



# **AKSA SOLUTIONS DEVELOPMENT SERVICES PRIVATE Ltd**



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## Intercom System

### Dual Cockpit Intercom System



Intercom system is an important part of voice communication system of a training aircraft. This system is used for communication between the Instructor pilot and trainee pilot. The system is capable of communicating aircraft system tones to both the pilots. Communication of both the pilots with other aircraft and the Air Traffic Controller is also one of the feature of this system.

### Technology

Intercom uses latest multistage low noise solid state amplifiers and active noise suppression. It includes software control of channel selection for VHF/UHF communication between front and rear pilot.

### Specifications

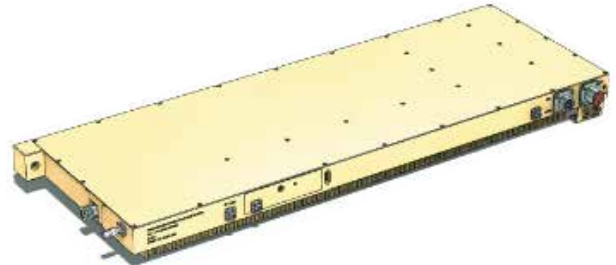
› Input power	18 - 28 VDC
› Current drain	<350 mA
› Aircraft radio impedance	600 Ohms
› Headphone impedance	8 Ohms
› Intercome frequency Response	3 dB at 300 Hz - 3.5 KHZ
› Output voltage distortion	<8%
› Temperature, shock and vibration	MIL - STD - 810
› EMI / EMC	MIL - STD - 461E

### Salient Features

- › Support voice activated microphone
- › Built-in impedance matching circuit for all input/output audios
- › Built-in priority selection between front and rear pilot to communicate with air traffic controller
- › Adjustment of audio level independently

## FPA

### Final Stage Power Amplifier



Final stage power amplifier (FPA) is designed and developed to amplify the RF pulse received from the driver stage for transmission in long range surveillance primary Radar. There are multiple high power amplifier modules in one Radar. Power is combined via RF combiner.

### Technology

The system is based on following main technologies:

- › Solid state power amplifier
- › BJT based RF amplification
- › LDMOS & GaN based technology used for amplification

### Specifications

› Operating frequency	2700 MHz~3000 MHz
› RF output power	≥1000 WATTS
› Supply voltage	36 VDC
› Duty cycle	8.4%
› Operating temperature	-40°C to +70°C
› Environment	MIL-STD-810G

### Salient Features

- › BIT (Built-in Test) signal
- › Temperature monitoring gauge to monitor temperature while in operation
- › Module status monitoring LEDs
- › Test Points for measuring different parameters
- › Can be customized as per user requirements in any form, factor and specifications

## Expertise Profile

### Embedded Systems

- › FPGA & DSP design platform for Image/Video/Signal processing applications
- › Application interfaces: 3G, 4G, GPS, USB 2.0, Wi-Fi, Ethernet, Bluetooth, NFC, RFID, SPI, I2C, CAN, RS232, RS422, RS485, Modbus, HART protocols, JESD204B, PAL, HDMI, VGA, Camera Serial Interface (CSI), 1553B, ARINC 429
- › Microcontroller and SoC design platforms: Microchip, NXP, Atmel, STM32, 8051, Texas Instrument, Mediatek, Quectel & Allwinner for consumer electronics, customized tablets, biometrics and gadgets, POS, IoT applications
- › Real-time (RTOS) based applications: VxWorks, FreeRTOS, TI-RTOS, RT-Linux, Windows CE
- › Android/Linux kernel & OS compilation, driver integration, scripting & bootloader development
- › Upgradation and replacement of obsolete systems (Attitude Heading Reference System (AHRS), Heads-up Display (HUD) systems, IFF systems, control and communication systems) using latest technology
- › Software Defined Radio (SDR) platforms like NI, USRP, analog devices, Hack RF & Lime SDR for waveform generation
- › Tools: RTL coding in Verilog/VHDL, Embedded C, GNURadio, LabView

