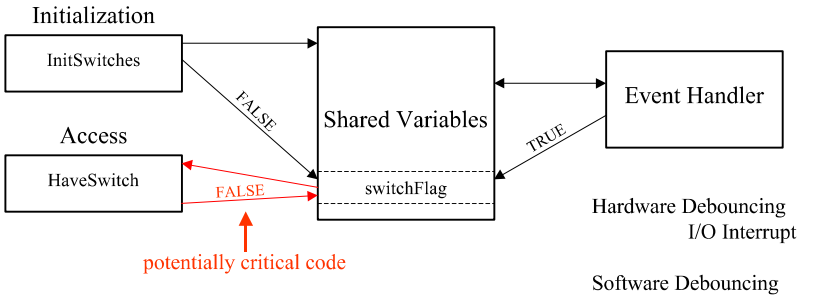
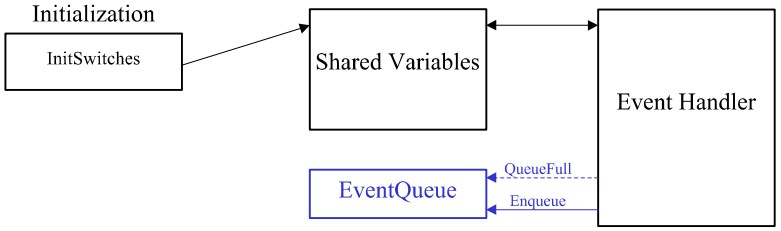
Switch Software

Polled



Event-Driven



Switch Software Event Handler - Hardware Debouncing

Pseudo Code

```
IF (current_switch ≠ prev_switch) THEN
        down_switch ← current_switch & !prev_switch
        FOR i ← 0 TO NUM_SWITCHES UPDATE i ← i + 1
                IF ((down_switch & 0x01) = 1) THEN
                        switchFlag[i] ← TRUE
                ENDIF
                down_switch ← down_switch SHR 1
        ENDFOR
ENDIF
prev_switch ← current_switch
```

code assumes current_switch and thus prev_switch contains the state of multiple switches

Switch Software Event Handler - Software Debouncing

Pseudo Code

```
IF (switch up) THEN
        debounce_cntr ← DEBOUNCE_TIME

ELSE
        decrement debounce_cntr
        IF (debounce_cntr = 0) THEN
                set switchFlag

        ELSE IF (debounce_cntr < 0) THEN
                debounce_cntr ← 0
        ENDIF

ENDIF
```

Switch Software Event Handler - Software Debouncing

Pseudo Code with Auto-Repeat

```
IF (switch up) THEN
        debounce_cntr ← DEBOUNCE_TIME

ELSE
        decrement debounce_cntr
        IF (debounce_cntr = 0) THEN
                set switchFlag
                debounce_cntr ← REPEAT_RATE
        ELSE IF (debounce_cntr < 0) THEN
                debounce_cntr ← 0
        ENDIF

ENDIF
```

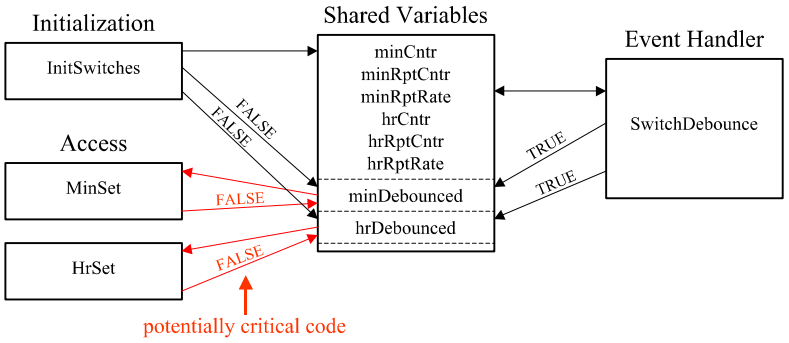
Switch Software Event Handler - Software Debouncing

