CRUMAR

Seven

PHYSICAL MODELING ELECTRIC PIANO

Works like digital, feels like analog.

Dear Customer,

thank you for purchasing a Crumar Seven, a high quality instrument that was entirely conceived, developed and built in Italy with premium quality parts. This instrument is the the result of years of research in sound design and quality electronics, and has been assembled with first class craftsmanship. We wish you many years of enjoyment and good music with your new Crumar Seven, and, if we may give you a small advice... you guessed it... please read this manual in its entirety and keep it in a safe place for future reference.

The Crumar Team.

SAFETY INFORMATION

- Do not open the instrument. The instrument can be opened and repaired only by qualified personnel. Unauthorized opening voids the warranty.
- Do not expose the instrument to rain or moisture.
- Do not expose the instrument to direct sunlight.
- Be careful not to infiltrate powders or liquids inside the instrument, nor on the outside.
- If liquids get inside the unit, remove the power immediately to prevent the risk of electric shock and contact a Crumar service center as soon as possible.
- Do not clean using abrasive cleaners as they may damage the surface.
- Please keep all packaging in case you need to transport the instrument to a service center.
- This instrument can be used in any Country that has a mains voltage between 100 Vac and 240 Vac.
- Do not touch the AC cord with wet hands.

ABOUT THIS MANUAL

This is not only an instruction manual that just explains how the instrument works and how to use it. This manual also explains why the Crumar Seven is so special and what makes it differ from other instruments that might look or seem similar at a first glance. Also, we hope that you find some interesting information about how the sound synthesis works and how to get the best out of your new keyboard. Therefore, the first part of this manual, particularly chapters 3 to 6, contain theoretical notions that we wish you read carefully before proceeding with the actual use of the instrument.

Chapters are indicated in the form: **CHAPTER X: TITLE.**
Paragraphs are indicated in the form: **X.X.** TITLE.
Other sub-paragraphs are indicated in **Bold text**.
References to labels and control names are always displayed in CAPITAL LETTERS.
Trademarks and other nomenclatures are always displayed in *Italic letters*.
Notes are displayed in the form: *PLEASE NOTE: Italic letters*.

You will find that some concepts might be repeated more than once, this happens because there could be a mention in a chapter, and a detailed explication in a later chapter.

We recommend you to read this manual with the instrument in front of you, so you can put into practice what you are reading and can have an instant feedback of the notions here explained.

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CHAPTER 1. INTRODUCTION.

The Crumar Seven is not just another digital piano, it's a whole new thing with an old look. As you can see, it is built into a wooden carrying case and has a shape that is reminiscent of some of the most famous electric pianos of the early seventies. This kind of design was almost obligatory back in the day, it was practical for both the user to transport and for the manufacturer to assemble, and was necessary to hold a very heavy structure made of several big moving mechanical parts. At some point, when digital electronics took over from old mechanical and analog keyboards, the concept of portable piano has gradually changed making the instruments smaller and lighter, up to the point that some of the modern digital pianos are small enough to be carried in a bag. But do they look good on a stage? Do they feel classy, solid, comfortable like an old electric piano did? And what about the sound? Almost all digital pianos offer just basic piano sounds based primarily on sampled material, and all of them aim to replace a grand piano, leaving behind the sounds of famous electric pianos, treating them as just an extra with less importance.

But now there's the Crumar Seven. The latest technology in sound generation under the form and the look that all keyboard players love. **Crumar Seven's main focus is the electric piano**, the most important electric piano sounds that have made the history of the music of the past decades. **All sounds are based on real-time synthesis models**, various types of synthesis specifically engineered to thoroughly reproduce a particular type of sound. And naturally **there's a physical model of a grand piano**, too, for a total of nine different synthesis engines.

Portable, elegant, lightweight, one of the most revolutionary stage pianos of the modern day. Complete with carrying case, metal legs and accessories, the Crumar Seven operates like a digital instrument but feels like an analog, electro-acoustic instrument and redefines the concept of the Stage Piano.

Crumar Seven main features:

Nine synthesis engines:	Effects:	Other features:
1. Tine Electric Piano	- Effect slot 1: Tremolo, auto-panner, LFO Wha-Wha and Pedal Wha-Wha	- built into a solid wooden case with handle
2. Reed Electric Piano	- Effect slot 2: Chorus, Phaser, Flanger, Delay (all stereo effects)	- metal legs with carrying bag
3. Electric Baby Grand		- sustain and expression pedal inputs
4. Clavi E.P.	- AMP simulator with overdrive and EQ	- accessory box with cover
5. DX Digital E.P.	- Reverb	- internal wi-fi hot-spot for web-app editor
6. MKS Digital E.P.	- 3-band semi-parametric EQ	- 32 presets (8 factory + 24 user)
7. Vibraphone	- Background synth PAD effect	- illuminated RGB encoders
8. Acoustic Grand Piano		- MIDI OUT and USB-MIDI port
9. Sample Playback		- internal PSU
		- 73 note hammer-action keyboard

CHAPTER 2. WARRANTY NOTICE.

- Crumar Seven is covered under 12 months manufacturer's warranty.
- Warranty extensions are at the discretion of the retailer.
- Damages caused by misuse, improper maintenance or transportation are not covered by this warranty.
- During the warranty period, the customer is entitled to repair or replacement of any parts considered defective at no charge.
- The possible replacement of the entire product is at the manufacturer's discretion.

Notes about the wooden structure.

- Crumar Seven's wooden enclosure is not compliant with A.T.A. regulations, as such it can't be loaded in the hold of a plane without a proper A.T.A. case.
- Do not place heavy loads on the Seven's case.
- All external parts (handles, hinges, locks, edge protectors) are subject to wear and are not covered by this warranty.
- The paint job is subject to wear and is not covered by this warranty.
- The metal legs are subject to wear and are not covered by this warranty.
- The included sustain pedal is not covered by this warranty.
- The plastic CRUMAR badge at the back of the instrument is fragile and can crack if the case is set down on an irregular surface.
- All other parts subject to wear (keys, encoders, buttons, switches, plugs) are covered under 12 months warranty only starting from the date of original purchase.

CHAPTER 3. WHAT IS PHYSICAL MODELING, EXACTLY?

If you look into the literature available on the internet, one of the most accurate definitions of "Physical Modeling", when applied to sound generation, is: "*Physical modeling synthesis refers to sound synthesis methods in which the waveform of the sound to be generated is computed using a mathematical model, a set of equations and algorithms to simulate a physical source of sound*". And that's exactly what the Seven does, all the time, while you play it.

Let's take the "Tine Piano" (a.k.a. the *Fender Rhodes Piano*) as an example. In the real electro-mechanical instrument, each key, when struck, pushes a rubber hammer against a steel bar, making it vibrate. At the same time, while the hammer goes up, a damper goes down, thus allowing the steel bar to vibrate freely, until the key is released and the bar is stopped by the damper going up to its rest position. The vibration is transferred to a magnetic pick-up by means of the changes in a magnetic field, producing a very small electric signal that is later amplified by an external amplifier. All this multiplied the number of keys the piano has.

Well, physical modeling, rather than just playing back a pre-recorded sound, tries to reproduce – in real-time, i.e. while you are playing the piano – each and every element of the mechanical piano by means of complex mathematical computations that only a very fast and powerful microprocessor could do. The result is that the sound interacts with the player, feels alive, feels natural, grows as the musician expresses himself. This is what musicians expect when they play a mechanical (or acoustic) instrument, but with digital instruments some of this interaction got lost somewhere in time, probably towards the beginning of the 80's when digital keyboards pretended to replace the heavy and bulky boards of the past decade. We simply accepted a compromise: a lighter board, easier to haul around, with a barely acceptable sound. But times are changing once again.

CHAPTER 4. ADVANTAGES OF MODELING AND/OR SYNTHESIS VS. THE OLD TECHNIQUE OF SAMPLING.

In many examples a sampled sound can be compared to a photograph, but we'd like to make a different example that better explains the difference between playing samples or playing a real-time synthesizer. Video games. Towards the beginning of the 90's, when game consoles started to get powerful enough for 3D graphics, some older adventure games still used portions of filmed material, shot with real actors just like a short movie, trying to offer the player the chance to interact with the movie by using three or four variants of the same clip under different scenarios. That was realistic from the visual point of view, as it was nothing but the digitized version of a VHS tape, but it felt pretty static and annoying from the player's perspective because there was very little room for interaction, a bit like a quiz game with three possible answers at each question, it's either 1, 2 or 3. On the other hand, real-time 3D games could offer a less realistic image but a greater sense of realism in matter of game interaction, the character could move around the virtual environment, explore rooms and landscapes, interact with other characters, and so on. Now, just guess which technique has had a future and which has not.

Back to sound generation now. Playing a sampled piano, for example, means having a limited number of pre-recorded samples to deal with, probably three or four samples each three or four notes, and that's all. Bigger modern sample libraries offer a ridiculous 15 ~ 20 GB worth of sampled material trying to "capture" the essence of an instrument by increasing the number of possible samples, but still it's about a limited number. Still, there's no way to interact with samples, no way to change their harmonic content if not by applying some equalization or compression, which is something that's only worth doing on a master stereo buss, because it would be too CPU intensive to do on each single sample.

