

## Production of NavIC Messaging Receiver

### **Introduction**

NavIC Satellite Constellation have a wide coverage area up to 1500 km around the Indian main land. They are mainly designed for Regional Navigation Services. In addition to their primary functionality, they allow broadcasting of additional short messages. These messages can be related to alerts, forecast and directives on the occurrence of natural disasters like Floods, Earthquake, Tsunami, Cyclones, Landslides etc. and dangers for the safety of life in areas with poor or no communication infrastructure. The NavIC Messaging Receiver is conceptualized and developed at Space Applications Centre (SAC), ISRO, Ahmedabad for reception and display of these messages. The receiver transmits raw data over Bluetooth link. An application running on a smart device like mobile phone or tablet having Bluetooth connectivity can decode and display the messages for users. This receiver is designed as battery operated low power device. This note describes hardware architecture and requirement for product.

### **1. Objective**

SAC has developed working prototype hardware. Product can also be used by fishermen/ marine applications in deep sea. IP67 packaging is to be designed by vendor along with battery charging option. Vendor participation is invited for production of same hardware in large numbers.

### **2. Design**

NavIC Messaging receiver has been designed to provide positioning along with messaging. NavIC module can be procured from ANTRIX Corporation Limited, Bengaluru, a commercial arm of ISRO. In addition to the NavIC chipset, it uses ATmega328P microcontroller and HC-05 Bluetooth(BT) module. The controller provides configuration for chipset and BT module. Microcontroller acts as an interface between chipset and BT. The TPS73633DBVT LDO converts 5V to 3.3V. It is designed to draw power from battery or power bank. The power consumption of the receiver is around 100 mA @ 5V. The receiver can work for about 4 days using a 10000mAh power bank. The block diagram of NavIC messaging and positioning receiver is as shown in Figure-1. Currently all the data from NavIC receiver is passed over BT to mobile which is consuming more power in both receiver and mobile. The blocks in dotted section are getting implemented as future enhancement. The idea is to save power in both mobile and device. This will be achieved by filtering out the messages in microcontroller and pass only needed messages to the mobile application. Figure 2 shows actual photograph of NavIC messaging receiver. The current size of PCB is 41mm x 46mm. The size of PCB with enhance feature is 70mm x 50mm.

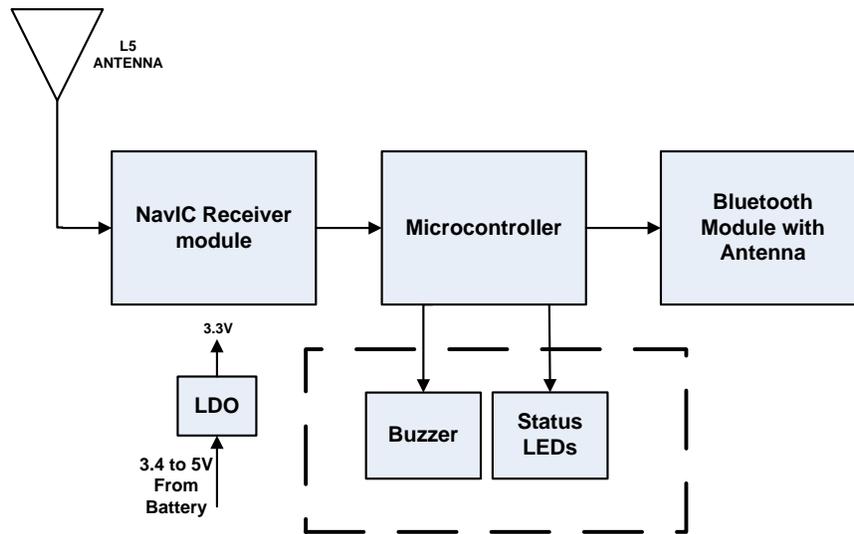


Figure-1: Block Diagram NavIC Messaging and Positioning Receiver

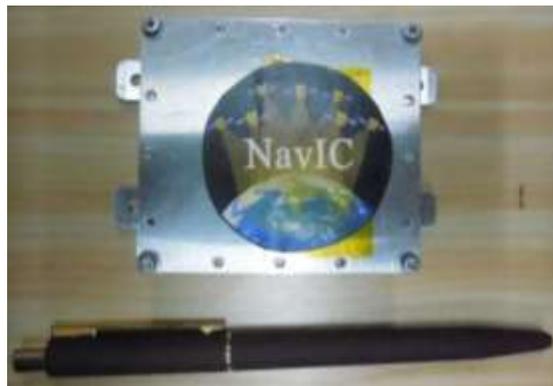


Figure-2: NavIC Messaging and Positioning Receiver



Figure-3: NavIC Messaging and Positioning Receiver Setup with power bank and Antenna

Above figure shows set up of receiver which has external antenna and it is drawing power from power bank. The Receiver has been developed, tested, demonstrated and delivered to many users. An Android application is also developed to display the messages on Mobile phone / tablet. Messages broadcasted by INCOIS can be received using this application.

### **3. Vendor Responsibility**

Interested vendor has to fabricate the receiver PCB and design packaging including all the three components. The package has to be IP 67 compliant. The option of using power bank or some rechargeable battery is left to vendor.

### **4. Mode of Technology Transfer**

SAC-ISRO has developed hardware and firmware for intended application.

**SAC / ISRO will provide technical details to Indian industry on a request basis against Non-disclosure agreement as per ISRO guidelines for this technology.**

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