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Part #560-1026-00
January 2000

APOLLO

Model MX20

Multi-Function Display

User's Guide



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122.7

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

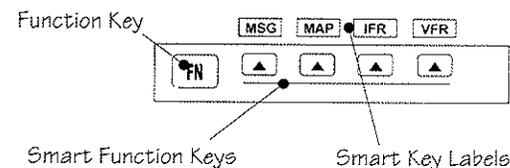
Power/Brightness



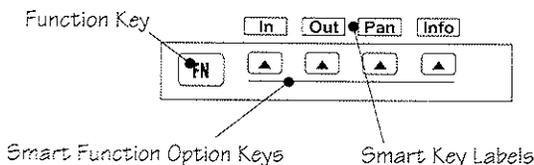
The power switch is located in the upper right corner of the MX20. Turn the power rotary knob clockwise past the detent to turn the power on. Turn the power knob fully counterclockwise to turn the power off. With the power knob pushed in, the brightness is set automatically according to ambient light 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.

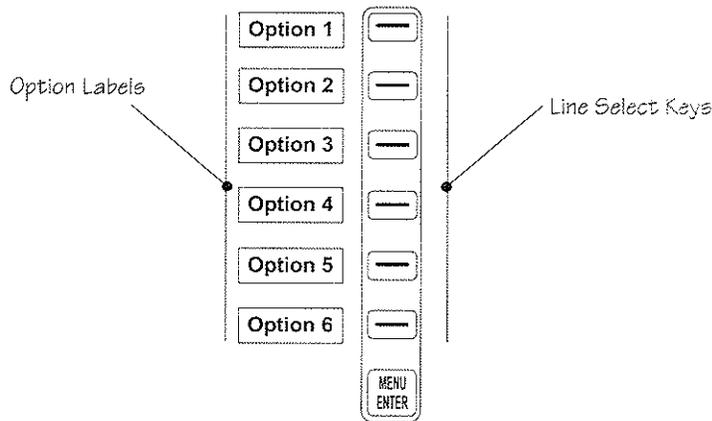
Menu/Enter



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.

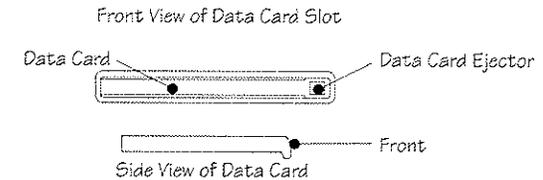
Line Selection

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.

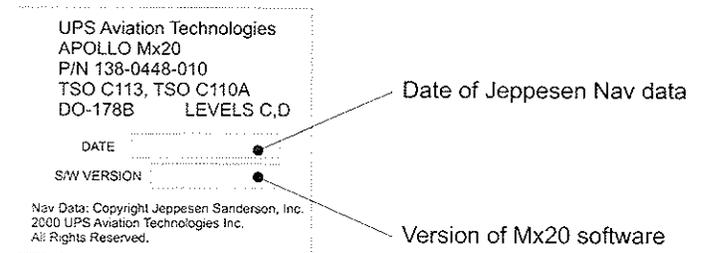


Data Card

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.

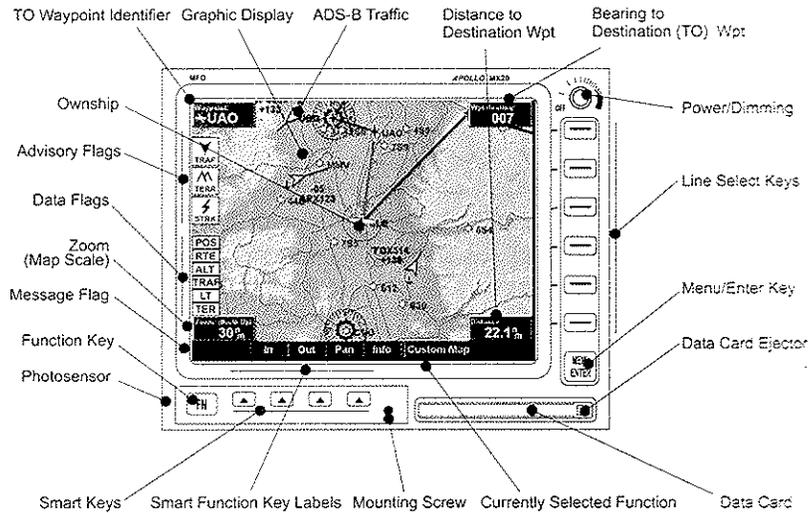


When contacting your dealer or the UPS Aviation Technologies technical services staff, eject the data card and write down the information shown on the label.



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

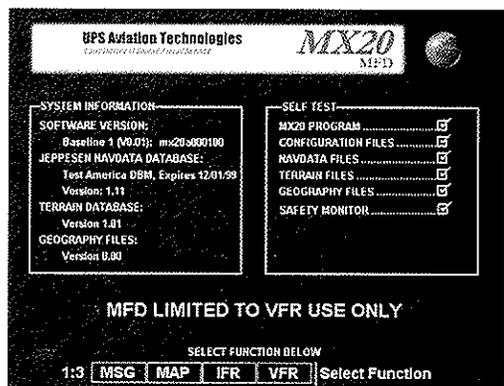
The MX20 will go into a pre-heat mode for a short period of time on start-up. During the pre-heat mode, the display will remain dark. The pre-heat mode is designed to extend the life of the LCD backlight.

