2. Power supply

The power supplies are of conventional linear design. The F18 has three power transformers.

2.1 Main 5V supply

Transformer T1 has two secondary windings of 9V (RMS), rated at 2.7A. They are connected in parallel for the main 5V (A) power supply (microcontroller and interface logic). The (linear) regulator is a TO3 device mounted on the rear panel. It employs remote sense for the output (5V) and "common" (0V): -

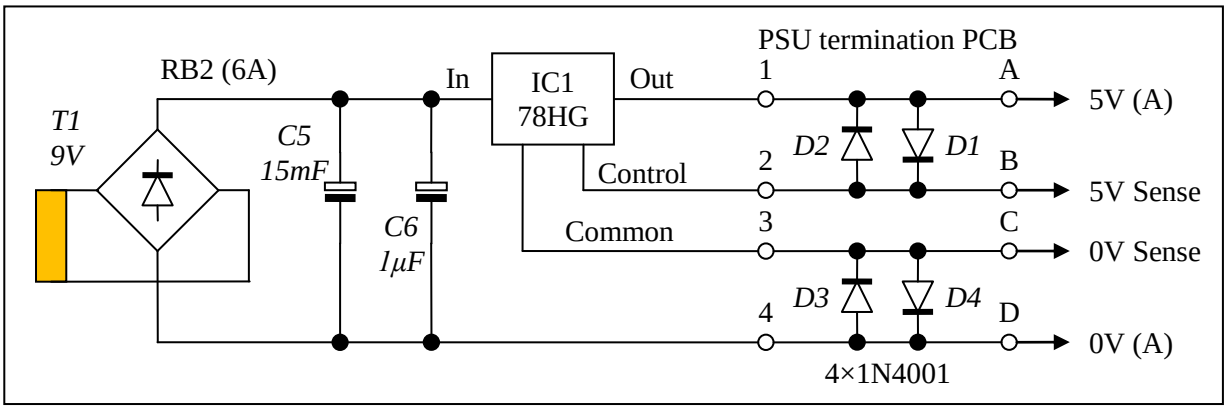

Fig. 2.1.1 Main 5V supply

The diodes are mounted on a PSU termination PCB and are included to provide feedback even if the remote sense connections are broken.

2.2 Main 15-0-15 supply

Transformer T2 has two secondary windings of 18V (RMS). The same type of regulator (78HG05, also mounted on the rear panel) is used, with remote sense, to produce two 15V DC supplies which are then connected in series: -

