

Audio Studio Guide

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Introduction

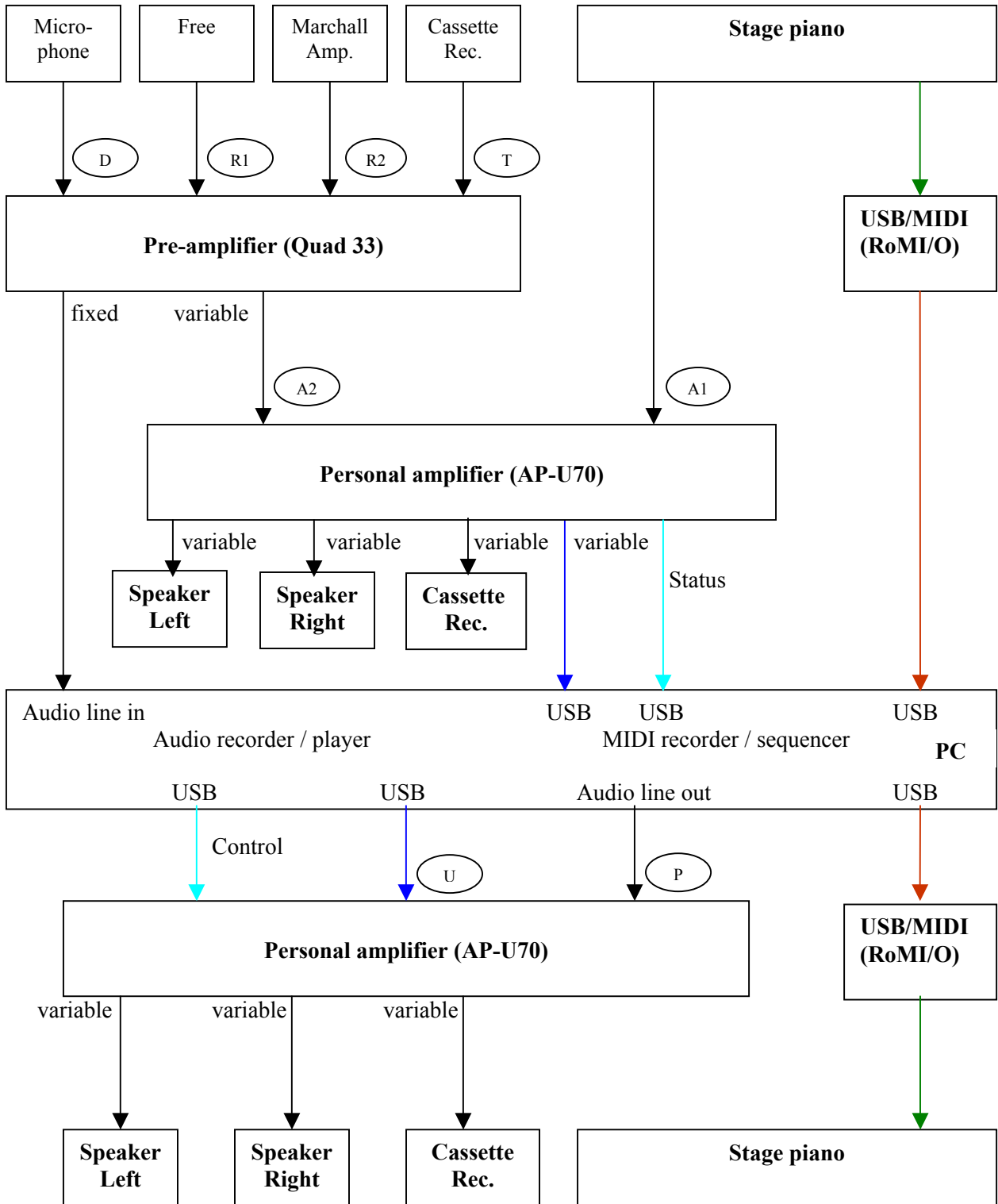
The guide describes the components used in the audio studio, the equipment and the used software. The interconnection between the different software is given with the recommended mode of operation.

Below, first a logical view is given of the information/data flows.

