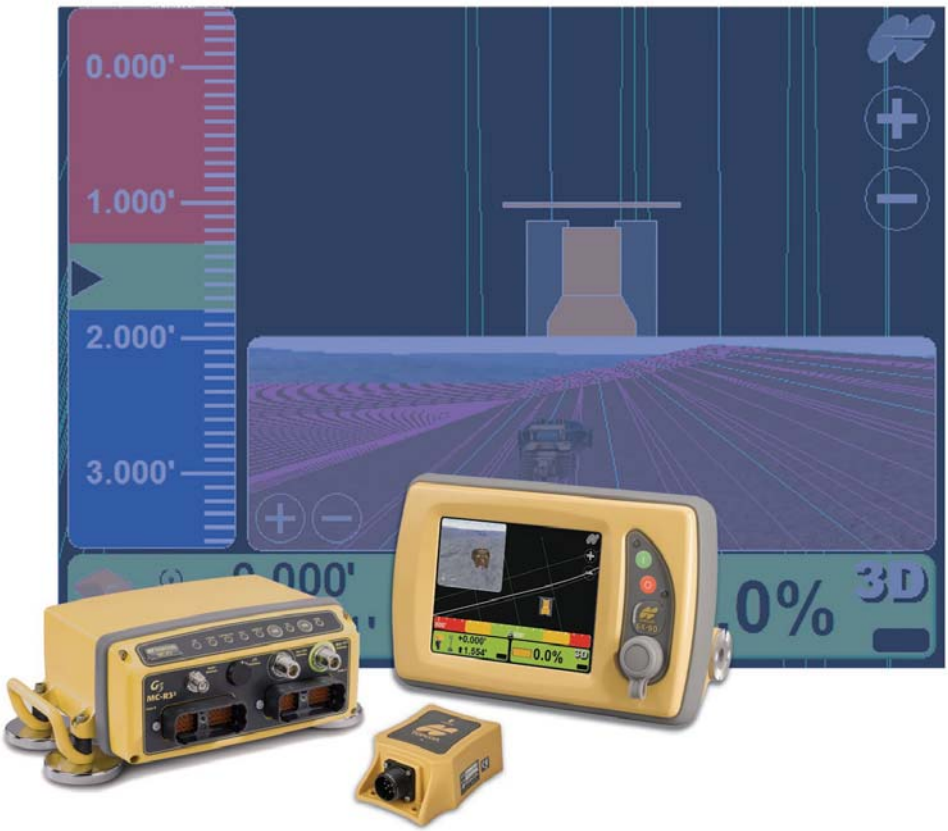
TOPCON

3D-MC²



Quick Reference Guide

TOPCON
POSITIONING SYSTEMS

3D-MC² Dozer
Quick Reference Guide

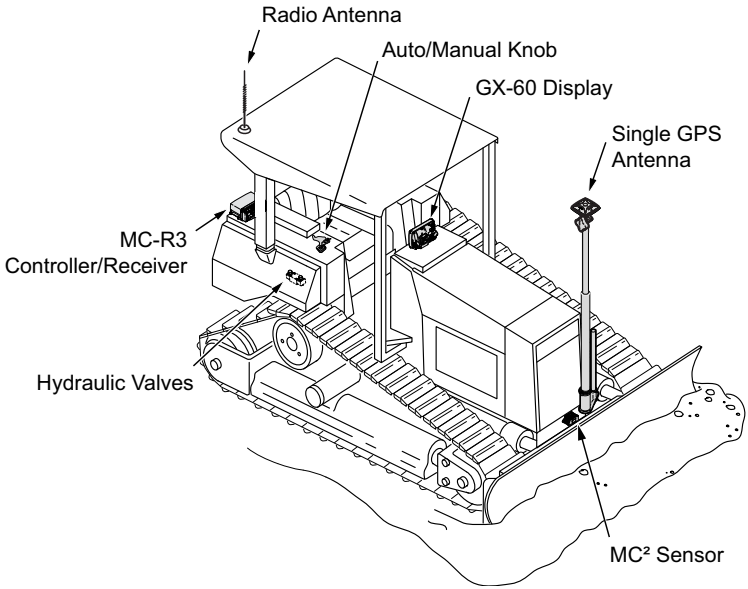
Part Number 7010-0921
Rev. A

Table of Contents

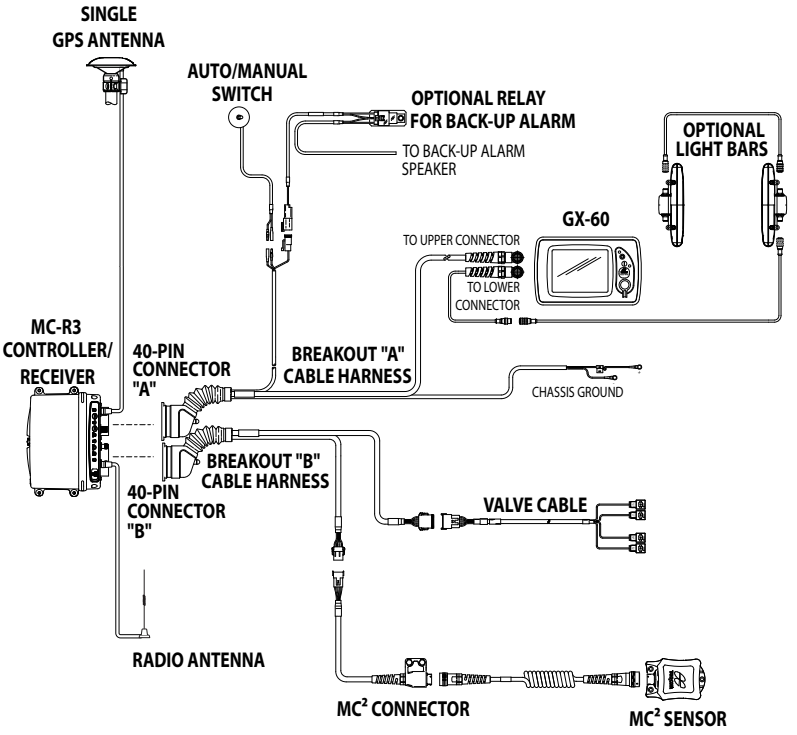
3D-MC²

3D-MC² is a new addition to the GPS+ system that allows a dozer to run and operate at high speed while maintaining smooth grade.

3D-MC² Components

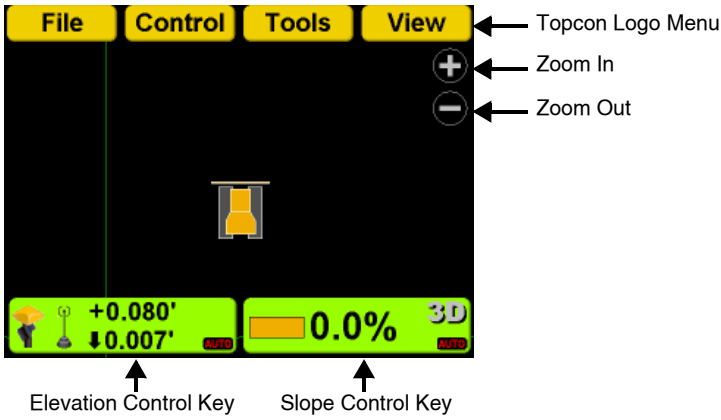


3D-MC² Dozer Schematic



3D-MC² Introduction

3DMC Main Screen

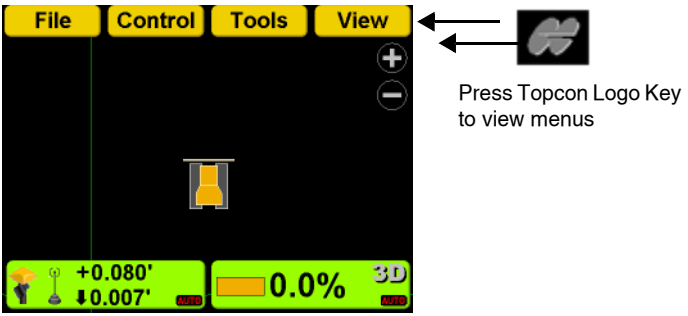


Topcon Logo Key

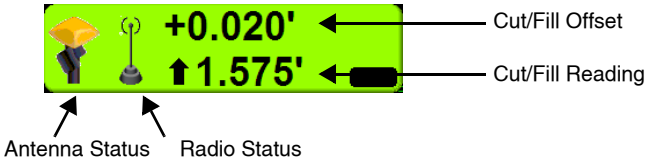
The Topcon Logo key at the top right corner of the Main Screen displays a pop-up bar of four menus: File, Control, Tools, and View.

To access the Topcon Logo menus, press the **Topcon Logo** in the far right corner.

Unless used, the menus disappear after 10 seconds.

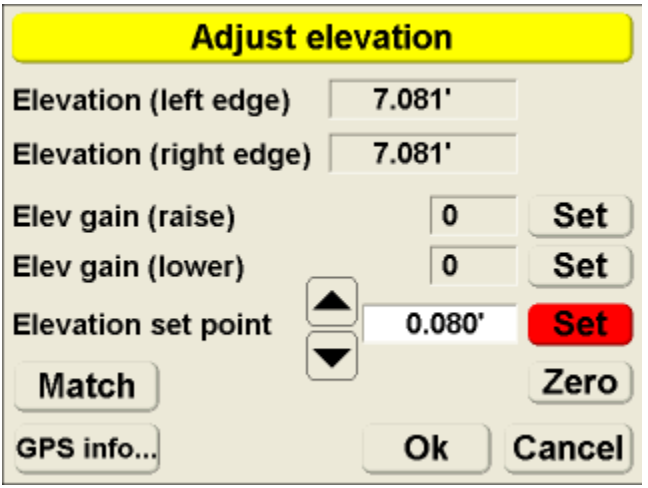


Elevation Control Key

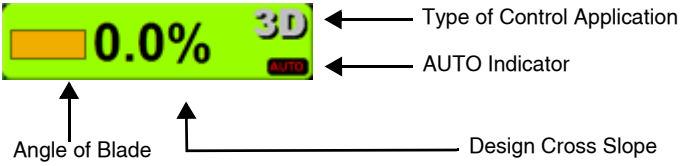


Adjust Elevation Screen

Press the Elevation Control Key to display the ***Adjust elevation*** screen.

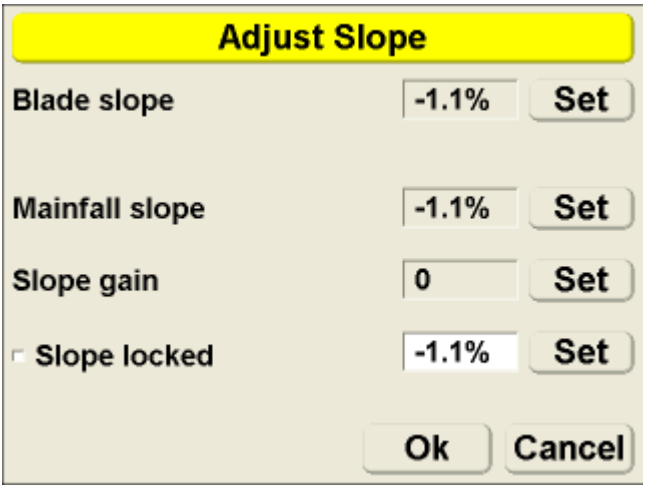


Slope Control Key



Adjust Slope Screen

Press the Adjust Slope Key to display the ***Adjust Slope*** screen.

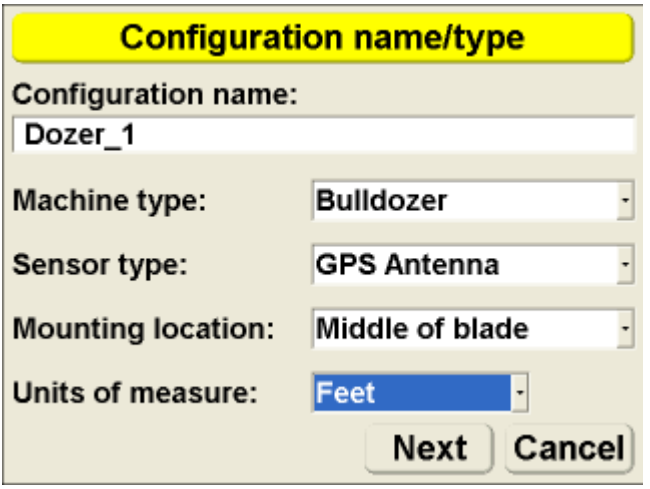


Keyboard Functions

When entering text or numbers, one of the following two pop-up keyboards displays:

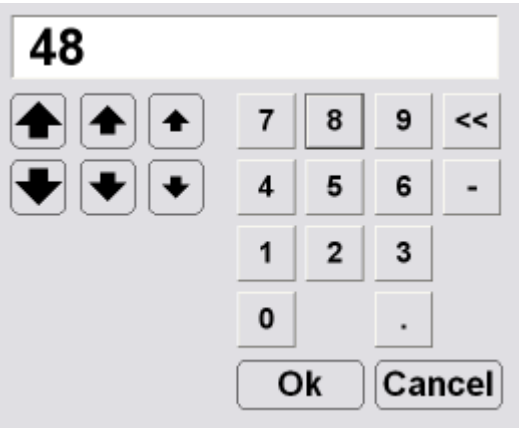
Alphanumeric Keyboard

1. To access the keyboard from any field requiring an alphanumeric input, press the field.

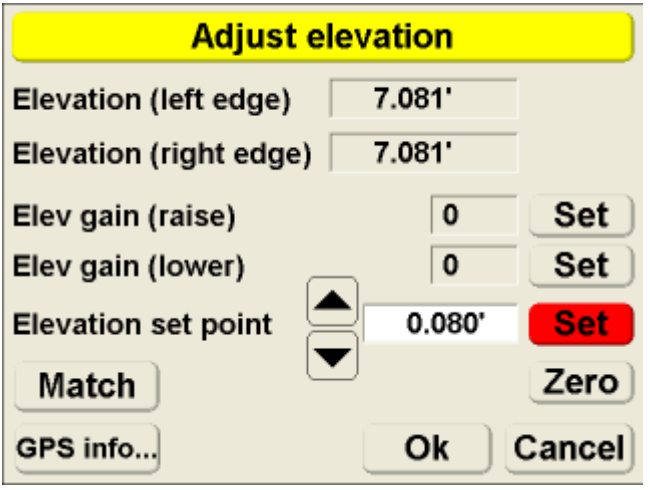


2. Press the letters or numbers on the keyboard to type.

Numeric Keyboard



1. To access the keyboard from any field requiring an numeric input, press the field.



2. Press the numbers on the keyboard to type in a value, or use the arrow keys to increase the value incrementally.

Setup and Usage

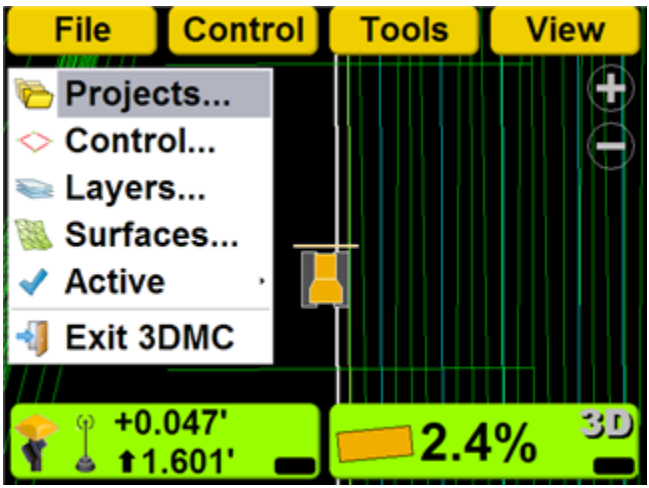
Project Files

You must create or import a project file in 3DMC. The project file contains one control point file and multiple layer and surface files.

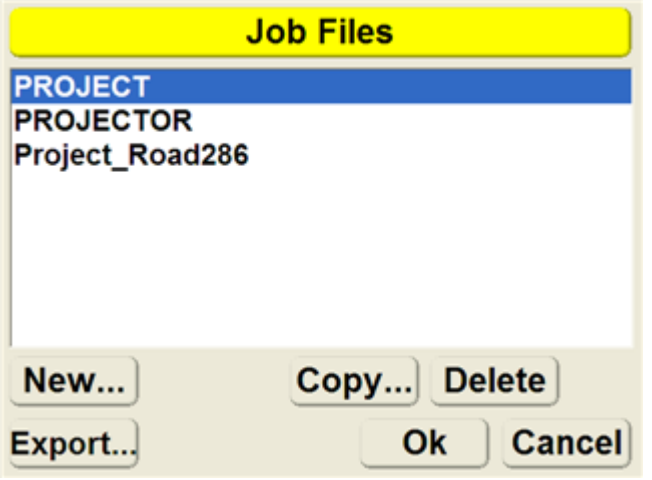
Importing Project Files

You can import complete project files from 3D-Office (recommended) or import elements of a project. individually (See “Control Point Files”, “Layers” and “Surface and Alignment Files”).

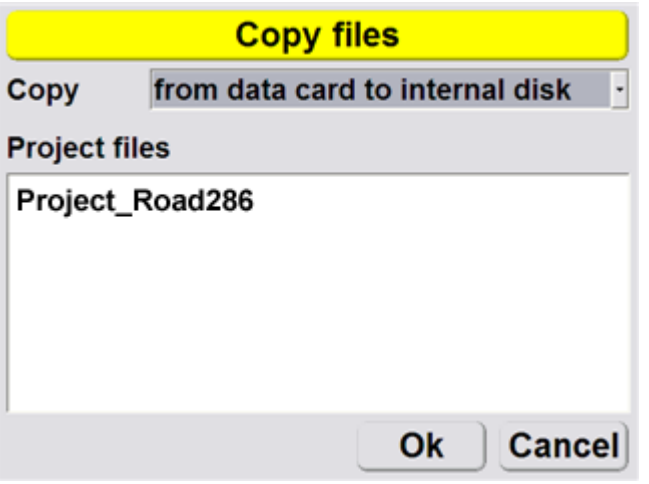
1. Press **Topcon Logo ▸ File ▸ Projects.**



2. Press **Copy**.



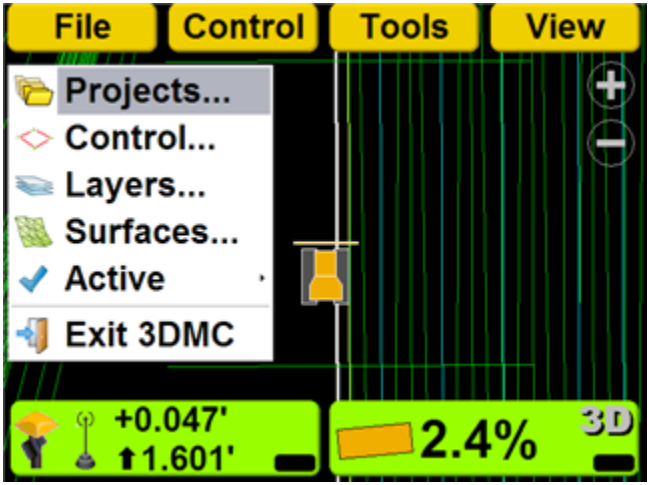
3. Select the file to copy and press **Ok**.



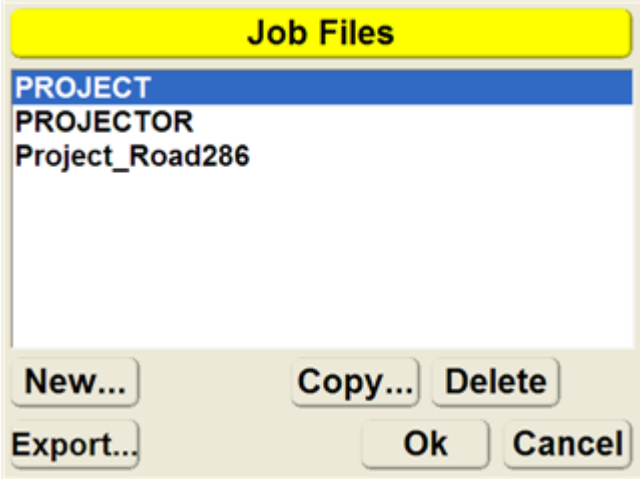
Creating a Project File

You can create multiple project files.

