Piezo · Nano · Positioning

# MS 157E User Manual

## C-809.D40 Interface for Delta Tau Controller

Release: 1.0.0 Date: 2006-02-22

This document describes the following product(s):

- C-809.D40
  Interface for Delta Tau Controller

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# 0. Manufacturer Declarations

## 0.1. Declaration of Conformity

The manufacturer,

**Physik Instrumente (PI) GmbH & Co. KG**

**Auf der Roemerstrasse 1**

**76228 Karlsruhe, Germany**

declares, that the product C-809 Motion I/O Interface complies with these specifications:

**EMC:** EN55022 (1991), Group1, Class B

EN50082-1 (1992) / IEC 801-2:1991 (4 kV Contact Discharge)
(8 kV Air Discharge)

EN50082-1 (1992) / IEC 801-3: 1984 (3V/m)

EN50082-1 (1992) / IEC 801-4: 1988 (1 kV power lines, 0.5 kV Signal lines)

**Safety:** IEC 1010-1:1990+A1 / EN61010-1:1993 (Low-Voltage Directive)

The product complies with the requirements of the EMC Directive 89/336/EEC and CE markings have been affixed on the devices.

## 0.2. Safety Precautions

**Warning: High Voltage**

Disconnect the C-809 from the line voltage before opening the case.

Procedures which require opening the case should be carried out by authorized, qualified personnel only.

**Caution: Use 24 V Power out sockets only for driving motors.**

The four 24 V Power out sockets are designed to drive DC motors. Using it for other purposes could cause permanent damage to the C-809.

**Caution: PMAC card setup**

If the jumpers JP1 and JP2 are set on the C-809 board to supply the PMAC card, the PMAC card must be operated with isolated setup to avoid damage of the electronics (see the documentation of the PMAC card for details).

# 1. Introduction

## 1.1. About This Manual

This manual contains information concerning the operation of the C-809 Motion I/O Interface.

## 1.2. C-809 Description

The C-809 Motion I/O Interface houses adaptor electronics that allows running a wide range of PI micropositioning stages with the *PMAC Delta Tau* controller.

The C-809 is designed as a 19" rackmount unit and makes the full functionality of the controller available for up to 4 analog or PWM (e.g. PI's ActiveDrive™ line) servo-motors from PI.

With its integrated power supplies the C-809 can drive all kinds of DC motors from PI. DC analog motors, with up to 10 W power each, can be driven directly. For the more powerful PWM DC motors, the C-809 features a 4-channel power supply which provides 24 V per channel. The PWM signals are generated by the C-809 based on analog signals from the controller card.

### 1.2.1. Front Panel Elements

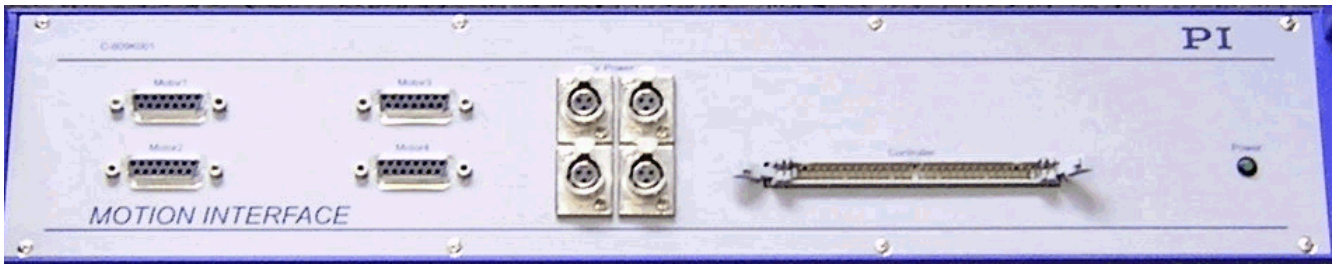



*Fig. 1: C-809.D40 Motion Interface front panel*

| Connector | Function |
|---|---|
| Motor 1<br>Motor 2<br>Motor 3<br>Motor 4 | Connectors for PI stages<br>4 x DB 15f, for pinouts see Section 3.1, p. 5 |
| 24 V Power out (4x) | Power supply for PWM stages (e.g. ActiveDrive™), 4 x 24 V<br>Switchcraft 3-pin, for pinouts see Section 3.2, p. 5, use the power cables that come with the C-809 (4 x C-815.PS3) |
| Controller | Interface to the Motion Control card |

### 1.2.2. AC Power Connection

The power connection and line fuses are located on the rear panel. The C-809 is equipped with a wide-range power supply and with fuses that are admissible for both 115 V and 230 V operation.

No settings need be changed when connecting a C-809 to a different supply voltage.

# 2. Operation

## 2.1. Quick Start

To operate your motion system using the C-809 adaptor electronics proceed as follows:

Install the PMAC Delta Tau motor controller card.

Connect C-809 to AC Power. The wide-range power supply works with line voltages from 90 to 240 volts AC at 50 to 60 Hz.

With the C-809 switched OFF, establish the connection between the C-809 box and the controller.

Connect the C-809 to up to four PI stages using the Motor1 to Motor4 connectors. Every PWM stage (see the stage's User Manual for model number and description) must also be connected to a 24 V Power out connector. For this purpose use one of the 4 power cables C-815.PS3 that come with the C-809. A mix of analog and PWM stages may be connected to the C-809.

Power up the C-809 by switching on the unit (rocker switch is located near the power cord socket on the rear panel).

## 2.2. Power Supply Settings

**Warning: High Voltage**

Disconnect the C-809 from the line voltage before opening the case.

Procedures which require opening the case should be carried out by authorized, qualified personnel only.

**Caution: PMAC card setup**

If the jumpers JP1 and JP2 are set on the C-809 board to supply the PMAC card, the PMAC card must be operated with isolated setup to avoid damage of the electronics.

By default, the jumpers JP1 and JP2 (see p. 8) are not set. So the output amplifiers of the PMAC card are not powered by the C-809 (non-isolated setup, see the documentation of the PMAC card for more information).

