# General

## Introduction and Intended Use (Informative)

## References

This standard should be interpreted in the context of the following NMRA Standards.

### Normative

* S-9.1.1 Decoder Interfaces
* S-9.1.1.2 JST 9 Pin Interface
* S-9.1.1.3 21MTC Interface
* S-9.1.1.4 PluX Interface
* S-9.1.1.5 Next18 and Next18-S Decoder Interface

## Terminology

|  |  |
| --- | --- |
| **Term** | **Definition** |
| Vehicle | Mobile model railroad device. This includes locomotives and other rolling stock. |
| Decoder | DCC receiver for controlling vehicle animation. |
| System Board | Electronic circuit board that is considered part of the vehicle with a decoder is intended to be plugged into. |

# Connector Sources

These are known valid connector sources for the various DCC decoder interface standards. Other sources may also be valid.

## JST 9 Pin Interface

JST offer two series of connectors: ZH series uses crimped wires while ZR series are insulation displacement. The decoder socket is the same in both cases. Datasheets for both series listing options may be found at:

ZR Series: <https://order.jst-mfg.com/InternetShop/app/pdf_show?kbn=1&key=eZR.pdf>

ZH Series: <https://order.jst-mfg.com/InternetShop/app/pdf_show?kbn=1&key=eZH.pdf>

### Decoder

|  |  |  |
| --- | --- | --- |
| **Manufacturer** | **Part Number** | **Notes** |
| JST | S9B-ZR-SM2-TF | Shrouded header. |

### System Board (Wire Harness)

|  |  |  |
| --- | --- | --- |
| **Manufacturer** | **Part Number** | **Notes** |
| JST | 09ZR-3H-P  ZHR-9 | Insulation displacement.  Housing for crimped contacts. See datasheet for contact details. |

## 21MTC Interface

### Decoder

|  |  |  |
| --- | --- | --- |
| **Manufacturer** | **Part Number** | **Notes** |
| Samtec | CLP-111-02-F-D |  |
| Aptos Technology | SPNBF-22-X-X-X-FG | Unverified. |

### System Board

|  |  |  |
| --- | --- | --- |
| **Manufacturer** | **Part Number** | **Notes** |
| Samtec | FTSH-111-01-F-DV | Surface mount |
| Samtec | FTS-111-01-F-D | through hole |

## PluX22 Interface

### Decoder

|  |  |  |
| --- | --- | --- |
| **Manufacturer** | **Part Number** | **Notes** |
| Samtec | FTSH-111-01-F-DV | Surface mount |
| Samtec | FTS-111-01-F-D | Through hole |

### System Board

|  |  |  |
| --- | --- | --- |
| **Manufacturer** | **Part Number** | **Notes** |
| Samtec | CLP-111-02-F-D |  |
| Aptos Technology | SPNBF-22-X-X-X-FG |  |

## Next18 and Next18-S Interface

Notes:

* The Panasonic AXK6 series is not a valid connector. It is a close friction fit, but does not have the required positive mating “snap” when mated to the other valid connector options.
* Morethanall connectors have been flagged to the NMRA as having some manufacturing quality issues in 2020 and 2021.

### Decoder

|  |  |  |
| --- | --- | --- |
| **Manufacturer** | **Part Number** | **Notes** |
| Morethanall Co, LTD | NP0519-P05P-018-LF |  |
| Coratec GmbH & Co. KG | CT0519P-05-2x09P | Not verified |
| Degson Electronics Co., Ltd. | CT0519P-05-2x09P | Not verified |

### System Board

|  |  |  |
| --- | --- | --- |
| **Manufacturer** | **Part Number** | **Notes** |
| Morethanall Co, LTD | NP0519-S10P-018-LF |  |
| Coratec GmbH & Co. KG | CT0519S-10-2x09P | Not verified |
| Degson Electronics Co., Ltd. | CT0519S-10-2x09P | Not verified |

## Manufacturer Websites

|  |  |  |
| --- | --- | --- |
| **Manufacturer** | **Web Address** | **Notes** |
| JST Manufacturing | <https://order.jst-mfg.com/InternetShop/app/> | Searchable. |
| Samtec | [www.samtec.com](http://www.samtec.com) | Searchable. |
| Aptos Technology | [www.aptostechnology.com](http://www.aptostechnology.com) | Reported dangerous by some web browser addins. |
| Morethanall Co., LTD | [m.morthanall.com](http://m.morthanall.com/) | Not an HTTPS site. |
| Coratec GmbH & Co. KG | [www.coratec.de](http://www.coratec.de) | Not searchable and not HTTPS. Coratec products are sold via distributors. |
| Degson Electronics Co., Ltd. | [www.degson.com](http://www.degson.com) | Searchable. |

Note: many of these items are also available from distributors such as Digikey, and others.

# Document History

|  |  |
| --- | --- |
| **Date** | **Description** |
| Jan 2008 | First Revision |
|  | Updated with improved formatting, updated known part numbers, added JST 9 Pin options, added Next18(-S) options. |
| May 2021 | Revisions to suppliers and web sites. Corrections and additional information. |
|  |  |

**Important Notices and Disclaimers Concerning NMRA Standards Documents**

The Standards (S), Recommended Practices (RP), Technical Note (TN), and Technical Information (TI) documents of the National Model Railroad Association (“NMRA Standards documents”) are made available for use subject to important notices and legal disclaimers. These notices and disclaimers, or a reference to this page, appear in all standards and may be found under the heading "Important Notices and Disclaimers Concerning NMRA Standards Documents."

