CHAIN MODE, NO BUSY INDICATOR

This mode can be used to daisy-chain multiple AD7686s on a 3-wire serial interface. This feature is useful for reducing component count and wiring connections, for example, in isolated multiconverter applications or for systems with a limited interfacing capacity. Data readback is analogous to clocking a shift register.

A connection diagram example using two AD7686s is shown in Figure 41, and the corresponding timing is given in Figure 42.

When SDI and CNV are low, SDO is driven low. With SCK low, a rising edge on CNV initiates a conversion, selects the chain mode, and disables the busy indicator. In this mode, CNV is held high during the conversion phase and the subsequent data readback.

When the conversion is complete, the MSB is output onto SDO, and the AD7686 enters the acquisition phase and powers down. The remaining data bits stored in the internal shift register are then clocked by subsequent SCK falling edges. For each ADC, SDI feeds the input of the internal shift register and is clocked by the SCK falling edge. Each ADC in the chain outputs its data MSB first, and 16 × N clocks are required to read back the N ADCs. The data is valid on both SCK edges. Although the rising edge can be used to capture the data, a digital host using the SCK falling edge allows a faster reading rate and, consequently, more AD7686s in the chain, provided the digital host has an acceptable hold time. The maximum conversion rate can be reduced due to the total readback time. For instance, with a 3 ns digital host setup time and 3 V interface, up to four AD7686s running at a conversion rate of 360 kSPS can be daisy-chained on a 3-wire port.

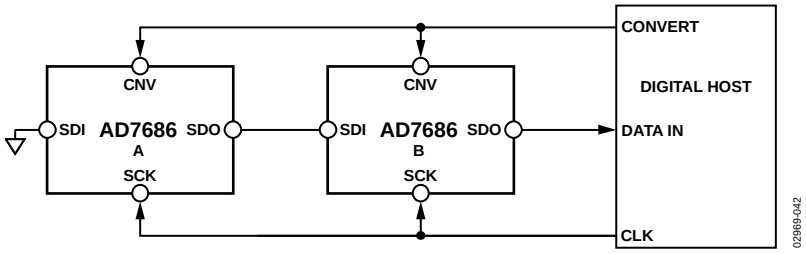

Figure 41. Chain Mode, No Busy Indicator Connection Diagram

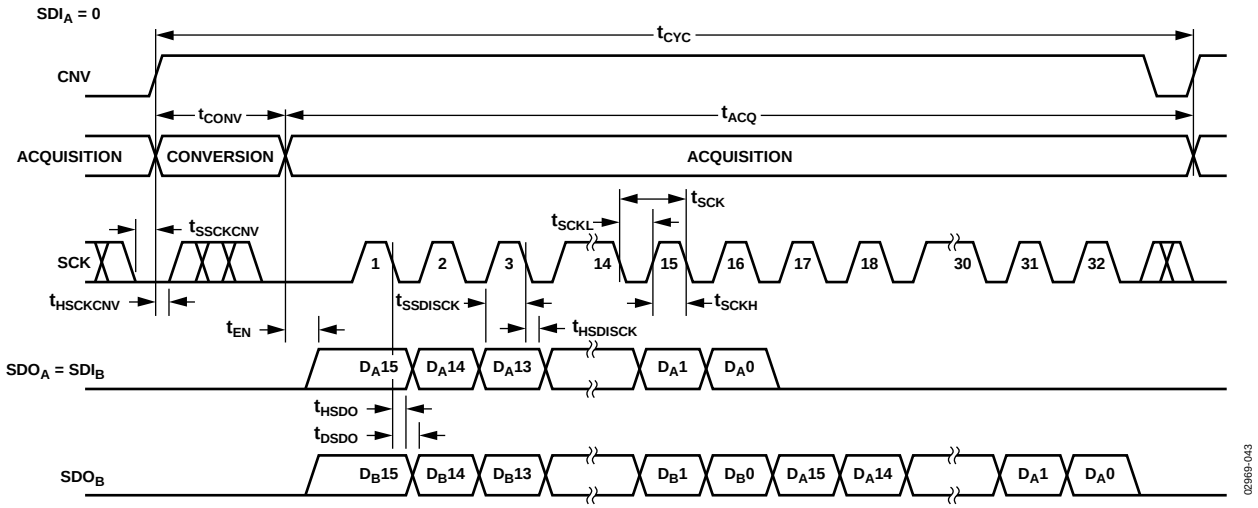

Figure 42. Chain Mode, No Busy Indicator Serial Interface Timing