INSTALLATION GUIDE

Autopilot

AUTOMATED STEERING SYSTEM

AGCO x1000 series (CAN)

- Fendt 1000 series
- Challenger 1000 series

Version 6.00
Revision A
May 2017
P/N 54035-56-E06

Trimble

Legal Notices

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note: the above limited warranty provisions may not apply to products or software purchased in the European Union. please contact your Trimble dealer for applicable warranty information.

Notices
Class B Statement – Notice to Users. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes and modifications not expressly approved by the manufacturer or registrant of this equipment can void your authority to operate this equipment under Federal Communications Commission rules.

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For product recycling instructions and more information, please go to:
http://www.trimble.com/Corporate/Environmental_Compliance.aspx
Recycling in Europe: To recycle Trimble WEEE, Call
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Or
Mail a request for recycling instructions to:
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c/o Menlo Worldwide Logistics
Meerheide 45
5521 DZ Eersel, NL



Safety Information

Always follow the instructions that accompany a Warning or Caution. The information they provide is intended to minimize the risk of personal injury and/or damage to property. In particular, observe safety instructions that are presented in the following format:

⚠ **WARNING –** This alert warns of a potential hazard, which, if not avoided, can cause severe injury.

⚠ **CAUTION –** This alert warns of a hazard or unsafe practice which, if not avoided, can cause injury or damage.

NOTE – An absence of specific alerts does not mean that there are no safety risks involved.

Warnings

⚠ **WARNING –** When you are working on the vehicle's hydraulic systems, vehicle attachments that are suspended can drop. If you are working around the vehicle, you could suffer serious injury if an attachment dropped on you. To avoid this risk, lower all vehicle attachments to the ground before you begin work.

⚠ **WARNING –** If someone else attempts to drive the vehicle while you are working on or under it, you can suffer serious or fatal injuries. To avoid this possibility, install a lockout box on the battery terminal to prevent the battery from being reconnected, remove the key from the vehicle's ignition switch, and attach a "Do not operate" tag in the cab.

⚠ **WARNING –** Agricultural chemicals can pose serious health risks. If the vehicle has been used to apply agricultural chemicals, steam clean the vehicle to remove any chemical residue from the areas of the vehicle where you will be working.

⚠ **WARNING –** Vehicle cabs can be quite high in the air. To avoid potentially serious injury through falling from this height, always use the steps and handrails, and face the vehicle, when you enter or exit it.

Cautions

⚠ **CAUTION –** When the vehicle has been running, parts of the vehicle, including the engine and exhaust, can become extremely hot and can cause serious burns. To avoid burns, allow hot machine parts to cool before you begin working on them.

⚠ **CAUTION –** The system installation may bring you into contact with chemical substances, such as oil, which can cause poisoning. Wash your hands thoroughly after you finish working on the system.

⚠ **CAUTION –** Battery posts, terminals, and related accessories contain lead and lead compounds, which can cause serious illness. To avoid ingesting lead, wash your hands thoroughly after touching the battery.

⚠ **CAUTION –** Always wear protective equipment appropriate to the job conditions and the nature of the vehicle. This includes wearing protective glasses when you use pressurized air or water, and correct protective welder's clothing when welding. Avoid wearing loose clothing or jewelry that can catch on machine parts or tools.

⚠ **CAUTION –** Parts of the vehicle may be under pressure. To avoid injury from pressurized parts, relieve all pressure in oil, air, and water systems before you disconnect any lines, fittings, or related items. To avoid being sprayed by pressurized liquids, hold a rag over fill caps, breathers, or hose connections when you remove them. Do not use your bare hands to check for hydraulic leaks. Use a board or cardboard instead.

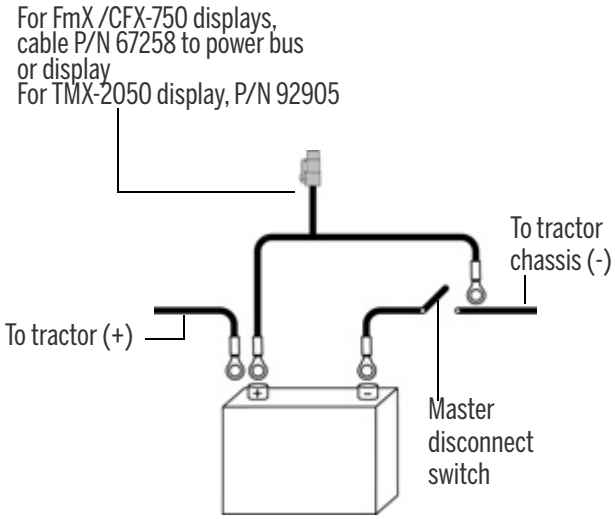
⚠ **CAUTION –** Do not direct pressurized water at:
- Electronic or electrical components or connectors
- Bearings
- Hydraulic seals
- Fuel injection pumps
- Any other sensitive parts or components



Set the hose pressure as low as practicable, and spray at a 45° to 90° angle. Keep the nozzle of the power washer away from the machine at the distance recommended by the manufacturer.

⚠ **CAUTION –** To prevent damage to the system, make sure that no wires or hoses interfere with or catch on any mechanical linkages, or contact any machine parts that get hot.

⚠ **CAUTION –** If the vehicle has a master electrical disconnect, make sure the basic power cable (P/N 67258 / 92905) is *not* directly attached to the battery terminal that is disconnected by the master switch - the negative pole in this example.
Attach this terminal side just past the main disconnect so that it is as close as possible to the battery but still gets disconnected when the master disconnect is turned off. Failure to do so can result in damaging the display.



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Introduction

- Technical assistance
- Manual system upgrade to the Autopilot system
- Required components
- Autopilot hardware organization: As shipped
- Preparing the vehicle for installation

This manual describes how to install the Trimble® Autopilot™ automated steering system.

Even if you have used another GNSS (Global Navigation Satellite System), such as the United States' GPS (Global Positioning System), before, spend some time reading this manual to learn about the special features of this product. If you are not familiar with GNSS, go to the Trimble website (www.trimble.com) for an interactive look at Trimble and GNSS.

Technical assistance

If you have a problem and cannot find the information you need in the product documentation, contact Trimble technical support:

1. Log into http://agpartners.trimble.com.
2. Click the **Feedback** link at the right of the screen. A form appears.
3. Complete the form and then click **Submit Feedback**.

Manual system upgrade to the Autopilot system

CFX-750 display, FmX integrated display and TMX-2050 display

Retain
CFX-750™ display: P/N 94110-xx Power cable CFX-750 display: P/N 77282 **FmX® integrated display: P/N 93100-xx** Power cable FmX display: P/N 66694 Antenna for display: P/N 60600-02 (DGPS) or 77038-00 (OmniSTAR®/RTK) Antenna to receiver cable: P/N 50449 Basic cable (both displays): P/N 67258 **TMX-2050™ display: P/N 96700-00** TM-200 Module: P/N 95060-00 TM-200 Module to display cable: P/N 93843 TM-200 Module power I/O cable: P/N 92676 TM-200 Module battery cable: P/N 92905

Required components

Kits required	Special tools
Platform kit: P/N 54035-56	N/A

Antenna mounting kits

Kits required
AG-15 antenna mounting plate: P/N 62034 Bracket, GPS - V Base Plate - Indexing: P/N 62388-02

Accessory kits

Kits required
Remote engage foot pedal: P/N 57259

Autopilot hardware organization: As shipped

Hardware	Component	See...
Platform kit: P/N 54035-56	CAN Bus connections	Chapter 2
	Power switch	
	Bolt kit controller	Chapter 5
Roof bracket kit: P/N 53676	Roof brackets	Chapter 3
	Bolt kit, roof bracket	
GNSS receiver	GNSS receiver	Chapter 3
	GNSS antenna	
	GNSS receiver power/data cable	
	RTK radio, cable, and radio antenna	
Display	CFX-750 display, TMX-2050 display	Chapter 4
	FmX integrated display	
	Display cable	
	Mounting bracket	
Common parts	Controller	Chapter 5
	Controller mounting bracket	
	Cable kit: • Main wiring harness • Power bus auxiliary wiring harness • Sonalert alarm	

Preparing the vehicle for installation

NOTE – The left and right sides of the vehicle are referenced while standing behind the unit, facing the normal direction of travel.

1. Park the vehicle on a hard, level surface. Block the front and rear wheels.
2. Align the steering straight ahead. On an articulated vehicle, install the articulation locks.
3. Remove all dirt and debris from the areas of the vehicle where the Autopilot system will be installed.
4. Open all kit boxes and check the contents of the box against the packing list/s. Lay all of the parts out on a clean workbench.

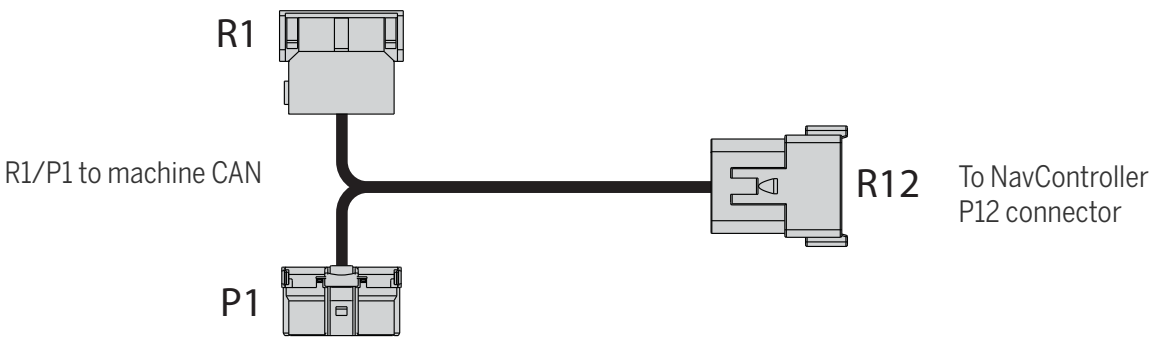
2

CAN Bus Installation

- CAN bus cable
- FmX integrated display
- CFX-750 display
- TMX-2050 display
- Calibration and set up
- Power cable installation
- Installing the CAN bus cable

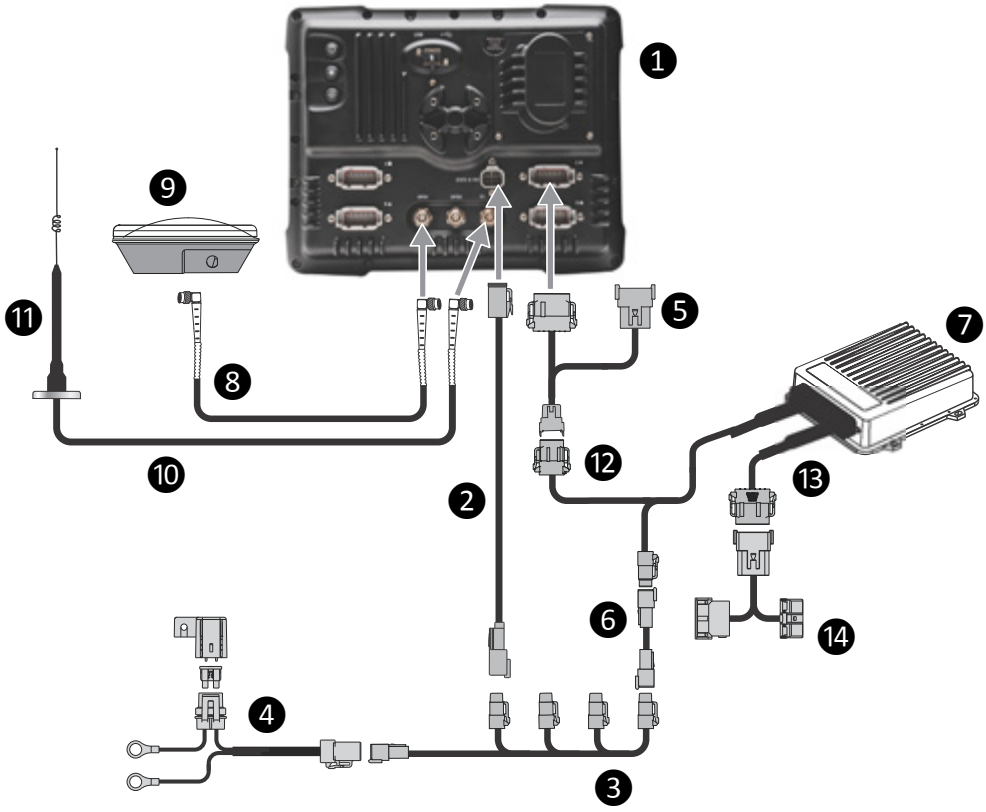
This chapter describes how to install the CAN interface cable in the vehicle.

