7 Power supply

Contents

The FL1.0 sets are equipped with 2 supply circuits, namely a main supply and an auxiliary supply (stand-by supply).

7.1 The main supply

This supply is of the SOPS type (Fig. 7.1). A characteristic feature of the FL1.0 main supply is that the entire driver circuit (with the exception of the stand-by and protection parts) is located on a separate SOPS control PC board. This power supply delivers the +141, +16 and -16 (for the sound output stage) and the +13 supply voltages.

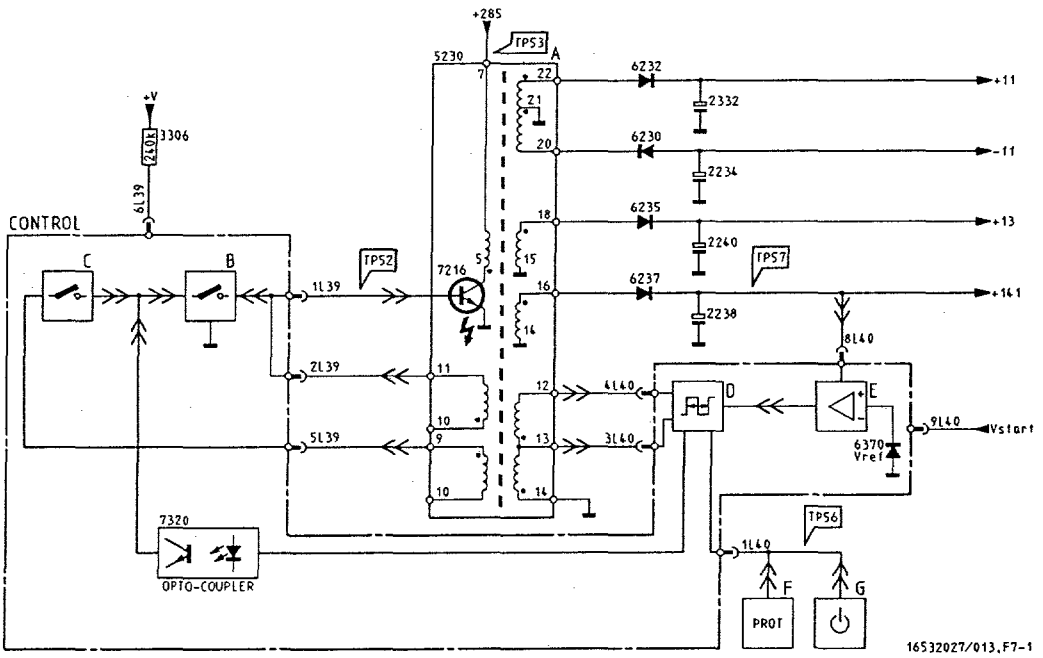
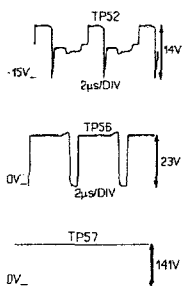


Fig. 7.1

Working



The mains voltage is rectified on the primary side (TP53). The power supply is started up via resistor R3306. The rectified voltage is fed to switching transistor 7216, which is driven by the circuit on the control PCB (TP52).
The control PCB accommodates both the primary and the secondary part of the control circuit. The stand-by circuit (G) and the protective circuit (F) are not located on the control PCB.
The primary control circuit, consisting of the switch-off circuit (B) and the blocking circuit (C), is driven by the secondary part (via an optocoupler) and by turns 9-10-11.
The secondary part contains a pulse width modulator (D), which is driven by turns 12-13-14 and by a voltage comparator (E). The latter adjusts the pulse width modulator with 141-volt voltage that is presented via pin 8L40.

