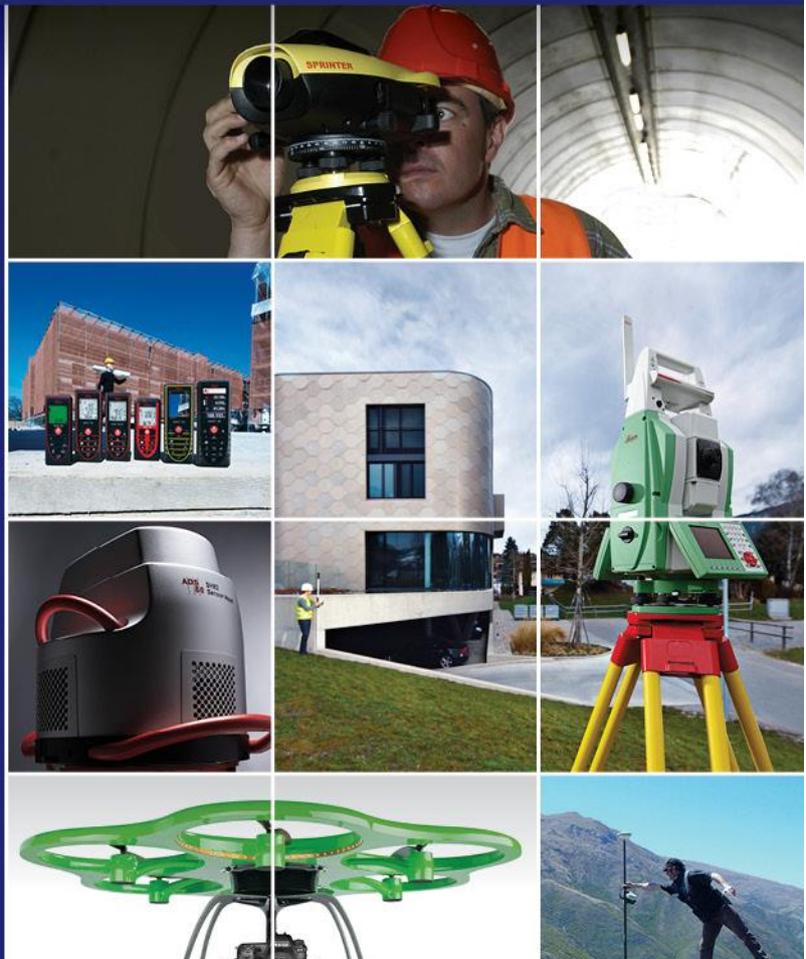




# Leica Captivate How To...



# Leica Captivate - How To...



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*To view this document on a smartphone, we suggest using the Adobe Acrobat Reader app (free). Email this document to yourself, open on your phone and then open the attached document in Acrobat.*

## Introduction

This manual is intended as a quick reference for common questions about Leica Captivate and related issues.

More detailed Help documents may be available from CR Kennedy, so please ask your local contact should you require more detailed information.

Leica have also created many useful self-Training videos which are available from their website or YouTube channel. See these links:

<http://leica-geosystems.com/products/total-stations/software/leica-captivate-training-videos>



## General

### About Leica MyWorld

Leica Geosystems' information portal puts a world of information at your fingertips. View detailed information about your products such as purchased options, firmware versions and CCPs. Access the latest documentation, release notes, brochures and manuals.

Login or register here:

<https://myworld.leica-geosystems.com/irj/portal>

### About SD cards

If you use a non-Leica SD card, you will see a message "The inserted SD card is not recognised as a Leica SD card...". This is just an information message and does not mean the card cannot be used. However, Leica do recommend using Leica branded cards as they are guaranteed to be compatible with Captivate software.

### How to transfer User Objects (e.g. Codelist, Format File, Working Styles)

You can use this process to backup your custom files from an instrument, or transfer from one instrument to another.

User Objects include, but are not limited to:

- Codelists
- Co-ordinate Systems
- Format Files
- Geoids
- RTK Profiles
- CORS Server details
- Working Styles

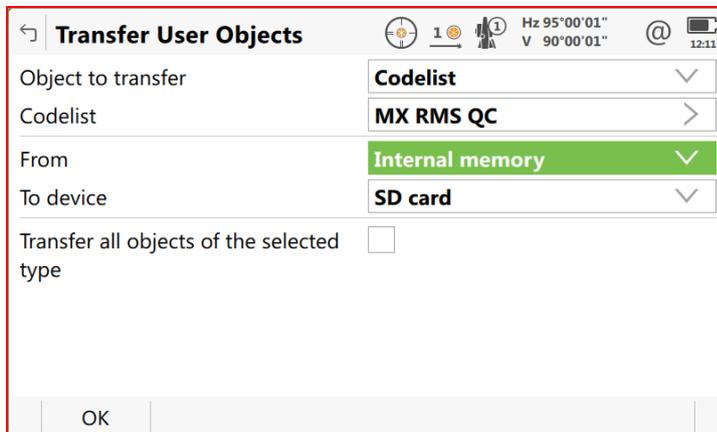
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- XSL Stylesheets

From the Home Screen select Settings, Tools, Transfer User Objects.

- Select the Object type you wish to transfer.
- Select the individual object you wish to transfer.
- Select the From and to device option you want.
- For some object types, you can transfer all objects of the same type in one step by selecting the checkbox.
- OK to continue.
- Repeat this process for each object type you require.

To make a backup copy of your User Objects, transfer **FROM** the internal memory of the instrument, **TO** a SD card or USB memory device. Repeat the process for each object type.



To import User Types to an instrument, transfer **FROM** the SD card or USB memory device, **TO** the instrument. Repeat the process for each object type.