Modern physical modeling sound synthesis can be compared to the graphic engine of a modern 3D video game, it can be very realistic, but most importantly feels real, offers interaction. The Crumar Seven bases its foundation on eight different powerful real-time synthesizers, each specifically designed and developed to faithfully reproduce one type of piano sound. And, just in case, number nine is a sample player.

CHAPTER 5. ABOUT POLYPHONY, VOICES VS. NOTES, HOW VOICES ARE ALLOCATED IN DIFFERENT SYNTHESIS MODELS.

Ever wondered why some digital piano, despite having just 88 notes, offer a total polyphony of 128, 256 or even more voices? Here's the answer. First, there's a difference between a note and a voice. A note corresponds to a key on the keyboard, it's what we play when we put our fingers on the keyboard; a voice is an element of an instrument that is responsible of reproducing a single sound. Imagine a small pipe organ, it has probably just one 61 note keyboard, but since it's capable of playing different "registers", it will probably have more than 500 pipes! Each single pipe is actually a voice, because a single note can play more than one voice at a time. Therefore, many sample-based instruments need many voices to be able to offer an acceptable amount of polyphony. One more question: how are voices allocated, or employed, each time a note is played? This varies according to how the instrument works. Some sample players need two voices to play a stereo sound (left and right channels), other need more than one voice to play the basic tone plus some details (an example could be an orchestra ensemble that uses two voices for the sustaining strings sound plus two more voices for the attack transients). So, each time a new note is added to form a chord, new voices are allocated, until they reach the polyphony limit. This leads us to the next question: what happens when the limit is reached? Again, this varies according to how the playback engine was designed. The most common situation is the simple "round robin" cycle, where all voices are allocated starting from 1 up until the limit is reached, then back to voice 1 and so on. Of course, if a voice is already playing and is now destined to another note, it gets interrupted. This case is called "voice stealing". Some players use intelligent methods to prevent frequent voice stealing occurrences, some try to steal the older voice, other steal the quieter voice (based on the amplitude envelope). And now the last question: how are voices allocated when the sustain pedal is depressed and the same note is being played over and over (like in a "ribattuto")? Well, most sample players just don't care of what note is being played, they just allocate the requested voices and do their job. Other players allocate only a pair of voices and alternate between them, others allocate a limited number of voices, like 4 or 8, in order to prevent the overlap of many voices playing the same sound.

This was how *other instruments* use polyphony. Now let's learn how Crumar Seven works.

We said that a physical model mimics the behavior of a mechanical instrument trying to replicate each and every element that generates the sound... and that's exactly what the Crumar Seven does. This also affects how the polyphony functions. The following table shows the synthesis model, the note range, the polyphony limit and the voice allocation system used for each synthesis engine.

ENGINE	TYPE OF SYNTHESIS	NOTE RANGE	POLYPHONY	VOICE ALLOCATION	NOTES
"Tine" Electric piano	Physical Modeling	A0 (Note 21) to C7 (Note 108)	88	Modeling	Fully Polyphonic
"Reed" Electric piano	Physical Modeling	A1 (Note 33) to C6 (Note 96)	64	Modeling	Fully Polyphonic
Electric Baby Grand	Physical Modeling	A0 (Note 21) to C7 (Note 108)	40 + 88	Modeling (hybrid)	
Clavi E.P.	Physical Modeling	F1 (Note 29) to E6 (Note 88)	60	Modeling	No sustain pedal support
DX Digital E.P.	Phase Modulation	A0 (Note 21) to C7 (Note 108)	28	RR + IVS	
MKS Digital E.P.	Hybrid	A0 (Note 21) to C7 (Note 108)	90	RR + IVS	
Vibraphone	Physical Modeling	C2 (Note 48) to C6 (Note 96)	49	Modeling	Fully Polyphonic
Acoustic Grand Piano	Physical Modeling	A0 (Note 21) to C7 (Note 108)	40 + 88	Modeling (hybrid)	**Experimental sound**
GSP-01	Sample playback	A0 (Note 21) to C7 (Note 108)	100	RR + IVS	
Synth PAD	Virtual Analog	A0 (Note 21) to C7 (Note 108)	16	RR + IVS	

PLEASE NOTE: all modeling engines have the exact same note range as the instrument they model. In some cases, there will be mute notes on the keyboard because those are outside the range of the real instrument. However, there are sampled counterparts of those instruments that offer full note range by simply stretching the samples at the extremes of the normal range. Of course, the result of this old practice is very questionable, but many people just ignore the fact that even the biggest Vibraphone doesn't exceed the 4 octaves.

5.1. VOICE ALLOCATION: MODELING.

This is common to all physical modeling engines, meaning that each single note is like a complete synthesizer on its own and plays independently from all other voices. Thus, each note is equivalent to a voice - exactly like in the real instrument - leaving no need for extra voices. The only correlation between notes is the generation of sympathetic resonances, but this is a different topic that will be discussed later in this manual. Let's take the "Tine" piano for an example: when the sustain pedal is kept depressed and the same note is played over and over (ribattuto), only one voice is allocated, and all the elements that make a voice (hammer, damper, tine, tonebar, pickup) are reused each time the same note is played. In this case we can call it "**Fully Polyphonic**", means that there's no limit to the polyphony as the instrument is capable of playing all of its possible notes simultaneously.

5.2. VOICE ALLOCATION: R.R. + I.V.S.

R.R. stands for Round Robin and I.V.S. stands for Intelligent Voice Stealing. This is the allocation model explained above, common to most synthesizers and sample playback engines. In our instrument, the voice stealing algorithm always steals the quieter voice.

5.3. VOICE ALLOCATION: MODELING (HYBRID)

This is only used for the Electric Baby Grand and the Acoustic Grand Piano engines and is a mix between two different voice allocation models. The stringboard is split in different parts because some of the strings are free to resonate even when they're not struck by the hammers, other strings only vibrate when they are required to do so. This method offers the possibility to obtain the behavior of a true polyphonic model just like in the real instrument.

CHAPTER 6. THE ADVANTAGES OF A MODELED PIANO OVER A SAMPLED ONE.

So, after all this talking about modeling vs. sampling and various polyphonic models, what are the real advantages of a physical modeling piano instrument over a sampled piano?

Polyphony. We've talked about numbers and how voices are allocated, but from a musical point of view there's something special about having a fully polyphonic instrument that makes it stand out from other polyphonic models, even if the number of voices is very high. Especially in a piano instrument where multiple elements vibrate together at the same time. Imagine the harp of a grand piano, in some cases there are 243 strings free to vibrate when the sustain pedal is held down, and each string can transmit a part of its vibration to other strings. This would not be possible to emulate with sample playback.

Sympathetic resonances. It's what happens when an element transmits parts of its movements to other elements. All piano instruments, including the electric pianos of the seventies, do resonate, even the Clavinet. There are several cases in which the resonances can be more or less evident. For example, with the Acoustic Grand Piano model or the Electric Baby Grand, try to press down a group of notes very softly so that they don't produce any sound, then play staccato on other notes one octave up. Or you can do the other way around, play some note very hard, then press down other notes then release the first group of notes... you'll find that the notes that you haven't played hard enough have been put into resonance. Now you're probably thinking that there are sample-based instruments that can do this, and you're probably wondering how they can achieve this result, right? Well, there's a synthesizer that plays along with the samples that generates just the resonances. GSP-01 (Seven's sample player engine) can do that as well.

Sound manipulation. Once a sound has been sampled, there's very little you can do to change its timbre. But if you're generating the sound in real time, you can practically do everything. Imagine changing the pickup position of a "Tine" E.P. or the string detuning of a Grand Piano, or the amount of resonance a piano can have, or the wear on the mallets of a Vibraphone. Many of these changes can be also applied in real time while playing, letting the player appreciate the difference between one setting and another.

Dynamics. The MIDI system used in most keyboards since the early eighties allows a maximum of 127 velocity levels for each note, but most sample-based instruments are usually limited to just 3 or 4 levels, 8 at best. Some of the modern sample libraries, those that require many Gigabytes worth of hard disk space and that can only be played on a full featured computer, can go up to 12, 16, or even 24 samples for each note, resulting in a huge waste of disk space for just one sound. Anyway, having all 127 levels filled with samples would be crazy even for today's computer technology. Crumar Seven uses an 11-bit dynamic model, resulting in a total of 2047 velocity levels, all used by the modeling engines. The advantage behind this virtually unlimited dynamic model is that the human being would never notice the switch between different dynamic levels, having the impression of a continuous and smooth transition between dynamic changes, just like playing a real acoustic instrument.

Last but not least, a clean and crisp sound. Since the sound is generated in real-time, and is not the result of a sound recording, it will always be perfectly clean, completely free from any background hum or hiss introduced by a recording equipment. Not counting that it can be perfectly dry, with no unwanted environmental reverberation mixed to the sound, so that artificial ambience and reverberation can be added to taste without compromising the original sound. You can't delete unwanted or excessive reverberation from a sampled sound, any more than you can remove the sugar from a cooked apple pie. Now imagine this: if a piano is sampled along with the natural reverberation of the room it is located in, each time you play a single note you hear both the piano note and the reverb, which can also be pleasing; but if you play a four note chord, what you hear is four piano notes plus four reverbs, which could very well be far from being a pleasing thing.

