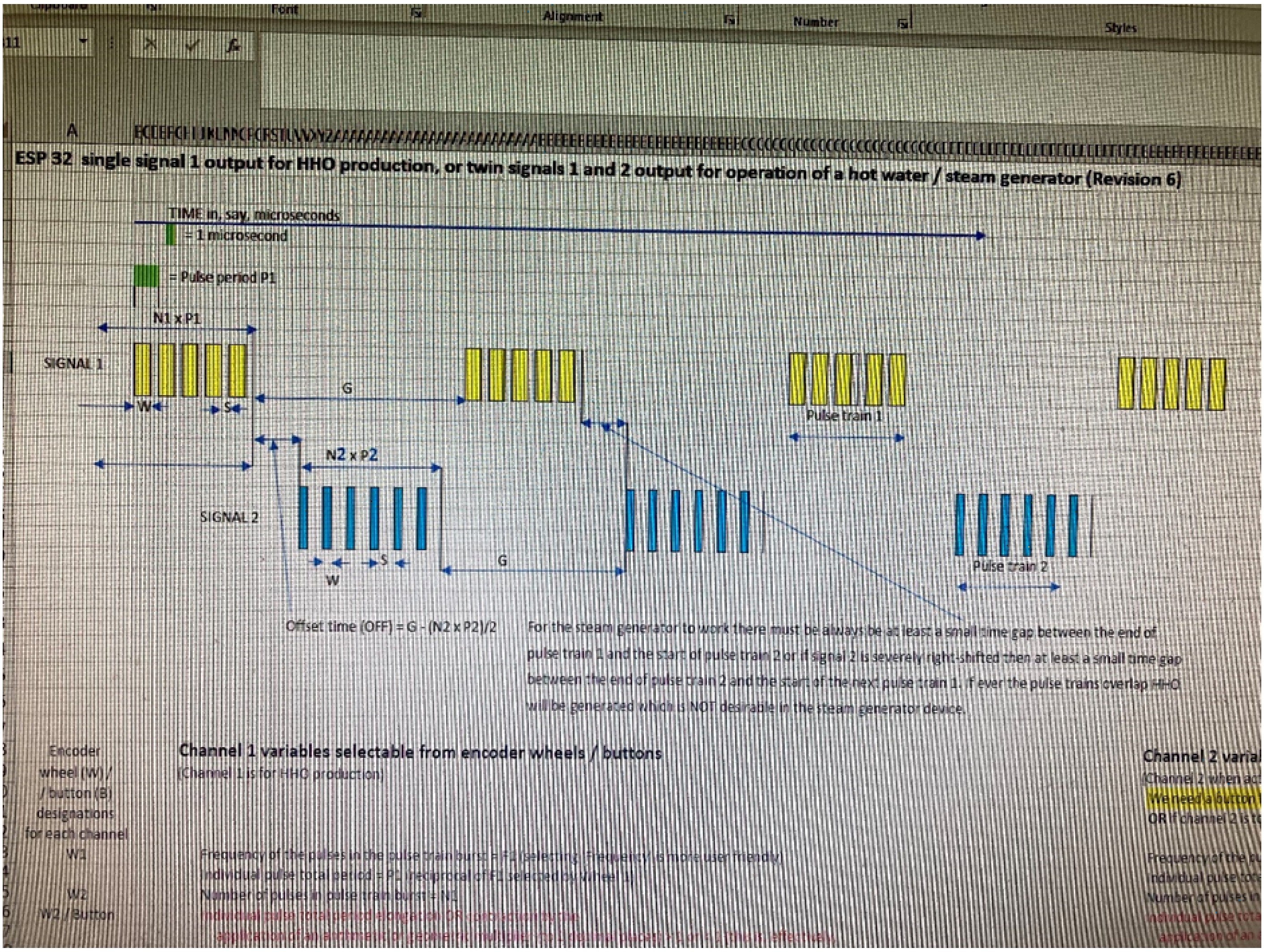
ESP32 microcontroller programming principles for operation of steam resonator



