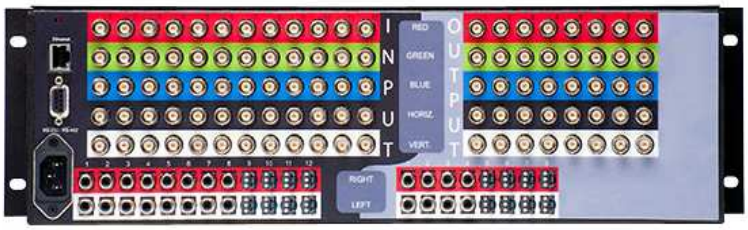
RSIII

Routing Switcher

Operation and Technical Manual



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Warnings, Cautions and Others

Mises en garde, precautions et indications diverses

WARNING TO REDUCE THE RISK OF FIRE OR ELECTRICAL SHOCK:

- DO CONNECT CHASSIS TO PROTECTIVE (SAFETY) EARTH WITH SUPPLIED POWER CABLE,
- DO NOT OPEN,
- DO NOT REMOVE THE COVER (OR BACK),
- DO NOT EXPOSE TO AN EXPLOSIVE ATMOSPHERE,
- DO NOT EXPOSE TO RAIN OR MOISTURE,
- DO NOT BLOCK THE POWER PLUG LOCATION,
- DO NOT ATEMPT TO SERVICE, NO USER SERVICE PARTS INSIDE,
- DO NOT ATEMPT TO PERFORM UNAUTHORIZED MODIFICATIONS,
- DISCONNECT THE MAINS PLUG TO SHUT THE POWER OFF COMPLETELY.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point, within an equilateral triangle, is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

For U.S.A.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
Reorient or relocate the receiving antenna
Increase the separation between the equipment and receiver
Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
Consult the dealer or an experienced radio/TV technician for help

For Canada/pour le Canada

CAUTION: TO PREVENT ELECTRIC SHOCK, MATCH WIDE BLADE OF PLUG TO WIDE SLOT, FULLY INSERT. ATTENTION: POUR EVITER LES CHOCS ELECTRIQUES, INTRODUIRE LA LAME LA PLUS LARGE DE LA FICHE DANS LA BORNE CORRESPONDANTE DE LA PRISE ET POUSSER JUSQUAU FOND.

This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la Classe A est conforme à la norme NMB-003 du **Canada.**

• Do not block the ventilation openings or holes.
(If the ventilation openings or holes are blocked by a newspaper or cloth, etc., the heat may not be able to get out.)
• Do not place any naked flame sources, such as lighted candles, on the apparatus.
• When discarding batteries, environmental problems must be considered and local rules or laws governing the disposal of these batteries must be followed strictly.
• Do not use this apparatus in a bathroom or places with water. Also do not place any containers filled with water or liquids (such as cosmetics or medicines, flower vases, potted plants, cups, etc.) on top of this apparatus.

ATTENTION:
• Ne bloquez pas es orifices ou es trous de ventilation. (Si es orifices ou es trous de ventilation sont bloqués par un journal un tissu, etc., la chaleur peut ne pas être évacuée correctement de l'appareil)
• Ne placez aucune source de flamme nue, telle qu'une bougie, sur l'appareil.

• Lors de la mise au rebut des piles, veuillez prendre en considération es problèmes de l'environnement et suivre strictement les règles et les lois locales sur la mise au rebut des piles.
• N'utilisez pas cet appareil dans une salle de bain ou un autre endroit avec de l'eau.
• Ne placez aucune récipient contenant de l'ear (tel que des cosmétiques ou des médicaments, un vase de fleurs, un pot de fleurs, une tasse, uec.) sur cet appareil.

ATTENTION
Afin d'éviter tout risque d'électrocution, d'incendie, etc.:
1. Ne pas enlever es vis ni es panneaux et ne pas ouvrir le coff ret de l'appareil.
2. Ne pas exposer l'appareil a la pluie ni a l'humidité.

Caution — STANDBY/ON switch!
Disconnect the mains plug to shut the power off completely. The STANDBY/ON switch in any position does not disconnect the mains line. The power cannot be remote controlled.
Attention — Commutateur STANDBY/ON!
Déconnecter la fiche de secteur pour couper complètement le courant. Le commutateur STANDBY/ON ne coupe jamais complètement la ligne de secteur, quelle que soit sa position. Le courant ne peut être télécommandé.

RoHS – Restriction of Hazardous Substances

The RoHS Directive, enacted by the European Union (EU), restricts the use of six hazardous substances (lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls or polybrominated diphenyl ethers) within electrical and electronic equipment. The goal, consistent with other international regulations, is to contribute to human health and the environment by restricting the use of these hazardous substances in new equipment. Manufacturers of electronics products outside Europe must abide by this legislation if the equipment they produce is ultimately imported in a EU member state. This equipment complies with the RoHS directive 2002/95/EC.

Initial Inspection

Before shipment, this unit was inspected and found to be free of mechanical and electrical defects. As soon as the unit is received, inspect for any damage that may have occurred in transit. Save all packing materials in case that the unit has to be returned. If damage is found, please file a claim with the carrier immediately. Do not return the unit to Knox Video Technologies without prior approval.

Limited Warranty

Unless otherwise stated in the product specific documentation received with this product, Knox Video Technologies provides a five-year limited warranty for this product. The above warranty period shall begin on the date of shipment by Knox to purchaser or, if purchaser is an authorized reseller of such Knox products, from the date of shipment by the reseller to the reseller's original customer. The warranty set forth above shall not apply to failure or deficiency, which has been caused by misuse, abnormal or unusually heavy use, neglect, alteration, improper installation, unauthorized repair or modification, improper testing, accidental or causes external to the product such as but not limited to excessive heat or humidity, power failure, or improper installation.

This warranty gives you specific legal rights, and you may have other rights, which vary from state to state.

