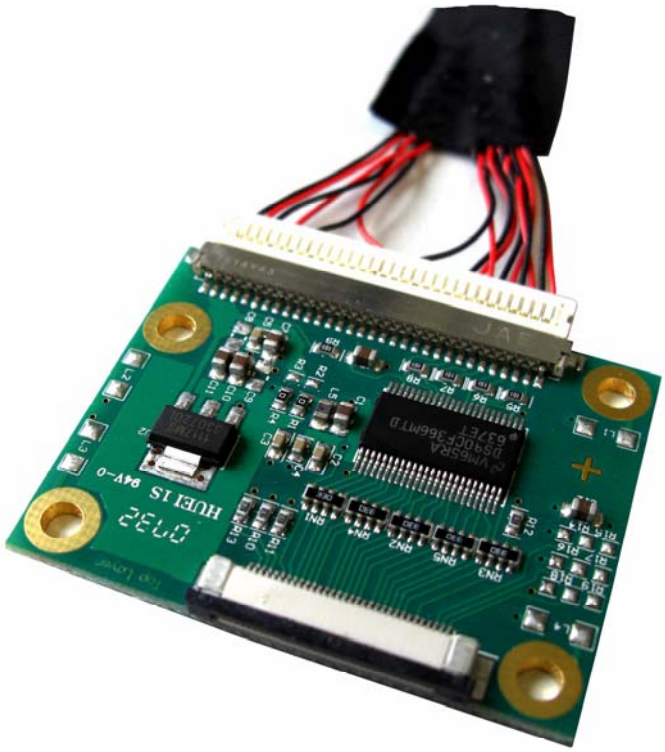
kontron

» Display Cable Guide «



JILI30 Development

KTD-S0018-0

» Table of Contents «

1 User Information

1.1 About This Document

This document provides information about products from KONTRON Technology A/S and/or its subsidiaries. No warranty of suitability, purpose or fitness is implied. While every attempt has been made to ensure that the information in this document is accurate the information contained within is supplied “as-is” - no liability is taken for any inaccuracies. Manual is subject to change without prior notice.
KONTRON assumes no responsibility for the circuits, descriptions and tables indicated as far as patents or other rights of third parties are concerned.

1.2 Copyright Notice

1.3 Trademarks

Brand and product names are trademarks or registered trademarks of their respective owners.

1.4 Standards

KONTRON Technology A/S is certified to ISO 9000 standards.

1.5 Warranty

This product is warranted against defects in material and workmanship for the warranty period from the date of shipment. During the warranty period KONTRON Technology A/S will at its discretion decide to repair or replace defective products.
Within the warranty period the repair of products is free of charge as long as warranty conditions are observed.
The warranty does not apply to defects resulting from improper or inadequate maintenance or handling by the buyer, unauthorized modification or misuse, operation outside of the product’s environmental specifications or improper installation or maintenance.
KONTRON Technology A/S will not be responsible for any defects or damages to third party products that are caused by a faulty KONTRON Technology A/S product.

1.6 Life Support Policy

KONTRON Technology's products are not for use as critical components in life support devices or systems without express written approval of the general manager of KONTRON Technology A/S.
As used herein:
Life support devices or systems are devices or systems which
a) are intended for surgical implant into body or
b) support or sustain life and whose failure to perform, when properly used in accordance with instructions for use provided in the labelling, can be reasonably expected to result in significant injury to the user.
A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system or to affect its safety or effectiveness.

1.7 Technical Support

Please consult our web site at **http://www.kontron.com/support** for the latest product documentation, utilities, drivers and support contacts. In any case you can always contact your board supplier for technical support.
Before contacting support please be prepared to provide as much information as possible:
Cable/Adapter identification:

- Type
- Part number (find PN on label)
- Attached hardware (LCD panels ...)

2 Introduction

2.1 JILI30 Specification

The SBCs (Single Board Computer) from KONTRON Technology A/S only support the JILI30 LVDS interface. JILI30 is a KONTRON hardware standard that interfaces a SBC via a LVDS connection to flatpanel displays. The number 30 is choosen because of the used 30 pin cables. In general a simple inexpensive cable with twisted lines is sufficient to establish the connection. For displays with a digital 18 bit interface and low resolutions (VGA to SVGA) KONTRON offers a special adapter board (KAB-ADAPT-LVDStoTTL). This adapter needs an additional FLEX32 cable for the connection to the display (the order implies 2 article numbers).

2.2 JILI30 Cable Overview

Please refer to the following matrix to choose the product that suits your needs best. The mentioned resolution is not binding as the cable could also be used for other resolutions – the panel connector is the most important part.

