



Consolidate and increase recording power with the 3254F EAFR.



The GE Aviation Model 3254F, Enhanced Airborne Flight Recorder (EAFR) is used to record flight crew audio, parametric flight data, and data link communications. This data is stored in non-volatile crash-survivable memory located within the EAFR. This data can be retrieved and analyzed in the event of an aircraft mishap. The EAFR has an Underwater Location Beacon (ULB) that transmits acoustic pulses that allow the EAFR to be located and recovered underwater. The ULB is mounted through the chassis to the armored housing of the Crash Protected Memory (CPM) to make sure that the ULB remains with the CPM in the event of a mishap.

The EAFR is capable of providing combinations of any or all of the mandatory crash protected recorder functions in a single Line Replaceable Unit (LRU). The EAFR functions include the Digital Flight Data Recorder (DFDR) function, the Cockpit Voice Recorder (CVR) function, the Data Link recording function, and Image Recording function growth. The EAFR also provides the Flight Data Acquisition function of collecting the flight data parameters for subsequent storage in the CPM.

EAFR Functionality

The EAFR recording capabilities include the following functions:

The Digital Flight Data Recorder (DFDR) function records parametric flight data from aircraft sensors and systems provided by the Flight Data Acquisition function. The Flight Data Acquisition function resides in

the EAFR and acquires the mandatory flight data recording parameters at the specified rates from the aircraft's ARINC 664 Part 7 Switched Ethernet data stream. This functionality is hosted inside the EAFR and made possible by the digital architecture of the aircraft and the availability of the data parameters on the aircraft data network interface. The flight data is stored in the Crash Protected Memory in a segregated memory partition separate from the other data types. The DFDR flight data information can be downloaded rapidly on board the aircraft using a high-speed Ethernet interface.

The Cockpit Voice Recorder function records the flight deck communications between crew members and also captures the general acoustical sound environment of the flight deck. The CVR function receives three analog audio crew channels provided by the Flight Deck Audio System and one analog audio channel from the cockpit Area Microphone and Preamplifier (AMP). The cockpit area audio and the three audio crew channels are recorded in both the forward and the aft installed EAFR recorders. The CVR recording duration is two hours minimum. Recorded audio can only be downloaded when the EAFR is off the aircraft.

The Data Link Recorder function is used to record the digital data link messages provided to and from the crew. The Data Link Recorder function receives digital messages from the aircraft air to ground communication system when digital air to ground communication is used. These data link messages are provided by the aircraft's Communication Management

Key Owner/User Benefits

- Provides Flight Data, Cockpit Voice Recorder, and CNS/ATM Recorder capabilities in one LRU package. One EAFR meets several recorder requirements.
- Provides Dual Combination installation with one EAFR installed Forward and one EAFR installed Aft (self identifying with configuration pins). The EAFR LRU is interchangeable between the Forward and Aft installation locations.
- Possible MEL relief due to redundant FDR and CVR functions.
- Very small size and weight
- Meets EUROCAE ED-112 MOPS for Crash Protected Airborne Recorder Systems.
- Uses the latest Crash Protected Memory (CPM) technology for survivability.
- Records three channels of Analog Audio System crew communications.
- Records Analog Cockpit Area Microphone audio from the AMP.
- Records flight data from ARINC 664 p7 Aircraft Data Network (ADN) interface.
- Provides Flight Data Acquisition function of ARINC 664 p7 data parameters – No need for a Digital Flight Data Acquisition Unit (DFDAU).
- Provides CNS/ATM Data Link communications recording.

Typical EAFR System

| Type | Qty | Description | Part Number |
|------|-----|--|-------------|
| EAFR | 2 | EAFR – One installed forward and one installed aft | 187422-001 |
| AMP | 1 | AMP - Area Microphone Pre-amplifier | 187423-001 |

Specifications - EAFR 3254F

Certification

FAA TSO TSO-C123b,
TSO-C124b,
TSO-C177

Environmental DO-160G

EUROCAE ED-112

RTCA DO-178B

Physical Characteristics

Height 150.11 mm
(5.91 in) max

Width 128.52. mm
(5.06 in) max

Length 242.544 mm
(9.549 in) max
with ULB

Weight (max) 9.0 Lbs max

Cooling Passively Cooled-
Free Convection

Mounting 4 Captive Screw
Information Fasteners

Environmental

Temperature -40 to +70 °C

Altitude 25,000 ft

Power Requirements

Operating +28 VDC
Power (20.5 W max)



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and Integrated Surveillance Functions.

The EAFR processes and stores this information in the Crash Protected Memory for a two hour duration. The EAFR stores this Data Link information in the crew audio memory partition. Even though the Data Link information is stored in the crew audio memory partition, the Data Link information, unlike the crew audio, can be downloaded rapidly on board the aircraft using a high-speed Ethernet interface.

The Image Recorder growth function is used to record visual images of the flight deck instruments, flight deck, the aircraft structures, and engines as required. The Image Recorder function is capable of receiving a digital 10/100 Mbit Ethernet data stream of cockpit images and stores this data in the Crash Protected Memory in a separate partition. Even though the image recording duration will be governed by regulations, the EAFR Crash Protected Memory capacity has the storage capacity for two hours of image data recording per EUROCAE ED-112 requirements. Data in the Image Recording Crash Protected Memory partition can only be downloaded when the EAFR is off the aircraft.

Operation and Performance

The EAFR processes and stores all of the acquired flight data parametric, analog audio, and data link information in the Crash Protected Memory in separate memory partitions for each data type, per EUROCAE ED-112. The Flight Data Recorder Electronic Documentation (FRED) is also stored in the Crash Protected Memory in a separate memory partition.

The forward installed EAFR along with the Cockpit Area Microphone and Preamplifier are typically connected to the Recorder Independent Power Supply (RIPS), providing a backup power source for 10 minutes in the event of power interruptions.

Key Owner/User Benefits

- Includes Flight Data Recorder Electronic Documentation (FRED) to convert the raw binary image of flight data into engineering units. FRED is stored in the CPM.
- Includes Built-in Ground tools- Operational Ground Program and Direct Parameter Display are Web Page based and accessible by an Ethernet Web Browser to provide Configuration, Data Readout, and Installation support using a PC Ethernet interface for fast flight data downloading.
- Includes growth for Image recording (5 Gigabytes Crash Protected Memory).

The EAFR includes a small 90 day Underwater Location Beacon that provides the location of the EAFR when submerged and has a battery life of six years.

The front panel contains one connector, J1, and a grounding stud.

- J1 provides the main EAFR power supply, Aircraft Data Network, Ethernet Channels A and B, analog audio input, input and output discretes, and other miscellaneous signals.
- Ethernet Channel A contains capability for future growth.

Data recorded in the EAFR can be retrieved using a PC and the EAFR's Operational Ground Program (OGP). The OGP is a web-based application, consisting of a Graphical User Interface (GUI) implemented in Hypertext Markup Language (HTML) pages hosted in the EAFR. This interface is accessed via a ground computer using Microsoft Internet Explorer® (IE). The OGP downloads data via the EAFR's maintenance Ethernet port. Flight Data Recorder data and Data Link data can be downloaded while the EAFR is installed on the airplane. To download Cockpit Voice Recorder data, the EAFR must be removed from the airplane and installed in a bench rig. The EAFR also includes a diagnostic program called Direct Parameter Display (DPD) that facilitates real time analysis of aircraft parameters.

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