



# KREOVATE ENGINEERING PRIVATE LIMITED

Innovation by design, powered by creativity

## KEPL SERVICES

### PRODUCTS AND SOLUTIONS

- Cluster – Smart Clusters, Infotainment System, Segmented clusters
- ECUs - Telematics ECU (TCU) BCM, LCM, Seat Controllers, USB Charges
- Lighting- LCM, Mood Lighting, Flashers, Sequential Blinkers, Headlamp Controllers
- EV – DC DC Convertors, BLDC Controllers, EV Charges, BMS
- Data loggers
- Software Stacks – UDS, Bootloader, FOTA, CAN, LIN

### ENGINEERING SERVICES

- POCs, Prototyping & Product Development
- Hardware Design, PCB Design & Layout
- Embedded Systems Development
- Firmware & Software Engineering – Linux, Android, BSP, Middleware, HMI, BLE, Wi-Fi
- System Engineering
- DVP Testing, Validation & Certification
- Manufacturing Support & Supply Chain Management
- DVP, Certifications
- Resources Augmentations – Embedded, AUTOSAR, Linux, BSP, HMI, IVI, Hardware

### DEVELOPMENT PLATFORMS

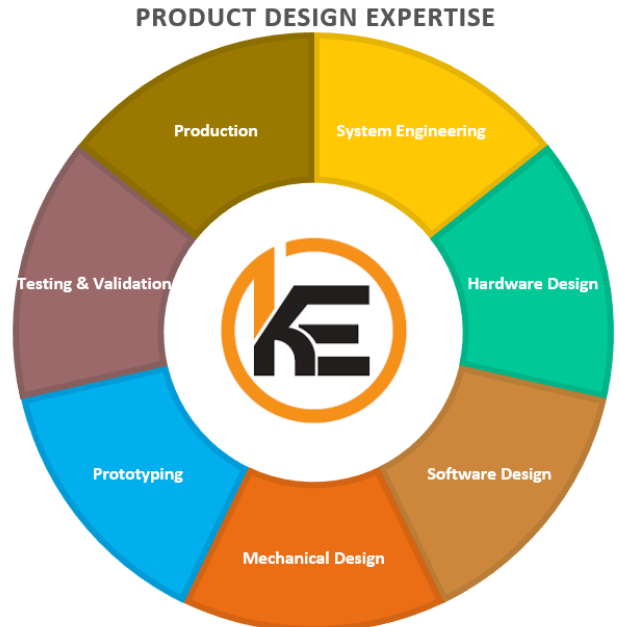


## KEPL BUSINESS MODEL

- **Product Design, End to End Solutions and Manufacturing**
  - Design of products and Solutions
  - DVP Testing
  - Prototyping
- **Service Based Model**
  - Software Engineering Services
  - Hardware Design Services, PCB Design Services
  - Mechanical Design Services
  - Prototyping and Testing Services
- **Manufacturing and Supply**
- **Partnerships and collaborations**

Collaborating with other businesses (Customers, Partners, Suppliers, Consultants etc) on joint product development, sharing revenues

- **Offshore Development Center(ODC)**
  - a. Dedicated Engineering Team
  - b. Infrastructure Setup
  - c. Ownership Model - Client Owned / Vendor Owned
  - d. Service Model
    - i. Time & Material (T&M) – based on effort
    - ii. Fixed Cost Projects
    - iii. Build-Operate-Transfer (BOT)



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## UDS AND BOOTLOADER STACK

### Features

#### 1. UDS and Bootloader Stack Inclusion

- CAN Stack
- Diagnostic Stack
  - DCM
    - RID
    - DIDs
  - DEM
    - DTC
- Bootloader
  - Authentication - Secure bootloader with KEPL Proprietary Security Algorithm
  - Protected Memory Portioning
  - Safety Mechanisms
  - Failsafe Mechanisms – Rollback
- Memory Stack
  - NVM – FDL/FCL