Article Number	Designation	Resolution	Display (Example)
62514	KAB-JILI30-TXLD03	XGA (1024x768), 24 Bit	SHARP LQ150X1LW71N
62517	KAB-JILI30-TELD02	SXGA (1280x1024), 24 Bit	AUO M170EN07
62518	KAB-JILI30-TSLD01	SVGA (800x600), 18 Bit WVGA (800x480), 18 Bit	AUO G104SN03 V2 PRIME VIEW PM070WL4
62520	KAB-JILI30-TXLD06	XGA (1024x768), 18 Bit	OPTREX T51756D121J-FW
62524	KAB-JILI30-TXLD07	XGA (1024x768), 24 Bit	NEC NL10276BC12-02
62526	KAB-JILI30-TSLD02	SVGA (800x600), 18 Bit	SANYO TM121SV-02L07

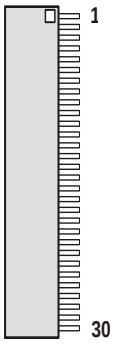
2.3 KAB-ADAPT-LVDStoTTL Accessories

Please refer to the following matrix to choose the product that suits your needs best. All displays that can be connected using a KAB-FLEX32 cable have a 18 bit digital interface (18 signal lines).

Article Number	Designation	Resolution	Display (Example)
61029	**KAB-ADAPT-LVDStoTTL**	----	----
64003	KAB-FLEX32-TSDD01	SVGA (800x600), left hand, 50 cm	SHARP & NEC Panels
64006	KAB-FLEX32-TVDD03	VGA (640x480), left hand, 20 cm	SHARP & NEC Panels
64007	KAB-FLEX32-TVDD04	VGA (640x480), right hand, 20 cm	SHARP & NEC Panels
64008	KAB-FLEX32-TSDD03	SVGA (800x600), left hand, 20 cm	SHARP & NEC Panels
64018	KAB-FLEX32-TVDD08	VGA (640x480), 20 cm	LG PHILIPS LB064V02
64019	KAB-FLEX32-TQDD01	QVGA (320x240), 20 cm	NEC NL3224BC35-20
64022	KAB-FLEX32-TVDD09	VGA (640x480), 20 cm	LG PHILIPS LB104V03
64026	KAB-FLEX32-TSDD10	SVGA (800x600), 30 cm	AUO A201SN02

3 JILI30 Connector (SBC Side)

It's a single row connector with 30 contacts and 1.0 mm pitch (JAE, FI-X30S-HF or equivalent).

Header	Pin	Signal Name	Function
	1	**FTX0-**	First channel data 0 output (negative)
	2	**FTX0+**	First channel data 0 output (positive)
	3	**FTX1-**	First channel data 1 output (negative)
	4	**FTX1+**	First channel data 1 output (positive)
	5	**FTX2-**	First channel data 2 output (negative)
	6	**FTX2+**	First channel data 2 output (positive)
	7	**GND**	Ground
	8	**FTXC-**	First channel clock output (negative)
	9	**FTXC+**	First channel clock output (positive)
	10	**FTX3-**	First channel data 3 output (negative)
	11	**FTX3+**	First channel data 3 output (positive)
	12	**STX0-**	Second channel data 0 output (negative)
	13	**STX0+**	Second channel data 0 output (positive)
	14	**GND**	Ground
	15	**STX1-**	Second channel data 1 output (negative)
	16	**STX1+**	Second channel data 1 output (positive)
	17	**GND**	Ground
	18	**STX2-**	Second channel data 2 output (negative)
	19	**STX2+**	Second channel data 2 output (positive)
	20	**STXC-**	Second channel clock output (negative)
	21	**STXC+**	Second channel clock output (positive)
	22	**STX3-**	Second channel data 3 output (negative)
	23	**STX3+**	Second channel data 3 output (positive)
	24	**GND**	Ground
	25	**SDA**	I2C data line
	26	**DATAENA**	Designator badly chosen - means: Panel power enable (power sequencing)
	27	**SCL**	I2C clock line
	28 - 30	**VCC**	Power +3.3V or +5.0V