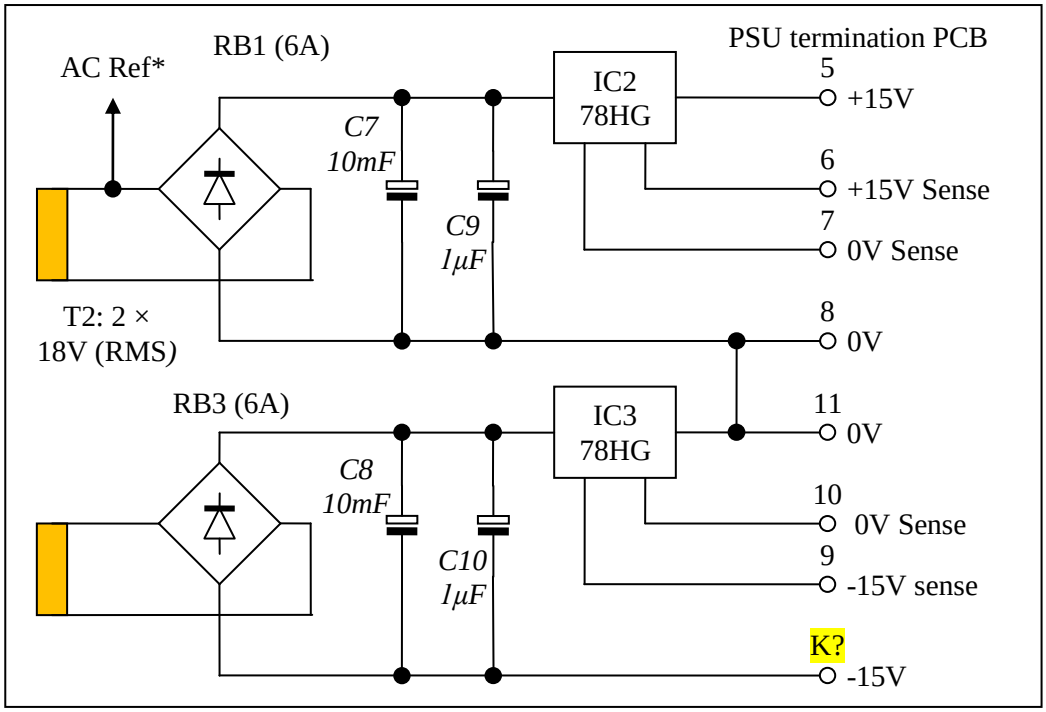

Fig. 2.2.1 Main 15-0-15 supply

The PSU termination PCB includes resistors to provide the required feedback. The diodes provide feedback even if the remote sense connections are broken: -

