



© 2000 by UPS Aviation Technologies, Inc.
2345 Turner Rd., S.E.
Salem, OR 97302 U.S.A.

Phone 503.581.8101
800.525.6726
In Canada 800.654.3415
FAX 503.364.2138

<http://www.upsat.com>

Part #560-1026-00
January 2000

APOLLO

Model MX20

Multi-Function Display

User's Guide



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UPS Aviation Technologies, Inc.
2345 Turner Road S.E.
Salem, OR 97302

U.S.A. Toll Free	800.525.6726
Canada Toll Free	800.654.3415
International	503.391.3411
FAX	503.364.2138

Visit our web page at <http://www.upsat.com>

Send comments about this manual by e-mail to:
techpubs@at.ups.com

History of Revisions

Date	Software Version	Manual Revision
January 2000	1.0	Original Release

Ordering Information

To receive additional copies of the Apollo MX20 User's Guide, order part #560-1026-xx. The Apollo MX20 Installation Guide is part #560-1025-xx. The MX20 Quick Reference Guide is part #561-0263-xx.

About This Manual

Please take a few moments to review the various sections in this manual. Even if you are an experienced user of Multi-Function Displays, be sure to read our Getting Started section. This section provides the rules for successful use of the Apollo MX20. The rest of the manual contains important information that you can refer to as you need more detail on specific procedures or features. The MX20 advances the technology of Multi-Function Displays and uses new state-of-the-art features you will want to know about.

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Limitations on Reverse Engineering, Decompilation and Disassembly. You may not reverse engineer, decompile, or disassemble the MX20 or its operating system, except and only to the extent that such activity is expressly permitted by applicable law notwithstanding this limitation.

Separation of Components. The MX20 and its operating system are licensed as a single product. Its component parts may not be separated for use on more than one MX20.

Single Embedded System. The MX20 and its operating system are licensed with the MX20 as a single integrated product. The MX20 operating system may only be used with the MX20 as set forth in these licensing terms.

Welcome...

Welcome to a new era of aviation navigation. Once again, UPS Aviation Technologies, Inc. has set new standards in features and ease of use for the general aviation public. The Apollo MX20 Multi-Function Display provides a focal point for integrating many of your navigation needs in an easy to use and convenient package.

The MX20 presents a wealth of information on its six-inch diagonal, 640x480 pixel, color display. The many features are organized as distinct functions and are designed to closely mimic the traditional instruments used in the standard cockpit. Each function allows varying degrees of customization. The custom map function is customizable so you can create a display for almost any configuration you require. The other functions provide more limited levels of customization so that they retain the look and feel of the instruments they reflect.

The MX20 is capable of creating powerful overlay views where information from a variety of sources can be presented simultaneously in proper relationship to each other, thus greatly increasing situational awareness for the pilot.

You can be confident in knowing that you are the owner of the state-of-the-art in aviation and navigation. The MX20 architecture is designed to support full expansion for both software and hardware enhancements. This flexibility protects your investment and allows for the ease of adding new features. Our products are built to last and to allow the flexibility to meet your needs as they change in the future.

About This Manual

This manual may be used as a summary, a reference, and a learning tool. Information is provided about all of the functions available to the MX20. Your specific installation may not include all of these functions.

Take a few moments to familiarize yourself with the various sections in this manual. The Getting Started section gives an introduction to the controls, basic operation, and organization of the functions in your MX20. Be sure to read the Getting Started section to learn the rules for using the MX20. The Detailed Operation section is the reference for each of the functions in the MX20. Refer to the Detailed Operation section when you want to get into the details on every function and option along with step-by-step instructions.

Not every function is available in all software versions or installations. Check your Approved Flight Manual Supplement to verify the features that are available.

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Getting Started

This section explains how to get started using the MX20. Information in this section describes the controls, data card, display, and basic operation. After reading this section, go to the Detailed Operation section for expanded explanations for each feature.

Functions

The MX20 contains nine major separate functions for the display of information. The function names are shown as “smart” keys at the bottom of the display. The “smart” key is the combination of a label above a triangle key at the bottom of the display. The labels above the triangle keys change to reflect the choices available to you at the time for each function. Press the **FN** key to show the available functions. Press the “smart” key below the function label to go to the displayed function. While in each function, press the **MENU/ENTER** key to show the options for each function. The options are shown on the right side of the display. Press the **LINE SELECT** key to manipulate the options. Some options toggle on/off, while some are tri-state (three choices). The functions are:

- MSG - Message Log (See page 16 for details)
- MAP - Custom Map (See page 17 for details)
- IFR - IFR Chart (See page 28 for details)
- VFR - VFR Chart (See page 31 for details)
- TRAF - Traffic (ADS-B installations only)
(See page 33 for details)
- FPL - Flight Plan (See page 40 for details)
- TER - Terrain (See page 41 for details)
- LT - Lightning Strikes (See page 45 for details)
- SYS - System Information (See page 48 for details)

The Message Log displays information from the MX20 or reported to the MX20 by its external sensors. A flashing

MSG annunciator notifies you of a new message that should be viewed. The Custom Map function allows you to completely customize the displayed map by overlaying selected information. The Custom Map can become “cluttered” if you choose every option, so use discretion. The IFR Chart function provides an IFR enroute style map on the display. The VFR Chart function provides a VFR sectional style map for the display. The Traffic function (when installed) shows nearby traffic and details about each target. The Flight Plan function provides details about your flight plan and each waypoint. The Terrain function shows a color coded map of terrain elevation in relation to your altitude. The Lightning function, when connected to the BF Goodrich WX500 Stormscope, controls the overlay of lightning strike information on the map displays. The System Information function lets you set general preferences, show software version information, and test the display.

Controls

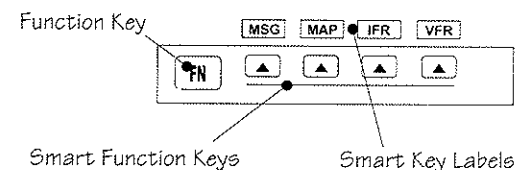
Power/Brightness



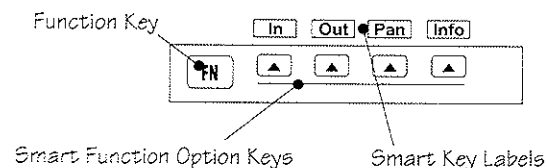
The power switch is located in the upper right corner of the MX20. Turn the power rotary knob clockwise past the detent to turn the power on. Turn the power knob fully counterclockwise to turn the power off. With the power knob pushed in, the brightness is set automatically according to ambient light by a photosensor. Pull the knob out and turn the knob to adjust the display brightness manually.

Function (FN)

The Function keys are made up of one dedicated key on the lower left side of the display and the four “smart” keys to the right of it. Press the function (**FN**) key repeatedly to scroll through the available functions. The functions will appear above the “smart” function keys in turquoise.



Use the **FN** key to display a list of the main functions, such as Map, IFR, Terrain, etc. Each time you press the **FN** key you will step through the list of functions. After you press one of the function “smart” keys at the bottom of the display, the function keys change to provide options to control the display related to the current function.



Change the function keys back to the function list by pressing the **FN** key.

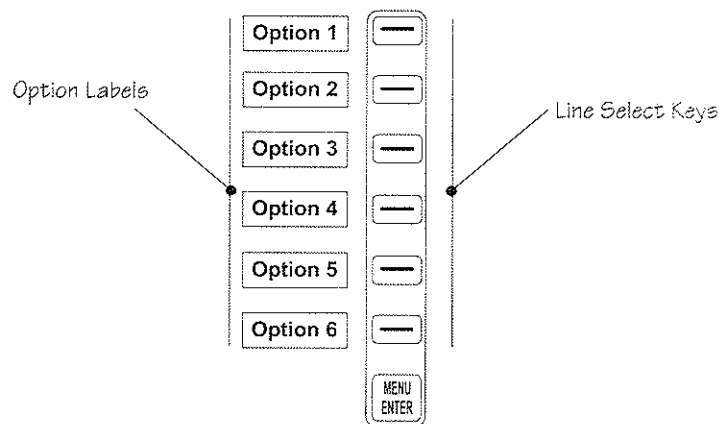
Menu/Enter

MENU
ENTER

The **MENU/ENTER** key is located on the bottom right corner of the MX20. Press the **MENU/ENTER** key to show a menu of options to modify the display of the current function. Press the **MENU/ENTER** key to hide the menu. If no action is taken, the menu will automatically extinguish in a few seconds.

