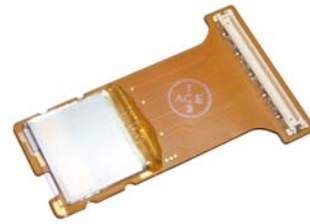


SXGA-R2-H1

FLCOS Microdisplay & Interface Electronics



Features

- Reflective microdisplay - **0.88"/22.4mm** diagonal
- High resolution - SXGA (*1280 x 1024 pixels*)
- Ferroelectric Liquid Crystal on Silicon (FLCOS) technology
- **Single flexi-rigid mounted microdisplay (SXGA-R2-H1)**
- Colour sequential operation
- Illuminator drive output
- 24 bit colour (R:8, G:8, B:8)
- Separate interface electronics with flexible, lightweight connecting cable
- Analogue PC graphics and Digital Video input (DVI) formats
- Fast motion video
- Sharp images, clear text
- Lightweight and portable microdisplay module
- Programmable display addressing sequences
- Also available in the reflective range of products:
 - [SXGA-R2-H2 \(1280 x 1024\)](#)
– dual flexi-carrier mounted microdisplay
 - [XGA-R2-H1 \(1024 x 768\)](#)
– single flexi-rigid microdisplay

Applications

- Near-to-eye viewers
- Personal viewers for PCs, DVDs.
- Helmet mounted displays
- LED based projection
- Simulation
- Medical imaging
- Holographic displays
- Microscopy
- Ophthalmic equipment
- Printing
- Beam steering
- Reconfigurable computer generated holograms
- Real-time beam shaping.
- Wavefront manipulation
- Laser cutting and welding
- Optical correlators
- Optical tweezers
- Free-space optical switching (telecoms)

Description

The SXGA-R2-H1 microdisplay system is supplied to end-users as an instant plug and play unit consisting of a reflective microdisplay module and interface electronics. Together, these components generate an SXGA resolution image with up to 24-bit colour depth.

The microdisplay module enables the user to easily position the high-resolution display in a range of near-eye applications where the optical assembly is either head or helmet mounted or where space is at a premium.

The microdisplay is a digital Liquid Crystal On Silicon (LCOS) device based on a 0.3um CMOS process. The silicon backplane forms a 1280 × 1024 active pixel plane for the LCD. The liquid crystal cell is constructed on top of the backplane using fast switching ferro-electric LC with a sub micron cell gap.

Grey scale and colour are achieved by the use of temporal dithering and colour sequential illumination. This utilises the fast switching speed and digital characteristics of the device, which along with the low-pass temporal filter effect of the human eye, gives the viewer a perception of grey scale/colour.

The microdisplay is mounted on a flexi-rigid circuit and driven by a small LVDS Receiver (Rxx) PCB that also provides the drive output for an RGB LED illuminator.

The microdisplay module and LVDS Rxx PCB are connected to the main interface electronics via a 2.5m connecting cable (a 2.5m cable is supplied as standard but shorter or longer cables are available on request).

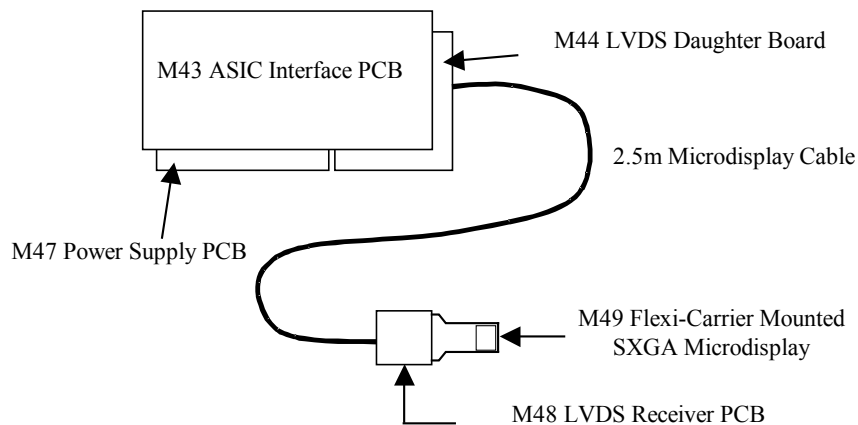
The main interface electronics consists of an ASIC Interface PCB, an LVDS Transmit (Tx) daughter board and a power supply. The ASIC Interface PCB accepts SXGA VESA standard graphics input in either analog or DVI formats and generates the addressing sequence and control signals for the microdisplay. The data outputs are converted to serial format by the LVDS Tx Board, and transmitted to the LVDS Rxx PCB via the 2.5m connecting cable.

