owner's manual

GXM 40

XM® Radio Smart Antenna

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Introduction

The GXM 40 XM Radio Smart Antenna provides marine and aviation XM WX® Weather information for viewing on your Garmin® unit. Operating the GXM 40 requires a subscription to the XM WX Satellite Weather service. The GXM 40 also offers music, news, and talk programming with a subscription to the XM Radio service. XM subscriptions are sold separately.

This manual covers the XM WX Weather and XM Radio features of the GXM 40 when viewed on a Garmin unit. To get the most out of your new system, take the time to go through this manual and the Owner's Manual for your unit. This manual discusses how to connect the GXM 40 and how to subscribe to XM WX Weather and XM Radio services, and provides detailed information about weather and audio features. Operational procedures are found in the Owner's Manual for your unit.

Manual Conventions

- This manual refers to the GXM 40 XM Radio Smart Antenna as the GXM 40.
- All Garmin products that are compatible with the GXM 40 are referred to as "Garmin unit" throughout this manual.
- The gray tabs on the edge of each page indicate the types of Garmin units for which each XM product is available:  for aviation units,  for marine units, and  for automotive units.

Product Registration

Help us better support you by completing our online registration today! Connect to our Web site at http://my.garmin.com. Keep the original sales receipt, or a photocopy, in a safe place.

Serial Number for the GXM 40

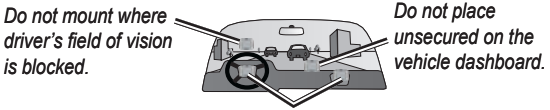
Use the line below to record the serial number in case it is lost, is stolen, or needs service. The serial number is located on the bottom of your unit. Keep your original sales receipt in a safe place or attach a photocopy inside the manual.

Serial Number:

_____

Warnings

WARNING: When installing the GXM 40 in a vehicle, place the unit securely so that it does not interfere with vehicle operating controls or obstruct the driver's view (see diagram).



WARNING: When Navigating in an aircraft, use the GXM 40 only as an aid for VFR navigation.

WARNING: Use the GXM 40 only as a navigational aid. Do not attempt to use the GXM 40 for any purpose requiring precise measurement of direction, distance, location, or topography. This product should not be used to determine ground proximity for aircraft navigation.

WARNING: This unit provides the ability to receive weather information through XM data. Use weather data only as an aid to situational awareness. Such weather information is merely supplemental and advisory in nature and is not intended to be relied upon as safety-critical information in connection with any aviation, vehicle, or marine usage. The user should always exercise caution and common sense when confronted with severe weather conditions.

WARNING: XM WX Weather should not be used for hazardous weather penetration. Weather information is approved only for weather avoidance, not penetration.

WARNING: This product, its packaging, and its components contain chemicals known to the State of California to cause cancer, birth defects, or reproductive harm. This Notice is provided in accordance with California's Proposition 65. See www.garmin.com/prop65 for more information.

Table of Contents

Getting Started

Unit Care

Cleaning – The case for the unit is constructed of high-quality material and does not require user maintenance other than cleaning. Clean the unit housing using a lightly-dampened cloth with a mild detergent solution and then wipe it dry. Avoid chemical cleaners and solvents that may damage plastic components. Do not apply cleaner to the electrical contacts on the front of the unit.

Storage – Do not store the GXM 40 where exposure to extreme temperatures may occur, as permanent damage may result.

Servicing Your Unit

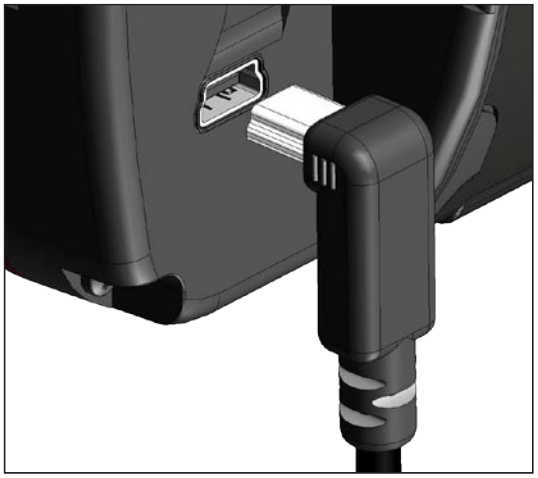
The Garmin GXM 40 has no user-serviceable parts. Should you ever encounter a problem with your unit, take it to an authorized Garmin dealer for repairs, or contact Garmin Product Support at 1-800-800-1020.

The GXM 40 is fastened shut with screws. Any attempt to open the case to change or modify the unit in any way voids your warranty and may result in permanent damage to the equipment.

GXM 40 Radio Smart Antenna

Connecting the GXM 40 to a Garmin Unit

Position the GXM 40 where it has a clear view of the sky, for example, on the outside of the vehicle or behind the windshield of the vehicle. Connect the GXM 40 to the USB port on the Garmin unit.



Subscribing to XM Services

With the GXM 40 connected to your Garmin unit, contact XM Satellite Radio to activate your XM WX Weather service, your XM Radio service, or both.

Step 1: Check the system setup

Ensure that the GXM 40 is connected to your Garmin unit.

Step 2: Turn on your system

Place the GXM 40 where it has a clear view of the sky and turn on your Garmin unit. This automatically turns on the GXM 40.

Step 3: Set up the XM account

Ensure that your XM WX Weather ID and your XM Radio ID are readily available. Contact XM Satellite Radio by phone at **(800) 985-9200**. After receiving the required information from you, the XM representative activates the account and sends out an XM signal to activate the GXM 40. You can also activate your account by visiting https://xmro-secure.xmradio.com/listenercare/login2.xm.

For answers to other XM questions, call the above number or visit www.xmwxweather.com.

Step 4: Confirm all components of your service package

XM WX Weather: Keep your Garmin unit turned on to ensure that you receive the XM signal. The XM signal is being received when the components of the selected service package are displayed in the **Weather Products** list. Do not turn off the Garmin unit until the name of the selected service package is displayed in the **Service Level** field.

