

Section - III
SYSTEMS DESCRIPTION**Sub-section 1**
MASTER WARNING SYSTEM**Table of Contents**

	Page
GENERAL	1-3
ANNUNCIATOR TYPES	1-3
MWS ARRANGEMENT	1-3
REPEATER ANNUNCIATORS	1-3
Figure 1 - Master Warning Annunciations and Controls	1-4
SYSTEM OPERATION	1-5
ACKNOWLEDGEMENT	1-5
ANNUNCIATION SEQUENCE	1-6
Table 1: Annunciation Sequence	1-6
TESTING	1-7
DIM CONTROL FAILURE	1-7
MWS MASTER WARNING LAMP FAILURE	1-7
POWER SUPPLIES	1-7
ANNUNCIATORS WITH ASSOCIATED MWS REPEATERS	1-8
ELECTRICAL	1-8
ICE PROTECTION	1-9
FUEL	1-10
ENGINE FIRE WARNING	1-11
DUCT OVHT REPEATER ANNUNCIATOR	1-11
MWS ANNUNCIATORS - WITHOUT A REPEATER	1-12
Table 2: MWS Annunciators - Without a Repeater	1-12

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GENERAL

A master warning system (MWS) consisting of annunciation logic, displays and associated controls is provided to alert or advise the crew to the status of the airplane systems.

ANNUNCIATOR TYPES

The annunciator captions are illuminated against a black background and are color coded as follows:

EMERGENCY



These indicate a hazardous fault condition which requires immediate flight crew action and are accompanied by the flashing red MWS warning lamps.

ABNORMAL



These indicate a fault condition which is not immediately hazardous and does not require urgent action by the flight crew. The MWS master warning lamps do not operate with this warning.

ADVISORY



These are advisory indications of system status and do not require any remedial action from the flight crew.

MWS ARRANGEMENT (Figure 1)

A main MWS panel with annunciators is located on the center instrument panel with a MWS DIM variable control and a NORM/DIM OVRD switch located adjacent to the main MWS panel. A MWS DIM FAIL annunciator is located on the copilot instrument panel above the PFD/MFD.

Two red master warning lamps, each with a push-to-cancel switch, are located on the glareshield, one in front of each pilot. Additional annunciators are arranged in groups in the system areas of the overhead roof panel. An ANNUN test button is located in the test section of the overhead roof panel.

REPEATER ANNUNCIATORS

The MWS panel also provides repeater annunciators which have an upward pointing arrow.

When illuminated, these annunciators indicate to the flight crew that an additional warning annunciator has illuminated on the overhead roof panel.

