Flying with Flightmaster™
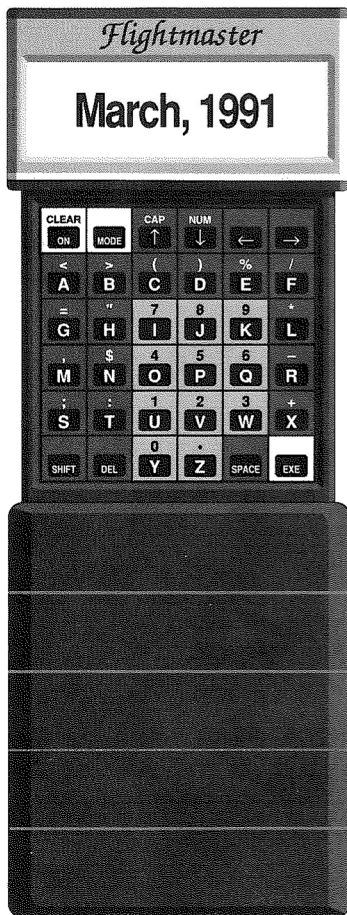
The latest news, tips and techniques for owners of the Flightmaster handheld flight management system.

Flightmaster

March, 1991

In this issue...

What's New?

Database Update Schedule for 1991

Here's the calendar of FAA database revision dates for 1991:

- February 7
- April 4
- May 30
- July 25
- September 19
- November 14

We suggest that VFR pilots update their FM datapaks at least twice a year (same as sectional charts), and that IFR pilots update every eight weeks.

Before we can update your Flightmaster, you must send us the two datapaks from the back slots of the machine. These datapaks contain both the FAA database and the Flightmaster software. The paks don't contain any information you have entered into the Flightmaster yourself (aircraft-specific data, user-defined fixes, saved routes)–that data is stored in the main unit.

When you ship your datapaks for updating, be sure to package them securely (preferably in bubble wrap) and insure them for $300. Be sure to include your full name, address, daytime phone, and (very important) your Flightmaster serial number. If you are not an update subscriber, include a check or credit card number to cover your one-time update.

Just so you know: once we receive your datapaks, we have to put them through an ultraviolet eraser for 30 minutes. Then it takes 20 minutes to reprogram each datapak with the latest database and software.

Unless you have purchased the "zero downtime" spare paks, returning your datapaks for updating means that you will be without the use of your Flightmaster while your datapaks are in-transit. We understand that you don't want to be "down" for long, so we try our best to turn around all updates within 24 hours. In fact, we often send updates out the same day they arrive. We ship the paks back to you via UPS air, either second-day or overnight.

Flightmaster Exhibit Schedule

Flightmaster will be exhibiting at the following major events this year:

- EAA Sun-'n-Fun
  Lakeland Florida
  April 7–13

- EAA Annual Convention
  Oshkosh Wisconsin
  July 26–August 1

- AOPA Annual Convention
  New Orleans Louisiana
  October 22–26

Be sure to stop by our booth and say hello. Bring your pilot friends!

Flightmaster Accessories

We're always getting questions about the various accessories available for the Flightmaster. What are they good for? Which do I really need? Here's the rundown on some FM accessories.

Fitted Leather Case — $30

If you don't already have one, this is the first accessory your should buy for your Flightmaster to prevent it from getting scratched as it rattles around in your pocket or flight bag. We suggest that every FM owner get one and use it.

This is a thin, tight-fitting leather case made of soft black glove leather, with the "Flightmaster" script logotype embossed on the outside. The leather flap that protects your FM's plastic display window has a Velcro closure. This case adds no weight or bulk at all to the FM, and you can use the FM without removing it from the case.

Comms Link RS232 Adapter — $100

If you have a PC or Macintosh, you'll probably want to buy one of these. The Comms Link plugs into the accessory slot of your FM and provides a standard RS232 asynchronous serial communications port. This lets you to do all kinds of good things.
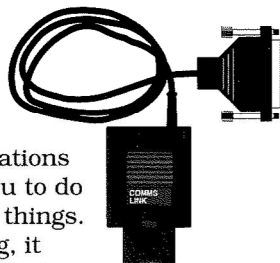
For one thing, it provides an excellent way for you to backup all of the user-entered information inside your Flightmaster (aircraft-specific data, user-defined fixes, saved routes, and so forth). We furnish file-transfer software for your PC or Mac. Be sure to specify which computer you use when you order.

