

GTUltra - V1.3.0

September 25th 2022 - Jason Page / MultiStyle Labs

GoatTracker Ultra - (Enhanced GoatTracker Stereo V2.76 - Jason Page / MSL)

GTUltra V1.3.0 - \$6To-Norah.sng

POS CHO 26 CH1 27 CH2 28 CH3 29 CH4 2A CH5 2B

CUT:02 RES:F

01 46:43 / 04:43:03

NAME To Norah
AUTHOR Shogoon/ESM/MSL
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ORDERLIST (SUBTUNE 00, POS 00B)

	00	18	01	16	02	18	03	18	04	18	05	18
008	0C	+0	01	+0	0A	+0	03	+0	04	+0	05	+0
009	0D	+0	12	+0	0E	+0	0F	+0	10	+0	11	+0
00A	14	+0	15	+0	16	+0	1E	+0	1F	+0	1A	+0
00B	1B	+0	47	+0	1C	+0	17	+0	18	+0	1D	+0
00C	20	+0	01	+0	22	+0	23	+0	24	+0	25	+0
00D	26	+0	27	+0	28	+0	29	+0	2A	+0	2B	+0
00E	35	+2	36	+0	16	+2	32	+0	33	+0	34	+0
00F	3A	+2	3B	+0	1C	+2	37	+0	38	+0	39	+0
010	45	+2	15	+2	16	+2	2F	+2	30	+2	31	+2
011	1B	+2	47	+2	1C	+2	3C	+2	3D	+2	3E	+2
012	3F	+2	40	+2	41	+2	42	+2	43	+2	44	+2
013	46	+2	46	+2	46	+2	46	+2	46	+2	46	+2
014	FF	000	FF	000	FF	000	FF	000	FF	000	FF	000

INSTRUMENT NUM. 01 bass

Attack/Decay 04 Vibrato Param 00

Sustain/Release A8 Vibrato Delay 01

Wavetable Pos 01 HR/Gate Timer 02

Pulsetable Pos 01 1stFrame Wave 09

Filterable Pos 01 IC:116 Pan 77

WAVE TBL PULSETBL FILT.TBL SPEEDTBL

01:41 00	01:88 00	01:00 74	01:06 06
02:41 00	02:FF 00	02:00 54	02:04 1C
03:FF 00	03:87 A3	03:90 F4	03:00 3F
04:21 00	04:03 C3	04:00 03	04:00 20
05:21 00	05:87 A0	05:00 01	05:00 80
06:21 00	06:33 0A	06:00 03	06:00 47
07:21 00	07:33 FA	07:02 00	07:00 42
08:20 00	08:FF 06	08:00 02	08:04 42
09:FF 00	09:8C 06	09:FF 00	09:02 A0
0A:81 DF	0A:04 00	0A:90 F7	0A:00 F0
0B:80 DF	0B:8E 14	0B:00 0C	0B:00 04
0C:FF 00	0C:FF 00	0C:40 00	0C:00 00
0D:21 01	0D:88 00	0D:05 01	0D:00 00
0E:41 00	0E:FF 00	0E:2A 00	0E:00 00

What is it?

GTUltra is an enhanced version of GoatTracker editor.

What's new for 1.3.0?

- Expanded Order List View
- True Stereo Panning per instrument (emulation only)
- Definable SID Chip Pan positions (eg. place the 3rd SID in the center!)
- Automatic regular .sng backups (user definable duration between saves)
- Inter-pattern looping now optional
- Optional "Classic" F1-F3 key use (shift-click on record button to enable)
- Improved 6502 code for 9 and 12 channel SIDs for simpler playback
- SID emulation now disabled when seeking to start position (the delay was noticeable and annoying)
- Option to fully disable MIDI within now within .cfg file
- Editor settings are now saved in .sng files:
 - FV, PO, RO, NTSC/PAL, SID Type, HR Value, Speed, # SIDs, Stereo mode

Credits:

Original GoatTracker Editor by Lasse Öörni (loorni\@gmail.com)

HardSID 4U support by Téli Sándor.

Uses reSID engine by Dag Lem.

Uses reSID distortion / nonlinearity by Antti Lankila.

Uses 6510 crossassembler from Exomizer2 beta by Magnus Lind.

Uses the SDL library.

Uses the RTMIDI library.

GoatTracker icon by Antonio Vera.

Command quick reference by Simon Bennett.

Patches by Stefan A. Haubenthal, Valerio Cannone and Raine M. Ekman.

GTUltra updates by Jason Page.