By setting the jumpers JP1 and JP2 the PMAC card can be supplied by the C-809. In this case the PMAC card must be in isolated setup (see the documentation of the PMAC card for details).

# 3. Connectors and Pinouts

## 3.1. Motor Connector

The motor connectors 1 to 4 follow standard conventions for PI analog and PWM stages. Note that if you operate a PWM stage, a C-815.PS3 power cable (see Section 3.2) is required in addition to connect to a 24 V Power out socket (see below).

**Pin Assignment (15-pin subD(f) connector):**

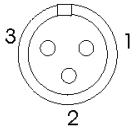
| Pin | | Function |
|---|---|---|
| 1 | | Brake |
| | 9 | Motor ( - ) |
| 2 | | Motor (+) |
| | 10 | Power-GND |
| 3 | | Magnitude (PWM) |
| | 11 | Sign (PWM) |
| 4 | | Out +5 V |
| | 12 | Input : Negative Limit |
| 5 | | Input:: Positive Limit |
| | 13 | Input:: Reference |
| 6 | | Limit GND |
| | 14 | Encoder: A (+) / ENCA |
| 7 | | Encoder: A ( - ) |
| | 15 | Encoder: B (+) / ENCB |
| 8 | | Encoder: B ( - ) |

## 3.2. 24 V Power-Out Sockets

The four 24 V Power out connectors are interchangeable, ready for use with PWM stages; no activation is required.

3-pin socket, Switchcraft

| | |
|---|---|
| 1 | GND |
| 2 | +24 V |
| 3 | unused |



## 3.3. Controller Connector

The 60-pin Controller connector is for the cable connecting the C-809 with the Delta Tau Controller.

**Pin Assignment (60-pin connector):**

| Function | Pin | Pin | Function |
|---|---|---|---|
| not used | 1 | 2 | not used |
| GND (Power Ground) | 3 | 4 | GND (Power Ground) |
| not used | 5 | 6 | not used |
| not used | 7 | 8 | not used |
| CHB3+ (Encoder 3, B+) | 9 | 10 | CHB4+ (Encoder 4, B+) |
| CHB3- (Encoder 3, B-) | 11 | 12 | CHB4- (Encoder 4, B-) |
| CHA3+ (Encoder 3, A+) | 13 | 14 | CHA4+ (Encoder 4, A+) |
| CHA3- (Encoder 3, A-) | 15 | 16 | CHA4- (Encoder 4, A-) |
| not used | 17 | 18 | not used |
| not used | 19 | 20 | not used |
| CHB1+ (Encoder 1, B+) | 21 | 22 | CHB2+ (Encoder 2, B+) |
| CHB1- (Encoder 1, B-) | 23 | 24 | CHB2- (Encoder 2, B-) |
| CHA1+ (Encoder 1, A+) | 25 | 26 | CHA2+ (Encoder 2, A+) |
| CHA1- (Encoder 1, A-) | 27 | 28 | CHA2- (Encoder 2, A-) |
| DAC3 (Motor analog +/-10 V, ch3) | 29 | 30 | DAC4 (Motor analog +/-10 V, ch4) |
| Not used | 31 | 32 | Not used |
| AENA3 (Amplifier enable, ch3) | 33 | 34 | AENA4 (Amplifier enable, ch4) |
| FAULT3 | 35 | 36 | FAULT4 |
| +LIM3 (Limit positive, ch3) | 37 | 38 | +LIM4 (Limit positive, ch4) |
| -LIM3 (Limit negative, ch3) | 39 | 40 | -LIM4 (Limit negative, ch4) |
| HMFL (Reference, ch3) | 41 | 42 | HMFL4 (Reference, ch4) |
| DAC1 (Motor analog +/-10 V, ch1) | 43 | 44 | DAC2 (Motor analog +/-10 V, ch2) |
| Not used | 45 | 46 | Not used |
| AENA1 (Amplifier enable, ch1) | 47 | 48 | AENA2 (Amplifier enable, ch2) |
| FAULT1 | 49 | 50 | FAULT2 |
| +LIM1 (Limit positive, ch1) | 51 | 52 | +LIM2 (Limit positive, ch2) |
| -LIM1 (Limit negative, ch1) | 53 | 54 | -LIM2 (Limit negative, ch2) |
| HMFL1 (Reference, ch1) | 55 | 56 | HMFL2 (Reference, ch2) |
| Not used | 57 | 58 | GND |
| + 15 V (JP1) | 59 | 60 | -15 V (JP2) |