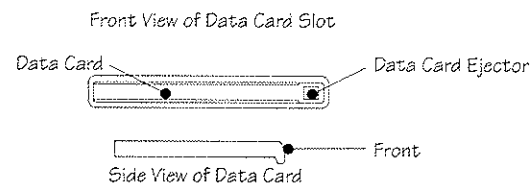
Line Selection

The Line Selection keys are on the right side of the MX20. Press the **MENU/ENTER** key to see the options for the current function. Press the **LINE SELECT** key next to each option to scroll through the choices for each option. Some options support tri-state choices, such as in Map mode. When you select a tri-state option, the option label will change with each key press between completely filled, partially filled, and empty.

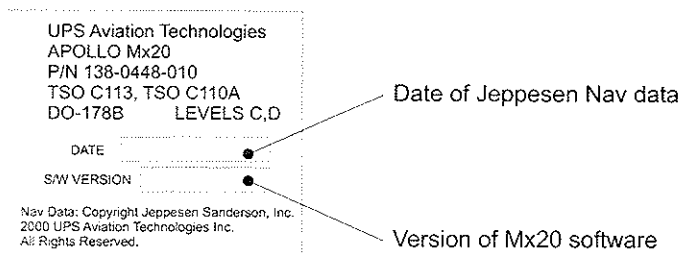


Data Card

The Map database and other information is stored on a data card. The use of a data card allows you to easily update information. Only change the data card when the power is turned off. Handle your data card carefully. Do not touch the connector edge of the data card. To eject the card, use a soft blunt object to press the data card ejector. Gently pull the card straight out of the slot. Insert a data card by pushing the card straight into the slot. When fully inserted, the data card and eject button will be flush and slightly recessed into the bezel.

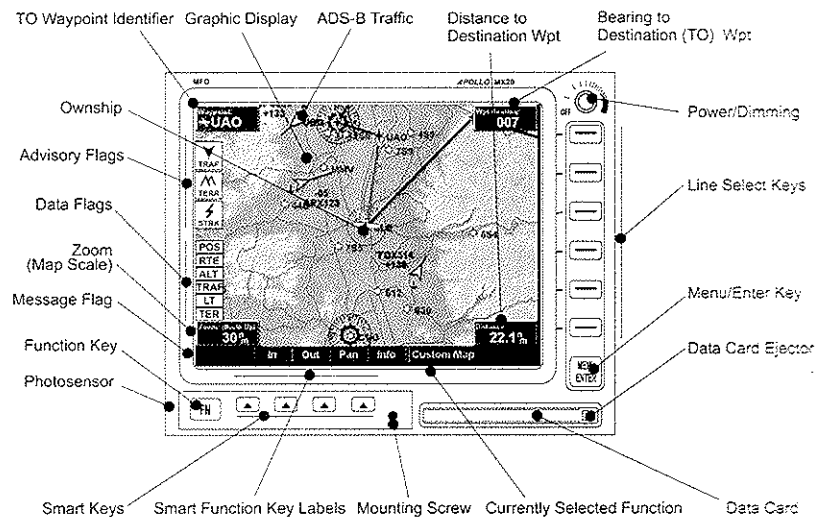


When contacting your dealer or the UPS Aviation Technologies technical services staff, eject the data card and write down the information shown on the label.



Display

The MX20 display provides text and graphic information to give a “picture” of your flight and surroundings. The display brightness may be set manually or allowed to automatically adjust to ambient light conditions. At the bottom of the display, labels above the function keys change to show the different choices for each function to allow access to commonly used actions. A typical Custom Map function display is shown below. See page 52 for details on display care.



The MX20 will go into a pre-heat mode for a short period of time on start-up. During the pre-heat mode, the display will remain dark. The pre-heat mode is designed to extend the life of the LCD backlight.

Annunciations

Advisory flags, data flags, and messages appear on the display to give information about the status of the MX20 or to provide operating information.

Advisory Flags

Annunciations will appear on the upper left side of the display to provide advisories for Traffic, Terrain, and Lightning. Advisory information is monitored and displayed regardless of the selected function. Advisory flags will flash for approximately 10 seconds when they first appear and then turn solid while they are still valid.

Traffic



The Traffic advisory flag will appear on the left side of the display when traffic is reported to be within ± 2000 feet of your altitude and 5 nm of your location. The Traffic advisory and Traffic functions are only available when the ADS-B system is installed.

Terrain



The Terrain advisory flag will appear on the left side of the display when the terrain surface altitude is within approximately 500 feet of your altitude and within approximately two minutes of flight in any direction.

Lightning



The Lightning advisory flag will show on the left side of the display when the WX500 sends an indication that lightning has been detected near your location. See the WX500 manual for details about range and other capabilities.

Data Flags

Data flags appear on the left side of the display to notify you when there is a loss of reported information. The data usually displayed, such as lightning or nearby terrain, may still exist; but may not be displayed for technical reasons. For instance, when the amber TRAF data flag appears it means that the MX20 is not receiving Traffic information. Traffic may be present, but will not be displayed.

POS	No valid position information is available from the source. Do not expect a valid position representation on the maps. The Ownship symbol will have an "X" through it.
RTE	No valid route (flight plan) is available from the external navigation source. Route (flight plan) information will not be shown on the maps.
ALT	No valid altitude information is available from the external source. Altitude related functions will not operate, such as terrain awareness.
TRAF	No traffic information is received from the external source. Traffic will not be displayed. Your position information will not be broadcast in ADS-B capable systems.
LT	No valid lightning detection information is being received from the external source. Strike and cell information will not be displayed.
TER	Terrain coverage is not available for some part of the terrain advisory coverage area. Terrain advisories may not be provided.

Message Flag

MSG

The Message flag will appear on the lower left side of the display when a new message is posted. Go to the Message function to view the information about the operation or status of the MX20.

Basic Operation

Use the following items to get a basic feel for the operation of the MX20. The basic steps for using any of the separate functions of the MX20 are:

- Turn the power on.
- Adjust the brightness or set it to automatic.
- Check that all tests pass on the Start Up screen.
- Press the **FN** key to view available functions. Each press of the **FN** key will step through the lists of functions.
- Press the key below the function label to select the desired function.
- Confirm or enter the current barometric pressure
- Press the **MENU/ENTER** key to display available options.
- Press the **LINE SELECT** key next to the displayed option to choose desired capabilities. Some options use multiple key presses for different states for the option. Press the **MENU/ENTER** key again to extinguish the option display.
- Refer to the Detailed Operation section for more details on each function.

Power On

Turn the power rotary knob clockwise past the detent to turn the power on. The MX20 will progress through a series of startup screens. The final startup screen shows System Information and the results of the Self-Test.

Pre-Heat Mode

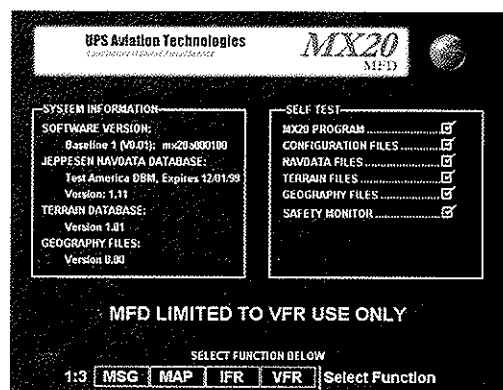
The MX20 will go into a pre-heat mode for a short period of time on start-up. During the pre-heat mode, the display will remain dark. The pre-heat mode is designed to extend the life of the LCD backlight.

Brightness

With the Power knob pulled out, turn the knob in each direction to adjust the display brightness manually. Manual brightness mode may be selected to adjust the display for difficult lighting conditions. Push the knob in, and the brightness is adjusted automatically according to the ambient light. When the brightness is set automatically, the display will not dim below a pre-defined level.

Start Up Screen

The Start Up screen is displayed while the MX20 goes through its initialization and testing routines. System information is shown that provides the MX20 software and database versions. The results of the self test are shown. A check mark shows that the test passed. If any of the Self-Tests fail (red "x"), contact your dealer or the factory (see page 52).



Confirm Current Baro Correction

A window that displays the current barometric value and asks you to verify the current value or enter a new value. This window will appear at startup and then every 30 minutes. Press **BARO +** to increase the value. Press **BARO -** to decrease the value. Press **OK** to confirm the existing values or to accept changes you have just entered. Press **CANCEL** to exit without making any changes.