This list could be even longer than this, but we're confident that you now get the picture. Physical modeling can do much more.

CHAPTER 7. CONTROL PANEL: HAVING COLORED ENDLESS ENCODERS INSTEAD OF POTENTIOMETERS.

When we at Crumar designed the Seven we had to make a choice: normal potentiometers or endless encoders? Since the Seven can store and recall presets, we wanted to find a solution to the problem when potentiometers' physical positions do not reflect what has been stored into presets. Since putting motorized potentiometers was completely out of the question, we came up with a very elegant and practical solution: RGB illuminated encoders.

Since most of the knobs don't need to be set to a precise value, a numerical readout is unnecessary (even a potentiometer can't give a precise readout), so the idea is to have the knob change color according to the current value, towards green when the value is low and towards red when the value is high, with intermediate shades of colors in between.

One advantage is that all knobs can be immediately updated as soon as a new preset is changed, they can change color or turn completely off according to the parameter values they're displaying. **Each single knob is both an input device and an output device.** Another advantage is that all knobs also function as a push button, so each knob can be used for two or more parameters at once. For example, the reverb can be turned on or off by simply making a slow button push on the knob; it can adjust the reverb level, in this case the color changes between green and red, but with a quick push on it, the function switches to reverb decay, displaying a color change between blue and red.

Each knob can be pushed in two ways to make two distinct operations:
- **SLOW PUSH**, keep pushed for at least 100 milliseconds then release, like pushing gently;
- **QUICK PUSH**, push and release immediately.

Since the slow push is always used to turn on or off all effects, this also prevents effects to be toggled accidentally if a knob is hit while playing on the keyboard. *PLEASE NOTE: if the VOLUME knob is blue, the instrument is set to LOCAL OFF and won't play.*

The following table shows the functions of the eight knobs and the colors they use.

KNOB NUMBER	PARAMETER 1	COLORS	PARAMETER 2	COLORS	SLOW PUSH	QUICK PUSH
1	VOLUME	GREEN-RED	-	BLUE	LOCAL ON-OFF	-
2	REVERB LEVEL	GREEN-RED	REVERB DECAY	BLUE-RED	REVERB ON-OFF	Switch parameter
3	EQ BASS	GREEN-RED	EQ MID	GREEN-RED	EQ ON-OFF	-
4	EQ TREBLE	GREEN-RED	EQ MID FREQ.	GREEN-RED	EQ RESET	Switch parameter
5	FX1 DEPTH	GREEN-RED	FX1 RATE	PULSING BLUE	FX1 ON-OFF	Switch parameter
6	DRIVE AMOUNT	GREEN-RED	-		AMP/DRIVE ON-OFF	-
7	FX2 DEPTH	GREEN-RED	FX2 RATE	PULSING BLUE	FX2 ON-OFF	Switch parameter
8	PAD LEVEL	GREEN-RED	PAD BLEND	BLUE-RED	PAD ON-OFF	Switch parameter

CHAPTER 8. CONTROL PANEL: USING KNOBS AND BUTTONS.

In the previous chapter we've learned how the knobs work and what they do, now let's see the rest of the controls.

8.1. CONTROL PANEL: THE PRESETS.

As you can see from the above picture, the center section consists of a group of big buttons used to store and recall our presets. There's a BANK button that cycles between 4 banks of 8 presets each, that can be recalled or stored using the 8 numbered buttons. The first bank, with a red LED, is a factory read-only bank containing presets that can't be overwritten by the user. Each factory preset uses one of the 8 modeling engines, clearly labeled above the button. The remaining 3 banks, with yellow LEDs, can store user presets.

- **To recall a preset**, select the bank by pushing the BANK button, the LED starts blinking, then push the desired preset number.
- **To save a preset**, first select a user bank (those with yellow LEDs) then push and hold the desired preset button for at least 3 seconds, until you see an LED animation.

If the bank button has been depressed but no preset has been recalled within three seconds, the previous bank number is restored and the LED stops blinking. *PLEASE NOTE: The Seven will always start with preset 1-1 every time it is turned on.*

The table at the next page shows a description of all factory presets.

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NUMBER	NAME	SOUND	EFFECTS	REMARKS
1 - 1	TINE PIANO	TINE PIANO	NO EFFECTS	DRY TINE PIANO WITH ALL DEFAULT SETTINGS
1 - 2	REED PIANO	REED PIANO	AMP SIMULATOR, MONO TREMOLO, REVERB	AMP SIM IS SET TO SOUND SIMILAR TO AN 200A INTERNAL SPEAKERS
1 - 3	ELECTRIC GRAND PIANO	ELECTRIC GRAND PIANO	REVERB	DRY SOUND WITH JUST REVERB
1 - 4	CLAVI PIANO	CLAVI PIANO	REVERB	TRY TO TURN FX1 ON
1 - 5	DX DIGITAL PIANO	DX SYNTH PIANO	REVERB	TURN FX2 ON FOR A DELAY
1 - 6	MKS DIGITAL PIANO	MKS SYNTH PIANO	CHORUS, REVERB	THE KING OF THE BALLADS
1 - 7	VIBRAPHONE	VIBRAPHONE	MONO TREMOLO, REVERB	WITH TREMOLO
1 - 8	ACOUSTIC PIANO	ACOUSTIC PIANO	REVERB	CLASSIC SETTING, CAN BECOME EITHER DARKER OR BRIGHTER
2 - 1	DOWNTINES	TINE PIANO	PHASER, REVERB	TINE EP WITH MODERATE PHASER
2 - 2	DYNO-MY-SEVEN	TINE PIANO	CHORUS, EQ, AMP SIMULATOR, REVERB	CLASSIC EP WITH A BRIGHT ATTACK
2 - 3	SUITCASE	TINE PIANO	AMP SIMULATOR, REVERB	CLASSIC EP WITH BUILT-IN AMPLIFIER
2 - 4	FM WURLY	DX SYNTH PIANO	DELAY, PAD, REVERB	DYNAMIC DIGITAL PIANO
2 - 5	PINK WURLEY	REED PIANO	LFO-WHA, AMP SIMULATOR, EQ, REVERB	REED PIANO WITH LFO WHA-WHA
2 - 6	FUNKY-CLAV	CLAVI PIANO	LFO-WHA, AMP SIMULATOR, REVERB	CLAVINET WITH LFO WHA-WHA
2 - 7	SIRIUSLY	SAMPLED CLAVI PIANO	DELAY, PAD, EQ, REVERB	CLAVI SOUND WITH RHYTHMIC DELAY
2 - 8	POP PIANO	ACOUSTIC PIANO	DELAY, PAD, EQ, REVERB	PIANO SOUND WITH SYNTH PAD OVERLAY
3 - 1	WATERPIANO	TINE PIANO	PHASER, AMP SIMULATOR, EQ, REVERB	AMPED TINE PIANO WITH PHASER
3 - 2	DIGIPOP PIANO	MKS SYNTH PIANO	FLANGER, PAD, EQ, REVERB	MKS PIANO WITH A DEEP FLANGER EFFECT
3 - 3	STRANGER WURLY	REED PIANO	CHORUS, AMP SIMULATOR, REVERB	REED EP WITH A LIGHT CHORUSING
3 - 4	SAMPLED CP	SAMPLED CP PIANO	REVERB	JUST THE SAMPLED CP PIANO
3 - 5	OUTTA-CLAV	CLAVI PIANO	PHASER, AMP SIMULATOR, REVERB	CLAVINET WITH DEEP PHASING
3 - 6	SEVEN GUITARS	SAMPLED CLAVI PIANO	CHORUS, PAD, EQ, REVERB	SIMULATES A GUITAR
3 - 7	SAMPLED VIBES	SAMPLED VIBRAPHONE	MONO TREMOLO, REVERB	JUST THE SAMPLED VIBRAPHONE
3 - 8	ROCK PIANO	ACOUSTIC PIANO	EQ, REVERB	THE MODELING PIANO SET TO SOUND VERY BRIGHT AND POWERFUL
4 - 1	DEEP DIGIPIANO	DX SYNTH PIANO	CHORUS, PAD, EQ, REVERB	A VARIATION OF THE DX PIANO WITH WARM EFFECTS
4 - 2	WET BABYGRAND	ELECTRIC GRAND PIANO	CHORUS, AMP SIMULATOR, PAD, EQ, REVERB	THE CP MODEL FULL OF EFFECTS
4 - 3	SUGAR DX	DX SYNTH PIANO	CHORUS, PAD, EQ, REVERB	ANOTHER VARIATION OF THE DX PIANO
4 - 4	FM RAINDROPS	DX SYNTH PIANO	DELAY, PAD, REVERB	YET ANOTHER VARIATION OF THE DX PIANO SIMILAR TO A MARIMBA
4 - 5	POP COMBO PIANO	COMBO PIANO	DELAY, PAD, EQ, REVERB	GOOD FOR MANY POP BALLADS
4 - 6	BRASS'N'STRINGS	DX SYNTH PIANO	MONO TREMOLO, DELAY, PAD, EQ, REVERB	AN FM BRASS SOUND LAYERED WITH SYNTH PAD
4 - 7	FM ORGAN	DX SYNTH PIANO	MONO TREMOLO, CHORUS, EQ, REVERB	AN ORGAN SOUND MADE WITH THE DX ENGINE
4 - 8	SAMPLED PIANO	GSI GRAND D	REVERB	JUST THE SAMPLED GRAND PIANO

8.2. CONTROL PANEL: THE EFFECT SECTION.

As seen in the previous chapter, all effects can be turned on or off by means of a slow push on a knob. The effects sections FX1 and FX2 offer a choice of 4 effects each. To select an effect, push the SEL button and the LED will show which effect has been selected. Effects can also be selected when the FX section is off. In this case, at the first push of the SEL button the LED just shows the current effect, then turns off after three seconds. If the SEL button is depressed again within three seconds, the selection shifts to the next preset. Effects are explained in detail later in this manual.