An additional LVDS Daughter Board can be fitted to the interface electronics to allow two displays to be driven simultaneously with the same image. The power supply for the interface is mounted on a separate PCB beneath the ASIC Interface PCB.

The SXGA-R2-H1 is very flexible and through the PC-based graphical user interface (GUI) software allows the user to change addressing schemes, to vary LED brightness and gamma correction and to flip the image. CRL Opto also offers custom development of drive schemes for specific applications.

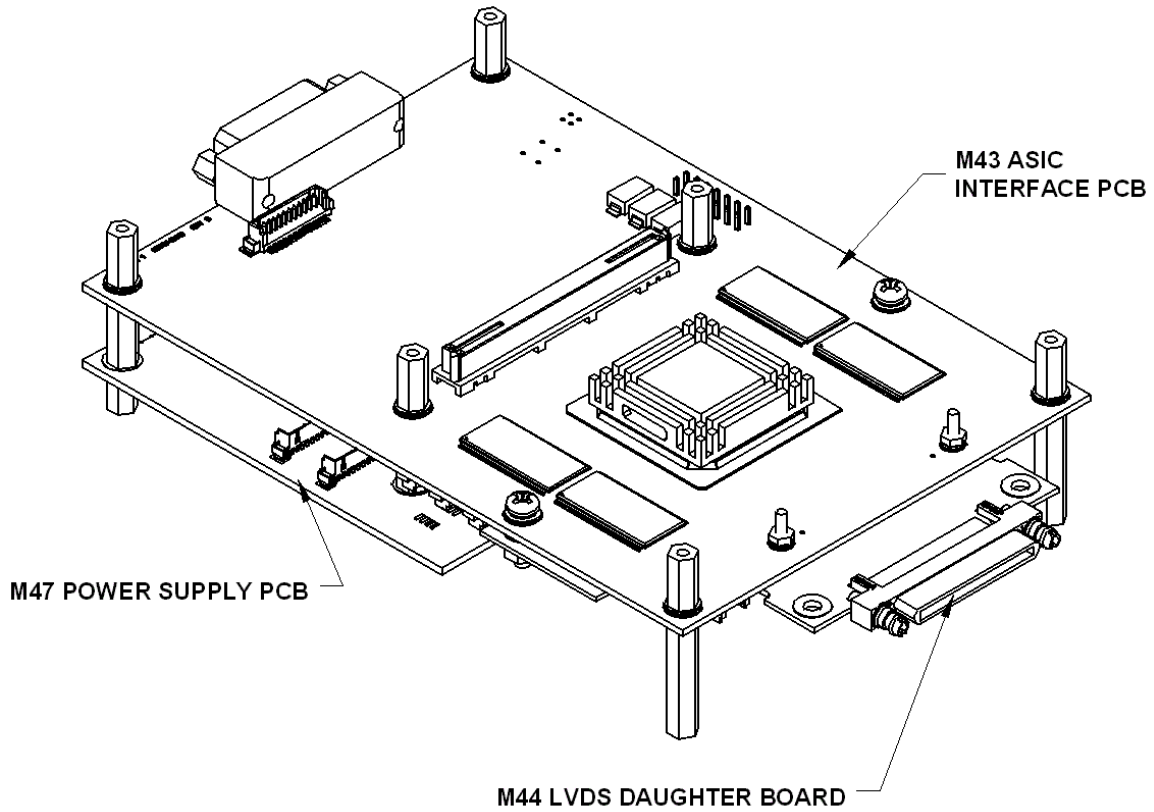
For more information on the board configurations and connection arrangements see below.

