

# BSS Audio Specification

## SW9016/SW9026 matrix device serial control

7th Feb 2003

Preliminary information only

---

### 1.0 Messaging protocol

#### 1.1 *Physical layer*

8-bit data with no parity.

Baud rate 38400 bps.

The following bytes have special meanings:

0x02 STX

0x03 ETX

0x06 ACK

0x15 NAK

0x1B Escape

Any other single byte can be used within a message body

To use one of the special bytes within a message body, do the following:

0x02 - substitute with 0x1B 0x82

0x03 - substitute with 0x1B 0x83

0x06 - substitute with 0x1B 0x86

0x15 - substitute with 0x1B 0x95

0x1B - substitute with 0x1B 0x9B

The following bytes are command bytes to appear at the beginning of a message after **STX** and are in use for the AMX system.

0x80 SET\_VALUE

0x81 SET\_STRING

0x82 REQUEST\_VALUE

0x83 REQUEST\_STRING

0x84 RAW\_MSG

New message types will be added:

0x85 SET\_CROSSPOINT

0x86 SET\_I/O

0x87 REQUEST\_I/O

0x88 SET\_BAUDRATE  
 0x89 SET\_CROSSPOINT\_IN\_PRESET  
 0x8A COPY\_PRESET  
 0x8B CLEAR\_PRESET  
 0x8C GET\_PRESET  
 0x8D ID\_REQUEST

## 1.2 Message Format

*<message>* = *<STX>* *<Body>* *<Checksum byte>* *<ETX>*

*<Checksum byte>* is the exclusive-OR of all the bytes in *<Body>*

**Note:** If the checksum is one of the special characters it must be substituted in the same way as body bytes.

## 1.3 Message Body Format

**SET\_CROSSPOINT** is sent from Soundweb to the expansion box to indicate that a switch position has been changed which must be reflected on the device. Soundweb Designer's user interface to a matrix switch network depicts an 8x8, stereo-audio-follows-video matrix with inputs 1-4 on box A and inputs 5-8 on box B.

Set\_crosspoint messages sent from Soundweb will always contain a group byte addressed to video + audio switch A with both the 'Audio' and 'Video' bits set (0x85). If a box 'A' and a box 'B' are present, they will both receive the message and work out if it is for them by the value of the *<output>* byte: box 'A' switches for outputs 1-4 and box 'B' switches for outputs 5-8.

Only box 'A' returns an ACK to Soundweb. Any messages for outputs 5-8 (box 'B') are ACKed, but not actioned by box 'A'.

## SET\_CROSSPOINT

*<SET\_CROSSPOINT>* *<group>* *<output>* *<input>* *<level>*

*<group>* is a byte identifying which type of control you are changing and on which box

*<output>* is the number of an output of the crosspoint switch that you are addressing.

*<input>* is an input number for the specified output

*<level>* is a gain value for future expansion. It is the level of the specified output.

N.B. Send 192 if not using this.

In response to this command the device returns an **ACK** control byte.

The group parameter is defined as a bit field as follows:



	F	V	A
Device	r	i	u
address	o	d	d
	m	e	i
		o	o
0000=A with no video card,	B		
	o		
1000=A with video card,	x		
0001=B with no video card,			
1001=B with video card.			

This leads to the following group numbers:

- 9016A\_AudioA = 0x01 Audio crosspoint switch set as unit A with no video card
- 9016A\_AudioB = 0x11 Audio crosspoint switch set as unit B with no video card,
- 9016A\_VideoA = 0x02 Composite video crosspoint switch set as unit A with no video card \*,
- 9016A\_VideoB = 0x12 Composite video crosspoint switch set as unit B with no video card \*,
- 9016A\_FollowA = 0x03 Audio follows video crosspoint switch set as unit A with no video card \*,
- 9016A\_FollowB = 0x13 Audio follows video crosspoint switch set as unit B with no video card \*,
- 9016V\_AudioA = 0x81 Audio crosspoint switch set as unit A with video card
- 9016V\_AudioB = 0x91 Audio crosspoint switch set as unit B with video card,
- 9016V\_VideoA = 0x82 Composite video crosspoint switch set as unit A with video card,
- 9016V\_VideoB = 0x92 Composite video crosspoint switch set as unit B with video card,
- 9016V\_FollowA = 0x83 Audio follows video crosspoint switch set as unit A with video card,
- 9016V\_FollowB = 0x93 Audio follows video crosspoint switch set as unit B with video card,

This arrangement of parameters allows addressing of up to a 256 by 256 matrix on each expansion box.

<SET\_I/O> is sent from Soundweb to control a logic output.

<REQUEST\_I/O> is sent from Soundweb to request values of the control inputs on an expansion box. The Expansion box responds with a SET\_I/O message for the same control.

