SH68689

Keyboard Controller

Features

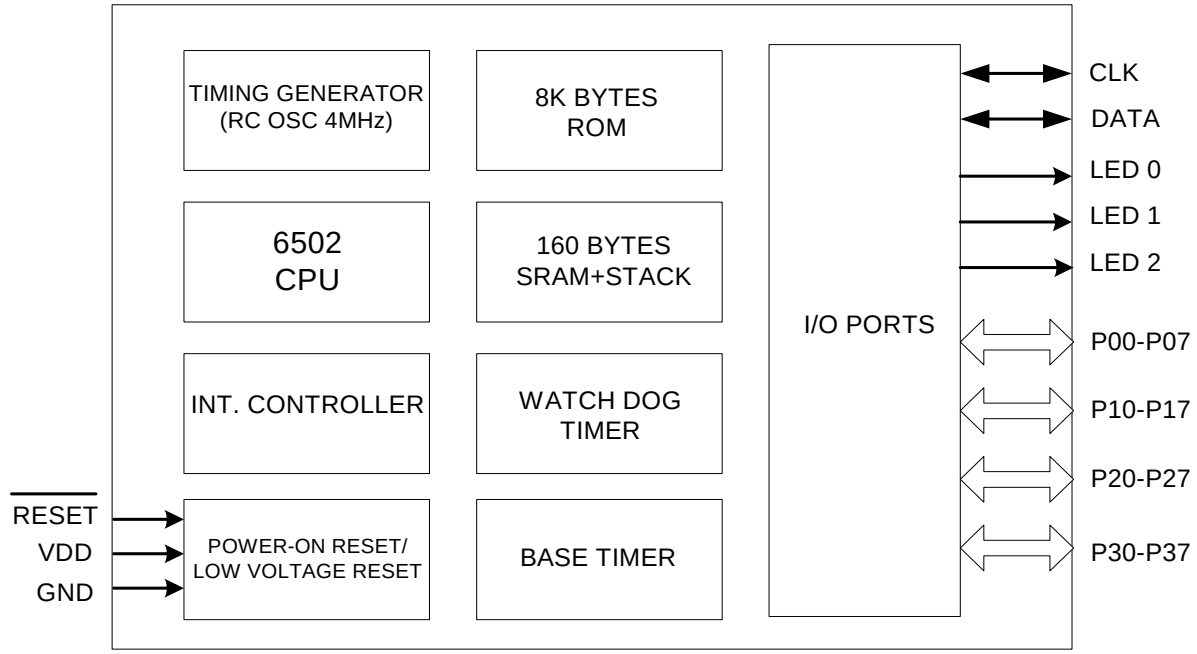
- Built-in 6502 8-bit CPU
- 2MHz CPU operation frequency
- 8K bytes of ROM
- 160 bytes of SRAM
- One 8-bit programmable base timer with 1 - 256 μsec interval
- 29 programmable bi-directional I/O pins
- 3 LED direct sink pins with internal serial resistors
- Built-in RC oscillator with an external resistor
- Mask option for DATA/CLK and I/O Port driving capability
- Watch-dog timer
- Built-in power-on reset
- Built-in low voltage reset
- CMOS technology for low power consumption
- Available in CHIP FORM

General Description

SH68689 is a single chip micro-controller for keyboard applications. It incorporates a 6502 8-bit CPU core, 8K bytes of ROM and 160 bytes of RAM used as working RAM and stack area. It also includes 29 programmable bi-directional I/O pins and one 8-bit pre-loadable base timer.

Additionally, it includes a built-in low voltage reset, a 4MHz RC oscillator that only requires an externally applied resistor, and a watch-dog timer preventing system standstill.

Block Diagram



Electrical Characteristics

Absolute Maximum Ratings*

DC Supply Voltage . . . . . .-0.3V to +7.0V

Input/Output Voltage . . . . . GND - 0.3V to V_{DD} + 0.3V

Operating Ambient Temperature . . . . . .0℃ to +85℃

Storage Temperature . . . . . .-55℃ to +125℃

Operating Voltage (V_{DD}) . . . . . .+4.5V to 5.5V

***Comments**

Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to this device. These are stress ratings only. Functional operation of this device at these or any other conditions above those indicated in the operational sections of this specification is not implied or intended. Exposure to the absolute maximum rating conditions for extended periods may affect device reliability.