Function Selection

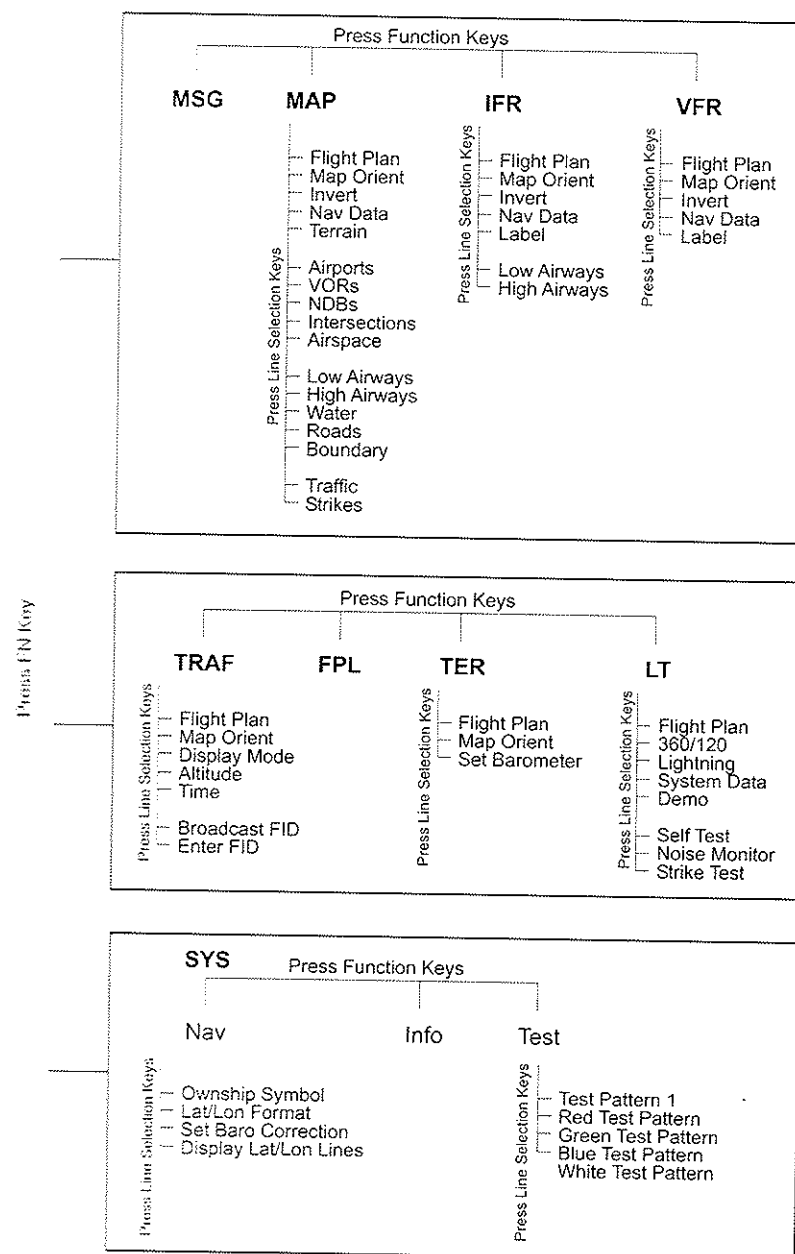
Press the **FN** key view the different Functions. The functions are shown above the function "smart" keys on the lower part of the display in green. Press the function key under the function label to activate that function. The labels above the function key will change to reflect the custom "smart" controls for that function. All described functions may not be available in each installation.

Function	Description
MSG	Message Log Function
MAP	Custom Map Function
IFR	IFR En Route Map
VFR	VFR Sectional Map
TRAF	ADS-B Traffic reporting
FPL	Flight Plan information
TER	Terrain Depiction
LT	Lightning detection and reporting
SYS	System Information

Options Menu

Most functions have a number of options available. Press the **MENU/ENTER** key to see the options for the current function. You change an option by pressing one of the Line Selection keys that are to the right of the displayed option. Many options have more than one choice. Press the same **LINE SELECT** key repeatedly to select the available choices. Some functions have several pages of options. The lower **LINE SELECT** key will allow you to reach the Next Page when multiple pages are available. Press the **MENU/ENTER** key a second time to remove the menu from view or wait a few seconds for the options to automatically extinguish.

Summary



Detailed Operation

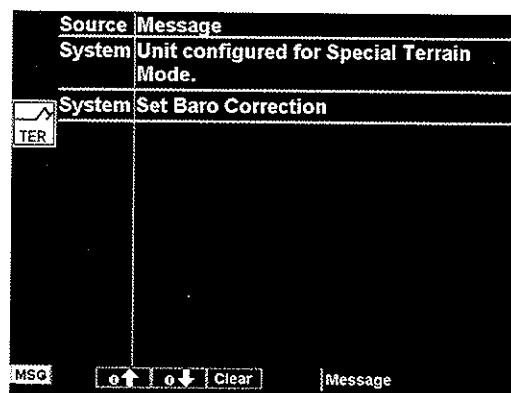
This section describes each operating function and the options available in each function. Each function operates independently. The Function “smart” keys and Line Selection keys are customized for each function and will appear while that function is selected. The functions are described in the order that they appear. A description of each function will be followed by an explanation of how the function “smart” keys operate for the function and then each menu option as selected by the Line Selection keys. All described functions may not be available in your particular installation. See your Airplane Flight Manual supplement for the details on your individual installation.

Message Log (MSG) Function

The Message function displays information about the status of the MX20. Messages may be logged by either the MX20 internal system or by one of the external sensors.

MSG

The amber MSG flag will flash until the message is viewed. The MSG flag will remain in view while any messages remain in the message log. New messages that have not been viewed will be highlighted as bold text.



1. Press **FN** until you see the **MSG** function key.
2. Press the **MSG** key.
3. Use the **UP/DOWN** arrow "smart" keys to move to additional messages, if more than one page of messages exist.
4. Press **CLEAR** to remove the stored messages.

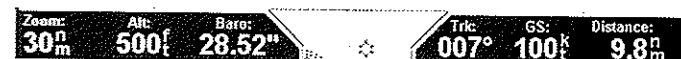
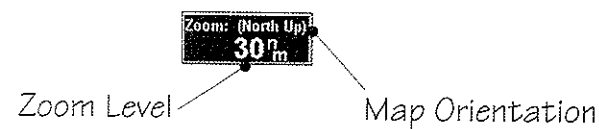
Custom Map (MAP) Function

The Custom Map function provides a graphic display of map features in relation to the aircraft location to help improve your situational awareness. The custom map function is unique in that it has the ability to selectively "overlay" all available types of information onto a single display. You can customize the map display by overlaying information selected from a menu of options. Press the **MENU** key to display a list of options on the right side of the screen. Press the **LINE SELECT** key next to the displayed option. Repeated presses of the **LINE SELECT** key will scroll through the available selections for each option.

The "smart" keys at the bottom of the display over the function keys control the map scale by zooming in or out, moving the map view around with the Pan feature, and viewing Info about the current destination waypoint.

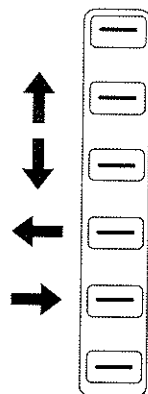
Map Scale

The In and Out function keys control the map scale by zooming in and out. You can zoom in to 0.25 nm and zoom out to 250 nm. The scale distance is measured from the location of your aircraft symbol to the top of the screen. The Map Scale is shown in the lower left corner of the screen. The map orientation appears above the map scale on one of the three Nav Data options.



Pan

The Pan keys are used to move the display around so you can see beyond the initial boundaries of the screen. The **PAN** function key is one of the “smart” keys available at the bottom of the screen. When you select the Pan function, four “arrow” keys appear on the right side of the screen next to the **LINE SELECT** keys.



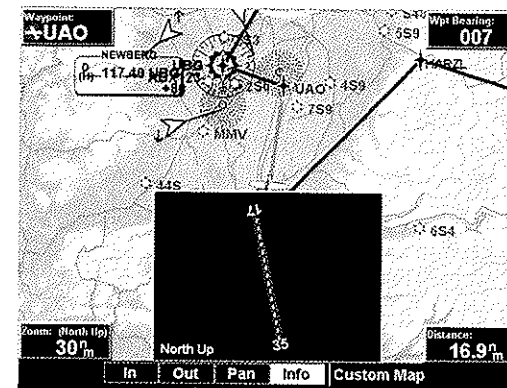
Move the map in the desired direction by pressing the **LINE SELECT** key next to the arrow that shows you want the map to move. Press the **PAN** key again to exit the Pan mode. While panning, a green reference line is drawn from the center of the viewed area back to your current position.

Info

Press the **INFO** “smart” key to view information about the waypoint.



