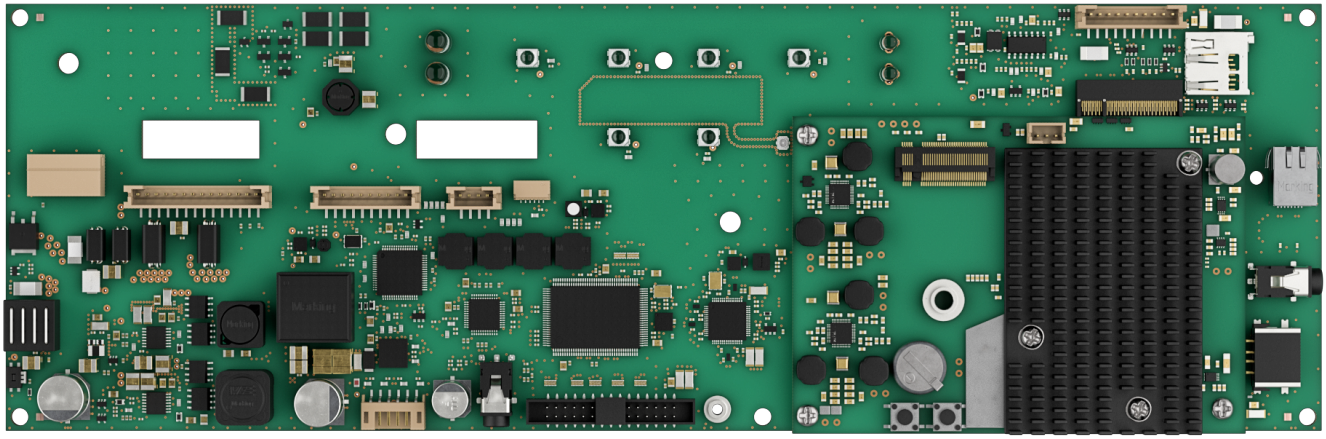
BrightSign®
Built-In

BRIGHTSIGN EMBEDDED DATASHEET



This document describes the XPO Screens – BrightSign Embedded Displayboard and its workings. The entire feature list and integration within a customer-side ecosystem will be explained fully to enable complete integration of XPO Screens' hardware.

Table of Contents

Who is this datasheet for?

Users of this datasheet will be able to integrate the XPO Screens' BrightSign Embedded Displayboard using any LVDS compliant FullHD panel. This is a technical overview meant for developers who have experience in integrating custom hardware and possess knowledge of varying display interfaces.

Revision history

Date	Version no.	Status	Hardware changes	Firmware changes	Other changes
01-2022	V0.1	Internal testing unit	First version	First version	
05-2022	V0.2	Internal testing unit	Fixed power circuit	Added phase 1,2 command list	
06-2022	V0.3	Internal testing unit	Larger format	Added phase 3,4 command list	
11-2022	V0.4	External testing unit	Reorientation RJ45 connector, antenna length changes, added pin-header for programming	Added phase 5 command list	
01-2023	V0.5	External testing unit	Larger USB connector cut-out easier access, extra mounting hole sensor, reworked pinning RJ45 connector	Added phase 5.5 command list	
05-2023	V1.06	Production unit	Component change for EMC/ CE, reset switch rework, extra testpads		EMC/CE certification achieved

General description

XPO Screens' BrightSign embedded displayboard is an industrial FullHD display controller for use in flexible custom screen solutions.

The chipset is capable of processing FullHD video formats up to 1920x1080@60Hz. Any screen equipped with an LVDS input is supported with the display controller. The video signal can be delivered by a BrightSign embedded player (HS-line) or through HDMI with a custom HDMI insert board equipped with an HDMI input and a USB port for communication.

Features

Power supply

- 24V DC input power / 2 pin Phoenix connector

Video input ports

- HDMI integrated by BrightSign on board
- HDMI insert board

Panel interfaces

- Support panel resolutions up to 1920x1080 pixels @60Hz
- Supports panel voltages of 3.3 Volts / 5 Volts / 12 Volts
- Flexible backlight control ranging from 24 Volts up to 63 Volts in up to 4 separate LED strings.

