

All programs in this manual are designed to operate with the HP infrared printers.

Note: The **HP49G**, **HP48GII**, **HP49G+** & **HP50G** calculators are not able to print to the HP Infrared printers.

HP User's Guide/Manual: Refer to your calculators User's Guide/Manual for more detailed explanations on the operations of your calculator.

1.1 OVERVIEW

The GEOCALC program consists of four main calculating modules:

CLOSE	Cadastral orientated calculations
COORD	Engineering orientated calculations
UTILS	Two useful Cadastral survey programs, Secant, Truncation
LEVEL	Simple level book reduction program

Additional Parts (Main Menu):

SETUP	Setup Module
RESET	Reset program
USER	Registered user information
ABOUT	Copyright information, Disclaimer, Module versions
UNINS	Uninstall program

1.11 CLOSE Module

The CLOSE Module consists of data entry similar to the HP41 **[R/S]**. Data Entry operates from the stack environment that prompts for either the next bearing or distance with line number and last entry for reuse all in the large 7-line display. Calculate coordinates of traverse at the same time. Apply datum shifts, linear conversions and angle summations (reverse bearing, add 90 degrees, subtract 90 degrees) during data entry while checking miscloses at any time. Close Module includes data storage, deletion and editing capabilities from a 2D matrix at any time. Calculate Unadjusted areas, Bowditched adjusted areas, Angular misclose, 2 missing distances, 2 missing bearings, Missing bearing and distance in different lines, Cut area by two methods (3 unknown distances or one unknown distance and bearing and distance). You can add calculation solutions to the end of the current matrix. The current matrix can be bowditched by either a closed traverse or from between two fixed coordinated points. The current matrix can be coordinated and then plotted to the screen. A print menu is available for headings, current matrix bearings and distances, traverse details and adjusted areas, coordinate listings, plot.

Registered To: SAMPLE

User No: SAMPLE



1.12 COORD Module

The COORD module consists of a TOOLS menu with Job, File and Data storage capabilities. Calculate bearing and distance between two fixed points. Calculate a new East and North from a fixed point by bearing and distance. Calculate East and North of an intersection of two straight lines from four fixed points. Calculate East and North on a straight line between two fixed points. Perform Reference Line calculations. Setout a distance from calculations using Setout Mode. Convert a coordinate matrix from CLOSE Module for use with COORD Module. Upload a TXT file from a computer and convert to points.

1.13 UTILS Module

The UTILS Module consists of a Road Secant program with multiple road widths. Truncate a boundary with any number of chords with Boundary Truncation program.

1.14 LEVEL Module

Enter level book data direct from a level book with Backsights, Intermediate and Foresights. **The program can also allow for un-even change points between forward & reverse runs.** Calculate total of backsights and foresights. Calculate rises and falls. Calculate total of rises and falls. Calculate Unadjusted Reduced Levels. Calculate Adjusted Reduced Levels by a Double Level Run from 1 Bench Mark. Calculate Adjusted Reduced Levels by a Single Level Run between 2 Bench Marks. Calculate Adjusted Reduced Levels by a Double Level Run between 2 Bench Marks.

1.15 SETUP Module

Toggle Auto Metres or Auto Links. Set display of misclose, from start to end or reverse. Change datum correction values. Choose between the HP82240A or HP82240B infrared printers. Toggle printer for print output off or on. Set display FIX for global changes, and applied to bearings, and applied to distances.

1.16 RESET Program

This program resets all flags used both system and user, deletes newly created variables during operation including current Close Matrix, turns off the **USER** keyboard, clears all suspended programs which normally slows down program operations. If suspended programs exist a HALT annunciator is displayed at the top of the display.

When the RESET program is finished an audible tone will beep.

1.17 USER Program

Displays the registered persons/companies details.

1.18 ABOUT Program

Displays the current GEOCALC version number with copyright, Disclaimer, and versions of the four main calculating modules.

1.2 PREREQUISITE READING

HP48GX/G+ Users: Please read the HP48G User's Guide chapter 1: **The Keyboard and Display.**
HP49G Users: Please read the HP49G User's Guide chapter 1 & 2: **Keys & Basic operation.**
HP48GII, HP49G+ & HP50G Users: Please read the HP48GII, HP49G+, HP50G User's Manual chapter 1: **Getting Started.**



1.21 Manual Terminology

The Stack

The Stack is a series of storage locations for numbers and other objects. The locations are called levels 1, 2, 3, etc. The number of levels changes according to how many objects are stored on the stack. Generally you will use the HP48 & HP49 by entering numbers and other objects onto the stack, then executing commands that operate on the data.

HP User's Guide/Manual: Refer to the section on: **Stack/ Basic operation.**

The Command Line

The Command Line is essentially a workspace for keying in and editing objects you will enter into the HP48 and HP49. The Command Line appears when you start keying in or editing text. The stack lines move up to make room. After you finish using the Command Line, the stack moves back down into the Command Line area.

When you execute a command, any arguments in the Command line are automatically put onto the stack before the command is executed. This means you don't always have to press the **[ENTER]** key to put the arguments on the stack, you can leave one or more arguments in the Command Line when you execute the command.

HP User's Guide/Manual: Refer to the section on: **Entering and Editing Objects/ Basic operation.**

Menu Labels

Menu labels across the bottom of the display show the operations associated with the six white menu keys across the top of the keyboard. Menus with more than six entries are extended over two or more pages. If necessary, change to the menu page you want:

To move to the next page, press the **[NXT]** key.

To move to the previous page, press the **[←] [PREV]** keys.

GEOCALC black menu labels define a set of operations for the corresponding menu key:

NAME Directory

NAME Program/Global Variable

GEOCALC white menu labels prompt for data entry.

NAM Awaiting data entry

Menu label names can vary to any length although only the first allowable characters will be displayed.

Keyboard Functions

Functions using the primary keyboard are shown as **[name]** where **name** is the label represented on the key faces; for example, **[+]**, **[7]**, **[ENTER]**, **[TAN]**, and **[▲]** are on the primary keyboard.

Functions using the Left-shift keyboard are shown as **[←] [name]** and activated by pressing the **[←]** key. (HP48GX/G+ Users: Purple key, HP49G/HP48GII Users: Blue key, HP49G+ Users: Green key). The **name** is the label in purple/blue/green and located above and to the left of their associated primary key; for example, **[←] [USER]** is on the Left-shift keyboard.

GEOCALC menu functions using the Left-shift keyboard are shown as **[←] NAME** and activated by



pressing the purple/blue **[⇐]** key followed by the corresponding menu key; for example, **[⇐]** is on the GEOCALC Left-shift menu keyboard.

Functions using the Right-shift keyboard are shown as **[⇨] [name]** and activated by pressing the **[⇨]** key. (**HP48GX/G+ Users:** Green key, **HP49G/HP48GII/HP49G+ Users:** Red key). The **name** is the label in green/red and located above and to the right of their associated primary key; for example, **[⇨] [OFF]** is on the Right-shift keyboard.

GEOCALC menu functions using the Right-shift keyboard are shown as **[⇨] NAME** and activated by pressing the green/red **[⇨]** key followed by the corresponding menu key; for example, **[⇨] REVB** is on the GEOCALC Right-shift menu keyboard.

Functions using the USER keyboard are shown as **<[name]>** where **name** is the label represented on the key faces; for example, **<[SPC]>** runs a user-defined program with the execution of this key. The USER keyboard is active when the USER annunciator is displayed at the top of the display. To disable the USER keyboard simply press the **[⇐] [USER]** keys.

GEOCALC assigns user defined settings to the **[NXT]** and **[⇐] [PREV]** keys when the **USER** keyboard is active in order to move through its menus.

Bearings

GEOCALC is designed to only operate with clockwise bearings.

Input Prompts

Input prompts have been used throughout GEOCALC. Input prompts pause a program and await data entry. Input prompts are structured to contain a Command Line, in which multiple objects can be placed and executed when entered. These objects generally operate with numbers and command names separated by a space. The menus associated with each input prompt are provided to easily enter commonly used commands.

Eg Reverse the Bearing and apply a datum correction during an input prompt. Type in the Bearing value, press the **REVB** key. Type in the datum correction value, press the **HMS+** key. Note the space is automatically created when the menu key is pressed.

Cursor Modes

Two cursor modes have been used throughout GEOCALC. They affect the manner in which input prompts operate. The Insert Mode cursor is displayed as **✚**. The Replace mode cursor is displayed as **■**.

To change the cursor modes press the **[⇐] [EDIT]** keys. This will display the EDIT menu. Press the **INS** key. This switches the command-line entry mode between *Insert* mode and *Replace* mode. Insert mode is active when the menu key displays as **INS ■**.

1.22 How to Print this Manual

The Geocalc Users Reference Manual has been created for double sided printing. Use your appropriate printer settings and procedures to print this manual using the odd and even pages printing method.

Alternatively you can take this electronic manual on this CD to your local commercial printing outlet and have your manual professionally printed and bound.



2. INSTALLATION

2.1 Memory Requirements

Note:

- Geocalc v3.2 will only operate correctly on the **HP49G, HP48GII, HP49G+ & HP50G**.
- Geocalc v3.1b will only operate correctly on the **HP48GX or HP48G+**.
- You will need to install the correct version for the correct calculator.

The GEOCALC program (v3.2 & v3.1b) requires approximately 64.8 KB (kilobytes) of free user memory (RAM) on a **HP50G, HP49G+, HP48GII, HP49G, HP48GX, HP48G+**.

Note: The GEOCALC program cannot be installed on the **HP48G** calculator because the HP48G has only approximately 30 KB of user memory in total, which cannot be further expanded.

The HP48GX\G+ has approximately 128 KB of user memory in total. To check the current free user memory on your HP48GX\G+, press the **[←] [MEMORY] MEM** keys. The amount of free user memory will be displayed in level 1 of the stack.

GEOCALC needs approximately 2 KB of free user memory as a minimum to operate successively. Data storage is dependent only by the available free memory on the calculator. The HP48GX, HP49G+ & HP50G user memory can be expanded with the use of plug in memory cards.

```
{ HOME }
4:
3:
2:
1: 127955
MEM BYTES NEW0 DIR ARITH
```

2.2 CD Contents

The GEOCALC program CD contains 18 files:

- | | |
|--------------------------------------|--|
| ▪ ACRE51EN.EXE | Adobe Acrobat Reader version 5.1 installation file |
| ▪ ADBERDR60.EXE | Adobe Acrobat Reader version 6.0 installation file |
| ▪ AdbeRdr708_en_US.EXE | Adobe Acrobat Reader version 7.0.8 installation file |
| ▪ GEOCALC.LIB | GEOCALC program library file |
| ▪ GEOCALC | GEOCALC Variables directory file |
| ▪ GINSTALL | GEOCALC installation file |
| ▪ Conn4x_English.EXE | HP48G, HP49G and HP50G series Calculator Connectivity Kit Version 2.3 Build 2439 |
| ▪ HP49G ROM v1.18.ZIP | HP49G Flash ROM Upgrade to Version 1.18 |
| ▪ HP49G+ 50G ROM v2.15.ZIP | HP49G+/50G Flash ROM Upgrade to Version 2.15 |
| ▪ KERMIT.EXE | MS DOS upload/download software file |
| ▪ KERMIT.TXT | KERMIT help file |
| ▪ MSKERMIT.INI | KERMIT user setup file |
| ▪ README.1 ST | Readme file |
| ▪ WINZIP81.EXE | Evaluation Version of Winzip 8.1 installation file |
| ▪ Geocalc Licence Key.PDF | Info on the Geocalc Licence Key |
| ▪ Geocalc Licence Agreement.PDF | Info on the Geocalc Licence Agreement, Disclaimer & Copyright |
| ▪ Service & Support.PDF | Info on Hewlett Packard Warranty |
| ▪ Geocalc Users Reference Manual.PDF | GEOCALC Manual in Adobe Acrobat Version 5 format |

2.3 Installation Procedure

To install the GEOCALC program you will need the GEOCALC program CD and a serial or USB interface cable.

The Geocalc program files can be installed by using either the Microsoft Windows method with the HP to PC Connectivity Kit or the MS DOS method with KERMIT.

You will need access to an IBM computer with a serial or USB port and a CD-Rom drive.



Note (HP49G, HP48GII, HP49G+ & HP50G Users):

The Operating Mode of the HP49G, HP48GII, HP49G+ or HP50G must be in RPN.

To check the current Operating Mode press the **[MODE]** key.

If necessary change the Operating Mode from Algebraic to RPN.

2.31 HP49G & HP49G+/50G Flash ROM Upgrade

The HP49G, HP49G+ & HP50G calculators have the ability to allow for Flash ROM Upgrades (Read Only Memory) of the internal command set as deemed necessary.

To check your current version, type in the word **VERSION** on your calculator.

i.e. press the **[α]** **[α]** **[V]** **[E]** **[R]** **[S]** **[I]** **[O]** **[N]** **[ENTER]** keys.

The ROM version will be displayed in level 1 of the stack.

Included on you Geocalc CD are the latest ROM's as of September-2006.

HP49G: HP49G Flash ROM Upgrade to Version 1.18

HP49G+/50G: HP49G+ Flash ROM Upgrade to Version 2.09

In order to guarantee the correct operation of Geocalc these version upgrades are required as a minimum.

If you require a ROM update you can use these updates from your Geocalc CD. Included in the ZIP file is a ROM update procedure file in Adobe Acrobat format.

Alternatively Hewlett Packard from time to time creates new versions of their ROMs.

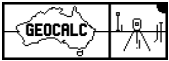
The latest ROM can be downloaded from the Hewlett Packard web-site as they become available:

<http://www.hp.com/calculators/>

Warning: You need to install the correct update for the correct calculator!!

2.32 HP48/HP49/HP50 File Transfer Setup

1. **HP User's Guide/Manual:** Refer to the section on:
Transmitting and Printing Data.
2. **HP48GX/G+, HP49G, HP48GII Users:** Connect the serial interface cable to the serial port on the computer by using either the **9-pin** or **25-pin** adapter.
HP49G+/50G Users: Connect the USB interface cable to a USB port on the computer.
3. **HP48GX/G+G+ Users:** Connect the serial interface cable to the **4-pin** connector at the top of the HP48 keeping the HP logo facing up.
HP49G Users: Connect the serial interface cable to the **10-pin** connector at the top of the HP49G keeping the HP logo facing up.
HP48GII Users: Connect the serial interface cable to the **Mini-B (USB)** connector at the top of the HP48GII (no HP logo).
HP49G+/50G Users: Connect the USB interface cable to the **Mini-B (USB)** connector at the top of the HP49G+/HP50G keeping the USB logo facing down.



4. Turn the HP48, HP49 or HP50 on, press the **[ON]** key.
5. GEOCALC can be installed within any directory on the HP48, HP49 or HP50.
Note: The Geocalc User Directory must be named GEOCALC

To create a new directory use the **CRDIR** command.
E.g. put the name of the new directory in level 1 of the stack,

i.e. press the **[']** **[α]** **[α]** **[S]** **[U]** **[R]** **[V]** **[']** **[ENTER]** keys.

Use the **CRDIR** command:

i.e. press the **[α]** **[α]** **[C]** **[R]** **[D]** **[I]** **[R]** keys.

6. Set your calculator in “Xmodem Server” mode.

HP48GX/G+ Users: Option not available, *Refer* to the next section.

HP49G, HP48GII, HP49G+, HP50G Users:

Press the **[↵]** key and release the key.

Press the **[▶]** key.

The display should read:

```
Xmodem Server
Waiting for command
```

2.33 Procedure using HP48G, HP49G and HP50G Calculator Connectivity Kit

7. Install the “HP48G, HP49G and HP50G series Calculator Connectivity Kit” to your PC. On the Geocalc CD a copy of Version 2.3 Build 2439 released by HP on September 2006 is supplied.

This file is named **Conn4x_English.EXE** and is compatible with Microsoft Windows 98/2000/ME/XP.

You can download the latest version of the “HP48G, HP49G and HP50G series Calculator Connectivity Kit” from the Hewlett Packard web-site as they become available:

<http://www.hp.com/calculators/>

Execute the file **Conn4x_English.EXE**. This will install the “HP48G, HP49G and HP50G series Calculator Connectivity Kit” software and USB drivers to your PC.

- *Refer* to the Help Section of the “HP48G, HP49G and HP50G series Calculator Connectivity Kit” software for further information.

```
{ HOME }
4:
3:
2:
1:
_____

{ HOME }
4:
3:
2:
1:
_____

'SURV'
PATH CRDIR PGDIR VARS TVARS ORDER
```

```
Xmodem Server
Waiting for command
```




HP48GX/G+ Users: The **Xmodem Server Library** is required to be first downloaded to your HP48 prior to setting the HP48 in Xmodem Server mode.

- Refer to the “HP48G, HP49G and HP50G series Calculator Connectivity Kit” Help files under Trouble Shooting Connections, HP48-G for full instructions on installing and running the library.
- On the HP48, Check the IOPAR settings: IR/wire = wire, baud = 9600
[←] [MEMORY] [IOPAR]
- On the PC, Check “Connect Using” & “Speed” setting, Speed: 9600
- Choose File > Download HP48 Server (Manual-XRECV) ...
Follow the on-screen prompts to download & install the library
- On the HP49G, HP48GII, HP49G+ & HP50G this library is built in.

8. Using the “HP48G, HP49G and HP50G series Calculator Connectivity Kit”, transfer the files: GEOCALC.LIB, GEOCALC & GINSTALL to your HP48 or HP49.

Note: Check the HP48GX/G+ and HP49G Baud Rate is set to 9600.
Check the HP48GII, HP49G+ and HP50G Baud Rate is set to 115200.

9. Skip to **Step 16** in section **2.34 Procedure using KERMIT under MS Dos.**

2.34 Procedure using KERMIT under MS-DOS (HP48GX/G+ & HP49G)

10. If you are using a computer running under DOS or Windows 95/98 you will need to Restart in MS DOS Mode.
11. Insert the GEOCALC program CD into the CD-Rom drive.
12. Access the CD-Rom drive and run the Kermit software by typing KERMIT at the Dos prompt.
13. The MSKERMIT.INI file should have set up the computers communication parameters for COM 1 and baud rate 9600. If this needs changing you can modify the respective setting at the MS-Kermit> prompt. Example:

```
MS-Kermit> set port 2
MS-Kermit> set baud 2400
```

The MSKERMIT.INI file is a text file that can be modified to automatically setup your communications. The MSKERMIT.INI file currently defaults to a port setting for COM 1 and a baud rate of 9600.

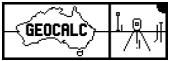
14. From the computer you are now ready to transfer the necessary program files.

From the MS-Kermit> send g*.*

This should take approximately
7 minutes at 9600 baud.

This will transfer the files GEOCALC,
GEOCALC.LIB, GINSTALL to your
HP48 or HP49.

```
{ HOME }
4:
3:
2:
1:
GEOC GINST GEOC IOPAR
```



15. On the HP48 & HP49 press the **[ON]** key followed by the **[VAR]** key. This brings up the variables menu. Note that files on the HP48 & HP49 are known as variables.
16. Press the **GINST** key from the menu. This starts the library installation.
17. Choose Port number to store the GEOCALC.LIB. Enter number 0, 1, or 2.
18. Port 0 is the only port memory available not requiring any plug in memory cards. The memory for port 0 is taken out of user memory, so objects stored in port 0 decrease the amount of user memory available. If you have plug in memory cards installed you may wish to install the GEOCALC library in these other ports.
19. **HP48GX/G+ Users only:** The HP48 will now automatically turn off.
20. **HP48GX/G+ Users only:** Turn the HP48 on, press the **[ON]** key.

The HP48 will momentarily blank as the library is attached, the GEOCALC.LIB variable is deleted and HP48 resets to the MTH menu.
21. **HP48GX/G+ Users only:** Press the **[VAR]** **GINST** keys.

This continues the installation process. The current User Flag settings are stored to variable 'USRFLAGS'. The variable 'GINSTALL' is deleted. The directory changes to the GEOCALC Variables directory.
22. Geocalc will now auto run to the Geocalc Main Menu

Installation of GEOCALC is now complete.

To run GEOCALC press the **GEO** key from the **[VAR]** menu.

2.4 To Uninstall GEOCALC

Library command: ~UNINSTALL

From the GEOCALC Main Menu page 2, press the **UNIN** key. This will activate the Uninstall program.

The program will HALT and prompt you "Are you sure you want to uninstall GEOCALC and all of its components?"

Options: Yes or No

YES

The program will firstly detach the GEOCALC library then delete it. The program will then delete the GEOCALC Variables Directory, clear the stack and return to the VAR menu.

NO

The program will clear the stack and return to the VAR menu.

```

PRG
{ HOME }
Choose Port to Sto
GEOCALC.LIB (0,1 or 2)

:PORT: 0

Installing GEOCALC....
(HP48 Version)

Please Wait...

Your HP48 will now
turn OFF. Turn your
HP48 back ON and press
the VAR key and then
the GINST key.

Press CONT to continue
CONT

```

```

{ HOME }
4:
3:
2:
1:
VECTR MATR LIST NVP REAL BASE

```

```

{ HOME }
4:
3:
2:
1:
GINST GEOC LOPAR

```

```

GEOCALC
© Noel Causerano 2005
CLOSE COORD UTILS LEVEL SETUP RESET

```

```

GEOCALC
© Noel Causerano 2005
USER ABOUT UNITS

```

```

***** UNINSTALL *****
Are you sure you want
to uninstall GEOCALC
and all of its
components?

YES NO

Uninstalling GEOCALC
Library.....

Please Wait...
YES NO

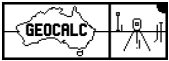
Uninstalling GEOCALC
User Directory.....

Please Wait...
YES NO

```



SAMPLE



3. OPERATING GEOCALC

To operate GEOCALC you need to be in the GEOCALC Variables directory. The current directory path is shown in the top left of the display: for example it should read { HOME GEOCALC }, depending on which subdirectory it was install in.

3.1 GEOCALC Variables Directory

The GEOCALC Variables directory contains the working variables that are subject to change during the operations of the program. The Variables Directory contains the following global variables at first installation and when reset:

[GEO] [CST] [SAFE.CL] [ICRDS] [TXT] [USRFLAGS]
 [M180] [WINP] [EMENU] [DATDF] [PTNO] [PTDAT]
 [CLM] [CLM?] [DCA] [DCB] [DCC] [DCD]
 [DCE] [CLOS.DAT] [DD.DAT] [BB.DAT] [BDDL.DAT] [CUTΔ.DAT]
 [SLN] [CB] [CD] [MD] [INFO] [SRN1]
 [SRN2] [RW1] [RW2] [TDIST] [CHDS] [SB]
 [SD] [B] [D] [d] [b] [B1]
 [B2] [E] [N] [E1] [N1] [E2]
 [N2] [E3] [N3] [E4] [N4] [EAST]
 [NRTH] [LNE] [NLEV] [LEVL] [SRL] [ERL]
 [RLF] [NSU] [NSTN] [~B] [~D] [~F]

Variable **[GEO]** is a non-editable program.

Other variables will add to this list as the program is operated.

3.2 The GEOCALC Main Menu

Library command: ~GEOMENU

To start GEOCALC press the **[GEO]** key. This is found in the GEOCALC Variables directory. The program **[GEO]** is a user-defined program that runs the library command: ~GEOMENU

The **USER** Keyboard is activated at this point.

