BEL Digital Audio Ltd.
Serial Protocols.

The BEL serial protocols for the 7210 and 7310 are as follows:

Overview.

Commands to be communicated to the remote unit (72/7310) are arranged in frames. These frame will then be sent to the remote unit which will always reply with either ACK for acceptance or NAK for rejection. Any requested reply then follows in the same frame format.

Frame format.

The frame starts with a start character 0xAA which is alternating ones and zeros. This is followed by the destination address, the source address, the command code, the data count, the data, a checksum and an end flag 0xFE.

Start Flag 0XAA
Destination Address
Source Address
Command
Data Count
Data
Checksum
End Flag 0XFE

Start Flag:
The start flag 0XAA may be sent at any time. If sent during a frame this will cause the frame to effectively restart.

Destination Address:
This should be set to 1 for a 72/7310. This will be returned by the remote unit as the source address.

Source Address:
This should be set to 1 for 72/7310. This will be returned by the remote unit as the destination address.

Command:
This character is the command for the remote unit and must fall in the range 0X80 to 0XEF. More details of the relevant codes are shown below.

Data count:

This is the total number of data bytes following, up to a maximum of 127;

Data:

The data required for the command is carried here. Each character can have a value of 0X00 to 0X7F i.e. 7 bits.

Checksum:

This is the modulo sum of characters in the frame between the destination address and the last data character *inclusively*. It is calculated thus:

DO
{
checksum = (character+checksum) AND 0x7F
}
FOR ALL CHARACTERS IN FRAME.

End Flag:

A character 0XFE ends the frame.

Commands.

Commands to the remote unit.

Code(Hex)	Function	Reply
80	General prompt for a reply	C0 - ACK (OK) C1 - NAK (send again)
81	Use first data char as a second command	ACK
82	Request unit identifier	ACK then C2.
83	Send delay. Data count =4, then 4 7 bit data bytes. most sig first	ACK
84	Send General data See below.	ACK
85	Send Program number, Data count =1 then program number 0-7	ACK
86	Request General	ACK then C6
87	Request Program number	ACK then C7
88	Request delay	ACK then C8
89	Request actual delay	ACK then C9
8A	Send Gains. Data count 3 then ingain 0-20 outgain 0-20 headroom 0-20	ACK
8B	Request Gains	ACK then CB
8C	Parameter reset	ACK

Replies.

Replies, when requested (e.g. 82), will consist of frames which contain the original command value plus 0X40. So a request for an ident, 0x82, will elicit a reply of ACK then a frame containing 0xc2 and the ident string..

General data format.

The send and request general data (84, 86) commands communicate most switch settings to PC and 7310. The format for these is:

	Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Byte 0		Pal/NTSC	L/R/ St/Mono	L/R/ St/Mono			Lock	Bypass
Byte 1		Vid/ TTL	An/Dig		Ref.	Ref.	Inc. mode. S/ms/fd/fm	Inc. mode. S/ms/fd/fm
Byte 2				Gain mode	Man/Ext.	Man/Ext.	Track speed	Track speed

RS232 format : 8 data bits, no parity, two stop bits, 9600 Baud.