STATE OF NEW JERSEY
DEPARTMENT OF TRANSPORTATION
TRENTON, NEW JERSEY 08625

METRIC SPECIFICATIONS FOR TOC VIDEO SWITCHER/CONTROL (TRAFFIC OPERATIONS CENTER VIDEO CONTROL EQUIPMENT)

N.J. Specification No. EBM-TOCVCE-1 Effective Date: July 1, 2001

New Jersey Department of Transportation Specifications for Traffic Operations Center Video Control Equipment including a video switcher, video controller, and monitors.

The purpose of these specifications is to describe minimum acceptable design and operating requirements for this equipment.

GENERAL - I

Video Control Equipment (VCE) includes the components for electronically switching the various CCTV video inputs from the cameras located in the field to the various TOC computers and display equipment under both computer control and manual command. The VCE will be used in an indoor environment and shall be compatible with the NTSC (National Television Standards Committee) video source and the CCTV assemblies defined in EBM-CCTV-COLOR.

COMPONENTS - II

The Video Control Equipment consists of an electronic video switching system, a video control system, and cabling.

2-1 Video Switcher

The Video Switcher shall switch video signals that are received from the camera sites via the video communication system to designated monitors and computers under computer and operator control.

A. Configuration

The Video Switcher shall include the following:

1. Switching Capacity - Switching capacity for a minimum of 48 video signal inputs to 16 monitor outputs. The switcher shall be expandable to double its original capacity (input and output) without requiring replacement of the switcher.

2. Serial Interface - An EIA RS-232C serial computer interface into the switcher that is capable of executing all video switch functions from commands issued by the host computer.

3. Camera/monitor Sequencing - Must provide a camera/monitor sequencing function to automatically switch between user predefined video signals and retain the selected circuit for a user-specified dwell time.

4. Keyboard or Keypad - Must provide a remote controller keyboard or keypad which can be utilized to manually control the switch.

5. Video Cables - All video cables plus 10% spares that are required to connect the monitors and computers to the video switcher. In addition, cables shall be supplied to connect the video input source (i.e., Fiber-Optic Video Receiver) to the switcher inputs. These cables shall be at least 30 meters in length or as required to satisfy the requirements of the contract documents.

6. Rack - Rack to hold video switcher/controller, signal distribution unit and fiber optic modem card cage.

7. Alphanumeric ID - the video switcher shall have the ability to store a 20 Character Alphanumeric identifier for each camera and pre-set. The video switcher shall have the ability to superimpose this identifier on one or more video input sources, before the signal is presented to the designated output. Procedures shall exist for entering the identifiers into the system. The alphanumeric identifier function can be implemented in the video controller, instead of the video switcher, or partially in both units, at the discretion of the supplier.

B. Compatibility

The video switcher shall be fully compatible with all other video equipment including cameras, camera controller, communications system and cabling. The switcher shall be able to implement a switch without creating a vertical roll transition period on the output monitor or computer.

C. Operation

The video switcher shall be able to route a single input to any number of outputs, simultaneously. The video switcher shall provide a camera/monitor sequencing function wherein a sequence of input to output switching may be programmed, stored and replayed. The sequencing function shall support variable dwell times in the range of from one to 60 seconds, for each view.

1. Automatic Looping - It shall also support automatic looping of the programmed sequence wherein the programmed sequence continues to repeat until a manual override is implemented.

2. Manual Operation - During manual operation, the video switcher shall have the capability to switch both the video signals originating from the cameras and the PTZ signals originating from the computer/operator.

This shall ensure that the operator can simultaneously control the PTZ while observing the video output for a given camera.

D. Video Switch Integration

The video switcher shall support control of all of its functions from a host computer system. Control by the host computer system shall be accomplished via communications using a standard EIA RS-232C serial interface. The video switcher control protocol shall use standard ASCII data format for its control commands. The Supplier shall provide a complete, accurate and detailed description of the video switcher host computer control protocol to the Engineer as part of the submittal process. A second copy of the control protocol shall be shipped with the video switcher equipment.

