



# *Installation Manual*

## DVR16X16

16-port DVI-D Matrix Switch  
with RS-232, IR, USB and TCP/IP Control (optional)



**Display Content From Any 16 Computers On Any  
16 Screens Independently Up To 30 Feet Away**

## Introduction

SmartAVI's non-blocking DVR16X16 digital video matrix switch provides an easy and dynamic approach to switching the DVI output from up to 16 computers, to up to 16 displays. The switching can be controlled directly via the front panel, or remotely using RS-232 commands, IR, USB or TCP/IP (optional). The DVR16X16 is controlled by Windows®-based software that is easy to understand and simple to use – a cornerstone of all SmartAVI products.

## Features

- Multiple EDID Support
- Programmable EDID from computer
- Automatic EDID learning from monitor
- Increases productivity by providing access to up to 16 computers from 16 workstations.
- 16 x 16 non-blocking, single-link DVI-D matrix switch
- Automatic output pre-emphasis and drive level
- Automatic receiver equalization
- Supports DVI operation at the maximum rate of 2 x 1.65 Gbps
- Supports resolutions up to 1920 x 1200
- Control from either front panel or RS-232
- Available IR remote
- USB Control Available
- Ethernet control available
- Easy-to-use Windows based software

The DVR16x16 provides single-link, DVI-D operation at the maximum TMDS rate of 2 x 1.65 Gbps at resolutions up to 1920 x 1200. The DVI-D signals can be transmitted through 30 feet of copper at the maximum TMDS rate on both the input and output sides of the switch.

## What's in the Box?

PART NO.	QTY	DESCRIPTION
DVR16X16S	1	DVI-D 16X16 Router. Includes: [DVR16X16 & CCPWR06USA]
User Manual	1	

## Technical Specifications

VIDEO	
Format	DVI-D Single Line
Maximum Pixel Clock	165 MHz
Input Interface	(16) DVI-I 29-pin female
Output Interface	(16) DVI-I 29-pin female
Resolution	Up to 1920 x 1200
DDC	5 volts p-p(TTL)
Input Equalization	Automatic
Input Cable Length	Up to 30 ft.
Output Cable Length	Up to 30 ft.
OTHER	
Control	RS-232, IR, USB and TCP/IP via SMTCP
Power	Internal 100-240 VAC, 50-60 HZ, 60 Watts
Dimensions	19"W x 5.25"H (3U) x 7"D
Weight	10 lbs.
Approvals	UL, CE, ROHS Compliant

