

Slide-AV more compact than ever before

APEX

Instruction manual



Table of contents

| | |
|--|----|
| Table of contents | 3 |
| Slide AV more compact than ever before - APEX | 7 |
| General information | 7 |
| Advantages APEX offers on practical work. | 7 |
| Introduction | 9 |
| APEX – First steps | 11 |
| How to switch APEX on | 11 |
| Basic information on APEX and its storage card | 12 |
| How to connect storage card to PC | 12 |
| How to prepare APEX | 12 |
| Projectors with a 24V-lamp and integrated triac | 13 |
| Projectors with serial interface (RS-232) | 13 |
| Setting of projector type | 14 |
| The MP3-Tool | 15 |
| How to register the MP3-Tool | 15 |
| A demo music | 16 |
| How to play demo back | 17 |
| Summary | 17 |
| Working with APEX | 18 |
| How to handle APEX-menu | 18 |
| Save configuring | 18 |
| Summary – menu system | 19 |
| APEX – its structure | 20 |
| The MP3-Player | 20 |
| Der IMAGIX Player | 20 |
| Command language | 20 |
| Triggering | 20 |
| Batch processing, batch files | 20 |
| APEX - its LEDs | 21 |
| How to operate APEX as an MP3-playback device | 21 |
| APEX working as a controllable sound generator | 21 |
| The MP3-Tool | 21 |
| How to run APEX together with IMAGIX | 23 |
| Operation with IMAGIX 5 | 24 |
| APEX – its projecting unit | 26 |
| How to connect projectors | 26 |
| Setting cycle | 26 |
| APEX – its connections | 27 |
| Manual operating by means of infrared remote control | 27 |
| IR disabled | 27 |
| IR standard | 27 |
| IR-mode „Random Access“ | 30 |
| IR-mode „Parallel Access“ | 31 |
| APEX – How to apply it on practical work | 32 |
| Manual operation | 32 |
| Operation with Compact-Flash card | 32 |
| Operation with different devices | 32 |

| | |
|---|----|
| Speakers Support..... | 32 |
| How to play back a slide show from an analogous tape..... | 33 |
| Playing back a slide show from CD or DAT..... | 33 |
| PC-programming by digital sound-blaster | 34 |
| PC-programming – analogous recording, connecting APEX by serial COM-port..... | 34 |
| APEX – its reference..... | 35 |
| General information..... | 35 |
| Files on the card..... | 35 |
| Menu functions | 35 |
| „Play File“..... | 35 |
| „Tone“ | 35 |
| „Configuring“ | 36 |
| Menü „Input select“ | 36 |
| Input autosense | 36 |
| Input digital | 36 |
| Input coaxial | 36 |
| Input optical | 36 |
| Input analogous | 36 |
| „Signal select“ | 36 |
| „Address select“ | 38 |
| PT/FT/PCOM..... | 38 |
| Dataton Syncode | 39 |
| DMX-512 addresses | 39 |
| „Config ports“ | 39 |
| Standard 1 to Standard 4 | 40 |
| Setting projector cycle time..... | 40 |
| Ektapro/Leica RT..... | 41 |
| Setting Auto-Standby-time | 41 |
| Ektapro/Leica HI | 41 |
| Auxiliary port | 42 |
| Rollei DUAL 66 P..... | 42 |
| Rollei MSC 3x0 P..... | 42 |
| TA-4002/S-AV | 42 |
| Simda Rev. 3.3 | 43 |
| Summary | 43 |
| „Config memory“ | 44 |
| „Save configs“ | 44 |
| „Read configs“ | 44 |
| „Default configs“ | 44 |
| „Diagnostics“ | 45 |
| Revision + ID..... | 45 |
| MP3-Encoder Key | 45 |
| DMX-512-Input..... | 45 |
| Ext. Function keys | 45 |
| S/PDIF input | 45 |
| AC line state..... | 46 |
| CF-Card directory..... | 46 |
| CF-Card status | 46 |
| „Advanced functions“ | 47 |
| „AC line sync“ | 47 |
| „Cue play offset“ | 47 |

| | |
|---|----|
| „PT step delay“ | 47 |
| „Autolink“ | 48 |
| „External input keys“ | 48 |
| „IR function keys“ | 49 |
| Menü „Exit at End“ | 49 |
| „Default diss. Rate“ | 49 |
| „Serial Baudrate“ | 50 |
| „Global Autoloop“ | 50 |
| „Player Loop“ | 50 |
| AUTOEXEC.BAT..... | 50 |
| „Power fail save“ | 50 |
| Menü „No cue -> aux off“ | 51 |
| „No cue -> no lamp“ | 51 |
| „No cue hold time“ | 51 |
| „Dig. Ch. toggle | 51 |
| „FreeTrac group“ | 51 |
| „TA-4002 autozero“ | 51 |
| „Min Volt level“ | 52 |
| „Max Volt level“ | 52 |
| „Syncode Aux Mode“ | 52 |
| „Slide adv. mode“ | 52 |
| Remote proj. cnt“ | 52 |
| „DMX Slide mode“ | 53 |
| „Overwrite Pos.“ | 53 |
| „RS232 Echo“ | 53 |
| „Do IMX-Comments“ | 53 |
| „Ignore IMX-Stops“ | 53 |
| „Infrared remote“ | 54 |
| „Timer functions“ | 54 |
| „Timer start/stop“ | 54 |
| „Time per slide“ | 54 |
| „Slides per proj.“ | 54 |
| APEX – its command language..... | 55 |
| Particularities in serial control..... | 55 |
| Player Address | 55 |
| Options..... | 55 |
| Time data..... | 55 |
| Short commands..... | 56 |
| Commands being embedded in IMAGIX-files | 56 |
| Commands..... | 57 |
| ASSIGN..... | 57 |
| PREPARE..... | 57 |
| PLAY..... | 58 |
| PAUSE..... | 58 |
| STOP | 58 |
| MAXPLAY..... | 59 |
| LOCATE..... | 59 |
| LPLAY | 59 |
| LCPREP | 60 |
| LINK | 60 |
| CALL..... | 60 |

| | |
|---|----|
| DIR | 60 |
| MUTE | 61 |
| DEMUTE..... | 61 |
| TASC | 61 |
| THEX..... | 62 |
| VOLUME..... | 62 |
| BASS, TREBLE..... | 62 |
| APEX – controlling by DMX-512..... | 64 |
| APEX – triggering by DMX-512 / the \DMX-512\ -folder..... | 64 |
| Direct projector control by means of DMX-512 | 64 |
| Functioning of addresses assigned..... | 65 |
| Summary | 65 |
| Conversion table: Hexadecimals – Percentages | 66 |
| Technical addendum | 67 |
| Assignment of connection sockets..... | 67 |
| V24-in-socket..... | 67 |
| Socket - Port A - D..... | 67 |
| AC-24-socket | 67 |

Slide AV more compact than ever before - APEX

General information

APEX is an all-round device to control complete slide shows. Unlike other traditional slide-control devices APEX not only ensures slide-control but entire audio playback as well. No additional playback device (tape, DAT, DC) will be needed anymore. Contrarily to traditional audio playback devices (cassette, DAT, CD) it is working without any moving parts. All information is saved in semi-conductors, i.e. silicon chips, being part of the exchangeable storage card. Compact-Flash cards being used are standard products having been developed by SanDisk. Such cards are used as well in digital cameras for example. To keep volume of information saved as low as possible, to enable higher playback time, sound data is compressed. Used is the standard according to MPEG-procedure (Layer 3) shortly called MP3. Data volume can therefore be reduced in a way enabling economic use of storage cards. Data compressing is done by the "Encoder" (encode = xxxx). As data compressing is a highly intensive computing procedure, the PC will always work as an encoder whenever working with APEX. APEX is equipped with an integrated "decoder", reversing compressing on playing back. Sound data therefore are processed by PC, copied onto storage card by means of an adapter and may then be played back by APEX. Control data ensuring projector control are also stored on the storage card. As those data are control data, compression won't be needed.

