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F-16C/D Cockpit Camera (CCAM)

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The Photo-Sonics F-16C/D Cockpit Camera (CCAM) is a fully-qualified HUD camera for the F-16C/D aircraft.

Part Number 93 - 4300 - 503

NSN 5821-01-668-5149

16VE135801-10

This camera has excellent environmental characteristics and superb image quality with high reliability (>22,000 MTBF). The camera is lightweight and designed around single-unit construction. It is easily installed and aligned in the aircraft in less than one hour. The camera incorporates extensive filtering to provide noise-free images using 115VAC, 400Hz, 3 phase aircraft power in accordance with MIL-STD-704A.

This camera will operate on both configurations of Wide-Angle Head-up Displays assemblies presently being used on the F-16C/D.

The camera assembly is mounted on the HUD in front of the combiner. In this position, the camera records only the outside world. The HUD symbology is electronically overlaid on the camera video in the HUD Electronic Unit. A precision periscope/lens assembly permits accurate boresighting with the aircraft computer resulting in minimal piper-to-target alignment errors, and camera coefficients are provided to ensure accurate alignment/calibration to the HUD.

The camera can replace either a one-, or two-piece HUD camera assembly. If the camera is used in an aircraft configured to accept a two-piece camera, an interface cable must also be installed in the aircraft. This cable is not necessary for an aircraft configured for a single-piece HUD camera. The cable can be purchased from Photo-Sonics or a cable and tray from Lockheed.

· Photo-Sonics Interface Cable Assembly: 93-4338-29

· Lockheed Interface Cable and Tray Assembly: 3887-55942-01

GENERAL FEATURES

- 115VAC, 400Hz, three phase, <5 watts
- Automatic Exposure Control (AEC)
- Visual event mark
- Sensor: Interline-transfer hyper HAD CCD, 1/3"
- Horizontal resolution: NTSC - 470 TV lines
- Picture elements: NTSC - 768(h) x 494(v)
- Luminance range: 1.8 Lux to 196,700 Lux
- Field of view - 21.34 degrees x 16.4 degrees
- S/N ratio: Camera Video - NTSC > -48dB
- Gamma - 0.45
- White balance - ATW
- AGC: Automatic 0 to -36dB
- Weight - < 1.5 lbs
- MTBF: >22,000 hours
- Warranty: 18 to 24 months
- Format: NTSC

ENVIRONMENTAL SPECIFICATIONS to MIL-STD-810, MIL-E-5400

Tests Performed

Temperature Shock

MIL-E-5400P, 30 mins., 10 cycles

Gunfire Vibration

GF peak: 3.7 G's
WF .016 GRMS²/Hz
3 axes

Funus (bv)

Humidity/Moisture/Rain	MIL-STD-210 exposure time MIL-STD-108 MIL-STD-810, Method 517,	analysis)	
Humidity	Procedure I, Cold soak: 4 hrs. at -40° C Non-gunfire	Fluids (by analysis)	82 watts per square foot
Vibration	Endurance: .053, 1 hr. Performance: .04, 1 hr. Stowage: -54°C to +95°c Non-operating: -40°C to +95°c Operating: -40°C to +55°c	Sunshine	3 axes, Basic design 15 G's at 11msec. Crash safety:
Temperature Altitude	Normal: 15.5 to 2.72 psia	Mechanical Shock	Longitudinal 40 G's 11 msec. Vertical 20 G's 11 msec. Lateral 15 G's 11 msec.
Salt Spray (500 hours)	MIL-E-5400P 15-200 Freq.	Sand and Dust	MIL-E-5400P MIL-STD-810, Method 511,
Random Vibration	Endurance level .053, 1 hr. Performance level .04, 1 hr.	Explosive Atmosphere	Procedure I
Sinusoidal Vibration		Explosive Decompression	MIL-E-5400P, MIL-STD-108
Touch Temperature	Surrounding air: +27° C Temperature limits: +60° C 600 KEAS	Temperature - Altitude	Longitudinal: FWD 40 G's AFT 20 G's
Wind Blast		Ultimate Crash Load Factors	Vertical: Up 10 G's Down 20 G's Lateral: Left 14 G's Right 14 G's
		Corrosive Atmosphere	MIL-E-5400P

EMI / EMC Tests to MIL-STD-461 / 462

RE102	Radiated Emissions	2 MHz – 30 MHz / 30 MHz – 200 MHz / 200 MHz – 1 GHz / 1 MHz – 18 GHz
RS103	Radiated Susceptibility	30 MHz – 200 MHz / 200 MHz – 1 GHz / 1 GHz – 2 GHz / 2 GHz – 4GHz / 4 GHz – 8 GHz / 8 GHz – 12 GHz / 12 GHz – 18 GHz
CE102	Conducted Emissions	10 kHz – 10 MHz
CS101	Conducted Susceptibility	800 Hz – 50 kHz
CS114	Conducted Susceptibility	10 kHz – 400 MHz
CS115	Conducted Susceptibility	(See CS115)
CS116	Conducted Susceptibility	10 kHz – 100 MHz

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