

## HighSpeed-Galvo-driver

# MicroAmp

### Tuning and adjustment

#### Introduction

The MicroAmp is currently the smallest and fastest scanamp for CTI's 6800 or 6210s on the world market. It's new technology allows to scan up to 60k with selected galvanometers, at a reduced scanangle of 4° optical. But even at large angles, the scanrate is increased.

The standard delivery package contains driver and input cable. The driver is presetted to CTI 6800 galvos, but has to be retuned slightly before first use. This can be done by using the three adjustment trimmers on the drivecard.

#### The cable

High speed galvanometers demand for special cables, which are shielded and separated between motor and position detector. Cable lenghts up to 100cm are allowed. We recommend a cable lenght of maximum 50cm.

#### Power source

Power source is slightly critical and has strong influence on speed and quality of the complete scanner system. Even if a standard transformer with a bridge and caps will do, MediaLas recommends a stabilized or switched power supply. The MicroAmp is able to run between +/-20VDC to +/-30VDC, at 1A each. The speed between 20V and 30V is different, especially at small step angles. While MediaLas uses 24V switching power supplies, a speed enhancement can be reached at 30V.

If you use transformer and bridge, then make sure to have minimum 10,000 uF caps per voltage, better 40,000 uF, parallel with a 100uF for fast peaks. Do not use extra capacitors at switching power supplies.

**Polarity of connecting power to the driver is important. No warranty if connected incorrect.**

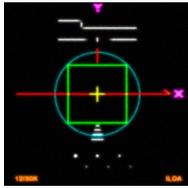
#### The measuring procedure

The MicroAmp was measured with CT6800HP, make 1999, passice cooled. Laboratory power supply, room temperature. Windows PC with LD Pro, 12/30k ILDA testframe. Later we did some measurements with 6210s, connector style, passive cooled. The speed differed from what we measured with the 6800s. Mainly this was caused by the mirrors and the different connector, which has a slightly higher resistance than the 6800 connector. We then changed to the older suttering style 6210s and found a speed increase at small step angles.

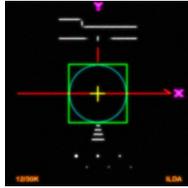
Deflection angle (6800)	Operating voltage	Speed
25° optical deflection	+/- 24V	25.000 pps
15° optical deflection	+/- 24V	30.000 pps
8° optical deflection	+/- 30VDC	45.000 pps
5° optical deflection	+/- 30V	52.000 pps

Deflection angle (6210)	Operating voltage	Speed
25° optical deflection	+/- 24V	28.000 pps
15° optical deflection	+/- 24V	35.000 pps
8° optical deflection	+/- 30VDC	50.000 pps
5° optical deflection	+/- 30V	57.000 pps
4° optical deflection	+/- 30V	~ 60.000 pps

## The ILDA standard



Driver is set too fast or output speed of computer is too slow. The inner circle is larger than the green square.



Driver and output speed matches together.



Driver is too slow or output speed of computer is too high. Readjust driver or slow down computer.

## Adjustments

Standard configuration shows 7 adjustment pots, 4 of them are necessary for the user. The small pots, which are placed inside the board, should not be changed in setting. These are necessary for linearity and other galvo specific settings.

### Basic adjustments

The MicroAmp comes already pre adjusted and needs to be set up for the galvo only in small areas. Every galvo is different, so minor adjustments are needed. For this, the ILDA test pattern is used, also a setup of the galvos in XY with a laser. If the driver is totally deadadjusted, this will be the procedure to retune it:

- Size, Servo-Gain, Damping und HF-Damping are adjusted counter clockwise to their left zero position. Now turn LFD 5 full rounds clockwise to right.
- Connect computer with ILDA test pattern, run it at approx. 20kpps.
- Power on the amplifiers.
- Slowly open the servo gain (clockwise). The mirror of the galvo should move now to its middle position. If yes, turn two rounds clockwise.
- Slowly open the size until you see the galvo moving.
- Increase servo gain until you see overshoots. Correct it with LFD.
- Decrease undershoots by opening the HFD pot slightly clockwise. Remove gain/LFD procedure and correct with HFD, until you the picture looks satisfying.
- Increase speed of test patterns and readjust for optimized picture.

