



DreamBlaster X16/X16GS User Manual

User Manual

The DreamBlaster X16 and X16GS are newly developed wavetable modules. They are fully General MIDI compatible, come with 1Gbyte of flash memory, have an USB interface and are software configurable with multiple soundbanks. Additionally X16GS features a GS compatible Dream/Roland licensed bank.

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Table of contents

Introduction	2
X16 and X16GS : The differences explained.....	3
X16 - Standard/musician's edition :	3
X16GS - gamer's edition:	3
Resources.....	4
Specifications	5
X16 Board Overview.....	6
Using the X16.....	7
As a USB MIDI device	7
As a wavetable board	9
Mixer settings	10
X16 connectors pinout.....	11
J4 : Stereo 3.5mm line out.....	11
J13: 'X16 WaveBlaster' Connector pinout.....	11
J2 : Expansion IO connector pinout.....	12
Connector positions and mechanical layout	12
Dip Switch settings	13
X16Manager software.....	14
Available SoundBanks	14
Available Presets	15
Uploading Presets and Soundbanks	15
DXP Preset Editor	18
Using DXP Preset Editor.....	18
DXP Reverb Acoustic Settings	19
DXP Chorus Acoustic Settings.....	19
DXP Equalizer / Amp Settings	19
Firmware updating.....	20
Synth Architecture	22
MIDI Specifications.....	22
Soundbank slot selection through NRPN commands.....	23

Introduction

Thank you for purchasing the DreamBlaster X16 or X16GS. The company behind this product is Serdaco BVBA in Belgium. Serdaco was founded in 2011 by Roland and Serge Defever, specializing in software and hardware development and consulting. We also produce MIDI related products, having launched products such as the DreamBlaster X1, X2, S1, S2,... The DreamBlaster X16/X16GS is our latest and greatest MIDI wavetable board. It is fully General MIDI compatible, comes with 1Gbyte of flash memory, has a USB interface and is software configurable. We have developed software tools that let the user upload Dream soundbanks, presets and firmware updates to the on-board flash memory. X16 and X16GS support switching between up to 7 different soundbanks, using a flash slot mechanism. In the rest of the manual, I will refer to X16 when describing common functionality that applies to both X16 and X16GS. When needed, i will explain the difference for X16GS.

I very much hope you are satisfied with this product and enjoy it

X16 and X16GS : The differences explained

This manual describes both the X16 and X16GS soundcards. It is important to understand the licensing differences between these 2 products. While the boards are technically similar, X16 cannot be converted to X16GS or vice versa. It is important to make the correct choice before purchasing.

X16 - Standard/musician's edition :



Figure 1 - DreamBlaster X16

This X16 can be used for any purpose including making musical instruments. This X16 does not have the Dream GS license sticker, and does not come with the protected soundbank and licensing restrictions as X16GS (see below).

X16GS - gamer's edition:



Figure 2 - DreamBlaster X16GS

X16GS is intended for DOS gamers, that enjoy the classic Dream/Roland midi sound. It features a preloaded officially licensed, read only 16mbyte GS bank. This bank is

used with the express permission of Roland Corporation. The bank must be used conforming a license agreement with Dream.



Roland, the GS logo are trademarks of Roland Corp.
Other cited trademarks belong to their respective owners
General MIDI logo under license of MIDI Manufacturers Association.

The X16GS product may not be installed in any musical instrument. Using this product in the manufacture of musical instruments or selling this product for use in a musical instrument is a violation of the intellectual property rights of Roland Corporation and will result in liability for infringement.

So if you want to use the soundcard in a musical instrument project, you should order X16 instead of X16GS.

Resources

The DreamBlaster X16 is an advanced wavetable board, having features and functionality not found in other wavetable modules. Because the flash memory is user upgradable, check the Serdaco product page for any updates, information and support.

Resource	URL
X16 product page	https://www.serdashop.com/DreamBlaster-X16
X16GS product page	https://www.serdashop.com/DreamBlaster-X16GS
X16/X16GS downloads	https://serdaco.com/downloads/X16/

Specifications

- High End 16 core Dream 5000 series synth chip (SAM5716B), with up to 256 voice polyphony
- Compact high-quality green, gold-plated PCB, 53mm x 77mm
- Super low latency < 1ms
- 8 MByte SDRAM for high quality effects
- 1 GByte Flash for soundbanks
- 2x13 Waveblaster header for integration on DOS sound cards and custom projects
- Up to 400mA current consumption at 5V, when using all DSP cores.
- USB-MIDI interface (Class compliant), USB mini connector
- Stereo out, high quality 24 bit 112 dB DNR DAC
- Expansion header for future expansion / OEM projects
- High quality Dream synth engine, compatible with Dream 5000 SDK for custom soundbank design
- High quality GS compatible reverb and chorus
- 3 Stereo Insert Multi-Effects blocks (s (Distortion, Equalizer, Compressor, Chorus/Flanger/Phaser/Tremolo/Rotary, Delay), controllable by MIDI.
- 4-bands Equalizer controllable by MIDI.
- Multi slot soundbank support, fast bank uploading over USB to flash using Serdaco X16Manager multi slot upload tool
- Bootloader for updating firmware over USB
- Supports DreamBlaster DXP Presets
- Preloaded soundbanks (For X16GS: preloaded licensed GS bank)

