JVC D-ILA® Projector

DLA-HD350 / DLA-HD750
DLA-HD550 / DLA-HD950
DLA-HD990

DLA-RS10 / DLA-RS20
DLA-RS15 / DLA-RS25
DLA-RS35

RS-232C and Infrared Remote Control Guide

Version 1.1

Contents

Introduction

This guide is intended to provide all of the information required to enable Remote Control of JVC D-ILA projectors, either by RS-232C connection or by Infrared Remote Control. This will enable Custom Installers or users to remotely control almost every function on these projectors.

The RS-232C codes shown in this guide will control the JVC DLA-HD350, DLA-HD750, DLA-HD550, DLA-HD950, DLA-HD990, DLA-RS10, DLA-RS20, DLA-RS15, DLA-RS25 and DLA-RS35 D-ILA projectors via an RS-232C connection. The commands in this guide are in raw hexadecimal format and may require conversion to work with proprietary control systems. See page 7 for some examples of how to convert them. Please note that some commands work only with specific projector models and this is indicated where applicable. Although the majority of users and installers will probably not require it, full details of the RS-232C interface and command format are shown on pages 12-13.

The Infrared Remote Control Codes shown in this guide will control the JVC DLA-HD350, DLA-HD750, DLA-HD550, DLA-HD950, DLA-HD990, DLA-RS10, DLA-RS20, DLA-RS15, DLA-RS25 and DLA-RS35 D-ILA projectors via Infrared emulation. Some controllers will also generate Infrared commands from the RS-232C control codes.

RS-232C Command Types

There are two basic types of RS-232C commands. These are:

1. Direct Commands (see page 3)

2. Remote Control Emulation Commands (see pages 4-6).

Direct Commands, as their name suggests, directly control the projector. Remote Control Emulation Commands achieve the same result, but they do it by emulating the functionality of the Remote Control Commands. The general rule is to use a Direct Command if one is available, otherwise use a Remote Control Emulation Command. One other difference between them is that Direct Commands will generally display fewer on-screen confirmation messages when the projector responds to them.

Some commands are duplicated as both a Direct Command and a Remote Control Emulation Command. For these, the Direct Command should be used in preference to the Remote Control Emulation Command unless any extra on-screen confirmation messages provided by the Remote Control Emulation Command are required. Many of the commands in the Remote Control Emulation list do not actually appear on the Remote Control Handset, but they are all available if you wish to control those functions on the projector, either by RS-232C connection, or by Infrared Remote Control.

In addition to the commands sent from the PC or controller to the projector, there are two types of Acknowledgement Response Return Codes returned by the projector to the PC or controller. When used with appropriate control equipment, these can be used to further customise the installation. Details of the Acknowledgement Response Return Codes and how to use them are on pages 8-11.

The following four pages contain a list of all useful Direct and Remote Control Emulation Commands.

Direct Commands:

POWER	
Command	Hex Code
Power Off	21 89 01 50 57 30 0A
Power On	21 89 01 50 57 31 0A

INPUT SWITCHING	
Command	Hex Code
Input – S-Video	21 89 01 49 50 30 0A
Input – Video	21 89 01 49 50 31 0A
Input – Component	21 89 01 49 50 32 0A
Input – PC (HD750/950/990/RS20/25/35)	21 89 01 49 50 33 0A
Input – HDMI 1	21 89 01 49 50 36 0A
Input – HDMI 2	21 89 01 49 50 37 0A
Input + (Go to next highest input)	21 89 01 49 50 2B 0A
Input – (Go to next lowest input)	21 89 01 49 50 2D 0A

TEST PATTERNS	
Command	Hex Code
Test Pattern – Off	21 89 01 54 53 30 0A
Test Pattern – Colour Bars	21 89 01 54 53 31 0A
Test Pattern – Stair step (black and white)	21 89 01 54 53 36 0A
Test Pattern – Stair step (red)	21 89 01 54 53 37 0A
Test Pattern – Stair step (green)	21 89 01 54 53 38 0A
Test Pattern – Stair step (blue)	21 89 01 54 53 39 0A
Test Pattern – Crosshatch (green)	21 89 01 54 53 41 0A

