D35

DLP™ VIDEO PROJECTOR

RS-232C CONTROL SPECIFICATIONS

Document Revision 1.0 (16 June 2006)

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Revision History:

Revision	Date	Software Version	Description of Change
1.0	20 April 2004	2.48.55 F or higher	Initial version.

1. Introduction

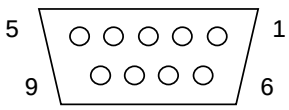
This document describes the communication and data formats used to control SIM2 D35 projector via RS-232C port.

2. Connection

Switch off your Personal Computer and Projector before connecting RS 232C cable.
Use a standard serial cable with 9 pin female to the Personal Computer and 9 pin male to the Projector: pin 2 connects to pin2, pin 3 to pin 3 and pin 5 to pin 5.
SIM2 D35 Port is described as follows.

SIM2 D35 RS-232C Control Port:

D-SUB 9-pin
(female)



Pin No	Signal	Definition
1	N/A	Not used
2	TD	Transmit data
3	RD	Receive data
4	N/A	Not used
5	GND	Ground
6	N/A	Not used
7	N/A	Not used
8	N/A	Not used
9	N/A	Not used

Switch on the Personal Computer and, after start up, switch on the Projector.

Load a suitable communication software onto your Personal Computer, and set the Serial Port Parameters as shown below.

Communication Parameters:

Parameter	Value
Transfer Rate	19200 bps
Data Bits	8
Parity Bit	None
Stop Bit	1
Flow Control	None

Set Send Mode and Read Mode to HEX.

3. Communication Protocol

The communication protocol is packet oriented. Packets consists of Header and Payload.

There are two types of packets: Event and Operation.
The packet header size is fixed (7 bytes), while the packet payload type and content varies based on the type of packet: Event payload size is 6 bytes, while Operation payload size is 25 bytes.
The entire packet size is variable, being the sum of the fixed-size packet header and variable-sized packet payload: Event packet size is 13 bytes and Operation packet size is 32 bytes.

Each packet received by the projector is acknowledged with a return code:
- 06: Acknowledged with no error
- 15: Acknowledged, but an error has occurred.

Header

All Packets use the same Packet Header format.
The Packet Header size is fixed at seven bytes.

0	1	2	3	4	5	6
BE	EF	Packet Type	Packet Payload Size		Packet Checksum (CRC)	

0xEFBE is a fixed value that is used to insure packet alignment if there are partial packets received or byte lost. The ls-byte of the word 0xBE is sent first, then the ms-byte 0xEF.

The **Packet Type** is a number (a byte in length) that defines the type of data in the packet.

The **Packet Payload Size** is a number (two bytes) that defines the size of the payload portion of the packet.
For a given Packet Type, Packet Size is fixed.

The **Packet Checksum** (two bytes) is the CRC value for the entire packet (Header and Payload).

Payload

The packet payload format depends on the packet type.
The Event packet payload size is 6 bytes, while the Operation packet payload size is 25 bytes.

Event Packet Format:

0	1	2	3	4	5
Event		00	00	00	00

Operation Packet Format:

0	1	2	3	4	5	6	7	8	9	10	11	12
Op Type	Operation ID		00	00	Target		Operation Value				00	00

13	14	15	16	17	18	19	20	21	22	23	24
00	00	00	00	00	00	00	00	00	00	00	00

4. Commands

Remote Control Keycodes

The following commands send simulated Remote Control input to SIM2 D35 projector.

Remote Control Keycodes:

Key	Command
STAND BY	BE EF 02 06 00 51 E4 48 01 00 00 00 00
0 (1)	BE EF 02 06 00 6B E6 52 01 00 00 00 00
1 (2)	BE EF 02 06 00 80 E5 49 01 00 00 00 00
2 (2)	BE EF 02 06 00 B3 E5 4A 01 00 00 00 00
3 (2)	BE EF 02 06 00 62 E4 4B 01 00 00 00 00
4 (2)	BE EF 02 06 00 D5 E5 4C 01 00 00 00 00
5 (2)	BE EF 02 06 00 04 E4 4D 01 00 00 00 00
6	BE EF 02 06 00 37 E4 4E 01 00 00 00 00
7	BE EF 02 06 00 E6 E5 4F 01 00 00 00 00
8	BE EF 02 06 00 89 E7 50 01 00 00 00 00
9	BE EF 02 06 00 58 E6 51 01 00 00 00 00
ESC	BE EF 02 06 00 0D E6 54 01 00 00 00 00
CURSOR UP	BE EF 02 06 00 DC E7 55 01 00 00 00 00
CURSOR LEFT	BE EF 02 06 00 EF E7 56 01 00 00 00 00
CURSOR RIGHT	BE EF 02 06 00 3E E6 57 01 00 00 00 00
CURSOR DOWN	BE EF 02 06 00 C1 E6 58 01 00 00 00 00
MENU LEFT (-)	BE EF 02 06 00 10 E7 59 01 00 00 00 00
MENU RIGHT (+)	BE EF 02 06 00 23 E7 5A 01 00 00 00 00
FREEZE	BE EF 02 06 00 F2 E6 5B 01 00 00 00 00
ZOOM	BE EF 02 06 00 94 E6 5D 01 00 00 00 00
FOCUS	BE EF 02 06 00 76 E7 5F 01 00 00 00 00
INFO	BE EF 02 06 00 A7 E6 5E 01 00 00 00 00
AUTO	BE EF 02 06 00 79 E2 60 01 00 00 00 00
ASPECT NORMAL	BE EF 02 06 00 2A F4 83 01 00 00 00 00
ASPECT ANAMORPHIC	BE EF 02 06 00 9D F5 84 01 00 00 00 00
ASPECT LETTERBOX	BE EF 02 06 00 4C F4 85 01 00 00 00 00
ASPECT PANORAMIC	BE EF 02 06 00 7F F4 86 01 00 00 00 00
ASPECT PIXEL TO PIXEL	BE EF 02 06 00 AE F5 87 01 00 00 00 00
ASPECT USER 1	BE EF 02 06 00 51 F5 88 01 00 00 00 00
ASPECT USER 2	BE EF 02 06 00 80 F4 89 01 00 00 00 00
ASPECT USER 3	BE EF 02 06 00 B3 F4 8A 01 00 00 00 00
VCR	BE EF 02 06 00 9B E3 62 01 00 00 00 00