RK-DVR-16x16 Front



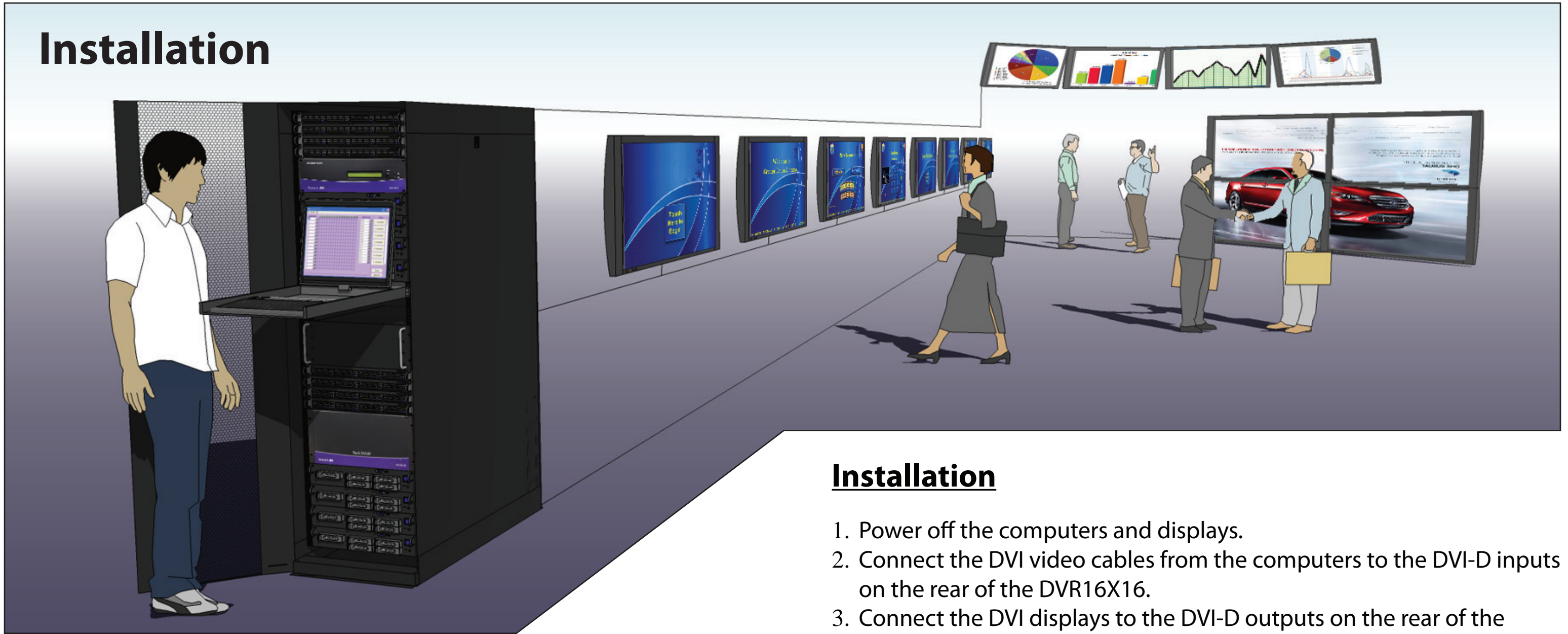
RK-DVR-16x16 Rear



## Applications

- Wall Displays
- Digital Signage
- Airports
- Dealer Rooms
- Control Rooms
- A/V Presentations
- Shopping Centers
- Security
- Point-of-Sale
- Hotels/Resorts
- KVM Switch

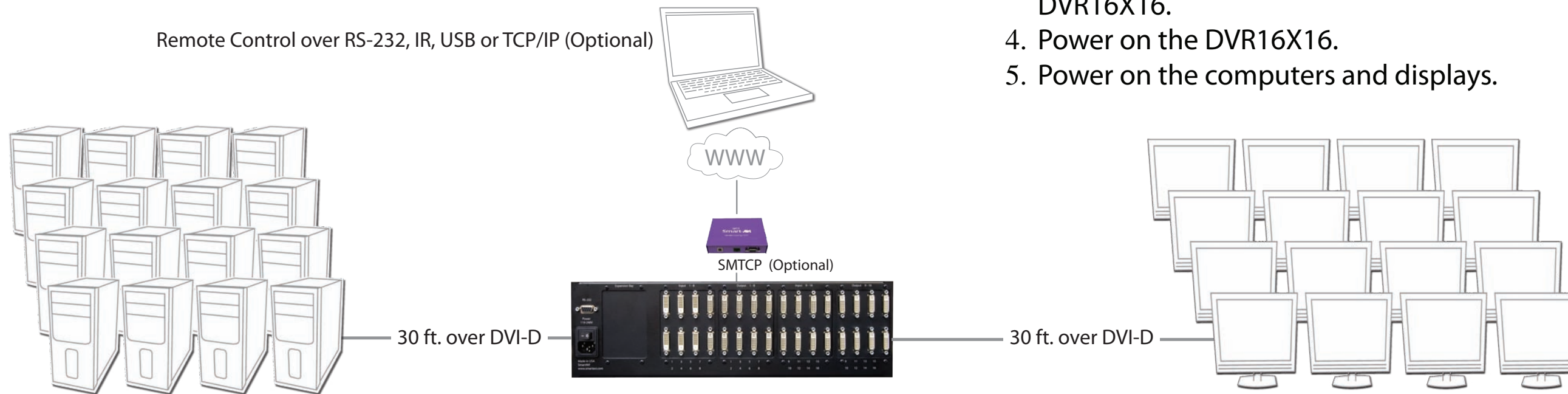
# Installation



## Installation

1. Power off the computers and displays.
2. Connect the DVI video cables from the computers to the DVI-D inputs on the rear of the DVR16X16.
3. Connect the DVI displays to the DVI-D outputs on the rear of the DVR16X16.
4. Power on the DVR16X16.
5. Power on the computers and displays.