X16 Board Overview

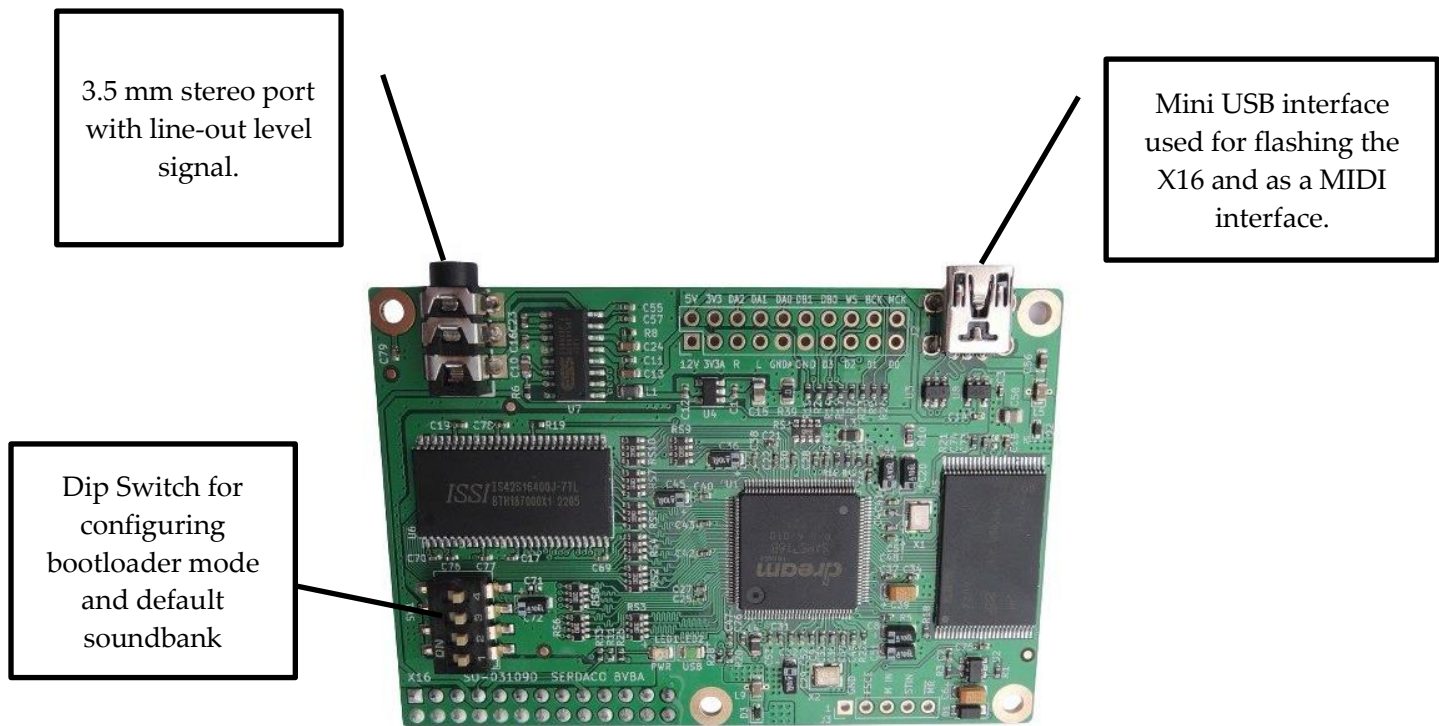


Figure 1 : Top of DreamBlaster X16



Figure 2 : Bottom of DreamBlaster X16 PCB

Using the X16

As a USB MIDI device

The USB interface of the DreamBlaster X16 is a class compliant USB MIDI interface. Connect the X16 to a USB port to your PC and after a short while the X16 will appear as a MIDI device.

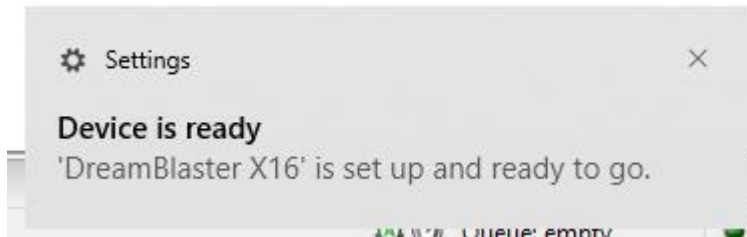


Figure 3 - Windows 10 detecting X16

Windows supports several MIDI devices, so it's important to configure the software so that the X16 is actually being used, rather than the default Microsoft GS SoftSynth.

To ensure that the X16 is the default MIDI device it is recommended that you're using applications that let you select the MIDI device. Examples of such applications are:

- DOSBox
- Falcosoft SoundFont Midi Player
- Midibar midi player (included with MIDI-OX)

With newer versions of Windows, applications are supposed to offer the selection of MIDI device, however not every application supports this. In such a case you need to use a tool, often referred to as MIDI Mapper, to select the default MIDI device of your system. We recommend the CoolSoft MIDIMapper:

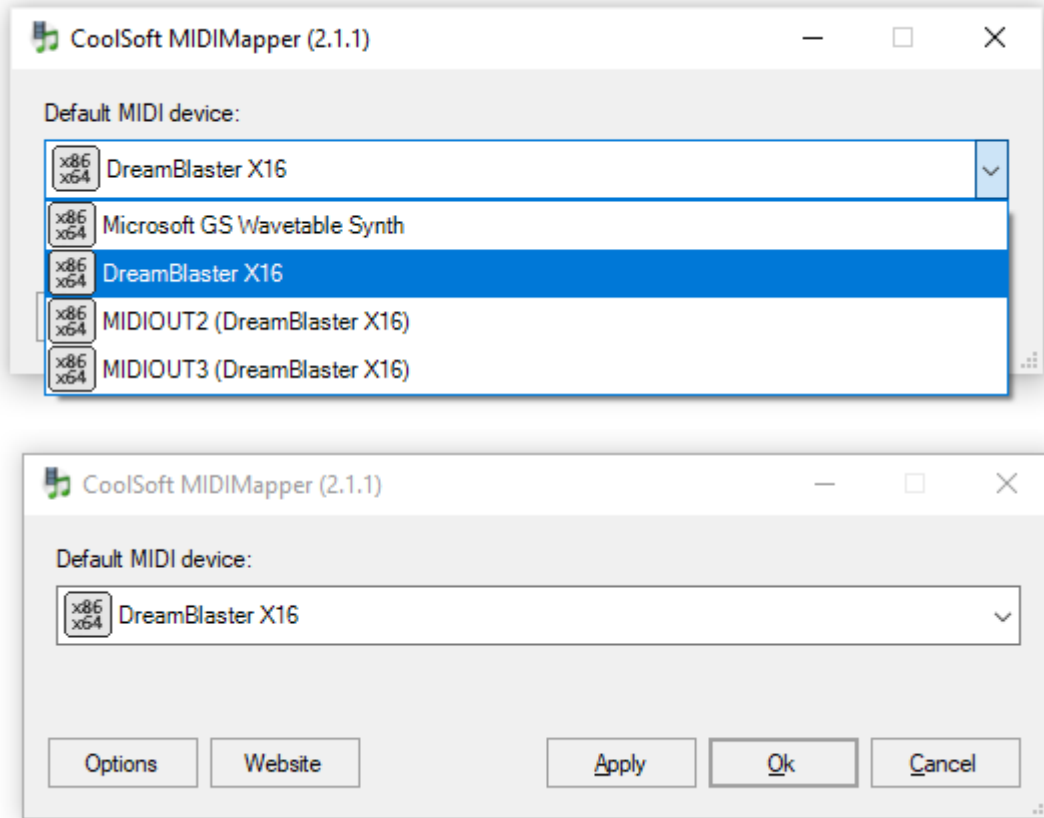


Figure 4 - CoolSoft MIDI Mapper Windows 10 64 bit

DreamBlaster X16 provides 3 USB midi port, you can choose any of these 3 (X16 allows playback of up to 3 USB MIDI Streams in parallel.). Once you have configured the DreamBlaster X16 as the default MIDI device, you can use most media players to play MIDI files. It will then also work with DOSBox and ScummVM without having to change the MIDI device internally.

Note that the X16 will output music through the 3.5 mm stereo line out port. You can route it through the line-in of your computer or use external speakers or an external mixer.

USB usually doesn't supply a stable 5V supply and ground connection. The X16 sound quality is best when powered from a stable supply, through the waveblaster connector. For high end external use, an interface board like Serdaco CHiLL Interface can be used. This is available at <https://www.serdashop.com/chill>.

As a wavetable board

Attaching the DreamBlasterX16 to a sound card with wavetable connector is straight forward, but to be 100% sure of the correct orientation, pins 1 and 2 on the top right side (see arrow – align the indicated pin to pin1 on your soundcard)



Figure 5 – X16 pin 1 and 2 location

Most sound cards have pins 1 and 2 marked as well, so it's easy to attach the X16 correctly:



Figure 6 - Marking for pin 1

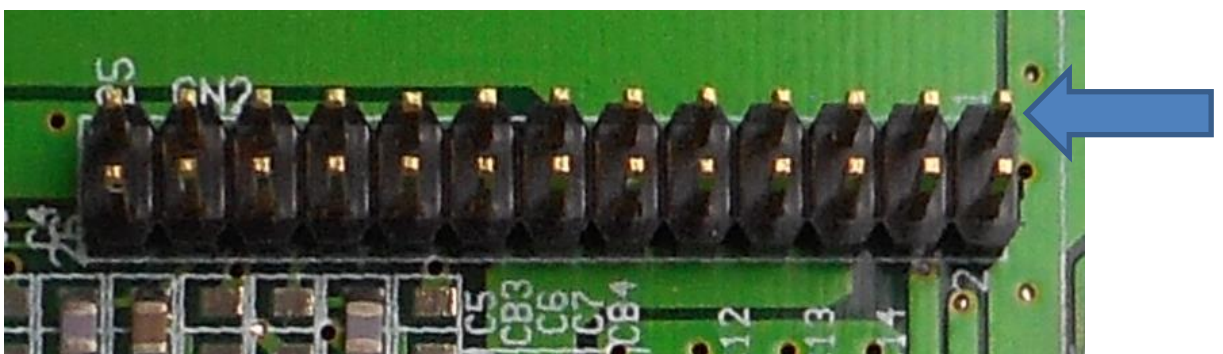


Figure 7 - Marking for pin 1 and 2

Mixer settings

The exact procedure varies between sound cards, but many sound cards have the wavetable muted by default. Under Windows this is straight forward and you just have to access the Windows mixer.

Under DOS however every card uses different tools. Some have a Graphical User Interface, such as Creative Sound Blaster or Yamaha YMF718-S cards, others use command line utilities such as the ESS AudioDrive range of cards.

If you are not getting sound from the X16 do the following:

- Connect a line input to the on-board 3.5mm jack and confirm that the X16 is outputting sound
- Consult the documentation of your sound card as to how to access the mixer to unmute the wavetable

X16 connectors pinout

J4 : Stereo 3.5mm line out

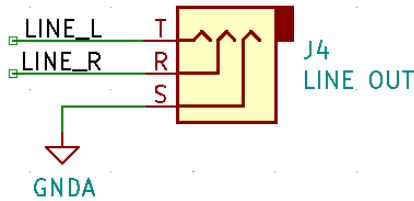


Figure 8 : J4 : Stereo 3.5mm line out

Note :

- The stereo line signal is the same as available on the J13 waveblaster header pins 19 and 23. The 3.5mm connector allows for convenient quick testing when connected to USB.

J13: 'X16 WaveBlaster' Connector pinout

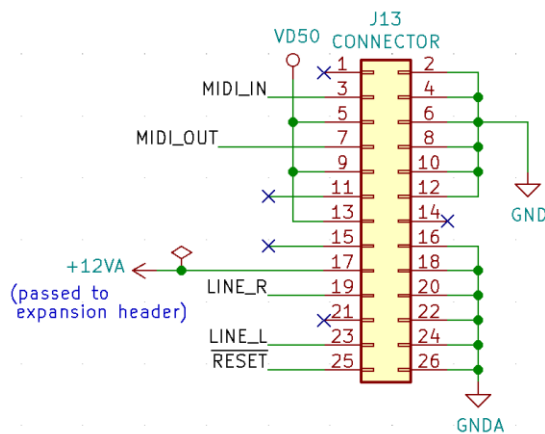


Figure 9: J13: 'WaveBlaster' Connector pinout

Notes :

- For MIDI IN signal , TTL 5V and 3.3V level both work fine (it is 5V tolerant)
- The MIDI Out signal level is 3.3V
- The board only uses the 5V supply, it consumes about 400mA.
- The +12V pin is not used by X16, it is passed through to the IO expansion header, for future/project use.
- The /Reset pin must be pulled high (to 5V or 3.3V) to boot up the board.