Encoder wheel (W) / / button (B) designations for each channel	**Channel 1 variables selectable from encoder wheels / buttons**
	(Channel 1 is for HHO production)
W1	Frequency of the pulses in the pulse train burst = F1 (selecting 'Frequency' is more user friendly)
	Individual pulse total period = P1 (reciprocal of F1 selected by Wheel 1)
W2	Number of pulses in pulse train burst = N1
W2 / Button	Individual pulse total period elongation OR contraction by the
	application of an arithmetic or geometric multiplier (to 2 decimal places) > 1 or < 1 (this is, effectively,
	stepwise non-random decreasing or increasing frequency modulation)
	Note: Pulse on time equates to pulse duty cycle expressed as a % of individual pulse total period
W3	Pulse duty cycle % of each individual pulse = D1 (selectable from 1 to 99%)
W3 / Button	Pulse duty cycle % granular selection (finer than 1%)
W4	Pulse duty cycle % elongation OR contraction by the application of an arithmetic or
	geometric multiplier (to 2 decimal places) either > 1 or < 1
	If the duty cycle % multiplier is set to any value other than 1, then within each consecutively growing
	or shrinking pulse total period (that is if a multiplier has been applied to total pulse period) the duty cycle % of each
	consecutive pulse can also be made to grow or shrink
	If, however, this duty cycle % multiplier is set to 1 and pulse total period elongation or contraction has been selected,
	by the application of a pulse total elongation or contraction multiplier
	then *the duty cycle* of each consecutively growing or shrinking pulse period will remain constant at the value selected
W5	Pulse voltage threshold value = T1, variable from 0 to 4V?? in 0.1V ?? Increments (ensures a minimum voltage is maintained
	if amplitude above threshold is going to be varying because of the application of a multiplier)
W6	Pulse voltage amplitude (above T1 threshold voltage) = A1 variable from 4V?? to V?? in 0.1V ?? increments)

W7	Gate (off) time = G.
W7 / Button	Gate (off) time elongation OR contraction by the application of an arithmetic or
	geometric multiplier (to 2 decimal places) either > 1 or < 1
	This Gate (off) time multiplier can only be used for channel 1 and HHO production. (If this function were
	also applied to channel 2 when it has been turned on for steam resonator operation, the overlapping
	of channel 1 and channel 2 pulse trains could occur causing HHO to be produced during
	steam resonator operation
	The problem of signal overlapping is even more likely if, by application of a multiplier on either or both
	channels, variable elongation or contraction is being applied to pulse total period and / or if the total
	pulse period has been randomised

Channel 2 variables selectable from encoder wheels / buttons
(Channel 2 when activated in addition to channel 1 is for steam generator operation)
We need a button that copies all channel 1 signal characteristics and assigns them to channel 2, so that the signals are identical.
OR if channel 2 is to be separately variable in all of the ways that channel 1 is, then we need all the following:-
Frequency of the pulses in the pulse train burst = F2 (selecting 'Frequency' is more user friendly)
Individual pulse total period = P2 (reciprocal of F2 selected by Wheel 1)
Number of pulses in pulse train burst = N2
Individual pulse total period elongation OR contraction by the
application of an arithmetic or geometric multiplier (to 2 decimal places) > 1 or < 1 (this is, effectively,
stepwise non-random decreasing or increasing frequency modulation)
Note: Pulse on time equates to pulse duty cycle expressed as a % of individual pulse total period
Pulse duty cycle % of each individual pulse = D2 (selectable from 1 to 99%)
Pulse duty cycle % granular selection (finer than 1%)
Pulse duty cycle % elongation OR contraction by the application of an arithmetic or
geometric multiplier (to 2 decimal places) either > 1 or < 1
If the duty cycle % multiplier is set to any value other than 1, then within each consecutively growing
or shrinking pulse total period (that is if a multiplier has been applied to total pulse period) the duty cycle % of each
consecutive pulse can also be made to grow or shrink
If, however, this duty cycle % multiplier is set to 1 and pulse total period elongation or contraction has been selected,
by the application of a pulse total elongation or contraction multiplier
then *the duty cycle* of each consecutively growing or shrinking pulse period will remain constant at the value selected
Pulse voltage threshold value = T2, variable from 0 to 4V?? in 0.1V ?? Increments (ensures a minimum voltage is maintained
if amplitude above threshold is going to be varying because of the application of a multiplier)
Pulse voltage amplitude (above T2 threshold voltage) = A2 variable from 4V?? to V?? in 0.1V ?? increments)

Gate (off) time = G. The value of this variable would have to be be THE SAME for channel 1 to avoid pulse trains in each channel overlapping one another at some "compound beat frequency" nodes.