The Comms Link also allows you to connect your FM to a serial printer, modem, or any other device with an RS232 serial port. It lets you transfer your FM-calculated trip logs to your PC or printer. We've even used it with a pocket modem to turn the FM into a DUAT terminal (although a laptop or notebook computer is much better suited for this task).

If you have a PC, you can use the Comms Link with our new FMSETUP software to edit aircraft performance profiles, W&B data and checklists on your PC, then transfer it to your FM. It makes aircraft setup a snap.

32K RAMpack — $90

This special datapak contains 32K of high-speed RAM memory and a tiny lithium battery that retains its contents even when unplugged from the Flightmaster. It provides another means for backing up your user-entered data.

For backup, the RAMpack is a bit faster and easier-to-use than the Comms Link, and doesn't depend on having a PC. The RAMpack allows you to carry your backup wherever you go.

If you have a PC or Macintosh, however, the Comms Link probably provides all the backup capability you need, and does lots of other things as well. You probably don't need both.

Printer — $350

This is a miniature thermal printer that "docks" with the Flightmaster and prints your trip logs and flight plans on roll-fed paper. It has a ni-cad battery pack, and comes with a charger. It's the only printer we know of that's actually small enough to use in the cockpit.

Before you spend $350 for this accessory, you need to decide whether you really need hardcopy printouts. Most pilots who carry their FM along in the cockpit don't...all the information is readily available on the FM display. But if you are uncomfortable without your trip log printed out in black-and-white, or if you use your Flightmaster to do flight planning for other pilots, you'll find the printer worthwhile.
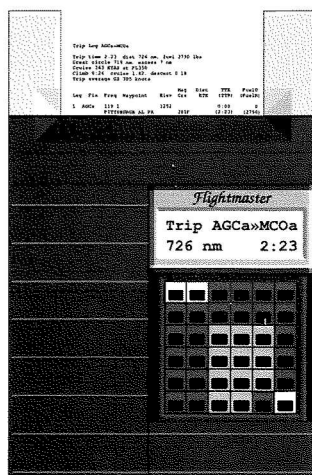
In-Flight Route Changes

*One of the most important advan-
tages of the Flightmaster over ground-
based computer flight-planning services
is FM's ability to deal with ATC re-routes
and other unplanned contingencies.
Here are some suggestions about how to
handle in-flight route changes.*

You've departed Las Vegas on an
IFR flight to Salt Lake City. You allowed
your Flightmaster to choose an airways
route by specifying:

        LAS A SLC

FM came up with this route:

        KLAS LAS V394 MMM V21
        SLC KSLC

and Las Vegas Clearance Delivery told
you *"cleared as filed."*

Don't worry about minor route deviations

Now you're climbing out on V394
headed toward Mormon Mesa VORTAC
and monitoring your flight progress on
your Flightmaster. Los Angeles Center
calls: *"Bellanca five-niner-two, turn left
twenty degrees, vector around traffic.
Expect direct Mormon Mesa in five
miles."*

There's really no point to entering
such minor route deviations into your
Flightmaster. Just allow FM to think
you're continuing on-course. When you
eventually reach Mormon Mesa and
record your actual fix-crossing time,
FM will probably show that the devia-
tion cost you a minute or two of delay.
FM will revise your remaining ETAs
and fuel projections accordingly.

