H8 H17 Storage Controller

Configuration/Connection Notes & Quick Start Guide
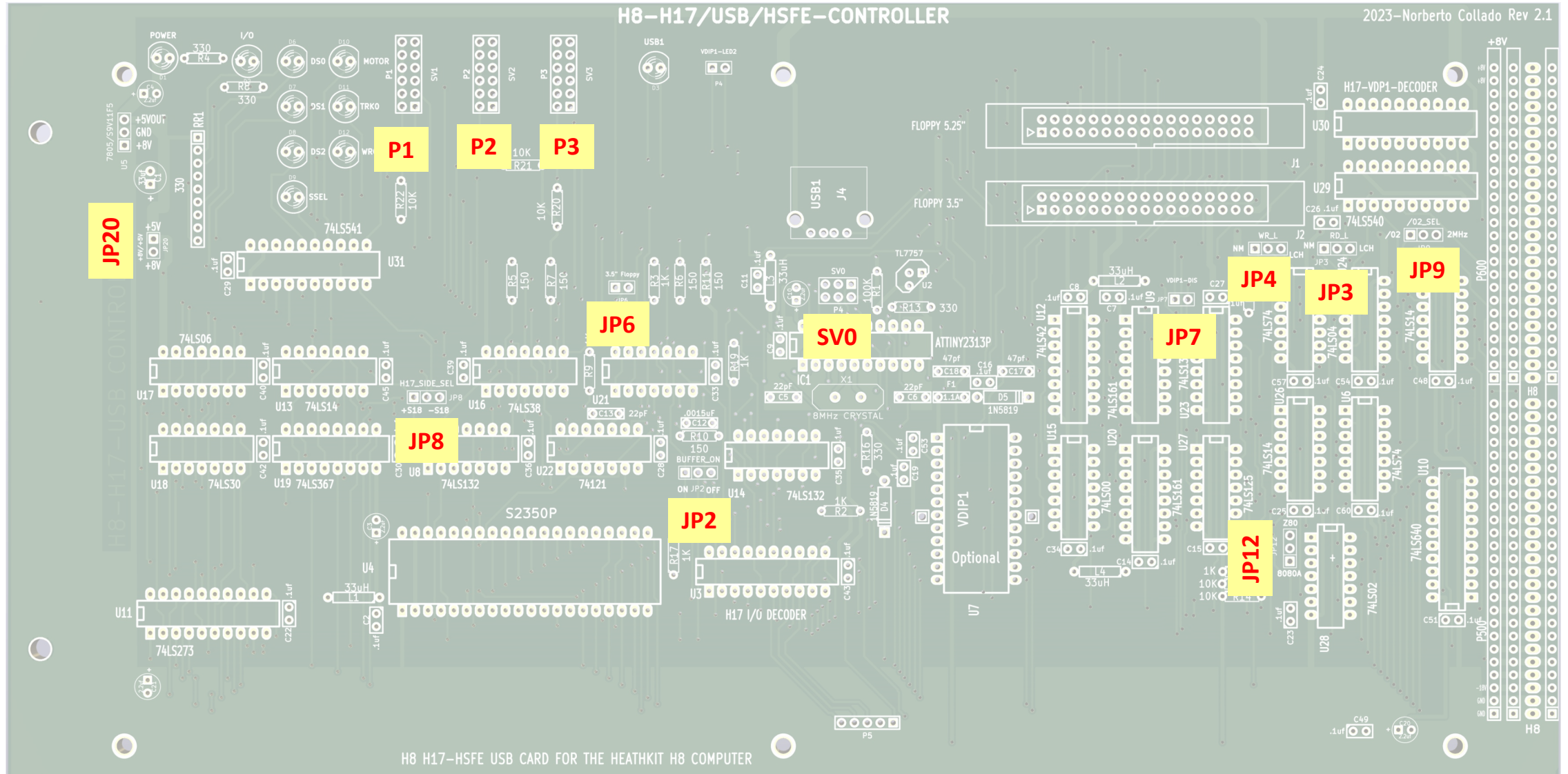

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Notes on the H17/USB Board

The H17/USB companion board adds three more kinds of support:

1. Access to "legacy" H17 5-¼" drives including all drives supported by the original H17 design, e.g.:
   - Tandon TM-100-1, Wangco-80 and Siemens FDD-100-5 (Single Side, Single Density, 40 Track, Hard Sectored – 100K capacity)
   - Tandon TM-100-2 (**Double** Side, Single Density, 40 Track/48TPI, Hard Sectored – 200K capacity)
   - Tandon TM-100-4 (**Double** Side, Single Density, **80** Track/96TPI, Hard Sectored – 400K capacity)
   - Up to 3 drives maximum supported. Drives must connect to connector "J1" on the board.
   - To access higher capacity disks (200K, 400K) must have - for HDOS: Dean Gibson's HUG SY: driver (885-1095), or for CP/M: Ray Livingston's BIOS-80.