Then a general overview of the equipment is given, with the used software. Finally a short description is given of how the different programs are used and how information between them can be transferred.



Logical view



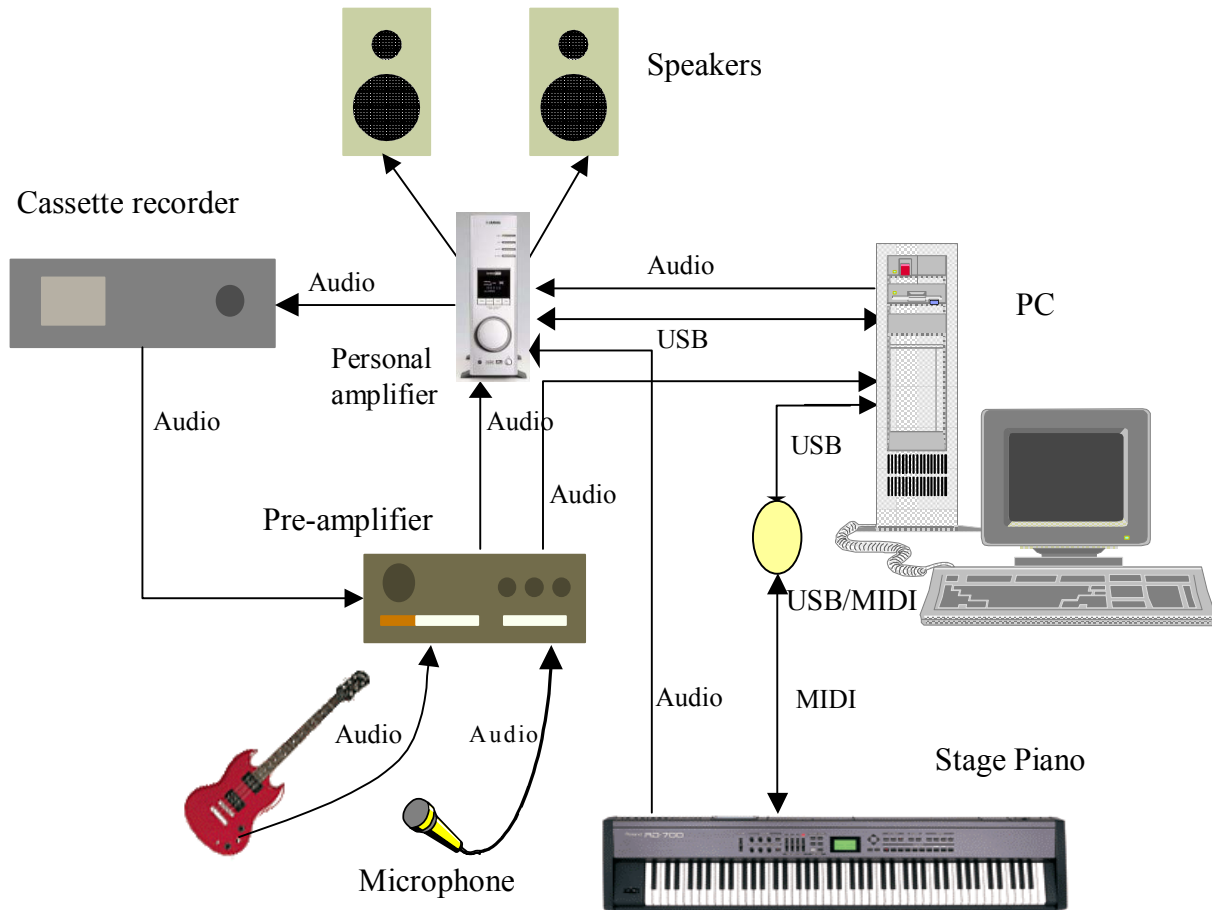
Legend:

- Audio analogue
- Audio digital within USB
- Midi
- Emulated MIDI within USB
- Control/Status within USB
- Selection button



