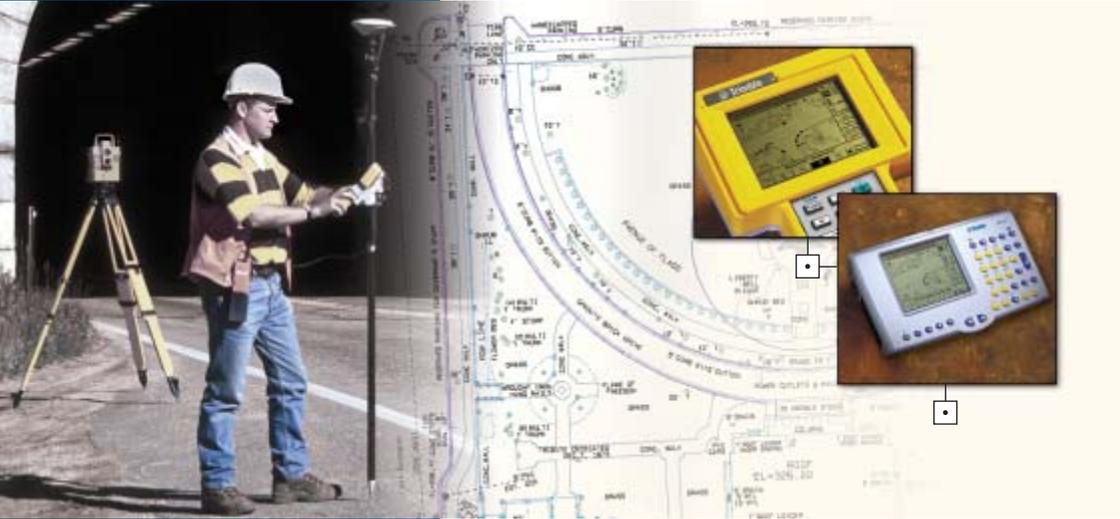


Trimble Survey Controller™ Getting Started Guide



Trimble Survey Controller™

Getting Started Guide



Version 10.5
Revision A
Part Number 571 702 061
September 2002

Corporate Office

Trimble Navigation Limited
Engineering and Construction Division
5475 Kellenburger Road
Dayton, Ohio 45424-1099
U.S.A.

Phone: (937) 233-8921

(800) 538-7800

Fax: (937) 233-9441

www.trimble.com

Copyright and Trademarks

© 2002, Trimble Navigation Limited. All rights reserved. The Globe & Triangle logo, Trimble, Autolock, CMR, Trimble Survey Controller, TSCe, and Zephyr are trademarks of Trimble Navigation Limited. GPS Total Station is a trademark of Trimble Navigation Limited registered in the United States Patent and Trademark Office. The Bluetooth trademarks are owned by its proprietor and used by Trimble Navigation Limited under license. All other trademarks are the property of their respective owners.

Release Notice

This is the September 2002 release (Revision A) of the *Trimble Survey Controller Getting Started Guide*, part number 571 702 061. It applies to version 10.5 of the Trimble Survey Controller software.

The following limited warranties give you specific legal rights. You may have others, which vary from state/jurisdiction to state/jurisdiction.

Software and Firmware License, Limited Warranty

This Trimble software and/or firmware product (the "Software") is licensed and not sold. Its use is governed by the provisions of the applicable End User License Agreement ("EULA"), if any, included with the Software. In the absence of a separate EULA included with the Software providing different limited warranty terms, exclusions, and limitations, the following terms and conditions shall apply. Trimble warrants that this Trimble Software product will substantially conform to Trimble's applicable published specifications for the Software for a period of ninety (90) days, starting from the date of delivery.

Warranty Remedies

Trimble's sole liability and your exclusive remedy under the warranties set forth above shall be, at Trimble's option, to repair or replace any Product or Software that fails to conform to such warranty ("Nonconforming Product"), or refund the purchase price paid by you for any such Nonconforming Product, upon your return of any Nonconforming Product to Trimble in accordance with Trimble's standard return material authorization procedures.

Warranty Exclusions and Disclaimer

These warranties shall be applied only in the event and to the extent that: (i) the Products and Software are properly and correctly installed, configured, interfaced, maintained, stored, and operated in accordance with Trimble's relevant operator's manual and specifications,

and; (ii) the Products and Software are not modified or misused. The preceding warranties shall not apply to, and Trimble shall not be responsible for defects or performance problems resulting from (i) the combination or utilization of the Product or Software with products, information, data, systems or devices not made, supplied or specified by Trimble; (ii) the operation of the Product or Software under any specification other than, or in addition to, Trimble's standard specifications for its products; (iii) the unauthorized modification or use of the Product or Software; (iv) damage caused by accident, lightning or other electrical discharge, fresh or salt water immersion or spray; or (v) normal wear and tear on consumable parts (e.g., batteries).

THE WARRANTIES ABOVE STATE TRIMBLE'S ENTIRE LIABILITY, AND YOUR EXCLUSIVE REMEDIES, RELATING TO PERFORMANCE OF THE PRODUCTS AND SOFTWARE. EXCEPT AS OTHERWISE EXPRESSLY PROVIDED HEREIN, THE PRODUCTS, SOFTWARE, AND ACCOMPANYING DOCUMENTATION AND MATERIALS ARE PROVIDED "AS-IS" AND WITHOUT EXPRESS OR IMPLIED WARRANTY OF ANY KIND BY EITHER TRIMBLE NAVIGATION LIMITED OR ANYONE WHO HAS BEEN INVOLVED IN ITS CREATION, PRODUCTION, INSTALLATION, OR DISTRIBUTION, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, TITLE, AND NONINFRINGEMENT. THE STATED EXPRESS WARRANTIES ARE IN LIEU OF ALL OBLIGATIONS OR LIABILITIES ON THE PART OF TRIMBLE ARISING OUT OF, OR IN CONNECTION WITH, ANY PRODUCTS OR SOFTWARE. SOME STATES AND JURISDICTIONS DO NOT ALLOW LIMITATIONS ON DURATION OR THE EXCLUSION OF AN IMPLIED WARRANTY, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. TRIMBLE NAVIGATION LIMITED IS NOT RESPONSIBLE FOR THE OPERATION OR FAILURE OF OPERATION OF GPS SATELLITES OR THE AVAILABILITY OF GPS SATELLITE SIGNALS.

