

25.1 Introduction

The MD404B oscillator is a separate plug-in module to the MJS401D test set. Tones are generated on the Analogue 1 board in two basic oscillators; the first is optimised for low distortion and fast settling, the second is optimised for frequency accuracy and stability.

The Analogue 2 board contains a squarer which takes its input from the first oscillator, a source switch, gain control chain and output amplifiers. The source switch combines the outputs of first oscillator, second oscillator and squarer according to the type of test signal selected (i.e. sine, square, wow and flutter or IMD) at various level ratios. The gain chain controls the resultant level in 0.1 dB steps over a 100 dB range. The last stage of gain control is around the output amplifiers, which are capable of delivering 2 W into 300 Ω with very little distortion.

The analogue electronics are controlled from the digital board, which contains a small microcomputer. Most of the outputs of the digital board are isolated so as to permit the oscillator to be earth-free. The digital board also contains most of the power conditioning circuitry for the supplies to the analogue sections.

The MD404B uses techniques of software calibration. Rather than buy expensive precision components for all frequency-determining networks, components of a lesser precision (but still of a good temperature stability) are used. The performance of these components is measured at calibration time, and the data stored in EPROM. The microcomputer calculates which bits must be set to generate the commanded frequency.

The errors in the gain control steps are also measured, and corrections applied by setting bits in a gain trim stage. In this way, gain steps are held accurate to much closer than ± 0.1 dB.

25.2 Removal/Replacement

25.2.1 Removal

The MD404B is a plug-in assembly located near the right hand end of the MJS401D front panel.

Remove the two retaining screws holding the MD404B front panel to the test set housing.

Take a firm grip of the frequency and level control knobs and gently ease the oscillator out of its housing.

If the oscillator proves difficult to remove, the lid should be removed from the top of the test set. The oscillator housing has a number of slits in it. Through the rear most slit the pillars between the A1 board, A2 board and digital board can be clearly seen. A small flat bladed screwdriver can be inserted here and the MD404B can be removed by levering against the centre pillar of the MD404B and the oscillator housing. **NEVER** lever against the "comb" of gold plated contact pins. Damage will certainly result.

25.2.2 Disassembly

Remove the six screws which pass through the six sets of pillars. Remove the two screws from the brackets at the front of the A1 board, leaving the brackets attached to the A1 board. The front panel and the digital board should remain attached together.

25.2.3 Accessing A1 board

Remove the fine frequency control socket from PL1. If the cable is not already marked, mark it with a letter "A". Carefully pull the A1 board off the comb edge connectors. Ensure the A1 board comes off evenly, or the pins will be bent.

25.2.4 Accessing A2 board

Remove the fine level control socket from PL1. If the cable is not already marked, mark it with a letter "B". Detach the A2 board by carefully working it up and off the comb edge connectors. It is even more important in this case to ensure that the board is removed evenly.

25.2.5 Accessing Digital board

Remove all the nylon screws from the shield plate and lift it off.

It is not necessary to remove the ground plane unless soldering must be done on the digital board. To remove the ground plane, desolder it from the pins on the rear of digital board.

25.2.6 Replacing the Digital board

If the ground plane has been removed, place it back over the pins and solder at each pin, pushing the ground plane and digital board hard together as you do so.

Place the shield plate over the digital board, mating the three socket connectors with the pins on the digital board such that the holes in the shield plate align with the holes in the pillars on the digital board. Screw in all the nylon screws - **DO NOT OVERTIGHTEN** as the threads strip easily and the heads shear off. If this happens, the repair will become very difficult. It is important, though, to tighten the screws, as thermal contact is required between the shield plate and the pillars in order to dissipate heat from the ICs and transistor.

25.2.7 Replacing the A2 board

Carefully push the comb edge connectors through the holes in the A2 board (PCB 76504). Replace the fine level connector to PL1. This is the cable labelled "B" (level control). Both cables should pass over the front of the A2 board.

25.2.8 Replacing the A1 board

Locate the wire from the top bit generator (frequency control) and place it under the lower bracket and over the upper bracket on the A1 board (PCB 76503).

Place the upper bracket under the ribbon cable running from SK2 on the digital board to the level bit generator.

Make sure the orange, yellow, green and blue cable from SK2 on the digital board to the frequency bit generator is kept well clear of the upper bracket to avoid it being trapped.

Carefully fit the A1 board over the comb edge connectors and plug the cable labelled "A" (from the fine frequency control) into PL1.

25.2.9 Final Assembly

With a small drop of low strength thread locking compound (e.g. Bostik T22) on each, replace the six screws to the back of the digital board first and then the two screws to the brackets on the A1 board.

Great care must be taken not to trap any wires.

25.2.10 Replacement

Locate the digital board (rear PCB) in the card guides on the right hand side of the oscillator housing.

Push the MD404B gently into the housing being very careful not to trap any of the cables. Take particular care of the cables beneath the module. Continue until the front panel is flush with the main front panel assembly.

DO NOT FORCE

Replace the two retaining screws.