XM Radio: Verify that channels 7, 9, 47, and 122 are being received. This indicates that all channels of the XM basic radio service are being received. If the XM WX Weather or the XM Radio service has not activated within an hour, call XM WX customer care at **(800) 985-9200** to verify the activation of your XM services. The customer-care representative can refresh the activation signal or you can do this yourself at www.xmradio.com/refresh by entering your radio ID where requested.

Step 5: Save the service package

After the service package name appears in the **Service Level** field, turn off the Garmin unit.

XM WX Weather Features

Displaying Weather Information

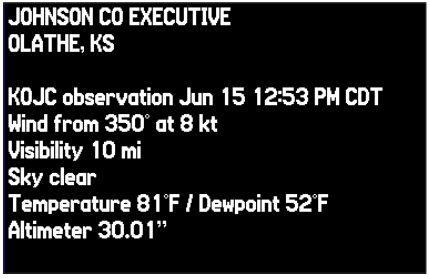
The GXM 40 receives XM WX Weather data and shows it on the Map and Weather pages of the Garmin unit. The weather data for each feature comes from reputable weather data centers such as the National Weather Service and the Hydrometerological Prediction Center. (See the XM WX Satellite Weather Web site at http://weather.xmradio.com/weather for more information.) Any weather feature can change in appearance or interpretation if the source that provides the information changes. XM WX Weather data is broadcast at set rates (see page 33 for all weather-related broadcast rates). For example, NEXRAD Radar data is broadcast at five-minute intervals. When the Garmin unit is turned on or when a new feature is selected, the GXM 40 has to receive new data before it can be displayed. You can experience a delay before weather data or a new feature appears on the map.

METAR

A METAR or **MET**eorological **A**eronautical **R**eport is an international code used for reporting weather observations. If METAR data is available for an airport, a color-coded flag is shown next to the airport. To view the METAR data, select the flag with the map pointer.

- *VFR (ceiling greater than 3000 ft. AGL and visibility greater than five miles)*
- *Marginal VFR (ceiling 1000–3000 ft. AGL and/or visibility three to five miles)*
- *IFR (ceiling 500 to below 1000 ft. AGL and/or visibility one mile to less than three miles)*
- *Low IFR (ceiling below 500 ft. AGL or visibility less than one mile)*
- *Undetermined*

METAR Selected With Map Pointer



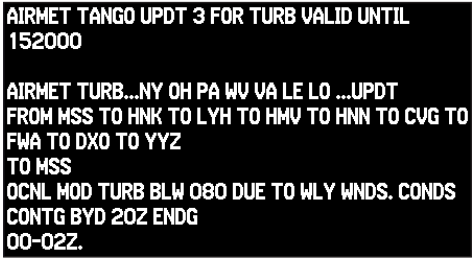
METAR Detailed Information

AIRMET

An AIRMET or **AIR**man's **MET**eorological Information can potentially affect all aircraft. This data can be especially helpful for pilots of light aircraft that have limited flight capability or instrumentation. An AIRMET must affect or be forecast to affect an area of at least 3,000 square miles at any one time. AIRMETs are routinely issued for six-hour periods and are amended as necessary due to changing weather conditions or the issuance or cancellation of a SIGMET (**SIG**nificant **MET**eorological Forecast). AIRMETs are displayed as an colored, dashed line.

- AIRMET Sierra (IFR) (purple): Ceilings less than 1,000 feet and/or visibility less than three miles affecting over 50% of the area at one time. Extensive mountain obscuration.
- AIRMET Tango (Turbulence) (orange): Moderate turbulence. Sustained surface winds of 30 knots or more at the surface.
- AIRMET Zulu (Icing) (blue): Moderate icing. Freezing levels.

AIRMET Selected With Map Pointer



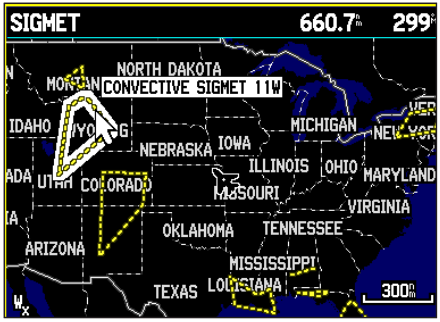
AIRMET Detailed Information

SIGMET

A SIGMET (**SIG**nificant **MET**eorological Forecast) advises of weather that is potentially hazardous to all aircraft. In the contiguous United States, the following items are covered: severe icing, severe or extreme turbulence, volcanic ash, dust storms, and sandstorms that lower visibility to less than three statute miles.

A Convective SIGMET is issued for the following conditions: thunderstorms, isolated severe thunderstorms, embedded thunderstorms, hail at the surface, and tornadoes.

A SIGMET is widespread and must affect or be forecast to affect an area of at least 3,000 square miles. SIGMETs are displayed as a yellow-dashed line. To view SIGMET data, select the SIGMET using the map pointer.



SIGMET Selected With Map Pointer

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CONVECTIVE SIGMET 11W

VALID UNTIL 2255Z
CO WY UT
FROM 50S BIL-40SSE DDY-60E DTA-50NNE JAC-50S
BIL
DVLPG AREA TS MOV FROM 24020KT. TOPS TO
FL380.