GTUltra inspiration - Thank you Daniel Larsson (SIDTracker 64)

GTUltra beta Testing - Thanks to: Russell Hoy, Jani Väisänen, Egon Sandar & Shogoon

GTUltra charset and palettes - Markus 'LMan' Klein

GTUltra Linux support - Special thanks to: tlr & theK

GTUltra Hall Of Fame. Thanks for feedback and bug reports:

acrouzet, JCH, spider-j, TheRyk, DeMOSic, Groepaz, Youth, zzarko,

And, of course, thanks to Emma. x

What's different compared to GTStereo?

1. Updated display / skinning

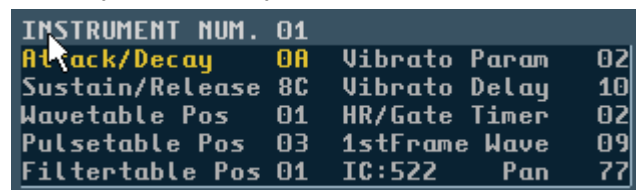
- a. User definable colour schemes
 - i. Make it easier to visualise what is actually going on!
 - ii. Presets are aimed to make you feel comfortable, with skins based on other trackers. If you don't like them - create your own!

2. Undo (ctrl-z)

- a. Yes. Really.

3. Instrument Use count (IC)

- a. Displays how many times an instrument has been used in all patterns
- b. Allows you to quickly find unused instruments



INSTRUMENT	NUM.	01
Attack/Decay	0A	Vibrato Param 02
Sustain/Release	8C	Vibrato Delay 10
Wavetable Pos	01	HR/Gate Timer 02
Pulsetable Pos	03	1stFrame Wave 09
Filtertable Pos	01	IC:522 Pan 77

4. Instrument True Stereo Panning

- a. See *True Stereo* section

5. Transport bar



- a. Change Skin (Mouse L/R button) - 16 default presets
 - i. Ctrl Left-Click = Open Palette editor
 - ii. Ctrl+Shift+Left Click = Open Char editor
- b. Select SID count (Mouse L/R button - 1-4)
 - i. Number of SID chips to be active during song playback

- c. Select output volume
 - i. Left Mouse Button = Increase volume
 - ii. Right Mouse Button = Decrease volume
- d. Select Octave (Mouse L/R button - 1-6)
 - i. Select octave for QWERTY note playback
- e. Follow ON / OFF
 - i. On = view will follow the current playback position
 - ii. This can be enabled / disabled during playback
- f. Loop pattern ON / OFF
 - i. On = playback will loop to start of the selected pattern when end of pattern is reached
 - ii. On also enables inter-pattern looping (if a section of a pattern is marked for copy/cut, this section will loop)
 - iii. See "Master Channel" section
- g. Selected area looping ON / OFF
 - i. Shift or CTRL click on the Loop Pattern button to enable/disable
 - ii. A "P" will be displayed within the loop button when this feature is enabled
 - iii. Note: Select area looping is only enabled when Loop Pattern is also enabled



- h. Rewind (similar to a *CD player rewind* control)
 - i. Single left-click (or CTRL-Left Key)
 - 1. Move to row 0 of the selected pattern
 - 2. If already at row 0, move to the previous song position
 - ii. Hold button
 - 1. Move to the start of the song
 - iii. During playback / follow enabled
 - 1. Double click to move to the previous song position
- i. Record ON / OFF
 - i. On = QWERTY will play monophonic. Notes will be recorded in the currently selected pattern.
 - ii. Off = JAM mode. This allows for up to 12 channels to play played at one time (4 SID chips)
- j. Use original GoatTracker F1-F3 keys
 - i. Press Shift or Ctrl when clicking on the RECORD button to turn this feature on or off.
 - ii. An "F" is displayed within the record button image when this feature is enabled



- k. Play / Pause
 - i. Play = song will play from the current position

- ii. Pause = song will pause at the current position
- l. Fast Forward
 - i. Move to the next song position (or CTRL-Right key)
- m. JAM Mode - SID chip enable
 - i. Click on 1-4 to enable/disable SID chips for jam mode
 - ii. Example: If a single 3 channel SID song, you could enable SID Chips 2-4 to allow you to jam over the 3 channel SID without interrupting playing notes from the song.
- n. Display piano keyboard On/Off / MIDI Port Select (SHIFT or CTRL)
 - i. Note: Available if MIDI is enabled
 - 1. Disable MIDI by setting MIDIport to 9999 in .cfg file
 - ii. Displays piano keyboard, showing playing notes
 - iii. Notes are calculated using the closest SID frequency, so this will take portamento / wild vibrato settings into account too.
 - iv. Press SHIFT or CTRL when clicking to open MIDI Port Select panel
- o. Detune (-100 cents > 100 cents)
 - i. 1 = normal pitch (440hz = A)
 - ii. 0 = -100 cents
 - iii. 2 = +100 cents
 - iv. This allows for testbit effects to be tuned to the music



