computer music

Manual

cm-505

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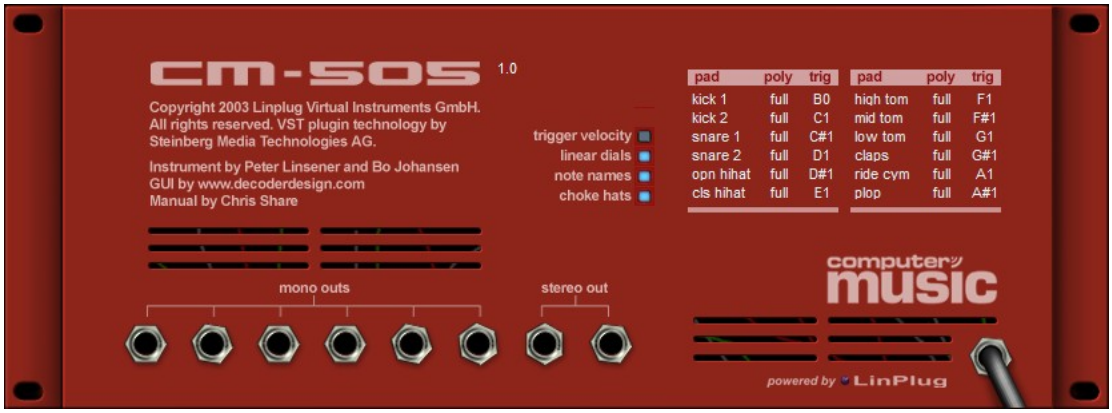
CM-505

Analogue Drum Machine



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Welcome

Welcome to your new CM-505.

The CM-505 is a flexible, easy-to-use, "analogue" drum machine designed for creating music on your personal computer.

The CM-505's key features include 10 different quality synthesis algorithms with several individual parameters, Distortion and BitCrusher, 24-voice polyphony, as well as separate volume, tune, pan, mute and solo controls for each Pad.

This manual describes all aspects of the CM-505 drum machine and is designed so that your use of this software is as efficient as possible.

We feel that the CM-505 is exceptional because of its audio quality, its features and its sonic potential. We hope you get a lot of pleasure using the CM-505 drum machine and that it becomes an important part of your music-making.

We strongly recommend that you register your copy of the CM505 at
http://www.linplug.com/support/support.htm
By doing so you will qualify for technical support and will also receive a monthly newsletter from LinPlug. After successful registering you'll receive more than 10 new free CM-505 kits from LinPlug. The newsletter contains the latest information about all LinPlug products and includes news about software updates and special offers.

Support inquiries should be sent to the LinPlug forum at
http://www.kvr-vst.com/forum/viewforum.php?f=10
please.

Computer Music & the LinPlug Team, June 2003

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Features

The CM-505 contains a range of features designed to make your music-making more efficient and enjoyable. These features are described below:

- 12 "analogue" drum pads featuring 10 different synthesis algorithms.
- 2 different Kick generators.
- 2 different Snare generators.
- Open HiHat generator with switchable choke.
- Closed HiHat generator with switchable choke.
- 3 Tom generators (for Hi, Mid, Lo Tom).
- Clap generator.
- Ride Cymbal generator.
- Plop Percussion generator.
- Each pad includes its own controls for Output Destination (Stereo, Mono 1...6), Level, Pan, (only if routed to Stereo), Tune (+- 12 semitones in 1 cent intervals), Choke (On/Off, HiHats only) and Polyphony (mono...8, full);
- Each pad includes two separate effects processors (Distortion and BitCrusher).
- 24-voice polyphony
- Adjustable voice limit per pad (mono...1...8, full).
- MIDI activity display on each pad
- Several parameters are conveniently located on the "rear panel" so they are not changed accidentally during use.
- Controller hardware (faderbox or synth) can be assigned to any parameter using ECS.
- Dial operation is switchable between circular and linear modes.

Overview

The CM-505 is a 24 note-polyphonic VST drum synthesizer. The instrument is designed specifically for creating synthetic drum sounds; no samples are used to create its sounds, not even a single cycle. The sounds created by the CM-505 have their roots in classic analogue drum machines such as the Roland TR808 and TR909. However, although the CM-505 can replicate many of the sounds of these classic analogue drum machines, it also extends them into new sonic territory.

The CM-505 consists of 12 Drum Pads that use 10 different synthesis algorithms to generate sound. Two insert effects are available for each Drum Pad.