Direct access codes

Goto Brightness	BE EF 02 06 00 C7 E1 7E 01 00 00 00 00
Goto Contrast	BE EF 02 06 00 16 E0 7F 01 00 00 00 00
Goto Color	BE EF 02 06 00 19 F4 80 01 00 00 00 00
Goto Tint	BE EF 02 06 00 C8 F5 81 01 00 00 00 00

(1) When the unit is in Stand-by state, this command switches on the unit and the last source memorised prior to switch off is automatically selected.
(2) When the unit is in Stand-by state, this command switches on the unit and selects the corresponding Source.

Operation Codes

The following codes provide direct access to SIM2 D35 User Interface operations not accessible via a single Remote Control command.

Operation Codes:

Operation	Action	Command
BRIGHTNESS	INCREMENT	BE EF 03 19 00 AB 7E 03 00 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	DECREMENT	BE EF 03 19 00 C5 D4 04 00 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
CONTRAST	INCREMENT	BE EF 03 19 00 3E 23 03 01 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	DECREMENT	BE EF 03 19 00 50 89 04 01 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
COLOR	INCREMENT	BE EF 03 19 00 C1 C7 03 02 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	DECREMENT	BE EF 03 19 00 AF 6D 04 02 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
TINT	INCREMENT	BE EF 03 19 00 54 9A 03 03 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	DECREMENT	BE EF 03 19 00 3A 30 04 03 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
SHARPNESS (Video)	INCREMENT	BE EF 03 19 00 7E 0C 03 04 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	DECREMENT	BE EF 03 19 00 10 A6 04 04 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
SHARPNESS FILTER	INCREMENT	BE EF 03 19 00 D4 C4 03 09 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	DECREMENT	BE EF 03 19 00 BA 6E 04 09 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
SHARPNESS MODE	SET VIDEO	BE EF 03 19 00 7A 80 01 60 02 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	SET GRAPHICS	BE EF 03 19 00 EA 41 01 60 02 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
CINEMA MODE	SET OFF	BE EF 03 19 00 33 43 01 07 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	SET AUTO	BE EF 03 19 00 A3 82 01 07 08 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
VIDEO TYPE	SET NORMAL	BE EF 03 19 00 A6 1E 01 06 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	SET VCR	BE EF 03 19 00 36 DF 01 06 08 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
POSITION HORIZONTAL	INCREMENT	BE EF 03 19 00 55 BA 03 21 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	DECREMENT	BE EF 03 19 00 3B 10 04 21 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
POSITION VERTICAL	INCREMENT	BE EF 03 19 00 AA 5E 03 22 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	DECREMENT	BE EF 03 19 00 C4 F4 04 22 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
COLOR TEMPERATURE	SET HIGH	BE EF 03 19 00 CD 17 01 37 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	SET MEDIUM	BE EF 03 19 00 5D D6 01 37 08 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	SET LOW	BE EF 03 19 00 AC 96 01 37 08 00 00 00 00 00 00 02 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	SET USER	BE EF 03 19 00 3C 57 01 37 08 00 00 00 00 00 00 03 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