On startup the display will momentarily display the Registered Users information followed by the Copyright message.

You can also start GEOCALC from the library menu, press **[F1] [LIBRARY] [GEO]** keys.

Note GEOCALC library programs will only operate from the GEOCALC Variables directory it was install into or any subsequent directories below this path, i.e. it will not operate from the HOME directory

The GEOCALC Main Menu consists of two pages:

Page 1: **CLOSE COORD UTILS LEVEL SETUP RESET**

Library command:
~GEOMENU

Page 2: **USER ABOUT** **UNITS**

Library command:
~GEOMENU2

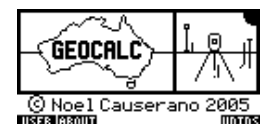
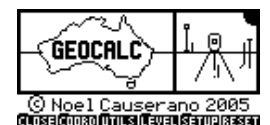
Registered To: **SAMPLE**

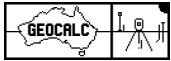
User No: **SAMPLE**

```
{ HOME GEOCALC }
4:
3:
2:
1:
GEO CST SAFE.ICRDS TXT USRFL
```

```
GEO CST SAFE.ICRDS TXT USRFL
SRN1 RW1 RW2 TDIST CHDS SB
M180 WINP EMEN DATDF PTNO PTDAT
CLM CLM? DCA DCB DCC DCD
DCE CLOS.DD.DA BB.DA BDDL.CUTΔ.
SLN CB CD MD INFO SRN1
SD B D d b B1
B2 E N E1 N1 E2
N2 E3 N3 E4 N4 EAST
NRTH LNE NLEV LEVL SRL ERL
RLF NSU NSTN ~B ~D ~F
```

```
REGISTERED__TO
(NAME)
User No. (1)
GEO CST SAFE.ICRDS TXT USRFL
REGISTERED__TO
Copyright 2005
Noel Causerano
User No. (1)
GEO CST SAFE.ICRDS TXT USRFL
```



**GEOCALC Main Menu page 1:**

CLOSE	CLOSE Module Directory
COORD	COORD Module Directory
UTILS	UTILS Module Directory
LEVEL	LEVEL Module Directory
SETUP	SETUP Module Directory
RESET	RESET GEOCALC

GEOCALC Main Menu page 2:

USER	Registered user information
ABOUT	Program Copyright info, Disclaimer, & Module versions
	Empty Menu Label
	Empty Menu Label
	Empty Menu Label
UNINS	Uninstall program

Menu page numbers are displayed in the top right corner of the display in all screens except the GEOCALC Main Menu. This is shown as page number of number of pages. E.g. 1/2 is page 1 of 2 pages.

3.3 The Custom Menu

The custom menu is a menu that you create with operations, commands and any other objects that you can create or group together for your own convenience.

HP48GX/G+ Users: The custom menu is available at any time by pressing the **[CST]** key.

HP49G, HP48GII, HP49G+/50G Users: The custom menu is available at any time by pressing the **[←]** & **[CUSTOM]** keys.

The custom menu is defined by the contents of a *reserved* variable named CST. A default CST variable has been set up and can be found in the first page of the Variables Directory:

GEO **→HMS** **HMS→** **HMS+** **HMS-** **CST**

GEO	Start GEOCALC Main Menu, runs library command ~GEOMENU
→HMS	Decimal to HMS, Converts a number from decimal degrees to HMS format
HMS→	HMS to decimal, Converts a number from HMS format to decimal degrees
HMS+	Adds two angles in HMS format
HMS-	Subtracts two angles in HMS format
CST	The <i>reserved</i> CST variable

For more information about Custom menus:

HP User's Guide/Manual: Refer to the section on:
Customizing the HP 48 / CUSTOM Menus.

Program: **USER**

```

REGISTERED__TO
      (NAME)
      User No. (1)
EXIT

```

Program: **ABOUT**

```

GEOCALC VER_3.2
Copyright
Noel Causerano
(May 2005)
All Rights Reserved
CONT

```

```

***** DISCLAIMER *****
Noel Causerano
and authorised
distributors
disclaim any liability
for the use of the
GEOCALC program.
CONT

```

```

CLOSE MOD VER: 6.7
COORD MOD VER: 3.9
UTILS MOD VER: 1.5
LEVEL MOD VER: 1.4
HP49G HP48GII HP49G+
EXIT

```



4. CLOSE MODULE

The CLOSE Module is a collection of Cadastral orientated programs commonly used by most cadastral surveyors.

4.1 CLOSE MODULE MAIN MENU

From the GEOCALC Main Menu press the **CLOSE** key. This will display the CLOSE Module Main Menu page 1.

The CLOSE Module Main Menu consists of two pages:

Page 1: **NEW DATA VIEW SAVE LOAD TIDY**

Library command:
~CLOSEMENU

Page 2: **SLN+ ADJUST CTRAV PLOT PRINT EXIT**

Library command:
~CLM2

CLOSE Module Main Menu page 1:

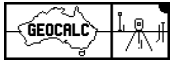
- NEW** Start a New Close Matrix, proceeds to Data Entry
- DATA** Data Entry, New or Resume Data Entry
- VIEW** View and Edit the Close Matrix
- SAVE** Save the Close Matrix
- LOAD** Load a stored Close Matrix
- TIDY** Delete a stored Close Matrix

CLOSE Module Main Menu page 2:

- SLN+** Add a calculation solution to the end of the Close Matrix
- ADJUST** Bowditch Adjustment
- CTRAV** Calculate Coordinates of the Close Matrix
- PLOT** Plot the Close Matrix
- PRINT** Close Print Menu
- EXIT** Exit to GEOCALC Main Menu

```
***** CLOSE MODULE ***1/2
NEW: New Close
DATA: Resume Entry
VIEW: View Current
SAVE: Save Current
LOAD: Load Old
TIDY: Delete Old
NEW DATA VIEW SAVE LOAD TIDY
```

```
***** CLOSE MODULE ***2/2
SLN+: Add Solution
ADJUST: Bowditch Adjust
CTRAV: Coordinate Trav
PLOT: Plot Trav
PRINT: Print Menu
EXIT: MAIN MENU
SLN+ ADJUST CTRAV PLOT PRINT EXIT
```



4.2 Starting a New Close Entry

Library command: ~NEWCL

The CLOSE Module operates primarily from the built in STAT application. The Close Matrix is stored in the *reserved* variable Σ DAT.

From the CLOSE Module Main Menu page 1 press the **NEW** key. This will start a New Close Matrix. The Σ DAT variable if it exists will be deleted and the program will proceed to Close Data Entry.

4.3 Close Data Entry

Library commands: ~NEWCL or ~CONTCL

From the CLOSE Module Main Menu page 1 press the **NEW** or **DATA** key. The **DATA** key is used to **Resume** Data Entry of an already existing Close Matrix.

Close Data Entry operates conveniently from the stack environment, meaning that you can perform any operations such as additions of bearings or distances etc without interrupting the running of the program.

Close Data Entry Menu consists of two pages:

Page 1: **NEW** **BRG±** **REVB** **LKSP** **ERL** **B&D**Library command:
~CONTCLPage 2: **VIEW** **CALC** **A/U** **A/A** **[E.N]** **EXIT**Library command:
~DM2

Close Data Entry Menu page 1:

- NEW** Start a New Close Matrix
- BRG±** Change Datum Correction values
- REVB** Reverse the Bearing value in line 1 of the stack by 180°
- LKSP** Auto Links Conversion
- ERL** Erase the last line
- B&D** Calculate the Misclose Bearing, Distance, and Ratios

Close Data Entry Menu page 2:

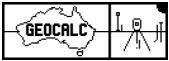
- VIEW** View and Edit the Close Matrix
- CALC** Close Calculation Menu
- A/U** Calculate Unadjusted Area
- A/A** Calculate Bowditch adjusted Area
- [E.N]** Calculate Coordinates during Data Entry
- EXIT** Exit to CLOSE Module Main Menu page 1

```

##### DATA ENTRY #####1/2
BRG1?~#BRG±0°00'00"
4:
3:
2:
1: ">>> NEW CLOSE <<<"
NEW BRG± REVB LKSP ERL B&D

##### DATA ENTRY #####2/2
BRG1?~#BRG±0°00'00"
4:
3:
2:
1: ">>> NEW CLOSE <<<"
VIEW CALC A/U A/A [E.N] EXIT

```



4.31 Entering Close Data

USER Keyboard: **<[SPC]>**

Library command: ~DATA

When a New Close Matrix is started the string ">>> NEW CLOSE <<<" will be displayed in level 1 of the stack.

The **<[SPC]>** key has been assigned to the **USER** keyboard to enter Bearings or Distances. The **<[SPC]>** key is programmed to only accept one field of entry at a time from level 1 of the stack. Type in the Bearing and press the **<[SPC]>** key. Type in the Distance and press the **<[SPC]>** key to complete the sequence.

The current Close Data Entry status is shown in line two from the top of the display. Characters 1-5 from the left displays a prompt for the **next** entry including the line number. Character 7 from the left displays the current Auto Metres/Auto Links status. Characters 9-22 from the left displays the current Datum Correction status.

When one sequence is complete, the display will prompt for the next Bearing while leaving the last Bearing and Distance displayed in levels 1 and 2 of the stack. These numbers can be manipulated or re-entered for the next sequence.

To re-enter the Bearing simply press the **<[SPC]>** key.

To re-enter the Distance simply press **[←] <[SPC]>** keys.

At the end of each sequence the values entered are stored to the bottom of the **ΣDAT** variable using the **Σ+ STAT** command. The Close Matrix contains **TWO** columns. The Brg and Dist sequence entered is converted to Departures (Eastings) and Latitudes (Northings). The Latitude value is stored to column 1. The Departure value is stored to column 2. The number of Rows is dependant on the number of sequences entered.

4.32 Bearing Corrections by 90° or 180°

Library command: ~REVB

From Close Data Entry Menu page 1:

To reverse the Bearing in level 1 of the stack by 180°, press the **REVB** key.

The result will be left in level 1 of the stack.

To subtract 90° from the Bearing in level 1 of the stack, press **[←] REVB** keys.

The result will be left in level 1 of the stack.

To add 90° to the Bearing in level 1 of the stack, press **[→] REVB** keys.

The result will be left in level 1 of the stack.

```

##### DATA ENTRY #####1/2
BRG1?~*BRG±0°00'00''
4:
3:
2:
1: ">>> NEW CLOSE <<<"
NEW BRG2 REVB LK3 ERR4 E&0

```

```

##### DATA ENTRY #####1/2
DST1?~*BRG±0°00'00''
4:
3:
2:
1: ">>> NEW CLOSE <<<"
NEW BRG2 REVB LK3 ERR4 E&0

```

```

##### DATA ENTRY #####1/2
DST1?~*BRG±0°00'00''
4:
3:
2: DST 11: 35.8050
1: BRG 11: 74.5130
NEW BRG2 REVB LK3 ERR4 E&0

```




4.33 Datum Correction

This option allows you to apply a Datum Correction to each entered Bearing during Close Data Entry. The Bearing will automatically be corrected in HMS when you press the **<[SPC]>** key.

This is useful when entering data using several cadastral plans.

The Datum Correction selection menu can be accessed from two locations:

SETUP Module Main Menu page 1:

Library command: **~D-DF1**

Close Data Entry Menu page 1:

Library command: **~D-DF2**

```
*** DATUM CORRECTION ***
A: 0°00'00"
B: 0°00'00"
C: 0°00'00"
D: 0°00'00"
E: 0°00'00"
CURRENT: 0°00'00"
A B C D E EXIT
```

From either location press the **PRG±** key. This will display the Datum Correction selection menu.

To set a New correction, type in the correction value in HMS, press the **[↵]** key followed by one of the five menu locations:

A B C D E

This will store the correction value to the specified location and also set it as CURRENT.

To reuse a stored correction, press one of the five menu locations.

Datum Correction selection menu:

A B C D E EXIT

- A** Datum Correction location A
- B** Datum Correction location B
- C** Datum Correction location C
- D** Datum Correction location D
- E** Datum Correction location E
- EXIT** Exit to Close Data Entry Menu page 1 or
Exit to SETUP Module Main Menu page 1

Note: **EXIT** will exit to the last used menu.

Note: Datum Corrections will be applied to all entered Bearings in CLOSE Module including calculating programs.

4.34 Auto Metres

Library command: ~AUTOM

This option is used to automatically convert any entered distance from Links to Metres when the **<[SPC]>** key is pressed during Close Data Entry.

From Close Data Entry Menu page 1:

To turn the Auto Metres **ON** press the **LKSP** key.

The Close Data Entry status line should look like this:

```

##### DATA ENTRY #####1/2
BRG1?M#BRG±0°00'00''

```

```

##### DATA ENTRY #####1/2
BRG1?M#BRG±0°00'00''
4:
3:
2:
1: ">>> NEW CLOSE <<<"
NEW BRG± REVB LKSP ERA.L B&B

```

To turn the Auto Metres **OFF** press the **LKSP** key.

The Close Data Entry status line should look like this:

```

##### DATA ENTRY #####1/2
BRG1?#~#BRG±0°00'00''

```

```

##### DATA ENTRY #####1/2
BRG1?#~#BRG±0°00'00''
4:
3:
2:
1: ">>> NEW CLOSE <<<"
NEW BRG± REVB LKSP ERA.L B&B

```

4.35 Auto Links

Library command: ~AUTOL

This option is used to automatically convert any entered distance from Metres to Links when the **<[SPC]>** key is pressed during Close Data Entry.

From Close Data Entry Menu page 1:

To turn the Auto Links **ON** press the **[←] LKSP** keys.

The Close Data Entry status line should look like this:

```

##### DATA ENTRY #####1/2
BRG1?L#BRG±0°00'00''

```

```

##### DATA ENTRY #####1/2
BRG1?L#BRG±0°00'00''
4:
3:
2:
1: ">>> NEW CLOSE <<<"
NEW BRG± REVB LKSP ERA.L B&B

```

To turn the Auto Links **OFF** press the **[←] LKSP** keys.

The Close Data Entry status line should look like this:

```

##### DATA ENTRY #####1/2
BRG1?#~#BRG±0°00'00''

```

```

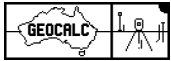
##### DATA ENTRY #####1/2
BRG1?#~#BRG±0°00'00''
4:
3:
2:
1: ">>> NEW CLOSE <<<"
NEW BRG± REVB LKSP ERA.L B&B

```

4.36 Erasing the Last Line

Library command: ~ERA.L

This option allows you to erase the last line entered. From Close Data Entry Menu page 1 press the **ERA.L** key. This will delete the last entered sequence from the end of the Close Matrix.



4.37 Displaying the Misclose

Library command: ~CLOS

This option allows you to calculate the misclose at any time. From Close Data Entry Menu page 1, press the **END** key.

Example: Enter surround metres for Lot 27 on RP898734.
Refer Appendix 1, **Diagram 1**, page 97.

BRG1: 74°51'30"	DST1: 35.805
BRG2: 111°12'00"	DST2: 112.025
BRG3: 179°59'30"	DST3: 129.970
BRG4: 250°42'20"	DST4: 105.945
BRG5: 339°59'20"	DST5: 114.050
BRG6: 0°01'00"	DST6: 88.955

The display will read "Calcing....." when calculating.

The Misclose calculates:

BRG:	119°36'53"
DIST:	0.032
RATIO:	
1mm	1:18387
10mm	1:26779

Misclose Ratio explained:

The current Queensland Surveyors Regulations define required cadastral survey accuracies as follows:

- "(c) The linear misclose in a surround must not exceed:-
- 10mm plus 1 part in 5000 of the total distance traversed; or
 - 20mm plus 1 part in 2500, if the survey is in rough and broken terrain; or
 - 20mm plus 1 part in 2000, if the surveyor's work is included in the surround; or
 - 20mm plus 1 part in 1000, if a survey effected before 1890 is included in the surround."

Extract from The Queensland Surveyors Regulations 1992 Regulation 31(6).

The values for the misclose calculation are copied to the stack. Press the **[VAR]** key. The misclose Bearing will be displayed in level 2 of the stack. The misclose Distance will be displayed in level 1 of the stack.

Misclose Menu: **[F1]** **CONT** **EXIT**

[F1] Refer Section 5.9, **Setout Distance Mode**, page 70.

Empty Menu Label

Empty Menu Label

Empty Menu Label

CONT Return to Close Data Entry Menu page 1

EXIT Exit to CLOSE Module Main Menu page 1

Calcing.....

NEW BRG: REV: LKS: Err: L: 8:0

***** MISCLOSE *****

BRG: 119°36'53''

DIST: 0.032

RATIO:

1mm 1:18387

10mm 1:26779

[F1]

CONT EXIT

USER

{ HOME GEOCALC }

4: DST 161: 88.9550

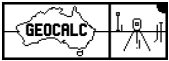
3: BRG 161: 0.0100

2: BRG: 119.3654

1: DIST: 0.0319

[F1]

CONT EXIT



4.38 Close Calculation Menu

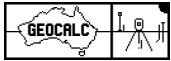
Library command: ~CALC.CL

From Close Data Entry Menu page 2, press the **CALC** key. This will display the Close Calculation Menu.

Close Calculation Menu: **◀MIS 2DIST 2BRG BDDL CUT△ EXIT**

- ◀MIS** Angular Misclose Adjustment
- 2DIST** 2 Missing Distances and Occupation References
- 2BRG** 2 Missing Bearings
- BDDL** Bearing and Distance in Different Lines
- CUT△** Cut Area
- EXIT** Exit to Close Data Entry Menu page 2

```
*** CLOSE CALC ***1/1
◀MIS: Angular Misclose
2DIST: 2 Missing Dists
2BRG: 2 Missing Brgs
BDDL: B&D Diff Lines
CUT△: Cut Area
EXIT: DATA ENTRY 2/2
◀MIS 2DIST 2BRG BDDL CUT△ EXIT
```

**4.381 Angular Misclose**Library command: **~AMIS**

This option allows you to calculate the Angular Misclose of a traverse and apply the new bearings to the Close Matrix.

Example: Enter surround metres for Lot 27 on RP898734.
Refer Appendix 1, **Diagram 1**, page 97.

BRG1: 74°51'30"	DST1: 35.805
BRG2: 111°12'00"	DST2: 112.025
BRG3: 179°59'30"	DST3: 129.970
BRG4: 250°42'20"	DST4: 105.945
BRG5: 339°59'20"	DST5: 114.050
BRG6: 0°01'00"	DST6: 88.955

From Close Calculation Menu press the **AMIS** key.

An input prompt will display showing the Closing Bearing for confirmation. Press the **[ENTER]** key to accept the default 0°01'00".

Type in the Original Bearing of the last line as 0°01'50" at the input prompt. Press the **[ENTER]** key.

The program will HALT and will display the Angular Misclose differences and prompt to Adjust? Yes or No.

YES Continue with Angular Misclose adjustment and modify Close Matrix with newly adjusted Bearings.

NO Quits Angular Misclose adjustment, returns to the Close Calculation Menu.

Press the **YES** key. Angular Misclose adjustment will display and a summary of the number of angles and adjustment per angle with the message "Adjusting....." in line two of the display.

When Angular Misclose adjustment is complete the message "Adjustment Complete..." will be displayed in line two of the display.

Press the **OK** key to return to the Close Calculation Menu.

The Close Matrix newly adjusted Bearings can now be viewed.
Refer Section 4.4 **Viewing and Editing the Close Matrix**, page 37.

The newly adjusted Close matrix should read:

BRG1: 74°51'38"	DST1: 35.805
BRG2: 111°12'16"	DST2: 112.025
BRG3: 179°59'55"	DST3: 129.970
BRG4: 250°42'53"	DST4: 105.945
BRG5: 340°00'01"	DST5: 114.050
BRG6: 0°01'50"	DST6: 88.955

```

t HOME GEOCALC 3  USER  PRG
Enter Closing Bearing
  
```

```

:BRG: 0.0100
  
```

```

t HOME GEOCALC 3  USER  PRG
Enter Original Bearing
  
```

```

:BRG: 0.0150
  
```

```

*** ANGULAR MISCLOSE ***
Closing 0°01'00''
Brq:
Original
Brq: 0°01'50''
Misclose: 0°00'50''
Adjust?
YES NO
  
```

```

*** ANGULAR MISCLOSE ***
Adjusting.....
No. of Angles: 6
Adjustment
per Angle: 0°00'08''
YES NO
  
```

```

*** ANGULAR MISCLOSE ***
Adjustment Complete...
No. of Angles: 6
Adjustment
per Angle: 0°00'08''
OK
  
```

**4.382 2 Missing Distances**

Library command: ~DD?

This option allows you to calculate 2 Missing Distances from the Close Matrix when 2 Bearings are known.

Example: Enter part surround metes for Lot 27 on RP898734.
Refer Appendix 1, **Diagram 1**, page 97.

BRG1: 74°51'30"	DST1: 35.805
BRG2: 111°12'00"	DST2: 112.025
BRG3: 179°59'30"	DST3: 129.970
BRG4: 250°42'20"	DST4: 105.945

From Close Calculation Menu press the **2DIST** key.

An input prompt will display for the 2 known Bearings. Type in 339°59'20" for BRG5.
To proceed down to the next level press the **▼** key. Type in 0°01'00" for BRG6.
Press the **[ENTER]** key.

The display will read "Calcing....." when calculating.

The 2 Missing Distances calculation will then be displayed as follows:

BRG5: 339°59'20"	<< DST5: 114.131 >>
BRG6: 0°01'00"	<< DST6: 88.895 >>

Note: Calculation metes are not the same as metes on RP898734 because of the 32mm misclose in Lot 27.

2 Missing Distances Menu: **→□**

CONT **EXIT**

→□ Refer Section 5.9, **Setout Distance Mode**, page 70.

Empty Menu Label

Empty Menu Label

Empty Menu Label

CONT Return to Close Calculation Menu

EXIT Exit to CLOSE Module Main Menu page 1

```

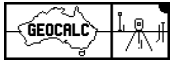
{ HOME GEOCALC }  USER  PRG
Enter Known Brgs or
ENTER for Occupation
:BRG5: 339.5920
:BRG6: 0.0100
→HMS→HMS→HMS→HMS→REV8→M
  
```

Calcing.....

```

→HMS→HMS→HMS→HMS→REV8→M

2DIST SOLUTION
151
BRG: 159°59'20''
DST: < 114.131 >
161
BRG: 180°01'00''
DST: < 88.895 >
→□ CONT EXIT
  
```

**4.383 2 Missing Distances (Occupation References)**Library command:
~ DD?

This option allows you to calculate occupation references by radiation using the 2 Missing Distances program.

Example: Calculate the occupation references of the Cen RFP from OPM 75105 at Stn 18 on RP 898734 using a field connection of 188°35' for 0.98m.
Refer Appendix 1, **Diagram 1**, page 97.

From CLOSE Module Main Menu page 1, start a new close, press the **NEW** key.

Enter in the connection from Stn 18 to PSM 75105. Type in 0.1820 and press the **<[SPC]>** key. Type in 1.2 and press the **<[SPC]>** key.

Enter in the field connection from PSM 75105 to Cen RFP. Type in 188.35 and press the **<[SPC]>** key. Type in 0.98 and press the **<[SPC]>** key.

