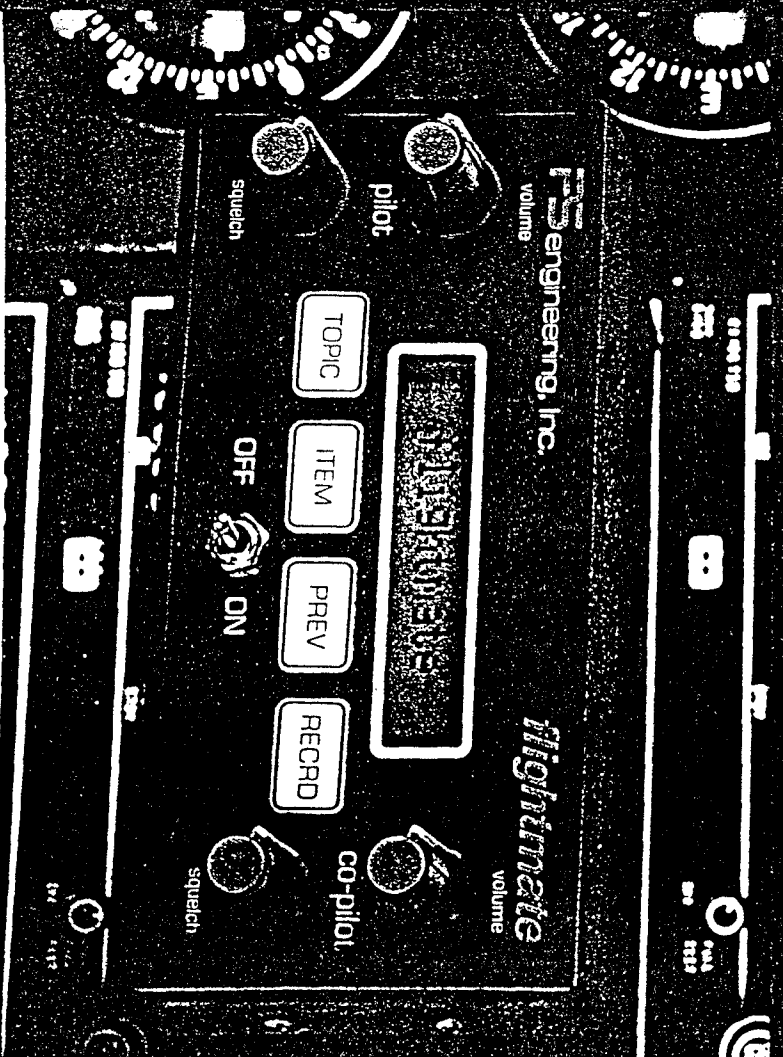




flightmate[®]



**OPERATOR'S
AND
INSTALLATION
MANUAL**

FORWARD

Thank you for choosing the Flightmate checklist and intercom system. Flightmate is designed with the latest technology in digital processing to provide a computerized checklist, and includes the following advanced features:

- * Recording time up to 2 minutes; expandable to 4 minutes.
- * Maximum checklist topics is 16.
- * Up to 31 voice/display items per topic.
- * Minimum of two months of data retention.
- * 20 minutes battery-powered operation. (minimum)

Please read this manual carefully before using your Flightmate. With proper care, Flightmate will provide years of dependable and enjoyable use.