The CM-505 is divided into 4 sections: Synthesis Algorithm, Effects, Drum Pad and Rear Panel.

Audio signals are generated by a synthesis algorithm that gets trigger information from the CM-505's Input. The MIDI input is automatically connected to MIDI output of the host software. The CM-505 receives MIDI on all Channels simultaneously. The instrument can also be triggered by clicking on a Drum Pad's Trigger button.

The CM-505 has 12 Drum Pads. Each Pad has its own dedicated set of controls which include Display, Pan, Tune, Volume, Output, Mute and Solo.

10 different synthesis algorithms are used to generate drum sounds in the CM-505. The parameters for the various algorithms, which differ according to the algorithm, can be set in the CM-505's Synthesis Algorithm section.

The CM-505 also features 2 independent effects units. The output of each Synthesis Algorithm is automatically routed to these effects units. Both effects function as "insert" effects. This means that their parameters can be set independently for each Drum Pad.

The audio outputs of the CM-505 are automatically connected to the input of your host software's mixer. Audio output can be sent to either a stereo output or any of 6 individual outputs. Note: some hosts may not support individual outputs, in this case only the stereo out should be used.

Finally, the CM-505's Rear Panel allows you to set various global parameters including Trigger Velocity, Dial Mode, Note Names, Choke Mode as well as each Drum Pad's polyphony and trigger note.

Hopefully, this chapter has given you a brief overview of how the CM-505 works. More detailed information can be found in the following chapters.

Controls

Users have the option of controlling all CM-505 dials in either a circular or a linear manner depending on the Dial Mode setting on the CM-505's Rear Panel (see the "Rear Panel" section of this manual for more information).

Holding down the ALT key while clicking on a control changes the selected control's value a minimum step upwards (when clicking in the upper half of the control) or a minimum step downwards (when clicking in the lower half of the control).

Holding down the CTRL key while clicking on a control sets the control to its default value (e.g. for Volume controls it sets the control's value to -3 dB).

All controls can be automated and controlled using external MIDI messages. To controll a parameter via MIDI you need to use the CM-505's ECS which is described in detail later in this manual.

Drum Pads

The CM-505 contains 12 Drum Pads, each of which is used for playing a particular drum sound. Each Drum Pad is hard-wired to a synthesis algorithm specifically designed for producing that Pad's sound.

The currently selected Drum Pad is shown by a small Indicator Light located next to the drum's name. To change to a different Drum Pad click on any control in the desired Drum Pad section. When you change Drum Pad, the CM-505's display changes so that it shows the Synthesis Algorithm of the currently selected Drum Pad.

The CM-505's 12 Drum Pads use 10 different synthesis algorithms. These algorithms are described in more detail in the Synthesis Algorithm section of this manual (see below).

Each Drum Pad is identical and consists of 8 controls: Display, Pan, Out(put), Tune, Vol(ume), Trigger, Mute and Solo. These described in detail below.

Display: The current settings for a Drum Pad can be given a name using the Display control located at the top of the Pad. The name of the Pad is saved with the Kit. Here are also the values of the Parameters Pan, Volume and Tune are displayed, when you change one of this Parameters.

Pan: The Pan dial is used to set the stereo positioning of the Drum Pad's output. The control has a range of 1.00 L to 1.00 R. A setting of "C"

places the output in the center of the stereo field. Note that if the Drum Pad's output is set to a mono destination the Pan dial has no effect.

Out(put): The Out(put) control is used to set the output destination of the Drum Pad. Available destinations include the main stereo output (oo) or Mono 1...6.

Tune: The Tune control sets the Drum Pad's tuning. The available range is +- 12 semitones in 1 cent steps.

Vol(ume): The Vol(ume) control is used to set the output volume of the Drum Pad. The available range is -oo to +6 dB.

Trigger: The Trigger button allows the Drum Pad to be played using the mouse. Simply click the mouse on the Drum Pad to trigger the sound. If Trigger Velocity is enabled on the CM-505's Rear Panel (see below for more information about the CM-505's Rear Panel), the Pad becomes velocity-sensitive. In this case, as the mouse is moved from left to right over the Trigger button, the trigger velocity increases. In other words, clicking on the left of the button triggers the Pad at lower velocities than clicking on the right of the Pad.

Mute: The Mute button silences the output of the selected Drum Pad.

Solo: The Solo button silences all Drum Pads other than the one that is selected.

