AVR8000

RS232 8:1 Video Mulitiplexer / Switch

USER MANUAL

V 3.0

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Although every attempt has been made to insure accuracy of information contained in this manual, **Ontrak Control Systems Inc.** assumes no liability for inadvertent errors.

Warranty: This AVR8000 is warranted from defects in workmanship and materials for a period of 90 days. Liability for defects is limited to the purchase price of the product. This warranty shall not apply to defects resulting from improper modifications or use outside published specifications.

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READ ME FIRST

Thank you for purchasing this ADR8000, AVR8000 8:1 Video Multiplexer/ Switch.
The AVR8000 is a versatile video switch with three modes of operation including;

Mode 1 - Motion Input/ Manual Switching (Power-On Default)
Mode 2 - RS232 Controlled Switching
Mode 3 - Timed Switching

This manual will provide guidance for using the switch in the various modes .
Additional applications and programming examples are available on our web
page at **http://www.ontrak.net/**

FEATURES

- Low Cost
-8 Buffered Inputs, Buffered Output
-Three wire RS232 interface.
-75 Ohm (Standard) or 50 Ohm Inputs
-Ultra-low 10mV P-P Switching Transient
-Integrated ESD Protection
-8 Contact inputs for motion detection or external switch.
-Versatile command set via RS232
- 3 Modes of Operation (Manual, RS232, Timed)
- 94V-0 Enclosure with rubber mounting feet.
-Operates on standard 9VDC wall adaptor or 7-15VDC

1a)THE AVR8000 RS232 INTERFACE

The AVR8000 communicates via a standard RS232 port utilizing a simple three-wire interface. The only signals used are received data (RC), transmitted data (TX) and ground (GND). Most RS232 ports use hardware handshaking (i.e. DTR, DSR, CTS, RTS) signals to control the flow of data on the port. For this reason the cable required to connect to the ADR867 should have jumpers on the Female DB9 end to satisfy these handshaking requirements. IBM PC or compatible computers may be used as a host computer with the supplied cable. The supplied cable has the following connections;

```
AVR8000                    PC
DB9P ( male)               DB9S ( female)
 RC    3 ——— RED ——————————— 3   TX
 TX    2 ——— WHITE ————————— 2   RC
 GND   5 ——— BLACK ————————— 5   GND
                          ┌─ 7   RTS
                          └─ 8   CTS
                          ┌─ 1   DCD
                          ├─ 6   DSR
                          └─ 4   DTR
```
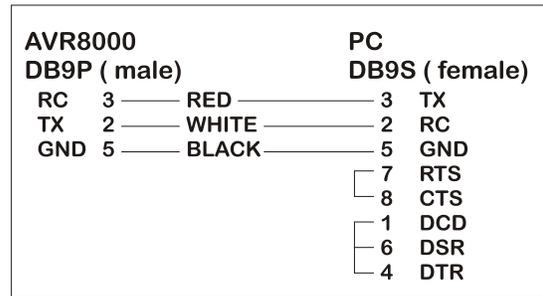
Figure 1: Supplied Cable Wiring Diagram

If the host computer has a male DB25 connector, a DB25 to DB9 adapter is required to use the supplied cable. This may be purchased at most computer dealers.

2.PROVIDING POWER TO THE AVR8000

The AVR8000 has an on-board 5 volt regulator allowing the use of a 9-volt wall adaptor to power the internal circuits. The adaptor should be able to provide a minimum of 100mA .(MODE 68-950-1) The adaptor must have a standard 2.1mm, center negative, coaxial connector.

