



LOW COST IOT GATEWAY – ‘THINGWAY’

May, 2020

Version 01



Low Cost IoT Gateway – ‘thingWay’



Cost effective, weather proof cellular IoT Gateway designed for outdoor applications. It can be used as an edge gateway for applications like remote infrastructure monitoring, energy monitoring, environment monitoring, smart cities, etc.

Solution Description

- Successfully developed, proto-typed processor based design with DDR2 and NOR Flash
- 6L 1.6mm Complex PCB design with stringent length matching and BGAs
- Interfaces – Cellular(2G/3G/4G), Wi-Fi, 3x Ethernet, 2x RS-485, 2x RS-232, PoE
- Expansion slot for BLE/BT, LoRA, Zigbee, Z-Wave.
- Critical placement & routing of radio signals (2G/3G/4G, Wi-Fi) to ensure optimum performance
- Linux OpenWRT based OS running Linux Kernel v4.14
- Initial bring-up of the board followed by detailed Electrical interface validation(EVT) & Deployment at customer locations.
- IP67 rated weather and tamper proof connectors.

Outcome and Benefits Delivered

- Designed a system with high reliability, modularity, and performance
- thingWay comes with an SDK for developing custom IoT gateway which can be integrated to cloud servers
- Customers can develop applications of their own on SDK
- The system is undergoing field trials and will be followed by formal product certification process



'thingWay' - System Description

- Requirements Gathering & Analysis, competitive product study, H/W Architecture development, feasibility study and finalization, Firmware architecture development and finalization, component selection of all major components with CBOM with MOQ, LT etc

Hardware design(Schematics), Cadence OrCAD Capture CIS

- Isolated power supply design(48V IN) with electrical safety and over current protection.
- Part selection to minimal cost so as to reduce the BoM cost and RoHS compliance.
- Pre-certified 4G module with superior quality and low cost.

PCB design(Layout)

- Multi- layer (6L) 1.6mm thick rigid PCB made of TU-662.
- Routing complexity involving differential pair and length matching and intra spacing for the RAM Interface between DDR2 and MT7688 processor placed on single side of PCB
- Split power/ground plane for isolated power supply design.
- Optimum placement of WiFi/4G antennas to achieve maximum range and minimum interference.
- Highly challenge to integrate 8 screw locked IP67 connectors so as to maintain a medium form-factor.

Fab and Assembly/BOM

- DFM and DFA reviews
- Low cost CBOM's with low cost alternates identified for high cost parts, life time check for critical components in design including NOR flashes,DDR2,USB Hub and Transceivers
- Manufacturing support with alternates identified for components going to EOL/obsolesce



'thingWay' - System Description

FW development

- Operating System - Linux based OpenWRT
- Development of bootloaders, kernel, file system etc
- Driver development and integration of open standard protocols HTTP, MQTT, FTP, SNMP and Websocket.
- Driver development of USB Hub, RTC, USB-UART bridge controller.
- Development of intuitive Lua based web server interface for configuration and management
- Development of manufacturing test scripts for board testing.
- Firmware upgrade

Bring-up and Testing

- Initial bring-up of the board followed by detailed Electrical interface validation(EVT) including interface validation of Power, DDR, SPI, I2C interfaces
- Successfully passed Thermal testing.

Mechanical and 3-D design

- Prepared the 3-D model of the board
- IP-67 Rated mechanical enclosure design
- Conceptualized and prototyped the weather and tamper proof rugged mechanical enclosure.

THANK YOU



For More Details, Let's Connect



Gadgeon Systems Inc.

881 Yosemite Way, Milpitas, CA 95035, USA

CONTACT - USA

Mani Ram - Vice President - Solutions and Technology

 +1-678-900-0874 |  mani.ram@gadgeon.com

Gadgeon Smart Systems Pvt Ltd.

VI 405/E1, Fathima Tower, Maleppally Road, Thrikkakara PO,
Kochi, Kerala, PIN: 682021, India

CONTACT - INDIA

Hari Nair - CEO & Co-Founder

 +91 989-501-5880 |  hari.nair@gadgeon.com

Gadgeon Europe

Antwerpsesteenweg 124/54, 2630

Aartselaar, Belgium

 +32 475 23 39 46 |  europe@gadgeon.com

 sales@gadgeon.com