8.3. CONTROL PANEL: TRANSPOSITION.

The transpose button is labeled with a small keyboard icon and has a red LED that turns on whenever the transposition is active. **Transposition is always zeroed every time the instrument is turned on.** To change the transposition between -12 and +12 semitones, just press and hold the transpose button and play a note around the middle C. To reset, use the middle C or keep the transpose button depressed for 3 seconds until the LED goes off.

CHAPTER 9. CONTROL PANEL: EXTRA FUNCTIONS.

9.1. CONTROL PANEL: CLAVI TABS.

When the Clavi E.P. engine is used in a preset, it is possible to use the preset buttons to switch the filters and the pickup selectors. These are arranged exactly the same as the Clavinet D6, which the Seven's synth engine simulates. The button right below the transpose section is labeled **CLAVI TABS**, push and hold it to switch the Clavi tabs, the corresponding LEDs will show the current statuses.

PLEASE NOTE: if all filters are turned off, you won't hear any sound. More details about this sound will be given later in this manual.

9.2. CONTROL PANEL: LOCAL OFF.

Seven's keyboard normally plays the internal sound engine but also sends MIDI messages to the MIDI output ports. If you need to control an external MIDI unit without playing the internal engine, do a slow push on the **VOLUME** knob, it will turn blue. It is possible to switch to a different MIDI channel when the Local Off is active. More details will be given later in this manual.

9.3. CONTROL PANEL: SHORTCUTS.

Press and hold the **BANK** button for 3 seconds to reverse the sustain pedal polarity.

CHAPTER 10. ACCESSING THE EDITOR.

The Crumar Seven editor offers many parameters that can be adjusted to obtain the desired sound or to change some global settings of the instrument. There are two ways to access the editor:

1. The remote MIDI editor, accessible through the MIDI-USB port and a computer or mobile device connected to the Internet.

You need a USB cable connected to the USB MIDI I/O port (like those used for connecting a printer to a computer), use it to connect the Crumar Seven to a computer, or to an Android device using an OTG adapter, or to an iPad using Apple's Camera Connection Kit. Once done, launch your CHROME browser and navigate to this website:

https://www.gsidsp.com/Seven

PLEASE NOTE: *if you don't have CHROME, install it from Google, or from the Play Store (Android) or from the App Store (Apple). Other browsers may not be compatible.*

2. The internal editor, accessible through a Wi-Fi connection. The Crumar Seven will function as an hot-spot that creates its own private network to connnect to.

IMPORTANT: Accessing the internal editor web-app requires the **Crumar Wi-Fi USB adapter** to be plugged into one of the two System USB ports located in the connection panel. The adapter must be plugged when the instrument is off.

Any modern mobile device (tablets and smartphones) or any modern computer (desktop or laptop) can be used to access the Editor web-app. The execution speed of the Editor depends on the CPU power of your device. When the Seven is on, use your device's network options to start scanning for existing Wi-Fi networks. The Seven should cast an SSID that starts with "Seven-xxxxxxxx" where the "x" are replaced by an hexadecimal serial number that is unique for each unit. Complete the connection using the following password: 00000000 (eight times zero). The password can be changed later from the home screen of the Editor app and can be restored to its default value at any time by using a small screwdriver or a sharp pencil to push the button that hides behind the hole labeled "Wi-Fi Reset" on the connection panel. The password will be re-set to "00000000" and the system will restart automatically.

Once connected, open your favorite browser (Chrome, Safari, Firefox, Edge, etc.) and type the URL using the IP number:

HTTP://192.168.1.1

The Editor home page should load into your browser like a normal web site. This can be viewed either in portrait or landscape mode, the page should redraw itself accordingly. This is pretty much the same procedure used by many xDSL modems, routers, web-cams, printers, CCTV recorders and many other modern network appliances that offer a built-in network-based editing interface.
PLEASE NOTE: **only one device at a time can be connected to the Seven**. *If you're unable to connect, check that no other device is already connected, turn all connections off then retry.*

The Editor consists of an home page with global settings, a page for sound selection, a page for sound parameters, a page for effect parameters, plus one last page for editing the Midi Controller Map.

10.1. EDITOR HOMEPAGE, GLOBAL OPTIONS.

The first page of the editor is dedicated to some global settings and operations such as the firmware update and factory reset.

The settings are:

- Tuning: This accepts a range from A=430 Hz to A=450 Hz, with 440 Hz being the default value. Every time this setting is changed, a reboot is required in order for the new change to take effect.

- Channel: the MIDI channel used for sending and receiving all messages. If incoming messages are on a different channel, they'll be ignored. This can also be set to OFF, in this case the Seven won't send or receive any MIDI message, but it will still send when it's set to Local-off mode.

- Alt. Channel: this is the *alternative* Channel that can be used only when the instrument is set in Local-off mode and is only for sending messages.

- Send CC: select YES to send all CC messages whenever a control is changed on the panel or in the editor; select NO to avoid sending CC messages.

- Send PC: select YES to send Program Change messages whenever a new preset is recalled; select NO to avoid sending them.
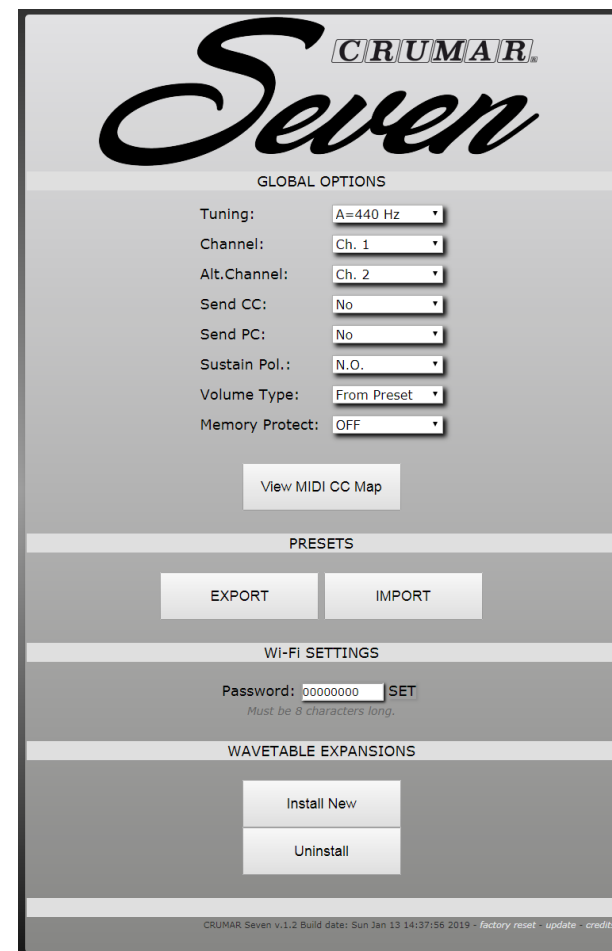
- Sustain Pol.: Select N.C. for Normally Closed pedals, and N.O. for Normally Open pedals. This parameter can also be changed by pressing and holding for 3 seconds the BANK button on the instrument panel.

- Volume Type: this is normally set to "From Presets", so that each time a new Preset is recalled, the volume knob is set to the value stored into the preset. If you need to use the volume knob as a global volume adjustment that doesn't change each time a new Preset is recalled, set this option to "Global".

- Memory Protect: this is normally set to OFF, but if you wish to lock your presets and avoid overwriting them accidentally, set this option to ON.

10.2. PRESETS EXPORT / IMPORT.

The two buttons under the PRESETS section can be used to export or import a preset to/from the USB memory. When exporting a preset, a file called "Seven_x-y.bin" is created, where x is the bank number and y is the preset number. This file can be renamed by the user, but the extension .bin must be kept. When importing a preset, this will be imported and immediately activated, but doesn't overwrite any existing preset until a preset store is performed by selecting the desired bank and the pressing and holding the desired preset number until the LED animation confirms the write operation.

10.3. WAVETABLE EXPANSIONS.

The two buttons under the WAVETABLE EXPANSIONS section are used to install a wavetable expansion whenever this is released by Crumar, or uninstall a previously installed expansion. Please follow the installation instructions provided with the expansion. When the INSTALL NEW button is clicked, a pop-up window appears in order to select the expansion file from the USB drive. Here you can also check the available storage memory.

