

KNOX VIDEO

RS16x16HB Routing Switcher

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SECTION 2. INSTALLATION

WARNING!

Static Sensitive Connectors! During the installation process and whenever changing cables to the Knox RS16x16HB inputs and outputs, use extreme caution to avoid conducting static electricity to any inputs or outputs including video, audio, and RS232.

DC Offset Warning! Connect standard video and audio inputs and outputs only. Do not connect input or output signals with a positive or negative dc offset.

Chassis Ground is Earth Ground Do not connect video or audio cables with induced or direct-connection potential on the shield.

2.1 INTRODUCTION

This section provides the information required for installation of the RS16x16HB into its operating environment.

2.2 UNPACKING AND INSPECTION

Unpack the RS16x16HB 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 have come loose.

Check that the power module is also present and marked for use with the RS16x16HB product.

Units are shipped with a memory backup battery which retains the routing crosspoint information when power is off. The battery is mounted on the printed circuit board and is accessible from the rear panel. In the event that crosspoint information is not retained during power off, the battery must be replaced. It is recommended that the battery be replaced after five years. See Section 4, Maintenance, for details on how to change the battery.

2.3 INSTALLATION

The RS16x16HB is designed to be mounted in a standard 19" rack panel; it is 10.5 inches, or six standard units, high.

Choose a space in the rack which is convenient for all the cables and mount the unit using standard rack bolts. Connect the output of the RS16x16HB power unit to the power connector at the right rear (as viewed from the back of the panel) of the RS16x16HB and plug the power unit into a grounded AC power outlet of the voltage and frequency specified on the power unit. There is no power switch on the RS16x16HB; it is designed to be ON at all times. (If it is desirable to have the RS16x16HB powered down regularly, connect the power module to a switchable AC power strip.)

2.4 VIDEO CONNECTIONS

Connect up to sixteen video sources (cameras, videocassette players, RF demodulators, still-stores, character/graphics generators, etc.) to the input BNC connectors marked VIDEO INPUT (or RCA connectors, if they were specified).

Inputs are automatically terminated in 75 ohms. Terminate unused outputs in 75 ohms.

Connect up to sixteen destination devices (monitors, VCRs, LCD projectors, displays, RF modulators, etc.) to the sixteen BNC (or RCA) connectors marked VIDEO OUTPUT. Be sure that all destination devices are terminated at 75 ohms.

Do not connect a SOURCE of video to any of the video OUTPUT connectors.

2.5 AUDIO CONNECTIONS

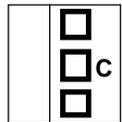
Connect up to sixteen audio sources (line level mikes, videocassette players, RF demodulators, tape/CD players, etc.) to the left and right channel connectors marked AUDIO INPUT.

Connect up to sixteen audio destination devices (amplifiers, VCRs, tape/CD recorders, RF modulators, etc.) to the sixteen left and right channel connectors marked AUDIO OUTPUT.

Do not connect a SOURCE of audio to any of the audio OUTPUT connectors.

For balanced audio units, the Phoenix connectors may be removed while making the screw connections.

When installing balanced audio connections, use the center pin for the common or ground wire. The top or bottom pin may be used for either + or -, however the connections must be consistent throughout.



Phoenix connector
for Balanced
Audio

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2.6 SETTING THE BAUD RATE

If the RS16x16HB is to be controlled through its RS232 port, it is important to set the correct baud rate. One of four baud rates may be selected using positions 1 and 2 of the programming switch located on the rear panel of the RS16x16HB. Set the switches as follows:

BAUDRATE	SWITCH 1	SWITCH 2
19200	ON	ON
1200	OFF	ON
2400	ON	OFF
9600	OFF	OFF

All Baud Rates are 8 bit, no parity, one stop bit. Switches are ON when pushed up (as viewed from the back of the panel)

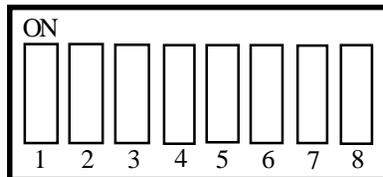


Figure 2.1 Baud Rate Setting
Switches 6-8 should always be off.

The switches are read by the microprocessor only at power-up; for switch configuration changes to take effect, cycle the power input to the RS16x16HB.

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2.7 ANSWERBACK MODES

The user may choose between two modes of answerback: verbose and nonverbose. Select the mode using position 3 of the programming switch located on the rear panel of the RS16x16HB.