Advantages APEX offers on practical work.

Compared to traditional slide control systems, APEX-technique offers a wide range of advantages:

1) Lifetime

Even with sound data being used frequently, there will be almost no wear. Compact Flash-cards by SanDisk may be recorded about 1000000 times. Number of data readings from such cards is unlimited.

2) Compact design

With any slide show whatsoever, only one compact APEX control device will be required. It is equipped with outputs for both sound and projectors. There will be less wiring on mounting. APEX is an optimal solution with permanent slide show installations as handling is very simple. A complete slide show for example may be started by an external keyboard to be connected.

3) Speaker Support

APEX being able to work without mechanical moving parts it reacts very quickly to external impulses. Live slide shows have become very popular in our days. If a speaker also wants passages set to sound, a technique supporting both is required. APEX will stop playing back at previously defined stops. The speaker may then restart it from there during the show. The semi-conductors technique enables APEX to react very quickly. No CD-player for example will have to be started first.

Introduction

The present instruction manual is divided up into three sections.

The first section, „First steps“, will explain how to activate APEX, how to load a sound-file from PC onto Compact-Flash card and how to play it back.

The second section, „Working with APEX“, will give explanations on basic structure of menu control enabling to "surf" through functions and settings of APEX. Once having read that section, you will be able to handle the menu. Later on, we will just detail effects of respective settings. By means of adequate examples we want to improve technical comprehension to enable you to successfully integrate APEX in your application environment.

The third section, „APEX - its references“, is an information pool on any possible function APEX offers. APEX enables a great variety of settings. They are going to be explained in detail in that section, in form of a table. By means of a few somewhat professional remarks, we will be going to improve comprehension. Internal command language of APEX will be described as well.

The „Technical Addendum“ showing assignment of the different connection sockets will complete our instruction manual.

Demo music

We added a demo music to the installation program of the MP3-Tool being part of APEX. We got the authorization from Highland Musikarchiv to use that music for demonstration purposes.

Highland Musikarchiv is producing music that is not subject to GEMA fees. Such music can be bought there for different application purposes. Please contact:

Highland Musikarchiv * Wolfhager Str. 300 * D-34128 Kassel.

More info and MP3 audio examples are available on the following homepage:

<http://www.highland-musikarchiv.com>

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Freiburg, June 2001

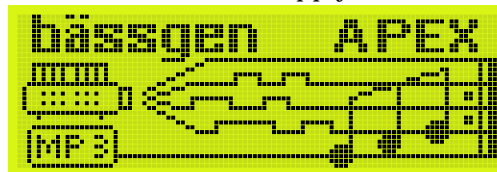
| |
|---|
| If you wish to provide friends of yours with our instruction manual, please refer to our homepage http://www.baessgen.de where its integral version is available in Adobe pdf format |
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- Personal notes -

APEX – First steps

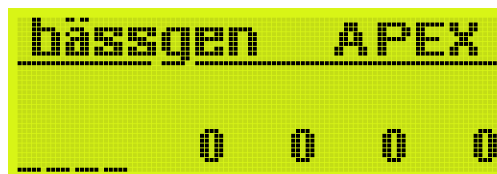
How to switch APEX on

Time has come to activate APEX. Connect the power unit AC-24 having been supplied to the socket labeled "AC-24" and connect it to an outlet box (power unit is designed for a power supply of 230V; with different voltages please use an adequate power unit). On running APEX together with at least one slide projector that is not controlled by a serial RS-232 interface, no external power supply unit will be needed. Projectors being equipped with a 10-pole-socket according to DIN will supply 24V alternate current on that socket. It will supply APEX with current. In case an external power supply unit was connected all the same, APEX won't get damaged. On working with Kodak Ektapro or Leica RT-projectors, power supply unit will be needed. Display should now be illuminated; the welcoming text should now appear. During that time, APEX will build up internal data structures and try to detect a Compact Flash-card.



Base screen of APEX will now appear:

The four zeros show positions at which projectors connected are located (with APEX LITE or APEX TRI only two or three projectors will appear). The present manual will always deal with a full version. Functions connected to projectors not being available in smaller devices are not shown in the menu. So if you work with an APEX TRI and there is a menu item missing, that one will probably apply to the fourth projector. The four small bars show that lamps of all projectors are faded down at the moment.



Base screen of APEX will always be the same, regardless whether a storage card will have been inserted or not. More information on check of storage card will be given in the menu „CF-Card status“.

As a matter of fact, we recommend storage cards be not exchanged on operation. Doing so will cause APEX to completely reboot.

Caution: Inserting or removing of storage cards on operation may cause strong crackling that might damage your loudspeakers. Reduce volume at first, prior to carrying out such operations!

Basic information on APEX and its storage card

In its current version, APEX is a mere reader for Compact-Flash cards. In general, content of a storage card is generated by means of a computer. Presentations can then be made without that computer. There are different ways to connect Compact-Flash cards to a computer to record necessary data.

„Image-Mate“ by SanDisk is an external read-write device that offers good value for money. „Image-Mate“ is available with either a parallel or an USB-port. Most notebook computers are equipped with an integrated PCMCIA-insert allowing recording of Compact-Flash cards by means of a small adapter. Drivers issued by Sandisk once having been installed, the storage card will appear on your computer as a hard-disk drive together with respective drive label.

How to connect storage card to PC

The example stated is based on an "Image Mate" by SanDisk that is working with a parallel port. The storage card being used is a SanDisk-product as well.

Caution! Not all Compact-Flash cards offered by other manufacturers are at 100% compatible with SanDisk-cards. Correct function can only be guaranteed on use of SanDisk-cards.



ImageMate by SanDisk.

The driver software supplied with the SanDisk „Image-Mate“ once having been loaded, a Compact-Flash card having been installed will appear under Windows as a hard disk drive together with respective drive label.



Storage card with 128 MB

Connect the SanDisk „Image-Mate“ to your computer, according to manufacturer's instructions enclosed and install driver software having been supplied with your equipment. Installation should be complete Windows once having been rebooted. Once a storage card has been inserted into the „Image-Mate“ check by means of the Windows Explorer whether a new drive label has been generated.

In case you used a different technique to record storage cards on your PC, the instructions to follow will apply as well, based on the assumption that a drive representing the card is available.