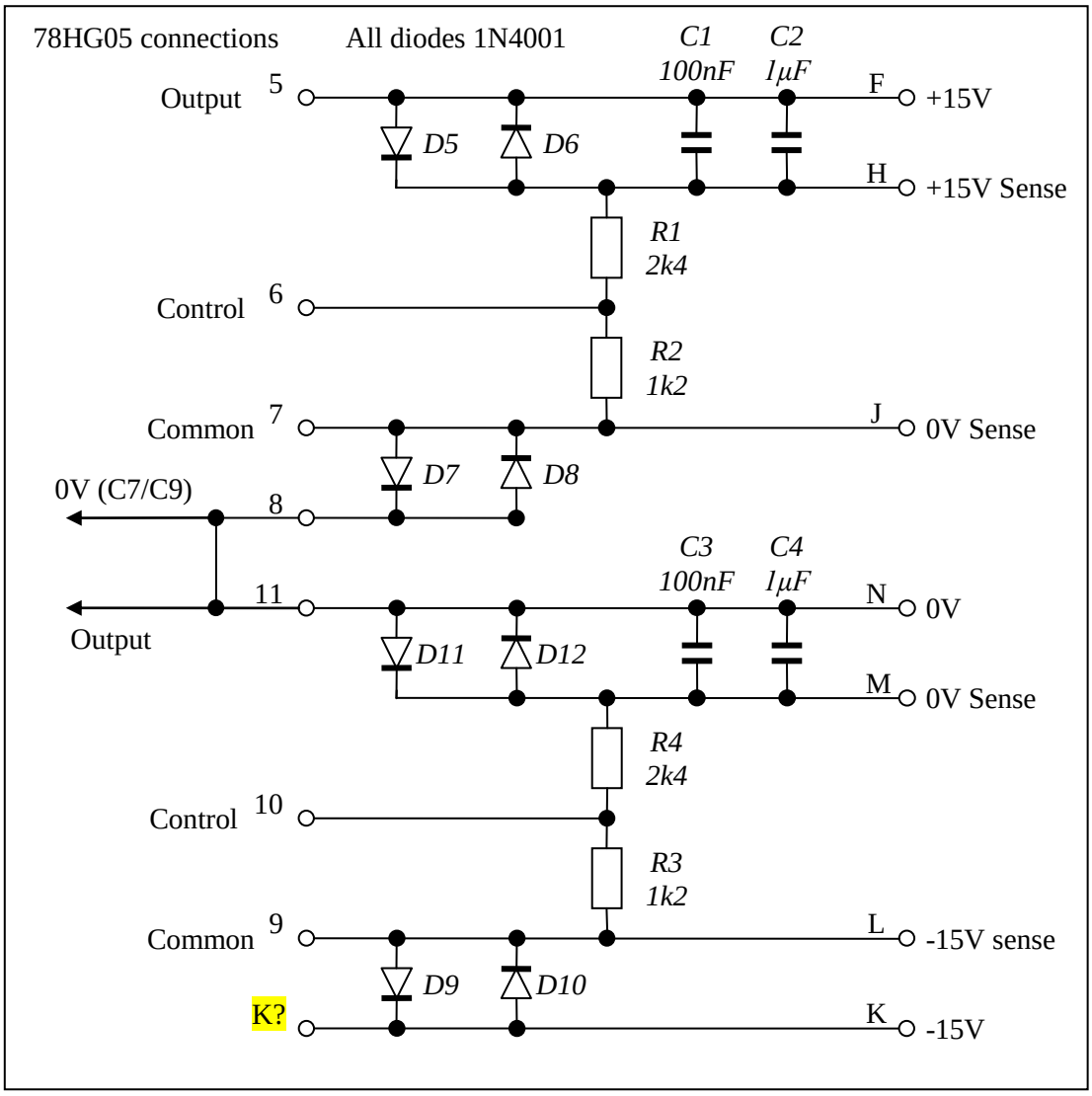

Fig. 2.2.2 Feedback components on the PSU termination PCB

It is not clear why the capacitors are included.

Components for the remaining supplies are on a power supply PCB, originally designed for the F700: -

2.3 Power supplies for the high accuracy voltage followers (HAVFs)

The power supply PCB includes a third transformer with a pair of lower current rated (100mA) 15-0-15 power supplies for the high accuracy voltage followers. See fig. 2.3.1.

The HAVF supplies are "floating" – the centre tap is not connected to local 0V (earth).

Do not connect to earth, e.g. via a scope probe earth clip.

2.4 Relay coil and 5V logic power supplies

Also part of the power supply PCB (ref: F17-03-057) is a 12V power supply for relay coils and an additional (1A rated) 5V supply. The 12V supply was originally a 15-0-15 (1A) supply, hence the unusual circuit. See fig. 2.4.1.

The extra 5V (B) supply is for logic chips on the analogue side of the interface PCB (slot 3) opto-couplers.