Equipment

Interconnection



Hardware

Equipment	Type	Manufacturer	Purpose
PC	Scaleo 600	Fujitsu Siemens	Storage and manipulation of the recordings, production of CD's
Personal amplifier	AP-U70	Yamaha	AD / DA conversion, recording inlet / outlet, main amplifier
Pre-amplifier	QUAD 33	Quad	Pre-amplifier
Microphone	F-VX30	Sony	Microphone
Cassette recorder	AD-F300	AIWA	Cassette recorder
USB/MIDI	RoMI/O	ESI	USB-MIDI conversion
Stage piano	RD-700	Roland	Digital piano and sound module



Equipment	Type	Manufacturer	Purpose
Guitar	Mod 106	Raimundo	Acoustic guitar
Guitar	Epiphone SG	Epiphone	Electric guitar
Speakers	Philips	RH 544	Monitoring
Headphone	HD 590 Prestige	Sennheiser	Headphone



Software

Software	Manufacturer	Purpose
Windows XP Home edition	Microsoft	Operating system
Cakewalk Sonar 6	Twelve Tone systems	MIDI-sequencer and audio recording; editing
Cubasis Notation	Steinberg AG	Music score editing
Cool Edit Pro version 2.00	Syntrillium	Audio recording and editing; MP3 generation; conversion to 16-bit for CD production
Nero 7 Premium	Nero	Cd/DVD production
Studio 10 plus TE	Pinnacle	Video creation
Yrec-24	Yamaha	24-bits recording with low CPU usage



Software-interfaces / data formats

Introduction

The base for audio is by default the PCM format¹. Recordings are made with a definition of 24 bits and a sample frequency of 44.1 kHz, mostly in stereo. This is the high quality base for later manipulation of the audio data. We use on disc the PCM 32-bits 44,1 kHz format to keep high quality audio.

ASIO for All

This generic ASIO driver can be used to reduce the audio latency. Sonar 6 and the Yamaha AP-U70 personal amplifier do not perform (many drop-outs) with the ASIO for All driver.

Cakewalk Sonar 6

Cakewalk will be used for MIDI editing and sequencing. Scores from Cubasis Notation will be imported in the 'MIDI 1' format.

Cool Edit Pro

Recordings in 24-bit made by Yrec.exe can be read in with 'Cool Edit Pro' with the following options: Windows PCM, 32-bit (float) / 24-bit packet Intel PCM with offset +2.

We use PCM 32-bits (16.8 float) 44,1 kHz format for temporarily storage during the manipulations of the audio data. This ensures the quality of audio we need for final mastering.

The master files for CD production are in 16-bit PCM 44,1 kHz format. We generate the files with the following 'Cool Edit Pro' options: dithering 1 bit, Gaussian, Noise shaping C1.

Cubasis Notation

Cubasis Notation will be used for music score editing. For editing/sequencing the MIDI information scores will be exported in 'MIDI 1' format to be imported in Cakewalk. Not all information will be stored within the 'MIDI 1' format.

Nero 7 Premium

Nero is used for creating the actual CD or DVD.

Yamaha recorder

The Yamaha application Yrec.exe with the Yamaha AP-U70 can be used for stereo recordings in PCM 16-bit en 24-bit with sample frequencies of 44,1 kHz or 48 kHz. The AP-U70 with the recording application is the center of the studio, therefore, we use these formats for transfer of data between the different audio applications.

¹ See also Multiple Channel Audio Data and Wave Files:
<http://www.microsoft.com/hwdev/tech/audio/multichaudP.asp>



Configuration aspects

During configuration SONAR 6 does not support audio devices with different bit-depth, even if only one device driver is selected. This means that for support of 24-bit you must disable – during the configuration - in the Windows hardware profile all 16-bit audio devices. After finishing the complete audio configuration you can again enable your 16-bit audio devices. However, I recommend keeping them disabled.

After the first start-up of SONAR after configuration you must ignore the 16-bit drivers.