How to prepare APEX

In a very first step, some sound shall now be played back from the storage card. To do so APEX first has to be connected to an audio chain. Audio outputs are located on the rear side of APEX. They are labeled OUT L and OUT R.

Connect either an amplifier or active loudspeaker boxes. Always consider that strong crackling may be caused on switching APEX on or off as well as on exchanging storage cards.

APEX is equipped with a wide range of setting possibilities for both sound playing back and projectors. We tried to provide settings for as many applications as possible (default settings).

On practical work, default settings will be sufficient in 95 per cent of applications. Exception: setting of projector type. Correct setting will be explained afterwards.

Prepare the two slide projectors to be connected to APEX. Don't switch them on yet. Prior to switching the installation on, all cable connections will have to be connected. The fact that there are two different types of mixing projectors always has to be considered. A first group includes 24-V projectors with a triac. Another group includes projectors being controlled by a serial interface (RS-232). Function principle is different; they are to be connected by different cables. APEX has to be informed on the type of projector to be connected to ensure correct control.

Projectors with a 24V-lamp and integrated triac

That group includes projectors being equipped with an integrated triac that may be externally controlled by a 10/14-pole socket. BRAUN Praximat (types with a 10-pole socket), KINDERMANN silent, LEICA P600, ZETT Royal AV etc. for example belong to that group. If a projector is equipped with such a 10/14-pole socket, it may more or less surely be connected to BASIX. Contrarily to many other 6- and 8-pole sockets showing often different pin assignments, they are usually all wired the same way.

Carousel projectors by ELMO, KODAK and SIMDA being usually equipped with a 12-pole socket dot not belong to that group, as they are not equipped with an integrated triac. All connections are led to the 12-pole socket described. By means of the triac-adapter BÄSSGEN TA-4001 containing a triac, projectors stated may also be connected to APEX.

With all projectors of that type, power supply of APEX is ensured by projectors being connected. To ensure correct power supply, just one projector has to be connected.

With former mixing devices, both projectors had to be connected to the same phase. APEX automatically detects phase for each projector; phase position therefore needn't be taken care of anymore. The microprocessor APEX is equipped with automatically compensates both phase and frequency deviations.

Projectors with serial interface (RS-232)

That type of projectors is equipped with a microprocessor ensuring lamp control internally. Such projectors are externally controlled by a data interface.

That group includes KODAK EKTAPRO from 4010 onwards, Leica RT-projectors, projectors by SIMDA working on serial control (starting software update 3.3), as well as Rollei MSC 300/330 P and Rollei Dual 66P. Rollei Dual 66 P is equipped with both types of interfaces. It may therefore as well be operated like a traditional 24V-projector.

Serial interface doesn't ensure power supply of APEX itself; an external AC-24 power supply unit will be required (except Simda whose RS-232 socket is equipped with a power supply unit for control device. A Q-4-cable will be required).

Technical details once stated, APEX just has to be adjusted to correct projectors, then work may start.

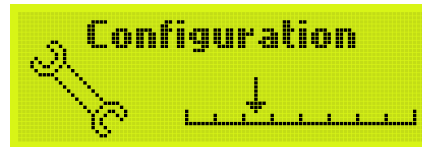
Technical addendum contains a list of cables required.

Setting of projector type

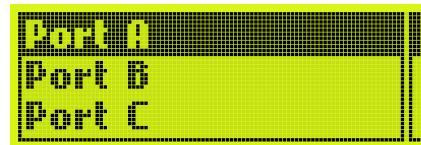
Starting from base setting, press bottom key three times till base screen of configuring menu will appear:

By means of the cursor-keys, i.e. upper and lower key you may move through menu items.

Press "Enter" and then three times bottom key. Select menu to configure APEX-ports will appear.



Respective port having been selected by pressing bottom key and "Enter" (APEX allows individual setting of each port, i.e. mixed operation with different projectors, i.e. select menu showing the different settings for foreseen projectors will appear.



Default setting „Standard 2“, works with Kodak carousel S-AV-projectors and many others being equipped with a triac. A different setting has to be selected for projectors working with serial control such as Kodak Ektapro and Leica RT. For further details please refer to reference section.



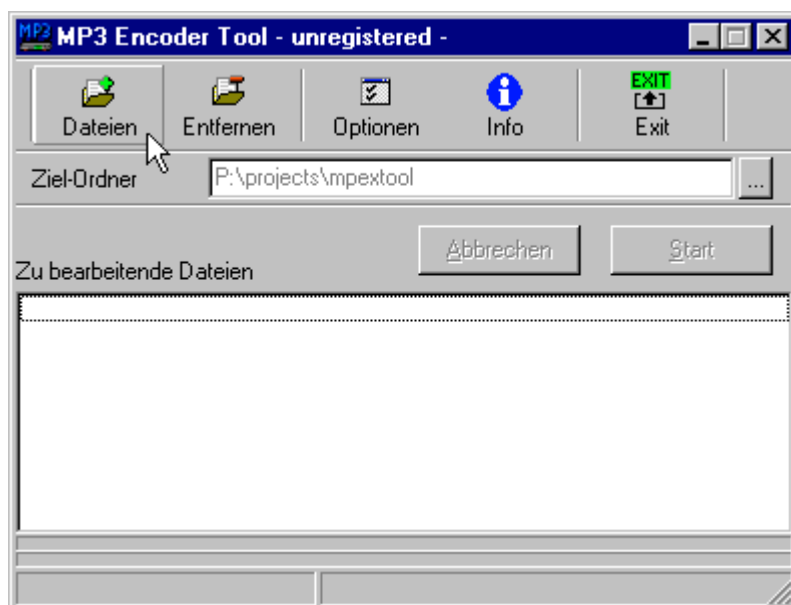
The most important setting has probably now been carried out. To store it definitely, configuring will have to be saved. Otherwise that setting will be lost APEX once having been switched off. Details on permanent saving will be given in the "Save configuring"-section. Prior to start working with projectors having been connected, playing back unit will be illustrated by a simple example. Explanations on how to play an MP3-file back from the storage card will be given as well.

The MP3-Tool

A tool-software will be supplied with APEX enabling compressing of sound-files according to MP3-standard. By means of that program, just one or a large number of files (WAV-format) may be selected, compressed and copied into a different folder (or directly onto storage card). Moreover, the MP3-Tool will at the same time generate the index-files being required. It will as well copy other files being necessary (i.e. IMAGIX-files) to position having been established. Further details will be given later on. You won't be going to need those functions to just play a file back.

The MP3-Tool absolutely is to be used whenever working with APEX, as only that tool will generate index-files required for failure-free operation of APEX. An external MP3-encoder may be used as well, but the MP3-Tool will still have to be used to generate the index-files.

