FLIGHT TRACKER
V2.04-D

INSTALLATION MANUAL

Doc: FT2D030411B

May 2013

Montreal AeroPlus, 685 Orly, Montreal, QC, H9P 1G1 Canada

Changes: Rev B May 2013 RDP – Document formatting changes, changes for Version 2.04-Digital :Graphics replaced, added Center on Mouse functions, Installer modified.

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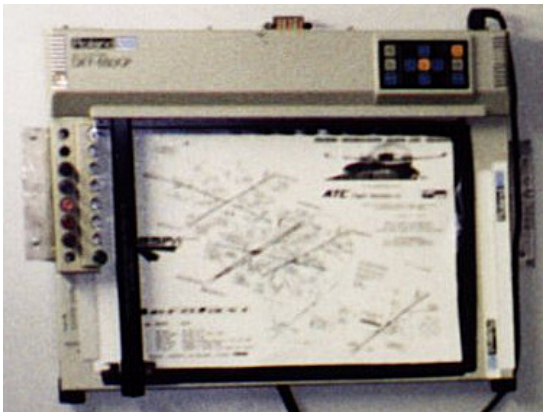
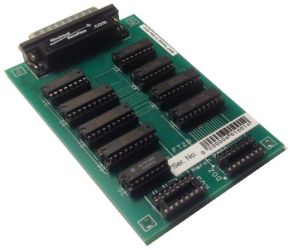
1.0 Introduction

Flight Tracker is an enhancement designed to work through a personal computer. It replaces the mechanical pen plotter supplied with the ATC 810 Flight Training Device (FTD).



ATC810 Plotter

It uses a digital interface card, which is connected to the computer's printer port. It provides precise real-time tracking of the simulated aircraft's position.



FT2D Digital Interface

Included in the software are features to enhance its training value such as user definable land features, Zoom and Pan features, and storage of the map and track in a standard bitmap graphics file format (BMP), which can be easily printed using any Photo Paint software.

2.0 Minimum System Requirements

- Personal computer (Pentium I or better)
- 256 k memory
- 1 GB hard disk
- Compatible SVGA video card
- Mouse
- Standard, EPP or ECP Parallel printer interface
- Microsoft Windows XP Operating System

(Note: Windows 2.04D has not been tested on MS Windows 9X or 2000)

3.0 Installation

3.1 Hardware Installation (Installing the Digital Interface System)

CAUTION: When handling any electronic equipment, care should be exercised to maintain a static-free environment. The installation should be performed by an experienced electronic technician, who is familiar with the ATC810 FTD. Failing to do may result in serious damage to the device.

Step 1: Locate and carefully remove the Audio / Transponder card from the ATC810.

Step 2: Identify (see Figure 3.1 below), de-solder, and remove the 74LS139 chip located in position K03.

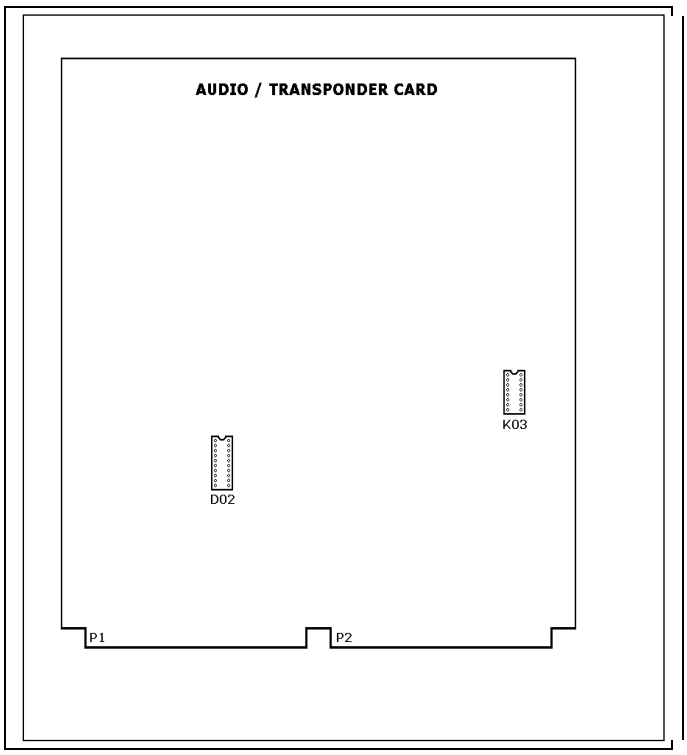


Figure 3.1

Step 3: Solder the supplied 16 pin socket in position K03. Take care to orient the socket correctly as shown in Figure 3.1.

Step 4: Next, identify (see Figure 3.1), de-solder, and remove the 74LS273 chip located in position D02.

Step 5: Solder the supplied 20 pin socket in position D02. Take care to orient the socket correctly as shown in Figure 3.1.

Step 6: In order to verify that no damage has occurred during the removal of the ICs, plug in a 74LS139 and a 74LS273 chip into the K03 and D02 sockets respectively, and verify that the FTD functions normally. Subsequently, shut down the FTD, and remove the 74LS 139 and 74LS273 chips.

Step 7: Select the 16 pin ribbon cable identified as K03, and plug the free end into the 16 pin socket, which was soldered into position K03 (See Figure 3.2). Pay particular attention to the legs on the connector. Special care should be given to make sure that they are exactly aligned with each of the socket's holes. Any legs, which are bent, may be damaged, resulting in communication failure.