Use Route→Expand, not Route→Change

*"Bellanca five-niner-two, proceed
direct Mormon Mesa. I have an amen-
ded routing for you, sir: after Mormon
Mesa, Victor 235 Milford, rest of route
unchanged."*
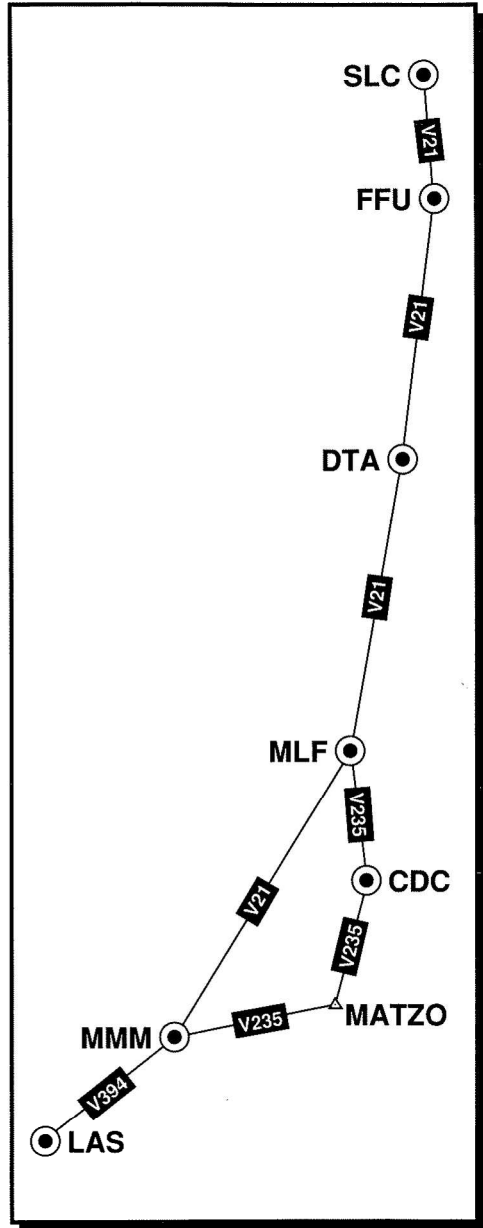
This is a significant deviation from your original route that will take you thirty miles southeast. You need to tell FM about it.

Exit the **View** spreadsheet by pressing ON/CLEAR. Then select the function **Route→Expand** to revise your route, and answer **Y** to the prompt **Expand airway fixes? [Y/N]**. Your original route will be displayed:

```
KLAS V394 MMM V21 (MLF
DTA FFU) SLC KSLC
```

Now use the cursor (arrow) keys plus DEL or SHIFT-DEL to edit the route to reflect the new routing amendment by changing "V21" to "V235" between MMM and MLF:

```
KLAS V394 MMM V235 MLF
DTA FFU SLC KSLC
```

[We've eliminated the parentheses from the route for clarity, but it doesn't actually make any difference whether you do so or not.]

Leave the altitude, OAT, and winds aloft unchanged. Then select **View** to update your trip log with the revised route. You see that the amendment has added 11 nm to your trip, with a corresponding effect on ETA and fuel required.

Note that using **Route→Expand** instead of **Route→Change** often makes it easier for you to enter such route amendments. If your original route involved automatic routing (**A**, **R**, or **V**), using **Route→Expand** eliminates the need for FM to redo those time-consuming auto-routing calculations for the unchanged portion of the route.

Going "present position direct"

Approaching Cedar City, Los Angeles hands you off to Salt Lake City Center. You cross Cedar City, notify Flightmaster of that fact, and turn toward Milford on V235.

A few minutes later, Center calls: *"Bellanca five-niner-two, when receiving Delta, proceed direct."*

You tune in Delta VORTAC and, although it's still 120 nm away, you get a good flag and proceed direct. How are you going to tell FM about the change?

As before, exit the **View** spreadsheet and select **Route→Expand** to revise your route. Your current route will be displayed:

```
KLAS V394 MMM V235 (MATZO
CDC) MLF DTA FFU SLC KSLC
```

Now edit the route to reflect the new clearance by replacing MLF with "PP" which is Flightmaster's special notation for "present position":

```
KLAS V394 MMM V235 (MATZO
CDC) PP DTA FFU SLC KSLC
```

Again, leave the altitude, OAT, and winds aloft unchanged. Now select **View** to update and display the trip log.

Preserving actual fix-crossing times

Whenever you use **Route→Change** or **Route→Expand** in this fashion to make route amendments, Flightmaster preserves your recorded takeoff time and any recorded fix-crossing times that apply to fixes on the unchanged portion of the route. When you return to the trip log spreadsheet, you can see the new ETA that reflects the impact of the revised route.

However, note that the **Route→New**, **Route→Load**, and **Route→Reverse** functions cause any active takeoff and fix-crossing times to be discarded. Flightmaster assumes that these functions are always used to specify an entirely new trip. You'll want to avoid using these three functions in-flight unless you really mean to start from scratch.

By the way: enjoy yourself in Salt Lake City...the ski conditions are great!