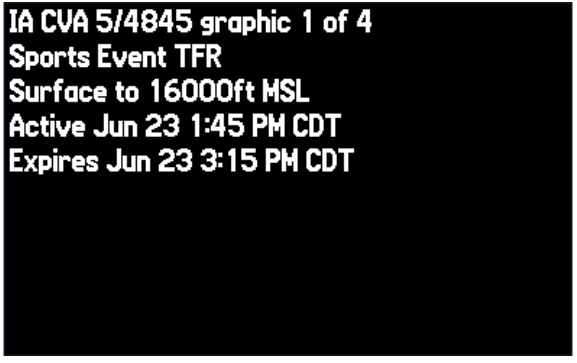
OUTLOOK VALID 152255-160255
```

SIGMET Detailed Information

TFR

A Temporary Flight Restriction (TFR) temporarily restricts all aircraft from entering the selected airspace unless a waiver has been issued. TFRs are routinely issued for occurrences such as sporting events, dignitary visits, military depots and forest fires. TFRs are represented as an area highlighted by red (active) or yellow (not yet active). To view information about the TFR, select it with the map pointer.

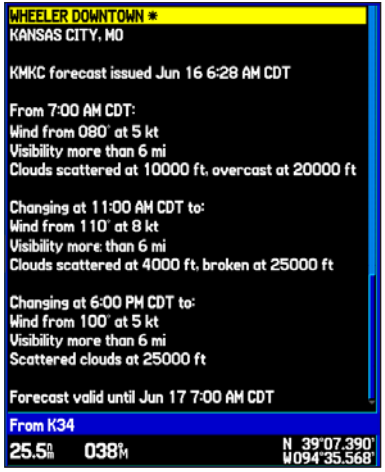
TFR Selected With Map Pointer



TFR Detailed Information

TAF

Terminal Aerodrome Forecasts are issued by the National Weather Service for pilots. They include 24-hour forecasts on wind, visibility, expected weather conditions, and wind shear.

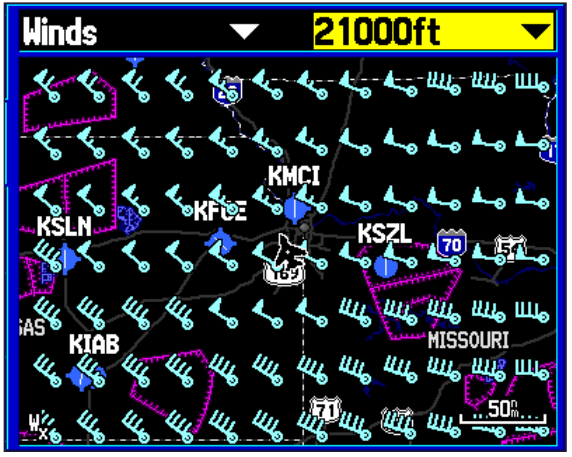


Terminal Aerodrome Forecast

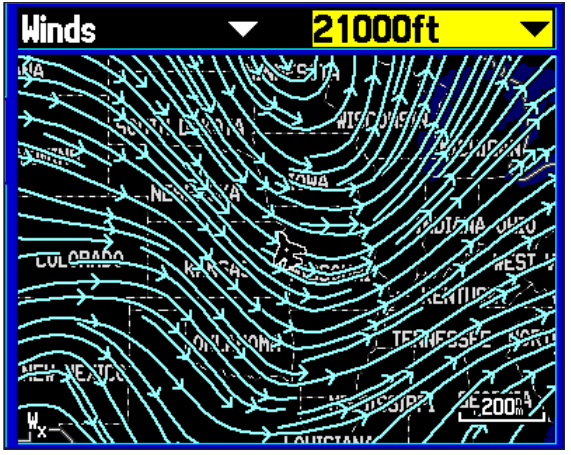
Winds

Winds Aloft

Aviation units display winds using wind barbs or a wind streamline depending on the zoom range of the map. Similar to marine and automotive units, the wind barbs indicate wind speed and direction. Arrows indicate the direction of the wind streamline.



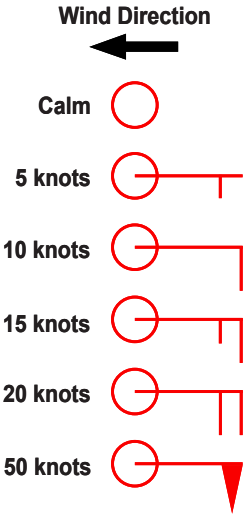
Wind Barbs

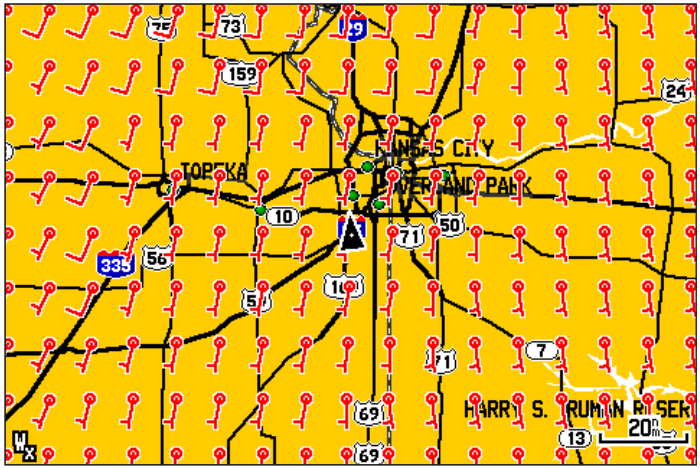


Wind Streamline

Surface Winds

Marine and automotive units show surface winds. The barb attached to the circle points in the direction of the wind. Wind speed is indicated by different flags attached to the barb.

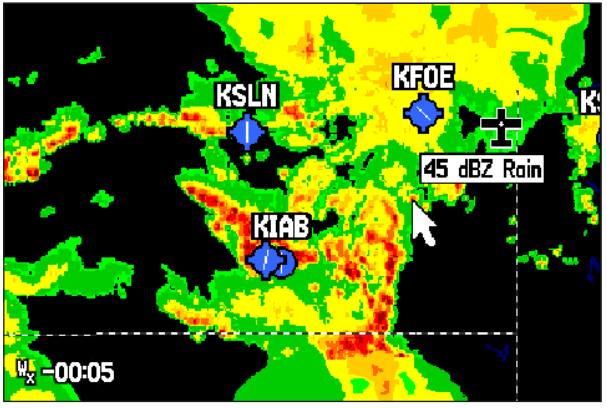




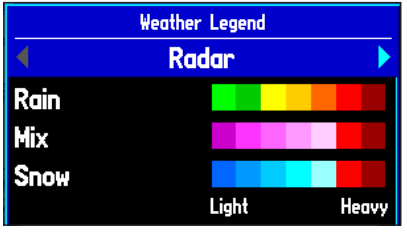
Surface Winds

NEXRAD Radar

NEXRAD or **NEX**t Generation Weather **RAD**ar displays precipitation, from very light rain and snow to strong thunderstorms, in varying shades and colors. The time stamp in the lower-left corner of the screen displays the elapsed time since the National Weather Service provided the information being displayed. NEXRAD can be displayed independently or with a variety of other weather information. For information on NEXRAD abnormalities, limitations, and intensity, see pages 34–35.



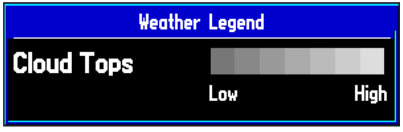
NEXRAD



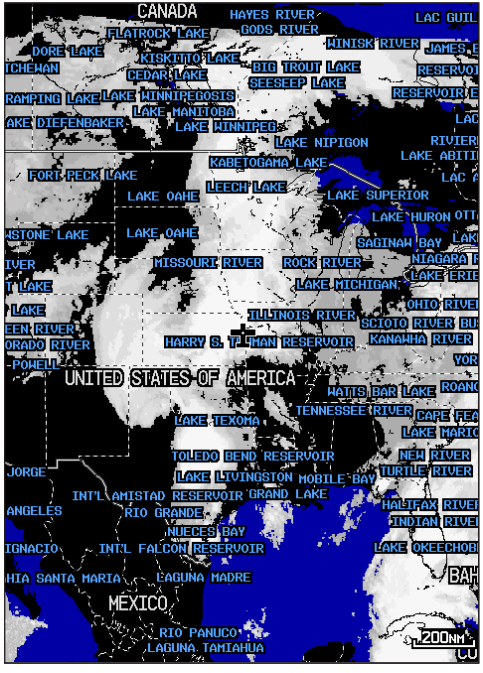
NEXRAD Legend

Satellite Mosaic

The Satellite Mosaic feature displays infrared composite images of cloud cover taken by geostationary weather satellites, providing up to seven levels of cloud cover.



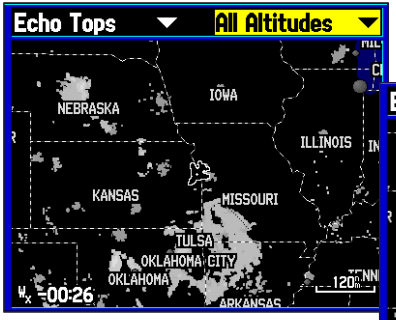
Cloud Tops Legend