WARNING

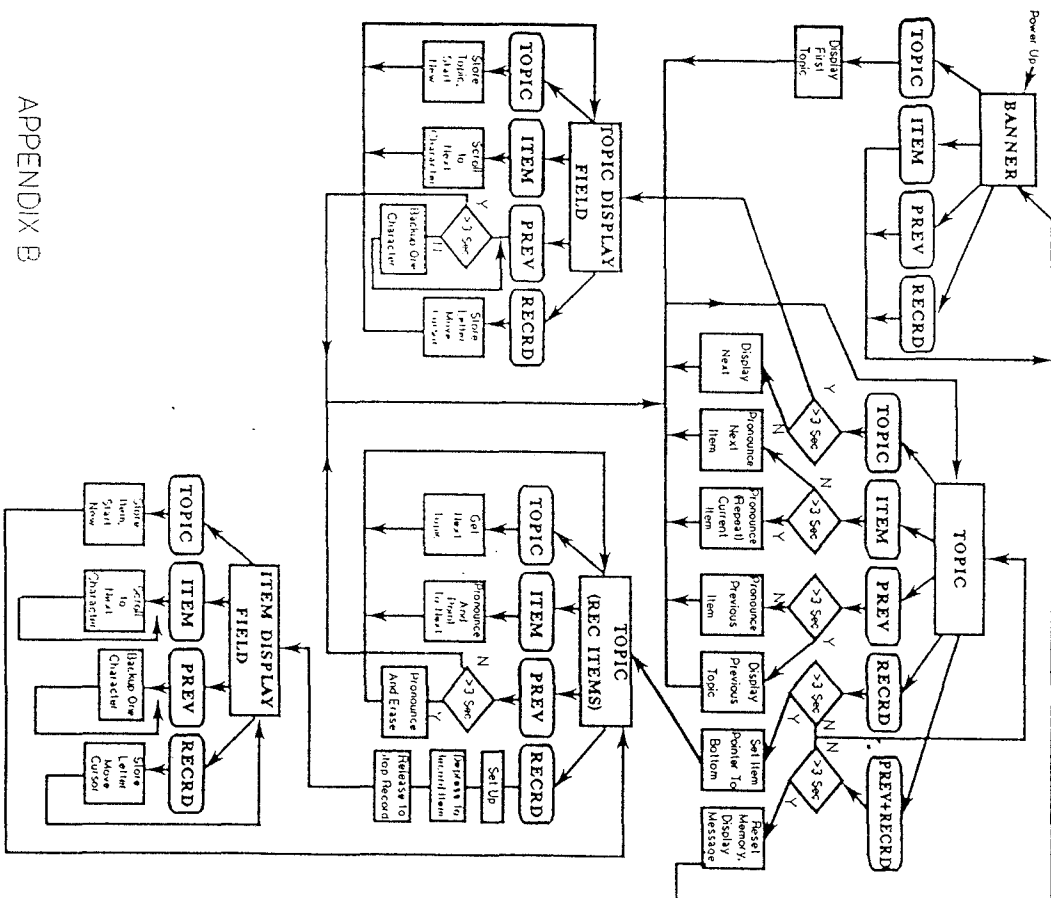
If the supplied cigarette lighter power plug and cord is not use, there MUST BE installed a fuse use of 1.0 Amp slow blow type. Serious damage to the Flightmate may occur without this installation.

PACKING LIST

Upon receipt of your new Flightmate checklist system, inspect the package and unit for any damage that may have occurred during shipment. Verify that the package contains the following items:

Contents	Qty.
1) Flightmate checklist system unit.....	1
2) Operating and Service manual.....	1
3) Cigarette lighter power cord.....	1
4) Remote "ITEM" switch & cable.....	1
5) Mounting bracket w/screws.....	1

FLIGHTMATE FLOW DIAGRAM



APPENDIX B

Section	Page
---------	------

I GENERAL INFORMATION

1-1. Introduction	3
1-2. Checklist System	3
1-3. Intercom	3
1-4. Control Functions	4
1-5. Battery	5
1-6. Character Set	5

II INSTALLATION

2-1. Mounting Location	6
2-2. Electrical Connection	6
2-3. Push-to-Talk Switch (PTT)	6
2-4. Remote Item Switch	7
2-5. Auxiliary Input	7

III OPERATION

3-1. Introduction	8
3-2. Front Panel Operation	8
On/Off Switch	8
Intercom Controls	8
Checklist Keys	9
3-3. LCD Contrast Adjustment	9
3-4. Powerup	9

IV PROGRAMMING

4-1. Introduction	10
4-2. Creating Topics	11
4-3. Recording Items	12
4-4. Inserting Items	13
4-5. Deleting Items	15
4-6. Using the Checklist	15

