



Table 1. Terminal Block Connector 1 Pin Function Descriptions

Pin #	Pin Name	Port Type	Description
1	VPS	Power input	Power supply voltage. The driver works from 10V to 28V.
2	PGND	Power ground	Power ground pin. Connect it directly to power supply return rail.
3	GND	Signal ground	Signal ground. Connect this pin to the signal ground of ADCs, DACs, and the signal sources.
4	CTMO	Analog output	The controller internal temperature indication output. It can be used for sensing the actual temperature of the controller to avoid over-heating. 0V to 4V represents the controller temperature from -55°C to 125°C.
5	LPGD	Digital output	Loop good indication. When outputting a high logic level 5V, it indicates the control loop works properly, i.e. the output current equals the set-point value; outputting a logic low level indicates there is something wrong in the control loop, such as open circuit, output current equals zero, etc.

Table 2. Terminal Block Connector 2 Pin Function Descriptions

Pin #	Pin Name	Port Type	Description
1	LIO	Analog output	Laser current output indication. 0V to 4V indicates the laser current from 0 to 500mA linearly.
2	LIS	Analog input	Laser current set. 0V to 4V sets the laser current from 0 to 500mA linearly.
3	ILM	Analog input	Laser current limit set. 0V to 4V sets the laser current limit from 0 to 0.5A linearly.
4	4VR	Analog output	4V reference voltage. It can be used by external POTs (Potentiometer), DACs and/or ADCs for setting the LIS. Under Stand-by Mode, this pin is still working.
5	GND	Signal ground	Signal ground. Connect this pin to the signal ground of ADCs, DACs, and the signal sources.
6	SBDN	Digital input	This is a duplex pin: when it is pulled down <0.4V, the controller is put to Shut-down Mode; when setting this pin to between 1.2V to 2.5V, the controller is set to Stand-by Mode; when setting it to >2.64V to VPS voltage, the controller goes to On Mode. There is an internal 10MΩ pull up resistor tied to VPS.

Table 3. Mini-USB Connector 1 Pin Function Descriptions

Pin #	Pin Name	Port Type	Description
1 & 2	LDA	Analog output	Laser diode anode. Connect it to the anode of the laser diode.
3 & 5	LDC	Analog output	Laser diode cathode. Connect it to the cathode of the laser diode. This pin is internally connected to PGND and GND, thus its voltage potential is zero.
4	GND	Signal ground	Signal ground. Connect this pin to the signal ground of ADCs, DACs, and the signal sources.

Table 4. Mini-USB Connector 2 Pin Function Descriptions

Pin #	Pin Name	Port Type	Description
1	1.2VR	Analog output	Internal reference voltage.
2	V _{IN-}	Analog input	The negative node of differential input signal.
3	V _{IN+}	Analog input	The positive node of differential input signal.
4	AGND	Signal ground	Signal ground.
	Shell	Power ground	Connect it to GND.