Gate (off) time elongation OR contraction would have to be achieved by the application of the same arithmetic or geometric multiplier as applied to channel 1 (to 2 decimal places) either > 1 or < 1

A different value Gate (off) time multiplier cannot be used on this channel 2. If a multiplier function different from channel 1 were also applied here to channel 2 when it has been turned on for steam resonator operation, the overlapping of channel 1 and channel 2 pulse trains could occur causing HHO to be produced during steam resonator operation

The problem of signal overlapping is even more likely if, by application of a multiplier on either or both channels, variable elongation or contraction is being applied to pulse total period and / or if the total pulse period has been randomised

Pulse amplitude variation is not possible to produce on the output signal of an ESP32 but may be desirable as input to the primary and onto the cell

Pulse voltage amplitude above threshold voltage increasing OR decreasing by the application of an arithmetic or geometric multiplier (to 2 decimal places) either > 1 or < 1

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geometric multiplier (to 2 decimal places) either > 1 or < 1

Regarding the use of multipliers to increase or decrease, either arithmetically or geometrically, the ESP32 output values of pulse voltage amplitude (above any set threshold voltage), whilst this option can be included it will affect ONLY the ESP32 output signals to the cell / steam resonator driver circuits. As such therefore, it will have limited, if any, impact upon the amplitudes of the pulses reaching the primary coil. If we wish to dramatically affect pulse amplitudes acting on the primary to make them vary between a voltage of 0V and 60V we will have to think of another way of achieving that.

Option to set individual values for the voltage amplitude (above T1 threshold voltage) of each of a maximum of 10 pulses
Would it perhaps be possible to "draw" the amplitude profile of 10 successive impulses in Audacity and then import the values generated and apply those valus to the ESP32 pulse train?

Option to set individual values for the voltage amplitude (above T1 threshold voltage) of each of a maximum of
Would it perhaps be possible to "draw" the amplitude profile of 10 successive impulses in Audacity and then import the values generated and apply those valus to the ESP32 pulse train?

Again, if we do assign individual and different values to the voltage amplitudes of each pulse (above any set threshold voltage) forming a train of pulses leaving the ESP32 to enter the cell / steam resonator driver circuits, they may have limited, if any impact upon the pulses reaching the primary coil
If we wish to dramatically affect pulse amplitudes acting on the primary to make them vary between a voltage of 0V and 60V we will have to think of another way of achieving that.

If the same and UNVARYING Gate (off) time G is applied to both channels AND no multipliers are enacted on either channel, then a helpful limiting function could be invoked to prevent signal 1 and signal 2 overlapping like this:-

If G is < (N**2** + 2) x P2 then signal 2 is to be automatically disabled and is prevented from being generated at all. This is a safe way of avoiding the pulse trains in both channels overlapping eachother

If G is > (N**2** + 2) x P2 then signal 2 is automatically enabled and is allowed to be generated.

	OFFSET FUNCTION (to ensure pulse trains on channel 2 happen BETWEEN pulse trains on channel 1)
W8	Offset time = OFF = (0 to 99%) x ((G - (N**2** x P**2**)/2)
	(button?) Offset time On or Off

TYPES OF MULTIPLIERS TO ELONGATE OR CONTRACT THE VALUES OF PULSE TOTAL PERIOD, PULSE DUTY CYCLE %, AND GATE (OFF) TIME

INCREASING MULTIPLIERS

***increase* arithmetically** above the set value of the variable in equal steps for which a step value (to 2 decimal places) can be selected

***increase* geometrically** above the set value of the variable by consecutively applying a geometrically *growing* multiplier (the initial value of which multiplier can be set manually *above* 1.00 to 2 decimal places) to maximum value of say, 5

DECREASING MULTIPLIERS

***decrease* arithmetically** below the set value of the variable in equal steps for which a step value (to 2 decimal places) can be selected

Limiting function : If as a result of applying a decreasing step value the value of the variable would reach zero, a condition needs to be se
such that if the value of the variable becomes lower than 1%, say, of the variable value initially set, then the application of the multiplier stops being applied to any subsequent pulses left in the pulse train

decrease geometrically below the set value of the variable by consecutively applying a geometrically *decreasing* multiplier (the initial value of which multiplier can be set manually *below* 1.00 to 2 decimal places)

Limiting function : If as a result of applying a geometrically *decreasing* step value the value of the variable would reach zero, a condition n
such that if the value of the variable becomes lower than 1%, say, of the variable value initially set, then the application of the geometrically *decreasing* multiplier stops being applied to any subsequent pulses left in the pulse train

RANDOMIZATION OPTIONS

Individual pulse total period (P1 or P2 or both) randomization between 1% of the value of variable set and 100% of the value of the variable set.