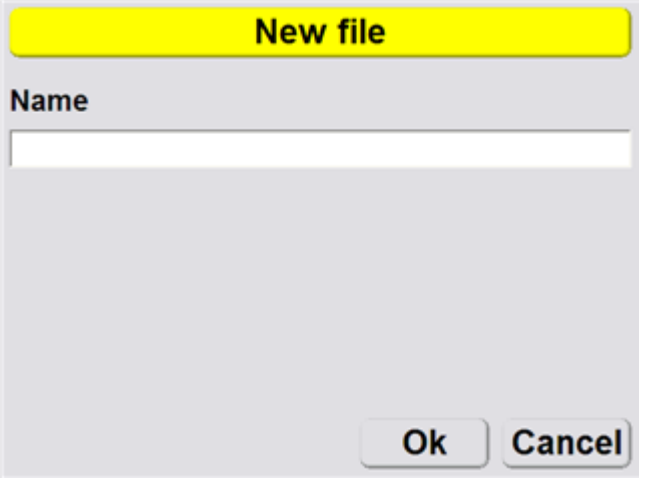
1. Press **Topcon Logo ▸ File ▸ Projects.**



2. Press **New**.



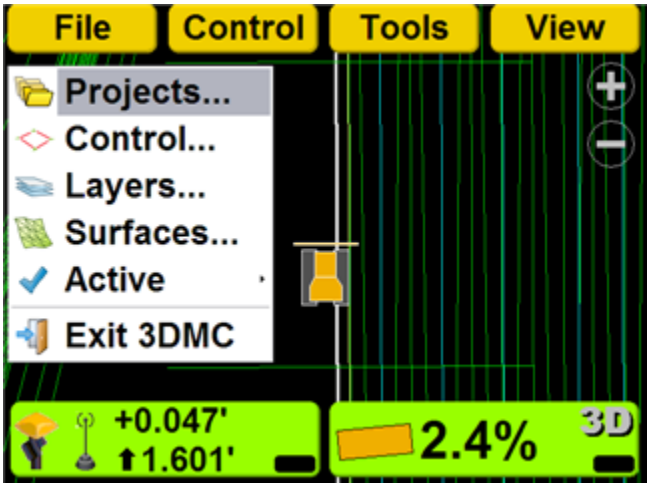
3. Enter the Project Name and press **Ok**.



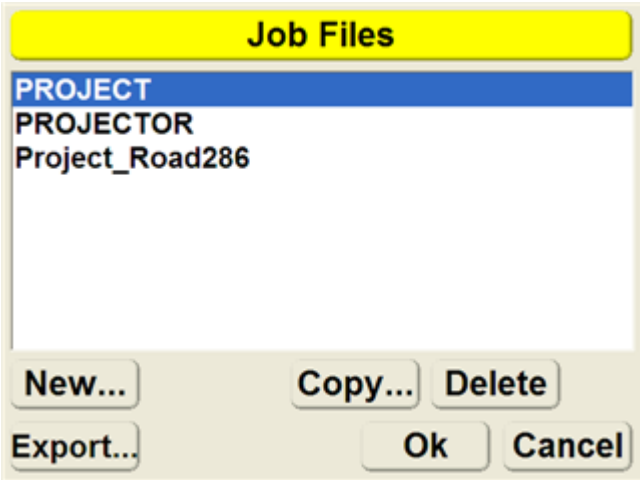
Exporting Project Files

Export project files to a data card (recommended), or to the internal disk, for use with Pocket-3D or other applications.

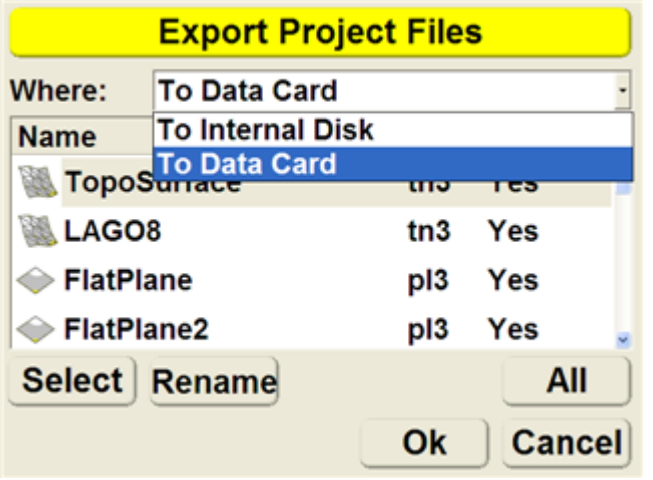
1. Press **Topcon Logo ▸ File ▸ Projects.**



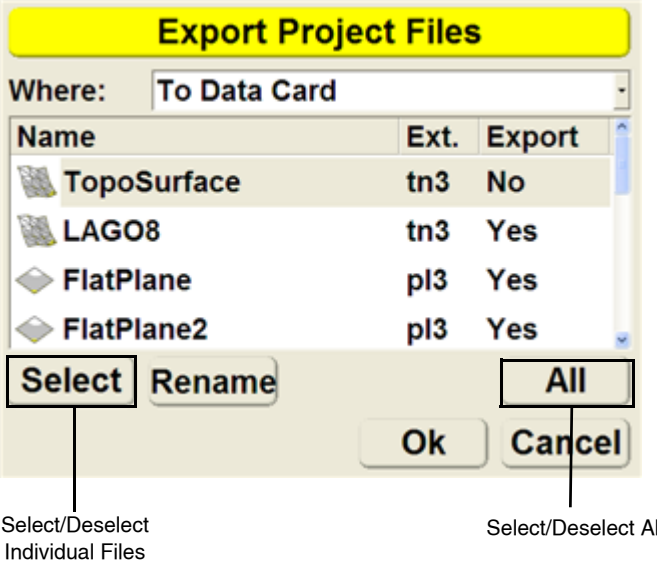
2. Press **Export**.



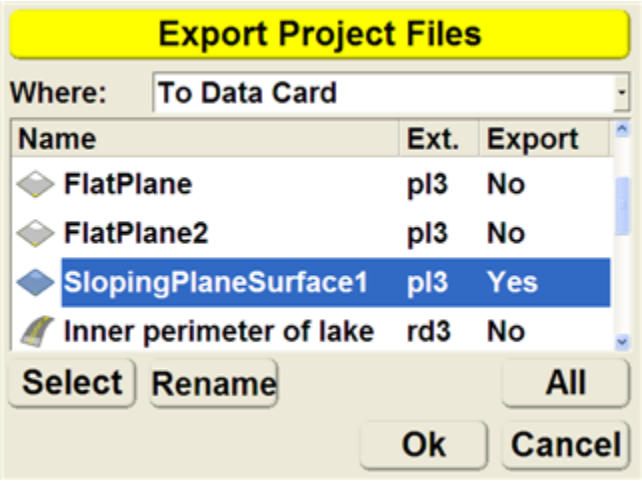
3. Select the location (*Where*) of the export.



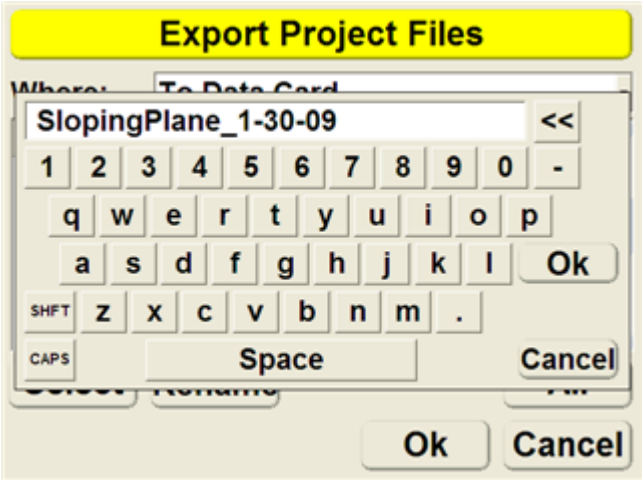
4. Press **All** to select or deselect files to export, or choose and individual file and press **Select** to change the selection to **Yes** (export) or **No** (do not export).



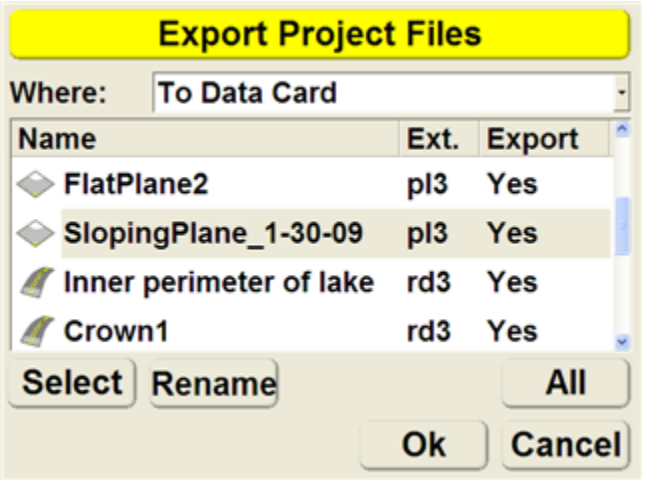
5. 3DMC allows the user to rename the exported file. Choose a file, and press **Rename**.



6. Enter the new name of the file. and press **Ok**.



7. Press **Ok** to export the files and return to the ***Job Files*** screen.



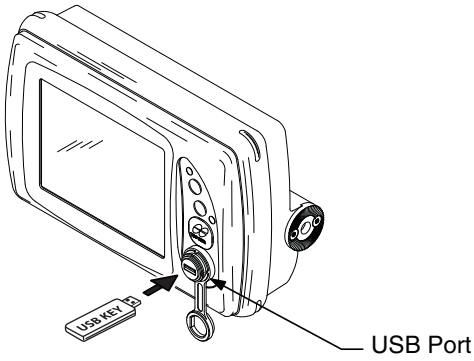
Control Point Files

A control point file is required in 3DMC and is usually imported into 3DMC with a project file. Control point files can also be imported into 3DMC individually from an external device or from the internal disk.

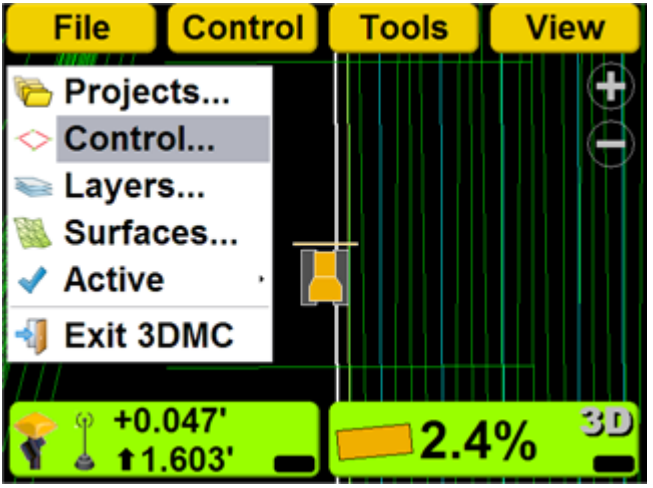
Importing Control Point Files

To import a control point file:

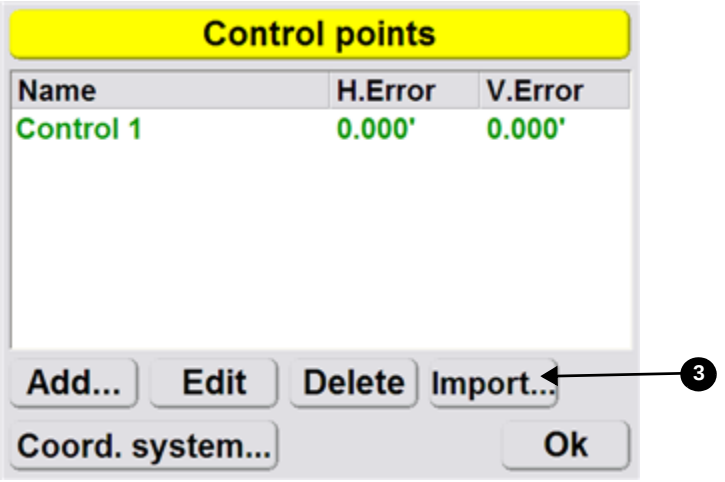
1. If importing from a USB key, insert the key into the GX-60.



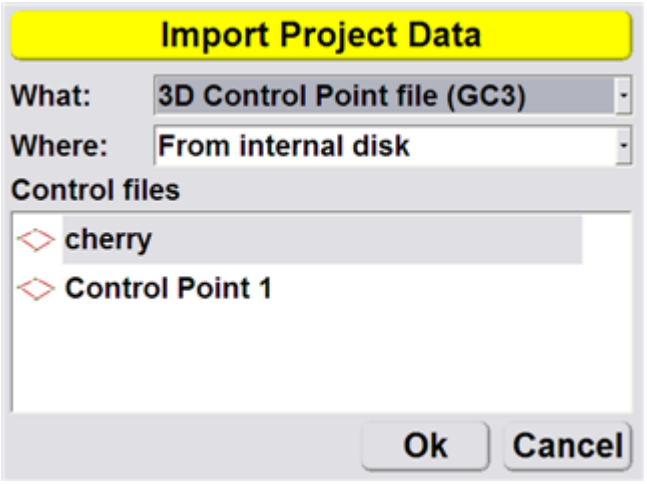
2. Press **Topcon Logo ▸ File ▸ Control**.



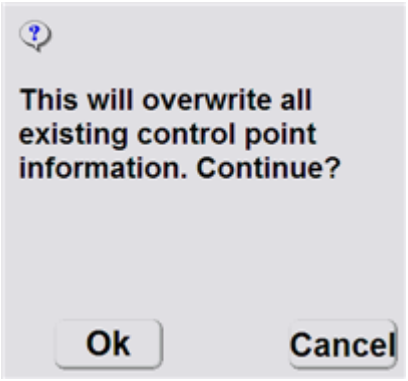
3. Press **Import**.



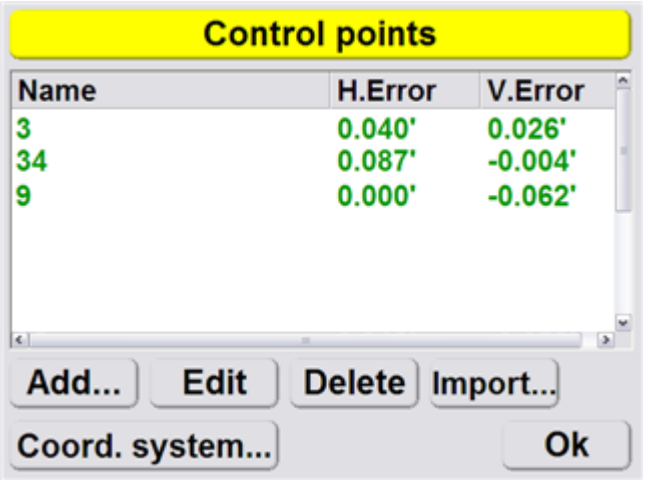
4. Select the file type (*What*) and location (*Where*) from the drop down menu, and then select the file name to import and press **Ok**.



5. Press **Ok** to apply the data to the current job.



6. Press **Ok** to return to the Main Screen.



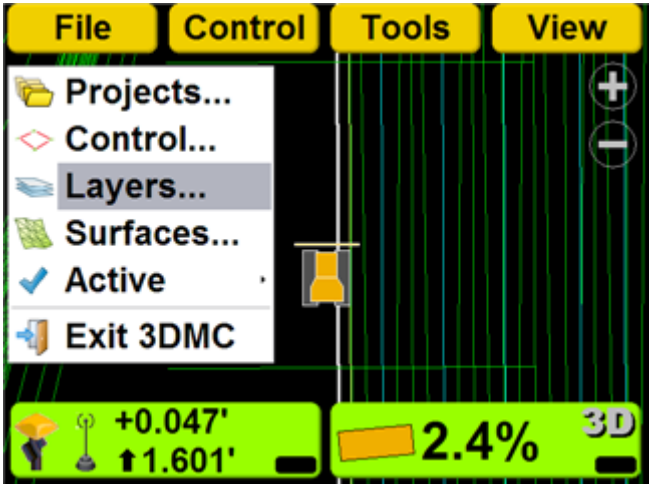
Layers

A layer in 3DMC contains point data and/or linework data.

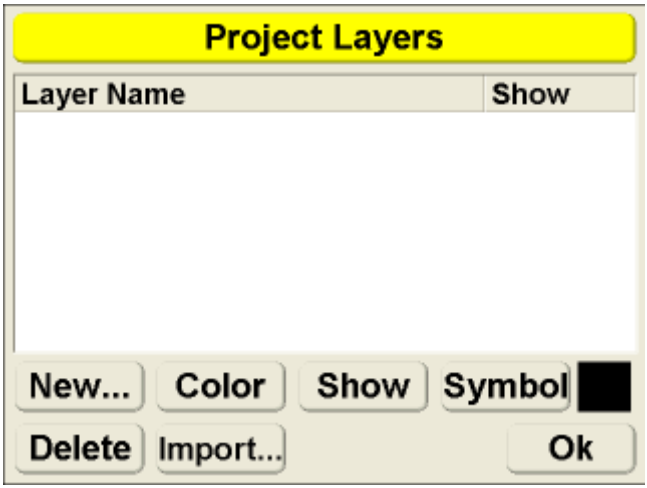
Importing Layers

Layers are usually imported into 3DMC with a project file. Layers can also be imported into 3DMC individually from an external device or from the internal disk.

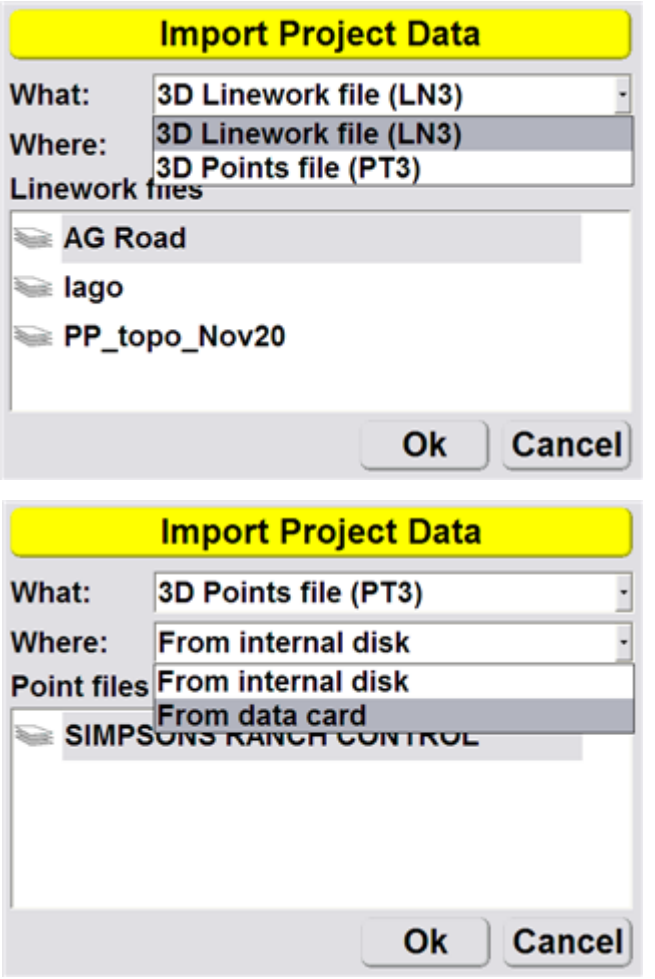
1. Press **Topcon Logo ▸ File ▸ Layers.**



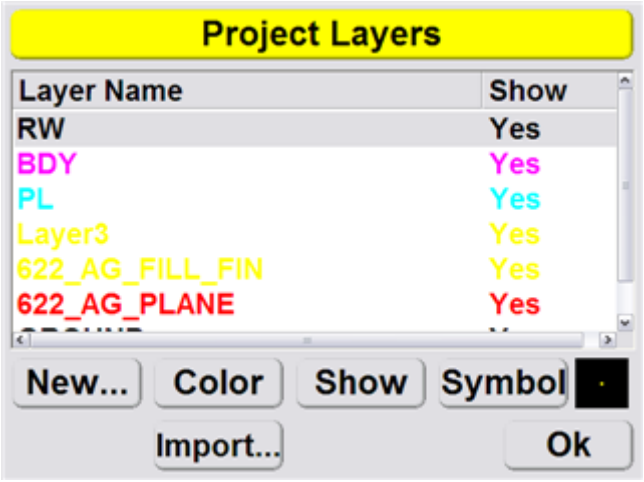
2. Press **Import.**



3. Select the file type (*What*) and the location of the file (*Where*) to import from the drop down menu. Then select the file to import, and press **Ok**.



4. Select individual point or linework files to change their color, symbol, and whether or not to show the layer. Press **Ok** to return to the Main Screen.



Surface and Alignment Files

Surface File Types

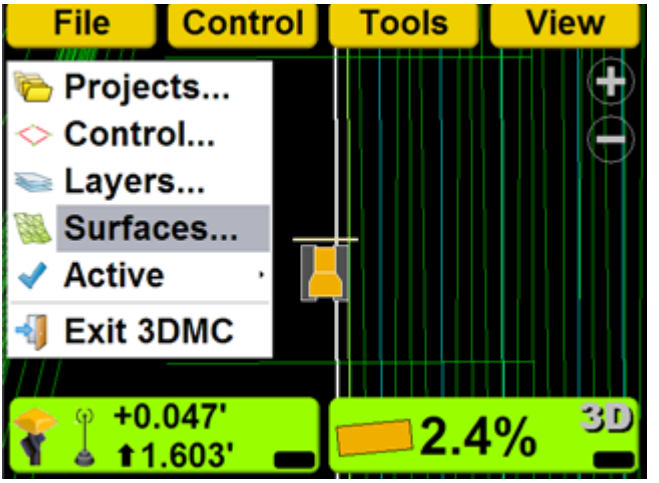
Flat Plane Surface/Sloping Plane Surface

Crown Road Surface (Alignment)

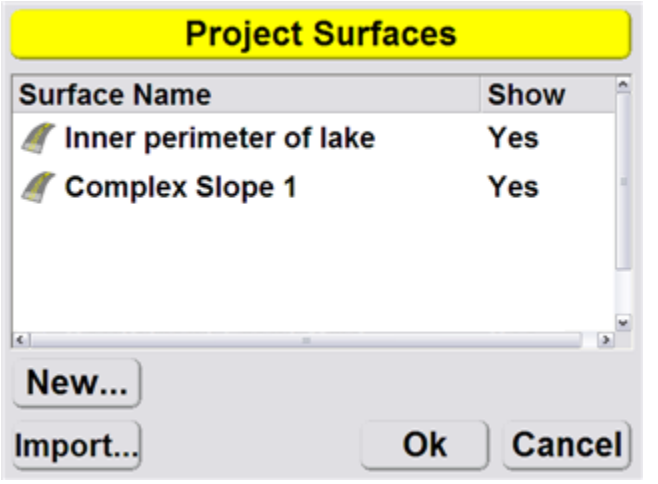
TIN (Triangulated) Surface File

Importing Surface Files

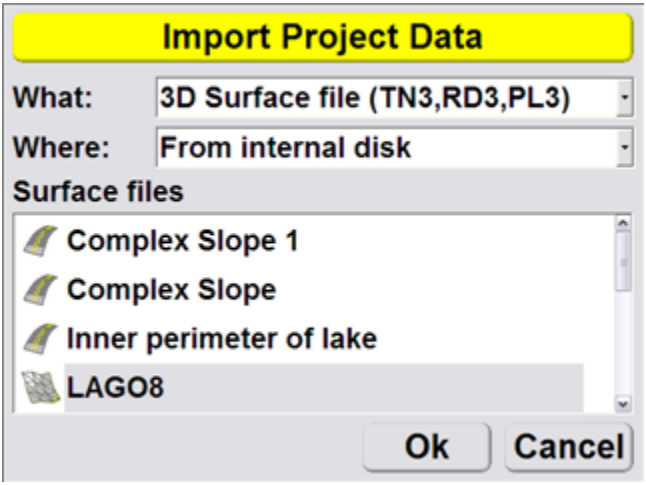
1. Press **Topcon Logo ▸ File ▸ Surfaces**.