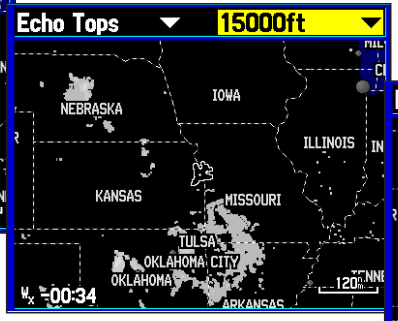
Satellite Mosaic

Echo Tops

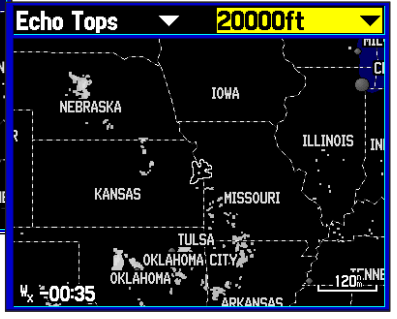
Echo Tops are derived from NEXRAD radar and indicate the highest altitude at which precipitation is falling. Echo Tops at or above the altitude you select are displayed in 5,000 foot increments up to 70,000 feet. Echo Tops can be helpful in determining the severity of thunderstorms, where higher altitudes equate to more intense thunderstorms.



Echo Tops for All Altitudes



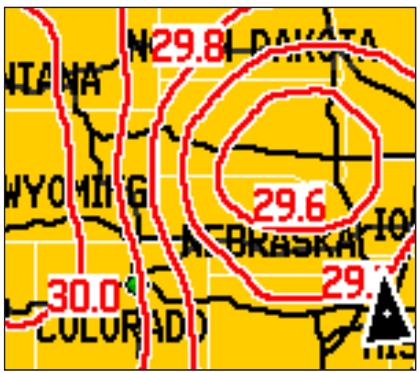
Echo Tops at 15,000 Ft.



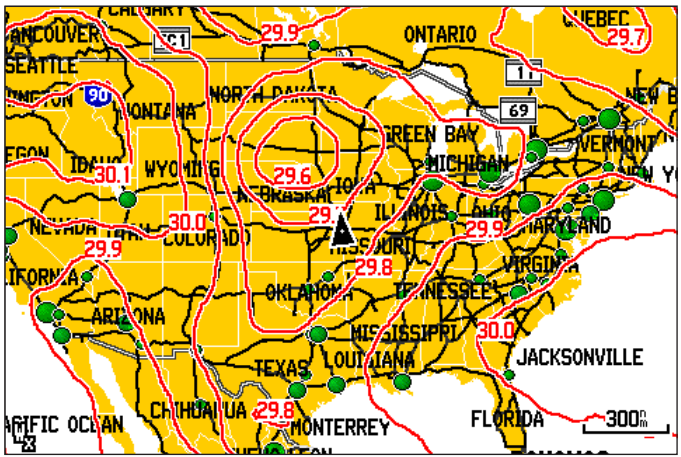
Echo Tops at 20,000 Ft.

Surface Pressure

This feature displays pressure isobars and pressure centers. The isobars connect points of equal pressure. Pressure readings can help determine weather and wind conditions in an area. High-pressure areas generally are associated with fair weather. Low-pressure areas generally are associated with clouds and the chance of precipitation. Isobars that are packed closely together show a strong pressure gradient. Strong pressure gradients are associated with areas of stronger winds. Pressure units can be displayed in millibars (mbar), inches of mercury (inHg), and hectopascals (hPa).



Strong Pressure Gradient

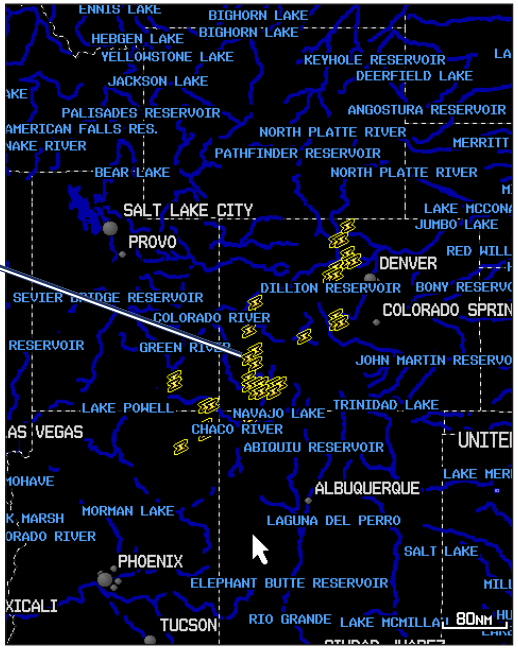


Pressure Isobars

Lightning

Lightning bolt icons represent lightning strikes, as shown in the image below. Lightning strikes appear on the map if strikes have been detected within the last seven minutes. The ground-based lightning detection network only detects cloud-to-ground lightning.

Lightning bolts indicate a cloud-to-ground lightning strike.



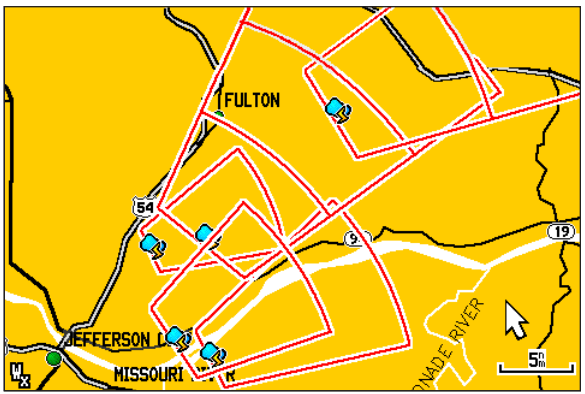
Lightning Strikes

Storm Cells

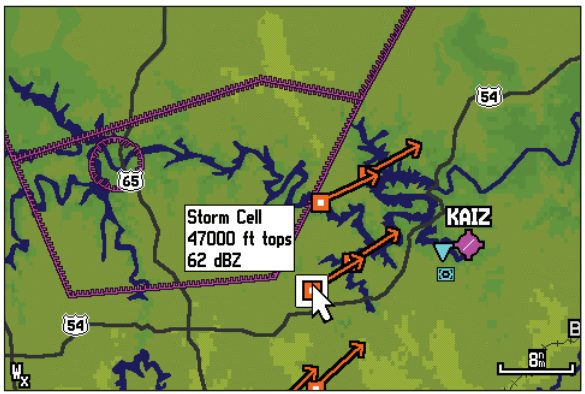
The Storm Cells feature displays storms and the projected path of storms in the immediate future.

Marine and automotive units also show the size of the storm cell. The direction in which the red cone is pointing (from the narrow end to the wide end) indicates the projected path of the storm cell. The red bars that span the cone indicate the projected area of the storm. Each bar represents 15 minutes.

Aviation units show the direction of the storm with an arrow. The tip of the arrow indicates the projected location of the storm in 15 minutes. Select the storm cell with the map pointer to view critical information about the storm.



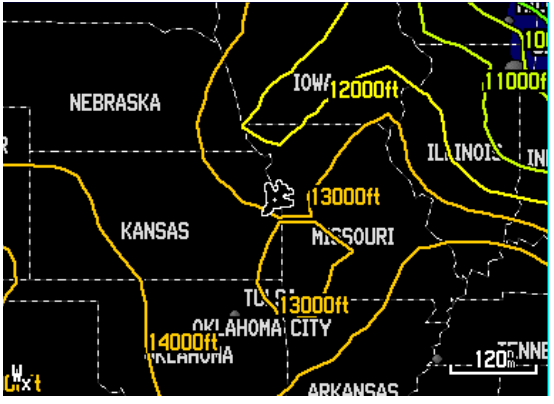
Automotive and Marine