IF SERVICE IS REQUIRED:

If the product does not perform as warranted, call Knox Video Technologies at *301-840-5805* for available service options. If it is necessary to return an item to Knox Video Technologies obtain a Return Authorization, RA, number prior to returning the product. When returning the product, the defective product should be securely packaged in original boxes and insured for shipment. Place the RA number on the outside and inside of the package. Include a description of the problem with the product. Owner agrees to insure and accept all liability for loss of or damage to this product.

YOU MUST CALL TECHNICAL SUPPORT AT 301-840-5805 FOR A RETURN AUTHORIZATION NUMBER (RMA) AND "SHIP-TO" ADDRESS BEFORE SHIPPING ANY PRODUCT TO KNOX VIDEO TECHNOLOGIES.

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SECTION 1. GENERAL INFORMATION

1.1 INTRODUCTION

The KNOX RSIII AUDIO/VIDEO ROUTING SWITCHER is a family of devices, which accepts up to sixteen video sources and sixteen stereo audio sources. The RSIII connects any one of the sixteen inputs, to one or more of the sixteen outputs, depending on model. The video signals may be switched independently or with the audio signals.

The RSIII family of switches consists of five basic models; Composite, Y/C, RGB/YPbPr and RGBHV any of which can contain balanced, unbalanced or no audio. Optional features include volume and tone control for the audio as well as capability to output the audio and video signals over CAT 5/6 cable.

1.2 TECHNICAL DESCRIPTION

The RSIII uses a single chip microprocessor with flash memory to control a set of monolithic digital latching crosspoint decoders. Cross-point information is collected by the microprocessor from the front panel controller, the RS232/RS422 and Ethernet inputs on the rear panel. Audio and video may be routed together or separately. The audio volume, tone, and balance may be adjusted if the VT option is installed.

1.3 DETAIL SPECIFICATIONS

Video Channels:

RGBHV, RGB/RGB: - up to QXGA (2048x1536), HD up to 1080p, SD NTSC, PAL, SECAM

Levels:	1V p-p
Frequency Response:	DC to 300MHz @ 1v <3dB down at 200MHz
Input Impedance:	75 Ohms
Output Impedance:	75 Ohms
Crosstalk:	less than -70dB@5MHz
Connectors:	
	75 Ohm female BNC
	Optional RJ-45 female (CAT 5/6/nano-skew cable)
Maximum DC Input:	+/-0.5V

Composite and Y/C: - NTSC, PAL or SECAM standards

Levels:	1V p-p
Frequency Response:	DC to 30MHz @ 1v <3dB down at 30MHz
Input Impedance:	75 Ohms
Output Impedance:	75 Ohms
Crosstalk:	less than -70dB@5MHz
Connectors:	
	75 Ohm female BNC
	4 pin DIN for Y/C
Maximum DC input:	+/-0.5V

Audio Channels

Without Volume Tone option:

Unbalanced Audio

Frequency Response:

Maximum:	10Hz-30kHz
+/- 0.1db	22Hz-22kHz

THD @1kHz:

0 dbu:	0.0083%
+20 dbu:	0.0063%
Noise 22Hz-22kHz:	-80 dbu
Crosstalk CH-CH, +20dbu:	
2kHz	-102 db
20kHz	-82 db
Max Input Level:	+24 dbu
Max Output Level:	+24 dbu
Gain:	0db (unity)
Input Impedance:	15K Ohms, DC coupled
Output Impedance:	500 Ohms, DC coupled
Connectors:	RCA

Balanced Audio

Frequency Response:	
Maximum:	10Hz-30kHz
+/- 0.1db	22Hz-22kHz

THD @1kHz:

0 dbu:	0.018%
+20 dbu:	0.008%
Noise 22Hz-22kHz:	-70 dbu
Crosstalk CH-CH, +20dbu:	
2kHz	-100 db
20kHz	-81 db
CMMR 22Hz-22kHz:	75.5 db
Max Input Level:	+24 dbu
Max Output Level:	+24 dbu
Gain:	0db (unity)
Input Impedance:	600 Ohms
Output Impedance:	600 Ohms
Connectors:	WECO 931-HSL/930-HFL

With Volume Tone option:

Unbalanced Audio

Frequency Response:	
Maximum:	10Hz-30kHz
+/- 0.1db	22Hz-22kHz

THD @1kHz:

0 dbu:	0.014%
+20 dbu:	0.022%
Noise 22Hz-22kHz:	-81.1 dbu
Crosstalk CH-CH, +20dbu:	
2kHz	-96 db
20kHz	-76 db
Max Input Level:	+24 dbu
Max Output Level:	+24 dbu
Gain:	0db (unity)
Input Impedance:	15K Ohms, DC coupled
Output Impedance:	500 Ohms, DC coupled
Connectors:	RCA

Balanced Audio

Frequency Response:	
Maximum:	10Hz-30kHz
+/- 0.1db	22Hz-22kHz
THD @1kHz:	
0 dbu:	0.019%
+20 dbu:	0.012%
Noise 22Hz-22kHz:	-70 dbu
Crosstalk CH-CH, +20dbu:	
2kHz	-100 db
20kHz	-81 db
CMMR 22Hz-22kHz:	75.5 db
Max Input Level:	+24 dbu
Max Output Level:	+24 dbu
Gain:	0db (unity)
Input Impedance:	600 Ohms
Output Impedance:	600 Ohms
Connectors:	WECO 931-HSL/930-HFL

CAT:	
Cable:	5/5e/6/nano-skew
Maximum Distance:	
CAT 5/5e/6:	450 feet
Nano-skew:	1000 feet
Connector:	RJ45

Control:	
Front Panel:	Push buttons
RS232/RS422:	DB9 female, Knox protocol 1.1.0
Ethernet:	RJ45, 10/100 Auto-sense (Default IP 192.168.168.48 port 3001)

General:	
Temperature:	
Operating:	32F to 113F (0C to 45C)
Storage:	-4F to +140F (-20C to +60C)
Humidity:	10% to 90% non-condensing
MTBF:	20,000 hours
Shipping Weight:	10 pounds
Compliance:	FCC Class A, CE Emissions, Health and Safety and RoHS
Power:	1.0A, 50 watts, 171 BTU/hr. maximum
Input Voltage:	100-240VAC, 50-60 Hz
RGBHV, RGB	
Dimensions:	19” wide by 5.25” high by 10” deep, 3RU
Composite Y/C	
Power:	0.5A, 40 watts, 137 BTU/hr. maximum
Dimensions:	19” wide by 3.5” high by 10” deep, 2RU

SECTION 2. INSTALLATION

2.1 INTRODUCTION

This section provides the information required for installation of the RSIII into its operating environment.