E. Video Signal Quality

The video switcher and its associated cables and connectors shall not degrade or distort the quality of the video signal.

2-2 Video Camera Control System

A. Configuration

One (1) camera controller shall control all of the cameras installed in the field. Commands over the RS232 port of the video controller and/or switcher, and signal distribution unit, shall be implemented independently of each other. However, a mechanism shall exist to link switcher and control functions when the devices are executed from their associated manual panels. The camera controller configuration shall include all electronics, cables, connectors and interfaces to accomplish the following:

1. Number of Cameras - Control of at least 64 cameras.

2. PTZ Control - Pan, Tilt and Zoom (PTZ) control for each PTZ-equipped camera. The system shall support a minimum of 16 PTZ presets per camera.

3. Camera Control Commands - Execution of all required camera control commands from the host computer via an EIA RS232C serial data interface.
4. Camera Interface - Communicate to the cameras via RS-232. Each camera shall be equipped with a separate RS-232 channel. All required cabling between the video controller and central RS232 terminus for these circuits must be provided with the switcher.

B. Communications Compatibility

The camera controller shall be compatible with the communication protocol and communication system used by the field camera receiver/controller. The camera

controller shall be fully compatible with all other video equipment including cameras, video switcher, signal distribution unit, communications system and cabling. Upon request, information shall be furnished on the cameras and communication equipment to which this equipment must be compatible.

C. Operator Functional Control

The camera controller shall allow an operator to control all camera and lens functions, including pan, tilt, and zoom. This control shall include all of the capabilities available with the field camera assembly. The camera controller shall allow an operator to perform camera to monitor video switching from a single keyboard/controller and via a master RS232 port.

D. Password Security

The camera controller shall have a password priority system that enables control of operator restrictions and capabilities. Priority, partitioning and lock out shall be user programmable by level of priority.

E. Camera Controller Alarms

The camera controller shall support alarms for system and field status. The controller shall have the capability for daisy chained to control via addressable field receivers.

F. Programmable Camera Features

The camera controller shall support camera position presets, sequencing, event alarms programming, partitioning and block switching. These features shall be user programmable. The camera controller shall have the capability to upload and download camera control programs via a host PC computer interface. Remote access for these functions shall be required. The video controller shall have the ability to superimpose a camera identification number and description onto the video received on the input port. This feature shall be controllable (On/Off) from the manual control panel or the central RS232 interface. The matrix switchers shall provide several sequential switching modes of cameras on monitors. Monitor dwell shall be adjustable for each monitor.

G. Diagnostic Tests

The video camera controller shall have a built-in diagnostic test for each CPU, an EPROM integrity self test, memory integrity test, and communications test.

2-3 Video Monitors

A. Configuration

The Supplier shall provide the number of color video monitors and mounting brackets shown in the contract documents. All necessary mounting hardware,

cabling and connectors shall be provided by the Supplier. The video monitors shall be identical and shall meet the following minimum requirements:

1. 508 millimeter diagonal color picture tube with integral implosion protection.

2. Specialized design for surveillance and industrial applications.

3. Minimum 560 TV lines resolution.

4. NTSC color video input.

5. Compatible with VCRs.

6. 525 line, 60 fields/second scanning.

7. Front-mounted operating controls.

8. S-VHS compatible.

9. Automatic degaussing.

10. Compatible with video cameras, video switcher, video controller and all video communications equipment and cabling provided in accordance with these specifications.

11. Capable of providing a clear, high quality video display of the output received from the field cameras via the video communication system and video control and switching systems.

12. Capable of displaying 768 horizontal by 492 vertical active pixels in full color.

The Supplier shall provide all necessary mounting brackets and hardware to install the video monitors from the ceiling as shown on the contract documents. The mounting brackets and hardware shall hold the monitors in a secure, stable and safe manner. The mounting brackets and hardware shall not interfere with the normal functioning of the video monitors. The mounting brackets shall be capable of adjusting the vertical and horizontal angle of the monitors to achieve an optimum viewing position.