3. AVR8000 Modes of Operation

There are many different methods of utilizing the AVR8000. Up to eight cameras can be connected to the video inputs and the video output can be fed to a frame grabber (Computer), video monitor or VCR. Switching can be controlled by motion detector inputs, a manual switch, an internal timer or by commands issued by a host computer. The AVR8000 has three fundamental operating modes. Each mode is explained along with suggested applications in the following sections.
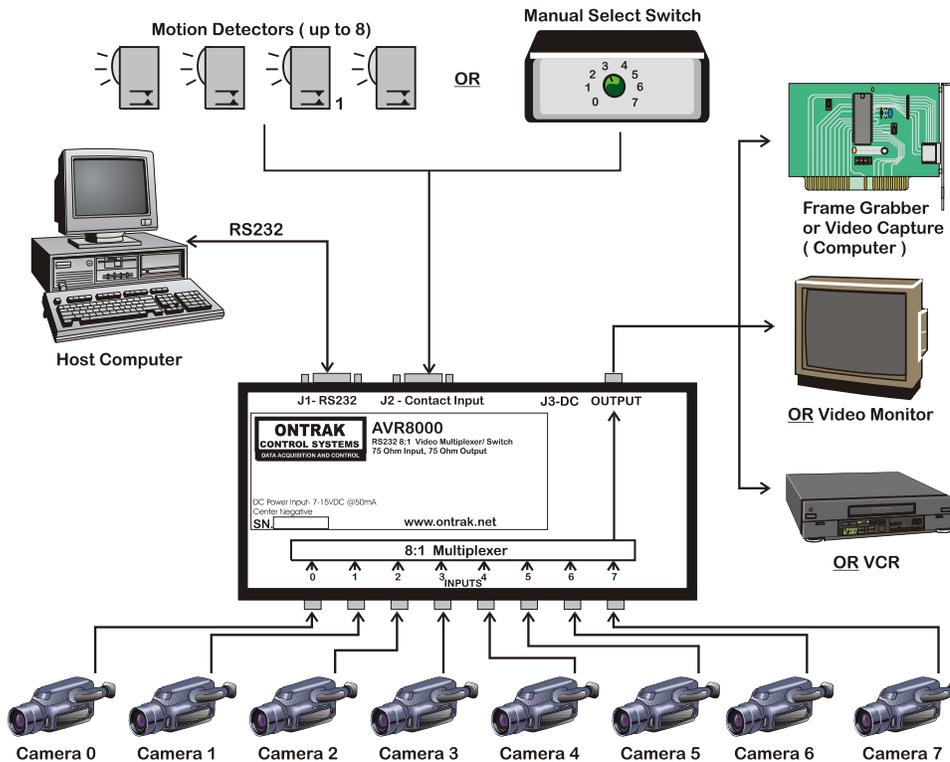
Figure 3A- General Connection Options

a) Mode 1 - Motion Input/ Manual Switching (Power-On Default)

When configured in MODE 1, switching of the video input channels is determined by the state of the contact inputs on connector J2. Connection of a host computer is not required. The eight contact inputs on connector J2 are collectively referred to as PORT A. Individually, each input is identified as PA0 to PA7 and is associated with a specific video input channel as illustrated in Figure 3B.

PORT A Line	Selected Video Channel	J2 DB9S Pin No.
PA0	Channel 0 (Highest Priority)	7
PA1	Channel 1	8
PA2	Channel 2	9
PA3	Channel 3	5
PA4	Channel 4	4
PA5	Channel 5	3
PA6	Channel 6	2
PA7	Channel 7 (Lowest Priority)	1
GROUND		6

Figure 3B - J2 Pin-Out Table

A manual switch can be used to select which video channel is routed to the output by wiring the switch to connect the appropriate lines to the common ground. An example is shown in Figure 3C , using an eight position select switch.
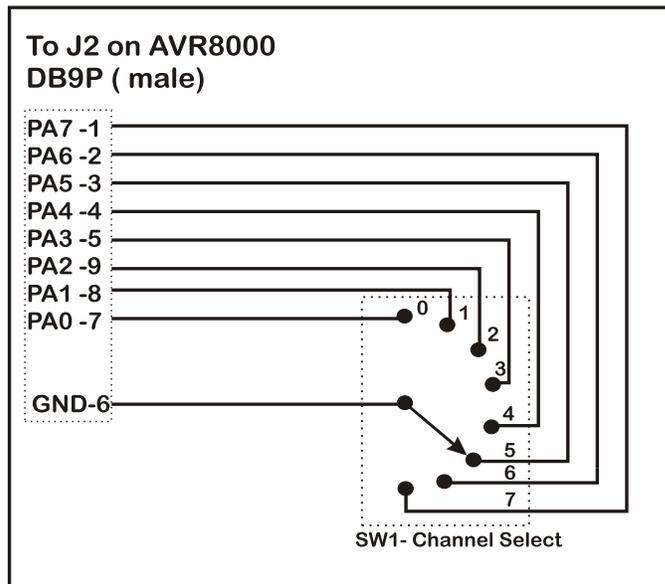