Limitation of Liability

TRIMBLE'S ENTIRE LIABILITY UNDER ANY PROVISION HEREIN SHALL BE LIMITED TO THE GREATER OF THE AMOUNT PAID BY YOU FOR THE PRODUCT OR SOFTWARE LICENSE OR U.S.\$25.00. TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, IN NO EVENT SHALL TRIMBLE OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES WHATSOEVER UNDER ANY CIRCUMSTANCE OR LEGAL THEORY RELATING IN ANY WAY TO THE PRODUCTS, SOFTWARE, AND ACCOMPANYING DOCUMENTATION AND MATERIALS, (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF BUSINESS PROFITS, BUSINESS INTERRUPTION, LOSS OF BUSINESS INFORMATION, OR ANY OTHER PECUNIARY LOSS). REGARDLESS OF WHETHER TRIMBLE HAS BEEN ADVISED OF THE POSSIBILITY OF ANY SUCH LOSS AND REGARDLESS OF THE COURSE OF DEALING WHICH DEVELOPS OR HAS DEVELOPED BETWEEN YOU AND TRIMBLE, BECAUSE SOME STATES AND JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES, THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

Contents

Introduction

What's in the box? vii

1 The ACU Controller

Attaching the ACU 2
ACU Function Keys 3
Power Supply 6
Screen. 7
Backlight 8
Clock 9
Storage Card 9
Rebooting. 9
Caring for the unit 10

2 Conventional Survey

Preparing for the Survey 13
Creating a New Job. 15
Starting a Survey 16
Trimble 3600 and 5600 Configuration 17
GDM CU Programs 18
Zeiss Elta Programs 23
GDM CU and Zeiss Measurement Modes 27

3 GPS Survey

Setting Up a GPS Total Station 5700 Receiver (Base). 29
Setting Up a GPS Total Station 5800 Receiver (Rover) 31

4 Data Transfer

Using the Data Transfer Utility. 33

A Menu Structure

Table of Contents

Introduction

Welcome to the *Trimble Survey Controller Getting Started Guide*. Information in this manual includes:

- The Trimble™ ACU controller
- Starting conventional surveys
- Starting GPS surveys
- Transferring data to the office PC

The Trimble Survey Controller™ software configures and controls receivers and instruments used in GPS and conventional surveys.

Trimble Survey Controller is also available on the TSCe™ controller. The information in this document also applies to the TSCe.



Where details apply only to the TSCe, they are indicated with this TSCe icon.

Note – If you are not familiar with GPS, visit Trimble's website (www.trimble.com) for an interactive look at Trimble and GPS.

Related information

Sources of related information include the following:

- Help – the software has built-in, context-sensitive help that lets you quickly find the information you need. The Help is also available on the CD.
- Release notes – the release notes describe new features of the product, information not included in the manuals, and any changes to the manuals.

Technical assistance

If you have a problem and cannot find the information you need in the product documentation, contact your local distributor.

Your comments

Your feedback about the supporting documentation helps us to improve it with each revision. To forward your comments, send an e-mail to ReaderFeedback@trimble.com

What's in the box?

Check that you receive all of the following components with Trimble Survey Controller:

Part	Part Number	Connection / Use
ACU controller	571 225 500	
ACU controller pouch	571 906 345	
Trimble Survey Controller software CD	571 702 071	
Getting Started Guide (this document)	571 702 061	
Multiport adaptor	RGR-MultiADPT	ACU 26-pin D-sub to LAN or USB
Power cord, and power supply with adaptors for Europe, UK, USA, and Australia	571 906 344	Mains power to the ACU. Use it to power the ACU and charge the internal battery.
PC adaptor	571 202 204	PC COM port to ACU COM1
2.5 m system cable	571 202 216	ACU to PC adaptor
USB cable	1-44016	ACU to PC Use with the multiport adaptor when transferring files with Microsoft ActiveSync.
Adaptor 26-to-9 pin D-Sub	1-RGR-A26TO9PIN	Convert the ACU 26-pin connector to a 9-pin COM2 connector
Screen protector	1-RGR-ALCDPELOFF	
Other available accessories	Part Number	
ACU holder	571224091	

The ACU Controller

CHAPTER 1

1

In this chapter:

- Attaching the ACU
- ACU function keys
- Power supply
- Screen
- Clock
- Storage card
- Rebooting
- Caring for the unit

Trimble Survey Controller is designed to run on the ACU controller. This chapter describes the controller and how to use it. Figure 1.1 shows the front of the ACU and its keys.



Figure 1.1 The ACU controller – front view

Attaching the ACU



Warning – Switch off the ACU when attaching it to the holder or when changing the batteries in the holder with the ACU attached. Otherwise, the on/off status of the ACU and the holder may become unsynchronised.

To attach the ACU:

1. Hold the controller with both hands.
2. Fit the groove on the back of the controller over the lower lip on the front of the holder.
3. Press down and rest the back of the controller flat against the holder.
4. Gently release downward pressure and guide the controller so that the teeth on the front of the holder click into the notches on top of the controller.

