In the May 1984 issue of Elektor we mentioned that connecting the digital cassette recorder described in January of this year to the output of a ZX 81 can cause problems. Since then we have worked day and night (in spirit at least) to find a solution to help owners of this computer. This article deals with what we came up with.

digital cassette recorder
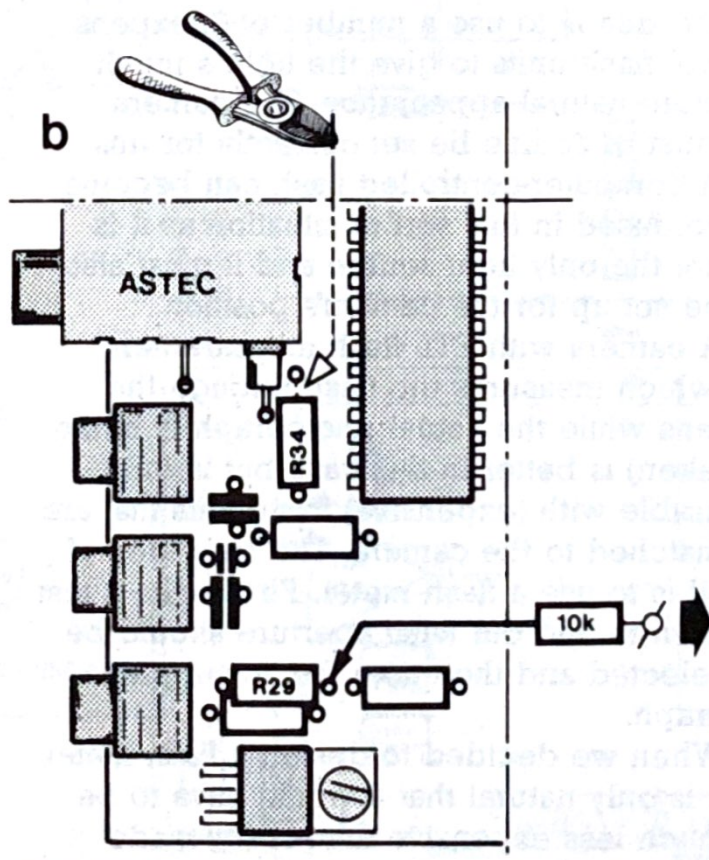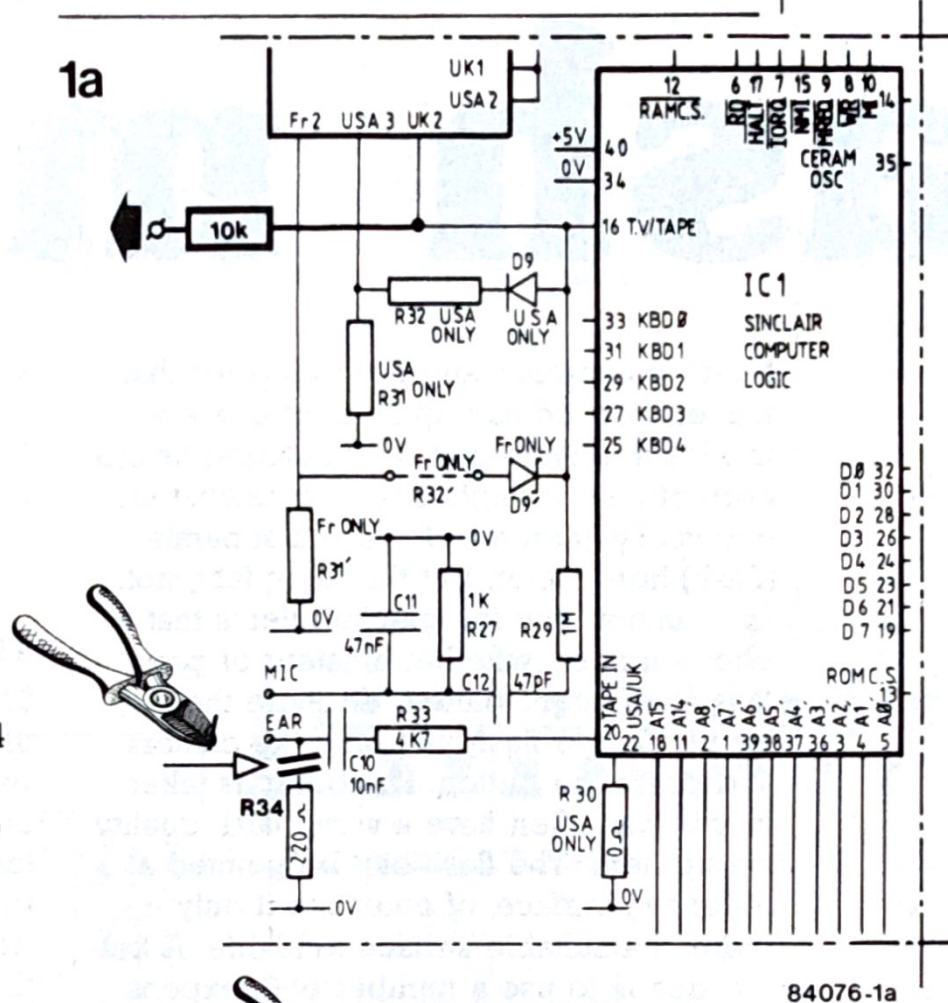with the ZX81
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digital cassette recorder with the ZX81

