

## 1. INTRODUCTION

### 1.1. *Automatic Identification System (AIS) Overview*

AIS is a radio data system where two or more stations operate on one or more radio channels using Time Division Multiple Access (TDMA). These units can be mobile, base or repeater stations. Mobile stations are installed onboard vessels and integrated to the vessel's sensors and display systems. Base stations, on the other hand, are installed on the shore side and allow remote monitoring of vessel traffic within the VHF coverage area of the base station. Base stations can be interconnected via an AIS Network to cover a larger area. Repeater stations can be used to extend the required coverage area, preferably where the traffic load is low and there is a lack of suitable communications infrastructure.

The main objective of the system is to assist in safer navigation; that is, sharing ship-to-ship, positional information, speed over ground, course over ground, heading, rate of turn, static and voyage information, as well as safety-related messages.

The Automatic Identification System (AIS Class A) is defined by the IMO and has been made a carriage requirement by the latest revision of SOLAS Chapter V. This does not only require the AIS to be installed, but also to provide information used for ship navigation.

The AIS has been standardised by the ITU and IEC and is subject to type approval. In order to fulfil the reliability requirements of information exchange, care must be taken to ensure the AIS unit is correctly installed.

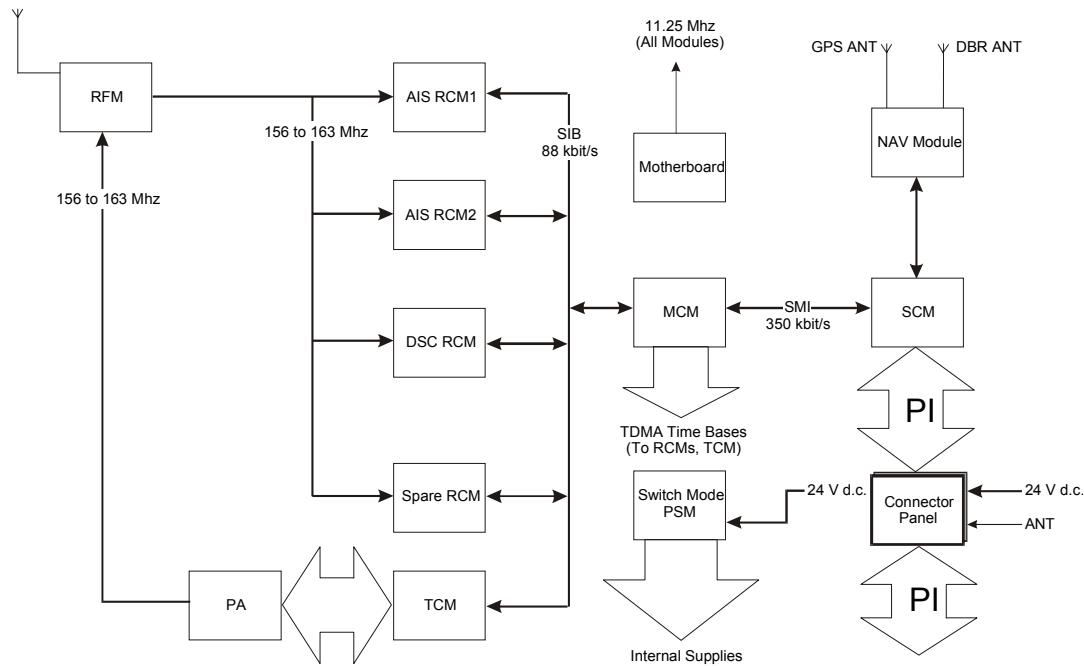
The AIS Unit operates in the VHF Maritime Mobile Band and, according to its programmed mode, operates:

- Ship to ship,
- Ship to shore,
- Shore to ship.

The AIS Unit operates autonomously with minimum user intervention and has a built-in display that monitors system health and activity. It is made up of a set of easily removable modules that can be replaced without any system adjustment or calibration.

It also incorporates those features of Digital Selective Calling (DSC) required by the AIS specifications. This means that the AIS Unit transmits and receives specified AIS related DSC messages on the maritime VHF DSC channel 70.

## 1.2. AIMS MIV Overview



**Figure 1: MIV Block Schematic**

Each AIMS MIV consists of:

- two AIS radio receivers (AIS RCM1 and AIS RCM2),
- one Digital Selective Calling (DSC) radio receiver (DSC RCM),
- a Radio Frequency Module (RFM),
- a Transmit Channel Module (TCM) (PA + Modulator),
- a Power Supply Module (PSM),
- a Main Controller Module (MCM),
- a Serial Communications Module (SCM),
- a Navigation Module (NAV),
- a Motherboard Module,
- a Connector Panel Module,
- a BIT Display module.