DC Electrical Characteristics (V_{DD} = 5V, GND = 0V, T_A = 25°C, unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Power Supply Current	I_{CC}			20	mA	No load
Input High Voltage	V_{IH}	2			V	
Input Low Voltage	V_{IL}			0.8	V	
Output High Voltage (Port 0, 1, 2, 3)	V_{OH1}	2.4			V	I_{OH} = -100μA **(Note 1)**
Output High Voltage (Port 0, 1, 2, 3)	V_{OH2}	2.4			V	I_{OH} = -50μA **(Note 2)**
Output High Voltage (CLK, DATA)	V_{OH3}	2.4			V	I_{OH} = -400μA **(Note 3)**
Output High Voltage (CLK, DATA)	V_{OH4}	2.4			V	I_{OH} = -800μA **(Note 4)**
Output Low Voltage (PORT 0, 1, 2)	V_{OL1}			0.4	V	I_{OL} = 4mA
Output Low Voltage (PORT 3)	V_{OL2}			0.4	V	I_{OL} = 5mA
Output Low Voltage (CLK, DATA)	V_{OL3}			0.4	V	I_{OL} = 10mA
Initial Frequency Variation	ΔF/F			+/-10	%	
LED Sink Current (LED 0, 1, 2)	I_{LED}	10	14	17	mA	V_{OL} = 3.2V
Low Voltage Reset Threshold	V_{LVR}		3.0		V	
Power-on Reset Time	T_{POR}	120	150	180	ms	
$\overline{\text{RESET}}$ Input Low Pulse Width	T_{RSTB}	512			us	
$\overline{\text{RESET}}$ Pull High Resistor	R_{PH}		220		KΩ	

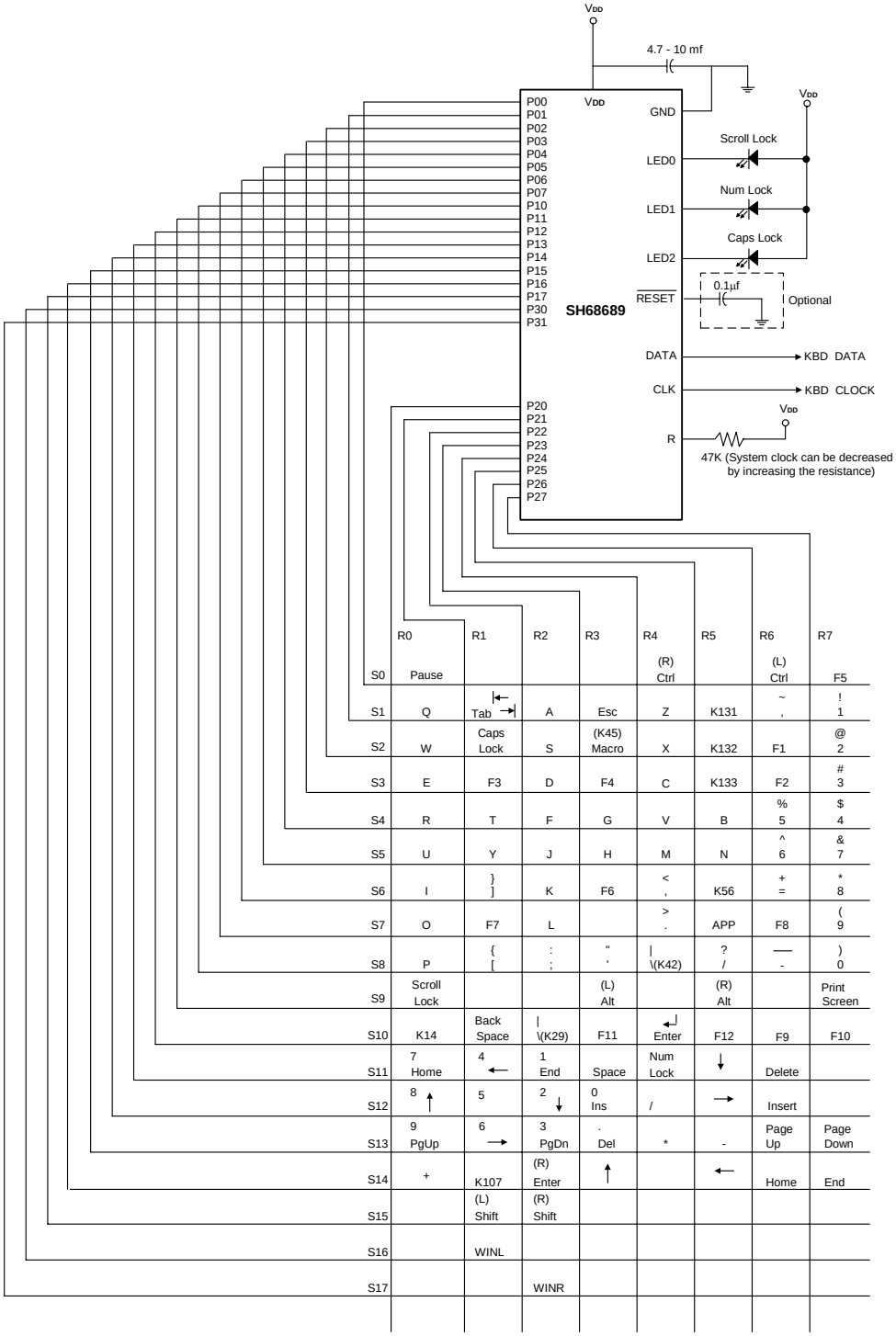
Note 1: There are 2 types of Port 0, 1, 2, 3 Pull-High Resistor. Under this condition, the user can select code option HA or HC. For more information, please refer to **Ordering Information** on page 14.

