

OKT507 Board Support Package (BSP) for Digital Cockpit PoC

1. Objective of PoC:

The primary objective of this PoC was to develop and integrate a Board Support Package (BSP) for the **OKT507** board to enable an automotive Digital Cockpit functionalities.

Designing and developing a Qt/QML-based digital instrument cluster on the OKT507 Embedded Linux platform, optimized for a 1024×600 landscape display and supporting real-time visualization.

2. Problem Statement:

Bring up the Linux operating system on the OKT507 platform.

Enable, test and verify essential device drivers, including LCD display.

Integrate and configure the Qt framework and graphics stack to support Qt/QML-based applications.

Configure and optimize the display subsystem for a 1024×600 automotive panel.

Validate real-time rendering and performance of the digital cockpit on the target display.

Configure system startup services to automatically launch the digital instrument cluster application upon power-on.

3. Initial Approaches Attempted:

A guest operating system was brought up on the host machine using VMware virtualization.

The OKT507 Linux image was built within the virtual machine environment using the Forlinx OKT507 SDK.

The SDK provided an integrated AArch64 cross-compilation toolchain for the target platform.

The virtual environment also included a complete Qt development framework for application development.

4. Description :

BSP Bringup, Image Deployment & Qt Enablement:

Successfully flashed the generated image onto the OKT507 board and verified system boot, Root file systems, application availability.

Verified framebuffer device (/dev/fb*) availability and configured the Qt platform plugin (linuxfb) for framebuffer-based rendering.

Configured Qt runtime parameters, including framebuffer device and font paths, validated required QML modules and successfully tested Qt sample applications on the target hardware.

Enabled a Qt-based cluster application rendering on the 7 inch LCD which having 1024x600 resolution.

5.Tools, Kits & Languages Used:

Qt Framework 5.12.5 (Qt Quick, QML, Qt Multimedia) and Qt Creator IDE on Ubuntu Linux4.9

Embedded Linux environment on OKT507

Languages: C++, QML script

6. Challenges Faced:

Faced SDK build errors during Linux image generation for OKT507; resolved by collaborating with the board vendor (Forlinux).

Faced issues related Qt platform Graphics module unavailability; resolved issues by using SDK existing modules.

Qt version limitations on embedded hardware

7. Key Learnings :

Hands-on expertise in BSP, Configuration, Building the complete linux image.

Qt/QML embedded automotive UI development

8. Future BSP Activities:

Implementing a Type 1 (baremetal) hypervisor at EL2 on OKT507 to support simultaneous Linux and Android OS guests.

LCD Touch screen I2C drivers including device tree configuration.

9. Conclusion:

The generated Linux image was successfully flashed onto the OKT507 board, system boot and root file system integrity were verified. Application availability was confirmed and the digital instrument cluster was successfully displayed on the target display.