For a total station or paired controller, you will most likely have the following object types:

- Codelists
- Format Files
- Working Styles
- XSL Stylesheets

For a GNSS controller, you will most likely have the following object types:

- Codelists
- Co-ordinate Systems
- Format Files
- Geoids
- RTK Profiles
- CORS Server details
- Working Styles
- XSL Stylesheet

## Transfer DBX Job files from your Captivate Sensor

Captivate stores your jobs to the \DBX folder of your SD card or internal memory. Each job is stored in its own \DBX sub folder using your job name followed by instrument ID and time/date information. E.g. DTM BASIN\_3456\_0818\_100319. The job will contain multiple files and folders.

It is a good idea to remove old jobs from time to time to reduce the likelihood of data corruption and keep the sensor performing at its best.

1. If the job is stored in the internal memory you can use *Tools/Transfer User Objects* to copy it to an SD card (or USB device).
2. Connect the SD card to your PC.
3. Use Windows Explorer to browse the card.
4. Select the \DBX folder and select the Job folders you want to backup or remove.
5. Make sure you select the Job folder and all its contents.

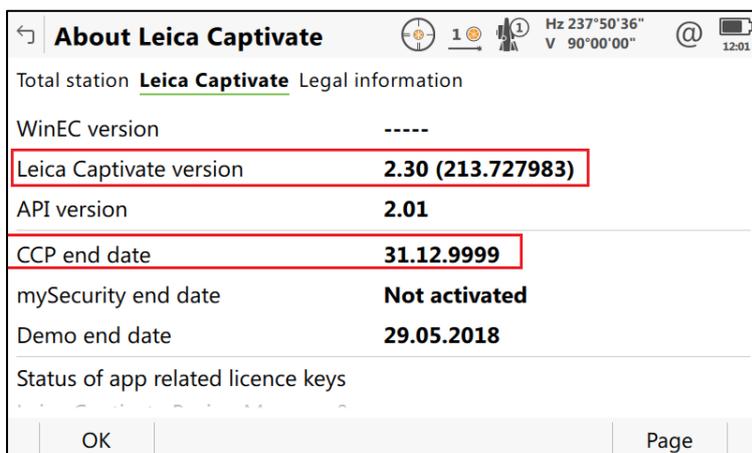
## Firmware Maintenance & Custom Care Packages

Leica Customer Care Packages (CCP) keep your total stations, controllers and GNSS receivers up to date with the latest software to maximize productivity. CCPs are optional 12 months subscriptions.

Your sensors have a CCP or Maintenance End Date and this date together with the Firmware version's required CCP date controls whether you may upgrade to a particular version. If your sensor's date is newer than the required firmware version's date, you may upgrade. If not, you will need to purchase a new CCP.

You can check your current CCP end date either using MyWorld where you register your products, or directly on-board the product.

From the Main Menu of your total station or controller, select Settings, About Leica Captivate, select the Leica Captivate page. Here you can see the current version and the CCP end date. To check a GS sensor, first connect it to the controller. There will be an additional About page available for the GS. Note that GS sensors run Viva firmware which has a different number series to the Captivate firmware.



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## How to install a License Key

You can use this process to load a sensor option (e.g. Firmware Customer Care Package, Beidou tracking, NMEA output) or application licence (e.g. DTM Stakeout, RoadRunner).

1. Copy the license file to the \System folder of your SD card or USB stick and insert in your instrument.
2. If you don't already have the license key, you can download from Leica MyWorld.



3. Select SD card or USB, F1 – OK.
4. The license key will load all included licenses.
5. You can check the results by accessing Settings, About Leica Captivate and scrolling through the various pages.

For **GS receivers**, the SD card containing the license file can be stored on the CS controller. Use the Web Interface from the CS Windows environment. You can also use a PC with Bluetooth connection and the webserver, however the CS is easier since it should already have a BT connection established.)

1. Select User (icon, not the text).
2. Select the green cross icon.
3. Choose File, and browse to the location of your License Key.
4. Select the disk icon.
5. You will see a message indicating the key has been successfully installed.

## How to Install Firmware & Apps

### General Instructions

Captivate firmware is available for download from Leica MyWorld once you have registered your instruments and controllers. See About Leica MyWorld for more information.

Captivate firmware and standard applications are contained in a single installation file. There are separate files for TS, MS, CS20 & CS35 controllers. GS sensors currently use Viva firmware and there are separate firmware files for each receiver model.

**If you use a CS controller to upgrade your GS sensor, you should upgrade the GS first.**

Some special or locally developed applications exist, and these are loaded as individual files following the same process described below. These files normally have a file extension of AXX for TS & CS20, DXX for CS35.

For TS, MS and CS20 sensors, follow the following instructions.

1. Ensure you have a full battery
2. Copy Firmware file(s) to SD card, **\System** folder and insert in the sensor. (You cannot use a USB stick to upgrade TS, MS or CS sensors).  
e.g. TS/MS firmware: **TSxxMS60LeicaCaptivate\_v1\_21.fw**  
e.g. CS20 firmware: **CS20LeicaCaptivate\_v1\_21.fw**



3. Select the file to load, F1 – OK.
4. Do not interrupt the installation process, it may take approximately 15 minutes and the sensor may turn off and on several times during the process.

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## CS35 Tablet

You can use a USB stick to transfer and/or install firmware on a CS35 tablet.

1. On your PC, unpack the firmware zip file to a USB stick.  
e.g. CS35 firmware file: **LeicaCaptive\_CS35\_v1\_21.zip**
2. Insert the stick in your CS35 tablet.
3. Using the File Explorer app within Windows 8.1 on the CS35 tablet, browse to the USB stick.
4. Double tap the Setup.exe file
5. Follow the instructions

Note that this procedure will need to be performed twice – once to uninstall the existing Leica Captivate software and then a second time to install the new software.