Tips & Techniques

More usage tips from the experts to help you get the most from your Flightmaster.

Changing Datapaks

Anytime you change datapaks on your Flightmaster—when updating your FM database, for example—it is absolutely essential that you follow the pak-change procedure described on page 14 of the *Flightmaster User's Guide.* In particular, you must exit the **AVIATION** program and return to the main menu before removing the datapaks from the machine.

The main menu is the one that appears in all capital letters:

```
AVIATION FIND
SAVE DIARY CALC
```

To reach it from within the **AVIATION** program, press the **ON/CLEAR** key one or more times as necessary until you hear a beep and see the message:

```
Exit AVIATION
program? [Y/N]
```

Answer this prompt by pressing the **Y** key and you will be at the main menu.

If you fail to do this before changing datapaks, FM's software can get very confused. Typical symptoms of this confusion can range from spurious **Fix not found:XXX** diagnostics to **MISSING PROC** errors that cause the program to abort. Some functions may seem to work correctly but others will not. No permanent harm is done, but it can be a very disconcerting experience if you don't understand what's wrong.

As a general rule, if your FM suddenly starts to behave in a bizarre fashion, it's not a bad idea to exit the **AVIATION** program and restart it before pressing the panic button.

User-Defined Fixes

The **DataBase→Def** function allows you to add your own navigation fix definitions to the 11,000 airports, navaids and intersections that are pre-defined in Flightmaster's built-in database. FM can accommodate dozens of such user-defined fixes.

Experienced FM users make use of this capability to add private airports, NDBs, approach aids such as outer compass locators, VFR checkpoints, and so forth. Pilots who fly overseas also use this feature to define fixes that are outside of FM's U.S. coverage.

Suppose you wish to define the outer compass locator at the Long Beach, Calif., airport. The name of this fix is "BECCA." To start the process, select **DataBase→Def**. FM prompts you to enter an identifier for the new fix:

```
Define: BECCA
```

You can give your user-defined fix any identifier you like that is composed of 1–5 letters or digits. Be sure your identifier doesn't conflict with one that's already defined in FM's built-in database—otherwise, you'll get an error message that warns you of the conflict.

Next, FM asks you to select from a menu of possible fix types:

```
Int Apt NDB VOR
VORDME VORTAC
```

and you specify that BECCA is an NDB.

Now FM prompts you to enter a number of self-explanatory pieces of information about the fix: name, state, frequency, and elevation. The dialogue looks like this:

```
Define BECCA
Name: BECCA LOM
```

```
Define BECCA
State Abbr.: CA
```

```
Define BECCA
Freq: 233
```

```
Define BECCA
Elev: 60
```

[Note that these four prompts are omitted if you are defining an intersection.]

At this point, FM prompts you to enter the geographic location of this fix:

```
Define BECCA
Loc:N3345/W11804
```

Here the location of BECCA has been specified by latitude and longitude. You could also have defined it as a fix-radial-distance (e.g., SLI200001), or as the intersection of two radials (e.g., SLI200/LGB121), or even as PP when you're flying right over the fix.

Since you specified BECCA's location by lat/lon, FM now asks you to verify that the magnetic variation is E15 (which it obtained from its database entry for the nearby SLI VORTAC):

```
N3345/W11804
mag. var.: E 15
```

Finally, FM asks you to confirm that you do indeed wish to add this user-defined fix to the database:

```
Add BECCA to
database? [Y/N]
```

Pressing Y to confirm completes the operation. BECCA will now remain a part of your FM database until you erase it with the DataBase→Erase function.

Avoid Static Zaps

We received an interesting note recently from Peter Lert, who is editor of Air Progress magazine and a big FM fan. Peter was ferrying a Turbo Arrow to Europe. Enroute from Gander, Newfoundland, to Shannon, Ireland, he ran into some thunderstorms.

"The airplane didn't take any actual lightening strikes, but things got a bit crackly—St. Elmo's Fire on the prop, ability to draw sparks from the windshield to my fingertip, etc. The LORAN failed right away, although a GPS system I was experimenting with hung in there.

"My Flightmaster was lying on top of the glareshield in its leather case. Apparently it picked enough static to crash the software. The screen went blank and I couldn't get the machine to function at all. Finally I removed the battery, at which point normal operation resumed, but I'd lost all my user-entered information and the clock setting."

