SECTION 686—BLANK

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VIDEO DECODER

DESCRIPTION

6867.01.01 GENERAL: This specification describes the functional, performance, environmental, submittal, documentation and warranty requirements, as well as the method of measurement and basis of payment, for a rugged field deployable and user selectable Moving Picture Experts Group (MPEG) 2+ and (MPEG) 4 video decoder. This video decoder will accept serial data signal and the digitally compressed video over the Freeway and Arterial System of Transportation (FAST) Communication Network Ethernet (TCP/IP) network from a video encoder, and output the decoded video as a standard National Television Standards Committee (NTSC) composite video signal and the serial data as RS-232.

The video decoder shall be of the same manufacturer as and fully compatible with the video encoder provided under Specification 685 “Video Encoder”.

The video decoder shall comply with the requirements stated within this specification so as to operate within the FAST Arterial Management System (AMS) and Freeway Management System (FMS).

This specification is for equipment only, no installation, to be delivered to the FAST Traffic Management Center (TMC) for testing and approval prior to final acceptance. The agency Project Manager shall be notified prior to the delivery to the TMC. No partial shipments will be accepted. All equipment supplied on this project will be delivered during a single delivery, and shall be labeled clearly with the project and location designation.

All equipment shall be approved prior to purchase by the FAST Manager or designee.

MATERIALS/EQUIPMENT

6867.02.01 FUNCTIONAL REQUIREMENTS: The video decoder shall comply with the following standards:


(b) Institute of Electrical and Electronic Engineers (IEEE) 802.3: Part 3: CSMA/CD Access Method and Physical Layer Specifications.


(d) Underwriters Laboratory (UL) 60960 Safety Requirements for IT Equipment (Applicable to equipment safety).


Detailed Requirements:

(a) The video decoder shall inter-operate with the video encoders, as defined in Section 685 “Video Encoder”.
(b) The video decoder shall support the following video features:

(1) The unit shall be capable of being soft configured to perform MPEG-2 ISO/13818-2 video decoding and MPEG-4 ISO/14496 video decoding.

(2) The unit shall be capable of being soft configured to produce elementary or transport stream.

(3) Video stream of up to 10 Mbps, auto-detecting.

(4) Video frame rate up to 30 fps and resolution of 720x480 pixels.

(5) 30 fps NTSC color video output.

(6) The end-to-end latency between the video encoder and the video decoders shall be no more than 250 ms while operating at a rate of 5 Mbps.

(c) The video decoder shall support the following network features:

(1) Ethernet Interface (10/100 Mbps, Half/Full-Duplex, Auto Negotiate (802.3), (RJ-45).

(2) Static Internet Protocol (IP) Addressing (Class A, B and C).

(3) Simple Network Management Protocol (SNMP) (M1B1, MIB2).

(4) Unicast and Multicast (IGMP V2).

(5) Gateway Configuration.

(d) The video decoder shall support:

(1) Command Line Interface (CLI).

(2) Telnet.

(3) Trivial File Transfer Protocol (TFTP) or FTP (new firmware download).

(4) The video decoder shall have an integrated web interface, which provides remote configuration and management features.

(5) Reset/Reboot and firmware upload shall be supported via all methods listed above.

(6) All video (i.e. resolution, contrast, etc.), data (i.e. baud rate, parity, etc), encoder (i.e. bandwidth, etc) and network (i.e. IP, subnet mask, gateway, etc.) parameters and settings shall be user configurable through the maintenance port, web interface, Telnet and all other supported remote management tools.

(7) All configurations and settings shall be downloadable/exportable in a document form. As a minimum, the exported settings shall include video, network, and data settings.

Failure and Reset Recovery:

The recovery time of a hard or soft reset shall be less than 45 seconds.

Electrical:

(a) The video decoder shall support the following:

(1) Power: Nominal input voltage of 120 VAC 60 Hz. The unit shall contain all power conversion and regulation necessary to support electronics operation.

(2) Power consumption: Shall not exceed 70 Watts.

(3) All supplied video decoders shall have the same power connectors. Each unit shall be provided with a power cable that is at least 5 feet (1.5 meters) in length and terminated with a male, three-prong UL-listed power connector for interface with the previously stated power system.

Ports:

(a) The video decoder shall have the following ports:
(1) Network: 10/100 Mbps RJ-45.
(2) Video: Composite Bayonet Neill-Concelman (BNC) and S-Video.
(3) Data: 2 Electronics Industry Association (EIA)-RS232/422/485, DB-9* (Female) I/F (supporting up to 57.6 kbps). These ports shall provide data pass thru for serial control (i.e. PTZ camera control).
(4) Data: One (1) EIA-232 DB-9* (Female) I/F. This port shall provide maintenance interface for local configuration.
*RJ-45 may be provided in place of DB-9. For each RJ-45 port, a RJ-45 to DB-9 converter shall be supplied.

Status Indicators:
(a) The video decoder shall have the following minimum indicators:
(1) Activity.
(2) Power.
(3) Video Loss.
(4) Transmit.
(5) Receive.
(b) Status indicators shall be (Light Emitting Diode) (LED).

Physical Characteristics:
(a) The video decoder shall not exceed 2 ½” high x 12” wide x 13” deep (2 ½” x 12” x 13”).
(b) The weight shall not exceed 10 pounds.