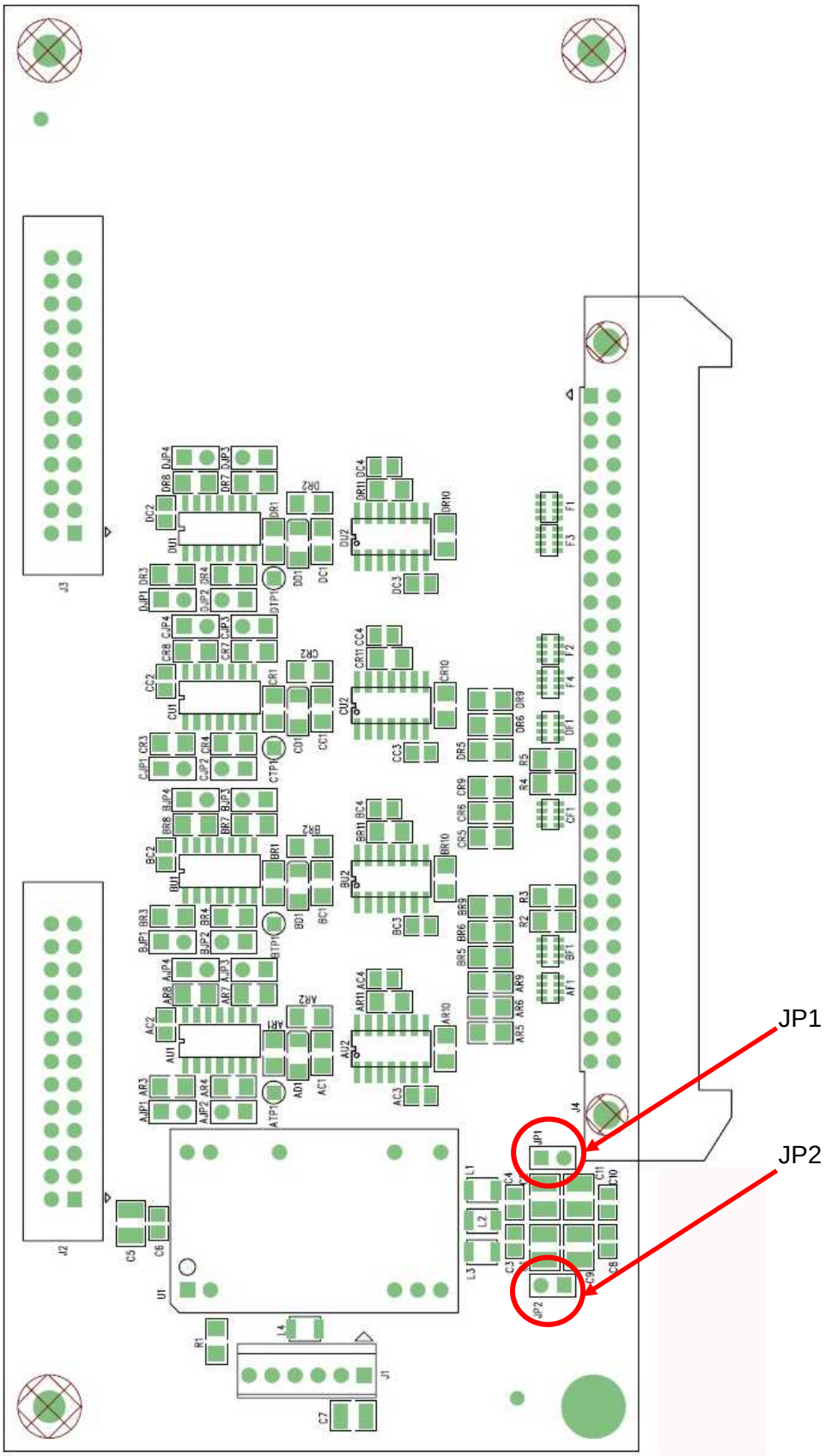
# 4. Technical Data

## 4.1. Specifications

| | |
|---|---|
| Model | C-809.D40 |
| Function | Interface for PMAC Delta Tau controller card |
| Axes | 4 |
| Output Power per channel | Analog DC Motors (on motor connector): 10 watts<br>PWM Stages (on separate power out socket): max. 100 watts* |
| Max. output power (total for an arbitrary mix of four stages) | 100 VA |
| Current limitation | 2 A per channel for analog DC motors (short-circuit proof) |
| PWM signal | 20-22 kHz, TTL |
| Motor connectors | 15-pin (f) sub-D per channel |
| Motion I/O connector | 60 flat ribbon connector socket |
| | |
| 24 V Power out sockets (4x) | 3-pin Switchcraft, only for driving motors |
| Size | 450 x 105 x 390 mm |
| Power supply | wide range, 90 to 240 V AC at 50 to 60 Hz |

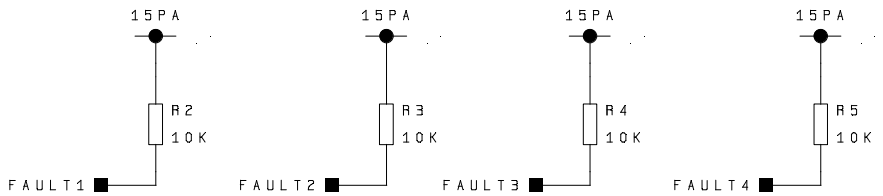
*100 watts are achieved if only one PWM stage and no analog stage is connected to the C-809.