Another approach with less stress during configuration and more predictable results is using the ASIO driver of your 24-bit device². If your device does not have an ASIO driver, you can use ‘ASIO4ALL’. For the configuration see “[Cakewalk Sonar 6 \(with ASIO4ALL driver\)](#)”

Cakewalk Sonar 6 with MME (32-bit)³

1. Preferable: do not yet install SONAR. However, if you have already installed SONAR 6, delete the AUD.INI file located in: ‘\Program files\Cakewalk\SONAR 6 Producer Edition’;
2. Click with the right mouse button on ‘My Computer’ and select Properties;
3. Click with the left mouse button on the ‘hardware’ tab;
4. Choose ‘Device Manager’;
5. Click with the left mouse button on ‘Sound, video and game controllers’;
6. Click with the right mouse button on the 16-bit audio device;
7. Select ‘Disable’;
8. Repeat ‘Disable’ for all 16-bit devices;
9. Install SONAR and configure audio as stated below;
10. If SONAR forces the device to 16-bit, you have to change the AUD.INI file (step 11 through 16), otherwise you can go to step 17;
11. Exit SONAR;
12. Go to ‘\Program files\Cakewalk\SONAR 6 Producer Edition’ and ‘double click’ on AUDI.INI;
13. Change in the statement ‘Use24BitExtensible=0’ for your 24-bit audio device the ‘0’ into ‘1’;
14. Remove – if in AUD.INI - all information for your 16-bit audio devices;
15. Save AUDI.INI;
16. Start SONAR, and enable your 24-bit;
17. Exit SONAR;
18. Now enable your 16-bit devices again;
19. Start SONAR, and do not use the 16-bit devices.

² The disadvantage of this is, that you cannot share the audio device between two programs unless both use the ASIO driver.

³ For SONAR 6 the MME (32-bit) driver will give better performance than the DWM/KS driver. You will get earlier drop-outs when using the WDM/KS driver.



Global options

General

- Deselect: 'On Stop, Rewind to Now Marker'.

Folders

- Project files: E:\udata\cwp30;
- CAL files: E:\udata\cwp30\CAL.

Audio data

- Global Audio folder: D:\Geluid;
- Picture Folder: D:\Mijn Video's;
- File Bit Depth: 24 bit
- Deselect: Use per-project Audio folder.

Audio device configuration for Yamaha AP-U70

General

- Playback timing master: USB-audioapparaat⁴;
- Record timing master: USB-audio-apparaat;
- Audio Driver Bit Depth: 24⁵;
- Sampling Rate: 44.100 Hz;
- Select: 64-bit Double precision Engine;
- Buffers in play back queue: 4;
- Buffer Size at such value that the effective latency is 30 msec.

Use the Wave profiler - after making all (below) settings - to determine the DMA buffer sizes.

Advanced

- Deselect: Enable Read Caching;
- Deselect: Enable Write Caching;
- I/O buffer size: 128 kB;
- Driver Mode: MME (32-bit);
- Dithering: Triangle;
- Select: 'Play effect tails after stopping?';

⁴ Note that SONAR 6 does not recognize the correct device name of the Yamaha AP-U70 when using the WDM driver.

⁵ To enable 24-bit mode for the AP-U70 the variable 'Use24BitExtensible' in SONAR's AUD.INI file must be set to 1. The variable can be found in the USB-Audioapparaat section of AUD.INI.



- Select: 'Share Drivers With Other Programs'.

Drivers

- Select: User friendly names to represent audio drivers;
- Enter user friendly driver names (Yamaha AP-U70).
- Select: the YAMAHA AP-U70 USB Audio driver.

Driver Profiles

Stream > 16 bit data as: 4 bytes left justified.

Settings for RoMIO

To enable System Exclusive messages larger than 1 kB the variable 'SysSendPacketsize' in TSSEQ.INI must be set to a higher value e.g. 2048.

The parameter goes under the 'MIDI Output Devices' section.

Example: [MIDI Output Devices]
 MaxOutPort=-1
 SysSendPacketSize=2048

Cool Edit Pro for Yamaha AP-U70

Device Properties

Wave Out

- Select: YAMAHA AP-U70 USB Audio;
- Select: 'Use This Device In Edit View';
- Select 'Send 32-bit audio as': 3 Byte Packet PCM;
- Deselect 'Try As WDM'.

Wave In

- Select: YAMAHA AP-U70 USB Audio;
- Select: 'Use This Device In Edit View';
- Select 'Get 32-bit audio as': 3 Byte Packet PCM;
- Deselect 'Try As WDM'.