General Configuration

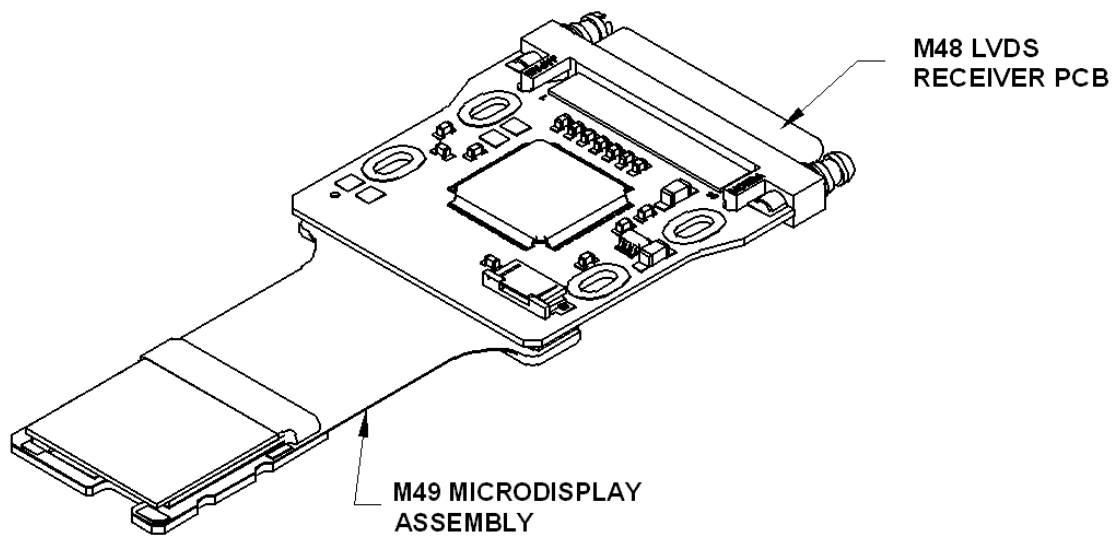


Mechanical Configuration

1. SXGA Interface Electronics

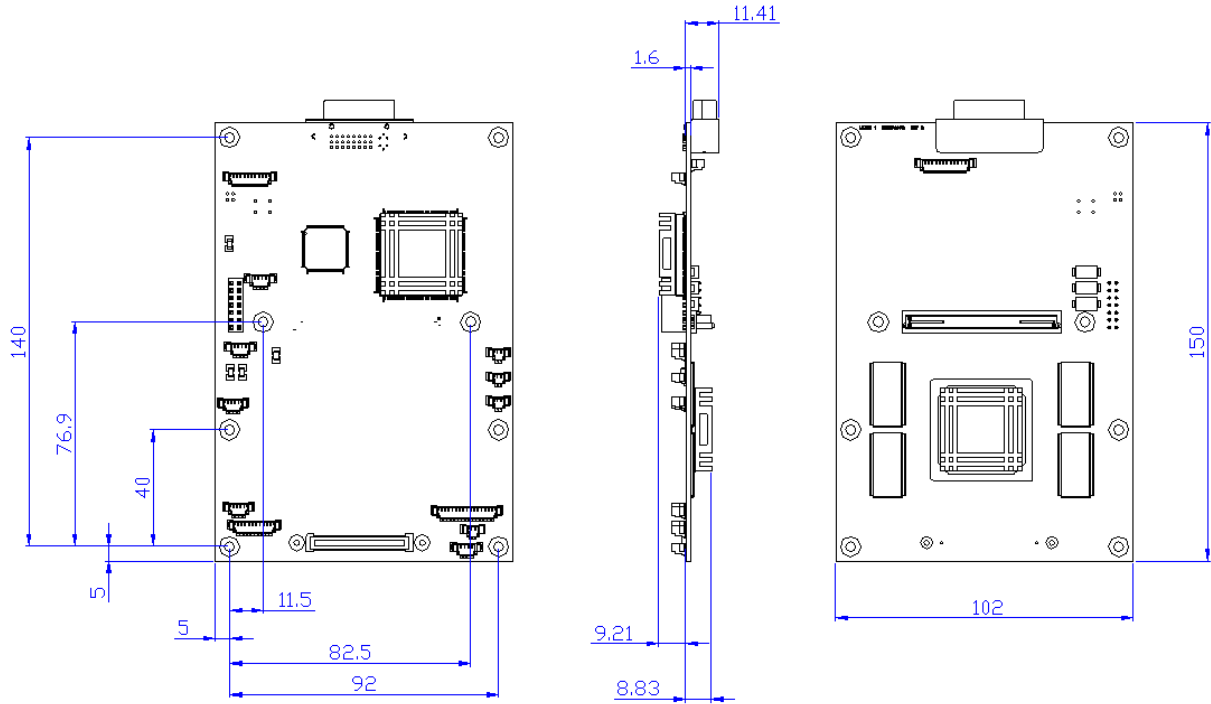


2. SXGA Microdisplay Module and LVDS Receiver PCB