CAN bus cable



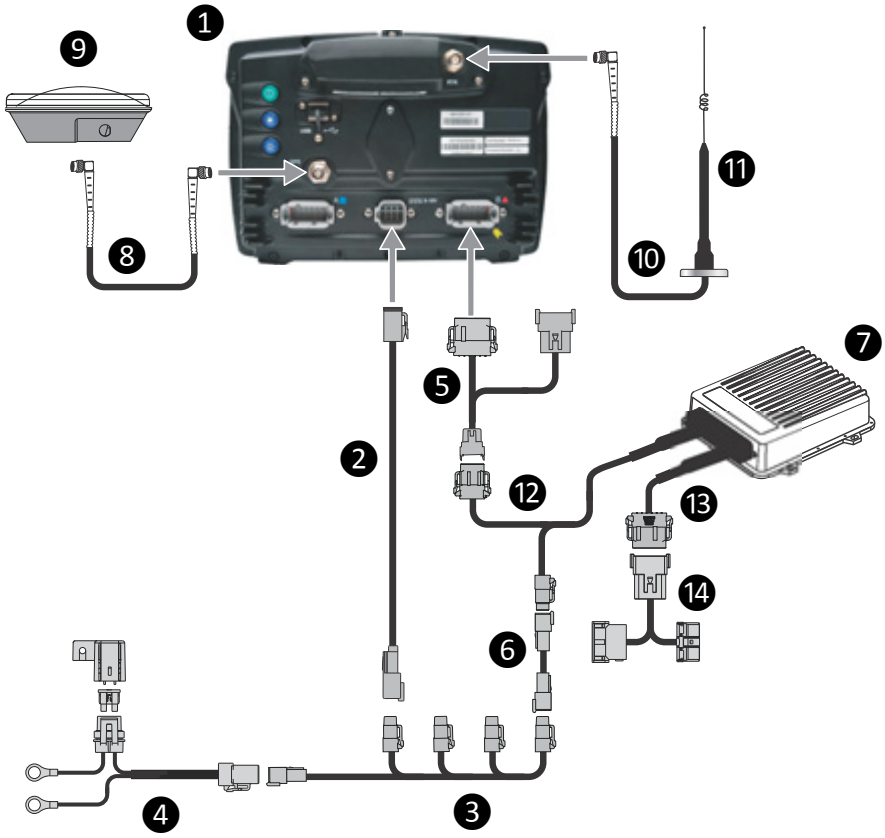
The diagram shows the cables that together comprise Trimble P/N 111324, which is used in the following cabling diagrams.

FmX integrated display



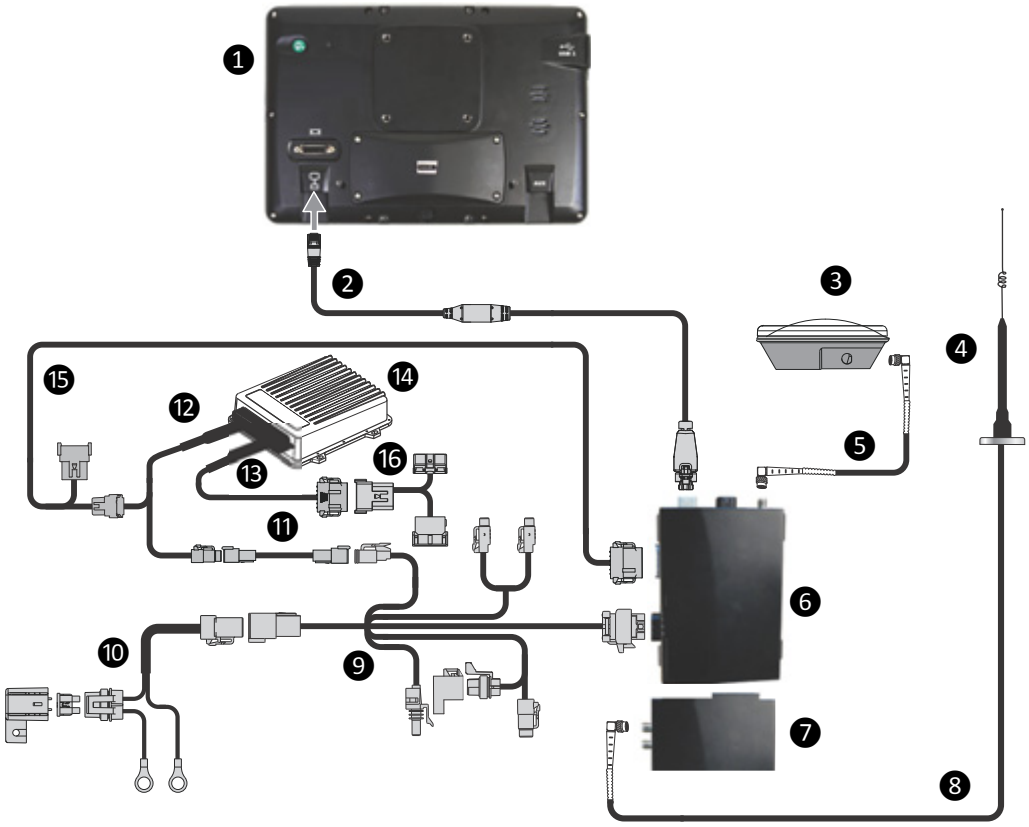
Item	Description	Trimble part number
1	FmX integrated display	93700-xx
2	FmX display power cable	66694
3	Power bus relay	67259
4	In-cab power cable	112905
5	FmX display to NavController II with port replicator	75741
6	2 pin DTM to 2 pin DT power adapter	67095
7	NavController II	55563-30
8	8 m GNSS TNC/TNC RT angle antenna cable	50449
9	AG-15 GNSS antenna	77038-00
10	NMO to TNC 20 ft antenna cable and base	72122
11	900 MHz radio kit	22882-10
12	NavController II main cable	54601
13	NavController II auxiliary cable	54602
14	CAN interface cable	111324

CFX-750 display



Item	Description	Trimble part number
1	CFX-750 display	94000-xx
2	CFX-750 display power cable	77282
3	Power bus relay	67259
4	In-cab power cable	112905
5	FmX display to NavController II with port replicator	75741
6	2 pin DTM to 2 pin DT power adapter	67095
7	NavController II	55563-30
8	8 m GNSS TNC/TNC RT angle antenna cable	50449
9	AG-15 GNSS antenna	77038-00
10	NMO to TNC 20 ft antenna cable and base	72122
11	900 MHz radio kit	22882-10
12	NavController II main cable	54601
13	NavController II auxiliary cable	54602
14	CAN interface cable	111324

TMX-2050 display



Item	Description	Trimble part number
1	TMX-2050 display	96700-00
2	TM-200 Module to display cable	93843
3	AG-25 GNSS antenna	77038-00
4	900 MHz radio antenna kit	22882-10
5	8 m GNSS TNC/TNC RT angle cable	50449
6	TM-200 Module	95060-00
7	AG-815 radio	
8	NMO-to-TNC 20 ft antenna cable and base	72122
9	TM-200 Module power and I/O cable	92676
10	Cable, in-cab power	112905
11	2-pin DTM to 2-pin DT power adapter cable	67095
12	Main NavController cable	54601
13	Cable, NavController diagnostic	54602
14	NavController	55563-00 55566-00
15	TM-200 Module to NavController cable with port replicator	75741
16	CAN interface cable	111324

Calibration and set up

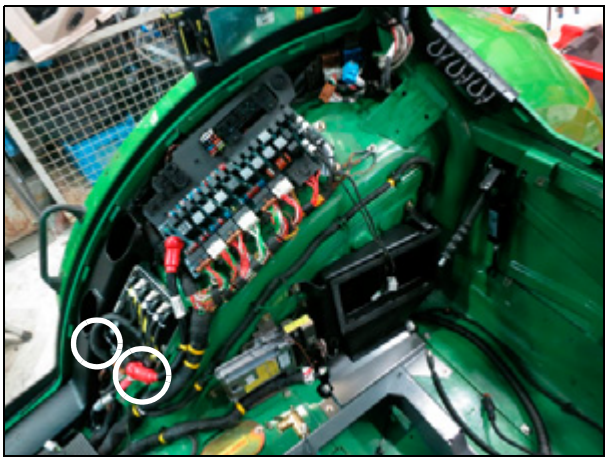
The tractor valve is calibrated in the factory and should not need to be adjusted. However, if there is no response from the valve, the factory service tool may be required to update the software and recalibrate. The local manufacturer's dealership can complete the following actions if necessary:

1. Using the dashboard, recalibrate the wheel angle sensor with the calibration code 2401.
2. Using the dashboard, recalibrate the valve dead-zones with the calibration code 2403.

Power cable installation

Step 1

Power is accessible inside the cab, underneath the large plastic trim, to the right of the driver's seat.

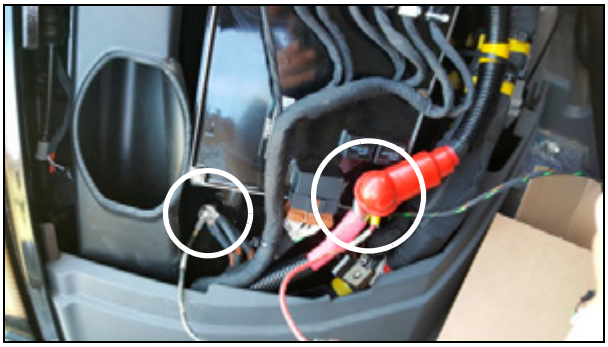


Step 2

Remove the nuts from the power and ground lugs.

Attach the ring terminals on the provided power cable (P/N 112905).

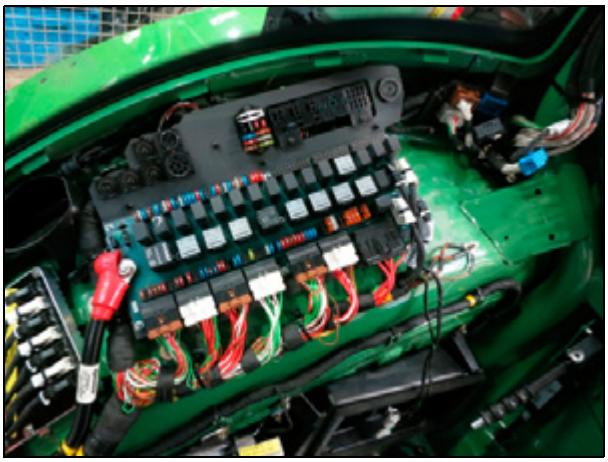
Replace the nuts and the red boot over the power lug.



Installing the CAN bus cable

Step 1

The CAN bus interface connector is located in the back right corner of the cab, underneath the plastic trim.



Step 2

Remove the rear right C-pillar trim and the large grommet assembly (see Power cable installation).

Then, remove the plastic fuse door.



Step 3

Remove the large plastic trim.



Step 4

Remove the blue 21-pin connector on the top right. This will allow more room to access the black 21-pin connector directly below it.

Remove the black 21-pin connector.



Step 5

Plug in the supplied CAN interface cable (P/N 111324) into the black 21-pin connector.

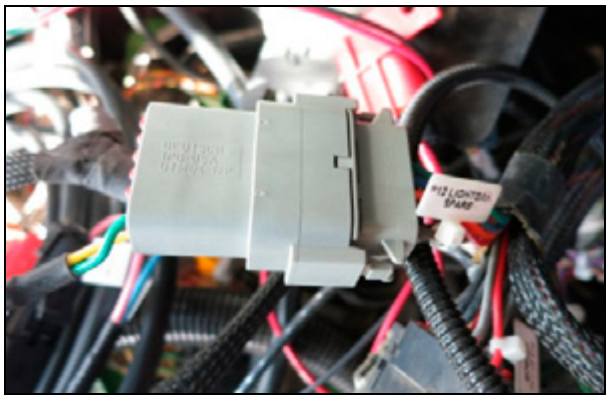
Replace the blue 21-pin connector as well.