From Close Calculation Menu press the **2DIST** key.

An input prompt will display for the 2 known Bearings. Leave blank and press the **[ENTER]** key.

This will then proceed to Occupation Calculation. Enter Reference Bearing of 359°59'30" at the input prompt. A reference Bearing is the Bearing the occupation references will be calculated square to, e.g.

Adjoining side boundary might be 15°00'. Enter 15°00' at the prompt. The occupation references will be calculated in a 15°00'-195°00' direction and a 105°00'-285°00' direction.

The display will read "Calcing....." when calculating.

The 2 Missing Distances calculation will then be displayed as follows:

```
BRG3: 359°59'30"  << DST3:  0.231 >>
BRG4: 269°59'30"  << DST4:  0.140 >>
```

Therefore Cen RFP reference: 0.23N 0.14W

2 Missing Distances Menu: **[→□]**

CONT EXIT

[→□] Refer Section 5.9, **Setout Distance Mode**, page 70.

Empty Menu Label

Empty Menu Label

Empty Menu Label

CONT Return to Close Calculation Menu

EXIT Exit to CLOSE Module Main Menu page 1

```

USER  PRG
{ HOME GEDCALC }
Enter Known Brgs. or
ENTER for Occupation
:BRG3:
:BRG4:
>HMS|HMS>|HMS+|HMS-|REVE|→M
```

```

USER  PRG
{ HOME GEDCALC }
Occupation Calc
Enter Reference BRG
:BRG3: 359.5930
>HMS|HMS>|HMS+|HMS-|REVE|→M

Calcing.....
```

```

>HMS|HMS>|HMS+|HMS-|REVE|→M

*** 2DIST SOLUTION ***
13|
BRG: 359°59'30''
DST: < 0.231 >
14|
BRG: 269°59'30''
DST: < 0.140 >
[→□] CONT EXIT
```



This option allows you to calculate 2 Missing Bearings from the Close Matrix when 2 Distances are known.

BRG1:	74°51'30"	DST1:	35.805
BRG2:	111°12'00"	DST2:	112.025
BRG3:	179°59'30"	DST3:	129.970
BRG4:	250°42'20"	DST4:	105.945

<< BRG5: 357°28'44" >> DST5: 114.050
<< BRG6: 337°31'12" >> DST6: 88.955

<< BRG5: 340°00'43" >> DST5: 114.050
<< BRG6: 359°58'15" >> DST6: 88.955

2 Missing Bearings Menu:

CONT EXIT

Empty Menu Label

EXIT Exit to CLOSE Module Main Menu page 1

User No: SAMPLE

```

R42                USER                PRG
< HOME GEOCALC >
Enter Known Dists

:DIST5: 114.050
:DIST6: 88.955
→HMS HMS→ HMS← HMS← REVE →M

Calculg.....

→HMS HMS→ HMS← HMS← REVE →M

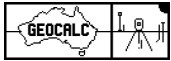
*** 2BRG SOLUTION 1 ***
151
BRG:< 357°28'43" >
DST: 114.050
161
BRG:< 337°31'11" >
DST: 88.955
END

Calculg.....

END

*** 2BRG SOLUTION 2 ***
151
BRG:< 340°00'43" >
DST: 114.050
161
BRG:< 359°58'15" >
DST: 88.955
[→] [CONT] [EXIT]

```


**4.385 Bearing and Distance in Different Lines**

Library command: ~BDDL?

This option allows you to calculate 1 Missing Bearing and 1 Missing Distance in different lines from the Close Matrix when 1 Distance and 1 Bearing are known.

Example: Enter part surround metes for Lot 27 on RP898734.
Refer Appendix 1, **Diagram 1**, page 97.

BRG1: 74°51'30"	DST1: 35.805
BRG2: 111°12'00"	DST2: 112.025
BRG3: 179°59'30"	DST3: 129.970
BRG4: 250°42'20"	DST4: 105.945

From Close Calculation Menu press the **BDDL** key.

An input prompt will display prompting for 1 known Bearing and 1 known Distances. Type in 339°59'20" for BRG(A). To proceed down to the next level press the **▼** key. Type in 88.955 for DIST(B). Press the **ENTER** key.

The display will read "Calcing....." when calculating.

The Bearing and Distance in Different Lines solution 1 will then be displayed as follows:

BRG(A): 339°59'20"	<< DST(A): 114.067 >>
<< BRG(B): 0°00'09" >>	DST(B): 88.955

Press the **END** key to calculate Bearing and Distance in Different Lines solution 2

The display will read "Calcing....." when calculating.

The Bearing and Distance in Different Lines solution 2 will then be displayed as follows:

BRG(A): 339°59'20"	<< DST(A): 281.233 >>
<< BRG(B): 139°58'31" >>	DST(B): 88.955

Note: Calculation metes are not the same as metes on RP898734 because of the 32mm misclose in Lot 27.

Bearing and Distance in
Different Lines menu:

**CONT EXIT**

← Refer Section 5.9, **Setout Distance Mode**, page 70.

Empty Menu Label

Empty Menu Label

Empty Menu Label

CONT Return to Close Calculation Menu

EXIT Exit to CLOSE Module Main Menu page 1

```

R4Z      USER  PRG
{ HOME GEOCALC }
Enter Known Brg(A) &
Dist(B) in diff lines
:BRG(A): 339.5920
:DIST(B): 88.955
>HMS HMS> HMS+ HMS- REVEI >M

```

Calcing.....

```

>HMS HMS> HMS+ HMS- REVEI >M

```

```

*** BDDL SOLUTION 1 ***
15|
BRG(A): 339°59'20''
DST(A): < 114.067 >
16|
BRG(B): < 0°00'08'' >
DST(B): 88.955
END

```

Calcing.....

```

END

```

```

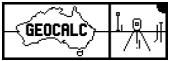
*** BDDL SOLUTION 2 ***
15|
BRG(A): 339°59'20''
DST(A): < 281.233 >
16|
BRG(B): < 139°58'31'' >
DST(B): 88.955
END

```

```

←>| CONT EXIT

```



4.386 Cut Area

Library command: ~CUTΔ

This option allows you to calculate a Cut Area by two methods.

From Close Calculation Menu press the **CUTΔ** key. This will display the Cut Area options screen.

Cut Area menu: **000Δ**

000Δ

000Δ Calculate Cut Area with 3 unknown Distances

Empty Menu Label

Empty Menu Label

Empty Menu Label

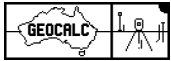
Empty Menu Label

000Δ Calculate Cut Area with unknown Distance and Bearing and Distance

***** CUT AREA *****
000Δ: 3 Unknown Dists
000Δ: Unknown Dist &
Brg & Dist

000Δ

000Δ

**4.3861 Cut Area with 3 unknown Distances**

Library command: ~DDDA

This option allows you to calculate a Cut Area by 3 unknown Distances.

Example: Enter part surround metes for Lot 27 on RP898734.
Refer Appendix 1, **Diagram 1**, page 97.

BRG1: 74°51'30"	DST1: 35.805
BRG2: 111°12'00"	DST2: 112.025
BRG3: 179°59'30"	DST3: 129.970

From the Cut Area options screen press the **000** key.

An input prompt will display prompting for the next 3 known Bearings. Type in 250°42'20' for BRG(4). To proceed down to the next level press the **▼** key. Type in 339°59'20' for BRG(5). To proceed down to the next level press the **▼** key. Type in 0°01'00' for BRG(6). Press the **[ENTER]** key.

An input prompt will display prompting for the Total Area. Type in 22445.665 for TOT AREA. Press the **[ENTER]** key.

The display will read "Calcing....." when calculating.

The Cut Area (DDDA) calculation will then be displayed as follows:

BRG4: 250°42'20"	<< DST4: 105.923 >>
BRG5: 339°59'20"	<< DST5: 114.191 >>
BRG6: 0°01'00"	<< DST6: 88.832 >>

Note: Calculation metes are not the same as metes on RP898734 because of the 32mm misclose in Lot 27.

The values for the Cut Area (DDDA) calculation are copied to the stack. Press the **[VAR]** key. The Cut Area Distance 4 will be displayed in level 3 of the stack. The Cut Area Distance 5 will be displayed in level 2 of the stack. The Cut Area Distance 6 will be displayed in level 1 of the stack.

Cut Area (DDDA) Menu: **[←→]**

CONT EXIT

[←→] Refer Section 5.9, **Setout Distance Mode**, page 70.

Empty Menu Label

Empty Menu Label

Empty Menu Label

CONT Return to Close Calculation Menu

EXIT Exit to CLOSE Module Main Menu page 1

```

USER  PRG
{ HOME GEOCALC }
Enter Cut Area Details
:BRG4: 250.4220
:BRG5: 339.5920
:BRG6: 0.0100
  HMS HMS+ HMS- REVE  M

```

```

USER  PRG
{ HOME GEOCALC }
Enter Cut Area Details

```

```
:TOT AREA: 22445.665
```

```
Calcing.....
```

```

***** CUT AREA *****
BRG4: 250°42'20"
DST4: < 105.923 >
BRG5: 339°59'20"
DST5: < 114.191 >
BRG6: 0°01'00"
DST6: < 88.832 >
  →  CONT  EXIT

```

```

USER
{ HOME GEOCALC }
4:
3: CUT DST4: 105.9234
2: CUT DST5: 114.1906
1: CUT DST6: 88.8315
  →  CONT  EXIT

```



4.3862 Cut Area with 1 unknown Distance and Bearing and Distance

Library command: ~DBDA

This option allows you to calculate a Cut Area by unknown Distance and Bearing and Distance.

Example: Enter part surround metes for Lot 27 on RP898734.
Refer Appendix 1, **Diagram 1**, page 97.

BRG1: 74°51'30" DST1: 35.805
BRG2: 111°12'00" DST2: 112.025
BRG3: 179°59'30" DST3: 129.970
BRG4: 250°42'20" DST4: 105.945

From the Cut Area options screen press the **DBDA** key.

An input prompt will display prompting for the next known Bearing and Total Area. Type in 339°59'20' for BRG(5). To proceed down to the next level press the **▼** key. Type in 22445.665 for TOT AREA. Press the **[ENTER]** key.

The display will read "Calcing....." when calculating.

The Cut Area (**DBDA**) calculation will then be displayed as follows:

BRG5: 339°59'20" << DST5: 113.969 >>
<< BRG6: 359°58'19" >> << DST6: 89.047 >>

Note: Calculation metes are not the same as metes on RP898734 because of the 32mm misclose in Lot 27.

The values for the Cut Area (**DBDA**) calculation are copied to the stack. Press the **[VAR]** key. The Cut Area Distance 6 will be displayed in level 4 of the stack. The Cut Area Bearing 6 will be displayed in level 3 of the stack. The Cut Area Distance 5 will be displayed in level 2 of the stack. The Cut Area Bearing 5 will be displayed in level 1 of the stack.

Cut Area (**DBDA**) Menu: **[→]**

CONT EXIT

[→] Refer Section 5.9, **Setout Distance Mode**, page 70.

Empty Menu Label

Empty Menu Label

Empty Menu Label

CONT Return to Close Calculation Menu

EXIT Exit to CLOSE Module Main Menu page 1

```

USER  PRG
{ HOME GEOCALC }
Enter Cut Area Details

:BRG5: 339.5920
:TOT AREA: 22445.665

Calcing.....

```

```

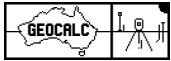
***** CUT AREA *****
BRG5: 339°59'20''
DST5: < 113.969 >
BRG6: < 359°58'19'' >
DST6: < 89.047 >
[→] CONT EXIT

```

```

{ HOME GEOCALC }
4: DST6: 89.0470
3: BRG6: 359.5851
2: DST5: 113.9689
1: BRG5: 339.5920
[→] CONT EXIT

```



4.387 Displaying the last two calculations

This option allows you to display the last two calculation screens at any time when the **USER** keyboard is active. This option will be turned off during input prompts and within the LEVEL Module.

To display the **Last** calculation screen press the **<[▲]>** key. Library command: **~LAST1**

To display the **2nd Last** calculation screen press the **<[▼]>** key. Library command: **~LAST2**

4.39 Unadjusted Area

Library command: **~AU**

This option allows you to calculate the Unadjusted Area from the close matrix.

Example: Enter surround metres for Lot 27 on RP898734.
Refer Appendix 1, **Diagram 1**, page 97.

BRG1: 74°51'30"	DST1: 35.805
BRG2: 111°12'00"	DST2: 112.025
BRG3: 179°59'30"	DST3: 129.970
BRG4: 250°42'20"	DST4: 105.945
BRG5: 339°59'20"	DST5: 114.050
BRG6: 0°01'00"	DST6: 88.955

From Close Data Entry Menu page 2, press the **~AU** key.

The display will read "Calcing....." when calculating.

This will calculate the unadjusted area using the **Area by double latitudes and double departure** method using the current values from the close matrix.

The Unadjusted Area calculation will then be displayed as follows:

Area unadjusted = 22445.665

The value for the Unadjusted Area calculation is copied to the stack. Press the **[VAR]** key. The Unadjusted Area will be displayed in level 1 of the stack.

Unadjusted Area Menu: **[→]**

CONT EXIT

[→] Refer Section 5.9, **Setout Distance Mode**, page 70.

Empty Menu Label

Empty Menu Label

Empty Menu Label

CONT Return to Close Data Entry page 2

EXIT Exit to CLOSE Module Main Menu page 1

Calcing.....

```

CALC  AU  AUA  (E.N)  EXIT
=====
AREA
=====
UNADJUSTED
= 22445.665
=====
[→]  CONT  EXIT

{ HOME GEOCALC }  USER
4:
3:
2:
1: 22,445.6653
[→]  CONT  EXIT
  
```

**4.310 Bowditch Adjusted Area**

Library command: ~A/A

This option allows you to calculate the Bowditch Adjusted Area from the close matrix.

Example: Enter surround metes for Lot 27 on RP898734.
Refer Appendix 1, **Diagram 1**, page 97.

BRG1: 74°51'30"	DST1: 35.805
BRG2: 111°12'00"	DST2: 112.025
BRG3: 179°59'30"	DST3: 129.970
BRG4: 250°42'20"	DST4: 105.945
BRG5: 339°59'20"	DST5: 114.050
BRG6: 0°01'00"	DST6: 88.955

From Close Data Entry Menu page 2, press the **AWA** key.

The display will read "Calcing....." when calculating.

This will firstly adjust the close matrix using the Bowditch method for a closed traverse. This will calculate the area using the **Area by double latitudes and double departure** method. Then will restore the original values of the close matrix.

The Bowditch Adjusted Area calculation will then be displayed as follows:

Area Bowditch Adjusted = 22447.080

The value for the Bowditch Adjusted Area calculation is copied to the stack. Press the **[VAR]** key. The Bowditch Adjusted Area will be displayed in level 1 of the stack.

Bowditch Adjusted Area Menu: **[F5]**

CONT EXIT

[F5] Refer Section 5.9, **Setout Distance Mode**, page 70.

Empty Menu Label

Empty Menu Label

Empty Menu Label

CONT Return to Close Data Entry page 2

EXIT Exit to CLOSE Module Main Menu page 1

Calcing.....

CALC A/U A/R [E.N] EXIT

Bowditch Adjusting....

CALC A/U A/R [E.N] EXIT

***** AREA *****

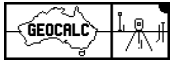
BOWDITCH ADJUSTED

= 22447.080

[F5] CONT EXIT

{ HOME GEOCALC } USER

4:
3:
2:
1: 22,447.0797
[F5] CONT EXIT



4.311 Calculate Coordinates during Data Entry

Library command: ~CD?

This option allows you to automatically calculate coordinates of your traverse during Data Entry. You can start calculating from a New Close or from the end of an existing Close Matrix.

From Close Data Entry Menu page 2, press the **[E.N]** key.

An input prompt will display prompting for East 1 and North 1. The input prompt has two options:

- (1) Enter East 1 and North 1 at the prompt: Type in the East 1 value. To proceed down to the next level press the **[▼]** key. Type in the North 1 value. Press the **[ENTER]** key.
- (2) Read from COORD Module: Refer Section 5.231, **Read Coordinate**, page 55.

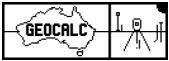
The calculated coordinates for the next point will be calculated when the next Bearing and Distance sequence is entered.

The calculated North value is copied to the level 4 of the stack. The calculated East value is copied to the level 3 of the stack.

To turn this function **OFF** simply press the **[E.N]** key again.

```
USER  PRG
{ HOME GEOCALC }
Enter Coords to calc
from or ENTER for READ
: EAST 1: 1000
: NRTH 1: 5000+
```

```
DATA ENTRY 2\2
BRG2? BRG±: 0°00'00"
4: NRTH 11: 5009.3525
3: EAST 11: 1034.5620
2: DST 11: 35.8050
1: BRG 11: 74.5130
CALC  ANU  ANR  [E.N]  EXIT
```



4.4 Viewing and Editing the Close Matrix

This option allows you to view, edit, delete, insert or apply a datum swing to the Close Matrix.

The Edit Close Matrix menus can be accessed from two locations:

CLOSE Module Main Menu page 1:

Library command: **~VIEW1**

Data Entry Menu page 2:

Library command: **~VIEW2**

From either location press the **VIEW** key. This will access the View **ΣDAT** Menu page 1. Line 1 Bearing and Distance will be displayed.

```
VIEW ΣDAT 1/2
LINE 1
BRG: 74°51'30''
DIST: 35.805
NEXT PREV # EDIT DELT INSR
```

The Edit Close Matrix Menu consists of two pages:

Page 1: **NEXT** **PREV** **#** **EDIT** **DELT** **INSR**

Library command:
~VIEW

Page 2: **DATM** **EXIT**

Library command:
~LM2

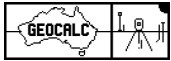
Edit Close Matrix Menu page 1:

NEXT View the Next Line
PREV View the Previous Line
Search by Line Number
EDIT Edit the Displayed Line
DELT Delete the Displayed Line
INSR Insert a Line

Edit Close Matrix Menu page 2:

DATM Datum Swing
Empty Menu Label
Empty Menu Label
Empty Menu Label
Empty Menu Label
EXIT Exit to Data Entry Menu page 2 or
Exit to SETUP Module Main Menu page 1

Note: **EXIT** will exit to the last used menu.



4.41 Viewing the Next and Previous Lines

This option allows you to view the Close Matrix one line at a time.

From Edit Close Matrix Menu page 1:

To view the next line, press the **NEXT** key. When you reach the end of the Close Matrix an audible tone will beep.

To view the previous line, press the **PREV** key. When you reach the start of the Close Matrix an audible tone will beep.

```
***** VIEW ΣDAT ***1/2
LINE 1
BRG: 74°51'30''
DIST: 35.805
NEXT PREV # EDIT DELT INSR
```

4.42 Search by Line Number

Library command: ~GOTO

This option allows you to search the Close Matrix at the required Line Number.

From Edit Close Matrix Menu page 1 press the **#** key.

An input prompt will display prompting for "Goto which line?". Type in the line number. Press the **[ENTER]** key. If the line number entered is not valid, the message "Nonexistent Line!" will be displayed.

```
{ HOME GEOCALC } PRG
Goto which line?

:LINE?:

{ HOME GEOCALC } PRG
Goto which line?
Nonexistent Line!
:LINE?: 7
```

4.43 Edit the Displayed Line

Library command: ~EDIT

This option allows you to edit the currently displayed line in the Close Matrix. You can edit both the Bearing and Distance.

From Edit Close Matrix Menu page 1 press the **EDIT** key.

An input prompt will display showing the contents of the current line. The cursor changes from insert mode to replace mode. Scroll through the command line using the **[▲]** **[▶]** **[▼]** **[◀]** keys. Type over the existing values with the new values. Press the **[ENTER]** key to replace the new line in the Close Matrix.

```
{ HOME GEOCALC } USER PRG
Replace Line 1,
Press ENTER
:BRG: 74.5130
:DIST: 35.805
>HMS|HMS>|HMS*|HMS-|REVE|>M
```

4.44 Delete the Displayed Line

Library command: ~DELT

This option allows you to delete the currently displayed line in the Close Matrix.

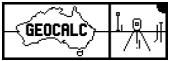
From Edit Close Matrix Menu page 1 press the **DELT** key.

The message "Deleting Line #....." will be displayed.

This will delete the currently displayed line from the Close Matrix.

```
Deleting Line 1 .....
LINE 1
BRG: 74°51'30''
DIST: 35.805
NEXT PREV # EDIT DELT INSR

***** VIEW ΣDAT ***1/2
LINE 1
BRG: 111°12'00''
DIST: 112.025
NEXT PREV # EDIT DELT INSR
```



4.45 Insert a Line

Library command: ~INSR

This option allows you to insert a line between the previous line and the currently displayed line in the Close Matrix.

From Edit Close Matrix Menu page 1 press the **INSR** key.

An input prompt will display prompting for the new line. Type in the Bearing. To proceed down to the next level press the **[▼]** key. Type in the Distance. Press the **[ENTER]** key.

The message "Inserting....." will be displayed.

This will insert the new line between the previous line and the currently displayed line in the Close Matrix.

4.46 Datum Swing

Library command: ~DATM

This option allows you to apply a datum swing to each bearing in the Close Matrix. The Datum Swing can be applied to any line currently displayed.

From Edit Close Matrix Menu page 2 press the **DATM** key.

An input prompt will display prompting for the new Bearing. Type in the new Bearing. Press the **[ENTER]** key.

The message "Swinging....." will be displayed.

This will apply a datum swing to all bearing in the Close Matrix.

```
{ HOME GEOCALC }  USER  PRG
Insert B&D Between
Line 0 and Line 1
:BRG: 4
:DIST:
>HMS>HMS>HMS>HMS- REV8 >M
```

```
{ HOME GEOCALC }  USER  PRG
Datum Swing?
#LINE 1: 74°51'30''#
Swing Line 1 to Brg?
:BRG?: 74.52004
>HMS>HMS>HMS>HMS- REV8 >M
```

```
Swinging.....
Datum Swing?
#LINE 1: 74°51'30''#
Swing Line 1 to Brg?
:BRG?: 74.5200
>HMS>HMS>HMS>HMS- REV8 >M
```



4.5 Save the Close Matrix

Library command: ~SAVE.CL

This option allows you to save the Close Matrix. Any number of Close Matrixes can be saved dependant only on the amount of available memory.

Saved Close Matrixes are stored in the Variables Directory under a sub-directory named **SAFE.CL**.

From CLOSE Module Main Menu page 1 press the **SAVE** key.

The **User** Keyboard is turned off at this time.
The Alpha Keyboard is activated at this time.

An input prompt will display prompting for a name of the Close Matrix. Type in the Close Matrix name. Press the **[ENTER]** key.

Note: Names must be in the format of alpha or alphanumeric, e.g. LOT or LOT27. The name 27LOT will not be accepted.

If the entered name exists then the Close Matrix is saved to a temporary variable named **DAT**. An audible tone will also beep.

From the input prompt you can view the names of previously stored Close matrixes. Turn the alpha keyboard off, press the **[α]** key once.

To move to the next page, press the **[NXT]** key.
To move to the previous page, press the **[←] [PREV]** keys.