Note 2: The Pull-High Resistor is higher than V_{OH1}. Under this condition, the user can select code option HB or HD. For more information, please refer to Ordering Information on page 14.

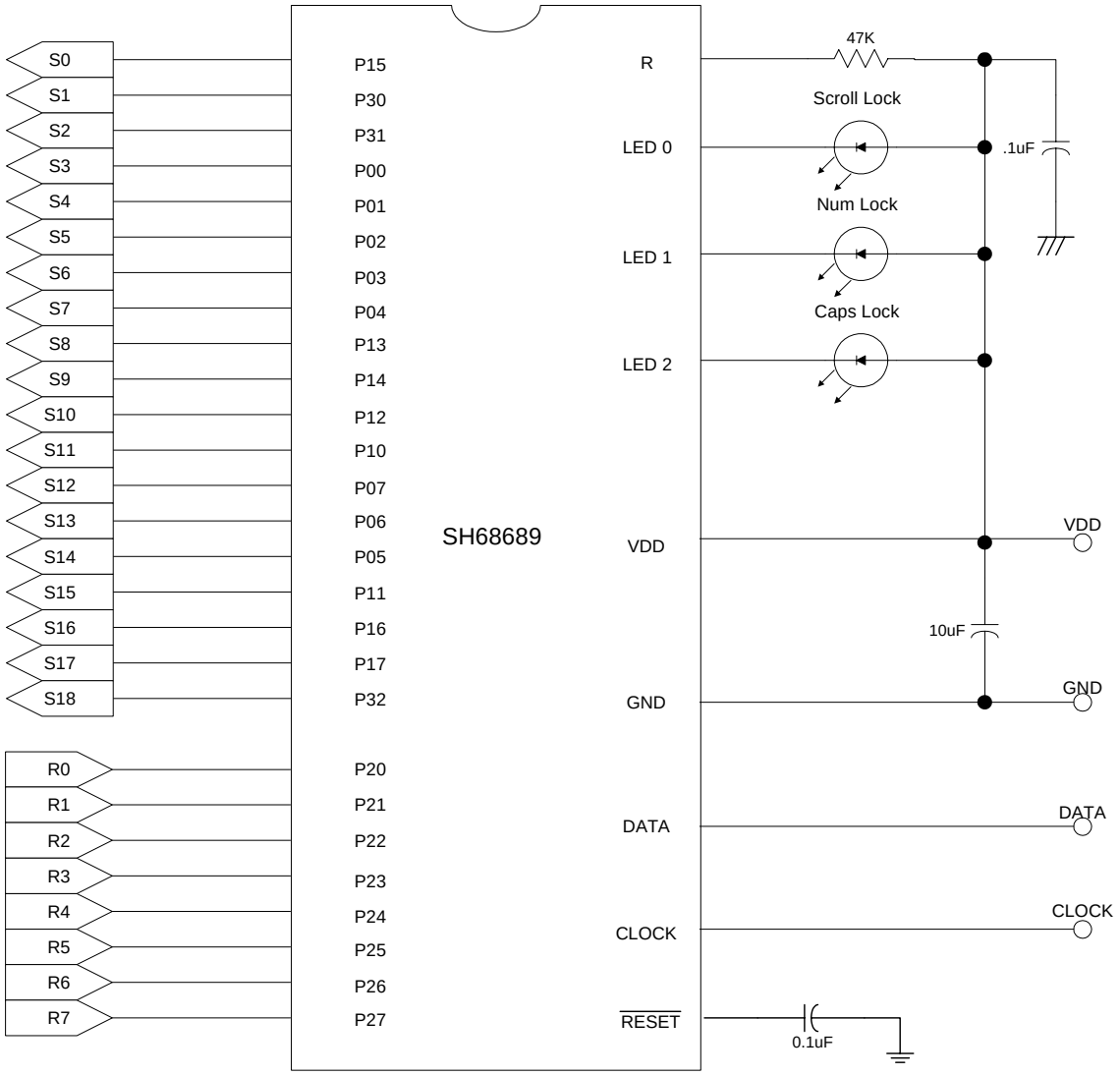
Note 3: There are 2 types of DATA/CLK driving capabilities. Under this condition, the user can select code option HA or HB. For more information, please refer to Ordering Information on page 14.

