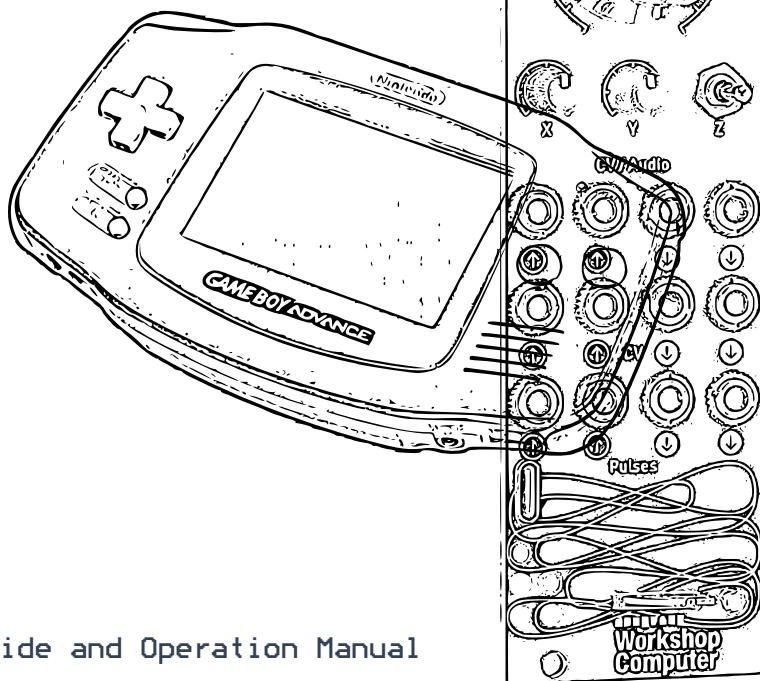


GBA PSG Voice

Program Card

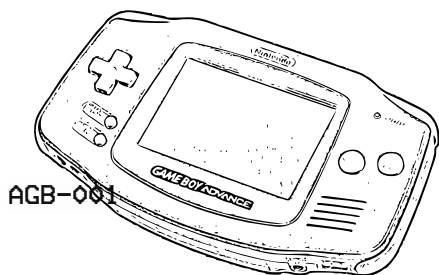
For the WORKSHOP COMPUTER
(MUSIC THING MODULAR)



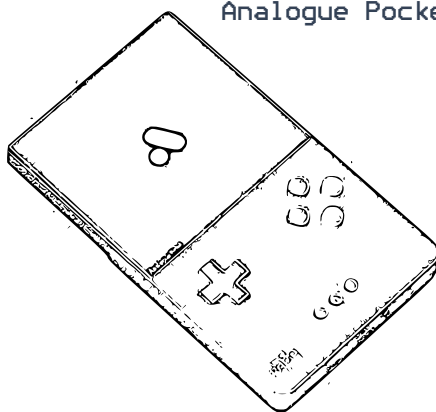
Guide and Operation Manual

GBA PSG Voice

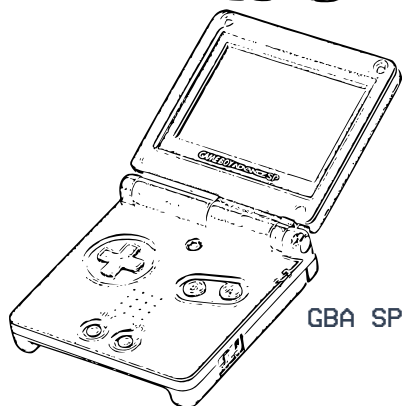
A Program Card for the Music Thing Modular Workshop Computer allowing bidirectional communication of signals from Eurorack and custom GBA software loaded via the multiboot link protocol.



AGB-001



Analogue Pocket



GBA SP

Game Boy Advance
Game Boy Advance SP
Analogue Pocket

Connect one of these to the Music Thing Modular Program Card via a link cable and adaptor without a cart in it. Switch on the Workshop Computer first, then the GBA - the LEDs on the Workshop Computer light in sequence as the software loads on the GBA.