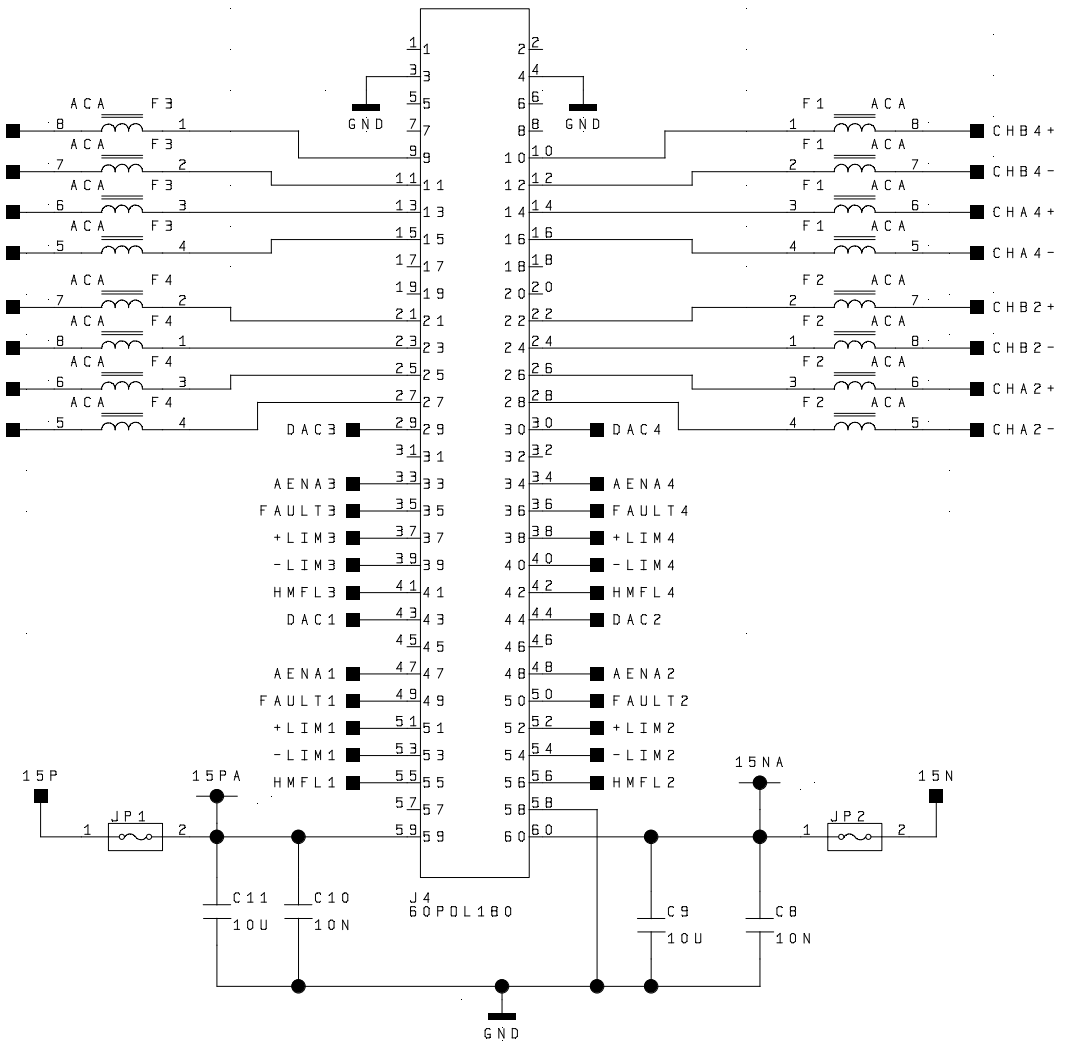
## 4.2. Layout Diagram

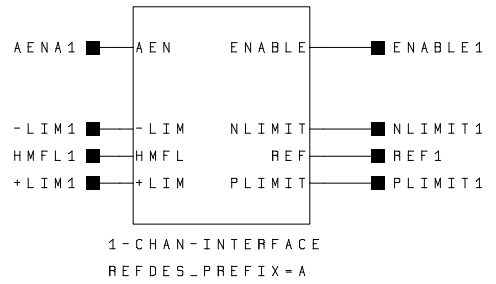


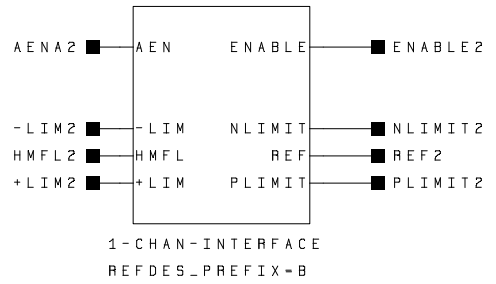
## 4.3. Circuit Diagram Details

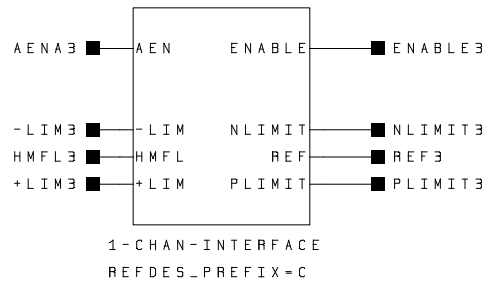
See the next pages.

