# NMRAnet Goals and Mandates

This document discusses how the OpenLCBTM/S9.6 proposal for the NMRAnetTM layout control bus meets the published Goals and Mandates of the NMRA's NMRAnet effort[1]. The proposal for NMRAnet S9.6 has been developed by the OpenLCBTM group via their web site at http://openlcb.org/ and discussion group at http://groups.yahoo.com/group/OpenLCB. References here to "NMRAnet" refer to this proposal. Further details of NMRAnet are available in other Standards and Recommended Practice documents in the S9.6 group.

## 1. Develop standards to define a communications bus that will manage and control devices that are independent of train control on a model railroad layout.

S9.6/OpenLCB is designed to control devices, both real and virtual, associated with a model railroad layout, whether that is novice layout requiring only two nodes, to very large layouts, such as museums or modular layout meets that require thousands of nodes across heterogeneous networks.

## 2. This bus shall be capable of working independently from other train control busses.

S-9.6 can work independently of other train control buses.

## 3. This bus should be capable of bridging commands from other train control busses. The bus shall be capable of bridging commands from a DCC bus.

S-9.6 has working prototype hardware that bridges from other buses, including Loconet and Ethernet. Plans have been made for a bridge from DCC.

## 4. Developing a set of instructions for track control is outside the scope of this working group at this time. However, the bus shall have the capability of managing and controlling devices that effect train control.

Although train control has been discussed and is fully within the capabilities of S-9.6, specific solutions have not been developed fully.

[1]The NMRA has specified these Goals and Mandates in a separate document.

## 5. The bus shall be designed so that the complexity to the user is minimized. Management and configuration of devices as well as fault finding of the system or individual devices shall require little to no technical knowledge of the bus by the user.

S-9.6 is specifically designed with the novice model railroader in mind. These users can connect nodes directly from the box and do not need to be aware of details (such as node IDs nor event numbers), but can program relatively complex interactions with push-button programming.

Although the specific user interface (UI) is manufacturer dependant, S-9.6 makes recommendations and prototype implementations are available. Simple networks will be easily debugged without additional equipment. Larger networks will have software support that is able to log, filter, and monitor bus traffic, and to drill down into the network to individual node level.

## 6. Maximum utilization of existing globally standardized communication technologies should be used to develop this bus. Multiple forms of communication transport shall co-exist. Generic implementations to enable all forms of communication shall not be required if it greatly impacts the size/cost/complexity of the solution. Defining communication technologies is beyond the scope of this WG.

S-9.6 uses standardized transports, including CAN and Ethernet. The protocol has been designed to meld with the different transports with transport-specific modifications. Simple nodes need to respond to a base number of messages. The more heavy lifting is confined to the bridging nodes. The protocol is designed to allow the network to scale gracefully, allowing bigger layouts to grow without excessive overhead. progr

## 7. The bus shall be owned by, and under the control of, the NMRA. All future changes to this bus shall be controlled by NMRA.

Standards and Recommended Practices that describe the NMRAnet are and will be entirely under the NMRAs control. The S9.6 developers would be happy to agree to that in whatever way is required. Actual ownership is a legal matter that we are not qualified to discuss.

## 8. Develop a bus that minimizes the amount of certification testing required of NMRA.

Certification of this bus should not require special testing equipment beyond a computer and appropriate connections.

Since S-9.6 uses standardize transports, testing is already defined for the transport layers.

The protocol has the capability for self-testing of nodes and its protocols. At the present S-9.6 has 5005 lines of code for testing.



 

### 9. Develop a set of NMRA Standards and Recommended Practices that fully define the characteristics of the bus which can be used by manufacturers to develop products.

S-9.6 is fully committed to developing NMRA SRP to fully document the technical requirements of the bus, but also user and higher level documentation for learning and exploring the intention and use of various features.

### 10. Develop NMRA education and marketing material to inform the users on the benefit, concepts and usage of the bus.

We are not sure what this entails, and cannot comment at this time.

### 11. Ultimately this bus shall be named the NMRANet.

S-9.6 has no issue with NMRA naming the bus.

### 12. NMRA Working Groups shall be kept informed on the development of this Working Group and be allowed to offer suggestions or comments on the Standards and Recommended Practices being developed.

S-9.6 has striven to provide the means and sites for this to happen, and is in the process of building a complete document base.

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