Note 4: The driving capability of DATA/CLK is higher than V_{OH3}. Under this condition, the user can select code option HC or HD.
For more information, please refer to Ordering Information on page 14.

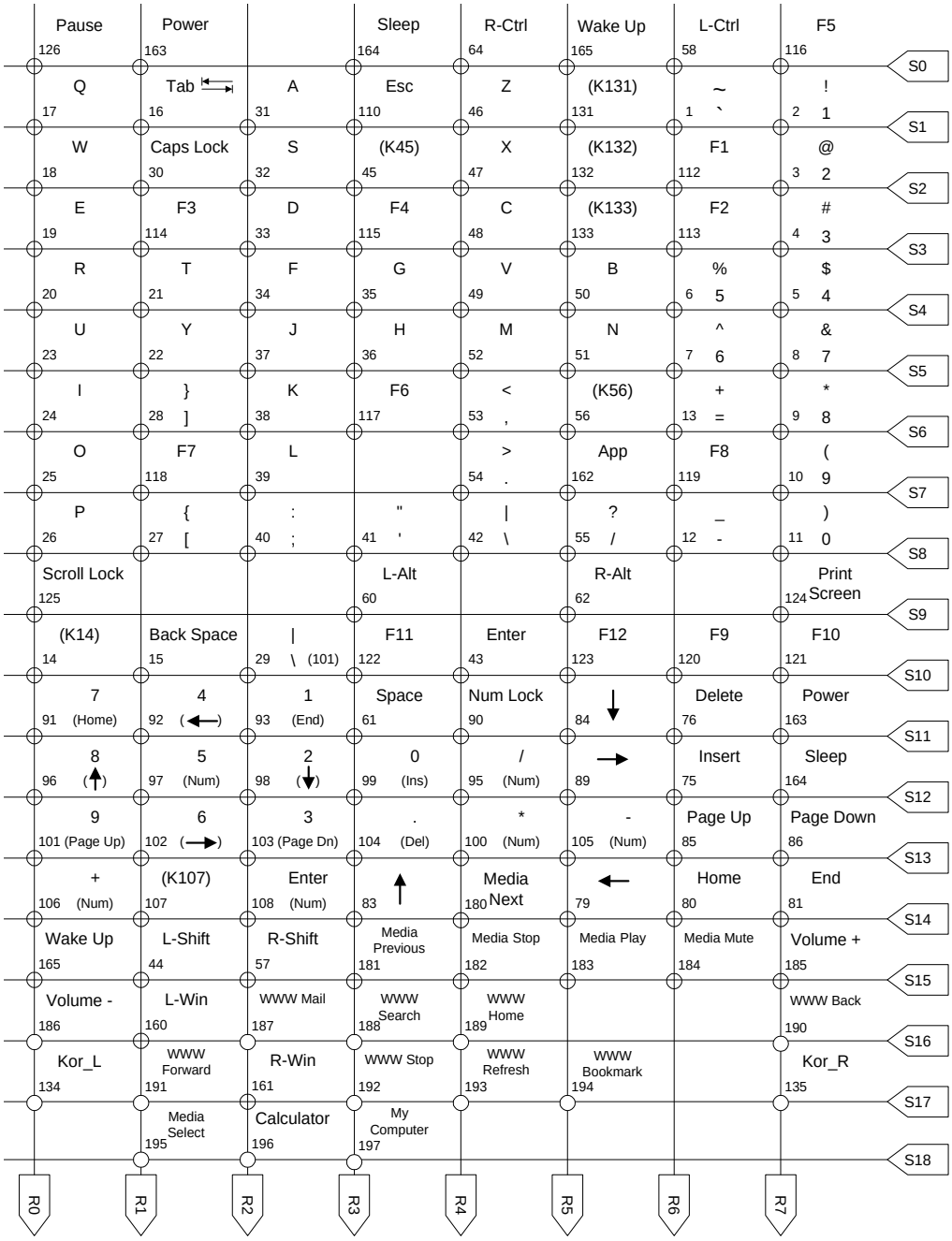
Application Circuits (for reference only)



Application Circuit For Windows 2000 Standard Code (for reference only)



Key Matrix definition for Windows 2000 Standard Code (for reference only)



Ordering Information

Part No.	Package
SH68689H	Chip form

Code Type No.	Port 0, 1, 2, 3 Pull-High Resistor	Data/Clk Driving capacitance
HAXXX	V_{OH1}	V_{OH3}
HBXXX	V_{OH2}	V_{OH3}
HCXXX	V_{OH1}	V_{OH4}
HDXXX	V_{OH2}	V_{OH4}

Data Sheet Revision History

Revision No.	History	Date
2.0	1. Delete DIP-40 package form. 2. Modify the Code Type No. in Ordering Information and DC Electrical characteristics.	Jul. 2011
1.0	Original	Feb. 2008