

# emc2-2

expandable modular configurable controller, 2. version



## Product Description

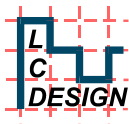
*emc2* is a test instrument specifically designed for the application with LCD modules. *emc2-2* indicates the 2. generation of this test system

Typical applications are

- incoming inspection
- product qualification at manufacturer or customer
- failure analysis
- hardware and software development lab
- support for LCD module performance measurement

The design is modular, consisting of a power supply and a CPU card. Add-on cards allow to adapt the system to special applications and/or to measuring systems, like the DMS (display measuring system from Autronic –Melchers). Module adapter pcbs allow to connect the lcd module to be driven.

The system is cost efficient because about 90% of the systems hardware can be used for every new module to be tested.



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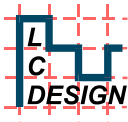
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## Power supply for DUT

- Selectable power supply for device under test (dut):  
 $V_{CC}$  +3,3V or 5.0V  
 $V_{LCD}$  up to 30V 10mV Resolution or supplied from external, e.g. DMS  
polarity selectable
- Fault proof lock against accidental polarity inversion or excess value
- In case of Vlcd supply from DMS, the display voltage is either directly passed through to the device under test or, if the display driver generates the voltage on its own, the DMS voltage is measured and a command is transferred to the lcd driver to get it generating a display voltage as near as possible to the DMS level.

## CPU Board

- Interface to host computer (PC) via RS232 (USB will be available soon) to download software or test pictures
- Interface to the external hand held terminal, which controls the unit
- Flash memory for test program and pictures
- MMC interface for up to 1GB MMCs, for test sequences and test picture
- Parallel I/O lines (>40 internally available)
- Interfaces: parallel, serial, I<sup>2</sup>C, pulse width modulation available
- Controls power supply for module (device under test)
- Measurement of currents drawn by device under test for faulty check
- Compliance check with currently adapted module card



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## Module Interface Board

The module interface board provides the hardware adaptation of **emc2** to the device under test. This adapter board will be designed especially for a display module or for a display driver family or a different application.

typical features, depending on request

- A personality module (EEPROM) contains typical data needed for operation of the device under test, e.g. interface type,  $V_{CC}$  range,  $V_{LCD}$  range, special features; safety function
- Buffers to avoid reactions of defective devices to test instrument
- Level translators for supply voltages different from 5.0V or 3.3V
- Current sources for LED backlight
- DC/AC Inverter for CFL or EL backlight
- Connector compatible to device under test (type and pinout)
- Trigger output for external measurement equipment
- Connector for reference device and much more.

## Option Board

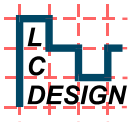
An option board may be installed if **emc2** is used to perform special tasks.

- Special interface (other than RS-232)
- Memory expansion
- LCD measurement expansion, trigger signals for measuring system
- Data logging/exchange

## Option Board DMS

The option board DMS is designed to interface with the display measuring system (DMS) from Autronic –Melchers or a similar system

- Input of the display voltage  $V_{lcd}$
- Switching of the input voltage in combination with the driver initialisation
- Adjustment of the polarity of the display voltage related to the display driver under test
- 12bit ADC to measure the DMS voltage in case the lcd driver has a voltage generator onboard and needs a volume control command
- Interface to allow response time measurement with selectable pictures



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## **Software**

- All software is application specific and has to be loaded into the Flash memory of the CPU.
- Software can be designed for a special application or for a special lcd module (module software), e.g for burn-in test or lifetime test
- Software can be created for lcd driver families (family software) to allow the adjustment of the different features and parameters of the lcd driver.
- Demonstration software (demo software) suitable for exhibitions and technology presentations
- LCD measurement support software  
input and output trigger  
adjust LCD controller's "electronic volume" according to input voltage or temperature

## **Configuration**

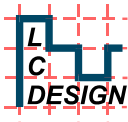
*emc2* has been designed to be adaptable to the customer's requirement. The basic configuration consists of the housing with power supply and CPU card. The unit is operated via an external hand held terminal.

