



**HAIDAR TECHNOLOGY, LLC.**  
**The Next Generation Of Intelligent Embedded GUI Systems**

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**EVL-CL4**  
**EVL-CL4-H**  
**Embedded Display Modules Evaluation Board**  
**Hardware Reference Manual**  
**REV 1.00**

Revision 1.00

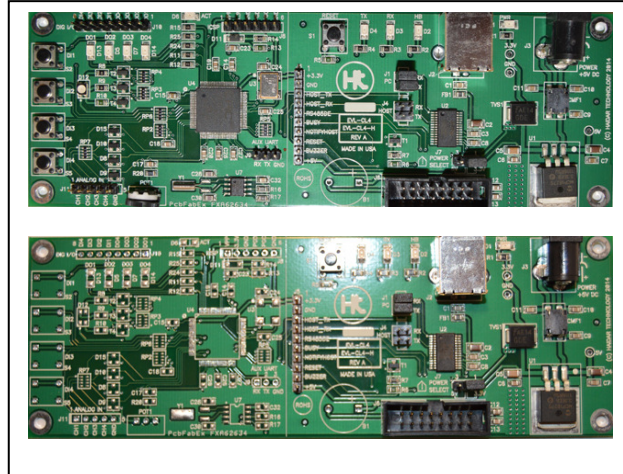
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## 1. Overview



EVL-CL4 (Without Host Controller) and EVL-CL4-H (With Host Controller) are development boards for Haidar’s Embedded Display Modules. They are used to quickly evaluate and demonstrate the functionality of display module.

EVL-CL4 can be interfaced to all Haidar’s Embedded display modules through a 16pin flat ribbon cable.

### Add a Feel to Your GUI

EVL-CL4-H is the simplest and fastest way to add a feel to your GUI. It is based on Microchip PIC32MX360F512 microcontroller and it directly connects to EVL-CL4 through a 10pin 0.1" header. The micro is already programmed with everything you need to start your evaluation.

### Rapid Prototyping

Whether you need to show your marketing team, or preview your future product to customers, EVL-CL4-H can help you deliver a look-and-feel prototype in a very short time!

### Hardware

The board is based on PIC32MX360F512 running at 80MHZ. It can be programmed using any of Microchip In-Circuit Programmers & Debuggers like MPLAB ICD3.

### Firmware

The firmware is written in C and is compatible with Microchip MPLAB IDE and PIC32 compiler. The firmware includes: UART, Object commands, Terminal commands, interrupt driven UI handler, Macros, and sample code for Demo\_CA32 GUI Project.

**Please see “SegeNT Software Manual” and “SegeNT Hardware Manual” for more information about the operation and the commands of SegeNT.**

## 2. EVL-CL4 Features

- Ready to use any of Haidar’s embedded display module
- On board USB to RS232 converter
- On board +3.3V linear converter
- On board Buzzer
- On board status LEDs

### 3. EVL-CL4-H Features

- Ready to use any of Haidar's embedded display module
- On board USB to RS232 converter
- On board +3.3V linear converter
- On board Buzzer
- On board status LEDs
- On board PIC32MX360F512 Microchip microcontroller (32bit @ 80MHZ)
- On board Real Time Clock
- On board RGB LED
- On board 4 user buttons
- On board 4 user digital outputs
- On board 4 user digital inputs
- On board 5 user LEDs
- On board 5 user analog inputs
- On board 1 user 10K POT
- It can be programmed using any of Microchip In-Circuit Programmers & Debuggers like MPLAB ICD3.
- The firmware is written in C and is compatible with Microchip MPLAB IDE and PIC32 compiler. The firmware includes: UART, Object commands, Terminal commands, interrupt driven UI handler, Macros, and sample code for Demo\_CA32 GUI Project.