Route the free end of the CAN cable underneath the plastic trim towards the NavController.



Step 6

Plug the other end of the CAN interface cable into connector P12 on the NavController auxiliary harness (P/N 54602).



3

Antenna / Receiver Installation

- Antenna and receiver installation options
- AG-372 receiver with AgGPS 450/900 radio module (if equipped) components
- Installing the AG-372 GPS receiver with AgGPS 450/900 radio module (if equipped)
- Installing an AG-372 receiver with magnetic feet
- AgGPS 542 receiver components
- Installing the AgGPS 542 receiver

This chapter describes how to install the required receiver and antenna, and radio module (if used).

To install the antenna for the CFX-750 or FmX display, see Display Installation.

Antenna and receiver installation options

There are several options for mounting components (the antenna, radio module, or GNSS receiver) on the cab roof depending on the accuracy required and the antenna type:

- **VHB mount** – Attach a P/N 62034 plate or a V plate directly to the roof with VHB (Very High Bond) adhesive for magnetic mounting. See page 19.
- **Magnetic mounting** – Magnetic mounting for quick release is available for VHB type mounting.

Possible mounting methods

GNSS receiver	VHB mounted plate	VHB V mounted plate
CFX-750 display FmX integrated display TM-200 Module	✓	✓
AG-372 receiver	✘	✓
AgGPS® 542 receiver	✓	✓

NOTE – For quick release magnetic mounting with an AG-372 receiver, order the kit listed in Antenna mounting kits, page 9 and use VHB to attach the V plate to the roof.

NOTE – For WAAS, EGNOS, OmniSTAR VBS, and DGPS applications, place either of the plates in a firm location using the VHB.

Attaching the plate with VHB adhesive

⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

You can use the VHB mounting method to attach either a P/N 62034 plate or a P/N 62388-02 V plate.

- **RTK, OmniSTAR HP/XP/G2, DGPS, GLONASS applications** – To use this method for high accuracy, the surface must be rigid and free of "oil panning". The V plate provides repeatable positioning of the antenna.
- **WAAS, EGNOS, OmniSTAR VBS applications** – Use a P/N 62034 plate for simplified installation in applications where high accuracy is not critical.

Step 1

Clean the antenna location on the roof of the cab with a light solvent to remove oil and dust. Apply force to the roof to find a firm location.

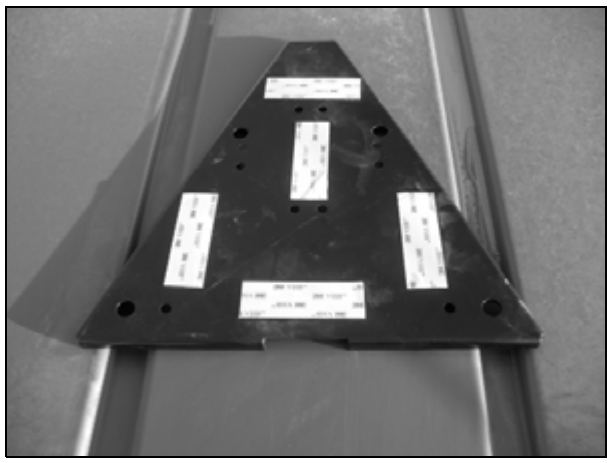


Step 2

V plate only

Remove the backing from one side of the VHB strips provided and then apply the strips to the plate.

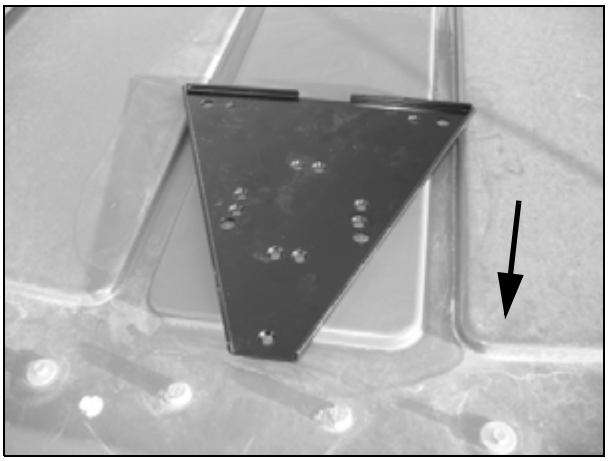
NOTE – The VHB strips are pre-applied to the P/N 62034 plate.



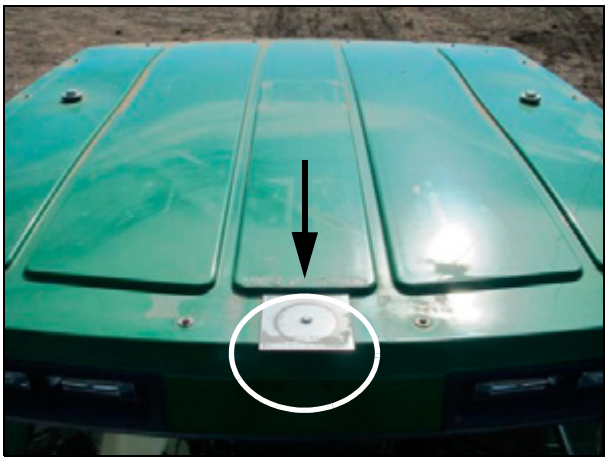
Step 3

Remove the backing from the other side of the VHB strips and then apply the plate to the cab roof. The narrow end of the plate points forward. Ensure that the VHB strips make even contact with the surface. Apply pressure and then leave for approximately 30 minutes to adhere.

NOTE – The arrow points to the front of the vehicle.

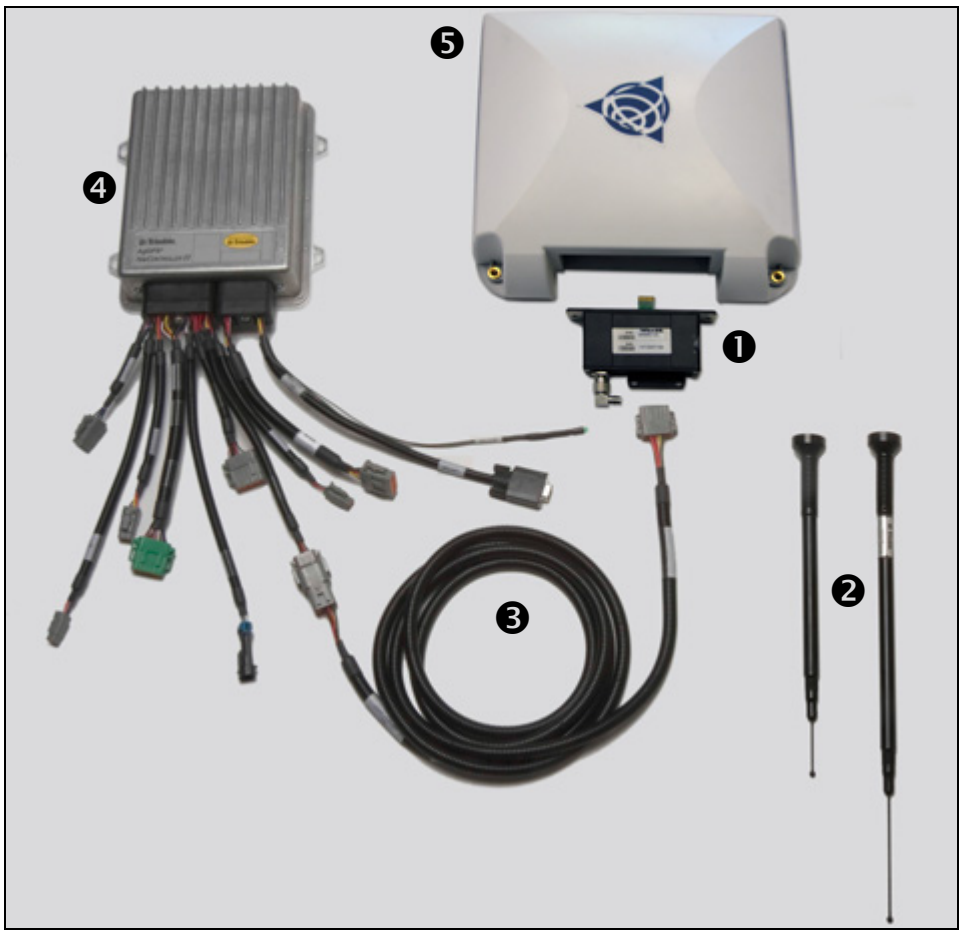


V plate



P/N 62034

AG-372 receiver with AgGPS 450/900 radio module (if equipped) components



Item	Description	Trimble part number
1	AgGPS 450 or 900 radio (if equipped)	
2	Radio antenna cable and magnetic mount	
3	AgGPS 450 or 900 radio antenna	
4	Antenna/receiver cable	54608
5	Autopilot controller	

Installing the AG-372 GPS receiver with AgGPS 450/900 radio module (if equipped)

⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

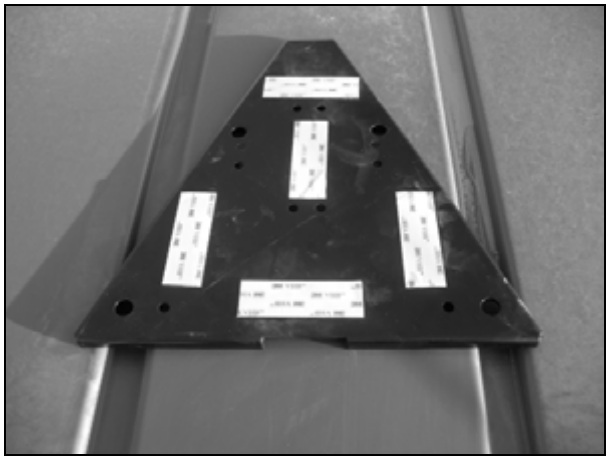
To attach the AG-372 receiver plate to the cab roof (for a removable installation), attach a V plate to the roof with VHB and then stick the receiver plate to the V plate with magnets.

Removable installation

Step 1

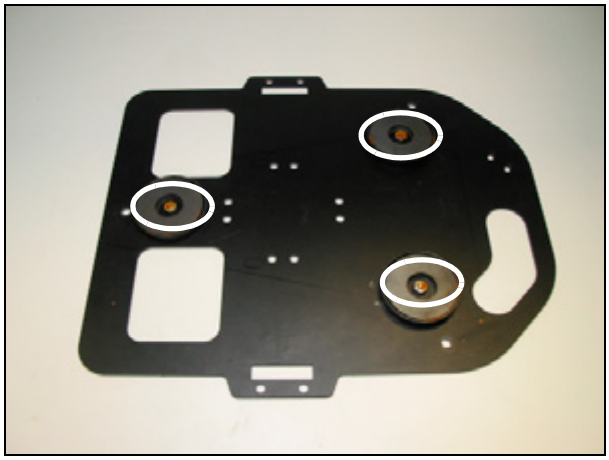
V plate

Attach the V plate to the roof using VHB. Ensure that the narrow end points forward.



Mounting plate

Attach the three provided magnets to the plate with the ¼" flathead screws and hardware provided.



Underside of plate

RTK radio installation

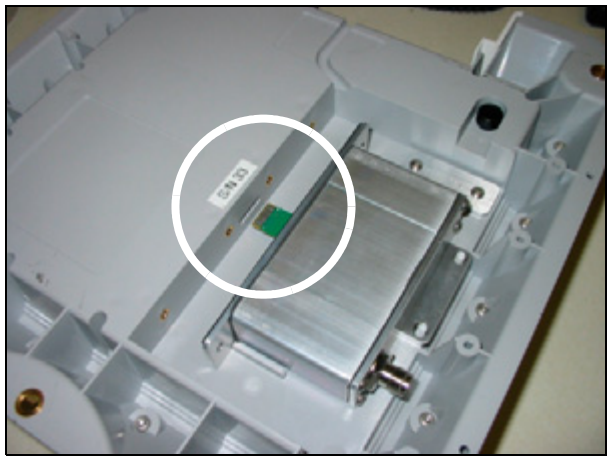
Step 1

Remove the blanking plate and set it aside.



