6. MODES

SWITCH POSITION 1 determines HH:MM or MM:HH. With POSITION A *on* the pins, the timer displays MM:SS. OFF the pins is HH:MM. Positions 2,3,4,5 determine the other behaviours as in chart.

MODE	SWITCH POSITION					DESCRIPTION
	1	2	3	4	5	
1	L / R	R	R	R	R	MANUAL STOP - EARLY WARNING ON LED1
2	L / R	L	R	R	R	MANUAL STOP - CANNOT CANCEL
3	L / R	R	L	R	R	MECHANICAL TRIGGER WITH EARLY WARNING
4	L / R	L	L	R	R	PAUSING
5	L / R	R	R	L	R	AUTOMATIC STOP - WITH CANCEL
6	L / R	L	R	L	R	MANUAL STOP - EARLY WARNING ON LED2
7	L / R	R	L	L	R	GUARD DUTY
8	L / R	L	L	L	R	SRAY RINSE
9	L / R	R	R	R	L	MACHINE RUN TIME
10	L / R	L	R	R	L	ON DELAY
11	L / R	R	L	R	L	REPEATING
12	L / R	L	L	R	L	RINSE TANK FLUSH
13	L / R	R	R	L	L	FUTURE USE
14	L / R	L	R	L	L	FUTURE USE
15	L / R	R	L	L	L	FUTURE USE
16	L / R	L	L	L	L	FUTURE USE