For a specific device under test, a module interface card has to be added, which is customised to the operation of this specific device. The software is developed by LC Design and – in case of application specific test software – customised to the module I/O card and the device under test or to a special lcd driver. The customer can easily download the software to the CPU's Flash memory. Software updates may be obtained from LC Design via e-mail or on a data carrier.

To adapt a lcd module mechanically a module adapter pcb may be needed.

This pcb also carries the components which have to be placed close to the lcd driver.

These adapter boards can also be delivered by LC Design



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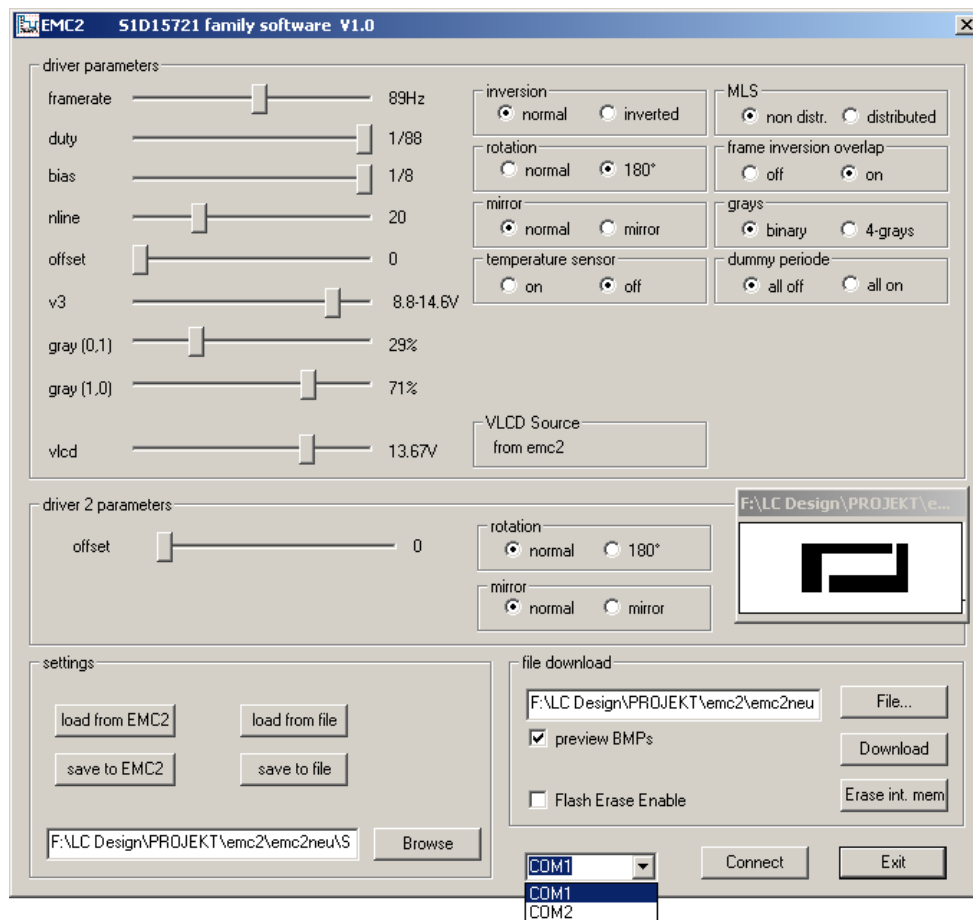
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## PC- mask

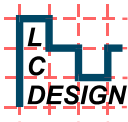
For a family-software for a special lcd driver a PC-mask is included. With this mask the parameters of the driver can also be set and read from a PC, if a connection to the **emc2** has been made. The mask also allows picture selection and download.

example: mask to family-software for the lcd driver S1D15721



## Expander

An expander can be added to the system to drive 5 modules with buffered signal lines to decouple the modules. In special cases also 2 expander to drive 10 modules can be connected.



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