10.4. VIEW MIDI CC MAP.

Access the MIDI Controller Map. All parameters accessible from the physical panel have pre-assigned fixed CC numbers that can't be changed. All other parameters are unassigned by default but can be freely assigned to any CC. This page will only display assignable parameters. The fixed CC numbers are shown in the following table.

VOLUME	7	FX1 TOGGLE	20	AMP TOGGLE	28
EQ BASS	12	FX1 SELECT	21	AMP DRIVE	29
EQ TREBLE	13	FX1 DEPTH	22		
EQMIDDLE	14	FX1 RATE	23	REVERB TOGGLE	30
EQ MID.FREQ.	15			REVERB LEVEL	91
EQ BYPASS	16	FX2 TOGGLE	24	REVERB DECAY	92
		FX2 SELECT	25		
		FX2 DEPTH	26	PAD TOGGLE	31
		FX2 RATE	27	PAD LEVEL	32
				PAD BLEND	33

10.5. WI-FI PASSWORD.

The default password for connecting to the Seven is "00000000", it can be changed to any word of a max. length of 8 characters. It's preferable to use only letters and numbers and avoid special characters. Setting a custom password prevents others to connect to the Seven while we are performing on the stage. However, the Wi-Fi radio in the Seven is powered enough to serve a connection in a range of max. 5 – 10 meters (30 feet) - even though this distance may vary according to possible interference - and accepts **only one connection at a time**, so there's no risk that two devices are editing the Seven at the same time.

10.6. FIRMWARE UPDATE AND FACTORY RESTORE.

At the bottom of the home page there is some useful information that shows the firmware release version and exact date, next to that there are a couple of useful links. One is to perform a firmware update, whenever this is released in the future. Firmware updates usually may solve problems or add new functions, new features, etc.

The other link is the FACTORY RESTORE that, if used, deletes all user presets and replaces them with the factory presets. Also, global settings are restored to their default positions.

Yes, the links are quite small for a good reason. Zoom in if you can't tap them on your mobile device.

PLEASE NOTE: each time a new firmware is released, if new functions are added to the software, a new revision of this user's manual is released too. Therefore, if you have a digital copy of this manual, we advice not to print it and make sure to get the latest version. Also, if you have downloaded this manual from a source other than Crumar's official web page, please visit www.crumar.it and download the latest manual from the support section.
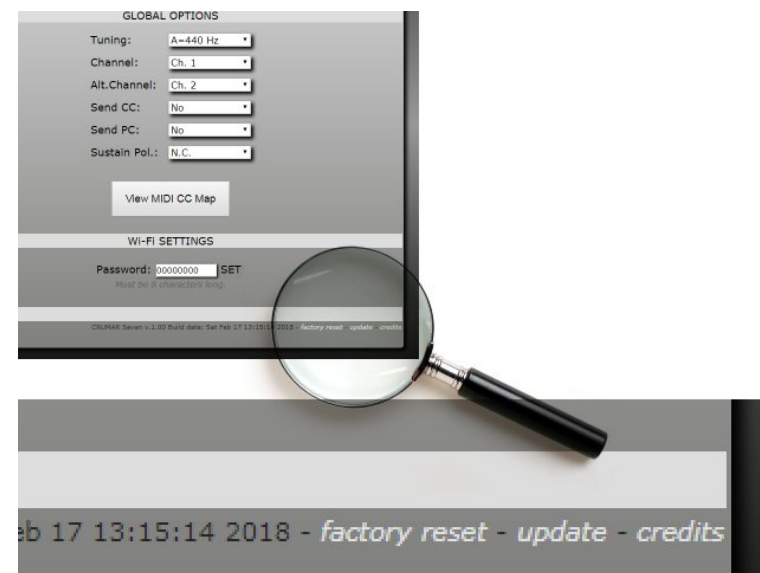
10.7. PAGE: SELECT PIANO.

This page lets you select which piano instrument to use for the current preset. The first 8 instruments are those based on real-time synthesis, either physical modeling or other types of synthesis as seen earlier in this manual, each represented with a graphical icon. The remaining sounds are all sample sets based on the GSP-01 Sample Player, and are represented with a waveform icon.
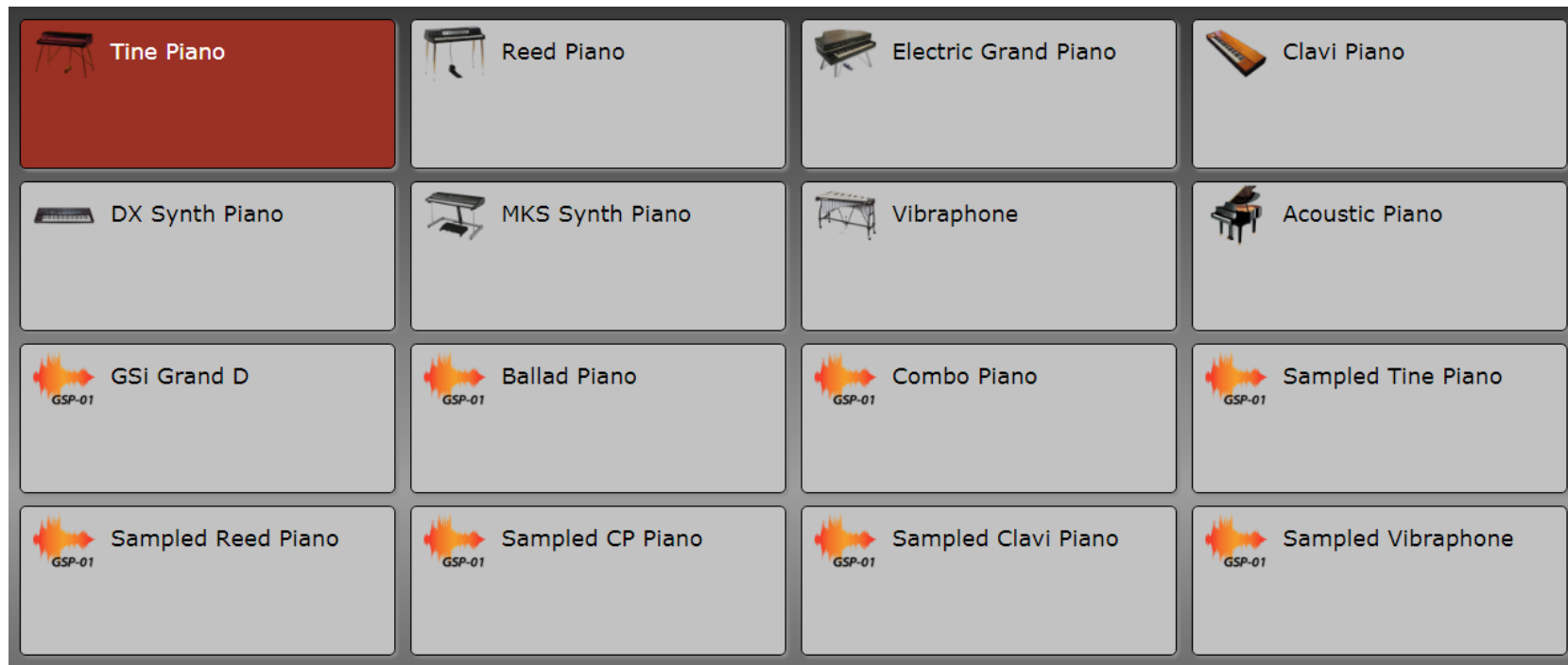

The active sound is highlighted in red. You'll notice that whenever a modeling sound is active, the illuminated "Seven" logo on the instrument's panel is fully lighted, but as soon as a sampled sound is selected, the logo dims out a bit... :-)

CHAPTER 11. SOUNDS: TINE ELECTRIC PIANO.

This is a simulation of the famous *Rhodes Electric Piano*. It's not specific to a Mark I, Mark II or Mark V model because it can do them all. The parameters you find in the EDIT PIANO page are:

- TYPE: This lets you select one of the 9 different variations.
- ATTACK LEVEL: Adjusts the volume of the wooden noises.
- RELEASE LEVEL: Adjusts the volume of the damper noises you can hear every time a key is released.
- HAMMER HARDNESS: Adjusts the hardness of the hammer tips; a higher value produces a snappier attack, a lower value produces a softer attack. This also affects the amount of metallic component you hear at the attack of each note.
- BITE AND BARK: Adjusts the aggressiveness of the virtual tines. This aspect also varies according the selected variation.
- METALLIC: Adjusts the metallic component of the tine sound.
- RESONANCES: Adjusts the level of the sympathetic resonances. When the sustain pedal is held down, the whole harp is free to vibrate so each key stroke puts the harp into self-resonance.
- PICKUP OFFSET: Adjusts the average offset of the pickups in front of the tines. This parameter affects the balance between the fundamental and its overtones. The picture at the right shows the correlation between the tine, the tonebar and the pickup in a real *Rhodes* piano.
- HI-PASS FILTER: Adjusts the hi-pass filtering, similar to the original "BASS BOOST" knob, which is indeed a passive high-pass filter.
- PEDAL NOISE LEVEL: Adjusts the volume of the noise produced by the sustain pedal.
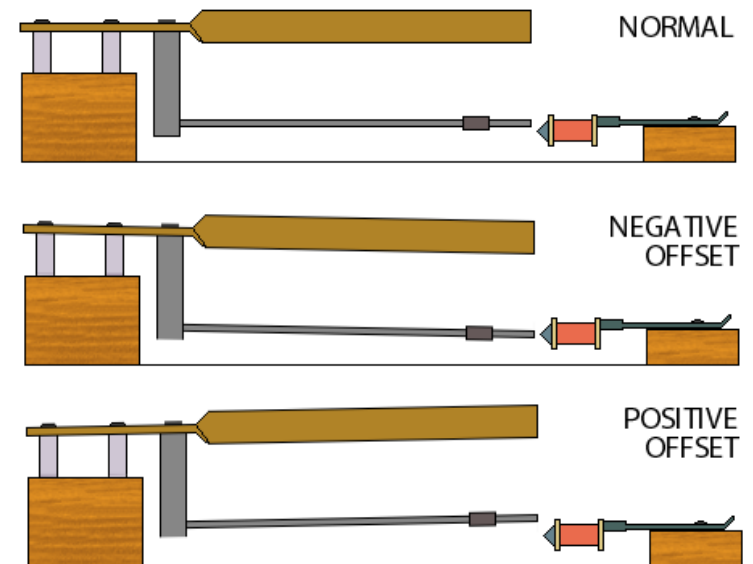
CHAPTER 12. SOUNDS: REED ELECTRIC PIANO.