Synthesis Algorithms

The CM-505 uses 10 different synthesis algorithms to produce drum sounds. Each algorithm is tailored to a particular type of drum sound.

Each algorithm is used on a single Drum Pad with the exception of the Tom algorithm which is used on the three Tom Pads (Hi, Mid and Lo).

Each synthesis algorithm has its own unique set of controls. The control values are read from the control itself and are not displayed on the user interface. The 10 synthesis algorithms are described in detail below:

Kick 1: The Kick1 algorithm contains controls for Pitch Envelope Depth, Pitch Envelope Decay, Oscillator Shape and Oscillator Decay. The Pitch Envelope Depth control determines the extent to which the drum's pitch is controlled by the pitch envelope. The Pitch Envelope Decay control is used to set the rate at which the drum's pitch returns to the fundamental frequency. The Oscillator Shape control is used to set the shape of the oscillator waveform. When turned fully anti-clockwise the oscillator produces a sine wave, while when turned fully clockwise the oscillator produces a pulse wave. The Oscillator Decay control determines how fast the sound decays after it is triggered.

Kick 2: The Kick2 algorithm contains controls for Pitch Envelope Depth, Pitch Envelope Decay, Oscillator Noise and Oscillator Decay. The

Pitch Envelope Depth control determines the extent to which the drum's pitch is controlled by the pitch envelope. The Pitch Envelope Decay control is used to set the rate at which the drum's pitch returns to the fundamental frequency. The Oscillator Noise control is used to set the amount of noise that is mixed into the output signal. The Oscillator Decay control determines how fast the sound decays after it is triggered.

Snare1: The Snare1 algorithm combines an oscillator with a noise source. The Oscillator Volume control sets the amount of oscillator signal that is mixed with the noise oscillator. The Oscillator Decay control is used to detemine how quickly the oscillator signal decays. The Noise Range control adjusts the frequency spectrum of the noise oscillator. The Noise Decay control determines how fast the noise oscillator signal decays.

Snare2: The Snare2 algorithm combines a noise oscillator and a pitched oscillator that incorporates a specially designed "Knarks" control. The "Knarks" control adds a unique sound (reminiscent of the word "knarks") to the algorithm's output. The "Knarks" effect is created by crossmodulating the noise source and the oscillator. The "Knarks" control varies the amount of crossmodulation of the pitched and noise oscillators. The Noise Colour control adjusts the frequency spectrum of the noise oscillator's output. As it is crossmodulated with the pitched oscillator, the setting of this control directly effects the sound of the output. The Mix control is used to adjust the mix of the "Knarks" oscillator and the Noise Oscillator. The Decay control is used to determine the rate at which the mixed sound decays.

Open/Closed Hihat: The Open/Closed Hihat algorithm employs a noise oscillator and a filter. The Oscillator Colour control adjusts the frequency spectrum of the oscillator's output. The Oscillator Decay control is used to set the rate at which the sound decays. The Filter Res(onance) control is used to set the amount of filter resonance. This in turn, emphasizes a specific frequency depending on the setting of the Oscillator Colour control and the Filter Envelope Depth control. The setting of the Filter Envelope Depth control determines whether the filter is closed while the sound decays (when turned fully clockwise) or open while the sound decays (when turned fully anti-clockwise). The same algorithm is used for both the Open and Closed Hihat sounds however the parameter ranges are different in each case.

Tom: The Tom algorithm employs a pitched oscillator and a noise oscillator to create the characteristic sound of a tom tom. The Pitch Envelope Depth control determines the extent to which the tom's initial frequency is raised. The Pitch Envelope Shape control is used to set the manner in which the drum's pitch returns to its

fundamental frequency as it decays. When turned fully anti-clockwise the decay is linear, while when turned fully clockwise the decay is exponential. The Oscillator Decay control sets the rate at which the oscillator output decays. The Noise Level control is used to determine how much noise is mixed with the output of the pitched oscillator.

Claps: The Claps algorithm uses short noise bursts and a longer noise tail to create a characteristic "clap" sound. The Gap control adjusts the length of time between the noise bursts. The Decay control is used to set the rate at which the noise bursts decay to silence. The Release control determines the length of the release portion of the signal's noise tail. The Colour control adjusts the frequency spectrum of the clap noise oscillator.