The GBA software

Once loaded the GBA software starts in the **MAIN PAGE**.

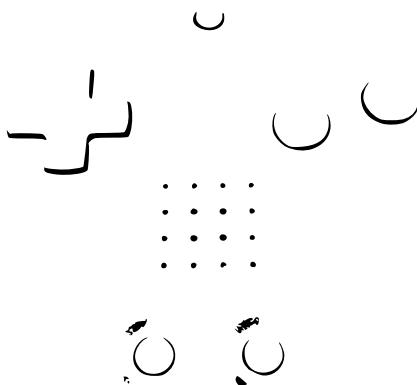
The **MAIN PAGE** performance screen, and there are multiple editing screens that change the behaviour of the GBA, and the response to the incoming CV and knob positions from the Workshop Computer.

Navigation:

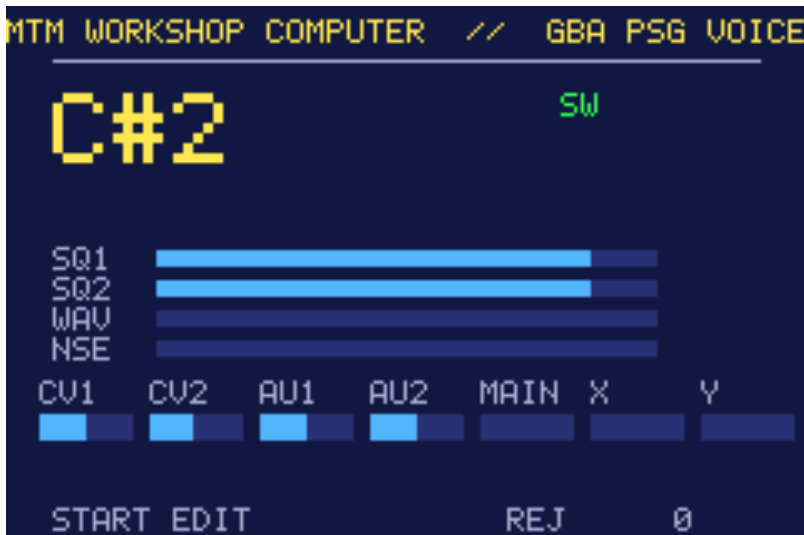
Press **START** to enter/leave the EDITOR PAGES / **MAIN PAGE**

Use **SELECT** and **DPAD** left/right to move between pages.

Use **DPAD** to navigate editor pages, **A+DPAD** to change values and interact with parameters.



MAIN Page

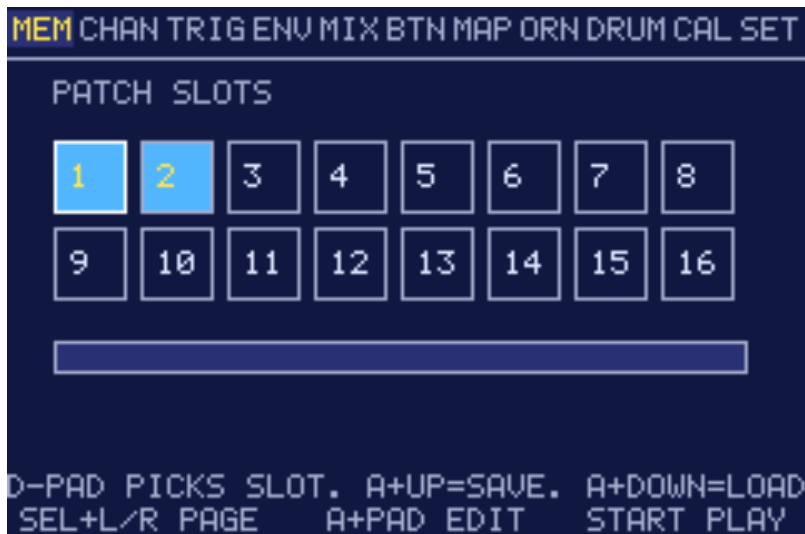


The MAIN page acts as your global performance and activity monitor, visualizing what the hardware and the internal synth engine are doing in real time.

