

# Chapter 52 - Music-Synchronised Effects

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A simple demo loop advances by frames. A music-synchronised demo advances by musical time.

The supplied resonance .bas demo reads the MIDI playback position when it can, falls back to the machine timer when it cannot, and derives visual intensity from that time. The picture is still a VideoChip frame loop, but the section changes are driven by the soundtrack.

## 52.1 Music Time

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The key variables are:

```
500 F=0:A=0:Z=0:PM=0:RT0=PEEK32(&H000F075C)/1000000
520 RT=PEEK32(&H000F075C)/1000000:MP=PEEK32(&H000F0BB0)
530 IF MP>PM THEN TM=MP/44100:PM=MP:GOTO 560
540 TM=RT-RT0
```

MP is the MIDI playback sample position. When it advances, the demo uses it as the clock. If the player has not advanced yet, TM comes from the machine timer at \$F075C.

That fallback is important. A demo should keep moving while the audio engine starts or while a file is still settling.

## 52.2 Sections And Intensity

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The demo turns time into broad visual sections:

```
560 IN=0.12:TI=INT(TM*100)
570 IF TI>=4500 THEN IN=0.28
580 IF TI>=9000 THEN IN=0.55
590 IF TI>=15000 THEN IN=0.9
600 IF TI>=20000 THEN IN=0.22
610 IF TI>=21800 THEN GOTO 3700
```

IN is a density control. Low values keep the picture restrained. Higher values add brighter colours, more stars, stronger bars, and more motion.

TI is time in hundredths of a second. It makes section tests compact.

## 52.3 Pulses And Phrases

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Short note pulses become local variables:

```
1500 REM MIDI CHORD PULSE ENVELOPE FOR BARS
1505 PU=0:DR=0
1510 IF TI<62 THEN PU=30:DR=1
1512 IF TI>=88 THEN IF TI<142 THEN PU=16:DR=1
```

PU is a pulse amount. DR is a direction. Later drawing code uses them to push bars, change colours, and add short flashes.

Longer phrases use separate variables such as PB and PD. That separates a one-beat accent from a multi-bar build-up.

## 52.4 Timeline Rather Than Loop

The frame loop still exists:

```
910 BLIT MEMCOPY BB,FB,1228800
940 VSYNC
950 A=A+0.012+IN*0.026:IF A>6.28318 THEN A=A-6.28318
960 Z=Z+0.018+IN*0.04:IF Z>6.28318 THEN Z=Z-6.28318
970 GOTO 510
```

But the loop is now controlled by a timeline. The same code can draw calm sections and dense sections because IN, PU, PB, and PD change the parameters.

## 52.5 Why Demos Use Timelines

Music-synchronised demos are often timelines because music has form:

Musical event	Visual response
Start	Prepare a restrained scene.
First phrase	Introduce motion.
Build-up	Increase density and brightness.
Accent	Pulse bars, flashes, or scale.
Peak	Show the richest combination.
Ending	Fade out and stop cleanly.

The machine does not know those meanings. The programme creates them by mapping playback position to variables.

## 52.6 Limits

- MIDI position is measured in output samples, not in bars or beats.
- A fallback timer keeps motion alive, but it is not musically exact.
- Avoid long blocking work after reading the music clock.
- Keep the variables small and named. A timeline becomes unreadable if every drawing routine reads the player position directly.

Chapter 53 uses the same timing variables to polish the presentation with copper bands, overlays, and foreground elements.