## GS Sensors

Viva GS10/14/15/16/25 sensors can be upgraded via the webserver interface. You can access this from a web browser on your PC or from WinCE on your controller. The connection can be made via Bluetooth or an appropriate data transfer cable such as GEV234(USB) or GEV269(serial).

6. Ensure your battery is at least 50% full.
7. Copy the firmware file to the SD card, **\System** folder and insert in the GS sensor. Ensure there is only one file loaded.  
e.g. firmware GS10/15/25 file GS\_FW+WinCE\_EN.fw  
e.g. firmware GS14 file GS14\_FW+WinCE\_EN.fw  
If you need to install a license key to enable a firmware upgrade, copy this file as well.
8. Connect your GS receiver to your controller or PC via Bluetooth or cable. See *How to Connect a GS receiver to a PC via Bluetooth* for instructions.
9. Open your Internet browser.
10. Enter this address if using a BT connection: 192.168.253.2  
Enter this address if using a cable connection: 192.168.254.2
11. Select User (icon, not the text)
12. Load firmware
13. Tick box, .fw file on GS SD card
14. Select the green cross Load New Firmware.
15. Tick box, I have read and agree to the Leica Geosystems Legal Agreement (if it appears)
16. The GS will reboot as part of the installation process. Be patient - Do NOT refresh until all the lights are constant and not flashing (about 5 mins to load the firmware).
17. Click browser refresh button (circling arrows icon, top bar)
18. Check firmware version is correct.
19. Close the window.
20. You must have previously installed the GS driver (available from MyWorld) if using a PC connection.

## How to install an Application

1. Copy the file (e.g. Autosetup.axx) to the \System folder of your SD card and insert in your instrument.
2. **Note:** You cannot load from a USB memory device.



3. Select the required application from “File to Load”

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4. Tick the box to agree to the Legal Agreement.
5. F1 – OK

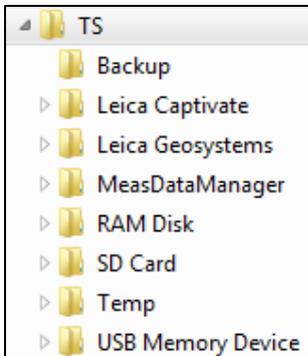
## How to install Simulators

To install, run Setup.exe

Accept the default path for the program files. Changing this path may mean the simulator does not work properly.

You can nominate your own path for the Loadables. I recommend something simple such as C:\, or C:\Simulator. This makes it easier to locate your data files. Don't use a long path name as this does not always work.

The folder structure looks like this:



The *SD Card* folder represents the physical card on a real instrument. The *Leica Geosystems* folder represents the internal memory on a real instrument.

You can use Codelists, Format files, Stylesheets, Working Styles and other User Objects simulator just as you would on a real instrument.

## How to Format your SD card

It is a good idea to format your memory card from time to time to reduce the likelihood of data corruption and keep it performing at its best. You should also backup your data and remove old jobs.

1. From the Main Menu select Settings, Tools, Format Memory.
2. From the Data memory device drop-down list, select **SD card**. *Be aware that this menu option also allows you to format the internal data memory, system ram, USB device and application programs.*



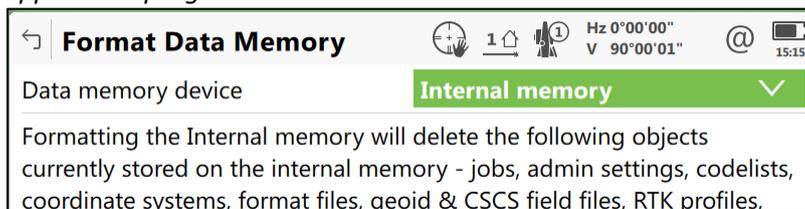
3. F1 – OK.

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## How to Format your Internal Memory

It is a good idea if you store jobs to your internal memory to format this from time to time to reduce the likelihood of data corruption and keep it performing at its best. You should also backup your data and remove old jobs. System performance can be hampered by storing a lot of data in internal memory.

1. From the Main Menu select Settings, Tools, Format Memory.
2. From the Data memory device drop-down list, select **Internal memory**. *Be aware that this menu option also allows you to format the internal data memory, system ram, USB device and application programs.*



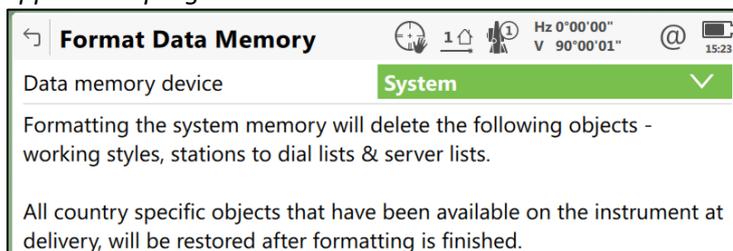
3. F1 – OK.

## How to Format your System RAM

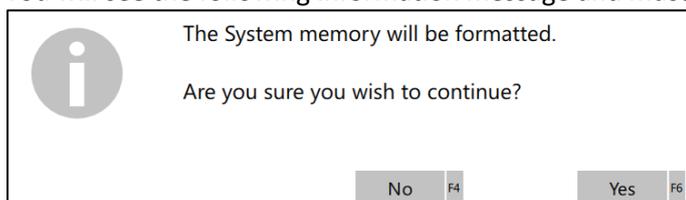
Formatting the System RAM may help if your software is not behaving normally. A CR Kennedy staff member may advise you to do this.

**Note** this will delete all Working Styles, Stations to dial, and GNSS Station lists so you should ensure you have a backup copy of these files before proceeding. Refer to *How to Transfer User Objects* for how to do this.