<SET\_I/O> <group> <id> <Data 0> <Data 1>

<REQUEST\_I/O> <group> <id> <Data 0> <Data 1>

<group> is a byte identifying which type of control you are changing and on which box

<id> is the number of an output of the crosspoint switch that you are addressing.

<data 0 > is an input number for the specified output

<data 1> is a gain value for future expansion. It is the level of the specified output.

N.B. Send 192 if not using this.

The group parameter is defined as a bit field as follows:



	C
	o
Device	n
address	tr
	o
0= A,	l
1=B	

EXP\_ControlA = 0x00 Control inputs on expansion unit A

EXP\_ControlB = 0x10 Control inputs on expansion unit B

EXP\_LogicA = 0x01 Logic outputs on expansion unit A

EXP\_LogicB = 0x11 Logic outputs on expansion unit B

**SET\_BAUDRATE** is sent to the switch box to set the secondary baudrate.

< SET\_BAUDRATE> <group> <baud\_index>

<group> is a byte identifying which box you are addressing

<baud\_index> is a byte according to the following list:

0	300
1	1200
2	2400
3	9600
4	19200
5	38400
6	115200

The response from the box to a SET\_BAUDRATE command depends on whether the device is in 'force 38k4' mode. If the unit is in 'force 38k4' mode the device returns an ACK control byte only.

If the device is not in 'force 38k4' mode, the unit will return one ACK at the current baud, change to the new baud and wait for an ACK from the PC application. If this ACK is received correctly, the command has been completed so a final ACK at the new baudrate is sent. If the ACK from the PC is not received correctly a timeout will occur, the device will return to the original baud and send an ACK (at the original baud).

**SET\_CROSSPOINT\_IN\_PRESET** is sent from the PC application if a crosspoint in a preset is to be changed. If preset number = 0 then the current state of the matrix is updated.

<SET\_CROSSPOINT\_IN\_PRESET> <group> <output> <input> <level> <preset>

<group> is a byte identifying which box you are addressing

<output> is the number of an output of the crosspoint switch that you are addressing.

<input> is an input number for the specified output

<level> is a gain value for future expansion. It is the level of the specified output. Set 192 if not used.

<preset> is the preset number that the previous four parameters refer to.

In response to this command the device returns an **ACK** control byte.

**COPY\_PRESET** is sent from the PC application when one preset is to be copied to another preset.

<COPY\_PRESET> <group> <source> <destination>

<group> is a byte identifying which box you are addressing

<source> is the preset number of the source preset

<destination> is the preset number of the destination preset

In response to this command the device returns an ACK control byte.

**CLEAR\_PRESET** is sent from the PC application when a preset is to be cleared.

<CLEAR\_PRESET> <group> <preset>

<group> is a byte identifying which box you are addressing

<preset> is the preset number of the preset that is to be cleared

In response to this command the device returns an ACK control byte.

**GET\_PRESET** is sent from the PC application when it wants the configuration of a preset.

<GET\_PRESET> <group> <preset>

<group> is a byte identifying which box you are addressing

<preset> is the preset number of the requested preset

In response to a GET\_PRESET command, the device returns the following:

<GET\_PRESET> <group> <preset byte 1.....preset byte 20>

<group> is a byte identifying which box the message has come from.

<preset 1.....

.....preset 20> the preset is returned in the same format as it is stored.

Input for audio out 1
Input for audio out 2
Input for audio out 3
Input for audio out 4
Input for audio out 5
Input for audio out 6
Input for audio out 7
Input for audio out 8
Level for audio out 1
Level for audio out 2
Level for audio out 3
Level for audio out 4
Level for audio out 5
Level for audio out 6
Level for audio out 7
Level for audio out 8
Input for video out 1
Input for video out 2
Input for video out 3
Input for video out 4

**ID\_REQUEST** is sent from the PC application to get information about the state of the device such as what mode it is in (zone or preset) and the user baudrate is set as.

<ID\_REQUEST> <group>

<group> is a byte identifying which box you are addressing

In response to an ID\_REQUEST command the device returns the following:

<ID\_REQUEST> <group> <baud\_index> <mem\_map> <led\_map> <version>

<group> is a byte identifying which box the message has come from.

<baud\_index> is the user defined baud rate.

<mem\_map> is a byte that contains a bit map of what presets are loaded. The following representation of an example mem\_map byte would mean that presets 3, 4 and 8 are available.

110001100

<led\_map> is a byte containing a bit map of the front panel leds.

<version> is the firmware version number.

### **Protocol details**

When a message is received successfully and the command has been completed, an **ACK** is returned. This should be done within one second of receiving the **ETX**.

When a message is received unsuccessfully, a **NAK** is returned. This should be done within one second of receiving the **ETX** (or the last character received).

If an **ACK** or **NAK** is not received within 1 second of sending a message, then the message should be resent.