### Power Solutions

- › Isolated/non-isolated/High voltage power supplies (Switch Mode, Modular based & Linear regulated) of different voltages and current ratings as per requirements
- › Design, development, repair/troubleshooting & modification of analog, digital and power circuits
- › Push-Pull, Boost, Buck, Buck-Boost and cuk converter designs
- › Frequency converter from 220 VAC, 50Hz to 115 VAC, 400Hz with 0A ~ 6A current
- › High frequency fly-back and multiple output transformer design for different frequencies
- › Under voltage & over voltage, reverse & short circuit protection, EMI/EMC, Shielding and Band pass filters

### RF Microwave Solutions

- › Pulsed and continuous wave amplifiers using BJT's, LDMOS and GaN technology
- › High power continuous wave amplifiers for jamming up to 100 W at UHF & VHF band
- › Transceiver design up to 9 GHz using super heterodyne and homodyne technique for ASK, FMCW, DPSK, PPM, MSK and PM applications
- › In house test capability: Vector Network Analyzer (VNA)
- › Spectrum analyzer, RF signal generator, Power meter, Sensors, Probes, Attenuators and cables

- › High power pulsed amplifier design up to 2 kW in L & S Band
- › Signal and voice jammers for UHF, VHF, GSM, GPRS, 2G, 3G, 4G & GPS applications
- › Antenna designing for GSM, UMTS, 3G, 4G, GPS and Wi-Fi applications
- › Tools: ADS, Genesys, Microwave office, CST, HFSS, Altium

### Mechanical & CAD Services

- › Heat transfer analysis in electronic circuit board
- › Sheet metal design and manufacturing
- › CNC turning design and manufacturing
- › Weldment design and manufacturing
- › Class 3 chromating as per standard MIL-DTL-5541F
- › Gold plating as per MIL-C45204b
- › Paint: As per standard FED-STD-595
- › CNC milling design and manufacturing
- › Chrome plating as per QQC-320b
- › 3D printing: FDM, SLA and SLS techniques
- › Ingress protection rating up to level IP56
- › Plastic injection molding design and manufacturing
- › Material: Al 6061-T6, Al 2024-T4 and steel 316
- › Manufacturing linear tolerance of approx. 0.1 millimeters

### PCB Design Services

- › Schematic capture
- › Multilayer PCBs with complex high speed digital, analog and mixed signal routing
- › Flex - Rigid PCB designing (High power flex, Book binder flex)
- › SI on hyper lynx
- › IPC standard (IPC-A-600, IPC-A-610 compliance)
- › Differential pairs
- › Video signals (VGA)
- › DFM/DFA consideration
- › GERBER generation
- › Library management
- › Component 3D and step file
- › Power planes (Split planes, Analog & Digital portion segregation)
- › Board bring-up
- › Controlled Impedance and matched length/timings
- › PCI/PCIe signal routing
- › Metal core multilayer PCB
- › BOM management
- › PCB manufacturing and assembly consultation

## HEU

### HUD Electronic Unit (HEU)



Head Up Display (HUD) Electronic Unit (HEU) is part of the aircraft weapon delivery aiming and navigation system. It is a multiple video generation, mixing and processing system. For this purpose, it communicates with other onboard aircraft system via 1553B, RS232 and ARINC429 analog and discrete interfaces.

### Technology

The HEU functions as a remote terminal unit RTU of a MIL-STD-1553B, multiplexed, data bus. In addition to the data received on the 1553B data bus, the HEU receives analogue and discrete switching signals from other systems on the aircraft. The HEU computer processes this data and provides inputs to the waveform generators which initiate the production of flight data symbology signals in cursive and raster formats. The flight symbology data is transmitted for the display on the PDU (cursive) and on an HDD (raster display).