Audio

- Power amplifier using speakers ≥ 4Ω, power: up to 2x10 Watts RMS
- Audio output through line-out up to 2V RMS

Control interfaces

- Sensor board breakout
- UART for extended player communication
- IR remote control
- 10-pin GPIO
- USB-A port

LEDs

- 6 Neo-Pixels (addressable RGBW LEDs)

Sensors

- IR distance sensors detecting people.

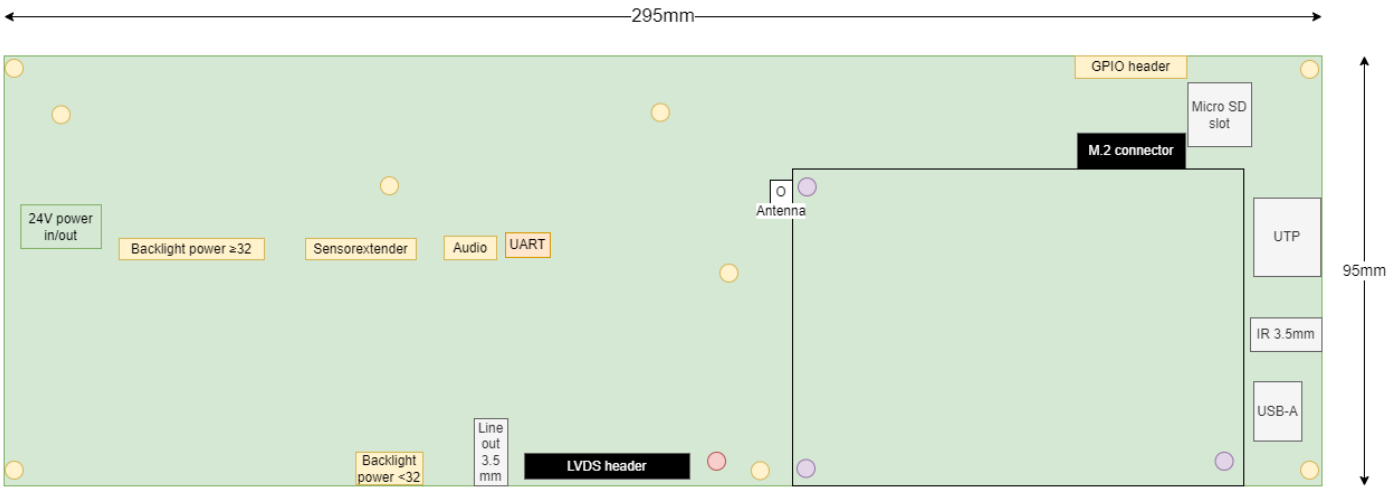
Absolute maximum ratings

Item	Symbol	Min	Nominal	Max	Unit
Supply voltage	V in	18	24	25	V DC
Supply current	I in			8	A
Continuous backlight current	I bkl			4	A
Continuous panel current	I panel			2	A
Audio interface continuous current	I audio	z		4.5	A
Storage temperature	T st	-40		+120	°C
Operating temperature	T op	0		+40	°C

Electrical specification

Item	Symbol	Condition	Min	Typ	Max	Unit
Supply voltage	V in			24		V DC
Supply current	I in					A

Connectors and dimensions



Connectors

Name from image	Connector name	Purpose
24V power in/out	4-pin Phoenix	Main power port for displayboard, powered using 24V DC with 1 wire pair for power in and 1 wire pair for power out.
Backlight power ≥ 32	14-pin JST-PH	Supplying power to screens from 32 inch upwards to 55 inch
Backlight power < 32	6-pin JST-PH	Supplying power to screens from 32 inch down to 11 inch
Sensor-extender	10-pin JST-PH	Extending the sensorboard integrated in the BrightSign embedded displayboard to a separate sensorboard supplied by XPO Screens
Audio	4-pin JST-PH	A dual channel port for connecting a set of speakers, check features above for specs
UART	6-pin JST-SH	For a direct communication channel to the displayboard outputting any data send over this interface to the OOB data stream
Line-out 3.5mm	3.5mm jack	Can be used for audio as well, for connecting to an audio system
LVDS header	30-pin box header	Sends video signal to the display, needed for screen output
Antenna	IPEX-1 U.fl	Needed for Wi-Fi to work correctly, should be attached to the Wi-Fi module on the BrightSign mediaplayer
GPIO header	10-pin JST-PH	Directly attached to the BrightSign player, used as a breakout for 1 USB connection and 6 GPIO pins
MicroSD slot	MicroSD card slot	Serves as the main storage for the BrightSign player, always required
M.2 connector	75-pin-M.2-KEY-G	Used for connecting the BrightSign players of the following models: HS124, HS144, HS125, HS145
UTP	RJ45	Supply a wired internet connection to the BrightSign player
IR 3.5mm	3.5mm jack	Connecting an additional IR receiver, directly connected to the BrightSign player
USB-A	USB-A	USB port directly connected to the BrightSign player, used for attaching alternative sensors