CAUTION!
The RSIII is designed to work in standard video and audio systems. Operation in other environments may harm the RSIII or associated equipment.

2.2 UNPACKING AND INSPECTION

Unpack the RSIII carefully and verify that the serial number matches the number quoted on the packing list. Before installing it into a system, check the outside of the unit carefully for signs of damage and check that none of the fasteners has come loose.

2.3 INSTALLATION

The RSIII will be connecting a number of input devices to a number of output devices. Choose a space, which is convenient for all the cables to converge. Mount the RSIII in a standard 19" rack panel; it requires two or three standard rack units (2U or 3U) for clearance.

CAUTION!
THE MAINS OUTLET THAT IS UTILIZED TO POWER THE EQUIPMENT MUST BE WITHIN 3 METERS OF THE DEVICE AND SHALL BE EASILY ACCESSIBLE. THERE SHALL BE NO SWITCHES OR DISCONNECT DEVICES IN THE EARTH CONDUCTOR.

Connect the AC power cord to a properly grounded AC power mains outlet of the correct voltage and frequency. There is no power switch on the RSIII; it is intended to be on at all times.

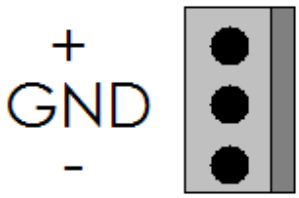
2.4 VIDEO CONNECTIONS

Connect up to sixteen, depending on model, video inputs (cameras, VCRs, DVD players, satellite receivers, RF demodulators, etc) to the video input connectors. It is not necessary to terminate unused inputs. Connect up to sixteen, depending on model, output devices (TV monitors, PVR’s,

LCD projectors, RF modulators, etc) to the video output connectors. Be sure that all destination devices are terminated in 75 ohms. It is not necessary to terminate unused outputs. Do not connect an input of video to any of the video output connectors.

2.5 AUDIO CONNECTIONS

Connect up to sixteen balanced or unbalanced audio sources (CD players, tape players, PVR's, microphones, RF demodulators, etc) to the left and right channel input connectors. For balanced audio units, the common is at the center the + is on top and – is on the bottom as shown on the figure.

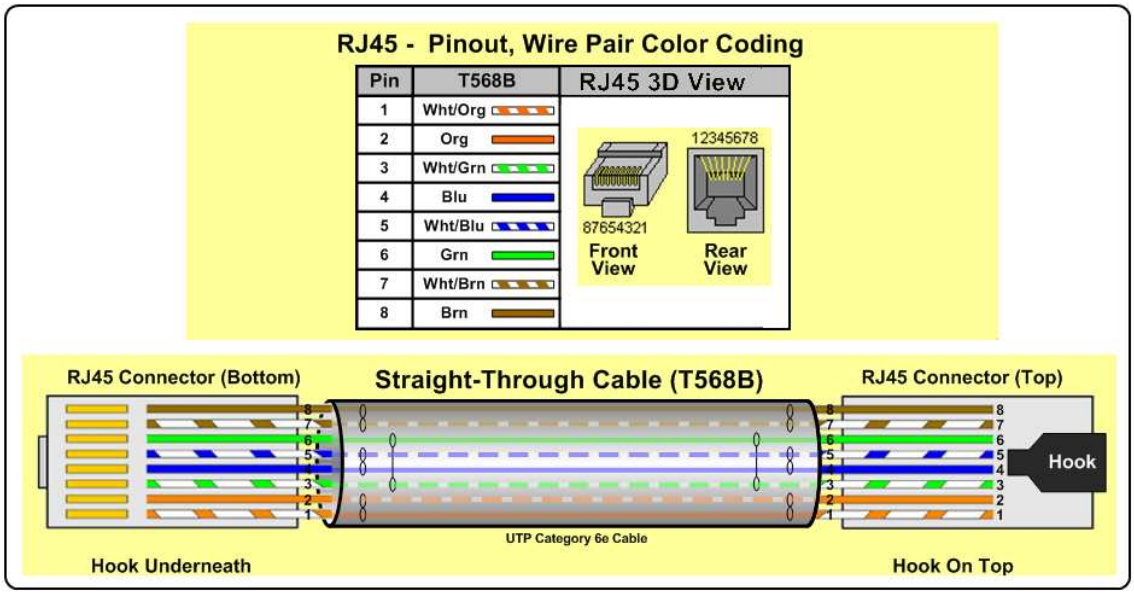


Inputs are high impedance (15K). Note: an unbalanced source may be connected to a balanced input by connecting the signal lead of the audio source to the + input and connecting the shield to both the center and – inputs. Connect up to sixteen, depending on model, audio output devices (amplifiers, PVR's, tape/CD recorders, RF modulators, etc) to the left and right channel output connectors. Do not connect a source of audio to any of the audio output connectors.

2.6 CAT CONNECTIONS

If the optional D-CAT is installed there are two output channels that can extend the audio and video signals over ordinary Category 5 cable. The RSIII contains the transmitter portion of the Knox Video System's CAT 5 Video Distribution System. The receiver (two required) portion must be purchased separately.