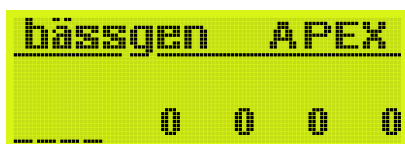
Install the MP3-Tool from either a disk or a file having been extracted from either a CD or Internet. Start the tool up. The following screen should appear:



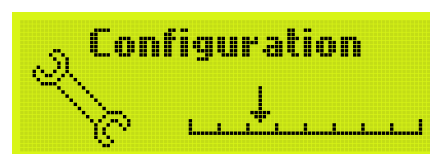
How to register the MP3-Tool

The MP3-Tool being part of APEX-supply it must exclusively be used together with APEX. For that reason, an enabling code is to be entered. That code will be supplied with your APEX. Please proceed as follows:

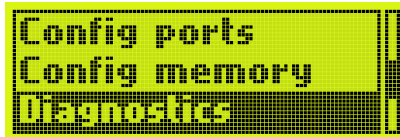
Switch APEX on and wait until it's ready:



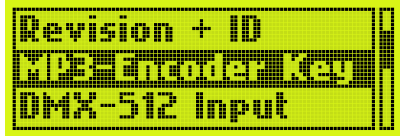
Press bottom key three times: display will then show:



Press „Enter“. Afterwards press lower key 5 times. Display should now show:



Select menu-item "MP3-Encoder Key" by pressing "Enter" and "bottom key".



Valid code will be displayed with "Enter" having been pressed once again:

MP3-Encoder Code:
00000000 00000000

A sixteen-digit code having been attributed especially to respective APEX will appear. Without that code, the "MP3-Tool-software" cannot be enabled.

After having acceded to the MP3-Tool-software, click onto submit button "options". The following screen will appear:



Enter your 16-digit code in the text field "Registration Code" being located at the bottom on the left of the options screen. Make sure spelling is correct.

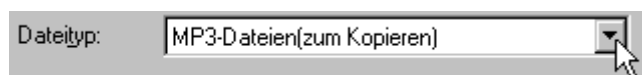
Once the correct code having been entered and the screen closed by „Ok“, quit the software by means of „Exit“ and reboot it. The software will now have been enabled; the respective text field won't appear anymore.

A demo music

Time has come to listen to some music. The installation program of the MP3-Tool will have installed a small MP3-file in the folder having been selected. It is called „test.mp3“, a piece of music of about 20 sec.

Press submit button „Files“ in the MP3-Tool.

Type of file to be selected will be „MP3-files“, as you will be going to listen to a file having already been compressed.



Select file „test.mp3“.

Destination folder to be directly selected will be the drive having been assigned to the SanDisk Image Mate that will now appear on your PC. You may use the key showing three dots being located at the right edge of text line.



Selecting once having been carried out, press „Start“-key.

The MP3-Tool will now copy the file onto the storage card. The file having already been compressed, it just has to be copied. Afterwards, the MP3-Tool will generate respective index-file on the storage card. Check the storage card by means of the Windows Explorer. It should now contain two files: the „test.mp3“-file as well as the index-file „test.mfi“.

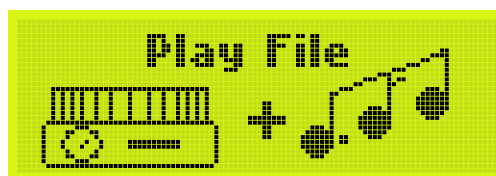
Quit the MP3-Tool now and remove storage card having been made ready for operation.

How to play demo back

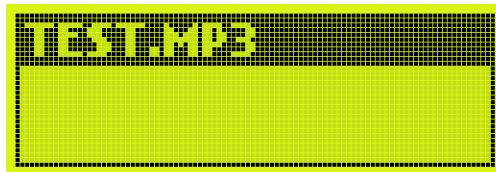
Insert the Compact-Flash card just having been recorded into APEX. Display will return to base message after a few seconds time.



Press bottom key to get into the menu „Play File“:



If „ENTER“ is pressed, a list of files able to be played back will appear. In the present case, only one file will be available:



Press „ENTER“ again now. The file „test.mp3“ will be played back.

Now listen to the file. The display will show:



That message will tell you: MP3-player is active and, at present, playing back the file „TEST“, it has reached position 0:04 (in minutes and seconds). By pressing „ESC“ you may interrupt playing back and restart it by pressing "Enter". By

keeping „ESC“ pressed (for about 1 sec.) playing will be aborted. Projectors will keep on staying on base position as no projector control file has yet been stored on storage card.

Summary

A music demo has now been played back by means of APEX. A Compact-Flash card has been recorded; the respective read-write device has been installed. Moreover, the MP3-Tool has been installed and used to copy respective file (compressing files by that tool is by no means more difficult; a Wave-file just has to be selected that will then automatically be converted into an MP3-file).

Working with APEX

That section will provide an introduction into structure of APEX as well as some basic explanations and practical examples dealing with different applications.

How to handle APEX-menu

As in other BÄSSGEN-devices being equipped with 4 keys on the front plate, APEX allows a lot of settings in a menu system. Those are often functions to be enabled one by one but it may as well be a setting to be saved later on. They all have an impact on the operation of APEX. The menu has a hierarchical structure obeying to the following rules:

- 1) Whenever APEX is switched on, the top-level menu will appear.
- 2) By means of the two center keys at the front plate, (also called "cursor keys", despite the fact they aren't showing any arrows) you may move through the different menu functions to select a specific one.
- 3) By pressing „ESC“ a menu function will be quit. There will be a shift upwards towards the item on top without any modifications being carried out. This means, pressing „ESC“ as often as needed allows returning to the first menu function, without any modification being carried out. That's quite useful in case "you got totally wrong". All the same, the menu system of APEX is by no means a highly sophisticated one.
- 4) Menu functions are selected by „ENTER“. Consequences: You will either get to next lower menu level. That level obeys to the same rules as any other menu level. On the other hand, lowest menu level having been reached, respective menu function will be carried out or selected. In select menus, such menu functions are mostly followed by a *. The menu is also offering different items in which a function is directly carried out on condition „ENTER“ is pressed, playing a file back for example.

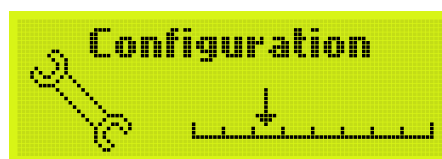
If a menu contains more than three items, only part of it will be displayed, as the display will normally show three lines only. A small scroll bar will then appear at the right-hand side, showing approximate position in the menu. You surely are already familiar with that technique as it is also used in cell phones.

Save configuring

The settings made in the menu system have not yet been saved. So if APEX was simply switched off after some settings having been made, they will be lost afterwards. To keep settings active, they first have to be saved in the configuring memory. To turn temporary settings into permanent ones, they have to be stored in a configuring memory. APEX is equipped with five independent configuring memories (showing the labels 0..4). Five different complete configuring may be stored there and be called at request. Especially in photo clubs or large-scale events that may be advantage, as the whole device often has to be completely re-configured. Memory 0 is a particular one. Whenever APEX is switched on, that memory will be read; APEX will be configured accordingly. Use that memory to save base configuring.

Caution: APEX will also be reconfigured on any exchange of storage card!

There are particular menu functions to definitely save configuring. First select "Configuring" in the top-level menu.



Select "Configuring" by "ENTER". Then select "Config Memory" by means of bottom key.