TIMER - PROJECT DESCRIPTION - rev. 12.02

1. Mode 1 - MANUAL STOP, EARLY LED1
MSw has no effect.

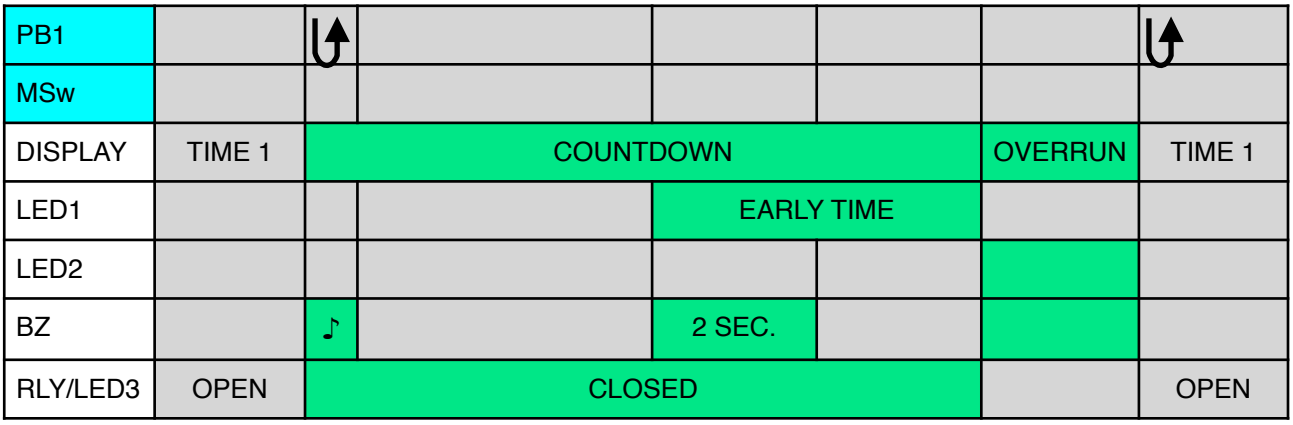


CHART 1.1 — STANDARD OPERATION

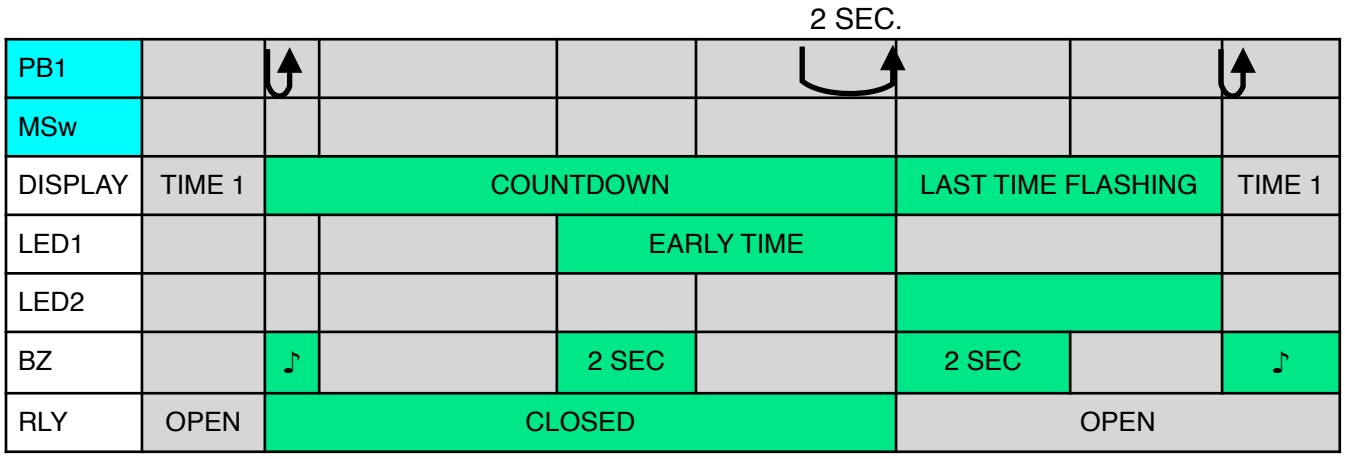


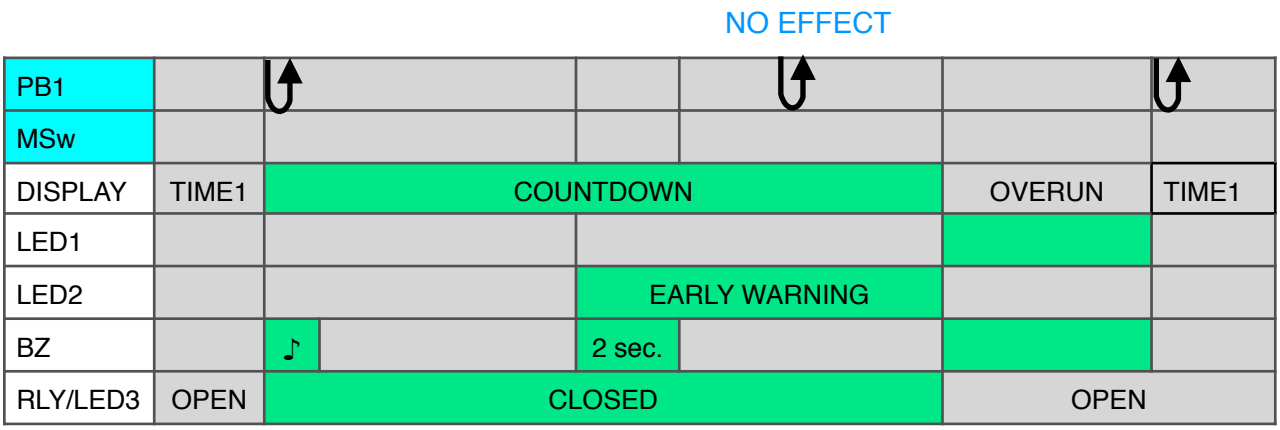
CHART 1.2 — CYCLE CANCELLED

PB1		↺	↺
MSw			
DISPLAY	00:00	COUNTUP	00:00
LED1			
LED2			2 sec.
BZ		♪	♪
RLY/LED3	OPEN	CLOSED	OPEN

CHART 1.3 — COUNT UP FROM ZERO

2. Mode 2 - MANUAL STOP, CANNOT CANCEL

- Same as cycle 1 but cycle cannot be cancelled with PB1.
- Setting “early warning” is the same as other modes. See mode 1 for details.
- MSw has no effect.



MODE 2.1 - CANNOT CANCEL

3. Mode 3 - MECHANICAL TRIGGER

- This is for applications where there is a sustained contact close, as by a mechanical switch.
- The cycle cannot be cancelled during timing. If the mechanical switch is interrupted, a warning is given. LED2 and BZ activate for 5 seconds initially, then chirp periodically, for the remainder of the cycle.