CAUTION:
CAT5/5e/6/nano-skew cabling must be pinned to the TIA-EIA T568B wiring specification. This equipment is not intended for, nor does it support, connection through an Ethernet network. Do not connect these outputs to any sort of networking or telecommunications equipment.



2.7 EXTERNAL COMMUNICATIONS

Any number of external devices can control the RSIII as long as it supports the Knox Communications Protocol. The simplest is a standard terminal program running on a computer. Knox Video Technologies provides a Graphical User Interface, GUI, called KnoxConnect that can be downloaded from the Knox Video Technologies website. KnoxConnect will run under Microsoft XP and Vista, Apple Mac and Ubuntu operating systems. The communications can be via any of the following interfaces: RS-232, RS-422 and Ethernet. All three methods can be active at the same time.

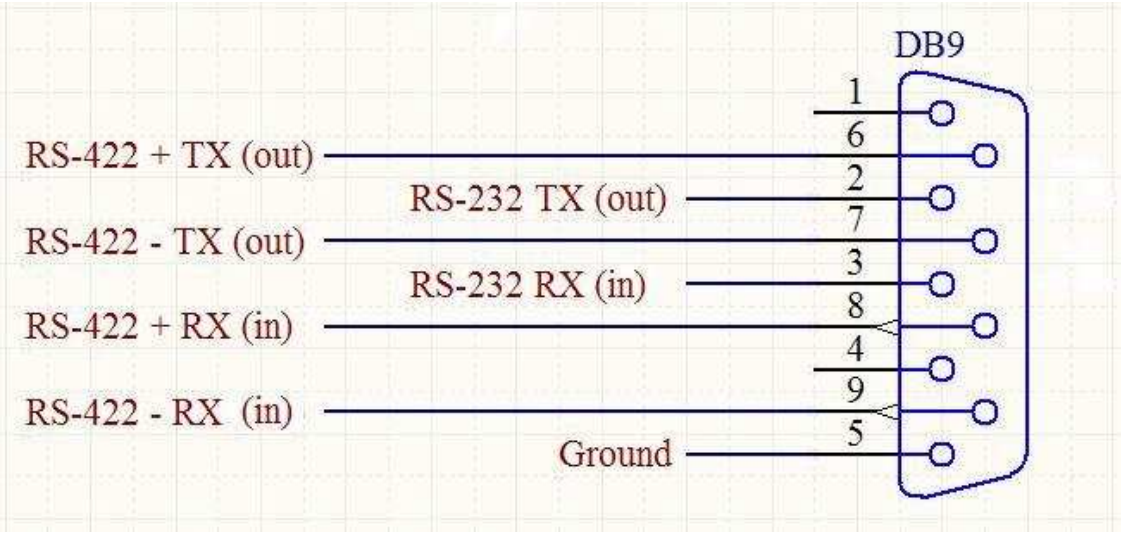
In a Windows environment, Hyperterminal™ may be set up to control the RSIII via RS-232, RS-422, or Ethernet. Start by brining up Hyperterminal™ then choose File, Properties, and choose the direct connection from a COM port or TCP/IP. Under Configure, for a COM port set the baud rate to 9600, 8 bits, no parity, 1 stop bit, and no flow control; for a TCP/IP connection enter the IP address of the RSIII and enter port 3001. Click OK and you should be connected. If the connect fails, consult your network administrator.

2.7.1 RS-232 CONNECTION

External RS-232 devices can control the RSIII. Connect a computer terminal or other RS-232 control device to the female DB9 connector on the left side of the rear panel. The RSIII is wired as a data terminal; that is, data out of the RSIII is on pin 2, data in is on pin 3, and pin 5 is common (ground). When connecting to the rear panel DB9. A direct pin-for-pin connection from a PC compatible COM port should be set up as follows: select 9600 baud, 8 bits, no parity, and one or two stop bits. Set the Flow Control to NONE. Once connected and operational the user can send an H command to the RSIII to get instructions on how to use specific commands. See the command summary later in the manual.

2.7.2 RS-422 CONNECTION

An external RS-422 device connected to the rear panel DB9 connector can also control the RSIII. Connect transmit data (from the RSIII) to pins 6 (+) and 7 (-), and receive data (to the RSIII) to pins 8 (+) and 9 (-). Common is pin 5.



2.7.3 ETHERNET CONNECTION

The RSIII can be controlled on a TCP/IP network from anywhere in the world by connecting a network cable to the Ethernet port on the rear of the RSIII. The RSIII must be assigned a unique IP address, and the device controlling the RSIII must use that IP address and the correct port to connect to the RSIII. The default network configuration, as shipped from the factory, is:

IP address:	192.168.168.48
Subnet mask	/24
Gateway	0.0.0.0
Port	3001.

CAUTION:

When accessing the RSIII through the network connection security must be considered. If the RSIII is connected to a network that has access to the Internet be sure to contact the network administrator to be sure an adequate firewall is in place.

To configure the IP network address and port to something different than the default, contact your network administrator and ask them for the network information. Connect the RSIII to a computer via a RS-232 cable. Note: the IP address cannot be changed from the Ethernet port. Once the Computer and RSIII have been powered up open a terminal server program and send the `IP` command to the RSIII. The RSIII will respond with the message:

```
Cycle Power To Enter Network Settings Menu
```

At this point unplug the power to the RSIII wait 10 seconds and then plug the RSIII back in. After the RSIII initializes itself the terminal program will display the message:

```
**************************************************
**                Network Configuration         **
**************************************************
IP Address:
```

And will be waiting for input. Available settings are the RSIII's IP, Gateway, Netmask, and Port Number. The IP and Gateway must be valid IP addresses or it will not be accepted. If an RSIII configured with DHCP is desired set the IP address to 0.0.0.0. The netmask can range from 0 to 31. Valid Port Numbers range from 1 to 65535, but 1 to 1024, 9999, 14000 to 14009, 30704, and 30718 are restricted from use.

