Installation Manual

SM-RS232
16-Port RS232 Router
with optional TCP/IP control

**Control up to 16 RS232 compliant devices
up to 50 feet away over UTP
or from anywhere via TCP/IP (optional)**

What's in the Box?

PART NO.	QTY	DESCRIPTION
SM-RS232	1	SM-RS232 16-Port RS232 Router.
PS5VDC2A	1	Power Supply 5 Volts DC 2 Amps.

SM-RS232 Front

SM-RS232 Rear

Technical Specifications

RS232	
Input Interface	(1) DB9 Female
Output Interface	(16) RJ45 Female
Pinouts	TXD, RXD, GND Only, No Handshake
Control	Via Software @ 9600 bps
OTHER	
Power	External 100-240 VAC/5VDC2A @10W
Dimensions	17"W x 6"D x 1.75"H
Weight	5 lbs.
Approvals	UL, CE, ROHS Compliant
Operating Temp.	32-131°F (0-55 °C)
Storage Temp.	-4-185 °F (-20-85 °C)
Humidity	Up to 95%

Introduction

The SM-RS232 is a 1U rack-mountable RS232 router capable of controlling up to 16 remote RS232 compliant devices from 50 feet away. Using seamless RS232 switching, one PC can be used to control up to 16 devices. The SM-RS232 is perfect for controlling the functions of multiple RS232 devices such as TVs, A/V Routers, Signage Players, DVRs, PCs, network hubs and many other devices.

Features

- 16 RS-232 DB9 female slave ports
- Automatic transmit and receive control
- Uses standard CAT5/5e/6 cabling with compact RJ45 to DB9 adapters
- Network up to 16 RS-232 devices up to 50 feet away
- Can be controlled remotely with optional TCP/IP controller
- Supports multiple baud rates, parity, and character length
- 1U rack mountable enclosure

Applications

- Control multiple audio and video matrixes
- Remotely control displays to save energy
- Send commands to signage players
- Consolidate home or industrial automation products
- Manage co-located servers
- Control network equipment
- Manage point-of-sale terminals