- p. Mono / Stereo / True Stereo
 - i. In mono mode (1 SID is selected), this will toggle between mono (Mon) and True Stereo (Pan).
 - ii. If more than one SID is selected, this will toggle between mono (Mon), stereo (Ste) and True Stereo (Pan).
 - iii. See *Stereo Panning* for more information on stereo panning options
 - iv. See *True Stereo Panning* for more information on True Stereo panning options

6. True Stereo (Editor emulation only)

- a. GT Ultra SID emulation has been modified to allow per-channel stereo panning. This can be used to bring new life to SID music, as well as being useful for SID remixes and such like.
- b. As an example of what stereo panning can offer, here's a set of classic Rob Hubbard music, processed in TrueStereo
<https://soundcloud.com/noothermedicine/reconstructed-rob-hubbard-in-truestereo>
- c. To enable TrueStereo, set the panning type to "Pan"



- d. Within each instrument, there is a "Pan" setting, which is comprised of two pan values

IC:522 Pan 77

- i. 0-7 = Left > Center
- ii. 7-E = Center > Right

- iii. (F does nothing. If 16 (or any even number) of values were available, it would not be possible to have a value that is in the center)
- e. Every time an instrument is played (a key ON is performed), a random pan value is set, somewhere between (and including) the two pan values.
 - i. Example 1: 07 would pan anywhere from hard-left to center
 - ii. Example 2: 0E would pan anywhere from hard-left to hard-right
 - iii. Example 3: E0 does the same as 0E (you can put values in any order)
 - iv. Example 4: 77 would pan to center only..
- f. Stereo SID emulation trivia:
 - i. Stereo SID emulation uses the unused 4 bits of the Pulse Width High byte (\$D403, \$D40A, \$D411). Therefore keeping somewhat to the possibility of reality in what a stereo SID could have achieved.
- g. Panning information is ignored if True Stereo is not enabled

7. Stereo Panning

- a. When playing in either mono or stereo mode (not True Stereo) it is possible to set the panning position of each SID chip.
- b. By default, SIDs 1+3 will play from the left speaker, and SIDs 2+4 will play from the right speaker. However, in many cases (for example, when playing 3 SID music), it may be that you want SIDs laid out in as Left, Right, Center.
- c. By Shift or Ctrl clicking on the HR: text at the top of the editor, the view will change to the panning information for the number of SID chips that is currently selected.
- d. For example, if 3 SID chips are selected:

PAL 8580 P3:0E7- 1X

- i. Here, you can see that P3 (Panning for 3 SID chips) information is showing 3 panning values (hard-left, hard-right and center)
- e. If 4 SID chips are selected for playback, the view shows 4 values:

PAL 8580 P4:0E0E 1

- i. As you can see, panning is set to Left,Right,Left,Right for each SID chip
- f. This panning information (a set of 4 values for SIDs 1-4) is saved in the GTUltra.cfg file

8. 3,6,9 or 12 channel playback (1-4 SID support)

- a. 7-12 channels require 2 songs (song 0+1, song 2+3, song 4+5...)
 - i. This ensures that the GT Stereo file format does not need to change (yet..)
 - ii. 3,6 or 9 channel .SID files can be exported. .SID file format only handles up to 3 SID chips. Not all SID players handle 3 SID chips.
 - iii. For 12 channel SIDs, 2 .SID files are saved. 6502 code to show how to sync these for playback on Mega65 will be released.
- b. Example: 9 channel (3 SID) song shows SUBTUNE 01 as only 3 channels

CHN	ORDERLIST (SUBTUNE 01, POS 00)									
6	81	8A	97	97	97	8B	91	97	98	9E
7	81	85	8A	97	97	97	8C	92	97	9F
8	83	86	CF	CE	97	97	8D	93	97	9A
9										
10										
11										

9. Song pattern selection

- Hold Left button OR shift-left click on a pattern in order list:
 - All correct patterns are selected for the song at that position
 - Takes into consideration order lists with patterns that may have repeated n times, or channel-specific tempo changes

10. Song playback from anywhere

- Double click on a pattern in order list:
 - Playback will begin at the selected position
 - Any previously keyed on notes will also be heard correctly (as long as they were started within the previous 2 song positions)

11. F3 = Shift/Space

- Pressing F3 plays the from the current cursor position. Depending on where you are currently editing:
 - From within the pattern, if you're editing the pattern, table or instrument data
 - From the correct position in the song if currently editing the order list
- All patterns are synced correctly (taking into consideration channel tempo and pattern lengths, etc.)
- Using F3 means that it's possible to play whilst also modifying instrument or table values
- Disabling FOLLOW allows for quick playing from a specific pattern position, whilst allowing you to edit instrument or table information.