Enter the information requested (`[ENTER]` represents the enter key).

```
IP Address: 192.168.48.1[ENTER]
Gateway Address: 192.168.1.1[ENTER]
Netmask: 24[ENTER]
Port: 3001[ENTER]
```

Once properly configured access to the RSIII can only be gained by use of a user login and password. The default username is `admin` and the default password is **`pswd.`** To change the username or password, send the command `/[ENTER]` to the RSIII. The RSIII will respond by asking for the current user name and password; once accepted, it will prompt for the new username and password. If the username and password were changed while connected via the Ethernet the user will be logged off and will have to login again with the new username and password.

The MAC address of the switch can be found by sending the `I` command to the switch. The unit will return various information (see paragraph 3.4.2.5), which includes the MAC and IP address.

SECTION 3. OPERATION

3.1 INTRODUCTION

This section explains the operation of the RSIII using the Front Panel push-button switches, the RS232/RS422 serial ports, or the Ethernet port.

On power up, the front panel display will indicate our company's name for a few seconds then display the current configuration. The configuration consists of the Switcher Series, which is RSIII; the Model type RGBHV, RGB, SVID, COMP or AO; the number of video inputs and outputs; the type of video connector; the type of audio UBAS, BAS, MIXED or VO; whether there is an optional Volume Tone board installed; the number of audio inputs and outputs; if there is an optional D-CAT board installed and finally if the unit has Ethernet communications ability. After a while, the display will revert to its normal status screen. At this point, the operator can use any of the three methods of controlling the unit**.**

3.2 CONNECTIONS

Connect audio and video sources and destinations as described in section 2. There is no requirement that all inputs or outputs be used or terminated, but be sure that all outputs that are used are properly terminated.
Outputs should not be looped back to unused inputs.

3.3 CONTROL VIA THE FRONT PANEL

The Front Panel displays information about the condition of the RSIII crosspoints and the settings of the optional volume and tone, VT, for each output. The display consists of a Vacuum Florescent Display with a rotary switch to select the output number and to adjust VT parameters. In addition, an array of up to 32 push-button switches allows for the selection of crosspoints and storage/recall of stored crosspoint patterns.

3.3.1 DISPLAYING THE CROSSPOINT CONNECTIONS AND VTB VALUES

In idle mode, line 1 of the display shows an output number (always output 1 at power up), the Video input number connected to that output, and the Audio input number connected to that output. Line 2 shows the current VT settings for that output number: Volume, Bass, Treble, and Balance. To stop the crawling motion push the Clear button or turn the rotary switch (the display will resume crawling after a few seconds). A typical display might look like:

```
OUT:01 VIDEO:03 AUDIO:03
V: -07 B: +2 T: -1 BAL:  0
```

To view the crosspoint and VT data for another output, turn the rotary until the desired output number shows on line 1 of the display.

3.3.2 CHANGING A CROSSPOINT CONNECTION

Changes may be made to the video crosspoint, the audio crosspoint, or both. Two indicators under the display show whether Video, Audio, or Both will be affected. Before starting a crosspoint change, push the Select button one or more times until the correct combination of lights is shown. You can make crosspoint changes with the 16 input buttons and 16 output buttons on the right. Start by pressing either an input number or with an output number, and then push the other connection you want to make. When making a crosspoint change, pushing one of the 16 input or output buttons will cause the Armed LED to light indicating a change is pending. Make the desired output or input connection, or push Clear to start over. If no crosspoint selection is made, the armed light will go off after five seconds the user will have to start all over again.

3.3.3 USING THE MUTE BUTTON

The Mute button under the display can be used to mute any output. Turn the Rotary Switch until the output you wish to mute shows on the display, then push the Mute button. You will be prompted to verify the output number so push Mute again, or push Clear. A letter M will appear next to the Volume indicator in the second line of the display in place of the polarity sign, e.g. `V: M07.`

3.3.4 ADJUSTING VOLUME AND TONE WITH THE ROTARY SWITCH

The VT parameters of any output may be changed from the front panel. Turn the rotary until the display is showing the output you wish to make changes to, then click the rotary (push the knob in, then release it) until the desired parameter is displayed on the LCD. Rotate the knob to raise and lower the volume or cut and boost the tone. Wait 10 seconds or press the Clear button to return to the status display.

3.4 CONTROL VIA THE SERIAL RS232/RS422 PORT OR ETHERNET PORT

The RS-232/RS-422 serial data ports on the rear panels allow complete control of the RSIII from a computer terminal or other software-driven control device. Through a simple alphanumeric protocol, commands to configure and control the RSIII can be accomplished. The rear panel DB9 serial connector will accept RS-232 or RS-422 serial data. A simple ASCII protocol allows all crosspoint and setup commands to be sent serially through the RSIII's RS-232/RS-422 or Ethernet ports. These ports will accept commands from a computer, or other third party control device. Set the control device to 9600 baud, 8 bits, no parity, and one or two stop bits, flow control NONE. When using the serial port mode the COM port of a PC-compatible device may be connected to the rear DB9 connector with a standard pin-for-pin serial cable. An Ethernet driven controller must be configured for IP address and port selection. See section 2.7 for setup and wiring details.

There are two general types of commands: letter commands, such as B, V, and A, generally crosspoint commands, and $ commands, generally volume and tone commands. The $ commands are commands which start with the dollar sign. Certain other commands are available but are only use for setup and control. All commands to the RSIII are not case sensitive. The RSIII will echo all ASCII characters sent to it and acknowledge completed valid commands with the word DONE. Invalid commands will result in the message ERROR and a short description of the error being returned. The designation `[ENTER]` in the commands below means Carriage Return, or hexadecimal 0D. It is not necessary to send a Line Feed (0A) with the Carriage Return.