SPECIFICATIONS

Table 5. Characteristics ($T_A = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Control SBDN Pin (# 2 of Terminal Block Connector 2)						
SBDN Voltage	$V_{\text{SBDN-ON}}$		2.64		V_{VPS}	V
	$V_{\text{SBDN-STANDBY}}$		1.2		2.5	V
	$V_{\text{SBDN-OFF}}$		0		0.4	V
	$V_{\text{SBDN-SB-HI}}$ Going up from Standby to On threshold voltage		2.508		2.64	V
	$V_{\text{SBDN-SB-LOW}}$ Going down from On to Standby threshold voltage		2.5		2.6	V
	$V_{\text{SBDN-OFF-HI}}$ Going up from Off to Standby threshold voltage				1.2	V
	$V_{\text{SBDN-OFF-LOW}}$ Going down from Standby to Off threshold voltage		0.4			V
Pull-up Resistor to VPS				10		MΩ
Current Setting LIS Pin (# 6 of Terminal Block Connector 2)						
Current Set Voltage			0		4	V
Power Supply Input VPS Pin (# 3 of Terminal Block Connector 1)						
Input Range	V_{VPS}		10		28	V
Input Current	I_{VPS}		0		600	mA
Output LDA Pin (# 1&2 of Mini-USB Connector 1)						
Output Voltage	V_{LDA}		0		$V_{\text{VPS}} - 4$	V
Output Current	I_{LDA}		0		500	mA
Output Current Noise	I_{NLDA}	Peak-to-peak value, 0.1Hz to 10Hz		0.5		$\mu\text{A}_{\text{P-P}}$
Minimum Dropout Voltage	$V_{\text{VPS}} - V_{\text{LDA}}$			4		V
Operating Ambient Temperature Range	T_A		-40		65	$^\circ\text{C}$
Large Signal Bandwidth	f_{lg}			1		MHz
Small Signal Bandwidth	f_{sm}			1		MHz
Small Signal Rise and Fall Times	$t_{\text{smr}}, t_{\text{smf}}$			350		ns
Large Signal Rise and Fall Times	$t_{\text{lgr}}, t_{\text{lgrf}}$			350		ns

APPLICATIONS INFORMATION

Voltage can be input through Mini-USB or LIS. Figure 2 shows the connection for the Mini-USB. Figure 3 shows the waveforms $v_{LIS}(t)$ vs. $v_{IN+}(t)$ & $v_{IN-}(t)$.

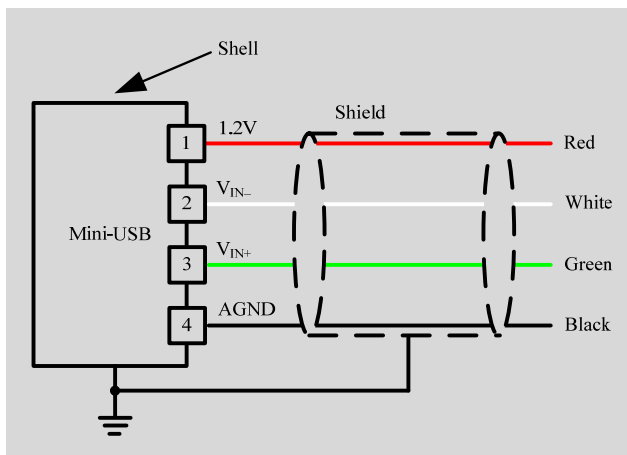
USB Differential Input


Figure 2. Connecting DAC Board to the QCL Driver AQCL500MA410

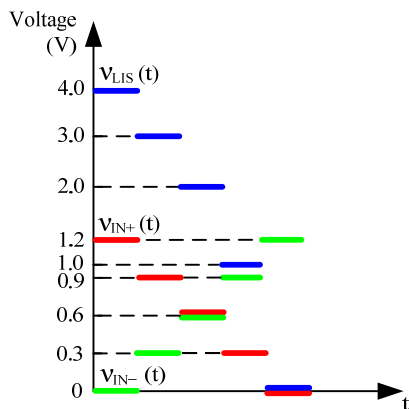


Figure 3. Waveforms $v_{LIS}(t)$ vs. $v_{IN+}(t)$ & $v_{IN-}(t)$

$$v_{LIS} = \frac{4}{2.4} (v_{IN+} - v_{IN-})$$

$$= 1.67 (v_{IN+} - v_{IN-})$$

Insert the screwdriver into the upper card slot, and the lower card slot should be inserted with a power cord with a bare core ($\phi = 1.5\text{mm} \pm 0.2\text{mm}$; $L = 7.5\text{mm} \pm 0.2\text{mm}$).