Aviation

Freezing Level

Freezing Level shows contours for the lowest forecast altitude where icing conditions are likely to occur.

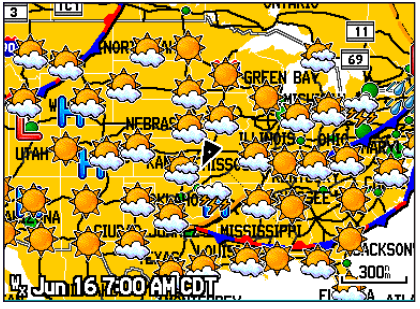


Freezing Level Contours

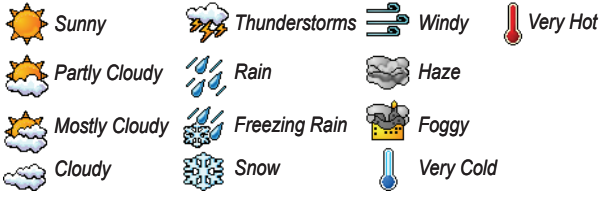
Forecast

Forecast displays fronts, high- and low-pressure centers, and city conditions. The forecast can be viewed in 12-hour increments for the next 48 hours.

Forecast Map



Forecast Legend

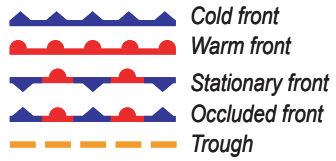


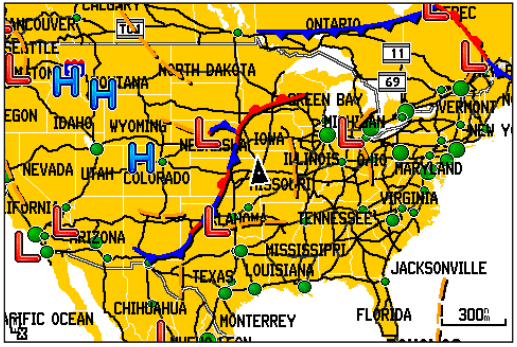
Fronts

The Fronts feature displays the lines indicating the leading edge of an air mass that is replacing an existing air mass. This feature also displays pressure centers. Pressure centers are represented by a large red “L” for low-pressure centers or a large blue “H” for high-pressure centers. Pressure centers represent an area where pressure is measured to be either the highest or the lowest relative to the surrounding area.

Indicates a low-pressure center. A low-pressure center is an area where the measured pressure is lowest relative to the surrounding area. Moving away from a low-pressure center in any horizontal direction results in increased pressure. Winds flow counterclockwise around low-pressure centers in North America.

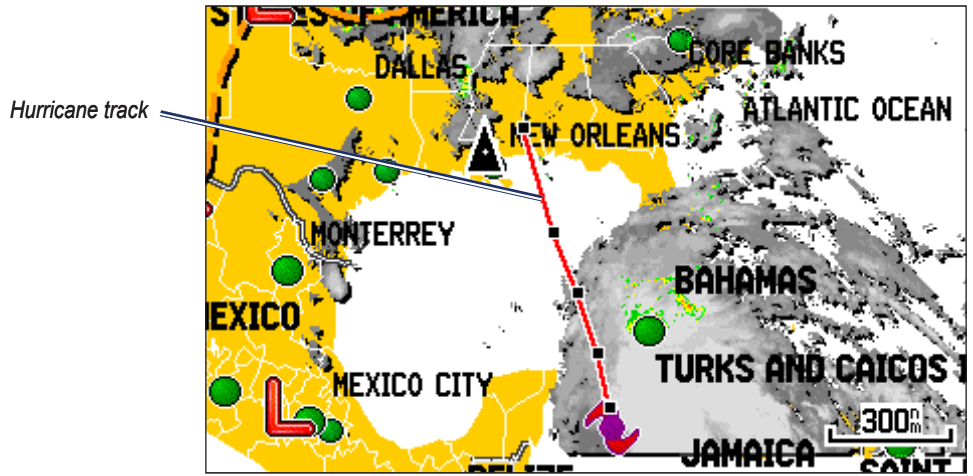
Indicates a high-pressure center. Similar to a low-pressure center, a high-pressure center is an area where the measured pressure is highest relative to the surrounding area. Moving away from a high-pressure center in any horizontal direction results in decreased pressure. Winds flow clockwise around high-pressure centers in North America.





Hurricanes

The Hurricanes feature shows the current position of a hurricane, a tropical storm, or a tropical depression, as well as its projected path (indicated by a red line). The darkened squares that appear along the red line indicate the projected locations received from the National Hurricane Center. The Center provides four forecasts at 12-hour intervals and a fifth forecast at a 24-hour interval. Each forecast indicates the projected location of the hurricane at different points along its projected path. Forecasted hurricane conditions at each projected location are also provided.



Hurricanes

County Warnings

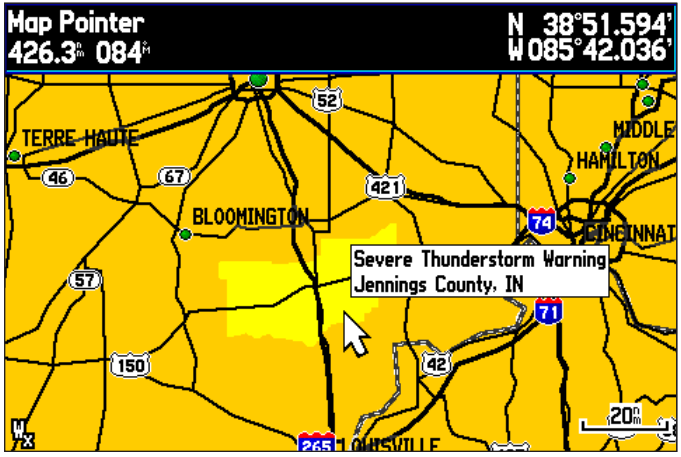
When the National Weather Service issues a weather warning for a county, the county is highlighted with the color corresponding to the warning. To view information about the warning, select the county with the map pointer.

