Interfacing to the LCV86LR1

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1	231007	Initial Release
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4		

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1 Introduction

1.1 Scope

This document contains the necessary information to interface 3rd party hardware and software to the LCV86LR1.

1.2 Identification

Unless otherwise specified, the requirements of this document apply to the target LCV86LR1 uniquely. The LCV8600 is similar in operation, but does not include the audio crosspoint function and does not respond to the *op_zone_on* command. The *op_comp_on* command must be used instead. To interface the LCV8600 to an RS232 system, the Leaf RS232 interface module must also be used.

1.3 System Overview

The LCV86LR1 implements an Audio/Video (A/V) crosspoint function, enabling it to independently route any of 8 A/V sources to any of 6 zones. The LCV86LR1 switches full component (YPrPb) signals in High Definition (HD) as well as stereo audio from the selected source to the target zone.

The LCV86LR1 transmits the analog video source signals as differential-mode signals over UnTwisted Pair (UTP) cables to the LCB20LR1 wallplate module where the signals are returned to unbalanced, suitable for connection to a HD monitor.

Configuration of the LCV86LR1 requires binary commands to be send from any Data Terminal Equipment (DTE) such as a PC or 3rd party home automation equipment.

2 Control Physical Interface

Connection to the LCV86LR1 is via DB 9 female (socket) connector wired Data Communications Equipment (DCE):

Pin	Signal	Direction
1	DCD	DCE → DTE
2	TxD	DCE → DTE
3	RxD	DTE → DCE
4	DTR	DTE → DCE
5	Gnd	-
6	DSR	DCE → DTE
7	RTS	DTE → DCE
8	CTS	DCE → DTE
9	RI	DCE → DTE

DTR is looped-back to emulate DSR and DCD.

Neither hardware (RTS/CTS) or software (XON/XOFF) handshake is required or supported.

3 Control Electrical Interface

Control codes are sent to the LCV86LR1 from the PC or other RS232 serial device. The data format is described in the following table:

Parameter	**Value**
Data Rate	9600bps
Start Bits	one
Parity	none
Stop Bits	one

4 Control Signaling Interface

Control codes are sent to the LCV86LR1 from the PC or other RS232 serial device. Data is sent in packets, with each packet consisting of 3 contiguous bytes:

The first byte is an opcode byte specifying the action to be performed,
the second byte is the number of the source selected by that zone and
the third byte is the zone number.

i.e. each packet from the keypad to the interface is of the format:

mnemonic		**Bit**							
Hex Value		D7	D6	D5	D4	D3	D2	D1	D0
Byte	1	Opcode							
	2	Source							
	3	Zone							

The following command opcodes are defined for the LCV86LR1:

op_zone_on Zone on - route the specified source to the specified zone
op_zone_of Zone off - turn the specified zone off
op_comp_on Component on - route the specified source to the specified zone (Same action as *op_zone_on*.)
op_glbl_on Global on - turn all zones on with the specified source.
op_glbl_of Global off - turn all zones off

The source numbering scheme is physical, that is from 1 through to 8, the zone numbering is logical, that is from 0 through to 5, covering zones 1 though 6 respectively.

Multiple configuration packets must not be sent contiguously, they must be spaced by at least 300mS to allow for processing.

Ten seconds after the last change to the crosspoint configuration, the configuration is stored to non-volatile memory and this configuration is restored at power-up.

The opcodes are detailed in the following sections:

4.1 Zone On Command

The Zone On command has the following structure

op_zone_on		Bit							
048H		D7	D6	D5	D4	D3	D2	D1	D0
Byte	1	0	1	0	0	1	0	0	0
	2	Source <1 to 8>							
	3	Zone <0 to 5>							

4.2 Zone Off Command

The Zone Off command has the following structure

op_zone_of		Bit							
047H		D7	D6	D5	D4	D3	D2	D1	D0
Byte	1	0	1	0	0	0	1	1	1
	2	Source <Don't Care>							
	3	Zone <0 to 5>							

