



THE MULTIPLE DRIVE CONNECTION

This project is for anyone interested in adding more than the maximum drives of 4 to your TI-99/4A. If you have never built any electronic projects before, please get some help first. I will not be responsible for any problem that ensues from trying this project. What I'm saying is: "if you whuff your disk controller and/or system, don't blame me!". Make sure you have all the schematics for the disk controller and console before continuing, and double check all connections before applying power to any part of this project. If you have doubts, get some help!!!

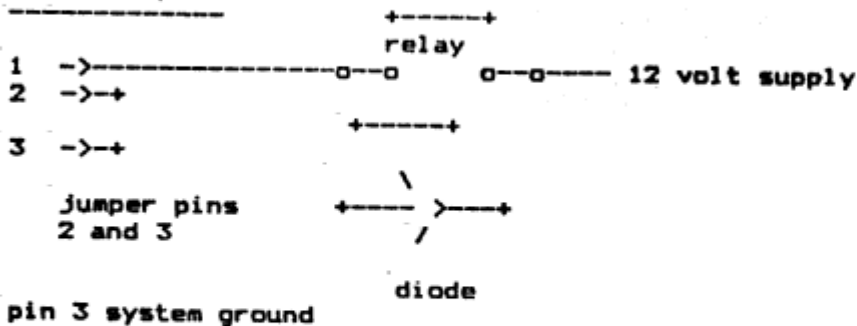
PARTS NEEDED:

- 1ea. 1N4004 diode or equiv.
- 1ea. DPDT 12V Relay
- 1ea. 9 pin connector female (cassette port)
- 1ea. 12V power supply (I use 12V from external drives).

NOTE: You can use a 5V relay in place of the 12V relay, but make sure your power supply is 5V also! The relay can be a small pc mount type (very low current is being used through the relay contacts).

Below is a schematic drawing that has to be wired up to your system and disk controller cabling. I recommend mounting the relay on perf board and enclosing the board in some type of box. Keep all connections isolated from touching any part of the computer or any other connection!

cassette port



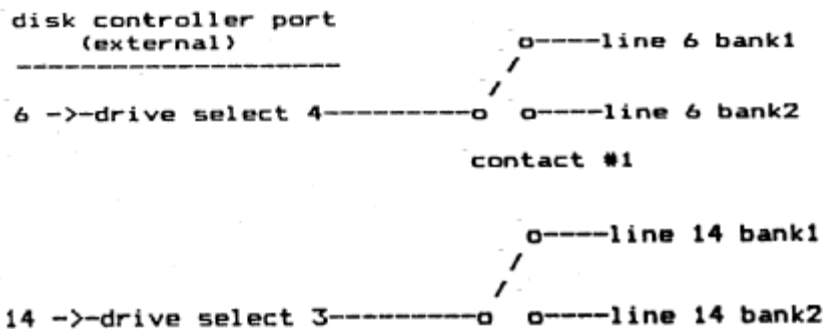
pin 3 system ground

DO NOT BEND
FLOPPY DISK ENCLOSED
DO NOT XRAY

```

100 | *****
110 | X
120 | X DON'T LABELS X
130 | X
140 | X
150 | X
160 | *****
170 |
180 ESC%=CHR$(27):
    ESCAPE CODE
190 EMP%=ESC%*E* !
    EMPHASIZED PRINT
200 NOR%=ESC%*N*CHR$(0):
    NORMAL PRINT
210 ENL%=ESC%*M*CHR$(1):
    ENLARGED PRINT
220 UDN%=ESC%*U*CHR$(1):
    TURN UNDERLINE ON
230 UDF%=ESC%*U*CHR$(0):
    TURN UNDERLINE OFF
240 OPEN #1:"PID"
250 PRINT #1:EMP%ENL%UDN%
    "DO NOT BEND"
260 PRINT #1:NOR%* FLOPPY D
    ISK ENCLOSED"
270 PRINT #1:ENL%UDF%*DO N
    OT XRAY"
280 PRINT #1: : : :
290 CALL KEY(0,R,S) !
    RE YOU PRESSING A KEY?
300 IF S=0 THEN 250 !
    IF NOT THEN PRINT ANOTHER
310 CLOSE #1
320 END

```



First, we will go over the cassette connections. By looking at the console schematics you will see that pin 1 of the cassette port is the collector of a NPN transistor and pin 2 is the emitter of the same transistor. By jumpering pin 2 to 3, you are making the emitter ground potential. IMPORTANT.. if you use a separate power supply other than the external +12v from the disk drives, the grounds must be common with each other. Solder a wire from your power supply ground to pin 3 of the cassette port! This will provide a common ground for the console and your external power supply. If you use the external drive +12v, the ground will be provided thru the drive cables and you don't have to solder ground to pin 3.

The default operation of the relay will be energised. Resetting to the title screen turns the NPN transistor on, which in turn energises the 12v relay. To operate the relay through software you will need this small routine in assembly. I use a CALL LINK from Basic, routine below:

```

MREG   BSS 32
        DEF BANK1
BANK1  LWPI MREG
        CLR R12
        SBO 22
OVER   LWPI >B3E0
        B >006A

        DEF BANK2
BANK2  LWPI MREG
        CLR R12
        SBZ 22
        B OVER

```

By doing the link the relay will stay in that state until it is turn on/off with the sister routine. This is the only way (I know of) you can access the cassette motor drive circuit in the console.

Ok now let's look at the connections to the drive cables. Break line 6 and 14 off of the cable coming out of the external drive port. Make sure there is no connection between these lines and the drives. Take the end closest to the drive controller port and attach these two wires to the common poles of the DPDT relay. Next open the lines (6 and 14) going to the two sets of drives 3 and 4. Make sure there is no connection between lines 6 and 14, there will be four breaks you will have to make, two on each drive bank set. Connect wires closest to drives to the normally open and normally closed contacts on the relay. Well that's it, if I explained everything that needs to be explained, you should now have six functional drives!