Figure 1.2 shows how to attach the ACU to the holder.



Figure 1.2 Attaching the ACU

ACU Function Keys

Table 1.1 describes Trimble Survey Controller functions that are associated with the ACU icons.

Table 1.1 ACU function keys

On this instrument or receiver ...	tap ...	to ...
Conventional or GPS		access the main Trimble Survey Controller menu
		access the <i>Trimble function</i> screen
		switch Autolock on and start a search
Conventional (with Autolock™)		switch Autolock on or off
		take a measurement

Table 1.1 ACU function keys (Continued)

On this instrument or receiver ...	tap ...	to ...
Conventional (with servos)		turn the instrument horizontally to the current point name or stakeout location
		turn the instrument vertically to the current point name or stakeout location
		turn the instrument horizontally and vertically to the current point name or stakeout location
		change face
		take a measurement
Conventional (3600)		activate the first softkey (F1)
		activate the second softkey (F2)
		activate the third softkey (F3)
		activate the fourth softkey (F4)
		take a measurement

Table 1.1 ACU function keys (Continued)

On this instrument or receiver ...	tap ...	to ...
		access the <i>Position</i> dialog
		access the <i>Satellites</i> dialog
		activate the first softkey (F1)
GPS		activate the second softkey (F2)
		activate the third softkey (F3)
		activate the fourth softkey (F4)
		activate the Enter button

Power Supply

Under normal operation, the ACU draws power from the device it is attached to or from one of the following external batteries:

- 12V NiMH
- 7.4 Lithium-ion

The ACU has an internal, rechargeable 4.8 volt 600 mAh NiMH battery. If power is lost during operation the ACU automatically switches over to this battery, which provides approximately two hours running time when fully charged.

The ACU holder has dual 7.4V 1.8Ah lithium-ion batteries. When fully charged, these provide approximately 15 hours running time to the ACU through the 7-pin backplane.



The TSCe is supplied with a rechargeable 4.8 volt 3800 mAh NiMH battery, which provides over 30 hours of running time when fully charged.

Charging the batteries

The internal battery of the ACU is automatically charged when the controller is connected to an external power supply.

To charge the internal battery:

- Connect the AC adaptor from the ACU 4-pin Hirose port to the mains power supply.

The ACU detects the following low power levels from the external batteries:

- 10 volts (12V NiMH battery)
- 6 volts (Lithium-ion battery)

The ACU alerts you when power level is critically low. If this happens, turn the equipment off and change the external battery. Otherwise, the ACU will switch over to its internal battery.



The TSCe incorporates a quick circuit that recharges its internal NiMH battery to 90% capacity in approximately one hour. To charge the battery, use one of the following methods:

- Connect the AC adaptor to a mains power supply, with the Multiport adaptor (part number RGR-MULTIADPT) plugged into the 26-pin port (COM 2) on the TSCe.
- Connect the O-shell to O-shell lemo (PN 31288-02) to Port 1 on the receiver (running on mains power)
- Connect the O-shell lemo from the OSMII to the O-shell lemo on the TSCe.

The control unit monitors the battery while it is charging. To turn off the display, press the  key. Before using the TSCe on battery power alone, charge the battery for a minimum of two hours.

Battery replacement



Warning – Do not attempt to change the battery or you may seriously damage the ACU. Contact your local distributor.



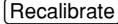
Contact your local distributor for a replacement battery.

Screen

The ACU reflective LCD screen can be viewed easily in direct sunlight or in overcast conditions. It also incorporates a passive touch interface for navigation. Tap elements on the display screen with a stylus or your finger.

Recalibrating the touch screen

If the touch screen does not respond properly when you tap it, recalibrate it as follows:

1. Tap  and select *Settings / Control Panel / Stylus*. The *Stylus Properties* dialog appears.
2. In the *Calibration* tab, tap .
3. Follow the prompts.

Disabling the touch screen

To clean the ACU screen during a survey, press + (the alpha key) then  four times (to access “S”) to disable it. This locks the screen and keypad, except for the  key.



To disable the TSCe screen, press +.

To enable the touch screen and keypad again, press .

Backlight

To modify the backlight settings:

- Select *Display / Backlight* from the Control Panel.
 - If the *Auto on* option is disabled, press  and .
- Press  and  to switch between these backlight modes:
- screen and keyboard on
 - screen only on
 - screen and keyboard off

Clock

To change time and date settings on the ACU:

1. Tap  **Start** and select *Settings / Control Panel / Date/Time*.

The *Date/Time Properties* dialog appears.

2. Change the date and time as required. Press  to accept the new settings or  to cancel.

Note – When you connect the ACU to a GPS receiver or to your PC using Microsoft ActiveSync, the date and time are automatically updated.

Storage Card

The ACU has a built-in storage card for your data and programs. This appears in the Windows CE files system as the *Disk* folder.

Note – *The system maintains several special files on the card, such as nk.bin and ranger.reg, which contain information crucial to the correct operation of the ACU. Directly modifying these files may result in the ACU failing to operate correctly.*

Safeguarding data

Back up your work regularly using Microsoft ActiveSync or the Trimble Data Transfer utility. For more information, see Chapter 4, Data Transfer.

Rebooting

If the ACU fails to respond to keystrokes, then perform one of the following resets, which shut down the hardware and restart the Trimble Survey Controller software.

Soft reset (warm boot)

This method retains all data.

To perform a soft reset:

- Hold down  and , while you press and release .

The ACU resets to the default Microsoft Windows desktop view.



To warm boot the TSCe, hold down  and , while you press and release .