J2 : Expansion IO connector pinout

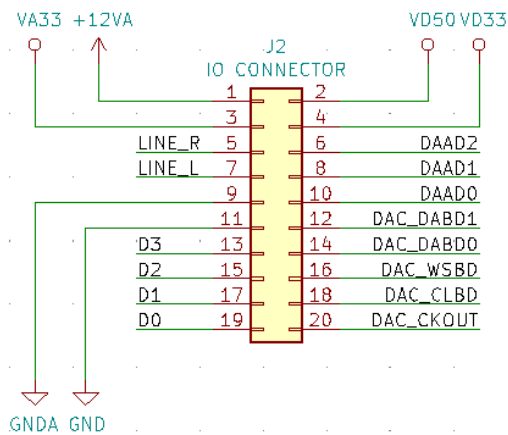
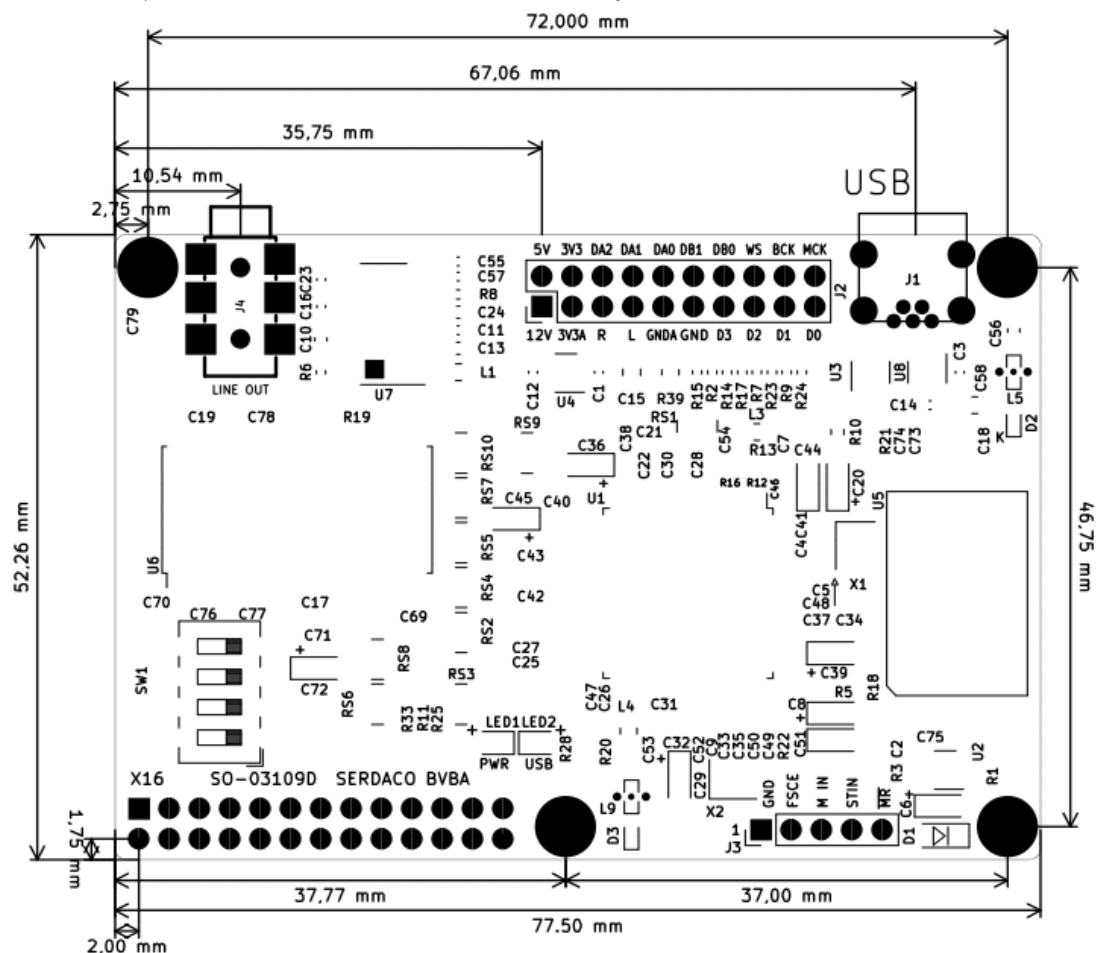


Figure 10: J2 : Expansion IO connector

Notes :

- This connector is intended for future use, for developers only.
- If you have a project that would need to use the IO header, contact me at <https://www.serdashop.com/Contact> for discussing the options.

Connector positions and mechanical layout



Dip Switch settings

The dip switch on your X16 allows to configure the bootup mode and the supported soundbanks.

The 4 switches are represented from left (1) to right (4):

1 means the switch is turned on (moved towards pcb outside).

0 means the switch is off (moved towards pcb inside).

x means the switch does not matter.

0000: Bootloader mode (**for updating only, does not play music**)

0001: Synthesiser using soundbank from slot 1 at startup

0010: Synthesiser using soundbank from slot 2 at startup

0011: Synthesiser using soundbank from slot 3 at startup

0100: Synthesiser using soundbank from slot 4 at startup

0101: Synthesiser using soundbank from slot 5 at startup

0110: Synthesiser using soundbank from slot 6 at startup

0111: Synthesiser using soundbank from slot 7 at startup

1xxx: Reserved for future use

See the following example photos of settings :