„Enter“ makes appear the following menu:

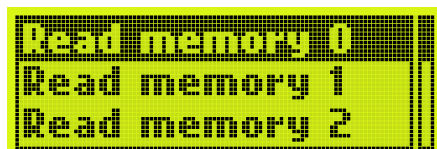
After selecting of one of the first two items, a new menu will appear where a one of the configuring memories may be selected.



„Save Configs“ records current settings in one of the configuring memories. They will have been saved definitely as they will be read automatically, each time APEX is switched on.



„Restore Configs“ will re-read settings from the configuring memory. It may be used whenever you feel you did something wrong, something that might modify configuring.



„Default Configs“, will load an established configuring to APEX, the so-called "Default settings". It's the configuring any APEX will have been equipped with for delivery.

Summary – menu system

Introduction to the menu system is now complete. Please run through the reference section of the present manual once in any case. Any menu function will be explained there in detail. There may be some among them giving answers to specific questions you may be interested in. Every user should at least know what settings are possible and where to find answers in case of need.

APEX – its structure

That section will deal with the internal logical structure APEX is relying on.

The MP3-Player

APEX mainly consists of the MP3-player and the IMAGIX-player. The MP3-player will play back a sound file having been saved on the storage card. The storage card contains a file system that is compatible with MS-DOS. It is working as a generator of sound-files and other ones. As file-systems being used in Windows operational systems go well along with the DOS file system, data transfer won't cause any problems. Other operational systems as well are able to work with MS-DOS file systems.

Der IMAGIX Player

If beside sound, APEX is to synchronously control slide projectors, the IMAGIX-player being integrated will be needed. The IMAGIX-player is a unit able to play IMAGIX-files back (in the IMAGIX 2/3-format). It can be operated on standalone, completely independently from the MP3-player but synchronous operation is possible as well. In a synchronous slide show it will mainly be going to work synchronously. Never forget that APEX is able to carry out different operations in parallel.

Command language

APEX-players may be controlled by a command language. It is somewhat similar to a command line entries like the ones being used on MS-DOS operational systems. You won't need that command language to carry out a simple slide show for example. But it can be quite useful when it comes to using APEX in permanent installations. By a command of the type „ASSIGN 1 TEST.MP3“, the respective file will be assigned to player 1 and opened; "Play 1" will play the file back.. „LOCATE 1 25000“ for example will set playback position to 25 sec. For detailed information on commands please refer to reference section.

Triggering

If other devices are to trigger APEX in a media field command language described will be used. The same commands may be transmitted to APEX by means of a RS-232-interface. APEX will then be going to carry out commands transmitted.

Batch processing, batch files

Batch files now may also be written by an ordinary text editor. Those are files containing different commands; every line contains its own command. By calling a batch-file different commands may therefore be enabled.

Practical example: a slide show set to sound is supposed to be triggered by a light barrier. The storage card will contain the respective IMAGIX-file, the respective MP3-file as well as a command-file called „E1.BAT“, containing commands to trigger respective slide show. The light barrier will have been connected to external input 1 of APEX. In APEX-configuring, the file „E1.BAT“ will have been assigned to external input 1. The show will be going to start as soon as the light barrier will have been interrupted.

APEX - its LEDs

Internal status of APEX is shown by three LED's.

LED „CTRL“ flashing: APEX has received an external command, usually a command transmitted by the infrared remote control or a trigger signal transmitted by means of an interface having been selected.

LED „PLAY“ lighting: the MP3-player is in playback mode. The LED described should be lighting, as soon as sound will start being transmitted. The respective LED flashing means APEX is in "Pause state". The file to be played back will still remain opened; APEX will be waiting at respective playback position. Another play command, i.e. pressing "Enter" will cause APEX to continue playing back.

LED „SYNC“: from its SYNC-output, APEX is transmitting a control signal being addressed to a projector control device for example. Such a signal will always be transmitted whenever the IMAGIX-player will be playing back an IMAGIX-file. The respective LED will be flashing with the IMAGIX-player being in the operational state "Pause".

How to operate APEX as an MP3-playback device

That section will only deal with operating APEX as an MP3-playback device. That's only a part of APEX, but respective MP3-Tool software will be described. On working with IMAGIX 5, that software will automatically be started. All the same, for special purposes and error detecting sound knowledge of the MP3-Tool may be useful as files APEX needs may be directly generated. Use in slide shows will be explained in an own chapter.

APEX working as a controllable sound generator

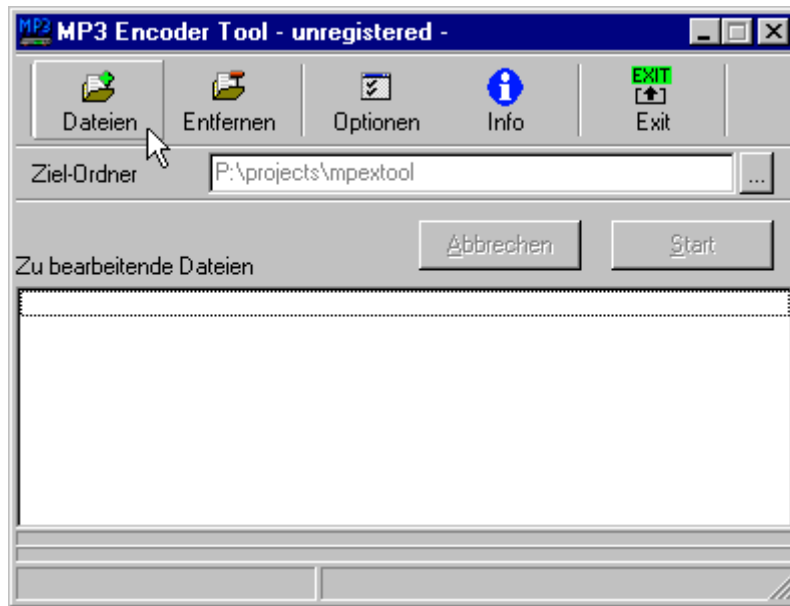
The following rule will always have to be obeyed to, no matter in what way APEX will be used as a sound generator: in any case whatsoever, sound first has to be processed by means of a PC and copied to the storage card. Use of the MP3-Tool having been supplied is absolutely compulsory. The respective program is waiting for sound having been converted into WAVE-files. One or more of them may be selected. They will be compressed into the MP3-format. The MP3-tool will be equipped with an MP3-encoder manufactured by Fraunhofer Society. Once the MP3-Tool having compressed respective sound, the MP3-file will be read once again; respective index-file will be generated. That file is a vital one as it ensures correct function of APEX. If for any reason whatsoever the integrated encoder will not be used or if, for example, sound is only available in an already compressed version, the MP3-Tool may also be used to generate just the index-file. Please refer to the following section dealing with the MP3-Tool.

Prior to initiate the storage card we recommend referring to the section dealing with the tool described. Start it, enter registration code on first use, then copy the file requested onto the card and start APEX. For controlling protocols and menu settings please see reference section.