Ride: The Ride algorithm combines a pitched oscillator and a noise oscillator. The Oscillator Decay control determines the rate at which the pitched part of the cymbal sound decays. The Noise Colour control adjusts the frequency spectrum of the noise oscillator. The Noise Decay control is used to set the rate at which the noise part of the cymbal sound decays. The Mix control adjusts the mix of pitched sound and noise.

Plop The Plop algorithm uses Frequency Modulation to create a unique "plop" sound. The Attack Range control adjusts the frequency range of the attack portion of the sound. The sounds's Attack Range is adjusted relative to the Body Range setting. The Attack Depth control determines the intensity of the attack portion of the sound. The Body Range control is used to set the range of the body sound that follows the attack part of the sound. The Body Decay control is used to set the rate at which the body sound decays to silence.

Effects

The CM-505 has two independent effects units: Dist (Distortion) and Crush (BitCrusher).

The two effects units operate as "insert" effects (as opposed to "send" effects) which means that they can be set independently for each Drum Pad. The Dist (Distortion) effect is located before the Crush (BitCrusher) effect in the signal chain. The Distortion effect saturates the signal adding a digital "hardness" to the sound. The Crush effect allows the bit depth of the signal to be decreased, thereby decreasing the resolution and making the sound rougher and noisier.

When an effect's control is changed, the value of the control is displayed in the corresponding Drum Pad's Display control. After a short period of time the Display controls revert to showing the title of the respective Drum Pad. Each effect has a single control which is described below.

Crush: The Crush (BitCrusher) control enables you to reduce the bit depth of the output signal from oo bits (the signal is not changed) to 1.00 bits. Reducing the bit depth adds a harsh, noisy quality to the sound.

Dist: The Dist control enables you to distort the Drum Pad's output signal within a range of 0% (no distortion) to 100% (full distortion).

Kit Control

The CM-505's Kit section is used for all File-related operations.

The Import Drum Kit button opens a dialog that lets you select a Kit for loading. The Previous and Next buttons allow you to traverse a list of available CM-505 Kits in the currently selected folder. The Save Drum Kit button allows you to export the current Kit.

The settings of all sections of the CM-505 are saved with the Drum Kit. The CM-505 loads and saves all of its Kits directly to hard disk so your computer's RAM does not limit the number of available Kits.

It is strongly recommended that you save Kits using the controls found in the CM-505's Kit section rather than the ones supplied by the host software. When using the host's controls it is strongly recommended that you save kit settings as a "Bank" and not as a single "Preset". Otherwise the complete kit will not be saved. Of course, the "Save Preset" option (found in Cubase for example) is useful for saving a single pad's settings.

For the Kit browse options to work, kits must be saved using the extension "DSC" (e.g. MyKit.DSC). If they are saved with another extension or without an extension, they may be loaded, but they cannot be browsed.

ECS (Easy Controller Setup)

The CM-505's ECS (Easy Controller Setup) makes it simple to control the CM-505 from an external MIDI controller (either hardware or software). Clicking on the title of the ECS control opens the ECS popup menu. This menu provides the following four options: Off, Learn, Clear and Clear All. These are described in detail below:

Off: Selecting "Off" switches ECS off.

Learn: Selecting "Learn" puts the CM-505 into ECS (Easy Controller Setup) mode. Once "Learn" is selected, click on the particular CM-505 control that you want to control. Then send some MIDI messages to the CM-505 from your MIDI source. ECS automatically creates a link between the Control Change message that was transmitted, and the CM-505 control that received it. From now on you can control the chosen CM-505 parameter with that particular Control Change message. In addition to this, more than one Control Change message can be defined to change a particular parameter. In fact, you can define up to 128 parameter-Control Change message-combinations. Don't forget to switch off ECS mode after you have finished using it!

Clear: Selecting "Clear" "disconnects" a CM-505 control from its previously-assigned Control Change message. To "Clear" a control, select "Clear" from the popup menu and then move the control with the mouse.

Clear All: Selecting "Clear All" disconnects all CM-505 controls from their previously-assigned Control Change message/s.

Note that clicking on the ECS indicator light switches directly between "Learn" and "Off" modes, and so can be used as a shortcut between them.

Rear Panel

The "Rear Panel" of the CM-505 is accessed by clicking on the "Computer Music", "CM-505" or "Powered By LinPlug" logos on the CM-505's front panel.