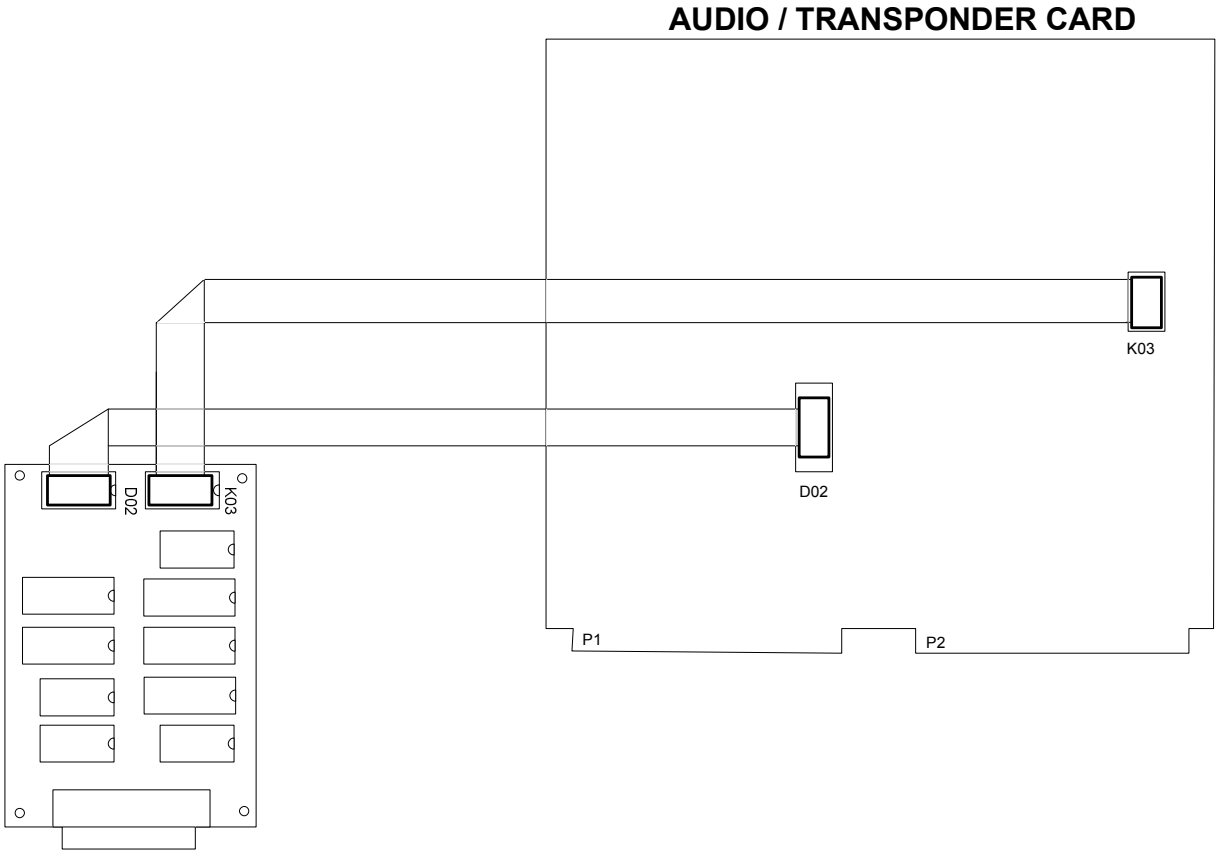


Figure 3.2 Cable Connections between Audio/ Transponder card and Flight Tracker Digital Interface

Step 8: Plug the free end of the other 16 pin ribbon cable into the 20 pin socket, which was soldered into position D02 (See Figure 3.2). Please note that the cable should be plugged such that pins 1, 10, 11, and 20 (i.e. the four corners) of the socket are left empty, as shown in Figure 3.3 below.

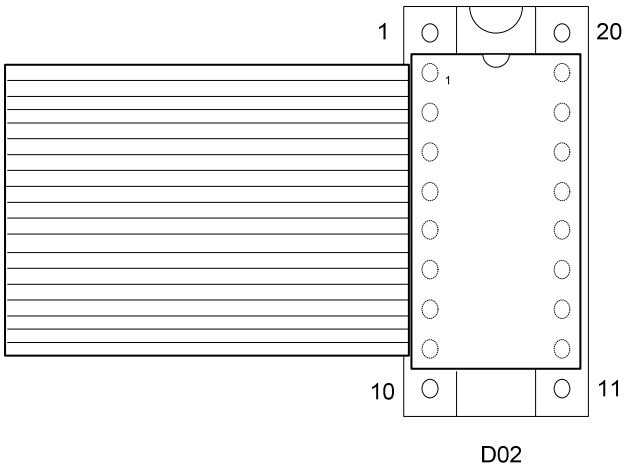


Figure 3.3 D02 Connection Placement

Step 9: Carefully re-insert the Audio / Transponder card with the ribbon cables into the ATC810, taking care to not to pinch or damage the ribbon cables. Refer to Figure 3.4 below for the completed installation.