### Inverting of axis

By using the jumpers at the inputs, each driver can be inverted easily. This can be done during scanning also. Just pull out the jumpers and put them in at 90° rotated.

### Heatsinking

The MicroAmps are relatively insensitive to heat, since the power stage contains a overheat shutdown. To assure full function, the MicroAmp should be used with the attached heatsink. If you want to save space, remove the heatsink and mount the amp on a metal housing, to remove the heat from the power stage. The temperature at the heatsink should be below 70°C (170°F)

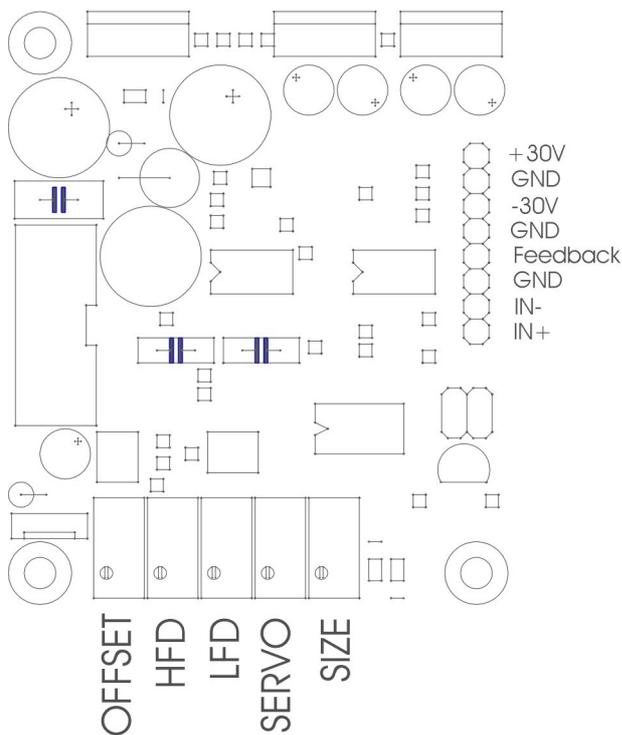
## In / Outputs

On the 8pin connector, all necessary in and outputs are available. Here is the power supply connected, the symmetric inputs and also the feedback outputs for the CAT-SAFE board. We recommend a ground free operation between computer and drivers.

**ATTENTION! Do not use FEEDBACK as inputs. This will instantly destroy your galvanometers!**

## Important hints

- Do not remove the driver board from its mounting bracket. This additional metal plate is needed for ground and increases stability of the driver. The bracket is isolated from ground.
- Do not use cheap and unshielded cable. We recommend to use the MicroAmps only with MediaLas cables. These cables are tested and designed for this driver. WE do not offer any warranty, if other cables are used.
- If the galvos gets very hot (above 48°C / 125°F), switch off the system and check for errors or problems. Use appropriate heatsink for the galvos. Do NOT run them without heatsink!!
- If the fuses blow continuously, do not replace them with a higher value. Check for possible errors.
- The maximum current per phase should be in average below 700mA. If it is higher, there can be a problem, which can result in overheating the galvos.



## Legend:

- Offset: Electrical offset of the driver, not the galvo!  
Is adjusted in factory.
- HFD: HighFrequency Damping. Corrects overshoots.
- LFD: LowFrequency Damping. Corrects undershoots.
- Servo: Servo-Gain. Power of the feedback signal for the internal PID controller.
- Size: Increases or decreases input sensitivity of the complete driver. Does not change driver settings.
- Pinouts: Galvo pinouts are 1:1 compatibel with CT6800

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