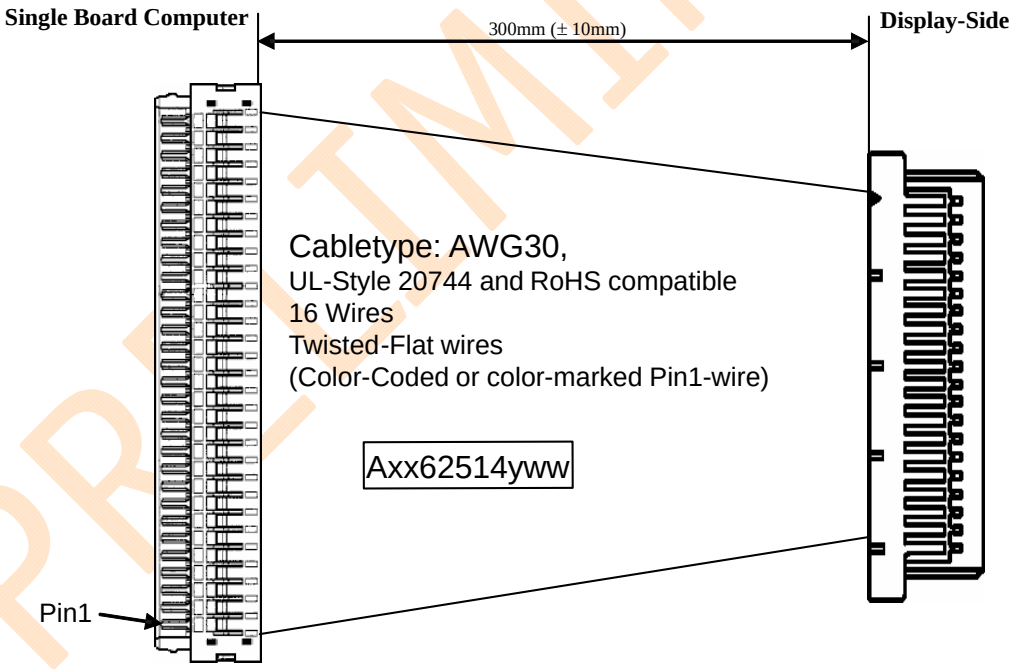
4 JILI30 Cable (Examples)

The following chapter describes the wiring of a JILI30 cable on two examples. KONTRON recommends that the differential pairs should be twisted together to minimize crosstalk on the signal lines. It may seems as if JILI30 cables are made for a specific display resolution. This is only particularly true.
The decision which cable can be used depends on the following criterias:

- Display connector type
- Pinout of display connector
- Number of channels/clocks (single or dual channel LVDS)
- Color depth (18 or 24 bit) respectively number of LVDS data pairs

4.1 KAB-JILI30-TXLD03

This cable can be used for single channel displays with 24 bit color depth (example SHARP LQ150X1LW71). Displays with an 18 bit single channel interface might also work depending on the color mapping of the display.



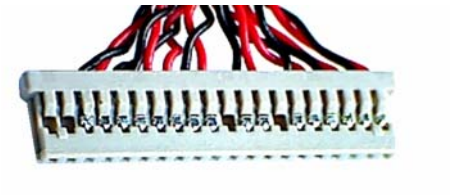
4.1.1 Display Connector Pinout

Pinout table for the display SHARP LQ150X1LW71.

Pin	Signal Name	Function
1	**VCC**	Power +3.3V
2	**VCC**	Power +3.3V
3	**GND**	Ground
4	**GND**	Ground
5	**TX0-**	Channel data 0 input (negative)
6	**TX0+**	Channel data 0 input (positive)
7	**GND**	Ground
8	**TX1-**	Channel data 1 input (negative)
9	**TX1+**	Channel data 1 input (positive)
10	**GND**	Ground
11	**TX2-**	Channel data 2 input (negative)
12	**TX2+**	Channel data 2 input (positive)
13	**GND**	Ground
14	**TXC-**	Channel clock input (negative)
15	**TXC+**	Channel clock input (positive)
16	**GND**	Ground
17	**TX3-**	Channel data 3 input (negative)
18	**TX3+**	Channel data 3 input (positive)
19	**GND**	Ground
20	**LVDS_SET**	Color mapping (FPDI or OpenLDI)