APPLICATION DIAGRAM

SMTCP-R

www

TCP/IP
Control

Console
Control

SM-RS232

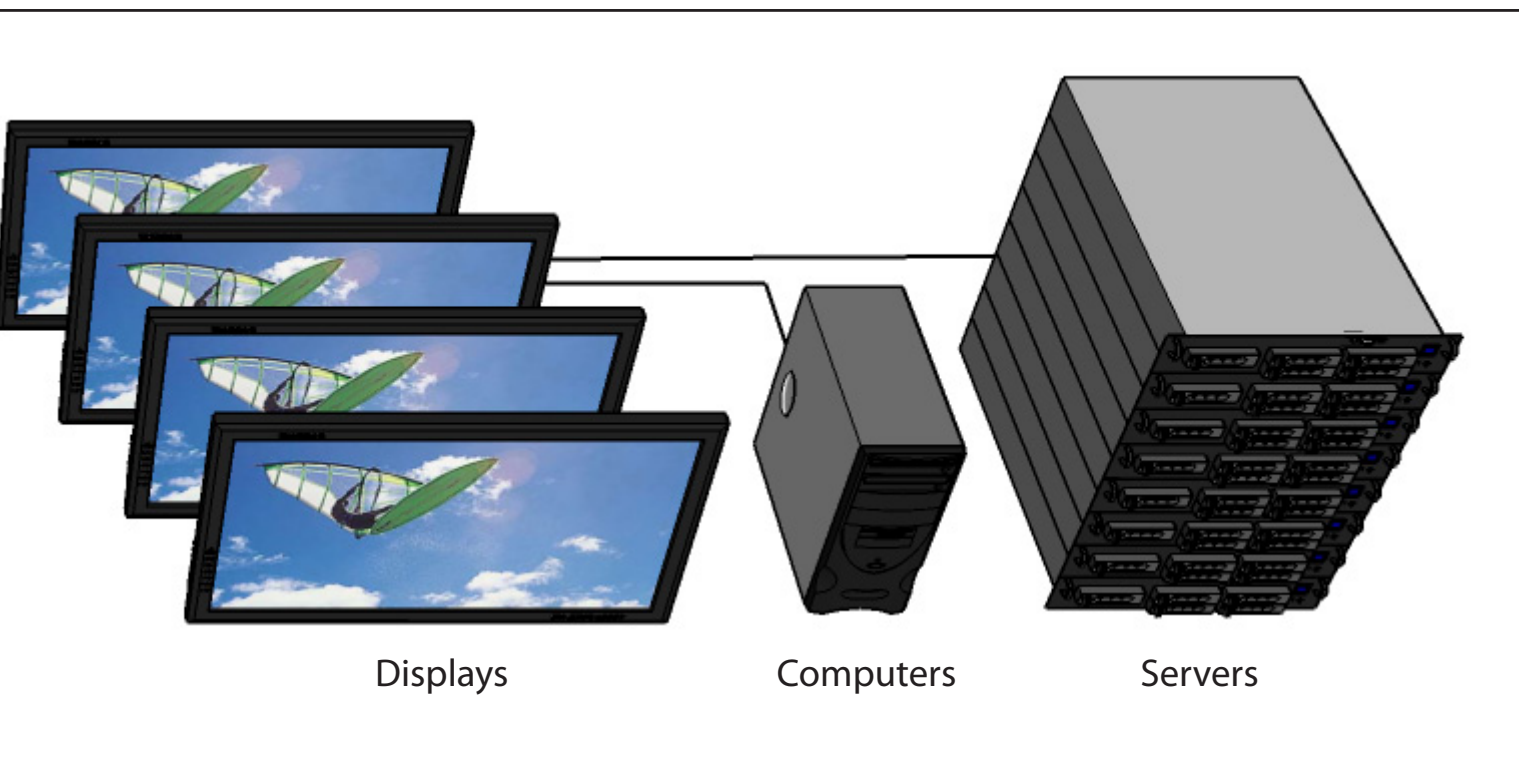Routers, Switches,
Matrixes

Signage
Players
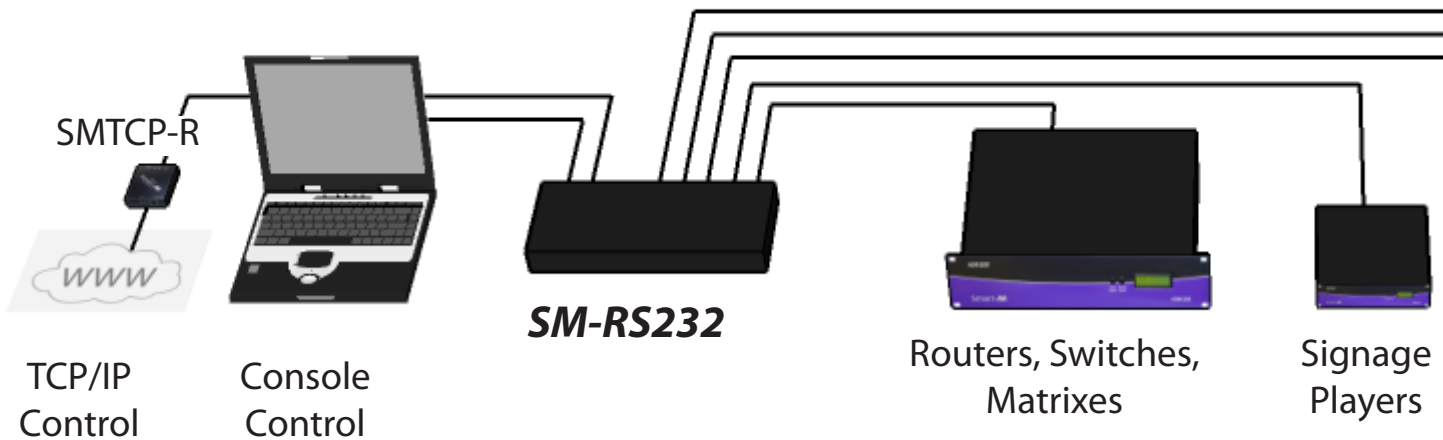
Installation

1. Turn off all devices.
2. Connect an RS-232 cable from the console computer to the SM-RS232.
3. Connect up to 16 RS232 compliant devices to the SM-RS232 using CAT5/5e/6 cabling with RJ45 to DB9 adapters (not included).
4. Connect the power cord to power-on the SM-RS232.
5. Power on the devices.

Control

1. First you will need to set up the terminal application.

   - Open Hyperterminal on the PC. (or use the terminal client of your choice)
   - Use the default settings to create a connection to the device. Settings MUST match those shown on the right.
   - Be sure that Flow Control is **None**.
   - The output of the device will be the same as the PC.

COM Properties

Port Settings

Bits per second: 9600

Data bits: 8

Parity: None

Stop bits: 1

Flow control: None

Restore Defaults

OK   Cancel   Apply

Displays   Computers   Servers

2. To select a port for control, use ****P[01-16]<space>**

3. Once a port is selected, the connection will be transparent for sending commands to the device.

For example, if you want to manage a device on port 6, send ****P06<space>.**
At this point any commands you send will transparently go to the device on port 6.

If you are using a DVSW8 for example, you would select its port and then use the standard control commands for it.

To select a port on the DVSW8 for display, use the standard "//M" command prompt.