4.3 Component On Command

The Component On command has the following structure

op_comp_on		Bit							
0BCH		D7	D6	D5	D4	D3	D2	D1	D0
Byte	1	1	0	1	1	1	1	0	0
	2	Source <1 to 8>							
	3	Zone <0 to 5>							

4.4 Global On Command

The Global On command has the following structure

op_glbl_on		Bit							
052H		D7	D6	D5	D4	D3	D2	D1	D0
Byte	1	0	1	0	1	0	0	1	0
	2	Source <1 to 8>							
	3	Zone <Don't Care>							

4.5 Global Off Command

The Global Off command has the following structure

op_glbl_of		Bit							
053H		D7	D6	D5	D4	D3	D2	D1	D0
Byte	1	0	1	0	1	0	0	1	1
	2	Source <Don't Care>							
	3	Zone <Don't Care>							

5 Connector Pinouts and Cable Wiring

Standard CAT5 cable is used to connect the wallplates to the interface unit.

Parameter	Value
Termination Standard	CAT5A
Cable Length	0 to 100M

Both cable ends are terminated the same. A crossover cable must NOT be used in any circumstance, damage to wallplate(s) or interface WILL result.

The RJ45 video and audio cable pinouts are described in the following table:

Pin	Video Cable	Audio Cable	Cable Conductor Colour
1	Y-	-	White, Green Stripe
2	Y+	-	Green
3	+12V	+12V	White, Orange Stripe
4	Pr-	IR Ring	Blue
5	Pr+	IR Tip	White, Blue Stripe
6	Gnd	Gnd	Orange
7	Pb-	S-	White, Brown Stripe
8	Pb+	S+	Brown

Note that the Audio Cable is not present for the LCV8600.

No damage will occur to either interface or wallplate if the video and audio cables are transposed, although no audio or video will be correctly decoded. No guarantee can be made against possible damage to any connected 3rd party equipment, so it is strongly advised that the installer ascertain that all cabling is correct before making connection to any other equipment.

[Ends]

Appendix A. Sample Code

The following examples are provided for clarification. All examples assume a Control 4 or code-equivalent programming interface.

Example 1. Global On, Source 2

To set all zones to source 2 issue the following command string:

$52 $02 $FF #300

The first byte is the *op_glbl_on* command, the second byte selects source 2 as global and the third byte is a don't care (a the value 0FFH has been used). The command is followed by a 300mS delay, so that the LCV86LR1 will be ready to process the next command as soon as it is issued.

Example 2. Source 3 to Zone 1

To route source 3 to zone 1, issue the following command string:

$48 $03 $00 #300

The first byte is the *op_zone_on* command, the second byte selects source 3 and the third byte selects zone 1. The command is again followed by a 300mS delay leaving the LCV86LR1 ready to process the next command.

Note that the *op_comp_on* command can be used interchangeably with the *op_zone_on* command for the LCV86LR1, but only the *op_comp_on* command may be used with the LCV8600.

Example 3. Zone 4 Off, Source 7 to Zone 3

To turn the existing source of zone 4 off and route source 7 to zone 3 issue the following command string:

$47 $FF $02 #300 $48 $07 $02 #300

The first byte is the *op_zone_of* command, the second byte a don't care and the third byte selects zone 3. The command is followed by a 300mS delay.

The next command begins immediately after the delay, selecting source 7 to zone 3 as per the previous example. Finally a 300mS delay is included so that the LCV86LR1 will be left ready to process the next command.

Appendix B. Binary/Hex Conversion

Bin				Hex
0	0	0	0	0
0	0	0	1	1
0	0	1	0	2
0	0	1	1	3
0	1	0	0	4
0	1	0	1	5
0	1	1	0	6
0	1	1	1	7

Bin				Hex
1	0	0	0	8
1	0	0	1	9
1	0	1	0	A
1	0	1	1	B
1	1	0	0	C
1	1	0	1	D
1	1	1	0	E
1	1	1	1	F

Appendix C. Cable Compensation Setting

The following chart (overleaf) shows the cable compensation setting as a function of cable length. Care should be taken to not over-compensate the cable length as it may result in loss of signal synchronization.