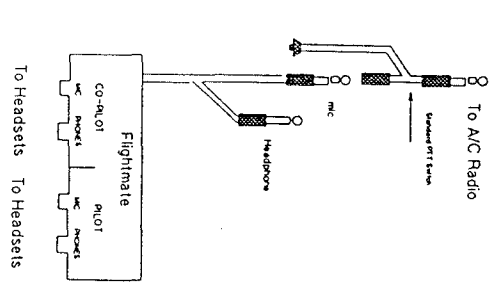
V MAINTENANCE AND WARRANTY

5-1. Maintenance	16
5-2. Warranty	16

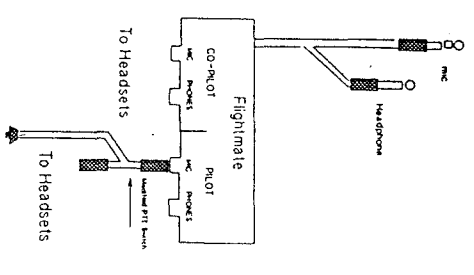
APPENDIX A: PTT Modification and Configurations	17
---	----

APPENDIX B: Front Panel Key Logical Flow Diagram	18
--	----

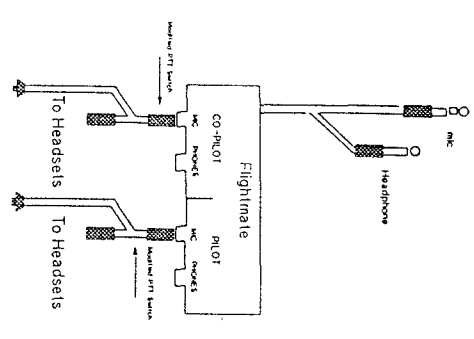
To A/C Radio



Configuration 2



Configuration 3



CASE I: The PTT is built into the yoke. Simply install the plugs from the headset into the flightmate and the interface cable from the flightmate into the aircraft radio jacks. If the co-pilot wishes to transmit, a modified PTT switch on the co-pilot side is required.

CASE II: No built in PTT switch. A modified PTT switch is required for both the pilot and optionally for the co-pilot. See description below.

CASE III: Built in PTT on pilot side and want the co-pilot to be able to transmit. Because there is a switching relay inside the flightmate, it will be required that the co-pilot have installed a modified PTT switch.

PTT switches when received from the manufacturer are wired in such a way as to open the microphone connections to the radio when the PTT is not pressed. This prevents the audio to pass to the intercom. If the PTT is placed in between the headset and the flightmate, it will be necessary to modify the PTT switch for proper operation. Below is a description of the modification for several PTT switches. This modification does not alter normal operation of the PTT.

David Clark PTT modification is accomplished by unscrewing the black plastic cover of the jack portion of the PTT. Connect the joined black wires to the red wire. For the Telex's

Telex PT-200, unscrew the black plastic cover of the jack portion of the PTT, then cut the red wire and solder both ends to the ground lug of the PTT jack.

Telex PT-300 or look a jikes are modified by unscrewing the black plastic cover of the jack portion of the PTT and solder the joined black wires to the ring lug. This lug has white wire already soldered to it.

SECTION I

GENERAL INFORMATION

1-1. Introduction

Flightmate is a self-contained integrated checklist and intercom system. The unit provides a solution for pilots to increase safety and comfort in the cockpit environment. Flightmate allows a pilot or co-pilot to queue up aircraft checklist topics on an alphanumeric display and listen to pre-recorded items for each topic. It interfaces to the aircraft radio and provides use of two headphones, with expansion to four headphones available. The unit provides an intercom for communication between pilots and passengers, along with an external audio input.

1-2. Checklist System

The checklist system can be programmed to match your aircraft checklist in every detail. Your aircraft checklist is organized as major topics, with a list of items under each topic. Topics are displayed on the front panel alphanumeric display and item names are stored both as displayed items and speech in the internal memory. With the use of electronic memory there are no tapes or moving parts to wear out.

1-3. Intercom

Flightmate provides a voice-activated intercom and aircraft radio interconnect system. When the intercom is used, the pilot and co-pilot can communicate to each other or listen to an auxiliary audio input, ie. entertainment/music. An expansion unit (Telecom) can be installed to provide two additional channels for passengers. A push-to-talk (PTT) switch can be used to activate aircraft radio transmissions.