To activate the alpha keyboard press the **[α]** key twice.

The program returns to CLOSE Module Main Menu page 1

```
PRG
{ HOME GEOCALC SAFE.CL }
Name the Close Matrix,
press ENTER
```

```
OIP
DAT LOT27
```

4.6 Load a stored Close Matrix

Library command: ~LOAD.CL

This option allows you to load a stored Close Matrix. Saved Close Matrixes are stored in the Variables Directory under a sub-directory named **SAFE.CL**.

From CLOSE Module Main Menu page 1 press the **LOAD** key.

An input prompt will display prompting for the Close Matrix name.

To move to the next page, press the **[NXT]** key.
To move to the previous page, press the **[←] [PREV]** keys.

Press the menu key below the menu label, the name will appear on the command line.

Press the **[ENTER]** key.

The stored Matrix is copied to the **ΣDAT** variable.

The program returns to CLOSE Module Main Menu page 1

```
USER PRG
{ HOME GEOCALC SAFE.CL }
Load Close Matrix?
press Menu Key Name,
press ENTER
LOT27
OIP DAT LOT27
```



4.7 Delete a stored Close Matrix

Library command: ~TIDY.CL

This option allows you to delete one or all stored Close Matrixes. Saved Close Matrixes are stored in the Variables Directory under a sub-directory named **SAFE.CL**.

From CLOSE Module Main Menu page 1 press the **TIDY** key.

An input prompt will display prompting for the Close Matrix name.

To move to the next page, press the **[NXT]** key.

To move to the previous page, press **[←] [PREV]** keys.

Press the menu key below the menu label, the name will appear on the command line, or leave blank.

Press the **[ENTER]** key.

The stored Matrix or all Matrixes are deleted.

The program returns to CLOSE Module Main Menu page 1.

4.8 Add Calculation Solutions to Close Matrix

Library command: -ADD

This option allows you to add the last calculated solution of Close, 2 Missing Distances, 2 Missing Bearings, Bearing and Distance in Different Lines or Cut Area to the end of the current Close Matrix.

From CLOSE Module Main Menu page 2 press the **SLN+** key.

This will display the Add Calculation Solution options screen.

Add Calculation Solution Menu: **CLOS 2DIST 2BRG 800L CUT△ EXIT**

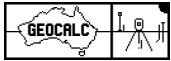
- CLOS** Add Misclose Solution
- 2DIST** Add 2 Missing Distances Solution
- 2BRG** Add 2 Missing Bearings Solution
- 800L** Add Bearing and Distance in Different Lines Solution
- CUT△** Add Cut Area Solution
- EXIT** Exit to CLOSE Module Main Menu page 2

Press the menu key below the menu label, the corresponding solution is added to the end of the current Close Matrix.

The program returns to CLOSE Module Main Menu page 2.

```
USER  PRG
{ HOME GEOCALC SAFE.CL }
Purge Close Matrix?
Press menu key & ENTER
or ENTER for All.
DIP 4
DIP DAT LOT27
```

```
※ ADD CLOSE SOLUTION ※
Add Soln to Matrix
CHOOSE FROM MENU
CLOS 2DIST 2BRG 800L CUT△ EXIT
```



4.9 Bowditch Adjustment

Library command: ~ADJSTM

This option allows you Bowditch adjust the current Close Matrix by two methods. Bowditch adjust on a closed figure or between two fixed coordinated points.

From CLOSE Module Main Menu page 2 press the **ADJST** key.

Closed Figure:

An input prompt will display prompting for the Start Coords, leave blank.

Press the **[ENTER]** key.

The program will calculate and then display the traverse misclose and will HALT prompting to Adjust? Yes/No.

YES Bowditch Adjust the Current Close Matrix

NO Return to CLOSE Module Main Menu page 2

The display will read "Bowditch Adjusting...." when adjusting.

Note: This option will modify the Current Close Matrix with the adjusted sequences.

The program returns to CLOSE Module Main Menu page 2.

Between two fixed coordinated points:

An input prompt will display prompting for the Start Coords.

Type in the Start East. To proceed down to the next level press the **[▼]** key. Type in the Start North. Press the **[ENTER]** key.

An input prompt will display prompting for the End Coords.

Type in the End East. To proceed down to the next level press the **[▼]** key. Type in the End North. Press the **[ENTER]** key.

The program will calculate and then display the traverse misclose and will HALT prompting to Adjust? Yes/No?

YES Bowditch Adjust the Current Close Matrix

NO Return to CLOSE Module Main Menu page 2

The display will read "Bowditch Adjusting...." when adjusting.

Note: This option will modify the Current Close Matrix with the adjusted sequences.

The program returns to CLOSE Module Main Menu page 2.

```
{ HOME GEOCALC }      USER  PRG
Enter Start Coords
or ENTER if none.
:EAST:  ♦
:NRTH:
```

```
*** ADJUST MISCLOSE ***
BRG: 119°36'53"
DIST: 0.032
RATIO:
1mm 1:18387.
10mm 1:26779.
Adjust?
YES NO
```

Bowditch Adjusting....

YES **NO**

```
{ HOME GEOCALC }      USER  PRG
Enter Start Coords
or ENTER if none.
:EAST: 1000
:NRTH: 5000
```

```
{ HOME GEOCALC }      USER  PRG
Enter End Coords

:EAST: 1000.03
:NRTH: 4999.98
```

```
*** ADJUST MISCLOSE ***
BRG: 331°54'35"
DIST: 0.005
RATIO:
1mm 1:122357.
10mm 1:-112750.
Adjust?
YES NO
```

Bowditch Adjusting....

YES **NO**



This option allows you to Calculate Coordinates of the Current Close Matrix.

An input prompt will display prompting for the Start Coords.

The display will read "Generating Coords....." when calculating.

The global variable `CDS` is created. The 'CDS' variable is a matrix, which contains the calculated Coordinates of the Current Close Matrix.

The program then proceeds to the Coord Trav viewing screen.

Note: Point number 0 is the starting coordinate of the traverse.

NEXT View the **next** coordinate of the 'CDS' matrix

PREV View the **previous** coordinate of the 'CDS' matrix

Empty Menu Label

PLOT Plot the 'CDS' matrix: *Refer Section 4.11, Plot the Close Matrix*, page 44.

Empty Menu Label

EXIT Exit to CLOSE Module Main Menu page 2

Coord Matrix Exists:

If the 'CDS' matrix exists then this screen will appear. The 'CDS' matrix may have been created by a previous CTRAV or PLOT operation.

GENR Generate new 'CDS' matrix. with prompt to overwrite previous. Yes/No

Empty Menu Label

VIEW View previous 'CDS' matrix

Empty Menu Label

Empty Menu Label

EXIT Exit to CLOSE Module Main Menu page 2

```

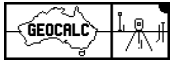
***** COORD TRAV *****1/1
POINT 0
EAST: 1000.000
NRTH: 5000.000
NEXT PREV PLOT EXIT

```

```

COORDINATE TRAVERSE
Coord Matrix
Exists
GEOR      UTEN      EXIT

```



4.11 Plot the Close Matrix

Library command: ~PLOTM

This option allows you plot the Current Close Matrix to the screen.

From CLOSE Module Main Menu page 2 press the **PLOT** key. Or from Coord Trav viewing screen press the **PLOT** key.

The program requires coordinates from the 'CDS' matrix. If the 'CDS' matrix does not exist then the program will automatically create it using a start coordinate of East=0 and North=0.

If the 'CDS' matrix does exist then the program will HALT and prompt to overwrite previous 'CDS' matrix. YES/NO?

YES Automatically create 'CDS' matrix using a start coordinate of East=0 and North=0 and plots to screen. Scale of plot is of best fit.

NO Plots previous 'CDS' matrix to screen.

The display will read "Plotting....." when plotting.

Press the **[ON]** key to exit the Picture Editor Mode and Exit to CLOSE Module Main Menu page 2.

```

*** PLOT THE CLOSE ***
Coords Matrix 'CDS'
Exists [ CTRAV ]

```

```

Overwrite? Y/N
YES

```

```

Plotting.....

```

```

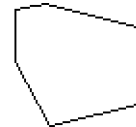
YES

```

```

NO

```



4.12 Close Print Menu

Library command: ~PRINTMENU

This option allows you print Close Module data to a HP 82240A or HP 82240B infrared printer.

Note: The HP49G, HP48GII, HP49G+, HP50G calculators are not able to print to the HP Infrared printers.

From CLOSE Module Main Menu page 2 press the **PRINT** key.

This will display the Close Print Menu.

The Close Print Menu consists of one page:

[HEAD] **PB&D** **Ptrav** **PCORD** **PPlot** **EXIT**

CLOSE Print Menu:

[HEAD] Print a Heading

PB&D Print Current Close Matrix, Bearings and Distances

Ptrav Print Lot No/Name, Time, Date, Bearings and Distances, Misclose, Bowditched Misclose, Ratio and Adjusted Area

PCORD Print 'CDS' Matrix coordinate listing

PPlot Print screen plot

EXIT Exit to CLOSE Module Main Menu page 2

```

*** CLOSE PRINT MENU ***
[HEAD]: Heading
PB&D: Brs & Dists
Ptrav: Traverse Areas
PCORD: Coord Listing
PPlot: Plot
EXIT: CLOSE MODULE 2/2
[HEAD] PB&D Ptrav PCORD PPlot EXIT

```



4.121 Print a Heading

Library command: **|HEAD|**

This option allows you to print a Heading to a HP 82240A or HP 82240B infrared printer.

From Close Print Menu press the **|HEAD|** key.

The program will HALT and prompt to choose a print heading.

Choose Print Heading Menu consists of one page:

TRAV **LOT** **ROAD** **EMT** **LEASE** **SEV**

CHOOSE PRINT
HEADING

TRAV **LOT** **ROAD** **EMT** **LEASE** **SEV**

Choose Print Heading Menu:

- TRAV** Print Traverse Heading
- LOT** Print Lot Heading
- ROAD** Print Road Severance Heading
- EMT** Print Easement Heading
- LEASE** Print Lease Heading
- SEV** Print Severance Heading

Press the menu key below the menu label.

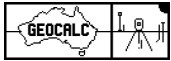
Additional information may be required for each Heading. This will be prompted after the selected key has been pressed:

- TRAV** Traverse Name/Number
- LOT** Lot number, on RP/Plan number
- ROAD** Road Severance Name/Number
- EMT** Easement number, In Lot number, on RP/Plan number
- LEASE** Lease number, In Lot number, on RP/Plan number
- SEV** Severance Name/Number

The Heading will now be printed to the HP infrared printer.

The display will read "Printing....." when printing.

The program returns to Close Print Menu.

**4.122 Print Close Bearings and Distances**

Library command: ~PB&D

This option allows you to print Bearings and Distances of the current Close Matrix to a HP 82240A or HP 82240B infrared printer.

From Close Print Menu press the **PE&D** key.

The program will create a string of the Bearings and Distances and will now be printed to the HP infrared printer.

The display will read "Printing....." when printing.

The program returns to Close Print Menu.

```
BRG1: 74°51'30''
DIST1: 35.805
BRG2: 111°12'00''
DIST2: 112.025
BRG3: 179°59'30''
DIST3: 129.970
BRG4: 250°42'20''
DIST4: 105.945
BRG5: 339°59'20''
DIST5: 114.050
BRG6: 0°01'00''
DIST6: 88.955
```

4.123 Print Close Traverse Details and Areas

Library command: ~PTRAV

This option allows you to print Traverse Details and Areas of the current Close Matrix to a HP 82240A or HP 82240B infrared printer.

From Close Print Menu press the **PTRAV** key.

An input prompt will display prompting for Job Name, Job Number, and Lot Number. Type in the information. To proceed down to the next level press the **▼** key. Press the **[ENTER]** key.

The program will HALT prompting for RP or Plan. Make a selection by pressing the corresponding menu key. An input prompt will display prompting for RP/Plan number. Type in the information. Press the **[ENTER]** key.

The program will create a string containing Job Name, Job Number, Lot Number, RP/Plan Number, Date, Time, Unadjusted Bearings and Distances, Misclose and Ratio, Bowditch adjustment Misclose and Ratio and Adjusted Area and will now be printed to the HP infrared printer.

The display will read "Printing....." when printing.

The program returns to Close Print Menu.

```
=====
:Job Name: ELGAR
:Job No.: 3100
:Lot No.: 257
On: RP 898734
Printed
on: 1-11-1999
at: 12:10:20pm

UNADJUSTED B&D'S
BRG1: 74°51'30''
DIST1: 35.805
BRG2: 111°12'00''
DIST2: 112.025
BRG3: 179°59'30''
DIST3: 129.970
BRG4: 250°42'20''
DIST4: 105.945
BRG5: 339°59'20''
DIST5: 114.050
BRG6: 0°01'00''
DIST6: 88.955

MISCLOSE
BRG: 119°36'53''
DIST: 0.032
RATIO:
1mm 1:18387.
10mm 1:26779.

BOWDITCH
BRG: 268°52'04''
DIST: 5.061E-10
RATIO:
1mm 1:1.E12
10mm 1:-58675.
ADJUSTED
AREA: 22447.080
=====

COORDINATE TRAVERSE

START
POINT 0
EAST: 1000.000
NRTH: 5000.000
-----
POINT 1
EAST: 1034.562
NRTH: 5009.353
-----
POINT 2
EAST: 1132.806
NRTH: 4968.842
-----
POINT 3
EAST: 1132.024
NRTH: 4838.872
-----
POINT 4
EAST: 1032.820
NRTH: 4802.625
-----
POINT 5
EAST: 1000.002
NRTH: 4911.029
-----
END
POINT 6
EAST: 1000.028
NRTH: 4999.984
=====
```

4.124 Print Coordinate Listing

Library command: ~PCORD

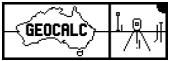
This option allows you to print the 'CDS' Matrix coordinate listing to a HP 82240A or HP 82240B infrared printer.

From Close Print Menu press the **PCORD** key.

The program will create a string of coordinates from the 'CDS' Matrix and will now be printed to the HP infrared printer.

The display will read "Printing....." when printing.

The program returns to Close Print Menu.



4.125 Print the Plot

Library command: ~PLOT

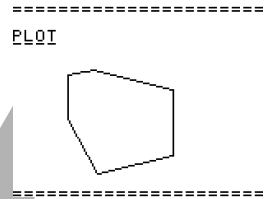
This option allows you to print a screen plot to a HP 82240A or HP 82240B infrared printer.

From Close Print Menu press the **PLOT** key.

The program uses the **PLOTM** library command and will now be printed to the HP infrared printer.

The display will read "Printing....." when printing.

The program returns to Close Print Menu.





SAMPLE



5. COORD MODULE

The COORD Module is a collection of engineering orientated programs commonly used by most Engineering surveyors.

5.1 COORD MODULE MAIN MENU

From the GEOCALC Main Menu press the **COORD** key. This will display the COORD Module Main Menu page 1.

The COORD Module consists of two pages:

Page 1: **TOOLS PT? ▢÷▢ ▢÷? ▢▢?▢▢ ▢?▢**

Library command:
~COORDMENU

Page 2: **REF.L |→▢| M→PT C→HP T→PT EXIT**

Library command:
~COMM2

COORD Module Main Menu page 1:

- TOOLS** Coordinate Tools Menu
- PT?** Coordinate Input
- ▢÷▢** Calculate Bearing and Distance between Two Fixed Coordinates
- ▢÷?** Calculate New Coordinates from Fixed Point with Bearing and Distance
- ▢▢?▢▢** Calculate Coordinates from Intersection of Two Lines
- ▢?▢** Calculate Coordinates on Line between Two Fixed Points

COORD Module Main Menu page 2:

- REF.L** Reference Line Calculations
- |→▢|** Setout Distance Mode
- M→PT** Convert CLOSE Module 'CDS' Matrix to COORD Module Points
- C→HP** Transfer a TXT file from a PC to the HP48 or HP49
- T→PT** Convert a TXT file to COORD Module Points
- EXIT** Exit to GEOCALC Main Menu

```

##### COORD MODULE #1/2
TOOLS: Coord Tools
PT?: Coord Input
▢÷: Calc B&D
▢÷?: Calc EN2
▢▢?: Line Intersect
▢?: Calc E&N on Line
TOOLS PT? ▢÷▢ ▢÷? ▢▢?▢▢ ▢?▢

```

```

##### COORD MODULE #2/2
REF.L: Reference Line
|→: Setout Mode
M→PT: CDS Matrix→Pts
C→HP48: TXT Transfer
T→PT: Convert TXT→PTS
EXIT: MAIN MENU
REF.L |→▢| M→PT C→HP T→PT EXIT

```



5.2 COORD TOOLS MENU

Library command: ~TOOLS

This option allows you to manage your Coordinate data using Job and File sub-directories.

From COORD Module Main Menu page 1 press the **TOOLS** key.

This will display the Coord Tools option screen.

Coord Tools Menu consists of one page:

JOB **FILE** **DATA** **EXIT**

Coord Tools Menu:

- JOB** Job Tools Menu
- FILE** File Tools Menu
- DATA** Data Tools Menu
- Empty Menu Label
- Empty Menu Label
- EXIT** Exit to COORD Module Main Menu page 1

```
*** COORD TOOLS ***1/1
JOB: Job Tools
FILE: File Tools
DATA: Data Tools

EXIT: COORD MODULE 1/1
JOB FILE DATA EXIT
```

5.21 JOB TOOLS MENU

Library command: ~JOBTOOLS

This option allows you to manage your Job Coordinate subdirectories.

From Coord Tools Menu press the **JOB** key.

This will display the Job Tools option screen.

Job Tools Menu consists of one page:

JOB **INFO** **ERASE** **DPOSE** **EXIT**

Job Tools Menu:

- JOB** Change Job Name or Number
- INFO** Display Job Information
- ERASE** Erase a Job
- DPOSE** Dispose a Job
- Empty Menu Label
- EXIT** Exit to Coord Tools option screen.

```
*** JOB TOOLS ***1/1
JOB: Change Name/No.
INFO: Job Info
ERASE: Erase Job
DPOSE: Dispose Job

EXIT: COORD TOOLS 1/1
JOB INFO ERASE DPOSE EXIT
```

5.211 Change Job Name/Number

Library command: ~CJOB

This option allows you to change your current coordinate Job Name or Number.

From Job Tools Menu press the **JOE** key.

An input prompt will display prompting to Create/Change the Job Name/Number. Type in the Name/Number. If the Name/Number exists you can place the Name/Number in the input prompt by pressing the menu key under the corresponding menu label.

To move to the next page, press the **[NXT]** key.

To move to the previous page, press the **[←] [PREV]** keys.

Press the **[ENTER]** key.

If the Name/Number does not exist then the program will prompt to create? YES/NO.

Note: Numerical Job names will be assigned the character 'A' to the start of the name.
E.g. 'A' 5100 **Numerical/Alpha names will not be accepted.**
 i.e. 5100A

The program returns to Job Tools Menu.

5.212 Job Information

Library command: ~JINF

This option allows you to display the current job information.

From Job Tools Menu press the **INFO** key.

The program uses the current Job Name/Number. This is stored in the **|CRDS|** directory in the variable 'JOBNO'.

The program will display the current Job Name/Number, the amount of memory used and the number of files.

5.213 Erase a Job

Library command: ~JERA

This option allows you to erase a Job.

From Job Tools Menu press the **ERASE** key.

An input prompt will display prompting to Erase Job. Type in the Name/Number. You can place the Name/Number in the input prompt by pressing the menu key under the corresponding menu label.

To move to the next page, press the **[NXT]** key.

To move to the previous page, press **[←] [PREV]** keys.

Press the **[ENTER]** key.

The display will read “Erasing Job:
Name/Number” when erasing.

This will erase the selected Job contents and will retain the Job directory.

The program returns to Job Tools Menu.

Registered To: SAMPLE

User No: SAMPLE

```

PRG
[ HOME GEDCALC ICADSI ]
Create/Change Job
Enter Job Name/No.
:JOB: '5100
'4522'5100 JOB
Job: '5100
Doesn't Exist!
Create?
YES NO

```

```

***** JOB INFO *****
JOB:  '5100
BYTES: 16
FILES: 0
JOB INFO ERASE DPOSE EXIT

```

```

{ HOME GEDCALC ICRDSI }
Erase Job
Enter Job
:JOB: '5100
4522 5100 J08N

```



5.214 Dispose a Job

Library command: ~JDPOSE

This option allows you to dispose a Job.

From Job Tools Menu press the **DPOSE** key.

An input prompt will display prompting to Dispose Job. Type in the Name/Number. You can place the Name/Number in the input prompt by pressing the menu key under the corresponding menu label.

To move to the next page, press the **[NXT]** key.

To move to the previous page, press the **[←] [PREV]** keys.

Press the **[ENTER]** key.

The display will read "Disposing Job:
Name/Number" when erasing.

This will delete the selected Job contents and the Job directory.

The program returns to Job Tools Menu.

```
PRG
{ HOME GEOCALC ICADSI }
Dispose Job
Enter Job
:JOB: '5100
'4522'5100'008N'
```

5.22 FILE TOOLS MENU

Library command: ~FILETOOLS

This option allows you to manage your File Coordinate subdirectories.

From Coord Tools Menu press the **FILE** key.

This will display the File Tools option screen.

File Tools Menu consists of one page:

FILE INFO ERASE DPOSE PFILE EXIT

Job Tools Menu:

- FILE** Change File Name or Number
- INFO** Display File Information
- ERASE** Erase a File
- DPOSE** Dispose a File
- PFILE** Print a File
- EXIT** Exit to Coord Tools option screen.

```
*** FILE TOOLS ***1/1
FILE: Change Name/No.
INFO: File Info
ERASE: Erase File
DPOSE: Dispose File
PFILE: Print File
EXIT: COORD TOOLS 1/1
FILE INFO ERASE DPOSE PFILE EXIT
```



5.221 Change File Name/Number

Library command: ~FCHG

This option allows you to change your current coordinate File Name or Number.

From File Tools Menu press the **FILE** key.

An input prompt will display prompting to Create/Change the File Name/Number. Type in the Name/Number. If the Name/Number exists you can place the Name/Number in the input prompt by pressing the menu key under the corresponding menu label.

To move to the next page, press the **[NXT]** key.

To move to the previous page, press **[←] [PREV]** keys.

Press the **[ENTER]** key.

If the Name/Number does not exist then the program will prompt to create? YES/NO.

Note: Numerical File names will be assigned the character **▣** to the start of the name.
E.g. **▣1234** **Numerical/Alpha names will not be accepted. i.e. 1234A**

The program returns to File Tools Menu.

5.222 File Information

Library command: ~FINF

This option allows you to display the current file information.

From File Tools Menu press the **INFO** key.

The program uses the current File Name/Number. This is stored in the **[CRDS]** directory in the current Job directory in the variable **'FILENO'**.

The program will display the current File Name/Number, the amount of memory used and the number of points stored.

5.223 Erase a File

Library command: ~FERA

This option allows you to erase a File.

From File Tools Menu press the **ERASE** key.

An input prompt will display prompting to Erase File. Type in the Name/Number. You can place the Name/Number in the input prompt by pressing the menu key under the corresponding menu label.

To move to the next page, press the **[NXT]** key.

