

### Microstim DBS Mk 3 Manufacturing Detail.

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#### Overview.

The Microstim DBS Mk 3 is a through-hole component design on a single-sided PCB. The electronics and battery are housed in a plastic case. Two 2-way switches on the front control the output pulse mode whilst a rotary potentiometer on the top controls the pulse amplitude. A LED on the front indicates pulse output and an internal sounder confirms correct pulse delivery. The LED also indicates battery condition – green, battery good; yellow, battery failing and red battery failed. The output pulses are available from a connector on the top of the Microstim.

#### Manufacturing detail.

- 1      The Microstim DBS Mk 3 must be compliant with ISO 601 2.10 and ISO 60601.
- 2      The Microstim has proved reliable for 20 years due to the quality components used.
- 3      The battery to be used is a Duracell Procell MN1604 alkaline battery.
- 4      C2 and C5 need to be low ESR (good pulse response), low leakage (low battery drain) types.
- 5      C4 does two jobs – it provides stability for the 5-volt regulator and decouples the PIC16F84. It needs to be near both devices so the regulator circuit needs to be laid out close to the PIC on the PCB.
- 6      The PIC16F84's oscillator circuit components, C6, C7 and XT1, need to be laid out close to the PIC's oscillator pins (15 and 16), following good practice.
- 7      The filter capacitor, C1, on pin 1 of the PIC16F84 should be laid out close to the pin.
- 8      The 9-volt, ground and associated tracks from the battery connector to D1, C2, C5, the Mode Switches, T1, T2, D2 and TR2 should be as short as possible and substantial as they carry large pulse currents. This will minimise voltage drops and reduce RFI emissions due to the antenna effect.
- 9      The output circuitry from T1 and T2 should be laid out away from all other circuitry as it carries high voltages (a maximum of about 110 volts) and pulse currents.
- 10     The transformers T1 and T2 have mounting clamps. These must be used to avoid the transformers breaking loose when the unit is dropped.
- 11     The technical details on the packaging of T1 and T2 are incorrect. Note on the circuit diagram the connection details – the transformers are used as step-up transformers.

- 12 The output pulse connecting lead will be removed regularly so it requires a quality plug and socket. A special connector is needed (not 2mm plugs for the USA market) and, ideally, should be non-standard with any other medical equipment.