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HI-SPEED CASSETTE INTERFACE

SUPPLEMENTARY NOTES

First of all the accompanying notes:- Where the instructions give what appear to be fractions, the references to switch contacts should be interpreted as 1 & 2 and 3 & 4. If the switch supplied is of the Lorlin type then the contacts for Pole A will be numbered 1-4, Pole B will be numbered 5-8 and Pole C will be numbered 9-12.

Note that the replay signal from the cassette recorder should be connected both to J2 and to the input of the TAQWA Board.

The **switch** should be mounted as close as possible to the board to keep lead lengths short, preferably no longer than 12ins. The 4000/8000 baud clock signal leads should be twisted and it is **not** recommended to use ribbon cable. There is no need to use screened cable, except between the cassette machine and the computer.

The **ULA** mentioned in the parts list (IC5) is the CD4013 device supplied with the kit.

The **led** is only of significance at the higher (4000/8000) baud rates. On powering up your system the led should be extinguished and should light up when you cold start. It will remain illuminated until you start to LOAD data when it will start to flicker. The led extinguishes during steady tone (unmodulated carrier) sections of tape and thus gives an indication of end of program, facilitating dense packing of programs on cassette.

The system **is** compatible with Auto Level recording.

The system **is** compatible with the BASIC 4 from Premier Publications although we would recommend our own BASIC 4 or the BASIC 4.5 from Mutek Ltd. which is the same as ours.

When setting up the system, please note that very fine adjustment of the preset may be necessary before the system locks on and gives you the absolute reliability promised. First of all, record a section of steady tone on tape i.e. switch to 4000 baud and set the cassette machine running in record mode. Rewind the tape and "view" the carrier signal, using the little routine described. Start with the preset turned fully clockwise and you should observe a steady stream of the letter "U" appearing on screen. Now rotate the preset anti-clockwise very gently until the cursor sits still. You now have the approximate correct setting and you may proceed as the instructions.

Despite every endeavour to ensure that the system is compatible with all cassette machines, it appears that modifications may be necessary in some instances. The most frequent problem is overload of the recorder's input circuitry (especially when using the mic. input) but this is easily remedied by dividing down the output from the TAQWA Board. Connect a 10K and a 1K resistor in series from Point F to ground, with the 1K at the "earthy" end. The new Point F is the junction of the 10K and the 1K resistors and the level will be about 10% of what it was formerly. You may also find that this arrangement makes the preset rather less critical during the setting-up procedure.

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TAQWA Hi - Speed Cassette Interface

The TAQWA Hi - Speed Cassette Interface employs phase encoding techniques to overcome the difficulties associated with the limited frequency response of domestic cassette recorders.

The unit has proved ultra - reliable and the error rate on the writer's heavily used system is, so far, absolutely nil. Remember that this is at 4,000 baud with named file handling ..... not 300 baud, plus search time, plus those intermittent loading problems that everybody encounters.

Construction

Insert and solder the components in order of height, beginning with the wire links and working through to the capacitors and vertically mounted resistors.

Note 1) The oval cut-out on one end of the IC sockets, for orientation.
2) The flat on the led, indicating the cathode (k).
3) The short lead on the diode, again indicating the cathode (k).

You may mount the led on board if you choose but since this gives an indication of end of program, you will probably prefer to attach flying leads to facilitate panel mounting.

Do not insert the ICs yet.

A convenient site for the PCB is underneath the main board, below the crystal. Mount the switch nearby.

Recommended Switching

The switch supplied is a 3P 4W type (minimum) which enables selection of 300, 600, 4,000 or 8,000 baud .....

POLE A is used to switch the signal going out to tape. Positions A($\frac{1}{2}$) pick up the signal you normally supply to tape from J2. Positions A($\frac{3}{4}$) take the TAQWA Interface tape output signal (Point F). Pole A, of course, delivers the selected signal to your cassette machine.

POLE B selects the signal to be delivered to the ACIA from tape. Remove the ACIA (U14), extend Pin 2 and re-insert. Connect a flying lead from Pole B to Pin 2 of the ACIA. As before, positions $\frac{1}{2}$ pick up the original signal so connect B ($\frac{1}{2}$) to the track which normally goes to U14/2. Positions B($\frac{3}{4}$) receive the decoded signal from the TAQWA Interface PCB (Point C).

POLE C switches the clocking to the ACIA and TAQWA Interface. Break the connexions across Pad W5 and common the tracks going to Pins 3 and 4 of the ACIA (Tx and Rx clocks). This is done conveniently across the bottom of W5. Connect this point to Pole C and also to the TAQWA Interface (Point A). Pick up the signal from the top of W5 (this is the original 300 baud clock) and connect to C(1). The 600 baud clock is picked up from U57, Pin 11 and may be taken from the left most of the four plated through holes above U57. Connect to C(2), on the switch.

The 4,000 and 8,000 baud clocks are taken from U59, Pins 11 and 12. Connect to C(3) and C(4), respectively. This completes the switching arrangements.

Power up and check that the 300 and 600 baud options still operate normally. Switch off and complete the wiring as follows:-

U68 (Pin 13) — RTS line (U14, Pin 5) to Interface Point D.
U68 (Pin 9) — Tx Data (U18, Pin 10) to Interface Point B.

Incoming tape signal to Interface Point E. Note that the screen on the tape signal lead should be connected either to the main board or to the TAQWA Interface, but not to both.

Connect up the power supply to the Interface, switch on and check that you have OV and 5V respectively at Pins 7 and 14 of the 14 pin sockets and at Pins 4 and 7 of the 8 pin socket. Switch off.

IMPORTANT: The ICs used on the TAQWA Interface are all CMOS devices and require careful handling. You are advised to press a sheet of aluminium foil on the track side of the PCB before inserting the ICs. Be sure to align the ICs correctly and check the orientation before you remove the protective foil and power up.

Setting Up

Type in the following routine:-

```
10 SAVE
20 POKE 15,44
30 A = A + 1 :PRINTA; :GOTO30
```

Put your cassette machine into record mode, switch to 300 baud and run the program. When the count gets to about 100, switch to 600 baud and at 300, switch to 4,000 baud. At about 10,000 switch to 8,000 baud.

Now type in the following:-

```
10 DATA 32,235,255,32,238,255,76,238,2
20 FORA = 750TO758:READ B: POKE A,B : NEXT
30 POKE 11,238 : POKE 12,2
40 LOAD : X = USR(X)
```

Run this program and "view" the recording you made earlier, starting at 300 baud, of course. Adjust your cassette output level (if it's adjustable) to the minimum setting commensurate with a satisfactory "load" at 300 and 600 baud. When the 4,000 baud section of tape arrives adjust VR1 until you have a reliable "load". Note that the time taken during carriage return and scroll will result in about six characters being missed.

You should have no trouble at all at 4,000 baud and provided your cassette recorder is up to the task you should obtain equally satisfactory results at 8,000 baud.

Troubleshooting

As ever, somebody somewhere is going to experience problems .....

The first thing to try is a better quality tape, such as the TDK AD range.

If that doesn't help and, indeed, makes things worse then it is probable that you are overloading the TAQWA Interface input. The solution is fairly simple: Remove the capacitor joining VR1 and the 5K6 resistor and re-insert across the broken line adjacent to VR1. Feed the incoming tape signal to Point U instead of Point E.

Parts List

Resistors	21	IC	1	CD4093
Preset	1		2	CD4070
Capacitors	9		3	CD4024
Transistors	2		4	CA3140
Diode	1		5	ULA —— CD4013
LED	1		6	CD4024
PCB	1			
Switch	1			
Software	1			