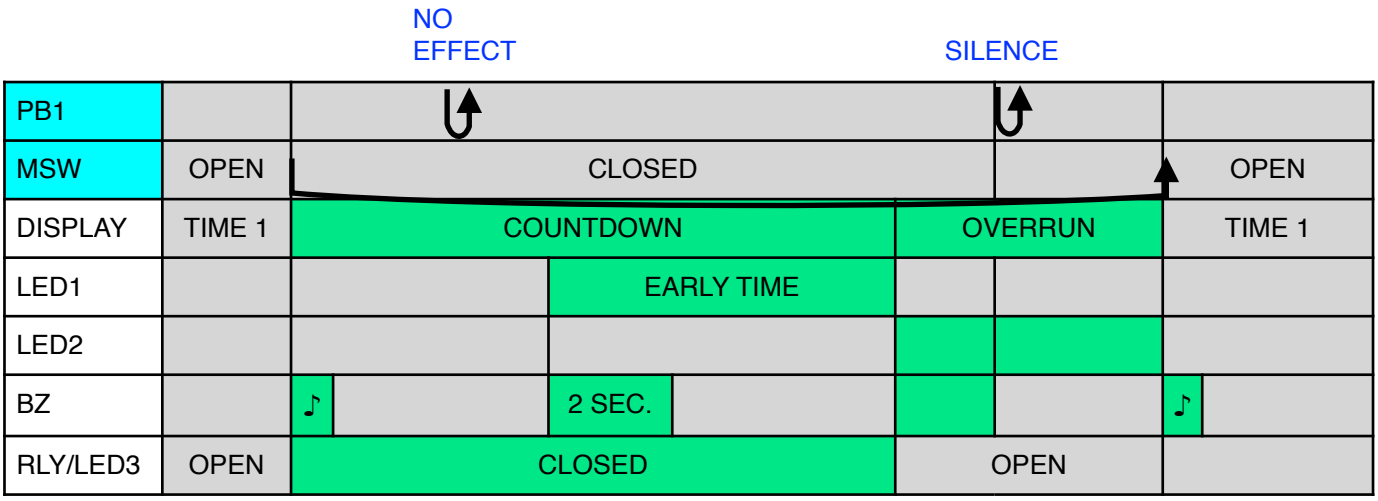


CHART 3.1 —NORMAL OPERATION

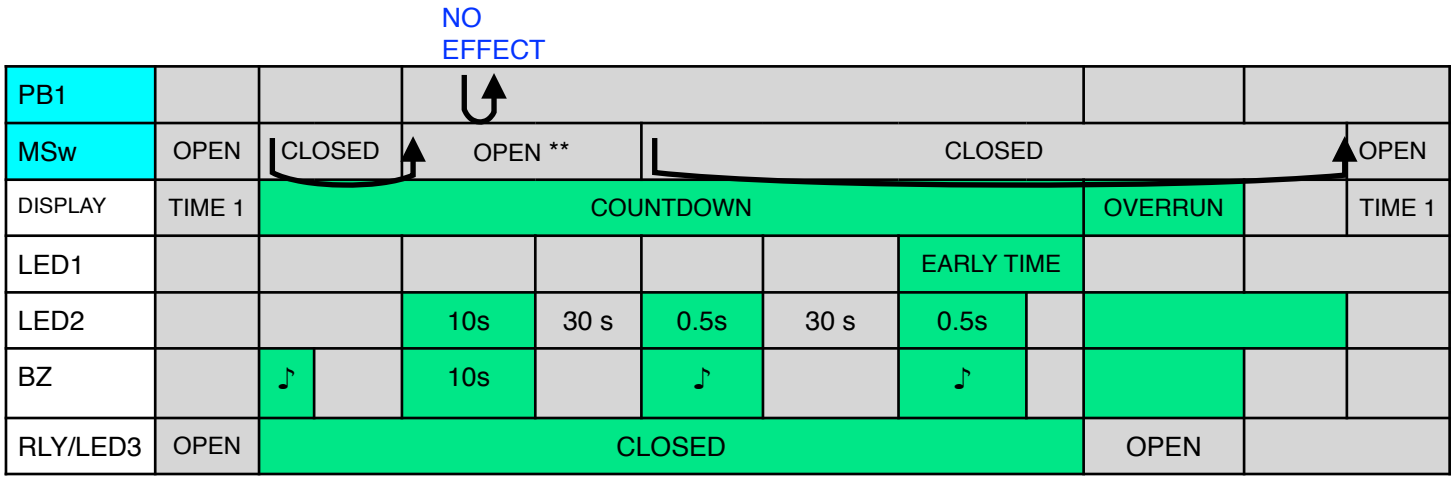


CHART 3.2 —MSw INTERRUPTED

** MSw interruption starts an alarm pattern on BZ and LED2. Continues even if contact restored.

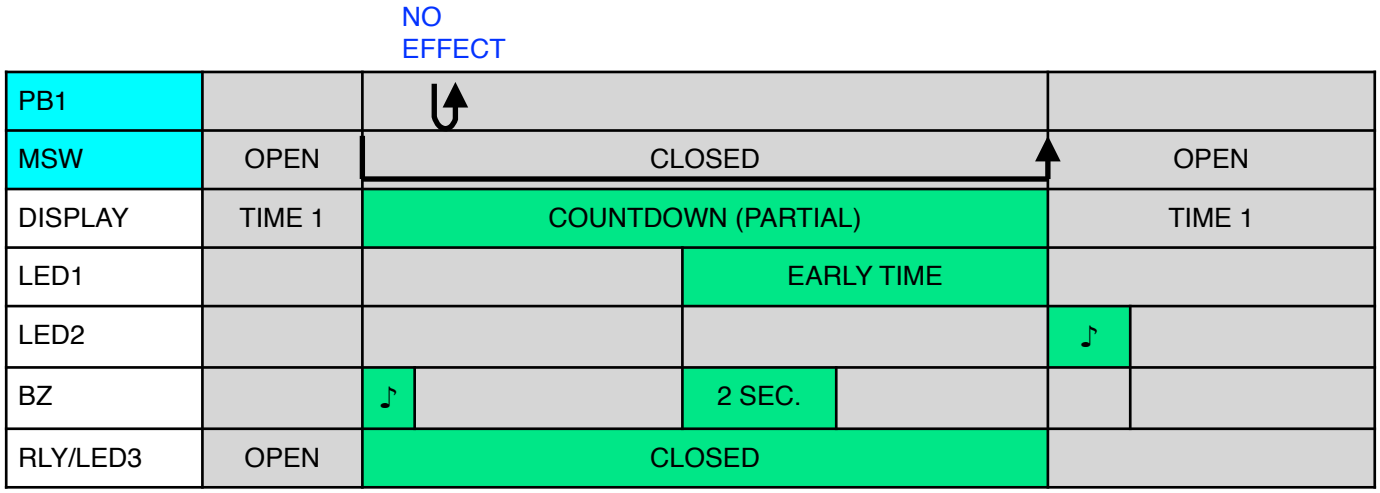


CHART 3.3 — MSw OPEN EARLY

4. Mode 4 - PAUSING

A. Counts down from a set value, or up from zero, but counting can be paused. When paused, the display flashes the time.

B. Count resumes by PB1 or MSw. (and display stops flashing) Can pause the timing an unlimited number of times. After the set time has elapsed, BZ and LEDs act as usual. If counting up from zero, counting just stops at 99:99

C. Count-up can be terminated when by holding PB1 for 2 seconds. MSw count is terminated by holding PB1 for 2 seconds with MSw "open".