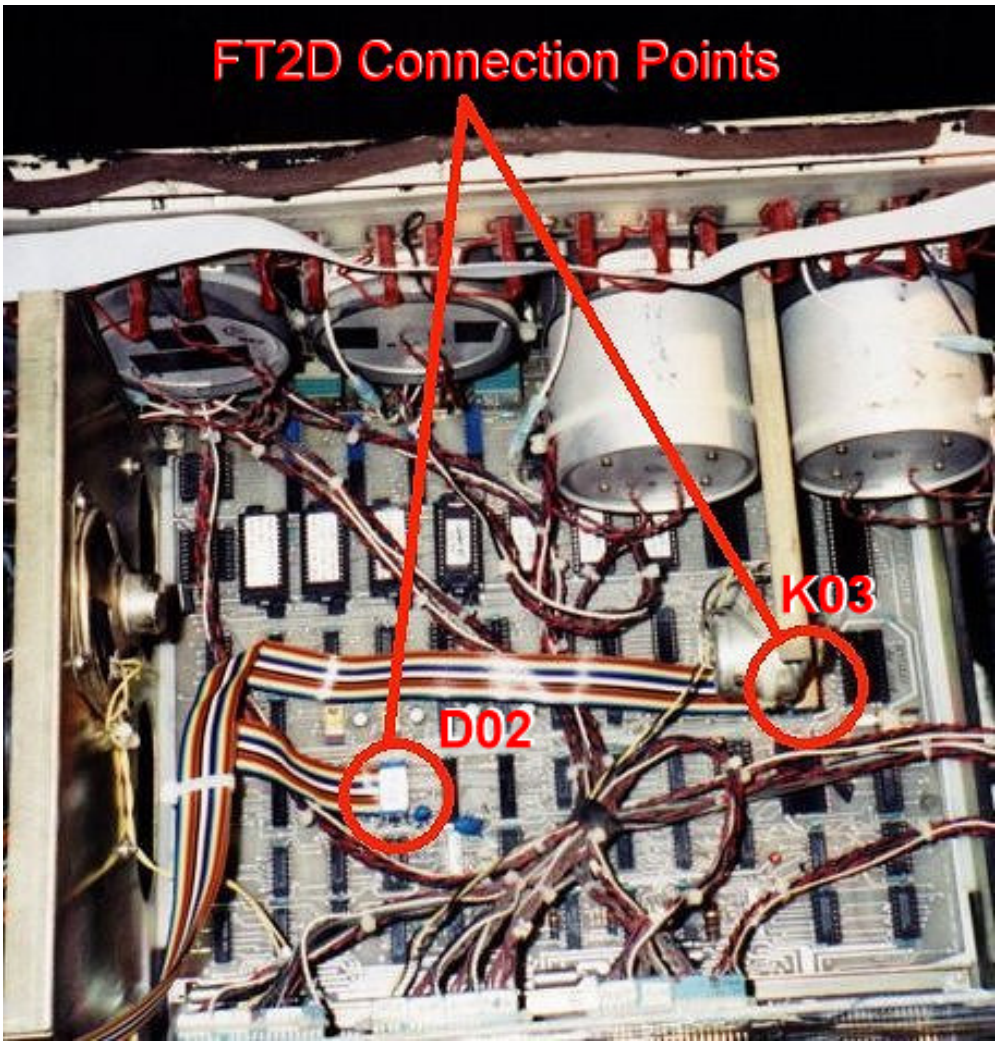


Figure 3.4

Step 10: Plug the two 16 pin ribbon cables into the FT2D interface taking care to connect them in the correct socket, and respecting the orientation. Refer to Figure 3.2 for the proper connections.

Step 11: Select a location within reach of the ribbon cables. Refer to Figure 3.6 for suggested location. Ensure that the location chosen does not restrict access for removal of any of the FTD's 4 cards and components.

Step 12: Using the drilling template supplied (see Appendix A), mark and drill four 9/64" diameter holes at the location selected in Step 10.

Step 13: Using the supplied screws, washers, spacers and nuts fasten the FT2D interface board to the holes drilled in Step 12. See Figure 3.5.

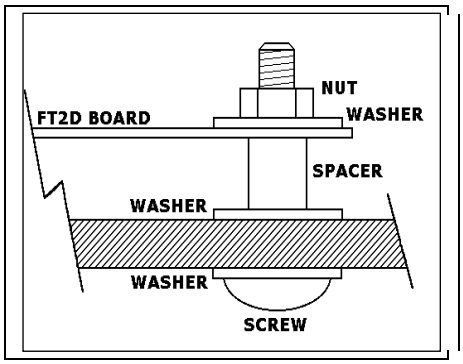


Figure 3.5

Step 14: Verify the installation making sure that all connections are solid and that the cabling does not interfere with anything. Tie wrap the cables if necessary. The completed installation is shown in Figure 3.6 below.

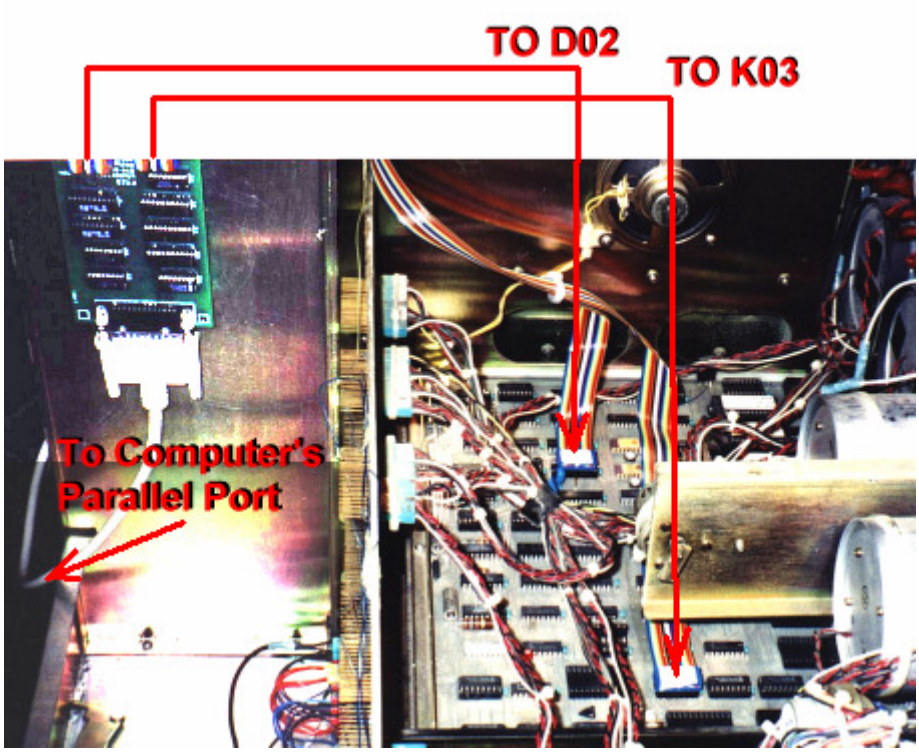


Figure 3.6

Step 15: Pass the female plug of the 25 pin cable through the hole on the left of the ATC810 rear swing down access panel.

Step 16: Tie a knot on the end of the 25 pin cable inside the ATC810 at the rear panel, leaving sufficient length to easily reach the FT2D interface board. In the event that the cable is accidentally pulled (such as someone tripping on it). The knot will act as a stop to prevent damaging the FT2D interface board.

Step 17: Close the rear panel on the ATC810 FTD.