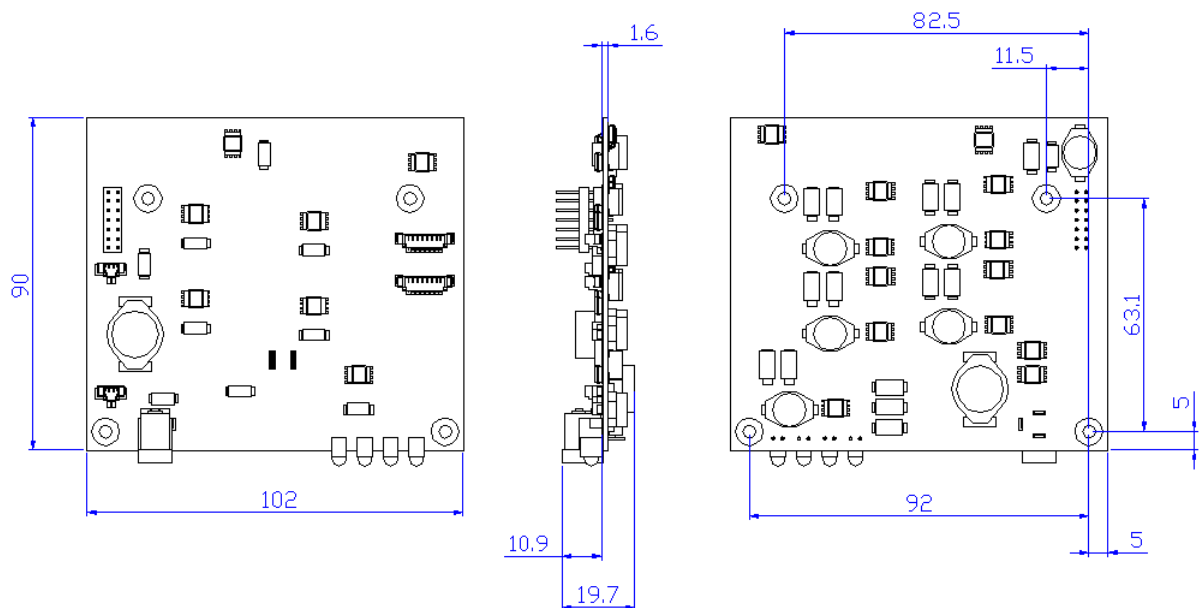
Mechanical Outline

1. M43 ASIC Interface PCB

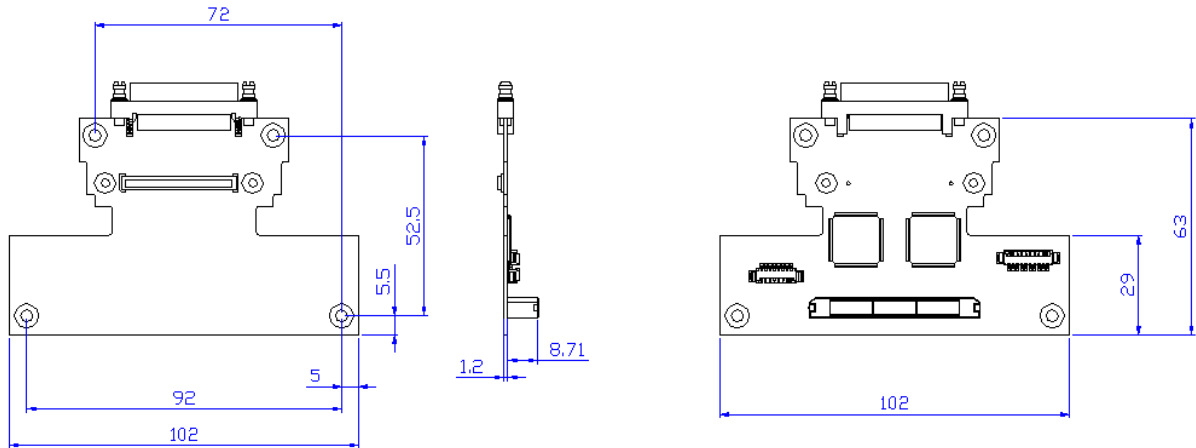


Heatsinks shown to indicate max. envelope if fitted – optional depending on environment