- **Note readout** shows the currently active or last-played musical note (e.g., **C#2**).
- **Voice Activity Meters:** show the output levels of the Game Boy Advance's four hardware sound channels:
 - **SQ1:** Square Wave 1
 - **SQ2:** Square Wave 2
 - **WAV:** The custom Waveform channel
 - **NSE:** The Noise channel
- **Hardware Input Monitors:** Track the live incoming signals and physical knob positions on the Workshop Computer. **CV1**, **CV2**, **AU1** & **AU2** voltages; **MAIN**, **X** & **Y** knob positions.

DPAD, **A**, **B** & **SHOULDER BUTTONS** are for performance.

Memory (MEM)



Manage your patches across 16 slots. Use the D-Pad to select a slot, A + UP to save, and A + DOWN to load your current state.

Control	Action	Function
D-Pad	Navigate	Select target slot (1-16)
A + UP	Combo	Save current state to selected slot
A + DOWN	Combo	Load saved state from slot

! Save operations overwrite existing slot data instantly. !

! Ensure you are on the correct slot before committing changes !

Channel Settings (CHAN)

MEM	CHAN	TRIG	ENV	MIX	BTN	MAP	ORN	DRUM	CAL	SET
	CH 1	CH 2	CH 3	CH 4						
OUTPUT	L	R	BOTH	OFF						
SEMITONE	+0	+0	+0	[X]						
ORNAMENT	OFF	SL1	SL5	[X]						
TIMBRE	50%	25%	TRI	15 BIT						
DETUNE	[X]	+2	[X]	[X]						
N PITCH	[X]	[X]	[X]	4						
N RATIO	[X]	[X]	[X]	3						
SWP TIME	0	[X]	[X]	[X]						
SWP DIR	DOWN	[X]	[X]	[X]						
SWP DEPT	-3	[X]	[X]	[X]						
D-PAD MOVES	A+UP/DN VALUE			A+L/R x8						
SEL+L/R PAGE	A+PAD EDIT			START PLAY						

Configure the core sound of the 4 audio channels. Adjust output routing, tuning, timbre, and apply sweeping effects.

- **Routing:** Direct individual channel audio output destinations <left/right/both/off>
- **Tuning & Timbre:** Fine-tune pitch offsets and select base waveforms/duty cycles.
- **Sweeps:** Apply automated pitch or frequency sweeps per channel.