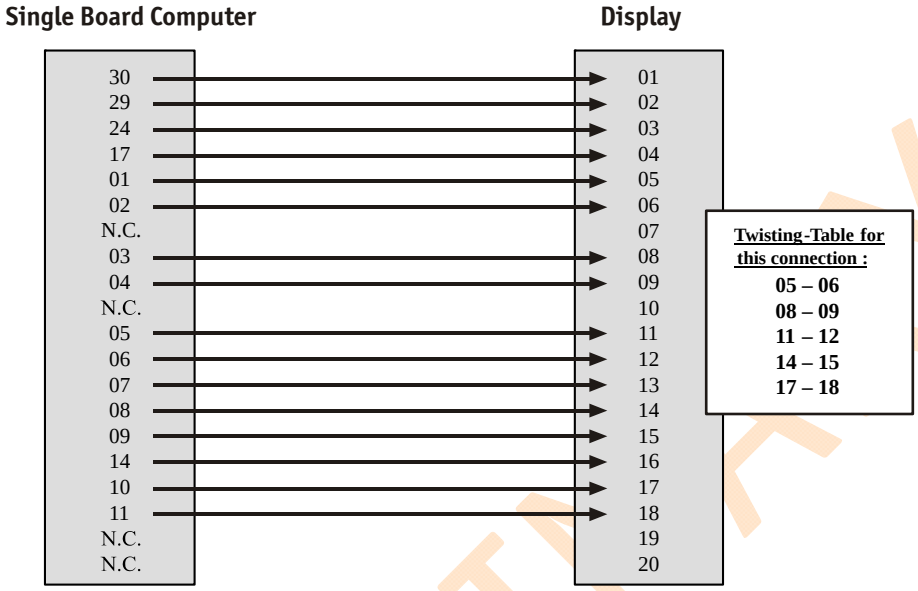
4.1.2 Display Connector

On the display side the connector HIROSE DF14H-20P is used.



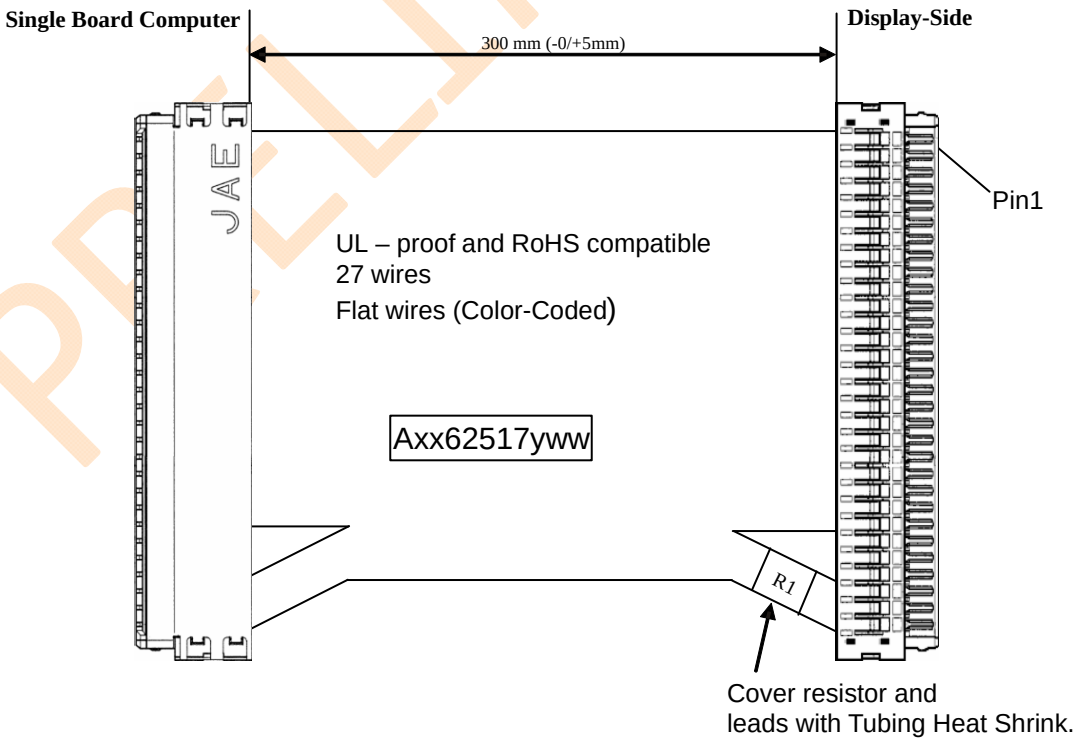
4.1.3 Cable Wiring

The following drawing shows the detailed wiring.



4.2 KAB-JILI30-TELD02

This cable can be used for dual channel displays with 24 bit color depth (example AU Optronics M170EN07).



4.2.1 Display Connector Pinout

Pinout table for display AU Optronics M170EN07.