To select the "IN 1" port, send "//M1 [ENTER]"
To select the "IN 2" port, send "//M2 [ENTER]" etc.

At any time you can switch ports on the SM-RS232 using the ****P[01-16]<space>** command.

Using the SM-RS232 with the SMTCP-R Module

The SMTCP-R (optional) is an RS-232 control module that allows the SM-RS232 to control most SmartAVI switching matrixes to be controlled remotely via HTTP or TELNET. Manage the switching functions of your matrixes or other devices with ease from anywhere in the world. TELNET access provides transparent command control of your matrix, perfect for use with automated third-party control software.

Features

- Supports HTTP and TELNET control
- 10/100 Ethernet Interface
- Up to 10 user-definable configurations
- Password Protected
- Up to 5 Users can Control the Matrixes
- IP Configuration via TCP/IP and RS-232
- Flexible control of several types of matrixes

Applications

- Server Collocation
- Digital Signage
- Airports
- Dealer Rooms
- Control Rooms
- Audio/Visual Presentations
- Hotels/Resorts
- KVM Switches

Technical Specifications

Power	External 100-240 VAC/5VDC2A @10W
Dimensions	2.8125"W x 1"H x 3.375"D
Weight	0.5 lbs
Approvals	UL, CE, ROHS Compliant
Operating Temp.	32-131°F (0-55 °C)
Storage Temp.	-4-185 °F (-20-85 °C)
Humidity	Up to 95%

Controlling the SM-RS232 with the SMTCP-R module (continued)

Connecting to the SMTCP-R for the first time (with DHCP)

The first time you connect the SMTCP-R, you will need to perform the following steps to set the initial configuration. This includes establishing an HTTP connection and manually setting the IP address for the SMTCP-R.

