Video Image Detection System (SVS-1)
User Guide – Part A
Overview, Hardware, and Interfaces

30 April 2007
Limited Warranty

© Copyright 1997-1998 SmarTek Systems, Inc. All Rights reserved.
SmarTek Systems, Inc
14710 Kogan Drive
Woodbridge, VA 22193
Phone: 703-680-6554 or 410-315-9727

LIMITED SOFTWARE WARRANTY. SmarTek Systems warrants that the original disks are free from defects in material and workmanship, assuming normal use for a period of 90 days from the date of purchase. If a defect occurs during this period, you may return your faulty disk to SmarTek Systems, along with a copy of your dated invoice. SmarTek Systems will replace the disk free of charge. After 90 days, you may obtain a replacement by sending your defective disk and a check for $15.00. Except for the express warranty of the original disks set forth above, SmarTek Systems grants no other warranties for software, express or implied, by statute or otherwise, regarding the disks and related materials, their fitness for any purpose, their quality, their merchantability or otherwise. The Liability of SmarTek Systems under the warranty set forth above shall be limited to the replacement costs of the original disks. In no event shall SmarTek Systems be liable for any special, consequential or other damages for breach of warranty. Except for the foregoing, the Software is provided “AS-IS”, and you accept the entire risk as to the quality and performance of the system. In no event will SmarTek Systems be liable to you for any indirect, incidental or consequential damages arising out of or in connection with your use or inability to use the software and documentation provided. Your use of the software acknowledges that you have read this agreement and agree to its terms.

LIMITED HARDWARE WARRANTY. SmarTek Systems warrants that its products, when properly installed, used, and maintained, will be free from defects in material and workmanship. SmarTek Systems sole obligation under this warranty will be limited to repairing or replacing, at SmarTek Systems option, the part or parts of the products which prove defective in material or workmanship within one (1) year from the date of delivery, provided that Buyer gives SmarTek Systems prompt notice of any defect or failure and satisfactory proof thereof. Products may be returned by Buyer only after written authorization has been obtained from SmarTek Systems, and Buyer will prepay all freight charges to return any products to SmarTek Systems’ factory, or any other repair facility designated by SmarTek Systems. SmarTek Systems will deliver replacements for defective products to Buyer freight prepaid to the destination provided for in the original order. Products returned to SmarTek Systems under this warranty will become the property of SmarTek Systems. With respect to any product or part thereof not manufactured by SmarTek Systems, only the warranty, if any, given by the manufacturer thereof, and no other will apply. SmarTek Systems’ obligations under this warranty will not apply to any product which (1) is normally consumed in operation, or (2) has a normal life inherently shorter than the warranty period stated herein. THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, WHETHER ORAL, WRITTEN, EXPRESS, IMPLIED OR STATUTORY. IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WILL NOT APPLY. SmarTek Systems’ WARRANTY OBLIGATIONS AND BUYER’S REMEDIES HEREUNDER ARE SOLELY AND EXCLUSIVELY AS STATED HEREIN. SmarTek Systems does not warrant against damages or defects arising out of the use or handling of the Products; against defects or damages arising from improper installation (where installation is by persons other than SmarTek Systems), against defects in products or components not manufactured by SmarTek Systems, or against damages resulting from such non-SmarTek Systems made products or components. SmarTek Systems passes on to Buyer the warranty it received (if any) from the maker thereof of such non-SmarTek Systems made products or components. This warranty also does not apply to Products upon which repairs have been effected or attempted by persons other than pursuant to written authorization by SmarTek Systems. Installation of the hardware acknowledges that you have read this statement and agree to its terms.
LIMITATIONS ON USE. Software provided on any medium (disks and Electrically Erasable Read-Only Memories (EEROMs)), or provided with or as components of the System Printed Circuit Board (PCB) shall not be copied, reverse engineered, reverse compiled, or otherwise manipulated to provide access to the code. SmarTek Systems grants a personal, and non-exclusive right to use, in object code form, all software and related documentation furnished with this system. This grant shall be limited to use said software with Product for which the software was obtained and is transferable only with that equipment. Any transfer should be subject to the terms of agreement and payment of any scheduled fees if any. Use of the software on any items other than that for which it was obtained, or other material breach shall automatically terminate this license. Software or technical business information (hereinafter "Information") owned by SmarTek Systems and furnished with this system shall remain the property of SmarTek Systems. All software and Information furnished with this system: (1) shall only be used to install, operate or maintain Product for which they were originally furnished; (2) shall not be reproduced or copied, in whole or in part, except as necessary for back-up use as authorized under this order; and (3) shall, together with any copies, be returned or destroyed when no longer needed or permitted for use with Product for which they were initially furnished.