### Specifications

- » Power requirements 115 VAC, 3 phase, 400Hz  
5 VDC  
28 VDC
- » Power Consumption 250 Watts (max)
- » EMI/EMC MIL-STD-461E
- » Temperature, shock and vibration MIL-STD-810
- » Altitude 55,000 ft

### Salient Features

- » Air to air weapon aiming computation
- » Navigation data
- » Cursive symbol generation of weapon aiming, navigation and altitude data for display on the Pilot's Display Unit (PDU)
- » Raster symbology generation for Head Down Display (HDD)
- » Display of ILS cues, glide slope, localizer bars, DME Channel, frequency on touch down distance at PDU

## HPA

### High Power Amplifier



HPA is a solid state high power amplifier for final stage of transmitter of an Air Traffic Control (ATC) radar. Radar consists of multiple HPAs. Each amplifier is capable to provide output power greater than 1450 WATTS in S-band.

### Technology

- » Solid state power amplification.
- » LDMOS & GaN based technology used for amplification

### Specifications

- » Output power  $\geq 1450$  Watts
- » Operating frequency 2.7 - 2.9 GHz
- » Pulse repetition frequency Configurable
- » Pulse width Configurable
- » Gain  $> 22$  dB
- » Impedance 50 Ohms
- » Operating temperature  $-40^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$
- » Environment MIL-STD-810G

### Salient Features

- » VSWR and RF monitoring
- » Temperature monitoring
- » Auto shut down system
- » Can be customized as per user requirements in any form, factor and specifications

## IFF Tester

### I Level Tester for IFF System



Intermediate (I) Level tester of IFF Transponder system is designed to check and verify the complete functionality of IFF transponders. User friendly, Graphic User Interface has been developed that helps the operator to perform all previously manual operating functions through automated software.

### Specifications

- » Operating frequency 1030MHz (Transmission)  
1090MHz (Reception)
- » Test modes M1, M2, M3 & MC
- » Operating voltage 220 VAC

### Salient Features

- » Built-in Test Equipment (BITE) capability
- » Manual and automatic testing capability
- » Single channel selection feature
- » High power up to 4 KWatts testing capability
- » Sensitivity up to -127 dBm & Bandwidth testing capacity
- » PRF, SLS and Pulse width testing capability
- » It can be developed with added features of depot level maintenance and fault diagnostic up to component level

## IFF Interrogator

### Air Borne IFF Interrogator



Solid-state technology based Airborne Interrogator is an indigenously designed product to identify the friend or foe flying objects within the radar range. It is an identification system installed on aircraft carrying Beyond Visual Range (BVR) weapons and also command and control Centers on ground / in air. It enables interrogation signal to identify aircraft as friendly or hostile and to determine its bearing and range. IFF may be used by both military and civilian (Air Traffic Control) applications

### Technology

Solid state LDMOS based technology is implemented in the transmitter module of IFF interrogator. Super heterodyne technique is implemented in the receiver.

### Specifications

- » Output power  $\geq 62$  dBm
- » Operating frequency 1030 MHz (Transmission)  
1090 MHz (Reception)
- » Impedance 50 Ohms
- » Sensitivity  $\geq -88$  dBm
- » Environment MIL-STD-810G  
EMI/EMC MIL-STD-461E

### Salient Features

- » Built-In Test in each module
- » Modular design
- » VSWR protected
- » Support SUM and Delta channel
- » Can be customized as per user requirements in any form, factor and specifications

## Reply Simulator

### IFF Reply Simulator



IFF Reply Simulator system is designed to check and verify the complete functionality of IFF interrogators installed on aircraft and ground radars. This handheld tester can be used to test conventional mode 1, 2, 3 and C of any interrogator. User friendly GUI is developed that helps the operator to perform all operations.