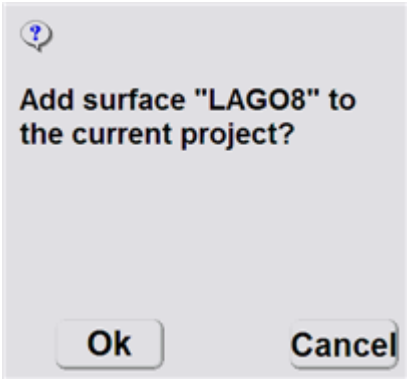
2. Press **Import**.



3. Select the file type (*What*) and the location of the file (*Where*) to import from the drop down menu. Then select the file to import, and press **Ok**.

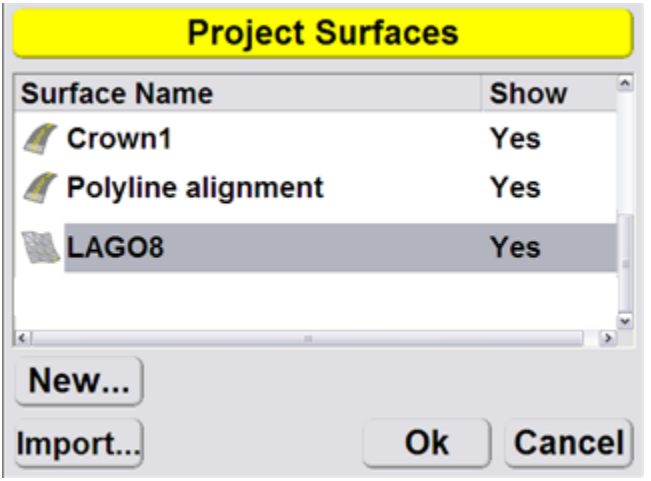


4. Press **Ok** at the prompt.



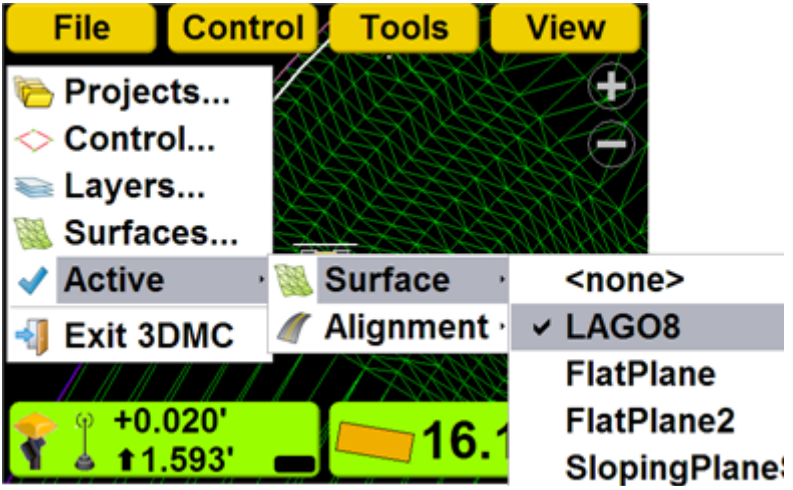
5. Press Ok to return to the Main Screen.
   You must make the imported file active to use the

file in 3DMC. See “Selecting an Active Surface File”.



Selecting an Active Surface File

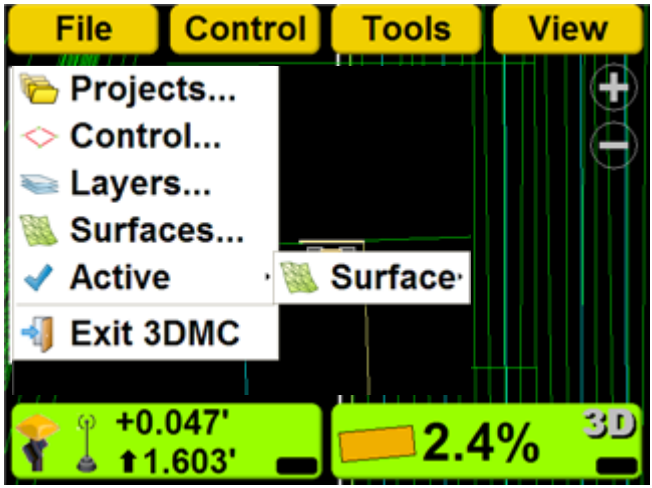
Press **Topcon Logo** ▸ **File** ▸ **Active** ▸ **Surface**. Choose the surface file to make active.



Using an Alignment File as a Reference

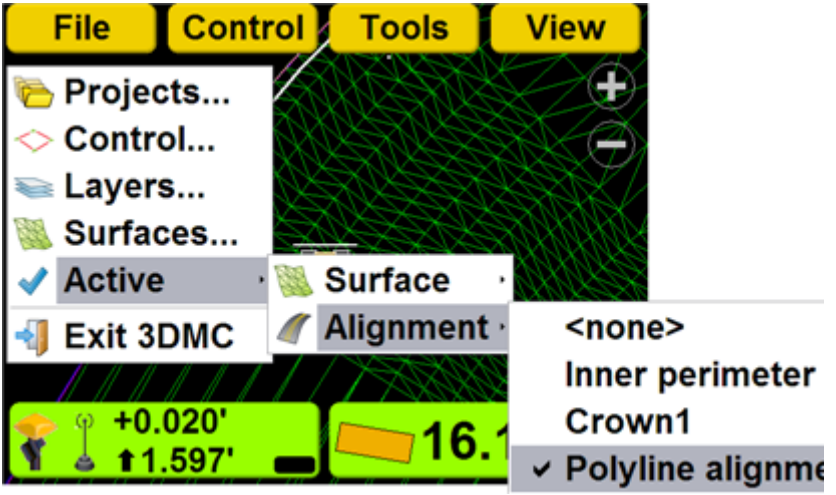
An alignment file can be used as a steering reference. An alignment file must be active, either as a working surface or a grading reference, to use steer indication in 3DMC. See “Steering or Grading to Polyline” for more information.

Note: By selecting an alignment file as an active surface, **Alignment** is disabled in the Active menu.



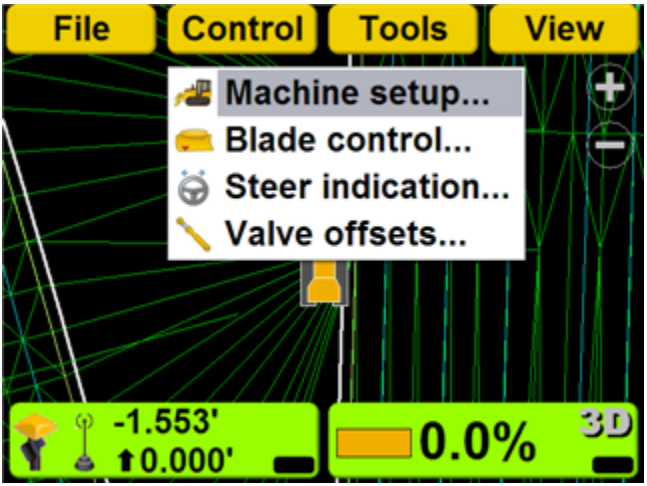
Selecting an Active Alignment File

Press **Topcon Logo ▸ File ▸ Active ▸ Alignment**. Choose the alignment file to make active.

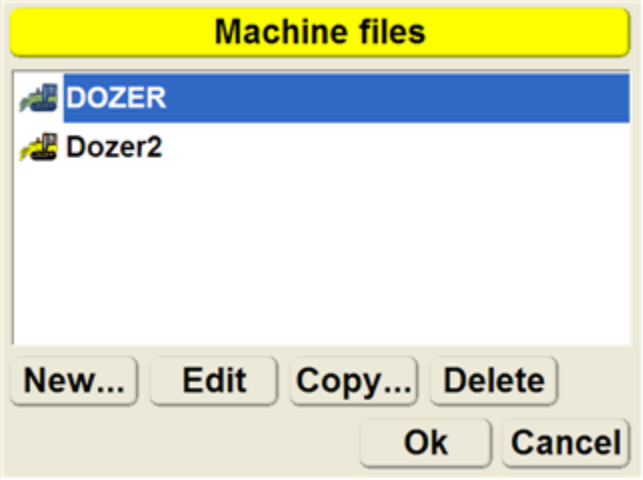


Creating a Machine Configuration File

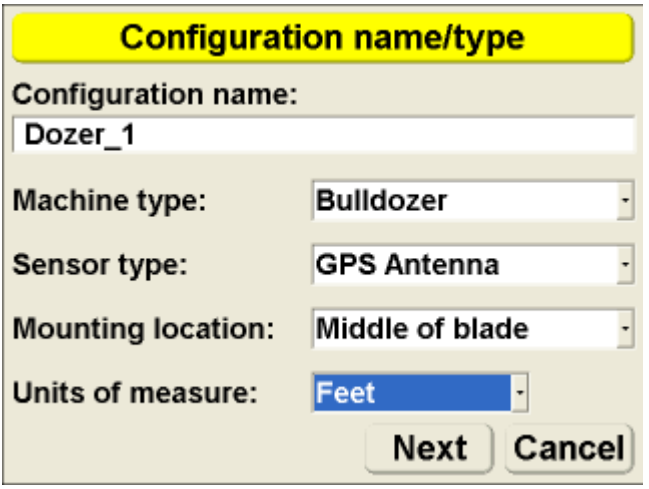
1. Press **Topcon Logo ▸ Control ▸ Machine setup**.



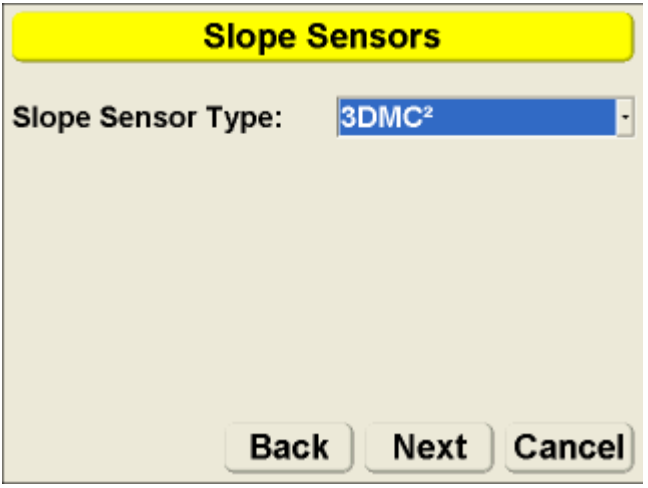
2. Press **New.**



3. Enter the machine information.

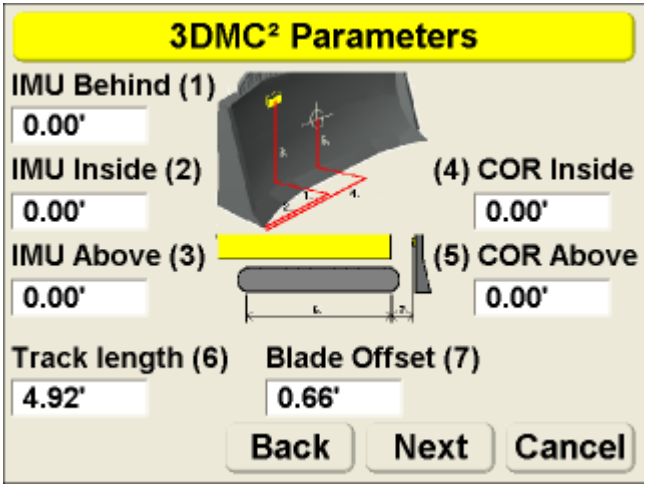


4. Select **3DMC²** as the sensor type, and press **Next**.

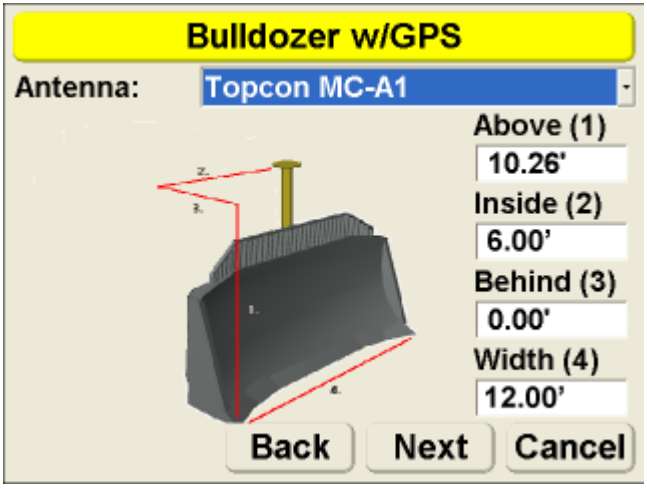


5. Enter the 3DMC² Parameters and press **Next**.
   Refer to the Installation and Calibration Manual

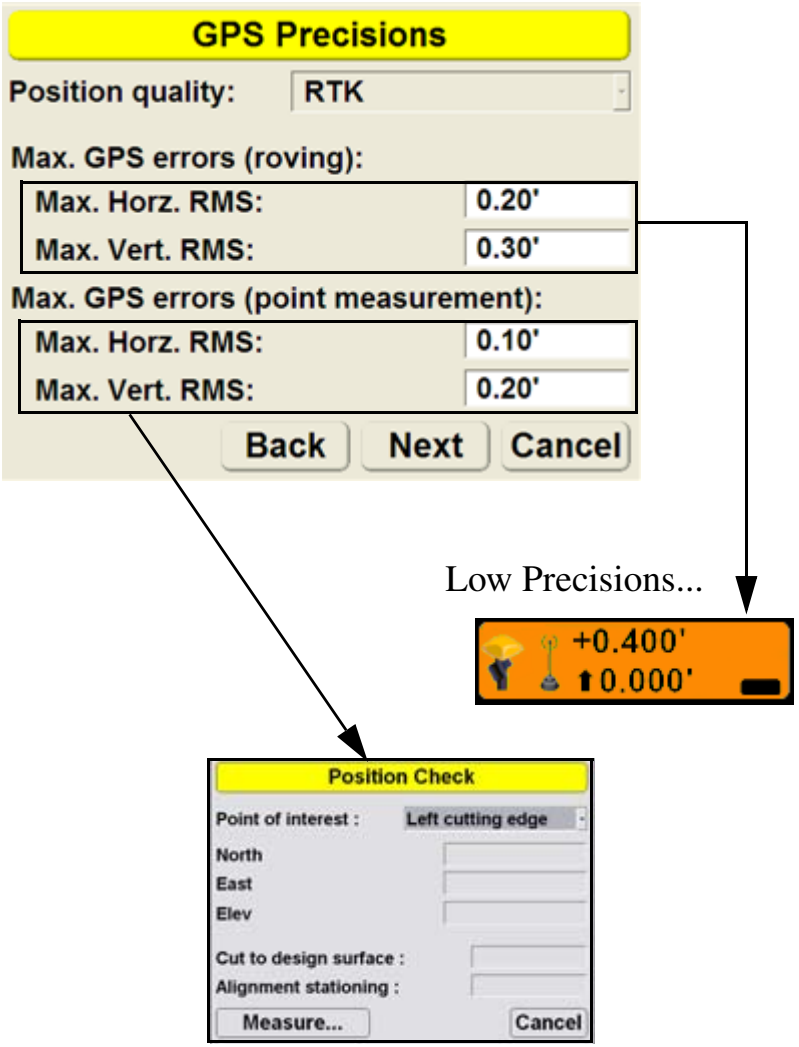
(P/N: 7010-0924) for details on 3DMC² Parameters.



6. Set **Topcon MC-A1** as the antenna type, enter the antenna measurement information, and press **Next**.

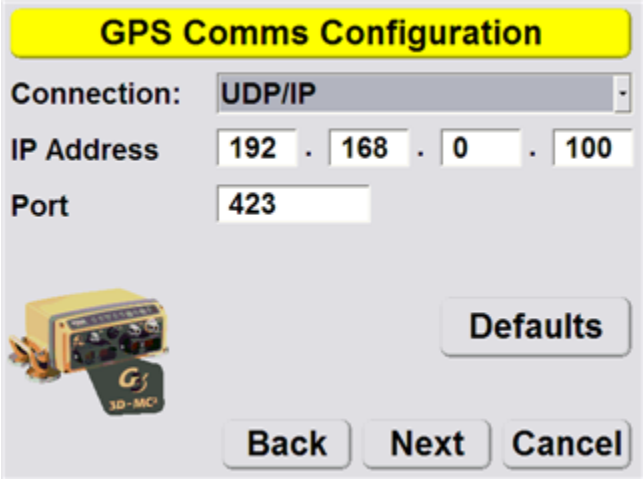


7. Enter the GPS precisions for point measurement and roving. Press **Next**.

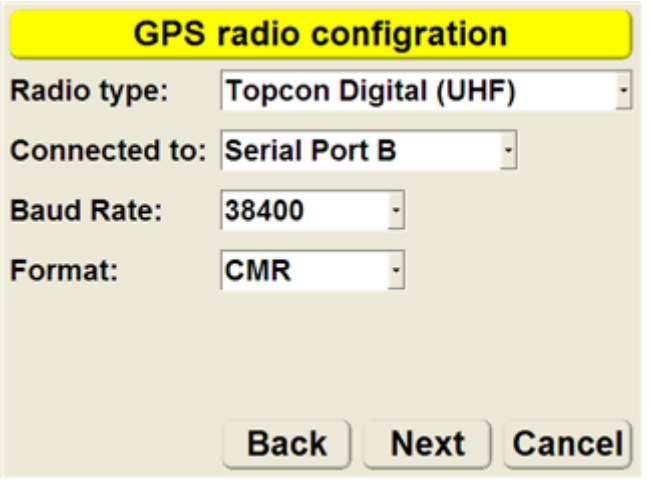


8. Set **UDP/IP** as the *Connection* type from the drop down menu in the ***GPS Comms Configuration*** screen. Your MC-R3 controller must have the G3

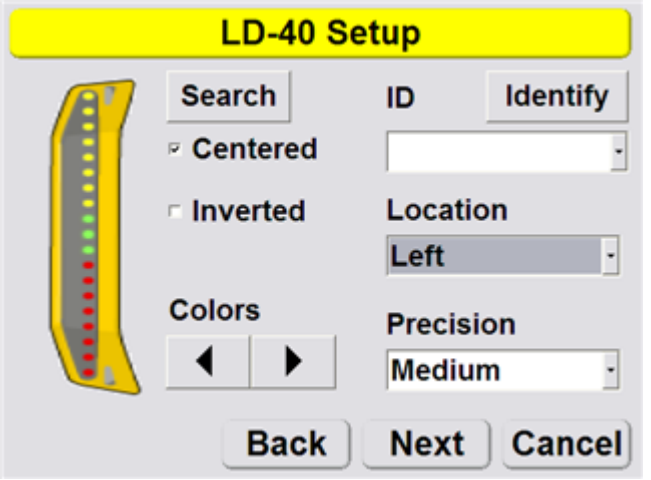
3D-MC² symbol, as shown on the ***GPS Comms Configuration*** screen, to be compatable with the MC² Sensor. Press **Next**.



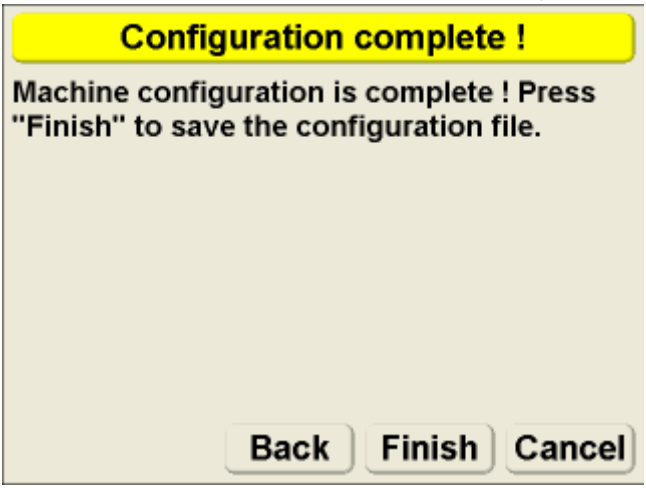
9. Set radio information and press **Next**. Refer to the serial number/radio label on the MC-R3 controller to determine the correct radio type. The radio type selection must match the radio contained in the MC-R3.



