

# Piano Hero

A Learning Game for my Final Project

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Teaching kids an instrument is hard



# Games help kids learn



Math Blaster



Mavis Beacon Teaches Typing

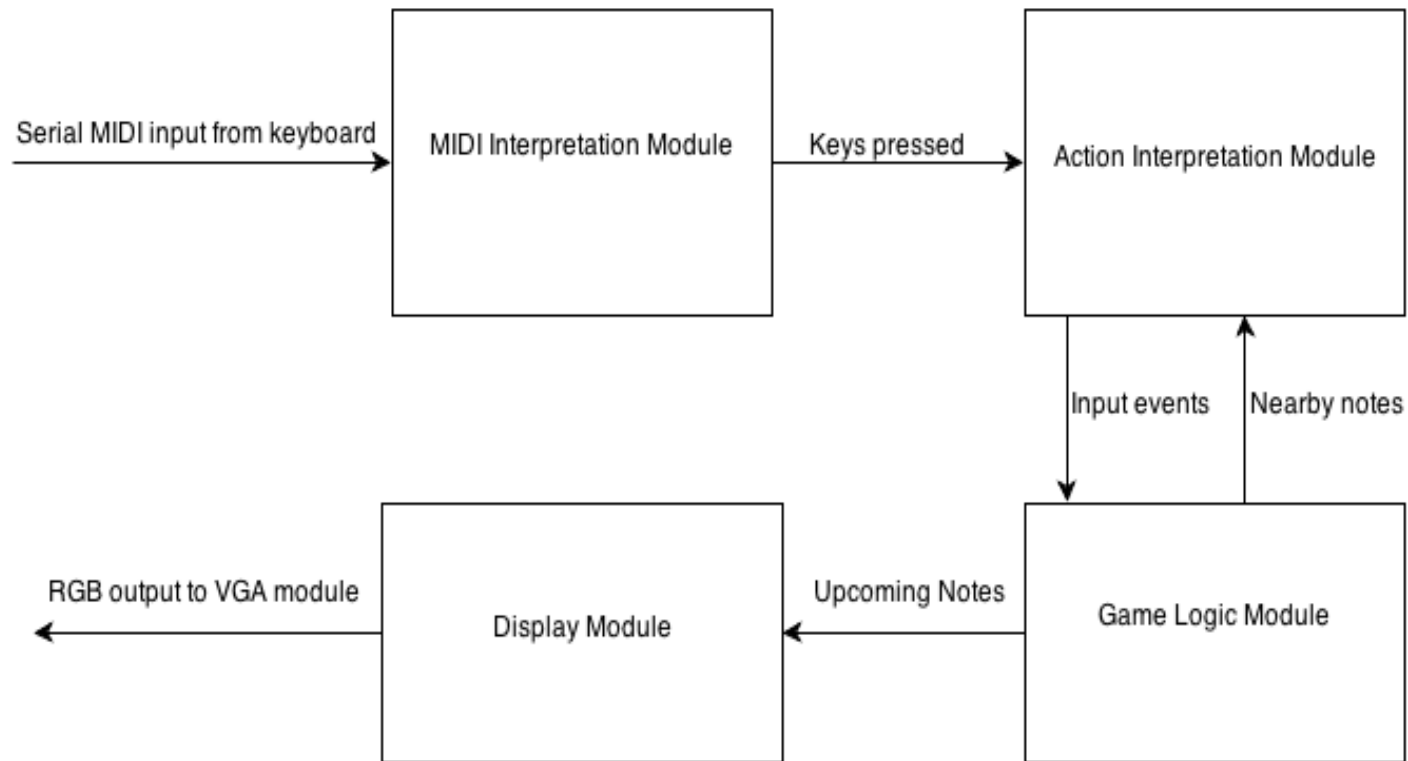
