WOODWARD

Electronic Maintenance Terminal (EMT)

User's Manual

Manual 91378

Contents

Appendices

1   Introduction

This manual is intended to aid the process of installing and setting up the EMT as tailored for use on the Williams International FJ44-2A engine during field service. The detailed descriptions of each EMT feature or how to use them are available on the EMT as on-line help. This manual contains instructions on how you can get to the EMT on-line help.

Warning

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment. Practice all plant and safety instructions and precautions. Failure to follow instructions can cause personal injury and/or property damage.

Product Review

This FJ44-2A EMT is designed to acquire, modify, and record data from the FJ44 engine's Electronic Control Unit (ECU) during in-service flight of an Electronic Fuel Control Unit (EFCU) system.

The FJ44-2A EMT implements security measures to tailor the full EMT functionality for applicable users. For more information about what features are available, see section titled *EMT Features*.

User Interface

The EMT user interface is designed to standardize with other Windows application programs. You can use all the Windows features that you are used to such as opening, moving, resizing, minimizing and maximizing windows. If you are not familiar with any of the Windows features, please refer to the *Microsoft® Windows™ User's Guide* or *Microsoft® Windows™ On-line Help.*

Hardware and Software Requirements

The EMT has the following minimum requirements:

- IBM-compatible 486-100 CPU or greater.
- Minimum software operating environment: DOS 6.2 with Windows 3.1x or Windows 95.
- 8MB RAM
- One 16550 UART serial port.
- TurboCom/2 software (required for operating EMT at high speed under Windows 3.1x)
- Minimum 640x480 VGA display
- 200MB hard drive
- CD-ROM (For installing software)
- Pointing device such as mouse, trackball, etc.

Conventions

This manual uses the following conventions to identify certain types of information.

Convention	Description
Menu Command	Indicate menu.
Type Text	Indicate text to be typed.
Italics	Indicate title of a chapter, section or even another document.
SHIFT+CTRL	Indicate keys on the keyboard. The plus sign (+) indicates that you should hold down the first key while pressing the second.

Abbreviations and Acronyms

This manual uses the following abbreviations and acronyms.

ECU	Electronic Control Unit
EFCU	Engine Fuel Control Unit
EMT	Electronic Maintenance Terminal
IBM	International Business Machines®
PC	IBM® Compatible Personal Computer
MB	Megabytes
RAM	Random Access Memory
UART	Universal Asynchronous Receiver/Transmitter
S/N	Serial Number

2   Getting Started

Introduction

This chapter explains how to install the EMT and to remove it from your systems. It also describes the steps the setup program will undertake during the installation process.

Installing EMT

To Install EMT, you must have Microsoft® Windows running.

To Begin Setup from Microsoft® Windows 3.1x
1.   Insert the EMT installation diskette/Compact Disk (CD).
2.   Select the Windows Program Manager or File Manager.
3.   Choose Run from the File menu.
4.   Browse for the diskette/CD-ROM Drive.
5.   Select and open SETUP.EXE.
6.   Select OK in the Run Command Line box.

To Begin Setup from Microsoft® Windows 95
1.   Insert the EMT installation diskette/CD.
2.   Choose Run from the Start button on the Taskbar.
3.   Browse for the diskette/CD-ROM Drive.
4.   Select and open SETUP.EXE.
5.   Select OK in the Run Command Line box.

Installation Overview

The setup program will do the following steps during the installation process.
1.   Display the version number and the Woodward part number of the EMT you are installing. If this is the incorrect EMT version, click the Cancel button to quit the setup program.
2.   Prompt you for the group name where the icons will be created. The default is WGC Applications. You can type a new group name or select an existing group from the list button.
3.   Prompt you for the location for the EMT files with the default location of the EMT. You can change the location if you wish to install the EMT into a different location.

     Note: If you are upgrading, then you must use the existing EMT directory.

4.   Check for adequate free space on the drive you have chosen.
5.   Copy the EMT files to the location you have chosen.
6.   Create icons in the group you have specified in step 2 in the Program Manager (Windows 3.1x) or the Start Menu (Windows 95).
7.   Display the README.TXT file.

If you are just upgrading the EMT, you may start the EMT by double clicking on the EMT icon in the WGC Applications group window. Otherwise, for a new EMT installation you must first install an ECU build before running the EMT.

Installing ECU Builds

If this is the first time you are setting up your system for the EMT, you need to install an ECU build. To install the ECU build, follow the instructions for installing the EMT but use the ECU build installation diskette/CD instead.

Important: You must specify the same location in which the EMT is installed.

Uninstalling EMT

The setup program installs an icon for removing the EMT from your system. To remove the EMT, double click on the icon.

Note: The uninstall process does not remove any of the ECU builds from the system. Remove the ECU builds first using the EMT's *Remove ECU Configuration* feature (see online help for more information) before uninstalling the EMT.

Where To Go From Here

If you are installing the EMT for the first time, you might need to configure the communication port (serial port) that the EMT uses to interact with the ECU. The default serial port is COM 1. If you wish to use another serial port, please refer to *Configuring EMT* section below. However, if you are new to the EMT or unfamiliar with the EMT startup procedure, please proceed to the next chapter entitled *EMT Overview* first.