To move to the previous page, press the **[←] [PREV]** keys

Press the **[ENTER]** key.

The display will read "Erasing File:
Name/Number" when erasing.

This will erase the selected File contents and will retain the File directory.

The program returns to File Tools Menu.

Registered To: **SAMPLE**

User No: **SAMPLE**

```
PRG
{ HOME GEOCALC [CRDS] 'S100 }
Create/Change File
Confirm File
:FILE: CONTROL
PRGM CONT 1234 FILE LAST
```

```
File: '1234
Doesn't Exist!
```

```
Create?
YES 00
```

```
***** FILE INFO *****
FILE: CONTROL
BYTES: 18
PTS: 0
FILE INFO ERASE DPOSE FILE EXIT
```

```
PRG
{ HOME GEOCALC [CRDS] 'S100 }
Erase File
Enter File
:FILE: '1234
CONT 1234 FILE LAST
```


**5.224 Dispose a File**

Library command: ~FDPOSE

This option allows you to dispose a File.

From File Tools Menu press the **FDPOSE** key.

An input prompt will display prompting to Dispose File. Type in the Name/Number. You can place the Name/Number in the input prompt by pressing the menu key under the corresponding menu label.

To move to the next page, press the **[NXT]** key.

To move to the previous page, press the **[←] [PREV]** keys.

Press the **[ENTER]** key.

The display will read "Disposing File:
Name/Number" when erasing.

This will delete the selected File contents and the File directory.

The program returns to File Tools Menu.

```

      HOME GEOCALC ICADSI '5100 } PRG
Dispose File
Enter File
:FILE: '1234
CONT '1234 FILEN LAST

```

5.225 Print a File

Library command: ~PFILE

This option allows you to print a coordinate File to a HP 82240A or HP 82240B infrared printer.

From File Tools Menu press the **PFILE** key.

An input prompt will display prompting to Print File. Type in the Name/Number. You can place the Name/Number in the input prompt by pressing the menu key under the corresponding menu label.

To move to the next page, press the **[NXT]** key.

To move to the previous page, press the **[←] [PREV]** keys.

Press the **[ENTER]** key.

The program will create a string containing COORD LISTING title, current Job Name/Number, File Name/Number, File directory listing and will now be printed to the HP infrared printer.

The display will read "Printing....." when printing.

The program returns to File Tools Menu.

```

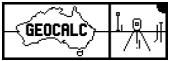
      HOME GEOCALC ICADSI '5100 } PRG
Print File
Choose File to Print
:FILE: '1234
CONT '1234 FILEN LAST

```

```

=====
COORD LISTING
:JOB: '5100
:FILE: '1234
DIR
[ 4999.984 1000.028 ]
[ 4911.029 1000.002 ]
[ 4903.865 1039.030 ]
[ 4838.872 1139.024 ]
[ 4968.842 1139.006 ]
[ 5009.353 1034.562 ]
[ 5000.000 1000.000 ]
END
=====

```



5.23 DATA TOOLS MENU

Library command: ~DATATOOLS

This option allows you to manage your Coordinate File data.

From Coord Tools Menu page 1 press the **DATA** key.

This will display the Data Tools option screen.

Data Tools Menu consists of one page:

READ **VIEW** **DEL** **EXIT**

Data Tools Menu:

READ Read coordinate
VIEW View coordinate directory
DEL Delete coordinate
Empty Menu Label
Empty Menu Label
EXIT Exit to Coord Tools option screen

5.231 Read Coordinate

Library command: ~DATAREAD

This option allows you to read a coordinate from the current coordinate file.

From Data Tools Menu press the **READ** key.

An input prompt will display prompting to Confirm File. The current file Name/Number will automatically be displayed in the input prompt. To choose a different file you can place the Name/Number in the input prompt by pressing the menu key under the corresponding menu label.

To move to the next page, press the **[NXT]** key.

To move to the previous page, press the **[←] [PREV]** keys.

Press the **[ENTER]** key.

An input prompt will display prompting to Read Point. Place the Name/Number in the input prompt by pressing the menu key under the corresponding menu label.

To move to the next page, press the **[NXT]** key.

To move to the previous page, press the **[←] [PREV]** keys.

Press the **[ENTER]** key.

The program will display the coordinates of the selected point on the screen and copy the coordinates to the stack.

```
DATA TOOLS 1/1
READ: Read Coord
VIEW: View Coord Dir
DEL: Delete Coord
```

```
EXIT: COORD TOOLS 1/1
READ VIEW DEL EXIT
```

```
{ HOME GEOCALC ICROSSI '5100 } PRG
Read Point
Confirm File
:FILE: '1234
CONT '1234'FILEN LAST
```

```
HOME GEOCALC ICROSSI '5100 '1234 } PRG
Read Point?
```

```
16
16 15 14 13 12 11
```

```
16
EAST: 1000.028
NRTH: 4999.984
```

```
←E01 ←E02 ←E03 ←E04 READ EXIT
```

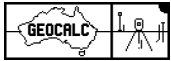
Hint:

To type in the number in a large file:

Type in any number on the menu.

Press the **[←]** key to delete the unwanted numbers keeping the first character

Type in your desired number.



Read coordinate Menu consists of one page:

→E1 **→E2** **→E3** **→E4** **READ** **EXIT**

Read coordinate Menu:

→E1 Store coordinate to E1 and N1 variables

→E2 Store coordinate to E2 and N2 variables

→E3 Store coordinate to E3 and N3 variables

→E4 Store coordinate to E4 and N4 variables

READ Read coordinate program

EXIT Exit to previous menu

5.232 View Coordinate File

Library command: ~DATAVIEW

This option allows you to view the current coordinate file.

From Data Tools Menu press the **VIEW** key.

This will access the current coordinate file.

Press the **[←]** **[CONT]** keys to return to Data Tools Menu.

Press [CONT] to
return to menu

4:
3:
2:
1:

■16 ■15 ■14 ■13 ■12 ■11

5.233 Delete Coordinate

Library command: ~DEL

This option allows you to delete one or all points from the current coordinate file.

From Data Tools Menu press the **DEL** key.

An input prompt will display prompting to "Purge which Pt? or ENTER for All." You can place the point name in the input prompt by pressing the menu key under the corresponding menu label.

To move to the next page, press the **[NXT]** key.

To move to the previous page, press the **[←]** **[PREV]** keys.

Press the **[ENTER]** key.

This will delete the point from current coordinate file.

To delete all coordinates, leave the input prompt blank and press the **[ENTER]** key.

The program returns to Data Tools Menu.

...DME GEBCALC ICROSSI '5100 '1234 } PRG
Purge which Pt?
or ENTER for All.

■14

■16 ■15 ■14 ■13 ■12 ■11



5.3 Coordinate Input

Library command: ~PT?

This option allows you to manually enter and store coordinates.

From COORD Module Main Menu page 1 press the **PT?** key.

If a Job does not exist then an input prompt will display prompting to Create/Change the Job Name/Number. Type in the Name/Number.

Press the **[ENTER]** key.

The program will prompt to create? YES/NO.

An input prompt will display prompting for Point Number, Easting, Northing and File Name/Number. The cursor used is in *Replace* mode. Scroll through the command line using the **[▲]** **[▶]** **[▼]** **[◀]** keys. Type in the data and press the **[ENTER]** key.

If the File Name/Number does not exist then the program will prompt to create? YES/NO.

The point is now created and stored in the selected File.

The program will now start the coordinate input sequence again.

To exit coordinate input press the **[ENTER]** key with a blank entry.

The program returns to COORD Module Main Menu page 1.

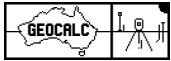
```
PRG
{ HOME GEOCALC ICROSI }
Create/Change Job
Enter Job Name/No.
:JOB: '5100'
'4522' '5100' JOB#

...HOME GEOCALC ICROSI '5100' '1234'
:No.?: N1
:EAST: 0123.456
:NRTH: 0789.012
:FILE: '1234'
#16 #15 #14 #13 #12 #11

File: '1234'

Doesn't Exist!

Create?
YES NO
```



5.4 Calculate Bearing and Distance between Two Fixed Coordinates

Library command: **■→■**

This option allows you to calculate the Bearing and Distance between Two Fixed Coordinates.

From COORD Module Main Menu page 1 press the **■→■** key.

The screen will display the currently stored coordinate data:

EAST 1 displays the contents of the 'E1' variable.
NRTH 1 displays the contents of the 'N1' variable.
EAST 2 displays the contents of the 'E2' variable.
NRTH 2 displays the contents of the 'N2' variable.

■→■ Menu consists of two pages:

Page 1: **E1** **N1** **E2** **N2** **READ** **CALC**

Page 2: **EXIT**

■→■ Menu page 1:

- E1** Store number in level 1 of the stack to the variable 'E1'
- N1** Store number in level 1 of the stack to the variable 'N1'
- E2** Store number in level 1 of the stack to the variable 'E2'
- N2** Store number in level 1 of the stack to the variable 'N2'
- READ** Read coordinate program
- CALC** Calculate Bearing and Distance

■→■ Menu page 2:

- Empty Menu Label
- Empty Menu Label
- Empty Menu Label
- Empty Menu Label
- Empty Menu Label

EXIT Exit to COORD Module Main Menu page 1

Registered To: **SAMPLE**

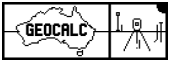
```
***** ■→■ B&D? ***1/2
EAST 1: 1000.000
NRTH 1: 5000.000

EAST 2: 1034.562
NRTH 2: 5009.353
E1 N1 E2 N2 READ CALC

***** ■→■ B&D? ***2/2
EAST 1: 1000.000
NRTH 1: 5000.000

EAST 2: 1034.562
NRTH 2: 5009.353
EXIT
```

User No: **SAMPLE**



Enter in the coordinates of the two fixed points.

Type in the Easting of point 1 and press the **E1** key.

Type in the Northing of point 1 and press the **N1** key.

Type in the Easting of point 2 and press the **E2** key.

Type in the Northing of point 2 and press the **N2** key.

Note: To recall the previous Easting of point 1 press the **[←]** **E1** keys.

To recall the previous Northing of point 1 press the **[←]** **N1** keys.

To recall the previous Easting of point 2 press the **[←]** **E2** keys.

To recall the previous Northing of point 2 press the **[←]** **N2** keys.

To use a saved coordinate, press the **READ** key.

Refer Section 5.231, **Read Coordinate**, page 55.

To calculate the Bearing and Distance press the **CALC** key.

The display will read "Calcing....." when calculating.

The calculated Bearing and Distance will be displayed and also copied to the stack.

■→■ Calc Menu:

[←→]

■→■ EXIT

[←→]

Refer Section 5.9, **Setout Distance Mode**, page 70.

Empty Menu Label

Empty Menu Label

Empty Menu Label

■→■

■→■ Program

EXIT

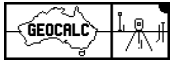
Exit to COORD Module Main Menu page 1

Calcing.....

```

HMS HMS HMS HMS REVB M
=====
B&D?
BRG: 74°51'29''
DIST: 35.805
=====
[←→] [→←] EXIT

```



5.5 Calculate New Coordinates from

Library command: **■→?**

This option allows you to calculate a new coordinate from a fixed point with Bearing and Distance.

From COORD Module Main Menu page 1 press the **■→?** key.

The screen will display the currently stored coordinate data:

EAST 1 displays the contents of the 'E1' variable.
NRTH 1 displays the contents of the 'N1' variable.
BRG displays the contents of the 'b' variable.
DIST displays the contents of the 'd' variable.

■→? Menu consists of two pages:

Page 1: **E1** **N1** **BRG** **DIST** **READ** **CALC**

Page 2: **EXIT**

■→? Menu page 1:

- E1** Store number in level 1 of the stack to the variable 'E1'
- N1** Store number in level 1 of the stack to the variable 'N1'
- BRG** Store number in level 1 of the stack to the variable 'b'
- DIST** Store number in level 1 of the stack to the variable 'd'
- READ** Read coordinate program
- CALC** Calculate East 2 and North 2

■→? Menu page 2:

Empty Menu Label

Empty Menu Label

Empty Menu Label

Empty Menu Label

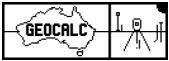
Empty Menu Label

EXIT Exit to COORD Module Main Menu page 1

```
***** ■→? ■ EN2? ***1/2
EAST 1: 1000.000
NRTH 1: 5000.000
BRG: 74°51'30''
DIST: 35.805
E1 N1 BRG DIST READ CALC

***** ■→? ■ EN2? ***2/2
EAST 1: 1000.000
NRTH 1: 5000.000
BRG: 74°51'30''
DIST: 35.805
EXIT
```

Enter in the
coordinates of the
fixed point.



Type in the Easting and press the **E1** key.

Type in the Northing and press the **N1** key.

Note: To recall the previous Easting press the **[←]** **E1** keys.

To recall the previous Northing press the **[←]** **N1** keys.

To use a saved coordinate, press the **READ** key.

Refer Section 5.231, **Read Coordinate**, page 55.

Enter in the Bearing and Distance from the fixed point.

Type in the Bearing and press the **BRG** key.

Type in the Distance and press the **DIST** key.

Note: To recall the previous Bearing press the **[←]** **BRG** keys.

To recall the previous Distance press the **[←]** **DIST** keys.

To calculate the new Easting and Northing press the **CALC** key.

The display will read "Calcing....." when calculating.

The calculated Easting and Northing will be displayed and also copied to the stack.

■ → ? Calc Menu:

STD **→EN1** **↵EN** **EXIT**

STD Store Point

→EN1 Copy 'E2' to 'E1' variable. Copy 'N2' to 'N1' variable.

↵EN Store Point. Copy 'E2' to 'E1' variable. Copy 'N2' to 'N1' variable.

Empty Menu Label

Empty Menu Label

EXIT Exit to COORD Module Main Menu page 1

Calcing.....

```

HMS HMS HMS HMS REVB →M
=====
      *→? EN2? =====
      EAST2: 1034.562
      NRTH2: 5009.353
      =====
      STD →EN1 ↵EN EXIT
      PRG
      { HOME GEOCALC ICROSI '5100 }
      Store Point
      Confirm File
      :FILE: '1234
      CONT '1234 FILE LAST
      PRG
      ...HOME GEOCALC ICROSI '5100 '1234 }
      Save as Point No.?

      :No.?: 17
      16 15 14 13 12 11
```




5.6 Calculate Coordinates from Intersection of Two Lines

Library command: ■ ■ ? ■ ■ ■

This option allows you to calculate a new coordinate from the intersection of two straight lines by four fixed coordinates.

From COORD Module Main Menu page 1 press the ■ ■ ? ■ ■ ■ key.

Screen 1 will display the currently stored coordinate data:

EAST 1 displays the contents of the 'E1' variable.
NRTH 1 displays the contents of the 'N1' variable.
EAST 2 displays the contents of the 'E2' variable.
NRTH 2 displays the contents of the 'N2' variable.

Screen 2 will display the currently stored coordinate data:

EAST 3 displays the contents of the 'E3' variable.
NRTH 3 displays the contents of the 'N3' variable.
EAST 4 displays the contents of the 'E4' variable.
NRTH 4 displays the contents of the 'N4' variable.

■ ■ ? ■ ■ ■ Menu consists of two pages:

Page 1: **E1** **N1** **E2** **N2** **READ** **EXIT**

Page 2: **E3** **N3** **E4** **N4** **READ** **CALC**

■ ■ ? ■ ■ ■ Menu page 1:

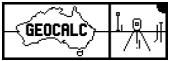
- E1** Store number in level 1 of the stack to the variable 'E1'
- N1** Store number in level 1 of the stack to the variable 'N1'
- E2** Store number in level 1 of the stack to the variable 'E2'
- N2** Store number in level 1 of the stack to the variable 'N2'
- READ** Read coordinate program
- EXIT** Exit to COORD Module Main Menu page 1

```
※ LINE INTERSECT ※1/2
EAST 1: 1000.000
NRTH 1: 5000.000
```

```
EAST 2: 1034.562
NRTH 2: 5009.353
E1 N1 E2 N2 READ EXIT
```

```
※ LINE INTERSECT ※2/2
EAST 3: 999.469
NRTH 3: 5015.560
```

```
EAST 4: 1027.835
NRTH 4: 4986.857
E3 N3 E4 N4 READ CALC
```



■ ■ ? ■ ■ Menu page 2:

- E3** Store number in level 1 of the stack to the variable 'E3'
- N3** Store number in level 1 of the stack to the variable 'N3'
- E4** Store number in level 1 of the stack to the variable 'E4'
- N4** Store number in level 1 of the stack to the variable 'N4'
- READ** Read coordinate program
- CALC** Calculate new Easting and Northing

Enter in the coordinates of the four fixed points.

Type in the Easting of point 1 and press the **E1** key.

Type in the Northing of point 1 and press the **N1** key.

Type in the Easting of point 2 and press the **E2** key.

Type in the Northing of point 2 and press the **N2** key.

Note: To recall the previous Easting of point 1 press the **[↵]** **E1** keys.

To recall the previous Northing of point 1 press the **[↵]** **N1** keys.

To recall the previous Easting of point 2 press the **[↵]** **E2** keys.

To recall the previous Northing of point 2 press the **[↵]** **N2** keys.

To use a saved coordinate, press the **READ** key.

Refer Section 5.231, **Read Coordinate**, page 55.

To move to the next page, press the **[NXT]** key.

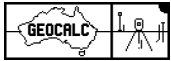
To move to the previous page, press **[↵]** **[PREV]** keys.

Type in the Easting of point 3 and press the **E3** key.

Type in the Northing of point 3 and press the **N3** key.

Type in the Easting of point 4 and press the **E4** key.

Type in the Northing of point 4 and press the **N4** key.



Note: To recall the previous Easting of point 3 press the **[↵]** keys. **E3**

To recall the previous Northing of point 3 press the **[↵]** **N3** keys.

To recall the previous Easting of point 4 press the **[↵]** **E4** keys.

To recall the previous Northing of point 4 press the **[↵]** **N4** keys.

To use a saved coordinate, press the **READ** key.

Refer Section 5.231, **Read Coordinate**, page 55.

To calculate the new Easting and Northing press the **CALC** key.

The display will read "Calcing....." when calculating.

The calculated Easting and Northing will be displayed and also copied to the stack.

■ ■ ? ■ ■ Calc Menu:

STO **→E1** **S&EN**

EXIT

STO Store Point

→E1 Copy 'E2' to 'E1' variable. Copy 'N2' to 'N1' variable.

S&EN Store Point. Copy 'E2' to 'E1' variable. Copy 'N2' to 'N1' variable.

Empty Menu Label

Empty Menu Label

EXIT Exit to COORD Module Main Menu page 1

Calcing.....

►HMS HMS► HMS* HMS- REVE ►M

*** LINE INTERSECT ***

EAST: 1011.714

NRTH: 5003.170

STO →E1 S&EN EXIT

{ HOME GEOCALC ICROSI '5100 } PRG

Store Point

Confirm File

:FILE: '1234

CONT '1234 FILE LAST

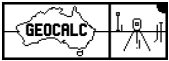
USER PRG

HOME GEOCALC ICROSI '5100 '1234 }

Save as Point No.?

:No.?: 17

16 15 14 13 12 11



5.7 Calculate Coordinates on Line between Two Fixed Points

Library command: **■?■1**

This option allows you to calculate a new coordinate on a line between Two Fixed Coordinates.

From COORD Module Main Menu page 1 press the **■?■** key.

The screen will display the currently stored coordinate data:

EAST 1 displays the contents of the 'E1' variable.
NRTH 1 displays the contents of the 'N1' variable.
EAST 2 displays the contents of the 'E2' variable.
NRTH 2 displays the contents of the 'N2' variable.
DIST displays the contents of the 'd' variable

■?■1 Menu consists of two pages:

Page 1: **E1** **N1** **E2** **N2** **DIST** **CALC**

Page 2: **READ** **EXIT**

■?■1 Menu page 1:

- E1** Store number in level 1 of the stack to the variable 'E1'
- N1** Store number in level 1 of the stack to the variable 'N1'
- E2** Store number in level 1 of the stack to the variable 'E2'
- N2** Store number in level 1 of the stack to the variable 'N2'
- DIST** Store number in level 1 of the stack to the variable 'd'
- CALC** Calculate new Easting and Northing

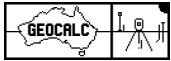
■?■1 Menu page 2:

- READ** Read coordinate program
- Empty Menu Label
- Empty Menu Label
- Empty Menu Label
- Empty Menu Label

EXIT Exit to COORD Module Main Menu page 1

```
### E&N ON LINE ###1/2
EAST 1: 1000.000
NRTH 1: 5000.000
EAST 2: 1034.562
NRTH 2: 5009.353
DIST: 12.135
E1 N1 E2 N2 DIST CALC
```

```
### E&N ON LINE ###2/2
EAST 1: 1000.000
NRTH 1: 5000.000
EAST 2: 1034.562
NRTH 2: 5009.353
DIST: 12.135
READ EXIT
```



Enter in the coordinates of the two fixed points and Distance from Point 1.

Type in the Easting of point 1 and press the **E1** key.

Type in the Northing of point 1 and press the **N1** key.

Type in the Easting of point 2 and press the **E2** key.

Type in the Northing of point 2 and press the **N2** key.

Type in the Distance from point 1 and press the **DIST** key.

Note: To recall the previous Easting of point 1 press the **[←]** **E1** keys.

To recall the previous Northing of point 1 press the **[←]** **N1** keys.

To recall the previous Easting of point 2 press the **[←]** **E2** keys.

To recall the previous Northing of point 2 press the **[←]** **N2** keys.

To recall the previous Distance press the **[←]** **DIST** keys.

To use a saved coordinate, press the **READ** key.

Refer Section 5.231, **Read Coordinate**, page 55.

To calculate the new Easting and Northing press the **CALC** key.

The display will read "Calcing....." when calculating.

The calculated Easting and Northing will be displayed and also copied to the stack.

■ ? ■ 1 Calc Menu:

STO· **→E1** **←E1** **EXIT**

STO· Store Point

→E1 Copy 'E2' to 'E1' variable. Copy 'N2' to 'N1' variable.

←E1 Store Point. Copy 'E2' to 'E1' variable. Copy 'N2' to 'N1' variable.

Empty Menu Label

Empty Menu Label

EXIT Exit to COORD Module Main Menu page 1

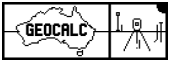
Calcing.....

```

>HMS HMS> HMS+ HMS- REVE >M
===== E&N ON LINE =====
EAST: 1011.714
NORTH: 5003.170
=====
STO· →E1 ←E1 EXIT
PRG
{ HOME GEOCALC ICROSI '5100 ' }
Store Point
Confirm File
:FILE: 1234
CONT 2224 FILEN LAST

USER PRG
HOME GEOCALC ICROSI '5100 '1234 '
Save as Point No.?

:No.?: 17
16 15 14 13 12 11
```



5.8 Reference Line

Library command: **~REF.L**

This option allows you to perform Reference line calculations using a radiated bearing and distance from a station coordinate to a known line. Calculate the chainage and offset from point 1 of the line and/or the distance to the line from the station coordinate.

From COORD Module Main Menu page 2 press the **REF.L** key.