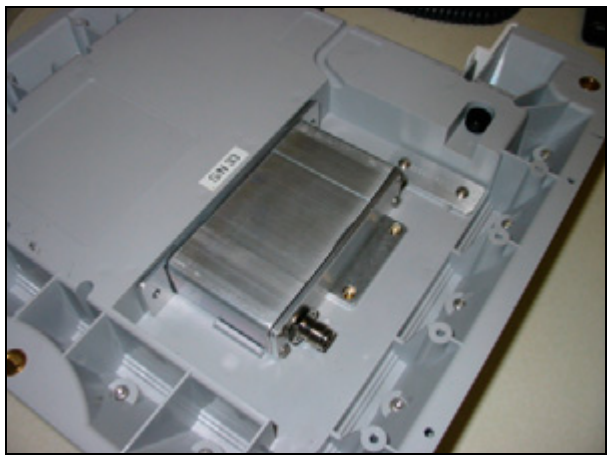
Step 2

Place the integrated radio inside the AG-372 receiver. Ensure that the circuit board is aligned with the slot in the vertical wall of the receiver.



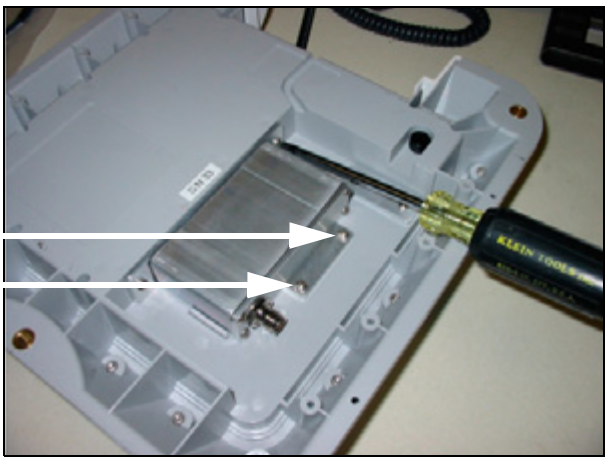
Step 3

Slide the integrated radio back so that it is flush with the vertical wall of the receiver.



Step 4

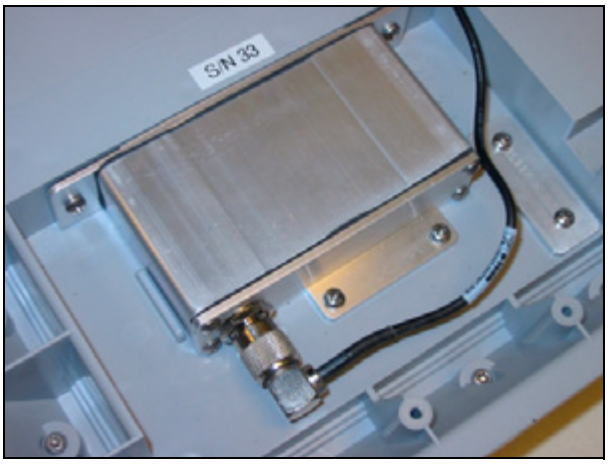
Use a #1 or #2 Phillips screwdriver and the supplied screws to install the integrated radio. First insert and tighten the two screws on the horizontal wall (arrowed), and then insert the remaining screws.



Step 5

Install the supplied antenna cable.

NOTE – The housing can accommodate a cable diameter of up to ¼".

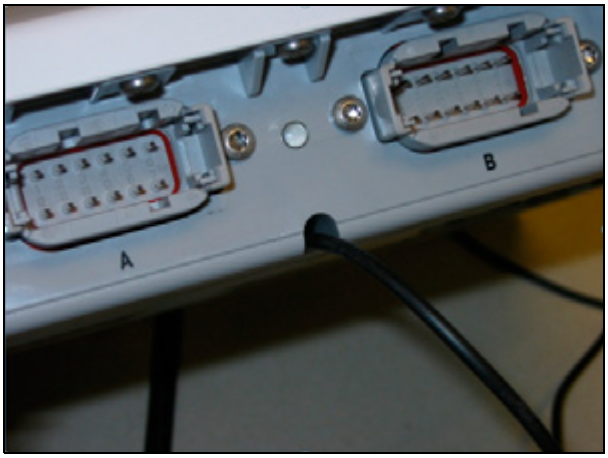


Step 6

Route the cable through the cable channel and then insert the cable cover.

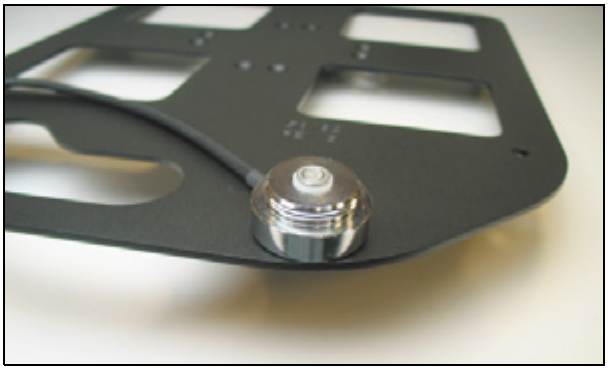


This image shows the unit with the cable routed through the channel.



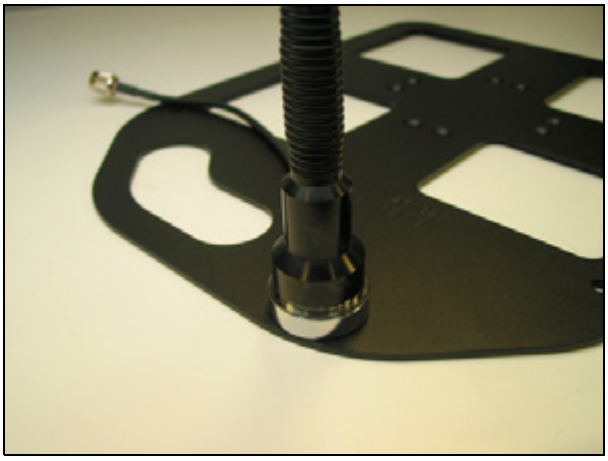
Step 7

Attach the antenna base to the rear of the plate with the two flathead screws provided.



Step 8

Attach the radio antenna to the antenna base.



Step 9

Position the AG-372 receiver and radio on the mounting plate with the connector ports facing the radio antenna. Align the three bolt holes with the receiver, radio, and mounting plate.



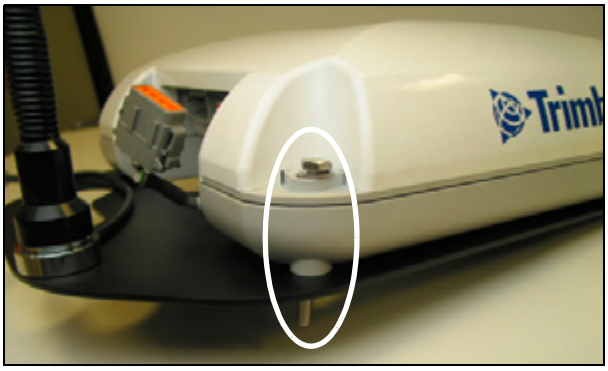
Step 10

Insert the nylon bushings provided.



Step 11

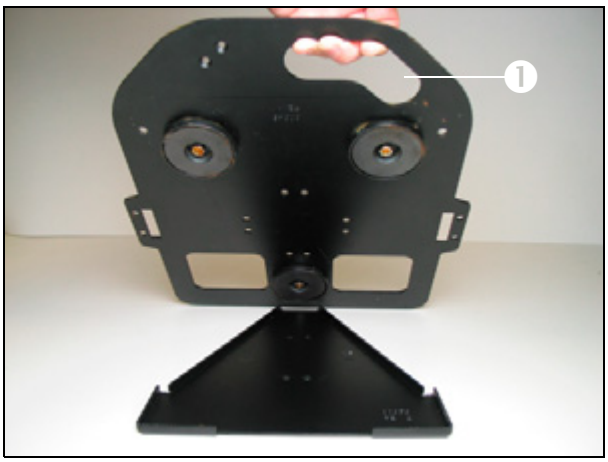
Insert the bolts through the receiver, radio, and mounting bracket. Place nuts on the bolt ends and then tighten them.



Step 12

Magnet method

Place the receiver on the roof by aligning the magnets with the V plate. Ensure that the handle ❶ is toward the back of the vehicle.

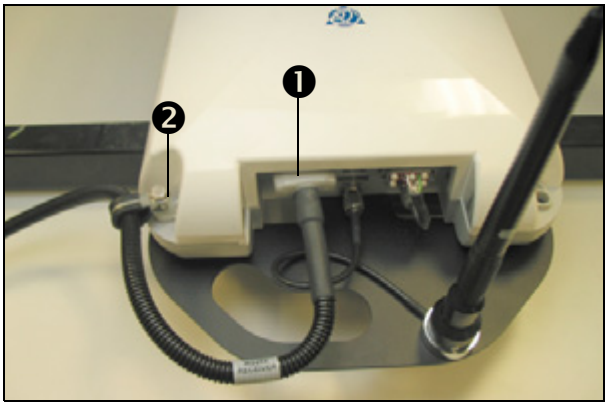


Step 13

Both methods

Connect the cable from the cab controller into port A ❶ of the AG-372 receiver. Bolt the cable clamp ❷ to the left side of the receiver.

Route the cable into the cab and into the controller.



Installing an AG-372 receiver with magnetic feet

⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

Use this option only when all other options are unavailable. It requires a firm surface for mounting to avoid vertical vibration and is not an easily repeatable location when moving receivers. Many cabs do not offer roof bolts; you may need to drill or to construct a firm location.

Step 1

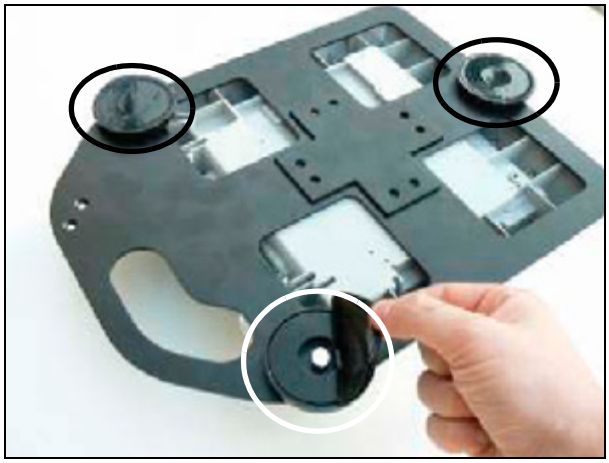
Attach the magnets to the receiver mounting plate. Use the three ¼" bolts to mount the AG-372 receiver.

Place the nuts on the receiver side.



Step 2

Turn the mounting plate upside down. Stick the covers onto the magnets as shown.

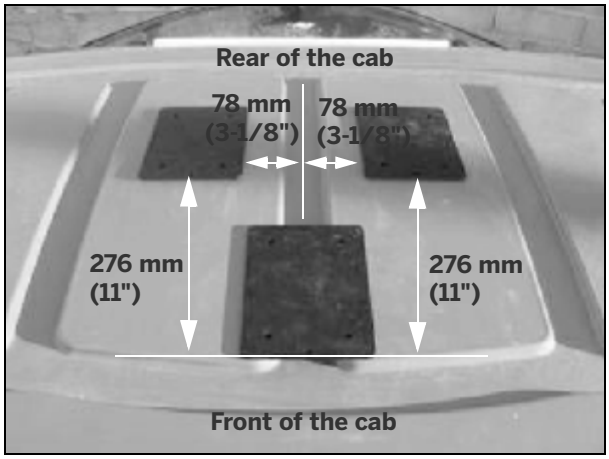


Step 3

Clean the antenna location on the roof of the cab with a light solvent to remove oil and dust.

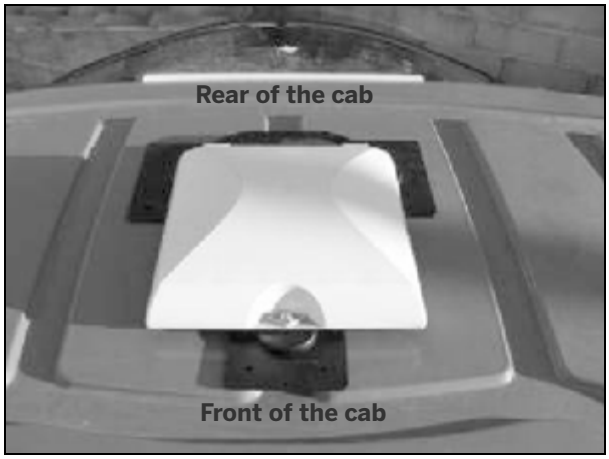
Remove the backing from the VHB strips and then apply the plates to the cab roof.