Configuring the EMT

The EMT uses the PC's serial COM port to communicate with the ECU. *Appendix B* shows the pin layout of the COM port.

Setting the COM port
1. Double click on the EMT icon in the WGC Applications group to start the program.
2. Chose the Select Com Port subcommand of the Admin Utilities under Utilities menu. A dialog with a choice of COM ports will appear.

   Note: You must have the proper password level in order to select the menu. Otherwise, it is grayed out.
3. Select the COM port that is to be used for communicating with the ECU. It will not allow you to select a COM port that is already used by another device such as a mouse, modem, etc.

Installing TurboCom/2

The EMT requires the TurboCom/2 software in order to operate at high speed (communicating with the ECU at 115.2Kbps) under Windows 3.1x. This software is not required if the PC operating system is Windows 95.

To install TurboCom/2:
1. Insert the TurboCom/2 diskette into a floppy drive.
2. Select the Windows Program Manager or File Manager.
3. Choose Run from the File menu.
4. Type A:\SETUP.EXE in the Command Line box.

For further information, please refer to the TurboCom/2 User's Guide.

3   EMT Overview

Introduction

This chapter explains the start up procedure of the EMT. It also describes how you can get more help about the EMT or the task at hand while running the EMT.

Starting EMT

To run the EMT from any Windows system, double click on the EMT icon (shown on the left) on the WGC Applications group created by the setup program. (see section **Installation Overview** on page 5). In Windows 95 you may run the application from the Start Menu: click on **Programs**, then **WGC Applications**, then click on **EMT**.

The EMT can load the appropriate ECU build configuration files upon connecting to the ECU. This feature uses the part number of the ECU Control software. However, if the matching ECU build is not installed in the system or connection could not be established within a certain amount of time, the EMT will display the cause of failure and then quits.

Startup Overview

The EMT startup procedure is as follows.
1.   Establish connection with the ECU.
2.   Get the part number of the ECU Control software.
3.   Match the part number of the ECU Control software with all the ECU builds installed in the system.
4.   If a match is found, then it loads configuration files of that matching ECU build.
- otherwise -

If no match is found or fail to connect to the ECU within allocated time, the EMT will take the following actions.
   i.   Display the reason for failing to select the appropriate ECU configuration.
   ii.   Ask the user to choose an ECU software build to be uploaded.
5.   Log into Level 1 (see section below, *EMT Features*).

EMT Features

As mentioned at the beginning of this manual, the EMT features are documented in the on-line help. If you have not used an on-line help before or are unfamiliar with the EMT help system, please proceed to the section entitled *Getting Help* below.

The table on Pages 7 thru 10 summarizes the features available at a particular password level.

The following are the default passwords (non case sensitive):
   •   Level 1 - tech
   •   Level 2 - admin
   •   Level 3 - bill

Remember to change these passwords immediately after installation. Refer to the on-line help for instructions to change password.

Features	No Password	Level 1	Level 2	Level 3
Utilities:				
Change Password				Y
Validate EMT Files				
Remove ECU Configurations				Y
Change COM Port		Y	Y	Y
Change File Location		Y	Y	Y
Upload:				
RAM		Y	Y	Y
Build		Y	Y	Y
Bootstrap		Y	Y	Y
ECU Information:				
Change Fan Cycle Count			Y	Y
Change Flight Cycle Count			Y	Y
Change Flight Number			Y	Y
Change High-pressure Compressor Cycle Count			Y	Y
Change High-pressure Turbine Cycle Count			Y	Y
Change Low-pressure Turbine Cycle Count			Y	Y
Change Takeoff Count			Y	Y
Change Serial Number			Y	Y
Change ECU Run Time			Y	Y
Read Fan Cycle Count			Y	Y
Read Flight Cycle Count			Y	Y
Read Flight Number			Y	Y
Read High-pressure Compressor Cycle Count			Y	Y
Read High-pressure Turbine Cycle Count			Y	Y
Read Low-pressure Turbine Cycle Count			Y	Y
Read Takeoff Count			Y	
Read Serial Number		Y	Y	Y
Read ECU Run Time			Y	Y
Variable Monitoring:				
Limited			Y	Y

Features	No Password	Level 1	Level 2	Level 3
Text		Y[1]		Y
Bar Graph				Y
Strip Chart				Y
Variable Modification				
Data Logging:				
Limited			Y	Y
Normal				Y
Remote				
Maintenance Data Display (BIT):				
Read		Y	Y	Y
Clear		Y	Y	Y
Save		Y	Y	Y
BIT Disable				
Read				Y
Modify				Y
Circuit Trim Values				
(Read Only)				Y
Circuit Trim Schedule				
Read from ECU				Y
Write to ECU				Y
Control Law Schedule:				
Read from ECU				Y
Write to ECU				Y
Transient Records:				
Read				
Clear				
Save				

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[1] Only CED_PLA and MIN_PLA are available.

