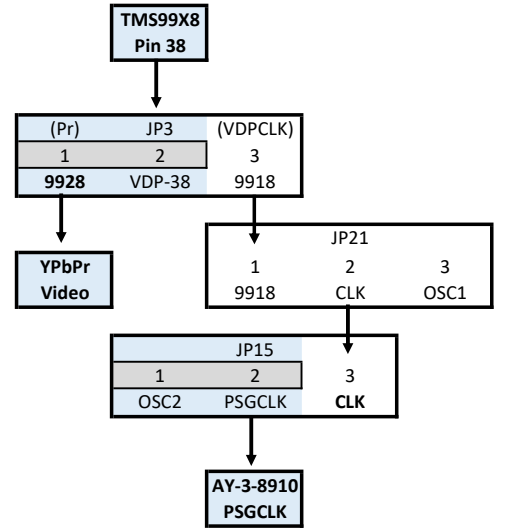
HA-8-3 CLOCK OSCILLATOR INSTALLATION

On the HA-8-3, can oscillators are used to clock the AY-3-8910 sound chip and the AM9511 APU
The original HA-8-3 board used a TMS9918 video chip, which outputs a 3.57954MHz "colorburst" frequency that is used to clock the AY-3-8910 sound chip
The TMS9928 YPbPr upgrade chip does not output the colorburst clock so an alternative clock for the AY-3-8910 must be used
The original HA-8-3 board used the 2MHz bus clock for the AM9511 APU
4MHz AM9511 chips are readily available, and require a clock source other than the bus clock for full performance

OSC1 Clock for the AM9511 APU, alternate clock for the AY-3-8910
OSC2 Primary clock for the AY-3-8910

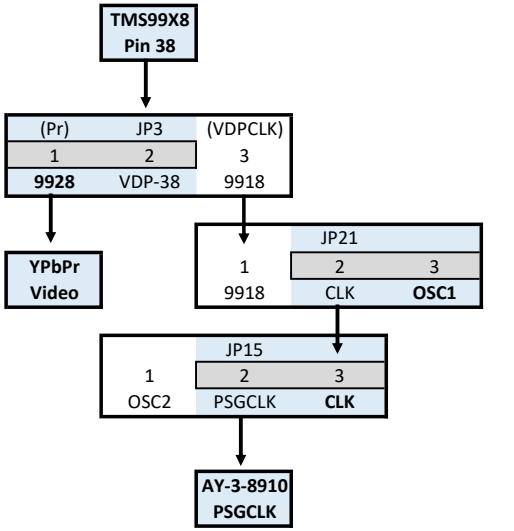
Jumpers JP3, JP15, and JP21 allow flexible selection of the oscillator(s) to be used on the HA-8-3 board

JP3 Selects Pin 38 of the VDP as either a clock signal (TMS9918) or a Pr signal (TMS9928)
JP21 Selects the CLK source - either OSC1, or Pin 38 of the VDP (TMS9918)
JP15 Selects the clock source for the PSG - either OSC2, or the CLK signal selected at JP21



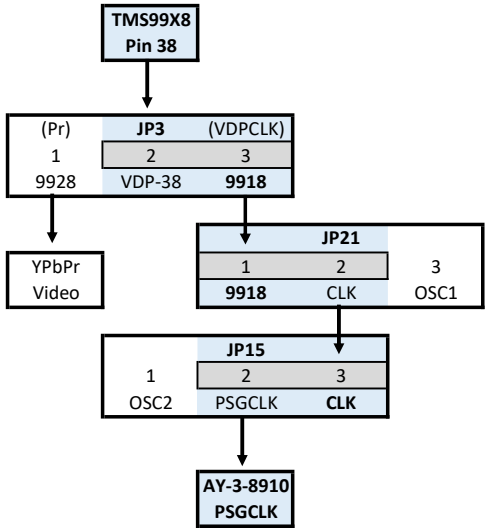
Dual oscillator installation with TMS9928:

Install "colorburst" (3.579MHz) at OSC2
Install 2/3/4MHz oscillator at OSC1 to match APU frequency specification
JP3 - "9928"
JP21 - no jumper required
JP15 - "OSC2"



Typical installation with TMS9928 and AM9511-4 (4MHz):

Install "colorburst" (3.579MHz) or 4MHz oscillator at OSC1
Do not install an oscillator at OSC2
JP3 - "9928"
JP21 - "OSC1"
JP15 - "CLK"
Choose 4MHz oscillator for best APU performance,
but slightly shifted AY-3-8910 audio frequencies
Choose 3.579MHz oscillator for exact match of AY-3-8910 frequencies,
but slightly reduced APU performance



Typical installation with TMS9918:

Do not install oscillator at OSC2

Install 2/3/4MHz oscillator at OSC1 to match APU frequency specification

JP3 - "9918"

JP21 - "9918"

JP15 - "CLK"