Attach the three mounting plates so that the receiver is as firm as possible.



Step 4

Stick the antenna magnetic mounts at the center of the mounting plates.

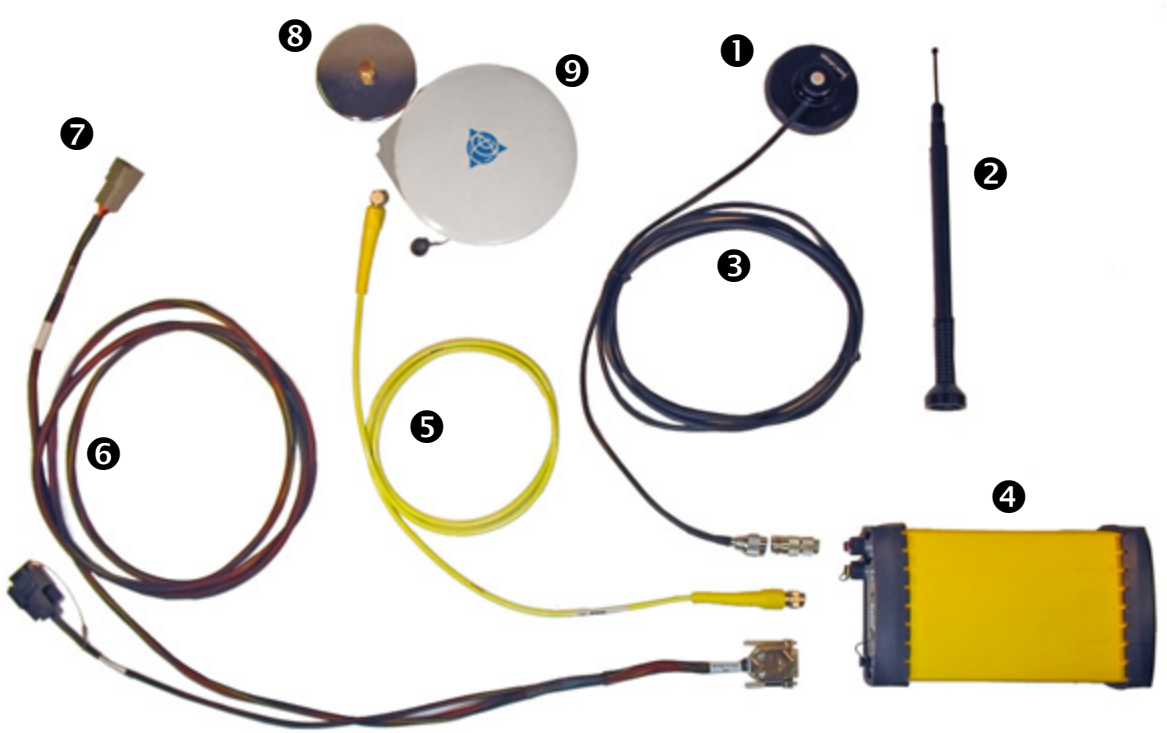


Step 5

Connect the antenna cable to port A of the AG-372 GPS receiver and then route the cable toward the NavController harness.



AgGPS 542 receiver components



Item	Description	Trimble part number
1	Radio antenna magnetic base	
2	Radio antenna	
3	Radio antenna cable	
4	AgGPS 542 GPS receiver	
5	Antenna cable	
6	Receiver cable	62037
7	To controller “P3 GPS”	
8	Antenna magnetic mount	
9	AgGPS 542 GPS antenna	

Installing the AgGPS 542 receiver

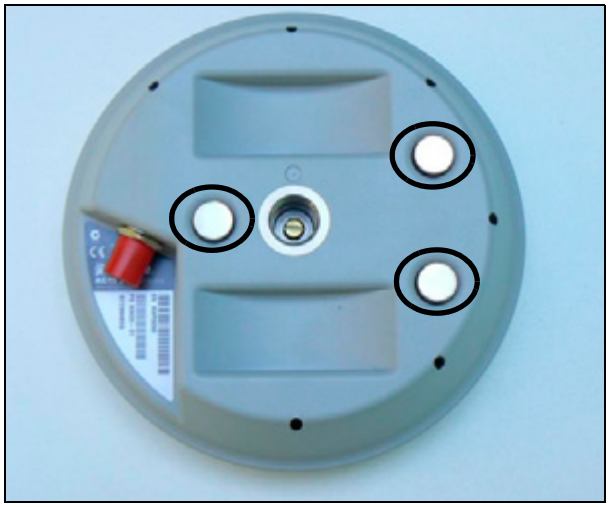
⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information chapter.

Step 1

Attach the large magnet with a ⅝" stud to the GPS antenna.



If the antenna has magnets built in, skip this step.



Step 2

GLONASS, RTK, OmniSTAR HP/XP/G2, DGPS applications

For repeatable positioning, place the antenna against the lip at the narrow end of the V plate.



Step 3

Attach the antenna/receiver cable to the antenna and then route the cable into the cab through the rubber grommet at the base of the rear window. Secure the cable along the way.



Step 4

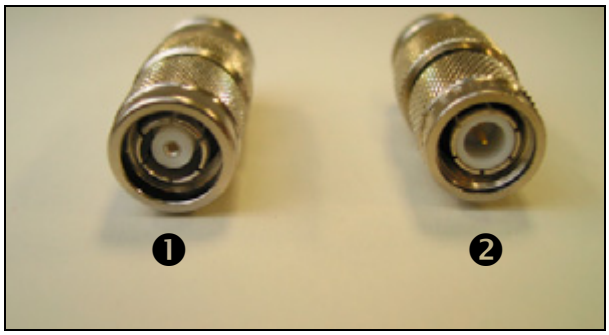
Mount the receiver in a convenient location in the cab. Route the antenna cable to the receiver and then connect it.



Step 5

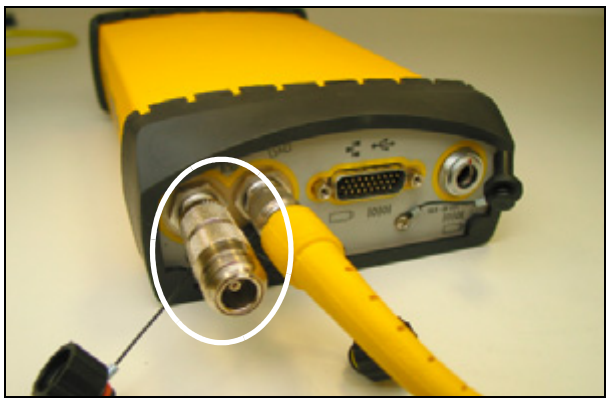
Identify the correct adaptor for the radio connection:

- ❶ Reverse polarity TNC-to-N for 900 MHz radios
- ❷ Normal polarity TNC-to-N for 400 MHz radios



Step 6

Attach the adaptor to the radio port.



Step 7

Connect the radio antenna cable to the radio port adaptor.



Step 8

Connect the controller cable to the 26-pin connector of the receiver. Controller cable connections will be completed in Chapter 5, Controller Installation.



Step 9

Connect the radio antenna to the magnetic antenna base.



Step 10

Attach the magnetic radio antenna base to the rear of the V plate on the roof. If the cable does not reach the V plate, use the P/N 62034, 5" x 5" plate with the VHB provided to relocate the antenna.



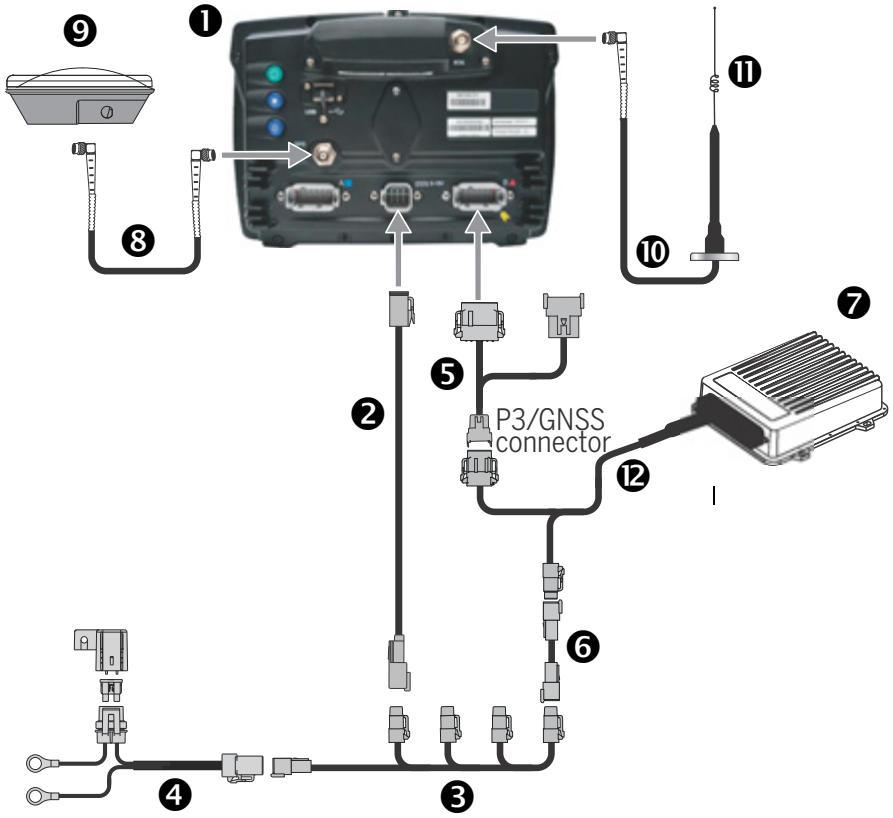
4

Display Installation

- CFX-750 display: Components
- CFX-750 display: Preparation
- CFX-750 display: Installation
- CFX-750 display: Installing the wiring harness
- FmX integrated display: Components
- FmX integrated display: Preparation
- FmX integrated display: Installation
- FmX integrated display: Installing the wiring harness
- CFX-750 display and FmX integrated display: Connecting accessory options
- TMX-2050 display: Components
- TMX-2050 display: Preparation
- TMX-2050 display: Installing the wiring harness
- AG-25 GNSS antenna
- Installing the GNSS antenna and plate
- Installing the RTK radio antenna

This chapter describes how to install and connect a Trimble integrated display in the vehicle.

CFX-750 display: Components



⚠ **CAUTION –** Connecting the Port Replicator on the Display to NavController cable ❺ to the P4 or P12 connector of the NavController harness ⓬ will result in damage to the display, and will void the warranty.

Item	Description	Trimble part number
1	CFX-750 display RTK password required.	94110-xx
2	CFX-750 power cable	77282
3	CFX-750 power cable with relay and switch (power bus)	67259
4	In-cab power cable	112905
5	Display to NavController cable with port replicator	75741
6	2-pin DTM to 2-pin DT power adaptor	67095
7	NavController	55563-00
8	8 m GNSS TNC/TNC RT angle cable	50449
9	AG-25 GNSS antenna	77038-00
10	NMO-to-TNC 20 ft antenna cable and base	72122
11	900 MHz radio antenna kit	22882-10
12	Main NavController cable	54601

CFX-750 display: Preparation

Step 1

Locate the CFX-750 display, the RAM mount, and the RAM mount clamp.



Step 2

Use the provided metric hardware to attach the RAM mount to the rear of the display.



Step 3

Attach the RAM mount to the rear of the display.



CFX-750 display: Installation

⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

Step 1

Decide where you will mount th display in the vehicle cab and then use the provided bolts to attach the bar mount to the rail.

Attach the free end of the RAM mount to the bar mount and then tighten the clamp on the RAM mount so that the display is secure.

Step 2

Connect the cable to the B port of the CFX-750 display.

To connect power to the CFX-750 display, see Chapter 5, Controller Installation.