Stand-by

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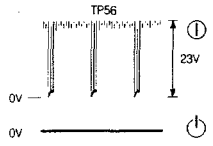


+11

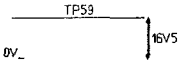
-11

+13

+141

Vstart

+ 13 Volt



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The power supply can be turned off via pin 1L40 (TP56). This takes place if the voltage at this pin drops below +/- 1 Volt (fig. 7.2).
In stand-by mode the control microcomputer generates a low level at the base of TS7385. Via TS7384 pin 1 of connector L40 is now connected to 0 V.
The main supply is now completely turned off and all output voltages are 0 Volts.

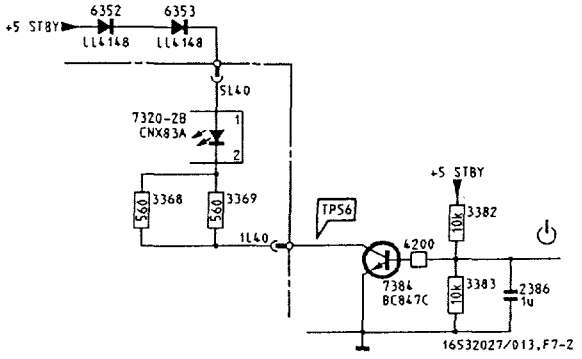


Fig. 7.2

Starting-up

The power supply can be adjusted back via pin 9L40; if the voltage at this pin is lower than 7 volts, the output voltages of the SOPS will be low, but the SOPS stays operational. For a good start-up of the line output stage when the set is switched on, first the auxiliary supply and then the main supply should be started. Therefore the +V start supply voltage of the auxiliary supply is fed to pin 9L40 of the control PCB. As long as this voltage is not available, the output voltages of the main supply stay low.

Most current for the +13 volts is supplied by resistor R3241 (Fig. 7.3).

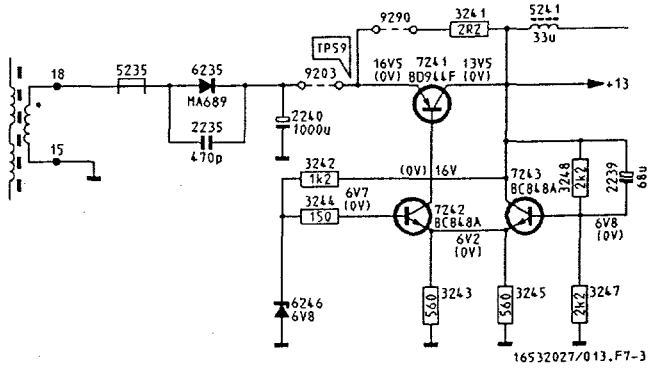
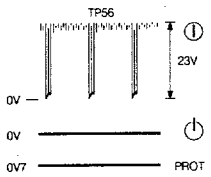
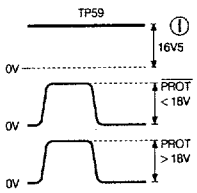


Fig. 7.3

However, its dimensions are such that during normal operation the output voltage is slightly less than 13 volts. Therefore an extra current is carried via TS7241, which brings the voltage at the required value of 13V. TS7241 is driven by the differential amplifier that is built around TS7242 and TS7243. D6246 delivers the necessary reference voltage.

Protection





The FL1.0 chassis is equipped with a number of protective circuits. If one of these circuits detects a fault, the main power supply will be switched off.
The protection is driven via the thyristor function that is built up around TS7380 and TS7381 (Fig. 7.4), and is activated by a pulse generated by one of the protective circuits.