### Specifications

- » Operating frequency 1030MHz (Reception)  
1090MHz (Transmission)
- » Test modes M1, M2, M3 & MC
- » Operating voltage 220 VAC, 50 Hz
- » Operating range Up to 50 meters
- » Operating temperature -40°C to +70°C
- » Environment MIL-STD-810G

### Salient Features

- » Solid State technology used to develop smart system
- » Built-in Test (BIT) capability  
Remote/Field Level testing capability
- » Can be customized as per user requirements in any form, factor and specifications

## IFF Transponder

### Air Borne IFF Transponder



Highly sophisticated solid-state airborne transponder system is designed to broadcast on request, the identity (friend or foe) of the flying vehicle. Transponder receives an interrogation signal and in reply generates a response consisting of a unique signal that identifies to broadcast the identity of aircraft/UAV. It enables military and civilian air traffic control interrogation systems to identify aircraft/vehicles as friendly or hostile and to determine its bearing and range. IFF is mandatory to be used by both military and civilian aircraft.

### Technology

Solid state LDMOS based technology is implemented in the transmitter module of IFF Transponder. Super heterodyne technique is implemented in the receiver.

### Specifications

- » Output power 57 + 3 dBm
- » Operating frequency 1030 MHz (Reception)  
1090 MHz (Transmission)
- » Impedance 50 Ohms
- » Sensitivity -77 + 3dBm
- » Operating temperature -40°C to +70°C
- » Environment MIL-STD-810G

### Salient Features

- » BITE implemented in each module
- » Modular design
- » VSWR protected
- » Dual antenna channel
- » Available on SDR platform
- » Can be customized as per user requirements in any form, factor and specifications



## SFIDU

## Expertise Profile

### Standby Flight Information Display Unit



SFIDU is a complete stand-alone navigation system to help aircraft's recovery in case of emergencies. It provides basic navigation information to the pilot in case other navigation systems are not available due to any reason. It operates using its own power source in case of aircraft electrical system failure to provide navigation aid for safe landing.

### Technology

SFIDU entails Military grade Gyro System along with Pressure transducers and 3ATI AMLCD. High speed DSP's and FPGA's are used for processing, sensors calibration, temperature measurement and adjustments.

### Specifications

- › Mach number operating range 2.22M
- › Airspeed data Up to 565 knots
- › Attitude (Roll, Pitch) 360, ± 90
- › Altitude 55,000 ft
- › Vertical velocity ±15000 ft/min
- › Baro-reference pressure range 941-1083 mbar
- › Temperature, shock and vibration MIL-STD-810G
- › EMI/EMC MIL-STD-461E

### Salient Features

- › SFIDU provides roll and pitch reference, by means of synthetic picture of an ADI (Altitude Display Indicator)
- › It provides air data references by means of digital information (Mach number, Calibrated Air Speed, Baro-Corrected Altitude, and Vertical Velocity)
- › Customizable in any form, factor and specification as per user requirements

### Software Design & Development Expertise Mobile App Design & Development

- › Mobile application development in native Android, iOS, React Native & Xamarin
- › Custom Firmware Development
- › Web APIs integration over different protocols (SOAP, JSON, WebApis etc.) and Legacy web services
- › Support for multiple screen designs using latest design guidelines like Material design
- › Firmware and apps OTA platform development
- › Image processing (2D barcode reading, object shape detection, OCR, image enhancement, image classifier etc.)
- › Auth authentication
- › Integration of SQL & NO SQL databases like Google Firebase, Mango DB etc.
- › Integration with GCM server

### Enterprise Application Development

- › Services development for different operating systems (Windows, Linux, Android, iOS, SOC etc.), data formats and languages with data integrity, robustness, scalability and stability
- › Third party services integration and development
- › Visual Studio
- › Windows Presentation Foundation Application (WPF) development
- › Telerik controls
- › Hardware integration e.g. Biometric device, Thermal printer, Cash code acceptor, Cash dispenser, SIM dispenser, NFC, Smart card reader etc.
- › IIS Web server, Apache tomcat server
- › Windows Form applications development
- › Service Oriented Architecture using SOAP, WCF and Restful web services
- › Entity framework and LINQ