12. Jam Mode (when not in record mode)- Polyphonic

- Up to 3 channels can be played for every enabled SID chip
 - Enable SID chips via clicking the transport bar options 1-4



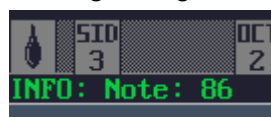
- KeyOff (release) is automatically performed when releasing keys

13. Displays note number and arp chord offsets in Jam Mode

- Holding multiple notes will display note offsets:



- Holding a single note will display the number number



14. MIDI note input

- Disable all MIDI processing by setting the MIDI Port number to 9999 within the GTUltra.cfg file or via -m command line option

- b. Connecting a MIDI keyboard *BEFORE STARTING GT-ULTRA* allows for MIDI keyboard input.
 - i. MIDI keyboard input works in jam mode when also editing tables / instruments
- c. Shift-click on the keyboard button in the transport bar to go to Midi Settings panel

15. Load / Save Screen

- a. Colour changed to GREEN (load) or RED (save) so that it's easier to realise that you're about to accidentally wipe over your work, rather than load it.

16. Move to the previous / next pattern in a song

- a. Scrolling to top or bottom of a pattern will automatically move to the previous / next song position, displaying correct patterns.

17. Tables separated by colour

- a. Sections separated with an underline when a END/LOOP (FF) is detected
- b. The table entry that is used by selected instrument is highlighted
- c. Unused entries (00 00) are shown as muted (grey, in this screenshot)

FILT. TBL	
01:90	A7
02:00	34
03:01	FE
04:30	00
05:FF	03
06:D0	F1
07:00	13
08:FF	00
09:B0	A7
0A:00	20
0B:FF	00
0C:00	00
0D:00	00
0E:00	00

18. Auto-Portamento key (SHIFT-Y)

- a. Press SHIFT-Y to automatically calculate portamento value for commands 1 or 2 from the pitch at cursor location to the next note in the pattern.
- b. Also changes the next note to be a tie
- c. Correct portamento value is added to the speed table
- d. Idea taken from the BRILLIANT SIDTracker 64 by Daniel Larsson

E-301590	E-301590
...	...
00000	00117
	117
	117
	117
B-301590	B-301300

>>>

19. Displays the overall length of the song

- a. Automatically calculated when loading / modifying song

00 25:28 / 01:57:43

20. Quick Save

- a. Ctrl-S at any time to save song using current file name

21. Info line

- Displays details based on what the cursor is currently over.
- Example1: Displaying the pattern instruction value (1 = portamento up), as well as the corresponding value from the speed table (\$0040)



- Example2: Displaying the filter table information:



22. The Master Channel

- To sync to the correct playing position, a channel needs to be selected as the "Master". Syncing will then take place, based on this channel. The Master channel is defined by the cursor position. Either:
 - The channel number within the pattern editor when editing patterns
 - The channel number within the order list
- The Master channel is always highlighted in the OrderList view as a yellow arrow (in this example, channel 2 is the Master Channel)



CHN	ORDERLIST	CS
0	12 19 18 00	
1	13 33 18 01	
2	14 34 18 02	
3	15 35 18 03	
4	16 36 18 04	
5	17 37 18 05	

- This then takes into consideration the different pattern lengths, pattern repeat commands, channel-specific tempo settings within the song.
(*If ALL patterns were the same length and there were no repeat commands in the order list or channel-specific tempo changes, life would have been far simpler..!)

23. F8 = Edit Tables ('cos Jammer said so)

- This used to go to the Edit Name / Copyright section.

24. Filter Information

- Displays the current filter type (green = active), cutoff and resonance for each SID channel above the corresponding SID channels



CUT:32 RES:0
CH1 12 CH2 13 CH3 14

- Also highlights when a channel has filter enabled (red dot)



CUT:DA RES:A
CH1 12 CH2 13 CH3 14

25. Palette Editor

- CTRL+Left Click on skin icon in transport bar
- This will display palette information