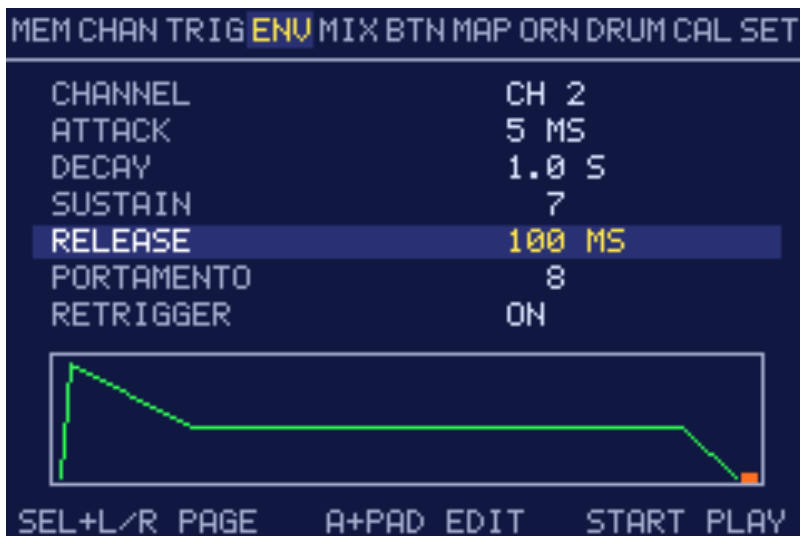
Triggers <TRIG>

MEM CHAN	TRIG	ENV	MIX	BTN	MAP	ORN	DRUM	CAL	SET
TRIGGERS	PU2	SW	BTN	A1	A2	V1			
CH 1	☐	☐	☐	☒	☐	☐			
CH 2	☒	☒	☒	☐	☒	☐			
CH 3	☐	☒	☒	☐	☐	☒			
CH 4	☐	☒	☒	☐	☐	☐			
SEL+L/R PAGE A TOGGLES START PLAY									

Determine what fires your sounds. Route incoming signals to trigger specific audio channels.

- **Signal Routing:** Map hardware control voltage (CV) or gate inputs to target channels.
- **Analogue Triggers:** Audio 1, Audio 2 and CV 1 fire on a rising level, like a gate.

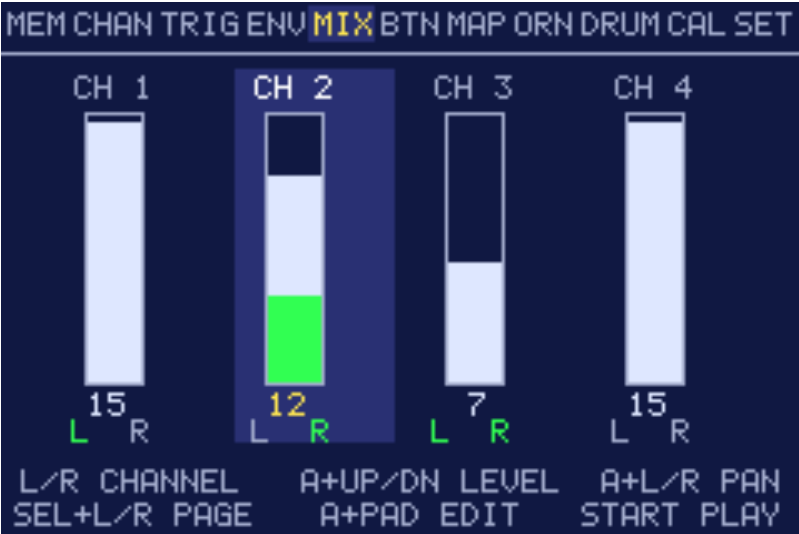
Envelopes (ENV)



Shape your sounds over time. Adjust Attack, Decay, Sustain, and Release (ADSR) times.

- **Attack:** Time taken for the initial run-up of level from nil to peak.
- **Decay:** Time taken for the subsequent run-down from the attack level to the designated sustain level.
- **Sustain:** Level during the main sequence of the sound's duration.
- **Release:** Time taken for the level to decay from the sustain level to zero after the key/gate is released.

Mixer (MIX)



Balance the mix. Adjust the volume levels for each of the four channels and set their panning.

Channel	Parameter	Description
CH 1-4	Volume	Gain control per channel
CH 1-4	Pan	L/R stereo field placement (L/R or both)

Button Assignments (BTN)

MEM CHAN TRIG ENV MIX BTN MAP ORN DRUM CAL SET	
A	TRIGGER
B	HOLD
L	DUTY 2
R	CH2 ON/OFF
UP	OCT +
DOWN	OCT -
LEFT	ORN SLOT 3
RIGHT	ORN SLOT 4

SEL+L/R PAGE A+PAD EDIT START PLAY

Map the physical Gameboy buttons to trigger functions (eg changing ornaments, octaves etc)

- **Latch / Hold:** Assign hardware buttons to sustain active notes without continuous pressing.
- **Ornament Triggers:** Execute programmed pitch sequences on keypress.