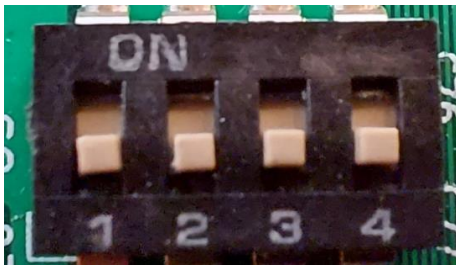


Figure 11 : Dip switch setting 0000 : Bootloader mode

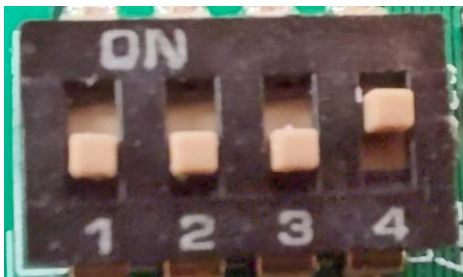


Figure 12 : Dip switch at 0001 setting = soundbank slot 1 selection

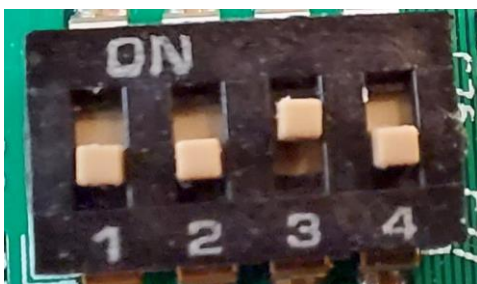


Figure 13 : Dip switch at 0010 setting = soundbank slot 2 selection

X16Manager software

Available SoundBanks

X16 supports uploading of multiple soundbanks to the flash memory.

DreamBlaster X16 compatible soundbanks are Dream specific binaries with the .B16 extension. At the time of this publication, several soundbanks are available that are compatible with the DreamBlaster X16 :

- GMBK5X128-V2.03.B16 : Dream 16M GM Bank (Copyright Dream S.A.S France - Only to be used with DreamBlaster X16)
- BURAN-v1.00.B16 : Buran 53M GM Bank – high quality GM bank
- OPL-3 FM 128M-v1.00.B16 : OPL3 FM synth Bank, 128M size
- GXSCC GM-v1.00.B16 : Chiptune SoundBank 588 kBytes size

The available soundbanks, can be downloaded from :

<https://serdaco.com/downloads/X16/>

Additionally, the X16GS comes with the Dream/Roland 16M Licensed GS bank preloaded. This special bank is only compatible with X16GS. The bank cannot be erased from X16GS. It is not compatible with X16 and not available for download.

Custom soundbanks can be designed using the Dream 5000 SDK hardware/software kit, available separately.



Figure 14: Dream 5000 SDK

See <https://www.serdashop.com/DREAM5000SDK> for more information.

Available Presets

DreamBlaster X16 supports DXP presets (.DXP extension), to customize sound characteristics and behaviour for each soundbank. These presets are 100% compatible with both DreamBlaster X2 and X16 and can be edited using the DreamBlaster DXP Preset Editor (see the description in the next chapter).

Uploading Presets and Soundbanks

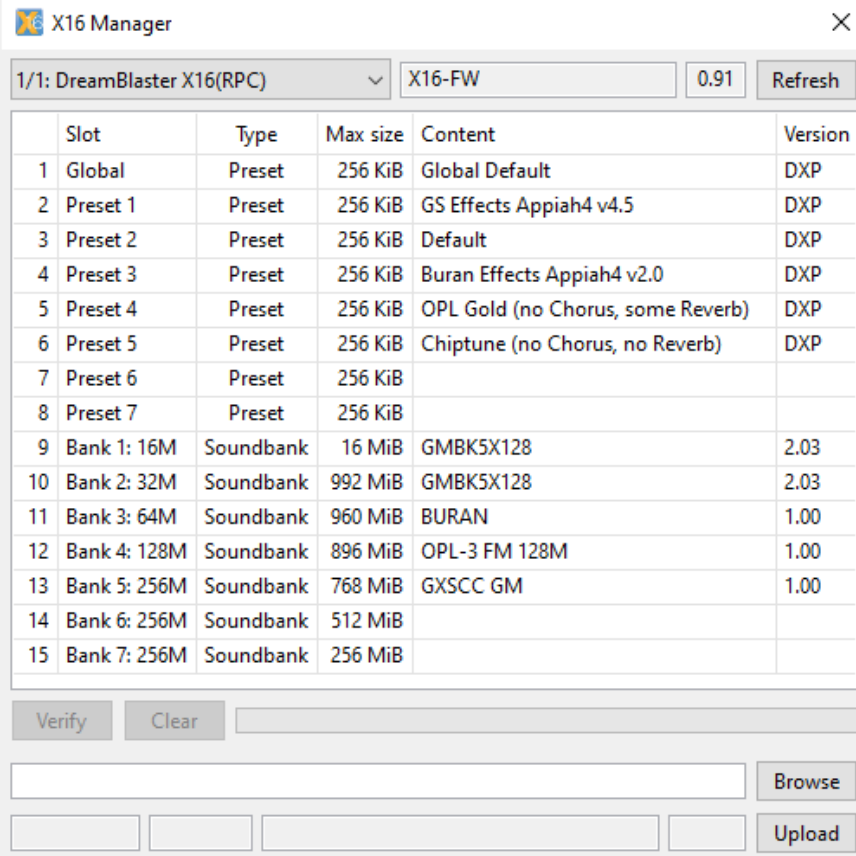
Plug the X16 in an USB port, and the USB MIDI driver 'DreamBlaster X16' will become available. Start up X16Manager.exe and you will see an overview of the contents in your X16's flash memory.

The memory is divided into slots :

Slot 1 : Global preset location

Slot 2-8: 7 presets for the corresponding sound banks

Slot 9-15: 7 locations for sound banks.



The screenshot shows the X16 Manager application window. At the top, there is a dropdown menu showing '1/1: DreamBlaster X16(RPC)', a text field with 'X16-FW', a version field with '0.91', and a 'Refresh' button. Below this is a table with columns for Slot, Type, Max size, Content, and Version. The table lists 15 slots, including global presets and soundbanks. At the bottom of the window, there are buttons for 'Verify', 'Clear', a text input field, a 'Browse' button, and an 'Upload' button.