Position 3 ON is verbose, while position 3 OFF is nonverbose.

The switches are read by the microprocessor only at power up; for switch configuration changes to take effect, cycle the power input to the RS16x16HB.

In the verbose mode, each time a routing command is sent, the routing map will be reported on the RS232 line.

OUTPUT 1	Video 3	Audio 1
OUTPUT 2	Video 2	Audio 2
OUTPUT 3	Video 1	Audio 3
OUTPUT 4	Video 6	Audio 6
OUTPUT 5	Video 7	Audio 7
OUTPUT 6	Video 8	Audio 8
OUTPUT 7	Video 5	Audio 1
OUTPUT 8	Video 4	Audio 1
OUTPUT 9	Video 3	Audio 1
OUTPUT 10	Video 2	Audio 2
OUTPUT 11	Video 1	Audio 3
OUTPUT 12	Video 14	Audio 14
OUTPUT 13	Video 15	Audio 15
OUTPUT 14	Video 16	Audio 16
OUTPUT 15	Video 16	Audio 16
OUTPUT 16	Video 16	Audio 16

Figure 2.2 Typical Routing Map Status Report

In the nonverbose mode, only the word DONE will be reported. In either mode, an incorrect or meaningless command will cause the word ERROR to be reported.

2.8 KEYPAD LOCKOUT

For security reasons it is sometimes desirable to lock out the front panel keypad. To prevent the crosspoints from being changed by the front panel keypad, put switch position 4 in the ON (up) position. Switches 6-8 should always be off.

The switches are read by the microprocessor only at power up. For switch configurations to take effect, cycle the power input to the RS16x16HB.

2.9 BREAKAWAY AUDIO LOCKOUT

Sometimes it is desirable to disable breakaway audio switching. Switch position 5 on the rear panel is used to disable breakaway audio. Position 5 OFF allows breakaway audio, while position 5 ON causes audio to always switch with video.

2.10 REMOTE READOUT OPTION

The remote readout option employs an internal character generator to produce a routing map status report in monochrome video format, genlocked to video input number 1. Connect a monitor to the Remote Readout connection on the rear panel to view this display.

2.11 VERTICAL INTERVAL SWITCHING

All units are now fitted with the vertical switching option. Switching will occur during the vertical interval, referencing the sync signal on input number one. If input number one has no input, switching will be random with respect to sync. *Note: vertical interval switching has no meaning unless the inputs are synchronous to one another.*

SECTION 3. OPERATION

3.1 INTRODUCTION

This section explains in detail the operation of the RS16x16HB using either the front panel keypad or the RS232 port.

3.2 CONNECTIONS

Connect audio and video sources as described in sections 2.4 and 2.5. There is no requirement that all inputs be used or terminated.

If outputs are left over they may be used like a distribution amplifier to buffer and distribute an input signal. To use extra outputs in this way simply route the input you wish to distribute to as many available outputs as desired.

Outputs may be looped back to unused inputs via short cables for the purpose of adding delays, but be aware that if an output is then routed to that same input, an illegal condition will exist and the output will oscillate at frequencies which could spill over onto other crosspoints.

3.3 CONTROL VIA THE FRONT PANEL SWITCHES

Switch position 5 on the rear panel is used to disable breakaway audio. Position 5 OFF allows breakaway audio. Position 5 ON causes audio to always switch with video. If position 5 is ON, disregard sections 3.3.1 and 3.3.2.

3.3.1 HOW TO ROUTE AUDIO AND VIDEO TOGETHER

On the front panel keypad, push the B (Both) key, then a two-digit number for the destination (output) you wish to route to, then a two-digit number for the source (input) you wish to route from, then push ENter.

If you do not complete your entry within fifteen seconds, the keypad will return to idle mode, waiting for you to begin a new command sequence.

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3.3.2 HOW TO ROUTE VIDEO ALONE

On the front panel keypad, push the V (Video) key, then a two-digit number for the destination (output) you wish to route to, then a two-digit number for the source (input) you wish to route from, then push ENter.

If you do not complete your entry within fifteen seconds, the keypad will return to idle mode, waiting for you to begin a new command sequence.

3.3.3 HOW TO ROUTE AUDIO ALONE

On the front panel keypad, push the A (Audio) key, then a two-digit number for the destination (output) you wish to route from, then a two-digit number for the source (input) you wish to route from, then push ENter.