Music games are commercially successful



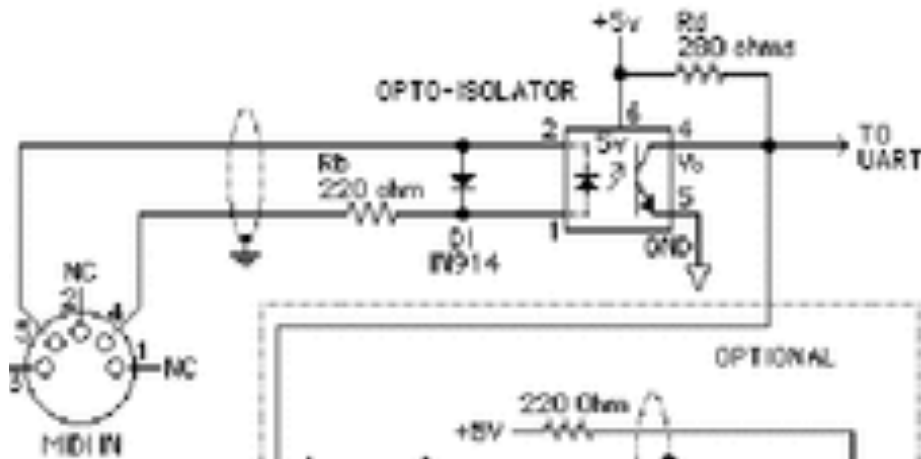
Moving away from a “toy” controller



# A block diagram for a commercial product



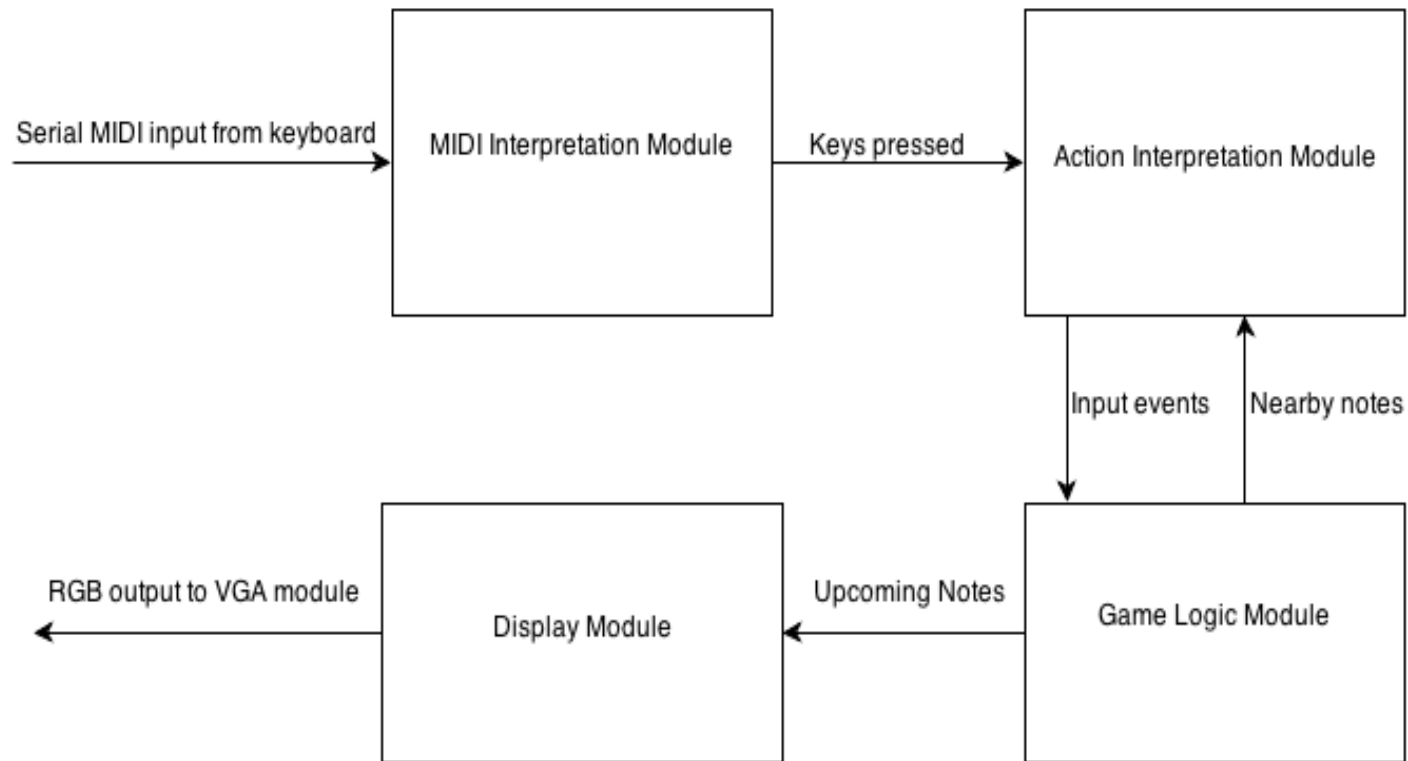
# MIDI is a sensible lightweight protocol