Slot	Type	Max size	Content	Version	
1	Global	Preset	256 KiB	Global Default	DXP
2	Preset 1	Preset	256 KiB	GS Effects Appiah4 v4.5	DXP
3	Preset 2	Preset	256 KiB	Default	DXP
4	Preset 3	Preset	256 KiB	Buran Effects Appiah4 v2.0	DXP
5	Preset 4	Preset	256 KiB	OPL Gold (no Chorus, some Reverb)	DXP
6	Preset 5	Preset	256 KiB	Chiptune (no Chorus, no Reverb)	DXP
7	Preset 6	Preset	256 KiB		
8	Preset 7	Preset	256 KiB		
9	Bank 1: 16M	Soundbank	16 MiB	GMBK5X128	2.03
10	Bank 2: 32M	Soundbank	992 MiB	GMBK5X128	2.03
11	Bank 3: 64M	Soundbank	960 MiB	BURAN	1.00
12	Bank 4: 128M	Soundbank	896 MiB	OPL-3 FM 128M	1.00
13	Bank 5: 256M	Soundbank	768 MiB	GXSCC GM	1.00
14	Bank 6: 256M	Soundbank	512 MiB		
15	Bank 7: 256M	Soundbank	256 MiB		

Figure 15: X16 Manager - overview of slots

Large soundbanks can cover multiple slots : for example if you load a 80mbyte soundbank in slot 2, it will work fine, but it will use also space from slot 3. The 'Max

Size' column shows the maximum soundbank size you can load to a specific slot, when allowing to span over multiple slots. That said, here are the next steps :
 Press the browse button to select the file you wish to upload.
 Highlight the slot you wish to upload to.

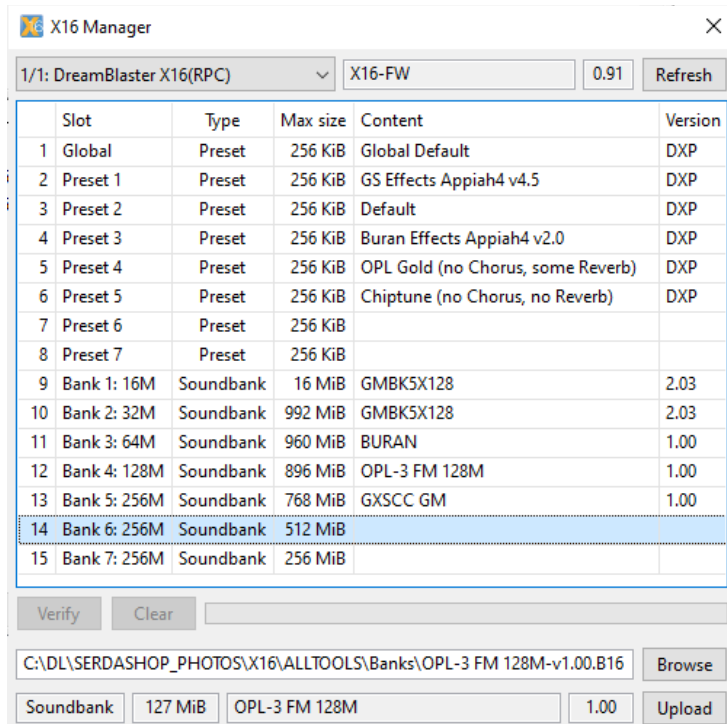


Figure 16: X16 Manager - highlight slot

Then press the upload button. The uploading to the slot will start, the progress bar will indicate.

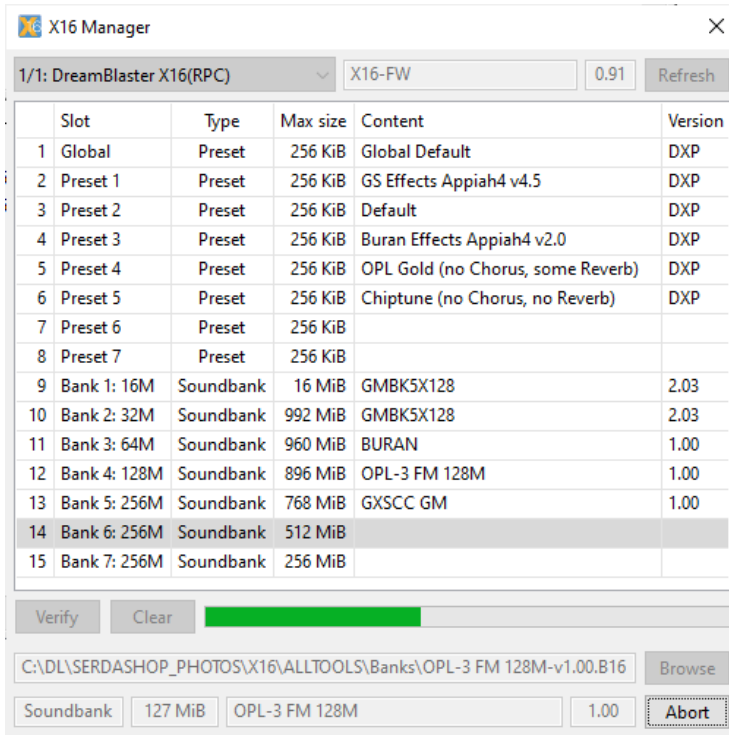


Figure 17 X16 Manager - upload in progress

After the upload is complete, the new bank will appear in the slot :