This should override and replace any application of elongation or contraction multipliers (arithmetic or geometric) that may have been applied to the pulse period (P1 or P2 or both)

Whatever duty cycle % has been selected the same % will be applied to each randomly generated pulse period

unless of course the duty cycle % (D1 or D2 or both) has also been randomized, in which case the chaos of the signals will be further enhanced !!!

Duty cycle % (D1 or D2 or both) randomization between 1% of the value of variable set and 100% of the value of the variable set.

This must override and replace any application of elongation or contraction multipliers (arithmetic or geometric) that may have been applied to the duty cycle % (D1 or D2 or both)

Whatever pulse total period has been selected the same total pulse period will be maintained but each pulse will have random duty cycles

unless of course the pulse total period (P1 or P2 or both) has also been randomized, in which case the chaos of the signals will be further enhanced !!!

Gate (off) time G randomization between 1% of the value of variable set and 100% of the value of the variable set.

This randomization can only be applied to one channel at a time otherwise uncontrolled signal clashing will occur

This must override and replace any application of elongation or contraction multipliers (arithmetic or geometric) to the Gate (off) time (G).

Above T1 or T2 threshold voltage, pulse voltage amplitude (A1 or A2 or both) randomization between 1% of the value of variable set and 100% of the value of the variable set.

This must override and replace any application of elongation or contraction multipliers (arithmetic or geometric) that may have been applied to the pulse voltage amplitude (A1 or A2 or both)

Whatever pulse total period and duty cycle% have been selected the same pulse total period and duty cycle % will be maintained but each pulse will have random pulse voltage amplitudes

unless of course either the pulse total period (P1 or P2 or both) OR the duty cycle % have also been randomized, in which case the chaos of the signals will be further enhanced !!!

and unless of course both the pulse period (P1 or P2 or both) AND the duty cycle % have also been randomized, in which case the chaos of the signals will be EVEN FURTHER enhanced !!!

SIGNAL INVERSION OPTIONS

For each channel individually, ALL pulse trains can be selected to invert.

For each channel individually, a selectable number of pulse trains can be inverted between a selectabe number of non-inverted pulses

For each channel individually, pulse trains can be randomly inverted

Any of the above inversion options should be capable of being selected to operate even while any or all of the above signal variation features are operating

OPTION TO HAVE TYPE 10XA OPERATION WITH OVERLAPPING PULSES

This would be achieved by the overlapping of identical pulse trains on both channels (so no difference in pulse total period or duty cycle % and no multiplier applied to either of these variables) to create a combined single unipolar pulse train with Convergent Point "Q"

This could be done by firstly synchronising the signals on each channel and then, without any signal inversion options selected, apply an offset value that is the same as the pulse duty cycle % but which itself is variable from 1% to 100% of that pulse duty cycle percentage value.

OPTION TO KEEP EXISTING METHODOLOGY OF WIDTH (W) AND SPACE (S) ?

We may want to also keep the existing methodology of Width (W) and Space (S) ?

Geometrically increasing progressions should look like this:

Apply a multiplier (M1 or M2), say, **1.2** to first pulse selected amplitude of, say, 1.5 (above T1 or T2 threshold voltage) would produce pulses like this:-

Initial amplitude selected (A1 or A2)	Pulse number N1or N2	Multiplier (M1 or M2) **1.2**	Amplitude value generated
1.5	1	1.2	1.8
	2	1.44	2.16
	3	1.728	2.592
	4	2.0736	3.1104
	5	2.48832	3.73248
	6	2.985984	4.478976

The above progression can be achieved by using the formula A x M^N

A more aggressive progression could be achieved using the formula A x M^N x 2^N-1

A fibonacci sequence could also be an interesting multiplier to apply to variables

Geometrically decreasing progressions should look like this:

Apply the SAME multiplier, say, **0.34** to first pulse selected amplitude of, say, 1.5 (above T1 or T2 threshold voltage) would produce pulses like this:-

Initial amplitude selected	Pulse number	Multiplier (M1 or M2) **0.34**	Amplitude value generated
1.5	1	0.34	0.51
	2	0.1156	0.1734
	3	0.039304	0.058956
	4	0.0133634	0.020045
	5	0.0045435	0.0068153
	6	0.0015448	0.0023172

The above progression can be achieved by using the formula A x M^N

A more aggressive progression could be achieved using the formula A x M^N x 2^N-1

A fibonacci sequence could also be an interesting multiplier to apply to variables

Revision #4
Created 14 June 2023 06:28:30 by Paul Butcher
Updated 14 June 2023 07:15:07 by Paul Butcher