Step 18: Connect the male end of the 25 pin cable to the computer's 25 pin female printer port located at the back as shown in Figure 3.7 below.

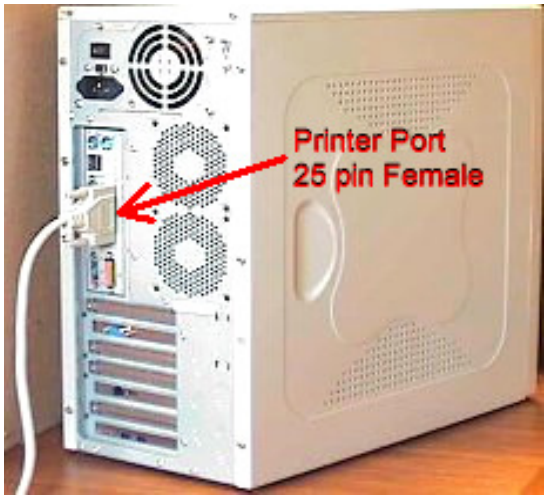


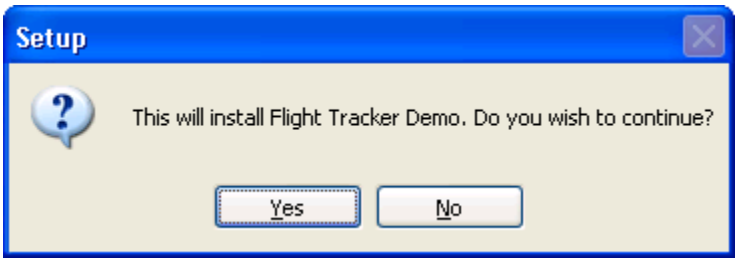
Figure 3.7

Step 19: Proceed to Section 3.2 to install the software.

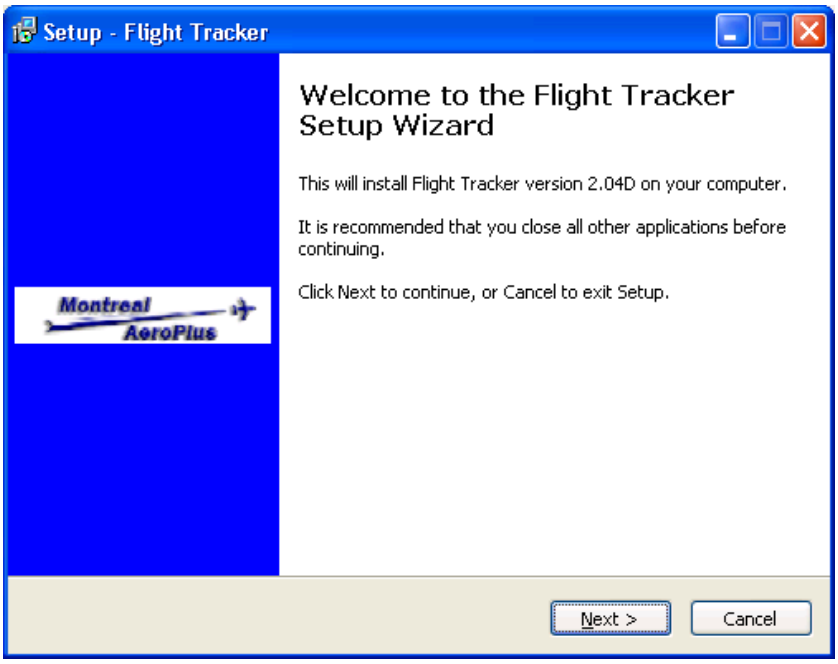
3.2 Software Installation

Step 1: Download the Flight Tracker Installer Software. Run the application 'Setup.exe'.

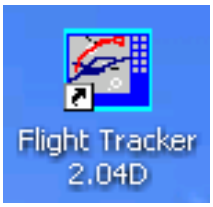
Step 2: Select "Yes" when the Setup confirmation dialog appears.



Step 3: Follow the install Wizard to complete the installation.



Step 3: When the installation is complete click on Finish on last dialog. The Flight Tracker system has now been installed on the computer's hard disk in the directory selected in the Install Wizard. The default location is C:\Program Files\Montreal AeroPlus\Flight Tracker . A new Program Menu is created on the Start-> Program File menu named "Flight Tracker" with the application FT 2.04D and Printio Driver Utility. The installation includes adding a shortcut on the desktop with the icon:



Step 3: If you wish to have Flight Tracker run automatically when the PC is turned on, then the icon can be copied by dragging into the computer's 'Startup' group.

Step 4: Start the Flight Tracker software by double clicking on the Flight Tracker ICON on the desktop or using the Start->Program File->Flight tracker and selecting Flight Tracker 2.04 D.