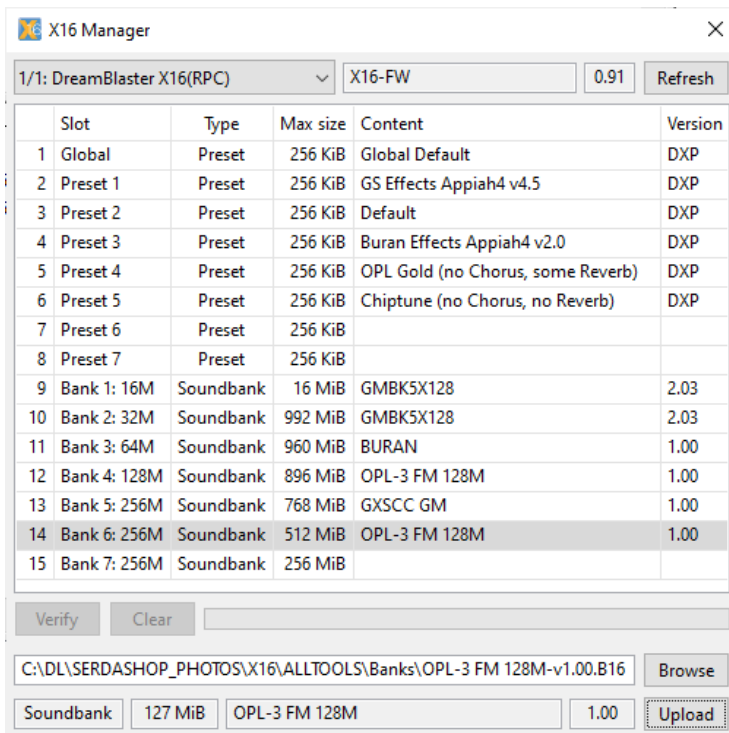


Figure 18: X16 Manager - upload done

DXP Preset Editor

Using DXP Preset Editor

DXP presets are profiles that let you change the sound signature of the device. These 'classic' presets are compatible with both DreamBlaster X2 and DreamBlaster X16. A set of default Presets are available for download from :

<https://serdaco.com/downloads/X16/>

- Factory default Preset
- Dry Preset (No Reverb and Chorus effects)
- Boombastic (Factory default Preset with bass boost applied)
- GS Effects Preset by Appiah4 (Tuned for classic GS sound characteristics)

To get the most out of the DreamBlaster X16, your own custom presets can be created with the provided DXP Preset Editor :

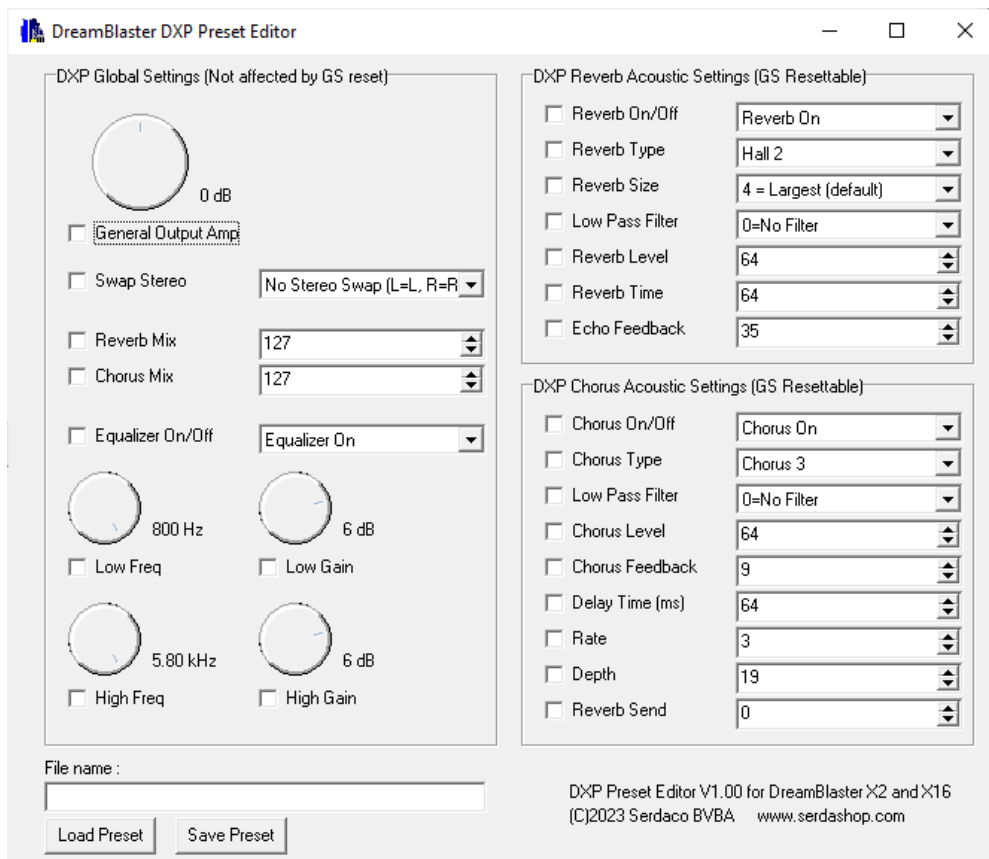


Figure 19 - Preset Editor with default settings

With this utility you can create, read and edit preset files. Remember that you still have to flash the preset file to the X16 as described in the previous chapter. For easy testing you can have the preset editor, as well as X16Manager open at the same time.

Only checked / ticked options are saved into the preset file. When the X16 boots, it will first load its default settings, and then override this with any custom settings that is checked. The X16 will first load the global preset slot, and then the preset slot associated with the current soundbank.

DXP Reverb Acoustic Settings

Reverb (short for reverberation) is created when sound is reflected by objects, often referred to as echo. It greatly affects how the X16 sounds and you can configure it to sound like in a recording booth or in a large church, or anything in-between.

DXP Chorus Acoustic Settings

Chorus sounds like more of the same instruments are playing, making the sound thicker and more layered.

DXP Equalizer / Amp Settings

General Output Amp: Some sound cards clip or distort with wavetable boards and certain games that output loud music. With this setting you can adjust the volume to avoid this.

Swap Stereo: Some sound cards have the wavetable wired up incorrectly, resulting in left sounds coming out of the right speaker and vice versa. You can use this option to swap them around and correct this behaviour.

Equalizer: This lets you adjust the low and high frequencies (bass and treble), further adjusting the sound signature to your taste.

Firmware updating

X16 firmware can be updated over USB, thanks to the built in bootloader. Updated firmware binaries may become available from :

<https://serdaco.com/downloads/X16/>.

Always read the accompanying readme.txt before updating.

To update the firmware of X16, you can follow the next steps :

Disconnect your X16 from any interface.

Make sure the dip switch is set to 0000 position (bootloader mode). In this mode the X16 will not play midi sound, but it will be possible to update the firmware.