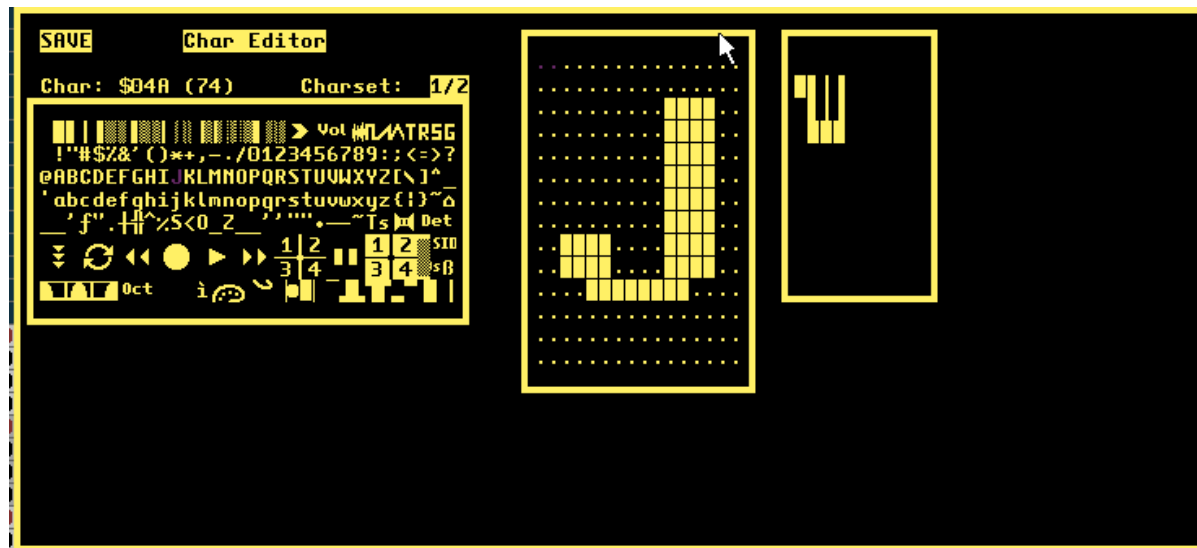
- c. Each column displays RGB for a specific area (8 bits)
- d. INFO text explains what each RGB is used for



- e. There are 16 palettes to choose from
 - i. File name and palette index is displayed
- f. Press Ctrl-S or left-click on the SAVE text to save a palette file.
 - i. User generated palette files will load automatically when starting GTUltra, if it is found within the gtpalettes folder.
 - ii. Ctrl-S will automatically save over the existing palette file, if one has already been selected.
- g. Press Ctrl-C to top current RGB (or click Copy RGB)
- h. Click on COPY ALL to copy all RGBs for this preset
- i. Press Ctrl-V or click PASTE to paste either current RGB or ALL (overwrites all RGBs for palette), depending on what was last copied.
- j. WARNING: NO UNDO.

26. Char Editor

- a. I needed to add this so that I could display nicer borders / piano keyboard and such like! Please excuse my programmer art.



- b. CTRL-S or click on the SAVE text to save charset (charset.bin)
 - i. If this file exists, it will automatically load when starting GTUltra.
 - ii. Delete or rename charset.bin file to restore the default charset
- c. Left panel
 - i. Select char to edit
- d. Middle panel
 - i. Char editor

- e. Right panel
 - i. Sketch pad (draw selected char)
- f. Largely untested and not exactly Photoshop - But it did the job.
- g. Charset 1 / 2
 - i. A second charset is used for specific purposes. Charsets can be selected by clicking on the 1 / 2 text next to the char set.

27. F2 - Change of function (if Classic F1-F3 mode is disabled)

- a. F2 used to play the current pattern. F3 now does this.
- b. F2 now enables/disables pattern follow or looping (Shift F2)
- c. See section *Use original GoatTracker F1-F3 keys* for more information on enabling classic GoatTracker F1-F3 keys

28. Modify values with mouse

- a. Hold / Drag Left or Right to modify the currently selected value
- b. Works for both Table and Instrument information only
- c. AD or SR values will only change the nybble selected
 - i. (Eg. Only change Attack OR Decay part of the Attack/Decay byte)

29. Looping

- a. When pattern loop is enabled, playback will sync all channels to the correct song position (based on the Master Channel) within the song, taking into consideration different pattern lengths, channel-specific tempo changes and such like.

30. Copy (Ctrl-C) changes

- a. Ctrl C will now always copy the information under the cursor, so no need to select a single entry via shift-Up/Down or shift-Left/Right
- b. When Ctrl-C is used to copy a single entry within the pattern view, the current instrument will also change to match the copied entry. This allows for very quick selecting of instruments.
- c. The functionality to copy the whole of a pattern row is still available via Shift-C

31. Inter-pattern looping

- a. When pattern looping **AND Selected Area looping is also enabled**, if a highlighted section within the pattern is marked (shift + up / down to select an area), playback will loop within this area. As with pattern looping, all channels will loop correctly, using the highlighted channel as the Master Channel

32. Improved ENTER key functionality

- a. Press ENTER to go to the correct table entry from anywhere
- b. Press ENTER again to return to the previous cursor position