Tornado warning

Severe thunderstorm warning

Flood warning

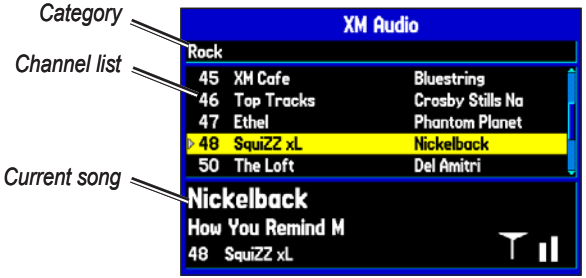
Flash flood warning



Severe Thunderstorm Warning

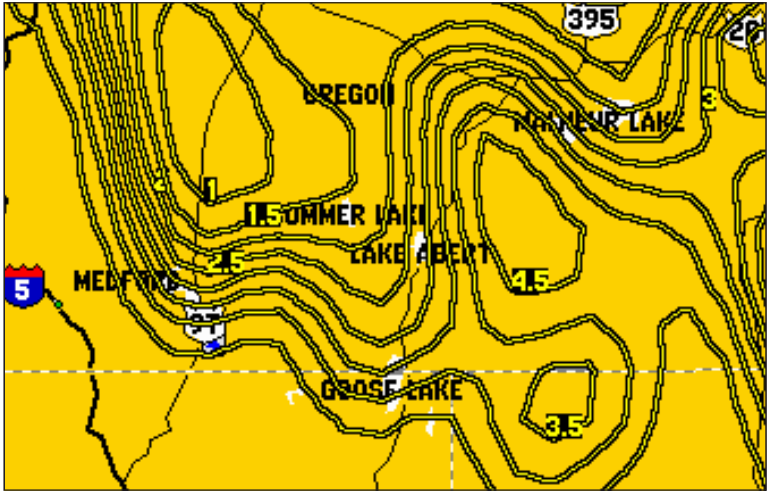
XM Radio

The XM Audio feature requires a subscription to XM Radio. (See page 7 for more information about subscribing to XM services.) You can scan channels by category and save them to a favorites list. You can turn the XM audio output on and off.

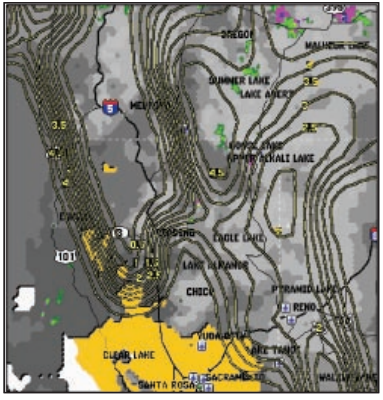


Visibility

Visibility is the forecasted maximum horizontal distance that can be seen at the surface. Contour lines on the Visibility display show the forecasted change in surface visibility. In the example below, visibility ranges from 1 mile to 4.5 miles.



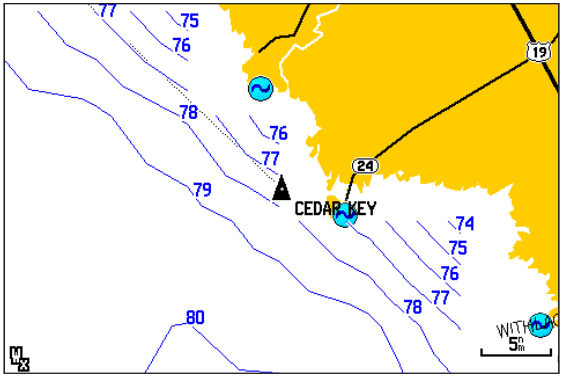
Visibility Contour Lines



This image displays NEXRAD Radar, Satellite Mosaic, and Visibility. Displaying multiple features may help to provide a clearer picture of the weather conditions in the area.

Water Temperature

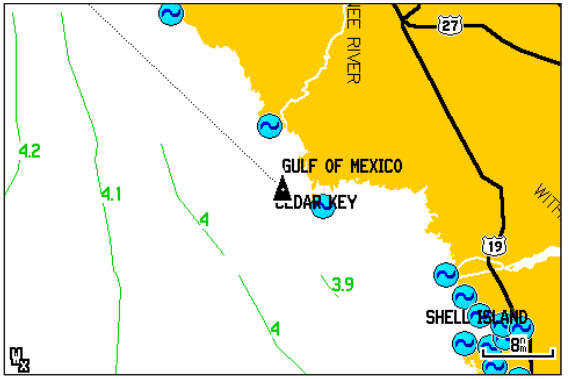
The Water Temperature feature displays the surface temperature of the water. Isotherm lines indicate the temperature breaks.



Water Temperature

Wave Period

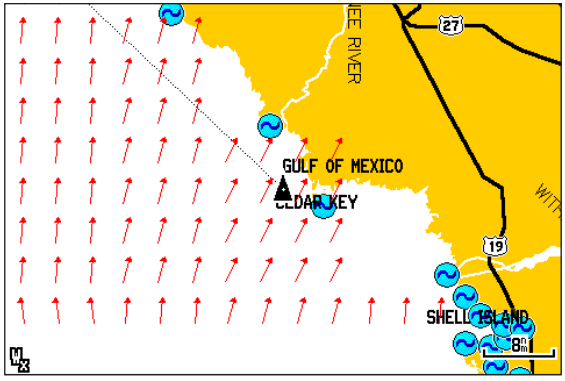
The Wave Period feature provides the time (in seconds) between successive waves.



Wave Period

Wave Direction

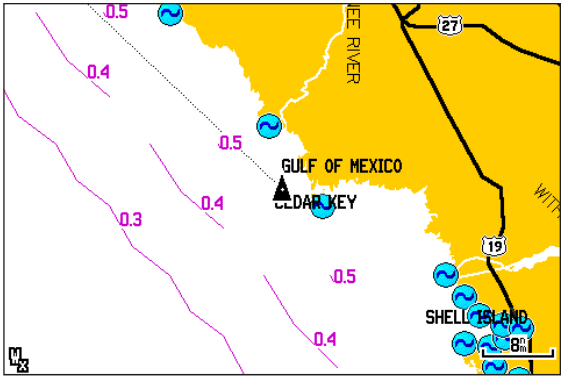
The Wave Direction feature shows the direction in which waves are moving, as indicated by the direction of the red arrow.



Wave Direction

Wave Height

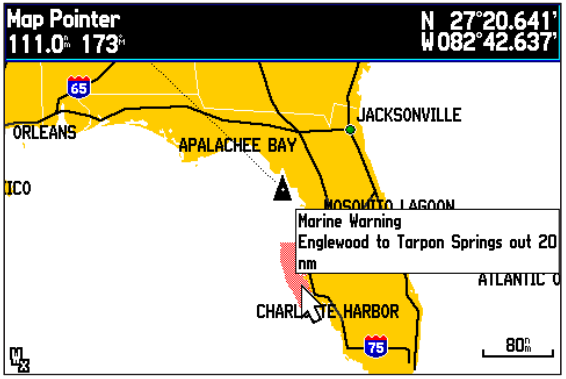
The Wave Height feature displays wave heights. The wave heights for an area are separated by contour lines.



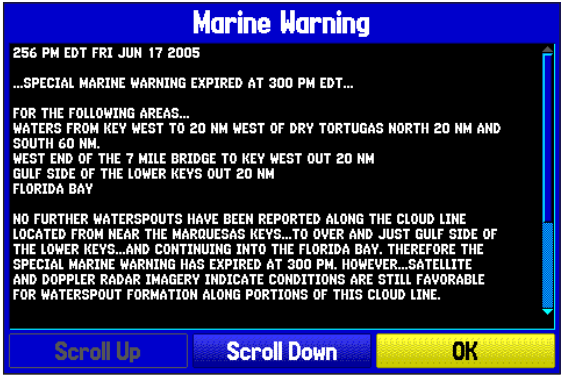
Wave Height

Marine Warnings

When a Marine Warning is issued, the area of the warning is highlighted in red. To view information about the warning, select the warning area with the map pointer.



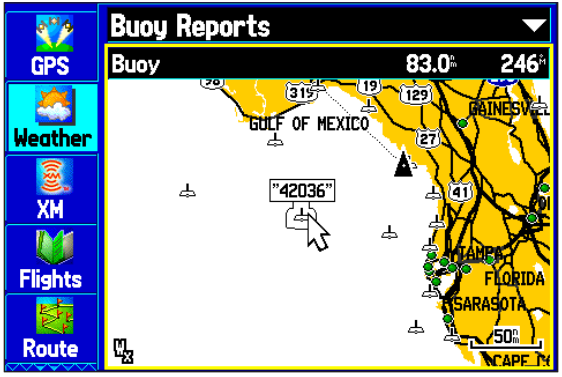
Marine Warnings



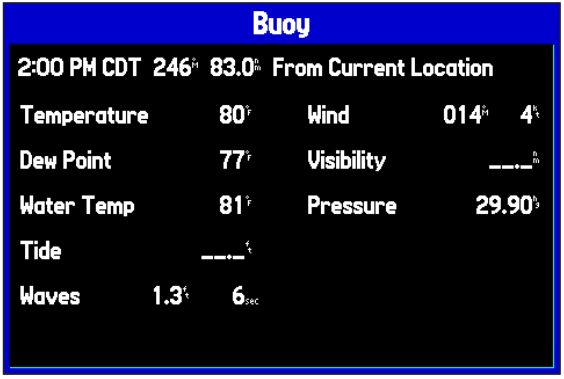
Marine Warning Detailed Information

Buoy Reports

Report readings are taken from buoys and coastal observation stations. These readings are used to determine air temperature, dew point, water temperature, tide, wave height and period, wind direction and speed, visibility, and barometric pressure.



Buoy Selected With Map Pointer