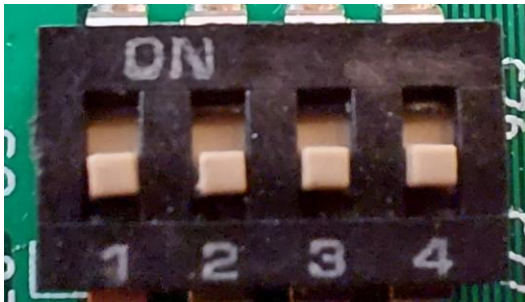


Figure 20 : Dip switch setting 0000 : Bootloader mode

Now connect your X16 to USB, and start X16Manager.exe.

It will show the following overview :

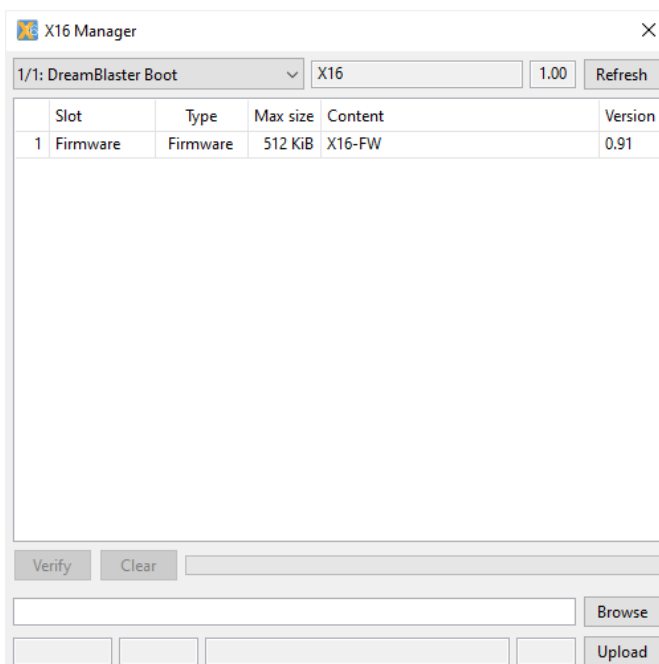


Figure 21: X16 Manager - firmware update screen

Similar to uploading soundbanks and presets, you can now upload the firmware :

Press 'Browse' to select the correct firmware binary. Now press 'Upload' to upload the firmware to the X16. In less than 1 second, your X16 will be upgraded to the new firmware. Change the dip switches and power cycle the board to try out your new version.

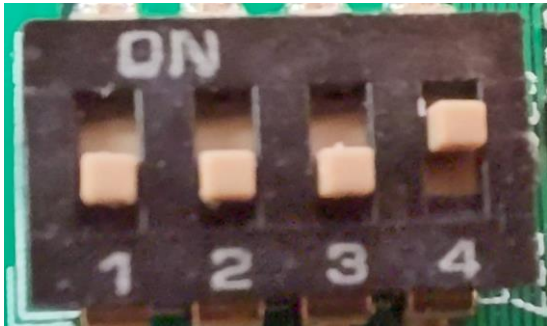


Figure 22 : Change the dip switches to 0001 to test the new firmware with soundbank 1

Synth Architecture

The X16 supports accurate control of the synth and effects.

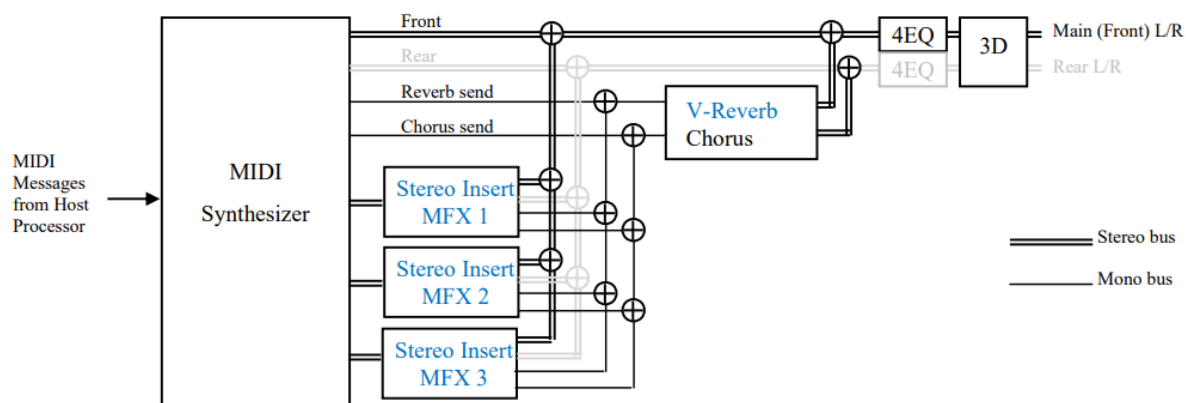


Figure 23 : X16 Synth and effect flow

All possibilities are further explained in the detailed MIDI specifications.

MIDI Specifications

Detailed MIDI specifications are available for download from:

<https://serdaco.com/downloads/X16/>.

Each soundbank also includes a patch list.

One aspect is particular for X16 : Next to using dip switches, the sound bank can also be selected using MIDI. To make this easy, some example midi files are provided at :

<https://serdaco.com/downloads/X16/>

MIDI File	Description
X16Slot1.mid	Select soundbank in slot 1
X16Slot2.mid	Select soundbank in slot 2
X16Slot3.mid	Select soundbank in slot 3
X16Slot4.mid	Select soundbank in slot 4
X16Slot5.mid	Select soundbank in slot 5
X16Slot6.mid	Select soundbank in slot 6
X16Slot7.mid	Select soundbank in slot 7
X16Next.mid	Cycle to the next soundbank
X16Prev.mid	Cycle to the previous soundbank

Below is described some more detail how this works :

Soundbank slot selection through NRPN commands

NRPN CC controls:

CC#06 NRPN Data Value MSB

CC#38 NRPN Data Value LSB (Unused)

CC#96 NRPN Data +1

CC#97 NRPN Data -1

CC#98 NRPN ID LSB

CC#99 NRPN ID MSB

NRPN MSB	NRPN LSB	Value MSB	Meaning
0x53	0x00	1 - 7	select slot
			slots can be cycled via CC#96 and CC#97