2. A Hard Sectored Floppy Emulator (HSFE) microcontroller that generates simulated index hole pulses to allow soft-sectored 3-½" media to appear to be hard-sectored
   - HSFE capability implemented only for 3-½" drives connected via J2 on the board
   - With appropriate SY: driver or BIOS (see above) can store 400K on a floppy disk
   - Unless needed here for legacy/compatibility reasons consider instead attaching your 3-½" drive(s) via the H37 interface for more speed and storage

3. An optional Universal Serial Bus (USB) capability to transfer files via flash drive
   - Uses FTDI VDIP-1 to implement USB host protocol https://www.ftdichip.com/Support/Documents/DataSheets/Modules/DS_VDIP1.pdf
   - Not necessary if user has Rev 3.x Z80 CPU board or higher (which includes VDIP-1) or an existing H8-USB board. If using separate H8-USB board, board should be configured for ports 331/332QQ (be sure to de-conflict with H-8-4 serial port settings.)

Jumper Locations

H17/USB Companion Board Jumper Definitions

Jumper	Function
JP1	RESERVED
JP2	BUFFER ON – Default is **installed** on **pins 1-2**. Explanation: When the H17 "/CS" signal is enabled for writes, the H17 data buffer will turn on to allow the data to be present on the H17 bus. When H17 "/CS" signal is disabled, the H17 data buffer is off for any write operation on the H8 bus. If JP2 is installed on 2-3: The H17 data buffer is always on for any write operation on the H8 data bus. The H8 data will be present on the H17 bus for any write operation regardless of the H17 "/CS" signal (useful for debugging).
JP3, JP4	WR_L and RD_L: Select "LCH" position for both.
JP20	Bypasses on-board regulator by connecting board 5V directly to bus pins 48/49. Default is **not** installed. (*Insert jumper only if using PC-ATX style switching power supply to place regulated 5V on the bus!*)
P5	RESERVED for future use
JP6	Variations in drive spin-up time can confuse the Heath OS into thinking the drive is at speed, however this is unusual. Install this jumper only if having problems booting or formatting 5-¼" or 3-½" media. Default is **not** installed.
JP8	H17_SIDE_SEL: Allows to invert H17 Side Select to support legacy CPU's. Default is jumper on pins 1-2.
SV0	SV0 Header is not used. Recommend using the TL866II-Plus Programmer.

Companion Board Jumper Definitions (cont'd.)

Recommended settings for *Z80 V3, V4, Z180 V5 and 8080A V1* CPU Boards

(See next page for all other boards)

Jumper	Function
JP7	This jumper activates the optional VDIP-1 breakout board to support USB flash drives. Recommend use of the CPU serial daughterboard for VDIP-1 operation and not installing VDIP-1 on H17 board. The default is **not installed**
JP9	/O2_SEL:This jumper allows the H17 to use the variable /O2 clock from the H8 bus, or a fixed 2MHz clock regarding of CPU speed. Only Z80 V4 and Z180 V5 CPU boards provides this capability • Z180 V5 CPU: remove JP28 and insert JP29 for a fixed 2MHz clock (02F). Set H17 board JP9 to"/O2". • Z80 V4 CPU: insert a jumper on JP30. Set H17 board JP9 to "2Mhz". • If using new Front Panel PC board: Change front panel jumper JP7 to position 3-2 ("/INT2/2Mhz") and on the CPU board insert a jumper on JP30 to send 2Mhz to H8 backplane regardless of CPU speed.
JP12	IORQ: Recommend installing "SEL24" jumper on CPU board to assert BIORQ signal on SL-24 H8 pin. Default is "Z80" (pins 2-3).

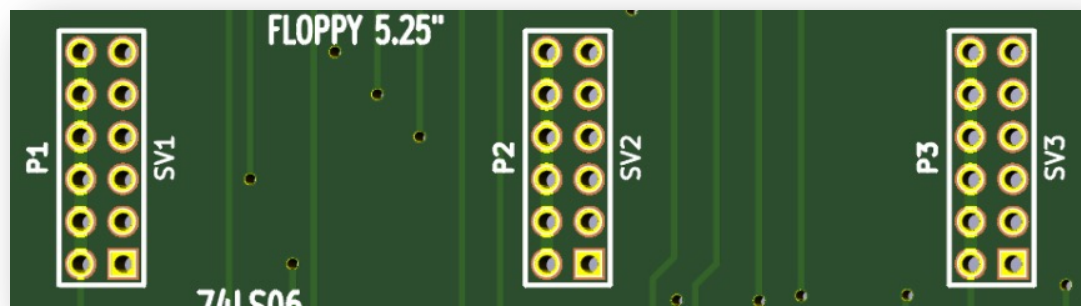# Companion Board Jumper Definitions (cont'd.)