The moral of Peter's story is this: try to avoid exposing your FM to intense static electricity. In particular, don't leave it on the glareshield when flying near thunderstorms. In extreme conditions such as those Peter described, it might not be a bad idea to stow your FM in your airplane's grounded metal glovebox.

Don't Leave Accessories Plugged In

We've had reports that leaving your FM docked with your printer over a long period of time can drain its battery. The same thing can happen if you leave the Comms Link RS232 adapter plugged in for a long time. In general, it's best to avoid storing your FM for any length of time with an accessory plugged into its top slot.

Questions & Answers

Every day, we answer lots of technical questions that come in by phone, electronic mail, and "snail mail" from Flightmaster users. Here are some interesting ones we've received recently.

Okay to Use FM on an FAA Exam?

"Is it legal for me to use my Flightmaster when taking an FAA written, oral, or checkride?"

Use of the Flightmaster on a practical test (oral plus checkride) is at the discretion of the examiner, who is obviously free to fail any of your avionics equipment including your FM. However, we know of lots of FM owners who have used their FMs on practical tests ranging from Private to ATP with no objections from the examiner.

Our best advice is to check with your examiner ahead of time. He'll probably say okay, in which case go ahead and use your FM on the test. But be prepared with a Plan B in case he "fails" it on you.

Using the Flightmaster on an FAA written test is quite another matter. FAA's policy regarding written tests is to allow the use of electronic flight computers *provided they do not have a memory.* Basically, FAA wants to make sure that your computer doesn't contain a "cheat sheet" containing answers to test questions.

Because this issue has caused so much confusion as portable electronic flight aids have proliferated, FAA recently came out with an Advisory Circular on the subject. It is AC 60–11B, entitled "Aids Authorized for Use by Airmen Written Test Applicants," and dated 10/10/90. This Advisory Circular says, in part, that an electronic calculator or computer may be used on a written test provided that:

> *"...prior to and upon completion of the written test, the applicant must actuate the on-off switch and perform any other function that ensures the erasure of any data stored in memory circuits. ... The use of electronic calculators incorporating permanent or continuous type memory circuits without erasure capability is prohibited."*

Since the Flightmaster has a non-volatile database memory that is not erased by turning the machine off or even by removing the battery, our interpretation is that its use on a FAA written test is prohibited.

So dust off your whiz wheel before you go to the PLATO center, and leave your FM in your flight case. Sorry!

Fuel in Gallons for W&B?

"I set up a W&B template for my Bonanza, following the sample template shown in the FM User's Guide. When working W&B calculations, I find that I must convert my fuel loading from gallons to pounds before entering it into the FM W&B function. How can I get FM to accept fuel loading directly in gallons?"

That's easy. Simply change the Multiplier field of each fuel load item in your template from +1 to +6. This will cause FM to multiply the values you enter by 6, thereby converting U.S. gallons of fuel to pounds automatically. You'll also have to divide the MaxVal, MinVal, and MidVal fields by 6, since you'll now be entering values in gallons instead of pounds.

For example, if your main fuel tanks hold 90 gallons of avgas, here's

what the two alternate forms of your W&B template item might look like:

```
To enter fuel in pounds:
        Title:  fuel mains (lbs)
    Multiplier: +1
        MaxVal: 540
        MinVal: 0
        MidVal: 270

To enter fuel in U.S. gallons:
        Title:  fuel mains (gal)
    Multiplier: +6
        MaxVal: 90
        MinVal: 0
        MidVal: 45
```

If you have any fuel burn items in your W&B template, you'll want to change their Multiplier values from -1 to -6. This will allow you to enter fuel burns in gallons instead of pounds.

If you've already set up your W&B template with fuel items in pounds and want to change them to gallons, you need not start all over again. Simply use the Setup→W&B→Change function to revise the appropriate fields of the fuel items in the existing template.

