sound modes

Cynthcart has 16 voicing modes that affect how played notes are distributed to the SID's three voices. The sound mode can be selected with the keyboard or through MIDI continuous controller #2. When a second SID chip is installed, all the modes use a stereo chorus effect except for the 6–voice polyphonic mode.

Name	Description	Name	Description
POLY	Default 3–voice polyphonic	**MONOP1**	3–voice mono1 w/ portamento
5THS	Polyphonic with added 5th	**MONOP2**	3–voice mono2 w/ portamento
5PORT	Poly portamento with 5th	**ARP1**	Arpeggiator up fast
PORT1	Poly portamento Slow	**ARP2**	Arpeggiator up med
PORT2	Poly portamento Fast	**ARP3**	Arpeggiator up slow
PORT3	Poly portamento Faster	**ARP4**	Arpeggiator down med
MONO1	3–voice mono w/ octave shifts	**ARP5**	Arpeggiator down fast
MONO2	3–voice monophonic	**6CHAN**	6–voice poly (requires 2nd SID)

modulation modes

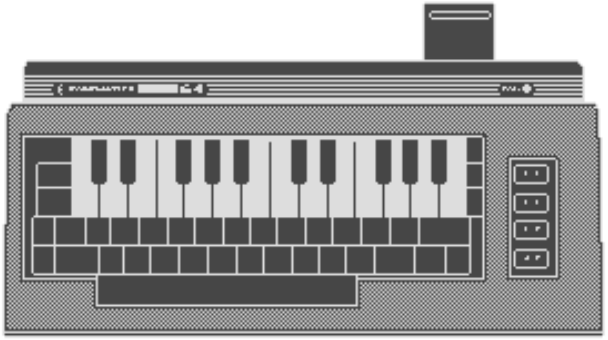
Modulation modes are preset configurations of an LFO or envelope tied to the filter cutoff or pulse width. Modulation modes can be selected with key commands or through MIDI continuous controller #3. Note that PULS1 and PULS2 will only affect sounds that use the pulse waveform.

Name	Description	Name	Description
NONE	Modulation off	**FILT4**	Square LFO → Filter
FILT1	Slow LFO → Filter	**FILT5**	Fast Square LFO → Filter
FILT2	Slow Rising Envelope → Filter	**PULS1**	Slow LFO → Pulse Width
FILT3	Fast Drop Envelope → Filter	**PULS2**	Rising Env → Pulse Width

sid hex editor

The SID editor allows advanced users to modify SID registers directly. Press RUNSTOP+F1 to enter SID HEX editing mode. Use keys 0–9 and A–F to enter the two digit SID address to modify, followed by the two digit value to write to that address. If the piano keyboard overlay is being used (which covers up the number keys) then start the SID editor in piano keyboard mode by pressing RUNSTOP+F7 and use the black piano keys for 0–9 and the center white piano keys for A–F.

The editor includes five special addresses ($22–$26) that simultaneously set all three SID oscillator registers to the same value. A customized patch can be saved by pressing RUNSTOP+F3, and that patch can later be recalled by pressing the "←" key.



cynthcart v2.0

Cynthcart is a cartridge for the Commodore 64/128 that turns the computer into a standalone analog synthesizer. Cynthcart's key–command user interface allows it to be played and controlled without a monitor, making it especially suitable for live performance. The original Commodore 64 piano keyboard overlay can be used (illustrated above), and Datel, Passport, Sequential, and Kerberos MIDI interface cartridges are now supported.

features

+ 30 preset sound patches
+ Arpeggiator, portamento, vibrato, and tremolo effects
+ Analog filter realtime control and modulation
+ Control of attack, release, and other sound parameters
+ MIDI support including pitch bend, patch changes, and continuous controllers
+ On–screen help
+ Color visualizer display
+ Mono stack, 3–voice mode, and 6–voice mode (with second SID)
+ SID hex editor for advanced users
+ Ability to turn off video chip to reduce noise
+ PAL and NTSC pitch tables with automatic selection
+ Copies itself to RAM (cartridge can be removed after loading)

supported accessories

+ Commodore 64 piano keyboard overlay
+ Datel, Passport, Sequential, and Kerberos MIDI interface cartridges
+ Paddle controllers in port 2 for filter, pulse width, vibrato, and pitch
+ 2nd SID chip at address $DF00 (supports SIDCart)

keyboard controls

The top two rows of the Commodore's keys function as a piano keyboard and are configured to be compatible with the piano keyboard overlay that was produced in the 80s, often marketed as the "Incredible Musical Keyboard". The top number row is the black piano keys and the QWERTY row is the white piano keys. Notes can be locked using the SHIFT LOCK button. The Commodore 64's other keys are used to select patches and change settings as indicated in the following tables. Sound patches are italicized and include their MIDI patch number in parenthesis.