### 4. Board Dimensions

Width	2.16" / 55mm
Length	6.3" / 160mm

### 5. Electrical Characteristics

**EVL-CL4 requires 5V DC. Exceeding the supply voltage over the typical value (5V) will cause a permanent damage to the board and to the attached LCD and void your warranty.**

Current draw is as follows:

Configuration	Typical Current (mA) at 5V
EVL-CL4 with no display module attached	Max 100mA

### 6. Environmental

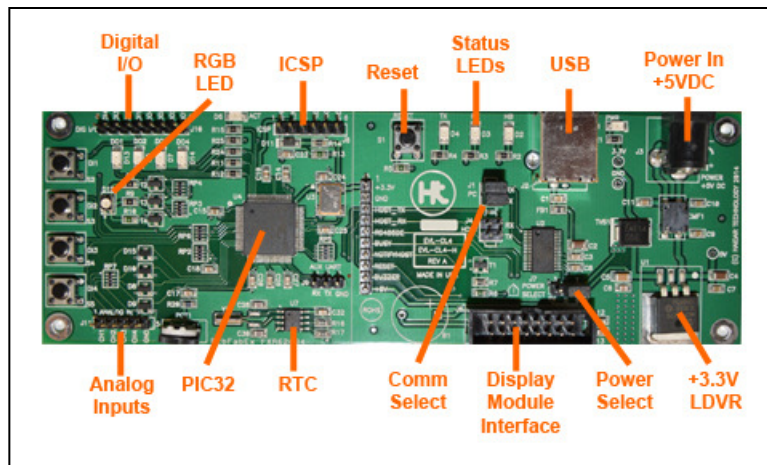
The standard EVL-CL4 board is rated for commercial temperature operation of -20 to 85°C.

## 7. Electrical Specifications

Parameter	Symbol	Min.	Typ.	Max.	Units
Input Supply Voltage	VDD	-	5	5.5	V
High Level Input Voltage (VDD = 3.3V)	VIH	0.7VDD	-	VDD	V
Low Level Input Voltage (VDD = 3.3V)	VIL	0	-	0.3VDD	V
Digital sink/source current	Id	-	-	25	mA
Analog input voltage	Va	0	-	3.3V	V
RS232 TX/RX		0.7VDD	-	VDD	V

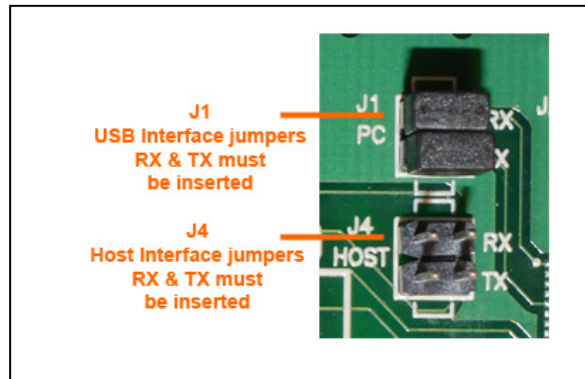
**Warning: RX and TX use a CMOS level of 3.3V. Connecting them to standard (PC) RS232 with +/- 12V or other will damage the controller and void your warranty**

## 8. Board Hardware



## 9. USB/Host Interface

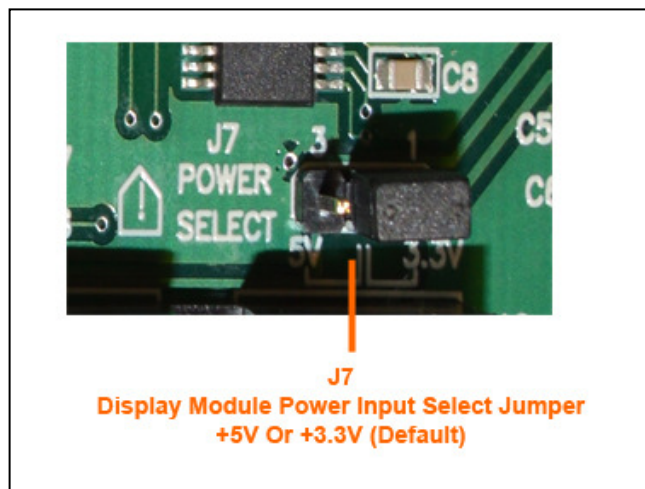
USB to RS232 converter (FT245RL) is used to connect the board to a PC running Haidar's uiLAB software. Jumpers J1 and J4 are used to connect the display module to the USB or to the Host.