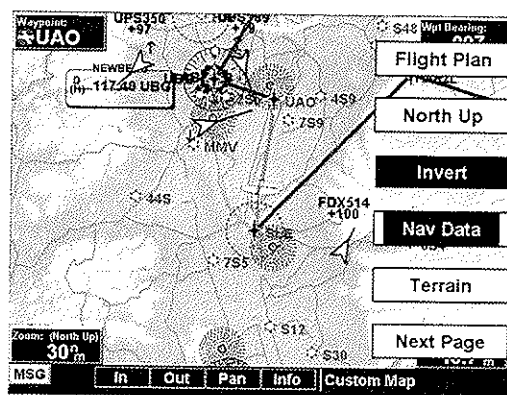
Each press of the **INFO** key will step through the available information for the current destination waypoint. The number of pages depends on the amount of information about the destination waypoint.



Runway diagrams of airports will be displayed in the same orientation as the main map (i.e., North Up, Track Up, or DTK Up).

Custom Map Menu Option Page 1

The first option page of the Custom Map function lets you select options for the choices of Flight Plan, map orientation, Invert, Nav Data, and Terrain. The last option selection takes you to the next page of options. The options have tri-state choices that are also shown visually. When the option is clear, the icons and labels are not displayed. When the option is solid, icons and labels are all shown. When the option box is partially filled, only the icons are shown.



Flight Plan

The Flight Plan option controls the display of the Flight Plan course line. Pressing the **LINE SELECT** key next to the Flight Plan option toggles between showing or not showing the Flight Plan route line.

Map Orientation

This option controls the screen orientation in reference to the aircraft symbol. You may select from North Up, Track Up, Track Up Arc, Track Up 360, and Desired Track Up. **North Up** sets magnetic north as the top of the screen. **Track Up** sets the current track of the aircraft as the top of the screen. **Track Up Arc** sets the current track of the aircraft and a 120° arc at the top of the screen. **Track Up 360** sets the current track of the aircraft at the top of the

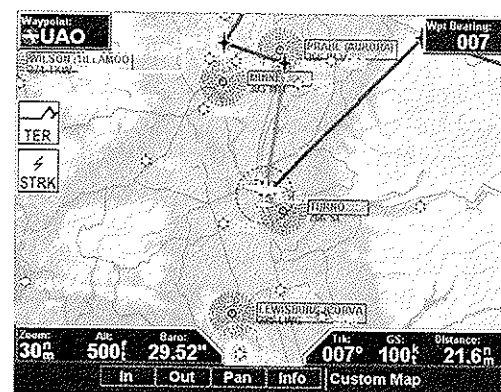
screen and a 360° ring with the aircraft symbol position in the center. **Desired Track Up** sets the desired track to the next waypoint as the top of the screen. Press the **LINE SELECT** key next to this option to scroll through the options.

Invert

The Invert option changes the display of text and the background color. Depending on which layers are turned on, inverting the display may help readability for the current lighting conditions. For instance, when terrain is shown, the Invert option switches between white and black text. When terrain is turned off, the Invert option switches between a white background with black text and a black background with white text.

Nav Data

The Nav Data option allows to control the display of navigation data on the display. Subsequent presses of the **LINE SELECT** key for this option provides choices of no nav data, nav data in the corners (waypoint, bearing, zoom, and distance), or full nav data. The full nav data option includes the information in the four corners selection plus altitude, barometer setting, track, and ground speed.



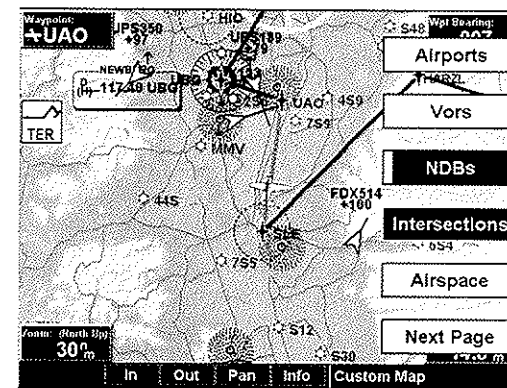
Terrain

The Terrain option allows you select the display of topographical features. Pressing the **LINE SELECT** key next to the Terrain option toggles between sectional (absolute), terrain awareness (relative), or no display of topographical features. The sectional (absolute) display shows a display similar to a sectional map. The terrain awareness (absolute) display shows a color coded view where the colors relate to terrain elevation relative to your altitude. For more information about the terrain awareness option, see the Terrain function section on page 41. When you turn the Terrain feature off, the background is either black or white depending on your selection in the Invert option. When no terrain data is available, the missing areas will be shown in light blue. Water will not be shown in relative mode.

Press the Next Page **LINE SELECT** key to display the next page of menu items.

Custom Map Menu Option Page 2

The second option page of the Custom Map function lets you select options for the choices of Airports, VORs, NDBs, Intersections, and Airspace. The last option selection takes you to the next page of options.



Airports

The Airports option allows you to choose the level of airport information displayed on the Map screen. You may select the display of airport icon and identifier, icon only, or no information by each subsequent press of the Airport **LINE SELECT** option keys.

VORs

The VORs option allows you to choose the type of VOR information displayed on the Map screen. You may select the display of VOR icon and identifier, icon only, or no information by each subsequent press of the VOR **LINE SELECT** key.

NDBs

The NDBs option allows you to choose the type of NDB information displayed on the Map screen. You may select the display of NDB icon and identifier, icon only, or no information by each subsequent press of the NDB **LINE SELECT** key.

Intersections

The Intersections option allows you to choose the type of Intersection information displayed on the Map screen. You may select the display of the Intersection icon and identifier, icon only, or no information by each subsequent press of the Intersection **LINE SELECT** key.

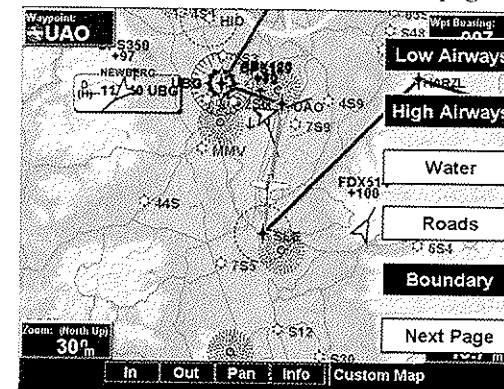
Airspace

The Airspace option allows you to control the display of airspaces. Pressing the **LINE SELECT** key next to Airspace toggles between either the display of airspace boundaries and altitude information, boundaries alone, or no display of airspaces.

Press the Next Page **LINE SELECT** key to display the next page of menu items.

Custom Map Menu Option Page 3

The third option page of the Custom Map function lets you select options for the choices of Low Airways, High Airways, Water, Roads, and political boundaries. The last option selection takes you to the next page of options.



Low Airways

The Low Airways option allows you to control the display of Low Airways. Pressing the **LINE SELECT** key next to Low Airways toggles between either the display of the airway and label, airway alone, or no display of Low Airways.

High Airways

The High Airways option allows you to control the display of High Airways. Pressing the **LINE SELECT** key next to High Airways toggles between either the display of the airway and label, airway alone, or no display of High Airways.

Water

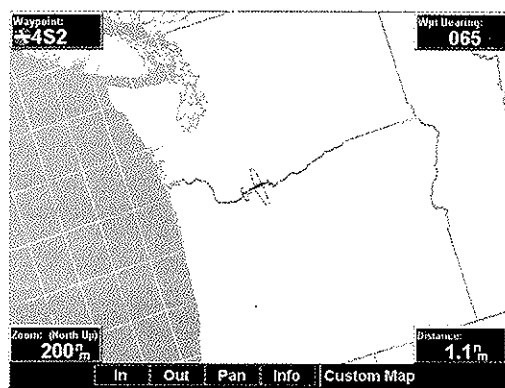
The Water option allows you to control the display of rivers and lakes. Pressing the **LINE SELECT** key next to Waters toggles between either the display or no display of the bodies of water.

Roads

The Roads option allows you to control the display of interstate and state highways. Pressing the **LINE SELECT** key next to Roads toggles between either the display or no display of the road features.

Boundary

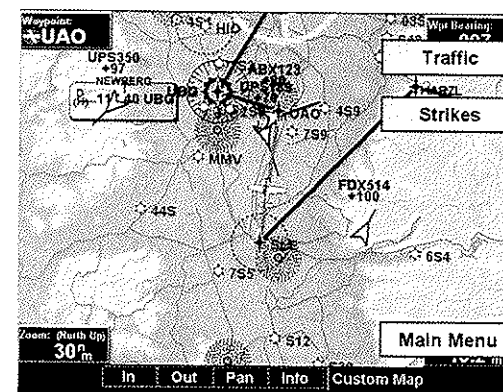
The Boundary option allows you to select the display of political boundaries on the Map displays.



Press the Next Page **LINE SELECT** key to display the next page of menu items.