Modulation Mapping (MAP)

MEM CHAN TRIG ENV MIX BTN MAP ORN DRUM CAL SET							
SRC	DESTINATION	AMT	1	2	3	4	
CV 1	PITCH	+32	☒	☒	☐	☐	
CV 2	PITCH	+32	☐	☐	☒	☐	
AUD 1	---	+0	☒	☐	☐	☒	
AUD 2	---	+0	☒	☒	☒	☒	
MAIN	LEVEL	+64	☐	☐	☒	☐	
KNOB X	ATTACK	+64	☒	☐	☐	☒	
KNOB Y	RELEASE	+64	☒	☒	☒	☒	
SWITCH	---	+0	☒	☒	☒	☒	
L/R COLUMN A+UP/DN VALUE A=TOGGLE TICK							
ORNAMENT: AMOUNT IS THE ORNAMENT SLOT							
SEL+L/R PAGE A+PAD EDIT START PLAY							

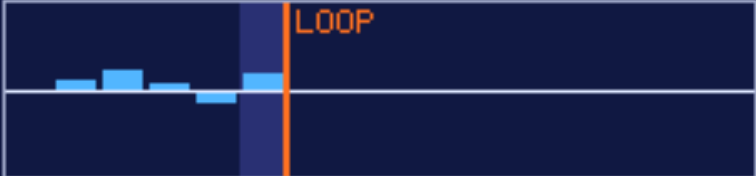
The modulation matrix. Route CV inputs, audio inputs, and knobs to control synthesizer parameters. Any jack, knob or the Z switch can drive any parameter, on any channel.

- **Sources:** CV Inputs, Audio Inputs, Physical Knobs and the Z switch.
- **Destinations:** Synth parameter across each channel.
- **Amount:** The amount of effect a mapped signal has.

Ornaments (ORN)

MEM CHAN TRIG ENV MIX BTN MAP **ORN** DRUM CAL SET

SLOT	1
LENGTH	6
RATE	7
MODE	LOOP
STEPS	6: +6



L/R STEP A+UP/DN SEMITONE A+L/R OCTAVE
SEL+L/R PAGE A+PAD EDIT START PLAY

Program arpeggios and pitch sequences.

Define the length, rate, and looping mode.

- **Length:** Specify step count for the active sequence.
- **Rate:** Set how fast the sequence steps through its notes.
- **Mode:** LOOP repeats while the note is held; ONCE plays through and holds the last step.

Drum Mode <DRUM>

MEM CHAN TRIG ENV MIX BTN MAP ORN DRUM CAL SET	
DRUM MODE	ON
THRESHOLD	6
AUD 1	KICK
AUD 2	SNARE
CV 1	CL HAT
CV 2	TOM HI
PU 2	KICK
SWITCH	SNARE
ANY INPUT GOING HIGH FIRES ITS SOUND. DRUMS BORROW CH3 AND CH4. SQUARES FREE.	
SEL+L/R PAGE A+PAD EDIT START PLAY	

Turn incoming triggers into percussion using Channel 3 and 4.

When Drum Mode is **ON**, high inputs fire the assigned sound.

- **Global Toggle:** Turn Drum Mode ON/OFF.
- **Behaviour:** Bypasses standard envelope 'sustain' phases for rhythmic elements.

Calibration (CAL)