When both RX and TX of jumper J1 are installed, the board is connected to the USB. When both RX and TX of jumper J4 are installed, the board is connected to the Host controller via J5. One jumper J1 or J4 must be installed at a time.

## 10. Display Module Power Input Select

The power to the display module can be +5VDC or +3.3VDC (Default). Jumper J7 is used to select the power input.



**Warning: be sure that the power to the display module is within the operating range of the module. Exceeding the power to the display module over the typical ratings will damage the display module.**

## 11. Host Controller Interface

This header can be used to interface the display module to the user host controller board.

J5 Host controller connector (10-pin, 0.1" Header)

Pin#	Pin Name	Description
1	+3.3V	3.3V Power
2	GND	Ground
3	RX	Connect to Host Controller TX
4	TX	Connect to Host Controller RX
5	RS485DE	RS485 Transmitter Enable. Leave open if is not used
6	BUSY	SegeNT Busy signal
7	NOTIFYHOST	SegeNT NotifyHost signal
8	RESET	SegeNT Reset signal. Leave open if is not used
9	Buzzer Enable	SegeNT Buzzer ON/OFF signal
10	+5V	5V Power

## 12. Main Display Module Interface

This is the main interface to the display module. 16pin flat cable is what you need to connect the display module to the PC or to the host controller.

J6 Main Interface (16Pos, 0.1", IDC connector)

Pin Name	Pin #	Type	Tolerance	Description
VIN	1	PWR	3.3V/5V	Power Supply Input
VIN	2	PWR	3.3V/5V	Power Supply Input
GND	3	PWR	0V	Power Ground
GND	4	PWR	0V	Power Ground
LED_RX	5	DOUT	3.3V	SegeNT RX LED Signal
LED_TX	6	DOUT	3.3V	SegeNT TX LED Signal
RX	7	DIN	3.3V	SegeNT Main UART RX
TX	8	DOUT	3.3V	SegeNT Main UART TX
RS485DE	9	DOUT	3.3V	SegeNT Main RS485 Data Enable
READY/BUSY	10	DOUT	3.3V	SegeNT Ready/Busy signal
NOTIFYHOST	11	DOUT	3.3V	SegeNT NotifyHost signal
BUZZER	12	DOUT	3.3V	SegeNT Buzzer signal
LED_HB	13	DOUT	3.3V	SegeNT HB LED Signal
RESET	14	DIN	3.3V	SegeNT Reset Signal
NC	15			Leave open.
NC	16			Leave open.

## 13. Host Controller ICSP

This header is used to program the host controller. It can be programmed using any of Microchip In-Circuit Programmers & Debuggers like MPLAB ICD3.

J8 Host controller ICSP (6-pin, 0.1" Header)

Pin#	Pin Name	Description
1	VPP	VPP
2	3.3V	3.3V Power
3	GND	Ground
4	PGD	Data
5	PGC	Clock
6	GND	Ground

## 14. Host Controller AUX UART

This header is connected to the host controller UART2. It can be used for debugging or for another function. RS232 driver is needed if you need to connect it to PC.

J9 Host controller AUX UART (3-pin, 0.1" Header)

Pin#	Pin Name	Description
1	RX	UART Receiver
2	TX	UART Transmitter
3	GND	Ground

## 15. Host Controller Digital Inputs/Outputs

This header is connected to the host controller general purpose digital input/output. 4 user digital output and 4 digital user inputs are provided. The digital outputs are connected to 4 status LEDs. The digital inputs are connected to 4 on board buttons. The digital inputs are pulled-up by 4.7K resistor array.

