



NMRA Technical Note	
PluX Decoder Interface	
May 10, 2021	TN 9.1.1.4

# 1 General

Decoder interface standards exist in order to aid in installation of decoders into vehicle system boards. Installation can be performed by the vehicle manufacturer or separately by the individual modeler.

## 5 2 Served Use Cases

The intent is that any decoder which conforms to the standard, from any manufacturer, will operate with any vehicle system board which conforms to the standard, from any manufacturer. Operate is further defined as not to cause any permanent damage of the decoder or vehicle system board.

### 2.1 Unserved Use Cases, References

10 It is not the purpose of the standard to ensure that every decoder and vehicle system board implements all of the possible features defined by the standard. Operation is limited to the features supported by the decoder and/or vehicle system board, as documented by the respective manufacturers.

## 3 Annotations to the Standard

### 15 3.1 References

Additional relevant references are found in

- S-9.1.1.4 PluX Decoder Interface
- RCN-122 Decoder Interface PluX, with which this standard is intended to be in harmony.
- 20 • NEM 658 Electrical Interface PluX, with which this standard is intended to be in harmony.

### 3.2 Requirements

25 It is important to note that a product is not required to implement all connections of the interface. A manufacturer may choose to omit certain features, for example the number of function outputs. It is incumbent on the manufacturer to document for users the supported features of their product(s).

### 3.3 Mechanical Properties and Dimensions.

30 The mechanical properties are provided in general terms so as not to codify into the standard any limit to alternative sources. Proper connector sources will result in the proper seating of the decoder on the locomotive mainboard so that the decoder's socket mounts flush with the mainboard pin header. TI-9.1.1 contains a list of manufacturer and part numbers for connector sources that have been tested for conformance to the standard.

The NMRA Conformance and Inspection committee may allow exemptions from the 3.0mm pin header height, at their discretion, depending on when the decoder under test was originally designed.

- 35 In the NEM-658 Standard PluX22 decoders have a maximum length of 35 mm. RCN-122 and NMRA S 9.1.1.4 have reduced this to 30mm to harmonize with RCN-121 and S 9.1.1.3 respectively. In the interests of compatibility with existing decoders, the installation space in the vehicle should, if possible, comply with the dimensions specified in NEM 658 to allow a maximum decoder length of 35mm.
- 40 A PluX16-S for sound decoders is defined in NEM 658. However, since its dimensions almost correspond to those of the PluX22, no need for this size was seen in RCN-122 and it is also not adopted for S 9.1.1.4. There are, however, sound decoders with a width and height of the normal PluX16 and a length corresponding to NEM 658. In the interests of compatibility with existing decoders, vehicle manufactures may want to pay attention to the PluX16-S dimensions in NEM-
- 45 658. At least the greater length of the decoder should be taken into account.

### 3.4 Electrical Properties

- It is strongly recommended that the effective impedance of the speaker(s), as observed by the decoder, is  $4\Omega - 8\Omega$ . The effective impedance required by the decoder must be documented by the decoder manufacturer. Impedance of factory installed speakers must be documented by the vehicle
- 50 manufacturer.

Date	Description
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