The MP3-Tool

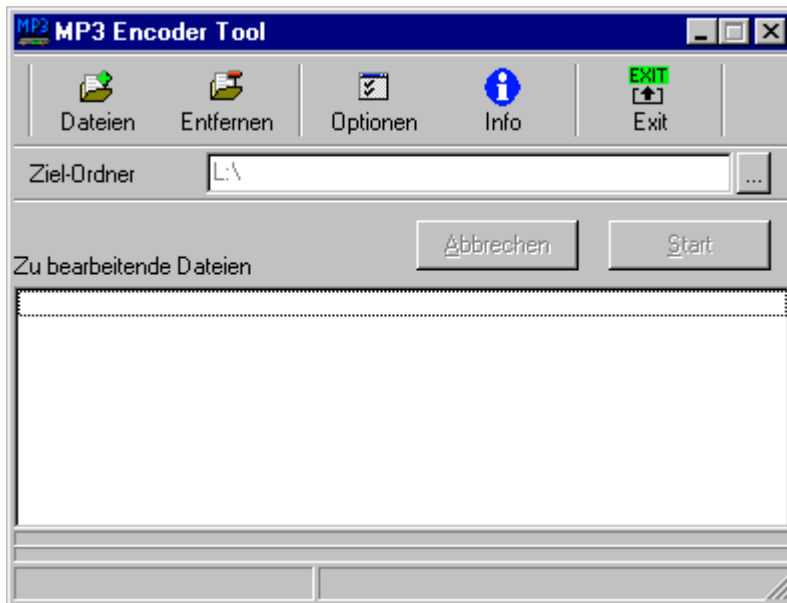
The MP3-Tool is supposed to compress sound-files and to generate the necessary index-files. The MP3-Tool once having been installed on your PC, start the program up.

The following screen should be displayed when the program is started for the first time:



At first, respective registration code will now have to be entered. Select menu function Configuring -> Diagnostics -> MP3 Encoder Key from APEX. A 16-digit key-number will be displayed. Select "Options" from the MP3-Tool; enter that number in respective field. Quit that field by "Ok"; quit the MP3-Tool by "Exit".

On restarting the MP3-Tool now, registration should have been completed. Your screen will now be going to display:



By means of the submit button „Files“ you may now select files. From the dialogue to follow you may select several files at once. The dialogue being quit, the files selected will be registered in the list of the MP3-Tool. You may activate the submit button "files" several times. By doing so, the list of files to be processed can be enlarged.

By means of the submit button „Cancel“ you may remove files having been marked from the list.

Options

By means of the submit button „Options“ you may influence functioning of the MP3-Tool

By means of the fields „Bit rate“, „Operating mode“, „Sampling rate“ you may influence quality of the encoder. With high quality requirements we recommend a bit rate of 112 or 128kB be always

used. Only in applications where quality requirements are low, you may switch over to a lower quality, to save considerable storage capacity.

With the check box „Generate MP3-files“ not having been marked; no MP3-file will be generated from a WAVE-file. Respective file will simply be copied into the destination folder.

With the check box „Generate MP3-Index-Data“ not having been marked, no index-file will be generated. That check box should absolutely be marked on working with APEX.

Generally speaking, further files showing other extensions will just be copied into destination folder (Imagix-files for example).

If sound-files are already available in the MP3-format, the MP3-Tool will just have to be used to generate the necessary index-files. Select respective MP3-files by means of the submit button "Files". Make sure the radio button „Generate MP3-Index-Data“ will have been marked. The MP3-files will be copied into destination file. Afterwards, the index-files will be generated.



How to start compressing

Procedure has to be started by activating the submit button "Start". The two progress bars at the bottom of the screen will be going to indicate progress of compressing. One bar stands for progress within the file being currently compressed; the other one stands for progress with regard to the whole list of files to be processed.

How to quit the MP3-Tool

Task once accomplished, quit the MP3-Tool by means of submit button "Exit".

Technical notice: Many notebooks are equipped with a serial PCMCIA-insert, allowing recording storage cards directly by using an adapter. On recording a storage card being installed in a notebook by means of an Ethernet network, make sure network configuring has been set in a way to provide you the necessary recording rights with regard to your storage card. Otherwise, the MP3-Tool will of course not be able to record the card.

How to run APEX together with IMAGIX

Whenever working with IMAGIX Vers. 3.xx only, the statements made with regard to „standalone“-operation will apply here as well. By means of the MP3-Tool make sure the IMAGIX-file is copied onto the card; an MP3-file showing the same name (except extension) is generated together with the index-file and saved on the card.

On working with IMAGIX 5, IMAGIX must at least be available in its version 5.04. Version 5.04 and later ones are equipped with a support for APEX. A specific dialogue will enable you to prepare data transfer onto the card. Imagix 5.04

will start the MP3-Tool on its own and to transmit the necessary parameters. Details are to follow below.

Operation with IMAGIX 5

Let's assume you programmed a slide show by means of IMAGIX 5 and you now want to play it back by means of APEX. It doesn't matter whether that show is a completely programmed one or a Speaker Support Show. In case of a Speaker Support Show, automatic stops will have been programmed that will be converted into the IMAGIX-format. On playing back, they will cause APEX to pause at the stops having been programmed.

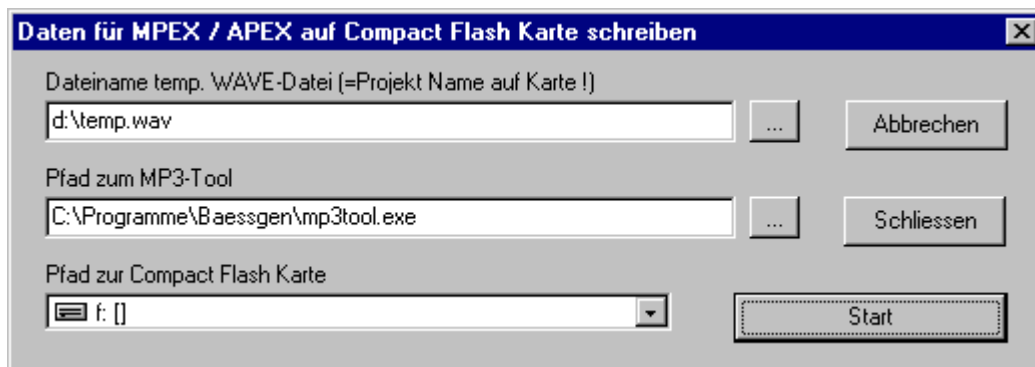
IMAGIX 5 (from 5.04 onwards) is equipped with a menu function going to assure preparing of the storage card. To put it quite clearly, we once again listed all the steps that have to be carried out in that procedure (They may also be carried out one by one on their own, result will be same!)

- 1) Call menu function „Export IMAGIX 2/3 file“ and save file on storage card.
- 2) Call Merge-function that will convert any sound into a WAVE-file. That WAVE-file will be saved on the disk.
- 3) Start the MP3-Tool that will compress the whole WAVE-file and to record it onto the storage card as an MP3-file.
- 4) The MP3-Tool will now generate the necessary index-file.
- 5) The MP3-Tool will be ended.

Those steps may all be started at once (from version 5.04 onwards) by means of the menu function APEX/APEX in the main menu.

Some information must be made available to enable that procedure.