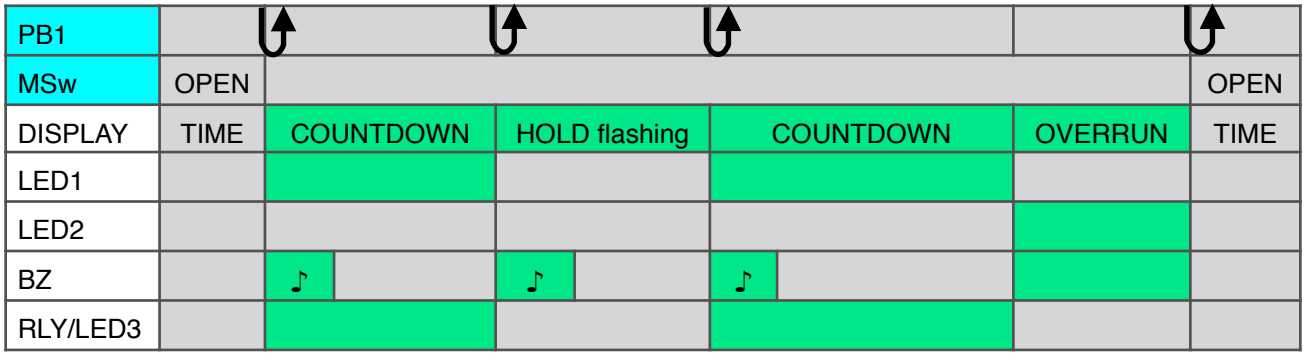


CHART 4.1 — PAUSING COUNT DOWN

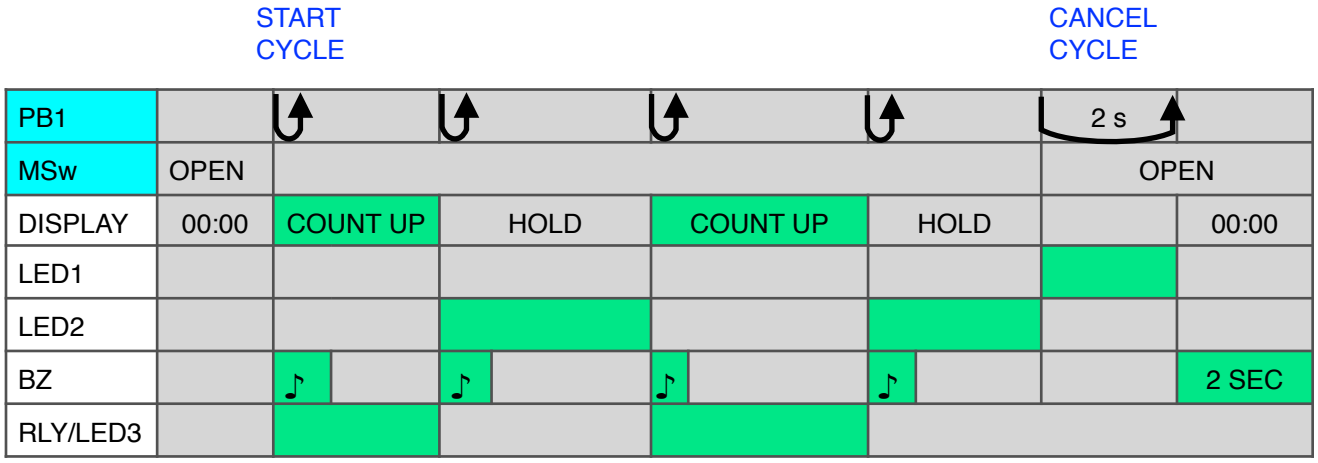


CHART 4.2 — PAUSING COUNT UP

5. Mode 5 -AUTO STOP WITH CANCEL

- After countdown, the cycle stops and resets automatically.
- LED2 is energized at the end of cycle for a variable time. (T2) This T2 counts down the time with flashing dots displayed.
- T2 It is set by holding all 3 buttons to enter a programming mode. (like other cycles)
- T2 default time after programming should be 4 seconds.
- T2 output is steady. (not flashing)
- Cycle can be started with either MSw *or* PB1. (gives more flexibility for short and long contact closes) MSw can be any length of time. If MSw exceeds T1, cycle runs to completion but can't reset until MSw re-opens.
- Cycle can be cancelled by holding PB1 for 2s.

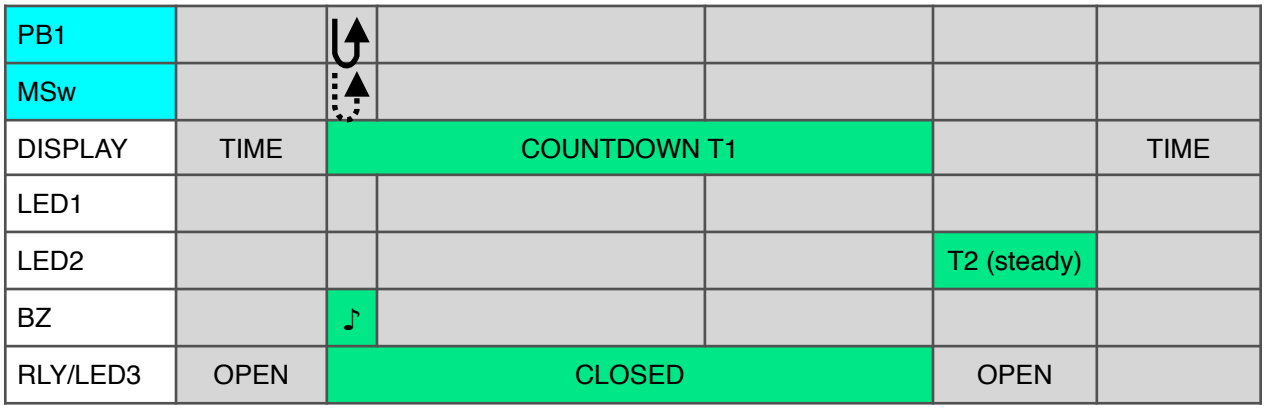


CHART 5.1 — AUTO-STOP STANDARD OPERATION

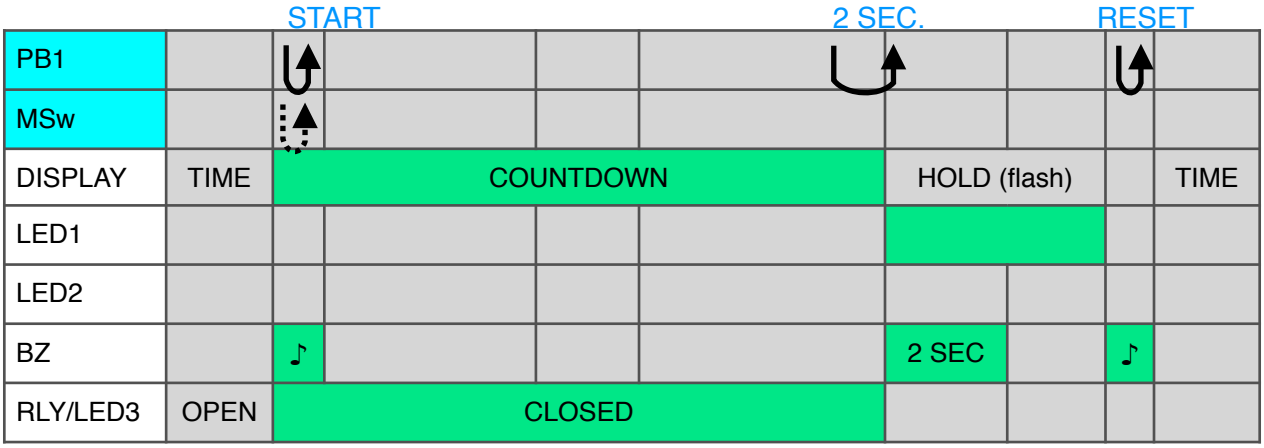


CHART 5.2 — WITH A CANCELLATION

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6. EARLY LED2

Identical to mode 1 except the behaviors of LED1 and LED2 are reversed from mode 1. See mode 1 for written description.

PB1		↺					↺
MSw	OPEN						
DISPLAY	TIME 1	COUNTDOWN				OVERRUN	TIME 1
LED1							
LED2				EARLY TIME			
BZ		♪		2 SEC.			
RLY/LED3	OPEN	CLOSED				OPEN	

CHART 6.1 - EARLY LED2

PB1		↺			2 SEC.			↺
MSw	OPEN							
DISPLAY	TIME 1	COUNTDOWN				LAST TIME FLASHING		TIME 1
LED1								
LED2				EARLY TIME				
BZ		♪		2 SEC		2 SEC		♪
RLY/LED3	OPEN	CLOSED				OPEN		

CHART 6.2 - EARLY LED2 WITH CANCELLATION

PB1		↺	↺
MSw	OPEN		
DISPLAY	00:00	COUNTUP	00:00
LED1			
LED2			
BZ		♪	♪
RLY	OPEN	CLOSED	OPEN

CHART 6.3 — COUNT UP FROM ZERO

7. Mode7 - GUARD DUTY

- During countdown, the time is reset to the starting value anytime PB1 is pressed. If set time elapses before this, then LED2 and relay activate. (this is like the doomsday counter on the TV show “Lost”)
- Cycle starts when MSw is closed. If timer powers up with MSw already “closed”, then countdown starts. (not necessary to press PB1 like previous firmware revision)
- Cycle can only be stopped by disconnecting power, or by opening MSw
- Setting the “early warning” time is set the same as other modes. (holding 3 buttons simultaneously)