2. M47 Power Supply PCB

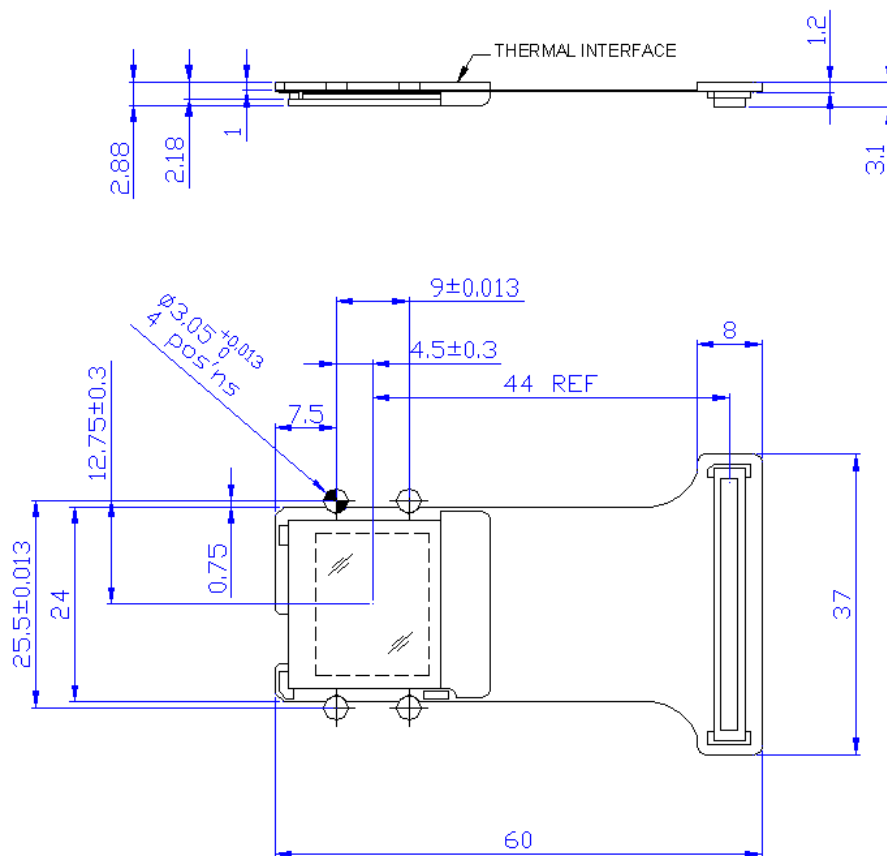


3. M44 LVDS Daughter Board

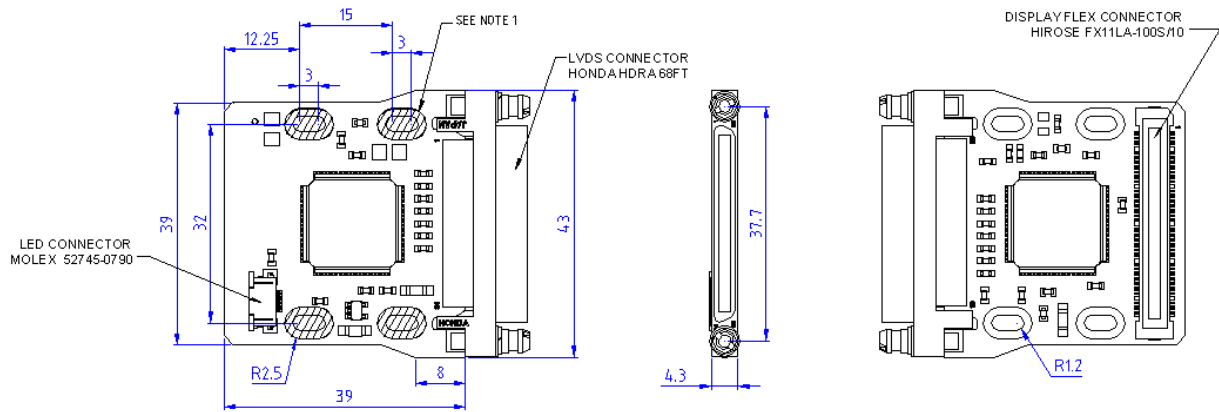


'M44 dash 1' Assembly for single channel operation

4. M49 Flexi-Carrier Mounted SXGA Microdisplay



5. M48 LVDS Receiver PCB



NOTES

1. HATCHED AREA DEFINES MOUNTING SURFACE LIMITS, BOTH SIDES

Microdisplay Module Specification

Display type	FLCOS, reflective mode
Spatial resolution	1280 (H) by 1024 (V) pixels
Active area	17.43mm (H) x 13.95mm (V)
Pixel pitch	13.62 μ m (H) x 13.62 μ m (V)
Fill factor / Aperture Ratio	93%
Optical efficiency	>70% (including switching angle, ITO and cover glass losses)
Contrast ratio	>200:1
Uniformity	95%
Colour technique	Colour sequential
Colour depth	24 bits (red 8; green 8; blue 8)
Operating temperature range	+10°C to +60°C
Storage temperature range	-40°C to +85°C

Interface Specification

Input format	Mode Frame rate	SXGA (1280 x 1024 pixels) 60Hz, non-interlaced
Input connector		DVI connector mounted on M43 ASIC Interface PCB Optional HD15 socket (female) to DVI adaptor available for analogue input. (HD15 socket can also be supplied on optional mating cable assembly for M43 PCB)

Interface Specification continued...

User controls	PC-based GUI software provides control over Gamma correction, LED brightness, Image flip (left-right and top-bottom invert) and <i>Colourwheel</i> drive parameters, and also a soft system reset. The GUI also enables different microdisplay drive sequences to be loaded up and updates of ASIC microcode to be installed. Image can also be flipped horizontally/vertically by two external switches (provided on optional mating cable assembly). Hard system reset can also be applied via external reset switch (also provided on optional cable assembly)