Several master controls have been located here to make the front panel less crowded, and also so that they are not changed accidentally while the CM-505 is in use. The controls located on the Rear Panel are Trigger Velocity, Linear Dials, Note Names and Choke Hats. These controls are described below:

Trigger Velocity: When this control is switched on, the trigger button becomes "velocity sensitive". In this case, clicking on a Trigger button's left side produces a low velocity note. When the right side of a Trigger button is clicked, a higher velocity note is produced. The note velocity value varies linearly from left to right across the Trigger button. When this control is switched off, the trigger velocity does not depend on where the trigger button is clicked. In this case, the note is always triggered at full volume.

Linear Dials: This control is used to select the CM-505's dial operation mode. Two modes are available: linear (when the button is on) and circular (when the button is off). In linear mode the CM-505's dials track vertical cursor movement. In circular mode the CM-505's dials track cursor movement in a circular fashion around the dial. It's important to note that some sequencers can override the instrument's dial mode settings so if the CM-505's dials are not operating in the correct manner, check the host program's settings.

Note Names: When this control is switched on, notes are displayed by name (for example "C#1") in the Settings display (see below for more information about the Settings display). When this control is

switched off notes are displayed by their MIDI note numbers (for example "40").

Choke Hats: When this control is switched on, open and closed hi-hat notes "choke" (mute) each other. As a result, when one note from the choke group is triggered the other stops sounding. When this control is switched off, both open and closed hi-hat notes sound independently.

In addition to the above-mentioned controls, there is also a Settings display located to the right of the above-mentioned controls. The Settings display allows 2 parameters to be set: Poly(phony) and Trig(ger note). These parameters are described below:

Poly(phony): The Poly(phony) setting determins the maximum number of notes that a Drum Pad can play at a single time. This ranges from mono...1...8...full.

Trig(ger note): The Trig(ger note) sets the MIDI note that triggers the Drum Pad. The CM-505 receives MIDI on all channels.

To switch back to the "Front Panel" click on the "Computer Music", "CM-505" or "Powered By LinPlug" logos on the CM-505's rear panel.

Glossary

Algorithm:	A process or set of rules used for calculation or problem-solving. In terms of audio synthesis, an algorithm is the way in which various components are combined to generate sound.
Bit Depth:	The number of bits (binary digits) used to represent an audio signal. CD quality audio uses 16 bits (2 bytes) to represent an audio signal. Reducing the bit depth of a signal means that it is less accurately represented and is thus, distorted.
Effect:	A signal processing device that changes some aspect of the input signal. An enormous number of different effect types are available. These include Chorus (which produces a thickening of the signal), Delay (adding echoes to the signal) and Distortion (which changes the shape of the waveform usually adding overtones).
Envelope:	A time-varying signal used to control the development of another signal after it has been triggered. Envelopes are most often used for controlling a signal's amplitude. The shape of the envelope is determined by the number of control parameters. Usually four parameters are available: Attack Time, Decay Time, Sustain Level and Release Time.
Filter:	A signal processing device that suppresses or "filters" out specific parts of a signal's frequency spectrum. Numerous types of filter are used in audio synthesis. These include Low Pass, High Pass, Band Pass and Notch. The tone controls on a stereo amplifier are one example of an audio filter.
FM:	FM or "Frequency Modulation" is a process where the frequency of one oscillator (the carrier) is controlled by another (the modulator). When the frequency of the modulator is periodic and below the audio range (less than 20 Hz) vibrato is produced. When the modulation frequency is within the audio range, Frequency Modulation is produced.
Oscillator:	A signal source that generates a periodic waveform at a given frequency.

MIDI Implementation Chart

Product: CM-505 Version 1.x Date: 30.Apr 2003
Manufacturer **LinPlug Virtual Instruments GmbH**

Function	**Transmitted**	**Recognized**	**Remarks**
Basic Channel			
Default	no	no	
Changed	no	no	
Mode			
Default	no	Omni	
Changed	no	no	
Note Number			
	no	**yes**	
True Voice	no	no	
Velocity			
Note On	no	**yes**	
Note Off	no	no	
Aftertouch			
Poly (Key)	no	no	
Mono (Channel)	no	no	
Pitch Bend	no	no	
Control Change	no	**yes**	via ECS
Program Change	no	no	
System Exclusive	no	no	
System Common			
Song Position	no	no	
Song Select	no	no	
Tune Request	no	no	
System Realtime			
Clock	no	no	
Commands	no	no	
Aux Messages			
Local On/Off	no	no	
All Notes Off	no	**yes**	
Active Sensing	no	no	
System Reset	no	**yes**	