The RSIII has a maximum of 16 input and output channels. For compatibility with other Knox Video Technologies' switches one, two or three digits can be used for the input and output channels with most commands. However, the number of digits must be consistent. The number of digits in the output portion must match the number of digits in the input. This is best shown with an example. Suppose a video connection between a TV attached to output 2 and a DVD player attached to input 11 is to be made. The correct syntax would be `V0211 [ENTER]` and not `V211 [ENTER]`. Likewise, `V002011 [ENTER]` would also have the same correct results.

3.4.1. LETTER COMMANDS – SWITCHING CHANNELS

3.4.1.1 ROUTING AUDIO AND VIDEO

In the examples that follow use 0, 00 or 000 for the input channel to turn that output channel off.

To route both audio and video from the same source, send a command in the form:

```
Bxy [ENTER]
Bxxyy [ENTER]
Bxxxyyy [ENTER]
```

Where x specifies the output to be routed to e.g. and y specifies the input source of e.g. (use 0, 00 or 000 for the input channel to turn the output channel off).

To route both audio and video from different sources to the same output, send a command in the form:

```
Qxyz [ENTER]
Qxxyyzz [ENTER]
Qxxxyyyzzz [ENTER]
```

Where x specifies the output to be routed to, y specifies the input source of video, and z specifies the source of audio, (use 0's for off).

To route video only, send a command in the form:

```
Vxy [ENTER]
Vxxyy [ENTER]
Vxxxyyy [ENTER]
```

Where x specifies the output to be routed to, and where y specifies the input source of video, (use 0's for off).

To route audio only, send a command in the form:

```
Axy [ENTER]
Axxyy [ENTER]
Axxxyyy [ENTER]
```

Where x specifies the output to be routed to, and where y specifies the input source of audio, (use 0's for off).

3.4.1.2 USING THE CONFERENCE MODE

Under certain circumstances, as in video conferencing, the input and output has to be cross connected, so that a person at location A sees and hears the person at location B and vice versa. The RSIII facilitates this with the J, K or L commands to cross connect an input and output in a single command.

For the conference mode to work correctly, the cameras, monitors, microphones and speakers for a given location must be wired to the same input and output number. Thus, a given location would have its camera on Video Input 6, its microphone on Audio Input 6, its monitor on Video Output 6, and its speakers on Audio Output 6.

To conference both audio and video from the same location, send a command in the form:

```
Jxy [ENTER]
Jxxyy [ENTER]
Jxxxyyy [ENTER]
```

Where x specifies the first location's video and audio while y specifies the other location's video and audio.

To conference video only, send a command in the form:

```
Kxy [ENTER]
Kxxyy [ENTER]
Kxxxyyy [ENTER]
```

Where x specifies the first location's video while y specifies the other location's video.

To conference audio only, send a command in the form:

```
Lxy [ENTER]
Lxxyy [ENTER]
Lxxxyyy [ENTER]
```

Where x specifies the first location's audio while y specifies the other location's audio.

3.4.1.3 USING THE SALVO MODE

It is possible to send the same input to a number of consecutive outputs using the Salvo command.

The X command sends both video and audio to the range of outputs.

```
Xmno [ENTER]
Xmmnnoo [ENTER]
Xmmmnnnooo [ENTER]
```

Where m is the first output number, n is the last output number, and o is the input number.

The Y command sends video only to the range of outputs.

```
Ymno [ENTER]
Ymmnnoo [ENTER]
Ymmmnnnooo [ENTER]
```

Where m is the first output number, n is the last output number, and o is the input number.

The Z command sends audio only to the range of outputs..

```
Zmno [ENTER]
Zmmnnoo [ENTER]
Zmmmnnnooo [ENTER]
```

where m is the first output number, n is the last output number, and o is the input number.

For example, `Y010408` sends the audio from input 8 to outputs 1 through 4.

3.4.1.4 USING THE QUEUE MODE

Sometimes it is necessary to have a number of switches made all at the same instant. It is possible to queue a number of pattern changes ahead of time, then to have them all executed at once. In the queue mode it is possible to send a set of commands to the RSIII that will be held until the final command is received, then all the commands are performed at the same time. The E, F, and G commands are used to synchronize the switching of multiple events. These commands are stored in the queue until the EE command is given to implement all changes.

The E command queues both video and audio commands.

```
Emn [ENTER]
Emmnn [ENTER]
Emmmnnn [ENTER]
```

where m is the output number, and n is the input number.

The F command queues video only commands.

```
Fmn [ENTER]
Fmmnn [ENTER]
Fmmmnnn [ENTER]
```
where m is the output number, and n is the input number.

The G command queues audio only commands.

```
Gmn [ENTER]
Gmmnn [ENTER]
Gmmmnnn [ENTER]
```
Where m is the output number, and n is the input number.

The final command in the set of commands must be EE. When the EE command is received all previous commands that are in the queue are executed.

For example, the following consecutive command sequence was sent over some period of time. `F10 [ENTER] G42 [ENTER] EE [ENTER]` will queue the video on output 1 to turn off and route the audio on input 4 to output 2.

3.4.2 CROSSPOINT STATUS AND CONFIGURATION COMMANDS

3.4.2.1 DISPLAY OR DUMP COMMAND

To determine the condition of a particular crosspoint or group of crosspoints use the D command of the form:

`D`	Display Entire Crosspoint Matrix in single group
`DL`	Display Entire Crosspoint Matrix in Multicolumn Format
`DRxy`	Display Range of Crosspoint Matrix in single group
`DRxxyy`	
`DRxxxyyy`	

Where x is the starting output channel and y is the ending output channel.