The MIV AIS is a fully synthesised AIS transponder operating in the Maritime Mobile Band. It has been designed in compliance with the listed relevant specifications against which it will be type approved.

On boot up, the system receivers and transmitter are set up for the default AIS and DSC frequencies.

All VDL access is in accordance with IEC 61993-2 and ITU R.M. 1371-1.

Each unit is capable of transmitting and receiving messages on the radio channels. The system uses a Self-Organising Time Division Multiple Access (SOTDMA) schema to operate the radio channel. The TDMA synchronisation is controlled within the system. Application

modules within the system determine the required update rate as well as the radio channel management. A Real-Time Operating System (RTOS) underlies the above functionality.

Displaying of incoming DSC/AIS messages requires the connection of an external terminal to the PI, Keyboard Display Unit (KDU) or Pilot port.

The Serial Communications Module (SCM) provides the system electrical connectivity to the 'outside' world via the connector panel. The MCM forms the main controlling entity of the unit.

The channel processors are also interfaced to the MCM over a Serial Interface Bus (SIB). The MCM and SCM are connected via the Serial controller to Main controller Interface (SMI).

The PI<sup>1</sup> interfaces allow connection to navigation equipment, for example, a tracking radar for positional information as well as connection to a Man Machine Interface (MMI) for the transfer of safety related messages, and navigation sensors.

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<sup>1</sup> The PI is all the external ports except the Service port.

## 2. INTERFACES

### 2.1. Internal Interface

- SIB – Serial Internal Bus. Single master, multi-drop serial bus.
- SMI – Serial controller to Main controller Interface.
- MCM Debug interface
- SCM Debug interface
- Internal GPS control interface
- Internal GPS data interface
- Internal DBR control interface
- Internal DBR data interface
- External DBR interface
- NMEA Sensor input interface 1/ External GPS interface
- NMEA Sensor input interface 2
- NMEA Sensor input interface 3
- PI – Presentation Interface
- KDU – Keyboard Display Unit interface
- Pilot Interface
- LR – Long Range Communications interface
- Alarm relay output interface

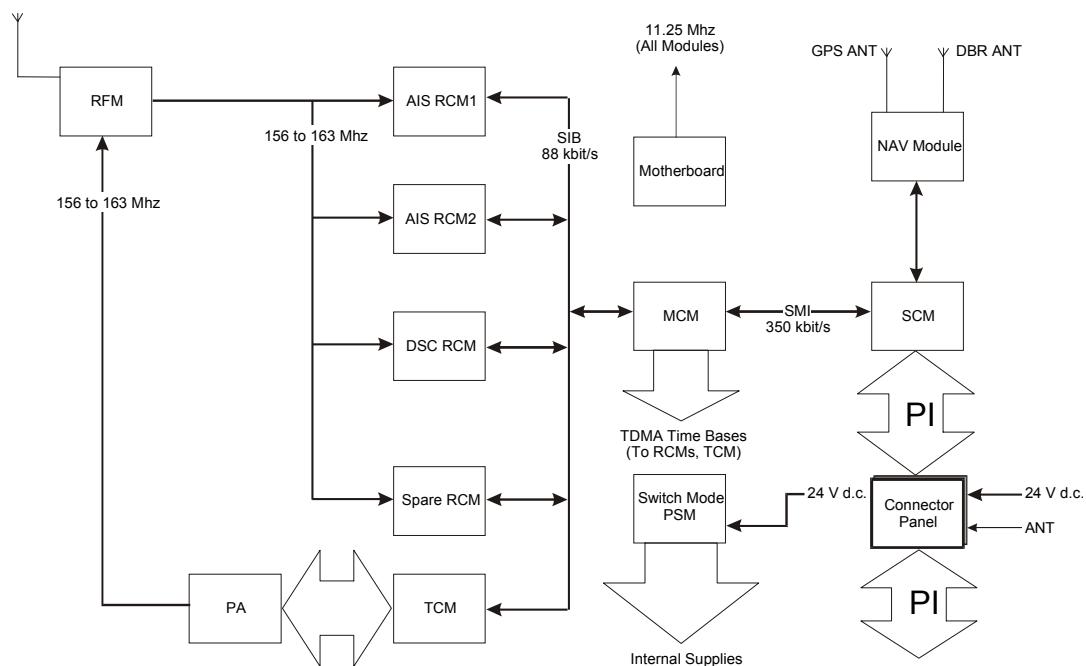


Figure 2: MIV Block Schematic