

AR7030 technical bulletin 003

J309 FET Change and SD5400 Clamping Diodes

A small number of first mixer FET's or SD5400 mixer IC's or occasionally both have been failing with users, on recently purchased units.

The initial failure manifests itself as a small "pop" followed sometimes by wisps of smoke from various orifices of the set; this may be followed seconds later by total failure of the set as the internal fuse blows. If the devices fail o/c a replacement fuse will restore operation of the set with reduced sensitivity; if however they fail s/c replacement fuses will continue to blow.

Although a very minor fault, the customer may view it as a catastrophic failure due to the initial smoke and the occasional blown fuse, careful handling of PR. may be required!

We at first thought the failure was due to an ESD problem during manufacture and therefore replaced all the FET's during final test here at Belper. This however did not totally alleviate the problem although it was much reduced and further investigation led us to believe that the cause was due to voltage transients produced by the front end switching relays.

The fact that this failure only took place in a very few units showed that the main contributing factor was one of tolerance and we have now produced two modifications which prevents the FET's and SD5400 from over dissipating during these transients

It should be noted at this point that if a unit has been in service for some weeks it is unlikely to now fail and any modification should be carried out on a case by case basis.

The symptoms to check for before carrying out the modifications are listed below, a faulty set may exhibit all or some of them.

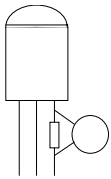
- Damaged or cracked Q18 or Q19
- Burnt or damaged L25 (supply choke)
- Blown or blowing fuses (remove L25 choke to isolate and confirm FET's are the cause)

- Smoke (as previously detailed)
- Insensitivity (if the set is still working)
- Excessive intermodulation products (SD5400 failed)
- Partial failure of set or microprocessor lock up if attenuator or preamp settings altered (SD5400 failed)
- Failure of audio if attenuator or preamp settings altered (SD5400 failed)

Many units now have the FET modification fitted as described below and this along with the SD5400 diode clamping mod, will be incorporated into all future production. If you already have the FET modification it is possible that you may still experience or have experienced SD5400 failure and we recommend that the SD5400 diode clamping mod is always fitted.

Q17, Q18, Q19 and L25 are located on the main PCB behind the rotary encoder. The fuse is located in a PCB mounted holder just in front of the power socket. All are marked on the PCB

The FET modification



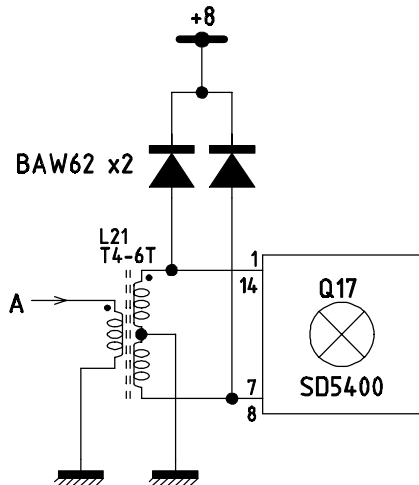
A 10k resistor is wired in parallel with a 10nF capacitor. This is then wired in series with the gate leg of the new FET as shown. This is carried out to both FET's.

Remove the old FET's and check L25 for damage - replace if necessary with a new 470uH choke. The new FET's are now fitted to the board - **the gate leg is the leg nearest the front panel of the set.**

The fuse should be replaced if necessary, replacement is a 20mm 1A Fast blow.

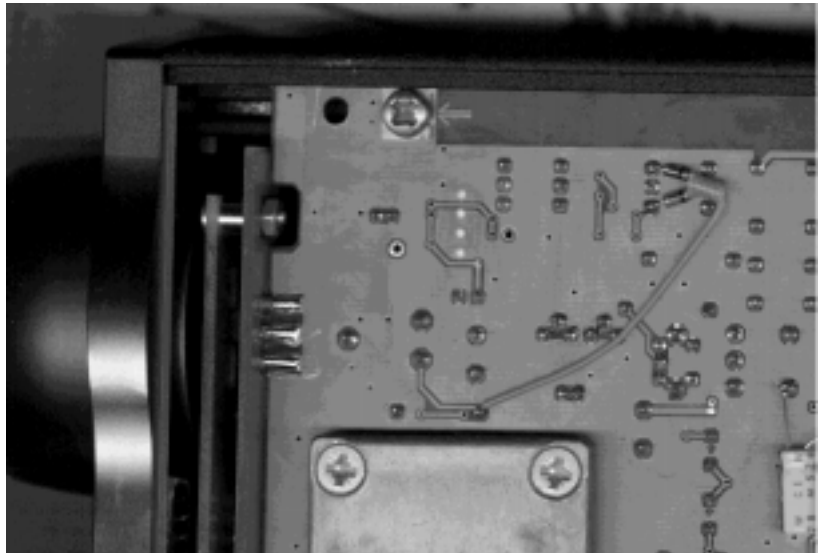
The SD5400 diode clamping mod

Replace the SD5400 if it's failure is suspected and in all sets add two diodes between the input transformer L21 and an 8V supply as shown below



We suggest that two silicon low capacitance diodes such as BAW62 are used. Twist the diodes together at the cathode end, solder and cut short. Cut both anodes short and solder each to one leg of the secondary winding of L21 on the underside of the board. Close proximity of the diodes to the SD5400 should be avoided, the diodes should therefore point towards the rear of the set being careful to insulate the cathode connection to avoid contact with the middle primary leg of L21 which is at +B potential. An insulated length of wire should be connected from the cathode connection pair to an 8V supply. A convenient point to pick up the 8V supply is at the top end of VR1 mixer bias preset.

Ideally the mixer bias should be reset after replacing the SD5400, however this will not be possible without specialist test equipment. We therefore recommend that the preset VR1 remains at the factory aligned setting for optimum performance.



End