

ADM3 AC-in Power Supply Module □

Circuit Description

3.1 Overview

The AC In power board of the ATC35x chassis supports the new ADM3 decoder. This supply will support the new 2006 California legislation regarding standby power as well as Energy Star. The audio amplifier for ADM3 uses a single +12.9 supply capable of 2 times 10 W output power at 10 % THD. The +12.9 standby supply also provides the majority of the power for the embedded system. The balance of the embedded system load comes from the +6 volt supply. A third supply provided by the main switcher is a +12V DLP supply for the light engine. This supply will be switchable to allow turn-off during standby mode to allow Energy Star requirements for DCR to be met. An AC line doubler will to be used to provide low-cost power to the lamp ballast.

This power supply board provides isolation between the AC line and the “cold” parts of the chassis. It also complies with all UL specifications as well as regulations for line conducted interference, radiation, and susceptibility.

3.2 Circuit Description

This design is significantly different than recent DLP supplies due to the need to meet “Green Mode” requirements such as Energy Star and the new California standby power regulations. A standby regulator has been added to provide minimum power needed to run the standby micro. Power for the standby regulator is provided by a bridge rectifier which includes diode D805 and capacitor C814. The standby regulator is controlled by a Green Mode Fairchild Power Switch, FSD210B.□

The main SMPS (Switched Mode Power Supply) is a flyback, current mode controlled, zero voltage switch type power supply as in the previous design. However, this supply utilizes an integrated switch controller from Sanken called STR-W6854. The regulated voltage is the +12.9VS in order to tightly control the supply for the audio amplifier.

In order to reduce power during low power standby mode, a relay, SP802 is used to disconnect the main switcher. This switching regulator consists of a quasi-resonant mode controller with integrated switch, IC803, which is a Sanken STR-W6854. The SMT is T806, part number BCK-3588D, and is similar to the transformer used in ATC33x applications.

3.3 Relay Drive

RELAY_DRIVE: This is an open collector output from the Standby Micro. The RELAY_DRIVE is used to enable the 120VAC line to the main switcher for Run mode. The RELAY_DRIVE output from the Standby Micro to the relay on the ACIN Board is active high.

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Circuit Description (cont)

3.4 Run Enable

The RUN_EN line is used to turn on the RUN supplies. The RUN_EN is active high (the Run supplies are enabled when the line is high). The RUN_EN signal is used to turn on the lamp supplies, including both the +12 VDLP and the high voltage Lamp supply. RUN_EN drives a buffer circuit.

The RUN_EN is used along with the POWER_FAIL to generate the POWER_GOOD signal.

3.5 Power Fail

The POWER_FAIL line is generated from the +5V SB. It provides an early warning to the Standby Micro to indicate that power is about to drop out. The POWER_FAIL line is active low (the supplies are going down if the POWER_FAIL is low). The 12.9VS output voltage will be at least a minimum of 10.8 V for 8 ms after the PWR_FAIL signal is asserted.

A power fail indication results in POWER_FAIL switching to a low state (less than 0.2 volts). The normal output of the PWR_FAIL is 4.75 to 5.25 volts. The output is an open collector with a 470 ohm pull-up. AC line voltage source must have less than 2% total harmonic distortion during testing of the power fail signal.

9.4 Power Good

POWER_GOOD is a high-true signal from the TV control electronics to indicate when DC power supplies have stabilized during power up. More importantly, it gives advance warning during power down (by being driven low) that the DC supplies will be ramping down, allowing proper DMD® housekeeping to occur.

The 12VR will remain within specifications for no less than 1ms after the POWER_GOOD signal is asserted. A power fail indication results in POWER_GOOD switching to low state. The AC line voltage source must have less than 2% total harmonic distortion during testing of the power fail signal.