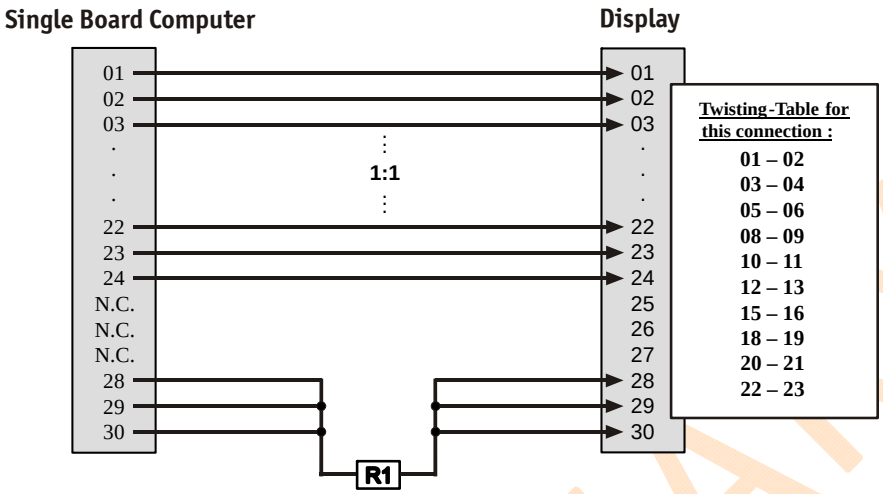
Pin	Signal Name	Function
1	**FTX0-**	First channel data 0 input (negative)
2	**FTX0+**	First channel data 0 input (positive)
3	**FTX1-**	First channel data 1 input (negative)
4	**FTX1+**	First channel data 1 input (positive)
5	**FTX2-**	First channel data 2 input (negative)
6	**FTX2+**	First channel data 2 input (positive)
7	**GND**	Ground
8	**FTXC-**	First channel clock input (negative)
9	**FTXC+**	First channel clock input (positive)
10	**FTX3-**	First channel data 3 input (negative)
11	**FTX3+**	First channel data 3 input (positive)
12	**STX0-**	Second channel data 0 input (negative)
13	**STX0+**	Second channel data 0 input (positive)
14	**GND**	Ground
15	**STX1-**	Second channel data 1 input (negative)
16	**STX1+**	Second channel data 1 input (positive)
17	**GND**	Ground
18	**STX2-**	Second channel data 2 input (negative)
19	**STX2+**	Second channel data 2 input (positive)
20	**STXC-**	Second channel clock input (negative)
21	**STXC+**	Second channel clock input (positive)
22	**STX3-**	Second channel data 3 input (negative)
23	**STX3+**	Second channel data 3 input (positive)
24	**GND**	Ground
25 - 27	**N. C.**	Not connected
28 - 30	**VCC**	Power +5.0V

4.2.2 Display Connector

On the display side the connector JAE FI-X30H (Japan Aviation Electronics) is used.

4.2.3 Cable Wiring

The following drawing shows the detailed wiring.

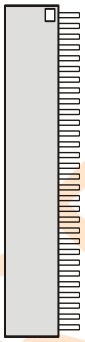


5 KAB-ADAPT-LVDStoTTL

The adapter has two connectors – one counter part of the JILI30 SBC connector and one for the KAB-FLEX32 cable.

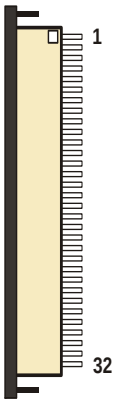
5.1 JILI30 Connector

The JILI30 interface of the KAB-ADAPT-LVDStoTTL uses only 3 LVDS data pairs so that only 18 bit displays can be driven. The following table shows the pinout.

Header	Pin	Signal Name	Function
	1	**FTX0-**	First channel data 0 input (negative)
	2	**FTX0+**	First channel data 0 input (positive)
	3	**FTX1-**	First channel data 1 input (negative)
	4	**FTX1+**	First channel data 1 input (positive)
	5	**FTX2-**	First channel data 2 input (negative)
	6	**FTX2+**	First channel data 2 input (positive)
	7	**GND**	Ground
	8	**FTXC-**	First channel clock input (negative)
	9	**FTXC+**	First channel clock input (positive)
	10 - 13	**N. C.**	Not connected
	14	**GND**	Ground
	15 - 16	**N. C.**	Not connected
	17	**GND**	Ground
	18 - 23	**N. C.**	Not connected
	24	**GND**	Ground
	25	**N. C.**	Not connected
	26	**DATAENA**	Designator badly chosen - means: Panel power enable (power sequencing)
	27	**N. C.**	Not connected
	28 - 30	**VCC** [1)]	Power +5.0V

5.2 FLEX32 Connector

Through this connector the connection to the display is established. As the display connectors differ strongly KONTRON offers a set of prefabricated FLEX32 cables (see chapter 'KAB-ADAPT-LVDStoTTL accessories'). The table shows the pinout of the FLEX32 connector on the adapter board.