33. Detailed Table Editing: WaveTable

WAVE TBL					SPEEDTBL	
01:	-WDCJ	RA	WAVE:81	20	G#2	01:0A A0
02:	-WDCJ	RA	WAVE:41	+00		02:10 02
03:	-WDCJ	RA	WAVE:40	+00		03:03 0A
04:	-WDCJ		STOP:00	--		04:00 FA
05:	-WDCJ	RA	WAVE:21	+00		05:00 23
06:	-WDCJ		CMND:01	01		06:00 12
07:	-WDCJ		CMND:01	01		07:00 40
08:	-WDCJ		CMND:01	01		08:03 23
09:	-WDCJ	RA	WAVE:41	+00		09:70 12
0A:	-WDCJ		CMND:02	01		0A:00 04
0B:	-WDCJ		JUMP:0A	--		0B:00 0F
0C:	-WDCJ	RA	DELY:01	+00		0C:7F 06
0D:	-WDCJ	RA	WAVE:81	45	A-5	0D:03 03
0E:	-WDCJ	RA	WAVE:41	+00		0E:00 01

- Clicking on the WAVE TBL title decodes the table data and displays it in a more user-friendly way
 - Click on the title again to show the original table view
- For each row, you can select functionality by clicking either **-WDCJ**
 - : Skip left column - only process note info in right column)
 - W: WAVE Set Waveform (0-\$DF)
 - D: DELY Set Delay (\$1-\$F)
 - C: CMND Set Command (1-\$F)
 - J: JUMP Jump (1-\$FF or 0 to Stop)
- If WAVE or DELAY is specified above, you can then also set the note (pitch) information in the right column.
- Note information can be either Relative or Absolute (offset from the note that is initially played.) **RA**
 - Select either R or A for Relative or Absolute note values
 - Disabling both leaves the pitch unmodified
- For Relative notes, you can also click on the + or - to swap between positive or negative offsets **+24**
- Pressing ENTER when the cursor is on a command value will move the cursor to the correct entry within the speed table (if applicable)
- Remember that the combination of CTRL-C / CTRL-V can be used to quickly copy & paste single entries

34. Detailed Table Editing: Pulse Table

PULSETBL				
01:	SMJ	PLS SET	D73	--
02:	SMJ	PLS MOD	0A	+00
03:	SMJ	PLS SET	D60	--
04:	SMJ	PLS MOD	01	+13
05:	SMJ	PLS MOD	0A	+00
06:	SMJ	JUMP:	01	--
07:	SMJ	PLS SET	310	--
08:	SMJ	PLS MOD	02	+00
09:	SMJ	PLS SET	0A0	--
0A:	SMJ	PLS SET	070	--
0B:	SMJ	STOP:	00	--
0C:	SMJ	PLS SET	EA0	--
0D:	SMJ	STOP:	00	--
0E:	SMJ	??? ???	--	--

- Clicking on the PULSETBL title decodes the pulse table data and displays it in a more user-friendly way

- i. Click on the title again to show the original table view
- b. For each row, you can select functionality by clicking either **SMJ**
 - i. S: "PLS SET" Set Pulse Width (0-\$FFF)
 - ii. M: "PLS MOD" Modify Pulse Width (left column = time, right column=speed)
 - iii. J: Jump (1-\$FF or 0 to Stop)
- c. When modifying pulse width, the right column (speed can be change from + to - by clicking on the + or - symbol **+24**)
- d. Remember that the combination of CTRL-C / CTRL-V can be used to quickly copy & paste single entries

35. Detailed Table Editing: Filter Table

FILT.TBL				
01:	CMFJ	FLT SET	0A	●●● [Icons]
02:	CMFJ	CUTOFF	34	--
03:	CMFJ	FLT MOD	01 -02	
04:	CMFJ	FLT MOD	31 +00	
05:	CMFJ	JUMP:	03	--
06:	CMFJ	FLT SET	0F	●●● [Icons]
07:	CMFJ	CUTOFF	13	--
08:	CMFJ	STOP:	00	--
09:	CMFJ	FLT SET	0A	●●● [Icons]
0A:	CMFJ	CUTOFF	20	--
0B:	CMFJ	STOP:	00	--
0C:	CMFJ	CUTOFF	00	--
0D:	CMFJ	CUTOFF	00	--
0E:	CMFJ	CUTOFF	00	--