## MIDI commands

Command	Meaning	#Parameters	Param1	Param2
0x80	Note Off	2	key	velocity
0x90	Note On	2	key	velocity
0xA0	Aftertouch	2	key	touch
0xB0	Continuous controller	2	controller#	value
0xC0	Patch change	2	instrument#	value
0xD0	Channel Pressure	1	pressure	
0xE0	Pitch bend	2	lsb(7bits)	msb(7bits)
0xF0	(non-musical commands)	0		

# A block diagram for a commercial product

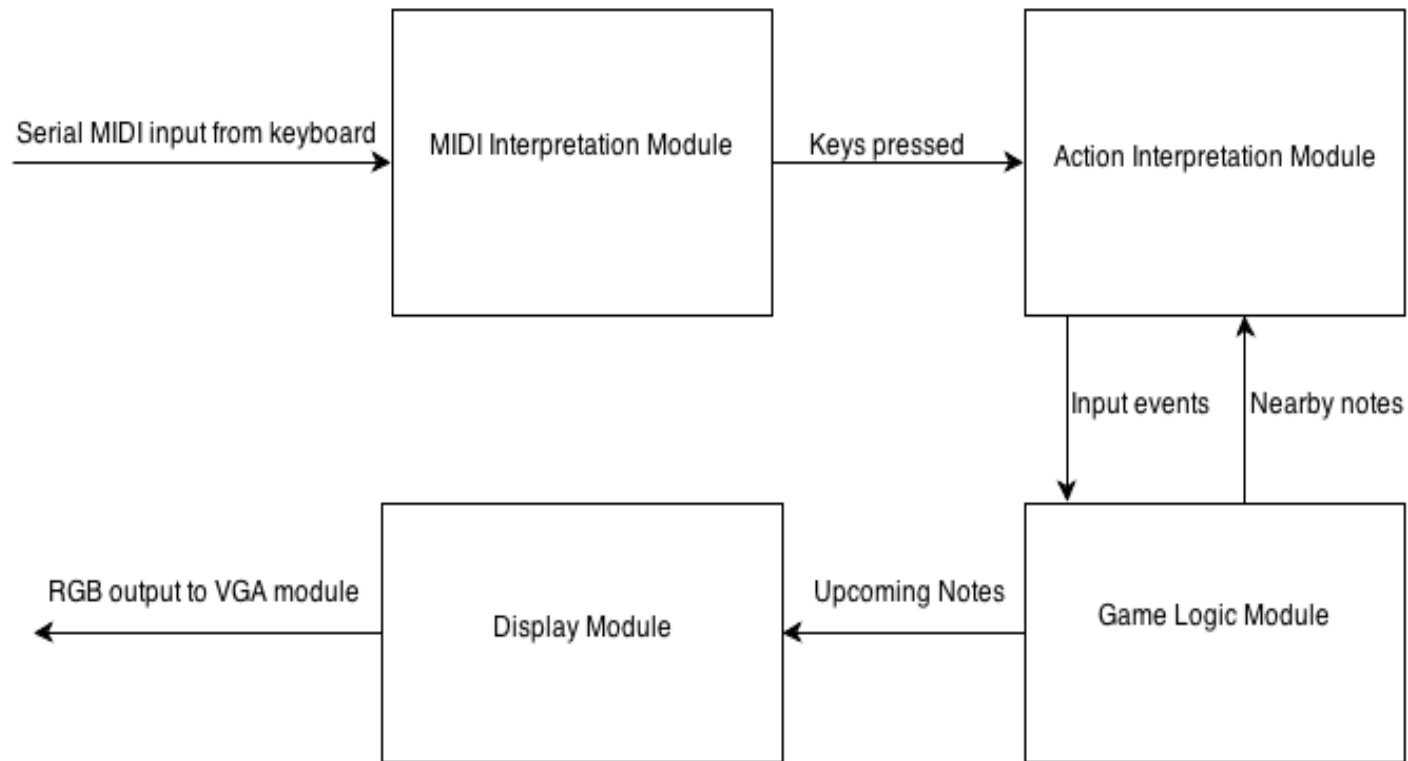




# The game logic block reads data controls game state

- Data stored in a lightweight format in RAM
- Internal “atomic” clock for smallest possible time subdivision (~50ms)
- Passes relevant information to specialized blocks

