DN05026/D

Automotive Mirror Control Design

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DESIGN NOTE

Circuit Description

The design note features two NCV7703 devices and a 250 mA capable low-drop-out regulator for side-view mirror application. The microcontroller unit (MCU) communicates with the NCV7703 via the serial peripheral interface (SPI) for driver operation and diagnostics. The SPI ports of the NCV7703 devices are configured in parallel configuration. Thus each of the integrated drivers has its own dedicated chip-select-bar (CSB) input signal from the microcontroller while the remaining SPI signals (SI, SCLK, SO) are shared. In a single SPI frame the MCU can only communicate with one NCV7703 device at a time with this configuration.

Two DC motors control the horizontal and the vertical movement of a side-view mirror. These motors are configured to the NCV7703 in a cascaded configuration, therefore, only one motor can be active at a given time.

Furthermore, the design schematic includes reverse battery protection and ESD suppression circuitry. Recommendations for DC bypass capacitors and current limiting resistors are also offered as a design aid.

Software Considerations

When programming the microcontroller for NCV7703 operation, the flow chart provided in Figure 2 can be used as a design reference. The chart illustrates how the MCU is kept in sleep mode when the reset is triggered by the LDO or the LDO is forced into a reset state due to a watchdog fault.

The flowchart shows that only one NCV7703 device is enabled at a given time; and the protection bits, over current detection shutdown, and the over voltage lockout controls are set to “1”. Furthermore, motor activation for specific axial movement and the non overlap delay is specified.

Key Features

- Right and Left Side-View Mirror Application
- Motor Control via SPI
- Under-Load Detection
- Over-Current Protection
- Reverse Battery Protection
- ESD Suppression

Table 1. DEVICE DETAILS

Device	Application	Load Dump	Channel Count	RDSon	Miscellaneous
NCV7703, NCV8518	Mirror Control	40 V	3	0.8 Ω (Typ)	Individual Driver Control

Table 2. OTHER SPECIFICATIONS

NCV7703 Output Current	0.5 A	Max
NCV7703 SPI Frequency	5 MHz	Max
NCV7703 Frame Length	16	Bits

Device Enable	Yes, NCV7703 & NCV8518
Under Load Detection	Yes, NCV7703
3.3 V/5 V System Compatible	Yes, NCV7703
Over Voltage and Under Voltage Lockout	Yes, NCV7703
Daisy Chain Compatible	Yes, NCV7703
Watchdog	Yes, NCV8518

