



Airborne Equipment

POWER SUPPLY CARD



Description:

The Dimmer unit is an essential unit used in Lighting control systems to regulate and adjust the intensity of light sources. It provides a convenient and efficient solution for controlling the brightness of Cockpit Display. ETPL has Designed & Developed Modules for all three channels along with Filter PCB (CH-1 5VDC, CH-2 28VDC & CH-3 115Vac) for Dimmer unit

PLATFORM: LUH-CIVIL

Engine Electronics Unit

Description:

Engine Electronics Unit (EEU) is an electronics interface to receive signals and commands, to suitably condition, modify them and produce electrical outputs to kill the engine. It also monitors the engine.

End User: ADE, Bengaluru



DESIGN & DEVELOPMENT OF HORN & BUZZER On going Project

Description:

HORN: The Horn is designed to produce a loud, high-intensity sound to alert the pilot and crew in the Dornier-228 aircraft. The Horn operates in a pulsed mode at a frequency of 500 ± 50 Hz & also operates in a continuous tone at a frequency of 1000 ± 100 Hz.

BUZZER: The piezo electric buzzer is designed to produce medium sound level to alert the pilot of aircraft, it operates in different frequency ranges i.e. 2900 ± 500 Hz continuous tone, 4500 ± 500 Hz continuous tone and 2900 ± 500 Hz pulsed tone.

PLATFORM: DORNIER AIRCRAFT, End User: HAL TAD, KANPUR

POWER SUPPLY UNIT B21-DLA - 3 UNIT & TEST JIG – On going Project

Description:

Power Supply Unit (B21-DLA) used in the communication system (KDLI) of SU-30 Aircraft. The goal is to provide a comprehensive set of specifications to ensure the Power Supply Unit (B21-DLA) perform reliably and consistently in the communication system (KDLI) of SU-30 Aircraft.

INPUT SUPPLY VOLTAGE

The Power Supply Unit (B21-DLA) is designed to operate within a voltage range of 108 to 118 volts AC at 393 to 407 Hz and 24 volts DC to 29.4 volts DC for allowing it to function reliably across the aircraft's electrical system.

OUTPUT VOLTAGE

Sl. No.	Condition	Value
1	At Rated load of 10% to 100%	24 VDC to 29.4 VDC, 40 Amps
2	No Load voltage	33 VDC max
3	Emergency Operation	18 VDC to 31 VDC
4	Abnormal Operation	21 VDC to 33 VDC

PLATFORM: SU-30 Aircraft.
End User :HAL, Hyderabad



GROUND POWER PROTECTION CARD (GPPC) ASSEMBLY – On going Project

Description:

Ground Power Protection Card (GPPC) Assembly, a critical subsystem designed to monitor and validate the integrity of a +28 VDC supply provided by Ground Power Supply Unit (GSU) to the aircraft.

Protection as per MIL-STD-704F:

- Over Voltage & Under Voltage
- Ripple amplitude
- Distortion
- Reverse polarity

Dimension: 78x75x25 mm, Weight: 200gms

End User: HAL Lucknow



Automated Test Equipment

AC MK2 SCM & SDIM SEMI ATE

Description:

Servo Control Module (SCM) Test Jig is used for testing the Servo Control Module at SRU level with the help of PCB Interface Module which contains 196 Pin Airborne Connector for interacting between SCM Module and Test Jig. Test Jig Consists of test fixture test and monitoring point at the front panel and interface connector, for interface UUT (Servo control module) with it. It also consists of workstation with DIO module and Respective driver software, used for simulation Digital module of AC Mk2. Servo Discrete Interface Module (SDIM) Test Jig is used for testing the Servo Discrete Interface Module at SRU level with the help of PCB Interface Module which contains 196 Pin Airborne Connector for interacting between SDIM Module and Test Jig. This Test Jig will have 6.5 digit Digital Multimeter, Fixed dc voltages +/-5V, +/-15V supply and programmable 28VDC power supply for Servo Discrete Interface Module (SDIM). Test Jig also consists of TTL Logic conversion board which converts 5V TTL. The logic conversion board will have +/-10V Reference voltage generation circuit with 10mA current.

End User: BEL /LCA, Bengaluru



GO NO GO TESTER HARDWARE MMS

Description:

The Go/ No Go Tester is used to test the hardware interfaces of Airborne LRUs such as Interface Computer, Display Computer, and Display test results to enable the user to declare serviceability.

End User: Dornier DO-228 through HAL MCSRDC Div., Bengaluru.