1. Power off all devices.
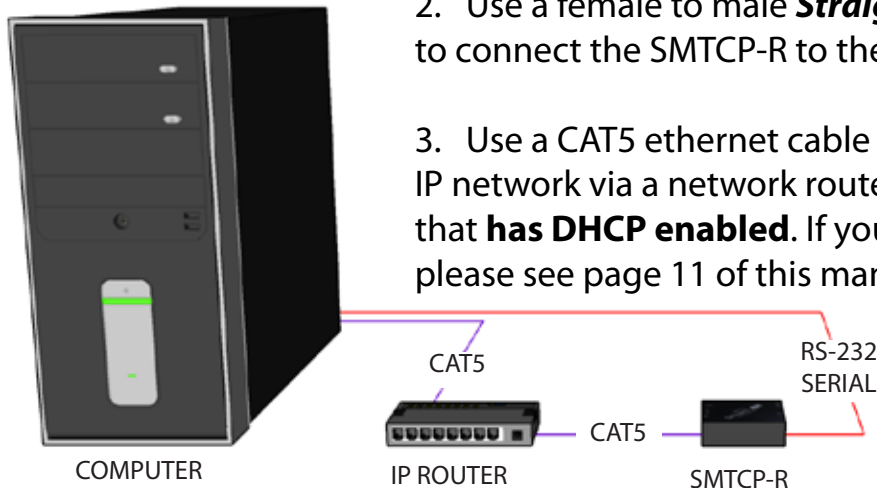
2. Use a female to male **Straight-Through** RS-232 (Serial) cable to connect the SMTCP-R to the computer.

3. Use a CAT5 ethernet cable to connect the SMTCP-R to a TCP/IP network via a network router or other network connection that **has DHCP enabled**. If your network does not support DHCP, please see page 11 of this manual for instructions.

COMPUTER   IP ROUTER   CAT5   SMTCP-R

CAT5   RS-232 SERIAL

4. Power on the computer and run a terminal program such as Hyperterminal to open a serial connection to the SMTCP-R using the standard 9600 baud, 8, N, 1 configuration.
5. Power on the SMTCP-R. When powered on, it will obtain an IP address automatically via DHCP from the network.
6. The IP information for the SMTCP-R will be displayed on the terminal screen as follows:

```
*************************
* SmartAVI control is UP *
*   version 10.12.20#6   *
*************************

addr:192.168.1.102
Mask:255.255.255.0
gtwy:192.168.1.1

*************************
```

NOTE: the above IP address is for demonstration purposes only. Actual results may be different.

7. The IP address shown must be used to connect to the SMTCP-R via HTTP.

Controlling the SM-RS232 with the SMTCP-R module (continued)

8. Open a web browser and navigate to the IP address that is indicated. You will be prompted to enter a username and password.
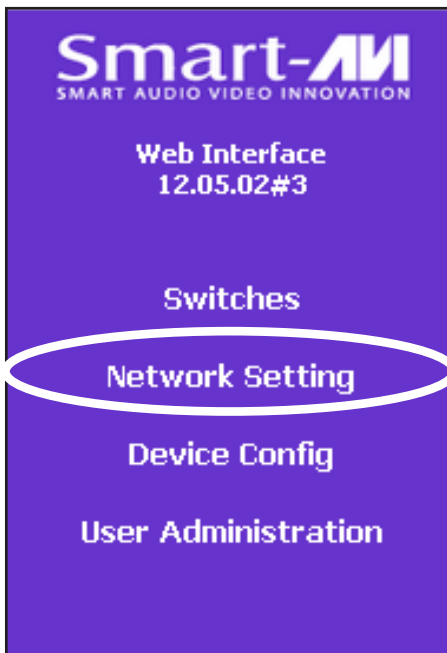
User ID:	Admin
Password:	••••

Click here to continue

9. The default login (case sensitive) is as follows:

User ID: *Admin*
Password: *Pass*

10. Once connected to the SMTCP-R, you will see the following menu of options:

Smart-AVI
SMART AUDIO VIDEO INNOVATION
Web Interface
12.05.02#3

Switches

Network Setting

Device Config

User Administration

1. *Switches*
2. *Network Setting*
3. *Device Config*

For the initial setup, click the **Network Setting** button and manually assign an IP address to the SMTCP-R. This will assure that the SMTCP-R will always have the same IP address. Be sure to choose an address that will not conflict with any other devices on the network, and that the address is not in the range of the DHCP server.