#### 2. Module Software Architecture

#### 3. Covers ISO14229 Requirements

### 4. Supported UDS Services :

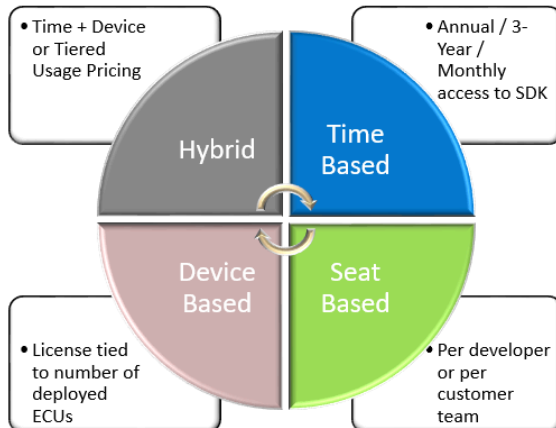
- |  |                                     |
|--|-------------------------------------|
| 1. Diagnostic Session Control (0x10)   | 12. Routine Control (0x31)          |
| 2. ECU Reset (0x11)                    | 13. Communication Control (0x28)    |
| 3. Clear Diagnostic Information (0x14) | 14. Write Data by Identifier (0x2E) |
| 4. Read Diagnostic Information (0x19)  | 15. Write Memory by Address (0x3D)  |
| 5. Read Data by Identifier (0x22)      | 16. Input/output Control (0x2F)     |
| 6. Read Memory by Address (0x23)       | 17. Tester Present (0x3E)           |
| 7. Security Access (0x27)              |                                     |
| 8. Control DTC Setting (0x85)          |                                     |
| 9. Request Download (0x34)             |                                     |
| 10. Transfer Data (0x36)               |                                     |
| 11. Request Transfer Exit (0x37)       |                                     |

### Supported ECUs

1. RH850
2. RL78 (Note)
3. NXP Series (Note)

**Note: Stack under development for RL78 and NXP series MCUs**

## FUTURE OFFERING FROM KEPL FOR SW STACKS



### KEPL USPs

- Secure, Verified UDS + Bootloader Stack
- Ready-to-Integrate for RH850 Microcontrollers
- Supports OTA
- License & Feature Control for OEM Use Cases
- Customizable, Scalable, SDV-Aligned Design
- Optional Support & Maintenance Packages

### EXAMPLE TIERS

**BASIC** - Binary only, email support, 1 year

**PRO** - Source code, priority updates, OTA ready

**ENTERPRISE** -Source + customization, SLA support, integration help

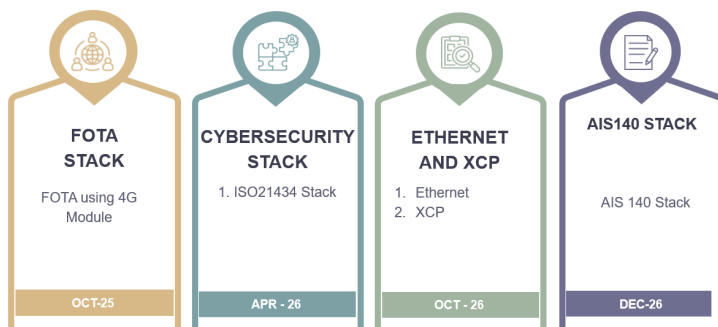
### What's in our stack?

- UDS Protocol Stack (ISO 14229)
- Secure Bootloader for RH850 (CAN-based)
- Configuration Tool (GUI/CLI)
- Integration Support for OEM ECUs
- Documentation & API
- Optional Custom Services

### Customer Benefits

- Faster time-to-market (pre-built stack)
- No upfront lock-in (flexible subscription)
- Secure and OTA-ready for future-proof platforms
- Integration and tech support included
- Customizable for OEM-specific needs