This is a simulation of the *Wurlitzer 200A* electric piano. This particular model also included a built-in amplifier and a couple of oval speakers, however the Seven only simulates the dry piano sound as found at the output jack. To obtain a sound similar to that produced by the piano's internal speakers, the AMP simulator must be turned on.

The parameters you find in the EDIT PIANO page are:

- ATTACK LEVEL: Level of the attack wood noises.
- RELEASE LEVEL: Level of the noises produced by the dampers.
- RELEASE TIME: Slightly adjusts the release time. If dampers are worn out, the release time tends to be a bit longer.
- HAMMER HARDNESS: Adjust the hardness of the hammer tips. A higher value produces a snappier attack, a lower value produces a softer attack. This parameter affects the whole aggressiveness of the sound.
- PEDAL NOISE LEVEL: Adjusts the level of the pedal noise.
- RESONANCES: Adjusts the level of the sympathetic resonances. As seen on the Tine EP, when the sustain pedal is held down, all reeds are free to resonate as soon as a key is played.

A *Wurlitzer 200A* piano also has a built-in tremolo effect. This can be accomplished by turning on FX1, set the Mono Tremolo effect and set the rate at about 6,5 Hz. Factory preset number 2 uses both the amp and the tremolo effect.

CHAPTER 13. ELECTRIC GRAND PIANO.

This is a simulation of a *Yamaha CP80* electric baby grand piano. The original instrument also featured a built-in equalizer with a "Brilliance" lever switch, and a tremolo effect. The Seven reproduces only the sound of the piano as found at the jack output with all EQ knobs at middle position and the brilliance lever on the high position. To obtain more EQ options, just turn on Seven's internal EQ. And, of course, the tremolo can be added with FX1.

The parameters you find in the EDIT PIANO page are:

- HAMMER CUTOFF: Cutoff frequency of the low-pass filter applied to the hammers. Since this is a physical modeling instrument, we're not talking about a filter applied to the whole sound, but only to a single element of the virtual piano. By increasing this parameter you'll notice that the attack component will result brighter, even though this brightness is not always added to the body of the decaying sound.
- HAMMER RESONANCE: Resonance amount of the low-pass filter applied to the hammers.
- HAMMER OFFSET: This parameter adjusts the horizontal alignment of all hammers in relationship with the strings. In the center position, all hammers are perfectly aligned; if the position is changed, the whole harmonic content of each note could change in an unpredictable way. This greatly affects what's known as the "voicing" of a grand piano.
- HAMMER WIDTH: Set the size of the virtual hammers. A bigger size results in a fuller sound but will increase the volume, which is not always a good thing. Imagine playing a drum with a thin stick, it sounds good and balanced. Now use a thicker stick, it sounds a bit louder but you may not like the timbre as some of the harmonic content is dampened by the bigger mass that strikes the drum head. Same with the strings.
- STRING DAMPING: Set the amount of damping of all strings, i.e. the loss of higher harmonics during the decay phase.
- STRING DETUNING: This parameter adjusts the slight detuning between the strings. This also affects the voicing, adjust it at small steps.

- PICKUP COMPRESSION: Adjusts the effect of level compression due to pickup impedance loss when the signal gets hotter. Results in a slower or longer decay according to this parameter's position.
- RELEASE LENGTH: Adjusts the amount of residual string vibration after each note-off (key is released, damper is off).
- STRETCH TUNING: Set the amount of stretch tuning. The middle position corresponds to the original tuning table as recommended by the piano manufacturer.
- SYMPATHETIC RESONANCES: Set the amount of sympathetic resonances spread over the whole harp.
- KEY NOISE LEVEL: Adjusts the volume of all key noises generated by the hammers.
- PEDAL NOISE LEVEL: Adjusts the volume of the noises generated by the pedals.
- DYNAMICS: Adjusts the dynamic response, i.e. the ratio between MIDI velocity and note velocity.

CHAPTER 14: CLAVI ELECTRIC PIANO.

This is a simulation of a *Clavinet D6*. As seen in Chapter 9, the CLAVI TABS can also be accessed by the physical control panel. There's only one more parameter only accessible from the editor. The parameters you find in the EDIT PIANO page are:

- PICKUP A/B: When single pickup, switch between A = Neck Pickup and B = Bridge Pickup;
  when playing both pickups (D Position) switch between A =Pickups in phase and B =Pickups out of phase.
- PICKUP C/D: Switch between Single Pickup (C position) or Both Pickups (D Position).
- FILTER SOFT: Toggles the Soft filter.
- FILTER MEDIUM: Toggles the Medium filter.
- FILTER TREBLE: Toggles the Treble filter.
- FILTER BRILLIANT: Toggles the Brilliant filter.
- DAMPER LEVER: Adjusts the dampening for all strings. In a real *Clavinet* this lever lets a damper felt touch all strings, reducing the duration of all notes, as well as their brightness and loudness.

CHAPTER 15. SOUNDS: DX DIGITAL PIANO.

This is the reproduction of the famous patch called "E.PIANO 1" of the *Yamaha DX7* which probably made that synthesizer very famous during the eighties. That patch wanted to be a replacement of the *Rhodes* sound using the technology of the time, but turned out being a sound on its own, featured in many pop songs of a whole decade. The Seven reproduces this sound by using the exact same synthesis, most known as "*FM, Frequency Modulation*" even though the modulation actually applies to the phase, not to the frequency of a sine waveform, so it'd better be called "Phase Modulation".

This instrument has only one parameter, which offers 9 variations of sound using the same *algorithm,* among which we also find an organ, a brass section, a bass and a marimba, of course all with that FM taste that is not actually focused at realism.

CHAPTER 16. SOUNDS: MKS DIGITAL PIANO.

Another very famous piano sound used during the eighties was that of a *Roland RD-2000* which aimed at simulating acoustic and electric piano sounds using the technology of the time as much as the Seven simulates the same instruments but with 30 years of technology advancements ahead. The sound simulated by the Seven is that of the patch n.7 "E.PIANO 1", which was in turn a reproduction of the Rhodes sound. Similarly to the *DX7*, this turned out to become a timbre of its own, featured in many famous pop songs of a whole decade, but with a difference: the *RD-2000* (or *MKS-20*) also featured a gorgeous 2-voice BBD analog stereo chorus. This effect can be reproduced in the Seven by turning on FX2.

This instrument also has just one parameter that adjusts the overall decay time. The original instrument had no parameters whatsoever.

CHAPTER 17. SOUNDS: VIBRAPHONE.

What does a vibraphone do in a keyboard that simulates piano instruments? Well, even though the vibraphone isn't played with a keyboard, it has that magic appeal of a piano because the bars are arranged exactly like piano notes, but it's played with mallets, so it puts together the fun of playing a percussive instrument with the ease of playing a piano at first glance. The vibraphone simulated by the Seven is completely based on physical modeling, and offers two parameters:

- DECAY TYPE: this can either be Keyboard or Mallets. The difference stands in the fact that a real vibraphone, as opposed to a piano, has only one big damper for all bars, while the piano has one damper for each note. So, on a piano you can play and hold a single note and have the sound to decay slowly in time; on a vibraphone the sound will decay soon after you hit the bar with the mallet, unless you press the sustain pedal. So, if you prefer to play the vibraphone piano-style, select Keyboard; if you wish to try the experience of using mallets, select Mallets... but remember that even the best vibraphonist can only use up to four mallets, so no more than four notes at once!

- MALLET HARDNESS: the harder the mallet, the brighter the sound.

PLEASE NOTE: the Seven simulates a four octave vibraphone, with a note range starting at the second C note up to the last C note. You'll find that all other notes will not produce any sound. This is not a bug, not an issue. If you don't like having mute notes on the keyboard, you can still use the sampled vibraphone.

CHAPTER 18. SOUNDS: ACOUSTIC GRAND PIANO.