Network Configuration:
Use DHCP: ☑
IP Address:
IP Mask:
Gateway:

Submit
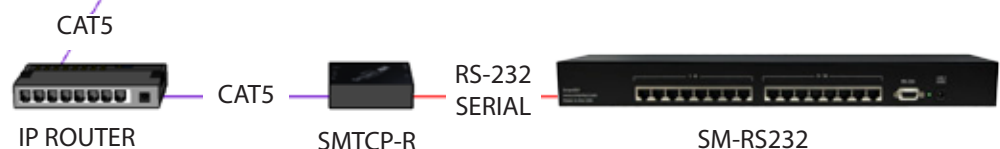
11. Once you have manually assigned an IP address to the SMTCP-R, you may disconnect the **Straight-Through** RS-232 (Serial) cable from the computer

12. Connect the SMTCP-R to the SM-RS232 with a **Cross** RS-232 (Serial) cable.

CAT5

CAT5

RS-232
SERIAL

COMPUTER   IP ROUTER   SMTCP-R   SM-RS232

Controlling the SM-RS232 with the SMTCP-R module (continued)

Using the SMTCP-R Web Interface

Once you have completed the Initial Setup for the SMTCP-R, you can now begin configuring it for your devices.

Switches Menu

The switches menu allows you to select the output for each port on the SM-RS232.

For example, to activate input 5 on a switch that is on port 1 of the SM-RS232, simply select port 5 on switch 1.

Example shown in diagram:
Switch 1 is set for input 5.
Switch 2 is set for input 5.
Switch 3 is set for input 2.

Device Config Menu

The device configuration menu allows you to select the type of matrix you are using, specify the dimensions of the matrix and reset the system to factory defaults.

To begin, set the type of device you are using from the drop-down menu labeled Device Type and specify the Matrix Dimensions. After specifying the Matrix Dimensions, press the Submit button to make the changes.

User Administration Menu

The User Administration menu allows you to change the user name and password for the SMTCP-R. The default user name for the SMTCP-R is Admin and the password is Pass. Once you modify the login information, press the Submit button to make the changes.

Controlling the SM-RS232 with the SMTCP-R module (continued)

Connecting to the SMTCP-R for the first time WITHOUT DHCP

The first time you connect the SMTCP-R, you will need to perform the following steps to set the initial configuration. This includes establishing an HTTP connection and manually setting the IP address for the SMTCP-R.

1. Power off all devices.

2. Use a female to male **Straight-Through** RS-232 (Serial) cable to connect the SMTCP-R to the computer.

3. Use a CAT5 ethernet cable to connect the SMTCP-R to a TCP/IP network via a network router or other network connection.

COMPUTER   IP ROUTER   SMTCP-R

4. Power on the computer and run a terminal program such as Hyperterminal to open a serial connection to the SMTCP-R using the standard 9600 baud, 8, N, 1, None Flow Control configuration.
5. Power on the SMTCP-R, and wait for a command prompt to appear.
6. Press **? <enter>** to show the network configuration help screen as follows:

```
Command:


     ÉÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ»
     ° Network Configuration help °
     ÈÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ¼
Enter a command followed by optional parameters


Commands are SET DHCP INFO RESET and QUIT/SAVE

SET command allows you to change the network configuration:
SI xxx.xxx.xxx.xxx = Set IP Address
        (if IP address is not entered then DHCP is ENABLED)
SM xxx.xxx.xxx.xxx = Set IP Mask
SG xxx.xxx.xxx.xxx = Set Gateway Address
RN                 = Reset Network Params:
                       IPADDR  = 192.168.0.2
                       IPMASK  = 255.255.255.0
                       GATEWAY = 192.168.0.1
DHCP ON            = Enable DHCP
DHCP OFF           = Disable DHCP
INFO               = Display network configuration
RESET              = Factory reset

QUIT               = Saves configuration and quits
SAVE               = Same as QUITNOTE: the above IP address is for demonstration purposes only.
Actual results may be different.
```


7. Follow the menu options to manually assign an IP address to the SMTCP-R, then refer to page 8 for instructions to connect via HTTP.

