

Related Products	MOPSIcd6 (P588) coolMONSTER/S (LEU3)
Subject	Low level control of contrast and backlight
Document Name	ContrBackl_E111.doc
Usage	Common

1. REVISION HISTORY

Date	Document Name	Subjects added, changed, deleted	Changed by
16-Oct-98	JAP0023.DOC	Initial release	Ch. Riesinger
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3. INTRODUCTION

Some **Kontron Embedded Modules GmbH** (in the following called **Kontron**) boards are equipped with a LCD interface called JIPA (JUMPtec Intelligent Panel Adaption). This interface is driven by an onboard graphic controller C&T69000 (or compatible type) of Chip&Technologies, Inc.

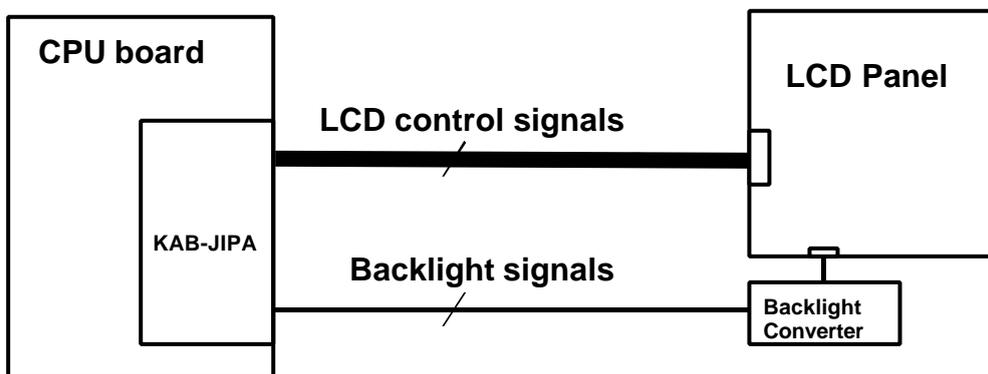
This JIPA interface, in combination with a connected JIPA cable (KAB-JIPA-??????), can not only drive the digital signal lines for the supported displays, it is also capable of controlling the display's contrast and backlight brightness. However, the contrast voltage is not required for all kind of displays (TFT displays don't need contrast voltage).

For several common operating systems the contrast and backlight control can be done easily by using the JIDA (JUMPtec Intelligent Device Architecture) which is integrated as BIOS extension in the system BIOS of the CPU board. **Kontron** offers a JIDA32 Interface API library for some operating systems which is available for free on the web pages. This application note does not give information about the JIDA programming, it is only useful for programmers that cannot use the JIDA32 bit API and need to do direct low level programming of the contrast and backlight features.

3.1. Hardware requirements

First of all you have to check, if your hardware meets the necessary requirements. What you need is:

1. A CPU board of **Kontron Embedded Modules GmbH** which is equipped with the JIPA interface.
 - MOPSIcd6
 - CoolMONSTER/S
2. A JIPA cable capable of driving your special display (e.g. KAB-JIPA-????? of **Kontron**).
Note: Not all JIPA cables may support the contrast and/or backlight brightness control feature
3. The LCD panel and a suitable backlight converter.
Note: The voltage for the backlight converter must be supplied through the JIPA cable