The Crumar Seven also has a physical modeling simulation of an acoustic grand piano. This simulation doesn't point at a specific model, but is based on a well known structure that is common to some of the most used, also most expensive, concert pianos. It consists of a total of 243 strings, the first 8 notes (A to E) have only one round-wound string each, next 5 notes (F to A) have two round-wound strings each, next 7 notes (A# to E) have three round-wound strings each, the remaining 68 notes (F to C) have three plain steel strings each. The last 17 notes (G# to C) do not have dampers. The soundboard has what's known as the "Duplex Scale" that adds harmonics to the sound. Many elements of this structure can be slightly modified to taste. The editing page of the Grand Piano will look pretty much similar to that of the Electric Baby Grand, since both are basically acoustic pianos and have many elements in common. **It's worth noticing that this sound engine is still in its experimental phase and should not be considered a key feature of the Crumar Seven. We recognize that, despite its editing capabilities, it may not sound 100% realistic and is not problem free. If you need to play a realistic acoustic piano, please select one of the sampled instruments.**

The parameters you find in the EDIT PIANO page are:
– HAMMER CUTOFF: Cutoff frequency of the low-pass filter applied to the hammers. Since this is a physical modeling instrument, we're not talking about a filter applied to the whole sound, but only to a single element of the virtual piano. By increasing this parameter you'll notice that the attack component will result brighter, even though this brightness is not always added to the body of the decaying sound.
– HAMMER RESONANCE: Resonance amount of the low-pass filter applied to the hammers; will mostly affect bass notes, leaving the treble notes almost unaltered.
– HAMMER OFFSET: This parameter adjusts the horizontal alignment of all hammers in relationship with the strings. In the center position, all hammers are perfectly aligned; if the position is changed, the whole harmonic content of each note could change in an unpredictable way. This greatly affects what's known as the "voicing" of a grand piano.
– HAMMER WIDTH: Set the size of the virtual hammers. A bigger size results in a fuller sound but will increase the volume and will also alter the voicing; adjust this parameter in accordance to the previous parameter.

- HAMMER BODY: Adjusts the timbre of the hammer noises, by filtering some of the thump caused by the hammers.
- STRING DAMPING: Set the amount of damping of all strings, i.e. the loss of higher harmonics during the decay phase.
- STRING DETUNING: This parameter adjusts the slight detuning between the strings. In a real grand piano, the three strings of a note should have the exact same pitch, which however is impossible to obtain so there will always be a slight detuning between them. This also affects the voicing, adjust it at small steps.
- DIRECT SOUND: Adjusts the balance between the sound coming directly from the strings and that coming from the piano cabinet. A lower value will result in slower loss of amplitude giving the effect of a longer decay, i.e. a nearer sound like putting your ears directly on the strings; a higher value results in a quicker loss of amplitude, even if the decay time remains unchanged.
- RELEASE LENGTH: Adjusts the amount of residual string vibration after each note-off (key is released, damper is off).
- HARP HI-PASS: this is an high-pass filter applied to the whole harp, needs to be adjusted in case the voicing tends to give a sound too resounding.
- STRETCH TUNING: Set the amount of stretch tuning. The middle position corresponds to the original tuning table as recommended by the piano manufacturer.
- SYMPATHETIC RESONANCES: Set the amount of sympathetic resonances spread over the whole harp.
- KEY NOISE LEVEL: Adjusts the volume of all key noises generated by the hammers.
- RELEASE NOISE LEVEL: Adjusts the volume of the noises caused by the dampers muting the strings when a key is released.
- PEDAL NOISE LEVEL: Adjusts the volume of the noises generated by the pedals.
- FUNDAMENTAL LEVEL: Adjusts the volume of the first harmonic (fundamental) of each note over the rest of the harmonic content.
- CABINET PRESENCE: Adjusts the volume of the resonances and reverberations produced inside the piano cabinet.
- CABINET TIMBRE: Adjusts the timbre of the cabinet sound, like modifying its structure and materials.
- LID POSITION: Adjusts the position of the piano lid. Lower values correspond to lid completely closed; higher values correspond to a lid completely removed. The center position corresponds to the lid half open.
- DYNAMICS: Adjusts the dynamic response, i.e. the ratio between MIDI velocity and note velocity.

CHAPTER 19. SOUNDS: EXTRA SAMPLED MATERIAL.

The last sound engine is the sample player GSP-01. This player can only play back custom Crumar and GSi sample sets, can't import user created samples and other common formats, but can be updated with new sounds whenever these are released. The editor's page SELECT PIANO offers a selection of sampled sounds, most of these are sampled counterparts of the modeled sounds (the reason was explained in Chapter 5), others are combinations of several type of pianos sampled together.

The parameters you find in the EDIT PIANO page are:

- – LEVEL: Volume of the sample set.
- – ATTACK: Attack time relative to the sample-set built-in attack value.
- – RELEASE: Release time relative to the sample-set built-in release value.
- – FILTER: Modifies the low-pass filter response.
- – VELOCITY: Adjusts the MIDI velocity response.
- – PIANO HARP: If a piano sample is selected, this parameter adjusts the piano resonance level; does nothing for other kind of samples.
- – LFO RATE: If this sample supports the modulation wheel, this parameter adjusts the LFO speed.
- – LFO DEPTH: If this sample supports the modulation wheel, this parameter adjusts the LFO amount.
- – REL. SMP. LEVEL: Adjusts the level of the release sample (if any).
- – PED. SMP. LEVEL: Adjusts the level of the pedal noise sample (if any).

CHAPTER 20. EFFECTS.

The EDIT EFFECTS page of the Web-App Editor shows everything about the effect section of the Seven, including the same parameters that already are accessible from the front panel. As a matter of fact, the editor and the physical panel are in perfect symbiosis, every time something is moved on the panel is reflected into the editor, as well as every time a parameter is changed in the editor, if it has a visual output on the panel (LED or knob's RGB LEDs) this will be updated accordingly. So, if for example you move the VOLUME slider on the editor, you'll see the first knob to change color. In this page, each section is enclosed in a numbered box. Here follows a detailed description of each parameter.

20.1. MASTER.

This section includes the master volume and the equalizer. The equalizer is a 3-band semi-parametric equalizer with bass, treble, middle and selectable middle frequency. There's a bypass switch that completely overrides the equalization.

20.2. EFFECT 1.

This corresponds to the FX1 section of the control panel. Here you can toggle the effect and choose between Mono Tremolo, Stereo Auto-Panner, LFO Wha-Wha and Pedal Wha-Wha. The latter requires an expression pedal to be connected (more details on connections later in this manual). The two parameters DEPTH and RATE are common to all effects in this section.

PLEASE NOTE: when the FX1 knob is displaying the RATE parameter, the blue light blinks in perfect sync with the effect's oscillator. The same applies to FX2 as well.

20.3. EFFECT 2.

This corresponds to the FX2 section of the control panel. The choice is between Stereo Chorus, Stereo Phaser, Stereo Flanger and Delay. The DEPTH and RATE parameters are common to all effects in this section, with the exception that when the Delay is used this is actually the TIME parameter. The Phaser and the Delay effects have further parameters that are explained in the following sections.

20.4. PHASER.

Here you can choose the number of phasing stages, 2, 4, 6 or 8 stages, the LFO offset and the amount of feedback. This allows you to emulate a wide range of existing phaser effects.

20.5. DELAY.

When the Delay effect is selected, the DEPTH parameter varies both the delay feedback and level at the same time. This section allows to establish the maximum amount of feedback and level that can be varied by the DEPTH parameter. Plus, the STEREO SPREAD parameter allows to separate the reflections on the left and right channels until a ping-pong delay effect is obtained.

20.6. AMP SIMULATOR.

This section emulates a number of well known guitar and bass amplifiers, each with its passive 3-way equalizer and overdrive. The choice is among a TWIN, an AC30, a JCM, a JAZZ CHORUS (sans the chorus!), and a BASS amp. The knob on the panel adjusts the amount of overdrive.

20.7. DIGITAL REVERB.

This is a great sounding digital reverberator with plenty of parameters to emulate a wide variation of rooms and other reflecting virtual environments. The knob on the panel adjusts the LEVEL and the DECAY time. Other parameters include:

– DAMP: amount of high frequency loss over the decay time
– DIFFUSION: amount of regeneration due to reflections on the walls
– PRE-DELAY: time before the first reflection takes place
– ROOM SIZE: max size of the virtual room
– HIGH SHELF: high-pass filter applied to the input signal
– LOW SHELF: low-pass filter applied to the input signal

20.8. PAD.

More than an effect, this is a virtual analog synthesizer that can play on top of any piano sound, thus obtaining an overlay between a piano and a synth pad. The only parameters here are the LEVEL and the BLEND, which can morph between two sound characters: lower values lean towards a cold and thin sound, higher values lets you obtain a warmer, darker and a softer sound. This parameter changes a whole set of internal elements such as low-pass filter, oscillator detuning and chorus. When the knob is set to display the BLEND parameter, it changes color between blue (cold) and red (warm).