1. From the Main Menu select Settings, Tools, Format Memory.
2. From the Data memory device drop-down list, select **Internal memory**. *Be aware that this menu option also allows you to format the internal data memory, system ram, USB device and application programs.*

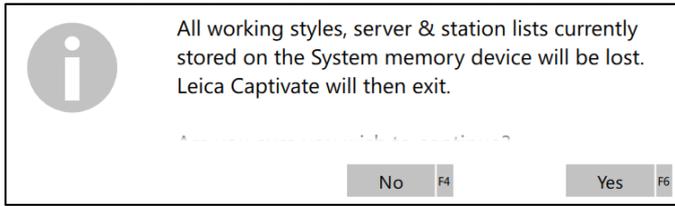


3. You will see the following Information message and must select Yes to continue.



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4. You will see a second information message and must select Yes to continue.



5. The system RAM is formatted and Captivate closes taking you to the Windows Desktop. Double tap on the Captivate icon to start Captivate again.
6. You may need to restore Working Styles or other custom information from you backup.

## What to do when a job is corrupted

There are several possible signs that indicate a job may be corrupted including

- Error message "**Whilst reading/storing from job...**" appears on the instrument screen
- Data is missing onboard or in LGO or Infinity
- Data or files are missing in the jobfile (DBX)
- Instrument takes a long time or crashes when trying to load data

## How can a job become corrupted

- The SD/CF card has been removed whilst the user has not been in the main menu. Please always return to the main menu and wait 3 seconds. This allows the system enough time to complete the writing of any data to the job
- The battery ran flat - the instrument then shut down whilst in the reading/storing process. Always swap the battery early enough using a controlled shut down of the instrument. This is rare, but can happen
- The SD card was removed in Standby mode or the battery ran empty in Standby mode. Please never remove the SD/CF card when in Standby mode. Do not leave the instrument in Standby mode until the battery runs empty.
- If using codes with more than 16 characters in any Captivate firmware version lower than 2.30.

If you suffer repeatedly corrupted jobs, then consider formatting the System Ram and the memory device to remove possible corrupted settings or elements.

## What to try with a corrupted job

Check the folders in the job sub-folder. If it is a GNSS job and the ".m00" is missing; this means the raw data is lost and the data measured with GNSS cannot be recovered (see graphic below). If it is a TPS or GNSS job and the ".X01" file is missing: This means the data is lost and cannot be recovered.

- Sometimes a possible work around is to use the corrupted job in the Viva Simulator and export the data as XML file. In LGO or Infinity import the XML file to try to recover the data from it.
- Sometimes the XCF file of the job is corrupted but the actual data is OK. Send your data to CRK Support for assistance as there is a chance it can be recovered.
- Try deleting the last point in the job as the corruption may have happened when storing it in. Then try exporting the data. You may find the rest of the job exports OK.

## Tools for data recovery

If the data is so badly corrupted that it is not possible to copy or use the job at all then a recovery tool may be used with the memory card to try to recover.

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E.g. <http://www.pcinspector.de/?language=1>

### What to do with a recovered job?

If you manage to recover a job yourself, or receive a job which has been recovered by CRK Survey Support then if possible only use the job to export the data and afterwards delete the job and not use it any more. This is because even the recovered job can still contain corruptive elements.

### Format Memory & Windows Reset Hardware

Captivate allows you to format the memory of your data storage device & internal memory. This may be helpful in the event of corruption of your SD card or if your software appears not to be functioning correctly. We suggest talking to CR Kennedy if you think this is the case.

**Note: user-defined files will be lost.**

Select: Home\Settings\Tools\Format memory

Field	Option	Description
<b>Data memory device</b>	Selectable list	The type of memory to be formatted.
	<b>Internal memory</b>	Formatting the Internal memory will delete the following objects currently stored on the internal memory - jobs, admin settings, codelists, coordinate systems, format files, geoid & CSCS field files, RTK profiles, sketch templates & user entered antennas. All country specific objects (codelists, coordinate systems..) that have been available on the instrument at delivery, will be restored after formatting is finished.
	<b>SD card</b>	Formatting the SD card will delete all data currently stored on the SD card.
	<b>USB stick</b>	Formatting the USB stick will delete all data currently stored on the USB stick.  The CS35 has two USB ports. The USB stick, that was inserted first, is used.
	<b>Apps</b>	Formatting the Apps will delete all currently loaded apps.
	<b>System</b>	Formatting the system memory will delete the following objects - working styles, stations to dial lists & server lists. All country specific objects that have been available on the instrument at delivery, will be restored after formatting is finished.

### Windows Reset

You can also perform various Windows Reset functions on your Captivate Totals Station and Controller. With the instrument turned ON, Press & hold the Power key   for 2 seconds to open the Power Options menu. For TS, the following applies.

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Option	Description
Turn off	Turn TS instrument off.
Stand-by	Put TS instrument into stand-by mode.  In stand-by mode, the TS instrument shuts down and reduces power consumption. Rebooting from stand-by mode is quicker than a cold start after turning off.
Reset...	Performs one of the following options: <ul style="list-style-type: none"> <li>• <b>Restart</b> (restarts Windows EC7)</li> <li>• <b>Reset Windows EC7</b> (resets Windows EC7 and communication settings to factory defaults)</li> <li>• <b>Reset installed software</b> (resets settings of all installed software)</li> <li>• <b>Reset Windows EC7 and installed software</b> (resets Windows EC7 and settings of all installed software)</li> </ul>