Remote Control over RS-232, IR, USB or TCP/IP (Optional)



# Flexible Control Options

## Switching Between Ports

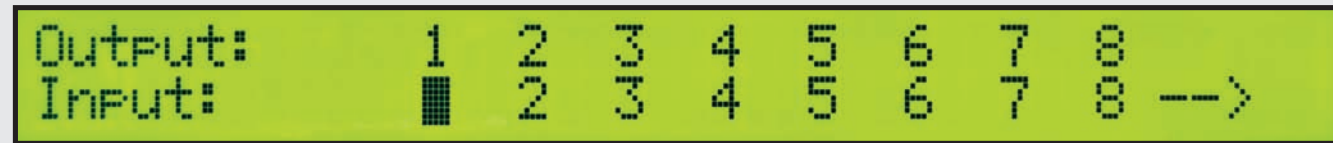
There are four ways to switch between inputs on the DVR16X16: via the front panel buttons, RS-232 connection, IR remote control (optional), or TCP/IP (optional).

### Front Panel Control

During normal operation, you will see a list of ports on the front panel display. The display will cycle between the status of ports 1-8 and 9-16, alternating every ten seconds.



To switch ports using the front panel, press and hold the UP button for one second to enter port selection mode. A block cursor will appear over the first input port (1). Use the dial to select the port you would like to change.



When selected, press the UP button to enter the editing mode for that port. When in editing mode the cursor will change to an underline. Use the dial to select the desired input port.



To exit the port editing mode and return to the port selection mode, press the DOWN button. To exit the port selection mode, press the DOWN button.

## MENU Options

To access the other features of the DVR16X16, press and hold both the up and down buttons simultaneously for 3 seconds to bring up the MENU screen. Use the dial to choose from the following list of options:



To change the status of the the selected option, press the UP button.

## MENU Options (continued)

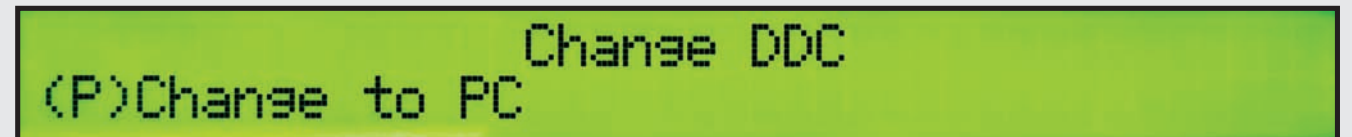
- **RS-232 ACKNOWLEDGE** - sends an acknowledgement after a command has been issued.
- **RS-232 CHECKSUM** - sends a CHECKSUM to validate commands (checks for command errors).
- **SEND UPDATE** - sends an update of the configuration to the SmartControl software (p. 10).
- **MEMORY SAVE** - saves the configuration to memory when powered off.
- **CHANGE DDC (submenu)** - modifies the DDC table, see DDC Learning below.
- **EXIT** - exits the MENU

## DDC Learning

DDC provides plug-and-play capability to your displays. When you plug a display into your computer, the DDC table in the display tells the computer the optimal resolution to use. In order to preserve this plug-and-play capability, we have integrated DDC learning into all of our DVI Solutions.

To enter CHANGE DDC mode, press the UP button when MENU/CHANGE DDC is shown. Use the dial to cycle through the DDC learning modes. To select a mode, press and hold the UP button for three seconds. The currently selected DDC Mode will be indicated by a letter in parenthesis (**P** for PC, **M** for Mac, and **S** for Screen). To exit the CHANGE DDC menu, press the down button.