If you do not complete your entry within fifteen seconds, the keypad will return to idle mode, waiting for you to begin a new command sequence.

3.3.4 HOW TO STORE AND RECALL CROSSPOINT PATTERNS

The RS16x16HB has 16 stored routing map configuration memory locations. These stored configurations are nonvolatile and are thus maintained during power interruptions.

To STORE the currently loaded crosspoint pattern to one of the sixteen pattern storage areas, push the S key, enter a number from 01 to 16, then push the ENter key.

To RECALL and load one of the sixteen stored crosspoint patterns from the front panel keypad, push the R key, enter a number from 01 to 16, then push the ENter key.

3.3.5 HOW TO USE THE TIMED SEQUENCER

The RS16x16HB can be set to cycle continuously through its sixteen stored patterns on a timed basis. To set the time push the S key, enter 92 followed by a 2-digit number from 01 to 99, then push the ENter key. The 2-digit number corresponds approximately to the number of seconds between pattern changes.

To begin the cycling, push the S key, enter the number 90, then push the ENter key.

To end the cycling, push the S key, enter the number 91, then push the ENter key.

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3.3.6 HOW TO TURN A CROSSPOINT OFF

Sometimes it is useful to be able to disconnect a crosspoint altogether; that is, have no input routed to a given output. To turn an output off, push a letter key (B for both, A for audio, or V for video), then the two-digit output number, then 00, then ENter. To turn the output back on, route any input to it in the usual way.

3.4 CONTROL VIA THE RS232 INPUT

A simple protocol allows all crosspoints to be set through the RS232 port. The RS232 port will accept inputs from a terminal, computer, or other software-driven control device. No handshaking is required. The RS16x16HB RS232 Port is configured as a DCE. The pin-out of this port allows connection to an PC or compatible 9 pin serial COM Port with a 1:1 cable. (Data is sent from the router as pin 2. Data is received by the router as pin 3. Pin 5 is ground.)

Note: in the following commands the letters may be upper or lower case; (ENTER) is the same as Carriage Return (in hex, a 0D). Do not add a Line Feed (in hex, 0A).

3.4.1 ROUTING AUDIO AND VIDEO

To route video and audio send a six-byte command in the form:

Bxxyy(ENTER)

where xx is an output number (01-16) and yy is an input number (01-16).

To route video alone send a six-byte command in the form:

Vxxyy(ENTER)

where xx is an output number and yy is an input number.

To route audio alone send a six-byte command in the form:

Axxyy(ENTER)

where xx is an output number and yy is an input number.

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To route both video and audio from different inputs, send an eight-byte command in the form:

Bxyyzz(ENTER)

where xx is an output number and yy is a video input number and zz is an audio input number. For example, B010203 sends video from input 2 to output 1 and audio from input 3 to output 1.

A crosspoint can be turned OFF by routing it to input zero; e.g. B0100 turns off the video and audio to output 1.

3.4.2 SENDING A SALVO COMMAND

It is possible to send the same input to a number of sequential outputs by a single eight-byte command of the form:

Xmmnnoo(ENTER)

where mm is the first output number, nn is the last output number, and oo is the input number.

Using X as the first byte sends both video and audio to the range of outputs, using Y sends video only, and using Z sends audio only.

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

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3.4.3 SENDING A STRING OF COMMANDS TO BE EXECUTED AT THE SAME TIME

It is possible to send a set of commands to the routing switcher that will be held until the final command is received, then all the commands are executed at the same time. For all but the final command in the set use the form:

Exxyy(ENTER),

where xx is the output number and yy is the input number.

Using E as the first byte sends both video and audio from input yy to output xx, using F sends video only, and using G sends audio only. The final command in the set must start with the letter B, V, or A instead of E, F, or G. This final command causes all the previous commands to TAKE. You may also cause a TAKE by sending the three-byte command EE(ENTER).

For example, the following commands sent over a period of time:

E0101(ENTER),E0202(ENTER),E0303(ENTER),B0404(ENTER)

will result in connecting input 1 to output 1, 2 to 2, 3 to 3, and 4 to 4 when the last (ENTER) is received.

3.4.4 USING CONFERENCE MODE TO CROSS-CONNECT AN INPUT AND AN OUTPUT

It is possible to send a single command to cross-connect an input and an output; for example, to connect input 1 to output 4 and input 4 to output 1. This is useful in teleconferencing and similar applications. To cross-connect both video and audio, send a six-byte command in the form:

Jxyy(ENTER)

where xx is an output number and yy is an input number. Adding two more bytes at the end

Jxyyzz(ENTER)

will cross-connect the audio as well, such that video xx and yy are cross-connected,

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and audio xx and zz are cross-connected.

