

Technical Note #37

NTCIP Compliance for Vanguard® VMS

by Brian Iwerks, Daktronics Product Manager

Background

Daktronics Vanguard® Variable Message Signs (VMS) and control systems are compliant with the National Transportation Communications for ITS Protocol (NTCIP). NTCIP consists of written specifications that define communication and operation of Intelligent Transportation System (ITS) devices. The NTCIP requirements were established through a joint effort of the National Electrical Manufacturers Association (NEMA), the Institute of Transportation Engineers (ITE), and the American Association of State Highway and Transportation Officials (AASHTO) with funding provided by the Federal Highway Administration (FHWA).

Daktronics is committed to supporting the NTCIP effort. Our engineers actively participate on the NTCIP DMS (dynamic message sign) working group and lead the effort to introduce several new features, including graphics and expanded color capabilities, to the NTCIP 1203 standard. Daktronics NTCIP expertise and commitment ensure that our products are up to date with the latest standards. Daktronics has demonstrated this by successfully passing numerous third-party NTCIP compliance tests.

Specification Conformance

Daktronics Vanguard VMS displays and control systems conform to the following NTCIP specifications:

- **NTCIP 1101 - Simple Transportation Management Framework (STMF)**
Defines how SNMP and STMP are used to manage devices
Daktronics complies with Conformance Level 1 as clarified in Amendment 1
- **NTCIP 1102 - Octet Encoding Rules (OER)**
Defines how data is encoded at the NTCIP application layer
- **NTCIP 1201 – Global Object Definitions**
Defines the SNMP (Simple Network Management Protocol) objects that manage the common features of any transportation device
Daktronics also complies with Amendment 1
- **NTCIP 1203 – Object Definitions for Dynamic Message Signs**
SNMP objects used to manage dynamic message signs (DMS), including variable message signs (VMS)
Daktronics also complies with Amendment 1
- **NTCIP 2101 – Point to Multi-Point Protocol (PMPP) Using RS-232 Subnetwork Profile**
Supports multi-drop serial communication using RS-232, RS-422, fiber optics, and radio networks
- **NTCIP 2103 – Point-to-Point Protocol (PPP) Using RS-232 Subnetwork Profile**
Supports point-to-point serial communication via RS-232 dial-up modems
- **NTCIP 2201 – NULL Transportation Transport Profile**
Transport profile common on serial and non-routed networks
- **NTCIP 2202 – Internet (TCP/IP and UDP/IP) Transport Profile**
Transport protocols for use on routable networks
- **NTCIP 2301 – Simple Transportation Management Framework (STMF)**
Used to manage the devices on an ITS network

For more information about the NTCIP initiative or to download draft and amendment documents, visit the NTCIP website at www.ntcip.org. All standardized documents are available for purchase from NEMA (www.nema.org).

Conformance Group Support

The global and DMS object specifications (NTCIP 1201 and NTCIP 1203) define conformance groups for certain device features. Each conformance group encapsulates all of the objects that are used for a specific device function. Daktronics Vanguard VMS support all of the mandatory and the following optional conformance groups. The following are supported:

- *NTCIP 1201 - Global Object Definitions*
 - Configuration Conformance Group (mandatory)
 - Time Management Conformance Group
 - Time Base Event Schedule Conformance Group
 - Report Conformance Group
 - PMPP Conformance Group
 - Security Conformance Group
- *NTCIP 1203 - Object Definitions for Dynamic Message Signs*
 - Sign Configuration and Capability Conformance Group (mandatory)
 - GUI Appearance Conforming Group
 - Font Definition Conformance Group
 - VMS Configuration Conformance Group
 - MULTI Configuration Conformance Group
 - Message Table Conformance Group (mandatory)
 - Sign Control Conformance Group (mandatory)
 - Default Message Conformance Group
 - MULTI Error Conformance Group
 - Illumination/Brightness Conformance Group
 - Scheduling Conformance Group
 - Auxiliary I/O Conformance Group
 - Sign Status Conformance Group
 - Status Error Subconformance Group
 - Fan Error Subconformance Group
 - Pixel Error Status Subconformance Group
 - Temperature Status Subconformance Group
 - Power Status Conformance Group

Daktronics NTCIP Extensions

Daktronics Vanguard VMS also contain a number of enhanced and proprietary features that are implemented as extensions to NTCIP. These features include:

- Multi-Color Displays (More Than 32,000 Colors)
- Advanced Power Supply Status
- Real-Time Pixel Diagnostics
- Dial-Up Callback to Central
- Diagnostic Test Patterns
- Fan and Heater Control and Monitoring
- Critical Temperature Shut-Down
- Maximum Pixel Failure Threshold