In IMAGIX 5, call menu function MPEX/APEX. The following dialogue will appear:



In the text field on top, enter a filename under which IMAGIX will save sound that hasn't been compressed yet. The name to be selected will be taken over on the storage card. Please consider that with APEX such entries are limited to 8 signs due to the fact it is ruled by the MS-DOS file-system!

Caution! Filename must show the extension .WAV, otherwise the MP3-Tool won't identify it as a sound file !!!

You may also use that temporary WAVE-file to record an audio CD that will contain sound that hasn't been compressed.

Please make sure enough storage capacity to record that WAVE-file as a temporary file is available in the folder selected.

In the next field, enter location where IMAGIX 5 can find the MP3-Tool. It is usual to install it in the same folder as IMAGIX itself.

From the bottom field, select the drive on which your storage card can be reached.

Start process by activating submit button "Start". In a first step, the IMAGIX-file will be copied to the card. Afterwards, mixing of audio events will be going to be started. You may follow that procedure by observing progressing of locator. Once the WAVE-file having been generated, the MP3-Tool will be started automatically. Progress will be illustrated by the blue bars in the two bottom boxes.

APEX – its projecting unit

How to connect projectors

The four projectors APEX is able to work with have to be connected to the four SUB-D-sockets (9-pole) on the rear side. Those sockets are labeled port A to port D. Respective configuring has been described in "First steps"-section. For details please refer to reference section.

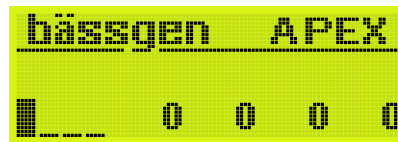
Notice:

The labels A-D in that case stand for a projector connection and mustn't be confused with projector address. In installations able to work with up to four projectors the addresses A-D are often used. In our particular case both denominations are to be used the same way. In special applications or larger installations a strict distinction must be made between (physical) port denominations and (logical) addresses.

Setting cycle

The function cycle setting APEX is equipped with is used to do a first test to check lamp control and to adjust projectors to screen.

Setting cycle is operated directly at APEX by means of "Enter" (top-level menu has to be selected).



Setting cycle is advanced by one step on pressing that key. At first, each projector will be individually faded up to focus them in a first step. Each projector will then be faded up together with the first one. Images projected may well be overlaid by adjusting each projector in the same way as projector A (projector A works as a reference to which the other ones should be adjusted to avoid unnecessary error accumulating). APEX will automatically identify number of projectors connected and calculate respective cycle. At the end, all projectors are faded up together; adjusting result may be checked. Pressing "Enter" another time will fade all projectors down.

By double-clicking you may always advance to the last step (all projectors faded up).

Pressing „ESC“ will fade all projectors down at once.

Pressing „ESC for more than 1sec. will enable a zero reset.

Setting cycle may only be started directly at the device but not at the infrared remote control.

Setting cycle is carried out at the slide being shown at that moment, i.e. at slide 0 usually.

Particular case Kodak Ektapro/Leica RT:

With those projectors, a slide always has to be inserted, otherwise lamp won't fade up. Projector is then often thought to be defective. Projector software only fades up lamp of slide slot 0 with a slide being identified. That particularity doesn't apply to any other slot.

APEX – its connections

Beside the four projector connections, there are other connections at the rear that are important to operating:



AC-24-socket ensures power supply of APEX if no projector supplying 24V itself has been connected. APEX will start working as soon as either one of the projector connections or the AC-24-socket will supply power. It doesn't matter whether different connections are supplying power at the same time. Deviating phase positions don't matter anymore either. The microprocessor APEX is equipped with will detect such deviations and automatically compensate them.

Outputs OUT R and OUT L are the sound outputs of the MP3-player. They are usually wired to amplifiers/sound mixers/active loudspeakers. Good results have been achieved with Power Mixer. Those are sound mixers with an integrated amplifier. Slide regulators allow adjusting of volume, microphone etc.

Socket OPT IN is a Digital Audio-input to play back ready-made productions from DAT or CD. On work with the MP3-player that connection won't be needed. But, as matter of fact, there are many applications where control signals are completely recorded on CD.

SYNC-socket assumes many functions that depend on operating mode. On playing back traditional productions from CD/DAT or tape, it is working as a signal input. With standard operating mode, i.e. right after switching on (with no file being played back from storage card), APEX, according to setting, is able to automatically identify a wide range of control signals having been encoded either digitally or analogously. As soon as APEX will have started working as an MP3-player (playback mode), that socket will be converted into an output emitting a synchronous control signal able to control further control devices (QUATRIX for example), in case of productions where four projectors aren't sufficient anymore.

Manual operating by means of infrared remote control

APEX will always be supplied with an infrared remote control. Different IR operating modes have been designed for specific requirements. Operating modes are selected by means of the menu "Infrared remote".



„IR Standard“ will work with most applications. Further operating modes to be described may be selected:

IR disabled

With that operating mode APEX can't be operated by IR-control. That function is needed in case different APEX' are operated in one and the same room with only one being supposed to be controlled by remote control.



IR standard

The following table will show what keys of remote control are used and what functions they are enabling:



Keys 0...9

Direct fading with subsequent slide exchange at projector being faded down will be enabled. Fading time used varies from 0 sec. (hard) to 20 sec. according to key pressed.

| Key | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|--------------|---|---|---|---|---|---|---|----|----|----|
| Time in sec. | 0 | 1 | 2 | 3 | 4 | 6 | 8 | 12 | 16 | 20 |

ENTER

Fading over to second projector with subsequent slide exchange at projector being faded down. Standard fading time will be used. That time period varies from 0 sec. to 20 sec. and has to be set by setting „Def. Diss rate“ (Advanced functions) (see reference section).

ESC

Fading over backwards. Projector being faded down will be reset first. Fading will always be done at a rate of 0 sec. (hard).

F+ and F-

Focusing of projector being faded up. That function is only available with the following projectors working with serial control: Kodak EKTAPRO, LEICA RT and SIMDA.

A, B, C and D

Respective projector will be faded up if it was faded down and vice versa. That's an ideal way to realize fade in and special effects. If less projectors are available respective keys will remain without function.

F1 to F4

Those keys start up a command file showing a defined name „E1.BAT“ (i.e „E2.BAT“ etc.) If no such file was available, keys will remain without function. Any of these keys has an own menu giving more detailed information on function described. Any key may be locked there as well. For further details please refer to reference section.