LED Output	Outputs for LED drive available from M48 LVDS Receiver PCB via 7-way SMT ZIF connector
Optional Outputs	Additional outputs for LED drive, <i>ColorSwitch™</i> and <i>Colourwheel</i> control available on M43 ASIC interface PCB (via optional cable assemblies)
Microdisplay cable	Low voltage differential signalling cable (LVDS). Light weight, flexible cable, 2.5m long (standard). Shorter or longer custom cables are available on request.
Supply voltage range	12V DC +/- 10%
Power input connector	2.5mm jack plug on M47 PCB (Mains power supply with universal input, 12V DC output supplied as optional extra)
PCB footprint	150mm (L) x 102mm (W) x 22mm (H) approx. for M43 ASIC Interface PCB alone. Length (L) increases to 163mm with M44 LVDS Daughter Board fitted. Height (H) 37mm with M47 Power Supply PCB fitted. Height (H) 37mm with M47 Power Supply PCB and M44 LVDS Daughter Board fitted

Product Ordering

To place an order please quote:

Product Configuration

SXGA-R2-H1 Microdisplay module consisting of 1 off M49 configuration SXGA microdisplay with 1 x M48 LVDS Receiver PCB, connected via 2.5m LVDS cable to Interface Electronics assembly consisting of 1 x M43 ASIC Interface PCB, 1 x M44-1 LVDS Daughter Board and 1 x M47 Power Supply PCB, plus 1 x HD15 socket (female) to DVI adaptor.

Note: All orders, irrespective of quantity, are supplied with 1 x Programming pack and User's Manual on CD ROM, plus 1 x entry level viewer as standard. Please specify if greater quantities required.

Optional Accessories

CRLCMAX Mains cable - USA
 CRLCMOX Mains cable - UK
 CRLCMEX Mains cable - Europe
 CRLPS12X 12 volt power supply

For more information on our exclusive range of SXGA (1280 x 1024) reflective microdisplays please refer to the relevant product datasheets on our website <http://www.crlopto.com> or contact CRL Opto directly: sales@crlopto.com