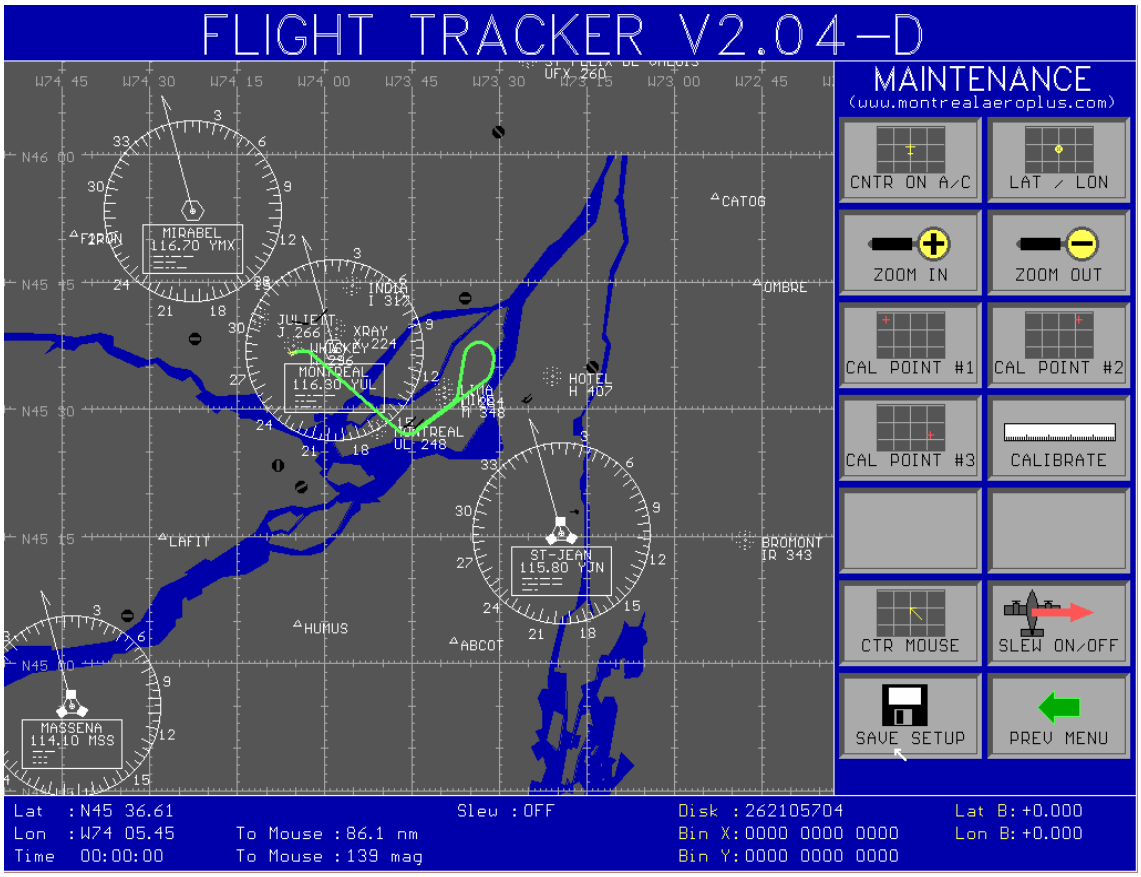
Step 5: On starting Flight tracker it will attempt to configure the computers graphics adapter card in 1024x768 resolution. If an error occurs the software will issue a message to restart Flight tracker then exit. Restart at Step 4 for up to two more attempts. After trying three different Graphics drivers a message will appear indicating that Flight Tracker is incompatible with the installed Graphics card. Contract Montreal AeroPlus customer support for further information. Trying a different graphics card may resolve the situation.

Step 6: Once started select the Maintenance Menu by selecting the Maintenance Icon and enter the password "PASSWORD" when prompted. Flight Tracker Maintenance functions are described in Section 4.0.

Step 7: Calibrate the system as described in section 5.0.

4.0 MAINTENANCE Menu Functions

The MAINTENANCE MENU contains the features needed to calibrate the Flight Tracker software. The calibration process sets up necessary internal calculations the Flight Tracker program will use to convert the data from the simulator into co-ordinates to be displayed on the map. The following figure shows the MAINTENANCE MENU display.



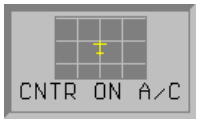
When the MAINTENANCE MENU is displayed, the following additional information is displayed.

Disk
The remaining disk space

Bin X and Y
This is the actual binary data received from the simulator if the digital system was installed.

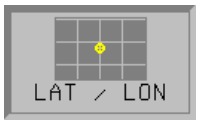
Lat B and Lon B
This represent the local offset applied when the slew function is used.

4.1 CNTR ON A/C



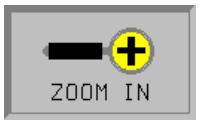
Selecting this button slews the entire map display such that the current aircraft position is located at the center of the screen.

4.2 LAT / LON



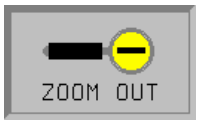
Selecting this button opens a window in the center of the map to enter the coordinates of the center of the map. Upon entering a valid position, the window will close and the map will slew such that the entered coordinates are at the center.

4.3 ZOOM IN



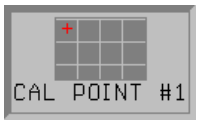
Selecting this function increases the scale of map display.

4.4 ZOOM OUT



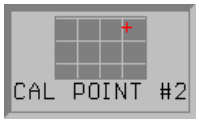
Selecting this button decreases the scale of map display.

4.5 CAL POINT #1



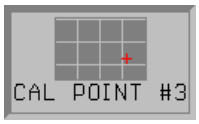
Selecting this button marks the first calibration point on the map. Note that if the map is zoomed or slewed the mark will not be redrawn but the location remains in effect for calibration purposes. Selecting this button once the calibration point has been marked will replace the old point with the newly selected one.

4.6 CAL POINT #2



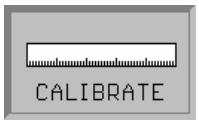
Selecting this button marks the second calibration point on the map. Note that if the map is zoomed or slewed, the mark will not be redrawn but the location remains in effect for calibration purposes. Selecting this button once the calibration point has been marked will replace the old point with the newly selected one.

4.7 CAL POINT #3



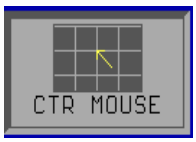
Selecting this button marks the third calibration point on the map. Note that if the map is zoomed or slewed, the mark will not be redrawn but the location remains in effect for calibration purposes. Selecting this button once the calibration point has been marked will replace the old point with the newly selected one.

4.8 CALIBRATE



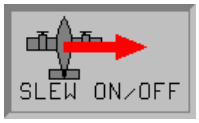
Selecting this button will execute the calibration process. All 3 calibration points must be defined before selecting this option. The new calibration takes effect immediately to draw the flight path on the map. Make certain that the three calibration points have been defined before selecting this button.

4.3.9 CTR MOUSE



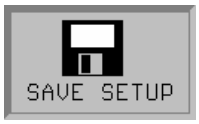
Selecting this button will slew the whole MAP to center on the position where the user place the mouse pointer and presses the left mouse button. The map will be redrawn and centered on the location where the mouse was clicked.

