Floboss™ 107 Network Radio Module

The Network Radio Module (NRM) is an integral part of the Distributed RTU Network and allows FB107 to communicate wirelessly. It has the ability to broadcast and detect information from other RTUs and flow computers for easier and faster interconnection and communication setup.

The NRM provides a wireless solution of transferring data from RTU to another RTU within the Distributed RTU Network (DRN). The data can be any type of information that the RTU has in its database, such as I/O, soft points, or other parameters.

Features

- Peer-to-peer wireless network
- The ability to move data on a 1 second time interval
- Ability to configure or issue diagnostic messages to all devices on the network from the gateway via a host computer with no interruption of critical data transfer
- Devices are automatically detected by the network
- The ability to replace any unit and allow the replacement unit to come up and join the network
- The ability to co-exist with adjacent RTU networks or other foreign radio networks

Distributed RTU Network

The Distributed RTU Network (DRN) is a network solution for RTUs in wide-area production pad or multiple well installations to communicate wirelessly. The DRN is an answer to challenges of wells spread over a wide geographical area wherein setting up wiring and connectivity is difficult.

The DRN is designed for RTUs to import, export, or process over-the-air messages and information. The DRN supports one central network access point (NAP) and up to 12 or 24 nodes.

DRN Model

The DRN employs two network models, Network Model 12 and 24. Network Model 12 is designed for a maximum of 12 nodes and one NAP. Network Model 24 is designed for a maximum of 24 nodes and one NAP. During each transmission, the node can send exports, pass through messages, or maintenance polls.

Network Access Point

You can configure an FB107 with an NRM installed to act as a Network Access Point (NAP). The NAP is a central RTU or flow computer connected to a host computer or ROCLINK that configures and diagnoses the network. The NAP imports and exports data over-the-air from the nodes connected on the DRN. The NAP is also responsible for syncing all of the nodes on network.

Auto Discovery

Auto Discovery is the method wherein the NAP locates or discovers nodes in the DRN. When NRM is configured as a NAP, the NRM initiates Auto Discovery sequence and sends an Auto Discovery broadcast to all the nodes in the DRN. If the node has the correct network ID and the frequency hop key, the NAP adds the node to a list of available devices. You can then activate an available node by dragging and dropping the device to a commissioned list.

Node

You can configure an FB107 with an NRM installed to act as a node. The node is responsible for over-the-air exporting of data which the NAP or other nodes in the network receive and process.

Network Radio Module

High Frequency Radio

The NRM includes a 2.4 GHz radio to handle the wireless data transmission. The radio utilizes TDMA technology, and allows for multiple networks (with unique Network IDs and Frequency hop Keys) to be located in close proximity to each other without experiencing signal degradation.

Data Export

The NRM shares data from one RTU to another RTU at a periodic interval. Exporting data is a process of one node sending data out over-the-air for other nodes or NAP to receive and use. Export data is sent over-the-air for not slower than once a second. The NRM delivers up to 30 Export Values to other receiving devices.

The NRM periodically requests the Export Values List from the RTU. This is requested every second. The NRM stores the Export Values List in its own local database. The export data is marked for transmission on the next available TDMA slot once a new data has been received from the RTU. The Export List consists of the following:

- Unique Map ID
- IEEE Float Value
- Data Integrity Status

Data Import

Importing is the process of receiving over –the-air-export messages. There is one or more consumers of every exported data. The NAP receives the export message and parses the message searching for an export value that it is configured to receive. The export data is saved in the local database of the NRM and is transmitted to the RTU every one second. The NRM can receive up to 128 Import Values to the FB107 every one second.

Installation

The NRM is designed to be plug-and-play and requires no wiring. The NRM can be installed in slot 1 or 2 in the FB107.

Depending on the enclosure you choose to surround the node and protect it from the environment, you may need additional cabling between the antenna and the connection on the module itself.

Note: The NRM does require an antenna to function. The antenna will be provided by the installer.

Network Radio Module

Processor		
Type	32-bit ARM7TDMI core Atmel AT91SAM7X256 processor at 24MHz.	
Reset Controller	The UCC2946 supervisor with watchdog timer IC monitors the onboard power supply voltage 3.3V and pin 46 of the microcontroller. The controller also generates the reset signal if the backplane reset line is asserted by the host processor.	
Clock	The processor's main clock oscillator is driven by an 18.432 MHz crystal.	
Memory		
Flash	256 KB	
SRAM	64 KB	
Communication		
Radio	Quantity	1
	Type	RadioGXM TDMA Embedded Radio
	Spectrum	2.4 GHz
	Range	20 km (12.4 miles) LOS
	Max output power	500 mW
	Operating temperature	-40°C to 85°C (-40°F to 185°F)
	Input Voltage	3.3 V to 5 V
	Power Adjustment	Linear
	Interface	TTL (RS-232 optional)
	Remote LED	Supported via 24-pin option
Data Security	AES 256-bit encryption (optional)	
Protocol	TDMA	TDMA assigns each radio within a network a specific time slot to transmit a message, receive a message, or stay in a listen mode.
Power		
Network Radio Module Controller	9 – 30 Vdc PWR IN	
Radio	5V LTM8023	
Consumption	1.2 W (24 Vdc @ 50 mA or 12 Vdc @ 100 mA)	
Physical		
Dimensions	82.55 mm H by 25.4 mm W by 127 mm L (3.25 in. H by 1.0 in. W by 5.0 in. L)	
Weight	140 g (4.8 oz)	
Light Emitting Diode (LED)	LED1 (Network joined status)	Node: On (non-blinking) – joined the network and commissioned Blinking – joined the network and not commissioned Off – not joined to the network NAP: Always on
	LED2 (NAP or Node)	Node: Always off NAP: Always on

LED3 (Signal strength indicator)	Node:	On (non-blinking) – good signal-to-noise ratio Blinking – adequate signal-to-noise ratio Off – poor good signal-to-noise ratio
	NAP:	Always on
LED4 TX (Transmission) activity	Node:	Blinking – indicates TX activity on the radio
	NAP:	Blinking – indicates TX activity on the radio
LED5 RX (Reception) activity	Node:	Blinking – indicates RX activity on the radio
	NAP:	Blinking – indicates RX activity on the radio

Environmental

Same as FB107 in which it is installed.

Approvals

Same as FB107 in which it is installed.

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