Microsoft and Windows are registered trademarks of Microsoft Corporation.
The SmarTek Video Detection System (SVS-1) is used to capture and process video signals from up to six (6) NTSC cameras for the purpose of indicating vehicle presence at surface street intersections. The heart of the SVS-1 system is SmarTek System's state-of-the-art Digital Signal Processor (DSP) based processing hardware and highly innovative image processing software. The SVS-1 system is modular, and therefore may be configured or populated with the right amount of "processing horsepower" to meet each customer's requirements. SVS-1's video signal acquisition design and processing algorithms are very robust which facilitates the use of a wide array of Off-The-Shelf NTSC Cameras.

The SVS-1 system hardware is designed to provide years of reliable service in the harsh environment of roadside cabinets. The SVS contains its own DC voltage regulators which facilitates the use of a wide range of unregulated DC power (12 to 24 VDC). For intersections requiring ten (10) or fewer vehicle presence relays, the basic SVS-1 processor box is all that is needed. This results in a very small footprint. For intersections requiring TS-1/2 card file inputs or more than ten (10) vehicle presence relays, external Relay Interface Cards are used with up to ten (10) relays per card (per camera channel) providing up to a total of sixty (60) relays.

The SVS-1 Setup and Monitor software has been designed and implemented using years of highway sensor setup experience. The Windows-based SVS setup software is very intuitive and easy to learn and use, making SVS-1 setup for a specific intersection quick and efficient.
The SVS-1 Feature Set includes, but is not limited to the following major features:

- Rugged processor enclosure with small footprint (7.75 in long x 6.5 in wide x 5 in high)
  One Main System Processor Board and up to three Camera Image Processor Boards (2 cameras per board)
- Interfaces and processing for up to 6 NTSC cameras
- RS-232 serial communication interface on each processor board (comms via serial I/O)
- Ethernet network interface on the main system processor board (comms via LAN)
- Ten (10) onboard Vehicle Presence Output Relays (SVS-1 back panel)
- Six (6) onboard Input Relays for local status input (door switches, controller status, etc.)
- Each camera processor channel has a unique ID (SVS0001, SVS0002, ..., SVS0006)
- Each processor channel provides up to 30 user selectable detection line zones (30 zones per camera)
- Each detection line zone can be setup for directional detection
- User selectable video output with active detection line zones overlay for operational visualization
- User selectable mapping/combining of detection line zones (30) to output Vehicle Presence Relays (10)
- User selectable Vehicle Presence Relay activation delay
- User selectable Vehicle Presence Relay activation extension
- User selectable Vehicle Presence Relay activation state (active low or active high)
- User selectable mapping of camera channel Vehicle Presence Relays to Onboard Output Relays
The SVS-1 system is modular, and may be configured or populated with the right number of processor boards to meet each customer's requirements. A fully populated SVS-1 is made up of three Camera Image Processor Boards and one Main Processor Board. Each Camera Image Processor Board in the SVS-1 implements two camera processing channels with each having a unique ID number (SVS0001, SVS0002, SVS0003, ..., SVS0006). Each camera processing channel provides up to thirty (30) detection zones with positions and sizes specified by the end user.

For robust vehicle detection performance, the end user may combine any number of the thirty (30) detection zones per camera channel to form a resultant Vehicle Presence Relay (up to 10 VPRs per camera channel). Each VPR may be output via the onboard back panel connector (up to 10 relays) or via an external Relay Interface Card (1 RI card per camera channel).
The SVS-1 Front Panel provides serial comm ports and an ethernet port for communications during system setup and operation.

The SVS-1 Front Panel also provides LED indicators for rapid and easy visualization of system status such as power on LEDs and heartbeat LEDs showing system software execution.

The SVS-1 Front Panel video output jack provides an interface for monitoring camera video during camera mounting and positioning. This video output provides a means for real time visualization of detection zone activation during operation. Channel selection for video output is via the Video Out Select Button. Pressing this button increments the selected channel and is indicated by the Video Out Selection LEDs.
SVS-1 Hardware—Back Panel

The SVS-1 Back Panel provides "loop-thru" video input for up to six (6) NTSC cameras.

The SVS-1 Back Panel provides a reliable connection point for an unregulated DC power supply of 12 to 24 VDC.

The SVS-1 Back Panel provides the connection point for ten (10) onboard vehicle presence relays that are opto-isolated. The SVS-1 processor is capable of providing up to sixty (60) vehicle presence output relays (10 per camera channel) using external Relay Interface Cards connected via the Front Panel RS-232 ports.

The SVS-1 Back Panel provides the connection point for monitoring the state of up to six (6) input relay signals.