Wireless Programmable Pace Clock
Instruction Set
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Instruction Format

M	T	IF1	IF0	M4	M3	M2	M1	M0
	7	6	5	4	3	2	1	0

T

1 : Type bit is always 1 for bytes containing instructions.
Instructions are always 1 byte long, but may use data contained in the next one or two bytes.

IF1,IF0

11 : Jump to routine specified in bits M[4:0].
Routine numbers are displayed as 1-indexed, numbered 1..32 on the display. M[4:0] is 0..31. The user thinks in a 1-indexed sense.

10 : Set outer loop register ROUT to value specified and activate it.
Program performs [4:0] + 1 loops since zero loops is illogical.
If the loop register is already activated, this instruction does nothing. This way, this command may serve as a target for loop-back instructions.

01 : Set inner loop register RIN to value specified and activate it.
Program performs [4:0] + 1 loops since zero loops is illogical.
If the loop register is already activated, this instruction does nothing. This way, this command may serve as a target for loop-back instructions.

00 : None of the above. Instruction is specified by the rest of the bits

M4:M0

if IF1,IF0 != 00

xxxxx : Meaning depends on IF1,IF0. See above.

if IF1,IF0 == 00

00000 : Marks the beginning of a routine (workouts are stored sequentially)

00001 : Display clock in hours : minutes (acquired from off-chip)

00010 : Set clock.
Running a routine with this instruction prompts for user input. The secondary clocking chip is updated accordingly, as it may have drifted.

00011 : Prompt for routine number.

00100 : Start workout at scheduled time of day.
Prompt the user for the time of day to start workout (hours/minutes).
Displays clock until that time of day occurs, and then continues execution.

00101 : Programmed pause. Wait for user to advance.
Display freezes and blinks the colon until user advances.

00110 : Outer conditional loop-back.
The outer loop-register is first decremented then compared to zero. If it is zero, the loop-register is deactivated and execution continues to the next instruction or timer value.

If the decremented outer loop-register is greater than zero, execution goes to the nearest preceding outer loop-register set command then proceeds. This accomplishes a loop-back of the outer loop since the set command will not modify the loop-register if the register is activated.

00111 : Inner conditional loop-back.
The inner loop register is first decremented then compared to zero. If it is zero, the loop-register is deactivated and execution continues to the next instruction or timer value.

If the decremented inner loop register is greater than zero, execution goes to the nearest preceding inner loop-register set command then proceeds. This accomplishes a loop-back of the inner loop since the set command will not modify the loop-register if the register is activated.

01000 : Screen test / display demonstration.

01001 : Display number of cycles remaining in the innermost activated loop.
Displays for approximately 1 second. Trailing timing interval in loop should be specified 1 second shorter for second-accurate timing if this display option is used at the loop footer.

10000 : Activate seconds : 10 milliseconds timer (count-up only).

Timing Format

	M	T	UD	C5	C4	C3	C2	C1	C0
		7	6	5	4	3	2	1	0

T

0 : Type bit is always 0 for bytes containing times (data)

UD

1 : Count up
0 : Count down

C5:C0

Hold an encoding of a number to display (0..63). Format is context dependent, but all times are stored as two consecutive bytes. Bit format is BCD (Binary Coded Decimal).

For timer/counter times, the format is that the first byte (at a lower EEPROM memory address) contains minutes, and the next byte (at the next highest EEPROM memory address) contains seconds. Both must be parsed to prepare the next timing interval.