2-4 Video Recorder

A. Configuration

The Supplier shall provide one high resolution video recorder to record significant traffic events being monitored by the video surveillance system. The video recorder shall meet the following minimum requirements:

1. S-VHS format.

2. Time lapse recording capability.

3. Minimum of 10 switch selectable record/playback speeds.

4. Front loading.

5. Field advance/reverse and field still playback.

6. High-speed visual search in both directions.

7. Alarm record recall and review functions that allow recording of an alarm with associated video such that the resulting tape can be rapidly scanned for alarms. The recorder shall automatically switch from high speed to play mode when a recorded alarm is detected on the tape.

8. Date/time generator with the capability of record and playback of on-screen date/time data.

9. Minimum 400 TV lines resolution in color or monochrome.

10. Low tape signal.

11. Automatic head cleaner.

12. Programmable timer with minimum of two timer programs per day.

All cables connectors and operating and installation documentation for the video recorder shall be provided. The Supplier shall provide fifty (50) ST-120 S-VHS cassette tapes with the VCR.

TESTING - III

All equipment defined in this specification shall be subject to factory testing as subsequently described. The factory test shall demonstrate or provide confirmation that all of the equipment complies with the specifications. For the factory test, all of the video equipment shall be activated and fully integrated together. The procedure shall verify that the video controller/switcher is capable of providing all indicated functions from the manual control panels and through a remote PC interface.

The supplier shall be responsible for submitting a test plan which has been designed to exercise and monitor the equipment for the purpose of determining compliance with the specifications.

TRAINING - IV

Prior to the acceptance of the equipment, training shall be provided for the Department's engineering, maintenance and operations staff, at a facility provided by the Department. The training shall include all material and manuals required for each participant. The training shall be as follows:

4-1 Maintenance Training

The training shall be provided for a minimum of 40 hours for at least five (5) personnel with an electronics background. The training shall include operation instructions, theory of operation, circuit description, adjustments, preventive maintenance procedures, troubleshooting, operation of diagnostic and configuration software, and repair of all components.

4-2 Engineering Training

The training shall be provided for a minimum of 16 hours for at least twenty (20) engineering and operations personnel. The training shall include a complete demonstration of the operation and capabilities of the equipment. This session should include a complete review of any adjustments or calibration of the equipment which may be necessary for optimum performance and should stress day-to-day operation and isolation of problems down to the unit level. For example, procedures should be discussed of identifying a faulty module, as opposed to board level repairs covered in Subsection IV-1.

INSTRUCTIONS AND GUARANTEES - V

5-1 One set of complete schematics and operations/maintenance manuals of the each component of the video switching and video control equipment items specified herein shall be supplied. Maintenance manuals shall include complete sub-component parts listing.

5-2 No changes or substitutions in these requirements will be acceptable unless authorized in writing. Inquiries regarding this specification shall be addressed to the Manager, Office of ITS Engineering, New Jersey Department of Transportation, P.O. Box 613, 1035 Parkway Avenue, Trenton, New Jersey 08625.

5-3 The video control equipment shall carry a two-year guarantee from the date of system acceptance against any imperfections in workmanship or materials.

5-4 The Supplier agrees upon the request of the Manager, Office of ITS Engineering to deliver to the Office, a sample of the complete video control equipment to be supplied in compliance with these specifications for inspection and test before acceptance. After completion of the test, the sample shall be returned.

5-5 The Supplier shall furnish any and all equipment which they deem necessary for safe and reliable operation of the video control equipment as part of the quoted price for the specified equipment.

5-6 All components furnished under this specification must be current production equipment and of recent manufacturer, similar models of which are in operation in not less than 20 locations in the United States or Canada. Untried or prototype units shall not be considered for acceptance.

5-7 All major components shall be identified with a metal plate containing the serial number with a bar code identification.

5-8 Any repairs made by a manufacturer or representative shall be documented and returned with units when warranty repaired. This documentation shall include an explanation of the exact repairs made and identification of parts replaced by part number and circuit number. All warranty repairs must be completed within thirty days of delivery of the equipment to the designated repair depot.