External Markings:
All connectors, indicators, and replaceable components shall be permanently marked and traceable to the supplied documentation, including schematics and parts list. The external markings shall include the product function name, model number, serial number and manufacturer’s name.

Environmental:
(a) The video decoder shall conform to the performance specification when operated in the following environment:
(1) Temperature: 0° degrees Celsius (+32° degrees F) to (+40° degrees Celsius. (104° degrees F).
(2) Humidity: 5 to 95 percent relative humidity, non-condensing.
(b) The video decoder shall have a minimum Maintain Time Between Failures (MTBF) of 60,000 hours.

MAC Address:
Each unit shall have a unique MAC address, MAC address shall be derived from an address space of 10,000 sequential addresses.

Network Management Software:
All custom Management Information Base (MIB’s) required for network management shall be provided for use with third party network management software.

IP Addressing:
Each unit shall support and be delivered with 2 user settable IP addresses, 1 for command and control, and 1 for video multicasting.

6867.03.01 SUBMITTALS: The following shall be submitted by the Vendor to the contracting agency:
(a) Acceptance Test Procedures (stand-alone and operational).
(b) Training Syllabus.
(c) Users Manual.
(d) Parts List.
(e) Description(s) of MAC address scheme / space.
(f) Certifications / Statement of: Conformance to all standards listed in this section the standard specification. Testing for compliance will be performed by an independent party.

6867.04.01 TESTING: Prior to acceptance by the contracting agency, the video decoder shall require testing as described below. The vendor shall absorb all costs associated with the testing including and not limited to shipping and handling, all material and equipment and any labor. Prior to acceptance of any video decoder the following tests shall be performed:

(a) Stand Alone Acceptance Test (SAT): Using the FAST approved vendor-supplied test procedures, FAST will perform the SAT in a test area provided by FAST. A vendor representative may be present during the SAT. The Vendor will be provided with a schedule of the test, including time and place.
(b) The SAT will be performed as follows:
   (1) The video decoder will be assembled and connected to power in a stand-alone configuration.
   (2) The video decoder will be powered up and allowed to initialize, boot and run self-diagnostic tests as defined in the FAST-approved test procedures.
   (3) After the video decoder has started and initialized, any additional test procedures will be executed.
   (4) After the test procedures have been executed, the video decoder will be allowed to run, uninterrupted, for a burn-in period of 72 hours.
   (5) At the end of the burn-in period, the unit will be restarted and configuration verified.
   (6) Upon completion of all test procedures, the Vendor will be notified of SAT acceptance or failure. If the unit fails the test the Vendor shall supply a new unit and the test shall restart.
(c) Operational Test: After successful completion of the SAT, FAST will configure and connect the video decoder to the FAST Test Network. Along with the video decoder, the network will also have a video encoder unit as specified in Section 685 and a Personal Computer (PC) operating the video decoder software, as specified by FAST, and the camera control application provided by FAST.
(d) The following tests will be performed by FAST:
   (1) Video Image (subjective quality acceptable to FAST).
   (2) Serial Data Channel both point-to-point (encoder to decoder), and IP.
   (3) User programmable parameters and functions.
   (4) Network management.
(e) While connected to the network, the video decoder shall not, in any way compromise the function or functions or any other connected network device(s).
(f) Upon completion of all the tests, the Vendor will be notified of operational test acceptance or failure. If the unit fails the test, the Vendor shall be disqualified and the Agency will proceed with the next low qualified bidder.
(g)  
(h)  

**6867.05.01 WARRANTY:** The video decoder shall be warranted for a minimum of 3 years. The warranty shall guarantee the video decoder to be free from defect from assembly, fabrication, and materials. The FAST and contracting agency may exercise the option of purchasing an extended warranty for an additional 2 years utilizing the item number as indicated in Section 6867.07.01, “Payment.” 

The warranty shall be provided in writing. If the normal manufacturers warranty extends for a longer period, the video decoder shall be warranted for that period. 

The warranty shall be measured from the date of receipt by the contracting agency. The manufacturer shall be responsible for maintaining a list of equipment supplied and warranty information during the period of the warranty contract. A report shall be submitted to FAST annually which details the status of equipment warranties. 

Video decoders found to be defective during the warranty period shall be replaced free of charge by the manufacturer. The vendor shall be responsible for all shipping and handling costs for equipment under warranty. 

The manufacturer shall also provide technical support coverage for all equipment and software furnished. This support shall as a minimum include the following:  
(a)  Software and firmware upgrades.  
(b)  Software patches. 

**METHOD OF MEASUREMENT**

**6867.06.01 MEASUREMENT:** The video decoder shall be measured per each. The unit will include furnishing all material required for facilitating an operational video encoder including all necessary jumpers. The video decoder, extended 2 year warranty shall be measured by lump sum.

**BASIS OF PAYMENT**

**6867.07.01 PAYMENT:** The accepted quantity of video decoder will be paid at the contract unit price per each. The unit will include furnishing and configuration, and all labor, material and equipment required for facilitating an operational video decoder. The lump sum price for video decoder, extended 2 year warranty shall be full compensation for the extended warranty. 

Payment will be made under:

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<tr>
<th>PAY ITEM</th>
<th>PAY UNIT</th>
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<tbody>
<tr>
<td>Video Decoder</td>
<td>Each</td>
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<tr>
<td>Video Decoder, extended 2 year warranty</td>
<td>Lump sum</td>
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