SECTION V
SERVICE AND WARRANTY

5-1. Maintenance

The Flightmate requires little maintenance other than normal care given to electronic devices. The extruded aluminum case is finished by an electrostatic paint process that should afford years of durability. However, damage may occur if the unit is dropped onto hard surfaces.

The lead-acid batteries can maintain checklist memory for at least two months without re-charging. These batteries internally discharge slowly over a period of several months. It is recommended that the unit be powered up for 30 minutes once a month for charging.

CAUTION

The Flightmate should not be exposed to direct sunlight for extended periods, as the batteries tend to self-discharge more rapidly at higher temperatures. If the aircraft is stored outside, protection must be observed to prevent direct sunlight conditions.

5-2. Warranty

Flightmate is warranted against defects in materials and workmanship for a period of ninety (90) days from the date of shipment. PS Engineering, at its option, will repair or replace products which have proven to be defective during the warranty period. This warranty is honored provided that proper maintenance procedures have been followed. Repairs necessitated by misuse of the product are not covered by this warranty.

WARNING

Any attempt to open the enclosure or modify the flightmate in any way will void any and all warranties.

NO OTHER WARRANTIES ARE EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. PS ENGINEERING IS NOT LIABLE FOR CONSEQUENTIAL DAMAGES. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES, SO THE ABOVE LIMITATION MAY NOT APPLY.

4-5. Deleting Items

An example below demonstrates how a previously recorded item can be deleted.

Procedure	Press Key	Display
<u>Step 1)</u> Enter the record items mode: press and hold for 3 seconds the RECRD key. "*" in the display confirms the record items mode.	RECRD^3	ENGINE START *
<u>Step 2)</u> Press TOPIC key until the topic containing the item to be deleted appears on the display.	TOPIC	LANDING *
<u>Step 3)</u> Press ITEM key until the item to be deleted is heard.	ITEM	*PRONOUNCED* "GAS"
<u>Step 4)</u> Press and hold for 3 seconds PREV key. The item will be heard and then erased from memory. NOTE: It requires several seconds to erase the item.	PREV^3	*PRONOUNCED* "GAS"
<u>Step 5)</u> Press the PREV to exit out of delete item mode.	PREV	

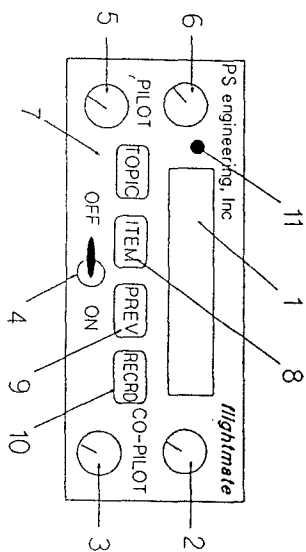
4-6. Using the Checklist

The previously recorded checklist is available to the pilot at every power-up. To enter the checklist mode, press TOPIC key. The first pre-recorded topic will appear in the display. The following table describes front panel key operations in the checklist mode.

Key	3 sec. hold	Checklist Mode
TOPIC	n/a	Display the next topic.
TOPIC	x	Enter create topic mode.
ITEM	n/a	Pronounce next checklist item
ITEM	x	Repeat the current checklist item under the current topic.
PREV	n/a	Pronounce previous checklist item under the current topic.
PREV	x	Display the previous topic.

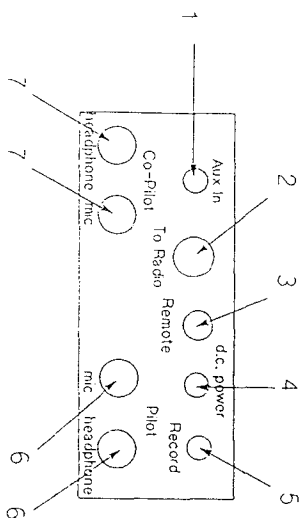
1-4. Control Functions

Front panel:



- 1 - Alphanumeric display.
- 2 - Volume control (co-pilot).
- 3 - Squelch control (co-pilot). Set this control to the threshold point.
- 4 - Three position power switch. Set this control to the threshold point.
- 5 - Squelch control (pilot).
- 6 - Volume control (pilot).
- 7 - "TOPIC" function switch.
- 8 - "ITEM" function switch.
- 9 - "PREV" function switch.
- 10 - "RECRD" function switch.
- 11 - LCD contrast adjustment.