Typical Repeater Annunciator



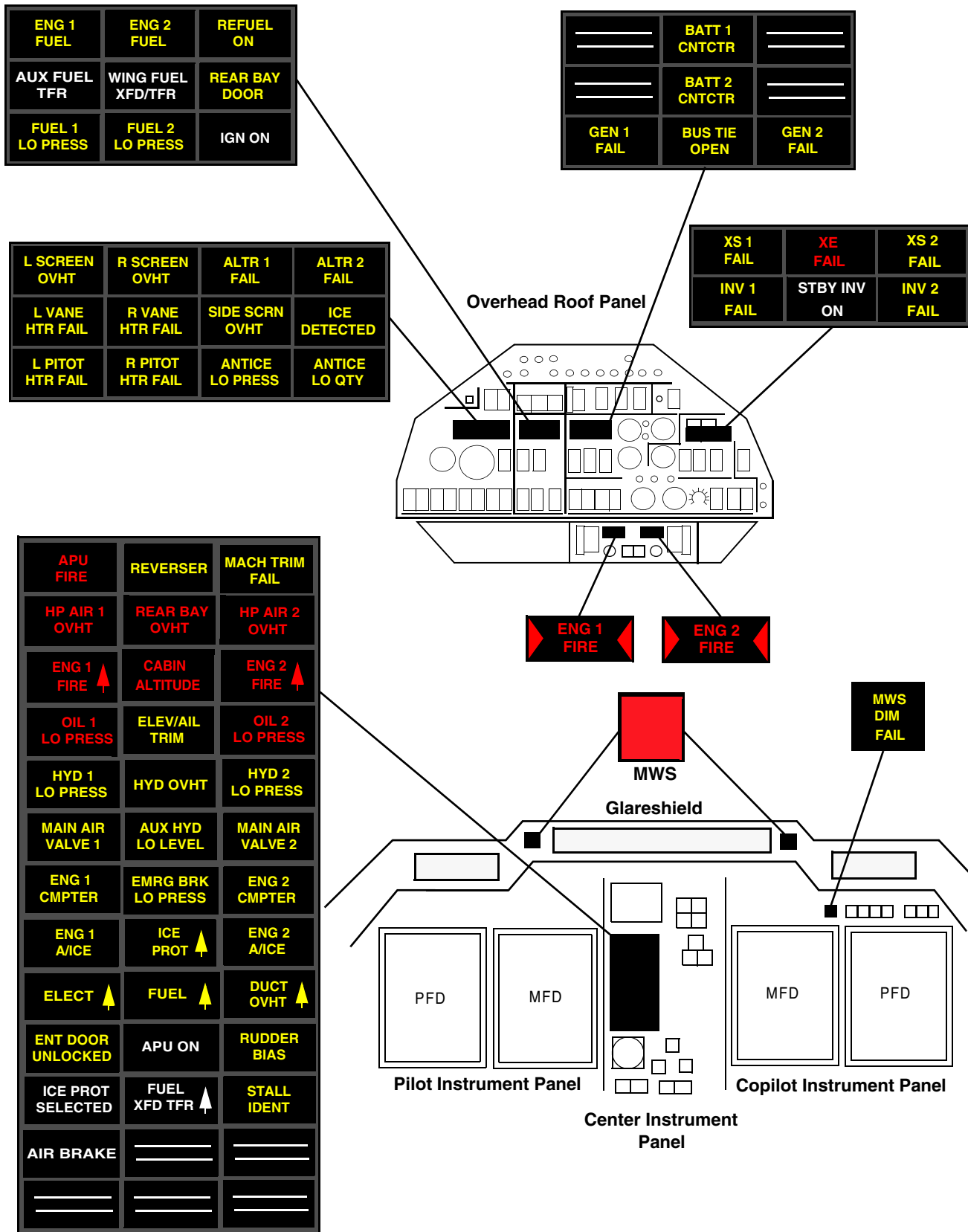


Figure 1
Master Warning Annunciators and Controls

SYSTEM OPERATION

When a system status change or fault condition occurs, the appropriate annunciator illuminates at maximum intensity.

In the event of a red warning, both MWS red master warning lamps will flash and if the red annunciator is located on the overhead roof panel, the associated repeater annunciator illuminates with a steady intensity. If the roof panel annunciator is amber, the repeater flashes.

NOTES:

- 1. A repeater annunciator will illuminate steady should associated red and amber annunciators illuminate together.*
- 2. When any annunciation is initiated, all previously dimmed annunciators will increase in brightness.*

ACKNOWLEDGEMENT

Either pilot can acknowledge the warning by pushing either MWS red master warning lamp on the glareshield with the following results:









- The MWS red master warning lamps are cancelled.
- The brightness of the annunciator (and repeater where applicable) reduces to the level selected by the MWS dimmer switch.
- The repeater, if flashing, changes to steady.

Should an additional system status change or failure occur, the relevant annunciator illuminates at maximum intensity and any dimmed annunciator increases in brightness.

Subsequent dimming is achieved by pushing either MWS red master warning lamp. This low lighting level is maintained until the system fault clears causing the annunciator to extinguish or until another system status change or failure occurs.

White annunciators are always illuminated at the set dim level and do not cause an increase in brightness of existing warnings to occur.

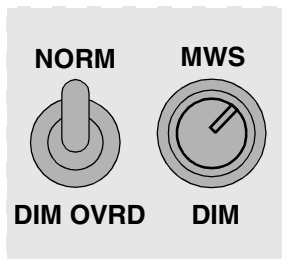
ANNUNCIATION SEQUENCE

Table 1: Annunciation Sequence			
<i>Annunciator Location</i>	<i>Annunciator Color</i>	<i>Annunciator state and intensity level when first illuminated</i>	<i>Attention Event</i>
Overhead Roof Panel		Illuminates steady at maximum intensity	 Flashes at maximum intensity
		Illuminates steady at dimmed intensity (as set on MWS DIM control)	None
MWS Main Panel		Illuminates steady at maximum intensity	 MWS Master warning lamps flash (on Glareshield)  Illuminates steady at maximum intensity
		Illuminates steady at maximum intensity	None
		Illuminates steady at dimmed intensity (as set on MWS DIM control)	None

TESTING

Pushing the ANNUN test button on the overhead roof panel results in the following:

- All of the overhead and MWS panel annunciators, including white, illuminate at maximum intensity.
- The amber repeater annunciators will flash and the red repeater annunciators illuminate steady.
- The MWS master warning lamps flash alternatively at an even rate.