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

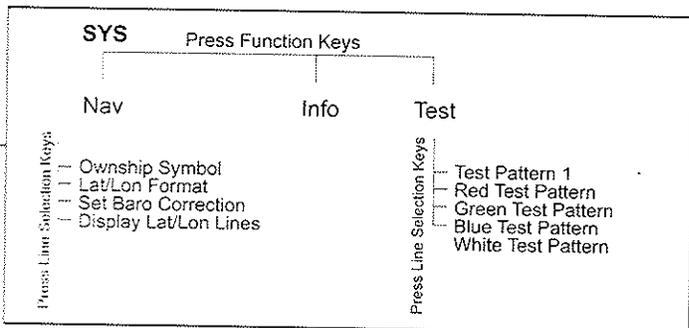
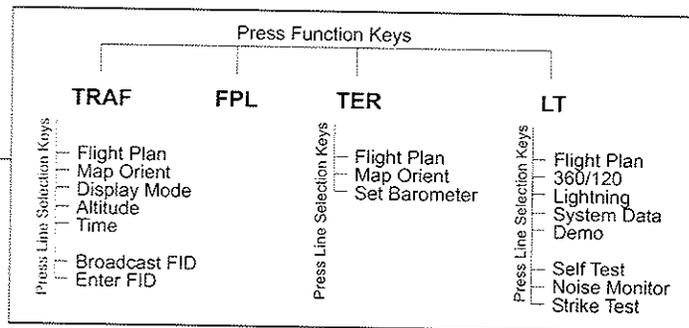
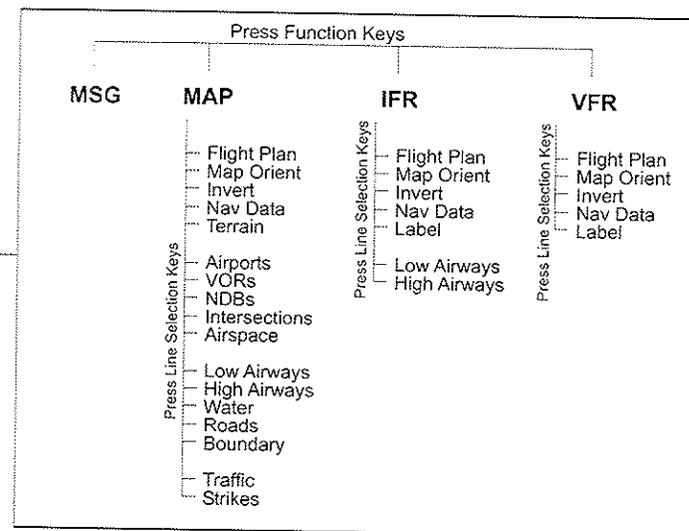
Press the **FN** key view the different Functions. The functions are shown above the function "smart" keys on the lower part of the display in green. Press the function key under the function label to activate that function. The labels above the function key will change to reflect the custom "smart" 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



Press FN Key

Notes

Detailed Operation

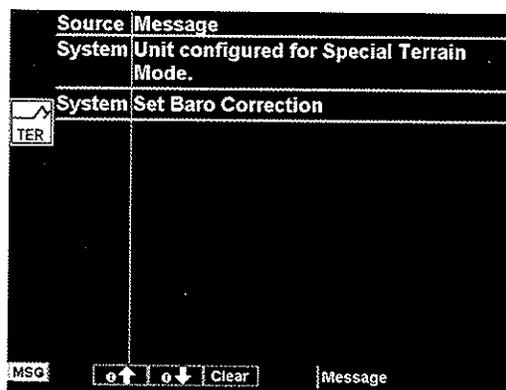
This section describes each operating function and the options available in each function. Each function operates independently. The Function “smart” keys and Line Selection keys are customized for each function and will appear while that function is selected. The functions are described in the order 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.

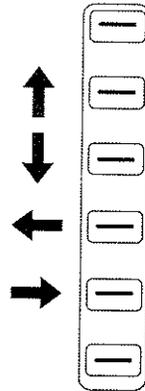
Map Scale

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

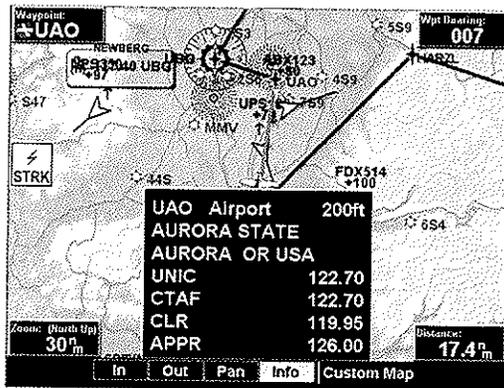
The Pan keys are used to move the display around so you can see beyond the initial boundaries of the screen. The **PAN** function key is one of the “smart” keys available at the bottom of the screen. When you select the Pan function, four “arrow” keys appear on the right side of the screen next to the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



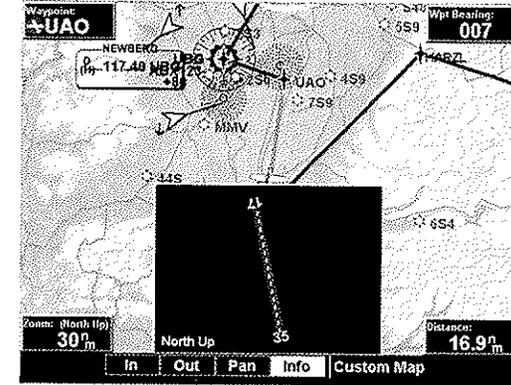
Move the map in the desired direction by pressing the **LINE SELECT** key next to the arrow that shows you want the map to move. Press the **PAN** key again to exit the Pan mode. While panning, a green reference line is drawn from the center of the viewed area back to your current position.

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).