Hard reset (cold boot)

This method retains any data on the built-in storage card (the *Disk* folder). However, a hard reset clears the contents of the RAM memory, including any desktop shortcuts that you have created.

To perform a hard reset:

1. Hold down .

After approximately 5 seconds, a countdown timer appears, indicating that the controller will reset.

2. Continue to hold  for a further 5 seconds, then release.

The controller briefly displays the boot screen and then resets to the default Microsoft Windows desktop view.

Caring for the unit

Trimble recommends the following to maintain your ACU during everyday use, and to prevent potential physical damage or data loss.

Operating temperature: -20°C to $+55^{\circ}\text{C}$

Storage temperature: -30°C to $+70^{\circ}\text{C}$



Do not expose the TSCe to temperatures below -20°C (-4°F) or above $+60^{\circ}\text{C}$ (140°F). Do not leave it in direct sunlight for extended periods of time.

Shock



The TSCe is designed to withstand a MIL-STD-810E drop. However, impact or pressure on the display screen may cause it to crack. Protect the display from impact, pressure, or abrasive substances.

Environment – The ACU is designed to withstand driving rain and dust.



The TSCe is designed to be immersible in up to one meter of water, for up to one hour.

Cleaning the case – Clean the controller with a soft cloth dampened with clean water or with water containing a mild detergent. If the keyboard has dirt or grime on it, use compressed air or a vacuum cleaner, or gently rinse it with clean water.

Care of the touch screen – Clean the touch screen with a soft cloth dampened with clean water or glass cleaner. Do not apply any cleaner directly to the screen. Apply the cleaner to the soft cloth and then gently wipe the screen.

Note – Do not use abrasive cleaners.

Applying a screen protector – Use a screen protector to help keep the touch screen clean and protected. Clean the screen thoroughly and leave it slightly wet. Peel the backing from the screen protector and then apply the protector to the screen. Use a soft cloth to squeeze the excess water and air from under the screen protector.

Conventional Survey

2

In this chapter:

- Preparing for the survey
- Creating a new job
- Starting a survey
- Trimble 3600 and 5600 configuration
- GDM CU programs
- Zeiss Elta programs
- GDM CU and Zeiss measurement modes

This chapter describes how to carry out a conventional survey with Trimble Survey Controller when the ACU is attached to a Trimble 3600 or 5600 instrument. For more information, refer to the Help.

Preparing for the Survey

To do this:

1. Set up the instrument.
2. Ensure that the ACU is turned off, and then attach it to the instrument. For more information, see page 2.
3. Press  on the ACU to switch on the instrument.
4. Start Trimble Survey Controller. The software automatically connects to the instrument and the *Electronic level* dialog appears.

Note – If you have a Trimble 3600 instrument with a laser plummet, the laser plummet automatically turns on when this dialog appears.

5. Position and level the instrument and tap . If you are using a Trimble 5600 instrument, the compensator is automatically initialized now.

6. When prompted by the *Corrections* dialog, enter appropriate atmospheric values and tap .
7. The *Survey Controller Basic* dialog appears. It displays the current instrument readings.

Note – You cannot store measurements in this mode.

8. Tap to exit Survey Controller Basic mode. The main Trimble Survey Controller menu appears, and you can then begin a survey.

If you are running a robotic survey, see the following section. Otherwise go directly to Creating a New Job, page 15.

Using the ACU to prepare for a robotic survey

To survey using a 5600 robotic instrument:

1. From the main menu, select *Instrument / Radio*. Set the radio channel, station address and remote address and tap .
2. From the main menu, select *Survey / Start Robotic* to prepare the 5600 for robotic connection.
3. Tap to suspend the 5600 and the ACU ready for robotic operation.
4. Remove the ACU from the 5600.

Note – If the radio settings on the 5600 instrument are already set to match the ACU, and the instrument is level, press the trigger button on the back of the 5600 to turn on the instrument for a robotic connection.

5. Ensure that the ACU is turned off, and then attach it to the ACU holder. For more information, see page 2.
6. Connect the ACU to Port A on the remote radio using the ACU holder or a 0.4m, 4 pin Hirose cable.
7. Turn on the active target or connect it to Port B on the remote radio.

Once the ACU is attached to the holder, Trimble Survey Controller connects to the remote radio and then to the 5600. The 5600 is re-initialized to compensate for the earlier removal of the controller.

You can now create a job, see page 15, and start the survey, see page 16.

Creating a New Job

Note – All information about a survey is stored in a Survey Controller job file. (This is not the same as a GDM job file.)

To create a new Trimble Survey Controller job:

1. From the main menu, select *File / New job*. The *New job* dialog appears.
2. Enter a name in the Job name field.
3. Tap the **Coord. sys** button and define one of the following coordinate systems:
 - Scale factor only
 - Select from library
 - Key in parameters
 - No projection

Note – For simple conventional surveys, select a scale factor only coordinate system and set the scale to an appropriate value. Use a scale factor of 1.0000 if you do not want to apply a scale.

The current coordinate system is displayed on the **Coord. sys** button.

4. Define the units by tapping the **Units** button. The current distance units are displayed on the **Units** button.

From the *New job* dialog, you can also select the following:

- a linked file. This can be a comma delimited (CSV), text (TXT), or existing Survey Controller job (JOB) file that contains survey information.
- a background map file. This can be displayed in the map.
- a feature library. This defines codes and associated attributes that are used for coding features.
- the Page down softkey (⏴). Tap this softkey to enter additional job details.

Starting a Survey

To start a survey, select *Survey* from the main menu, and then select one of the following:

- *Station setup* – to orientate the survey on a point with known coordinates. Multiple backsight points can be added to define the orientation as required.
- *Resection* – to orientate the survey on a point with unknown coordinates. The resection will calculate the coordinates for the instrument point and orientate the survey.