J10 Host Controller Digital I/O (8Pos, 0.1" Header)

Pin Name	Pin #	Description
DO1	1	Digital Output 1
DO2	2	Digital Output 2
DO3	3	Digital Output 3
DO4	4	Digital Output 4
DI1	5	Digital Input 1
DI2	6	Digital Input 2
DI3	7	Digital Input 3
DI4	8	Digital Input 4

## 16. Host Controller Analog Inputs

This header is connected to the host controller analog input. 5 user analog are provided. One analog input is connected to on board 10K POT. The input range is from 0v to 3.3V. The analog inputs are diode protected.

J11 Host Controller Analog Inputs (5Pos, 0.1" Header)

Pin Name	Pin #	Description
CH1	1	Analog Input 1
CH2	2	Analog Input 2
CH3	3	Analog Input 3
CH4	4	Analog Input 4
GND	5	Ground

## 17. Host Controller RGB LED

The on board RGB LED is connected to the host controller PWM through 3 power MOSFET drivers. The PWMs are used to change the brightness for each LED (Red, Green and Blue).

## 18. Host Controller RTC

The on board RTC (MCP79400 from Microchip) is connected to the host controller via I2C bus. The RTC powered from the main 3.3V and battery power is disabled. The time/date data will be lost if the board is power-off and the user need to set the time/date at power-on or reset.