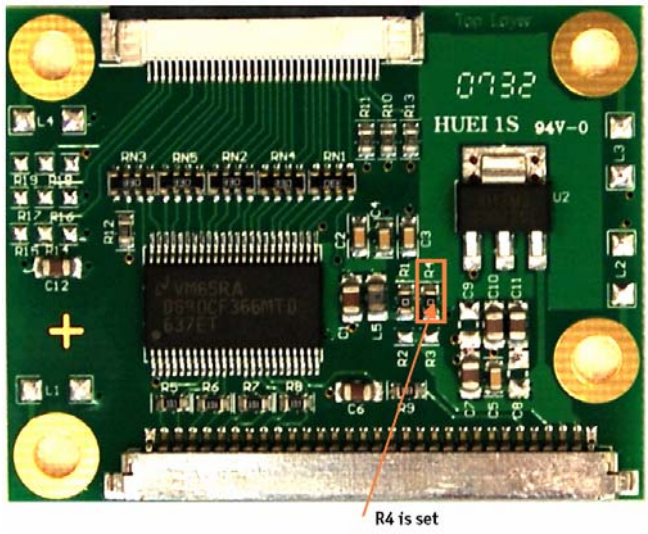
Header	Pin	Signal Name	Function
	1	**GND**	Ground
	2	**CLK**	Clock output
	3	**HSYNC**	Horizontal sync output
	4	**VSYNC**	Vertical sync output
	5	**GND**	Ground
	6	**R0**	Red data 0 output
	7	**R1**	Red data 1 output
	8	**R2**	Red data 2 output
	9	**R3**	Red data 3 output
	10	**R4**	Red data 4 output
	11	**R5**	Red data 5 output
	12	**GND**	Ground
	13	**G0**	Green data 0 output
	14	**G1**	Green data 1 output
	15	**G2**	Green data 2 output
	16	**G3**	Green data 3 output
	17	**G4**	Green data 4 output
	18	**G5**	Green data 5 output
	19	**GND**	Ground
	20	**B0**	Blue data 0 output
	21	**B1**	Blue data 1 output
	22	**B2**	Blue data 2 output
	23	**B3**	Blue data 3 output
	24	**B4**	Blue data 4 output
	25	**B5**	Blue data 5 output
	26	**GND**	Ground
	27	**DE**	Data enable output
	28	**VCC**	Power +3.3V or +5.0V
	29	**VCC**	Power +3.3V or +5.0V
	30	**CONF0**	Configurable pin
	31	**CONF1**	Configurable pin
	32	**CONF2**	Configurable pin

5.3 Power Supply

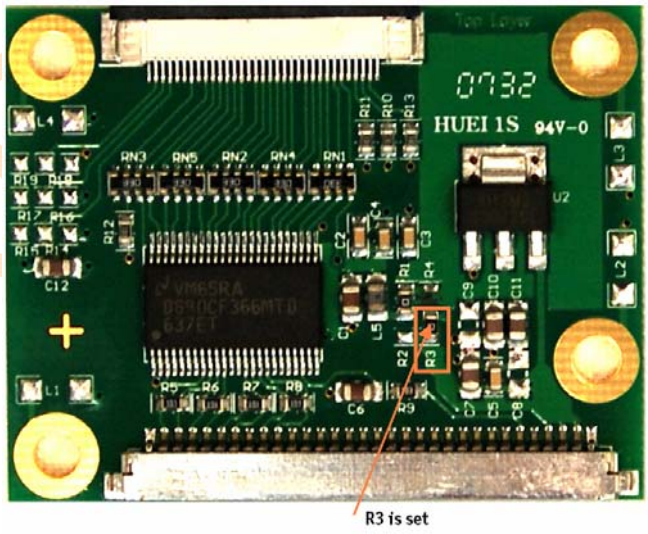
The adapter KAB-ADAPT-LVDStoTTL must be driven with +5.0V DC. The adaption to a panel voltage of 3.3V is done on the adapter. The panel voltage can be set using solder jumpers.

5.3.1 Panel Power +3.3V

This is the default setting.



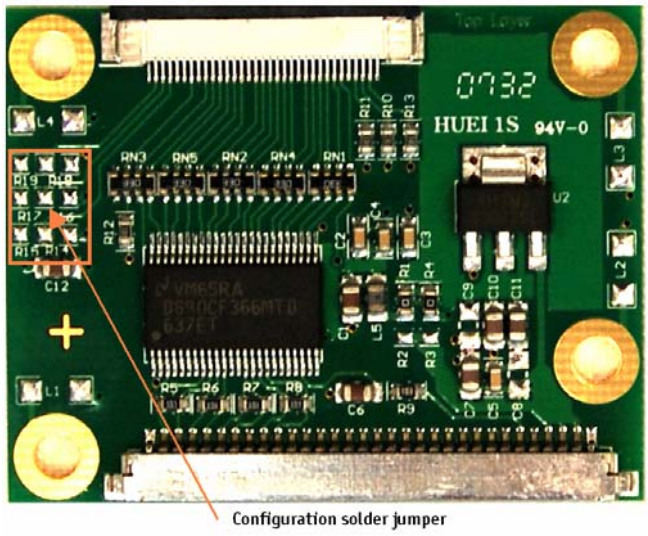
5.3.2 Panel Power +5.0V



Attention: *Never set both solder jumper simultaneously! This can damage the adapter, the display and/or the SBC.*

5.4 FLEX32 Configurable Pins

Three configurable data lines of the FLEX32 cable allow the use of special panel features. Many displays have input pins for horizontal/vertical flipping respectively mirroring (signal name i.e. L_R and U_D). These lines can be set to VCC or GND through solder jumpers. Under no circumstances both solder jumpers may be set at the same time.