Custom Map Menu Option Page 4

The fourth option page of the Custom Map function lets you select options for choices of Traffic and Lightning Strikes.



Traffic

The Traffic option turns the display of traffic information on or off. Traffic information includes the location and identifier of a reporting aircraft, its direction of travel, elevation, and the estimated path for the selected time interval. See the section on the Traffic mode for more details on how traffic information is used.

The Traffic function is not available in all software versions. Check your Approved Flight Manual Supplement to verify if this feature is available.

Strikes

The Strikes menu option controls the display of lightning strike information if the MX20 receives strike data from an external source, such as the WX500. Each reported lightning strike is shown as a red "x" on the display. Strikes are not shown if the zoom level is below 20 nm.

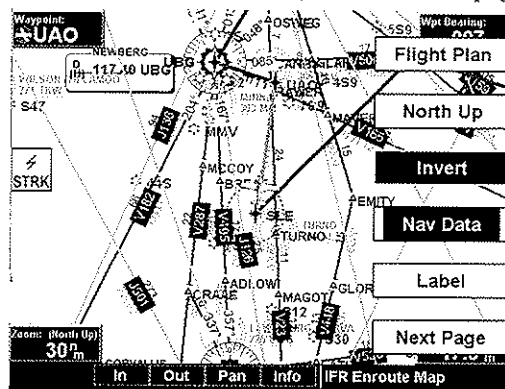
Press the Next Page **LINE SELECT** key to display the next page of menu items.

IFR Chart Function

The IFR Chart function shows an IFR en route style map for the display. The IFR display shows navigational aid information and the flight plan course line. The "smart" keys on the bottom of the screen control zooming in and out, panning, and the display of information on the current TO waypoint. The menu of options available for the IFR mode include Flight Plan, map orientation, Invert, and turning labels on or off.

IFR Option Page 1

The first option page of the IFR Chart function lets you select options for the choices of Flight Plan, Map Orientation, Invert display, Nav Data, and Labels. The last option selection takes you to the next page of options.



Flight Plan

The Flight Plan option controls the display of the Flight Plan course line. Pressing the **LINE SELECT** key next to the Flight Plan option toggles between showing and not showing the Flight Plan route line.

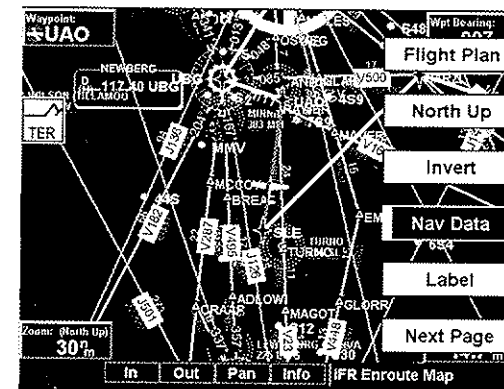
Map Orientation

This option controls the screen orientation in reference to the aircraft symbol. You may select from North Up, Track Up, Track Up Arc, Track Up 360, and Desired Track Up.

North Up sets magnetic north as the top of the screen. Track Up sets the current track of the aircraft as the top of the screen. Track Up Arc sets the current track of the aircraft and a 120° arc at the top of the screen. Track Up 360 sets the current track of the aircraft at the top of the screen and a 360° ring with the aircraft symbol position in the center. Desired Track Up sets the desired track to the next waypoint as the top of the screen. Press the **LINE SELECT** key next to this option to scroll through the options.

Invert

The Invert option changes the display of text and the background color. The Invert option switches between a white background with black text and a black background with white text.



Nav Data

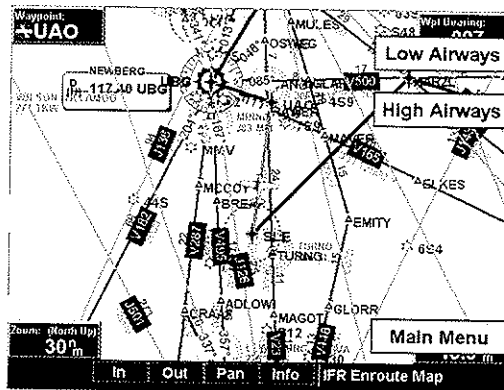
The Nav Data option allows you to control the display of navigation data on the Map displays. Subsequent presses of the **LINE SELECT** key for this option provides choices of no nav data, nav data in the corners (waypoint, bearing, zoom, and distance), or full nav data. The full nav data option includes the information in the four corners selection plus altitude, barometer setting, track, and ground speed.

Label

The **LABEL** key turns the labels for each item on or off for easy decluttering. When Labels are turned off, only the identifier for waypoints along the flight plan will remain in view when the flight plan is enabled.

IFR Option Page 2

The second option page of the IFR Chart function lets you select options for the choices of Low Airways, and High Airways. The last option selection takes you back to the first page of options.



Low Airways

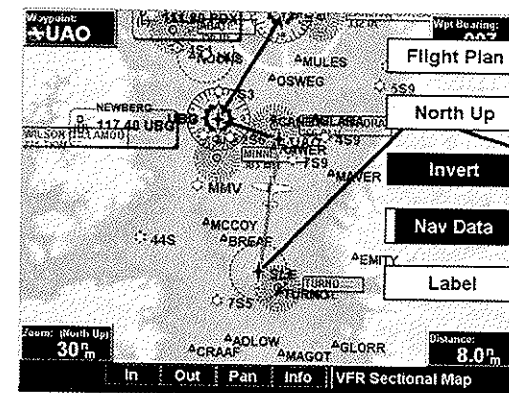
The Low Airways option allows you to control the display of Low Airways. Pressing the **LINE SELECT** key next to Low Airways toggles between either the display of the airway and label, airway alone, or no display of Low Airways.

High Airways

The High Airways option allows you to control the display of High Airways. Pressing the **LINE SELECT** key next to High Airways toggles between either the display of the airway and label, airway alone, or no display of High Airways.

VFR Chart Function

The VFR Chart function shows an VFR sectional style map for the display. Topographic features are shown. The VFR display shows navigational aid information and the flight plan course line. The "smart" keys on the bottom of the screen control zooming in and out, panning, and the display of information about the current TO waypoint. The options available for the VFR mode include Flight Plan, screen orientation, Invert, and turning labels on or off.



Flight Plan

The Flight Plan option controls the display of the Flight Plan course line. Pressing the **LINE SELECT** key next to the Flight Plan option toggles between showing and not showing the Flight Plan route line.

Map Orientation

This option controls the screen orientation in reference to the aircraft symbol. You may select from North Up, Track Up, Track Up Arc, Track Up 360, and Desired Track Up. North Up sets magnetic north as the top of the screen. Track Up sets the current track of the aircraft as the top of the screen. Track Up Arc sets the current track of the aircraft and a 120° arc at the top of the screen. Track Up

360 sets the current track of the aircraft at the top of the screen and a 360° ring with the aircraft symbol position in the center. **Desired Track Up** sets the desired track to the next waypoint as the top of the screen. Press the **LINE SELECT** key next to this option to scroll through the options.

Invert

The Invert option changes the text and background color. Inverting the display may help readability for the current lighting conditions and the color of the terrain in a given area.

Nav Data

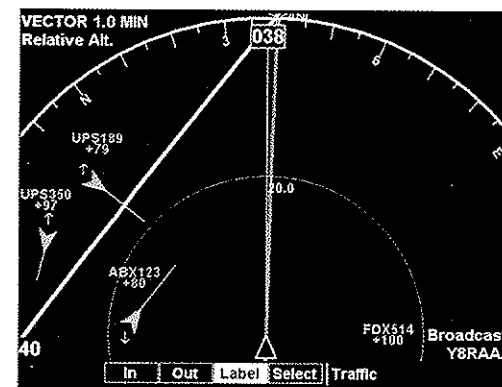
The Nav Data option allows to control the display of navigation data on the Map displays. Subsequent presses of the **LINE SELECT** key for this option provides choices of no nav data, nav data in the corners (waypoint, bearing, zoom, and distance), or full nav data. The full nav data option includes the information in the four corners selection plus altitude, barometer setting, track, and ground speed.

Label

The **LABEL** key turns the labels over each item of information on or off. When Labels are turned off, only the identifier for waypoints along the flight plan will remain in view when the flight plan is enabled.