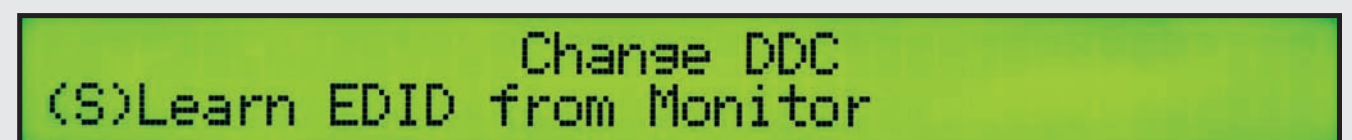
“**Change to PC**” indicates Personal Computer Mode and automatically selects the standard display characteristics of a PC display, which typically works for any PC/Display combination. This mode is indicated by (**P**).



“**Change to Mac**” indicates Mac Mode and selects the best display mode to accommodate a Mac. This mode is indicated by (**M**).



“**Learn EDID from Monitor**” indicates Screen Mode, which learns the type of display connected to the “OUT” port. This mode is indicated by (**S**).



# Flexible Control Options (Continued)

## RS-232 Control

To control the functions of the DVR16X16 using an RS-232 connection, use a male-to-female serial cable to connect a computer to the DVR16X16's RS-232 port. Use Hyperterminal to create a terminal connection to the DVR16X16, making sure to use the standard communication mode of 9600bps, 8, N, 1.

(NOTE: all commands must be uppercase)

- To modify the crosspoints (input/output port mapping), use the command format “//FxxMxxlxx” (Fxx is the frame number (for more than one switch), Mxx is the monitor number, and lxx is the Input number.)
- EXAMPLE: to map Input 01 to Monitor 01 on Switch 01, send “//F01M01I01 [ENTER]”
- EXAMPLE: to map Input 12 to Monitor 09 on Switch 04, send “//F04M09I12 [ENTER]”
  
- To toggle the hotplug pin (used to wake the display from standby), use the command format “//FxxHxxlxx”
- EXAMPLE: to toggle the hotplug pin for Input 01, Monitor 01 on Switch 01, send “//F01H01I01 [ENTER]”
- EXAMPLE: to toggle the hotplug pin for Input 12, Monitor 09 on Switch 04, send “//F04H09I12 [ENTER]”
  
- To display the current crosspoint status, send “//FxxU [ENTER]”
- To reboot the DVR16X16, send “//BOOT [ENTER]”
- To display the current firmware version number, send “//XXXX [ENTER]”
- To reset the DVR16X16 to factory defaults, send “//RESET [ENTER]” (the DVR16X16 must be power cycled to complete the reset command)

## IR Control (optional)

To switch ports using an infrared remote control (optional accessory), connect an SM-EYE (optional accessory) to the DVR16X16 box and the unit will auto-detect the infrared connection. Once the connection is made, you may use the IR remote to cycle through the available ports.

When using the SRC-2A infrared remote control:

- To create a crosspoint, use the keypad to enter the number (two digit) of the desired Monitor port, press the ENTER button, then enter the desired Input port and press ENTER.



## TCP/IP Control (optional)

To control the DVR16X16 remotely via the internet, connect an SMTCP controller (optional accessory) to the RS-232 port of the DVR16X16. For more information about the SMTCP controller, please visit our website at [www.smartavi.com](http://www.smartavi.com).

# Software Installation & Operation

Find the Installation CD that came with your DVR16x16 unit. This CD has the SmartControl software that you will need in order to control the unit using a computer.

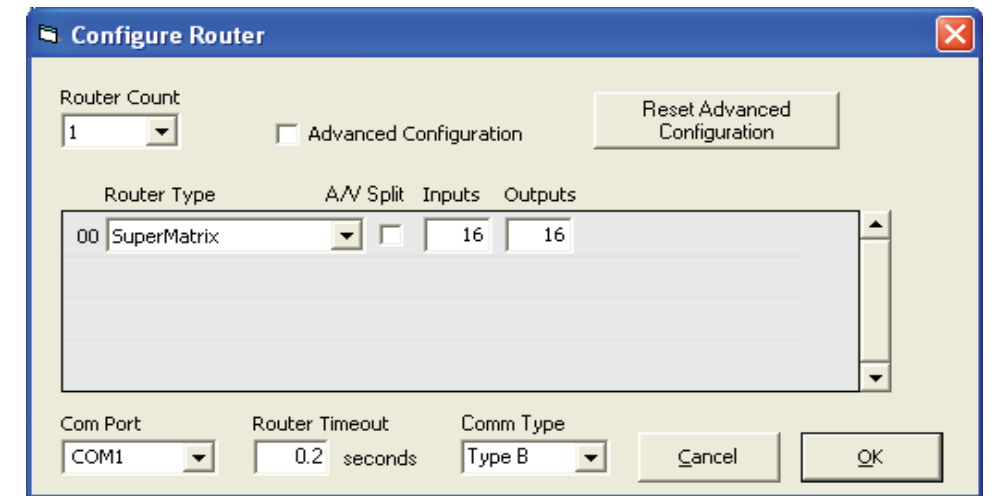
Insert the CD into your CD-ROM. On the CD you should see:

- SmartControl Installer.exe
- SmartControl Help File
- DVR 16X16 Manual in PDF format

Double click SmartControl.exe in order to initiate software installation. Click Install. After installation has completed, click CLOSE.

In order to use the software, click on the START button>Programs>SmartControl. There you should see a help file, the SmartControl launcher as well as a shortcut to uninstall SmartControl. Click on SmartControl in order to launch the software.

When the software starts you will see a screen like this.



**Advanced Configuration:** If you have more than one Router installed you will want to check this box.

**Router Type:** Select SmartNet-X. This is not the actual model of the router but communication will still function properly if this is selected.

**A/V Split:** Check this box if you need to route audio and video independently, regardless from which source they originated from. Leave unchecked if you want audio and video signals from the same input to remain together.

For example, if you wanted to route different video feeds to different locations but wanted all of them to have the same audio, you should check the box.

**Inputs/Outputs:** Enter the number of Inputs/Outputs your DVR 16x16 has. For now we will assume that there are 16 inputs and 16 outputs.

**Com Port:** Select the appropriate COM port that your computer is using to access the router.

**Router Timeout:** By default this is 0 meaning the computer acknowledges commands almost instantly. Sometimes a computer takes longer to respond. This setting should be left at 0. If you need to change it, it should be no higher than 0.2.

After you have entered in the necessary information click OK.

This will now take you to the Main Routing Window where you can route the different video connections.

# Software Installation & Operation (Continued)

The Main Routing Window enables you to control the router(s) connections by means of the matrix panel, the button panel, or with pre-recorded routes called macros.

**Matrix Panel:** This is probably the simplest way to route the connections. Simply click on the cross point itself. The input on the left will then be routed to the output above.

*Note: Inputs can be routed to several different outputs, but each output can only have a single input at any one time. So you can have several connections horizontally but not vertically.*

**The Button Panel:** These are the numbered buttons across the top and left sides. Click an output button on the top, and then click an input button on the left.

### Output Options:

To select multiple outputs next to each other, click on one output, then hold the shift key down and click the last output. When the input is clicked, it is routed to all selected outputs.

To select multiple outputs individually, hold the control key down and click on any number of outputs. When the input is clicked, it is routed to all selected outputs.

### Input Options:

To route an input to all the outputs at once, hold the control key down and click on an input.

To leave the outputs selected after the route is made, hold the shift key down and click on an input.

**Macros:** This section of the window is used to save and playback macros. Macros are used to store a set sequence of routes.