The following table gives and overview:

Pin	Designator	Link to GND set	Link to VCC set
CONF0	R14 / R15	R14	R15
CONF1	R16 / R17	R16	R17
CONF2	R18 / R19	R18	R19

5.5 Electrical Specifications

Supply Voltage

- + 5.0V DC ± 5%

Panel Current (maximal)

- 600mA

Ambient Temperature

- 0 to +60°C

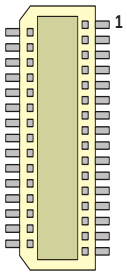
6 FLEX32 Cable (Example)

This example shows the wiring of a FLEX32 cable. Due to relatively low frequencies it is not nessecary that the signal lines of the cable are twisted. A flatfoil cable is sufficient.

6.1 KAB-FLEX32-TVDD04

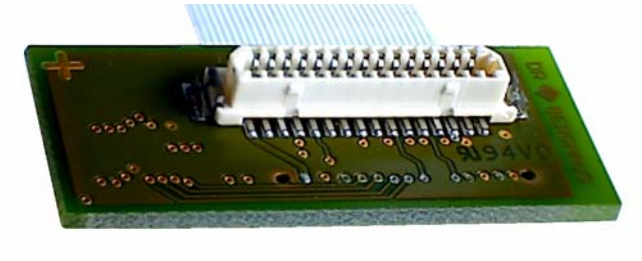
6.1.1 Display Connector Pinout

Pinout table for a VGA display (example SHARP LQ10D42).

Header	Pin	Signal Name	Function
	1	**GND**	Ground
	2	**CLK**	Clock input
	3	**HSYNC**	Horizontal sync input
	4	**VSYNC**	Vertical sync input
	5	**GND**	Ground
	6	**R0**	Red data 0 input
	7	**R1**	Red data 1 input
	8	**R2**	Red data 2 input
	9	**R3**	Red data 3 input
	10	**R4**	Red data 4 input
	11	**R5**	Red data 5 input
	12	**GND**	Ground
	13	**G0**	Green data 0 input
	14	**G1**	Green data 1 input
	15	**G2**	Green data 2 input
	16	**G3**	Green data 3 input
	17	**G4**	Green data 4 input
	18	**G5**	Green data 5 input
	19	**GND**	Ground
	20	**B0**	Blue data 0 input
	21	**B1**	Blue data 1 input
	22	**B2**	Blue data 2 input
	23	**B3**	Blue data 3 input
	24	**B4**	Blue data 4 input
	25	**B5**	Blue data 5 input
	26	**GND**	Ground
	27	**DE**	Data enable input
	28 - 29	**VCC**	Power +5.0V
	30	**R/L**	Horizontal display mode input
	31	**U/D**	Vertical display mode input

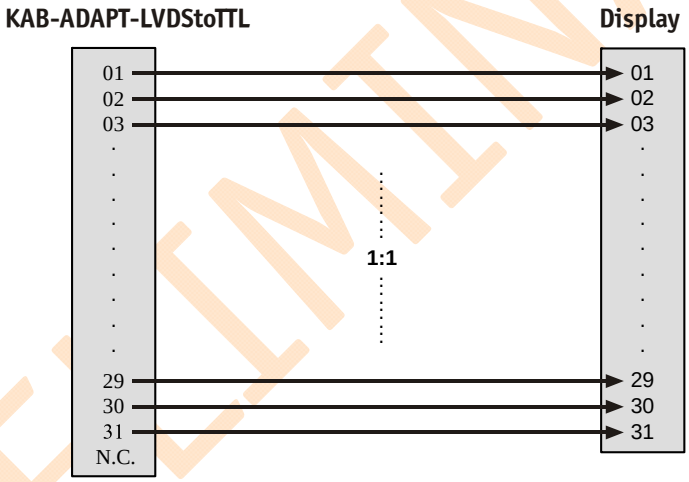
6.1.2 Display Connector

On the display side the connector HIROSE DF9B-31S-1V is used.