DIM CONTROL FAILURE

If a warning occurs and the associated annunciator fails to illuminate due to an open-circuit failure of the dimming circuit, the amber MWS DIM FAIL annunciator will illuminate on the MWS panel.

The flight crew should set the NORM/DIM OVRD switch to the DIM OVRD position. This causes the warning annunciator to illuminate at maximum intensity and the MWS DIM FAIL annunciator will extinguish.

When the warning is acknowledged, the annunciator will remain at the maximum level of intensity.

MWS MASTER WARNING LAMP FAILURE

The MWS red master warning lamp control channel contains dual circuitry which provides a back-up, and a means of indicating a single failure. A failure is indicated by alternate flashing at an uneven rate (one faster than the other) of the two lamps.



POWER SUPPLIES

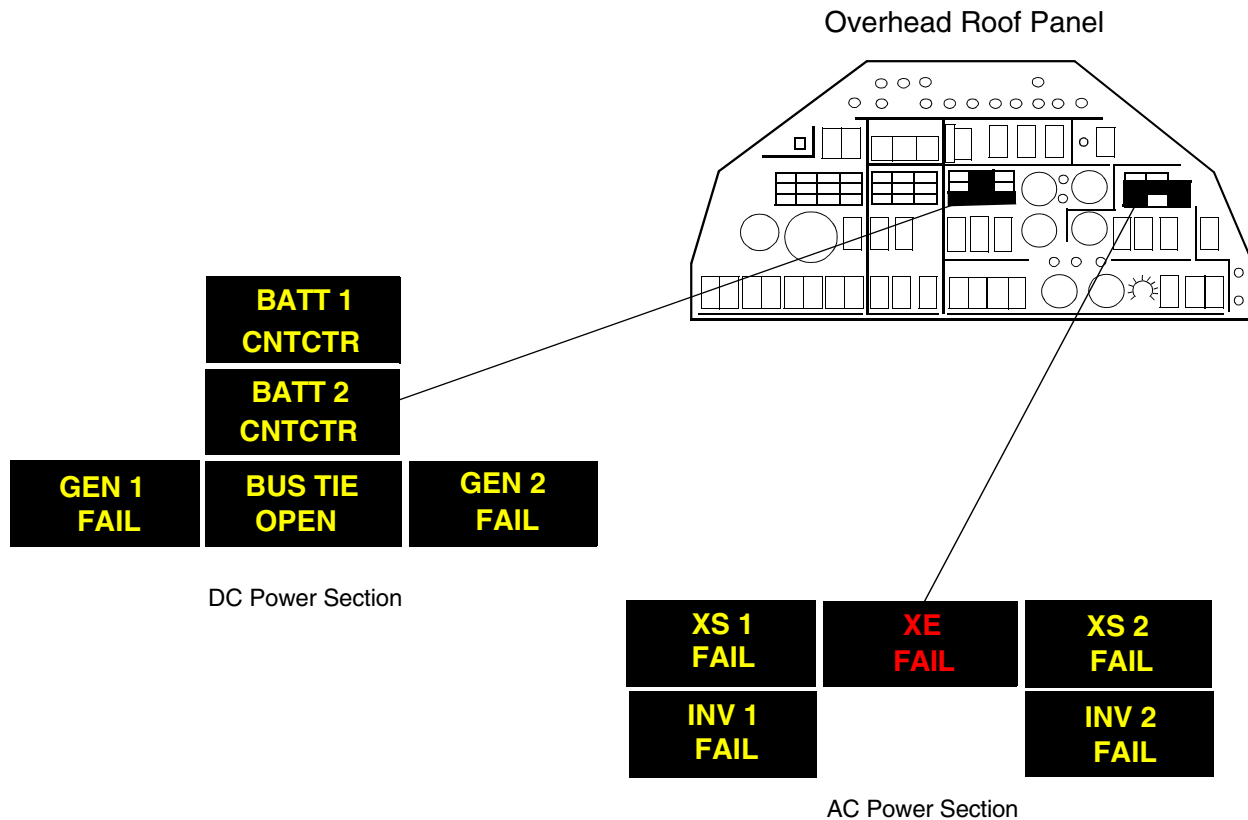
The MWS is powered from PE busbar via three circuit breakers located on panel DA-D:

- MWS PWR 1 and 2
- MWS TEST

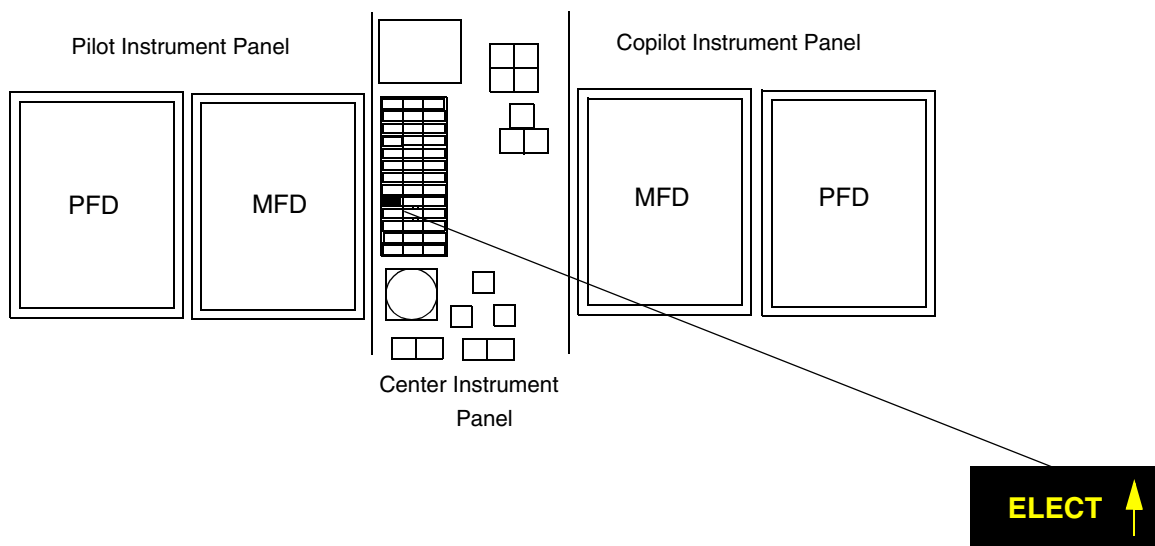
The MWS dimming circuit is powered from a secondary busbar - MWS DIM bus.

ANNUNCIATORS WITH ASSOCIATED MWS REPEATERS

ELECTRICAL

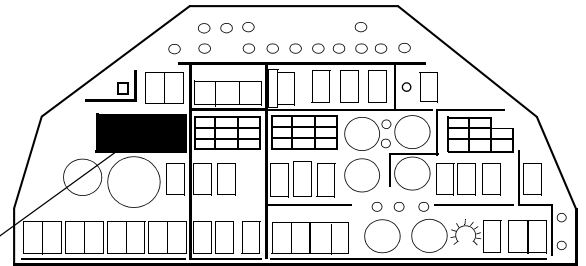


The illumination of any of the above electrical annunciators on the Overhead Roof Panel will be accompanied by the illumination of the associated MWS repeater shown below:



ICE PROTECTION

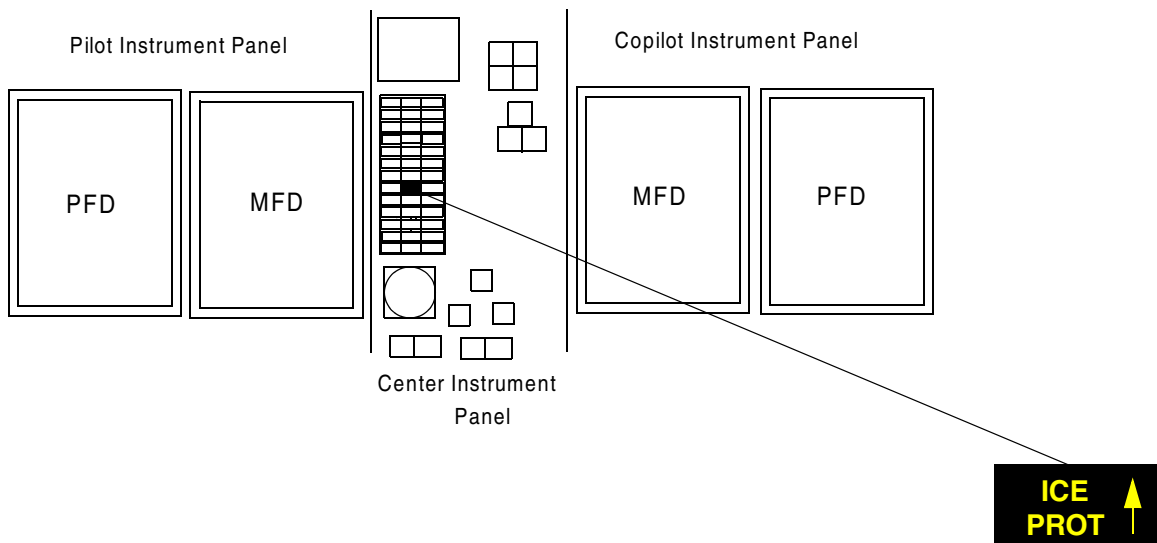
Overhead Roof Panel



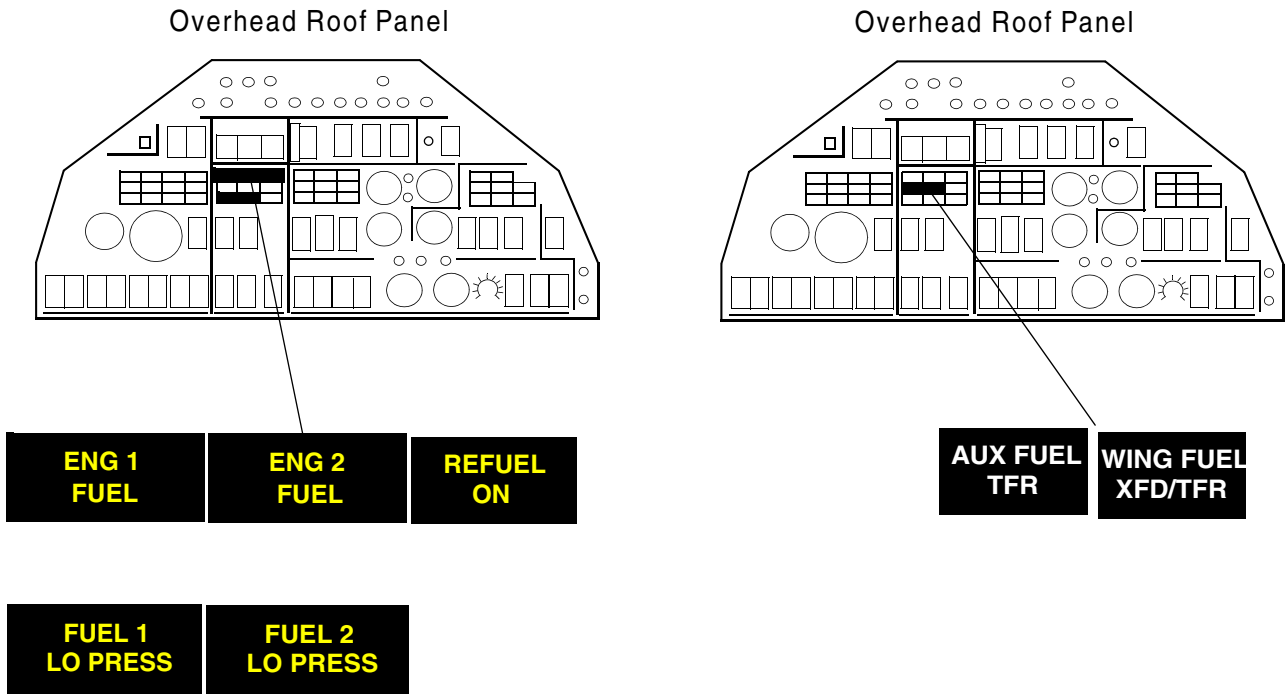
L SCREEN OVHT	R SCREEN OVHT	ALTR 1 FAIL	ALTR 2 FAIL
L VANE HTR FAIL	R VANE HTR FAIL	SIDE SCR N OVHT	ICE DETECTED
L PITOT HTR FAIL	R PITOT HTR FAIL	ANTICE LO PRESS	ANTICE LO QTY

Ice Protection Section

The illumination of any of the above ice protection annunciators on the Overhead Roof Panel will be accompanied by the illumination of the associated MWS repeater shown below:

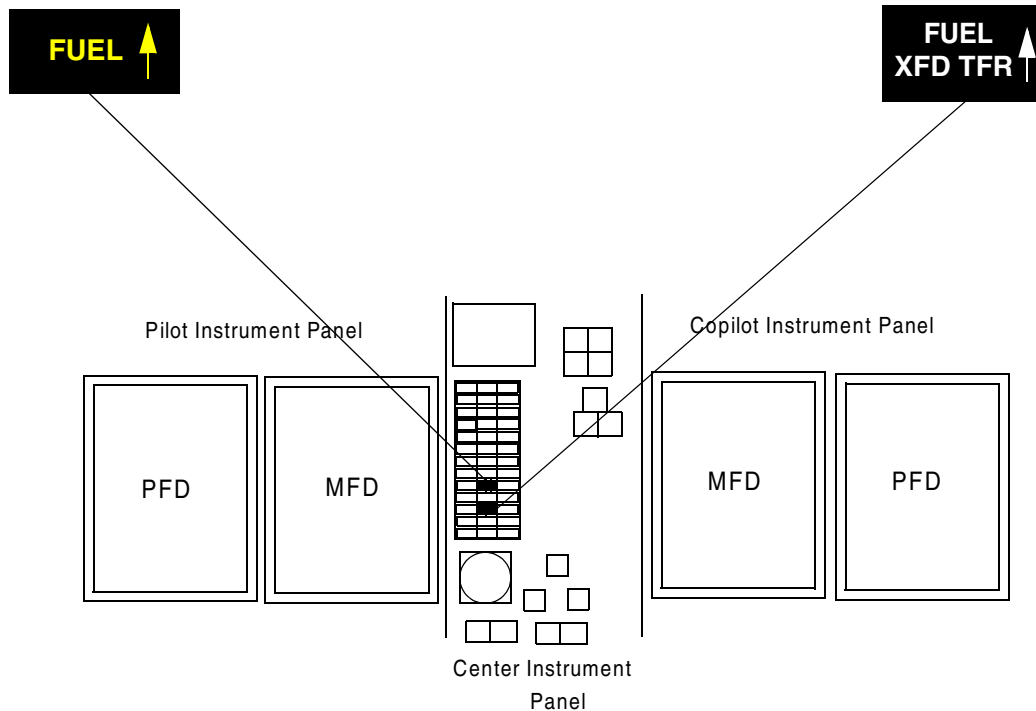


FUEL

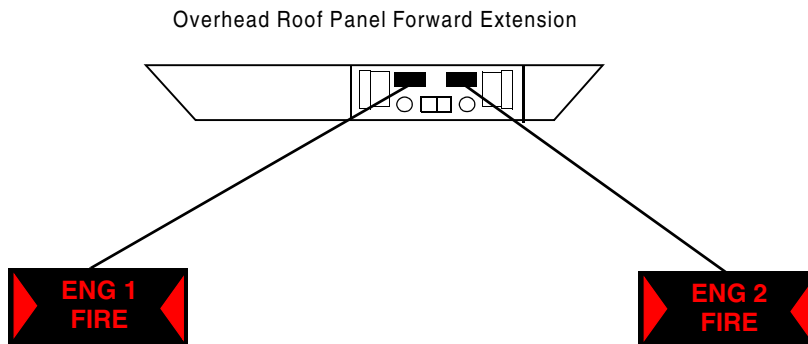


The illumination of any of the above fuel annunciators on the Overhead Roof Panel will be accompanied by the illumination of the associated MWS repeater shown below:

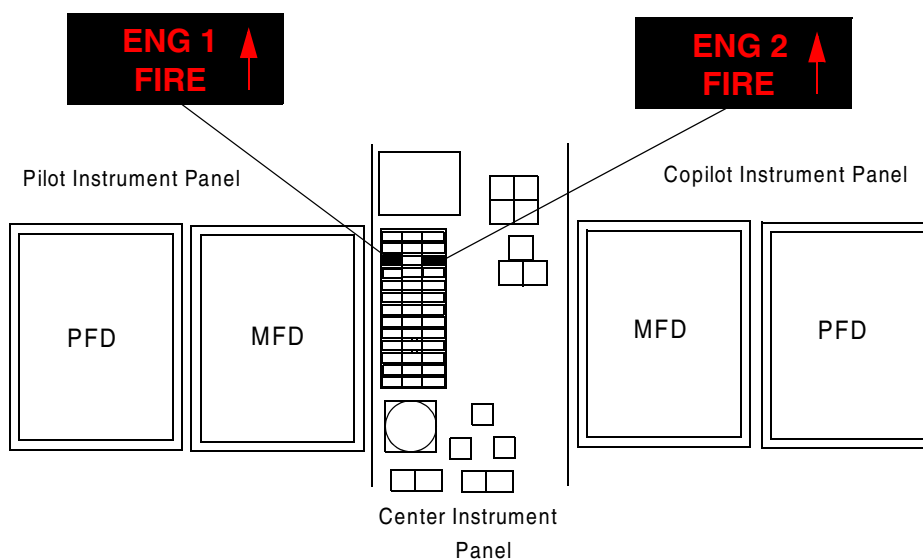
The illumination of either of the above fuel annunciators on the Overhead Roof Panel will be accompanied by the illumination of the associated MWS repeater shown below:



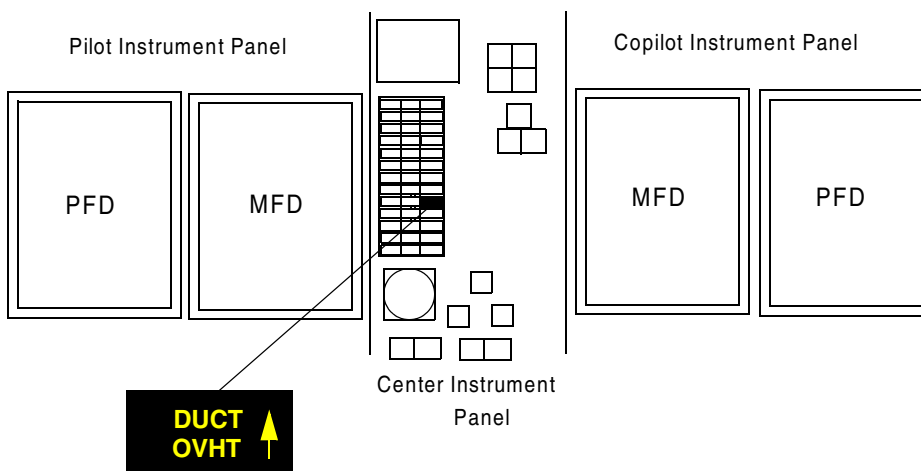
ENGINE FIRE WARNING



The illumination of either of the above fire warning annunciators on the Overhead Roof Panel Forward Extension will be accompanied by the illumination of the respective MWS repeater shown below:



DUCT OVHT REPEATER ANNUNCIATOR



This repeater illuminates on the MWS panel and directs attention to the DUCT TEMP indicator on the Overhead Roof Panel ENVIRONMENTAL section.

MWS ANNUNCIATORS - WITHOUT A REPEATER

Table 2: MWS Annunciators - Without a Repeater

<i>Red Annunciators</i>	<i>Location</i>	<i>Amber Annunciators</i>	<i>Location</i>
APU FIRE	MWS panel (if installed)	REVERSER	MWS panel
HP AIR 1 or 2 OVHT	MWS panel	ELEV/AIL TRIM	MWS panel
REAR BAY OVHT	MWS panel	MACH TRIM FAIL	MWS panel
CABIN ALTITUDE	MWS panel	HYD 1 or 2 LO PRESS	MWS panel
OIL 1 or 2 LO PRESS	MWS panel	HYD OVHT	MWS panel
		MAIN AIR VALVE 1 or 2	MWS panel
		AUX HYD LO LEVEL	MWS panel
		ENG 1 or 2 CMPTR	MWS panel
		EMRG BRK LO PRESS	MWS panel
		ENG 1 or 2 A/ICE	MWS panel

Table 2 continued: MWS Annunciators - Without a Repeater

<i>Red Annunciator</i>	<i>Location</i>	<i>Amber or White Annunciators</i>	<i>Location</i>
		ENT DOOR UNLOCKED	MWS panel
		RUDDER BIAS	MWS panel
		STALL IDENT	MWS panel
		REAR BAY DOOR	Overhead panel
		APU ON	MWS panel (if installed)
		ICE PROT SELECTED	MWS panel
		IGN ON	Flight Compartment Overhead Roof Panel
		AIR BRAKE	MWS panel
		STBY INV ON	Flight Compartment Overhead Roof Panel

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