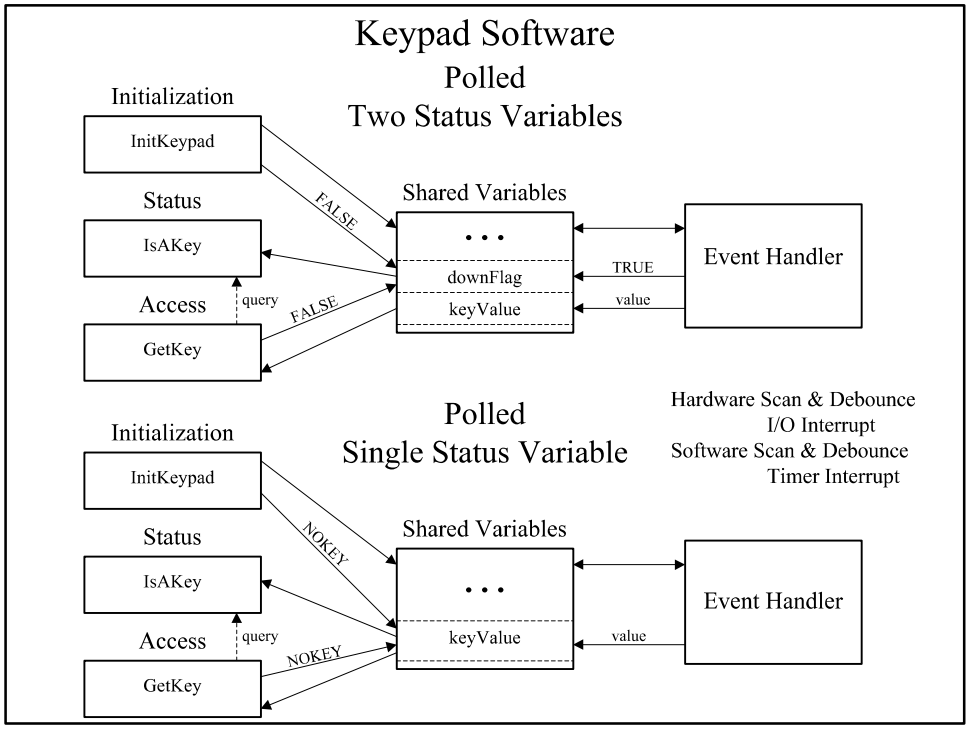
Pseudo Code with Variable Rate Auto-Repeat

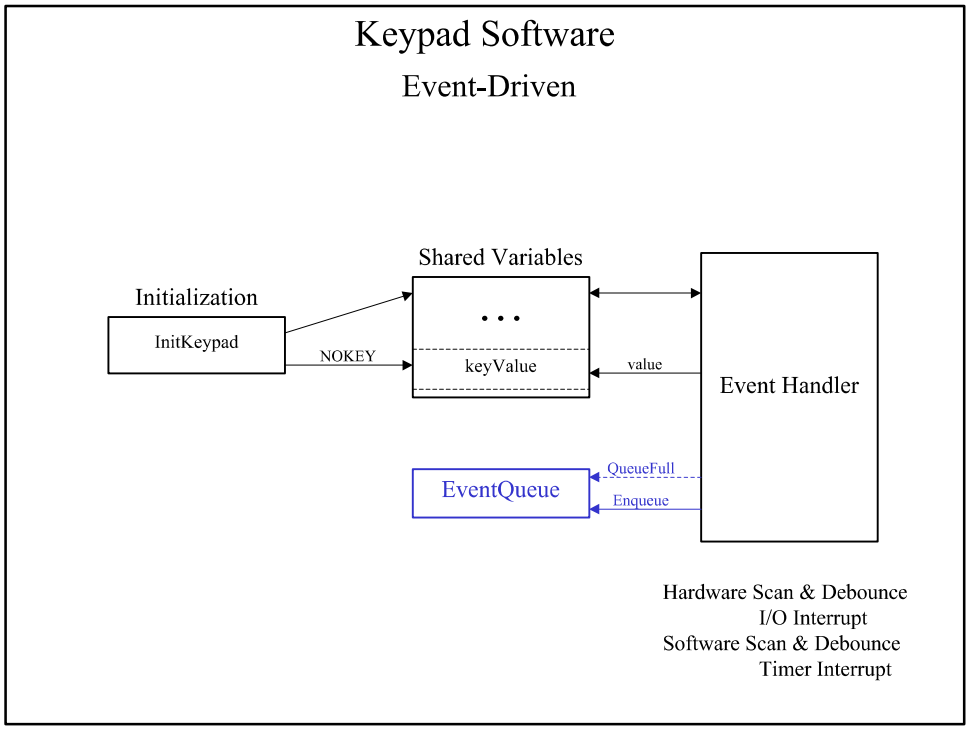
```
IF (switch up) THEN
        debounce_cntr ← DEBOUNCE_TIME
        repeat_rate ← SLOW_RATE
        repeat_cntr ← FAST_REPEAT_TIME
ELSE
        decrement debounce_cntr
        IF (debounce_cntr = 0) THEN
                set switchFlag
                debounce_cntr ← repeat_rate
        ELSE IF (debounce_cntr < 0) THEN
                debounce_cntr ← 0
        ENDIF
        decrement repeat_cntr
        IF (repeat_cntr = 0) THEN
                repeat_rate ← FAST_RATE
        ENDIF
ENDIF
```

Software Switch Debouncing Example

Alarm Clock Example




Keypad Software
Polled
Two Status Variables
Initialization
InitKeypad
Status
IsAKey
Access
GetKey
query
FALSE
FALSE
Shared Variables
• • •
downFlag
keyValue
TRUE
value
Event Handler
Polled
Single Status Variable
Hardware Scan & Debounce
I/O Interrupt
Software Scan & Debounce
Timer Interrupt
Initialization
InitKeypad
Status
IsAKey
Access
GetKey
query
NOKEY
NOKEY
Shared Variables
• • •
keyValue
value
Event Handler


Keypad Software
Event-Driven
Shared Variables
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Event Handler
EventQueue
QueueFull
Enqueue
Hardware Scan & Debounce
I/O Interrupt
Software Scan & Debounce
Timer Interrupt