

# CIRCUIT MAKER

## Casio Modifications

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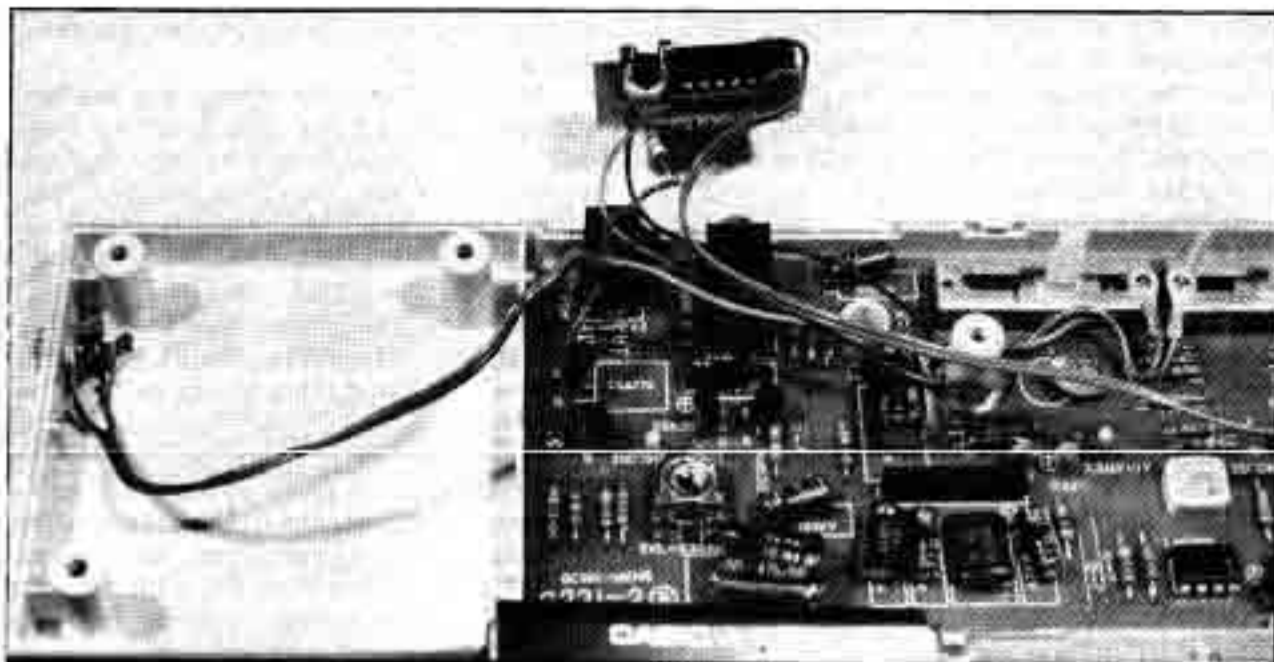
It happened in the early 70s with the launch of the first pocket calculators and it has happened now, in the early 80s, with the portable keyboard. Every so often a company launches a new product which uses the most up-to-date technology to enable millions of people to become involved in what to them is a new field.

Casio began by adding musical sounds to their calculators and now the musical content has taken over. The first Casio keyboard, the VL-Tone, also doubles as a calculator. This unit is probably their most successful because of its low price. It offers preset rhythms, preset sounds, a sequencer and a programmable sound where you can set each of the waveform, attack, decay, sustain level, sustain, release, vibrato speed and tremolo speed controls to a volume between 0 and 9, thus enabling a wide variety of sounds to be produced. The sequencer can be programmed in real time or step mode. The VL-Tone is ideal as a pocket size composition aid but does it fit into the studio environment?

The instrument has a digitally set tempo clock which runs the rhythm section and the sequencer. A sequence of up to 100 notes can be recorded. By use of the DEL key the sequence can be repeated 4 times but that is all.

If you want to use your VL-1 in the studio as a sequencer it is likely that you will want to repeat the sequence more than 4 times and you will want precise control of the tempo.

The heart of the VL-1 is a single 64 pin flat pack integrated circuit which carries out all the functions. This makes modification of the instrument rather difficult. Our aim is to modify the circuit so that an external clock can be used to drive the sequence continuously. We can achieve this crudely by using the 'One Key Play' buttons. These keys



Internal modification to VL-Tone.

will step through each note in the sequence then when it gets to the end it inserts a rest (unfortunately) and then repeats. If the circuit shown in Figure 1 is connected across the 'One Key Play' button we can trigger the sequencer from an external clock. The length of each note of the sequence is related to the trigger pulse length. A short trigger pulse will only give a short note - possibly inaudible - so to make the VL-1 more universal as a sequencer, a monostable with variable pulse length can be connected between the trigger source and the external clock input. It is just about possible to fit the additional circuitry inside the VL-1 but ensure that the supply connections are correctly made so that the extra circuitry only comes on with the synthesiser. Therefore prolonging battery life.

If you don't want to tamper with your VL-1 inwards too much then the extra circuitry can be outside the case and powered from its own 9V battery. The two wires from across the 'One Key Play' button can then be brought out via a socket. This is the best approach to avoid damaging the VL-1 or running down the batteries.

To take the VL-1 apart you need to remove the slider knobs and batteries and then unscrew the fixings in the base. The two parts of the case can be pulled apart and the two circuit boards removed - care is required here to ensure that none of the switches in the top are lost. The wires can then be fitted to the top circuit board with extreme care (see photo). The connections to the lower PCB can be made and the keyboard reassembled. The trigger input socket can be fitted with care and gentle persuasion. The draw back with this method is that the rhythm section cannot be synchronised to the external clock.

Figure 1. Trigger interface for the Casio VL-1.

