

HFR5-D FLIGHT DATA RECORDER (FDR) TECHNOLOGY ADVANTAGE

The HFR5-D FDR is a crash-survivable recording device intended for installation in commercial air transport aircraft to accommodate mandatory flight-data recording into a crash-survivable memory unit. The flight data input is an ARINC 717 data stream from a Flight Data Acquisition Unit (FDAU) or similar equipment. The HFR5-D FDR retains the most recent 25 hours of recorded flight data in solid-state, crash-survivable memory. The HFR5-D FDR fully satisfies the Minimum Operational Performance Specification (MOPS) for Crash Protected Airborne Recorder Systems as stated in ED-112. This industry document defines the requirements for a Flight Data Recorder (FDR) utilizing solid-state memory as the recording medium. The HFR5-D FDR complies with the airworthiness requirements defined in TSO-C124b.

An ARINC 573/717/747 hardware interface is provided to accept serial Harvard Bi-phase data at a rates of 64, 128, 256, 512, or 1024 twelve-bit words per second from the FDAU or equivalent equipment.

HFR5-D Product Specification

Hardware Description

The HFR5-D FDR consists of two Shop Replaceable Units (SRUs) and a standard ½ ATR Long chassis per ARINC 404A. The two SRUs are: a System Controller card which includes an integrated Power Supply (SC/PS), and a Crash-Survivable Memory Unit (CSMU). The SC/PS is a single-circuit card which controls all states and modes of the system including the record and test functions. The SC/PS also provides all functional interfaces to external systems. The power supply portion of the SC/PS converts either 115 Vac (360-800 Hz) or +28 Vdc aircraft power to secondary power for the SRUs and provides power on reset, power failure monitoring, and significant power hold-up capability.

The CSMU is a solid-state, non-volatile, mass-memory system encased in a crash-protected enclosure. The CSMU provides storage for all required input data as well as for ancillary system data. In addition to these SRUs, an Underwater Locator Beacon (ULB) is mounted to the front of the CSMU. As of early 2016, Honeywell is only providing new ULB's to the 90-day minimum operating duration per TSO-C121b for all new HFR5 recorders

Performance Summary

The HFR5-D FDR is designed to meet or exceed the minimum performance, environmental, and crash-survival requirements as specified in EUROCAE ED-112.

Physical Characteristics

Dimensions	½ ATR Long per ARINC 404A
Weight	12.8 lb maximum (Long), 10 lb typical
Connector	DPX2-37065-12
Crash Protected	Enclosure Compliant with TSO-124b Appendix 1 Figure 2 Max Dimensions: a=3.6in b=3.6in c=5.0in

Performance Characteristics

Input voltage	115 Vac, 360-800 Hz or +28 Vdc
Power	12 W maximum, 8 W typical
ARINC 717 Data Rates	64, 128, 256, 512, 1024 words per second (12 bits/word)
Power on to recording delay	500 milliseconds maximum
Recording duration	25 hours



Environmental Test Conditions per DO-160E

Environment	DO-160E Section	Category	Comments
Temperature and Altitude	4.0		
Temperature Test	4.5	F2	
In-Flight Loss Of Cooling	4.5.5	N/A	There is no cooling supplied to the UUT, thus this test is not required.
Altitude Test	4.6.1	F2	+55,000 ft
Decompression Test	4.6.2	A2	+55,000 ft
Overpressure Test	4.6.3	A2	Test Pressure = 26.9 psia
Temperature Variation	5.0	A	10°C per minute
Humidity	6.0	B	Severe humidity environment
Operational Shocks and Crash Safety	7.0	E	Operational lowfrequency and crash safety
Vibration	8.0	R,H	Random - Curve C, & C1 sinusoidal
Explosion Proofness	9.0	E	Not hermetically sealed
Waterproofness	10.0	W	Subject to falling water (condensation)
Fluids Susceptibility	11.0	F	
Sand and Dust	12.0	S	Subject to blowing dust
Fungus Resistance	13.0	F	Demonstrated by analysis
Salt Fog	14.0	S	Subject to a corrosive atmosphere
Magnetic Effect	15.0	A	Deflection between 0.3 m and 1.0 m
Power Input	16.0	A(WF) Z	AC Power DC Power
Voltage Spike	17.0	A	High degree of damage protection
Audio Frequency Conducted Susceptibility	18.0	K(WF) K	AC Power with higher voltage distortion DC Power
Induced Signal Susceptibility	19.0	ZC, ZW	Interference-free operation required over wide frequency range (DC and variable)
Radio Frequency Susceptibility (Radiated and Conducted)	20.0	RR	Bench testing allowed to meet HIRF associated with normal environment
Emission of Radio Frequency Energy	21.0	M	Apertures are EM significant
Lighting Induced Transient Susceptibility	22.0	A3G33	Pin Injection waveform set A level 3, Cable bundle waveforms set G level 33 multiple strokes / multiple bursts
Lightning Direct Effects	23.0	X	Not applicable
Icing	24.0	X	Not applicable
Electrostatic Discharge (ESD)	25.0	A	Equipment installed, repaired, or operated in an aerospace environment
Fire, Flammability	26.0	C	

Crash Survivability Testing per ED-112

Impact Shock	3400 g, 6.5 ms duration (half-sine)
Penetration Resistance	500 lb weight dropped from 10 feet
Static Crush	5000 lb, 5 minutes duration
High Temperature Fire	1100 °C, 50,000 BTUs, for 60 minutes
Low Temperature Fire	260 °C, for 10 hours
Deep Sea Pressure	20,000 feet, for 24 hours
Sea Water Immersion	3 metres, for 30 days
Fluid Immersion	Per ED-112

For more information on Honeywell's HFR5 Recorders please contact your Honeywell sales representative or call +1 800 601 3099 or +1 602 365 3099.

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