Rear panel:



- 1 - "Aux in" jack (auxiliary audio input).
- 2 - Interface cable to aircraft radio (includes mic and headphone plug).
- 3 - Expansion jack to Telecom unit for additional headsets.
- 4 - DC power jack.
- 5 - Two function record jack. (1-tape record ALL communications; 2-external switch to advance checklist items only).
- 6 - Mic and headphone jacks (pilot).
- 7 - Mic and headphone jacks (co-pilot).

1-5. Battery

Flightmate contains a sealed lead-acid (6 volt) battery, known as "Gel-cell". The internal battery provides approximately 20 minutes of operation in a power-fail situation, along with two months or more of data retention. An auto-shutoff feature is built-in to prevent the battery from draining during long periods of battery operation.

In addition, each time Flightmate is used, the internal battery charger will charge the battery to full potential.

CAUTION

If aircraft power fails while using Flightmate, DO NOT move the on/off switch to off. In this situation, the Flightmate will not turn on again until aircraft power is restored.

1-6. Character Set

Flightmate displays up to sixteen characters at a time. Each character represents a letter of the English alphabet, punctuation, or numbers 0 through 9. The characters are listed below in the order of scrolling: (The "blank space" character is located after the character "Z".)

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z SPACE _ , - /
0 1 2 3 4 5 6 7 8 9 :

4-4. Inserting Items

The following example demonstrate the method to insert items in a previously recorded checklist. Previously recorded items are:

"GAS"
"UNDERCARRIAGE"
"PROP"

EXAMPLE 3: Insert the item "MIXTURE" between "UNDERCARRIAGE" and "PROP".

Procedure	Press Key	Display
Step 1) Enter the record items mode: press and hold 3 seconds RECD key. "*" in display confirms the record items mode.	RECD*3	ENGINE START *
Step 2) Press TOPIC key until the topic "LANDING" is displayed. NOTE: If LANDING was the first TOPIC it will appear after step 1	TOPIC	LANDING *
Step 3) Press ITEM key until the item "UNDERCARRIAGE" is heard.	ITEM	*PRONOUNCED* "GAS" "UNDERCARRIAGE"
Step 4) Press RECD key for short duration to prepare for recording.	RECD	SHORT BEEP
Step 5) Record the new item: press hold RECD key while pronouncing "MIXTURE" into the microphone.	RECD*hold	"MIXTURE"
NOTE: RELEASE RECD KEY IMMEDIATELY AFTER PRONOUNCING TO PREVENT WASTING MEMORY		
Step 6) Press PREV key to examine the record mode	PREV	

At the completion of example 3, the checklist consists of four items. To verify the insert, press PREV key (first topic in list displayed), then press ITEM key until you verify all four items are recorded.

"14"

"5"

NOTE: AT THIS POINT THE HEADSET MUST BE WORN WITH THE VOLUME SET SO THAT WHEN SPEAKING AND RECORDING THE LCD DISPLAY INDICATES LEVEL CHANGES WITH OCCASIONAL PEAKS INDICATED BY THE TWO THIN LINES ON THE DISPLAY.

Procedure

Press Key Display

Step 3) Ready the record mode:
press RECRD key.

RECRD LANDING *

Step 4) Record the first item:
press and hold RECRD key
while pronouncing
"GAS" into the microphone

RECRD*hold LANDING *

HINT: RELEASE RECRD KEY IMMEDIATELY
AFTER PRONOUNCING LAST WORD TO
PREVENT WASTING MEMORY.

NOTE: THE LETTER A IS DISPLAYED IN
THE LCD DISPLAY, THIS INDICATES YOU
ARE NOW READY TO ENTER THE JUST
RECORDED ITEM INTO THE DISPLAY.

Step 5) Input up to 16 characters
that best describes your
recorded ITEM:press and
hold ITEM key until the
letter you want appears.

ITEM G

NOTE: IF A DESIRED LETTER IS PASSED,
IT IS POSSIBLE TO SCROLL BACKWARDS
BY PRESSING THE PREV KEY UNTIL THE
DESIRED LETTER APPEARS.

