Converting STK20C04 to STK12C68

Introduction

This document provides guidance on converting a design that is currently using the STK20C04 to the Simtek recommended part STK12C68.

Feature set and limitations of the STK20C04

Function Category	STK20C04	STK12C68
Autostore	No	Yes, but can be disabled
Software store	No	Yes
Software recall	No	Yes
Hardware store HSB based	No	Yes
Hardware store NE based	Yes	No

Package Comparison

The 600 mil dip package is available in the STK12C68 and the STK20C04 .
Other packages that take less PCB area also exist such as the 350 mil SOIC.

Package	PKG Code	STK20C04	STK12C68	Notes
350 mil SOIC – 28 pin	S	Not Available	Available	Surface mount – smallest PCB area
600 mil pdip -- 28 pin	W	Yes	Not Available	Through hole
300 mil pdip -- 28 pin	P	Not Available	Not Available	Through hole
300 mil cdip -- 28 pin	C	Not Available	Not Available	Through hole

Issues to consider during the conversion

The key difference is that the STK20C04 has a different hardware store mechanism than the STK12C68. STK12C68 will normally autostore so powering via VCAP and having VCCx open will prevent autostore. Logic explained here creates a signal to activate /HSB(hardware store) by combining the /G, /NE, /E, and /W signals used with the STK20C04 . This will activate the same feature as in the STK12C68 (NE based hardware store) by instead activating /HSB.

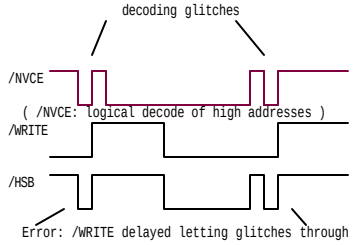
It is essential that the logic output be glitch free. In many implementations, /NE and /E signal is usually a logic decode of uppermost addresses and any decode from multiple address lines can glitch. /W signal is usually falling later in the cycle glitch-free strobe from the MPU. Please check that there is sufficient time from address change to /W falling to gate out /E and /NE glitches. This will ensure glitch free leading edge. Also, be sure that /W rises before the address changes. (Delay in the /W signal can cause problems for the rising edge.) This is the normal situation for most MPUs (check your MPU datasheet). The /HSB signal should go low only when /G

is high and /E, /NE, and /W are all low. This low going pulse will activate the /HSB input which initiates a hardware store when low just like the STK20C04 does in response to /G being high, /NE, /E, and /W being low.

Hardware recall is not supported in this conversion. There is no external pin on the STK12C68 to support hardware recall. Recall is automatic on power up so is in most cases not needed or used. If needed, contact Simtek applications engineering for recommendations.

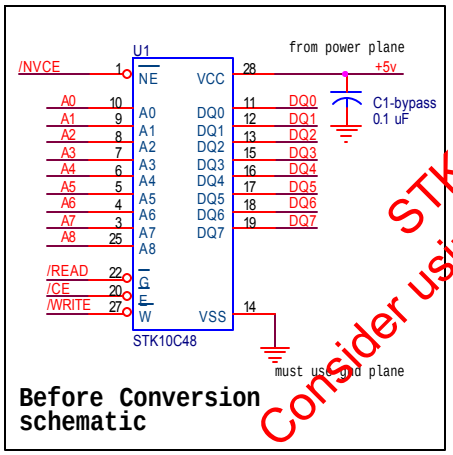
Improper Timing example

The following timing diagram shows an unwanted situation just before the low going write pulse. /HSB output from the OR gate should not glitch by having /WRITE extend into the next cycle. This can occur if there are too much delay in the /WRITE signal. Normally, /WRITE output from an MPU will terminate well before any address change. Be sure to check the timing of address changes to /WRITE rising. This time should always be negative and any positive values risk activating /HSB inadvertently.

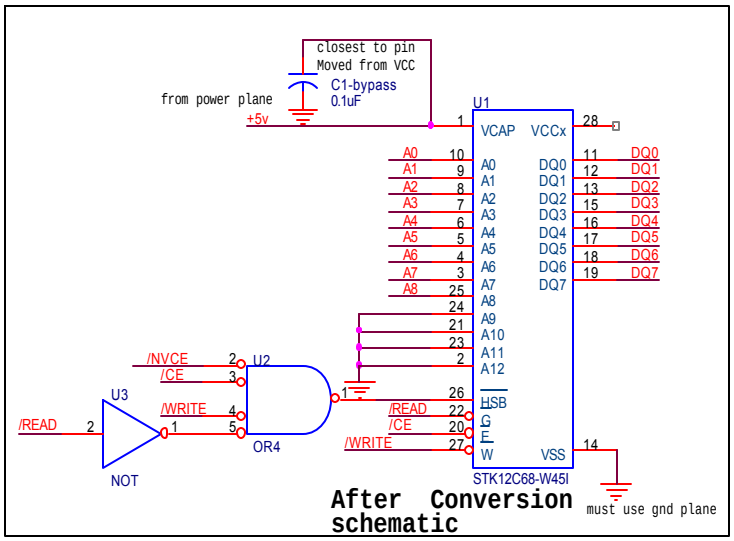


Schematic changes for conversion:

The larger memory is used with identical function but with four high order address bits tied inactive. The choice of package is open with the “S” package being the most area efficient surface mount choice.



Here, A9, A10, A11 and A12 are tied low and only 2k x 8 of the available memory is used. The power is applied to VCAP (pin 1) and VCCx (pin 28) is left open which prevents autostore. The bypass capacitor, C1, is best if tightly connected to pin 1. Logic as shown creates the /HSB signal. Adjust the timing of inputs to ensure a glitch free output as needed with additional logic or delays (explained above in detail).



Corresponding pin Connection

Pin for pin comparison of the two parts is given in the table below:

STK10C48 NAME	STK12C68 NAME	Pin	Comments
/NE	VCAP	1	Hook VCAP to system VCC Unhook /NE and connect to OR gate input (see schematic)
NC	A12	2	Connect A12 to ground
A7	A7	3	“
A6	A6	4	“
A5	A5	5	“
A4	A4	6	“
A3	A3	7	“
A2	A2	8	“
A1	A1	9	“
A0	A0	10	“
DQ0	DQ0	11	“
DQ1	DQ1	12	“
DQ2	DQ2	13	“
VSS	VSS	14	“
DQ3	DQ3	15	“
DQ4	DQ4	16	“
DQ5	DQ5	17	“
DQ6	DQ6	18	“
DQ7	DQ7	19	“
E#	E#	20	Also, connect to OR gate input (See schematic)
NC	A10	21	Connect A10 to ground
G#	G#	22	Also, connect to OR gate input (See schematic)
NC	A11	23	Connect A11 to ground
NC	A9	24	Connect A9 to ground
A8	A8	25	“
NC	HSB	26	Also, connect to OR gate output (see schematic above)
W#	W#	27	Also connect to OR gate input
VCC	VCCX	28	12C68 VCCx should be open