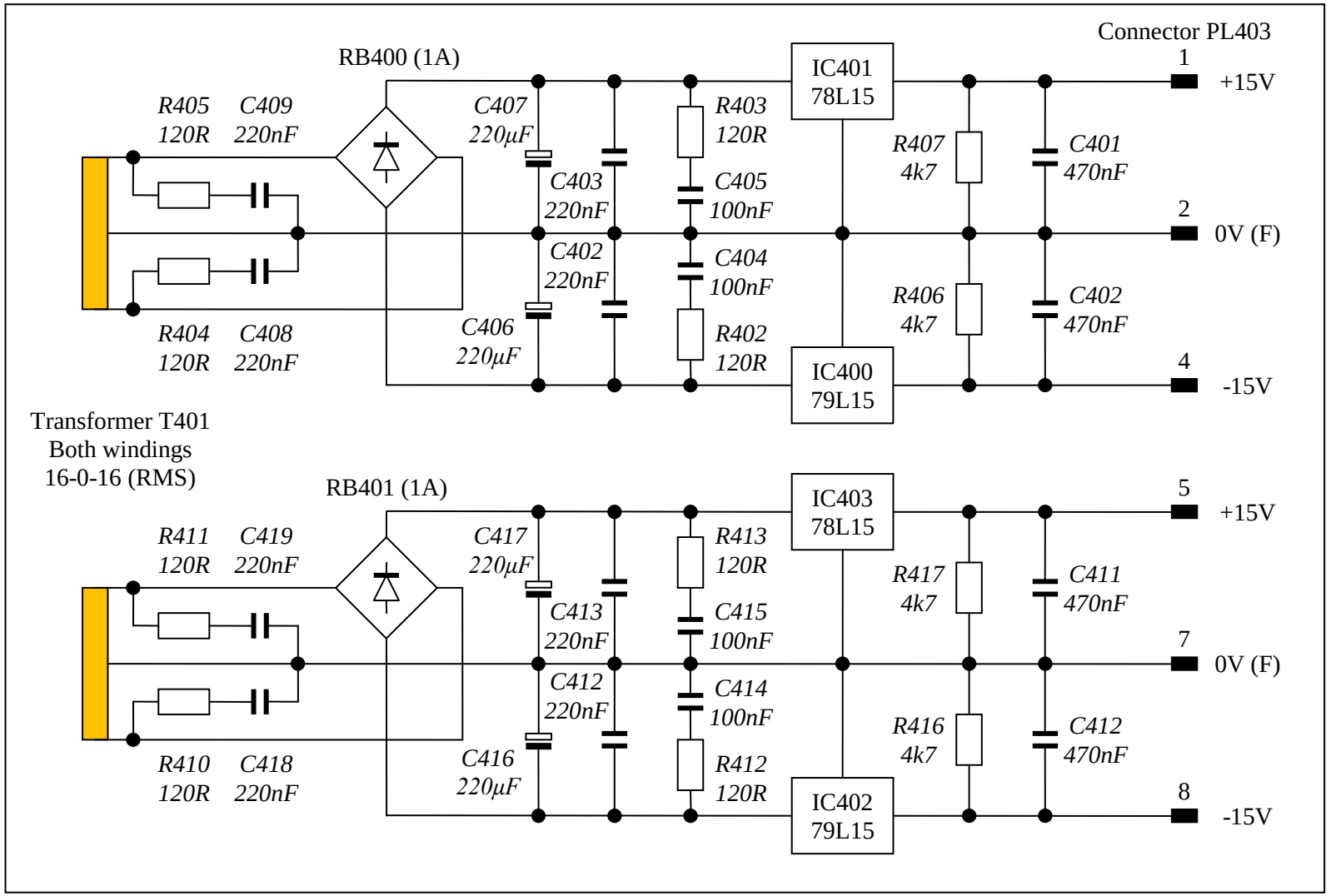

Fig. 2.3.1 “Floating” power supplies for HAVFs

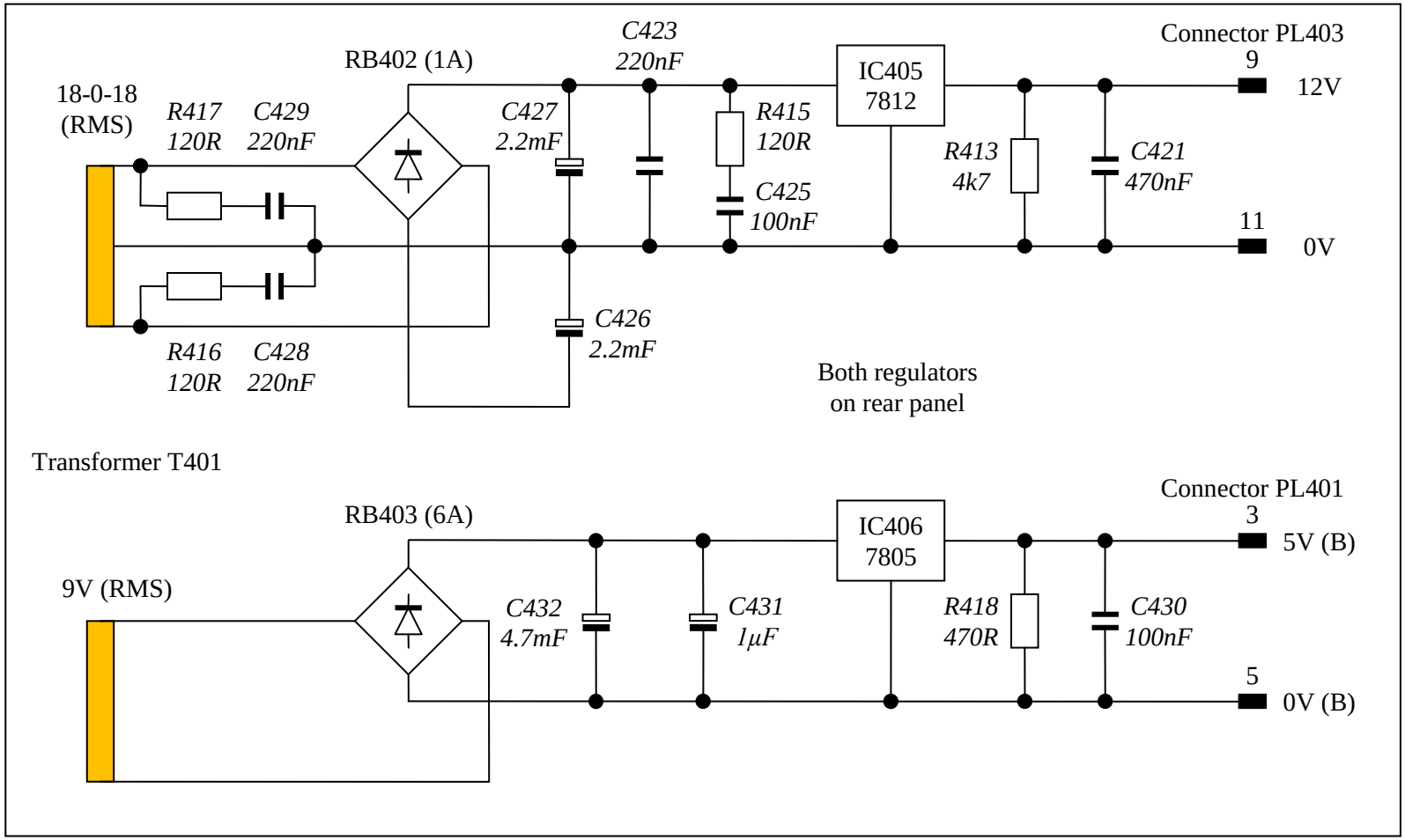

Fig. 2.4.1 Relay coil and 5V logic power supplies

2.5 Power supply distribution PCB

Interconnections to the various circuit modules and card frame are via a distribution PCB. It is on this PCB that the remote sense lines (78HG05 regulator control and common) for the main 15-0-15 supply (5A) are connected to the outputs. Any voltage drop due to the resistance of the connections thereafter is not corrected.

Remote sense for the main 5V (A) supply, on the other hand, appears to pass through to the card frame.

The outputs are via eight smaller connectors: -

Connector JT1: Card frame: -

1	2	3	4	5	6	7	8	9	10	11	12
+15V	0V	-15V	5V	5V	Sense (5V)		0V	0V	Sense (0V)		AC Ref.

Connector JT2: Guard amplifier module: -

1	2	3	4	5	6	7	8	9	10
+15V	0V	-15V		12V			+15V	0V	-15V

Connector JT3: Negative and simulated capacitor PCB: -

1	2	3	4	5	6	7	8	9	10
+15V	0V	-15V					+15V	0V	-15V

Connector JT4: Relay PCB: -

1	2	3	4	5
		+15V	0V	-15V

Connector JT5: Interface PCB: -

1	2	3	4	5
5V	0V	12V		0V

Connector JT6: Relay PCB: -

1	2	3	4	5
12V	0V	5V		

Connector JT7: High accuracy voltage follower PCB (floating PSUs): -

1	2	3	4	5	6	7	8	9	10
+15V	0V (F)	-15V					+15V	0V (F)	-15V

Connector JT8: Amplifier PCB: -

1	2	3	4	5
12V	0V	5V		

Connections from the distribution PCB and power supply PCB, to the rest of the instrument, are via one large in-line connector (MRAC: SK1), presumably so that the whole power unit can be replaced with the minimum of effort.