GAMMA	SET FILM	BE EF 03 19 00 58 DA 01 27 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	SET VIDEO	BE EF 03 19 00 C8 1B 01 27 08 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	SET GRAPHICS	BE EF 03 19 00 39 5B 01 27 08 00 00 00 00 00 00 02 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
FREQUENCY	INCREMENT	BE EF 03 19 00 15 95 03 24 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	DECREMENT	BE EF 03 19 00 7B 3F 04 24 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
PHASE	INCREMENT	BE EF 03 19 00 80 C8 03 25 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	DECREMENT	BE EF 03 19 00 EE 62 04 25 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Y/C DELAY	INCREMENT	BE EF 03 19 00 7F 2C 03 26 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	DECREMENT	BE EF 03 19 00 11 86 04 26 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
MAGNIFICATION	INCREMENT	BE EF 03 19 00 FF 72 03 2C 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	DECREMENT	BE EF 03 19 00 91 D8 04 2C 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
PAN HORIZONTAL	INCREMENT	BE EF 03 19 00 6A 2F 03 2D 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	DECREMENT	BE EF 03 19 00 04 85 04 2D 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
PAN VERTICAL	INCREMENT	BE EF 03 19 00 95 CB 03 2E 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	DECREMENT	BE EF 03 19 00 FB 61 04 2E 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
KEYSTONE VERTICAL	INCREMENT	BE EF 03 19 00 01 26 03 1C 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	DECREMENT	BE EF 03 19 00 6F 8C 04 1C 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
KEYSTONE HORIZONTAL	INCREMENT	BE EF 03 19 00 6B 9F 03 1E 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	DECREMENT	BE EF 03 19 00 05 35 04 1E 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
LANGUAGE	SET ENGLISH	BE EF 03 19 00 15 35 01 05 24 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	SET ITALIANO	BE EF 03 19 00 85 F4 01 05 24 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	SET FRANCAIS	BE EF 03 19 00 74 B4 01 05 24 00 00 00 00 00 00 02 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	SET DEUTSCH	BE EF 03 19 00 E4 75 01 05 24 00 00 00 00 00 00 03 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	SET ESPANOL	BE EF 03 19 00 D6 37 01 05 24 00 00 00 00 00 00 04 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	SET PORTUGUES	BE EF 03 19 00 46 F6 01 05 24 00 00 00 00 00 00 05 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
OSD POSITION HORIZONTAL	INCREMENT	BE EF 03 19 00 82 88 03 61 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	DECREMENT	BE EF 03 19 00 EC 22 04 61 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
OSD POSITION VERTICAL	INCREMENT	BE EF 03 19 00 7D 6C 03 62 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	DECREMENT	BE EF 03 19 00 13 C6 04 62 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

INPUT 3 (COMP. RGB) / SIGNAL TYPE	SET YCrCb AutoSync	BE EF 03 19 00 92 04 01 82 08 00 00 00 00 00 00 14 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	SET YCrCb 15kHz	BE EF 03 19 00 5B 0C 01 82 08 00 00 00 00 00 00 08 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	SET YCrCb 32kHz	BE EF 03 19 00 51 06 01 82 08 00 00 00 00 00 00 10 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	SET RGB AutoSync	BE EF 03 19 00 97 01 01 82 08 00 00 00 00 00 00 18 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	SET RGB 15kHz	BE EF 03 19 00 5E 09 01 82 08 00 00 00 00 00 00 04 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
	SET RGB 32kHz	BE EF 03 19 00 98 0E 01 82 08 00 00 00 00 00 00 0C 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

5. Examples

1. **Send the simulated "SWITCH ON FROM STAND-BY AND SELECT SOURCE" Remote Control keycode.**
   Remote Control allows Switching on from Stand-by via one of the keys "1", "2" ... "5".
   Send, for instance, the code relative to key "1": `BEEF02060080E5490100000000.`
   The projector switches on and selects Input 1.
   The projector returns the response code: `06` (Acknowledged with no error).
   NOTE: Commands that simulate keys "1", "2" ... "5" switch on the unit and select the corresponding Source.
   Command that simulate key 0 switches on the unit: the last source memorised prior to switch off is automatically selected.

2. **Send the simulated "MENU RIGHT" Remote Control keycode.**
   Send the packet: `BEEF02060023E75A0100000000.`
   The OnScreen Display appers on the screen.
   The projector returns the response code: `06` (Acknowledged with no error).

3. **Send the "SET ASPECT ANAMORPHIC" Operation Code.**
   Send the packet: `BEEF0206009DF5840100000000.`
   The Aspect Ratio changes to Anamorphic.
   The projector returns the response code: `06` (Acknowledged with no error).

4. **Select "INPUT 3 (COMP. RGB) WITH YcrCb 15kHz SIGNAL"**
   Send the packet: `BEEF0319005B0C0182080000000000000800000000000000000000000000000000`
   Wait for the return code and add an additional delay of 40 ms.
   Send the the code relative to the Key to which Input 3 has been assigned: for instance if the key is "3" the code is: `BEEF02060062E44B0100000000`

6. Warnings

When the number of bytes sent to the Projector is greater than indicated for the Command (32 bytes for Operation Packets and 13 bytes for Event Packets), excess data will be ignored.
Conversely, if number of bytes sent to the Projector is smaller than required by the Communication Protocol, an Error Code will be returned.
Allow a time interval of at least 40 ms between the Return Code and the following Command.