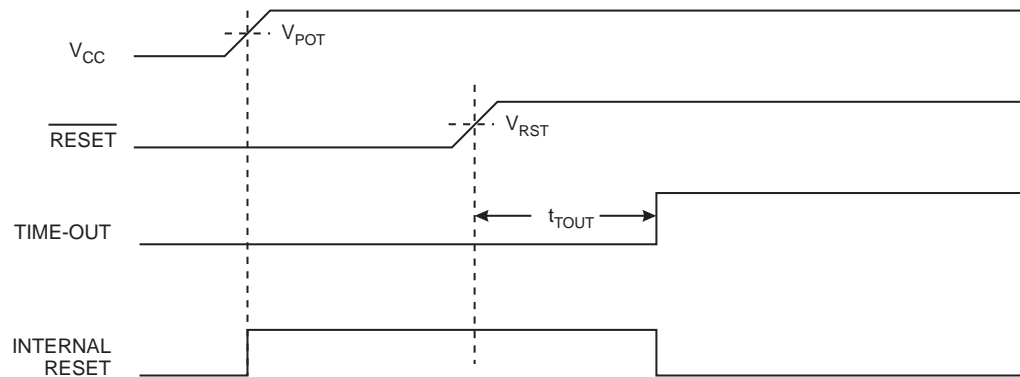


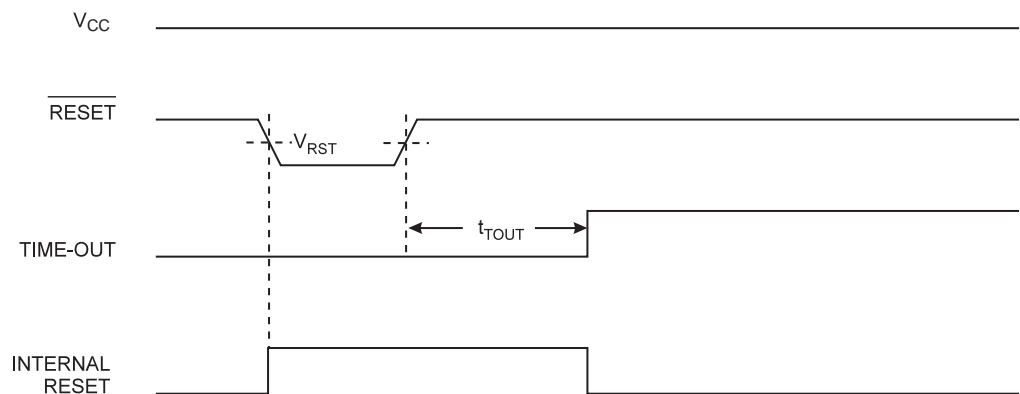
Figure 8-3. MCU Start-up, $\overline{\text{RESET}}$ Extended Externally



8.4 External Reset

An External Reset is generated by a low level on the $\overline{\text{RESET}}$ pin. Reset pulses longer than the minimum pulse width (see ["System and Reset Characteristics" on page 320](#)) will generate a reset, even if the clock is not running. Shorter pulses are not guaranteed to generate a reset. When the applied signal reaches the Reset Threshold Voltage – V_{RST} – on its positive edge, the delay counter starts the MCU after the Time-out period – t_{TOUT} – has expired. The External Reset can be disabled by the RSTDISBL fuse, see [Table 25-7 on page 297](#).

Figure 8-4. External Reset During Operation



8.5 Brown-out Detection

ATmega48P/88P/168P/328P has an On-chip Brown-out Detection (BOD) circuit for monitoring the V_{CC} level during operation by comparing it to a fixed trigger level. The trigger level for the BOD can be selected by the BODLEVEL Fuses. The trigger level has a hysteresis to ensure spike free Brown-out Detection. The hysteresis on the detection level should be interpreted as $V_{BOT+} = V_{BOT} + V_{HYST}/2$ and $V_{BOT-} = V_{BOT} - V_{HYST}/2$. When the BOD is enabled, and V_{CC} decreases to a value below the trigger level (V_{BOT-} in [Figure 8-5 on page 49](#)), the Brown-out Reset is immediately activated. When V_{CC} increases above the trigger level (V_{BOT+} in [Figure 8-5 on page 49](#)), the delay counter starts the MCU after the Time-out period t_{TOUT} has expired.

The BOD circuit will only detect a drop in V_{CC} if the voltage stays below the trigger level for longer than t_{BOD} given in ["System and Reset Characteristics" on page 320](#).