**Notice and Disclaimer of Liability Concerning the Use of NMRA Standards Documents**

NMRA Standards documents are developed within the Standards and Conformance Department of the NMRA in association with certain Working Groups, members, and representatives of manufacturers and sellers. NMRA develops its standards through a consensus development process, which brings together volunteers representing varied viewpoints and interests to achieve the final product. NMRA Standards documents are developed by volunteers with modeling, railroading, engineering, and industry-based expertise. Volunteers are not necessarily members of NMRA, and participate without compensation from NMRA.

NMRA does not warrant or represent the accuracy or completeness of the material contained in NMRA Standards documents, and expressly disclaims all warranties (express, implied and statutory) not included in this or any other document relating to the standard or recommended practice, including, but not limited to, the warranties of: merchantability; fitness for a particular purpose; non-infringement; and quality, accuracy, effectiveness, currency, or completeness of material. In addition, NMRA disclaims any and all conditions relating to results and workmanlike effort. In addition, NMRA does not warrant or represent that the use of the material contained in NMRA Standards documents is free from patent infringement. NMRA Standards documents are supplied “AS IS” and “WITH ALL FAULTS.”

Use of NMRA Standards documents is wholly voluntary. The existence of an NMRA Standard or Recommended Practice does not imply that there are no other ways to produce, test, measure, purchase, market, or provide other goods and services related to the scope of the NMRA Standards documents. Furthermore, the viewpoint expressed at the time that NMRA approves or issues a Standard or Recommended Practice is subject to change brought about through developments in the state of the art and comments received from users of NMRA Standards documents.

In publishing and making its standards available, NMRA is not suggesting or rendering professional or other services for, or on behalf of, any person or entity, nor is NMRA undertaking to perform any duty owed by any other person or entity to another. Any person utilizing any NMRA Standards document, should rely upon their own independent judgment in the exercise of reasonable care in any given circumstances or, as appropriate, seek the advice of a competent professional in determining the appropriateness of a given NMRA Standards documents.

IN NO EVENT SHALL NMRA BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO: THE NEED TO PROCURE SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE PUBLICATION, USE OF, OR RELIANCE UPON ANY STANDARD OR RECOMMENDED PRACTICE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE AND REGARDLESS OF WHETHER SUCH DAMAGE WAS FORESEEABLE.

**Translations**

NMRA’s development of NMRA Standards documents involves the review of documents in English only. In the event that an NMRA Standards document is translated, only the English version published by NMRA is the approved NMRA Standards document.

**Official Statements**

A statement, written or oral, that is not processed in accordance with NMRA policies for distribution of NMRA communications, or approved by the Board of Directors, an officer or committee chairperson, shall not be considered or inferred to be the official position of NMRA or any of its committees and shall not be considered to be, nor be relied upon as, a formal position of NMRA.

**Comments on Standards**

Comments for revision of NMRA Standards documents are welcome from any interested party, regardless of membership. However, **NMRA does not provide interpretations, consulting information, or advice pertaining to NMRA Standards documents.**

Suggestions for changes in documents should be in the form of a proposed change of text, together with appropriate supporting comments. Since NMRA standards represent a consensus of concerned interests, it is important that any responses to comments and questions also receive the concurrence of a balance of interests. For this reason, NMRA, its departments, Working Groups or committees cannot provide an instant response to comments, or questions except in those cases where the matter has previously been addressed. For the same reason, NMRA does not respond to interpretation requests. Any person who would like to participate in evaluating comments or in revisions to NMRA Standards documents may request participation in the relevant NMRA working group.

**Laws & Regulations**

Users of NMRA Standards documents should consult all applicable laws and regulations. Compliance with the provisions of any NMRA Standards document does not constitute compliance to any applicable regulatory requirements. Implementers of the standard are responsible for observing or referring to the applicable regulatory requirements. NMRA does not, by the publication of NMRA Standards documents, intend to urge action that is not in compliance with applicable laws, and NMRA Standards documents may not be construed as doing so.

**Copyrights**

NMRA Standards documents are copyrighted by NMRA under US and international copyright laws. They are made available by NMRA and are adopted for a wide variety of both public and private uses. These include both use, by reference, in laws and regulations, and use in private self-regulation, standardization, and the promotion of modeling, structural and engineering practices and methods. By making NMRA Standards documents available for use and adoption by public authorities and private users, NMRA does not waive any rights in copyright to the NMRA Standards documents.

**IMPORTANT NOTICE**

NMRA Standards documents do not guarantee or ensure safety, security, health, or environmental protection, or ensure against interference with or from other systems, devices or networks. NMRA Standards documents development activities consider research and information presented to the standards development group in developing any safety recommendations. Other information about safety practices, changes in technology or technology implementation, or impact by peripheral systems also may be pertinent to safety considerations during implementation of the standard. Implementers and users of NMRA Standards documents are responsible for determining and complying with all appropriate safety, security, environmental, health, and interference protection practices and all applicable laws and regulations.