GAMMA TABLE	
Command	Hex Code
Gamma – Normal	21 89 01 47 54 30 0A
Gamma – A	21 89 01 47 54 31 0A
Gamma – B	21 89 01 47 54 32 0A
Gamma – C	21 89 01 47 54 33 0A
Gamma – D (HD550/950/990/RS15/25/35)	21 89 01 47 54 37 0A
Gamma – Custom1	21 89 01 47 54 34 0A
Gamma – Custom2	21 89 01 47 54 35 0A
Gamma – Custom3	21 89 01 47 54 36 0A

GAMMA VALUE	
Command	Hex Code
Gamma Correction Value – 1.8	21 89 01 47 50 30 0A
Gamma Correction Value – 1.9	21 89 01 47 50 31 0A
Gamma Correction Value – 2.0	21 89 01 47 50 32 0A
Gamma Correction Value – 2.1	21 89 01 47 50 33 0A
Gamma Correction Value – 2.2	21 89 01 47 50 34 0A
Gamma Correction Value – 2.3	21 89 01 47 50 35 0A
Gamma Correction Value – 2.4	21 89 01 47 50 36 0A
Gamma Correction Value – 2.5	21 89 01 47 50 37 0A
Gamma Correction Value – 2.6	21 89 01 47 50 38 0A

TEST COMMAND	
Command	Hex Code
Null Command (to check communication)	21 89 01 00 00 0A

Remote Control Emulation Commands

Command	Hex Code	ASCII
Advanced (HD550/950/990/RS15/25/35) (Direct access to Picture Adjust > Advanced)	21 89 01 52 43 37 33 37 33 0A	73
Aspect – 16:9	21 89 01 52 43 37 33 32 36 0A	26
Aspect – 4:3	21 89 01 52 43 37 33 32 35 0A	25
Aspect – Zoom	21 89 01 52 43 37 33 32 37 0A	27
Aspect + (cycles through all available modes)	21 89 01 52 43 37 33 37 37 0A	77
Back (steps backwards through menus and removes any OSD messages)	21 89 01 52 43 37 33 30 33 0A	03
BNR (Block Noise Reduction) Off	21 89 01 52 43 37 33 31 30 0A	10
BNR (Block Noise Reduction) On	21 89 01 52 43 37 33 30 46 0A	0F
Brightness –	21 89 01 52 43 37 33 37 42 0A	7B
Brightness +	21 89 01 52 43 37 33 37 41 0A	7A
Brightness Adj. (Adjustment Bar On/Off toggle)	21 89 01 52 43 37 33 30 39 0A	09
CEC – Off	21 89 01 52 43 37 33 35 37 0A	57
CEC – On	21 89 01 52 43 37 33 35 36 0A	56
Colour –	21 89 01 52 43 37 33 37 44 0A	7D
Colour +	21 89 01 52 43 37 33 37 43 0A	7C
Colour Adj. (Adjustment Bar On/Off toggle)	21 89 01 52 43 37 33 31 35 0A	15
Colour Management – Custom1 (HD750/HD950/HD990/RS20/RS25/RS35)	21 89 01 52 43 37 33 36 31 0A	61
Colour Management – Custom2 (HD750/HD950/HD990/RS20/RS25/RS35)	21 89 01 52 43 37 33 36 32 0A	62
Colour Management – Custom3 (HD750/HD950/HD990/RS20/RS25/RS35)	21 89 01 52 43 37 33 36 33 0A	63
Colour Management – Off (HD750/HD950/HD990/RS20/RS25/RS35)	21 89 01 52 43 37 33 36 30 0A	60
Colour Temp. – 5800K	21 89 01 52 43 37 33 34 45 0A	4E
Colour Temp. – 6500K	21 89 01 52 43 37 33 34 46 0A	4F
Colour Temp. – 7500K	21 89 01 52 43 37 33 35 30 0A	50
Colour Temp. – 9300K	21 89 01 52 43 37 33 35 31 0A	51
Colour Temp. – Custom1	21 89 01 52 43 37 33 35 33 0A	53
Colour Temp. – Custom2	21 89 01 52 43 37 33 35 34 0A	54
Colour Temp. – Custom3	21 89 01 52 43 37 33 35 35 0A	55
Colour Temp. – High Bright	21 89 01 52 43 37 33 35 32 0A	52
Colour Temp. + (cycles through all options)	21 89 01 52 43 37 33 37 36 0A	76
Contrast –	21 89 01 52 43 37 33 37 39 0A	79
Contrast +	21 89 01 52 43 37 33 37 38 0A	78
Contrast Adj. (Adjustment Bar On/Off toggle)	21 89 01 52 43 37 33 30 41 0A	0A
CTI (Colour Transient improvement) – High	21 89 01 52 43 37 33 35 46 0A	5F
CTI (Colour Transient Improvement) – Low	21 89 01 52 43 37 33 35 44 0A	5D
CTI (Colour Transient Improvement) – Middle	21 89 01 52 43 37 33 35 45 0A	5E
CTI (Colour Transient Improvement) – Off	21 89 01 52 43 37 33 35 43 0A	5C
Cursor Down ▼	21 89 01 52 43 37 33 30 32 0A	02
Cursor Left ◄	21 89 01 52 43 37 33 33 36 0A	36
Cursor Right ►	21 89 01 52 43 37 33 33 34 0A	34
Cursor Up ▲	21 89 01 52 43 37 33 30 31 0A	01
Detail Enhance –	21 89 01 52 43 37 33 31 32 0A	12
Detail Enhance +	21 89 01 52 43 37 33 31 31 0A	11
Gamma – A	21 89 01 52 43 37 33 33 39 0A	39
Gamma – B	21 89 01 52 43 37 33 33 41 0A	3A