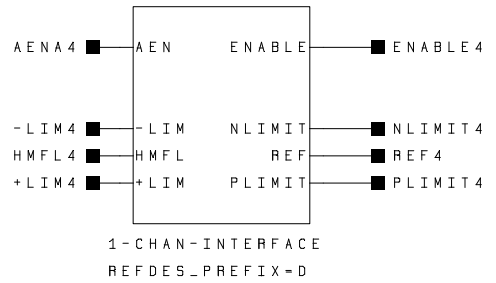


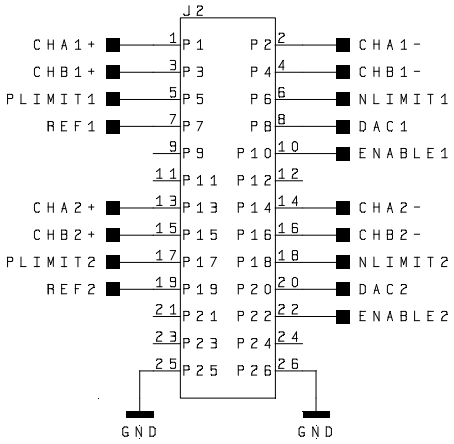



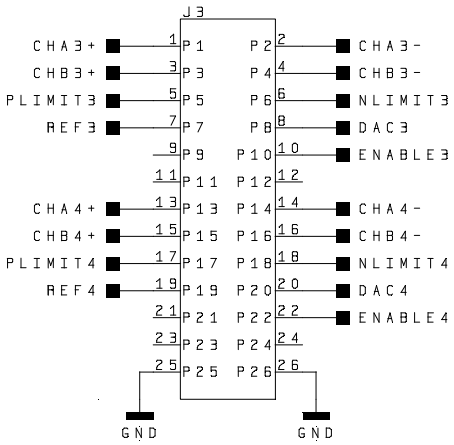



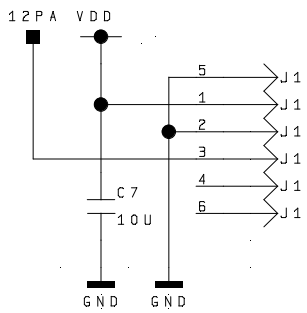



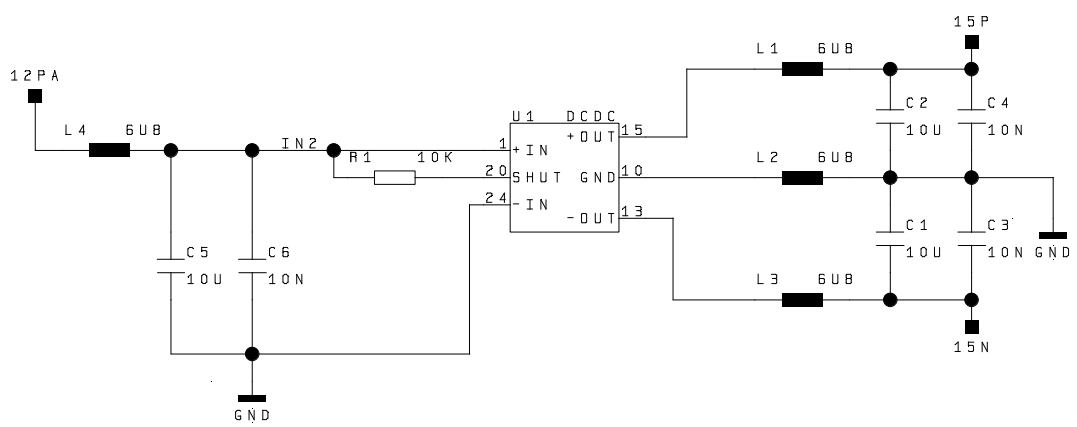

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| CHK | / / | Interface for Delta TAu controller | |
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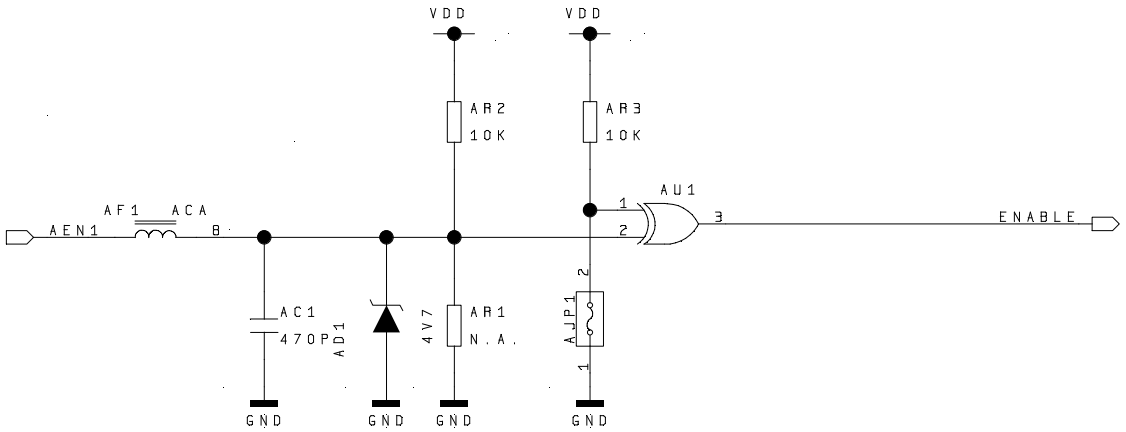