CFX-750 display: Installing the wiring harness

Step 1

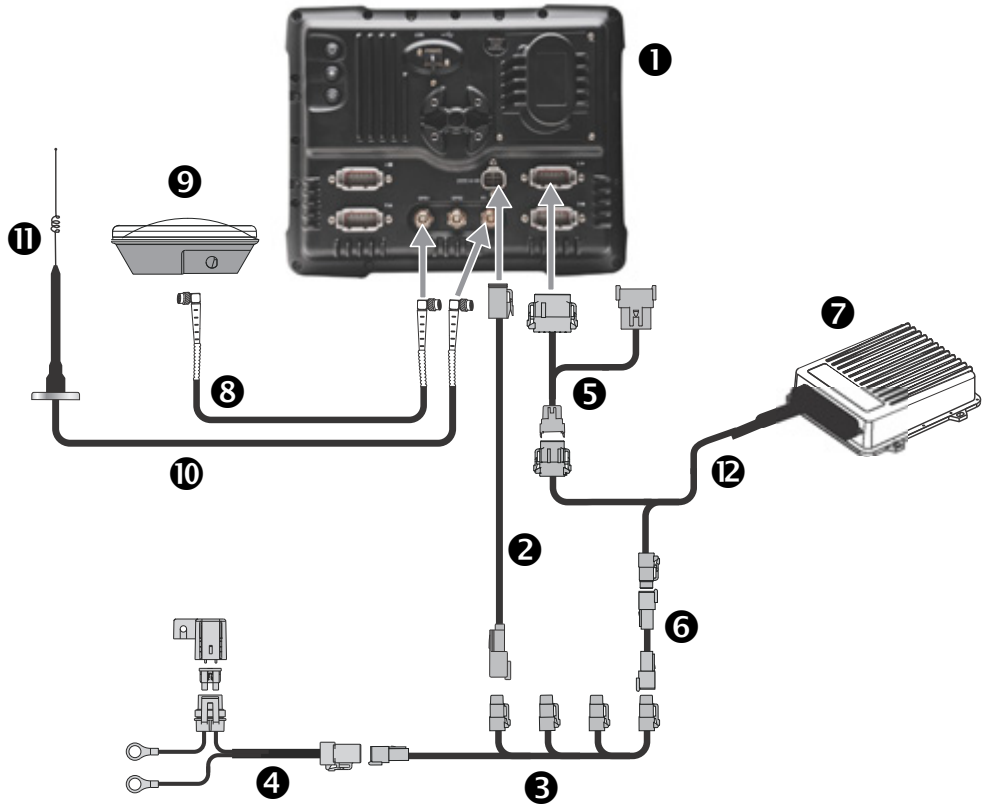
Locate the cable that connects the CFX-750 display to the NavController.

Step 2

Connect the cable to the P3 connector on the NavController main harness and then route the cable from the NavController to the mounting location on the CFX-750 display.



FmX integrated display: Components



⚠ **CAUTION –** Connecting the Port Replicator on the Display to NavController cable 5 to the P4 or P12 connector of the NavController harness 12 will result in damage to the display, and will void the warranty.

Item	Description	Trimble part number
1	FmX integrated display	93100-02
2	FmX power cable	66694
3	FmX power cable with relay and switch (power bus)	67259
4	In-cab power cable	112905
5	Display to NavController cable with port replicator	75741
6	2-pin DTM to 2-pin DT power adaptor	67095
7	NavController	55563-00
8	8 m GNSS TNC/TNC RT angle cable	50449
9	AG-25 GNSS antenna	77038-00
10	NMO-to-TNC 20 ft antenna cable and base	72122
11	900 MHz radio antenna kit	22882-10
12	Main NavController cable	54601

FmX integrated display: Preparation

Step 1

Locate the FmX integrated display, the RAM mount, and the RAM mount clamp.



Step 2

Use the provided metric hardware to attach the RAM mount to the rear of the display.



Step 3

Attach the RAM mount to the rear of the display.



FmX integrated display: Installation

⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

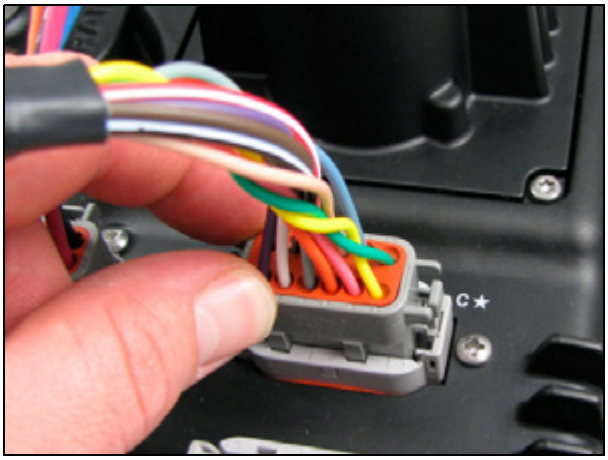
Step 1

Decide where you will mount the display in the vehicle cab and then use the provided bolts to attach the bar mount to the rail. Attach the free end of the RAM mount to the bar mount and then tighten the clamp on the RAM mount so that the display is secure.

Step 2

Connect the cable to the C port of the FmX integrated display.

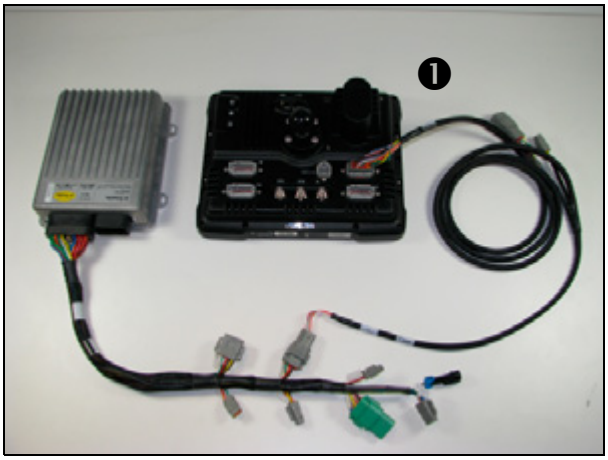
To connect power to the FmX integrated display, see Chapter 5, Controller Installation.



FmX integrated display: Installing the wiring harness

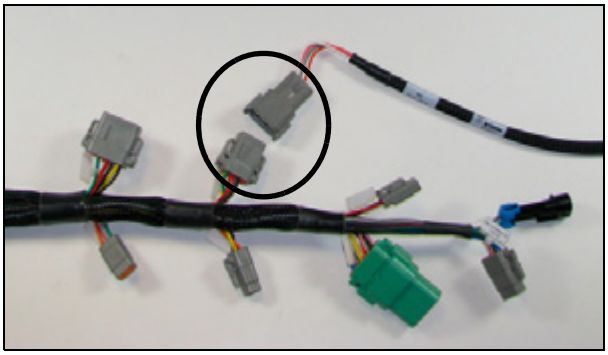
Step 1

Locate the cable that connects the FmX integrated display to the NavController ❶.



Step 2

Connect the cable to the P3 connector on the NavController main harness, and then route the cable from the NavController to the mounting location on the FmX integrated display.



CFX-750 display and FmX integrated display: Connecting accessory options

NOTE – Unless otherwise stated, "the display" applies to the CFX-750 display or the FmX integrated display.

AgCam

The AgCam and AgCam cable are accessory items that you can purchase separately from the display. The CFX-750 display allows up to two video inputs; the FmX integrated display allows up to four.

Step 1

Locate the AgCam and AgCam cable.

Step 2

Mount the AgCam in a secure location and then route the cable towards the display.



CFX-750 display



FmX display

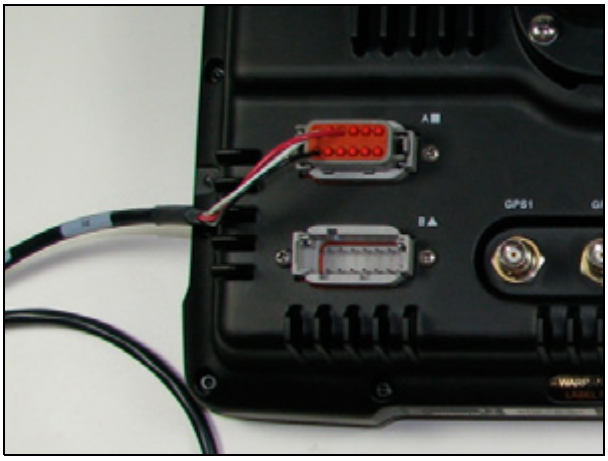
Step 3

Connect the AgCam cable to the display adaptor cable.



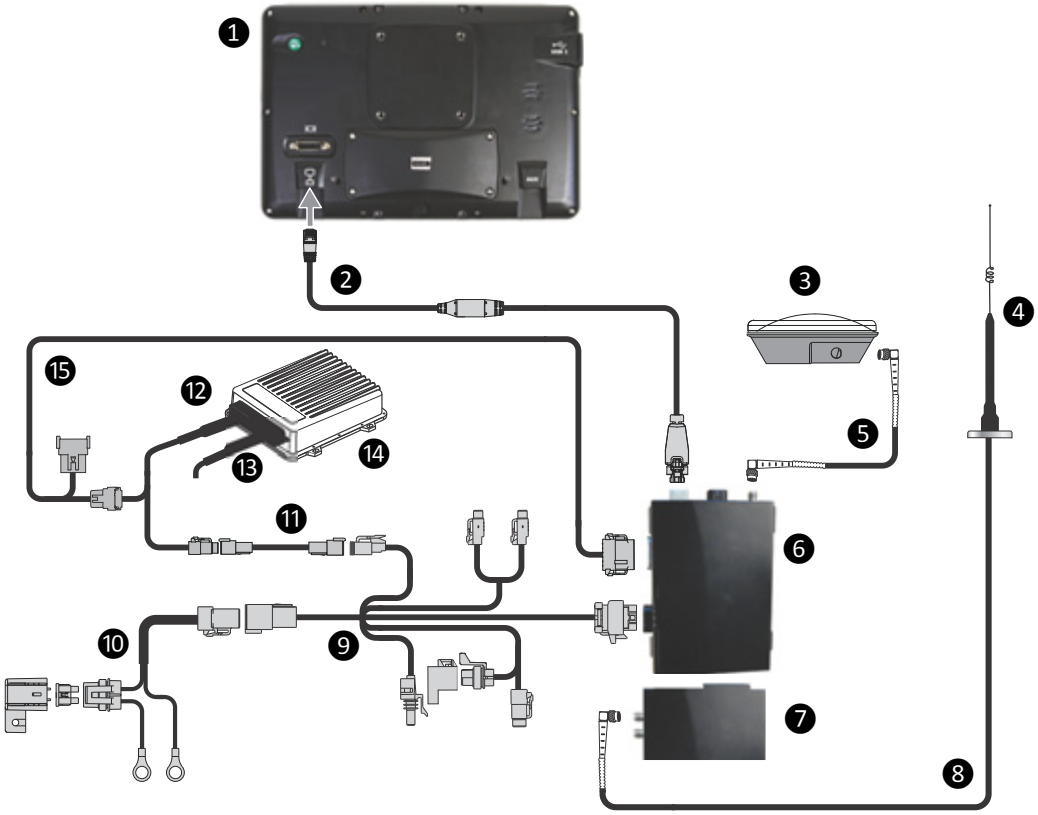
Step 4

Connect the display to AgCam adaptor cable to one of the open 12-pin connectors on the back of the display.



TMX-2050 display: Components

This graphic shows how to connect the TM-200 Module and the Autopilot system for after-market installations.



Item	Description	Trimble part number
1	TMX-2050 display	96700-00
2	TM-200 Module to display cable	93843
3	AG-25 GNSS antenna	77038-00
4	900 MHz radio antenna kit	22882-10
5	8 m GNSS TNC/TNC RT angle cable	50449
6	TM-200 Module	95060-00
7	AG-815 radio	
8	NMO-to-TNC 20 ft antenna cable and base	72122
9	TM-200 Module power and I/O cable	92676
10	Cable, in-cab power	112905
11	2-pin DTM to 2-pin DT power adapter cable	67095
12	Main NavController cable	54601
13	Cable, NavController diagnostic	54602
14	NavController	55563-00 55566-00
15	TM-200 Module to NavController cable with port replicator	75741

TMX-2050 display: Preparation

The display mount attaches to a rail in the cab of the vehicle. The TMX-2050 display connects to the display mount.

The TM-200 Module connects to the display with a single cable.

Additional components to install depend on your connection and correction services, and the features you are using.

⚠ **CAUTION –** Make sure the vehicle power is off when you are connecting system components.

Installing the display and mount

Use the mounting hardware supplied in the display kit to mount the display in the vehicle cab.