A few changes are needed both to the cassette recorder board and the ZX 81 board and we will begin with the latter. Part of the circuit of the ZX 81 is shown in figure 1. The computer's output signal must be amplified by making a new cassette output. This is done by connecting a 10 k resistor to the TV/TAPE output (pin 16) of IC1. All this means is soldering the resistor to R29 on the printed circuit board, as indicated by figure 1b. The output signal then has an amplitude of 150 mV$_{pp}$. The digital cassette recorder operates by driving the tape into saturation but the ZX cannot do this very easily as the impedance of its EAR input is too high. All that is required to lower the impedance is to cut the connection of R34 to EAR.

Moving on to the cassette recorder board, the hysteresis of A1 must be reduced by increasing the value of resistor R6 to 82 k. The amplification of the playback section is reduced by increasing the value of R20 to 10 k. The pause-level is improved by giving C8 a value of 10 n. The pair of relays, Re1 and Re2, can better be operated by hand. In normal use the video signal is present at the cassette output of the Sinclair with the result that the circuit will always select recording. The easiest way to solve this problem is to cut the copper track close to pin 6 of Re2 and link pin 6 to +12 V via a switch. For those who want the ultimate, a band-pass filter (with a centre frequency of about 5 kHz) can be added in the playback section. In this case C6 = 10 n, C8 = 2n2, C9 = 100 n and R20 remains 1 k. All that remains then is to connect a 560 p capacitor parallel to R21.

To enable the circuit to be calibrated a short program with a large loop must be written into the computer and the SAVE command is then given. The preset at the input, P1, must now be trimmed so that LED D11 lights properly. The analogue output, AN, is used when playing a recorded program back to the ZX81. For playback preset P3 must be set so that the program is read into the computer correctly. This can be seen by looking at the width of the black bars on the screen. There should be slightly more black than white visible.

When reading in a program it is important that preset P1 should be turned completely to ground or that the plug be removed from the input of the recorder

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b

makes the storing of programs more reliable for Sinclair's smallest

circuit. Under no circumstances may LED D11 light during playback. This is essential to prevent cross-talk between the recording and playback sections. Probably the best solution is to short-circuit the input by using a 3.5 mm socket with a built-in switch. As soon as the plug is removed from the socket the input is then grounded.

When the modifications given here are carried out there will be joy in the hearts of Sinclair ZX81 users as this computer can finally be used with the Elektor digital cassette recorder.