Figure 3B - Manual Operation using External 8 Position Switch

Note 1:   If more than one input is connected to ground (Active) at the same time, the input with highest priority will be the selected channel. The highest priority is given to PA0 and the lowest priority is given to PA7.

Contact inputs from motion detectors can be used in place of the manual switch by connecting the dry contact inputs between the common ground and the corresponding input line. This allows the video signal to be switched based on motion detection. Caution should be exercised in use of this mode as the priority of the inputs can cause some motion to go undetected. This happens when motion occurs in two zones (ex. Channel 0, and Channel 5) at the same time. While motion is detected on Channel 0, its signal will be routed to the output and motion on Channel 5 will not be recorded unless the contact on Channel 0 opens. This is because of the higher priority given to Channel 0 than Channel 5. If this method is to be used, high security areas should be connected to the lower numbered (Higher Priority) video input channels and less important areas connected to the higher numbered (Low Priority) video input video channels. Another preferred method of using motion detector inputs is MODE 2 with interrupts enabled. See below.

b)Mode 2 - RS232 Controlled Switching

MODE 2 allows switching of the video inputs based on commands sent by a host computer connected to the RS232 port J1. This allows the host to select which input is routed and for how long using simple ASCII commands sent via the RS232 port. Details of these commands are given in section 4 of this manual.

Note: For tutorials on sending ASCII commands via RS232 in BASIC, Visual Basic, Turbo C, Visual C, TestPoint, Labview and other languages, see our web page at: http://www.ontrak.net In the programming section.

One example of using MODE 2 is to configure the host to switch the desired channels to the output in one second steps and use a Frame Grabber to capture a complete frame of video for storage.

Another application example is to connect motion detector outputs to the contact inputs and enable interrupts from the AVR8000. The interrupts will send codes to the host computer when motion is detected telling the host which zone has motion. The host computer can then switch the related camera to a video monitor, VCR or video capture input.

c)Mode 3 - Timed Switching

Mode 3 features a timed switching option where the inputs are switched at intervals set by the host computer from 1 to 255 seconds in duration. Inputs can be masked to allow switching only of the inputs with video connections. The timed switching commands are listed in section 4 of this manual.

AVR8000 Command Quick Reference

CHANNEL SELECT COMMANDS (c=0 to 9)

MVc	Select video channel. (c = 0 to 9)
	Note: If c = 8 or 9, output is disabled.
PV	Returns current video channel. (0-7 or 9 if disabled)
DTddd	Sets dwell time in seconds. (ddd=001 to 255)
DR	Returns current dwell time. (000 - 255)

MODE SELECT COMMANDS

M1	Configures AVR8000 for MODE 1 operation (Default)
M2	Configures AVR8000 for MODE 2 operation
M3	Configures AVR8000 for MODE 3 operation
MR	Returns current MODE (1,2 or 3)

INTERRUPT COMMANDS

IE	Enables all un-masked interrupts.
ID	Disables all interrupts.
IS	Returns status of interrupts. (1 if enabled, 0 if disabled)
SMKxxxxxxxx	Loads interrupt mask data. (x=0 (unmasked)or 1 (masked))
MKR	Returns current mask data.

CONTACT INPUT (PORT A) COMMANDS

PA	Returns current value of PORT A in decimal format. (000 - 255)
RPA	Returns current value of PORT A in binary format.
RPAn	Returns value of input line (0 or 1) specified by n (0 - 7).