SCHEMATIC

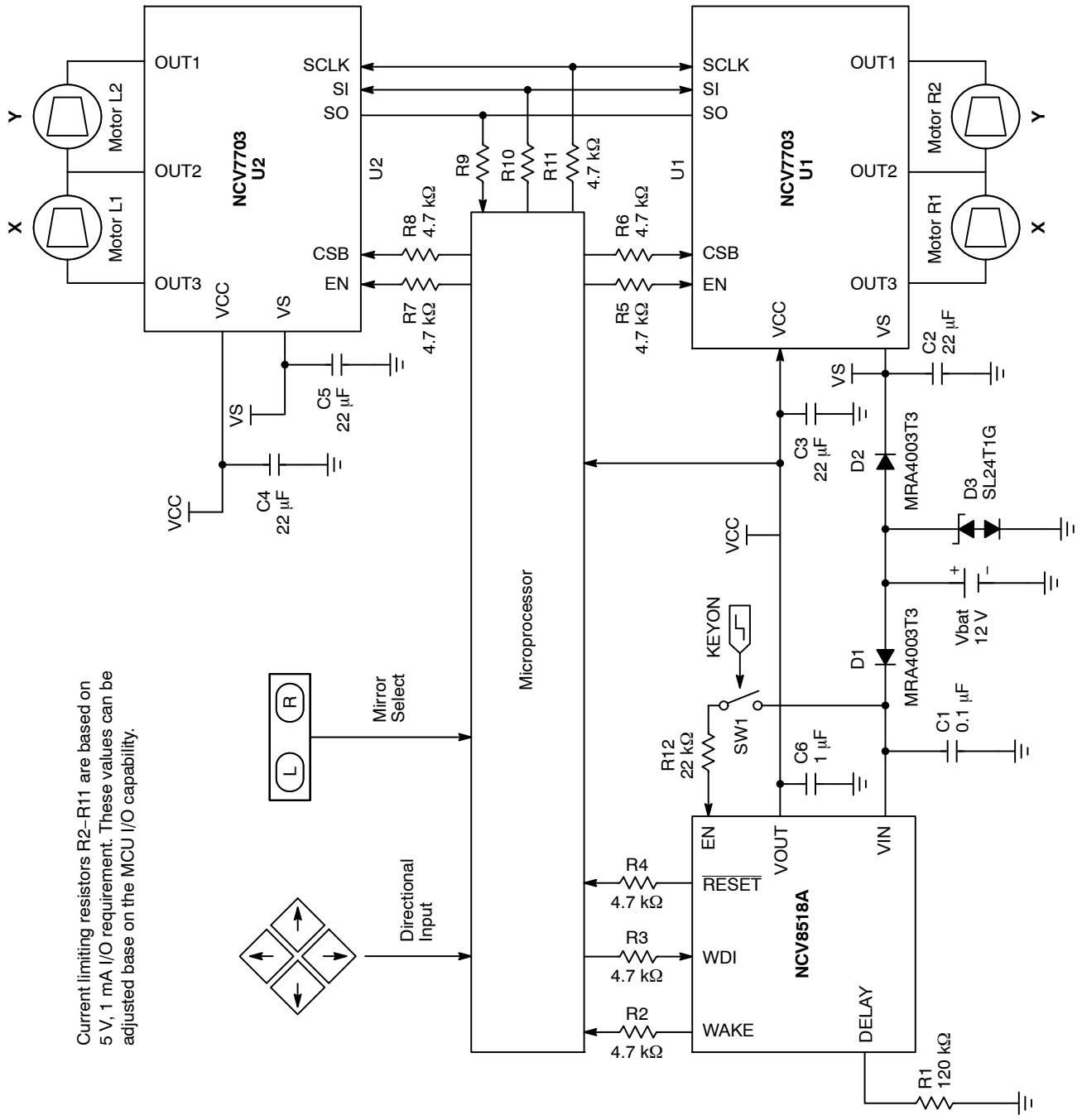

Figure 1. Design Schematic

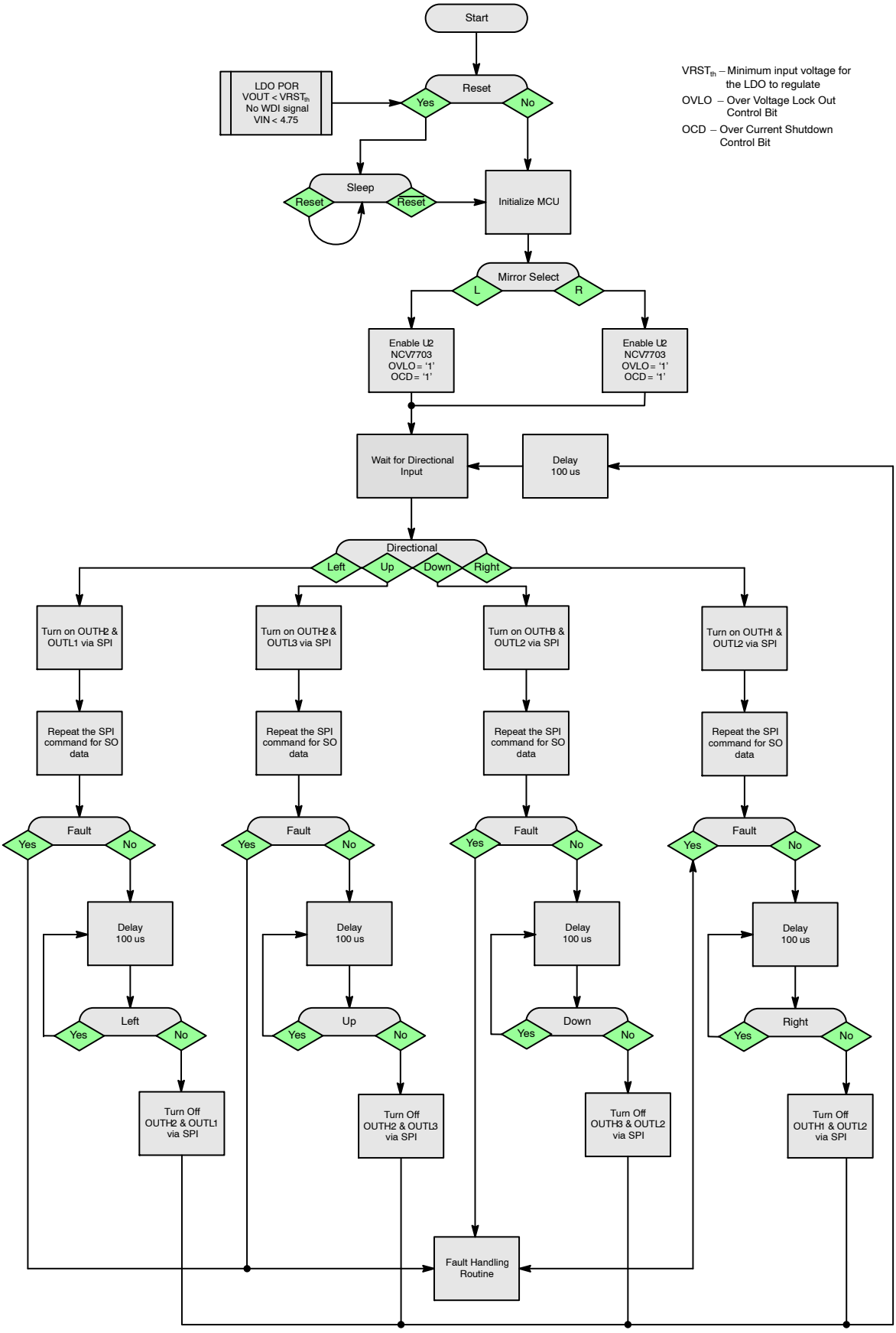

Figure 2. Software Flow Chart

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