2.6 Zener diode supplies

There are a number of CMOS chips on the PSD and quad servo PCB for which reduced power supplies are derived using zener diodes. Viz: -

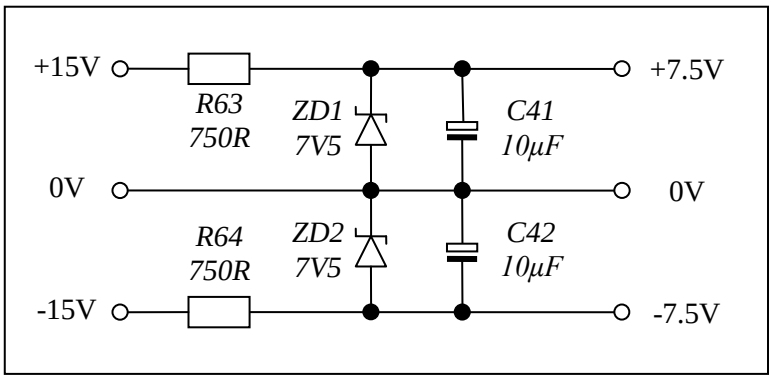

Fig. 2.6.1 Reduced power supply for PSD and quad servo PCB

Similarly for the main amplifier/filter PCB: -

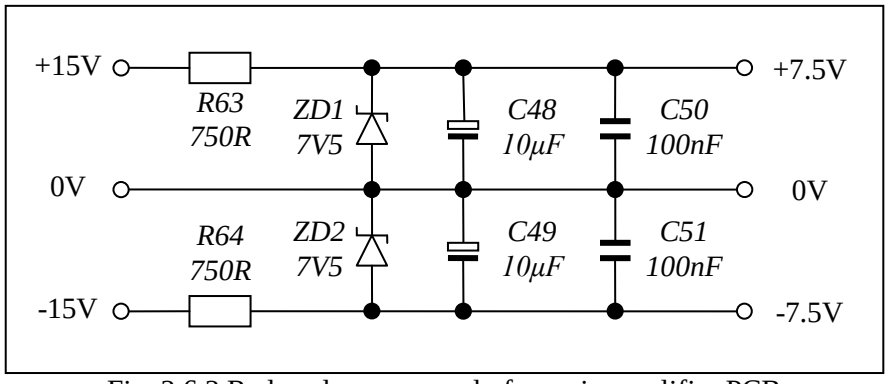

Fig. 2.6.2 Reduced power supply for main amplifier PCB

Also on the main amplifier PCB is a 5V regulator for the MDAC variable gain stage: -

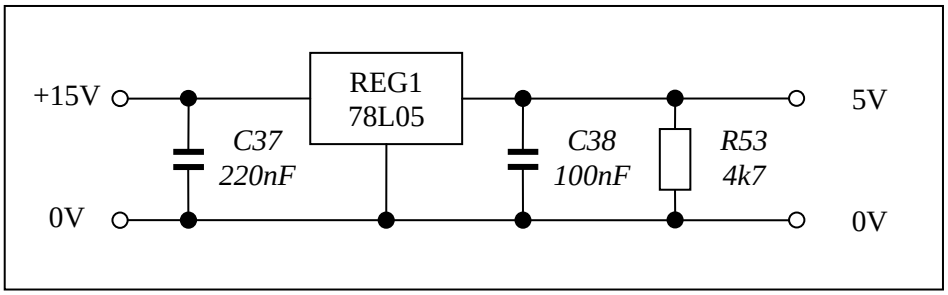

Fig. 2.6.3 Reduced power supply for MDAC variable gain stage