Once the station setup or resection is completed, select one of the following:

- *Survey / Measure points* – to perform survey measurements.
- *Survey / Stakeout* – to stake points, lines, arcs, roads or DTMs.
- *Map* – to graphically review the survey data or to perform survey operations.
- *Favorites / Review* – to view the data stored in the Survey Controller job.

For more information, see GDM CU Programs, page 18, or Zeiss Elta Programs, page 23.

Trimble 3600 and 5600 Configuration

To view and modify the instrument configuration, select *Instrument* from the Trimble Survey Controller main menu. The instrument menu appears with all available options for the current instrument, as shown below:

Item	Instrument	
	3600	5600
Electronic level	✓	✓
Direct Reflex (DR instrument only)	✓	✓
Instrument controls (Servo only)	x	✓
Tracklight	✓	✓
Autolock (Autolock only)	x	✓
Instrument settings	✓	✓
Radio settings (Robotic only)	x	✓
Adjust instrument	✓	✓
Survey Controller basic	✓	✓

Modifying instrument configuration

To quickly access and modify the instrument configuration:

1. Select the Trimble function key () on the ACU, or the instrument icon on the status bar (for example, ). The *Trimble function* screen appears.
2. Select the required icon to change the instrument configuration.

Changing the target for DR measurements

For 3600 and 5600 instruments with Direct Reflex (DR), tap the target icon on the status bar and select one of the following:

- DR target – to change the target height and prism constant and enable the DR EDM mode on the instrument.
- Normal target – to change to a normal target height and prism constant and disable the DR EDM mode.

GDM CU Programs

Trimble Survey Controller offers similar functionality to the GDM Control Unit.

To access GDM CU programs, use the Trimble function key as you would the PRG key on the GDM CU.

Table 2.1 shows where to find specific GDM CU programs within Trimble Survey Controller.

Table 2.1 GDM CU programs in Trimble Survey Controller

Trimble Survey Controller			
GDM CU program	Select ...	to ...	Shortcut ( + number)
20 - Station setup	<i>Survey / Station setup</i>	perform a known station or known station + station setup.	20
	<i>Survey / Resection</i>	perform a free station or eccentric station setup.	
21 - Z/IZ	<i>Survey / Resection</i> and set the calculate option to V (1D)	calculate an instrument elevation	21
22 - Angle measurement	<i>Survey / Measure rounds</i>	measure a defined number of Face 1 (CI) and Face 2 (CII) measurements.	22
	<i>Survey / Measure points</i>	measure individual Face 1 and/or Face 2 measurements.	
23 - Set Out	<i>Survey / Stakeout / Points</i>	set out points with known coordinates. Points can be defined via <i>Keyin / Points</i> or obtained from a linked CSV, TXT or Survey Controller JOB file.	23

Table 2.1 GDM CU programs in Trimble Survey Controller (Continued)

Trimble Survey Controller			
GDM CU program	Select ...	to ...	Shortcut ( + number)
24 - Refline	<i>Survey / Station and offset</i>	measure or set out relative to a line, arc, or road. The line, arc, or road can be defined via <i>Keyin / Line, Arc, Road</i> , or imported to the Survey Controller job. <i>Reflin / Unknown line</i> is not supported.	24
25 - Area Calculation	<i>COGO / Compute area</i>	calculate an area.	25
26 - Distob	<i>COGO / Compute inverse</i>	calculate an inverse between two points.	26
27 - Moving Coordinates Forward		Trimble Survey Controller stores raw data and automatically calculates point coordinates. There is no specific program required in Trimble Survey Controller to move coordinates forward. Instead use <i>Measure Points</i> .	27
28 - Obstructed Point	<i>Survey / Measure points</i>	and set the method to Dual-prism offset.	28
29 - Roadline	<i>Survey / Stakeout / Roads</i>	measure or set out relative to a road. Roads can be defined using horizontal alignments, vertical alignments, and templates defining cross sections.	29

Table 2.1 GDM CU programs in Trimble Survey Controller (Continued)

Trimble Survey Controller			
GDM CU program	Select ...	to ...	Shortcut ( + number)
30 - Measure Coordinates	<p>Trimble Survey Controller stores raw data and automatically calculates point coordinates. There is no specific program required in Trimble Survey Controller to measure coordinates. Instead, use <i>Measure Points</i>. Points can be exported to a CSV or TXT file, via <i>Files / Import/Export / Send ASCII data</i>, for use as a control file. To access the control file from another job, select the CSV, TXT or JOB file as a linked file via <i>Files / Properties of current job</i>.</p>		30
32 - Angle measurement plus	<i>Survey / Measure rounds</i>	measure a defined number of Face 1 (CI) and Face 2 (CII) measurements.	32
	<i>Survey / Measure rounds / Options</i>	configure the number of rounds to be measured; select automatic measurements (to Remote Targets only); set the observation order; measure distances on Face 2(CII); define a time interval between rounds (automatic measurements only).	
33 - Robotic Lite	Not supported		

Table 2.1 GDM CU programs in Trimble Survey Controller (Continued)

Trimble Survey Controller			
GDM CU program	Select ...	to ...	Shortcut ( + number)
39 - Roadline 3D	<i>Survey / Stakeout / Roads</i>	measure or set out relative to a road. Roads can be defined using horizontal alignments, vertical alignments, and templates defining cross sections.	39
43 - Enter coordinates	<i>Keyin / Points</i>	enter the coordinates for a point.	43
45 - Pcode	<i>Configuration / Feature and attribute libraries</i>	create a feature library with codes. To create a full feature and attribute library, or a feature and attribute library with both codes and attributes, use Feature and Attribute Editor or Autodraft Configuration File Editor. You can then transfer the feature and attribute library to the ACU.	45
60 - Athletics	Not Supported		
61 - COGO	<i>COGO / Compute point</i>	perform similar coordinate calculations.	61