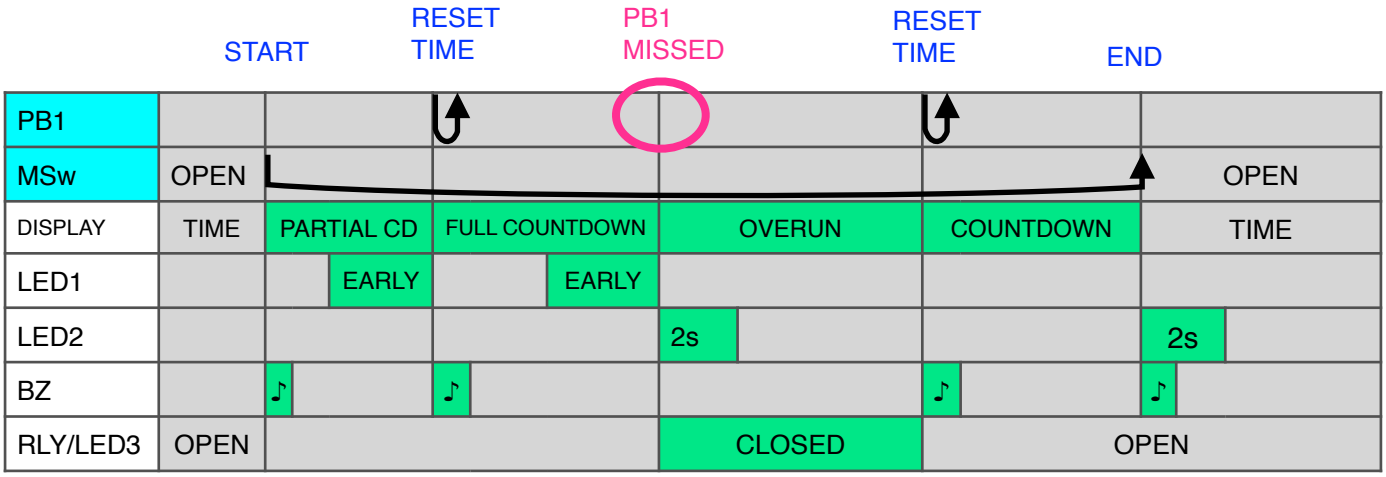

CHART 7 - GUARD DUTY

8. Mode 8 - SPRAY RINSE

- Designed to activate a spray rinse at the end of a cycle. If contact with a N.O proximity sensor is closed the cycle starts. The sensors will be connected to PB input.
- When a time cycle is activated, the relay close is delayed by TIME2, then relay closes for TIME1.
- TIME2 is set in the same way as the “early warning” in mode 1. (Hold down all three buttons etc.)
- After programming, the default times should be TIME2= 5.00 seconds, TIME1= 10.00 seconds.
- DIP switch 1 is not used. (the only display resolution is minutes:seconds)

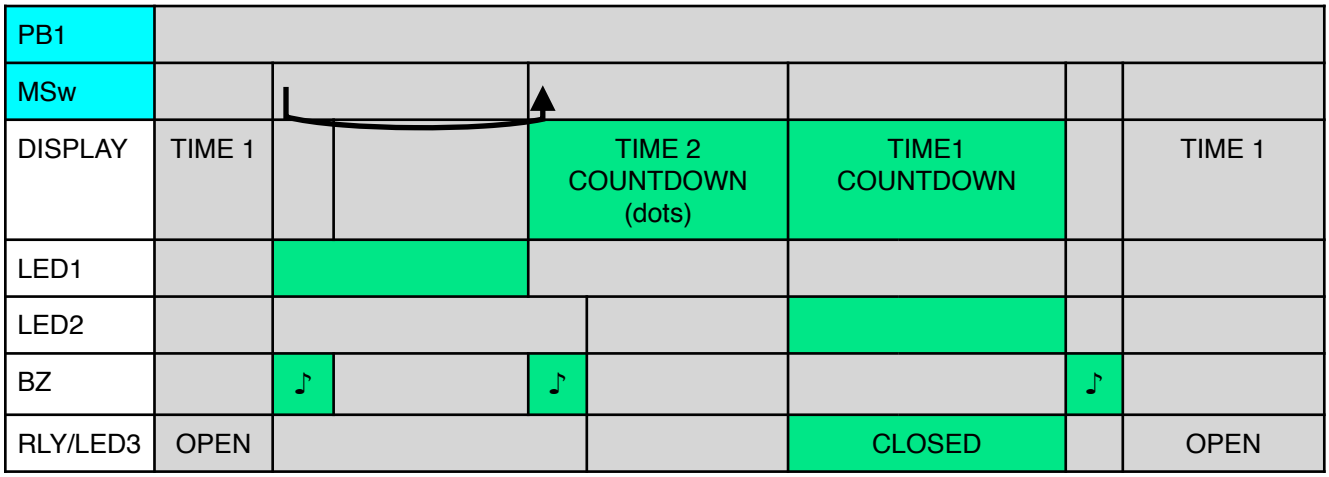

CHART 8.1 -SPRAY RINSE

9. Mode 9 - MACHINE RUN TIME

- Purpose: to track running hours on a machine.
- Counting starts when triggered by MSw, stops when MSw is off. (chart 9.1)
- Counting can also be controlled by presence/absence of power. (chart 9.2)
- PB1 immediately resets time. (like guard duty cycle #7)
- If time starts at zero, then it counts up with no alarm. In this case there is no alarm to silence, so PB1 resets time only.
- Time can be also reset *before* the countdown has elapsed.
- This will only be used with line power. (not 9V battery)

PWR	reset								
PB1							↺		
MSw		┗	┛ OPEN	┗	┛ OPEN		┗		
DISPLAY	SET	COUNTDN	HOLD	COUNTDN	OVERRUN	HOLD	OVERRUN	SET	CNTDN
LED1									
LED2									
BZ		♪	♪	♪	2 s †	♪	♪	♪	
RLY		CLOSED		CLOSED	OPEN			CLOSED	