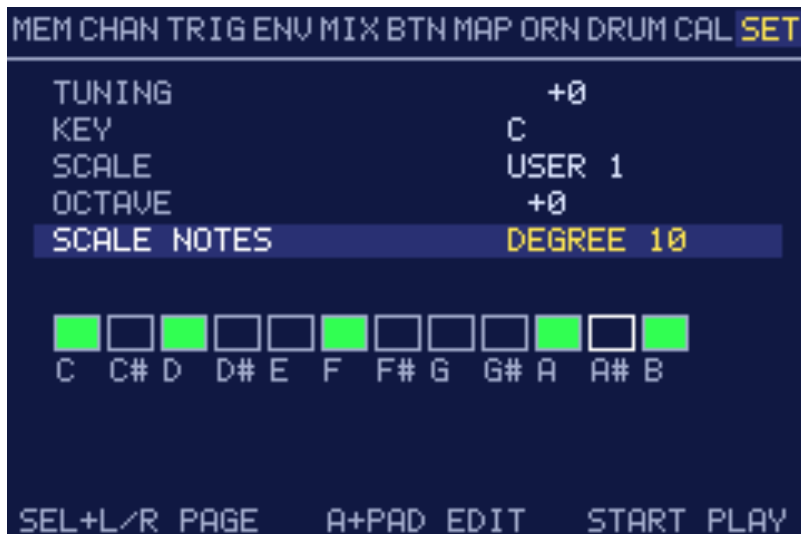
MEM CHAN TRIG ENV MIX BTN MAP ORN DRUM				CAL SET
CV SCALE		7422		
CV OFFSET		-34		
BASE NOTE		C2		
MASTER L		7		
MASTER R		7		
PSG LEVEL		100%		
CV 2 IN		-18		
LINK		IRQ		
IN	C#2 -45c	RAW	2016	
OUT	C#2	CAL		
GBA PSG VOICE		BY ANDY JENKINSON 2026		
SEL+L/R PAGE		A+PAD EDIT START PLAY		

Fine-tune how the synthesizer interprets incoming control voltages.

Adjust the CV scale and offset, define base notes, and set master volume levels for Left, Right, and the internal Programmable Sound Generator.

- **CV Scaling:** Calibrate input tracking to match your Eurorack pitch standards.
- **Monitoring:** Keep an eye on raw input values and outgoing note data (e.g., IN C#2, OUT C#2) to ensure accurate pitch tracking across octaves.

Settings (SET)



Configure global musical parameters. Set the master tuning, define the root key, and select the active musical scale (e.g., User 1, Major, Minor).

- **Scale Quantization:** The scale notes visualizer blocks out the active degrees for your chosen scale, locking incoming sequences or live play into tune. 'Free' ignores quantisation.
- **Transposition:** Shift the entire system up or down via the Octave setting.

Connections To / From Workshop Computer

Inputs

Audio 1 : Unassigned by default

Audio 2 : Unassigned by default

CV 1 : Unassigned by default

CV 2 : 1V/oct pitch CV

Pulse 1 : GBA SO (MISO)

Pulse 2 : Gate / Trigger in

Main Knob: Wav Chan (3) Level

X/Y Knob: Attack / Release Modifier

Outputs

Audio 1 : 'A' Button Gate

Audio 2 : 'B' Button Gate

CV 1 : Gate Out

CV 2 : Pitch Out (Quantised)

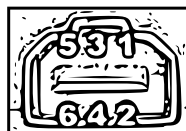
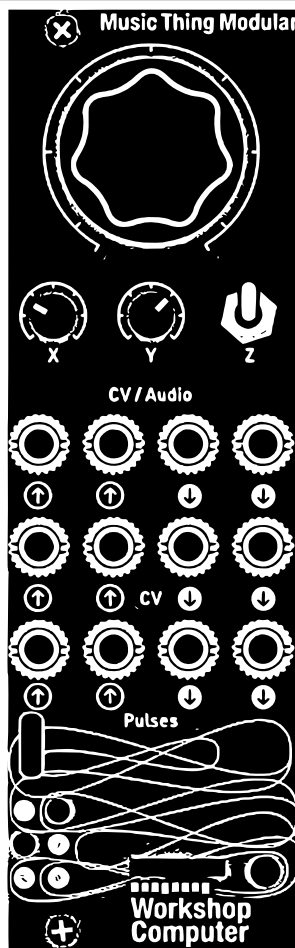
Pulse 1 : GBA SC (clock)

Pulse 2 : GBA SI (MOSI)

Cable Connector

Pin Name

1	VDD (unused)
2	SO
3	SI via 1k Ω resistor
4	SD (unused)
5	SC via 1k Ω resistor
6	GND $\leftarrow$ common $\rightarrow$



Link Cable / Link Port
Pins Numbers