ID COMMAND

*IDN?	Returns 4-digit ID number (8000)

4. AVR8000 COMMANDS

a) CHANNEL SELECT COMMANDS

The channel select commands allow the RS232 host to select which input channel is routed to the video output. Additionally, the dwell time used for MODE3 Timed Switching can be set to any value from 1 to 255 seconds.

MVc   Selects video channel to be routed. (c=0 - 9)

example;   MV3<CR>

               (Video input 3 is routed to video output.)

Note: If c = 8 or 9, video output is disabled.

PV   Returns present video channel.

example;   PV<CR>
               6
               (Channel 6 is presently routed to video output.)

Note: If a value of 9 is returned, video output is disabled.

DTddd   Sets dwell time in seconds (ddd= 001 to 255)

example;   DT10<CR>

               (Dwell time is set to ten seconds.)

DR   Returns dwell time in seconds.

example;   DR<CR>
               25
               (Channel dwell time is 25 seconds)

b) MODE SELECT COMMANDS

The mode select commands allow the mode of the AVR8000 to be set and read back at any time..

M1   Sets current MODE to 1. (Motion Input / Manual Switching)
M2   Sets current MODE to 2. (RS232 Controlled Switching)
M3   Sets current MODE to 3. (Timed Switching)
MR   Returns current mode. (1, 2 or 3)

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c) CONTACT INPUT (PORT A) COMMANDS

The AVR8000 features 8 contact inputs on J2, designated as PORT A. The contact input status can be read individually or as a complete byte. The port configuration is:

PORT A Line	Selected Video Channel	J2 DB9S Pin No.
PA0	Channel 0	7
PA1	Channel 1	8
PA2	Channel 2	9
PA3	Channel 3	5
PA4	Channel 4	4
PA5	Channel 5	3
PA6	Channel 6	2
PA7	Channel 7	1
GROUND		6

There are pull-up resistors connected to each input line allowing the use of dry contact inputs or TTL type signals. The normal (Inactive) state for an input is a logic "1" (HIGH) . If a dry contact is connected between an input and ground, and the contact closes, the input state will be a logic "0" (LOW) . For example, if PORT A is read with nothing connected, a value of 255 will be returned indicated that all inputs are HIGH or in the open state.

The commands used to access the inputs are:

PA   Returns value of PORT A in decimal format. (000 - 255)

example;   PA<CR>
                  127
                  (PA7 is LOW (contact input closed), PA6-PA0 are HIGH (Contact inputs open))

RPA   Returns current value of PORT A in binary format. Order is PA7-PA0

example;   RPA<CR>
                  11101110
                  (PA7, PA6, PA5, PA3, PA2, PA1 are HIGH,   PA4 and PA0 are LOW)

RPA$_n$ Returns current value of input line (specified by n) in PORT A .

example;   RPA4<CR>
                  1
                  (PA4 is HIGH)

d) <u>INTERRUPT COMMANDS</u>

The AVR8000 features 8 contact inputs that can be used to generate interrupts when a contact closure is detected. When enabled, the interrupt will cause a 2 digit code to be sent to the host. The two digit code has a leading zero followed by a number (0 - 7) representing the input that generated the interrupt. The host can then use this data to select which input is routed to the video output of the AVR8000. Individual input lines may be masked, (disabled) or unmasked, (enabled) using the interrupt mask command.

For example, when interrupts are enabled,

00	-interrupt on PA0 (Channel 0 Contact Input)
01	-interrupt on PA1 (Channel 1 Contact Input)
05	-interrupt on PA5 (Channel 5 Contact Input)
03	-interrupt on PA3 (Channel 3 Contact Input)

The interrupt commands include;

IE   Enables all un-masked interrupts.

ID   Disables all interrupts.

IS   Returns status of interrupts (1 if enabled, 0 if disabled)

SMKxxxxxxxx   Loads interrupt mask data (x =1 to mask bit, 0 to unmask bit)
The order of data is CH7-CH0. All eight bits must be specified.