The screen will display the currently stored coordinate data:

EAST 1 displays the contents of the 'E1' variable.
NRTH 1 displays the contents of the 'N1' variable.
BRG displays the contents of the 'b' variable.
DIST displays the contents of the 'd' variable.

REF.L Menu consists of two pages:

Page 1: **E1 N1 BRG DIST READ CALC**

Page 2: **E3 N3 E4 N4 READ EXIT**

REF.L Menu page 1:

- E1** Store number in level 1 of the stack to the variable 'E1'
- N1** Store number in level 1 of the stack to the variable 'N1'
- BRG** Store number in level 1 of the stack to the variable 'b'
- DIST** Store number in level 1 of the stack to the variable 'd'
- READ** Read coordinate program
- CALC** Reference Line Calculation

REF.L Menu page 2:

- E3** Store number in level 1 of the stack to the variable 'E3'
- N3** Store number in level 1 of the stack to the variable 'N3'
- E4** Store number in level 1 of the stack to the variable 'E4'
- N4** Store number in level 1 of the stack to the variable 'N4'
- READ** Read coordinate program
- EXIT** Exit to COORD Module Main Menu page 1

```
※ REFERENCE LINE ※1/2
EAST 1: 1000.000
NRTH 1: 5000.000
BRG: 74°51'30''
DIST: 10.000
E1 N1 BRG DIST READ CALC

※ REFERENCE LINE ※2/2
EAST 3: 999.469
NRTH 3: 5015.560
EAST 4: 1027.835
NRTH 4: 4986.857
E3 N3 E4 N4 READ EXIT
```



Enter in the station coordinate.

Type in the Easting and press the **E1** key.

Type in the Northing and press the **N1** key.

Note: To recall the previous Easting press the **[↵]** **E1** keys.

To recall the previous Northing press the **[↵]** **N1** keys.

To use a saved coordinate, press the **READ** key.

Refer Section 5.231, **Read Coordinate**, page 55.

Enter in the Bearing and Distance from the fixed point.

Type in the Bearing and press the **BRG** key.

Type in the Distance and press the **DIST** key.

Note: To recall the previous Bearing press the **[↵]** **BRG** keys.

To recall the previous Distance press the **[↵]** **DIST** keys.

To move to the next page, press the **[NXT]** key.

To move to the previous page, press the **[↵]** **[PREV]** keys.

Enter in the coordinates of the Line.

Type in the Easting of point 3 and press the **E3** key.

Type in the Northing of point 3 and press the **N3** key.

Type in the Easting of point 4 and press the **E4** key.

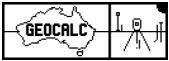
Type in the Northing of point 4 and press the **N4** key.

Note: To recall the previous Easting of point 3 press the **[↵]** **E3** keys.

To recall the previous Northing of point 3 press the **[↵]** **N3** keys.

To recall the previous Easting of point 4 press the **[↵]** **E4** keys.

To recall the previous Northing of point 4 press the **[↵]** **N4** keys.



To use a saved coordinate, press the **READ** key.
Refer Section 5.231, **Read Coordinate**, page 55.

To perform the Reference Line calculations press the **CALC** key.

The display will read "Calcing....." when calculating.

The calculations will be displayed on the screen.

REF.L Calc Menu:

CONT

EXIT

CONT

Continue back to Reference Line

Empty Menu Label

Empty Menu Label

Empty Menu Label

Empty Menu Label

EXIT

Exit to COORD Module Main Menu page 2

Calcing.....

→HMS HMS→ HMS→ HMS← REVB →M

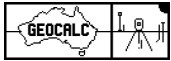
```

*** REFERENCE LINE ***
LINE: BRG 135°20'18"
      DIST 40.355
POINT: CH 16.368
       o/s 1.858 R
LINE INT: 12.135
DIST+LINE: 2.135

```

CONT

EXIT



5.9 Setout Distance Mode

Library command: ~SETDST

This option allows you to setout a distance, calculating the difference between an original distance and a measured distance.

From COORD Module Main Menu page 2 press the **[→□]** key.

The screen will display the previously entered data. The Calc Brg is used for display purposes only.

Setout Distance Mode Menu consists of one page:

NEW **MEAS** **EXIT**

Setout Distance Mode Menu:

- NEW** Enter in Calc Bearing and/or Calc Distance
Empty Menu Label
- MEAS** Enter in Measured Distance and calculate difference
Empty Menu Label
Empty Menu Label
- EXIT** Exit to Data Entry Menu page 1 or
Exit to COORD Module Main Menu page 2

Enter in the Calc distance, type in the distance and press the **NEW** key.

NEW uses the value in level one of the stack as the Calc Distance and the value in level two of the stack as the Calc Brg. The Calc Brg is optional. If no value exists in level two of the stack then the Calc Brg will default as "NO BRG".

The Calc Bearing will be stored to the 'CB' variable.
The Calc Distance will be stored to the 'CD' variable.

Enter in the Measured distance, type in the distance and press the **MEAS** key.

The Measured Distance will be stored to the 'MD' variable. The program will calculate the difference between the original distance and a measured distance and will be displayed in line seven of the display.

```

##### SETOUT  MODE #####
CALC BRG: 74°51'30''
CALC DST: 35.805
MEAS DST: 32.000
< AWAY: 3.805 >
NEW      MEAS      EXIT

```



5.10 Convert CLOSE Module 'CDS' Matrix to COORD Module Points

Library command: **M→PT**

This option allows you to convert Close Module 'CDS' Matrix to Coord Module points.

Refer Section 4.10, **Coordinate the Close Matrix**, page 43 in regard to the 'CDS' Matrix.

From COORD Module Main Menu page 2 press the **M→PT** key.

An input prompt will display prompting to confirm File. Enter in the File and press the **[ENTER]** key.

An input prompt will display prompting to enter the Starting Number, type in a starting number and press the **[ENTER]** key.

The program will create points with the character **■** incrementing by positive 1.

The program returns to COORD Module Main Menu page 2.

```
{ HOME GEOCALC ICROSI '5100 } PRG
'CDS' Matrix → Points
Confirm File
:FILE: 5678
CONT '1234' FILE LAST
File: '5678
Doesn't Exist!
Create?
YES NO
USER PRG
HOME GEOCALC ICROSI '5100 '5678
Enter Starting Number
:No.?: 20
```

5.11 Transfer a TXT file from a PC to the HP48 or HP49

Library command: **C→HP48**

Kermit Users:

This option automatically sets up your HP48 or HP49 to receive a TXT file from your PC using your DOS based Kermit download software.

This is used to download a coordinate listing file to a *HP48GX*, *HP48G+*, *HP49G* or *HP48GII* calculator.

From COORD Module Main Menu page 2 press the **C→HP** key.

An input prompt will display prompting for required BAUD rate speed. Type in the required Baud rate or accept default and press the **[ENTER]** key.

The program will set -33 system flag (Serial Port) and -35 system flag (ASCII form) and execute the RECV command.

Copy the files KERMIT.EXE & MSKERMIT.INI from your Geocalc CD, to the same directory as your ASCII file on your PC. Using Kermit, download the required ASCII file using the SEND command. i.e. MS-Kermit> send txt1

The ASCII file will be downloaded as a **"Program"** type variable. Your ASCII file will be stored in the Geocalc Variables Directory under the TXT sub-directory.

The ASCII file must be in the form of three columns with Point Number, Easting, and Northing. File extension is not important. Example:

1	1000.000	2000.000
2	1234.567	8901.234
3	3456.384	5732.994

The program returns to COORD Module Main Menu page 2.

```
{ HOME GEOCALC } USER PRG
Enter Required
BAUD Rate Speed
:BAUD: 9600
Upload TXT File
Settings:
9600 BAUD
-33 CF ( Serial Port )
-35 CF ( ASCII Form )
```

HP48G+, HP48GX, HP48GII Users:

An ASCII file no greater than **600** points is suggested.

**HP48, 49 Calculator Connectivity Kit Users:**

HP48GX/G+ Users: Please use Kermit for your ASCII coordinate file transfers.

HP49G, HP48GII, HP49G+, HP50G Users: Set your calculator in "Xmodem Server" mode.

Refer Section 2.32, **HP48/HP49/HP50 File Transfer Setup**, page 13.

Using the "HP48G, HP49G and HP50G series Calculator Connectivity Kit", transfer your ASCII file to your HP48, HP49 or HP50. You will need to navigate and store your ASCII file in the Geocalc Variables Directory under the **TXT** sub-directory. The ASCII file will be downloaded as a "**Program**" type variable.

The Windows based HP48G, HP49G and HP50G series Calculator Connectivity Kit software, is not capable of transferring true ASCII type files. The following header & footer lines is required on the top and bottom of your ASCII file:

Please Note: A space between the : & T in the header as shown below is very important.

The ASCII file must be in the form of three columns with Point Number, Easting, and Northing. Example: (File extension is not important)

```
% %HP: T(3);
\<<
1      1000.000    2000.000
2      1234.567    8901.234
3      3456.384    5732.994
\>>
```

Hint: To check your available free memory type the **[α] [α] [M] [E] [M]** keys.

A **600** Point file uses: 18846.5 Bytes
MEM Required before download = **37693** Bytes
A **1700** Point file uses: 53498.5 Bytes
MEM Required before download = **106997** Bytes

5.12 Convert a TXT file to COORD Module Points

Library command: **T→PT**

This option allows you convert a TXT file to Coord Module Points.

Refer Section 5.11, **Transfer a TXT file from a PC to the HP48 or HP49**, page 71.

From COORD Module Main Menu page 2 press the **T→PT** key.

An input prompt will display prompting to enter a TXT file.

To move to the next page, press the **[NXT]** key.

To move to the previous page, press the **[←] [PREV]** keys.

Press the menu key below the menu label, the name will appear on the command line.

Press the **[ENTER]** key.

An input prompt will display prompting to confirm File. Enter in the File and press the **[ENTER]** key.

..

The program will create points starting with the character

The program returns to COORD Module Main Menu page 2.

Registered To: **SAMPLE**

HP49G, HP49G+, HP50G Users:

An ASCII file no greater than **1700** points is suggested.

If more points are required, you will need to break your ASCII file into 2 or more smaller files.

File Size Limits:

You will only be able to successfully download and convert to Geocalc Points, an ASCII file that is less than half of the available free memory on your calculator.

Memory Error:

Avail MEM = 13447.5

MEM Required for File Conversion = 18851.5

OK

```
{ HOME GEOCALC ICARDI '5100 } PRG
Convert TXT File
Confirm File
:FILE: 5678
CONT '1234[FILE] LAST
File: '5678
Doesn't Exist!
Create?
YES NO
{ HOME GEOCALC TXT } USER PRG
Enter TXT File to
Convert to Points
TXT1
```

User No: **SAMPLE**



6. UTILS MODULE

The UTILS Module contains two simple Cadastral orientated programs commonly used by most cadastral surveyors.

6.1 UTILS MODULE MAIN MENU

Library command: ~UTILSMENU

From the GEOCALC Main Menu press the **UTILS** key. This will display the UTILS Module Main Menu.

The UTILS Module consists of one page:

SECT TRUN

EXIT

UTILS Module Main Menu:

SECT Road Secant Program

TRUN Boundary Truncation Program

Empty Menu Label

Empty Menu Label

Empty Menu Label

EXIT Exit to GEOCALC Main Menu

```
***** UTILITIES *****1/1
SECT: Secant
TRUN: Truncation
```

```
EXIT: MAIN MENU
SECT TRUN EXIT
```

6.2 Road Secant Program

Library command: ~SECT

This option allows you to calculate a road secant with the option of multiple road widths.

From UTILS Module Main Menu press the **SECT** key.

The screen will display the currently stored secant data:

BRG1 displays the contents of the 'B1' variable.
BRG2 displays the contents of the 'B1' variable.
ROAD WIDTH 1 displays the contents of the 'RW1' variable.
ROAD WIDTH 2 displays the contents of the 'RW2' variable.

```
***** SECANT *****
BRG1: 74°51'30''
BRG2: 111°12'00''
ROAD WIDTH 1: 20.000
ROAD WIDTH 2: 20.000
BRG1 BRG2 RW1 RW2 CALC EXIT
```

Road Secant Menu consists of one page:

BRG1 BRG2 RW1 RW2 CALC EXIT



Road Secant Menu:

- BRG1** Store number in level 1 of the stack to the variable 'B1'
- BRG2** Store number in level 1 of the stack to the variable 'B2'
- RWD1** Store number in level 1 of the stack to the variable 'RW1'
- RWD2** Store number in level 1 of the stack to the variable 'RW2'
- CALC** Calculate Road Secant
- EXIT** Exit to GEOCALC Main Menu

Enter in the Road Secant data.

Type in the first bearing and press the **BRG1** key.

Type in the second bearing and press the **BRG2** key.

Type in the first road width and press the **RWD1** key.

Type in the second road width and press the **RWD2** key.

If both road widths are the same then use the same value for both road widths.

Note: To recall the previous first bearing press the **[←] BRG1** keys.

To recall the previous second bearing press the **[←] BRG2** keys.

To recall the previous first road width press the **[←] RWD1** keys.

To recall the previous second road width press the **[←] RWD2** keys.

To calculate the Road Secant press the **CALC** key.

The display will read "Calcing....." when calculating.

The calculated Secant Bearing and Distance will be displayed and also copied to the stack.

Road Secant Calc Menu:

SECT

Empty Menu Label

Empty Menu Label

Empty Menu Label

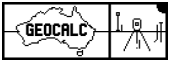
Empty Menu Label

Empty Menu Label

SECT Return to the Road Secant program

Calcing.....

```
→HMS|HMS→|HMS+|HMS-|REVB|→M
*****
SEC BRG: 183°01'45''
SEC DST: 21.050
*****
SECT
```



6.3 Boundary Truncation Program

Library command: ~TRUN

This option allows you to calculate a boundary truncation with any number of chords.

From UTILS Module Main Menu press the **TRUN** key.

The screen will display the currently stored boundary truncation data:

BRG1 displays the contents of the 'B1' variable.
BRG2 displays the contents of the 'B1' variable.
TANGENT DIST displays the contents of the 'TDIST' variable.
NO OF CHORDS displays the contents of the 'CHDS' variable.

```
***** TRUNCATION *****  
BRG1: 74°51'30''  
BRG2: 111°12'00''  
TANGENT DIST: 4.000  
NO OF CHORDS: 3  
[BRG1][BRG2][TDIST][CHDS][CALC][EXIT]
```

Boundary Truncation Menu consists of one page:

BRG1 **BRG2** **TDIST** **CHDS** **CALC** **EXIT**

Boundary Truncation Menu:

BRG1 Store number in level 1 of the stack to the variable 'B1'
BRG2 Store number in level 1 of the stack to the variable 'B2'
TDIST Store number in level 1 of the stack to the variable 'TDIST'
CHDS Store number in level 1 of the stack to the variable 'CHDS'
CALC Calculate boundary truncation
EXIT Exit to GEOCALC Main Menu

Enter in the Boundary Truncation data.

Type in the first bearing and press the **BRG1** key.

Type in the second bearing and press the **BRG2** key.

Type in the Tangent Distance and press the **TDIST** key.

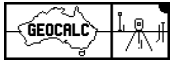
Type in the Number of Chords and press the **CHDS** key.

Note: To recall the previous first bearing press the **[↵]** **BRG1** keys.

To recall the previous second bearing press the **[↵]** **BRG2** keys.

To recall the previous Tangent Distance press the **[↵]** **TDIST** keys.

To recall the previous Number of Chords press the **[↵]** **CHDS** keys.



To calculate the Boundary Truncation press the **CHLC** key. The calculated Chord Length will be displayed with menu (a).

Boundary Truncation Menu (a):

CONT**TRUN****CONT**

Continue program and calculate Chord Length

Empty Menu Label

Empty Menu Label

Empty Menu Label

Empty Menu Label

TRUN

Return to the Boundary Truncation program

To calculate the Chord Bearings press the **CONT** key. The first Chord Bearing will be displayed with menu (b).

Boundary Truncation Menu (b):

NXT**TRUN****NXT**

Continue program and display next Chord Bearing

Empty Menu Label

Empty Menu Label

Empty Menu Label

Empty Menu Label

TRUN

Return to the Boundary Truncation program

Press the **NXT** key to consecutively display the remaining Chord Bearings.

The program will return to the Boundary Truncation program when all Chord Bearings have been displayed. The calculation data will be copied to the stack.

```
*****
CHORD LGTH = 2.572
*****
```

```
*****
CONT      TRUN
*****
```

```
*****
CHORD
BRG1 = 80°54'55''
*****
```

```
*****
NXT      TRUN
*****
```

```
*****
CHORD
BRG2 = 93°01'45''
*****
```

```
*****
NXT      TRUN
*****
```

```
*****
CHORD
BRG3 = 105°08'35''
*****
```

```
*****
NXT      TRUN
*****
```



7. LEVEL MODULE

The LEVEL Module is designed to reduce level observations from a level-book.

7.1 LEVEL MODULE MAIN MENU

From the GEOCALC Main Menu press the **LEVEL** key. This will display the LEVEL Module Main Menu.

The LEVEL Module consists of two pages:

Page 1: **NEW DATA T.B/F R/F T.R/F RLS**

Library command:
~LEVELMENU

Page 2: **ADJ1 ADJ2 ADJ3 EXIT**

Library command:
~LEV2

LEVEL Module Main Menu page 1:

- NEW** Start a New Level Matrix, proceeds to Level Data Entry
- DATA** Level Data Entry, New or Resume Level Data Entry
- T.B/F** Calculate Total of Backsights and Foresights
- R/F** Calculate Rises and Falls Matrix
- T.R/F** Calculate Total of Rises and Falls
- RLS** Calculate Unadjusted Reduced Levels Matrix

LEVEL Module Main Menu page 2:

- ADJ1** Calculate Adjustment 1, Double Run (1BM)
- ADJ2** Calculate Adjustment 2, Single Run (2BM)
- ADJ3** Calculate Adjustment 3, Double Run (2BM)
- Empty Menu Label
- Empty Menu Label
- EXIT** Exit to GEOCALC Main Menu

```
##### LEVEL MODULE #1/2
NEW: New Level Matrix
DATA: Resume Entry
T.B/F: Total BS & FS
R/F: Calc Rises/Falls
T.R/F: Total Rise/Fall
RLS: Calc RLS
NEW DATA T.B/F R/F T.R/F RLS
```

```
##### LEVEL MODULE #2/2
ADJ1: Double Run (1BM)
ADJ2: Single Run (2BM)
ADJ3: Double Run (2BM)
```

```
EXIT: MAIN MENU
ADJ1 ADJ2 ADJ3 EXIT
```


7.2 Starting a New Level Entry

Library command: ~LEVNEW

This option allows you to start a New Level Matrix.

The LEVEL Module operates primarily from the built in STAT application. The Level Matrix is stored in the *reserved* variable Σ DAT.

From the LEVEL Module Main Menu page 1 press the **NEW** key. This will start a New Level Matrix. The Σ DAT variable if it exists will be deleted and the program will proceed to Level Data Entry.

```

*** LEVEL DATA ENTRY ***
Enter BS
Line 1?
Last Entry:
***NEW LEVEL MATRIX***
BS IS FS VIEW EXOA EXIT
    
```

7.3 Level Data Entry

Library commands: ~LEVNEW or ~LEVDATA

This option allows you to enter Level values from your Level Book using the Level Data Entry program.

From the LEVEL Module Main Menu page 1 press the **NEW** or **DATA** key. The **DATA** key is used to **Resume** Level Data Entry of an Existing Level Matrix.

Level Data Entry operates conveniently from the stack environment, meaning that you can perform any operations without interrupting the running of the program.

Level Data Entry Menu consists of one page:

BS **IS** **FS** **VIEW** **EXOA** **EXIT**

Library command:
~LEVDATA

Level Data Entry Menu:

- BS** Store number in level 1 of the stack as next **Backsight** reading to the end of the Level Matrix.
- IS** Store number in level 1 of the stack as next **Intermediate** reading to the end of the Level Matrix.
- FS** Store number in level 1 of the stack as next **Foresight** reading to the end of the Level Matrix.
- VIEW** View and Edit the Level Matrix
- EXOA** Store an External New Level Matrix
- EXIT** Exit to LEVEL Module Main Menu page 1

**7.31 Entering Level Data**Library command: **~LEVDATA**

When a New Level Matrix is started the string ">>> NEW LEVEL MATRIX <<<" will be displayed on line 7 of the display.

The Level Data Entry keeps track of your entries and prompts for the next appropriate entry with line number. This is shown on lines 3 and 4 of the display.

The Level Data Entry also keeps track of the **Last Entry**. This is done by interrogating the last row of the Level Matrix. This is shown on lines 6 and 7 of the display.

The Level Matrix is created using the same **Line Structure** as your level book. i.e. Backsight and Foresight reading will be on the same line (same row) in the Level Matrix.

At each Backsight, Intermediate or Foresight entry the values are stored to the Σ DATA variable using the Σ + STAT command. The Level Matrix contains **FOUR** columns:

- Column 1: Backsight Readings
- Column 2: Intermediate Reading
- Column 3: Foresight Readings
- Column 4: Location of Station points

Column 4 is used to distinguish between Change Points and Stations

Level Book Example:

LINE	B/S	I/S	F/S	RISE	FALL	RL	REMARKS
1	1.486					50.000	PSM 1
2	1.614		0.869	0.617		50.617	CP
3	1.672		0.945	0.669		51.286	CP
4	1.502		1.513	0.159		51.445	STN 2
5		1.618			0.116	51.329	STN 3
6		1.635			0.017	51.312	STN 4
7	1.781		1.605	0.030		51.342	CP
8	1.012		0.842	0.939		52.281	PSM 5
9	1.734		1.888		0.876	51.405	CP
10		1.825			0.091	51.314	STN 4
11		1.806		0.019		51.333	STN 3
12	1.011		1.691	0.115		51.448	STN 2
13	0.920		1.716		0.705	50.743	CP
14			1.669		0.749	49.994	PSM 1
	12.732		12.738	2.548	2.554	49.994	
	12.738			2.554		50.000	
	-0.006✓			-0.006✓		-0.006✓	

```

*** LEVEL DATA ENTRY ***
Enter BS
Line 1?
Last Entry:
>>>NEW LEVEL MATRIX<<<
BS  IS  FS  WIER  >ZDA  ENT

```

7.311 Entering a Backsight Reading

Library command: ~BS?

This option allows you to enter a Backsight reading using Level Data Entry program.

From the Level Data Entry Menu, type in your Backsight reading and press the

BS key.

The program will store the Backsight value to *Column 1* of the last entry of the Level Matrix. If no Σ **DAT** variable exists, then the program will create a new line as such:

[1.486 0.000 0.000 0.000] and stores as the first row of Σ **DAT**.

BS Does not alter values in Column 4.

```

*** LEVEL DATA ENTRY ***
Enter IS or FS
Line 2?
Last Entry:
BS=1.486
[ BS ] [ IS ] [ FS ] [ VIEW ] [ >DATA ] [ EXIT ]
    
```

7.312 Entering an Intermediate Reading

Library command: ~IS?

This option allows you to enter an Intermediate reading using Level Data Entry program.

From the Level Data Entry Menu, type in your Intermediate reading and press the

IS key.

The program will store the Intermediate value to *Column 2* of a new row to the Level Matrix.