10. If using light bars, set LD-40 information and press **Next**. If no light bars are in use, press **Next** to bypass LD-40 setup.



11. Press **Finish** to save the machine configuration file.

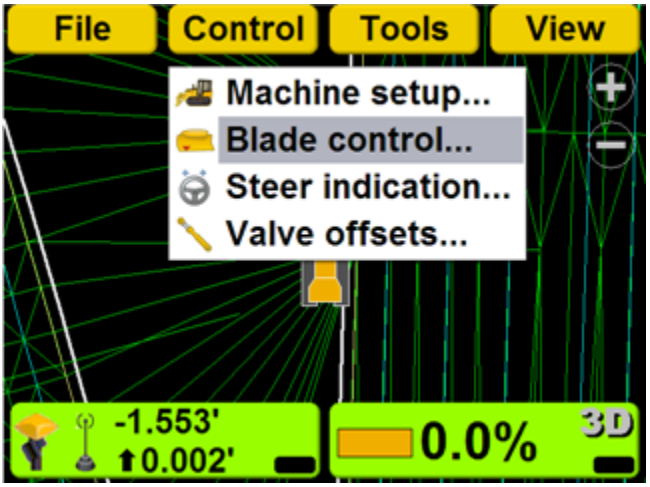


Setting Blade Control

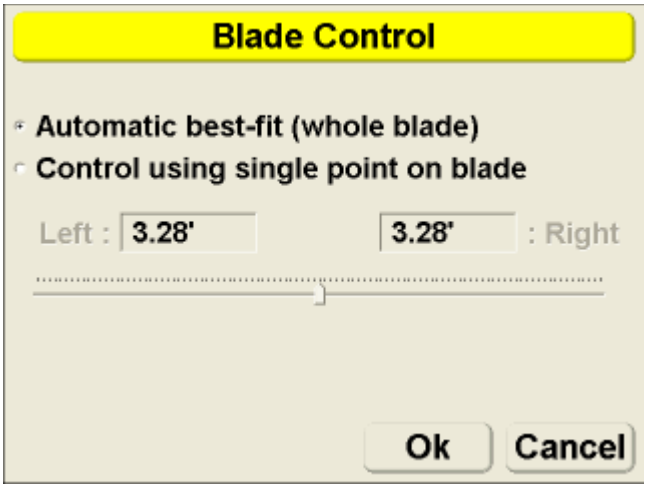
Automatic Best-Fit Blade Control

In the *Automatic best-fit (whole blade)* method, 3DMC chooses the elevation reference point to prevent undercutting.

1. Press **Topcon Logo ▸ Control ▸ Blade control**.



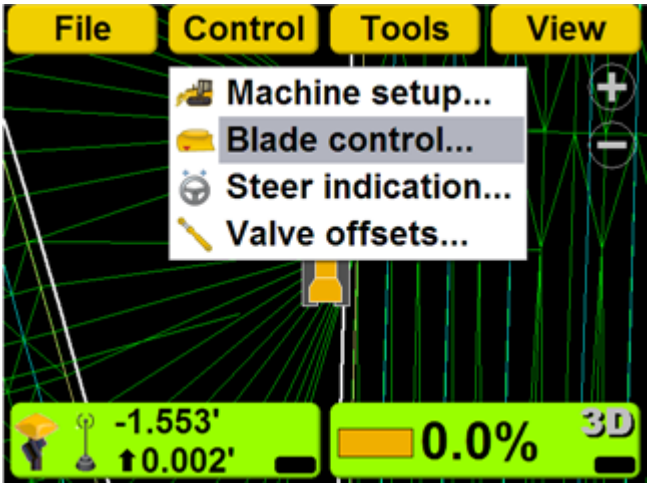
2. Select *Automatic best-fit (whole blade)*.



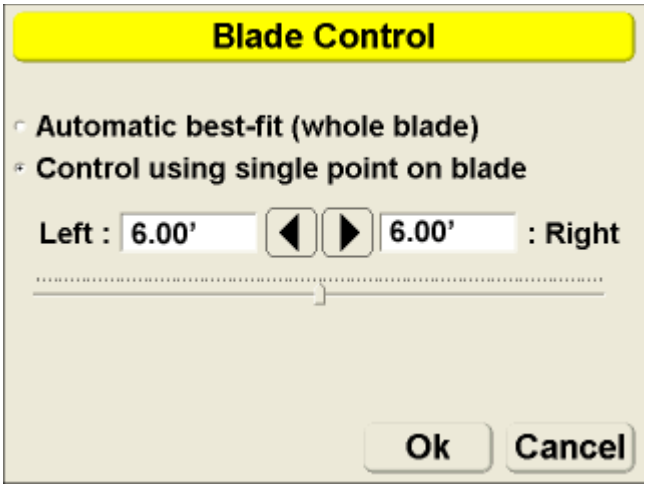
Control Using Single Point on Blade

In the *Control using single point on blade* method, the user defines a point on the blade to use as the elevation reference.

1. Press **Topcon Logo ▸ Control ▸ Blade control**.



2. Select *Control using single point on blade*. Enter a distance from the left/right side of the blade.

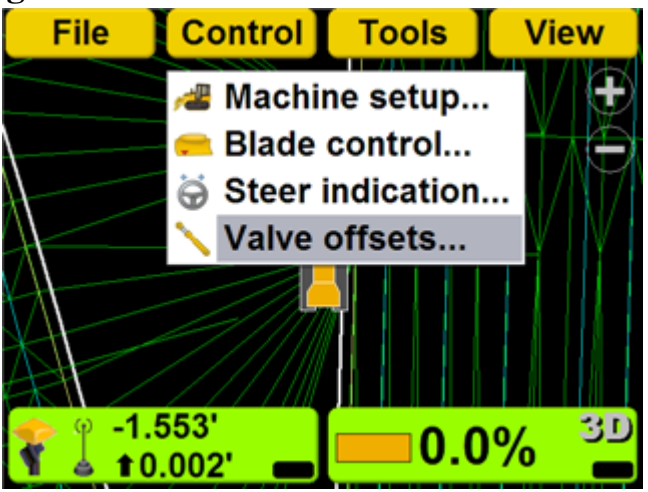


Valve Offset Calibration

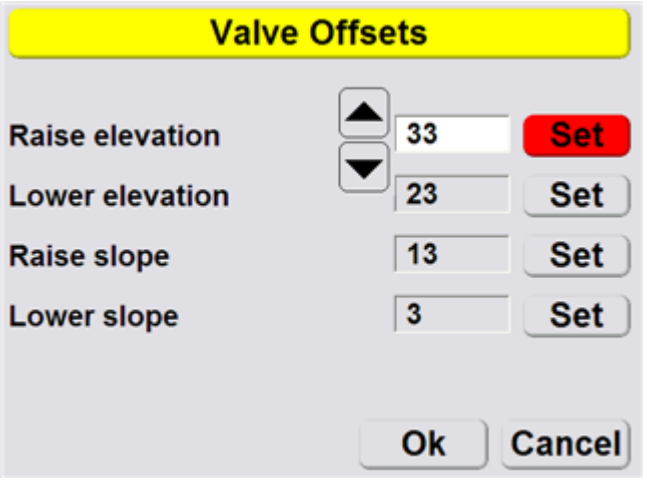
WARNING

Since the blade is about to move, automatically, HANDS and FEET should be clear of the blade!

1. Raise the machine blade so that both sides of the cutting edge rest a few inches above the ground.
2. At the display, press **Topcon Logo ▸ Control ▸ Valve offsets**.



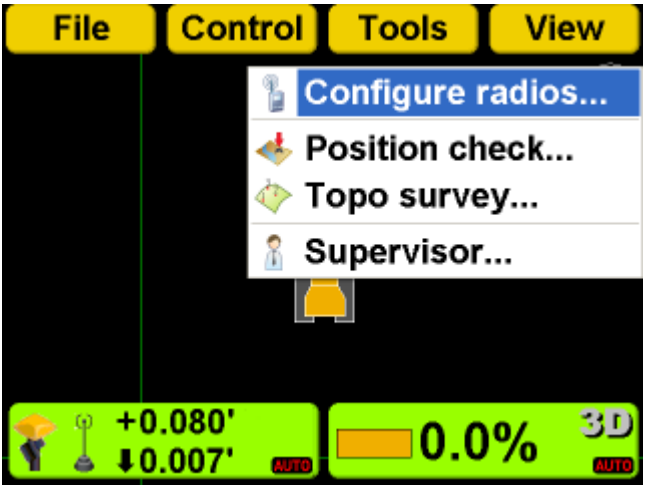
3. Press *Raise elevation* **Set** and enter a value into the field, or press the arrows to increase or decrease the valve offsets.



4. Repeat Step 3 for each of the selections.

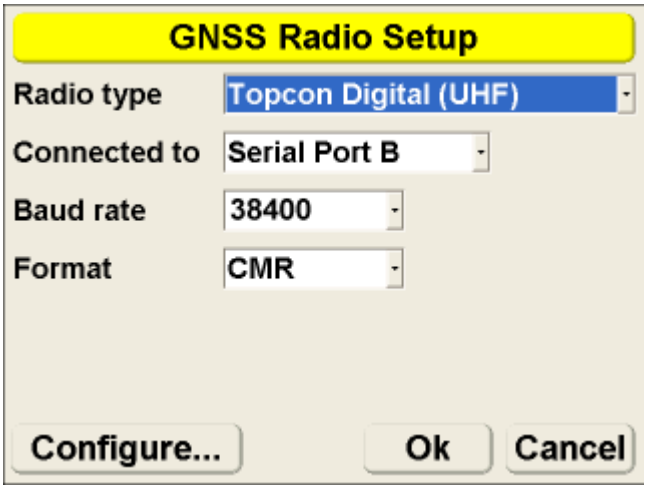
Configuring Radios

1. Press **Topcon Logo ▸ Tools ▸ Configure radios**.

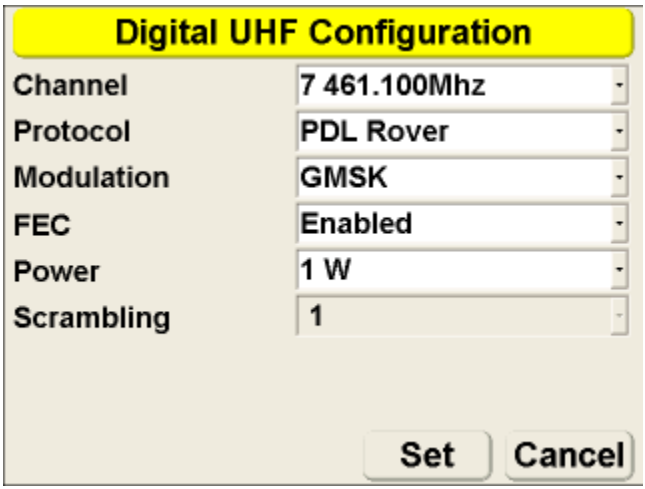


2. Select the *Radio type* that matches the radio type in the MC-R3, and then press **Configure**.
   Example: Topcon Digital (UHF)

3. 3DMC will connect to the radio after several seconds.

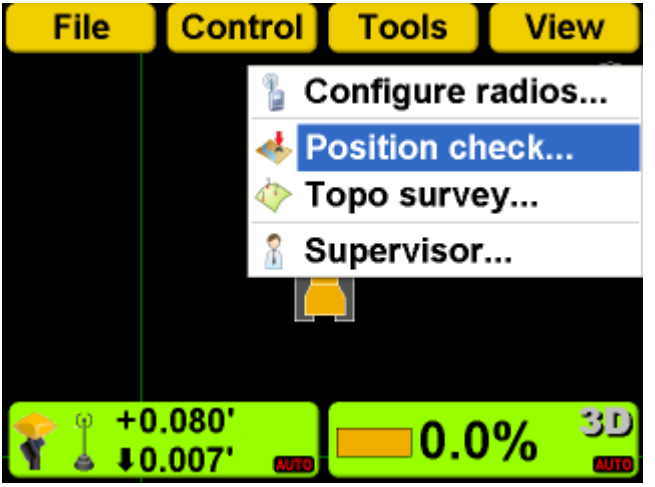


4. Select the radio configuration information. The channel must match the channel of the base station. Then Press **Set** to save the radio configuration settings.

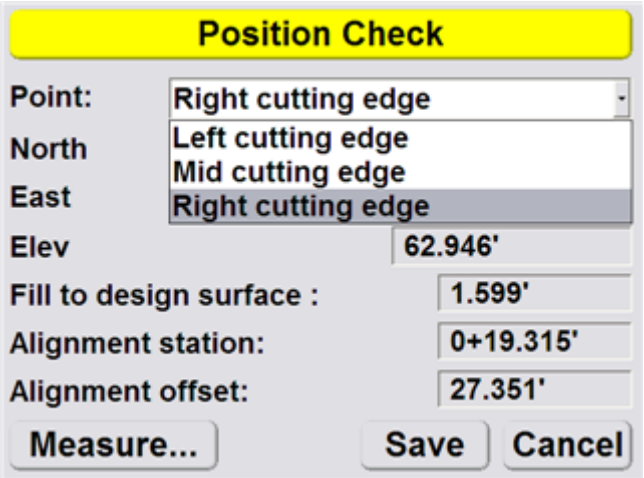


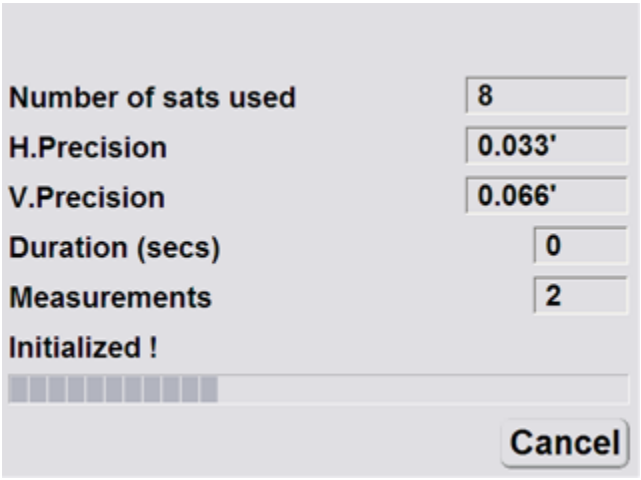
Checking the Blade's Position

1. To check the position of the blade, press **Topcon Logo ▸ Tools ▸ Position check**.



2. On the ***Position Check*** screen, select the *Point* from the drop down menu, and press **Measure**.

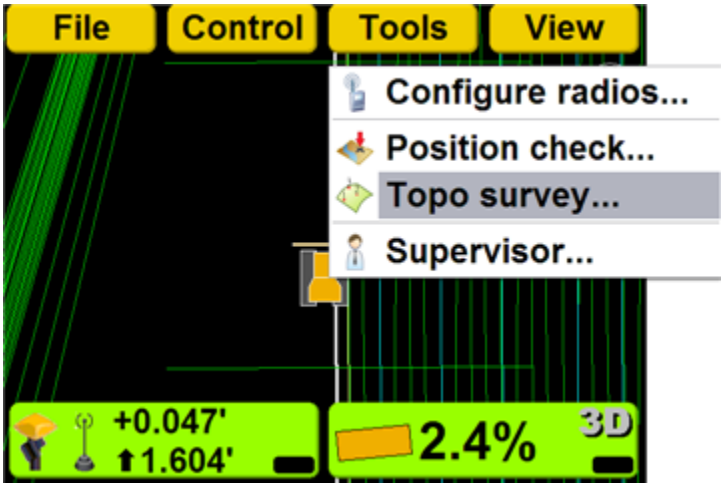




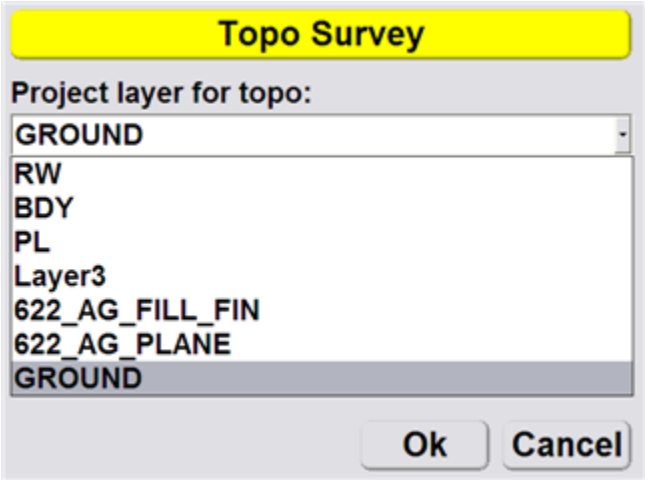
3. When finished, the ***Position Check*** screen displays the point on the job at the selected edge of the blade.
4. Press **Save** to record the point for reference. The saved point appears on the Main Screen.

Performing Topographic Surveys

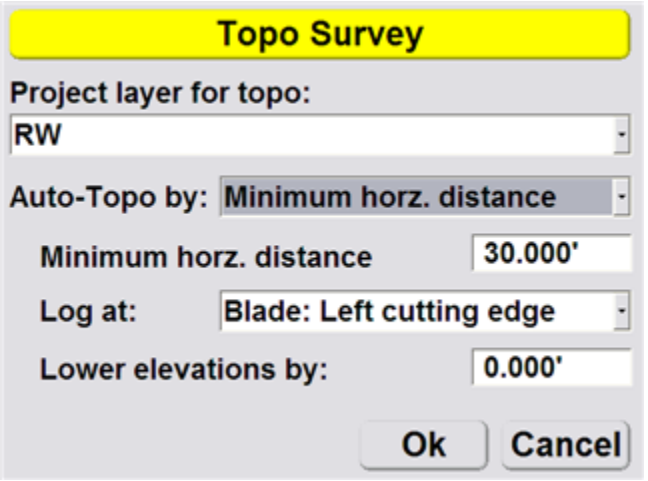
1. Press **Topcon Logo ▸ Tools ▸ Topo survey**.



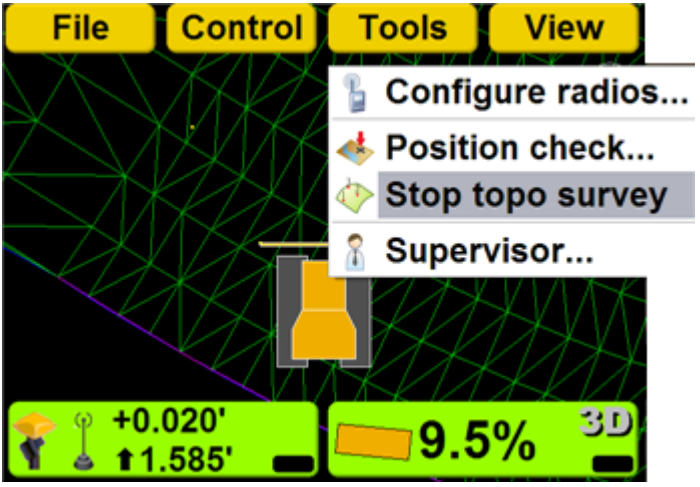
2. Choose the project layer for the topo survey from the drop down menu.



3. Set the topo survey information.



4. Press **Ok** to start the topo survey function.
5. To stop topo measurements, press **Topcon Logo ▸ Stop topo survey**.

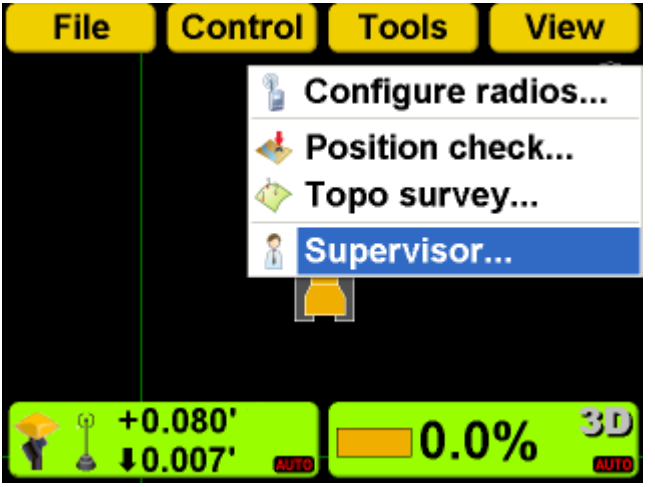


Using Supervisor Mode

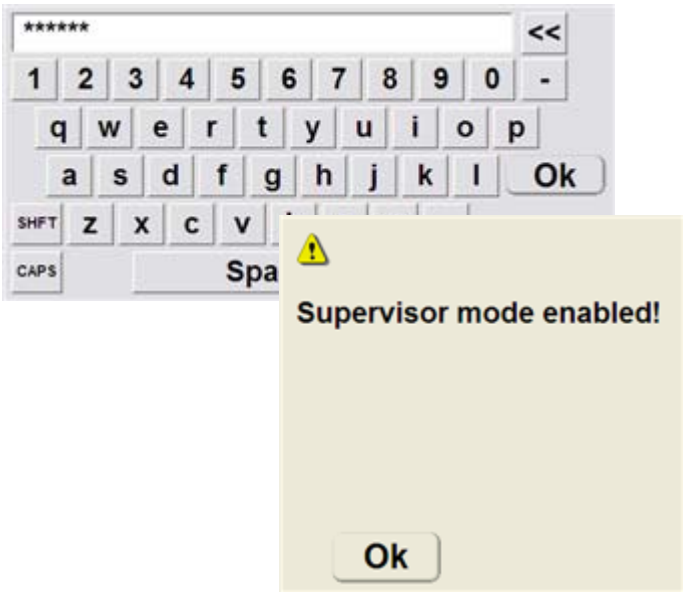
Using Supervisor mode in 3DMC, a supervisor can disable menus, buttons and screen items from the user. A password is needed to access Supervisor mode. Passwords are case sensitive.