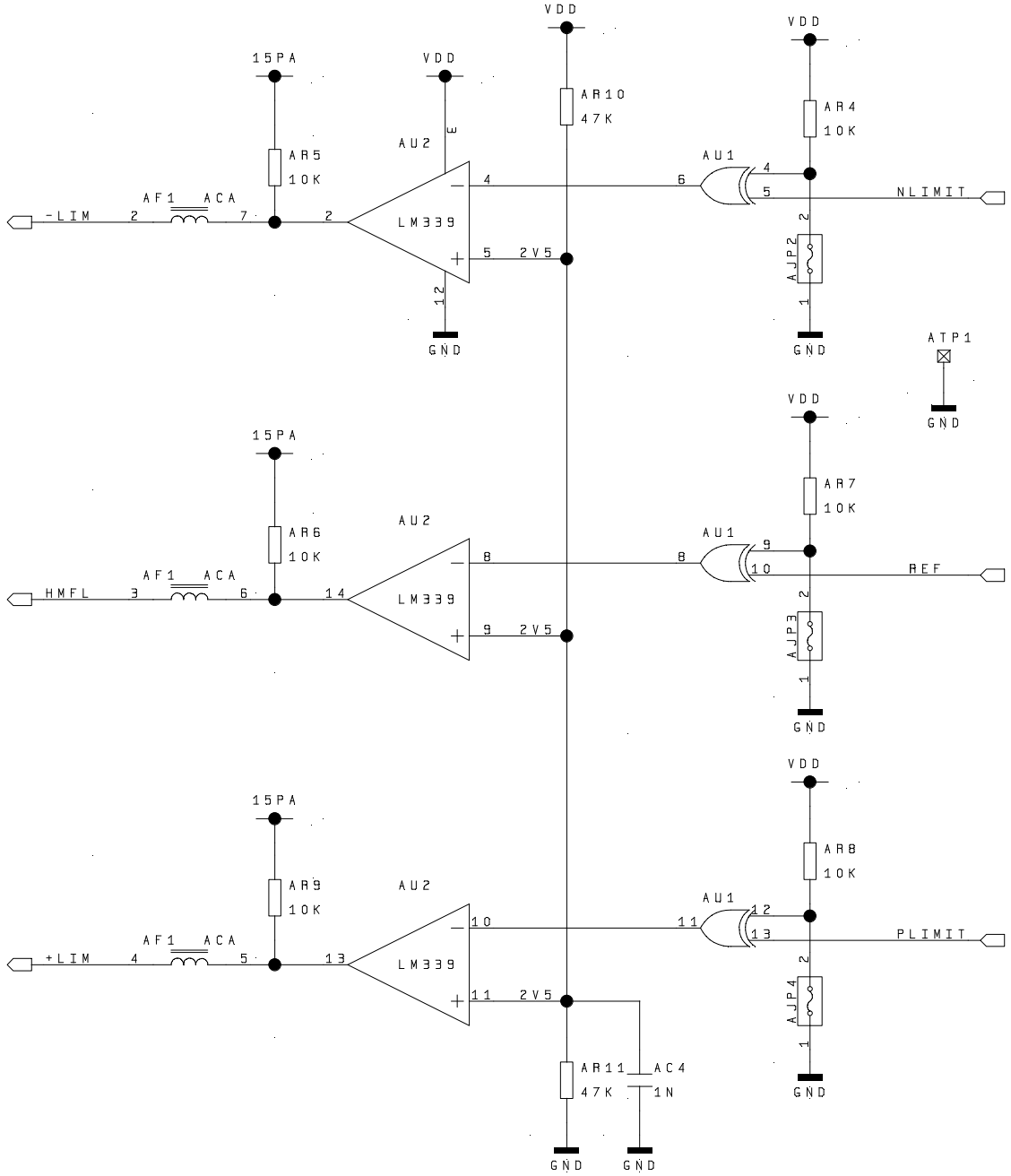


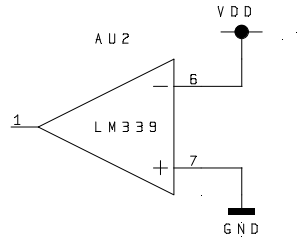


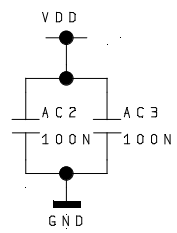


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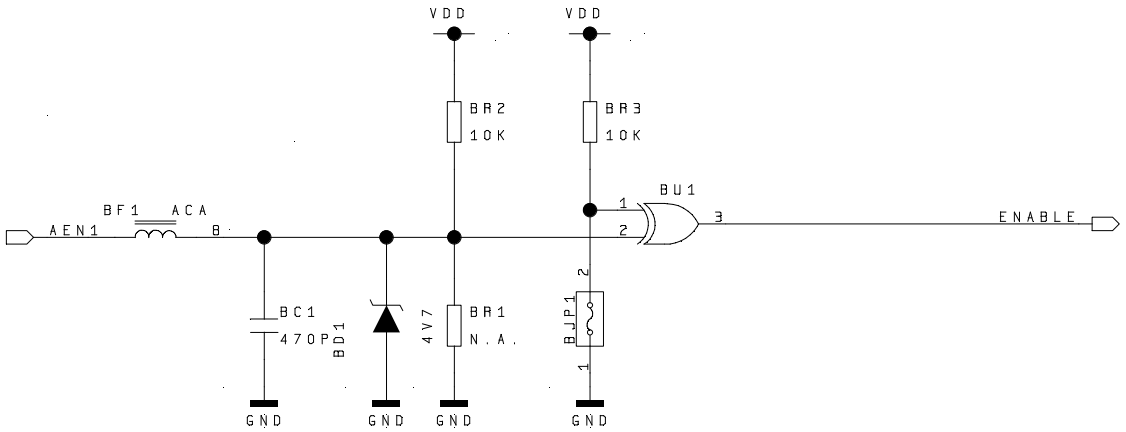