CHART 9.1 - MACHINE RUNTIME

PWR		reset							
PB1							↺		
MSw	┗								┛
DISPLAY	-	SET	COUNTDWN (partial)	-	LAST TIME	COUNTDN (complete)	OVERRUN	SET	CNTDWN
LED1									
LED2									
BZ		♪			♪		2 s	♪ †	♪
RLY		CLOSED			CLOSED			CLOSED	

CHART 9.2 - MACHINE RUNTIME (intermittent power)

† 500ms BZ chirp every 5 minutes after countdown is complete, while unit is counting. (not while idle)

10.Mode 10 - RELAY DELAY

- Ability to set a delay time (T2) before a countdown with relay close begins (T1).
- When the programmed “delay time” T2 is over, then countdown T1 begins.
- T2 displays with dots displayed on the bottom of the screen to differentiate it from T1.
- Delay time (T2) is programed by holding down 3 buttons (PB1, PB2, PB3) for 5 seconds. (like programming the “early warning” in mode 1 and 6.)
- Cycle can be cancelled cycle by holding PB1 down 2s. (whether started by PB1 or MSw) If started by MSw, it can be any length of time.
- If MSw does not re-open before the end of the cycle, the cycle continues to completion anyway.

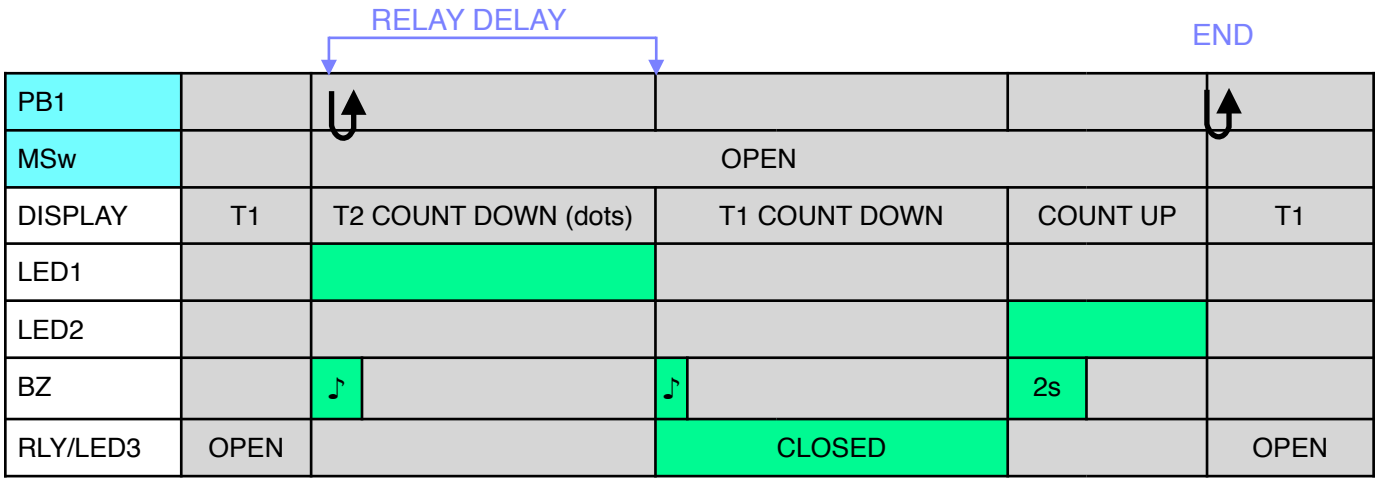

CHART 10.2 - CYCLE 10 (PB OPERATION)

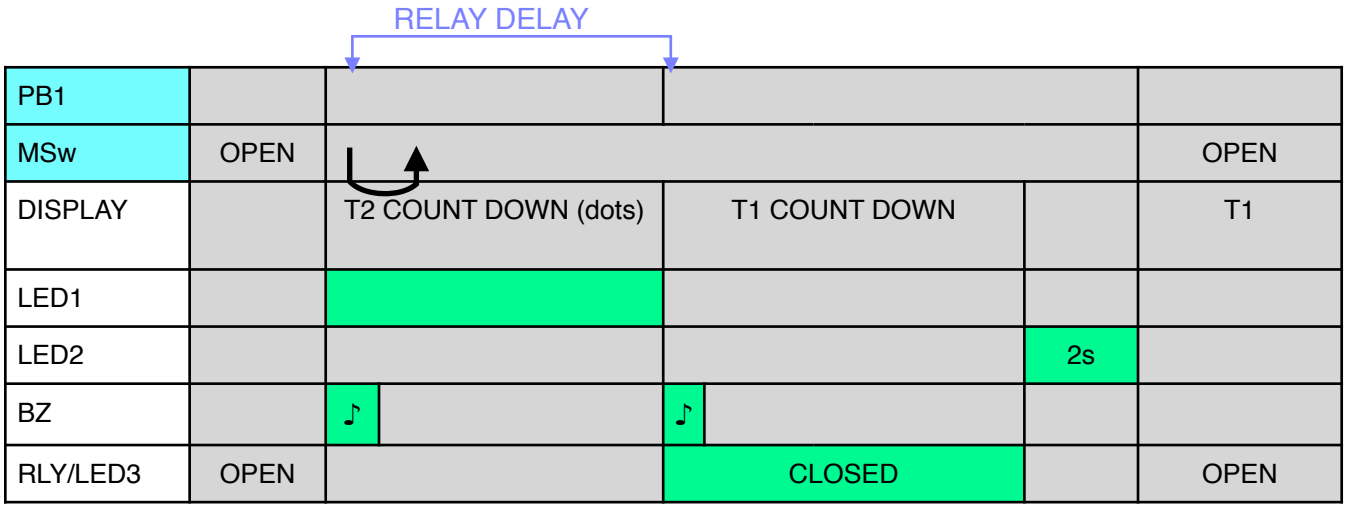

CHART 10.3 - CYCLE 10 (MSW OPERATION - MOMENTARY)