For CS, the following applies

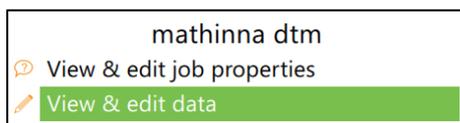
Option	Description
Power down and turn off	To turn the field controller off.
Put into stand-by	To put the field controller into stand-by mode.
Reset hardware	Perform one of the following options: <ul style="list-style-type: none"> <li>• <b>Restart hardware</b> The device powers down and restarts.</li> <li>• <b>Reset Windows EC7</b> The device powers down and restarts. Any Bluetooth pairings are deleted.</li> <li>• <b>Reset Leica Captivate</b> The device powers down and restarts. All working styles, dial-up lists and server lists are deleted. Jobs, code lists, coordinate systems etc. are not deleted.</li> <li>• <b>Reset Windows EC7 and Leica Captivate</b> The device powers down and restarts. Bluetooth pairings, working styles, dial-up lists and server lists are deleted.</li> </ul>

## Data Sort & Filter

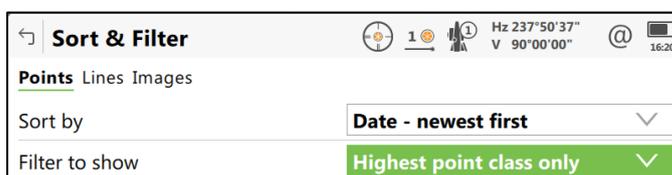
Captivate allows you to Sort & Filter your data. The Sort & Filter settings are stored in each job and remembered each time the job is used. When a new job is created, these settings are copied from the last current job.

 These settings are used to control the display and selection of points and lines. A separate copy of these settings is used when exporting data via one of the ASCII options. They do not apply when exporting to DXF, XML or via stylesheet.

To access these settings, tap on the Job tile and select View & Edit Data



On the Points or Lines pages, press Fn F5 Filter.



**Sort by** selects the method of sorting the data. Options are: Point ID ascending or descending, Date oldest to newest or newest to oldest.

**Filter to show** selects the method of filtering the data, default is **Highest point class only**. The Point options are as follows.

Option	Description
All	Shows all points.
Highest point class Only	Shows points of highest class.
Range of point IDs	Shows points with point IDs between the entered start and end ID. The points are left aligned and sorted by the first digit.
Pt IDs matching wildcard	Shows points with point IDs matching the wildcard.
Time	Shows points which were recorded within a defined time window.
Certain point classes only	Shows points of the selected class.
Pts created by instrument	Shows points originating from the selected instrument or software program type.
Points with certain codes	Shows points with selected codes attached.

### Point Classes

The Point Class describes the type of point and is automatically assigned when each point is created. You can Filter data using the Class.

Class	Description
Control	Control Points. Automatically assigned to entered points or manually assigned to calculated points from COGO
Adjusted	Adjusted points using the adjustment program. Source from Infinity or Leica Captivate (Measure foresight)
Reference	Reference point received by a real-time rover, or by TPS Setup app.
Average	Averaged point calculated when more than one coordinate triplet of class Measured exist for the same point ID (unless Don't check in the Duplicate Points panel selected).
Measured	Measured points from TPS with angles and distances, GNSS points differentially corrected using real-time phase, real-time code or post-processing, Calculated from some apps.
Navigated	Navigated points from GNSS using uncorrected code solutions of a single epoch or SPP positions.
Estimated	Estimated points from Infinity. Infinity or Leica Captivate (Create point here).
None	Measured points from TPS with angles but no distance.

Average class points are created when the Duplicate Points setting is set to “Check the Average” or “Check the Abs Diff” (Home\Settings\Point Storage\Duplicate Points), and you measure a point with an ID that already exists. Captivate checks the Averaging method and limits, and creates the Average point if the criteria is satisfied. The individual points are kept. You will be warned if the criteria are not met and can choose how to proceed.

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← **Duplicate Points**

When a point is stored with same point ID as existing point

Method **Check the average** ▾

Limit in position **Weighted** ▾

Limit in height **0.0500 m**

**0.0750 m**

As a point is stored the difference to the position of the average point will be checked.

## Selecting Design Data

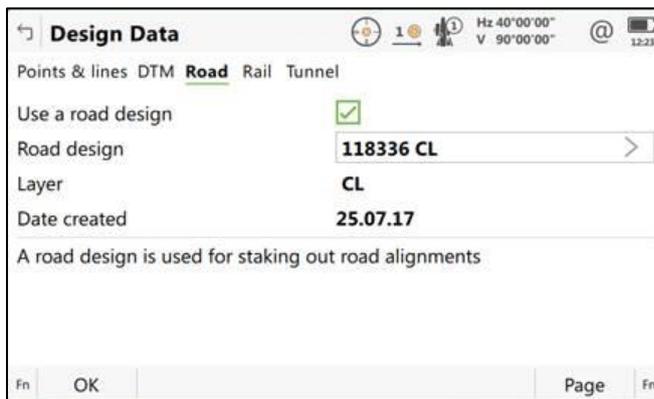
Captivate handles the selection of a design job differently to Viva SmartWorx.

On the Job carousel go to the left end. Depending on firmware version, you may be able to use Fn F3 – Home to get there if you have a lot of jobs.



Select the Design Data tile.

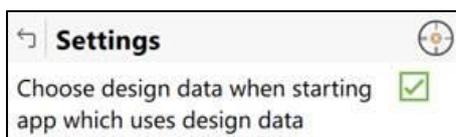
Here you can select the different Design Job types. If any of these are set, the nominated jobs will always be used by default.



For example, look at the Road Page above. This road design will always be used in Stake or Measure Road until this screen is changed.



You can choose to be prompted to select design data when a relevant application is started. If you want to do this, press Fn, F1 Settings and tick the box as shown below.



This will force the software to ask you to select your design file each time.