## KEPL ROADMAP - SW STACKS



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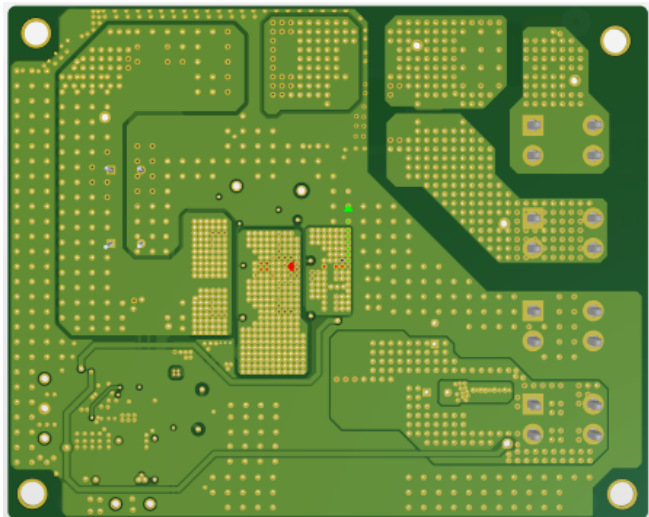
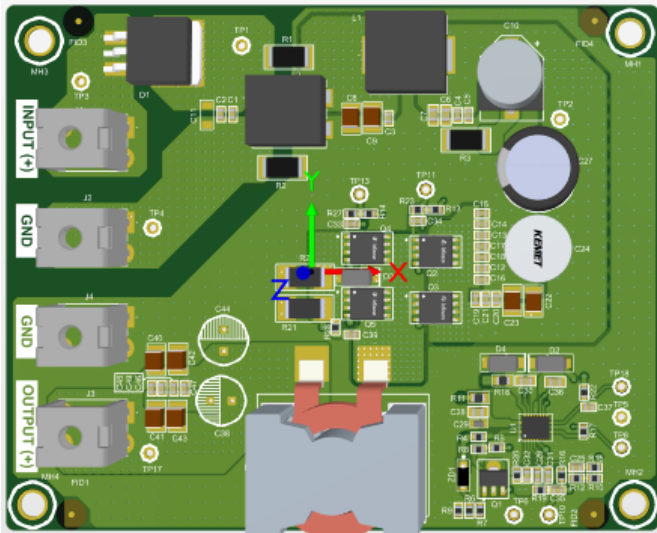
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## DC DC CONVERTOR

Sr no	Parameter	UOM	Values
<b>A) Functional:</b>			
1	Supply Voltage Range	V	36 to 60
2	Supply Voltage Nominal	V	48
3	Output Voltage	V	12 @ 20A
4	Output power	W	240W
5	Type & Topology	-	Non – isolated
6	Efficiency	%	> 90
7	Operating Frequency	kHz	150
<b>B) Electrical:</b>			
1	Line Regulation	%	< 3
2	Load Regulation	%	< 3
3	Output Ripple voltage	mV	< 200
4	Output Ripple Current	mA	< 200
5	Full Load Output voltage Turn on time	Sec	2 to 3 Sec @ nominal voltage

Sr no	Parameter	UOM	Values	
C) Protections:				
1	Input Protections	Under Voltage	V	Provided below 35
		Over Voltage	V	Provided above 60
		Reverse polarity	-	Provided
2	Output Protections	Over voltage	-	Provided
		Over Current	-	Provided @130 %
		Short Circuit	-	Provided
D) Mechanical Specifications:				
1	Packaging (L x W x H)	mm	150 x 105 x 50	
2	Weight	gm	~ 200	
3	Mounting Arrangement	-	Using fasteners	
E) Environmental Specifications:				
1	Operating Temperature	°C	0 to +65	
2	Storage Temperature	°C	0 to +85	

Sr no	Parameter	UOM	Values
<b>F) Compliance requirement:</b>			
1	Conducted Immunity	V	Pulse:1,2a, 2b, 3a, 3b
2	Input Transient Protection	V	200V for 100µs with 2Ω Ri
3	Radiated Immunity: BCI	mA	60 mA
4	Radiated Immunity: ALSE	v/m	30 v/m
			Test is as per vertical polarization (QP limits)
			30 to 75 MHz – 62 to 52 dB uV
5	RE	dB uV	75 to 400Mhz – 52 to 63 dB uV
			400 to 1000Mhz – 63 dB uV
			79 dB uV (QP limits), 66 dB uV (AV limits) 73 dB uV (QP limits), 60 dB uV (AV limits)
6	CE	dB uV	AD ± 15 KV CD ± 8 KV
7	ESD	KV	