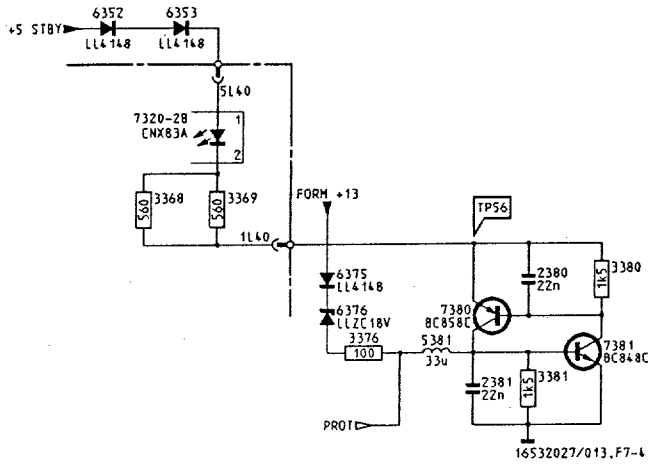


Fig. 7.4

If the protection is activated, pin 1L40 (TP56) will be kept low (0,7 volt) so that the main supply is switched off. The thyristor function will keep the power supply switched off, even when the fault is eliminated.

The following circuits are equipped with a protection:

Main SOPS

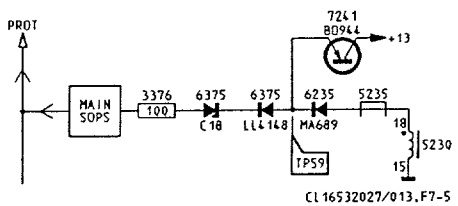
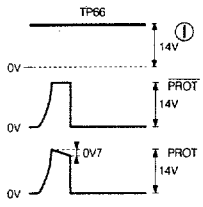


Fig. 7.5

In order to detect a possible overvoltage of the main SOPS the +13 output voltage is checked.
If the output voltage at the cathode of D6235 exceeds +19 volts, zener diode D6376 will start to conduct and activate the protection circuit.



EW circuit

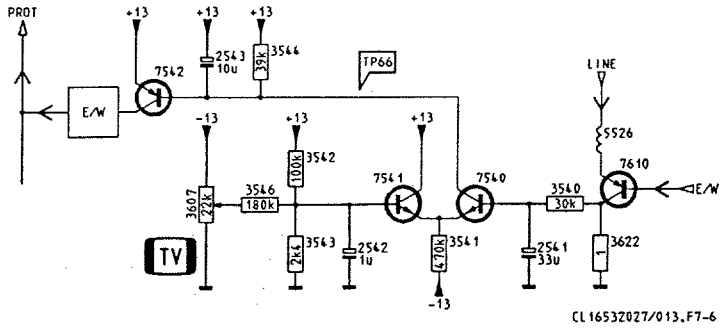
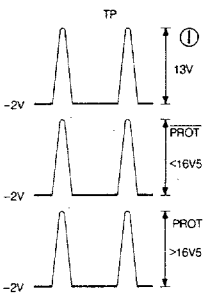


Fig. 7.6

Transistors 7540 and 7541 form a differential amplifier. The base of TS7541 can be set with R3607 (picture width control), whereas the base of TS7540 is driven by the collector of TS7610.
If a fault causes the voltage on the collector of TS7610 to become too high, TS7540 will start to conduct, thus activating the protection circuit via TS7542.

L.O.T.



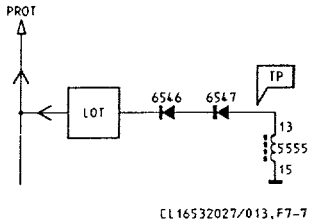


Fig. 7.7

The amplitude of the flyback pulse will increase if the flyback pulse becomes shorter, e.g. because of a fault in the line output stage.
The protection circuit will thus be activated via D6547 and D6546.

Beam current

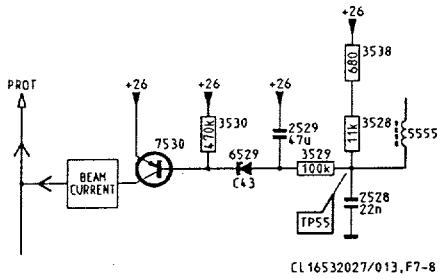


Fig. 7.8

If the beam current becomes too high, the voltage across C2528 will drop, thus causing D6529 to zener and the protection circuit to be activated via TS7530.