The default password is: *topcon*

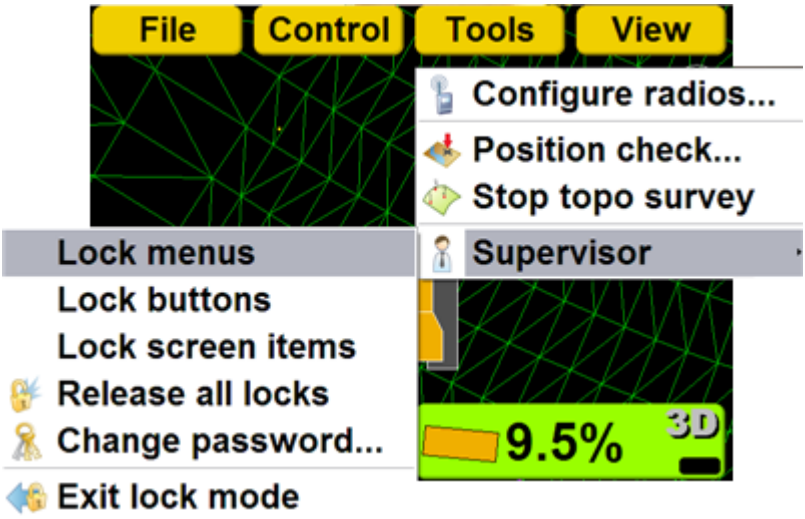
1. Press **Topcon Logo ▸ Tools ▸ Supervisor**.



2. Enter the password using the keyboard, and press **Ok**. Press **Ok** at the prompt.

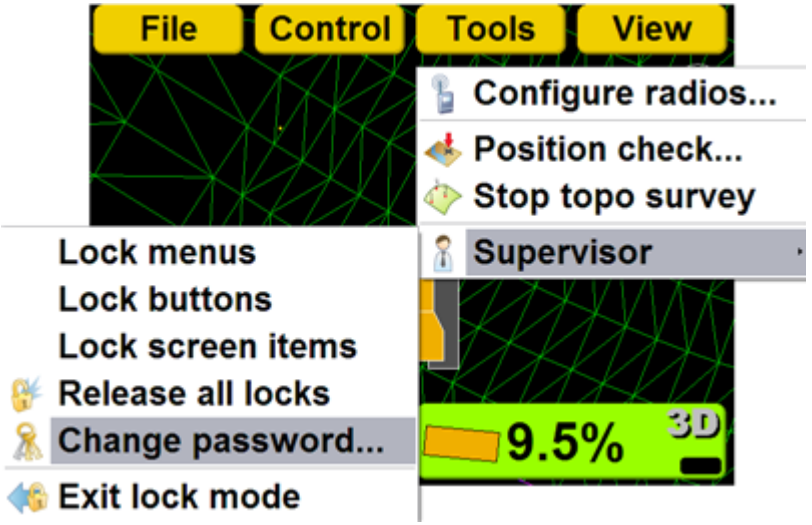


3. Press **Topcon Logo** ▸ **Tools** ▸ **Supervisor** to access the Supervisor menu.



Changing the Password

1. Press **Topcon**
   Logo ▸ Tools ▸ Supervisor ▸ Change password.
   Press **Ok** at the prompt.

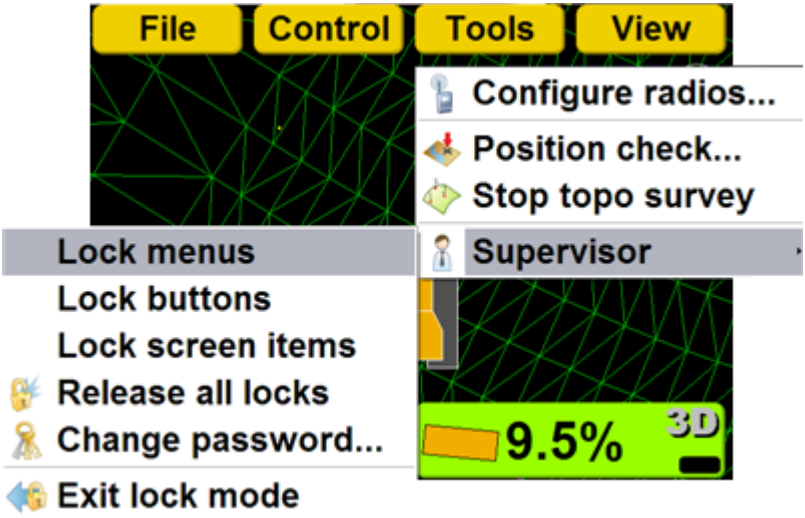


2. Enter the new password twice, and press **Ok**.

Locking Menus, Buttons and Screen Items

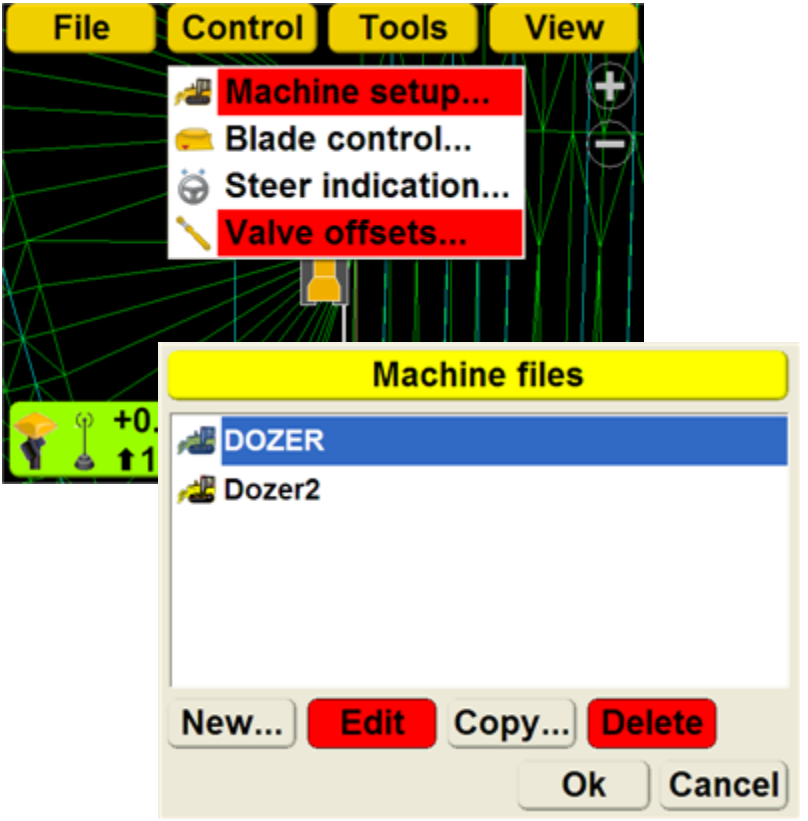
- Menu: a selection from the **File**, **Control**, **Tools**, or **View** menu.
- Button: a button on various 3DMC screens, such as the **Edit** button on the ***Machine Files*** screen.
- Screen item: an alphanumeric entry field or drop down menu.

1. Press **Topcon Logo ▸ Tools ▸ Supervisor ▸ Lock menus/buttons/screen items**. Then press **Ok**.

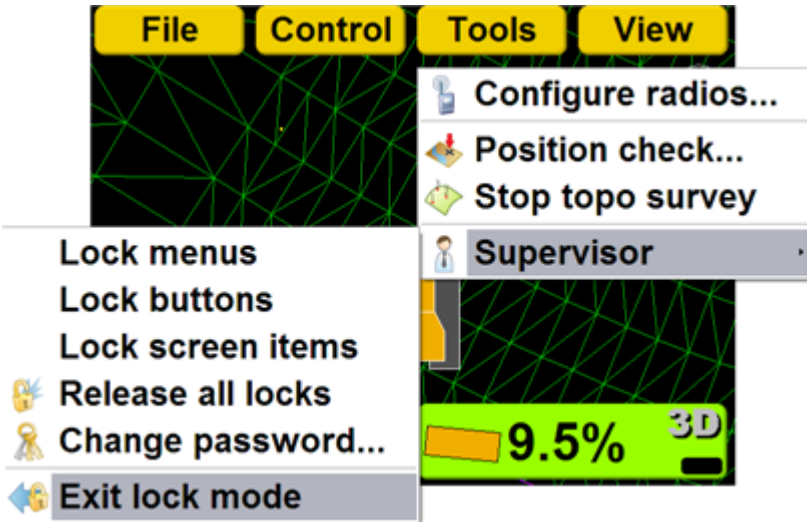


2. Press menus, buttons or screen items to disable. The selections display as red when locked. Press

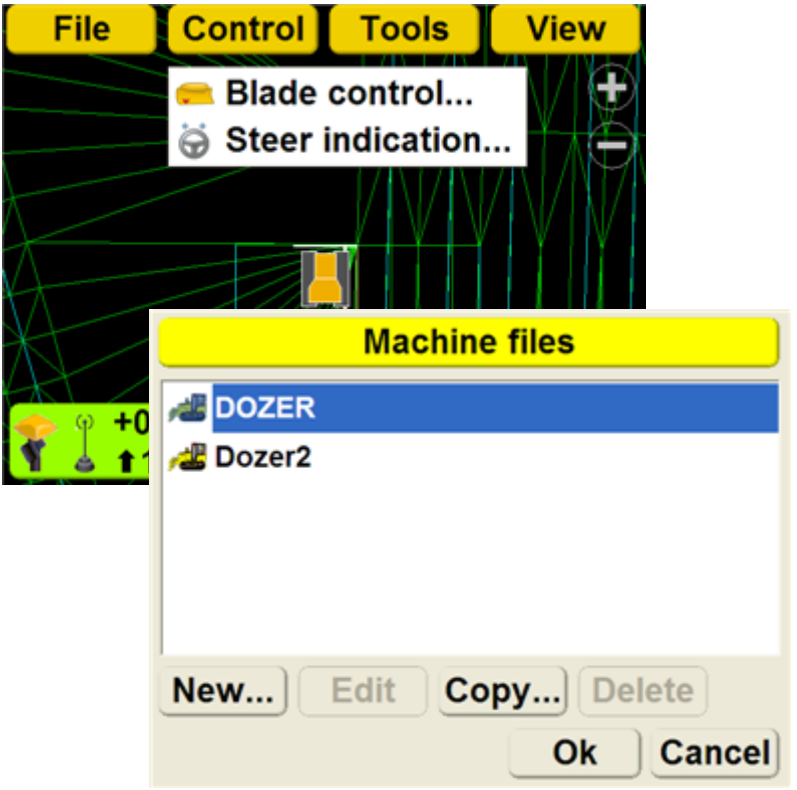
the menu again to unlock. The menu will no longer display as red.



3. When you are finished locking , press **Topcon Logo ▸ Tools ▸ Supervisor ▸ Exit lock mode.**

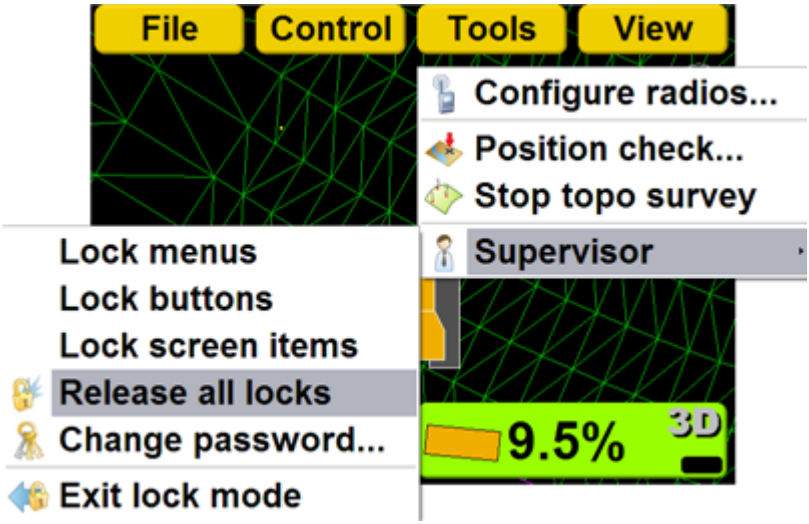


4. The selections are no longer displayed or are inactive.

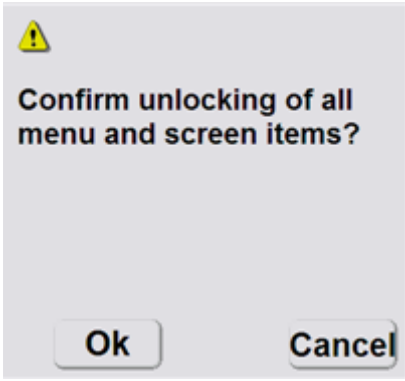


Releasing All Locks

1. Press **Topcon Logo ▸ Tools ▸ Supervisor ▸ Release all locks**.

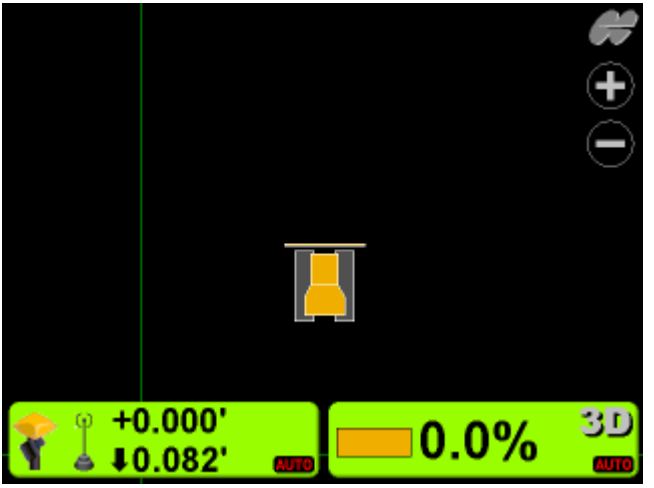


2. Press **Ok** at the prompt to unlock all menu and screen items.



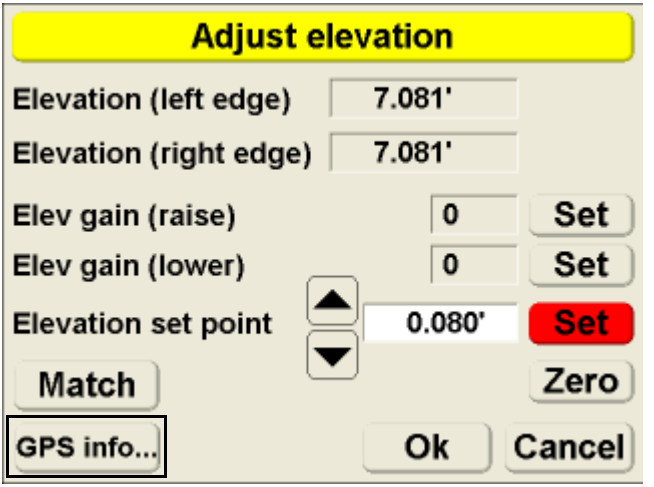
Viewing GPS Information

1. To view the ***GPS information*** screen and tabs, press the **Elevation control** key.

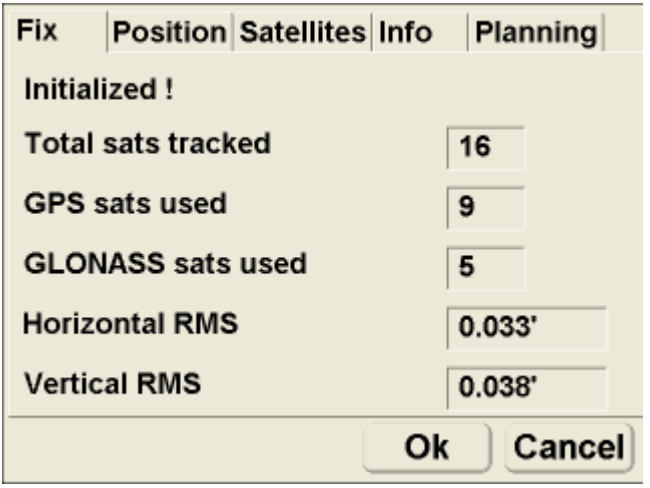


Elevation Control Key

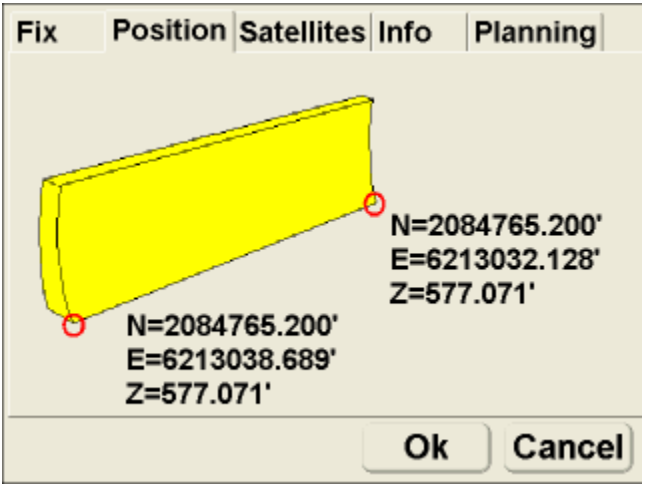
1. Press the **GPS info** button.



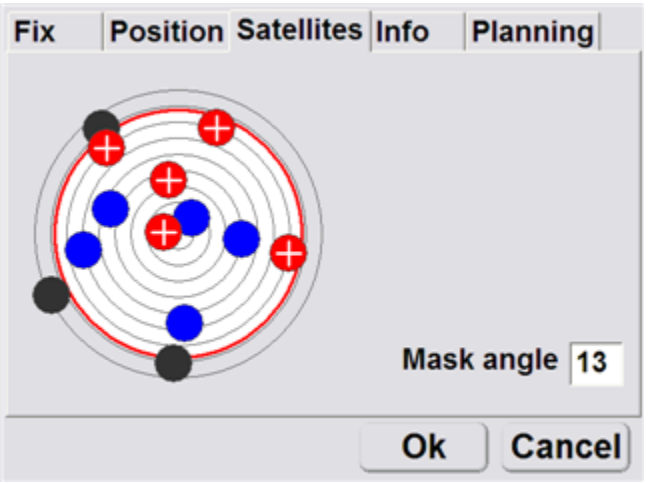
Fix



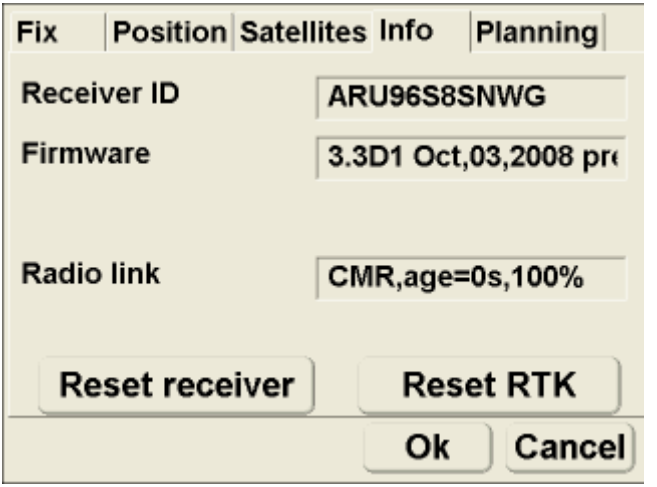
Position



Satellites

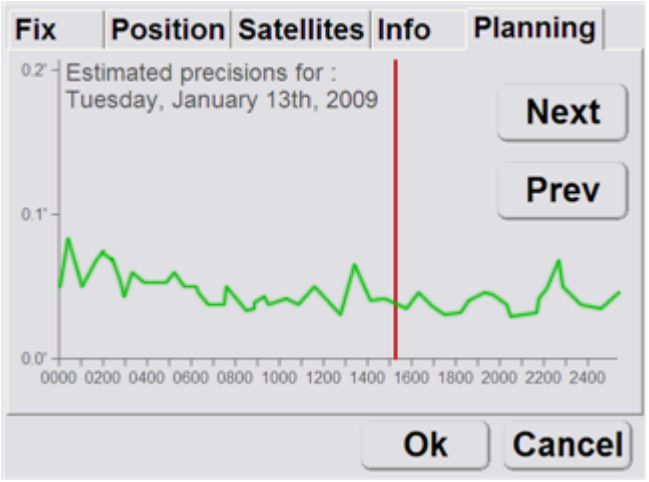


Info



Planning

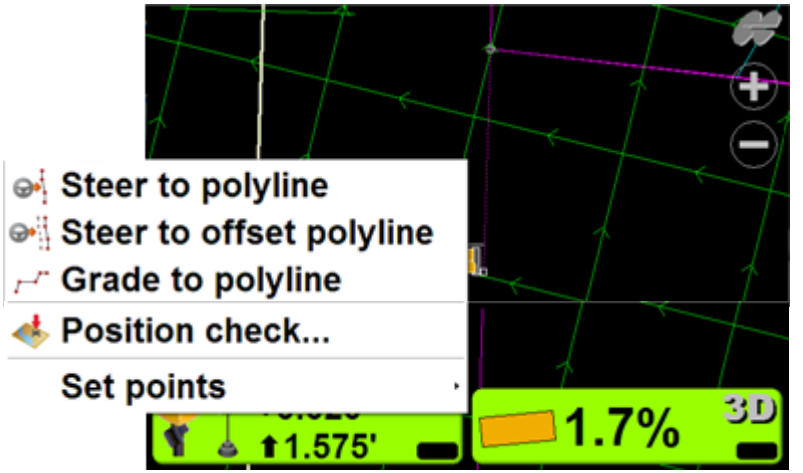
The red vertical line marks the current time.