If you left the first screen ticked, this will be the default job offered but you can then select a different one in the Road applications.

## Working Styles

Working Styles are files that save your preferred settings. You can create these to suit different types of work or different users' preferences. Working Styles can be transferred to other instruments to quickly customise them to your liking.

- There is no compatibility between Total Stations and Controllers, nor between Captivate and Viva.
- Any changes you make to settings at any time will be copied into the current Working Style.
- The Restrict Access Wizard allows you to lock Working Styles in whole or part so that other people can't change them.
- RTK Profile settings are copied into the current Working Style when they are selected to load.
- The Default Style will be overwritten when you install new firmware so it is best to create your own uniquely named Styles.

From the Home screen, select Settings, Customisation, Working Style Wizard.



You can select a Working Style to load, create a new one or edit one. When creating or editing, a Wizard will open and you need to follow the wizard selecting preferred settings as you go through to completion.

# Total Station

## Atmospheric Corrections

Accessed via Settings\TS instrument\Atmospheric corrections, this panel defines the atmospheric ppm and refraction.

 Atmospheric corrections are applied to Slope Distance so any displayed or stored Slope Distance is corrected.

The Refraction correction is applied when calculating the height difference of a measurement.

## TS Scale

The geometric distance correction is accessed via the Job Properties, TS Scale page. When the box is unticked, the scale is set to 1.

This correction is applied in calculating the Horizontal Distance and therefore affects co-ordinates of points measured by TPS at the time of their creation.

 Changing the TS scale does not affect previously stored points.

The geometric distance correction (geometric ppm) is derived from the map projection distortion (map projection ppm), the height above reference datum correction (height ppm) and an individual correction (individual ppm).

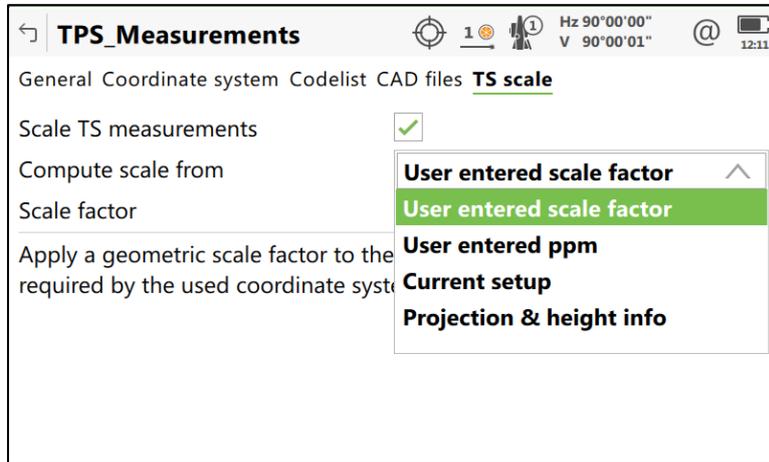
The calculation of the map projection ppm follows the formula for the Transversal Mercator Projection.

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The individual factors are: the scale factor of the line of projection central meridian, Gauss-Krüger = 1.0, UTM = 0.9996, and so on, and the offset from the line of projection.

The calculation of the height ppm is derived from the height of the instrument setup above the reference datum.

Normally this is the height above mean sea-level MSL.



## Robotic Connection

### Range

There are several options for connecting a Captivate controller to a Total Station. Working ranges are shown below, however, you can also connect directly to the TS Bluetooth for a range of approximately 10m. You may use this option as a temporary solution if your RH connection isn't available.

	Instrument with RH16	Instrument with RH17
CS20 with integrated long-range Bluetooth and included antenna	450-550 metres with no video being streamed from instrument to CS	450-550 metres with no video being streamed from instrument to CS
	250-300 metres with video being streamed from instrument to CS	250-300 metres with video being streamed from instrument to CS
CS20 with long-range Bluetooth and antenna expansion pack (CTR20)	1000 metres with no video being streamed from instrument to CS	1000 metres with no video being streamed from instrument to CS
	800 metres with video being streamed from instrument to CS	800 metres with video being streamed from instrument to CS
CS35	220 metres with no video being streamed from instrument to CS	220 metres with no video being streamed from instrument to CS
	150 metres with video being streamed from instrument to CS	150 metres with video being streamed from instrument to CS
CS35 with long-range Bluetooth USB stick (CTR35)	400 metres with no video being streamed from instrument to CS	400 metres with no video being streamed from instrument to CS
	200 metres with video being streamed from instrument to CS	200 metres with video being streamed from instrument to CS
CS30	n.a.	100 metres. Reduced range expected with video streaming being used.
CS30 with long-range Bluetooth variant	n.a.	Typical range of 600 metres. Ranges up to 1000 metres are not uncommon to achieve. Reduced range expected with video streaming being used.

RH18 was designed for the usage with AP20 and AP20T and should only be used in combination with these.

To maximise the distance, the following may help.

- Ensure there is no unnecessary radio interference from other sources. For example, ensure the Bluetooth is not searching for a device which cannot be found; WLAN is not on.
- Minimise the data load on the radio link. For example, do not use the video stream from the TS to the CS.

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- If using a radio cap, ensure the antenna is vertical on the CTR16/17 radio cap.
- Work facing the TS total station whenever possible. If the body is between the CS field controller and the total station then this will reduce the range.

## Connecting

To establish a connection from controller to TS:

- on the TS, run the CS Connection wizard (Home\Settings\Connections\CS Connection wizard).
- On the CS, run the TS Connection wizard (Home\Settings\Connections\TS Connection wizard). Set Connect Using to : Long-range TS. When choosing the Bluetooth device, ensure to select the **RH\_1234567** device (where 1234567 is the serial number of the TS instrument). The TS instrument itself will also be shown in the list of found devices - but ensure to choose the device with the **RH\_** at the start of the device.
- Ensure that the sensors are running compatible versions of Captivate. Version 2.xx is compatible with 2.xx but not v1.xx.