Table 2.1 GDM CU programs in Trimble Survey Controller (Continued)

Trimble Survey Controller			
GDM CU program	Select ...	to ...	Shortcut ( + number)
65 - Direct Reflex	<i>COGO / Compute point</i>	perform a From a baseline (Corner + distance), Brng-Line intersect (Corner + angle), or Four point intersection (Two lines intersection) measurement.	65
	Survey / Measure points	perform a Circular Object (Eccentric object) measurement. Surface scan is not supported.	
66 - Monitoring	<i>Survey / Measure rounds</i>	configure the number of rounds to be measured, automatically store points (to Remote Targets only), and define a time interval between rounds.	66
	<i>Survey / Measure rounds / Options</i>		
Menu 2 (View/Edit)	<i>Files / Review current job</i> <i>Favorites / Review</i>	review and edit the data stored in the job.	
F 6 (Change target height)	the target icon on the status bar	quickly edit the target details.	
F 33 (Change prism constant)			
GDM Job Files export	Trimble Data Transfer (connected to Trimble Survey Controller)	transfer the GDM Job file. For more information about transferring data, see Chapter 4, Data Transfer.	

Zeiss Elta Programs

Trimble Survey Controller offers similar functionality to the Zeiss Elta software. Table 2.2 shows where to find specific Zeiss Elta programs within Trimble Survey Controller.

Table 2.2 Zeiss Elta programs in Trimble Survey Controller

Zeiss Elta program	Trimble Survey Controller
Project Management	
New Project	<i>Files / New job</i>
Delete Project	<i>Files / Open job</i> , then highlight a job and tap <input type="button" value="Delete"/> .
Copy Project	<i>Files / Open job</i> , then highlight a job and tap <input type="button" value="Copy"/> .
Rename Project	<i>Files / Windows Explorer</i> , then highlight a job file and select <i>File / Rename</i> .
Project Information	<i>Files / Properties of current job</i> .
Adjustment	<i>Instrument / Adjust</i> to perform a collimation and compensator adjustment.
Measure (and Detail Points)	<i>Survey / Measure points</i> to measure individual Face 1 and/or Face 2 measurements.
Indirect Survey (Eccentricity)	<i>Survey / Measure points</i> , then the Single dist offset method to measure eccentric offsets.
Indirect Survey (Intersection)	<i>Survey / Measure points</i> , then the H Angle offset method to measure an Angle/Dist intersection. <i>COGO / Compute point</i> , then the Four point intersection method to perform a General intersection.
Hidden Point	<i>Survey / Measure points</i> , then the Dual-prism offset method.
Object Height	Not supported.
Stationing	
Free Stationing	<i>Survey / Resection</i> to perform a free station setup.
Stationing on Known Point	<i>Survey / Station setup</i> to perform a known station setup.

Conventional Survey

Table 2.2 Zeiss Elta programs in Trimble Survey Controller (Continued)

Zeiss Elta program	Trimble Survey Controller
Eccentric Stationing	<i>Survey / Resection</i> to perform an eccentric station setup.
Heightstationing	<i>Survey / Resection</i> and then the V (1D) calculate option.
Coordinates	
Detail Points (Verification Points)	Trimble Survey Controller checks all points using the duplicate point tolerances specified in the survey style.
Setting Out	<i>Survey / Stakeout / Points</i> to setout points with known coordinates. Points can be defined via <i>Keyin / Points</i> or from an existing CSV, TXT or Survey Controller JOB file.
Traverse	<i>COGO / Traverse</i> to adjust a traverse. Any station setup point can be used as a traverse point.
Intersect Lines	<i>COGO / Compute point</i> and use an appropriate method.
Intersect Arcs	
Transformation	Not Supported.
Roadline Lite	<i>Survey / Stakeout / Roads</i> to measure or set out relative to a road. Roads can be defined using horizontal alignments, vertical alignments and templates defining cross sections.
Special	
Multiple Rounds	<i>Survey / Measure Rounds</i> to measure a defined number of Face 1 and Face 2 measurements.
Point to Line	<i>Survey / Station and Offset</i> to measure or set out relative to a line, arc or road. The line, arc, or road can be defined via <i>Keyin / Line, Arc, Road</i> or imported to the Survey Controller job.
3D Plane	Not supported.
Area Computation	<i>COGO / Compute Area</i> to calculate between points.
Connecting Distances	<i>COGO / Inverse</i> to calculate an angle and distance between two points.

Table 2.2 Zeiss Elta programs in Trimble Survey Controller (Continued)

Zeiss Elta program	Trimble Survey Controller
Editor	<i>Files / Review current job</i> to review and edit the data stored in the job.
Input coordinates	<i>Key in / Points.</i>
Search	<i>Files / Review current job</i> , then tap <input type="text" value="Search"/> .
Data Transfer	<i>Files / Import/Export.</i>
Configuration	
Instrument	View/edit the instrument settings from the <i>Instrument</i> menu. <i>Files / Properties of current job</i> to change the job coordinate system and units. <i>Configuration / Controller / Language</i> to change the language.
Programs	<i>Configuration / Survey styles</i> to view/edit various survey options.
Codelists	<i>Configuration / Feature and Attribute libraries</i> to create a feature library with codes. To create a full feature and attribute library, or a feature and attribute library with both codes and attributes, use the Feature and Attribute Editor in the office software. You can then transfer the feature and attribute library to the ACU.