Yamaha AP-U70

Set-up

USB Multi-Channel Setting

- Select: 2 channels.

Volume setting

- Enable 'USB Mix On', and set at -12 dB;
- Set 'Digital Volume Setting' on maximum with an analog input activated.⁶

NOTE: The Yamaha AP-U70 application and Sweex wireless media presenter IA001 interfere with each other. The application cannot be started, It will give an error message during initialization, and abort . Therefore, the AP-U70 application cannot be used together with the IA001. However, the AP-U70 and IA001 can be used together.

⁶ This setting is automatically adjusted if the actual sound level exceeds 0 dB. Therefore, it has to be checked every time when a recording from analog input will be made.



Appendix 1 (Sonar alternative configurations)

ASIO for All⁷

Enable the Yamaha AP-U70;

A4A buffer size: 512 samples;

Advance options:

- Latency compensation in and out: 32 samples;
- Deselect :Use hardware buffer;
- Deselect: Always resample;
- Deselect: Force WDM driver to 16 bit.

Cakewalk Sonar 3 with ASIO driver

Global options

General

- Deselect: 'On Stop, Rewind to Now Marker'.

Folders

- Project files: E:\udata\cwp30;
- CAL files: E:\udata\cwp30.

Audio data

- Global Audio folder: D:\Geluid;
- Picture Folder: D:\Mijn Video's.

Audio device configuration for Yamaha AP-U70

General

- Audio Driver Bit Depth: not selectable (will be on 24);
- Sampling Rate: 44.100 Hz;
- File Bit Depth: 24;
- Buffers in play back queue: not selectable (will be on 2);
- Buffer Size at Fast.

⁷ If you are using the ASIO4ALL driver you must ensure that in the MIDI setup the 'MS GS Wavetable Synthesizer' is not selected.



Advanced

- Deselect: Enable Read Caching;
- Deselect: Enable Write Caching;
- I/O buffer size: 128 kB;
- Driver Mode: ASIO⁸;
- Enable 'Share Drivers With Other Programs'.

Drivers

Only the YAMAHA AP-U70 USB Audio driver will be visible, because it is the only with an ASIO driver.

Driver Profiles

- Stream > 16 bit data as: 3 bytes.

Cakewalk Sonar 6 (with ASIO4ALL driver)

Global options

General

- Deselect: 'On Stop, Rewind to Now Marker'.

Folders

- Project files: E:\udata\cwp30;
- CAL files: E:\udata\cwp30\CAL.

Audio data

- Global Audio folder: D:\Geluid;
- Picture Folder: D:\Mijn Video's;
- Deselect: Use per-project Audio folder.

Audio device configuration for Yamaha AP-U70

General

- Playback timing master: 'ASIO4ALL V2 USB-audioapparaat 1';
- Record timing master: 'ASIO4ALL V2 USB-audio-apparaat 1';
- Audio Driver Bit Depth: 24⁹;

⁸ If you do not want to use the ASIO4ALL driver, an alternative configuration is shown in Appendix 1 (Sonar alternative configurations)

⁹ Will be set automatically.



- Sampling Rate: 44.100 Hz;
- Select: 64-bit Double precision Engine;
- Buffer size: at the lowest latency.

Advanced

- Deselect: Enable Read Caching;
- Deselect: Enable Write Caching;
- I/O buffer size: 128 kB;
- Driver Mode: ASIO;
- Dithering: Triangle;
- Select 'Share Drivers With Other Programs'
- Select: ' Use Multiprocessing engine'
- Deselect: 'Play effect tails after stopping'.

Drivers

- Select: the 'ASIO4ALL V2 USB-audio apparaat 1'.



Appendix 2 (Pinnacle Instant Write)

With 'Pinnacle Instant CD/DVD' a CD or DVD can be burned. Pinnacle 'Instant CD/DVD' generates sometimes a glitch between two tracks.¹⁰ The glitches can be avoided by deselecting the option 'Just Link' in the 'advanced mode', before burning the CD.

¹⁰ With the CD/DVD writer 'NEC 2500A'. It is not clear whether this is also true for other CD/DVD writers.