4.9 SLEW ON/OFF



Selecting this button will toggle the status of the slew function. The slew On/Off status is indicated in the lower center of the screen. When on, clicking the left mouse button on the map repositions the simulator to the location on the map pointed to by the mouse. This feature does not reposition the simulator itself, it is used to correct for minor position errors around a specific location. It should be used as the slew function was used on the mechanical plotter, which is to set the exact position of the simulator on the map.

4.10 SAVE SETUP



Selecting this button saves the calibration to a file so that it will automatically be used the next time Flight Tracker is run. If this button is not selected after the calibration process, the calibration will only be in effect until the program is exited.

4.11 PREV MENU

Selecting this button returns to the MAP menu.

5.0 CALIBRATION PROCEDURE

To calibrate the system, the position of three points must be accurately defined. From these three points, Flight Tracker makes the calculations to convert the signal from the simulator to the co-ordinates, which will be drawn on the map.

For best results the following recommendations should be followed if possible.

1) Try to select points, which form a wide triangle.
2) Avoid points, which tend to form a straight line
3) Try to select points where most of the training will be done such as a runway or VOR.

Step 1: Ensure that the slew function is on.

Step 2: Fly and freeze the simulator to the first known position e.g. a NDB or a VOR.

Step 3: Click on this first position on the map to slew the aircraft on the map to this position. If necessary the map may be zoomed or slewed in the same manner as from the MAP menu.

Step 4: Click on the CAL POINT #1 button. A marker will appear at this point on the map. If the incorrect point was accidentally selected, steps 1 to 4 can be repeated.

Step 5: Fly and freeze the simulator to the second known position.

Step 6: Click on this second position on the map to slew the aircraft on the map to this position. If necessary the map may be zoomed or slewed in the same manner as from the MAP menu.

Step 7: Click on the CAL POINT #2 button. A marker will appear at this point on the map. If the incorrect point was accidentally selected, steps 5 to 7 can be repeated.

Step 8: Fly and freeze the simulator to the third known position.

Step 9: Click on this third position on the map to slew the aircraft on the map to this position. If necessary the map may be zoomed or slewed in the same manner as from the MAP menu.

Step 10: Click on the CAL POINT #3 button. A marker will appear at this point on the map. If the incorrect point was accidentally selected, the steps 8 to 10 can be repeated.

Step 11: Click on the CALIBRATE button to use the three selected position to calibrate Flight Tracker.

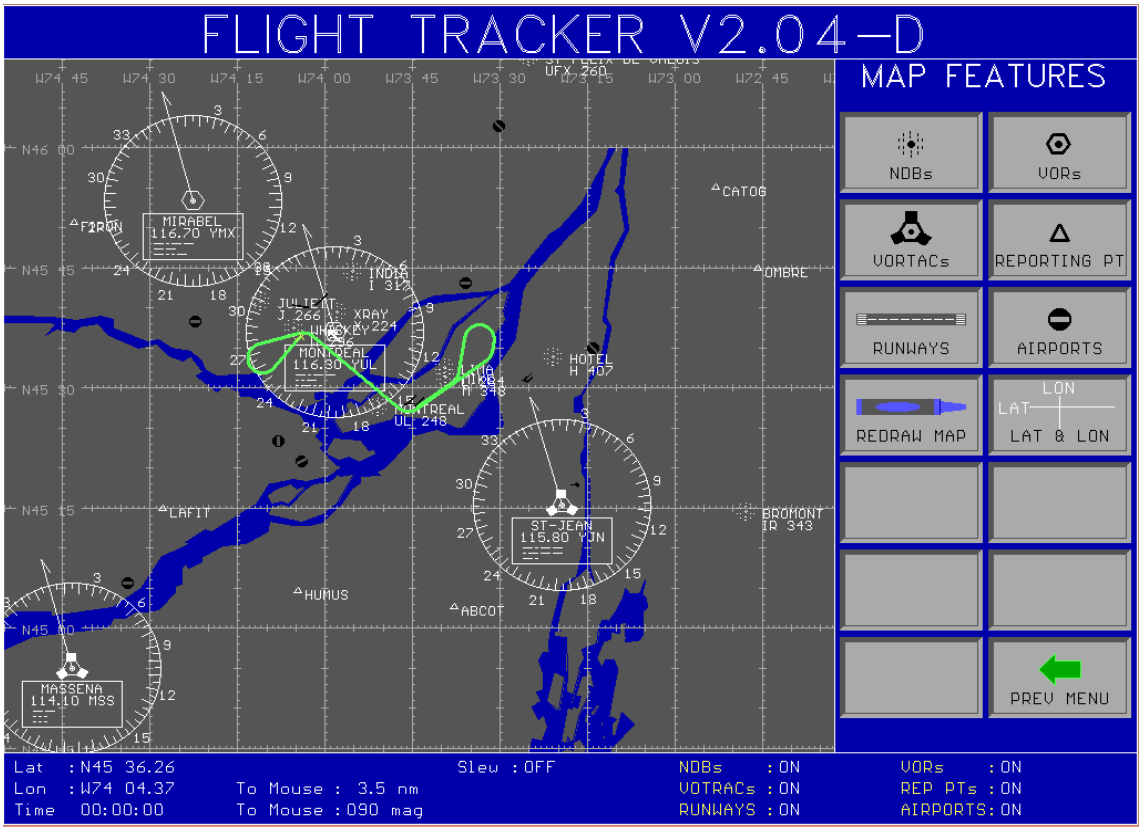
Step 12: Click on the SAVE SETUP button to save the calibration.

Step 13: Click on the SLEW ON/OFF button to turn off the slew function.

Step 14: Click on PREV MENU to return to the MAP menu.

5.1 MAP FEATURES Menu Functions

The MAP FEATURES Menu is used to select which features, such as VORs, NDBs, and airports, are to be displayed on the map. Each button acts as a toggle to select or deselect each feature. The lower right portion of the screen lists each feature and their display status. The following figure shows the MAP FEATURES display. The REDRAW MAP button must be selected for the changes to take effect.