Note: For turbine aircraft, use a multiplier of ±6.7 to convert Jet A from U.S. gallons to pounds.
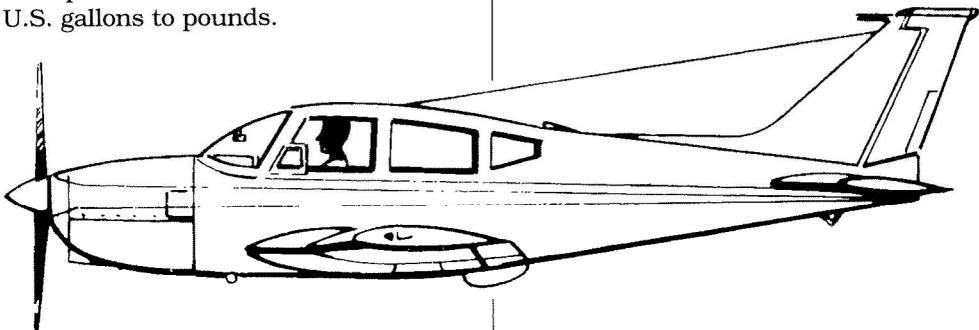
END OF PACK

"I just managed to get a really bizarre message on my Flightmaster display. The top line is a whole line of asterisks, and the bottom line reads **END OF PACK**. What did I do wrong?"

Nothing really. You must have exited the **AVIATION** program and executed the **FIND** function from the main menu.

The main menu functions **FIND** and **SAVE** are described in the last chapter of the *Flightmaster User's Guide* ("Non-Aviation Functions"). **FIND** and **SAVE** are used to store and retrieve textual information from your personal database, and can be quite useful for keeping track of names, addresses, phone numbers, and that sort of thing.

If you try to use **FIND** to search for an item that wasn't in your personal database, you'll get that odd-looking ****END OF PACK**** message. In fact, if you never used **SAVE** to store anything in your personal database, any use of **FIND** will elicit that message.

Software Revisions

Here is a summary of the revision history of Flightmaster software, showing the bug-fixes, enhancements, and database revisions that have been incorporated into each successive update. Scheduled updates are released every eight weeks to coincide with the FAA database revision cycle. Update subscription customers automatically receive a reminder whenever a new update is available. We recommend a Flightmaster database subscription for all active IFR pilots, because there are usually substantial airway structure changes in every revision cycle. VFR pilots should update their Flightmaster twice a year, the same frequency with which their sectional charts are updated.

v2.06 07-Feb-91
Database updated to FAA 07-Feb-91 revision cycle.

v2.05 13-Dec-90
Database updated to FAA 13-Dec-90 revision cycle.
Allow lat/lon entry to tenths of minutes.

v2.04 18-Oct-90
Database updated to FAA 18-Oct-90 revision cycle.
Correct sequence of items displayed in View col D.

v2.031 10-Sep-90
Corrected AutoRNAV error introduced in v2.03.
Corrected default temp for Route→??? OAT prompt.

v2.03 23-Aug-90
Database updated to FAA 23-Aug-90 revision cycle.
Corrected trig in AutoRNAV waypoint positioning.
Added "Heading" display to View column D.
Added climb/descent milage to View trip summary.
Improved selection of initial/final AutoV/R fixes.
Enhanced accuracy of density altitude calculations.
Reduced Database→Wpt search radius to 50 nm.

v2.02 28-Jun-90
Database updated to FAA 28-Jun-90 revision cycle.
Backup via CommsLink now sets 9600-8-N-1-XON.
Fixed "INTEGER OVERFLOW" error in Quick.
Fixed bad OAT when exiting/reentering AVIATION.

v2.01 28-Apr-90
Database updated to FAA 03-May-90 revision cycle.
Improved AutoV/AutoR navaid selection algorithm.
Improved AutoR waypoint calculation on N-S routes.
Eliminated roundoff error in density altitude calcs.
Fixed bug in "nested" Database→Search.
E6B→UnkownWind: fixed wind direction calc error.
W&B: fixed DIVIDE BY ZERO error.

v2.00 15-Mar-90
Database updated to FAA 08-Mar-90 revision cycle.
New universal location parser accepts 6 formats:
- Fix identifier: KLAX
- Fix-radial-distance: ICT330018
- Intxn of two radials: LAX316/VNY240
- Lat/lon: 3530/12715 or N3530/W12715
- Asterisk-prefixed name fragment: *PITTS
- Estimated present position: PP

Estimated present position referenced by "PP".
View: spreadsheet reorganized into six columns.
View: added dist-to-fix, airway, elev., full-route.
Route→New/Change: correct performance for OAT.
Route→New/Change: accept 4- or 5-digit winds.
Airport database includes runway length & ILS info.