Recommended settings for all other CPU Boards

| Jumper	Function
JP7	This jumper activates the optional VDIP-1 breakout board to support USB flash drives. • If VDIP-1 **is** installed on the H17 board then **install** this jumper. • If VDIP-1 is **not** installed on H17 board then this jumper should **not** be installed.
JP9	/O2_SEL: This jumper allows the H17 to use the variable /O2 clock from the H8 bus, or a fixed 2MHz clock regarding of CPU speed. Legacy boards do not provide this capability. Default is jumper on 1-2 = /O2 selection.
JP12	IORQ: Legacy boards do not support this feature. Default is "8080A" (pins 1-2).

P1, P2, P3: H17 Drive Select Jumpers

- The H17 hardware supports by design three drives, SY0:, SY1:, and SY2:. There are three possible configurations:
  - One 5-¼" floppy drive and two 3-½" floppy drives
  - Two 5-¼" floppy drives and one 3-½" floppy drive
  - Three 5-¼" floppy drives

- The first 4 rows of jumpers are to select combinations of 5-¼" floppy drives. The last two rows are to select only the 3-½" floppy drives.

- The header labeled "SV0" is only used for programming the Micro-controller using the AVR programmer. That is it's SPI bus https://www.sparkfun.com/products/9825

5.25 – DS0
5.25 – DS1
5.25 – DS2
5.25 – DS3
3.5 – DS0
3.5 – DS1

To SY2: drive

To SY1: drive

To SY0: drive

H17 Drive Select Example

- Here is a sample configuration:
    - Header "SV1" is configured for a 3-½" floppy selected as "SY0"
    - Header "SV2" is configured for a 3-½" floppy selected as "SY1"
    - Header "SV3" is configured for a 5-¼" floppy drive selected as "SY2".

- The 3-½" drives are connected to the socket on the right (J2) using a "twist" ribbon cable; the 5-¼" drive is connected on the left (J1).
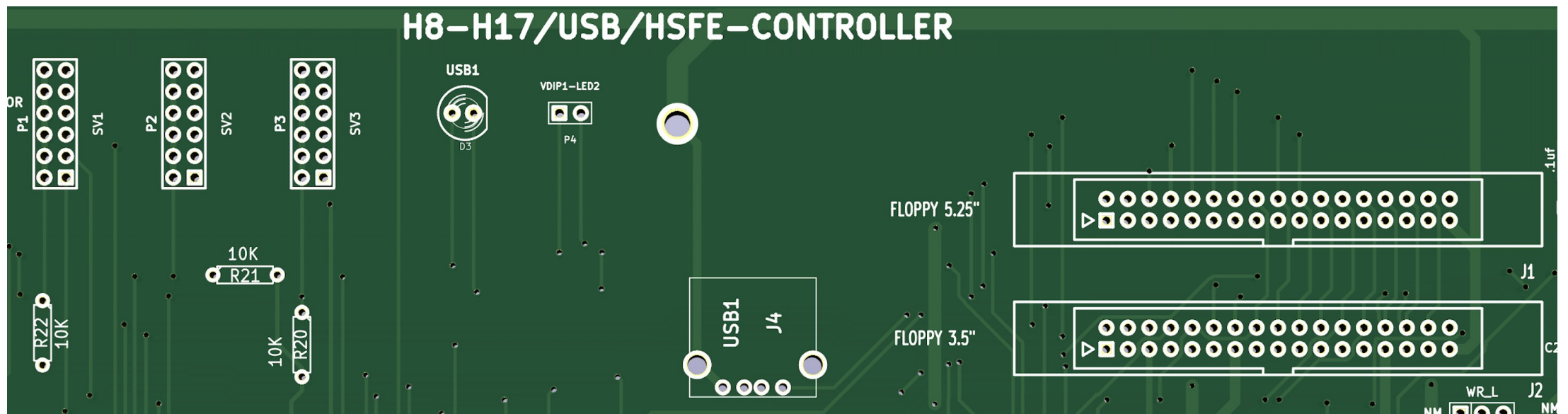
Using All Three Simultaneously (H17/H37/H67)

- The H17 uses port 174Q, so in order to use H37, H67 and H17 simultaneously set the H67 to port 274Q and configure the operating system and drivers accordingly. (Heath did not support all three at once, but there are no issues if configured properly.)

Standard drivers (Heath or HUG) can be used for H17 and H37
but special drivers or BIOS must be installed for using H67 on
port 274Q (Heath drivers/BIOS configured for H67 on 174Q)

- More info at http://koyado.com/Heathkit/Z67-IDE-plus.html

H37 on Port 170; H67 on Port 274

Using GoTek drives

- GoTek drive emulators should work with no issues for soft-sectored (H37) storage

- They can also be used for hard-sectored (H17) storage on connector J1 with certain limitations:
  - Must install hxc firmware from http://hxc2001.com/store/
  - Firmware functionality currently limited to **read only** on H17 disk format

Programming HSFE Fuses with TL866II-Plus Programmer.

- Please use file "HSFEV10.BIN" file to program the HSFE IC – ATTINY2313P.
- Please reconfigured fuses as shown below for FLB & FHB before programming the ATTINY2313P controller.