# Overview

This document attempts to detail the instructions available and how to program the Timing Generator core. The document has two sections at the moment detailing the architecture of the timing generator and the instructions that are possible.

# Architecture

The timing generator acts as a micro-coded processor. Each instruction contains 16 payload bits which are output. By programming the core in a specific manner, the payload bits can toggle and control complex devices like CCD cameras.

# Timing Generator Instructions

These are the instructions supported by the core. A summary is provided at the end of the section.

## Instruction Details

This section is for details on a specific instruction.

### WAIT-TRANSITION

Description: This instruction triggers the timing generator to enter a tight loop observing on of the input lines until the selected edge occurs.

Opcode – 1000

Parameters:

* Input Select – the index of the input vector to observe
* Edge – A 1 denotes a rising edge must be observed, a 0 denotes a falling edge.

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|  | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Instruction | Opcode | | | | Instruction Data | | | | | | | | | | | | Payload Data | | | | | | | | | | | | | | | |
| JUMP | 0000 | | | | Rep | Alt Jmp | Jump Address | | | | | | | | | | User Defined | | | | | | | | | | | | | | | |
| REPEAT | 0001 | | | | Rep | Repeat Count | | | | | | | | | | |
| SET-A | 0010 | | | | Rep | Loop Count A | | | | | | | | | | |
| SET-B | 0011 | | | | Rep | Loop Count B | | | | | | | | | | |
| LOOP-A | 0100 | | | | Rep | 0 | Loop Address | | | | | | | | | |
| LOOP-B | 0101 | | | | Rep | 0 | Loop Address | | | | | | | | | |
| CALL | 0110 | | | | Rep | 0 | Call Address | | | | | | | | | |
| RETURN | 0111 | | | | Rep | Unused | | | | | | | | | | |
| WAIT-TRANSITION | 1000 | | | | Rep | Unused | | | | | | Input  Select | | | | Edge |
| *Reserved* | 1XX1 | | | | *Reserved* | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Reserved* | 1X1X | | | | *Reserved* | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Reserved* | 11XX | | | | *Reserved* | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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