Traffic Function

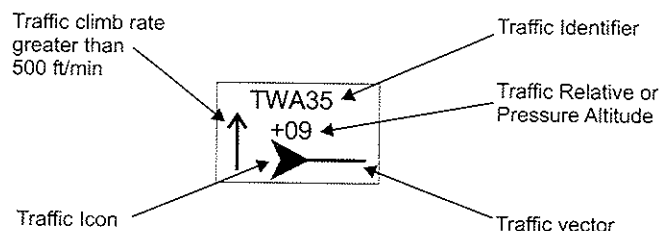
The Traffic Function allows you to view other traffic in the area. This screen can also show your flight plan. Traffic is shown in relationship to your aircraft. "Smart" keys allow you to zoom in and out, show traffic labels, and select an individual traffic target. The Traffic function is not available in all software versions. Check your Approved Flight Manual Supplement to verify if this feature is available.



Traffic Description

Your position (ownship symbol) is located at the tip of the empty triangle. The other traffic is shown as a large solid cyan (light blue) arrow pointing in its direction of travel. Next to the traffic arrow symbol is the traffic identifier, and altitude. Altitude is selected as either Pressure or

Relative and is noted in the upper left corner of the display. A small up or down arrow next to the identifier



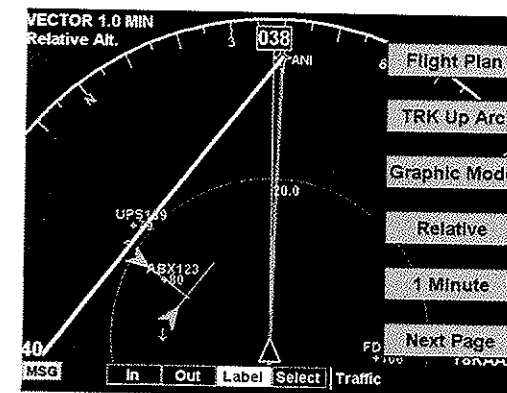
indicates that the traffic is climbing or descending at a rate of at least 500 feet per minute. The end of the vector line that extends beyond the point of the traffic arrow indicates where it will be at the end of the selected time interval. The currently selected time interval is indicated in the upper left corner of the display.

The controls at the bottom of the screen allow you to zoom in and out, turn the traffic identifiers on/off (Label), and to select each traffic target on the screen.

1. Press the **FN** key to reach the Function page showing the **TRAF** "smart" key.
2. Press **TRAF** (Traffic).
3. Press the **IN** key to zoom in. Press the **OUT** key to zoom out.
4. Press the **LABEL** key to turn the Identifier over each Traffic item on or off.
5. Press the **SELECT** key to step through each Traffic item that is shown on the display. When a target is selected, additional information about that target is shown in the upper right corner of the display. The selected target will be highlighted in green on the display.

Traffic Option Page 1

The first option page of the Traffic function lets you select options for the choices of Flight Plan, Traffic Map Orientation, Display mode, Altitude, and Time. The last option selection takes you to the next page of options.



Flight Plan

The Flight Plan option controls the display of the Flight Plan course line. Pressing the **LINE SELECT** key next to the Flight Plan option toggles between showing and not showing the Flight Plan route line.

Traffic Map Orientation

The Traffic Map Orientation option lets you choose between a 360-degree compass rose or an arc that covers about 90 degrees over the top of the display. Your aircraft position is shown by an empty white triangle near the center of the display. The Traffic function display is always in the Track Up mode.



Traffic Altitude Values

Altitudes shown next to the traffic icon are in hundreds of feet (09 = 900 feet). Altitude values shown in all other locations and displays are the actual values in feet (+100 = 100 feet).

Display Mode

The display mode lets you select either a graphic or text version of traffic information.

Graphic

The graphic traffic display shows your location, nearby traffic, and information about the traffic.

Text

The text traffic display shows the distance to the traffic item, flight id, category, position, speed, and altitude. The currently selected target is shown in green. The traffic list is sorted by distance with the closest traffic to your current position shown on the top line. The total number of targets tracked is shown in the upper left corner. Up to 12 of the nearest targets are listed.

Dist(NM)	FlightID	Cat.	Position	Speed(kts)	Altitude
9.7	FDX514	HWY	3 / 10	250	+100
15.6	UPS189	LRG	8 / 10	450	+79
15.7	ABX123	HWY	8 / 1	500	+80
42.4	UPS350	XLG	7 / 7	300	+97

MSG In Out Label Select Traffic

Altitude Option (Relative/Pressure)

The altitude option lets you select between relative and pressure altitude in hundreds of feet. The altitude option choice is shown on the upper left corner of the screen while in the graphic display option. When Relative Altitude is selected, the altitude value on the traffic is shown relative to your altitude. A "+" indicates the target is above your altitude. A "-" indicates the target is below your altitude. For instance, if a value of +80 is shown, the value means that the indicated traffic is 8000 feet above your altitude. When Pressure Altitude is selected, if a value of 121 is shown, the value means that the indicated traffic is at 12,100 feet pressure altitude. Pressure altitude does not show a + or -. Remember that pressure altitude can be substantially different than the baro-corrected altitude shown on the altimeter in your aircraft.

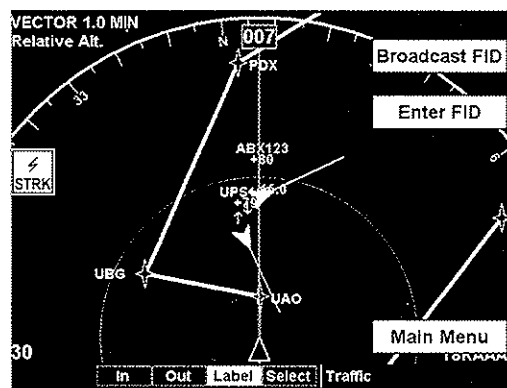
Time

The time interval option sets the amount of time to estimate the path and location of the traffic. The path of the traffic is shown by the line extending from the point on the end of the traffic arrow icon. The end of the line shows the point where the traffic item will be at the end of the selected time interval. Select 1, 1.5, 2-5, or 10 minutes.

Press the Main Menu **LINE SELECT** key to display the next page of menu items.

Traffic Option Page 2

The second option page of the Traffic function lets you select options for the choices of Broadcast ID and Flight ID Editing. The last option selection takes you back to the first page of options.

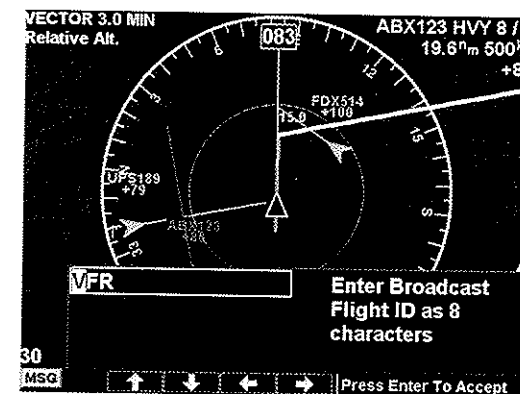


Broadcast Flight ID

The Broadcast Flight ID option lets you choose whether to broadcast your Flight ID or not (VFR anonymous). When the Flight ID is set to be broadcast, the ICAO address that was assigned during installation, as well as the user set Flight ID will be broadcast. When VFR Anonymous is selected, a randomly generated ICAO address is broadcast and the Flight ID will be sent as "VFR." When you press the Flight ID **LINE SELECT** key, the selection will toggle between "VFR" and the Flight ID. In the bottom right corner of the screen the Broadcast status will be shown.

Flight ID Editing

The Enter Flight ID option allows you to edit your broadcasted Flight ID. The Function "smart" keys at the bottom of the screen change to arrow keys. Use the **UP/DOWN** arrow keys to change the characters. Use the **LEFT/RIGHT** arrow keys to move between characters. Press the **MENU/ENTER** key to save the displayed Flight ID. The Flight ID is only sent when the Flight ID broadcast option is enabled.



Flight Plan (FPL) Function

Use the Flight Plan function to view details about your flight plan route. Press the **UP/DOWN** arrow “smart” keys to step through the waypoints in your flight plan. Press the **INFO** “smart” key to view information about the waypoint. The Flight Plan Function shows the Current Flight Plan that is active in the connected navigation source (i.e. GPS receiver). The Current To Waypoint box shows the current leg of the flight plan. The Current Flight Plan box shows all of the legs of your flight plan with the current leg indicated in magenta. Listed are each leg with the bearing and distance between the legs. The Current Nav Data box shows the aircraft current position in latitude and longitude, ground speed, and track. In the lower right corner information for the current waypoint is displayed in the Waypoint Info box. The Flight Plan function does not have any options.