v1.06 24-Jan-90
Database updated to FAA 11-Jan-90 revision cycle.
Route→New/Change: diagnose "Too many winds".
View: diagnose "No route".

v1.05 24-Nov-89
Database updated to FAA 16-Nov-89 revision cycle.
Enhanced VOR/RNAV auto-routing for longer legs.
Changed VL and RL to use shorter legs.
Fixed retention of trip ATAs after Route→Change.
Added "Free Memory" display to Setup→Checklist.
Enhanced precision of fuel figures on trip log.
Fixed CommsLink→Restore bug affecting Macs.
Fixed roundoff bug in lat/lon display.
Fixed roundoff bug in fuel-remaining on printed log.

v1.04 29-Sep-89
Database updated to FAA 21-Sep-89 revision cycle.
Deleted duplicate VORs: CDR, CRO, LIB, SYA, TAL.
AVIATION does a device-boot at startup.
AVIATION does an escape-off on way out.
Warbling "beep" deleted...annoyed some users.
Print changed to 60 chars/line (from 80).
Fixed bug: divide-by-zero error on zero-length leg.
Fixed bug in retrieval of NDBs with 2-letter ids.
Fixed minor bug in checklist editor.
Fixed minor bug in Database→Def.
Fixed minor bug in route parsing.
Fixed minor bug in Quick display.
Enhanced FltPln error recovery.

Ordering Information

Flightmaster

❑ Flightmaster $595
The complete handheld flight management system with battery, 100-page User's Guide, laminated quick-reference card, and a free subscription to the quarterly "Flying with Flightmaster" newsletter.

Flightmaster is sold with a rather extraordinary 90-DAY NO-RISK SATISFACTION GUARANTEE. Fly with Flightmaster. If you are not delighted, return it in original conditionwithin 90 days for a full and immediate no-hassle refund.

Updates

❑ Annual (6x) update subscription via 2nd-day air $150
The Flightmaster database is updated every 8 weeks with revised airport, airway and navaid data from the FAA flight data center. This subscription covers your next six updates. We send you a reminder card when each update is available. You ship us your two datapaks, we reprogram them with the latest updated database and software revision, and ship them back to you via 2nd-day air. (You need not get every revision, as long as you take at least two per year.)

❑ Annual (6x) update subscription via next-day air $180
Same as above, except we ship your updates by next-day air. This provides one less day of downtime.

❑ Zero-downtime update option $200
We provide a pair of extra datapaks for you so that you can receive database updates without any downtime whatsoever. This one-time-only price covers only the two extra datapaks... you must also purchase an update subscription.

❑ One-time update via 2nd-day air $50
Ship us your two datapaks at any time, we reprogram them with the latest updated database and software revision, and ship them back to you via 2nd-day air. Add $5 more for shipment by next-day air.

Accessories

❑ RS232 comms link $100
Enables your Flightmaster to communicate with a PCor Macintosh, modem, serial printer, or any other device with a serial port. Includes software to backup user-defined data to disk: specify MS-DOS or Mac.

❑ RS232 adapters $20
Used with Comms Link to change its DB25F connector to whatever is necessary. Specify which of the following adapters you need: IBM AT, Mac+, Mac SE or II, serial printer, or modem.

❑ Fitted leather case $30
Made of soft black glove leather with Velcro flap. Keeps your Flightmaster looking new.

❑ 32K RAMPACK $90
The most convenient way to back up your Flightmaster data.

❑ AC adapter $20
Lets you power your Flightmaster from a 120-volt AC electrical outlet.

❑ Printer II $350
Compact "docking" thermal printer for your Flightmaster.

❑ Thermal paper for Printer II................$20
Package of four rolls.

Video Information Package

❑ Video information package with manual......................................$15
Detailed 30-minute VHS videocassette which demonstrates the many features of the Flightmaster, explains how it is used in a wide variety of pre-flight and in-flight situations, and shows the various accessories available. Also includes the complete 75-page Flightmaster User's Guide. The $15 cost for this package is credited toward your purchase of a Flightmaster.

To order, call (800) 462-6669 toll-free, or FAX (301) 387-7322. We accept VISA, Mastercard, and American Express.

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City, state, zip: _____

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Total pilot hours: _____ **Aircraft flown:** _____

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