Command	Hex Code	ASCII
Gamma – C	21 89 01 52 43 37 33 33 42 0A	3B
Gamma – D (HD550/950/990/RS15/25/35)	21 89 01 52 43 37 33 33 46 0A	3F
Gamma – Custom1	21 89 01 52 43 37 33 33 43 0A	3C
Gamma – Custom2	21 89 01 52 43 37 33 33 44 0A	3D
Gamma – Custom3	21 89 01 52 43 37 33 33 45 0A	3E
Gamma – Normal	21 89 01 52 43 37 33 33 38 0A	38
Gamma + (cycles through all options)	21 89 01 52 43 37 33 37 35 0A	75
Hide (On/Off toggle)	21 89 01 52 43 37 33 31 44 0A	1D
Information (displays Information tab of menu)	21 89 01 52 43 37 33 37 34 0A	74
Input – Component	21 89 01 52 43 37 33 34 44 0A	4D
Input – HDMI-1	21 89 01 52 43 37 33 37 30 0A	70
Input – HDMI-2	21 89 01 52 43 37 33 37 31 0A	71
Input – PC (HD750/950/990/RS20/25/35)	21 89 01 52 43 37 33 34 36 0A	46
Input – S-Video	21 89 01 52 43 37 33 34 43 0A	4C
Input – Video	21 89 01 52 43 37 33 34 42 0A	4B
Input + (cycles through all inputs)	21 89 01 52 43 37 33 30 38 0A	08
ISF – Off (HD950/990/RS25/35)	21 89 01 52 43 37 33 35 41 0A	5A
ISF – On (HD950/990/RS25/35)	21 89 01 52 43 37 33 35 42 0A	5B
Keystone Correction Horizontal –	21 89 01 52 43 37 33 34 31 0A	41
Keystone Correction Horizontal +	21 89 01 52 43 37 33 34 30 0A	40
Keystone Correction Vertical –	21 89 01 52 43 37 33 31 43 0A	1C
Keystone Correction Vertical +	21 89 01 52 43 37 33 31 42 0A	1B
Lens Aperture – 1 (HD350/HD550)	21 89 01 52 43 37 33 32 38 0A	28
Lens Aperture – 2 (HD350/HD550)	21 89 01 52 43 37 33 32 39 0A	29
Lens Aperture – 3 (HD350/HD550)	21 89 01 52 43 37 33 32 41 0A	2A
Lens Aperture Adj. (HD350/750/950/990/ RS10/20/25/35 – On/Off toggle of adjustment) (HD550/RS15 – Cycles through all options)	21 89 01 52 43 37 33 32 30 0A	20
Lens Control (cycles through all options)	21 89 01 52 43 37 33 33 30 0A	30
Lens Focus –	21 89 01 52 43 37 33 33 32 0A	32
Lens Focus +	21 89 01 52 43 37 33 33 31 0A	31
Lens Shift – Down	21 89 01 52 43 37 33 32 32 0A	22
Lens Shift – Left	21 89 01 52 43 37 33 34 34 0A	44
Lens Shift – Right	21 89 01 52 43 37 33 34 33 0A	43
Lens Shift – Up	21 89 01 52 43 37 33 32 31 0A	21
Lens Zoom – In	21 89 01 52 43 37 33 33 35 0A	35
Lens Zoom – Out	21 89 01 52 43 37 33 33 37 0A	37
Menu (On/Off toggle)	21 89 01 52 43 37 33 32 45 0A	2E
Menu Position (HD550/950/990/RS15/25/35)	21 89 01 52 43 37 33 34 32 0A	42
MNR (Mosquito Noise Reduction) –	21 89 01 52 43 37 33 30 45 0A	0E
MNR (Mosquito Noise Reduction) +	21 89 01 52 43 37 33 30 44 0A	0D
NR (toggles display of RNR/MNR)	21 89 01 52 43 37 33 31 38 0A	18
OK (to accept currently selected option)	21 89 01 52 43 37 33 32 46 0A	2F
Picture Adjust (HD550/750/990/RS15/25/35)	21 89 01 52 43 37 33 37 32 0A	72
Picture Mode – Cinema1	21 89 01 52 43 37 33 36 39 0A	69
Picture Mode – Cinema2	21 89 01 52 43 37 33 36 38 0A	68
Picture Mode – Cinema3 (HD550/750/990/RS15/25/35)	21 89 01 52 43 37 33 36 36 0A	66
Picture Mode – Dynamic	21 89 01 52 43 37 33 36 42 0A	6B
Picture Mode – Natural	21 89 01 52 43 37 33 36 41 0A	6A
Picture Mode – Stage	21 89 01 52 43 37 33 36 37 0A	67
Picture Mode – THX (HD750/950/990/RS20/25/35)	21 89 01 52 43 37 33 36 46 0A	6F