6.0 Customizing the Map Features

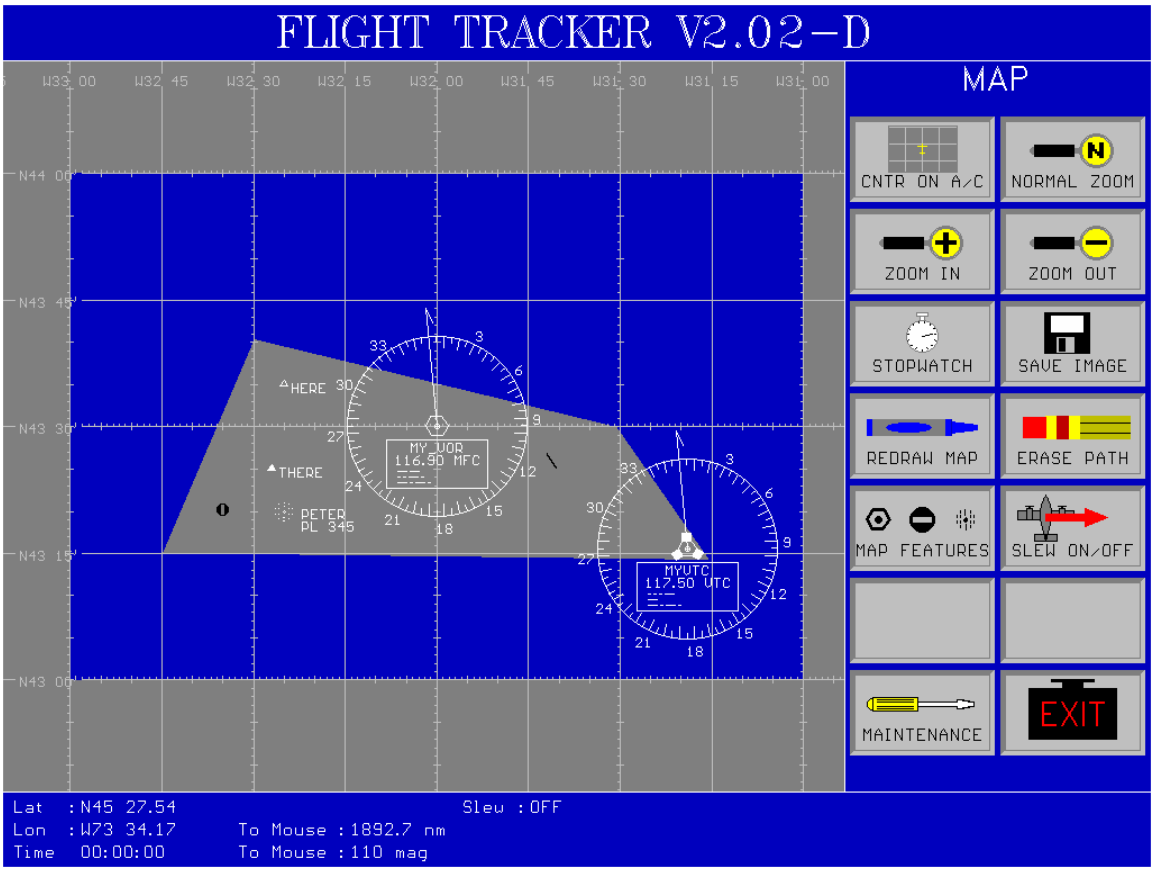
The map geography and features such as airports and beacons are each stored in files, which are read as required to display on the screen. The file-name describes the area it applies to, and the extension describes the type of data in the file. Each file covers an area of two degrees longitude and one degree latitude. The file-name is based on the south-east corner of the area. The longitude must be an odd number. For example the file N44_W073.VOR contains all VORs for the region ranging from 44 to 45 degrees latitude and west 73 to 75 degrees longitude. The file names always have an 8 character core name.

The following is a list of the different files for the area ranging from north 43 to 45 degrees latitude and west 31 to 33 degrees longitude. Since the spacing is important in these files, it is recommended that an existing file be used as a template to create new ones. Make certain that there is always a carriage return after the last line of these files. This example may be viewed by going to the MAINTENANCE MENU, selecting MAP CNTR button, and entering the center of the map as N43.50 and W 32.00.

N43_W031.MAP	map geography including land and water
N43_W031.VOR	VORs
N43_W031.VTC	VORTACs
N43_W031.NDB	Non Directional beacons
N43_W031.REP	Reporting points
N43_W031.AIR	Airports
N43_W031.RUN	Runways

The contents of these files will be described through the development of a hypothetical island in the Atlantic Ocean with all these features.

6.1 Creating a MAP File



(Note the above image is from a previous revision of Flight Tracker but the procedure described below will work in Fight Tracker 2.04D)

The MAP files contains a list of latitude and longitude pairs defining the contour of a body of land or water, terminated by a string to specify if the contour is defining land or water. The map file N43_W031.MAP is as follows:

```
W 31 00.0 N 43 00.0 1
W 31 00.0 N 44 00.0 2
W 33 00.0 N 44 00.0 3
W 33 00.0 N 43 00.0 4
B  0 00.0 X  0 00.0 0
W 32 45.0 N 43 15.0 1
W 32 30.0 N 43 40.5 2
W 31 30.5 N 43 30.0 3
W 31 15.3 N 43 14.2 4
G  0 00.0 X  0 00.0 0
X  0 00.0 X  0 00.0 0
```

The first four lines are the co-ordinates of corners of the area covered by this file.

Notice that each line ends with a sequence number. There is no limit to how many bodies of land or water may be defined in this file but each one can only have up to 100 points defining it. The fifth line is a dummy line to indicate that the points up to that point form the contour of an area which should be filled in blue as indicated by the letter B.

The next four lines are the co-ordinates, which make up the contour of the island. Again, each line is ended with a sequence number. There can be up to 100 sets of co-ordinates defining any area of land or water. These lines are followed by a dummy line to indicate that the points up to that points form the contour of an area which should be filled in grey as indicated by the letter G.