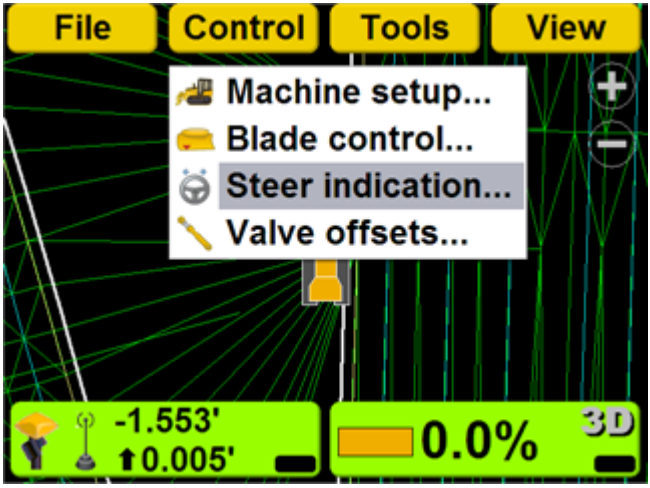
Steering or Grading to Polyline

You must make an alignment file active to steer or grade to polyline. See “Selecting an Active Alignment File”.

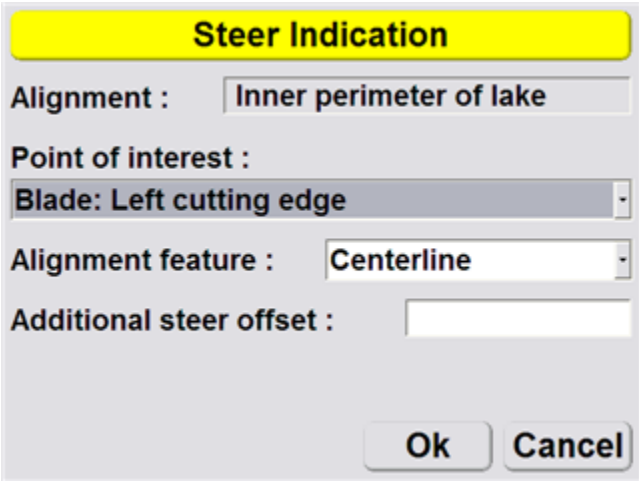
1. On the Main Screen, press and hold the polyline to which you wish to steer or grade. Then press Steer to polyline on the pop-up menu.



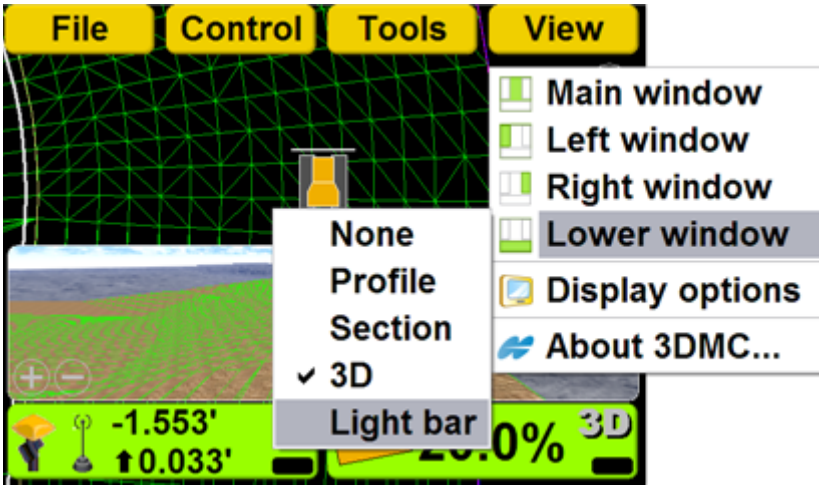
2. Press **Topcon Logo ▸ Control ▸ Steer indication**.

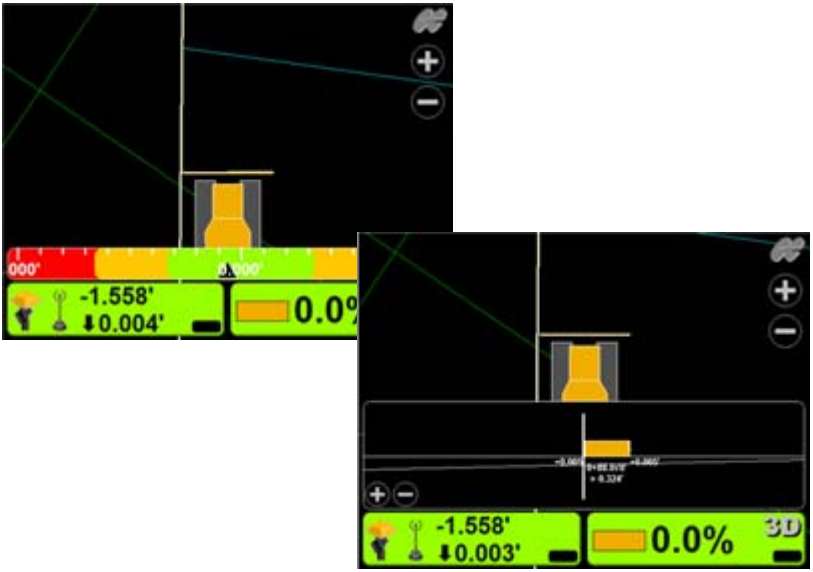


3. Set the steer indication options. Then press **Ok**.



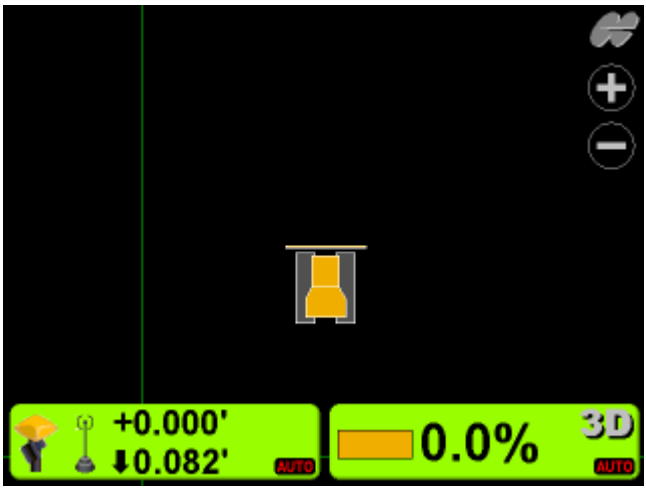
4. Press **View** ▸ **Lower window** ▸ **Section** or **Light bar** for additional steering information.





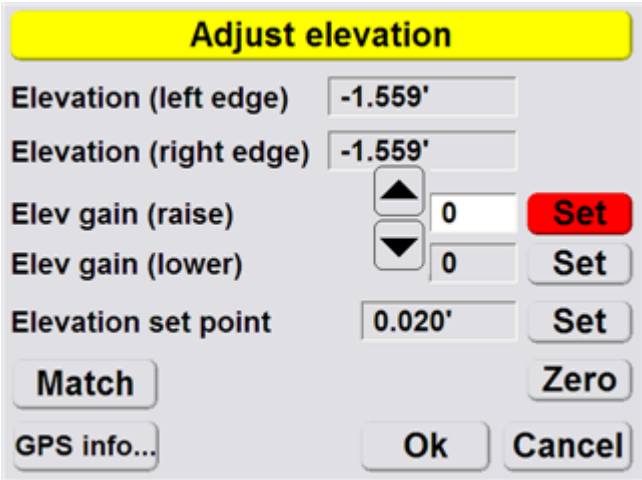
Adjusting Valve Gain

1. On the 3DMC Main Screen, press the **Elevation Control** key.



Elevation Control Key

2. Press *Elev gain (raise)* or *Elev gain (lower)* **Set** key, changing it to red.

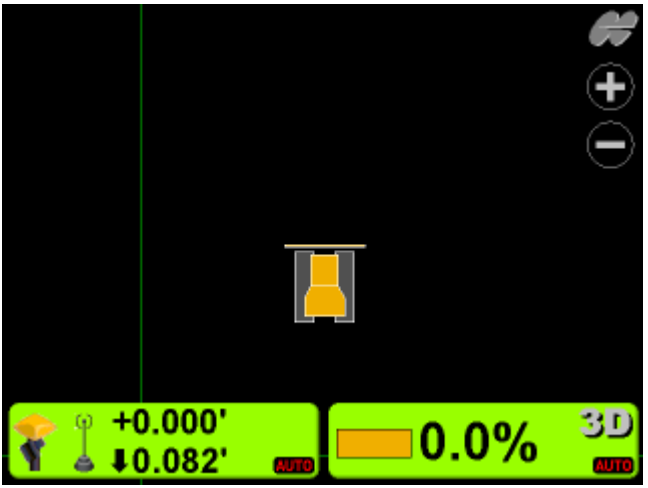


3. Change the offset using the up/down arrow or press the numeric field to access the keyboard.
4. Press **Ok**.

Changing Cut/Fill Offsets

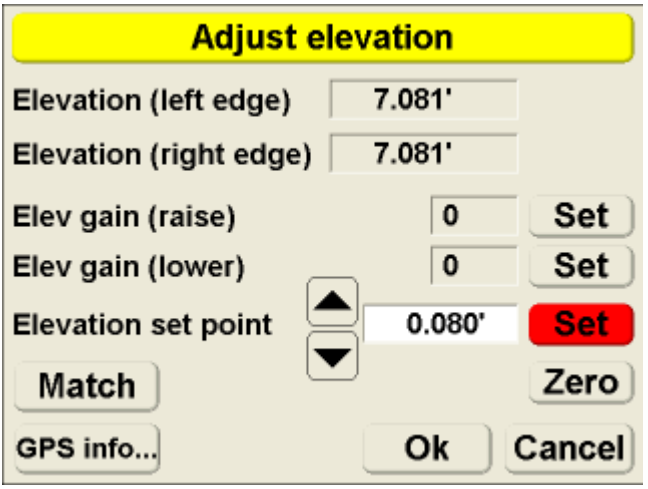
Changing the Cut/Fill Offsets Using the Elevation Control Key

1. On the 3DMC Main Screen, press the **Elevation Control** key.



Elevation Control Key

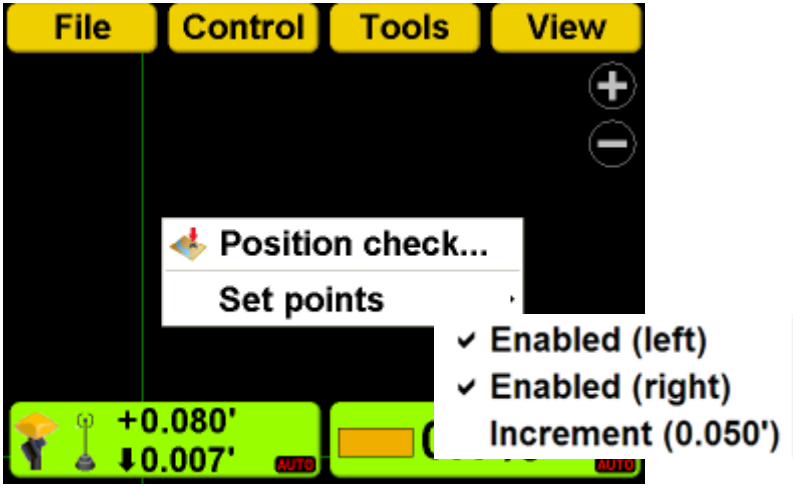
2. Change the offset using the up/down arrows, or press the numeric field to access the keyboard, and press **Ok**.



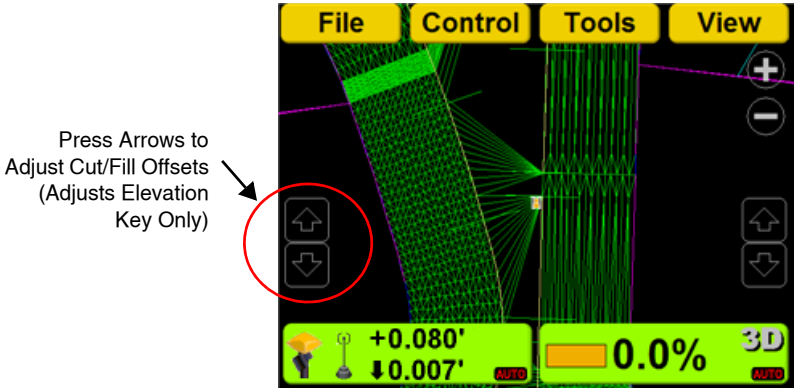
Changing the Cut/Fill Offsets Using the Set-Points Pop-Up Menu

The Set-points pop-up menu allows quick adjustment of the cut/fill offsets from the Main Screen.

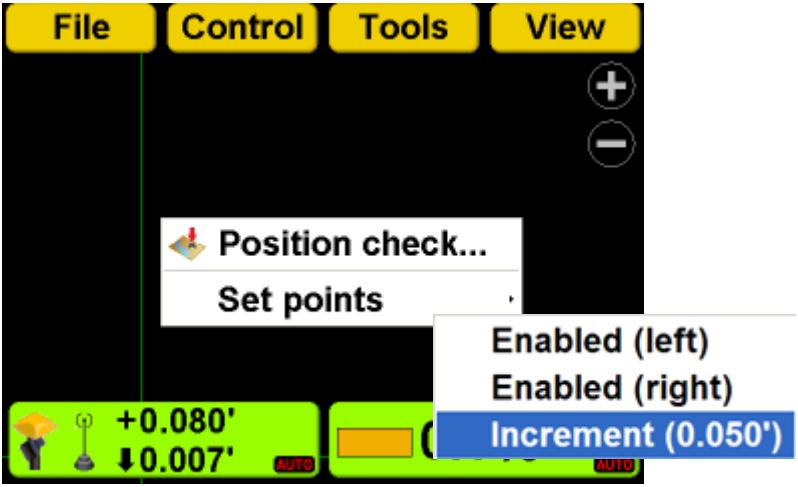
1. To access, press and hold anywhere on the Main Screen.
2. Press **Set-points ▸ Enabled (left)** or **Enabled (Right)** to display the set-point (cut/fill offsets) adjustment arrows. Enable the set-point arrows above the Elevation Control Key. Pressing the keys above the Slope Control Key has no effect.



3. Press the arrows to adjust the cut/fill offsets.

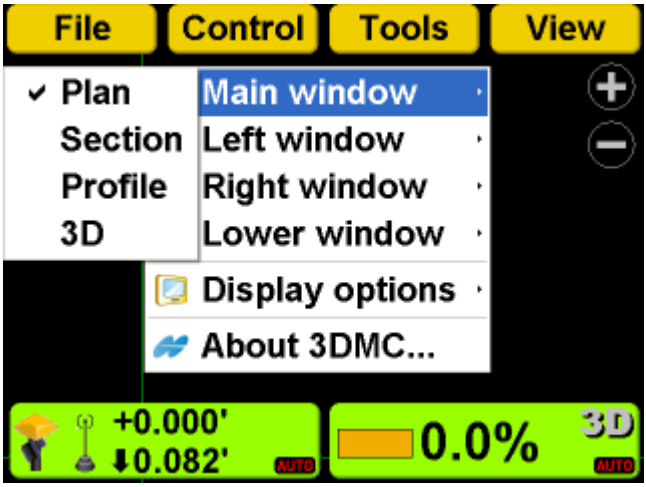


4. Press **Set-points ▸ Increment** to adjust the set-points increment.



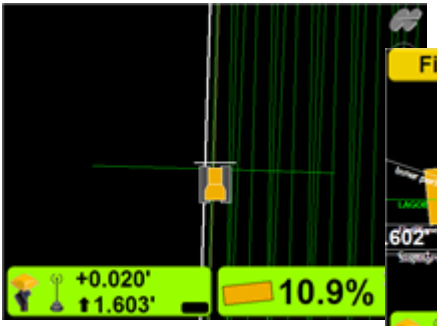
Changing the Display View

To access the a window view, press **Topcon Logo ▸ View ▸ Main/Left/Right/Lower window**, then select a view; a check mark indicates the active view.

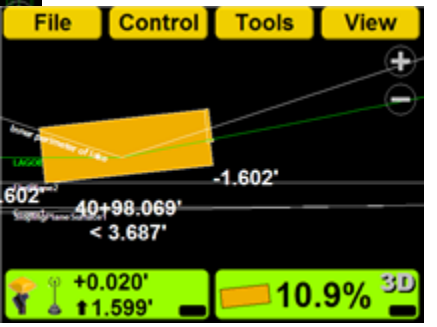


Main Window Views

Plan View



Section View

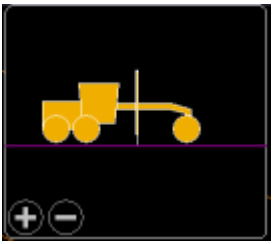


Profile View

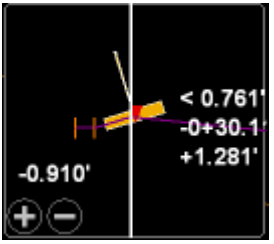
3D View

Left Window Views

Profile View



Section View



Grade Indicator

3D View

Right Window View

Grade Indicator

Lower Window Views

Profile View

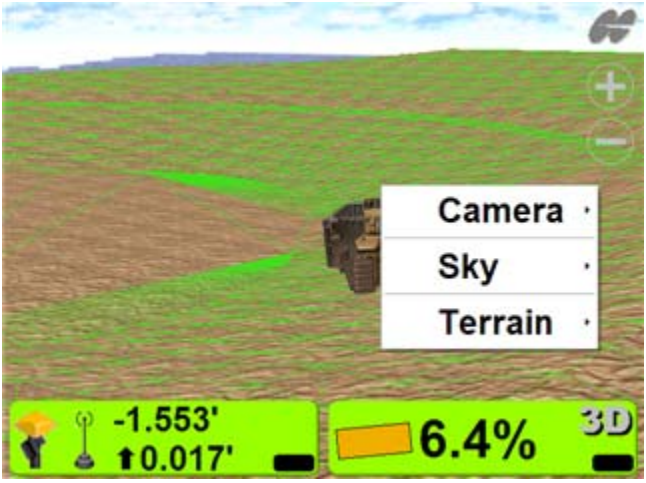
Section View

3D View

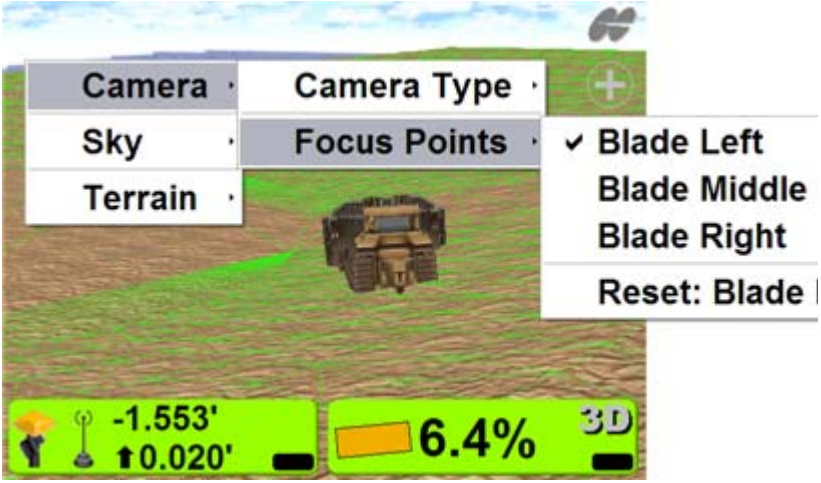
Lightbar

Changing the 3D View

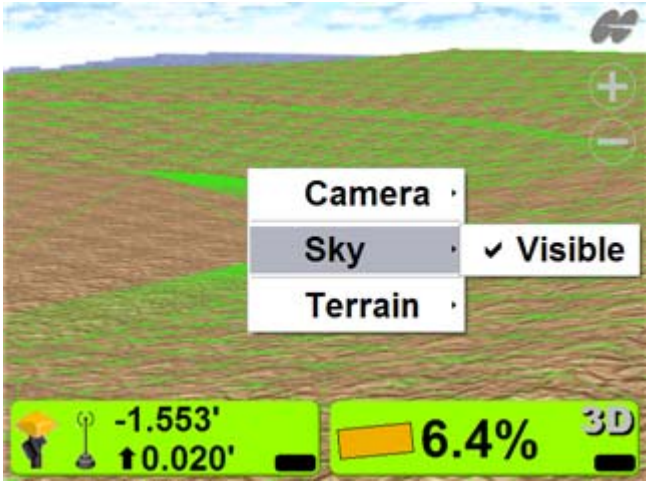
1. With 3D active, press and hold the 3D screen for one second, to display the 3D options menu.