Buoy Report Detail

Appendix

GXM 40 Specifications

Physical Specifications

Size (W × H): 3.189 × 0.768 in. (81 × 19.5 mm)

Weight: 4.2 oz. (120 g)

Temperature Range: from -40˚F to 185˚F (from -40˚C to 85˚C)

Case: Fully-sealed, high-impact plastic

Waterproof: IEC 60529 IPX7 standard; 3.28 ft. (1 m) submersion for 30 minutes

Mount Thread Size: M3 × 0.5

Cable: Braided shield, 5 conductor, 28 AWG (0.081 mm^2), right-angle male mini-B connector

Power

Source: 4.5–5.5 Vdc

Usage: 1.25 W max

Performance

Dynamics: 999 knots, 6 *g*

Feature Broadcast Rates

Feature	Data Broadcast Frequency
NEXRAD Radar	5 min.
Satellite Mosaic	15 min.
Storm Cells	1.25 min.
Lightning	5 min.
Surface Winds	12 min.
Surface Pressure	12 min.
Hurricane Track	12 min.
Visibility Forecast	12 min.
Fronts	12 min.
Water Temperature	12 min.
Wave Height	12 min.
Wave Period	12 min.
Wave Direction	12 min.

Feature	Data Broadcast Frequency
Buoy Reports	12 min.
City Forecast	12 min.
County Warnings	5 min.
Marine Warnings	20 min.
METAR	12 min.
AIRMET	12 min.
SIGMET	12 min.
Echo Tops	7.5 min.
Winds Aloft	12 min.
TFR	12 min.
TAF	12 min.
Freezing Level	12 min.

NEXRAD Overview

NEXRAD Description

NEXRAD Radar is a Doppler radar system that has greatly improved the detection of meteorological events such as thunderstorms, tornadoes, and hurricanes. An extensive network of NEXRAD stations provides almost complete radar coverage of the continental United States, Alaska, and Hawaii, and the majority of Canada. The range of each NEXRAD is 124 nautical miles.

NEXRAD Abnormalities

There are possible abnormalities regarding displayed NEXRAD images. Some, but not all, of those include the following circumstances:

- Ground clutter
- Strobes and spurious radar data
- Sun strobes, when the radar antenna points directly at the sun
- Military aircraft deployment of metallic dust (chaff), which can cause alterations in radar scans
- Interference from buildings or mountains, which may cause shadows

NEXRAD Limitations

Certain limitations exist regarding the NEXRAD radar displays. Some, but not all, are listed here for your awareness:

- NEXRAD base reflectivity does not provide sufficient information to determine cloud layers or precipitation characteristics (for example, determining between hail and rain).
- NEXRAD base reflectivity is sampled at the minimum antenna elevation angle. An individual NEXRAD site cannot depict high altitude storms at close ranges, and has no information about storms directly over the site.