Step 6) Store the letter "G": press
RECRD key. The cursor moves
to the right for the next
letter entry.

RECRD GA

Step 7) The remaining characters in
"GAS" are selected and
stored by repeating steps
5 & 6.

NOTE: DO NOT USE RECRD KEY TO STORE
THE LAST CHARACTER OF A TOPIC, REFER
TO STEP 8

Step 8) When the final letter is
displayed, press TOPIC key
to record.

TOPIC GAS

Step 9) To record more items, con-
tinue steps 3-8 until all
items are recorded.

TO EXIT THE ITEM RECORD MODE, PRESS PREV AFTER LAST ITEM DISPLAY IS STORED

"13"

SECTION II
INSTALLATION

2-1. Mounting Location

Flightmate is designed for use as a portable unit. A mounting bracket is included for under the instrument panel installation.

NOTE

If permanent installation is desired, ie. mounting in the instrument panel, the unit is considered aircraft equipment. Permanent installation must be conducted by a licensed mechanic in order to meet Federal Aviation Administration regulations. DO NOT DRILL OR TAP A HOLE INTO THE ALUMINUM HOUSING OF THE FLIGHTMATE. DOING SO WILL DAMAGE THE INTERNAL ELECTRONICS AND VOID WARRANTY.

2-2. Electrical Connection

Flightmate uses power from the aircraft's electrical system. Only a 12 or 24 volt DC negative ground system is approved for use.

The easiest method of obtaining power is from the aircraft cigarette lighter. The DC POWER connector (located on the rear of the unit) should be connected to the aircraft cigarette lighter using the cable provided.

NOTE

Flightmate has reverse input voltage protection and will not operate if input voltage is reversed.

2-3. Push-to-Talk Switch (PTT)

The use of a yoke mounted push-to-talk switch is possible with Flightmate by installing an external PTT switch into the corresponding "mic" jack. Either the pilot or co-pilot can use an external PTT switch with separate operations possible. This configuration assures that either mic will transmit only when the corresponding PTT switch is depressed. See Appendix A

"6"

2-4. Remote Item Switch

Once Flightmate is programmed with your individualized checklist, the front panel key most often used will be the ITEM key. For convenience, a remote ITEM switch can be installed using the dual-purpose "record" Jack. The remote ITEM switch is pre-wired to a 1/8" stereo Jack. This stereo Jack can also be used to connect a tape recorder to provide the pilot the ability to record all communications. You will need to hard wire the input of the recorder to the "ring" and "sleeve" of this stereo connector. Refer to appendix A for installation wiring diagram.

2-5. Auxiliary Input

Flightmate includes provisions for an auxiliary audio input; i.e. entertainment/music. The "aux in" Jack is for monaural audio operation and can provide input connection from portable tape players, radios, CD players, etc. For proper installation use a standard 1/8" monaural plug. Refer to appendix A for an installation wiring diagram.

4-3. Recording Items

After topics are created, a series of topic items can be recorded using short words or phrases. The solid-state memory is capable of two minutes (four minutes with extended memory option) of total recording time. Up to thirty-two (32) items are permissible under each topic.

In order to record items a headset and microphone must be connected. (Note: either pilot or co-pilot connections can be used.) Pressing the PTT switch is not necessary to record items.

CAUTION

If Flightmate is installed in an aircraft during the record items procedure, turn off aircraft radios. Any communications received on aircraft radios, while connected to the Flightmate, can inadvertently be recorded.

Example 2 demonstrates the method used to record items under a topic name.

EXAMPLE 2: Using the topic "LANDING" created in example 1, record the following checklist items.

1. GAS
2. UNDERCARRIAGE
3. PROP

Procedure	Press Key	Display
Step 1) Enter the record items mode: press and hold for 3 seconds RECRD key. "*" in display confirms the record items mode.	RECRD*3	ENGINE START *
Step 2) Press TOPIC key until the topic "LANDING" is displayed.	TOPIC	LANDING *

NOTE: IF THE CURRENT TOPIC IS SIXTEEN CHARACTERS LONG, THE RIGHTMOST CHARACTER IS ONLY TEMPORARILY BLANKED OUT BY ASTERISK.

