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TECHTOPICS

SPECIAL TECHINICAL UPDATE 12/17/86 - SX64 POWER SUPPLY PROBLEMS

A LARGE NUMBER OF SX64 POWER SUPPLY PCBs ARE BEING RETURNED FOR EXCHANGE. THE PARTS DEPARTMENT HAS SECURED A SUPPLY OF THE MOST COMMON FAILURE ON THIS BOARD - T2 TRANSFORMER PART NUMBER 608010-54.

ENCLOSED IS A TECHINICAL WRITE UP FOR SX64 POWER SUPPLY. THIS SHOULD AID AUTHORIZED SERVICE PERSONNNEL IN COMPONENT REPAIRS AND REDUCE CUSTOMER REPAIR COSTS.

Power Supply

The power supply in the Executive 64 containes 3 out-puts 12 volts DC, 5 volts DC and 9 volts unregulated AC.

The 12 volt and 5 volt supplys are developed through a Swithing Power supply. The hart of the swiching power supply is IC1 a Pulse Width Modulator. See figure below.

C28 at pin 5 and R24 at pin 6 determine the fequency of IC1s internal oscillator. The output signal of approximatly 435.KHZ will be input to the negitive side of A3 and A4.

A3 and A4 are inverting Pulse Width Modulator Comparators. The oscillator signal is compared to the reference voltage applied to the positive input. The pulse width of the inverted output signal is governed by the value of the reference voltage. See figure below.

An internal Regulator developes a reference protential of 5 volts DC at output pin 14.

Input pin 1 and pin 16 are used to adjust the regulated 12 volt output. The 12 volts is droped across resistors R14,VR2 and R15 produceing a variable potential of 3.07 to 4.48 volts which is input at pin 1 of the intenal differential amp A1. A reference potential of 3.4 volts is input at pin 2. VR1 and R12 will develop a variable potential of 11.7 to 12 volts which is input at pin 16 of the internal differential amp A2. A reference potential of 11.9 volts is input at pin 15. As the positive inputs of A1 and A2 deviate there positive outputs will forward bias diodes D1 and D2 adding the difference to the reference input voltage at pin 3.

The outputs of PWM comparators A3 and A4 are added together through OR gate G1. When A4 outputs a pulse more negitive then A3, G1s output will match that of A3. If A4 outputs a more positive pulse then A3, then G1s output will match that of A4. See figure below.

OR gates G2 and G3 will act as inverters due to the constant "low" applied to 1 input on each. Thier output when active "high" will forward bias the emitter-base juntion of Q1 and Q2, allowing current to flow from the emiter to collector.

As the 12 Volt supply increases PWM Comparitor A4s output pulse will become less negitive and more positive, decreasing the "on" time of Q1 and Q2. As the 12 volt supply decreases the A4s output will become more negitive and less positive, increasing the "on" time of Q1 and Q2.

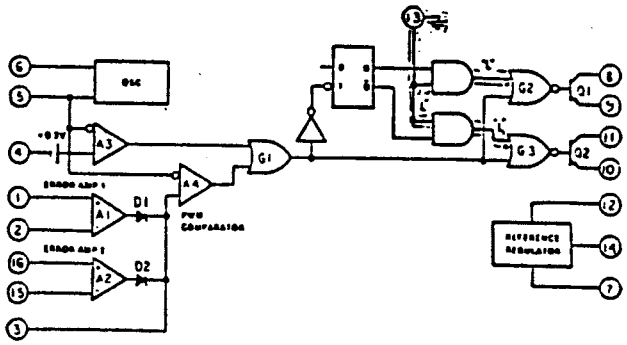
The collector pins 8 and 11 and emiter pins 9 and 10 of Q1 and Q2 are externaly tied together alowing them to sink twice the current. These internal transistors are the first Switch in the Switching Power Supply.

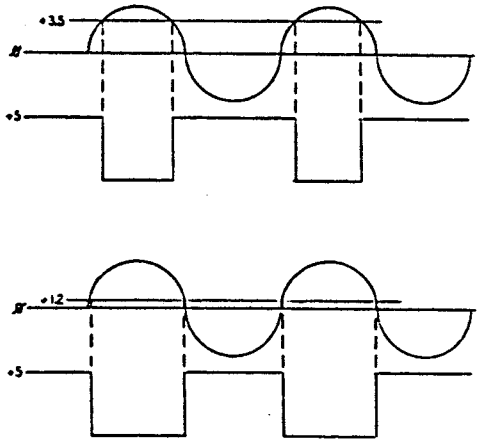
Transformer T2 and bridge rectifier REC2 develop the 20 volt source for IC1 and Pulse Transformer T3. As internal transistors Q1 and Q2 are strobed "on", current will flow from the negitive side of REC2 through the emitter-collector juntions of Q1 and Q2 to the 20 volt source via the primary winding of T3. As the magnetic field falls across the secondary windings an AC signal will be developed. This signal will be used to enable external switching transistor Q1.

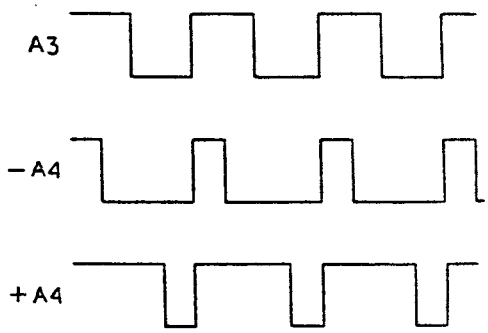
Bridge rectifier REC1 and electolitic capacitor C7 will develop the 155 volt DC source. The "high" going pulses of T3 will forward bias the base-emiter juntion of Q1, current will then flow from the negitive side of REC1 through the emmier-collector juntion of Q1 to the 155 volt DC source via Pulse Transformer T1. The AC voltage on the secondary windings is rectified and filltered by fullwave D6 and Pi fillter C14, L3 and C17 producing the 12 volt DC source.

Power Supply

continued







The 5 volt source uses Pulse Width Modulator IC2. This is the same as the circuit explaned for the 12 volt source. Except that a Series Pass Regulator is used in place of Pulse transformers T1 and T3.

Q3 and Q4 make up the Series Pass Regulator. The 12 volt source is connected to the collector of Q3 and the emitter of Q4. As IC2 switches on internal transistors Q1 and Q2, resister R17 will drop the base voltage more negitive than the emitter allowing emitter-base current to flow, enabling Q4. Now that Q4 is turned "on" the, base of of Q3 will rise high allowing emitter-base current to flow, enabling Q3. The pulse-width output of IC2 will govern the "on-off" time of Q3, charging electolitic capacitor C21 to 5 volts.

Diodes D7 will prevent any negitive feedback voltage from circuits which are attached to the 5 volt DC source.