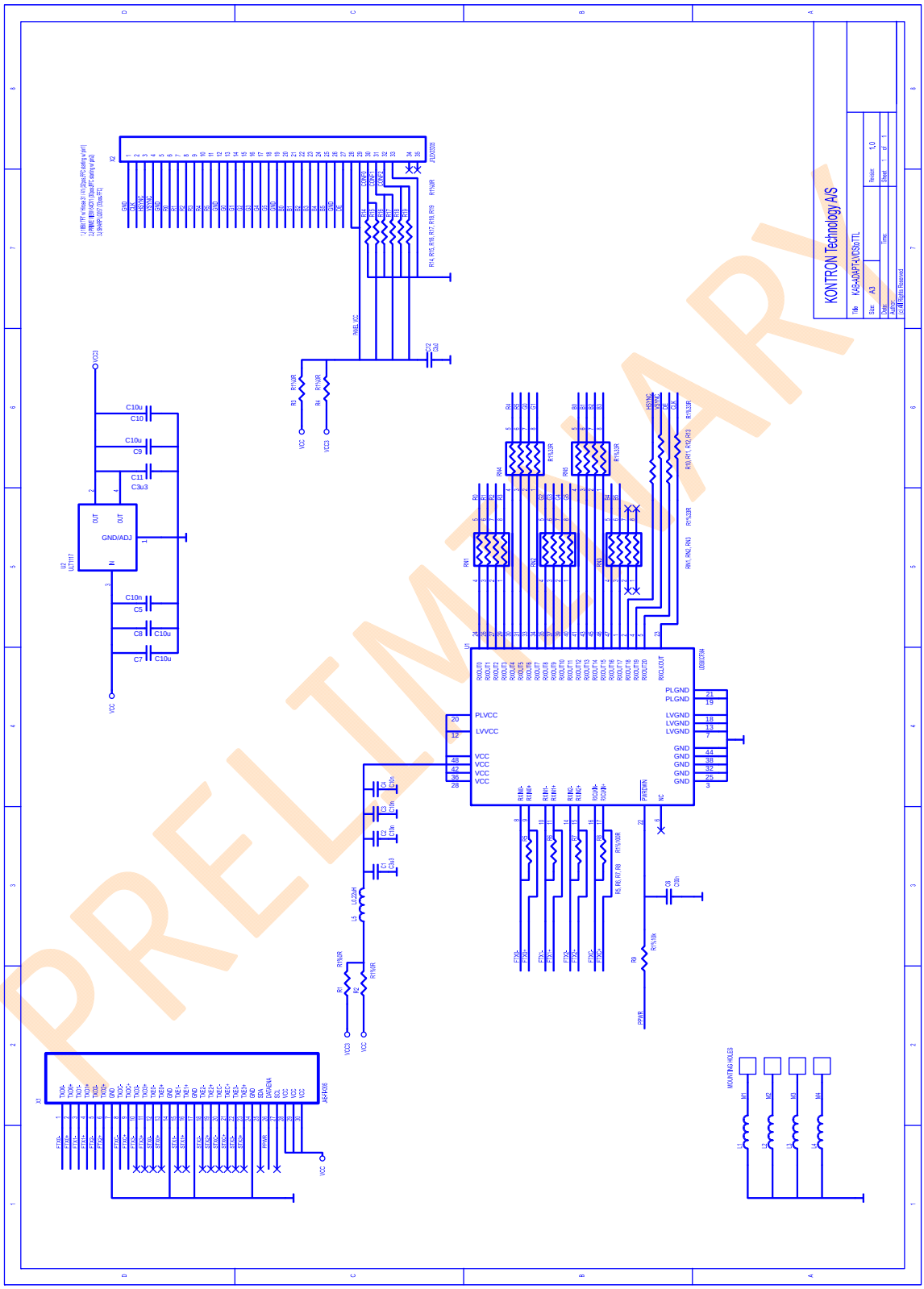


6.1.3 Cable Wiring

The following drawing shows the detailed wiring.



App. A: Schematic KAB-ADAPT-LVDStoTLL



Appendix B: Document Revision History

Revision	Date	Author	Changes
S0018-0	09/17/10	M. Hüttmann	Created preliminary manual

Corporate Offices

Europe, Middle East & Africa

Oskar-von-Miller-Str. 1
85386 Eching/Munich
Germany
Tel.: +49 (0)8165/ 77 777
Fax: +49 (0)8165/ 77 219
info@kontron.com

North America

14118 Stowe Drive
Poway, CA 92064-7147
USA
Tel.: +1 888 294 4558
Fax: +1 858 677 0898
info@us.kontron.com

Asia Pacific

17 Building,Block #1,ABP
188 Southern West 4th Ring Road
Beijing 100070, P.R.China
Tel.: + 86 10 63751188
Fax: + 86 10 83682438
info@kontron.cn