

Sequence Examples for Common Trigger and Termination Actions

Four Images are used in this example. Each Image features an amplitude ramp to aid identification on an Oscilloscope trace.

Image1: 183pts, **Image2:** 201pts, **Image3:** 120pts, **Image4:** 100pts

SDIO0 output is applied towards the end of each image, for 10 or more points to aid observation.

Internal Image clock is set to 1000KHz.

Below is typical code to control a Sequence of Images in an Image Queue.....

```
seqMgr.StartSequenceQueue(SequenceManager::SeqConfiguration(
    SequenceManager::PointClock::INTERNAL,
    SequenceManager::ImageTrigger::CONTINUOUS),
    SequenceManager::ImageTrigger::CONTINUOUS);
Clock (Clock source for Image output),
    Options = EXTERNAL or INTERNAL
    ImageTrigger (Start image(s) within each sequence),
    Options = CONTINUOUS, EXTERNAL, HOST or POST_DELAY.
    ImageTrigger (Start Sequence(s) within queue)
    Options = CONTINUOUS, EXTERNAL, HOST or POST_DELAY.
```

Abbreviated in the following to: **Configuration:** ((INTERNAL, CONTINUOUS), (CONTINUOUS))

All examples use two sequences, loaded with two different images.

Sequence1

Image1 with 5 repeats (= 6 plays). Amplitude ramp 0-50%

Image2 with 6 repeats (= 7 plays). Amplitude ramp 100-0%

Sequence2

Image3 with 10 repeats (= 11 plays). Amplitude ramp 20-80%

Image4 with 11 repeats (= 12 plays). Amplitude ramp 90-70%

The iMS4 RF output behaviour will depend on the Trigger selection AND the Sequence Termination action.

```
SequenceTermAction::RECYCLE
SequenceTermAction::STOP_RECYCLE
SequenceTermAction::DISCARD
SequenceTermAction::STOP_DISCARD
SequenceTermAction::INSERT
SequenceTermAction::STOP_INSERT
SequenceTermAction::REPEAT
SequenceTermAction::REPEAT_FROM
```

For brevity we will limit this example to using RECYCLE and STOP-RECYCLE.

In the following Scope plots:

Yellow trace C1 = iMS4 J1 output. (Channel1 RF)

Magenta trace C2 = SDIO J7 output. (Programmed to change level towards the end of each image)

Green trace C4 = EXTERNAL trigger J10 input. (When used)

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Example 1.

Sequence1 **Termination: Stop -Recycle**

Sequence2 **Termination: Stop -Recycle**

Configuration: ((INTERNAL, CONTINUOUS), (CONTINUOUS))

First code run of **Configuration:()**

Output-A



Second code run of **Configuration:()**

Output-B



Subsequent code runs: Output-A > Output-B > Output-A > Output-B >

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Example 2.

Sequence1 Termination: **Recycle**
Sequence2 Termination: **Stop-Recycle**

Configuration: ((INTERNAL, CONTINUOUS), (CONTINUOUS))

First and subsequent code runs of **Configuration:()**



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Example 3.

Sequence1 Termination: Stop -Recycle

Sequence2 Termination: Recycle

Configuration: ((INTERNAL, CONTINUOUS), (CONTINUOUS))

First code run of **Configuration:()**

Output-A



Second and subsequent code runs of **Configuration:()**

Output-B



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Example 4.

Sequence1 Termination: **Recycle**
Sequence2 Termination: **Recycle**

Configuration: ((INTERNAL, CONTINUOUS), (CONTINUOUS))

First code run of **Configuration:()**

Runs (recycles) continuously, Seq1 > Seq2 > Seq1 > Seq2 > Seq1 > Seq2.....



Example 5. (Single External Triggers)

Sequence1 Termination: Stop -Recycle or Recycle
Sequence2 Termination: Stop -Recycle or Recycle

Set **Configuration:** ((INTERNAL, EXTERNAL), (EXTERNAL))

(J10 Trigger = one physical input to trigger both 'Images in Sequence' and 'Sequences in Queue')

For aid explanation, single Trigger pulses are applied, one at a time.

EXT trigger, Pulse #1 = start Sequence1 in the queue AND start Image1 in this sequence.

Output-C



EXT trigger, Pulses #2 ... #6 = Trigger Image1 repeats (5off)



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EXT trigger, Pulse #7 = start Image2 in Sequence1



EXT trigger Pulses #8...#13 = Trigger Image2 repeats (6off). Same scope plot as above.

- **IF** Sequence1 termination = **STOP and RECYCLE**, then further EXT triggers will do nothing. Run again **Configuration: ((INTERNAL, EXTERNAL), (EXTERNAL))** to progress to Sequence2.
- **IF** Sequence1 termination = **RECYCLE**, then the queue will progress to Sequence2 without further software code intervention.

EXT trigger, Pulse #(n+1) = start Sequence2 in queue AND start the first image in this sequence = Image3



EXT trigger, Pulses #(n+2)...(n+12) = Trigger each Image3 repeat (11off). Same scope plot as above.

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EXT trigger, Pulse #(n+13) = start Image4 in Sequence2



EXT trigger, Pulses #(n+14)...#(n+25) = Trigger each Image4 repeat (12off)
Same scope plot as above.

- **IF** Sequence2 termination = **STOP and RECYCLE**, then further EXT triggers will do nothing. Run again **Configuration: ((INTERNAL, EXTERNAL), (EXTERNAL))** to restart at Sequence1.
- **IF** Sequence1 Termination = **RECYCLE**, then the queue will recycle and start Sequence1. (go to Output-C)

Example 6. (Continuous External Triggers)

Sequence1 Termination: **Recycle**
 Sequence2 Termination: **Stop -Recycle**

Set **Configuration: (INTERNAL, EXTERNAL), (EXTERNAL)**



Will run and complete both sequences once for each code run of..

Configuration:((INTERNAL, EXTERNAL), (EXTERNAL))

Sequence1 Termination: **Recycle**
 Sequence2 Termination: **Recycle**

Runs (recycles) continuously, Seq1 > Seq2 > Seq1 > Seq2 > Seq1 > Seq2..... after first run of **Configuration: ((INTERNAL, EXTERNAL), (EXTERNAL))**



Example 6. (External Trigger applies to Sequence Only)

Sequence1 Termination: **Recycle**
 Sequence2 Termination: **Stop-Recycle**

Set **Configuration**: ((INTERNAL, CONTINUOUS), (EXTERNAL))

A single External trigger will run and complete both sequences in the queue.
 Image Trigger is continuous and Image Clock is Internal.



To repeat,

- Run **Configuration**:((INTERNAL, EXTERNAL), (EXTERNAL))
- Apply single Trigger

Sequence1 Termination: **Recycle**
 Sequence2 Termination: **Recycle**

Runs (recycles) continuously, Seq1 > Seq2 > Seq1 > Seq2 > Seq1 > Seq2..... after first trigger