Current To Waypoint		
Ident	Distance	Bearing
 UAO	19.9 nm	007°

Current Flight Plan			Current Nav Data	
Ident	Bearing	Dist(NM)	GS: 100 kt	N 44 56.94°
*  SLE	008°	22.5	TRK: 007°	W122 58.52°
*  UAO	288°	10.8	Waypoint Info UAO Airport 200ft AURORA STATE AURORA OR USA UNIC 122.70 CTAF 122.70 CLR 119.95 APPR 126.00	
*  UBG	030°	21.4		
*  PDX	064°	45.0		
*  4S2	084°	15.9		
*  DLS	162°	57.1		
*  S33	288°	55.0		
*  HARZL	225°	37.7		
*  SLE				




Info | Flight Plan

Runway diagrams of airports will be displayed in the same orientation as the main map (i.e., North Up, Track Up, or DTK Up).

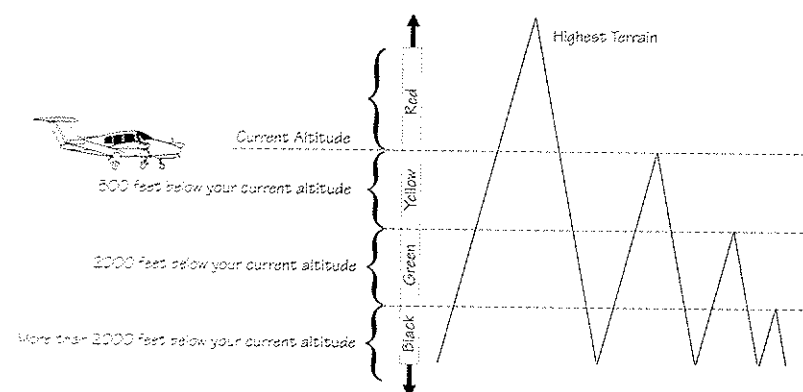
Terrain (TER) Function

The Terrain Function shows a map of the terrain in the area relative to your airplane's position and altitude. The altitude information comes from an external altitude encoder. The displayed altimeter setting has to be adjusted, or baro-corrected, just like the one in your aircraft's instrument panel.

The terrain screen has a 360-degree and a 90-degree display. Both screens will show terrain relative to your position. Colors used for terrain display are shown below.

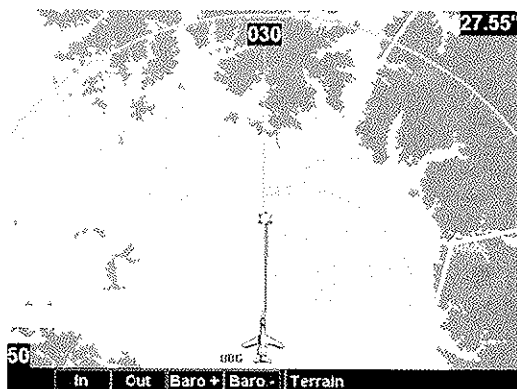
Note

The Terrain function shows you the general terrain elevations relative to your altitude and are advisory in nature. No individual obstructions are shown. Terrain is displayed from database information and may therefore potentially contain some degree of error. Do not use this information for surface or primary navigation.



Use the **IN** and **OUT** keys at the bottom of the screen to zoom in and zoom out. The zoom range is shown in the lower left corner of the screen.

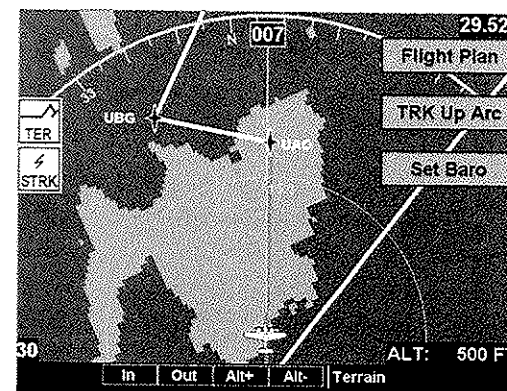
Use the **BARO+** and **BARO-** keys at the bottom of the screen to make minor adjustments to the barometric pressure value.



Color	Description
RED	Terrain that is at, or above, your current altitude
YELLOW	Terrain that is within 500 feet of your current altitude
GREEN	Terrain that is within 2000 feet of your current altitude
BLACK	Terrain that is more than 2000 feet below your current altitude
LIGHT BLUE	No terrain data is available

Terrain Option Page

The Terrain option page lets you select options for the choices of Flight Plan, Map Orientation, and setting the barometric pressure.

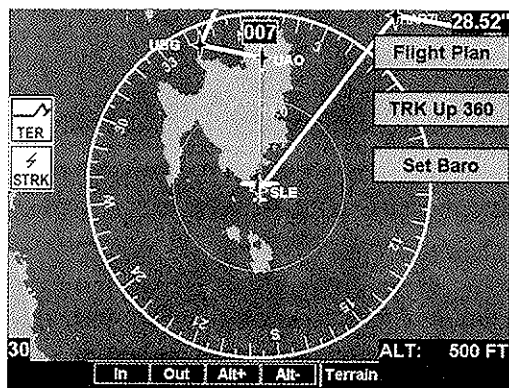


Flight Plan

The Flight Plan option controls the display of the Flight Plan course line. Pressing the **LINE SELECT** key next to the Flight Plan option toggles between showing and not showing the Flight Plan route line.

TRK Up Arc/TRK Up 360

This ring is marked in nautical miles from your airplane with the ring placed at one half the distance of the map scale. For instance if you have the map scales at 50 miles, the ring will be at 25 miles. The ring will change automatically as you change the map scale. The Terrain function display is always in the Track Up mode.



Set Barometer

Use the Set Barometer option to enter the correct barometric pressure for your area or adjust the current value. Use the **UP/DOWN** arrow keys to increase or decrease the values. Use the **LEFT/RIGHT** arrow keys to move between characters. Press the **ENTER** key to save the displayed barometric pressure.

A "Confirm Current Baro" message is displayed at the initial power-up and again once every 30 minutes of operation as a reminder to check your baro setting.

TER Data Flag

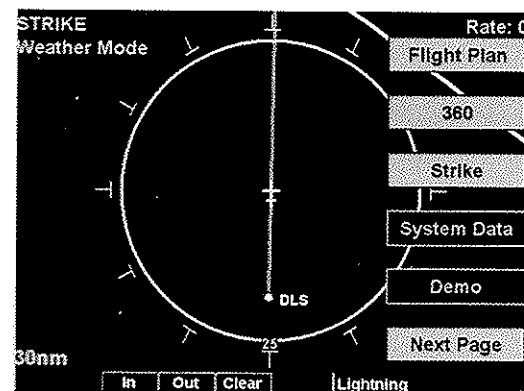
The TER flag will appear if no terrain data is available for the advisory coverage area.

Lightning Strikes (LT) Function

The Lightning Strike mode allows you to view lightning strikes that are reported by a BF Goodrich WX500 Stormscope Weather Mapping Sensor. The "T" marks are used as reference marks to aid in locating strikes in reference to your position. The Lightning function is not available in all software versions. Check your Approved Flight Manual Supplement to verify if this feature is available. Your display range must be selected to be greater than 25 nm to display lightning strikes. The display range is shown in the lower left corner of the display. For instance, if you zoom In to a range of 20 nm, no strikes will be shown, but if you zoom Out to 30 nm strikes will be shown.

Lightning Menu Option Page 1

The first option page of the Lightning function lets you select options for the choices of Flight Plan, Display view, Lightning groups, Stormscope info, and Demo. The last option selection takes you to the next page of options.



Flight Plan

The Flight Plan option controls the display of the Flight Plan course line. Pressing the **LINE SELECT** key next to the Flight Plan option toggles between showing and not showing the Flight Plan route line.

360/120

Two display views of the lightning information may be selected. The 360 view shows a 360° view the airspace surrounding your aircraft. The 120 view shows a 120° forward view from your aircraft's position and the display is divided into three segments.

Lightning

The WX500 detects electrical discharges within a range determined by the installation of your Stormscope. These discharge locations are noted as Lightning strikes and displayed as a red "x." You may select either single strike or cell (groups) of lightning representations.

Strike

Individual strikes are noted.

Cell

Only lightning strikes associated with a group, or cell, of strikes are displayed.

System Data

Select the System Data option to display information about the WX500.

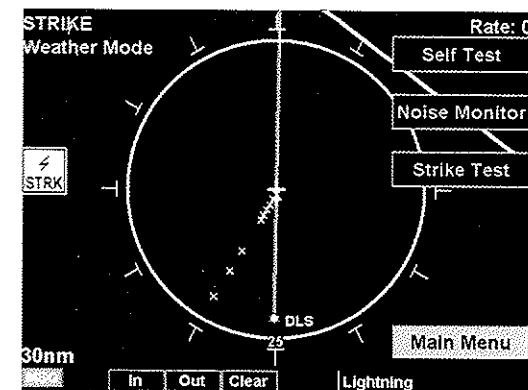
Demo

The Demo option places the WX500 sensor in a demonstration mode that simulates lightning strikes.