⚠ **CAUTION –** Make sure the vehicle power is off when you are connecting system components.

Before completing installation steps, select a position in the cab where the bar mount (4) can be attached to a rail. Hold the display in the selected location and make sure that it:

- Is easy to see, but does not block the driver's view.
- Is within the driver's reach so that the USB drive is easy to remove and replace.
- Does not interfere with the driver getting in or out of the cab, or any other activities.

.

Item	Description
1	Mounting plate
2	Zirkona mount
3	Tightening arm
4	Bar mount



Step 1

Locate the TMX-2050 display and the Zircona mount and mounting hardware.



Step 2

Use the provided hardware to attach the Zircona mount to the display as shown





Step 3

Decide where you will mount the display in the vehicle cab and then use the provided bolts to attach the rail mount of the Zircona display mount to the rail of the vehicle.



Step 4

The Zircona mount has a tightening arm ❸. Loosen the arm to let the display move on the mount.

Step 5

Adjust the TMX-2050 display until it is positioned where you want it.

Turn the tightening arm clockwise to tighten the Zircona mount and lock the display in the desired position.

Step 6

Connect the display cable to the display.



Step 7

Route the other end of the display cable to the TM-200 Module and then connect it to the TM-200 Module.



TMX-2050 display: Installing the wiring harness

⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

Step 1

Connect the P5 and P2 connectors on the harness, P/N 106111, to the TM-200 Module.

Step 2

On the TM-200 Module, locate the display connection point.



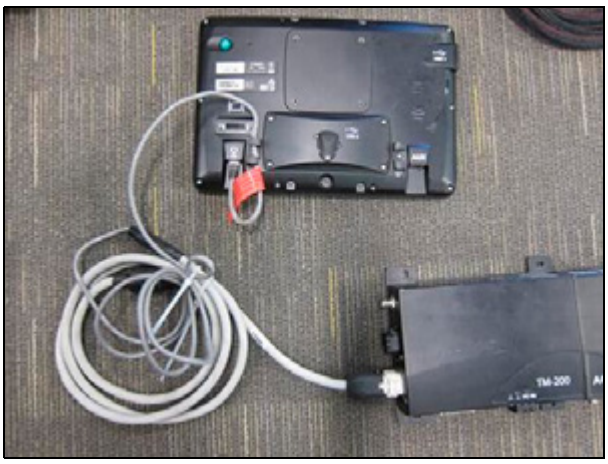
Step 3

Connect the display cable P/N 93843 to the TM-200 Module.



Step 4

Route the cable between the TMX-2050 display and the TM-200 Module.



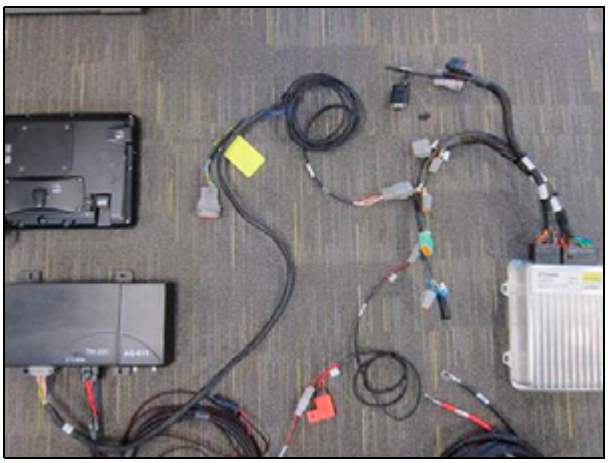
Step 5

Locate the Port labeled **A** on the TM-200 Module and then connect the NavController connection cable, P/N 75741.



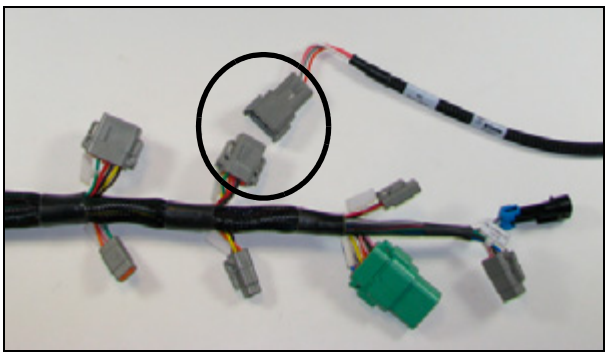
Step 6

Route the other end of the P/N 75741 cable to the plug on the P/N 54601 harness labeled **GPS**.



Step 7

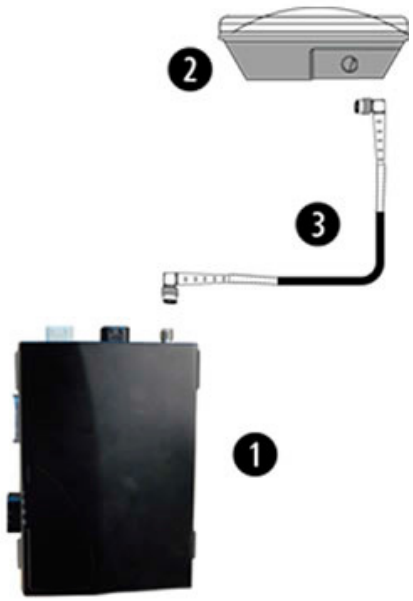
Connect the cable to the P3 connector on the NavController main harness.



AG-25 GNSS antenna

The AG-25 GNSS antenna is required for all correction services. It enables the GNSS receiver in the TM-200 Module to receive GPS / GNSS corrections. The antenna connects to the antenna connector on the TM-200 Module

⚠ **CAUTION –** Wireless cellular radio and GNSS signals can interfere with each other. For best performance, mount antennas at least 1 meter away from each other.



Item	Description
1	TM-200 Module
2	AG-25 GNSS antenna
3	AG-25 antenna to TM-200 Module cable

The AG-25 GNSS antenna has integrated magnets for easy installation. To attach the antenna to a non-metal surface, use the mounting plate.

NOTE – If you are using the AG-25 GNSS antenna with a steering system, refer to the installation instructions for the steering system to determine the correct location for mounting the antenna.

Installing the GNSS antenna and plate

⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

NOTE – The V plate antenna bracket is available on the Autopilot price list. See Antenna mounting kits, page 9.

VHB adhesive method

Standard 5" x 5" plates (P/N 62034) are provided in most kits. You can use Very High Bond (VHB) to attach either a 5" x 5" plate (P/N 62034) or a V plate (P/N 62388-02).

- **GLONASS, RTK, RTX, OmniSTAR HP/XP/G2, DGPS applications** – To use this method for high accuracy, the surface must be rigid and free of "oil panning". The V plate provides repeatable positioning of the antenna.
- **WAAS, EGNOS, OmniSTAR VBS, applications** – Use a P/N 62034 plate for simplified installation in applications where high accuracy is not critical.

Step 1

Clean the antenna location on the roof of the cab with a light solvent to remove oil and dust.

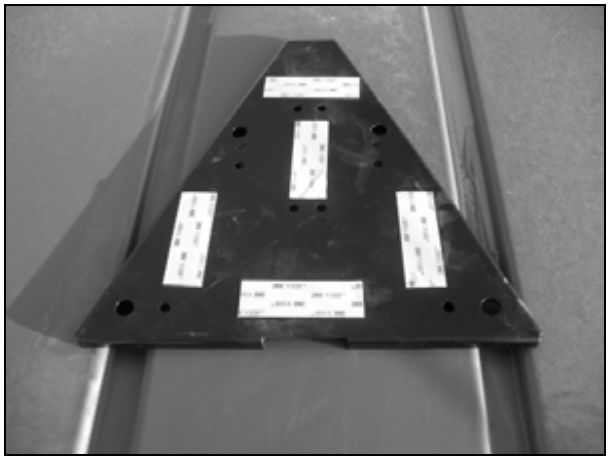


Step 2

V plate only

Remove the backing from one side of the VHB strips provided and then apply the strips to the plate.

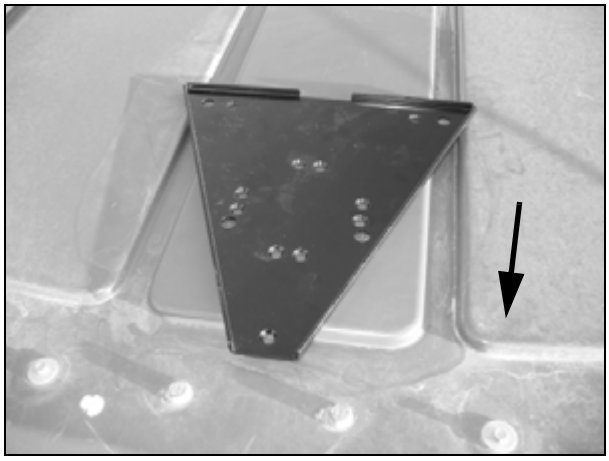
NOTE – The VHB strips are pre-applied to the P/N 62034 plate.



Step 3

Remove the backing from the other side of the VHB strips and then apply the plate to the cab roof. The narrow end points forward. Ensure that the VHB strips make even contact with the surface. Apply pressure and then leave for approximately 30 minutes to adhere.

NOTE – The arrow in this figure points to the front of the vehicle.



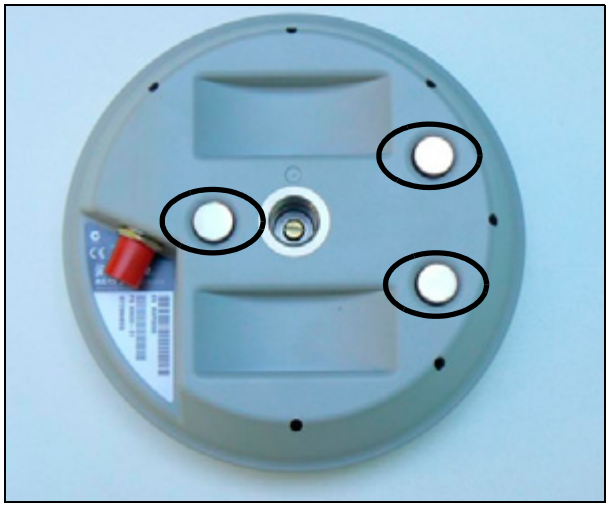
V plate



P/N 62034

Step 4

If the antenna has magnets built in, omit this step.



Otherwise, attach the large magnet with a ⅝" stud to the GNSS antenna.



Step 5

GLONASS, RTK, RTX, OmniSTAR HP/XP/G2, DGPS, applications

For repeatable positioning, place the antenna against the lip at the narrow end of the V plate.



WAAS, EGNOS, OmniSTAR VBS applications

Attach the antenna to the center of the P/N 62034, 5" x 5" plate.



Step 6

Both models

Attach the antenna/receiver cable to the antenna and then route the cable into the cab through the rubber grommet at the base of the rear window. Secure the cable along the way.



Installing the RTK radio antenna

⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

Step 1

Connect the radio antenna to the magnetic antenna base.



Step 2

Attach the magnetic radio antenna base to the rear of the V plate on the roof. If the cable does not reach the V plate, use the P/N 62034 plate with the VHB provided to relocate the antenna.



Step 3

Attach the magnetic radio antenna base to the rear of the V plate on the roof. If the cable does not reach the V plate, use the P/N 62034 plate with the VHB provided to relocate the antenna.



5

Controller Installation

- Installing the controller
- Controller connections

This chapter describes how to install the controller unit.

Installing the controller

⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

Step 1

There are two mounting location options for the NavController:

- behind the seat
- on the front right of the cab

The default option is to install the NavController behind the seat. A mounting bracket (P/N 112628) for this location is provided in the kit.

NOTE – This location is not well suited for cabs that are equipped with the optional Reverse Station, which allows the entire seat and steering column to spin around to face the rear of the machine. In this case, you may order the optional bracket (P/N 112628-01), and install the NavController on the front right of the cab.



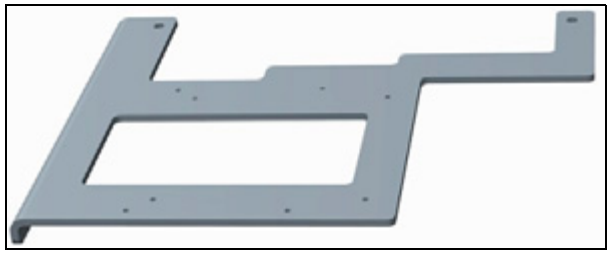
Step 2

Locate the two studs on the back side of the seat base. Remove the two nuts.