## 19. Manual Change History

Date	Revision	Change
3/5/2015	REV1.00	Initial version of this manual

## 20. Hardware Limited Warranty

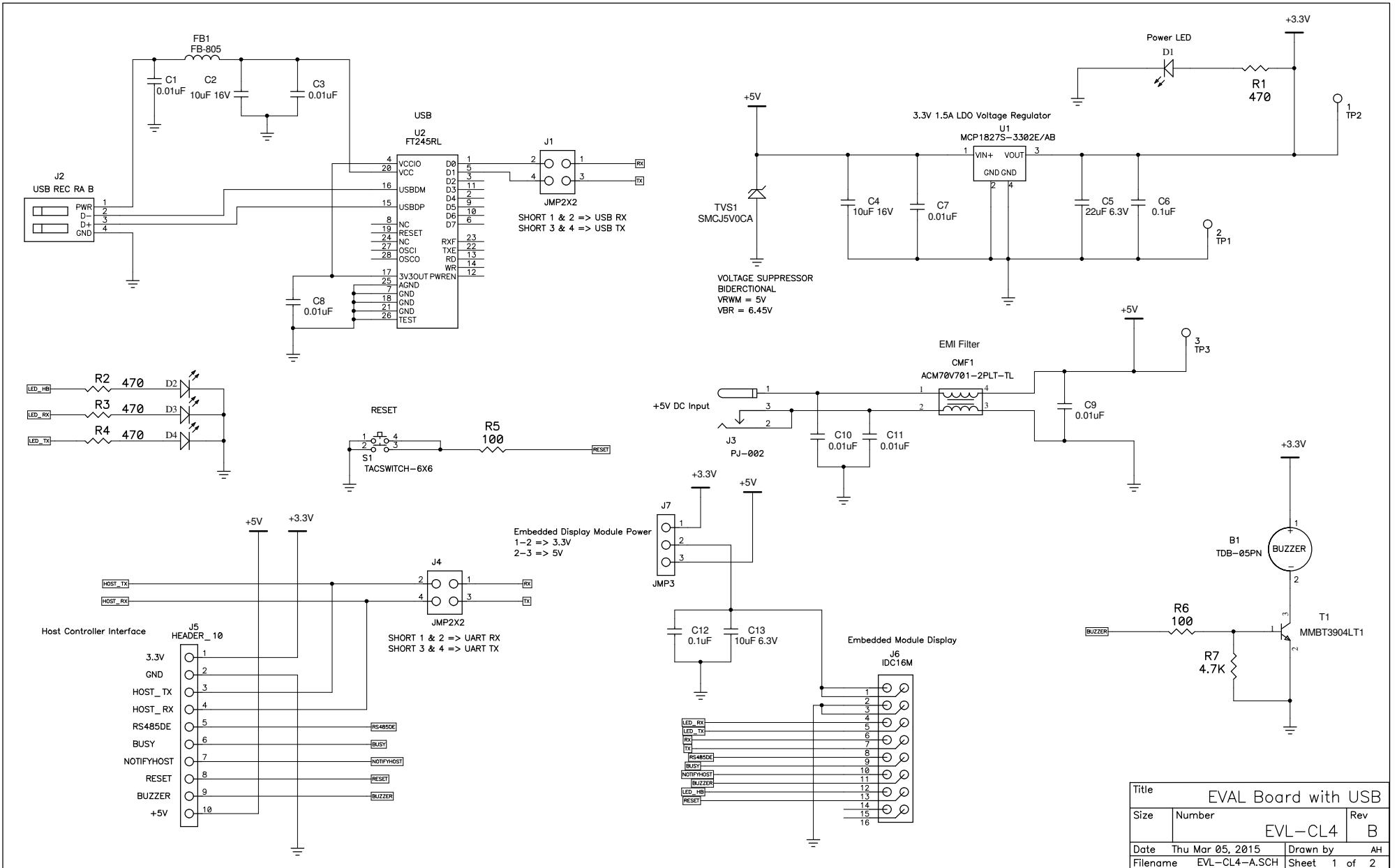
Haidar Technology, LLC. Warrants its hardware products to be free from manufacturing defects in materials and workmanship under normal use for a period of one (1) year from the date of purchase from Haidar. This warranty extends to products purchased directly from Haidar or an authorized Haidar distributor. Purchasers should inquire of the distributor regarding the nature and extent of the distributor's warranty, if any. Haidar shall not be liable to honor the terms of this warranty if the product has been used in any application other than that for which it was intended, or if it has been subjected to misuse, accidental damage, modification, or improper installation procedures. Furthermore, this warranty does not cover any product that has had the serial number altered, defaced, or removed. This warranty shall be the sole and exclusive remedy to the original purchaser. In no event shall Haidar be liable for incidental or consequential damages of any kind (property or economic damages inclusive) arising from the sale or use of this equipment. Haidar is not liable for any claim made by a third party or made by the purchaser for a third party. Haidar shall, at its option, repair or replace any product found defective, without charge for parts or labor. Repaired or replaced equipment and parts supplied under this warranty shall be covered only by the unexpired portion of the warranty. Except as expressly set forth in this warranty, Haidar makes no other warranties, expressed or implied, nor authorizes any other party to offer any warranty, including any implied warranties of merchantability or fitness for a particular purpose. Any implied warranties that may be imposed by law are limited to the terms of this limited warranty. This warranty statement supercedes all previous warranties, and covers only the Haidar hardware.