Serial communication

Introduction

The displayboard can execute a collection of commands which can be sent through an onboard USB device using Serial communication. These commands are all text-based serial, there are four distinct types of commands:

- commands that change a setting on the displayboard like the backlight level, these are SET commands.
- commands that request a setting or value on the displayboard like the serial number, these are GET commands.
- commands that act as responses to the aforementioned GET commands, these are the return values that come from the displayboard.
- commands part of the out-of-band data, OOB – data, these are commands that come through as a stream of data every half second.

Command structure

The two types of command a user can initiate are structured like this:

commandName parameter1 parameter2 etc.

Where the command name is always its descriptive function as well as that executed command itself. The separator used is always a single space.

The commands are primarily lowerCamelCase but can also be written as kebab-case, in which the case the output of any following commands will automatically change to the last sent command.

Not every command has any parameters, most of the GET commands have none at all but a response almost always consists of multiple word separated by the “space” character.

Examples

Example SET command

“setLed all FF0000 default”

This command sets the LEDs to a new value,

It targets “all” LEDs on the board,

The color value of FF0000 means red,

“Default” stands for store as default, an extra keyword which makes sure the new value is written to the on-board memory.

Example GET command

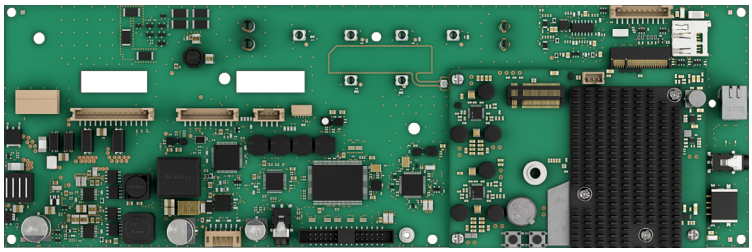
“getSerialNumber”

This command retrieves the serial number, a unique number hardcoded in each displayboard.

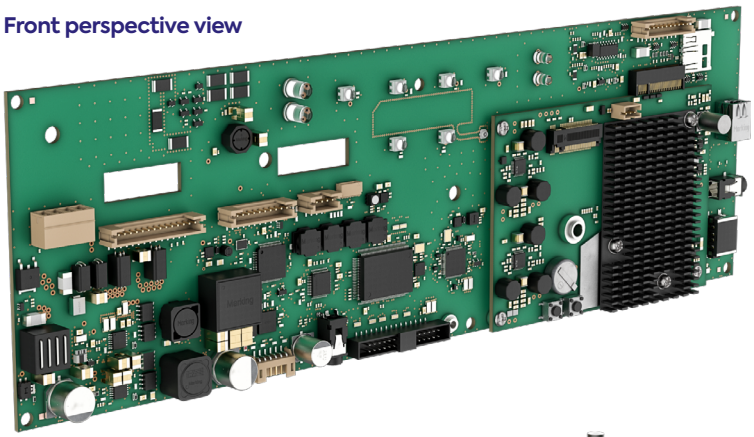
The response is structured like this:

“serialNumber 205XXXXX”

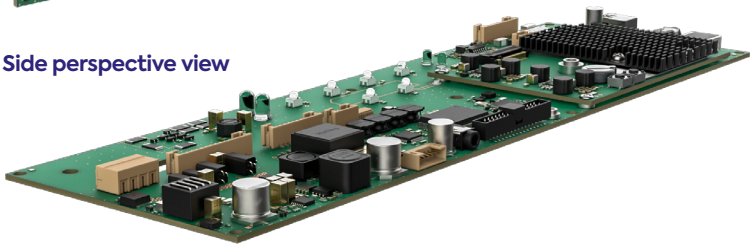
Top view



Front perspective view



Side perspective view



For much more information about sensor integration check our knowledgebase at:

https://www.xposcreens.com/knowledgebase?search=sensor