### To record a macro:

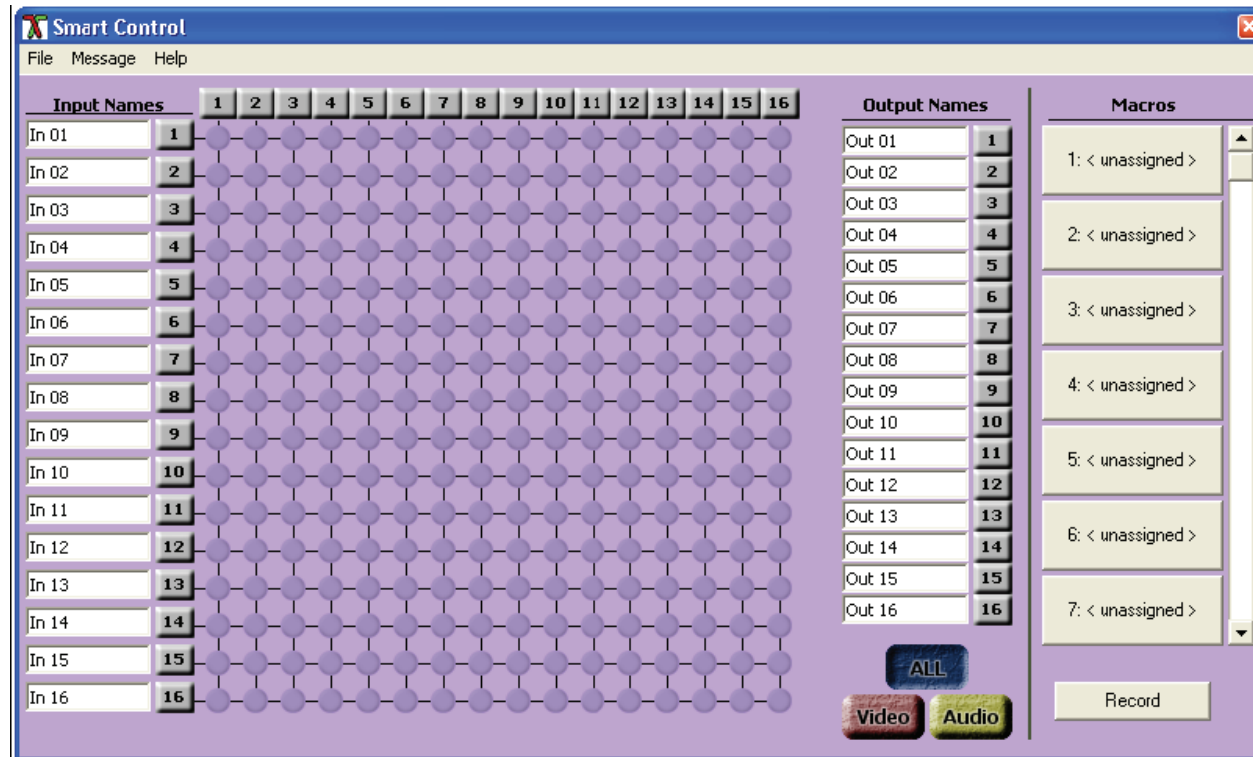
1. Click on the Record button (last button shown above). A blinking "recording" message below this button will be displayed to indicate that all routes are being recorded.
2. Select the desired cross points. (See Matrix Routing for details on making these routes.) There is no limit on the number of routes you may record.
3. If you click a macro button while in the record mode, the macro will be executed, and these routes will be added to the recording. This makes it possible to combine the routes of two or more macros into one bigger macro.
4. When finished, click the "Save Macro" button. You will be instructed to then click on one of the macro buttons. Doing this will save the recorded routes to that button.

*To cancel saving the macro, click the "Cancel Save" button.*

5. To play back a macro, simply click on one of the 50 macro buttons. Use the scrollbar to bring any of these into view.

6. The macros are automatically saved in the current configuration file. They are also saved when you select the File/Save Configuration... menu.

*To save macros in a separate file for a special purpose, select the File/Save, Macros, menu.*



On this screen you will notice the input buttons running down the left side while the output buttons run across the top. They are each labeled 1 through 16.

Note: The three small colored buttons at the lower right labeled ALL, VIDEO are not available if AV Split was not checked when you configured your router.



## NOTICE

The information contained in this document is subject to change without notice. Smart-AVI makes no warranty of any kind with regard to this material, including but not limited to, implied warranties of merchantability and fitness for any particular purpose.

Smart-AVI will not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance or use of this material.

No part of this document may be photocopied, reproduced or translated into another language without prior written consent from Smart-AVI.

For more information, visit [www.smartavi.com](http://www.smartavi.com).



SmartAVI, Inc. / Twitter: smartavi  
2840 N. Naomi Ave. Burbank, CA 91504  
Tel: (818) 565-0011 Fax: (818) 565-0020  
<http://www.SmartAVI.com>