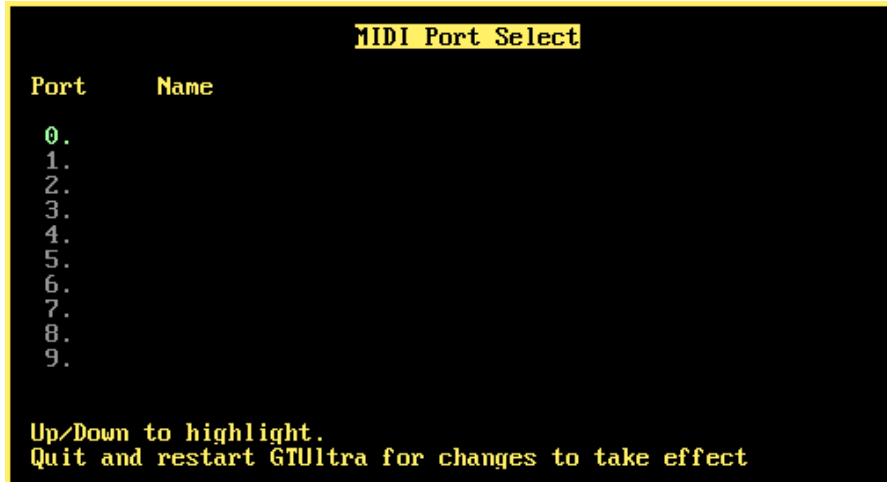
- a. Clicking on the FILT.TBL title decodes the filter table data and displays it in a more user-friendly way
 - i. Click on the title again to show the original table view
- b. For each row, you can select functionality by clicking either **CMFJ**
 - i. C: "CUTOFF" Set Filter Cutoff (0-\$FF)
 - ii. M: "FLT MOD" Modify Filter Cutoff (left column = time, right column=speed)
 - iii. F: "FLT SET" Filter Info (Resonance, Channel On/Off, Filter Type)
 - iv. J: Jump (1-\$FF or 0 to Stop)
- c. Filter Info **CMFJ FLT SET 0F ●●● [Icons]**
 - i. The 3 circles represent the channels which will be affected by the filter
 1. Red = filter is active on the channel
 2. Grey = filter is not active on the channel
 3. Click on the circles to enable / disable filters
 - ii. The filter type (lowpass, bandpass, high pass) is shown as 3 icons
 1. Green = filter type is enabled
 2. Grey = filter type is disabled
 3. Click on the icons to enable / disable filter types
- d. When modifying filter cutoff, the right column (speed can be change from + to - by clicking on the + or - symbol **+24**)
- e. Remember that the combination of CTRL-C / CTRL-V can be used to quickly copy & paste single entries

36. Waveform editor



- When editing any waveform parameter, the current waveform settings are displayed (replacing the timer display above the transport bar)
- Click on the waveforms / test bit (TEST), ringmod (RING), sync or gate bit (GATE) information to toggle enable / disable

37. MIDI Port Select



- Click on the keyboard icon in the transport bar, whilst holding either CTRL or SHIFT
- This opens the MIDI Port Select Panel.
- Use up/down to select MIDI port
- Exit and restart GTUltra for the newly selected MIDI port to take effect.

38. Ctrl+Left / Ctrl+Right keys to quickly move to previous / next song position

- These key combinations emulate clicking on the previous / next icons in the transport bar.

39. SID export

- Uses original GoatTracker 3 channel assembly code if saving a 3 channel SID
- Saves as V3 .SID format if saving 9 channel SID (note: not all sid players can handle this format)
- Saves 2* 6 channel SID files if saving 12 channel SID.SID file format only allows up to 3 SIDs to be selected. So 12 channel SID files can only be played on compatible hardware or Mega65.
- 12 channel SID files need to be synced together. Info to follow.

40. Automatic .sng backup

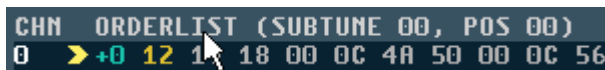
- There's always a chance that GTUltra may crash (or a power cut, or you accidentally save over your song..etc.). GTUltra automatically saves a copy of the current song at regular intervals in a folder named "gtbackup", which is located within the same folder as the GTUltra.cfg file.
- If GTUltra crashes, you can use this .sng file to hopefully recover your work with minimal loss of time and effort.
- The gtbackup folder is automatically created when GTUltra is run.
- You can specify how often a song is backed up either by changing the value in the GTUltra.cfg file or via the -b command line option
- Setting the backup time to 0 will disable auto backups

- f. Default is to save the backup every 30 seconds.
- g. A copy of the sng is automatically saved every n seconds to gtbackup folder.
- h. Saving only happens when a song is not being played to ensure that nothing interrupts playback.
- i. Saving only happens if there has been a change to the song since the last save.
- j. Each backup filename contains the time and date.

41. Editor information is saved within the .sng file

- a. The following information is saved within the GTUltra .sng file
 - i. FV (use fine vibrato)
 - ii. PO (optimize pulse)
 - iii. RO (optimize realtime)
 - iv. NTSC / PAL
 - v. SID Model (8580 or 6581)
 - vi. HR value (eg: HR:0F00)
 - vii. Speed multiplier
 - viii. Number of SID Chips used
 - ix. Stereo mode (mono, stereo or TrueStereo panning)
- b. On loading a .sng, the editor settings will then be set accordingly.