Command	Hex Code	ASCII
Picture Mode – User1	21 89 01 52 43 37 33 36 43 0A	6C
Picture Mode – User2	21 89 01 52 43 37 33 36 44 0A	6D
Picture Mode – User3	21 89 01 52 43 37 33 36 45 0A	6E
Power – Off (send twice to switch off)	21 89 01 52 43 37 33 30 36 0A	06
Power – On	21 89 01 52 43 37 33 30 35 0A	05
Quick Align (PC input on HD750/950/990/ RS20/25/35)	21 89 01 52 43 37 33 31 33 0A	13
RNR (Random Noise Reduction) –	21 89 01 52 43 37 33 30 43 0A	0C
RNR (Random Noise Reduction) +	21 89 01 52 43 37 33 30 42 0A	0B
Sharpness –	21 89 01 52 43 37 33 37 46 0A	7F
Sharpness +	21 89 01 52 43 37 33 37 45 0A	7E
Sharpness Adj. (Adjustment Bar On/Off toggle)	21 89 01 52 43 37 33 31 34 0A	14
Shutter – Close (HD550/950/990/RS15/25/35)	21 89 01 52 43 37 33 31 39 0A	19
Shutter – Open (HD550/950/990/RS15/25/35)	21 89 01 52 43 37 33 31 41 0A	1A
Shutter – On (HD550/950/990/RS15/25/35) Synchronises shutter with “Hide” function.	21 89 01 52 43 37 33 32 43 0A	2C
Shutter – Off (HD550/950/990/RS15/25/35) Un-synchronises shutter with “Hide” function.	21 89 01 52 43 37 33 32 44 0A	2D
Test Pattern (cycles through all patterns)	21 89 01 52 43 37 33 35 39 0A	59
Tint Adj. (Adjustment Bar On/Off toggle)	21 89 01 52 43 37 33 31 36 0A	16
Vertical Stretch – Off	21 89 01 52 43 37 33 32 34 0A	24
Vertical Stretch – On	21 89 01 52 43 37 33 32 33 0A	23

Converting & Testing Codes

The codes shown on pages 3-6 are raw hex codes and must be converted to the appropriate format in order to work with proprietary controllers such as those from Crestron or AMX. To help with the conversion, here are two sample strings for those brands:

Crestron controller – Power On Command:

\x21\x89\x01\x50\x57\x31\x0A\r

AMX controller – Power On Command:

SEND_STRING dvProj, "$21, $89, $01, $50, $57, $31, $0A”

You can see from these examples that it is easy to convert any of the RS-232C codes in this guide into the equivalent Crestron or AMX control strings. This should also be the case for most other controllers that allow transmission of hex data.