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## 4G MODEM - LE910CX

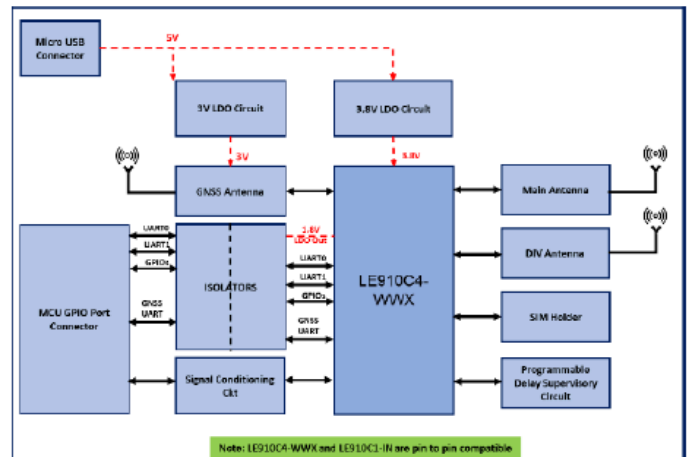


### Specifications:

1. Supply Voltage – 3.8V
2. Temperature Range: -40°C to +85°C
3. 1.8V/3V SIM Interface
4. SPI, I2C, UART, PCM, USB2.0,
5. 10 IO Ports
6. 181 Pin LGA Interface
7. Data
  - a. LTE Cat 4 – Uplink 50Mbps, Downlink – 150Mbps
  - b. LTE Cat 1 - Uplink 5Mbps, Downlink – 10Mbps
8. Approvals:
  - a. FCC/ISED, PTCRB, MNOs (North America)
  - b. RCM, MNO (Australia)
  - c. RED/GCF (Europe)
  - d. JRL/JTBL (Japan)
  - e. Enacom, Anatel, CRC, MTC (Latin America)

### Features

1. LE910C2-WWX for Global
2. LE910C1-IN for India
3. LTE FDD Cat.1. 3GPP release 10 compliant
4. LTE FDD Cat.4. 3GPP release 10 compliant
5. Rx Diversity and MIMO DL 2x2
6. Single Rx option
7. VoLTE support
8. SMS over IMS
9. Built in UDP/TCP/FTP/SMTP stack
10. IPv4/IPv6 stack
11. Control via AT commands according to 3GPP
12. TS 27.005, 27.007 and Telit Cinterion Custom AT
13. commands
14. SIM application Tool Kit 3GPP TS 51.014
15. OMA-DM Telit Cinterion Software Management
16. Simultaneous support of GPS, Glonass, Beidou,
17. Galileo, QZSS



## 4G MODEM - ELS63



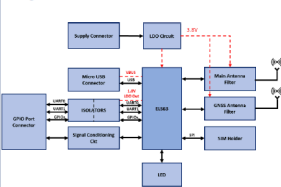
### Specifications:

1. Supply Voltage – 3.8V
2. Temperature Range: -40°C to +85°C
3. 1.8V SIM Interface
4. I2C, UART, USB2.0,
5. 10 IO Ports
6. 114 Pin LGA Interface
7. Data
  - a. LTE Cat 1 bis:
    - ° Uplink: 5Mbps,
    - ° Downlink: 10Mbps
8. Approvals:
  - a. RED, GCF

### Features

1. LTE FDD Cat 1 bis 3GPP Rel 14 compliant (India)
2. Single LTE antenna
3. 4G Bands: B1, B3, B5, B8, B40, B41
4. Built-in UDP, TCP, PPP, HTTP, HTTPS, NTP, FTP stack
5. IPv4/IPv6 stack
6. Control via AT commands according to 3GPP
7. TS 27.005, 27.007 and Telit Cinterion custom AT commands
8. Embedded GNSS (GPS, GLONASS, Galileo, Beidou, NavIC/IRNSS, QZSS)

### Design Architecture



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