4-2. Creating Topics

The following example demonstrates the method used to create a topic.
 Note: ^3 means hold the key until a long tone is heard.

SECTION 111
 OPERATION

EXAMPLE 1: Create the topic "ENGINE START"

Procedure

Press Key Display

Step 1) Enter the topic mode:
 Press TOPIC key.

Step 2) Enter the create topic mode: press and hold TOPIC key for 3 seconds.

Step 3) Input the topic "ENGINE START": press and hold ITEM key until the letter "E" appears.

NOTE: IF THE DESIRED LETTER IS PASSED, IT IS POSSIBLE TO SCROLL BACKWARDS ONE LETTER AT A TIME UNTIL THE DESIRED LETTER APPEARS

Step 4) Store the letter "E": press RECRD key. The cursor moves to the right for next character

Step 5) The remaining characters in "ENGINE START" are selected and stored by repeating steps 3 & 4. The blank space character is located after the letter "z"

NOTE: DO NOT USE RECRD KEY TO STORE THE LAST CHARACTER OF A TOPIC NAME, REFER TO STEP 6.

Step 6) When the final letter "T" is ready to be stored, press TOPIC key. This stores the letter "T" along with the topic "ENGINE START".

Step 7) At this point the Flightmate prompts user for another topic. Exit the create topic mode: press PREV key for 3 seconds until a long beep is heard.

Repeat the above procedure to create "LANDING" which will be used in one of the following example.

"11"

3-1. Introduction
 This section helps the user become familiar with basic operations of the Flightmate.

3-2. Front Panel Operation

On/Off Switch

The on/off switch turns power on & off. Both the checklist and intercom operations are controlled by the on/off switch; along with the built-in charger. The on/off switch functions as shown in the following table:

position	function
left	off
center	on
right	on with display backlight on

Intercom Controls

The intercom consists of a volume and squelch control for both the pilot and co-pilot. Each set of controls operate independently, allowing each pilot the ability of controlling volume and squelch to a desired level. The squelch function turns off the intercom when voice level is below the squelch setting. The squelch controls function as shown in the following table:

position	function
counter-clockwise	more sensitive (lower thresholds)
clockwise	less sensitive (higher thresholds)

"8"

Checklist Keys

Flightmate checklist keys consist of four push-buttons located on the front panel:



These keys are used in conjunction with the checklist mode of operation. When any of the checklist keys are pressed a tone can be heard in the headset. Refer to appendix B for a detailed description of the front panel keys and their operations.

3-3. LCD Contrast Adjustment

The LCD contrast adjustment is located to the left of the front panel display and is used to adjust display contrast. Use a small screwdriver to adjust a desired level.

3-4. Power-up

Each time Flightmate is powered-up, a built-in microprocessor executes a power-up selftest. Power-up selftests execute internal diagnostics which verifies operational status of the unit. During selftests the front panel display displays the following message:

TESTING V5.0

When the power-up selftest is complete, the following message appears on the display:

flightmate

NOTE

If Flightmate's battery is at a low charge level, it may be necessary to turn Flightmate on while connected to an external power source for a couple of minutes and then re-cycle the power to have the unit turn on.

"9"

SECTION IV PROGRAMMING

4-1. Introduction

Programming Flightmate is illustrated in a series of examples. The examples include:

- creating topics
- inserting topics
- recording items
- deleting items
- using programmed data as a checklist

Throughout this section, programming hints are provided to help facilitate programming techniques. Refer to appendix B for a detailed description via a flow diagram, of the front panel key operations.

NOTE

When Flightmate is new or the need arises to completely re-program the unit, it may be necessary to clear all memory. To clear all memory locations, press the TOPIC and then hold the PREV & RECRD keys for 3 seconds. After releasing both keys the unit will display:

MEMORY CLEARED then Flightmate

Programming hint 1: Before programming Flightmate with a checklist tailored to your aircraft, expedite the time needed by creating a rough draft on paper.

Programming hint 2: The display allows for 16 character locations. To center a word in the display, determine the number of character locations needed and subtract from 16. The "blank space" character can be programmed in before and after each word as fill space.

"10"