Controlling the SM-RS232 with the SMTCP-R module (continued)

Connecting the SMTCP-R via TELNET

Commands may be sent transparently to the SM-RS232 via a TELNET connection to the SMTCP-R. To use this function, use a telnet client such as Hyperterminal or PuTTY to connect to the IP address of the SMTCP-R.

You will be prompted for a username and password - this will be the same as the login information via HTTP. Once logged in, the SMTCP-R is ready to accept the standard RS-232 commands. For a list of the available commands, please see the user manual for the matrix you are using.

Although the commands are not echoed to the client display, the commands are being issued to the matrix. Should you need commands to be echoed, please see the instructions for your TELNET client.

Upgrading the SMTCP-R

To updgrade the SMTCP-R with the latest firmware, contact your sales representative to obtain the firmware upgrade file or visit the SMTCP-R product page at www.smartavi.com. The version information is listed on the Main Menu.

Once you have the file, use an FTP client, preferably TFTP, to navigate to the IP address of the SMTCP-R. To upload the file to the SMTCP-R, navigate to the /var/ directory, and upload the file *firmware.img* - **IMPORTANT: the file MUST BE NAMED** *firmware.img* for the upgrade to work properly. Again, the full path **MUST BE** /var/firmware.img.

Once the file has been copied, restart (power off and power on) the SMTCP-R. Once restarted the firmware update will be installed. To verify the upgrade, see the version information listed on the Main Menu.

RS-232 Specifications

How to properly create an RS-232 connection between a PC and most SmartAVI RS-232 compliant devices
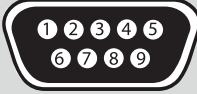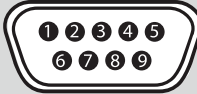
Establish a connection to your RS-232 compliant device:

1. Connect a straight through male to female RS-232 cable (shown on right) to the RS-232 connector on the PC.
2. Connect the other end of the cable to the RS-232 compliant device.
3. Power on the device.

Male to Female Straight Cable (not provided)

RS-232 SPECIFICATIONS

CONNECTOR	PIN	NAME	DESCRIPTION
DB9 MALE – RECEIVE	2	RxD	Receive Data on DB9 Male
	3	TxD	Transmit Data on DB9 Male
	5	SGND	Ground
DB9 FEMALE – TRANSMIT	2	TxD	Transmit Data on DB9 Female
	3	RxD	Receive Data on DB9 Female
	5	SGND	Ground

Setting up the Terminal application:

1. Open Hyperterminal on the PC. (or use the terminal client of your choice)
2. Use the default settings to create a connection to the device (see settings on left). Settings MUST match those shown on the lower right.
3. Be sure that Flow Control is *None*.
4. The output of the device will be the same as the PC.

Hyperterminal Settings

RS-232 Specifications (continued)

How to properly test an RS-232 connection between a PC and most SmartAVI RS-232 compliant devices

After you have established a connection to your device use the following commands:

1) To set a video crosspoint:
//Fxx**M**yy**I**zz**<CHK><CR>**
      e.g. to set video input 3 to output 12 on a router with frame address "0"
send the command: `//F00M12I03<0x42><CR>`

2) To set RS-232 crosspoint:
//Fxx**R**yy**I**zz**<CHK><CR>**

3) To disconnect RS-232 crosspoint:
//Fxx**D**yy**I**zz**<CHK><CR>**

4) To set new frame address:
//Fxx**F**nn**<CHK><CR>**

IMPORTANT

CALCULATING THE <CHK>

<CHK> stands for CHECKSUM: the <CHK> value is calculated by performing an XOR of the full command string. For example: //F00M12I03 will XOR to the hexadecimal value 0x42, therefore the value of <CHK> is 0x42.