## Troubleshooting

- Ensure the RH16 is fully connected to the TS. The handle should not separate at all from the instrument if you try to lift it.
- Check the contacts are dry, clean and free of corrosion.
- If the RH contacts become wet, communication can be affected. Try drying the RH. (Always transport it in an upright position to prevent the contacts getting wet).
- If range is short, check that the connection is to the RH via Long-range TS and not to the TS itself. Check for sources of interference such as wi-fi, and your smartphone BT mode may need to be turned OFF.
- Sometimes the Windows BT settings become corrupt. In this case, exit Captivate and in Windows CE Control Panel, delete the BT connection. You may need to run the Captivate Connection wizard(s) again.

# GNSS

## How to Connect a GS Receiver to a PC via Bluetooth

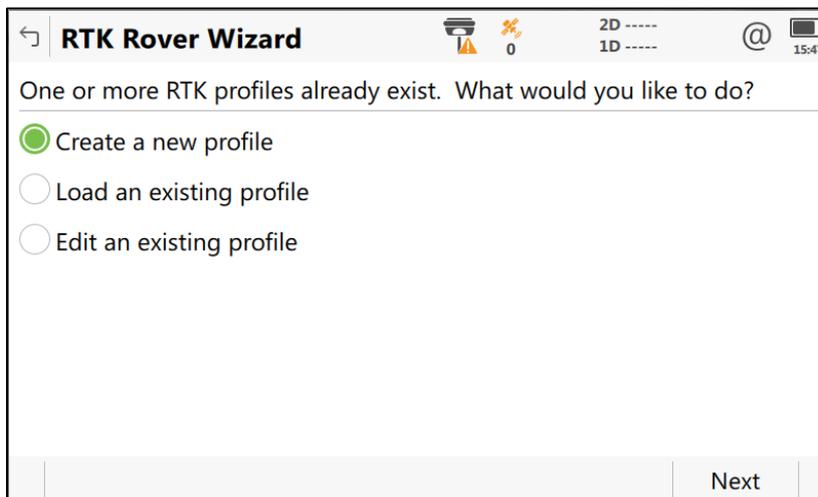
1. Select the Bluetooth shortcut from the Taskbar on your PC.
2. Select Add a Device. Windows will search for Bluetooth Devices.
3. Select your receiver identified as GSxxxxxx (where xxxxxx is the serial number).
4. Right Click on the device and Connect using “Ad hoc network”.
5. Right click on the Network icon in the Taskbar.
6. Select Open Network and Sharing Center.
7. Select Change adapter settings.
8. Right Click on Bluetooth Network Connection.
9. Select Properties.
10. Select Internet Protocol Version 4, then select Properties
11. Set the IP address to **192.168.253.1** for BT connections or **192.168.254.1** for Cable connections.

## RTK Profiles

RTK profiles are files that store different RTK communication preferences. You may use two RTK Profiles, for example, one to handle RTK Networking via NTRIP, and another to use a UHF radio correction.

When an RTK Profile is selected, it is copied into the current Working Style. This allows you to minimise the number of Working Styles needed and avoid duplication of common settings. If you prefer, you can use Working Styles only and not use RTK Profiles at all.

To access RTK Profiles, from the Home Screen, select Settings, Connections, RTK Rover Wizard.



You can Create a new Profile, Load or Edit an existing one. When creating or Editing, a Wizard will open and you need to follow it selecting preferred settings as you go through to completion. There will be an option to test your settings at the end.

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## How to Log Static data in RINEX format

A license is required to log static GNSS data in RINEX format. Logging to Leica (MDB) format is not license-protected on most receiver models.

A RINEX data record can consist of 3 files with extensions:

- xxo Observation file
- xxn Navigation file for GPS satellites
- xxg Navigation file for Glonass

Submission to AusPos requires only the observation file.

One set of RINEX files may contain more than one point depending how you record it but AusPos requires a single point per file set.

Recording multiple points within a single Survey session will store in a single file. To ensure each point is stored in a separate file, exit Survey before starting the next point. You can do this manually by exiting Survey, or by answering Yes to the Confirmation Message "... Do you wish to exit Survey...?".

Leica Infinity software can split a file of multiple points into individual points.

 Set L2C tracking to **"Automatic"**, not **"Always track"**. (Settings, GS Sensor, Satellite Tracking, Advanced Page)

## SmartNet Aus – Download RINEX files

To download RINEX files from SmartNet Aus, Go to the Smartnet web site and log in.



Select RINEX download guide and have a look at the instructions. Then proceed to the Job Service.

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You only need to enter a Job Name if you are creating a recurrent download so for one-off downloads, leave it blank.

Enter the date, start time (local) and duration.

You can choose the required site(s) from a list or the map.

You will receive an email when the files are ready to download. Follow the link to go to the results, select all and click on the icon to download.

## How to use AusPos

**AUSPOS** is a free online GPS data service provided by Geoscience Australia. It uses the IGS Stations network and works with data collected anywhere on Earth. Your results will be emailed to you in GDA and ITRF coordinates.

AUSPOS requires at least one hour of data, preferably two, and 6 hours for best results (the more the better). Insufficient data can result in unacceptable accuracy. Data should be in RINEX ver 2 format for GPS satellites at 30 second intervals. *However, we recommend logging GPS & Glonass at 10 second intervals.* If AUSPOS is unable to process your data, CR Kennedy may be able to use the additional data to get a result for you.