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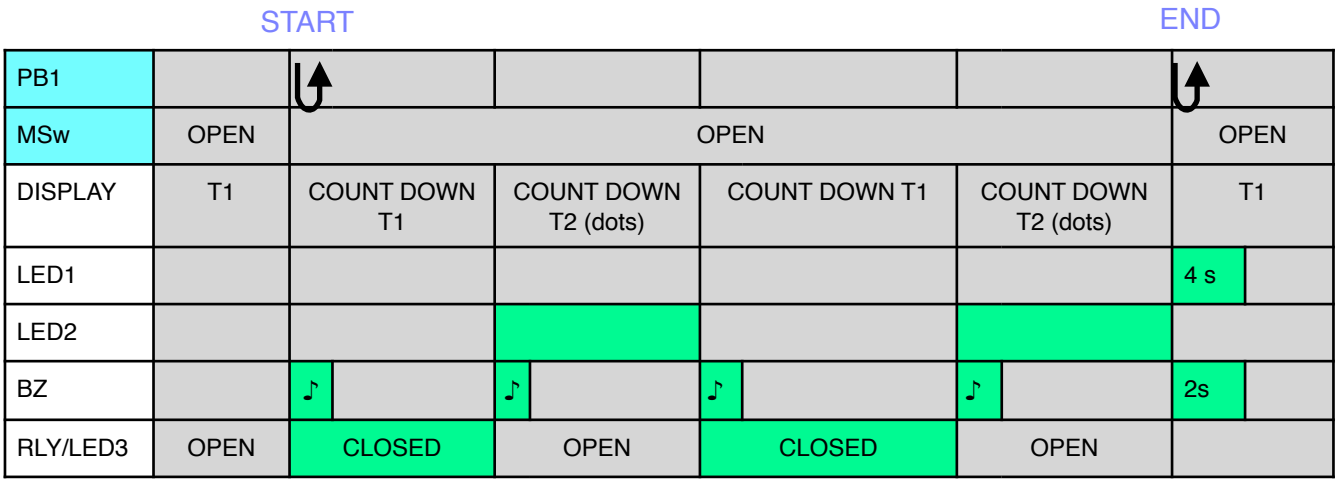
11.Mode 11 REPEAT

- Once activated, the timer will have a repeating behavior until deactivated. Timer can be activated either by MSw or PB1.
- The “interval time” or T2 is set by holding down all three buttons like the “early warning” time in other mode
- Dots displayed while counting T2.
- Cycle can be activated by either PB1 or MSw. (whichever happens first) If MSw closes during a PB1 countdown there is no effect.



CYCLE 11.1 - ACTIVATED BY PB1

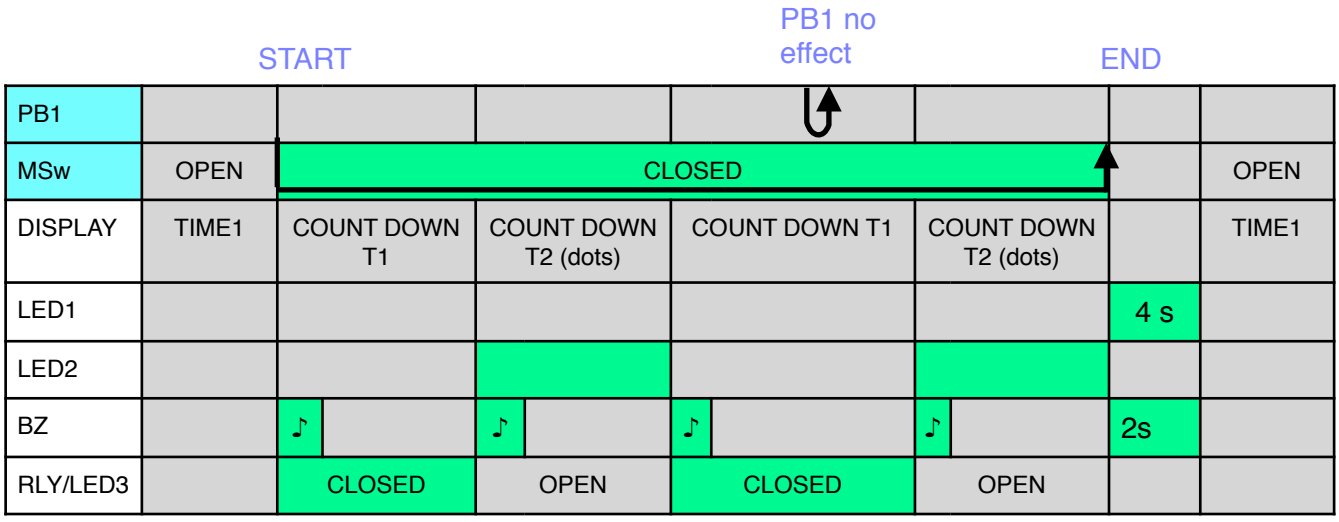


CHART 11.2 ACTIVATED BY MSw

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12.Mode 12 RINSE TANK FLUSH

- After the countdown, the relay closes for a second programmed time to flush a rinse tank. (T1)
- Programming T2 is done by holding 3 buttons for 5s to enter a programming mode. (same as some other programs)
- MSw inputs allow timer to run from a sustained contact close instead of momentary PB1. (so a cycle can be started either way.
- When running from pushbutton, cycle can be cancelled at any point by holding PB1 for two seconds; display will then flash and hold display when cancelled. Another PB1 press resets time to set time. (there is no rinse time in this case)
- Bottom dots display steady (not flashing) as time T2 counts down.