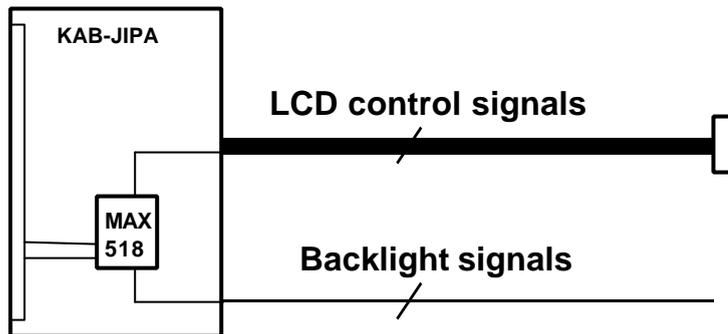
Drawing 1: System overview

Application Note

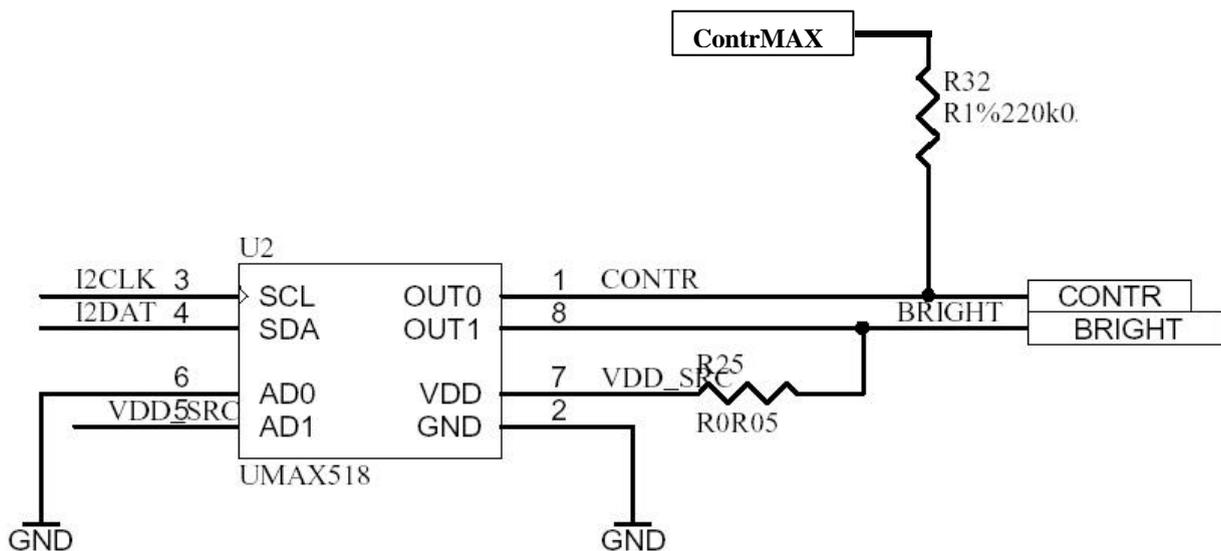
The basic circuitry to control contrast and backlight voltage is located on the JIPA cable. One or two 8-bit DACs (MAX517/518) on the I2C bus control contrast and backlight voltages. The JIPA interface on the CPU board just offers two pins (I2CLK and I2DAT) to program this circuitry on the JIPA cable. You can check your JIPA cable for the existence of the following components:

- One MAX517 normally only backlight brightness control supported
- Two MAX517 contrast and backlight brightness supported
- One MAX518 contrast and backlight brightness control supported (if display has a contrast voltage)

If you are not sure about the capability of contrast and backlight brightness control, please contact your local technical support for detailed information about your JIPA cable.



Drawing 2: JIPA cable with MAX518



Drawing 3: MAX518 Schematics

4. PROGRAMMING INFORMATION

The device addresses on the I²C bus are:

Function	Component	Device Address
Contrast DAC	MAX517	5Chex
Backlight Brightness DAC	MAX517	58hex
Contrast/Backlight DAC	MAX518	5Chex/58hex

With the addresses above it is possible to directly change the output voltage of the contrast and backlight brightness.

The two functions for contrast and backlight control are preset during the boot up of the board with default values. These default values are stored in an EEPROM located on the CPU board which is also connected to the I²C bus. The device addresses of that EEPROM and the functions subdevice addresses are:

Function	Component	Device Address	Subdevice Address
Contrast preset value	EEPROM	A0hex	30hex
Brightness preset value	EEPROM	A0hex	5Fhex

With the addresses above it is possible to change the preset default values stored in the EEPROM and make the system come up with own special default values after next boot.

More details about I²C bus programming can be found in separate application notes about I²C bus on Kontron Embedded Modules products. Also refer to specifications and special text books holding information about I²C bus signaling and timing.