To cross-connect video only, send a six-byte command in the form:

Kxxyy(ENTER)

and to cross-connect audio only, send a six-byte command in the form:

Lxxyy(ENTER)

For example, K0113 connects video input 13 to output 1 and video input 1 to output 13.

3.4.5 READING SYSTEM STATUS

The crosspoint status can be read from the RS232 port at any time by sending the two-byte command:

D(ENTER)

The status report does not disturb the existing crosspoint pattern.

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3.4.6 STORING AND RECALLING CROSSPOINT PATTERNS

To STORE the currently loaded crosspoint pattern to one of the sixteen pattern storage areas, send the four-byte command:

Snn(ENTER),

where nn is a number from 01 to 16. The pattern stored in that memory area will be overwritten with the current pattern.

To RECALL and load one of the sixteen crosspoint patterns from the battery backed-up memory, send the four-byte command:

Rnn(ENTER),

where nn is a number from 01 to 16.

3.4.7 TIMED SEQUENCER

The RS16x16HB can be set to cycle continuously through its sixteen stored patterns on a timed basis. To set the time interval and start the cycling send the four-byte command:

Tnnn(ENTER),

where nnn is a one- to three-digit number from 1 to 999.

To stop the cycling, send the two-byte command:

N(ENTER).

3.4.8 LAMP TEST

The lamp test which occurs automatically on powerup can be initiated through the RS232 port by sending the two-byte command:

T(ENTER).

The lamp test does not disturb the existing crosspoint pattern.

3.4.9 ANSWERBACK MODES

The user may choose between two modes of answerback: verbose and nonverbose. Select the mode using position 3 of the programming switch located on the rear panel of the RS16x16HB. Position 3 ON is verbose, while position 3 OFF is nonverbose.

In the verbose mode, each time a routing command is sent, the current routing map will be reported on the RS232 line followed by the word DONE.

The switches are read by the microprocessor only at power up; for switch configuration changes to take effect, cycle the power input to the RS16x16HB.

SECTION 4. MAINTENANCE

NOTE: Maintenance of the RS16x16HB, except for changing the battery, should be performed by qualified service people only.

4.1 INTRODUCTION

The only routine maintenance the RS16x16HB requires is to change the battery located at the rear of the RS16x16HB unit.

4.2 HOW TO CHANGE THE MEMORY BACKUP BATTERY

The RS16x16HB is shipped with a memory backup battery which retains the routing crosspoint information when power is off. The battery, approximately 1/2 inch in diameter, is mounted in a holder on the main printed circuit board. In the event that crosspoint information is not retained during power off, the battery must be replaced.

To change the battery, pry up the retaining bar gently and slip the old battery out. Replace at least every five years with Knox part number 140896, or commercial type DL1220.

4.3 SWITCH OPTIONS

An 8-position switch, accessible through the rear panel, is provided for setting the baud rate and certain programming functions.

Switch positions 1 and 2 are used to set the baud rate for the RS232 control port. One of four baud rates may be selected as follows:

BAUD RATE	SWITCH 1	SWITCH 2
19200	ON	ON
1200	OFF	ON
2400	ON	OFF
9600	OFF	OFF

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Switch position 3 chooses between the verbose and nonverbose mode of operation (see section 2.7). Position 3 ON is verbose, while position 3 OFF is nonverbose.

Switch position 4 is used to lock out the front panel keypad for security reasons. Position 4 OFF allows keypad entry, while position 4 ON locks out keypad entry.

Switch position 5 is used to disable breakaway audio. Position 5 OFF allows breakaway audio, while position 5 ON causes audio to always switch with video.

Switch positions 6 through 8 are reserved for programming options not covered here. Switches 6 through 8 should always be OFF.

Switches are ON when pushed up.

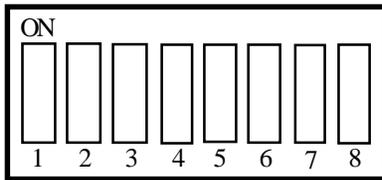


Figure 4.1 Baud Rate Setting

The switches are read by the microprocessor only at power-up; for switch configuration changes to take effect, cycle the power input to the RS16x16HB.