The last line is a dummy line to mark the end of the map file. Do not forget to press <ENTER> after this line.

6.2 Creating a VOR File

The VOR file contains all the data necessary to place the VOR stations on the map. The file may contain any number of VORs, each defined by its own line. The N43_W031.VOR file is as follows:

```
VOR NAV AIDS
Ind Freq  Name              Lat        Long       Var
MFC 11690 MY_VOR            N 43 30.0 W 32 00.0 W 5
```

The three letters define the ident, this will be drawn under VOR station and will be used to draw the Morse code ident as well. The frequency is five characters long, note that the decimal place is omitted. The name may not contain any blank spaces, it is recommended to use an underscore '_' or dash '-' if one is required. The final elements are the latitude, longitude and magnetic variation at the VOR station. Additional VORs may be entered on sequential lines. Do not forget to insert a carriage return after the last line.

6.3 Creating a VORTAC File

The VORTAC file contains all the data necessary to place the VORTAC stations on the map. The file may contain any number of VORTACs, each defined by its own line. The N43_W031.VTC file is as follows:

```
VORTAC NAV AIDS
Ind Freq  Chan Name              Lat        Long       Var
VTC 11750 122  MYVTC            N 43 15.6 W 31 18.9 W 5
```

The three letters define the ident which will be drawn under VORTAC and will be used to draw the Morse code ident as well. The frequency is five characters long, note that the decimal place is omitted. The name may not contain any blank spaces, it is recommended to use an underscore '_' or dash '-' if one is required. The final

elements are the latitude, longitude and magnetic variation at the VORTAC station. Additional VORTACs may be entered on sequential lines. Do not forget press <ENTER> after the last line. 6.4 Creating an NDB File

The NDB file contains all the data necessary to place the NDB stations on the map. The file may contain any number of NDBs, each defined by its own line. The N43_W031.NDB file is as follows:

```
NDB NAV AIDS
Id Chan    Name                Lat       Long
PL  345    PETER               N 43 20.0 W 32 25.0
```

The first letters define the ident, which will be drawn next to the NDB. This is followed by the frequency. The name may not contain any blank spaces, it is recommended to use an underscore '_' or dash '-' if one is required. Finally the latitude, longitude and magnetic variation at the NDB station. Additional NDBs may be entered on sequential lines. Do not forget to press <ENTER>after the last line.

6.5 Creating an AIR File

The AIR file contains all the data necessary to place small single runway airports on the map. The file may contain any number of airports, each defined by its own line. The N43_W031.AIR file is as follows:

```
AIRPORTS
Nane                Lat         Long        Rwy Var
MY_AIRPORT          N 43 20.20 W 32 35.10 18  W 5
```

The name may not contain any blank spaces, it is recommended to use an underscore '_' or dash '-' if one is required. This is followed by the latitude, longitude and magnetic variation at the airport. The runway number can be either runway, for example 18 or the reciprocal 36, it is used to draw the symbol with the correct orientation. The magnetic variation at the airport is the last element in the line. Additional airports may be entered on sequential lines. Do not forget to press <ENTER>after the last line.

6.6 Creating a RUN File

The RUN file contains all the data necessary to place larger runways on the map. The file may contain any number of runways, each defined by its own line. The N43_W031.RUN file is as follows:

```
RUNWAYS
Nane                Lat        Long       Rwy Var  Width Length
MY_RUNWAY           N 43 25.00 W 31 40.05 330 W 5  200   12000
```

The name may not contain any blank spaces, it is recommended to use an underscore '_' or dash '-' if one is required. This is followed by the latitude, longitude and magnetic variation at the threshold. The runway heading is in the direction from the threshold, it is used to draw the runway in the correct direction. The magnetic variation at the airport is the last element in the line. The last two elements are the runway length and width in feet. Additional runways may be entered on sequential lines. Do not forget to press <ENTER>after the last line.

6.7 Creating a REP File

The REP file contains all the data necessary to place triangular reporting points on the map. The file may contain any number of reporting points, each defined by its own line. The N43_W031.REP file is as follows:

```
REPORTING POINTS
Fill Name               Lat       Long
0    HERE               N 43 35.0 W 32 25.0
1    THERE              N 43 25.0 W 32 27.0
```

The first element contains a 1 or a 0. A 1 indicates that the symbol should be filled with a solid colour while a 0 indicates that it should drawn as an outline only. The name may not contain any blank spaces, it is recommended to use an underscore '_' or dash '-' if one is required. This is followed by the latitude and longitude. Additional reporting points may be entered on sequential lines. Do not forget to press <ENTER>after the last line.

7.0 Frequently Asked Questions

Question : Why is the MAINTENANCE MENU protected by a password?
Answer : The MAINTENANCE MENU is protected by a password to avoid accidental changing of the calibration of other setup parameters. There are no features in the MAINTENANCE MENU that would be normally be used during pilot training.

Question : Can I reposition the FTD's simulated aircraft using the computer?
Answer : No. Like the plotter, Flight Tracker only receives data from the simulator. Flight Tracker does not affect or control the simulator in any way.

Question : Why is the flight path a bit off over some points?
Answer : This is due to minor variations in the output from the simulator. Like the plotter, one may have to adjust the pen position to place it exactly in the correct position. The slew feature is allows one to correct these minor errors at a specific location such as a VOR to practice holding patterns, or the runway for an ILS approach.

Question : When I zoom in enough the flight path is a zigzag line, why?.
Answer : If you zoom in sufficiently, you will actually see the path being drawn in the smallest distance increments calculated by the simulator, except for flying exactly true north, south, east or west, this will result in the flight path appearing as a zigzag line when extreme zoom is used.

8.0 Technical Support

All technical support issues can be submitted at any time by email at the following address:

Support@MontrealAeroPlus.com

Web Site:

http://www.MontrealAeroPlus.com

Please note that all issues will be dealt with on a priority basis

Appendix A Drilling Template

Use the following template to locate the mounting holes for the FT2D digital interface.