IS Will automatically add a "1" to Column 4 in this row. This will define the Intermediate reading as a Station.

```

*** LEVEL DATA ENTRY ***
Enter IS or FS
Line 6?
Last Entry:
IS=1.618
[ BS ] [ IS ] [ FS ] [ VIEW ] [ >DATA ] [ EXIT ]
    
```

7.313 Entering a Foresight Reading

Library command: ~FS?

This option allows you to enter a Foresight reading using Level Data Entry program.

From the Level Data Entry Menu, type in your Foresight reading and press the

FS key.

The program will store the Foresight value to *Column 3* of a new row to the Level Matrix.

The program will then prompt for you to define the Foresight reading as a *Change Point* or a *Station*.

Press the appropriate menu key, CP or STN:

CP This will define the Foresight reading as a *Change Point*. The program will add a "0" to column 4 in this row.

STN This will define the Foresight reading as a *Station*. The program will add a "1" to column 4 in this row.

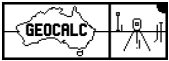
```

*** FORESIGHT READING ***

FS=0.869
Change Point or Stn?
[ CP ] [ STN ]
    
```

```

*** LEVEL DATA ENTRY ***
Enter BS
Line 2?
Last Entry:
FS=0.869
[ BS ] [ IS ] [ FS ] [ VIEW ] [ >DATA ] [ EXIT ]
    
```



7.314 Viewing and Editing the Level Matrix

Library command: ~LVIEW

This option allows you to view and edit the Level Matrix

From the Level Data Entry Menu press the **VIEW** key.

The contents of the Σ DAT variable is copied to level 1 of the stack (the Level Matrix).

The **USER** Keyboard is turned off at this time.

To view the Matrix in level 1 of the stack press the **▼** key.

This activates the “Built-in Matrix Writer Application” of the calculator.

HP User’s Guide/Manual: Refer to the section on:
Matrices

To save a modified Level Matrix, press the **ΣDRA** key.

Refer Section 7.315, **Storing an External New Level Matrix**, page 81.

The **USER** Keyboard is turned on with any menu key from the Level Data Entry Menu.

1	1.486	0	0	0	0
2	1.614	0	.869	0	0
3	1.672	0	0	.945	0
4	1.502	0	0	1.513	0
5	0	1.618	0	0	0

I-1: 1.486

EDIT VEC ΣDRA ΣDRA GO GO

```
*** LEVEL DATA ENTRY ***
Enter BS
Line 14?

Last Entry:
FS=1.669
BS IS FS VIEW ΣDRA EDIT
```

7.315 Storing an External New Level Matrix

Library command: ~ΣDAT?

This option allows you to create a New Level Matrix using the “Built-in Matrix Writer Application” of the calculator.

HP User’s Guide/Manual: Refer to the section on:
Matrices

From the LEVEL Module Main Menu page 1 press the **NEW** key. The Σ DAT variable if it exists will be deleted and the program will proceed to Level Data Entry.

Using the “Built-in Matrix Writer Application” of the calculator, create your New Level Matrix with the same **Line Structure** as your level book. i.e. Backsight and Foresight reading will be on the same line (same row) in the Level Matrix.

To create in a New Level Matrix: **HP48GX/G+ Users:** **[↵] [MATRIX]**
HP49G, HP48GII, HP49G+/50G Users: **[↵] [MTRW]**

When complete press the **[ENTER]** key.

This will place the New Level Matrix on line 1 of the stack.

From the Level Data Entry Menu press the **ΣDRA** key.

This will save the New Level Matrix from level 1 of the stack to the Σ DAT variable.

Note: The program will automatically determine the **Last Entry**

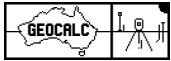
1	1.486	0	0	0	0
2	1.614	0	.869	0	0
3	1.672	0	0	.945	0
4	1.502	0	0	1.513	0
5	0	1.618	0	0	0

I-1: 1.486

EDIT VEC ΣDRA ΣDRA GO GO

```
*** LEVEL DATA ENTRY ***
Enter BS
Line 14?

Last Entry:
FS=1.669
BS IS FS VIEW ΣDRA EDIT
```



7.4 Calculate Total of Backsights and Foresights

Library command: ~T.B\F

This option allows you to calculate the total of the Backsights and Foresights.

From the Level Module Main Menu page 1 press the **T.B\F** key.

The display will read "Calcing....." when calculating.

The Total of Backsights and Foresights and Misclose will display on screen.

The total of the Backsights and Foresights will also be displayed in levels 1 and 2 of the stack.

Calcing.....

```
NEW DATA T.B\F R\F T.R\F RLS
*** TOTAL BS & FS ***
BS: 12.732
FS: 12.738
MISCLOSE: -0.006
NEW DATA T.B\F R\F T.R\F RLS

{ HOME GEOCALC } USER
4:
3:
2: FS: 12.738
1: BS: 12.732
NEW DATA T.B\F R\F T.R\F RLS
```

7.5 Calculate Rises and Falls Matrix

Library command: ~R\F

This option allows you to calculate the Rises and Falls Matrix.

From the Level Module Main Menu page 1 press the **R\F** key.

The display will read "Calcing....." when calculating.

The Rises and Falls Matrix will be displayed in level 1 of the stack.

To edit and view the Matrix in level 1 of the stack press the **[▼]** key.

Calcing.....

```
NEW DATA T.B\F R\F T.R\F RLS

{ HOME GEOCALC } USER
4:
3:
2:
1: [[ 0.617 ] [ 0.66...
NEW DATA T.B\F R\F T.R\F RLS

13:1
1 0.617
2 0.663
3 0.159
4 -0.116
5 -0.017
1-1: 0.617
EDIT VEC [←] [→] [↶] [↷] [GO] [GO]
```

7.6 Calculate Total of Rises and Falls

Library command: ~T.R\F

This option allows you to calculate the total of the Rises and Falls.

From the Level Module Main Menu page 1 press **T.R\F** the key.

The display will read "Calcing....." when calculating.

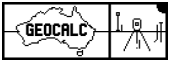
The Total of Rises and Falls and Misclose will display on screen.

The total of the Rises and Falls will also be displayed in levels 1 and 2 of the stack.

Calcing.....

```
NEW DATA T.B\F R\F T.R\F RLS
*** TOTAL RISES&FALLS ***
RISE: 2.548
FALL: -2.554
MISCLOSE: -0.006
NEW DATA T.B\F R\F T.R\F RLS

{ HOME GEOCALC } USER
4:
3:
2: RISE: 2.548
1: FALL: -2.554
NEW DATA T.B\F R\F T.R\F RLS
```



7.7 Calculate Unadjusted Reduced Levels Matrix

Library command:

~RLS

This option allows you to calculate the Reduced Levels Matrix.

From the Level Module Main Menu page 1 press the **RLS** key.

An input prompt will display prompting to "ENTER START RL". Type in the starting reduced level. Press the **[ENTER]** key

The display will read "Calcing....." when calculating.

The Reduced Levels Matrix will be displayed in level one of the stack.

To edit the Matrix in level 1 of the stack press the **[▼]** key.

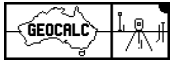
```
USER  PRG
{ HOME GEOCALC }
ENTER START RL

:START RL: 50.000

Calcing.....
Unadjusted
Reduced Levels...

USER
{ HOME GEOCALC }
4:
3:
2:
1: [[ 50.000 ] [ 50...
NEW DATA T.R/F R/F T.R/F RLS

14:1
1 50.000
2 50.617
3 51.286
4 51.445
5 51.329
1-1: 50.000
EDIT VEC <WID WID> GO> GO4=
```



7.8 Calculate Adjusted Reduced Levels Double Run (1BM)

Library command: ~ADJ1

This option allows you to calculate adjusted reduced levels from the Level Matrix. The adjustment method is on a Double Level Run using 1 Origin Bench Mark.

This adjustment allows for **uneven** Change Points in the Forward Run and Reverse Run and weights the measurements accordingly.

We will use the Level Book Example on page 77 as an example.

With reference to the observations between PSM 1 to STN 2. The Forward Run has 3 Change Points. The Reverse Run has 2 Change Points. The Misclose between PSM 1 and STN 2 is divided by 5 and each **Set-up** is adjusted equally. Therefore the Forward Run is adjusted more than the Reverse Run in this case, allowing for a stronger fix to the Reverse Run.

This adjustment allows for Intermediate observations.

This adjustment does **not** allow for **Side Shot** type levelling from the main Forward and Reverse Runs.

- From the Level Module Main Menu page 2, press the **ADJ1** key.

An input prompt will display prompting to "ENTER START RL". Type in the reduced level of Bench Mark 1. e.g. 50.000 Press the **[ENTER]** key.

The display will read "Calcing....." when calculating.

HP48G/G+ Users: Refer to the HP48G User's Guide chapter 3: The Interactive Stack.
HP49G, HP48GII, HP49G+, HP50G Users:(No documentation on The Interactive Stack).

To view all the results press the **[▲]** key. This will activate The Interactive Stack. From the Interactive Stack environment press the **[▲]** and **[▼]** keys to scroll through the levels of the stack. Once you have selected the stack level desired press the **VIEW** key to view the results. To exit the Interactive Stack simply press the **[ON]** key.

Understanding the Results:

- The **Adjusted Reduced Levels** of the Stations is returned to level 1 of the stack.

Note: There are no Change Point levels shown.

The *Adjusted Reduced Levels* Matrix:

- Column 1: Contains the Adjusted Reduced Levels of the Stations.
- Column 2: Contains the individual Miscloses between the Stations.
- Column 3: Contains the adjustment applied to the Station.

- The **Misclose Observed** is returned to level 2 of the stack.

```

{ HOME GEOCALC } USER PRG
ENTER START RL

:START RL: 50.0000

Calcing.....
Double Run, (1BM)
Adjusted
Reduced Levels...
ADJ1 ADJ2 ADJ3 EXIT

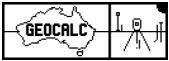
{ HOME GEOCALC } USER
4:
3:
2: Misclose Observed*...
1: [[ 50.0000 0.0000 ...
ADJ1 ADJ2 ADJ3 EXIT

{ HOME } PRG
Misclose Observed
.006
[SKIP] [DEL] [INS] [STK]

5:
1 50.0000 0.0000
2 01.4504 0.0000
3 01.3343 0.0010
4 02.3169 -0.0020
5 02.2849 -0.0020
1-1: 50.0000
EDIT VEC [←] [→] [GO] [GO]

5:
1 0.0000 0.0000
2 0.0000 0.0004
3 0.0010 0.0005
4 -0.0020 -0.0010
5 -0.0020 -0.0010
1-3: 0.0000
EDIT VEC [←] [→] [GO] [GO]

```



7.9 Calculate Adjusted Reduced Levels Single Run (2BM)

Library command: ~ADJ2

This option allows you to calculate adjusted reduced levels from the Level Matrix. The adjustment method is on a Single Level Run adjusted between 2 Bench Marks.

The Misclose between the Known Difference and the Observed Difference between the 2 Bench Marks, is divided by the number of set-ups. Where there are Change Points, if any, the adjustment per set-up is proportioned by the number of Change Points for that set-up.

We will use part of the Level Book Example on page 77 as an example. We will use the first section from PSM 1 to PSM 5, Lines 1-8.

This adjustment allows for Intermediate observations.

This adjustment does **not** allow for **Side Shot** type levelling from the main Forward Run.

- From the Level Module Main Menu page 2 press the **ADJ2** key.

An input prompt will display prompting to "ENTER START RL". Type in the reduced level of Bench Mark 1. e.g. **50.000** Press the **[ENTER]** key.

An input prompt will display prompting to "ENTER END RL". Type in the reduced level of Bench Mark 2. e.g. **52.293** Press the **[ENTER]** key.

The display will read "Calcing....." when calculating.

HP48G/G+ Users: Refer to the HP48G User's Guide chapter 3 on The Interactive Stack.
HP49G, HP48GII, HP49G+, HP50G Users:(No documentation on The Interactive Stack).

To view all the results press the **[▲]** key. This will activate The Interactive Stack. From the Interactive Stack environment press the **[▲]** and **[▼]** keys to scroll through the levels of the stack. Once you have selected the stack level desired press the **[VIEW]** key to view the results. To exit the Interactive Stack simply press the **[ON]** key.

Understanding the Results:

- The **Adjusted Reduced Levels** of the Stations is returned to level 1 of the stack.

Note: There are no Change Point levels shown.

The *Adjusted Reduced Levels* Matrix:

Column 1: Contains the Adjusted Reduced Levels of the Stations.
Column 2: Contains the adjustment applied to the Station.

- The **Adjustment per Set-up** is returned to level 2 of the stack.
- The **Number of Set-ups** is returned to level 3 of the stack.
- The **Misclose** (Observed Difference / Known Difference) is returned to level 4 of the stack.
- The **Observed Difference** is returned to level 5 of the stack.
- The **Known Difference** is returned to level 6 of the stack.

Registered To: **SAMPLE**

User No: **SAMPLE**

```

USER  PRG
{ HOME GEOCALC }
ENTER START RL

:START RL: 50.0000

USER  PRG
{ HOME GEOCALC }
ENTER END RL

:END RL: 52.2930

Calcing.....
Single Run, (2BM)
Adjusted
Reduced Levels...

USER
{ HOME GEOCALC }
4: Misclose Observed/...
3: No. Set-Ups=: 5.00...
2: Adjustment/Set-up=:
1: [[ 50.0000 0.0000 ...
ADJ1 ADJ2 ADJ3 EXIT

{ HOME GEOCALC }
6: Known Difference=:...
5: Observed Differenc...
4: Misclose Observed/...
3: No. Set-Ups=: 5.00...
ECHO VIEW PICK ROLL ROLLOLIST

PRG
{ HOME }
*Known Difference
:
2.293
<SKIP> <DEL> <DEL> INS <STK>

PRG
{ HOME }
:Observed Difference
:
2.281
<SKIP> <DEL> <DEL> INS <STK>

PRG
{ HOME }
:Misclose Observed/BM
:
.012
<SKIP> <DEL> <DEL> INS <STK>

PRG
{ HOME GEOCALC }
:No. Set-Ups
: 5
<SKIP> <DEL> <DEL> INS <STK>

PRG
{ HOME GEOCALC }
*Adjustment/Set-up
:
.0024
<SKIP> <DEL> <DEL> INS <STK>

5-2
1 50.0000 0.0000
2 51.4322 0.0072
3 51.3370 0.0008
4 51.3208 0.0008
5 52.2930 0.0032
I-1: 50.0000
EDIT VEC <MID> <MID> <GO> <GO>

```


7.10 Calculate Adjusted Reduced Levels Double Run (2BM)

Library command: ~ADJ3

This option allows you to calculate adjusted reduced levels from the Level Matrix.
The adjustment method is on a Double Level Run adjusted between 2 Bench Marks.

This adjustment allows for **uneven** Change Points in the Forward Run and Reverse Run and weights the measurements accordingly.

We will use the Level Book Example on page 77 as an example.

With reference to the observations between PSM 1 to STN 2. The Forward Run has 3 Change Points. The Reverse Run has 2 Change Points. The Misclose between PSM 1 and STN 2 is divided by 5 and each **Set-up** is adjusted equally. Therefore the Forward Run is adjusted more than the Reverse Run in this case, allowing for a stronger fix to the Reverse Run.

This adjustment allows for Intermediate observations.

This adjustment does **not** allow for **Side Shot** type levelling from the main Forward and Reverse Runs.

This adjustment uses the method used in Double Run (1BM) first and then the Single Run (2BM) second.

- From the Level Module Main Menu page 2 press the **ADJ3** key.

An input prompt will display prompting to "ENTER START RL". Type in the reduced level of Bench Mark 1. e.g. 50.000 Press the **[ENTER]** key.

An input prompt will display prompting to "ENTER END RL". Type in the reduced level of Bench Mark 2. e.g. 52.293 Press the **[ENTER]** key.

The display will read "Calcing....." when calculating.

HP48G/G+: Refer to the HP48G User's Guide chapter 3 on The Interactive Stack.

HP49G, HP48GII, HP49G+, HP50G Users:(No documentation on The Interactive Stack).

To view all the results press the **[▲]** key. This will activate The Interactive Stack. From the Interactive Stack environment press the **[▲]** and **[▼]** keys to scroll through the levels of the stack. Once you have selected the stack level desired press the **VIEW** key to view the results. To exit the Interactive Stack simply press the **[ON]** key.

```
{ HOME GEOCALC } USER PRG
ENTER START RL
```

```
:START RL: 50.0000
```

```
{ HOME GEOCALC } USER PRG
ENTER END RL
```

```
:END RL: 52.2930
```

```
Calcing.....
```

```
Double Run, (2BM)
```

```
Adjusted
Reduced Levels...
```

```
{ HOME GEOCALC } USER
4: Misclose Adjusted*...
3: No. Set-Ups*: 9.00...
2: Adjustment/Set-up*...
1: [[ 50.0000 0.0000 ...
ADJ1 ADJ2 ADJ3 EXIT
```

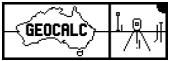
```
{ HOME }
8: Misclose Observed*...
7: [[ 50.0000 0.0000 ...
6: Known Difference*...
5: Observed Adjusted*...
ECHO VIEW PICK ROLL ROLL2LIST
```

Double Run (1BM):

```
{ HOME } PRG
Misclose Observed
:
.006
SKIPSKIP DEL DEL INS STK
```

```
5:3
1 50.0000 0.0000
2 51.4504 0.0000
3 51.3349 0.0010
4 52.2849 -0.0020
5 52.2849 -0.0020
1-1: 50.0000
EDIT VEC K10 K10 GO GO
```

```
5:3
1 0.0000 0.0000
2 0.0000 0.0004
3 0.0010 0.0005
4 -0.0020 -0.0010
5 -0.0020 -0.0010
1-3: 0.0000
EDIT VEC K10 K10 GO GO
```



Understanding the Results:

- The **Adjusted Reduced Levels** of the Stations is returned to level **1** of the stack.

Note: There are no Change Point levels shown.

The *Adjusted Reduced Levels* Matrix:

- Column 1: Contains the Adjusted Reduced Levels of the Stations.
- Column 2: Contains the individual Miscloses between the Stations.
- Column 3: Contains the adjustment per Station.
Double Run (1BM)
- Column 4: Contains the adjustment per Station.
Single Run (2BM)

- The **Adjustment per Set-up** is returned to level **2** of the stack.
- The **Number of Set-ups** is returned to level **3** of the stack.
- The **Misclose Adjusted Observed/BM** (Observed Difference / Known Difference) is returned to level **4** of the stack.
- The **Observed Adjusted Difference** is returned to level **5** of the stack.
- The **Known Difference** is returned to level **6** of the stack.
- The **Adjusted Reduced Levels, Double Run (1BM)**, is returned to level **7** of the stack.
- The **Misclose Observed, Double Run (1BM)**, is returned to level **8** of the stack.

```
PRG
{ HOME GEOCALC }
:Known Difference
:
2.293
<SKIP> <DEL> <DEL> <INS> <STK>

PRG
{ HOME GEOCALC }
:Observed Adjusted
Difference
:
2.2849
<SKIP> <DEL> <DEL> <INS> <STK>

PRG
{ HOME GEOCALC }
:Misclose Adjusted
Observed/BM
:
.0081
<SKIP> <DEL> <DEL> <INS> <STK>

PRG
{ HOME GEOCALC }
:No. Set-Ups
:
9
<SKIP> <DEL> <DEL> <INS> <STK>

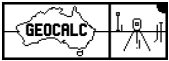
PRG
{ HOME GEOCALC }
:Adjustment/Set-up
:
.0009
<SKIP> <DEL> <DEL> <INS> <STK>

5-4
1 50.0000 0.0000
2 51.4549 0.0000
3 51.3400 0.0010
4 51.3226 -0.0020
5 52.2930 -0.0020
1-1: 50.0000
EDIT VEC <XID> <XID> <GO> <GO>

5-4
1 0.0000 0.0000
2 0.0054 0.0045
3 0.0005 0.0006
4 -0.0010 0.0006
5 -0.0010 0.0024
1-4: 0.0000
EDIT VEC <XID> <XID> <GO> <GO>
```



SAMPLE



8. SETUP MODULE

The SETUP Module is used for setup configuration for GEOCALC.

8.1 SETUP MODULE MAIN MENU

From the GEOCALC Main Menu press the **SETUP** key. This will display the SETUP Module Main Menu page 1.

The SETUP Module consists of two pages:

Page 1: **M** **LKS** **M-RV** **BRG±** **SPRN** **PRN**

Library command:
~SETUPMENU

Page 2: **FIX-F** **FIX-B** **FIX-D** **KEYTH** **EXIT**

Library command:
~SEM2

```
*** SETUP OPTIONS ***1/2
M:   Auto Metres
LKS: Auto Links
M-RV: Misclose Rev
BRG±: Datum Diff
SPRN: Select Printer
PRN:  Printer On/Off
M   LKS M-RV BRG± SPRN PRN
```

```
*** SETUP OPTIONS ***2/2
FIX-F: Global Disp Fix
FIX-B: Brg Disp Fix
FIX-D: Dist Disp Fix
```

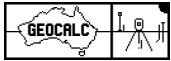
```
EXIT: MAIN MENU
FIX-F FIX-B FIX-D EXIT
```

SETUP Module Main Menu page 1:

M	Auto Metres
LKS	Auto Links
M-RV	Misclose Reverse
BRG±	Datum Difference
SPRN	Select Printer
PRN	Printer output on/off

SETUP Module Main Menu page 2:

FIX-F	Global Display Fix
FIX-B	Bearing Display Fix
FIX-D	Distance Display Fix
KEYTH	KEYTIME Feature
	Empty Menu Label
EXIT	Exit to GEOCALC Main Menu



8.2 Auto Metres

Library command: ~AUTOM

This option is used to automatically convert any entered distance from Links to Metres.

From the SETUP Module Main Menu page 1 press the **M** key.

Auto Metres is active when the menu key displays as **M■**.

To turn this function off, simply press the **M■** key.

8.3 Auto Links

Library command: ~AUTOL

This option is used to automatically convert any entered distance from Metres to Links.

From the SETUP Module Main Menu page 1 press the **LKS** key.

Auto Links is active when the menu key displays as **LKS■**.

To turn this function off, simply press the **LKS■** key.

8.4 Misclose Reverse

Library command: ~M-RV

This option sets the display direction of the Misclose, from start to end or end to start.

From the SETUP Module Main Menu page 1 press the **M-RV** key.

An input prompt will display prompting to enter the value 0 or 180 for the display direction of the Misclose.

To set the Misclose display from start to end, type in the value 0 and press the **[ENTER]** key.

To set the Misclose display from end to start, type in the value 180 and press the **[ENTER]** key.

The program returns to SETUP Module Main Menu page 1.

8.5 Datum Correction

Refer Section 4.33, **Datum Correction**, page 22.

8.6 Select Printer

Library command: ~SPRN

This option allows you to select between the HP82240A or HP82240B infrared printer for printed output.

From the SETUP Module Main Menu page 1 press the **SPRN** key.

An input prompt will display prompting to select the HP82240A or HP82240B infrared printer.

To select the HP82240A infrared printer, press the **A** key from the menu.

To select the HP82240B infrared printer, press the **B** key from the menu.