Table 2.2 Zeiss Elta programs in Trimble Survey Controller (Continued)

Zeiss Elta program	Trimble Survey Controller
Additional functions	
Input of Parameters	<p>Tap the target icon on the status bar to edit the target height and prism constant.</p> <p><i>Select Options</i> from the <i>Station Setup, Resection, Measure Points, or Measure Rounds</i> dialog to edit the temperature, pressure and ppm.</p>
Recording mode (R-M, R-C, R-MC)	<p>Trimble Survey Controller stores raw data and automatically calculates point coordinates. There is no specific program required in Trimble Survey Controller to measure coordinates. To export points to a CSV or TXT file (to use as a control file), select <i>Files / Import/Export / Send ASCII data</i>.</p> <p>To link a control file to the current job, select <i>Files / Properties of current job</i>, then the required CSV, TXT, or JOB file.</p>
Export M5 files	<p>Use Data Transfer (connected to Trimble Survey Controller) to transfer the M5 file to your PC. For more information, see Chapter 4, Data Transfer.</p>

GDM CU and Zeiss Measurement Modes

GDM CU and Zeiss measurement modes are supported in Trimble Survey Controller. Select the Trimble function key or the instrument icon from the status bar to change measurement modes as follows:

Measurement mode	Function	Status bar indicator
STD (Standard / normal)	Measures and averages angles as one standard distance is measured.	S
FSTD (Fast standard / rapid)	Measures and averages angles as one fast standard distance is measured.	F
TRK (Tracking)	Continually measures angles and distances.	T

GDM CU D-bar

To access this mode in Trimble Survey Controller, select the *Averaged Observations measurement* method from the *Station setup*, *Resection*, *Measure points*, or *Measure Rounds* menu.

Then select one of the following:

- To measure a defined number of observations, select *Options / Averaged observations*. Standard deviations are updated and displayed during measurement.
- To continually measure until the standard deviations are acceptable, select *Options* and enter a high number in the *Averaged Observations* field.

Tap  when the standard deviations are acceptable.

Matched Face 1 and Face 2 measurements

Trimble Survey Controller lets you make Face 1 (direct) and Face 2 (reverse) measurements at any time and in any order. The software averages a pair of observations in a matched pair record, then averages multiple matched pair records (rounds of observations) in a mean turned angle record.

To measure a point using both faces:

1. Complete a station setup.
2. Measure a point.
3. Measure the same point again on the opposite face of the instrument. In the *Point name* field, use the same name as in step 2.

When using a servo instrument:

- To automatically change face and retain the point name after completing the F1 measurement, select *Survey / Options* and then select the *Auto matched pair (F1/F2)* check box.
- To perform an F2 measurement the same as the F1 measurement, press the trigger button on the back of the instrument. Press and hold the button to change the instrument back to F1.
- If distances are not required on F2, clear the *Measure distance on face 2* check box.

When using an instrument with Autolock and Remote Targets:

- Select *Auto matched pair (F1/F2)* to automatically change face, retain the point name and start the F2 measurement. When the F2 measurement is completed, the instrument changes back to F1.

In this chapter:

- Setting Up a GPS Total Station 5700 receiver (base)
- Setting Up a GPS Total Station 5800 receiver (rover)

3

This chapter describes how to carry out a GPS survey with Trimble Survey Controller when the ACU is used with a Trimble GPS Total Station® 5700 or 5800 receiver. For more information, refer to the Help.

Setting Up a GPS Total Station 5700 Receiver (Base)

To set up a base receiver for a real-time survey using a GPS Total Station 5700 receiver:

1. Mount the Zephyr™ (or Zephyr Geodetic) antenna on the tripod.
2. Connect the antenna to the GPS receiver port labeled “GPS”. Use the yellow GPS antenna cable (PN 41300-10).
3. Connect the external radio to the GPS receiver port 3 using the supplied radio cable, then connect a radio antenna to the external radio.
4. Connect an external power source to the 5700 through GPS receiver port 2.
5. Connect the ACU controller to the GPS receiver port 1 using an O-shell Lemo-to-Hirose cable.
6. Turn on the controller.

Starting a base survey

Before beginning a base survey:

1. Open a job. For more information, see *Creating a New Job*, page 15.
2. Select a survey style. From the main menu, select *Survey* and then select a survey style from the list. For information on creating or editing a survey style, refer to the *Help*.

To start the survey:

1. From the *Survey* menu, select *Start base receiver*. The first time that you use this survey style, the Style wizard prompts you to specify the equipment you are using. The *Start base* screen appears.
2. Enter the base station name, and one of the following:
 - a grid coordinate (projection and datum transformation parameters must be defined)
 - the current autonomous position derived by the GPS receiver (the **Here** softkey)
 - a WGS-84 coordinate

For more information about entering base station coordinates, refer to the *Help*.



Warning – Within a job, only use an autonomous position (the **Here** softkey) to start the first base receiver.

The *Observation class* field shows the observation class of the base point.

3. Enter values in the *Code* (optional) and *Antenna height* fields.

4. Set the *Measured to* field.



Tip – If you are using CMR™ or CMR+™ broadcast formats, tap **Scan** to view the index numbers of other base stations operating on the frequency you are using, and the reliability of each. Check that your radio is working and that there are no other base stations operating on your frequency. Choose a different station index number from those displayed.

5. Tap **Start**.

The base receiver's external radio starts to broadcast RTK corrections. The following message appears:

Base started
Disconnect controller from receiver

6. Disconnect the controller from the base receiver but **do not** turn off the receiver.

You can now set up the rover receiver.