The `D` command will dump all crosspoint connections in three columns: the output channel the video input channel and the audio input channel that is connected to that output.

```
D[ENTER]
001 V007 A007
002 V007 A007
003 V007 A007
004 V006 A006
005 V004 A004
006 V002 A001
007 V001 A001
008 V000 A000
DONE
```

The `DL` command will break the display into a multi column output with headings above the columns. It will try to use as much as the screen's width as possible. This will allow the operator to see more connections on a given screen.

```
DL[ENTER]
Out Video Audio  Out Video Audio  Out Video Audio  Out Video
Audio
  1  003   003     5  000   000     9  000   000    13  000   000
  2  005   011     6  000   000    10  000   000    14  000   000
  3  004   001     7  000   000    11  000   000    15  000   000
```

```
  4  004   004     8  000   000    12  000   000    16  000   000
DONE
```

The DRxy command will display a limited range of outputs starting at x and ending at y.

```
DR35 [ENTER]
003 V003 A003
004 V004 A004
005 V005 A005
DONE
```

3.4.2.2 CLEARING ALL CONNECTIONS

All crosspoints can be reset to their default (off) condition by using the clear command of the form:

`C [ENTER]` Clear all crosspoint connections

3.4.2.3 USING PATTERNS

The RSIII has memory for 16 stored routing patterns. Fifteen patterns for typical use and one for power on restore. The power-up pattern is the pattern that is loaded when the RSIII is power cycled or first turned on. These stored configurations are non-volatile and are thus maintained during power interruptions. To STORE the current crosspoint pattern to one of the sixteen pattern storage areas, send a command in the form:

```
Sxx [ENTER]
```

Where xx is 01-16.

To store the current crosspoint pattern to the power-up pattern type the command

```
S [ENTER]
S01 [ENTER]
```

To recall and load one of the sixteen stored crosspoint patterns send a command in the form:

```
Rxx [ENTER]
```

Where xx is 01-16.

To recall the power-up pattern, send the command

```
R [ENTER]
R01 [ENTER]
```

The contents of the all stored patterns can be viewed by sending the `M` command.

```
M [ENTER]
```

3.4.2.4 IMMEDIATELY CORRECTING INADVERTENT COMMANDS

If a connection was incorrectly made the operator can reverse the previous command by the `UNDO` command.

```
UNDO [ENTER]
```

3.4.2.5 OBTAINING INFORMATION ABOUT THE SWITCH

Issuing the `I` command the operator can obtain information about the switch

```
I [ENTER]
Copyright 2008, Knox Video Technologies
RSIII, RGBHV, 12,8,BNC, UBAS, VT, 12,8,DCAT, IP
Version 1.0.7    No Video Sync Present   ID: 35447070
Serial #: CO-000000-00-000
```

```
MAC ADR: 00-20-4A-A6-B6-2B     IP ADR: 192.168.168.48

DONE
```

The first line of the information is the Knox Video Technologies copyright notice. The second line is the nomenclature describing the unit. This particular unit is a series RSIII model RGBHV with 12 input channels and 8 output channels of video that has BNC connectors on the rear panel for input. The audio is unbalanced stereo with the optional Volume Tone Board installed with 12 input and 8 output channels. There is an optional two channel CAT 5 cable driver and is controllable via TCP/IP. The third line contains the firmware revision level whether or not a sync signal was detected and a unique ID number. The fourth line is the unit's serial number. The fifth line displays the MAC address and Internet address.

3.4.2.6 HELP WITH COMMAND SYNTAX

Information on specific commands can be found while communicating with the switch. Send the H command and a summery of the commands will be displayed. Sending an Hx, where x is a command name, will display specific help about using that command.

`H [ENTER]`	Summary of help command
`Hx [ENTER]`	Specific help on command x

```
H [ENTER]
Crosspoint Commands:          Misc. Commands:
  B Follow Switch               H    General Help Display
  A Audio Breakaway             Hx   Specific Help on Command 'x'
  V Video Breakaway             I    Sign on Message
  Q Split Switch                IP   Change Network Parameters
  E Delayed Follow Switch       UNDO undoes the previous command
  F Delayed Video Switch        / Change Ethernet
Username/Password
  G Delayed Audio Switch
  C Clear all Crosspoints
  J Conference Audio & Video VT Commands:
  K Conference Video only       $D Display     $M Mute
  L Conference Audio only       $V Volume      $L Loudness
  X A/V to Multiple Outputs     $B Bass        $Z Zone
  Y Video to Multiple Outputs   $T Treble      $S Balance
  Z Audio to Multiple Outputs   $C Clear       $I Input Trim

Pattern Memory Commands: Display Crosspoint Matrix Commands:
  S Store Pattern               D    Display in single format
  R Recall Pattern              DL   Display in multicolumn format
  M Display Patterns            DR   Display Range of Matrix
```

3.4.3 $ COMMANDS - CONTROLLING THE SOUND

If the optional VT board (VTB) is installed, an external controller can control the volume, tone and balance of any channel by sending a $ command.

3.4.3.1 VOLUME CONTROL

The range of the volume control is from full volume (unity gain) to –63 dbm in 1-db steps. There is no amplifier in the RSIII so the audio signal cannot be boosted beyond what is coming in. To control volume send a command of the form:

`$Vxx+ [ENTER]`	Turn Volume up one step
`$Vxxu+ [ENTER]`	Turn Volume up multiple steps < 9
`$Vxxuu+ [ENTER]`	Turn Volume up multiple steps > 10
`$Vxx- [ENTER]`	Turn Volume down one step
`$Vxxu- [ENTER]`	Turn Volume down multiple steps < 9
`$Vxxuu- [ENTER]`	Turn Volume down multiple steps > 10
`$Vxxyy [ENTER]`	Set Volume level
`$Cvuu [ENTER]`	Set ALL Volume levels together

Where xx is an output number, yy is a number from 00 to 63, u is a number from 1 to 9 and uu is a number from 10 to 63.

The $Vxx+ command will increment the current volume setting by one to a maxim value of 00. While the $Vxx- command will do the opposite and decrement the current volume setting by one to a minimum value of -63. The $V command understands that the volume control is an attenuator and the command itself does not use the polarity sign when the value is sent. The + and – signs are used to indicate the direction of the level change; that is up or down respectively. The polarity of the volume is displayed as a negative number when displayed or retrieved.