The program returns to SETUP Module Main Menu page 1.

```

*** SETUP OPTIONS ***1/2
M:      Auto Metres
LKS:    Auto Links
M-RV:   Misclose Rev
BRG±:   Datum Diff
SPRN:   Select Printer
PRN:    Printer On/Off
M ■ LKS ■ M-RV BRG± SPRN PRN

```

```

*** SETUP OPTIONS ***1/2
M:      Auto Metres
LKS:    Auto Links
M-RV:   Misclose Rev
BRG±:   Datum Diff
SPRN:   Select Printer
PRN:    Printer On/Off
M ■ LKS ■ M-RV BRG± SPRN PRN

```

```

{ HOME GEOCALC }      USER      PRG
Misclose Direction
Start → End Enter 0
End → Start Enter 180
0

```

```

*** PRINTER SELECT ***
A: HP 82240A Infrared
B: HP 82240B Infrared

```

```

EXIT: SETUP 1/2
A B      EXIT

```



8.7 Printer output on/off

This option sets the printer output on or off. GEOCALC will automatically print to a HP infrared printer after each calculation is displayed.

From the SETUP Module Main Menu page 1 press the **PRN** key.

Printer output is active when the menu key displays as **PRN**.

To turn this function off, simply press the **PRN** key.

```
*** SETUP OPTIONS ***1/2
M: Auto Metres
LKS: Auto Links
M-RV: Misclose Rev
BRG±: Datum Diff
SPRN: Select Printer
PRN: Printer On/Off
M LKS M-RV BRG± SPRN PRN
```

8.8 Global Display FIX

Library command: ~FIX-F

This option sets the default FIX value for operating in the stack environment.

From the SETUP Module Main Menu page 2 press the **FIX-F** key.

An input prompt will display prompting to enter the Global Fix value. Type in the value and press the **[ENTER]** key. The value will be stored to the variable '~F'.

The program returns to SETUP Module Main Menu page 2.

```
{ HOME GEOCALC } USER PRG
Enter Global Fix
```

4

8.9 Bearing Display FIX

Library command: ~FIX-B

This option sets the FIX value for all displayed Bearings to the screen.

From the SETUP Module Main Menu page 2 press the **FIX-B** key.

An input prompt will display prompting to enter the Bearing Fix value. Type in the value and press the **[ENTER]** key. The value will be stored to the variable '~B'.

The program returns to SETUP Module Main Menu page 2.

```
{ HOME GEOCALC } USER PRG
Enter Fix to BRGS
```

4

8.10 Distance Display FIX

Library command: ~FIX-D

This option sets the FIX value for all displayed Distances to the screen.

From the SETUP Module Main Menu page 2 press the **FIX-D** key.

An input prompt will display prompting to enter the Distance Fix value. Type in the value and press the **[ENTER]** key. The value will be stored to the variable '~D'.

The program returns to SETUP Module Main Menu page 2.

```
{ HOME GEOCALC } USER PRG
Enter Fix to DISTS
```

3



8.11 KEYTIME Feature (HP49G, HP48GII, HP49G+ & HP50G Only)

Library command: ~KEYTIME

This option allows you to set the KEYTIME delay parameter to a desired level.

From the SETUP Module Main Menu page 2 press the **KEYTH** key.

An input prompt will display prompting to enter a KEYTIME value. Type in a value between 0 and 4096 and press the **[ENTER]** key. This will change the value of the KEYTIME delay to the desired level.

The program returns to SETUP Module Main Menu page 2.

```
DEG RVZ HEX R~ 'X' PRG
CHOME GEOCALC3 USR
Enter a KEYTIME Value
Valid No. 0 - 4096
1365
```

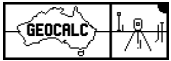
KEYTIME Feature Explained:

The HP49 series (HP49G, HP48GII, HP49G+ & HP50G) are quite smart calculators. They have a feature built into the keyboard called the "Anti-Bounce System". This feature effectively determines whether keys have been pressed one or more times relative to a delay parameter calculated via the clock.

All the older model calculators such as the HP48 series never had this problem. When a key was detected as down, the system waits 1/10 of a second, checking the key, in order to ensure that they were not bouncing. This is one of the reasons why the HP48 was going slower when a key was pressed.

On the HP49, the anti-bounce system is different. When the system detects a key as down, it puts the entry into the keyboard buffer, and saves the current time into a special variable. If the system detects a key as down, before entry into the keyboard buffer, it performs a calculation. This calculation being: $\{ (\text{current time} - \text{saved time}) > \text{constant} \}$. If the equation is true, it means that the key has been pressed twice, otherwise it means the key just bounced (and the key is not entered into the keyboard buffer).

You can adjust the constant using the KEYTIME command. A valid number between 0 and 4096 is required. For example if you set KEYTIME to 4096 and press the same key fast, you will see that you cannot get anymore than 2 valid key presses per second. Set the KEYTIME to 0 and you get every key press. The default value is 1365. You'll need to experiment with this to find what works best for you.



9. TROUBLESHOOTING

9.1 Missed Keystrokes?

If you're using a HP49G, HP48GII, HP49G+ or HP50G and your experiencing missed keystrokes, the problem may not be because of the Geocalc software or the calculator keyboard being faulty.

It could in fact be due the "Anti-Bounce System" built into the keyboard. The delay parameter may be set to a level that is not adequate for your usage. This can be modified by the onboard software "KEYTIME".

Refer Section 8.11, **KEYTIME Feature (HP49G, HP48GII, HP49G+ & HP50G Only)**, Page 92.

9.2 If the program Crashes

If the program crashes the calculator may produce an error message followed by a tone. The stack may be left with useless objects. To clear the stack press the **[DEL]** key. To return to GEOCALC press the **[CST]** key followed by the **[GEO]** key.

A common cause for the program crashing is the naming of objects during input prompts within the program being the same as the Geocalc Variables Directory or Library Command Listing. Refer Section 3.1, **GEOCALC Variables Directory**, page 17, & Refer Appendix 3, **Library Command Listing**, page 103.

9.3 To Reset GEOCALC

If the program is behaving excessively slow or unusual it may be necessary to reset to program. From GEOCALC Main Menu page 1 press the **[RESET]** key.

The Reset program resets all flags used both system and user, deletes newly created variables during operation including current Close Matrix, turns off the **USER** keyboard, clears all suspended programs which normally slows down program operations. If suspended programs exist a HALT annunciator is displayed at the top of the display. When the RESET program is finished an audible tone will beep.

9.4 To Reset the Calculator

If the calculator freezes and doesn't respond to any keystrokes it may be necessary to reset the calculator.

1. Insert the end of a metal paper clip into the hole in the back of the calculator. Hold for one second and then remove the clip.
2. Press the **[ON]** key.
3. If necessary:
 - a) Press and hold the **[ON]** key.
 - b) Press and hold the **[F3]** key.
 - c) Release both keys

If this does not fix the problem, the calculator requires service.



SAMPLE



10. SERVICE AND SUPPORT

10.1 Hardware Support

HP Calculator Support:

All HP Calculators are covered by a one-year limited warranty against defects in materials and workmanship. The period of one (1) year is from the date of original consumer purchase.

The warranty will not apply to the product if it has been damaged by misuse, alteration, accident, improper handling or operation, or if unauthorized repairs are attempted or made.

If you require technical support please direct your enquiry to **Australian HP Calculator Support** via telephone.

The calculator support (toll free) telephone numbers are:

Tel: 1300 551 664 (Australia)

Tel: 0800 551 664 (New Zealand)

Monday - Friday; 9am - 5pm AEST (excluding public holidays)

Software for the HP33S, HP35S, HP48 Series, HP49 Series, HP50G

Please direct your enquiries to:

Geocalc Software

Contact: Noel Causerano

Email: noel@geocalc.com.au

WEB: www.geocalc.com.au

Postal Address:

PO Box 386,
Earlville, QLD, 4870,
Australia

10.2 Comments, Faults, and Suggestions

Help Us To Help Serve You Better

All comments are appreciated for the benefit of future versions of the program. You can contact the programmer at the addresses below.

For problems with the GEOCALC program, the programmer **Noel Causerano** can be contacted at:

Postal Address: PO Box 386, Earlville, Cairns, QLD, 4870, Australia

Email: noel@geocalc.com.au



SAMPLE

APPENDIX 1

DIAGRAM 1

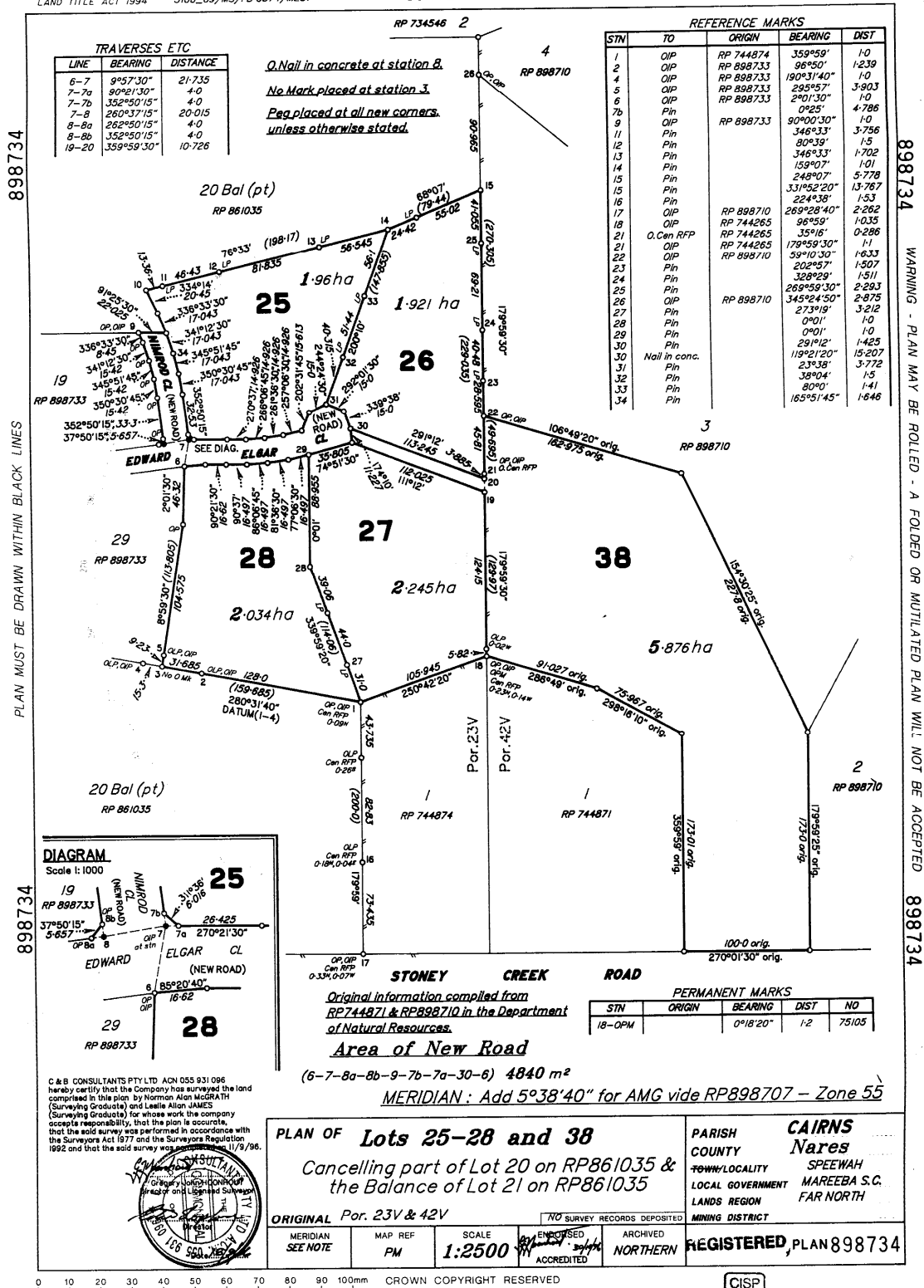
RP898734 REGISTERED Pages: 2 Page 1 of 2

LAND TITLE ACT 1994

5100_09/MS/FB C874/M287

SURVEY PLAN

FORM 21 VERSION 1



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(Department of Natural Resources)



SAMPLE



APPENDIX 2 MENU MAP

GEO

CLOSE COORD UTILS LEVEL SETUP RESET
USER ABOUT UNINS

CLOSE

NEW DATA VIEW SAVE LOAD TIDY
SLN+ ADJUST CTAVY PLOT PRINT EXIT

NEW

NEW BRG± REVB LKSP ERA.L B&D
VIEW CALC A/U A/A [E.N] EXIT

BRG±

A B C D E EXIT

VIEW

NEXT PREV # EDIT DELT INSR
DATM EXIT

CALC

ΔMIS 2DIST 2BRG BDDL CUTΔ EXIT

VIEW

NEXT PREV # EDIT DELT INSR
DATM EXIT

SLN+

CLOS 2DIST 2BRG BDDL CUTΔ EXIT

PRINT

IHEAD I B&D PTRAY PCORD PPLOT EXIT

IHEAD

TRAY LOT ROAD EMT LEASE SEV



COORD

TOOLS PT? ■→■ ■→? ■■?■■ ■?■

REF.L |→□| M→PT C→HP T→PT **EXIT**

TOOLS

JOB **FILE** **DATA** **EXIT**

JOB

JOB **INFO** **ERASE** **DPOSE** **EXIT**

FILE

FILE **INFO** **ERASE** **DPOSE** **PFILE** **EXIT**

DATA

READ **VIEW** **DEL** **EXIT**

■→■

E1 **N1** **E2** **N2** **READ** **CALC**
EXIT

■→?

E1 **N1** **BRG** **DIST** **READ** **CALC**
EXIT

■■?■■

E1 **N1** **E2** **N2** **READ** **EXIT**
E3 **N3** **E4** **N4** **READ** **CALC**

■?■

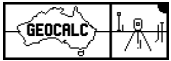
E1 **N1** **E2** **N2** **DIST** **CALC**
READ **EXIT**

REF.L

E1 **N1** **BRG** **DIST** **READ** **CALC**
E3 **N3** **E4** **N4** **READ** **EXIT**

|→□|

NEW **MEAS** **EXIT**



UTILS

SECT TRUN

EXIT

SECT

BRG1 BRG2 RWD1 RWD2 CALC EXIT

TRUN

BRG1 BRG2 TOPT LWD2 CALC EXIT

LEVEL

NEW DATA T.B/F R/F T.R/F RLS

ADJ1 ADJ2 ADJ3

EXIT

NEW

BS IS FS VIEW EXOM EXIT

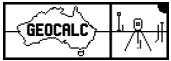
SETUP

M LKS M-RV BRG± SPAN PRN

FIX-F FIX-B FIX-D KEYTH EXIT



SAMPLE



APPENDIX 3 LIBRARY COMMAND LISTING

Library Command Listing (Library order) :

~GEOMENU ~GEOMENU2 ~GMENU ~ABOUT ~USER ~LOGO ~RESET ~CLOSEMENU
 ~COORDMENU ~UTILSMENU ~LEVELMENU ~SETUPMENU ~CLM2 ~COMM2 ~LEV2 ~SEM2 ~EMEN
 ~UK0 ~UK1 ~UK2 ~UK3 ~UK4 ~HD ~DISP ~NEWCL ~CONTCL ~CONTCL2 ~DATA ~DATA1
 ~DATA2 ~LSTL ~LSTLM ~ADC ~DATMENU ~DM2 ~CALC.CL ~ERA.L ~CLSCD ~CD? ~PRDE
 ~CALCD ~VIEW ~VIEW1 ~VIEW2 ~CLOS ~CLS ~RAT? ~AREA? ~AMIS ~AMAJ ~AMISD ~DD?
 ~BB? ~BDDL? ~CUTΔ ~DDDΔ ~DBDΔ ~ADJSTM ~ADJST ~ADJ? ~AJ ~PLOTM ~PLOTT ~PLOT
 ~PBOW ~CTRAV ~CTRAVM ~CTRAVDM ~PRINTMENU [HEAD] ~ECD ~RP? ~PB&D ~FB&D ~CDSP
 ~PCORD ~PSRN ~PSRN1 ~PSRN2 ~DATM ~EDITT ~GOTO ~INSR ~DELT ~PTRAV ~ADD ~ADDED
 ~S1OR2 ~PMSG ~SAVE.CL ~LOAD.CL ~TIDY.CL ~NMENU ~DMENU ~CMMENU ~REVB →M →LKS
 ~PULL ~GETLNE ~DSPCD →B&D →CD →L&D L&D→ ~BRG? ~LM ~LM2 ~NLBL ~CLG ~SAVE
 ~LAST1 ~LAST2 ~TOOLS ~JOBTOOLS ~FILETOOLS ~DATATOOLS ~CJOB ~TJOB ~PJOB ~JFD
 ~CFLE ~FCHG ~TFLE ~CCF ~PFLE ~PFILE ~JINF ~FINF ~JERA ~FERA ~JDPOSE ~FDPOSE
 ~DATAREAD ~DATAVIEW ~TIDY.CD ■→■ ■→■D ■→■M1 ■→■M2 ■→■1 ■→■2 C■→■ ■→?
 ■→?D ■→?M1 ■→?1 ■→?2 C■→? C■→?M ■■?■■ ■■?■■1 ■■?■■2 C■■?■■ ■?■ ■?■1
 ■?■2 ■?■M1 ■?■M2 C■?■ ~REF.L ~CREF.L ~SETDST SET■ ~SINFO ~CALC ~MEAS
 ~SETOUTMENU ~PT? ~TNO ~PTST ~PTSTO ~PTREN ~SVCD .? ~READ ~DE&N ~DE&N1 ~DE&N2
 ~DDST M→PT C→HP48 T→PT ~SECT ~TRUN ~BS? ~IS? ~FS? ~LEVNEW ~LEVDATA ~LEV
 ~LEVM ~LEVSTO ~LEVSTO1 ~ESRL ~EERL ~ΣDAT? ~LVIEW ~T.B\F ~R\F ~R\F1 ~T.R\F ~RLS
 ~LADJ1 ~LADJ2 ~LADJ3 ~LAC1 ~NSU? ~NST1? ~NST2? ~RLF? ~LEVERR ~AUTOM ~AUTOL
 ~D-DF ~D-DF1 ~D-DF2 ~DFSTO ~M-RV ~SPRN ~FIX-B ~FIX-D ~FIX-F ~BFX ~DFX ~FX ~KEYTIME
 ~DMS UNINSTALL

Library Command Listing (Alphabetical order) :

~ABOUT ~ADC .ADD ~ADDED ~AJ ~ADJ? ~ADJST ~ADJSTM ~AMAJ ~AMIS ~AMISD ~AREA?
 ~AUTOM ~AUTOL ~BB? ~BDDL? ~BFX ~BRG? ~BS? ~CALC ~CALC.CL ~CALCD ~CCF ~CDSP
 ~CD? ~CFLE ~CJOB ~CLG ~CLM2 ~CLOS ~CLOSEMENU ~CLS ~CLSCD ~CMMENU ~COMM2
 ~CONTCL ~CONTCL2 ~COORDMENU ~CREF.L ~CTRAV ~CTRAVM ~CTRAVDM ~CUTΔ C→HP48
 C■→■ C■→? C■→?M C■■?■■ C■?■ ~DATA ~DATA1 ~DATA2 ~DATAREAD ~DATATOOLS
 ~DATAVIEW ~DATM ~DATMENU ~DBDΔ ~DD? ~DDDΔ ~D-DF ~D-DF1 ~D-DF2 ~DDST ~DELT
 ~DE&N ~DE&N1 ~DE&N2 ~DFSTO ~DFX ~DISP ~DMENU ~DMS ~DM2 ~DSPCD ~ECD ~EDITT
 ~EERL ~EMEN ~ERA.L ~ESRL ~FB&D ~FCHG ~FDPOSE ~FERA ~FILETOOLS ~FINF ~FIX-B
 ~FIX-D ~FIX-F ~FS? ~FX ~GEOMENU ~GEOMENU2 ~GETLNE ~GMENU ~GOTO ~HD [HEAD]
 ~INSR ~IS? ~JDPOSE ~JERA ~JFD ~JINF ~JOBTOOLS ~KEYTIME ~LAC1 ~LADJ1 ~LADJ2 ~LADJ3
 ~LAST1 ~LAST2 ~LEV2 ~LEVSTO ~LEVSTO1 ~LEVERR ~LEVELMENU ~LEVM ~LEVNEW ~LEVSTO
 ~LEV2 ~LM ~LM2 ~LOAD.CL ~LOGO ~LSTL ~LSTLM ~LVIEW L&D→ ~MEAS ~M-RV M→PT
 ~NEWCL ~NLBL ~NMENU ~NST1? ~NST2? ~NSU? ~PBOW ~PB&D ~PCORD ~PFILE ~PFLE ~PJOB
 ~PLOTM ~PLOTT ~PMSG ~PLOT ~PRDE ~PRINTMENU ~PSRN ~PSRN1 ~PSRN2 ~PTRAV
 ~PTREN ~PTST ~PTSTO ~PT? ~PULL ~RAT? ~READ ~REF.L ~RESET ~REVB ~R\F ~R\F1 ~RLF?
 ~RLS ~RP? ~SAVE ~SAVE.CL ~SECT ~SEM2 ~SETDST ~SETOUTMENU ~SETUPMENU SET■
 ~SINFO ~SPRN ~SVCD ~S1OR2 ~T.B\F ~TFLE ~TIDY.CD ~TIDY.CL ~TJOB ~TNO ~TOOLS ~T.R\F
 ~TRUN T→PT ~UK0 ~UK1 ~UK2 ~UK3 ~UK4 UNINSTALL ~USER ~UTILSMENU ~VIEW ~VIEW1
 ~VIEW2 →B&D →CD →LKS →L&D →M ■→■ ■→■D ■→■M1 ■→■M2 ■→■1 ■→■2 ■→?
 ■→?D ■→?M1 ■→?1 ■→?2 ■■?■■ ■■?■■1 ■■?■■2 ■?■ ■?■1 ■?■2 ■?■M1 ■?■M2 .?
 ~ΣDAT?



SAMPLE

APPENDIX 4

FLAGS SETTING USED BY GEOCALC

HP48GX/G+ & HP49S

Flag	Description
-15	Rectangular
-16	Polar/Spherical
-19	2-dimensional vector/complex number
-33	I/O Device
-34	Printing Device
-35	I/O Data Format
-52	Single Line Display
-56	Error Beep
-60	Alpha Lock
-62	User Mode
1	User Flag
33	User Flag
34	User Flag
35	User Flag
36	User Flag
37	User Flag
38	User Flag
39	User Flag
40	User Flag
41	User Flag
43	User Flag
44	User Flag
45	User Flag
47	User Flag
48	User Flag
49	User Flag
50	User Flag
51	User Flag
52	User Flag
53	User Flag
54	User Flag
56	User Flag
57	User Flag
58	User Flag
59	User Flag
60	User Flag

HP49S, HP48GII, HP49G+, HP50G ONLY

Flag	Description
-85	Normal Stack Display
-91	MTRW: Matrix
-95	RPN Mode
-103	Complex Off
-105	Approx mode on
-110	Normal Matrices



NOTES

SAMPLE



NOTES

SAMPLE