In order to test these commands, it is useful to have a program that can send raw hex codes directly to the Serial port on a PC. There are many programs that can do this, but there are a few that are useful for test purposes:

RS232 Hex Com Tool – 30 Day Evaluation Version available from http://www.rs232pro.com
This is a very simple to use program that lets you send any hex command and see the response from the projector. The Evaluation Version times out every five minutes, but it can be instantly restarted and is very simple to use.

Hercules Setup Utility – Free from:
http://www.hw-group.com/products/hercules/index_en.html
This is a slightly more complex program that can do far more than just send hex commands. Use the “Serial” tab to send commands direct to the serial port. This program is recommended if you are a more experienced PC user.

Docklight – Evaluation version available from: http://www.docklight.de
Another more advanced program. This one is particularly good for checking the Acknowledgement Response Return Codes.

AccessPort – Free from: http://www.sudt.com/en/ap/index.html
This is an intermediate level program. Not as easy to use as some of the others, but free.

Eltima Software Advanced Serial Port Terminal – 14 Day Evaluation Version available from: http://www.eltima.com/products/serial-port-terminal/
This is an excellent intermediate level program. It allows the commands to be sent in loops for repeated testing. It also shows the return codes in both hex and ASCII formats.

If you want to use just one program from those above for general testing, I would recommend the Hercules Setup Utility.

All of these programs will accept the hex codes exactly as shown in this guide. They can simply be copied and pasted into the programs and then sent to the projector. Most of the programs require the user to switch to hex mode before sending hex codes.

Please note that you will require a cross-connected serial cable (sometimes called a null-modem or DTE/DTE cable) if you wish to connect the projector to a PC for testing.

Acknowledgement Response Return Codes - Basic

In most installations, it will normally be sufficient just to send a command to the projector and assume that the projector will carry it out requested. In some installations, there may be a requirement to confirm that the projector has carried out the command before continuing. This is particularly important when sending multiple commands. It is possible to check if the projector has carried out a command by monitoring the Acknowledgement Response Return Code returned by the projector. The projector will return an Acknowledgement Response Return Code for any valid command that it receives.

The general format of the Acknowledgement Response returned from the projector is:

06 89 01 CC CC 0A - Where CC CC is the first 2 bytes of the command that was originally sent to the projector (not including the 21 89 01).

Taking the Power On command from page 3 as an example, to switch the projector power on, we would send to the projector:

21 89 01 50 57 31 0A

If the Power On Command completes successfully, the projector will return:

06 89 01 50 57 0A

This Acknowledgement Response format is the same for all of the commands listed above.

The Acknowledgement Response Return Codes for all of the commands listed on pages 3-6 (assuming the command is successful) are as follows:

Function	Acknowledgement Response
Power On/Off	06 89 01 50 57 0A
Input Changed	06 89 01 49 50 0A
Test Pattern On/Off	06 89 01 54 53 0A
Gamma Table Changed	06 89 01 47 54 0A
Gamma Value Changed	06 89 01 47 50 0A
Remote Control Emulation Command (all commands)	06 89 01 52 43 0A
Test (Null Command – to check communication)	06 89 01 00 00 0A

The list above includes a Test (null) response. This doesn't actually do anything, but it is useful to check that the controller is communicating with the projector before sending any real commands. This should be used with the Test Command shown on page 3.

If we send to the projector:

21 89 01 00 00 0A

Assuming the projector is connected to the PC or controller correctly, it will respond with:

06 89 01 00 00 0A

It will respond whether it is in Standby or Powered On.

Acknowledgement Response Return Codes - Advanced

For some functions, it is possible to obtain a more detailed response from the projector. This is useful where different actions are required depending on the current projector settings or status. To request the detailed response, taking the above example of the Power Command, we would send to the projector:

3F 89 01 50 57 0A

If the projector receives the enquiry command, as a confirmation that it has received the command, it will first respond with exactly the same information as that returned by the basic Acknowledgement Return Code shown on page 8:

06 89 01 50 57 0A

Next, the projector will send the detailed response. It will send:

40 89 01 50 57 **RR** 0A – Where RR is the Detailed Response Return Code.