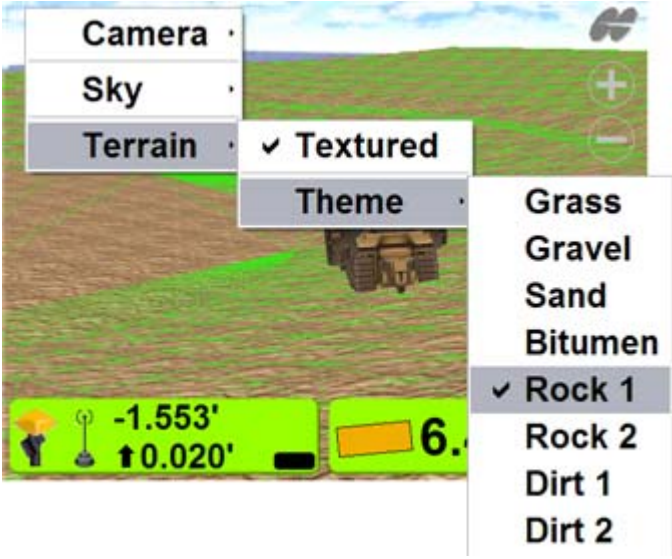
2. Press **Camera** ▸ **Focus Points**, and choose the focus point of the camera.



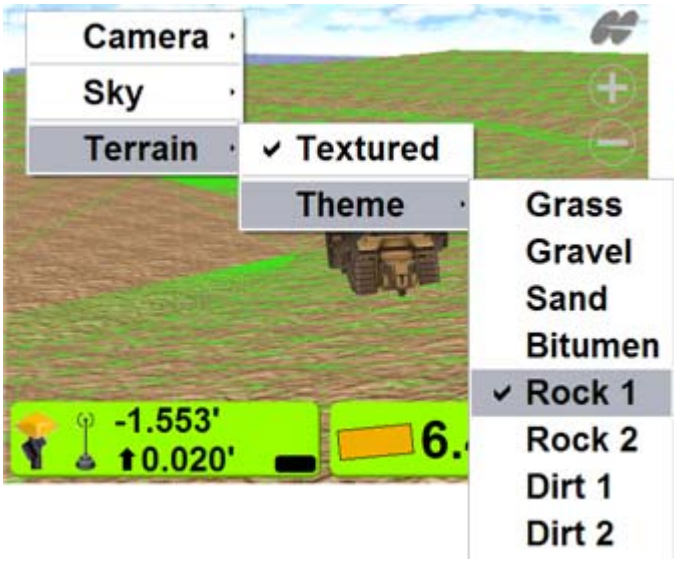
3. Press **Sky** ▸ **Visible**, and to show or hide the sky.



4. Press **Terrain** ▸ **Textured** to show or hide the surface terrain texture.

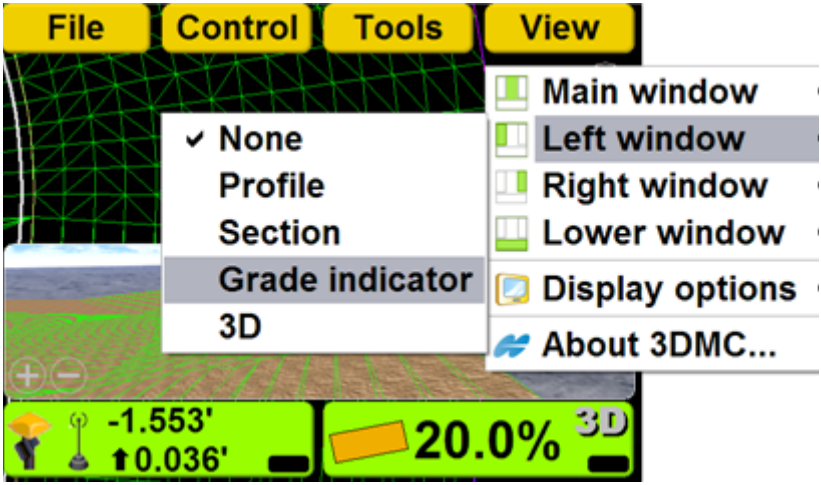


5. Press **Terrain** ▸ **Theme**, and choose the type of terrain texture displayed.

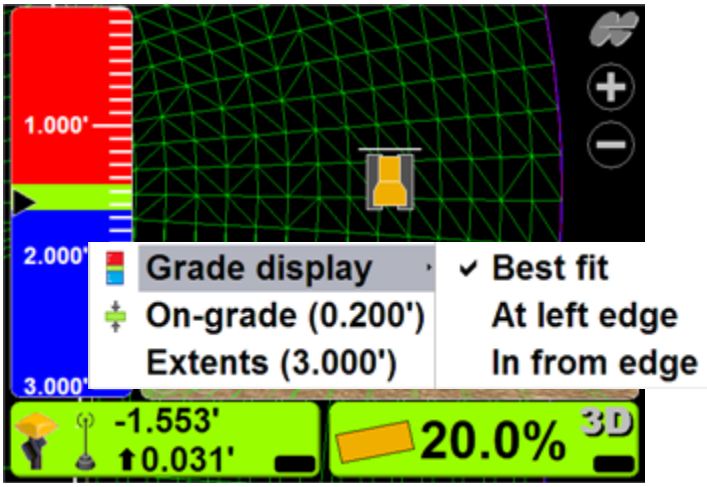


Changing the Grade Indicator Scale and Extents

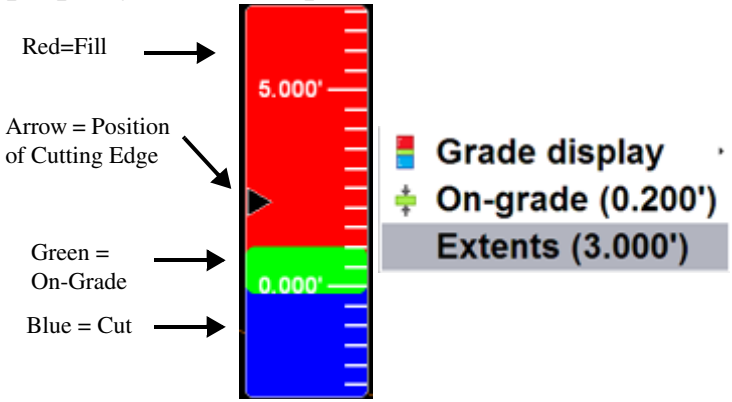
To view the grade indicator, press **Topcon Logo ▸ View ▸ Left window ▸ Grade indicator**.



To change the grade display, press and hold the grade indicator for one second, press **Grade display**, then choose an option.



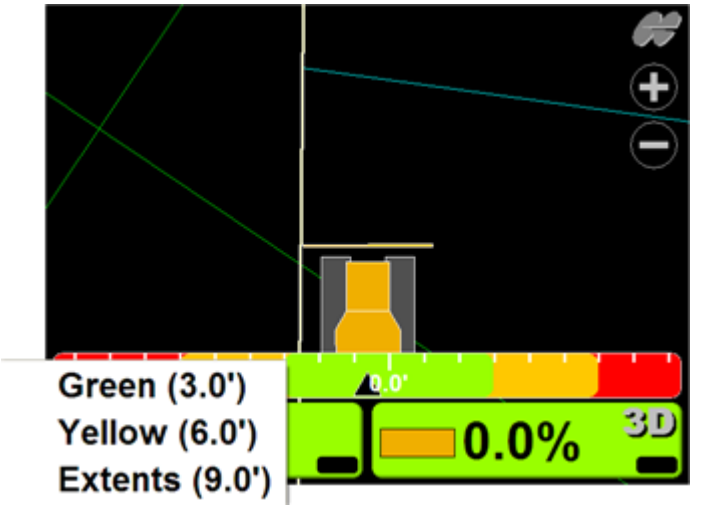
To change the on-grade or extents, press and hold the grade indicator for one second, and then press **Extents** or **On-grade**. Enter the new value into the pop-up keyboard, and press **Ok**.



Changing the Lightbar Scale and Extents

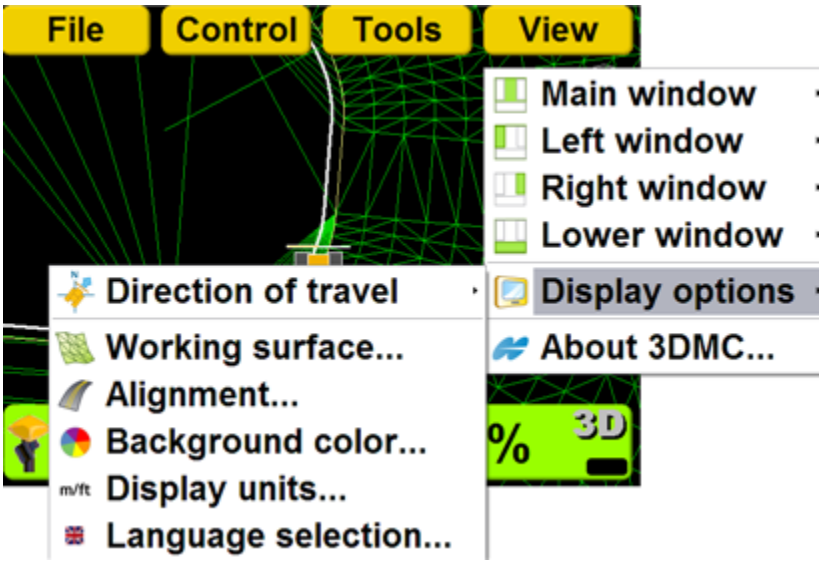
An alignment file must be active to display the lightbar in the lower window view.

1. To view the lightbar, press **Topcon Logo ▸ View ▸ Lower window ▸ Lightbar**.
2. Press and hold the lightbar scale for one second, then press **Green**, **Yellow,** or **Extents** to change the scale.



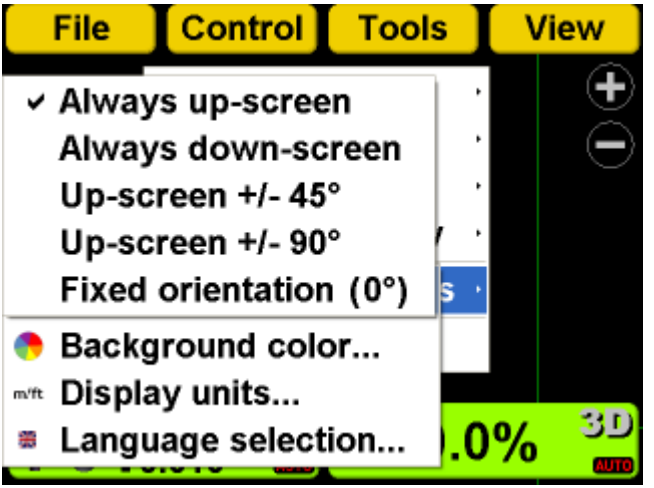
Changing Display Options

To view available options, press
TopconLogo ▸ View ▸ Display options.



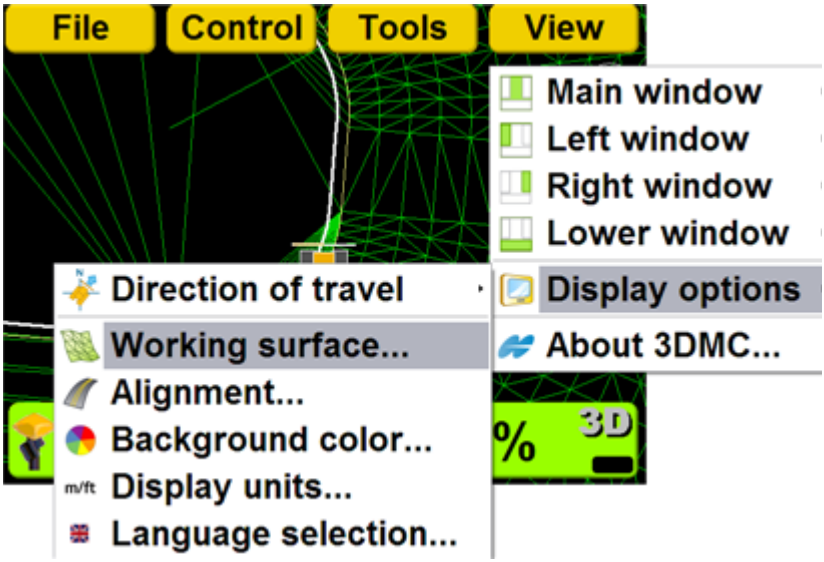
Direction of Travel Options

1. Press **Topcon Logo ▸ View ▸ Display options ▸ Direction of travel**.

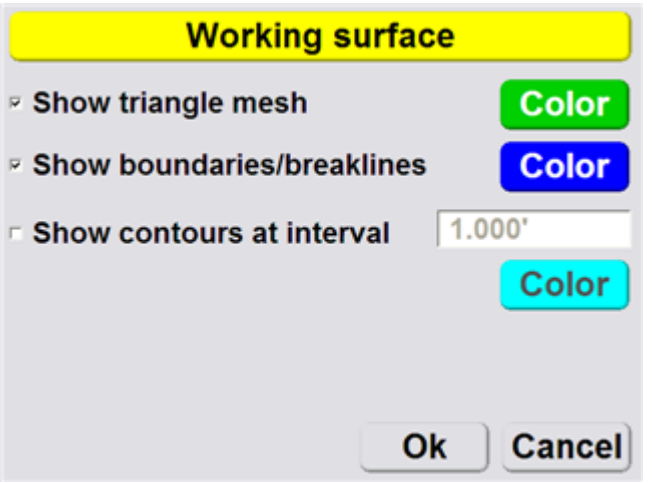


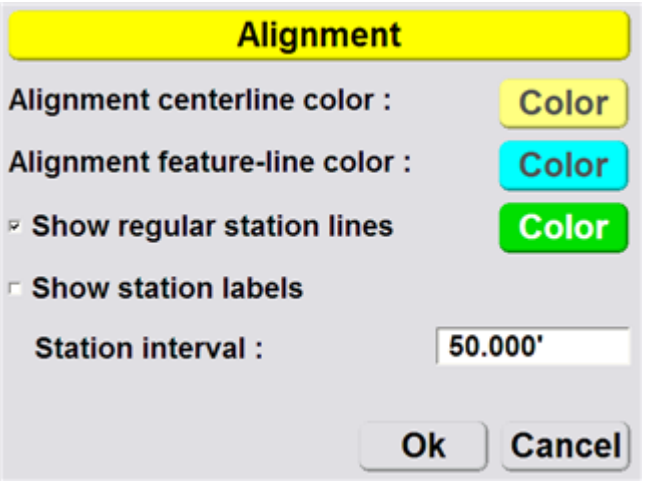
Working Surface and Alignment Display Options

1. Press **Topcon Logo ▸ View ▸ Display options ▸ Working Surface** or **Alignment**.



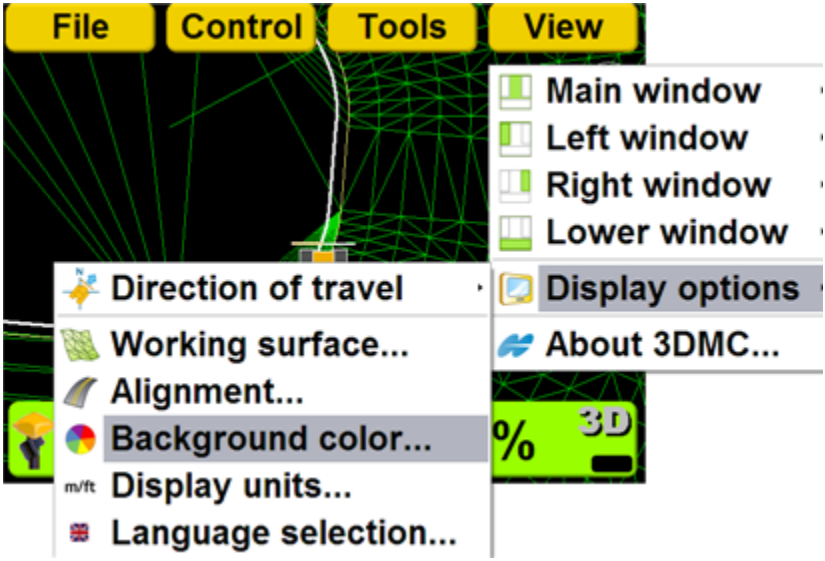
2. Set the working surface or alignment options. Press **Color** to change the color of the mesh, alignment, boundaries, and station lines, and then press **Ok**.





Changing the Background Color

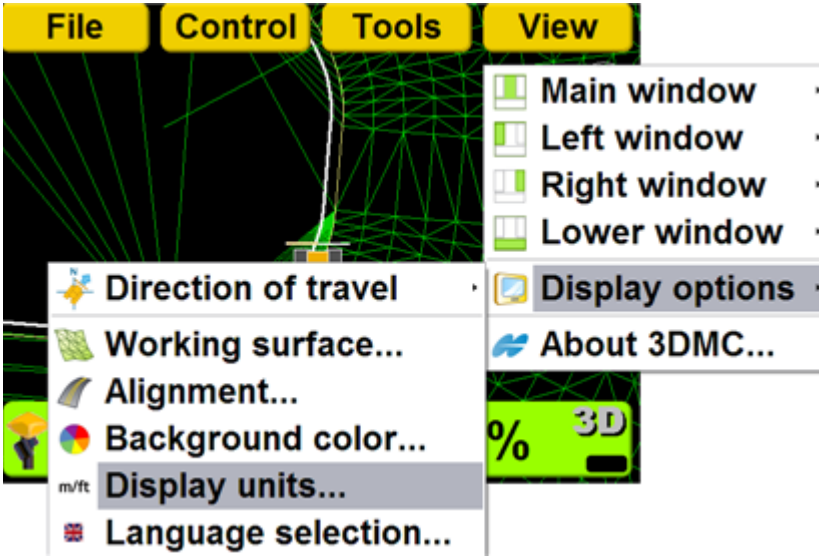
1. To change the background color of the Main Screen, press **Topcon Logo ▸ View ▸ Display options ▸ Background color**.



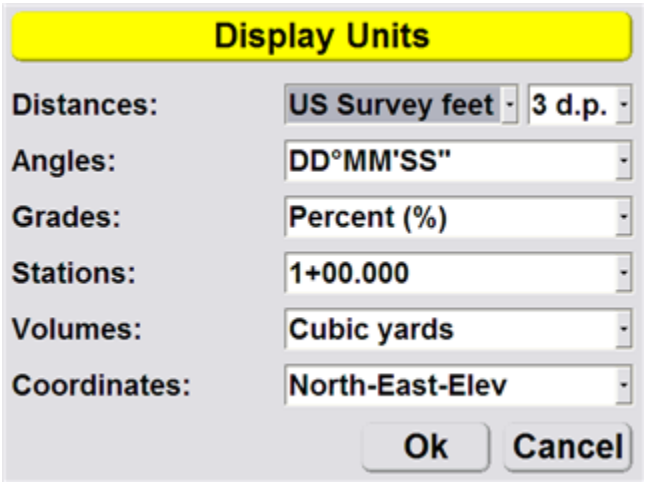
2. Select a background color and press **Ok**.

Display Units Options

1. To set the type of units used in the job, press **Topcon Logo ▸ View ▸ Display options ▸ Display units**.

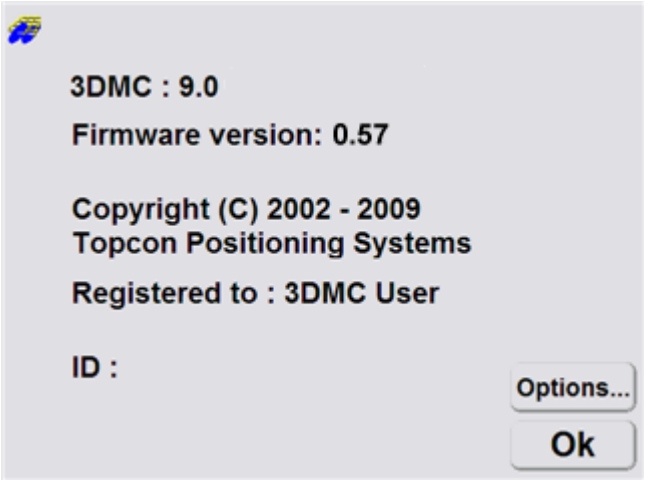


2. Set the display unit options and press **Ok**.



Viewing and Updating 3DMC

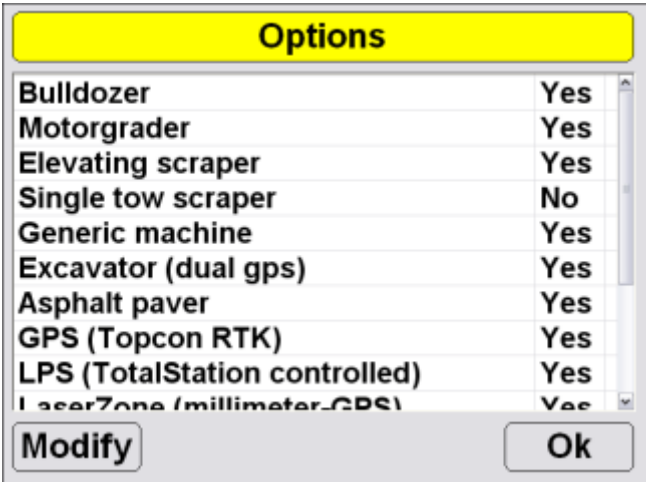
To view information about 3DMC, press **Topcon Logo ▸ View ▸ About 3DMC**.