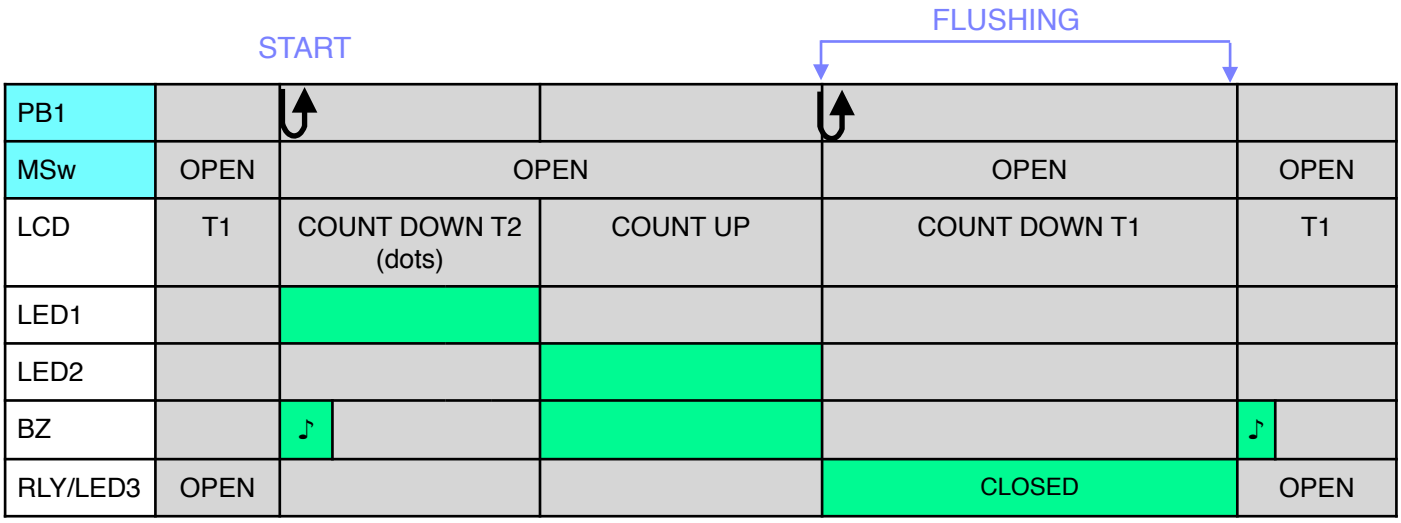

CHART 12.1 - PB1 OPERATION

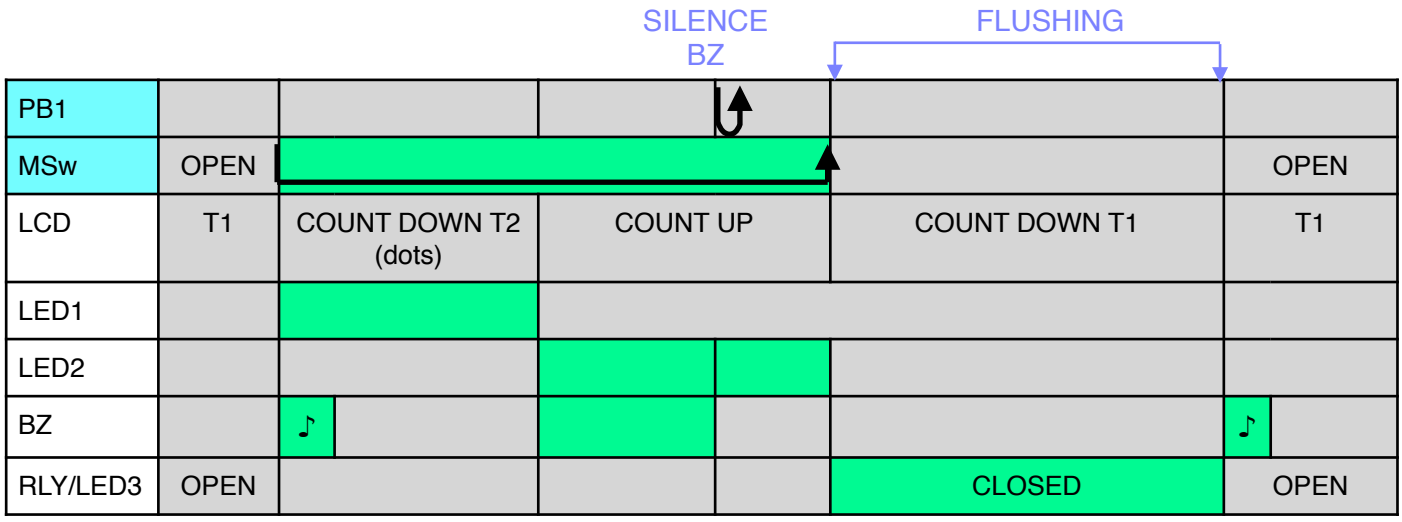

CHART 12.2 - MSw NORMAL OPERATION

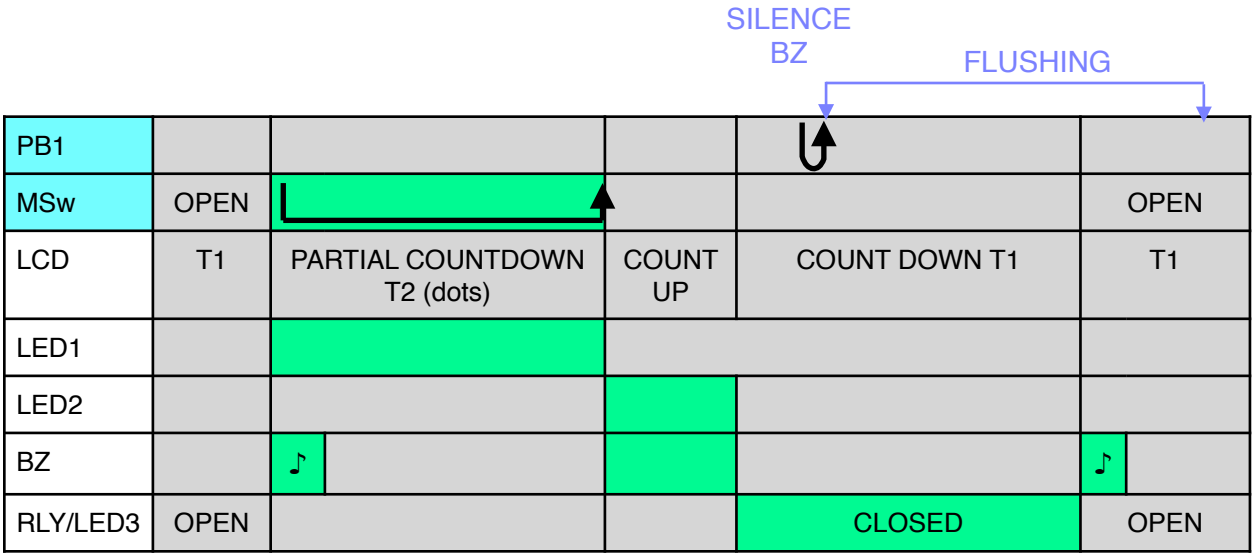

CHART 12.3 - MSw EARLY STOP

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