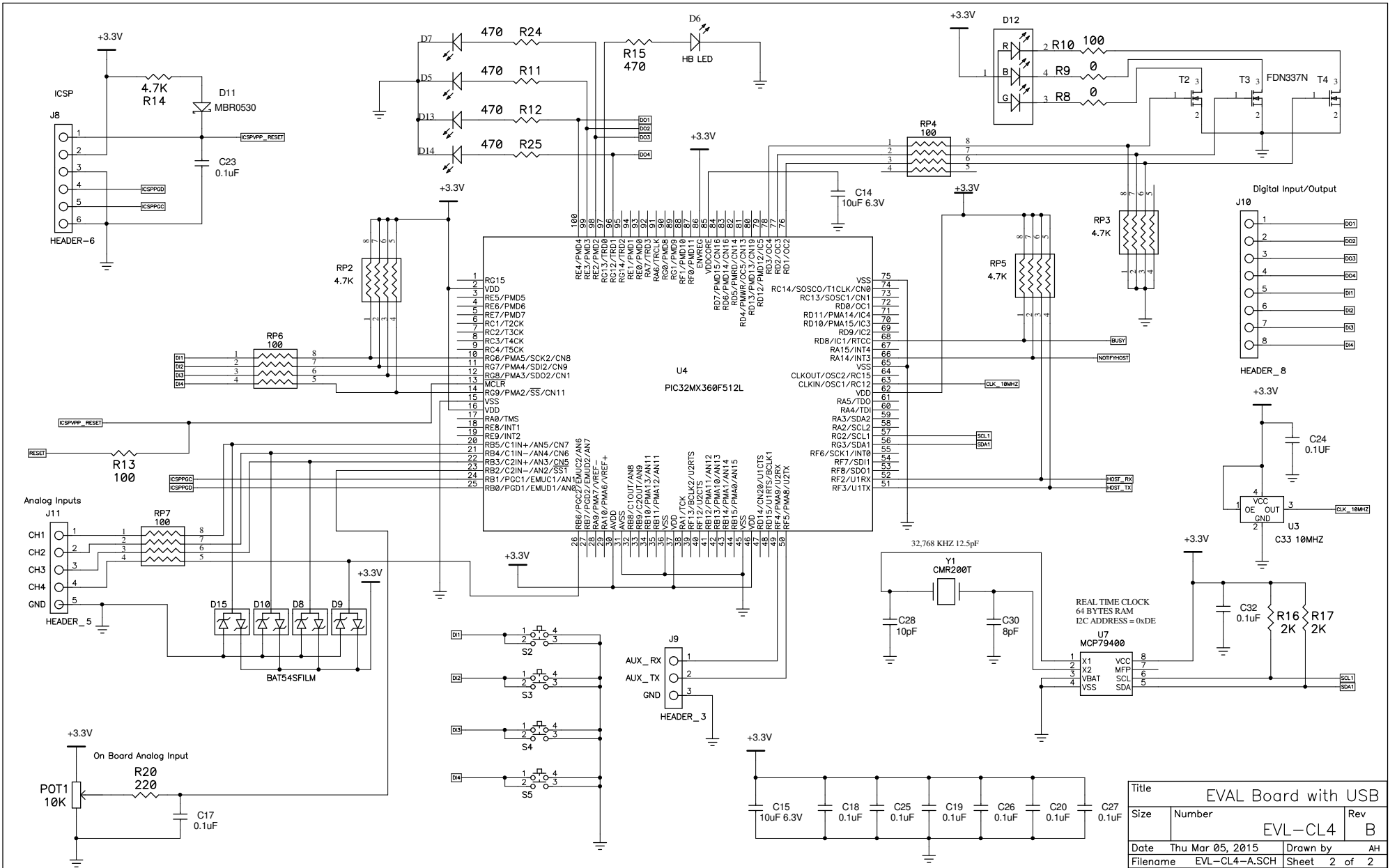
## 21. Returns and Repair Policy

No merchandise may be returned for credit, exchange, or service without prior authorization from. To obtain warranty service, contact the factory and request an RMA (Return Merchandise Authorization) number. Enclose a note specifying the nature of the problem, name and phone number of contact person, RMA number, and return address. Authorized returns must be shipped freight prepaid to Haidar Technology with the RMA number clearly marked on the outside of all cartons. Shipments arriving freight collect or without an RMA number shall be subject to refusal. Haidar reserves the right in its sole and absolute discretion to charge a 15% restocking fee, plus shipping costs, on any products returned with an RMA.

Return freight charges following repair of items under warranty shall be paid by Haidar, shipping by standard ground carrier. In the event repairs are found to be non-warranty, return freight costs shall be paid by the purchaser.







Title		EVAL Board with USB	
Size	Number	Rev	
		EVL-CL4 B	
Date	Thu Mar 05, 2015	Drawn by	AH
Filename	EVL-CL4-A.SCH	Sheet	2 of 2