Features	No Password	Level 1	Level 2	Level 3
Trend Records:				
Read		Y	Y	Y
Clear			Y	Y
Save		Y	Y	Y
Exceedence Records:				
Read		Y	Y	Y
Clear			Y	Y
Save		Y	Y	Y

Getting Help

The EMT has an on-line Help system, similar to other Windows application programs. You can get help about the EMT or the task you are working on. If you are unfamiliar with the Windows Help, you can choose Using Help from the Help menu of the EMT main window.

Get Help About EMT

1. If the EMT main window is not active, click in the EMT main application window.

2. Press the F1 key or select Index from the Help menu. This brings up the contents of the help reference.

Get Help About the Task At Hand

1. Click in the window that you want help on if it is not already active.

2. Press the F1 key. This brings up the help for the active window.

Note: The F1 key not only applies to windows, it also applies to dialogs. In a dialog, press F1 or select the Help button (if available).

Get Help From the Context-Sensitive Button

1. Click on the button as shown on the left on the toolbar. The cursor turns into the image of the button.

2. Click on anything you have questions about such as the buttons on the toolbar or the menu commands.

Shortcut: Pressing SHIFT+F1 is the same as clicking the context-sensitive button.

4 Troubleshooting

When problems are encountered when installing the EMT on a PC, first refer to Appendix A for potential solutions. For any additional problems or issues encountered with installation or other use of the EMT, utilize the following Problem Report form for documenting the problem for Williams International.

EMT Problem Report

Title:

_____

EMT Version # (from "About EMT" screen): _____

EMT Part #   (from "About EMT" screen): _____
Selected ECU Configuration (from "About EMT" screen):

_____
PC System Processor-type: _____   PC System
Memory: _____ MB

Operating System: ___ Windows 3.x   ___Windows 95

Problem Description:

Requested By: _____ Date: _____

Return completed form to:
Customer Support Manager
c/o Williams International
2280 W. Maple
PO Box 200
Walled Lake, Michigan
48390

Appendix A Installation Questions

Q1. The EMT flashes and quits when I run the program.

The EMT is not configured for any ECU builds. Make sure you install at least one ECU build after installing the EMT for the first time in your system. Please refer to chapter 2 on *Getting Started*.

Q2. Can I install the ECU builds first before installing the EMT?

No. You must install the EMT first before installing any ECU builds.

Q3. Can I move the ECU builds into another directory?

No - see Q4.

Q4. I moved the ECU build into another directory. When I run the EMT program, I get an error message saying that the EMT files has been found to be invalid and contact the EMT administrator.

Once you have installed an ECU build into a location of your choice during installation, you cannot move the ECU build files to another location. If you want to move an ECU build to another directory, you would have to remove the ECU build first and then re-install it again into that directory. Refer to *How do I remove an ECU build* on the EMT on-line help for more details on removing an ECU build.

Q5. I have tried everything as instructed in the manual but still fail to run the EMT.

Try starting all over again.

Appendix B   RS-232 Serial Port Layout

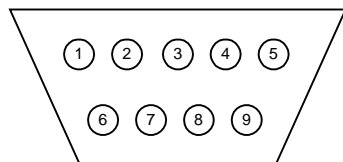The EMT uses only pins 2, 3, and 5 for communicating with the ECU.

Figure 1. Pin numbers of the serial port.

Pin	Signal	I/O	Definition
1	DCD	I	Data carrier detect
2	SIN	I	Serial input
3	SOUT	O	Serial output
4	DTR	O	Data terminal ready
5	GND	N/A	Signal ground
6	DSR	I	Data set ready
7	RTS	O	Request to sent
8	CTS	I	Clear to send
9	RI	I	Ring indicator

Table 1. Pin assignments for the serial port.[2]

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[2] From the User's Guide of a Dell® XPS 486 systems. It should equally apply to any IBM® compatible systems.

How to Contact Woodward

In North America use the following address when shipping or corresponding:
>   Woodward Governor Company
>   PO Box 7001
>   5001 North Second Street
>   Rockford, IL 61125-7001, USA
>
>   Telephone—+1 (815) 877-7441 (24 hours a day)
>   Toll-free Phone (in North America)—1 (800) 523-2831
>   Fax—+1 (815) 639-6033

You can also contact the Woodward Customer Service Department or consult our worldwide directory on Woodward's website (**www.woodward.com**) for the name of your nearest Woodward distributor or service facility. [For worldwide directory information, go to
http://www.woodward.com/AES/overview/locations.cfm]

Engineering Services

Woodward AES Engineering Services offers the following after-sales support for Woodward products. For these services, you can contact us by telephone, by e-mail, or through the Woodward website.

- Technical Support
- Customer Training
- Field Service

Contact information:
>   Telephone—+1 (815) 877-7441
>   Toll-free Phone (in North America)—1 (888) 273-8817
>   E-mail—woodward@woodward.com
>   Website—**www.woodward.com/aes**

WOODWARD

Woodward/Aircraft Engine Systems
PO Box 7001, Rockford IL 61125-7001, USA
5001 North Second Street Rockford IL 61125, USA
Phone +1 (815) 877-7441 • Fax +1 (815) 639-6033

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