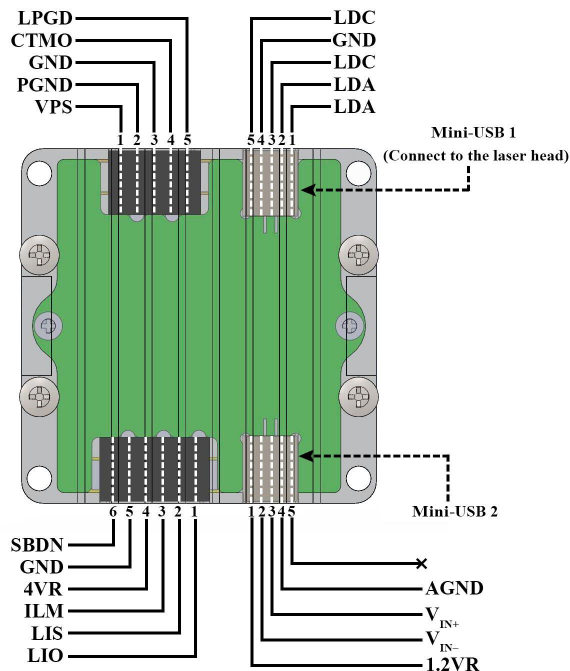


Figure 4. Top View of AQCL500MA410



MECHANICAL DIMENSIONS

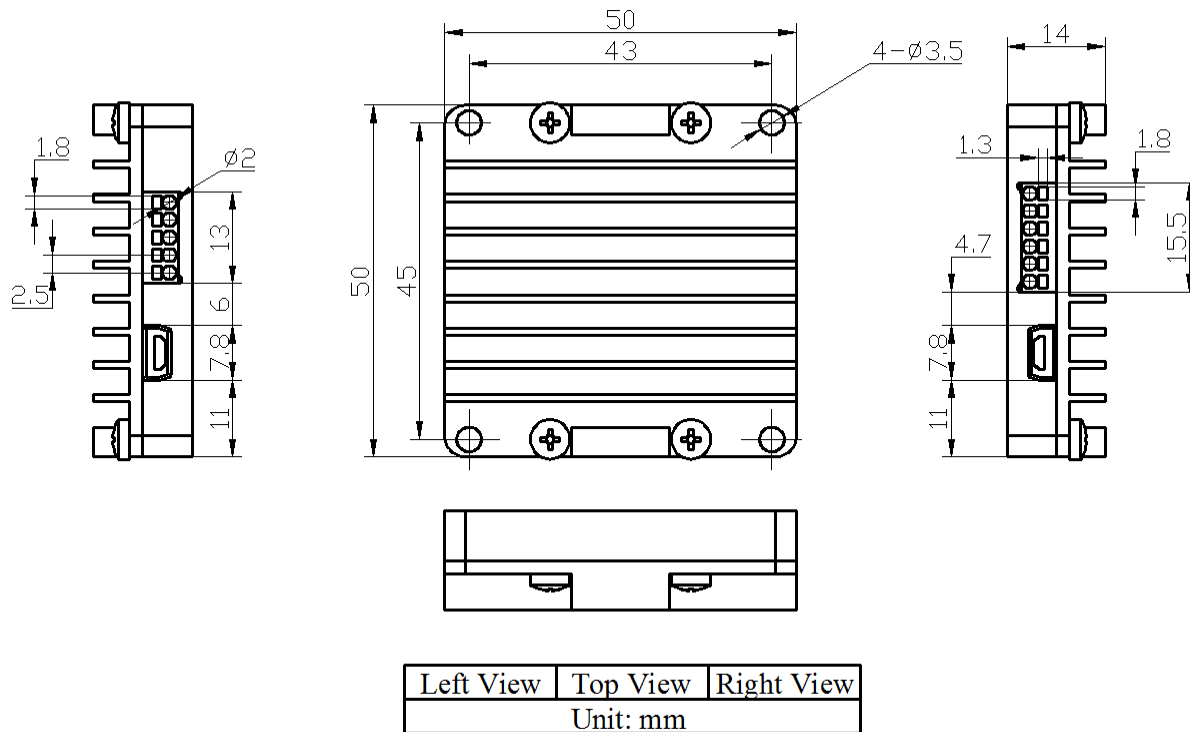


Figure 5. Dimensions of AQCL500MA410



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