The volume command also allows the volume to be set in steps greater than 1. A number in front of the + or – sign (besides the output number $Vxxu+) changes the level in multiple steps. Thus $Vxx+ increases the volume by 1 step while $Vxx3+ increases it by 3 steps. There is a special case for the clear command a $CVuu will clear ALL output channels to the value specified by uu. The default setting is –63 (minimum).

3.4.3.2 BASS AND TREBLE CONTROL

To control bass and treble send a command of the form:

```
$Bxx+ [ENTER]
$Bxx- [ENTER]
$Bxxyy [ENTER]
```

for bass and

```
$Txx+ [ENTER]
$Txx- [ENTER]
$Txxyy [ENTER]
```

for treble.

The $Bxx+ and $Txx+ commands will increment the current tone setting by one to a maxim value of +7. The $Bxx- and $Txx- commands will decrement the current tone setting by one to a minimum value of -7. The range of yy is from 00 to 14 (-7 to +7, cut or boost) yet the value sent in the $B or $T command does not directly correspond to the displayed/retrieved value. Use Table 1 to determine the value of yy to send. A value of 0 (flat) is the default setting.

Desired Output	Value to Send
-7	**00**
-6	**01**
-5	**02**
-4	**03**
-3	**04**
-2	**05**
-1	**06**
0	**07**
+1	**08**
+2	**09**
+3	**10**
+4	**11**
+5	**12**
+6	**13**
+7	**14**
Table 1	

3.4.3.3 BALANCE CONTROL

The balance between the left and right channels may be centered, incremented/decremented by 1, or directly set to an absolute value. To control balance between the left and right channels send a command of the form:

```
$Sxx+ [ENTER]
$Sxx- [ENTER]
$Sxxuu+ [ENTER]
$Sxxuu- [ENTER]
$Sxx0 [ENTER]
```

Where xx is an output number and uu is the absolute value to be set and is a number from 01 to 31. Using $Sxx+ and $Sxx- will vary the balance one step at a time. The command `$Sxx0` resets the balance to equal left and right levels. When used with the absolute value version of the command + sets the left channel and – sets the right channel. Setting an absolute value on the right channel will automatically set the left channel to 0 and vice versa. The default value is 0 (centered).

3.4.3.4 MUTE CONTROL

Individual outputs can be muted. To mute the sound, send the command

```
$Mxx1 [ENTER]        for mute on,
$Mxx0 [ENTER]        for mute off (default is off).
```

Where xx is the output number.

3.4.3.5 LOUNDESS CONTROL

Individual outputs can have a slight base boost when the volume is low. To change the loudness, send the command

```
$Lxx1 [ENTER]        for loudness on,
$Lxx0 [ENTER]        for loudness off (default is off).
```

Where xx is the output number.

3.4.3.6 SETTING ZONE GROUPS FOR VTB CONTROL

It is possible to group multiple audio channels into a single Zone that behave as one. Up to 8 Zones can be created. An audio command sent to the Zone will affect all channels in the Zone. This is beneficial for applying VTB commands to a number of outputs at one time. To set up a Zone Group send a command of the form:

```
$Zx [aa, bb, cc, dd...]
```

Where x is a letter in the range A to H. This corresponds to Zone Groups A through Zone Group H, and aa,bb, etc. are a list of two-digit output numbers in square brackets, separated by commas (no spaces) for that Zone Group. The list can include any number of outputs from 01-16. Any output may be included in any Zone Group.

To see a list of the outputs assigned to any group, send the command

```
$Zx$D [ENTER]
```

Where x=A to H.

To clear all the Zone Groups send the command

```
$Z$C [ENTER]
```

This command will clear ALL outputs associated with ALL zones and not the settings of the outputs.

Once a Zone Group has been established, VTB commands may be sent in common to all the outputs in the group. To send a Zone Group VTB command, send $Z followed by the command stripped of its output number. For example, a three-step volume increment command would normally be $Vxx3+, where xx is the output number. To send the command to all the outputs in Zone Group A, omit the output number and precede the command with a $ZA. So the full command for the above example is ZAV3+. The different zone commands are summarized:

$Za [xx,xx,...,xx]	Create Audio Zone a (A-H) xx=output number
ZaV00	Set Full Volume in Zone a (A-H)
ZaVuu	Set Absolute Volume (uu) in Zone a (A-H)
ZaV+	Increment Volume in Zone a (A-H) by 1
ZaV-	Decrement Volume in Zone a (A-H) by 1
ZD	Dump Audio Zone configuration
ZC	Clear All Audio Zones

3.4.4 AUDIO STATUS AND CONFIGURATION COMMANDS

3.4.4.1 DISPLAY OR DUMP COMMAND

To determine the condition of the VTB setting use the $D of the form:

$D [ENTER]	Dump all outputs
$Dx [ENTER]	Dump individual output channel
$Dxx [ENTER]	
$Dxxx [ENTER]	

Where x is the output channel to be displayed.

3.4.4.2 CLEAR COMMAND

To set the VTB channels to their default values use the $C command of the form:

$C [ENTER]	Clear ALL VTB output channels
$Cx [ENTER]	Clear VTB channel x output
$Cxx [ENTER]	
$Cxxx [ENTER]	
$Cvuu [ENTER]	Sets ALL VTB output channels to uu

Where x is the output channel and u is an absolute volume level.

SECTION 4. MAINTENANCE

CAUTION! There are no user serviceable parts in the RSIII. Do not operate unit with top cover removed.

4.1 INTRODUCTION

The RSIII uses passive air flow (convection) to keep its power supply within a safe operating temperature range. No maintenance of the cooling system is required. No other routine maintenance is required in the RSIII.

4.2 CLEARING THE MEMORY

Under certain circumstances the RSIII memory may become corrupted. To clear the main memory, send the letter command `C` followed by Enter. To clear all volume, tone, and balance adjustments and set them to their default values, send `$C` followed by Enter.