RS-232 Specifications (continued)

How to properly test an RS-232 connection between a PC and most SmartAVI RS-232 compliant devices

RS-232 Commands continued:

5) To query crosspoints from PC:
//Fxx**U**<**CHK**><**CR**>

- If all outputs are connected to input 1 then a 4x4 Matrix will respond with **<0x80><0x80><0x80><0x80><CR>**
- The router will send back one byte for each output and the string ends with a <CR>. The first byte sent is Output #1. In the example above, since there are 5 bytes total, we know that there are 4 outputs.
- To calculate the input number, the router sends the input number with the 7th bit set.
  - o 0x80 = "1000 0000" → input 0
  - o 0x81 = "1000 0001" → input 1
  - o …
  - o 0x8F "1000 1111" → input 15

Comms Port Settings:

Baud Rate	9600
Start Bits	1
Data Bits	8
Parity	None
Stop Bits	1

Notes:

- When successful, commands #1-4 will acknowledge by sending the checksum with nibbles swapped & <CR><LF>
  - o e.g. checksum of 0x24 acknowledges with <0x42><CR><LF>

Limited Warranty Statement

A. Extent of limited warranty

1. SmartAVI Technologies, Inc. warrants to the end-user customers that the SmartAVI product specified above will be free from defects in materials and workmanship for the duration of 1 year, which duration begins on the date of purchase by the customer. Customer is responsible for maintaining proof of date of purchase.

2. SmartAVI limited warranty covers only those defects which arise as a result of normal use of the product, and do not apply to any:

    a. Improper or inadequate maintenance or modifications

    b. Operations outside product specifications

    c. Mechanical abuse and exposure to severe conditions

3. If SmartAVI receives, during applicable warranty period, a notice of defect, SmartAVI will at its discretion replace or repair defective product . If SmartAVI is unable to replace or repair defective product covered by the SmartAVI warranty within reasonable period of time, SmartAVI shall refund the cost of the product.

4. SmartAVI shall have no obligation to repair, replace or refund unit until customer returns defective product to SmartAVI.

5. Any replacement product could be new or like new, provided that it has functionality at least equal to that of the product being replaced.

6. SmartAVI limited warranty is valid in any country where the covered product is distributed by SmartAVI.

B. Limitations of warranty
TO THE EXTENT ALLOWED BY LOCAL LAW , NEITHER SMARTAVI NOR ITS THIRD PARTY SUPPLIERS MAKE ANY OTHER WARRANTY OR CONDITION OF ANY KIND WHETHER EXPRESSED OR IMPLIED , WITH RESPECT TO THE SMARTAVI PRODUCT , AND SPECIFICALLY DISCLAIM IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY, SATISFACTORY QUALITY , AND FITNESS FOR A PARTICULAR PURPOSE

C. Limitations of liability
To the extent allowed by local law the remedies provided in this warranty statement are the customers sole and exclusive remedies

TO THE EXTENT ALLOWED BY LOCAL LAW , EXCEPT FOR THE OBLIGATIONS SPECIFICALLY SET FORTH IN THIS WARRANTY STATEMENT , IN NO EVENT WILL SMARTAVI OR ITS THIRD PARTY SUPPLIERS BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES WHETHER BASED ON CONTRACT , TORT OR ANY OTHER LEGAL THEORY AND WHETHER ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

D. Local law
To the extent that this warranty statement is inconsistent with local law, this warranty statement shall be considered modified to be consistent with such law.

NOTICE

The information contained in this document is subject to change without notice. SmartAVI 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.

SmartAVI 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 SmartAVI.

For more information, visit www.smartavi.com.

SmartAVI, Inc. / Twitter: smartavi
11651 Vanowen St. North Hollywood, CA 91605
Tel: (818) 503-6200 Fax: (818) 503-6208
http://www.SmartAVI.com