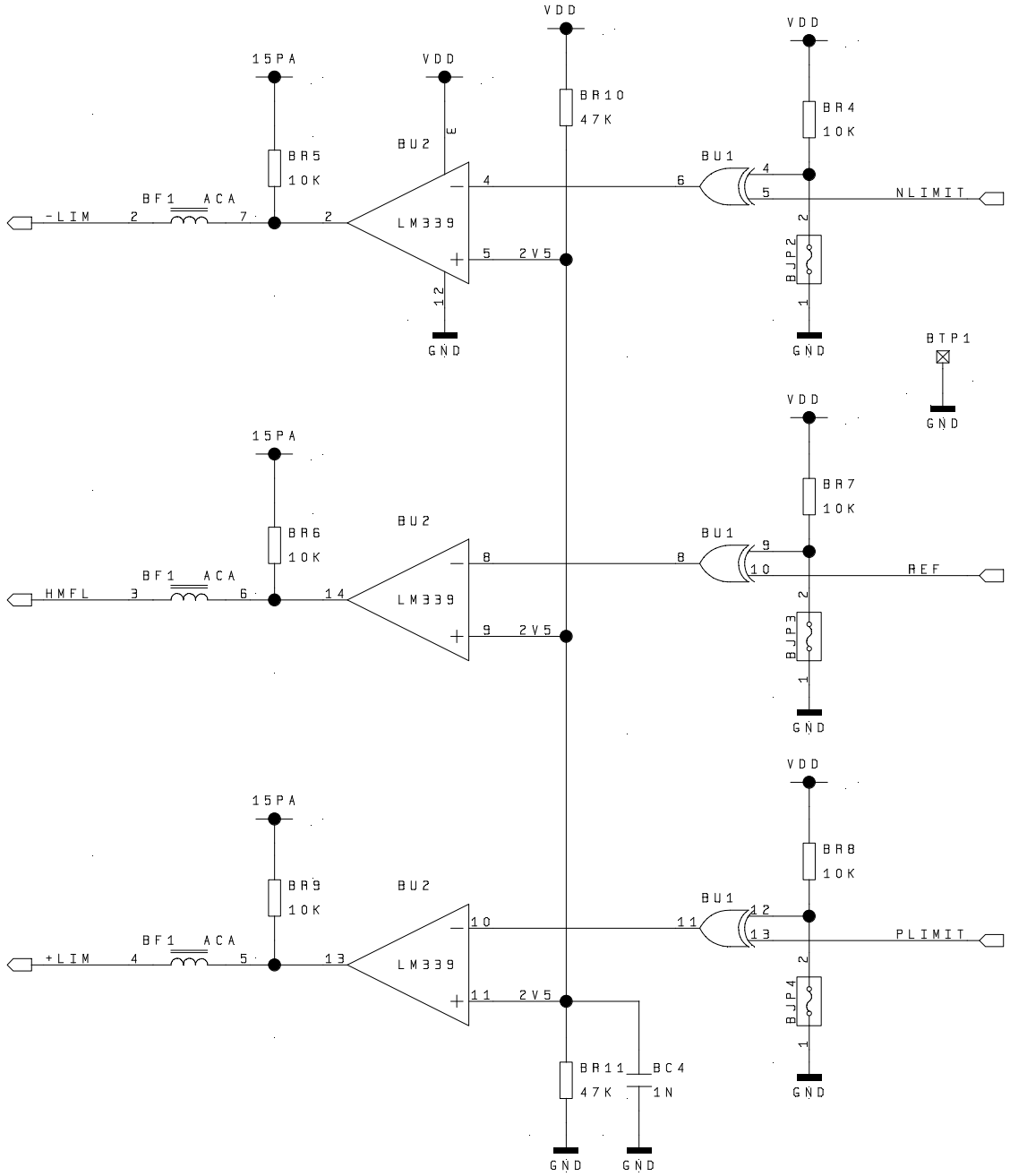


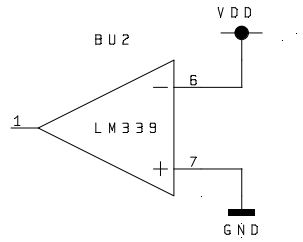


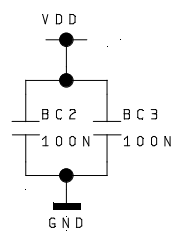


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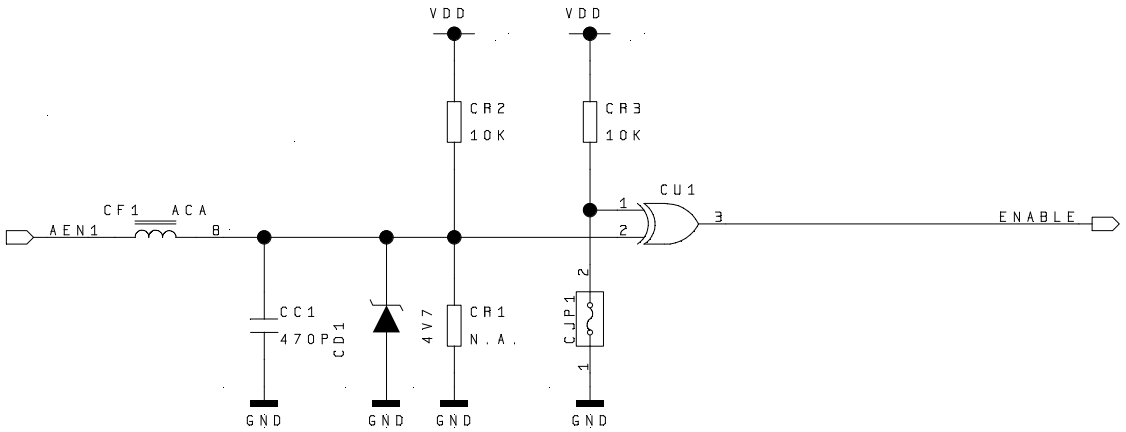