Example;

**SMK11000001**<cr>   Masks CH7, CH6, CH0, unmasks CH5, CH4, CH3, CH2, CH1

NOTES TO INTERRUPT OPERATION:

1)   Interrupts are disabled on power-up**.**
2)   All interrupts are un-masked on power-up**.**
3)   The contact input must be closed for at least 10ms to ensure detection.
4)   It is not recommended to generate more than 10 interrupts per second per channel as interrupt data may be lost.

e) <u>ID COMMAND</u>

*IDN?   Returns four digit product identifier code (8000)
* may be omitted

APPENDIX A CONNECTION DIAGRAM

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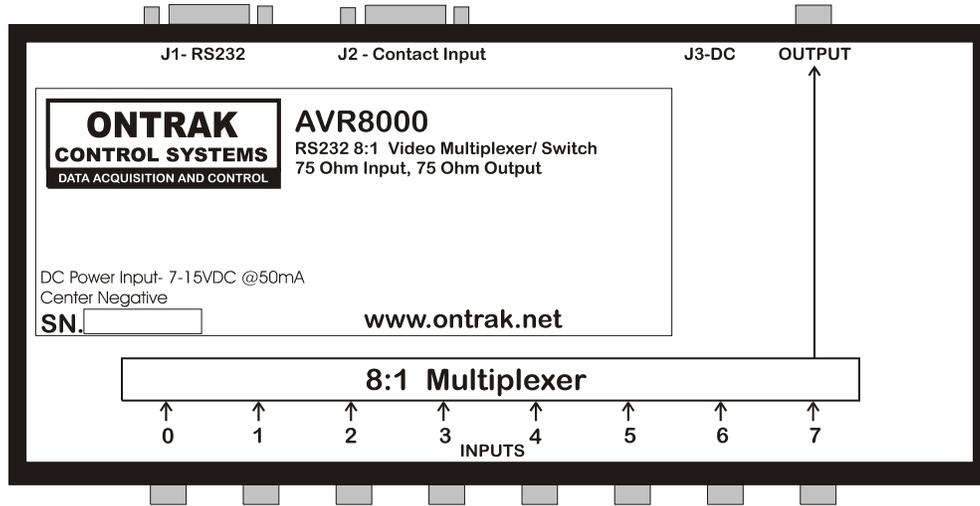
J1-RS232	J2-Contact Input DB9 Female	J3- DC
Pin1 -Connected to Pins 6,4 *	Pin 1 - PA7	Sleeve 7-15VDC
Pin2 - Transmit Data	Pin 2 - PA6	Center- Negative
Pin3 - Receive Data	Pin 3 - PA5	
Pin4 -Connected to Pins 1,6 *	Pin 4 - PA4	
Pin5 - Ground	Pin 5 - PA3	
Pin6 -Connected to Pins 1,4 *	Pin 6 - Common Ground	
Pin7 - Connected to Pin 8 *	Pin 7 - PA0	
Pin8 - Connected to PIN 7 *	Pin 8 - PA1	
Pin9 - Make no Connection	Pin 9 - PA2	

APPENDIX B ELECTRICAL SPECIFICATIONS

Video Inputs (8)	
Input Impedance	75 Ohms (50 Ohm Available)
Input Level	1V P-P
Maximum Input Voltage Range	+/- 2V P-P
Connector Type	RCA
Video Output	
Output Impedance	75 Ohm (50 Ohm Available)
Output Level	1V P-P into 75 Ohms
Switch Transient	10mV Maximum
Bandwidth (-3dB)	70 Mhz
Connector Type	RCA
J2 - Contact Inputs (8)	
Input Type	Dry Contact or TTL
Connector type	DB9 Female
J1 - RS232 Port	
Configuration	9600, 8-bit words, no Parity, 1 Stop bit
Connector Type	DB9 Female
J3 - DC Power Input	
Input Voltage Range	7-15VDC
Input Current	30mA Maximum

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