LOAD BANK

Description:

The Load Bank is designed to perform grounding checks for helicopters. This unit ensures critical power verification and identifies potential failures by periodically testing ground support equipment with a 28V DC load bank. It features pre-set, force-cooled, high-power resistor channels that enable manual load current adjustment through a handheld controller.

End User: Hal Helicopter Div. Bengaluru



ANTI-SKID CONTROLLER TEST RIG

Description:

This Test Rig has been designed and manufactured to meet the PIC requirements of Antiskid Controller Pt. No. 228700000 of HJT-36 aircraft. Test Rig is required for carrying out the following tests such as Insulation test, Input reverse protection test, Skid valve current test, Emergency valve current test, Functional Test.

End User: HJT-36 Aircraft, Indian Air Force



Cable Harness

WIRE HARNESS P/N:8819796000



End User: Shakti Engine ,
HAL Helicopter, Div.,
Bengaluru

WIRE HARNESS P/N: TM1625G001



End User : Jaguar Aircraft,
Indian Air Force through
HAL -Aircraft Div., Bengaluru

WIRE HARNESS P/N: TM2925G002



End User :
Shakti Engine ,
HAL Helicopter Div.,
Bengaluru.

WIRE HARNESS P/N: TM4227G001



End User :
HAL-Aircraft Div.,
Bengaluru

WIRE HARNESS P/N: TM4229G001



End User :
Shakti Engine ,
HAL Helicopter
Div., Bengaluru

WIRE HARNESS P/N: TM4898G002



End User : Shakti Engine ,
HAL Helicopter Div., Bengaluru.

RIG LOOM 10R CABLE

Function- The RIGLOOM:10R CABLE is used for intercommunication of crew with ground personnel during ground testing/maintenance. The communication from ground personnel to crew takes place when Press-To-Talk (PTT) is pressed by ground personnel.

End User: HTT-40 Aircraft, Indian Airforce through HAL-AURDC, Nashik



Ground Support Equipment (GSE)

JAGUAR AIRCRAFT

BREAK IN BOX TEST SET

Description:

The scope of the Break-in-Box is to monitor the voltage and current level at all the pins of ADR (Accident Data Recorder) and DAU (Data Acquisition Unit).

End User: Jaguar Aircraft, HAL-Aircraft Div., Bengaluru



AC DC TEST SET



Description:

The Dimmer unit is an essential unit used in Lighting control systems to regulate and adjust the intensity of light sources. It provides a convenient and efficient solution for controlling the brightness of Cockpit Display. ETPL has Designed & Developed Modules for all three channels along with Filter PCB (CH-1 5VDC, CH-2 28VDC & CH-3 115Vac) for Dim

PLATFORM: LUH-CIVIL

SLAT FLAP TEST SET

Description:

This test is used to carry out comprehensive checks of the aircraft flap and slat system. They provide interconnections, indicator lamps and switches to enable comprehensive checks of the electrical part of the aircraft flap and slat system to be carried out in conjunction with the hydraulic test schedule.

End User: Jaguar Aircraft, HAL –Aircraft Div. Bengaluru



FLAP SLATS EOT TEST BOX

Description:

This test is used for checking the end of travel limit adjustment of the aircraft flaps and slats. It provides interconnections, indicator lamps and switches to enable the micro-switch settings of the flap and slat limit switches under test

End User: Jaguar Aircraft, HAL-Aircraft Div. Bengaluru



LASER WINDOW DEMIST SYSTEM

Description: This test is used to carry out comprehensive checks of Laser Window Demist System. The toggle switches in the unit are used to carry out electrical checks

End User: Jaguar Aircraft, HAL –Aircraft Div., Bengaluru



ERSU TEST RIG TR-27

Description:

Test rig TR-27 is designed for bench testing of the ERSU 72 series. It provides power for the ERSU and tests all microphone, telephone and keying lines, providing modulation loads and monitoring facilities for external test equipment

End User: Jaguar Aircraft, HAL-Aircraft Div., Bengaluru



JUNCTION BOX (EJB 72 SERIES) TEST RIG TR-41

Description:

Test rig TR 41 is designed for bench testing of the EJB 72 series Junction box. It provides power for the Junction Box amplifier and test receiver, telephone and microphone lines, signal levels and control lines.