Note – For a real-time survey, check that the radio is working before leaving the equipment. The data light should be flashing.

If you are logging data in the ACU, leave the controller connected to the base receiver and set up the rover using another controller.

Note – To end an RTK survey, or after logging data in the base receiver, select Survey / End survey. For more information, refer to the Help.

Setting Up a GPS Total Station 5800 Receiver (Rover)

To set up a rover receiver for a real-time survey using a GPS Total Station 5800 receiver:

1. Mount the 5800 receiver on a range pole. The 5800 supplies its own power from an internal battery.
2. Attach the whip radio antenna to the 5800 receiver.
3. Attach the Trimble lithium-ion batteries to the ACU holder.
4. Attach the ACU holder to the range pole.

5. Attach the ACU to the holder. For more information, see page 2.
6. Turn on the 5800.
7. Turn on the ACU and start Trimble Survey Controller.
8. Connect to the 5800 receiver using Bluetooth™ wireless communications:
 - a. From the main menu, select *Configuration / Controller / Bluetooth*.
 - b. Tap **Config.** and enable *Bluetooth*. Tap **OK** .
 - c. Select *Scan* to locate the 5800 receiver.
 - d. When the scan is complete, select the 5800 receiver from the list and tap **Accept** .

Starting a rover survey

Note – Start the base receiver before you start a rover survey.

To start a survey:

1. Make sure that the required job is open. The name of the current job appears in the title bar of the main menu.
2. From the main menu, select *Survey*, then select a survey style from the list. This must be the same survey style as that used for the base survey.
3. To start the rover receiver for a real-time survey, select *Start survey*.

A *Survey* menu appears with items specific to the chosen survey style, including *Start base receiver* and *Start survey*. The first time that you use this survey style, the Style wizard prompts you to specify the equipment you are using.

4. If necessary, initialize the survey.

For an RTK survey, initialize before starting centimeter-level surveying. If you are using the OTF option, the survey automatically starts to initialize using the OTF initialization method.

Once the survey is initialized, you can perform a site calibration, stakeout, or measure points.

Data Transfer

In this chapter:

- Using the Data Transfer utility

4

This chapter describes how to use the Trimble Data Transfer utility to transfer data between the ACU and an office computer. Install the Data Transfer utility from the Trimble Survey Controller CD to ensure that you have the latest version. Refer to the Trimble Survey Controller or Data Transfer Help for information on:

- connecting to a Trimble controller
- transferring files
- using Microsoft ActiveSync

Using the Data Transfer Utility

To transfer files using Data Transfer:

1. Put Trimble Survey Controller into File Transfer mode:
 - a. Turn on the controller and run the Trimble Survey Controller software.
 - b. From the *Files* menu, select *Import/Export / Trimble PC Communications*.

The following message appears:

Waiting for PC Connection

When you connect to the device in Data Transfer, the following message appears:

Connected to PC

- c. Connect the ACU to the office computer.

***Note** – If Microsoft ActiveSync is installed on the office computer, clear the Allow serial cable or infrared connection to this COM port check box in the ActiveSync Connection Settings dialog. For more information, refer to the ActiveSync Help.*

2. Connect to the controller using the Trimble Data Transfer software. To do this:
 - a. Run Data Transfer. (Select  Start, then Programs / Trimble Data Transfer / Data Transfer.)
 - b. In the *Devices* list, select the appropriate Trimble Survey Controller device.

The Data Transfer software connects to the ACU.

3. Select the files to transfer. For example, to receive a file:
 - a. Select the *Receive* tab and click **Add**.
The *Open* dialog appears.
 - b. Select the file type and files to transfer. Click **Open**.
 - c. Click **Transfer All**.
The files are transferred.

Menu Structure

APPENDIX

A

Table A.1 shows the Trimble Survey Controller main menu structure.

Table A.1 Main menu structure

Name / Icon	Menu / Sub-menu
Files 	New job Open job Review current job Map of current job Properties of current job Copy between jobs Import/Export Trimble PC communications Send ASCII data Receive ASCII data
Key in 	Points Lines Arcs Boundary Roads Templates Notes

Table A.1 Main menu structure (Continued)

Name / Icon	Menu / Sub-menu
Survey	Start base receiver
	Station setup
 <p data-bbox="311 448 468 544">Items depend on the type of survey you are doing</p>	Start survey
	Measure points
	Measure rounds
	Continuous topo
	Station and offset
	Measure Stakeout
	Stakeout
	Points
	Lines
	Arcs
	DTMs
	Roads
	Site calibration
	Swap base Receiver
Start Robotic	
End survey	

Table A.1 Main menu structure (Continued)

Name / Icon	Menu / Sub-menu
Configuration	Controller
	Time/date Language Sound events
Items depend on the survey style you select	Feature and attribute libraries
	Survey Styles
	Rover options
	Topo points
	Rover radio
	Base options
	Base radio
	Laser rangefinder
	FastStatic point
	Observed control point
	Rapid point
	Continuous points
	Stakeout
	Instrument
	Rounds
	Site calibration
	PP initialization times
	Duplicate point tolerances
	Traverse options
	Options

Table A.1 Main menu structure (Continued)

Name / Icon	Menu / Sub-menu
<p>Cogo</p> 	<p>Compute inverse Compute point Compute area Compute azimuth Compute distance Subdivide a line Subdivide an arc Traverse</p>
<p>Instrument</p>  <p>Items depend on the type of instrument the Trimble controller is connected to.</p>	<p>Satellites Receiver files Import from receiver Export to receiver Position Receiver status Options Navigate to point Electronic level Direct Reflex Instrument controls Tracklight Autolock Radio Settings Instrument Settings Adjust Instrument Survey Controller Basic</p>