### Database Design, Development & Administration

- › Remote database monitoring
- › Data mining
- › Configuring high availability solutions
- › Installation, configuration, and maintenance of databases on Linux and Windows
- › Database performance tuning
- › Data migration from legacy systems
- › Data cleansing
- › Database encryption
- › 24/7 databases availability

## SLS RF Amplifier

### Web Applications Design & Development

- › Web application development in Java server faces, Servlet, JSP, AJAX, Java Bean, Java Script, Java Applet
- › Frameworks: WordPress, Prestashop, Magento, Joomla, Zencart, Opencart, Shopify
- › HTML5 jQuery Ajax, AngularJS and Node JS
- › Integration with Google Cloud Messaging (GCM) server for Push notifications
- › Web application development in Asp.net, Web forms and MVC
- › Customized reporting
- › Legacy services, SOAP based and RESTful using MVC web API, WCF for intranet and internet solution (XML and JSON)
- › Integration of third party controls like Telerik Asp.net and Kendo UI for MVC applications
- › Responsive UI design by using Twitter Bootstrap
- › Google Map integration for geo location and geo fencing
- › Interaction with client end hardware like Biometric Device, camera etc. through ActiveX and applets

### Technical Writing

- › Create System Architecture Documentation (SAD)
- › Proposal writing (Response to RFP & RFQ)
- › Deployment guides and installation guides
- › Develop project plans
- › Design product, Functional & system requirements documents
- › SOPs, Policies, Procedures and ISO Documentation
- › Process documentation and work flows
- › Training materials

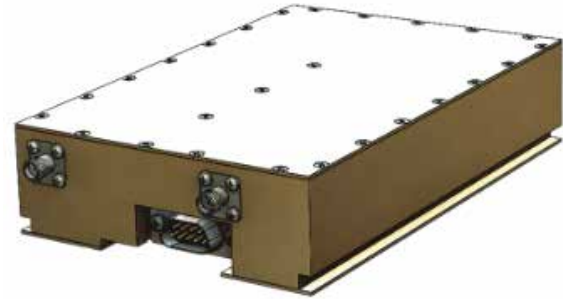
### Software Quality Assurance & Testing

- › Developing test plans / test cases
- › Application / Web channel level security testing
- › Cross browser compatibility testing
- › Performance testing
  - › Benchmarking on required TPS
  - › Load testing on required TPS
- › Manual / Automated testing
- › Information security testing
- › Usability testing

### Multimedia, Graphics & UI/UX

- › **UI/UX Services** (Responsive website design, Web & Mobile application design, Corporate identity & branding, Blogs, Newsletters, E-magazines, Corporate profile & presentations)
- › **Digital Marketing & Print Design** (Brochures, Flyers, Banners, Operational manuals for products with sketched images/illustrations, Packaging, Stickers, Videography, SEO)

### Solid State RF Amplifier



Solid state power amplifier is a device that fulfills the RF power requirements in IFF SLS transmitter application. This has replaced the old technology tube amplifiers. It provides output power around 500 WATTS in operation band of 1030 MHz.

### Technology

Formerly, Tetrode tube amplifiers were used to achieve desired output power. But due to its obsolescence and high cost, is replaced by Solid State amplifier.

### Specifications

- |                          |                |
|--------------------------|----------------|
| › Operating frequency    | 1030 MHz       |
| › RF output power (peak) | ≥500 Watts     |
| › Supply voltage         | +28, 50 VDC    |
| › Operating temperature  | -40°C to +70°C |
| › Environment            | MIL-STD-810G   |
| › EMI/EMC                | MIL-STD-461E   |

### Salient Features

- › Small size and low weight
- › Low cost as compared to Glass tube amplifier
- › No warm-up time or cathode heaters required
- › High reliability and greater physical ruggedness
- › Can be customized as per user requirements