End User: Jaguar Aircraft, HAL-Aircraft Div., Bengaluru



GROUND CREW JACK BOX TEST RIG TR-42

Description:

Function-Test Rig TR-42 is designed for bench testing CCS ground crew jack boxes. It provides power for the jack box and tests intercom facility, amplifier output and microphone/telephone lines

Jaguar Aircraft, HAL-Aircraft Div., Bengaluru



ERSU TEST RIG TR-135

Description:

Test rig TR-135 is designed for bench testing of the ERSU 74 series. It provides power for the ERSU amplifiers and tests microphone lines, telephone lines and all switches facilities.

Jaguar Aircraft, HAL-Aircraft Div., Bengaluru



LASER WINDOW TEST SET

Description:

This test set is used to determine the acceptable degree of sand erosion on the laser window (in terms of laser ranging / target seeking performance) by measuring the light transmission through the window. A transmission level between 45% and 55% is considered as acceptable limit.

Jaguar Aircraft, HAL –Aircraft & Overhaul Div., Bengaluru



Hawk Aircraft

CWS TEST SET

Description:

The Centralised Warning System (CWS) test set is used on the aircraft to test the aircraft CWS. The test set can be used to test the CWS with or without the CWS related circuits (attention getters and lightning circuits).

Hawk Aircraft, HAL –Aircraft & Overhaul Div., Bengaluru



FUEL DIP TEST SET



Description:

The fuel dip system test box consists of test panel and cable stowage panel assembly, contained in a case. The fuel dip test box is used in conjunction with a digital timer to perform a series of static checks on the electrical circuits to the fuel dip systems.

Hawk Aircraft, HAL –Aircraft Div., Bengaluru

MICROTURBO STARTER SYSTEM

Description:

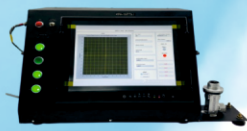
This test set is designed to carry out following functions:

- System monitoring- Functional check of the starting system.
- System simulation- Check for correct sequencing and the operation of safety circuits in the starting system.

Hawk Aircraft, Indian Air Force through HAL –Aircraft Div., Bengaluru



SU-30 AIRCRAFT



Description:

Function- The indigenously designed Manual Control Signal Generator Unit tester (KPA1MTTs.I) is used to check the operation and interfaces requirement of Manual Control Signal Generator Unit (1MTTs.I).

The equipment is meant to check functional performance and serviceability of Manual Control Signal Generator (1MTTs) unit for Su-30MKI Aircraft (I- Level Tester).

Su-30MKI Aircraft, HAL AURDC Div, Nashik.

MANUAL CONTROL SIGNAL GENERATOR

POWER SUPPLY MODULE (PSM) TEST JIG

Description:

The Power Supply Module (PSM) Test Jig consists of test panel assemblies. The Test Jig is used in conjunction with Power Supply Module (PSM) and interfacing through interconnecting loom. This Test Jig unit consists of Resistive and Capacitive loads to test the 3 types of Power Supply Module, CH-1 (5 VDC) 6A, CH-2 (28 VDC) 6.25A and CH-3 (115 VAC) 0-390mA with 400Hz.

End User: LUH-CIVIL HAL Accessories Div., Lucknow



DECADE RESISTANCE BOX



Description:

This device offers 6 decades of resistance ranges from 0.1Ω to over 111.1KΩ. Rotary switches allow easy addition and subtraction of resistance values. Binding posts offer simple and secure connections.

End User: HAL Avionics Div., Hyderabad

TEST BOX

Description:

The test bench for control units is special purpose test that is designed to test the control unit of automatic control box. Control unit consists of a Relay PCB which is assembled inside AC master box. The test bench enables quick functional check of the control box at the laboratory.

End User: Artouste III B Engine HAL Engine Div., Bengaluru



LINK TEST SET



Description:

The LTS can perform some of the functions of the ground control station required for checking the operation of the telecommand system of Lakshya in radiate / direct mode.

End User: Lakshya Pilotless Target Aircraft, Indian Air Force,

BEL PROJECTS

AUXILIARY CARD TEST JIG

Description:

AC Module test jig has provision to set certain signals in the UUT and to monitor all pins on the AC Module edge connector. The Fixture interfaces the cards to the appropriate power supplies, signal sources and monitoring devices like CRO, DMM and logic analyzer. Further provision is available to monitor activities on the various important pins.