Press the Next Page **LINE SELECT** key to display the next page of menu items.

Lightning Menu Option Page 2

The second option page of the Lightning function lets you select options for the choices of Self-Test for the Stormscope, Noise Monitor, and Strike Test. The last option selection takes you back to the first page of options.



Self-Test

The Self-Test option performs a number of tests on the operation of the WX500 and provides a report of its status.

Noise Monitor

The Noise Monitor feature is a function of the WX500. For details about using this feature refer to the WX500 owner's documents.

The Noise Monitor displays reports of electrical noise, whether they are from lightning or other noise sources within the range of the system. This function is used to help determine if electrical noise is present that may affect normal system operation.

Strike Test

The Strike Test feature is a function of the WX500. For details about using this feature refer to the WX500 owner's documents.

The Strike Test feature is used by installers to verify proper operation of the WX500. Test strikes are sent to the antenna. The received test strike is then visually presented on the screen.

System Function

The System function allows you to set general Nav preferences, obtain version information, and perform tests on the operation of your MX20.

System Nav Page

The screenshot shows the 'System Nav Setup' screen with the following settings:

Ownship Symbol	Single Engine
Lat/Lon Format	DD MM SS.SS
Set Baro Correction	28.52
Display Latitude/Longitude Lines	Off

At the bottom, there are tabs for 'Nav', 'Info', 'Test', and 'System'.

Ownship Symbol

The Ownship Symbol option allows you to choose the type of icon that will represent your aircraft on the display. You can make selections of Single, Twin, or Jet.

Lat/Lon Format

The Lat/Lon format option allows you to select between two choices for the display of Lat/Lon coordinates. Choose between degrees-minutes-seconds-decimals (DD MM SS.SS) or degrees-minutes-minutes-decimals (DD MM.MM).

Set Baro Correction

You may enter the corrected barometric pressure so that the proper pressure altitude will be displayed.

The screenshot shows the 'Set Baro Correction' screen. It has a title 'System Nav Setup' and a list of options: 'Ownship Symbol', 'Lat/Lon Format', 'Set Baro Correction', and 'Display Latitude/Longitude Lines'. The 'Set Baro Correction' option is selected, and the value '28.52' is entered in the field. To the right of the field, it says 'Enter in the corrected pressure altitude'. At the bottom, there are four arrow keys (up, down, left, right) and a button labeled 'Press Enter To Accept'.

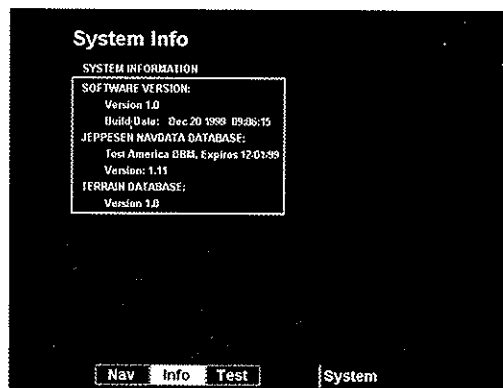
1. Press the **LINE SELECT** key for Set Baro Correction.
2. The Function "smart" keys at the bottom of the display will have direction arrows above them. Press the **UP/DOWN** arrow keys to change the value of the highlighted number. Press the **LEFT/RIGHT** arrow keys to move to another number.
3. Press **MENU/ENTER** to save the changed values and leave the Set Baro Correction option.

Display Lat/Lon Lines

Use this option to choose to display or not display Lat/Lon lines on the map displays.

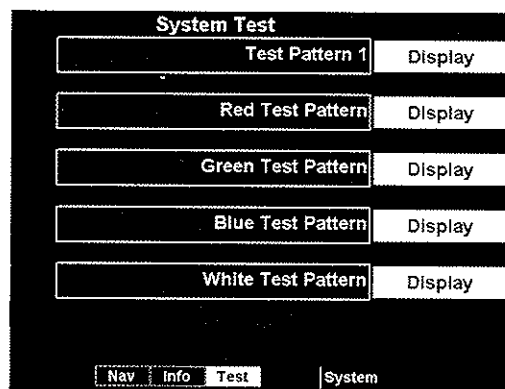
System Info

The System Info page includes information about the software and database versions of the MX20. Use this information when you contact your dealer or the factory.



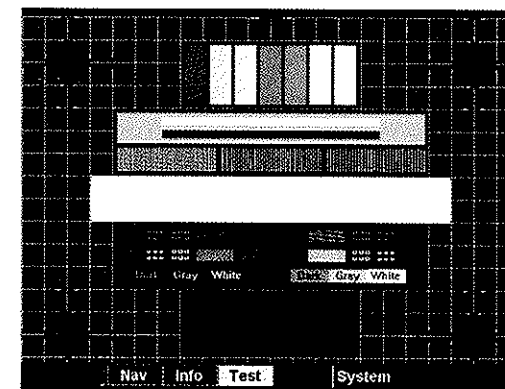
System Test Page

The System Test Page allows you to test the display of the MX20 to ensure proper operation.



Test Pattern 1

The Test Pattern option displays a number of patterns and colors to test the MX20 display. Use this option to verify proper operation of the display or when contacting Customer Service.



Red, Green, Blue, White Test Pattern

Choosing the Red, Green, Blue, or White options floods the screen with the selected color. Use this option to verify proper operation of the display or when contacting UPS Aviation Technologies Customer Service.

Caring For Your MX20

Display Care and Cleaning

Your MX20 has a durable display, but reasonable care must be taken to maintain its performance and life. To remove stains, smudges, fingerprints, and so forth, we recommend these cleaning methods. If the first method fails to remove the problem, try the next method.

- Wipe with a clean, dry, non-abrasive fabric (for example, cotton or handi-wipes). Do NOT use paper products, such as paper towels or facial tissues.
- Blow on the area to condense moisture on the display and then wipe the area with the clean fabric.
- Moisten a clean fabric with a small amount of water and wipe the display area.
- Apply a small amount of glass cleaner (without ammonia) to the fabric and wipe the area.
- Apply a small amount of isopropyl alcohol and wipe the area (this is your last resort).

Contacting the Factory

The UPS Aviation Technologies factory may be called weekdays from 8:00 am until 5:00 pm Pacific time. The technical service staff will gladly assist you.

UPS Aviation Technologies
Technical Service Department
2345 Turner Rd., SE
Salem, OR 97302 USA

USA Toll Free 800.525.6726
Canada Toll Free 800.654.3415
FAX 503.364.2138
International 503.391.3411

Troubleshooting

This section contains information to troubleshoot the MX20 when improper operation is observed. The following table lists possible problems you could encounter. Examine the possible causes of the problem and take the action listed to correct the problem. If you cannot correct the problem, contact your dealer. If your dealer is unavailable, contact the UPS Aviation Technologies factory at the address and phone number listed in the preceding section. Be sure to have the information from the System Info page (see page 50) and the data card available before you contact your dealer or the factory.

Problem	Possible Cause	Action
Unit does not power on or blank screen	Wiring problem	Check for proper wiring or. Check the fuse/circuit breaker
	Improper brightness setting	Check the display brightness setting
	Low temperature	Allow the MX20 to heat up for approx. 60 seconds
	Data card	Make sure the data card is fully inserted
Unit fails during start up test	Data card	Make sure the data card is fully inserted
	System failure	Contact your dealer or the factory

Problem	Possible Cause	Action
POS data flag shows	Antenna or wiring	Check the antenna and wiring
	Position source wpt	Ensure that a waypoint is selected as the current destination and a Nav flag is not shown
	Position source serial data	Ensure that the serial data output is configured properly
	Interference	Have dealer/installer check for any interference sources
	Installation setup	Have dealer/installer check for proper MX20 setup
RTE (Route) flag	Position source route	Ensure that the external position source has an active route engaged
ALT (Altitude) flag	Serial altitude source	Ensure the serial altitude encoder is powered up and working properly Have dealer/installer check for proper installation and setup of the encoder
LT (Lightning) flag	WX500 installation	Have dealer/installer check for proper installation of the WX500

Problem	Possible Cause	Action
TER (Terrain) flag	Terrain database	Ensure that the proper database is used for your location and it passed the startup test
	Altitude source	Have dealer/installer check for proper altitude input
No traffic display	ADS-B system installation	You must have the ADS-B system installed
		If you do have an ADS-B system, check the antennas and other components for proper operation Have dealer/installer check for proper MX20 setup
"Special Terrain" message	Capstone/General Aviation setup	This is normal for the Capstone installation Have dealer/installer check for proper MX20 setup

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