The input signal drives QX15 (one half of a diff amp pair; consisting of transistors QX15 and QX16). QX16 is driven by a feedback signal from the output section through a 39K resistor (RX30). This 39K resistor is used to match the impedance seen at the base of QX15 so that the voltage at the base of both transistors is approximately 0.1V. This insures consistent operation of the inputdiff amp. The output of the first diff amp is used to drive a second diff amp pair(QX12 and QX13) where the actual gain of the amplifier is set up. this is done with a V be multiplier (QX04) connected to the second diff amp pair that can be used to adjust the amount of current that the output section will deliver to the load (more about this in section XX). The output of the second diff amp pair drives the output stage that consists of two pairs of driver and power transistors (QX05/QX07 and QX01/QX03). This stage of the circuit is where the current to the output is amplified.

The input diff amp (QX15 and QX16) is protected from high input voltageswith a limiter made up of two diodes (DX08 and DX09) connected reverse polarities) directly across the bases of both transistors. This limiterused to keep the input voltages at or below 0.7V. `The mute fast supply circuit is also connected into the input stage to eliminate any voltage surges that could be caused during power up or power down that could damage circuit components or speakers. This circuit consisa JFET (QX11) connected across the supply storage capacitor (CX08) for the input diff amp and an RC time constant that charges the gate of the JFET. As

unit is powered up, the JFET acts like a 30   resistor short to ground around the supply storage cap until a -10V supply from the units power supply is applied to the gate of the JFET through the RC time constant (RX43 and CX09). Once CX09 is charged and applied to the gate, the JFET turns off and allows CX08 to charge and supply voltage for the input stage. As the unit is powered down, CX09 quickly discharges through DX13 and C4 turning the JFET back on and shorting any leftover supply voltage to ground immediately. The thermal shutdown circuit is also connected into the incircuit is similar to the mute fast supply in that a transistor (QX10) is connected across the supply storage capacitor top the input stage and,shorts the supply voltage to ground. The biasing voltage for QX10 is determined by a transistor (QX09 -placed in the heat sink) in parallel with a voltage divider at the base of QX10. The base of QX09 is left open so that it acts like a zener diode and can drop about 7.7V across it. This voltage is applied to RX39 and RX40 and keeps about 0.48V at the base of QX10. As temperature increases in the heatsink, the voltage across QX09 begins to increase, causing a larseen at the base of QX10. As this voltage increases, QX10 begins to turn on and short some of the supply voltage to the input stage to ground. This causes a reduction in output current and allows the unit to cool down.

The first stage drives a second diff amp pair that is used to drive the output stage. This is where the clip indicator is connected. As QX12 and QX13 are being turned on and off, there is a constant current being delivered through RX27. This current sets up a voltage drop of about 0.45V that is seen at the base of QX14. Any sharp increase in current through QX12 or QX13 will cause a voltage peak at the base of QX14 and turn it on. When QX14 is turned on, DX11 becomes forward biased and allows CX16 to discharge through RX42 and turns off QX18. The LED is no longer forward biased and turns off. The outputs of QX12 and QX13 are connected to a V be multiplier where the current gain of the output stage can be adjusted. This output is used to drive the output stage. The base current of QX04 is set up by a current mirror and can be adjusted with RX08. Since the voltage across RX08 and RX09 remains constant at 0.7V, adjusting RX08 will determine the amount of current that flows through RX10 which in turn determines the output voltage of the V 0.7V) that drives the output section. This V be be multiplier (V R20 + voltage drop is what determines the amount of current that can flow through QX01 and QX07 by setting the base currents to QX03 and QX05. This adjustment should be made with the amp powered up at room temperature and the outputs unloaded. With these conditions satisfied, RX08 should be adjusted until the voltage drop across RX18 and RX02 together is about 2.5mV. As QX13 turns on, the emitter of QX17 gets pulled down to -0.7V which turns it on and allows more current to flow through RX33. This decreases the voltage at the base of QX08 which turns it on faster and decreases the voltage drop across it. This in turn pulls the output voltage drop across the V up towards the positive rail and turns on QX05. When QX12 is turned on, the same thing in that the V be multiplier be multiplier output is pulled down toward the negative rail and turns on QX03. QX05/QX07 and QX01/QX03 make up the output sections of the amplifier. They are set up as current amplifiers that deliver large amounts of current to the When QX05 is turned on, 7mA of current flows through RX19 and QX05. This brings the voltage at the base of QX07 to 0.7V below the positive rail and turns it on. This allows a large amount of current to flow through RX18 and RX44 to the load (approximately 5.3 amps for a 4   load) and the voltage drop across RX02 decreases. When QX01 and QX03 are turned on, current is pulled back through RX44 and RX02 which increases the voltage drop across RX02. This whole process is seen as large voltage swings at the output that follow the input signal. L1 is placed in parallel with RX44 so that when the unit is first powered up, any large current transients are forced through RX44. The decreases power to the speakers until the unit reaches steady state operation, at which point the inductor then acts like a short around RX44. This protects the speakers from being damaged if the unit is on with the volume controls turned up.