Step 3

Install the NavController to the bottom of the bracket using the supplied 10-32 Phillips head-screws. Then, slide the mounting bracket over the studs, and reinstall the nuts.



Step 4

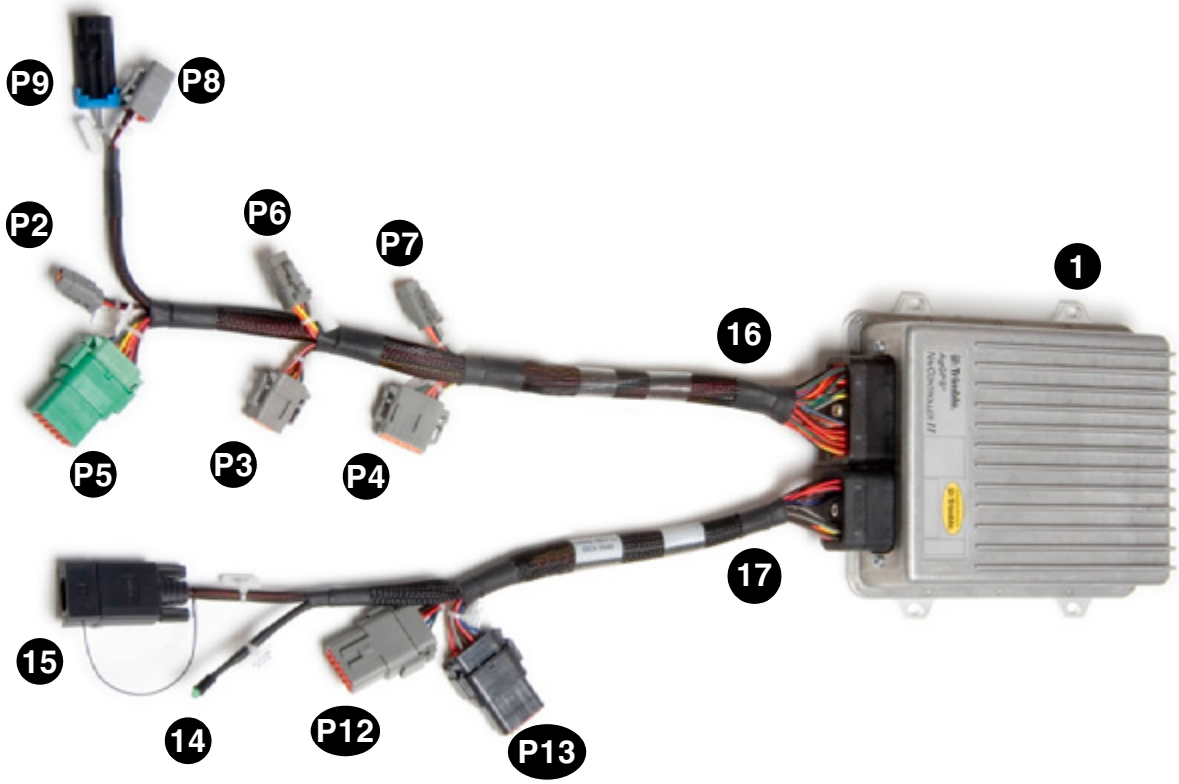
There are tapped holes on the bracket, to accommodate both a NavController and a TM-200 receiver on opposite sides of the bracket.

If applicable, use the supplied 10-32 HHCS screws and #10 washers to mount the receiver.





Controller connections

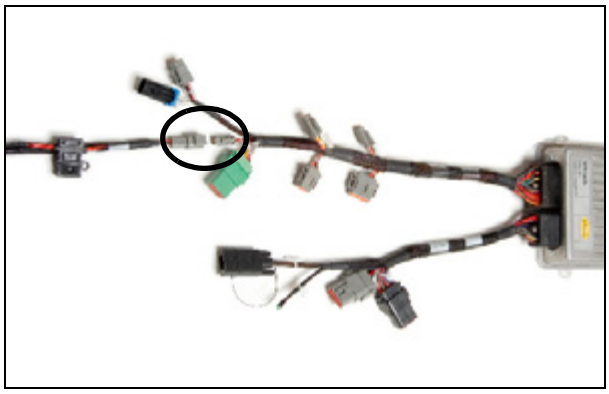


Item	Description	Item	Description
1	NavController	**P9**	Sonalert connector
P2	Power connector	**P12**	Lightbar/spare connector
P3	GNSS connector	**P13**	Spare sensors connector
P4	Display connector	**14**	Status indicator
P5	Vehicle sensors connector	**15**	Laptop connector
P6	Steering sensor connector	**16**	Main harness
P7	Manual override connector	**17**	Auxiliary harness
P8	Hydraulic valve connector		

Step 1

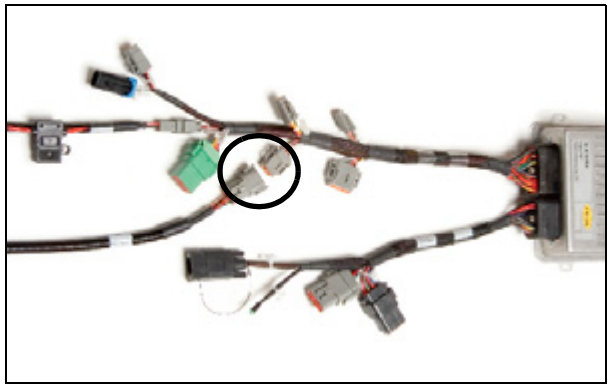
Connect the power cable connection to P2, which is labeled **Power**. P2 is located on the main wiring harness.

NOTE – The power connection supplies power through the controller to all connected devices, including GNSS and displays.



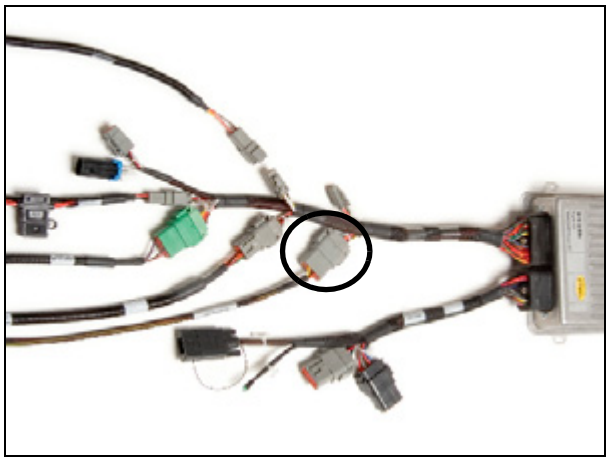
Step 2

Connect the CFX-750 display or FmX integrated display to P3, which is labeled **GPS**. P3 is located on the main wiring harness.



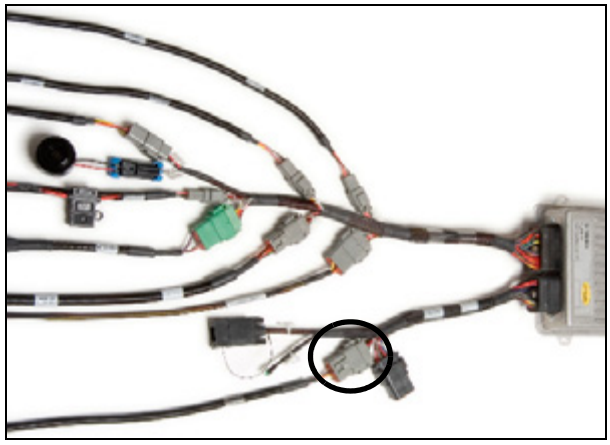
Step 3

Connect the R4 connector of the machine interface cable to P4 on the NavController.



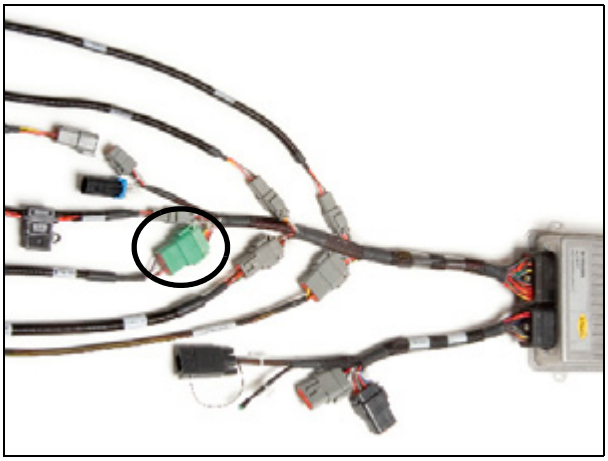
Step 4

Connect the R12 connector of the machine interface cable with P12 on the NavController.



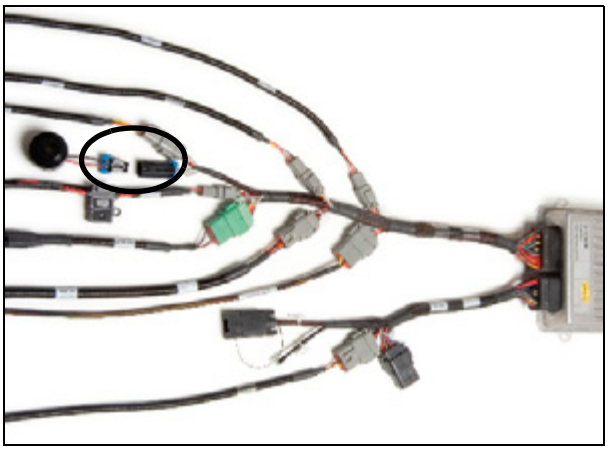
Step 5

If used, connect the green R5 connector for remote engage to the P5 connector on the NavController harness.



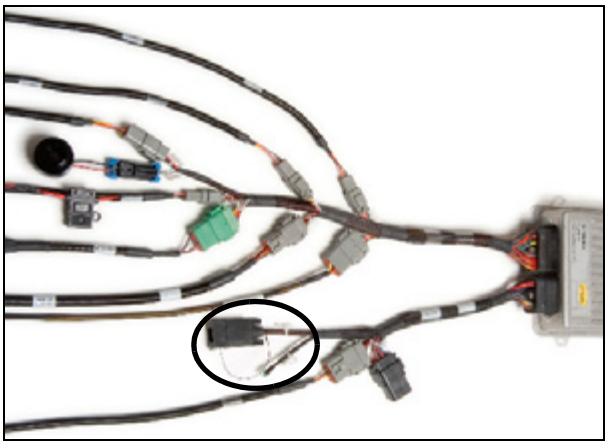
Step 6

Connect the Sonalert P9 to the 2-pin Delphi connector on the main wiring harness. Route the cable so the Sonalert warning device is in a position that is audible to the operator.



Step 7

Route the LED and laptop lead, which is located on the auxiliary wiring harness, to a location that allows the operator to determine the controller status. See controller LED status for status determination. Six flashes per second indicates a correctly functioning controller.



Step 8

Use the provided sleeving to secure the harness cables with tie wraps. Cover and route the cable bundle to avoid damage to connectors and strain on wire connections.

6

Final Machine Check

⚠ **WARNING –** To avoid potentially serious personal injury or illness, and to prevent damage to equipment, make sure that you read and understand the Safety Information.

To perform the final machine check:

1. Connect the battery.
2. Start the machine and check for hydraulic leaks. Correct as needed.
3. Update the Trimble display and the Autopilot NavController to the latest firmware from http://agpartners.trimble.com.

   You can use FlashLoader 200 software version 3.19 to update the Autopilot controller: Download it from http://agpartners.trimble.com.
4. Load the correct configuration file into the Autopilot NavController for the vehicle model being used.

   Download the latest set of configuration files from http://agpartners.trimble.com.

   You can use Autopilot Toolbox II software version 2.92 or later to load the configuration file into the Autopilot controller. You can download the Autopilot Toolbox II software from http://agpartners.trimble.com.
5. Calibrate the Autopilot system using the Trimble display or Autopilot Toolbox II software version 2.92 or later. Depending on your machine type, the following items must be calibrated before you can use the Autopilot system:
   - NavController mounting orientation
   - Manual override
   - AutoSense mounting orientation
   - Valve deadzone
   - Autopilot P-gain
   - Antenna height/Antenna axle offset, and Roll offset