Your RINEX data is located on your SD card in \Data\GPS\Rinex, and consists of three files. The files ending in 'g' and 'n' are navigation files for Glonass and GPS and are not required by AUSPOS but are useful for post processing in LGO or Infinity. The file ending in 'o' is the observation file required by AUSPOS.

To process the data through AUSPOS, go to...<http://www.ga.gov.au/bin/gps.pl>

Results are available any time after 10am the day following the logging session and often within 10 minutes of your submission.

Complete the submission details.

Choose your Observation file (extension YYo where YY is a two-digit year, e.g. 17o). Do not submit the Navigation files (YYn or YYg).

The antenna height required is to the Antenna Reference Point (ARP). You can check the value stored in the \*.xxo RINEX file, open it with a Text Editor and read the antenna height. *Remember if you used a Tripod Setup and a Height Hook, 360mm is added to the taped value.*

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```

3242148          LEICA GS12
                  LEIGS12
-4642092 -5561  2553239.2982 -353
  1.9120      0.0000
  1
  9   C1   L1   D1   P2

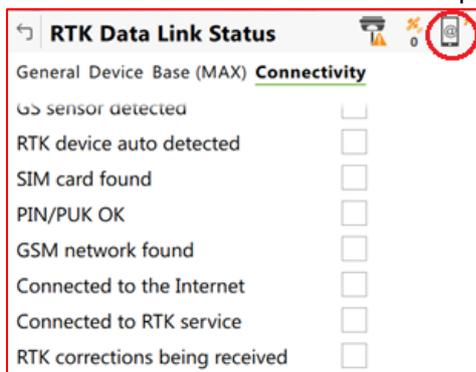
```

Select your antenna from the list e.g. **LEIGS15 NONE** .

Enter your email address and select Submit.

## CORS connection Troubleshooting

If you are having problems with your connection or getting an RTK fix, the following may help. Tap on the phone icon to access RTK Data Link Status, Connectivity page to see which items are working. The first item not ticked shows where the problem begins.



**GS sensor detected** - indicates if the receiver is connected to the controller. Usually this is via Bluetooth but may also be by cable. If this is OK, ensure the rover has a navigated position. If connected but no navigated position, it may be a bad almanac, or obstructions at the current location causing a lack of satellite tracking (press & hold both buttons for 1 sec). Also check the Satellite tracking options to ensure all relevant constellations are active.

**RTK device auto detected** – indicates if the GSM modem has been found. If the modem is a GS15 slot-in type, it is a Telit modem which needs the AT commands edited to suit Australia. The GPRS/Internet commands required are:

Initialisation 1 – ATZ^M

Initialisation 2 – AT+CGDCONT=1,"IP","^N"^M

*Other modem types do not need editing.*

If the GS15 slot-in modem is not detected or not initialised, formatting the GS may help (press & hold both buttons for 15 sec for full registry). Also check the firmware version on the GS15. Version 6.04 corrected a timing problem with GS sensor not initialising the modem.

**SIM card found** – indicates if the SIM card has been located. If not, check that a valid sim is inserted correctly. It is possible to have a faulty sim card, or modem.

**PIN/PUK OK** – indicates that the system has opened the sim, i.e. either there is no PIN required, or the entered value is correct.

**GSM network found** – indicates if the phone network has been found and connected. Failure here could be to do with an expired data subscription.

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**Connected to the internet** – indicates if the rover has connected to the internet. Check that the correct APN has been used. Common APNs:

Telstra	telstra.internet
Optus	internet
Vodafone	vfinternet.au
3Mobile	3netaccess
CRK	<i>Telstra.M2M</i>

**Connected to the RTK service** – indicates if the rover has connected to SmartNet Aus. Check the server address details and port details (smartnetaus.com). Also check if the source table can be accessed.

**RTK corrections being received** – indicates if corrections are being received. If not, check the mountpoint selected. If requesting a network or Nearest base solution, the rover could be outside the network area, or the network is not receiving your GGA position so it can't provide the required solution type. If it is receiving a correction but not resolving, the rover could be too far away from a single base selected so that it can't resolve.

### Error Messages

- NTRIP caster does not recognise your privileges.

Check your user name & password. Ensure another user is not already logged into the account.

## Help Sheets

CR Kennedy have written several Help Sheets on various topics that may be of interest to you. These can be found on our web site at [survey.crkennedy.com.au](http://survey.crkennedy.com.au)

Please contact CR Kennedy to enquire about other topics you may be interested in.

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# Leica LS Digital Level

## Loading Format Files in LS10/15

You can only load format files via the USB port.

- Copy files(\*.frt) into the USB device in the “Formats” directory and insert in the LS. Make sure battery is more than 75% charged.
- Main menu\Transfer\Import
- Set to transfer From USB-Stick, To Instrument, File = Single File
- Cont
- Navigate to Formats Directory and Select the format file you want
- Cont
- Cont

## Loading Firmware in LS10/15

You can only load firmware via the USB port.

- Copy files (\*.fw) into the USB device in the “System” directory and insert in the LS. Make sure battery is more than 75% charged.
- Main menu\Tools\Load FW
- F1 Firmware
- Highlight the firmware file you copied
- Upload = Yes
- Cont
- Yes
- It will take about 5 mins. Cont. it will reboot.

## Loading Keys in LS10/15

You can only load firmware via the USB port.

- Copy files (\*.key) into the USB in the “System” directory and insert in the LS. Make sure battery is more than 75% charged
- Main menu\Tools\License
- Cont
- Cont. it will reboot



**Feedback.** Does this document meet your needs? If you would like additional information or topics added please contact me with your request: [mailto:Chris Emmerick](mailto:Chris.Emmerick)

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## Revisions

26/10/2017	First edition
04/04/2018	How to Log Static data in RINEX format, note added to set L2C to Automatic
04/10/2022	Minor updates

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