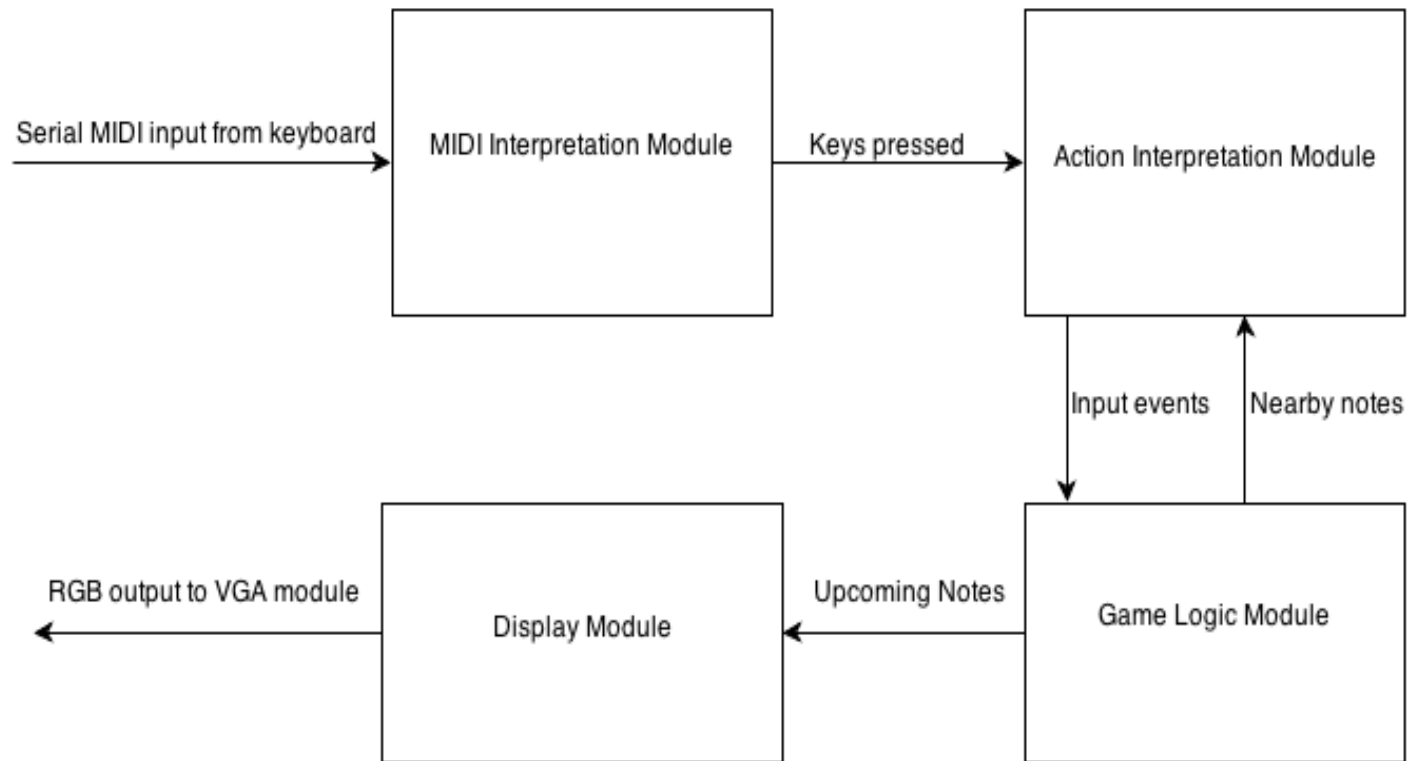
# A block diagram for a commercial product



# Action interpreter interfaces between game logic and parsed user input

- Gets input from game logic – what notes should be played and when
- Gets input from MIDI interpreter – what notes user is playing and when
- Determines if user action matches the correct action based on internal game data
- Lots of little design decisions w/ regards to input

# A block diagram for a commercial product



A display module drives the VGA output



# Insight: reusable sub-modules

- Example: “NxM” buffer
- A NxM buffer takes in blocks of size M as input.
- It can hold N such blocks
- An input signal triggers data clearing
- An output signal indicates data overflow

# Timeline

- Week of 11/18: Build a working minimum viable product for each block
- Week of 11/25: Debug and adjust the individual blocks
- Week of 12/2: Integration and user testing
- If there is time: Fun augmentations. For example, a “learning” mode in which you can play a tune and thus “create your own level”