20.9. EXPRESSION PEDAL.

This is definitely not an effect, but serves to control effects. The Crumar Seven features a jack input that can be used to connect an expression pedal, which can be freely assigned to a number of parameters. This section lets you choose what the pedal must be assigned to and in which way it can operate. The parameter FUNCTION has the following values:

- – VOLUME: the pedal controls the MASTER VOLUME
- – FX1 DEPTH: the pedal controls the DEPTH parameter of FX1
- – FX2 DEPTH: the pedal controls the DEPTH parameter of FX2
- – FX 1+2 DEPTH: the pedal controls the DEPTH parameter of both FX1 and FX2 at the same time
- – FX1 RATE: the pedal controls the RATE parameter of FX1
- – FX2 RATE: the pedal controls the RATE parameter of FX2
- – FX 1+2 RATE: the pedal controls the RATE parameter of both FX1 and FX2 at the same time
- – AMP DRIVE: the pedal controls the amount of overdrive (only available if AMP SIMULATOR is on)
- – PAD LEVEL: the pedal controls the volume of the background synth pad
- – PAD BLEND: the pedal controls the BLEND parameter of the background synth pad

PLEASE NOTE: when FX1 is set to Pedal Wha-Wha, the expression pedal will ignore any assignment made in this section and will always control the Wha-Wha. In other words, **the Pedal Wha-Wha effect always takes the priority on the expression pedal**.

The next two parameters RANGE MIN. and RANGE MAX. set the minimum and the maximum values the expression pedal can reach.
If min is greater than max, the action is automatically reversed.

Being treated as an effect, the expression pedal assignment is stored with each preset.
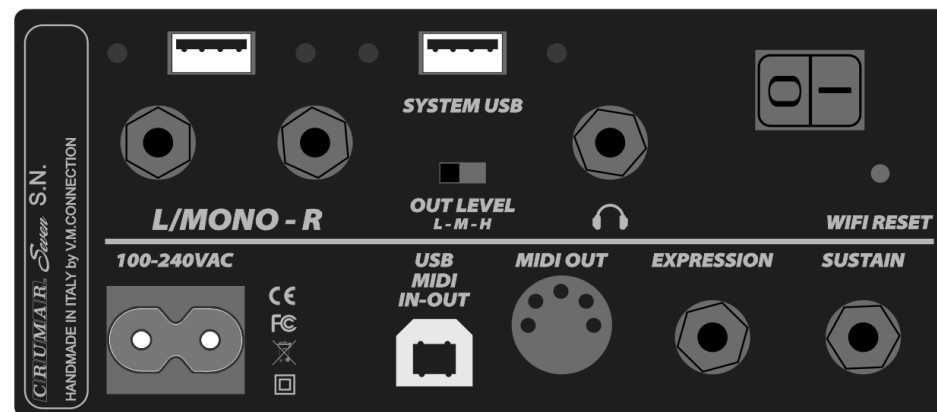
CHAPTER 21. CONNECTIONS.

The following picture shows the connection panel located at the right of the piano.

From top to bottom, left to right:
- – LEFT/MONO OUTPUT, RIGHT OUTPUT: these are 1/4" TRS Jack sockets for the balanced outputs.
- – SYSTEM USB: used to accept a USB Thumb Drive to update the firmware, the Wi-Fi USB dongle and other functions explained later.
- – OUT LEVEL: Line output level selector. Please see next chapter for more details.
- – HEADPHONE: Connect your stereo headphone to this 1/4" TRS Jack socket.
- – POWER SWITCH: don't forget to power on the Seven if you're feeling yourself somewhat inspired.
- – WIFI RESET: this hole hides a button that must only be used to restore the Wi-Fi password in case it's lost. See Chapter 10 for more details.
- – AC SOCKET: Connect the supplied AC power cable here.
- – USB MIDI IN-OUT: this is a USB port that carries bi-directional MIDI-USB connection to your computer.
- – MIDI OUT: standard DIN5 MIDI output port.
- – EXPRESSION: connect your expression pedal here. A 10 K linear pedal is preferred, works with 50 K pedals as well.
- – SUSTAIN: connect the sustain pedal to this input.

PLEASE NOTE: We suggest to use Crumar original accessories.

21.2. ACCESSORY TRAY.

Just for the love of symmetry, the right side of the piano features a blank panel with a knob, behind which is an accessory tray. Rotate the knob counterclockwise to unscrew the lock and remove the cover, use this tray for your sustain pedal or your cables.
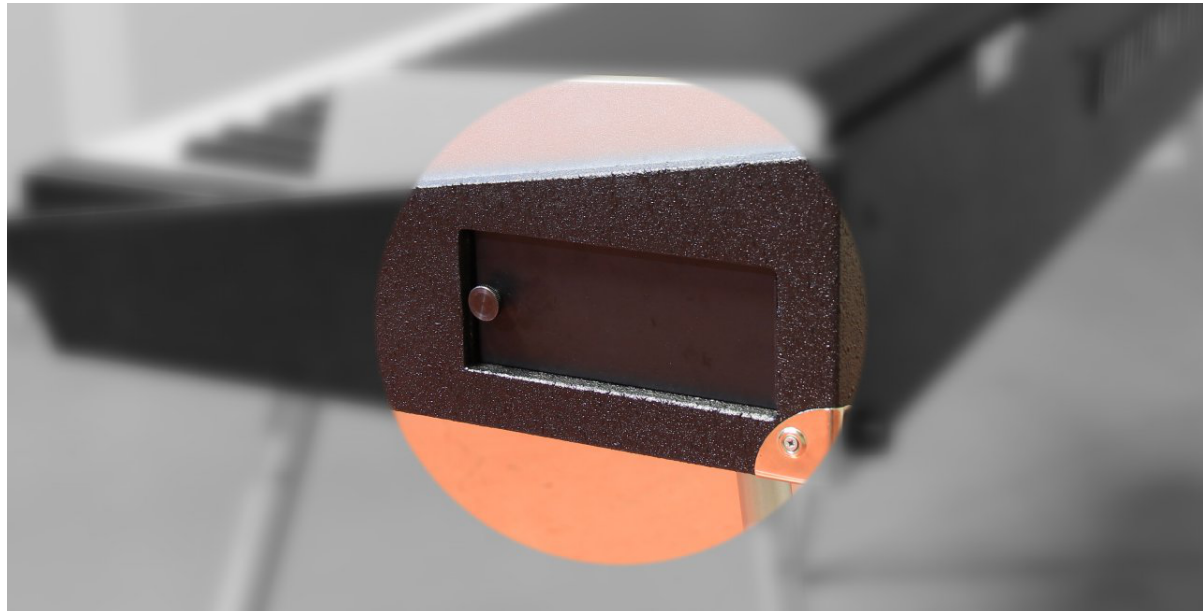
A few recommendations: don't overload it, don't put anything liquid or dangerous, flammable, explosive; don't put anything smaller than a jack cable. Also don't try to insert your whole arm inside this tray. We suggest to wrap your accessories in a soft cloth or in a nylon bag before putting them into this tray. Don't forget to put the cover back and tighten the screw.
CHAPTER 22. SETTING THE OUTPUT LEVEL CORRECTLY.

The Crumar Seven features a pair of balanced TRS jack outputs that also support unbalanced connections. Connect your amplification system to this stereo output and adjust the output level selector according to your needs.

Obtaining the best performance from the analog outputs

The Seven features a 3-way switch that lets you select the preferred sound level.

1. L = Low = -10 dB. Use this selection if you are connecting the Seven to other -10dB (consumer level) equipment such as a home hi-fi system using unbalanced cables; this level should also be used if you intend to connect the Seven to a guitar or bass amp with a "HI" input (usually dedicated to a preamplified guitar or bass).

2. M = Middle = +4 dB. Use this selection when connecting the Seven to a professional level equipment (mixers, powered amps or speakers, etc.) and preferably use only balanced cables, which will guarantee a cleaner signal as well an average of 6 dB gain over unbalanced cables. If you're connecting the Seven to a professional mixer, adjust the gain knobs so that the +4 dB input level is well matched, in order to reduce the noise floor and obtain the highest S/N ratio possible.

3. H = High = about +10 dB. This selection should only be used when connecting the Seven to some very old amplification system with a particularly low input impedance or weak preamplification. Beware: using this selection with normal professional or consumer level equipment might increase the sound level as well as the noise floor, resulting in a noisy or distorted sound.

CHAPTER 23. SPECIFICATIONS.

– Power rating:	100V AC ~ 240V AC	
– Output level:	selectable -10 dBu, +4 dBu, High Gain (~ +10 dBu)	
– Headphone output max load:	32 ohm	
– Dimensions (with cover):	110,6 x 44,7 x 19,0 cm	43,5 x 17,6 x 7,5 inches
– Dimensions (without cover):	110,6 x 44,7 x 16,2 cm	43,5 x 17, 6 x 6,4 inches
– Weight (piano only):	15 Kg	33 lbs
– Weight with cover and legs:	23,5 Kg	51,8 lbs
– Weight of the legs only:	3,5 Kg	7,7 lbs
– Box dimensions:	119,6 x 53,7 x 27,0 cm	47 x 21 x 10 inches
– Box weight:	27 Kg	59,5 lbs

Crumar Seven.
Works like digital, feels like analog.

Final hint: to listen to a music demo, push and hold the CLAVI TABS button then push the VOLUME knob; push any button to stop.

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Last update: July 2021 – FW v.1.22