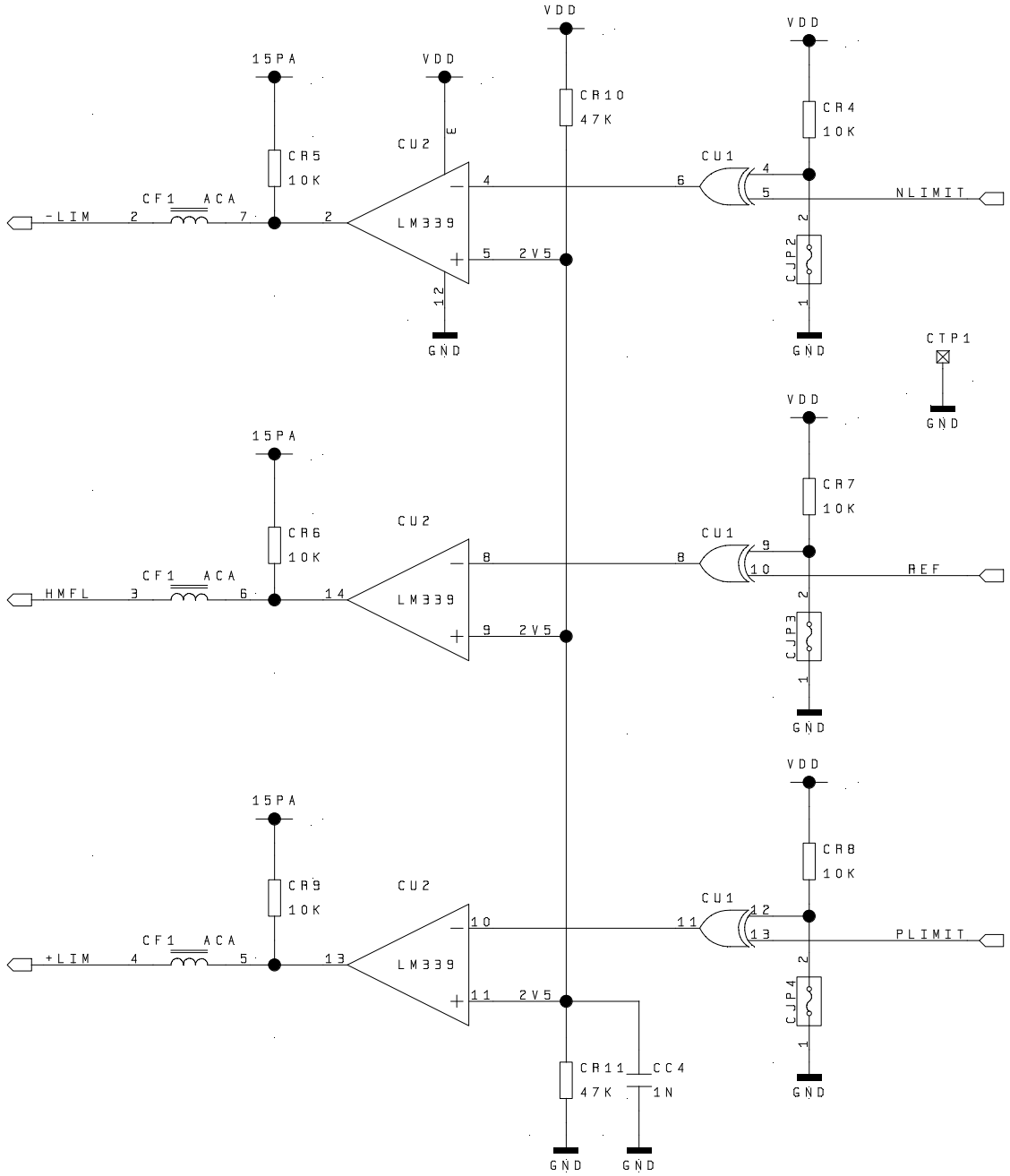


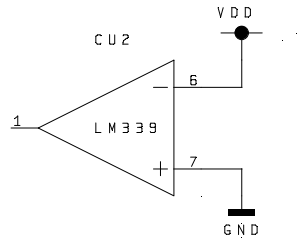


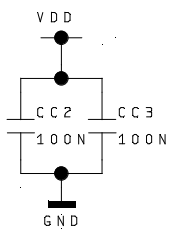


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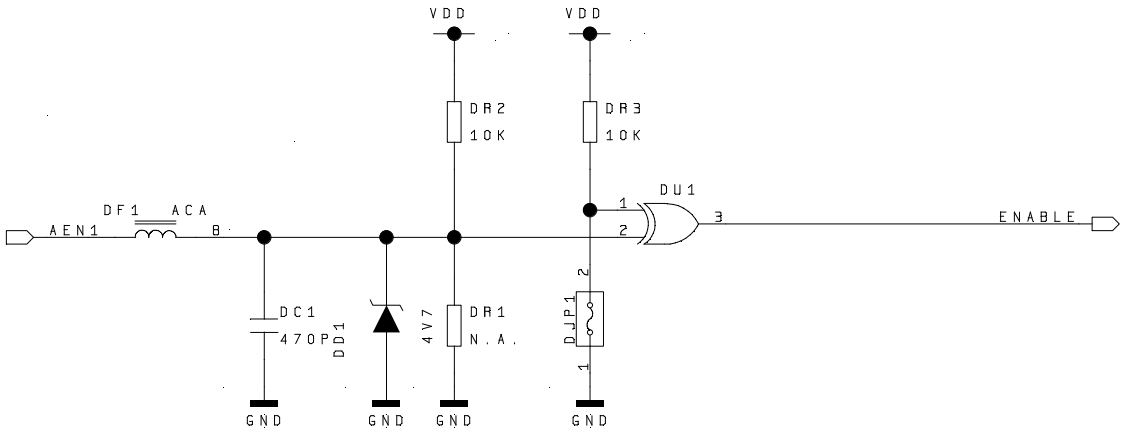


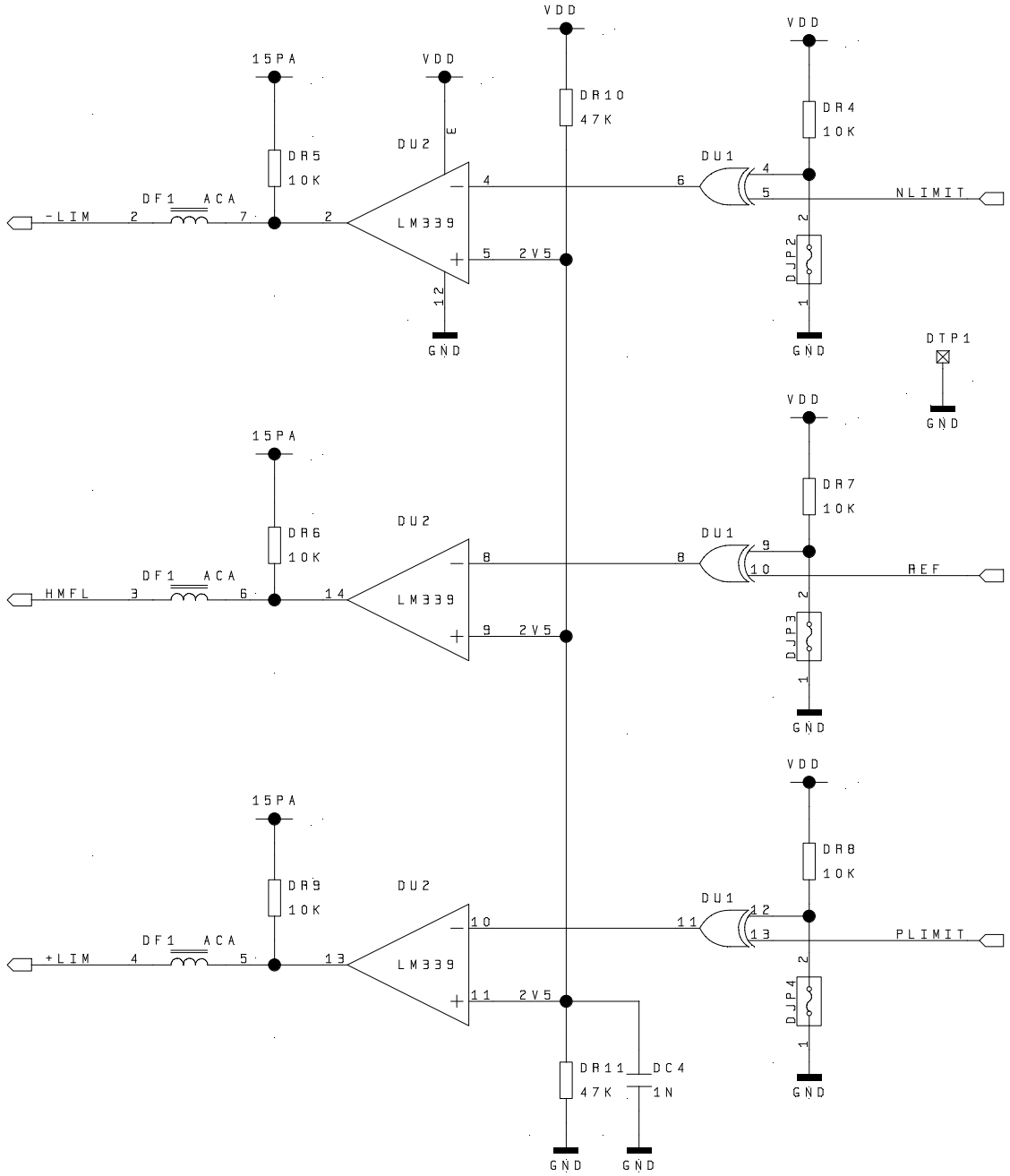


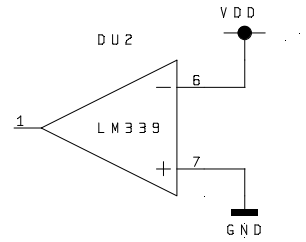


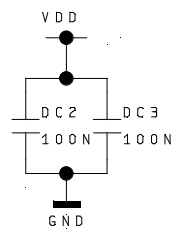


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