The power supplies are interfaced to UUT via wires. End User: . BEL-LCA



DIGITAL MODULE TEST JIG



Description:

The Manual Test Jig has provisions to set certain signals in the UUT and to monitor all pins on the Digital Module edge connector. The fixture interfaces the cards to the appropriate power supplies, signal sources and monitoring devices like CRO, DMM and logic analyzer. Further provision is available to monitor activities on the various important pins. The power supplies are interfaced to UUT via wires

End User: BEL-LCA

ACCELERATION SENSOR ASSEMBLY (ASA) TEST JIG

Description:

ASA test jig and ASA sensor test jig. Acceleration sensor assembly (ASA) 3-Axis Test Jig (STTE) for measuring longitudinal, lateral, normal axis acceleration using ASA unit. **End User: BEL-LCA**



Description:

This Load Box is used along with Automatic Test Equipment to check the IFCC LRU. It contains resistive-inductive loads, and their switching operations are managed by relays. **End User: BEL, LCA**



LOAD BOX FOR IFCC LRU ATE

WMC IO MODULE

Description:

WMC IO Module Test Jig will be used to test all the interfaces of IO module. It will also used for interfaces for simulation of IO module load lines. It is used to set and simulate input signals to UUT (unit under test) and to monitor output IO modules. **End User: BEL, LCA**



IFCC ANALOG TEST JIG CONTROLLER

Description:

The Test Jig controller with consists of a Host controller (workstation) with a DIO module, RS422 module and respective driver software (DAQ driver, RS422 driver) used for testing the analog module and it will also use for the simulation of discrete words through DIO modules. **End User: BEL, LCA**



LAKSHYA SYSTEM INTIGRATION

Description:

The actuator interface box is used during the actuator checks of Lakshya. It provides I/P points and monitor points of signals related to actuation system. It consists of two boxes. One mates with FCE J1 and J3 connectors of the aircraft loom. The other box consists of a 19-pin fixed connector to which the computer interface cable/actuator test cable is connected.

End User: Lakshya Pilotless Target Aircraft, Indian Air Force.



ACTUATOR INTERFACE UNIT 1 & 2

28V SUPPLY BOX

Description:

This unit consists of a box with cable having a fixed type connector when mated to aircraft loom connector providing the +28V line, which is drawn through two wires to banana sockets mounted on the box. **End User: Lakshya Pilotless Target Aircraft, Indian Air Force**



Description:

The Accelerometer Electronics with linear accelerometer is used for measuring control surface during flight control system check of Lakshya. It is necessary to use this setup to amplify the accelerometer output which is very low.

End User: Lakshya Pilotless Target Aircraft, Indian Air Force



ACCELEROMETER ELECTRONICS

Risbridger Oil Gun



Description:

Electrolinks technologies is the sole distributor for Ground Service Equipment's of M/s Risbridger in India. Risbridger hand pumps and Rigs are designed to dispense super clean fluids into critical Aircraft systems, whilst protecting them from contamination. The high quality equipment is made to fit directly to factory packed cans or containers.

Features:

1. Couplings and Accessories
2. Handheld Pumps
3. Free Standing Pumps
4. Refillable Trolleys
5. Non-Refillable Trolleys
6. Mobile Dispensers
7. Series Filers
8. Anti-Syphon Valves

Services

Laser Tracker Services

Laser Tracker Uses

- 1) Higher accuracy than traditional methods
- 2) Repeatable measurements (consistency across shifts and locations)
- 3) Results instantly available (no hours of engineering time to analyze data)
- 4) Portable (can be moved anywhere within the unit and mounted in different positions)
- 5) Long measurement range (ideal for Machine Builders, Heavy Engineering and other large objects)
- 6) Establishes centerline using a coordinate system
- 7) Easy to use



Make Leica MODEL: AT-500

Measurement Range: 0.8 to 160 m (3D), 1.6 to 12 m (6D)

Measurement Mode: Stationary, Continuous (Reflector), Stationary (B-Probe PLUS)

Absolute Angular Performance: $\pm 15\mu\text{m} + 6\mu\text{m}/\text{m}/\text{m}$

AIFM Absolute Distance Performance: $\pm 0.5\mu\text{m}/\text{m}$

Dynamic Lock-on: $\pm 10\mu\text{m}$

Make Leica MODEL: AT-402

Accuracy (MPE): $\pm 15\mu\text{m} + 6\mu\text{m}/\text{m}$ ($\pm 0.0006'' + 0.00023''/\text{ft}$)

Repeatability (MPE): $\pm 7.5\mu\text{m} + 3\mu\text{m}/\text{m}$ ($\pm 0.0003'' + 0.00012''/\text{ft}$)

Full range 1.5 to 80m

Infinite Horizontal Rotation: $\pm 360^\circ$

Infinite Vertical Rotation: $\pm 145^\circ$

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