NEXRAD Intensity

Colors are used to identify the different NEXRAD echo intensities (reflectivity) measured in dBZ (decibels of Z). Reflectivity (designated by the letter Z) is the amount of transmitted power returned to the radar receiver. The dBZ values increase as returned-signal strength increases. Precipitation intensity is displayed using colors represented by the dBZ values listed in the dBZ Values/Precipitation Table.

Display Rain	Display Snow	dBZ	Rain (inches per hour)	Snow (inches per hour)	Remarks	
					Rain	Snow
		≤ -10	0.00 in.	0.00 in.		
		-5	0.00 in.	trace		
		0	0.00 in.	trace–0.05 in.		Very Light
		5	0.00 in.	trace–0.10 in.		Light
		10	0.00 in.–trace	0.01 in.	Light	Light
		15	0.01 in.	0.1–0.2 in.	Light	Light
		20	0.02 in.	0.2–0.3 in.	Light	Light
		25	0.05 in.	0.3–0.5 in.	Light	Light–Moderate
		30	0.09 in.	0.5–0.7 in.	Light–Moderate	Moderate
		35	0.24 in.	0.7–1.0 in.	Moderate	Heavy
		40	0.48 in.	1 in.+ or sleet	Heavy	Heavy
		45	1.25 in.	1 in.+ or sleet	Heavy	Heavy
		50	2.5 in.	sleet	Intense	
		55	5.7 in.	sleet	Extreme	
		55+	12.7 in.		Extreme	

dBZ Values/Precipitation Table

FCC Compliance

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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 may cause harmful interference to radio communications if not installed and used in accordance with the instructions. 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 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 that is on a different circuit from the GPS unit.
- Consult the dealer or an experienced radio/TV technician for help.

This product does not contain any user-serviceable parts. Repairs should only be made by an authorized Garmin service center. Unauthorized repairs or modifications could result in permanent damage to the equipment, and void your warranty and your authority to operate this device under Part 15 regulations.

Limited Warranty

This Garmin product is warranted to be free from defects in materials or workmanship for one year from the date of purchase. Within this period, Garmin will, at its sole option, repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the

customer for parts or labor, provided that the customer shall be responsible for any transportation cost. This warranty does not cover failures due to abuse, misuse, accident, or unauthorized alteration or repairs.

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