42. Expanded OrderList View



- a. Click on the *ORDERLIST* text to toggle between *Classic* and *Expanded* OrderList view.

b. Expanded orderlist:

	ORDERLIST (SUBTUNE 00, POS 019)											
	00 34	01 33	02 38	03 04	04 04	05 04						
018	23 +0	2E +0	33 +0									
019	22 +0	2F +0	0C +C									
01A	16 +0	30 +0	0D +C									
01B	1E +0	31 +0	0E +0									
01C	17 +0	3F +0	34 +0									
01D	18 +0	03 +3	01 +3									
01E	19 +0	04 +3	05 +3									
01F	18 +0	02 +0	01 +0									
020	1A +0	07 +0	05 +0									
021	35 +0	36 +0	01 +2									
022	00 +3	37 +2	09 +2									
023	00 +3	38 +2	43 +E									
024	00 +3	39 +2	42 +E									

- Shows each channels order list vertically.
- Each entry has its corresponding transpose value (-F > +E)
- All repeat instructions are unravelled.
 - For example, **+2 R3 00** in Classic view is displayed as the following in Expanded view:

```
00 +2
00 +2
00 +2
```

- When changing back to *Classic* view, the expanded orderlist data is re-compressed - Any repeated patterns will be compressed using repeat counters.

43. Expanded OrderList - Copy / Cut / Paste / Insert

	ORDERLIST (SUBTUNE 00, POS 019)											
	00 34	01 33	02 38	03 04	04 04	05 04						
018	23 +0	2E +0	33 +0									
019	22 +0	2F +0	0C +C									
01A	16 +0	30 +0	0D +C									
01B	1E +0	31 +0	0E +0									
01C	17 +0	3F +0	34 +0									
01D	18 +0	03 +3	01 +3									
01E	19 +0	04 +3	05 +3									
01F	18 +0	02 +0	01 +0									
020	1A +0	07 +0	05 +0									
021	35 +0	36 +0	01 +2									
022	00 +3	37 +2	09 +2									
023	00 +3	38 +2	43 +E									
024	00 +3	39 +2	42 +E									

- Right click / drag to select multiple rows and channels
- CTRL_C / CTRL_V / CTRL_X to copy/paste/cut
- Unlike the classic view, CTRL_V (paste) will *not* insert new rows prior to pasting.
- To insert copied data in expanded view, use CTRL_I to insert the clipboard

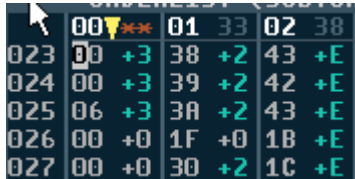
44. Expanded OrderList - Pasting Transpose Values

- If the cursor position is in the transpose column when pasting, only the transpose values are set

45. Expanded OrderList - Setting Transpose values

- a. When the cursor is in the + or - column, use keys + or - to set the transpose direction
- b. When the cursor is in the transpose value column, use keys 0-F (or 0-E for positive transpose) to set the value
- c. If you change the transpose value of a currently playing pattern within the orderlist, you will hear the difference in pitch instantly (in *Classic* view, the transpose value is only refreshed when playback starts a new pattern)

46. Expanded OrderList - Compressed Size



	00	01	02
023	00 +3	38 +2	43 +E
024	00 +3	39 +2	42 +E
025	06 +3	3A +2	43 +E
026	00 +0	1F +0	1B +E
027	00 +0	30 +2	1C +E

- a. When a .sng is saved or is exported, it is still done so in classic mode. This ensures that the data size is still as small as possible.
- b. In Expanded mode, is it possible to create order list data that is too large - the number of entries does not compress to under 256 bytes of data.
- c. The current compressed data size is shown at the top of the expanded orderlist view. In the case above, you can see:
 - i. Channel 00: **
 - ii. Channel 01: 33
 - iii. Channel 02: 38
- d. The ** shows that the size of the channel is invalid (over 256 bytes). As such, **it is not possible to swap back to the classic view - or the .sng to be saved or exported** - until the data in this channel has been reduced to a valid size.

47. Expanded OrderList - Repeat / End Markers



02A	00 +2	3C +2	3E +0
02B	06 +2	FF000	3C +0
02C	00 +2	00 +0	FF000

- a. In *Classic* view, the RPT marker at the end of an orderlist dictates the position to loop to.
- b. In *Expanded* view, this is the same. However, the marker is shown as the value FF
- c. In *Expanded* view, it is possible to have up to 2048 (0x800) entries (based on a compressed orderlist, that uses R0 (repeat 16) multiple times). As such, the loop values are converted to this larger range when a song is expanded.
- d. Other than this, the same rules apply:
 - i. A value that is lower than the FF position will cause the channel to loop to the position specified
 - ii. A value that is higher or equal to the FF position will cause song to stop.

48. Disable all MIDI

- a. Set the MIDI Port to 9999 within the .cfg file to disable all MIDI processing
 - i. No MIDI calls or initialization will take place when this is enabled