KEY	by itself	with SHIFT	with CTRL
A	*FILTER BASS (#10)*	Note Attack = 0	Note Release = 0
S	*SWEEP ARP (#11)*	Note Attack = 5	Note Release = 5
D	*PLUCK ARP (#12)*	Note Attack = 8	Note Release = 8
F	*SLOW ARP (#13)*	Video Pattern 1	Poly Mode (default)
G	*FILTER STACK 1 (#14)*	Video Pattern 2	5ths Mode
H	*FILTER STACK 2 (#15)*	Video Pattern 3	5ths Port Mode
J	*PULSAR (#16)*	Video On	Mono1 Mode
K	*VIBRATO LEAD (#17)*	Video if Sound	Arp1 Mode
L	*SLOW RISE (#18)*	Video Off	Arp2 Mode
:	*BENDING ECHO (#19)*	Full Screen On	Arp3 Mode
;	*ARP LEAD (#20)*	Full Screen Off	Arp4 Mode
=	*6-VOICE SAW (#21)*		Arp5 Mode
RETURN	Help Page	Clear Modulation	6-Channel Mode
Z	*SAWTOOTH BASS (#30)*	Tremolo Speed=0	Modulation Off
X	*GRITTY BASS (#1)*	Tremolo Speed=1	Filter Modulation 1
C	*PORTAMENTO 5TH (#2)*	Tremolo Speed=2	Filter Modulation 2
V	*SAW PORTAMENTO (#3)*	Tremolo Speed=3	Filter Modulation 3
B	*PULSE 5TH (#4)*	Tremolo Level=0	Filter Modulation 4
N	*PULSE HIGH (#5)*	Tremolo Level=1	Filter Modulation 5
M	*TRIANGLE HI/LO (#6)*	Tremolo Level=2	Pulse Modulation 1
,	*TRIANGLE DROP (#7)*	Tremolo Level=3	Pulse Modulation 2
.	*SID EXPLOSION (#8)*		Pulse Modulation 3
/	*MUTE (#9)*		Mono 2 Mode
cursor up/down	5ths Mode Off (Poly)	Paddle 1 = Off	Mono Portamento 1
cursor left/right	5ths Mode On	Paddle 1 = Filter	Mono Portamento 2
SPACE	Bend Pitch		
F1	Octave Highest	Portamento Mode 3	Volume = 9
F3	Octave High	Portamento Mode 2	Volume = 6
F5	Octave Low	Portamento Mode 1	Volume = 4
F7	Octave Lowest	Portamento Off (Poly)	Volume = 0
backarrow	Custom Patch		

KEY	with C= key	with RUNSTOP
A	Filter Cutoff = 0	Tuning = –40
S	Filter Cutoff = 1	Tuning = –30
D	Filter Cutoff = 2	Tuning = –20
F	Filter Cutoff = 3	Tuning = –10
G	Filter Cutoff = 4	Tuning = 0
H	Filter Cutoff = 5	Tuning = +10
J	Filter Cutoff = 6	Tuning = +20
K	Filter Cutoff = 7	Tuning = +30
L		Tuning = +40
:		Tuning = +50
Z	Filter On	*LASER BASS (#22)*
X	Filter Off	*TROMBONE BLAST (#23)*
C	Filter Disabled	*NOISY SQUARE ARP (#24)*
V	Paddle 2 = Off	*TRIANGLE SYNC (#25)*
B	Paddle 2 = Pulse Width	*MONO SYNC ECHO (#26)*
N	Paddle 2 = LFO Speed	*CLEAN SAW (#27)*
M	Paddle 2 = Pitch Bend	*CLEAN TRIANGLE (#28)*
,	MIDI channel = omni	*CLEAN SQUARE (#29)*
.	MIDI channel = 1	
/	MIDI channel = 5	
F1	NTSC Tuning Table	Open SID Editor (keyboard)
F3	PAL Tuning Table	SID Editor Save
F7		Open SID Editor (piano)

midi control

Cynthcart supports MIDI input through a Datel, Passport, Sequential, and Kerberos MIDI interface cartridges, and it responds to note data, patch changes, pitch bend, and various controllers. By default Cynthcart listens on all MIDI channels (omni mode), but single channels can also be selected by key command (see table above). MIDI patch numbers are listed in the keyboard chart beside the patch names, and the chart below lists the Cynthcart MIDI controller numbers.

CC#	Parameter	CC#	Parameter
0	Filter Resonance	**7**	Volume
1 (wheel)	Filter Cutoff	**8**	Tremolo Depth
2	Select Voice Mode	**9**	Tremolo Speed
3	Select Modulation Mode	**13**	Osc Waveform (all voices)
4	Attack	**14**	Osc Waveform (voice 2 only)
5	Release	**15**	Osc Waveform (voice 3 only)
6	Pulse Width		