For clarity, the two returned responses are separated here. In practice, they are returned from the projector as one continuous string.

For the power Status Enquiry, the possible values for the Detailed Response Return Code status (RR) are:

30 – Standby
31 – Power On
32 – Cooling
34 – Emergency

So, as a full worked example, if we send to the projector:

3F 89 01 50 57 0A

If the projector were currently cooling down after being switched to Standby, it would return:

06 89 01 50 57 0A 40 89 01 50 57 32 0A

If the projector were on Standby, it would return:

06 89 01 50 57 0A 40 89 01 50 57 30 0A

A list of all of the useful enquiry codes, together with all possible detailed responses is below:

Power Status (to confirm the current Power Status)

Enquiry Command (to projector)	3F 89 01 50 57 0A
Response (from projector)	06 89 01 50 57 0A 40 89 01 50 57 **RR** 0A

Response (RR)	Meaning
30	Standby
31	Power On
32	Cooling
34	Emergency

Input Status (to confirm the current Video Input)

Enquiry Command (to projector)	3F 89 01 49 50 0A
Response (from projector)	06 89 01 49 50 0A 40 89 01 49 50 **RR** 0A

Response (RR)	Meaning
30	S-Video
31	Video
32	Component
33	PC (HD750/HD950/HD990/RS20/RS25/RS35 only)
36	HDMI 1
37	HDMI 2

Gamma Table (to confirm the current Gamma Table)

Enquiry Command (to projector)	3F 89 01 47 54 0A
Response (from projector)	06 89 01 47 54 0A 40 89 01 47 54 **RR** 0A

Response (RR)	Meaning
30	Gamma – Normal
31	Gamma – A
32	Gamma – B
33	Gamma – C
34	Gamma – Custom1
35	Gamma – Custom2
36	Gamma – Custom3

Gamma Value (to confirm the current Gamma Value)

Enquiry Command (to projector)	3F 89 01 47 50 0A
Response (from projector)	06 89 01 47 50 0A 40 89 01 47 50 **RR** 0A

Response (RR)	Meaning
30	Gamma Correction Value – 1.8
31	Gamma Correction Value – 1.9
32	Gamma Correction Value – 2.0
33	Gamma Correction Value – 2.1
34	Gamma Correction Value – 2.2
35	Gamma Correction Value – 2.3
36	Gamma Correction Value – 2.4
37	Gamma Correction Value – 2.5
38	Gamma Correction Value – 2.6

Source Status (to confirm the current Video Source Status)

Enquiry Command (to projector)	3F 89 01 53 43 0A
Response (from projector)	06 89 01 53 43 0A 40 89 01 53 43 **RR** 0A

Response (RR)	Meaning
00	JVC Logo displayed
30	No signal or signal out of range
31	Signal input correctly

There is one enquiry command that has a different response from the projector to those listed above. This is the Model Status enquiry. When this enquiry sent to the projector, the projector will respond with a 14-byte string that identifies the model number(s) of the projector.

Details are as follows:

Model Status (to confirm the current Projector Model)

Enquiry Command (to projector)	3F 89 01 4D 44 0A
Response (from projector)	06 89 01 4D 44 0A 40 89 01 4D 44 **RR** 0A

Response (RR)	Meaning
49 4C 41 46 50 4A 20 2D 2D 20 2D 58 48 34	DLA-HD350
49 4C 41 46 50 4A 20 2D 2D 20 2D 58 48 37	DLA-RS10
49 4C 41 46 50 4A 20 2D 2D 20 2D 58 48 35	DLA-HD750 & DLA-RS20
49 4C 41 46 50 4A 20 2D 2D 20 2D 58 48 38	DLA-HD550
49 4C 41 46 50 4A 20 2D 2D 20 2D 58 48 41	DLA-RS15
49 4C 41 46 50 4A 20 2D 2D 20 2D 58 48 39	DLA-HD950/HD990/DLA-RS25/RS35

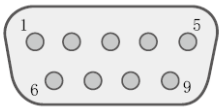
RS-232C Interface Details

The RS-232C interface on the projector is a standard 9 pin D-Sub male socket. The pin connections for the projector are as follows:

Pin No.	Signal	Function	Signal Direction
2	Rx Data	Receive Data	Computer/Controller to Projector
3	Tx Data	Transmit Data	Projector to Computer/Controller
5	Ground	Signal ground	–
1, 4 & 6-9	No Connection	–	–

Connector

Looking at the connector from the side of the projector, the pins are as follows:

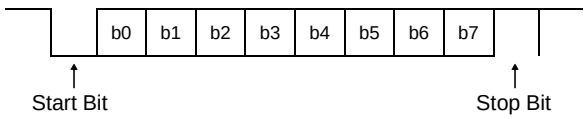


Communication Parameters

The communication parameters for the projector are as follows:

Parameter	Value
Interface	RS-232C
Mode	Asynchronous
Data Rate	19200bps (19.2kbps)
Character Length	8 Bit
Parity	None
Start Bit	1
Stop Bit	1
Flow Control	None
Data Format	Binary

Diagram of Data Format:



Set both send and receive modes to Hex in control software.

Command Format

The RS-232C commands are bidirectional and consist of a variable number of hexadecimal numbers. All of the commands sent to the projector shown in this guide are either 7 bytes or 10 bytes long. The Acknowledgement Response Return Codes returned from the projector can be between 6 and 14 bytes long. The basic format of the commands is as follows:

Section	Size	Comments
Header	1 byte	Can be one of four possible values – see below
Unit ID	2 bytes	Fixed – always 89 01
Command	2 bytes	See below
Data	Variable	Length varies depending on command – see below
End	1 byte.	Fixed – always 0A

Taking each of these sections in turn:

Header
The header can be one of 4 possible values. These are:
21 – Operating Command (from PC/controller to projector)
3F – Acknowledgement Response return Code Request (from PC/controller to projector)
06 – Acknowledgement Response Return Code – Basic (from projector to PC/controller)
40 – Acknowledgement Response Return Code – Detailed (from projector to PC/controller)

Unit ID
This is fixed at 89 01 for all models.

Command
This is the command sent to/from the projector and varies depending on the command. As an example, the Power Command is 50 57. The other commands can be worked out from the tables on pages 3-6.

Data
This is the value to apply to the command. Using the Power example above, the data value for Off is 30 and the data value for On is 31.

End
This signifies the end of the command and is fixed at 0A for all models.

Putting all this together, a typical command (Power On) to the projector would therefore be:

21	89	01	50	57	31	0A
Header	Unit ID		Command		Data	End

Error Handling
The projector will ignore any commands that it cannot recognise, e.g. Unit ID does not match, parity error, invalid command, etc. It will also ignore any inappropriate commands, e.g. Power On when in cooling mode.

The projector will discard any commands received if there is a break of 50ms or longer in the incoming data.

If consecutive commands are used, it is assumed that any external controller will not transmit a command until it has received an appropriate Acknowledgement Response Return Code to confirm that the projector is ready to accept the next command (see page 8 for details).

Infrared Control

It is also possible to control JVC D-ILA projectors via Infrared Remote Control Signal Emulation, though is this sometimes slightly more difficult to achieve than RS-232C control due to the differences in Infrared emulation methods between the various equipment manufacturers.

To send an Infrared command to the projector, the required format is 73, followed by the ASCII value in hex of the command required. The ASCII values for all of the Remote Control Emulation Commands are shown in right hand column of the Remote Control Emulation Command tables on pages 4-6.

As an example, to send the Power On command, we would send: **73 05**

It is unlikely that these raw commands will work with proprietary Infrared controllers and they will have to be converted to the appropriate format before use. For the most common Infrared control system, the Philips Pronto, the widely available free “MakeHex” program should be able to convert the codes from this document into the “Long hex” format used by Pronto and other similar systems. Full details of how to carry out the conversion are included with the MakeHex program. When using MakeHex, you should set “Device=73” in the MakeHex .irp input file.

Some controllers are able to create Infrared Commands from the hex Remote Control Emulation Codes on pages 4-6. Where this is possible, it is a matter of personal preference as to which of them should be used.

Document Version History:

Version	Date	Details
1.0	01/06/2009	First Version
1.1	21/09/2009	Added new codes for DLA-HD550/HD950/HD990/RS15/RS25/RS35. Added RS-232C Interface Details. Added additional Video Source Status Response. Other minor corrections and amendments.

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