Changing 3DMC Options

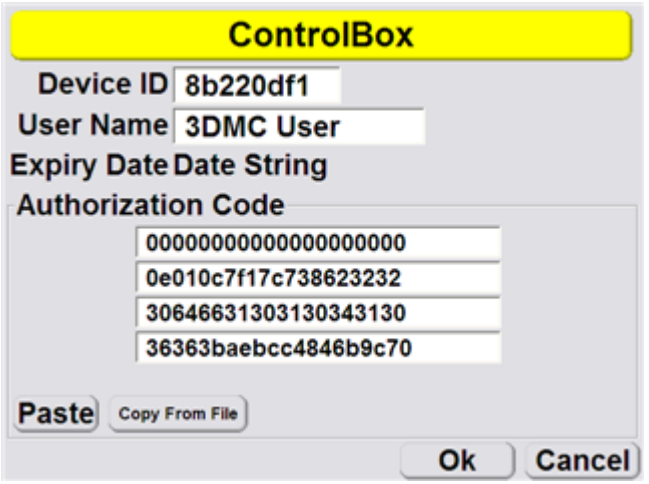
1. To view the enabled options, press **Options** on the ***About 3DMC*** screen.

2. To modify 3DMC options, press **Modify** on the ***Options*** screen.



3. Record the *Device ID* number on the ***ControlBox*** screen to give to your Topcon representative. Contact your Topcon representative to obtain a new authorization code file.
4. When you have received the new authorization code file, press **Copy from File** to copy the codes from the file on the internal disk or an external device. The data fields automatically update with the new codes.

Codes can also be entered manually into the *Authorization Code* entry fields.



5. Press **Ok** to apply the new codes and options. Press **Ok** on each screen to return to the main screen.

Notes:

Troubleshooting

Before contacting TPS Customer support about any problems, try the following and see the following sections:

- Check that the various components for your Topcon 3D Machine Control system (radio, MC-R3 Controller, GX-60 Display, MC² Sensor, Base Station receiver) have power and are powered up.
- Check that all cables are securely and properly connected to the various components of system.
- Disconnect cables and inspect them for damage or contamination. Clean all connections with an electrical contact cleaner.

Base Station

This section lists possible Base Station problems you may encounter (also refer to the Base Station's documentation) for 3D Machine Control. If you still have problems after trying the solutions listed here, contact TPS customer support.

Problem	
Receiver does not power on.	
Causes	Solutions
The PWR button was pressed too quickly.	Make sure you hold the PWR button down for at least one second. A quick press will not activate the receiver.
The power cable is incorrectly connected or damaged.	Check that the power cable is correctly connected to the battery—RED to positive and BLACK to negative—and that the battery is charged. Check that the RED dots on the power cable connector and the socket on the receiver are aligned, and the cable is pushed in as far as it can go. If the power cable is damaged, contact your dealer to replace it.

Problem	
Radio modem does not power on.	
Causes	Solutions
The power cable is incorrectly connected or damaged.	Check that the power cable is correctly connected to the battery—RED to positive and BLACK to negative—and that the battery is charged. If the power cable is damaged, contact your dealer to purchase a new cable.
The radio receives power through the receiver.	Some radios do not require a separate power supply, but are supplied power through the port on the receiver. For these radios, check that the receiver is also switched on.
Problem	
Pocket-3D does not connect to receiver.	
Causes	Solutions
The receiver may be off.	Check that the receiver is switched on.

The cable may be incorrectly connected.	Check that the cable is connected to the COM port on the computer and Port A on the receiver. If still no connection, try to reset the computer and repeat.
Problem	
Pocket-3D is waiting for satellites.	
Causes	Solutions
The cable is incorrectly connected or damaged.	Check that the antenna cable is not cross-threaded and is screwed in all the way. If the cable is damaged, contact your dealer to purchase a new cable.
The antenna has poor PDOP.	Check that the antenna has a clear view of the sky.
The receiver is collecting an almanac.	If this is the first time connecting to the receiver, or if an internal reset has recently been performed, this message may persist for several minutes while the receiver obtains a new almanac.

Problem	
Radio modem light is not flashing	
Causes	Solutions
The cable is incorrectly connected or damaged.	Check that the cable from the receiver is properly connected to the radio. If the cable is damaged, contact your dealer to purchase a new cable.
The radio does not have a TX LED.	Some radios may not have a TX (Transmit) LED so the radio may in fact be functioning.
The radio has a TX LED, but it is not yet flashing.	All radio types specifically listed for the Base Station kit have a TX light and should flash every second. It may take several seconds after connection for this flashing to commence.

GX-60 Display

This section lists possible display problems you may encounter. If you still have problems after trying the solutions listed here, contact TPS customer support.

Problem	
Display does not power on.	
Causes	Solutions
The cable is the wrong cable, incorrectly connected, or damaged.	Check that the power cable supplies 12 to 24 VDC and is negative conductive. • A socket (positive) = 12 to 24 VDC • E socket = Ground Check that the power cable is connected to the correct port and the ends are securely fastened. If the cable is damaged, contact your dealer to purchase a new cable.
Problem	
Screen display turns off by itself.	
Causes	Solutions

The fan may be damaged, causing the display to overheat.	Check that the fan is rotating. If the fan is not rotating, it may be damaged and needs to be replaced with a new one. Contact your dealer. Contact your dealer for information on replacing the fan.
Problem	
Screen display goes dim by itself	
Causes	Solutions
The fan may not be rotating.	Check that the fan is rotating. If the fan is not rotating, it may be damaged and needs to be replaced with a new one. Contact your dealer for information on replacing the fan.
The display has the self-adjusting ability of screen brightness.	Brightness may be dimmed when the display gets over-heated with high temperature around the cab, as well as when the ambient light becomes dim. The backlight also reduces when the ambient light becomes dim.
Problem	
Screen has transferred to operating system.	
Causes	Solutions

"Exit 3DMC" function may have been pressed unexpectedly or incorrectly.	If the screen displays the desktop, the "My Computer" folder should be visible. 1. Double-tap "My Computer" folder. 2. Look for the folder named "Disk C", and double-tap on it. 3. Look for the "Control Box" icon and double-tap. The application program opens and returns to the Main Screen.
Problem	
"Control file has no GPS localization" message.	
Causes	Solutions
No GPS localization has been performed for the project.	Plan to implement the GPS localization.
Problem	
"Loading…." or "Building…." message.	
Causes	Solutions

The program in the display is in the middle of loading files or making graphics.	If the pointer on the Main Screen moves, when you press in different places, the display is computing. When the system is busy, the pointer becomes an hourglass. Wait for a few more minutes to let it complete the process. Remember, computing will take longer when a larger file is selected.
If the pointer does not move, the display may have a computing problem.	Switching off the display can fix the computing problem.
Problem	
Elevation/Slope Control pad displays: “GPS receiver not connected!”	
Causes	Solutions

Either the GPS+ signal or radio signal is invalid. The graphic may indicate what causes the problem.	For GPS+ signal, check cable connections along the GPS antenna cable from the GPS Antenna port on the MC-R3 Controller to the Rover Antenna. Check cable connections at the MC-R3 Controller and at the display.
Problem	
Elevation Control key displays: "Waiting for radio link"	
Causes	Solutions
Radio transmission, radio antenna, lights status on the receiver, and/or power may have a problem.	Check that the Base Station is working correctly. Also check that the Rover Radio Antenna on the machine and its cable connections are properly connected. Make sure that the radio channel is identical between the Base Station and the Machine Rover, and that the radio is correctly configured on the display.

Problem	
Elevation Control key displays: "Waiting for Initialization"	
Causes	Solutions
The GPS+ receiver has not been successful tracking enough valid satellites.	Check that the Rover Antenna has a clear view of the sky. Check for obstructions, such as trees, buildings, and vehicles, that can block or reflect satellite signals.
The system is still in the process of determining a solid position.	If this is the very first time operation, this message may persist for several minutes while the receiver obtains a new almanac.
Problem	
Elevation Control key displays: "Out of design area"	
Causes	Solutions
The machine is out of the Design Surface area.	Make sure that the correct Project file is selected and Surface file is made active. Move into the Design Surface area so the operator can begin grading.

Problem	
Elevation Control key displays : "No GPS localization"	
Causes	Solutions
The Layer currently selected has not been localized properly.	Make sure that the correct Layer is selected.
You are in a process of building a Control Point file or just starting the process.	Disregard the message until the localization is complete.
Problem	
Slope Control key displays: "3DMC² sensor not connected!"	
Causes	Solutions
Cross slope system is not connected properly.	Check cable connections display, the MC² Sensor.

Wrong sensor type selected in 3DMC Machine Configuration.	Select the MC² sensor type in 3DMC.

MC-R3 Controller/Receiver

LED Status Chart

The CAN, Sensor, Control, and Auto LED's in the chart below have a heartbeat to indicate proper operation of the processor.

7 EA BI-COLOR RED/GREEN STATUS			
CAN			
	STATUS	RED	GREEN
	CAN Communication OK	Off	On
	No CAN Communication	On	Off
	No CAN Required	Off	Off
SENSOR			
	STATUS	RED	GREEN
	Sensor Communication OK	Off	On
	No Sensor Communication	On	Off
	Firmware Loading	Alternate Flashing Red/Green (LED flashes alternately with Control LED)	
CONTROL			
	STATUS	RED	GREEN
	GUI Communication OK; Current	Off	On
	GUI Communication Established; Not Current	Off	Blinking
	No GUI Communication	On	Off
	Firmware Loading	Alternate Flashing Red/Green (LED flashes alternately with Sensor LED)	
AUTO			
	STATUS	RED	GREEN
	Not in Automatic	On	Off
	One Side in Automatic	Off	Blinking
	Both Sides in Automatic	Off	On

7 EA BI-COLOR RED/GREEN STATUS			
RADIO RX			
	STATUS	RED	GREEN
	Power	Off	On
	Receiving Radio Signal	1 Blink per Second for Each Reception of Data	On
MAIN and AUX (GPS ANTENNAS)			
	STATUS	RED	GREEN
	Tracking GPS	Off	1 Blink for Each Satellite Tracked
	Tracking Glonass	1 Orange Blink for Each Satellite Tracked - Red and Green Blink Together	
	Firmware Download	Alternate Flashing Red/Green	

This section lists possible MC-R3 Controller/Receiver problems you may encounter. If you still have problems after trying the solutions listed here, contact TPS customer support.

Problem	
All LEDs off.	
Causes	Solutions
The power cable may be incorrectly connected.	Power is supplied through the cable connected on the power port. Check that the cable is properly connected

The Display does not have power.	The MC-R3 Controller turns on only when the Display is also powered on.
Problem	
Satellite Status indicator does not flash green.	
Causes	Solutions
The cable is incorrectly connected or damaged.	Check that the antenna cable is not cross-threaded at the antenna and is connected to the intermediate cable installed on the machine. Check the connection at the GPS Antenna port on the MC-R3 Controller. If the cable is damaged, contact your dealer to purchase a new cable.
The antenna has poor PDOP.	Check that the Machine Antenna has a clear view of the sky.
The receiver is collecting an almanac.	If this is the first time connecting to the MC-R3 Controller, the LED may not flash for several minutes while the GPS receiver obtains a new almanac.
Problem	
Radio Status indicator does not flash green.	

Causes	Solutions
The Base Station and/or Base Station radio has a problem.	Check that the Base Station is running correctly and the TX light on the radio modem flashes on.
Different channels are used between the Base Station and the machine.	Check that the Base Station and Machine use the same radio channel. • For the Base Station, use the button on the radio modem or use the "GPS Radio Configuration" program with the Pocket-3D connected. For the machine, use the Control Box function.
The antenna at the Rover or Base may be too low, incorrectly placed, or too far away.	If the green LED flashes when near the Base Station, but not when farther away, check that the Machine Radio Antenna mast is mounted vertically at the highest point on the machine. If the machine gets too far from the Base Station, elevate the radio antenna at the Base Station or move it to a closer Control Point.

MC² Sensor

LED Status Chart

1 EA BICOLOR RED/GREEN STATUS		
STATUS	RED	GREEN
Power off	Off	Off
OK	Off	50% 5 Hz
Firmware download	Blink at Rx Data	Blink at Tx Data
Data accumulation in calibration mode	Off	On

Problem	
LED off.	
Causes	Solutions
The power cable may be incorrectly connected.	Power is supplied through the cable connected on the power port. Check that the cable is properly connected

GPS Localization

This section lists possible GPS localization problems you may encounter. If you still have problems after trying the solutions listed here, contact TPS customer support.

Problem	
Measurement takes too long.	
Causes	Solutions

The machine may be blocking satellite signals to the range-pole or tripod-mounted antenna.	Watch the status of the measurement screen. If the status indicates “waiting for satellites” move the machine away from the antenna.
The Control Point may be located too close to obstructions.	Move to an alternative Control Point or have the surveyor place a new Control Point away form the obstructions.
The MC-R3 Controller has not yet initialized; the system may be tracking many satellites.	The MC-R3 Controller may take several minutes to initialize.
The range-pole was unsteady.	Make sure that the pole is held steady while measurement is taking place. Any movement will make for a lengthy initialization and/or measurement.
Problem	
Localization produces large errors.	
Causes	Solutions

A typographical error occurred.	If errors are 10s or 100s of feet or meters, it is likely that a typographical error has occurred. If coordinates are manually entered, check that longitudes are correctly prefixed with a minus sign if working in the western hemisphere (e.g., USA). Re-enter the coordinates.
The range-pole was unsteady.	If the errors are decimeter level in magnitude, it may point to either inaccurately measured local site coordinates or not holding the range-pole vertical when measuring the GPS coordinates.
Inaccurate local site coordinates or erroneous GPS measurement.	If error values of the first few points are reasonable but increase when a new point is measured, the point just measured must have either inaccurate local site coordinates or erroneous GPS measurement.

To isolate the error, disable horizontal and/or vertical localization for each Control Point in turn and observe the set of errors.

When the errors become acceptable due to certain isolation, the point isolated is most likely to detract from the quality of the localization.

Also, as a general rule, if error values of the first few points are reasonable but increase when a new point is measured, the point just measured must have either inaccurate local site coordinates or erroneous GPS measurement.

Once a problematic Control Point is discovered, try to re-measure the point again to see any improvement. If it is still suspect and affects the acceptable tolerance, the horizontal and/or vertical localization for this point may be disabled.

Problem	
There are no H.Error and V.Error values.	
Causes	Solutions
“Use for horizontal GPS localization” and/or “Use for vertical GPS localization” check boxes may not have been selected.	These check boxes need to be selected for a minimum of three points. Note that the error value will be calculated once three Control Points are measured and used for the GPS localization. This troubleshooting is useful when the Pocket-3D is being used to perform GPS localization as well as the display.

Blade Response

This section lists possible Blade Response problems you may encounter. If you still have problems after trying the solutions listed here, contact TPS customer support.

Problem	
Blade is moving too slowly. The blade seems to move too slowly in Control Mode. The Grade Indicator takes too long to reach grade.	
Causes	Solutions
The Valve Gain setting is too low.	Increase the Valve Gain setting, which will cause the hydraulics to respond quicker. Check which control is slow before adjusting the Valve Gain. Remember that the larger number setting speeds up the response.

Problem	
Blade is moving too fast. The blade seems to move too fast in Control Mode. The Grade Indicator skips through on-grade.	
Causes	Solutions
The Valve Gain setting is too high.	Decrease the Valve Gain setting, which will cause the hydraulics to respond slower. Check which side control is fast before adjusting the Valve Gain. Remember that the lower number setting slows down the response.
Problem	
Blade reacts, but does not reach On Grade	
Causes	Solutions
Valve Offsets are too small.	Assume that Valve Offsets are too small, and perform a Valve Offsets Calibration.
Problem	
Blade reacts, but overshoots around On Grade	
Causes	Solutions
Valve offsets are too large.	Assume that Valve Offsets are too large, and perform a Valve Offsets Calibration.

Safety Information

It is your responsibility to be completely familiar with the cautions described in this manual. These messages advise against the use of specific methods or procedures which can result in personal injury, damage to the equipment, or unsafe operating conditions. Remember, most accidents are caused by failure to observe basic safety precautions.

General Precautions

1. Read and become familiar with the machine manufacturer's operating instructions, including safety information, before installing or using your Topcon equipment.
2. Use extreme caution on the job site. Working around heavy construction equipment can be dangerous.
3. DO NOT attach Topcon 3D Machine Control brackets or hose connections while the machine is running.
4. DO NOT allow any 3D Machine Control component to limit the visibility of the operator.

5. Use Ty-wraps, supplied with 3D Machine Control, to keep hoses and wires secured and away from possible wear or pinch points.
6. Use eye protection whenever welding, cutting, or grinding is being done on the machine.
7. Protect yourself at all times, and wear protective clothing, when working on or near hydraulic lines. Hydraulic lines can be under extreme pressure, even when the machine is turned off.

WARNING

Warning: Relieve all pressure in the hydraulic lines before disconnecting or removing any lines, fittings or related components. If injury does occur, seek medical assistance immediately.

CAUTION

Caution: Avoid direct exposure to your eyes when using laser control. DO NOT stare into the laser beam or view the beam directly with optical equipment.

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8. Use appropriate welding precautions and practices when welding. After welding, all paint all affected areas with a rust inhibitor
9. To prevent vandalism or theft, do not leave removable Topcon components on the machine at

night. Remove the components each evening and store appropriately in the Carrying Case.

10. Keep the Carrying Case dry at all times.If moisture does gent inside of the Carrying Case, leave it open and allow it to thoroughly dry before storing any components.

Radio Usage Information

Depending on the type of radio, users may need to obtain an FCC (Federal Communications Commission) license before operating a Topcon system (GPS RTK (Real-Time Kinematic) or simultaneous calculation of Global Positioning System and Global Navigation Satellite System). Check the sites listed below to determine if a license is needed before operating a Topcon system.

- **The Federal Communications Commission is at:**

  http://www.fcc.gov/

- **The rules are at:**

  http://www.access.gpo.gov/nara/cfr/waisidx_00/47cfr90_00.html

There have been many problems in the past with RTK base radio modems interfering with voice users. The issue finally culminated with the FCC refusing to grant licenses until something was done to ensure that surveyors did not interfere with voice users. The solution was to stop using frequencies in the 469MHz

range, to add an identifier to the broadcast message, and other measures designed to minimize interference with voice users. The user and his employer are subject to fines of up to $82,500, confiscation of surveying equipment and legal action, if the rules are ignored.

Topcon cannot obtain the license for the user. There are companies to assist with licensing. Two are listed here:

- **Professional Licensing Consultants Inc.**

  P.O. Box 1714
  Rockville, MD 20849-1714

- **Atlas License Company and Data Services**

  1725-A North Shadeland Avenue
  Indianapolis, IN 46219

  http://www.alcds.com/

General Usage Warnings

CAUTION

Caution: If any Topcon 3D Machine Control component has been dropped, altered, transported or shipped without proper packaging, or otherwise treated without care, erroneous measurements, calculations, or display may occur. Periodically test 3D Machine Control components to ensure accurate measurements and operation.

Inform TPS immediately if any product does not function properly.

WARNING

Warning: The LCD display can be damaged if struck with sufficient force.

Base Station Precautions

CAUTION

Caution: TPS receivers are designed for machine control, survey, and survey related uses (i.e., surveying coordinates, distances, angles and depths, and recording such measurements). This product should never be used:

Without the user thoroughly understanding this manual.

After disabling safety systems or altering the product.

With unauthorized accessories.

Without proper safeguards at the survey site.

Contrary to applicable laws, rules, and regulations.

WARNING

Warning: TPS receivers should never be used in dangerous environments. Use in rain or snow for a limited period is permitted.

Internal Battery Pack Warnings

WARNING

Warning: Tampering with the internal batteries by end users or non-factory authorized technicians will void the receiver's warranty.

Do not attempt to open the battery pack or replace it.

Do not disassemble the battery pack.

Do not charge in conditions different than specified.

Do not use other than the specified battery charger.

Do not short circuit.

Do not crush or modify

WARNING

Warning: Never attempt to open the receiver's casing or replace the batteries! Lithium-Ion batteries can be dangerous if mishandled!

WARNING

Warning: Do not incinerate or heat battery pack above 212 degrees fahrenheit (100 degrees celsius). Excessive heat can cause serious damage and possible explosion.

Mercury Warning

The LCD display in the GX-60 Topcon display contains mercury. The display should not be disposed of or placed in a waste stream destined for disposal until the mercury is removed and reused, recycled, or otherwise managed to ensure that the mercury in the product does not become mixed with other solid waste or wastewater.

EU-Member Warning

WEEE DIRECTIVE

This symbol is applicable to EU-member states only.

The following information is only for EU-member states:
The use of the symbol indicates that this product may not be treated as household waste. By ensuring this product is dispose of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. For more detailed information about the take-back and recycling of this product, please contact your supplier where you purchased the product or consult.

EU BATTERY DIRECTIVE

This symbol is applicable to EU-member states only.

Battery users must not dispose of batteries as unsorted general waste, but treat properly.

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800·443·4567 www.topconpositioning.com

ISO 9001:2000
FM 68448

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