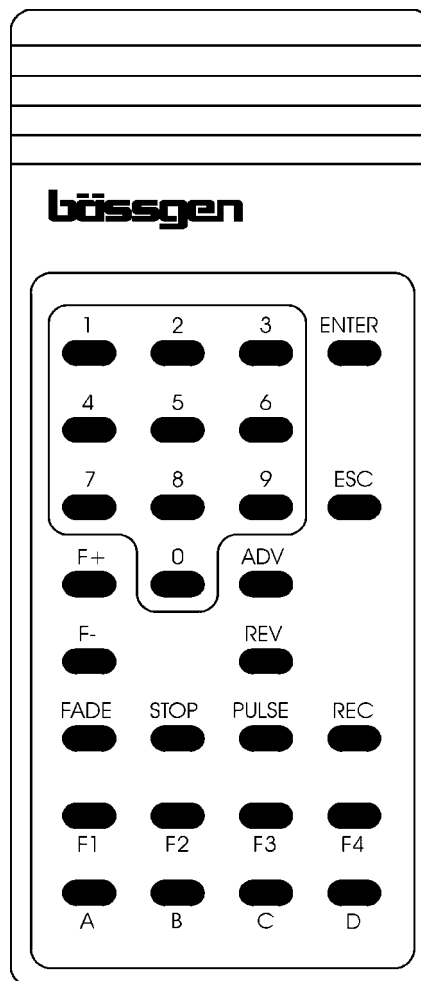
ADV

By pressing that key and subsequent activating of A or B respective projector may be advanced by one slide regardless fading degree of lamp.

REV

By pressing that key and subsequent activating of A or B respective projector may be set back by one slide regardless fading degree of lamp. Pressing REV three times resets both projectors to zero position.

REC



That key enables PlusTrac-generating. It allows carrying out a slide show in real time together with storing of commands on a tape at the same time. In former times slide shows were construed like this. Seen poor possibilities to carry out modifications on tape later on, that mode isn't used frequently anymore. All the same, it allows quick storing of a simple slide show in line with music on a free track of a 4-channel recorder.

The three keys to be described afterwards STOP, PULSE and FADE only work with record mode. It may of course also be switched on when no recording is done.

STOP

All fade up will immediately be frozen.

PULSE

With keys A or B used immediately after pressing PULSE, respective projector will start flashing (rate: 0,3 sec.). With a digit from 0-9 set and A or B activated afterwards, after pressing PULSE, respective projector will start flashing at a rate ranking from 0.05 sec to 0.9 sec. Pressing PULSE again will stop flashing.

FADE

If key A or B is used immediately after pressing fade, respective projector will be faded down to 50%. With a digit from 0-9 set and A or B activated after pressing FADE, respective projector will be faded to 10% to 100% (0=100%).

Work with an individual projector

With only one projector connected to APEX (identifying doesn't work with SIMDA with serial control), APEX will identify that state automatically. ENTER and ESC won't enable fading but simple steps forward and backwards. Lamp will be automatically faded up on first activating. APEX may therefore be used as an infrared remote control for an individual projector without any reconfiguring.

IR-mode „Random Access“

That operating mode allows direct projecting of single slides. We recommend that mode be used together with projectors allowing random access. Keys of remote control enable the following functions:



0...9

Digit field, 3 digits may be entered at maximum. Value will be read by APEX and used as soon as another key is pressed.

A and B

Set respective projector to position having been established. Lamp of that projector will be faded up, the one of the other will be faded down. Example: with 45A entered, slide 45 will be projected by projector A.

ADV and REV

Projector being faded up will be advanced i.e. set back by one slide.

ENTER

The digit out of a range from 0..160 having been entered last will be used to select a projector and to project respective slide. Slides 1..80 will be in projector A, 81..160 will be in projector B.

ESC

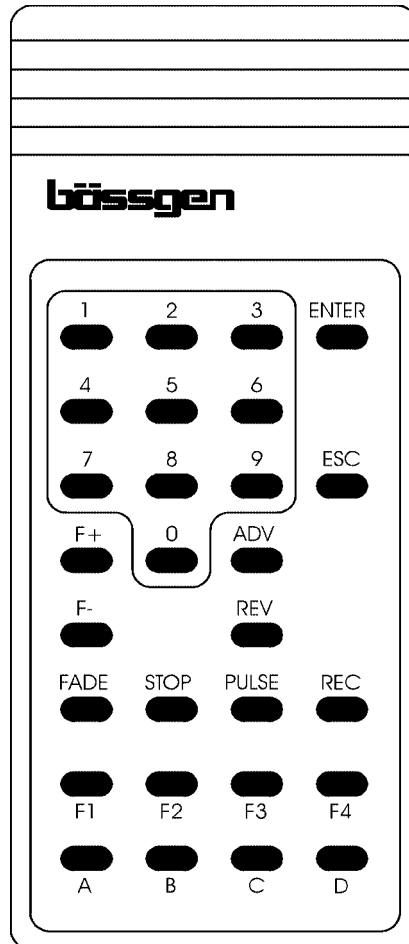
Both projectors will be faded down. That state once reached and ESC pressed another time, all projectors will be reset to zero position.

F+ and F-

Focusing of projector being faded up. That function is only available with the following projectors working with serial control: Kodak EKTAPRO, LEICA RT and SIMDA.

REC, FADE, PULSE, STOP

With present operating mode, those keys don't have any function.



IR-mode „Parallel Access“

We recommend using that operating mode with both projectors working in parallel. In comparative tasks both projectors may be influenced independently. Both lamps are faded up. Keys will enable the following functions:



0...9

Digit field, 2 digits may be entered at maximum. Value will be read by APEX and used on next key being pressed.

A and B

With a digit having been previously entered value of A or B will set respective projector to position having been set. Lamps are not affected. With A or B being activated with no value having been entered, lamps of respective projector will be faded up i.e. faded down.

ENTER and ADV

All projectors being faded up are advanced by one slide at the same time. With all of them faded down, state existing prior to pressing ESC will be re-established.

REV

All projectors being faded up are set back by one slide.

ESC

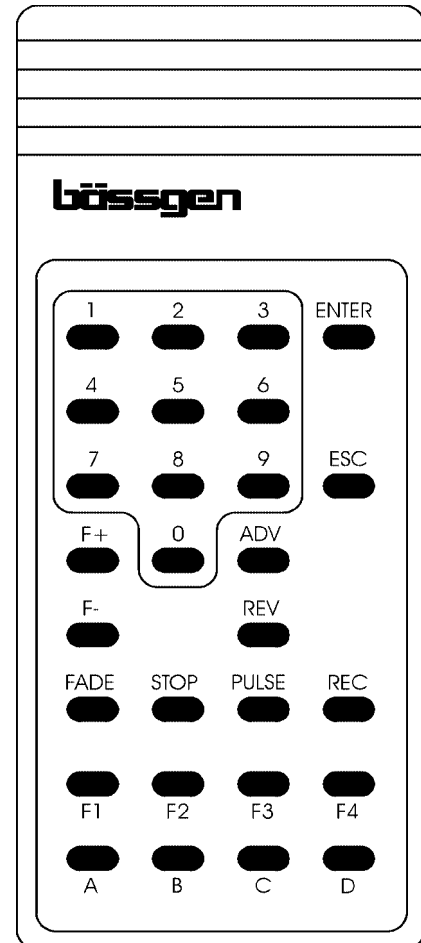
Both projectors are faded down. With ESC pressed that state once having been reached all projectors will be reset to zero.

F+ and F-

Focusing of projector being faded up. That function is only available with the following projectors working with serial control: Kodak EKTAPRO, LEICA RT and SIMDA.

REC, FADE, PULSE, STOP, F1-F4

With present operating mode, those keys don't have any function.



APEX – How to apply it on practical work

That section will deal using APEX together with CD-players, tape-recorders etc. Operating APEX together with different control devices will be explained as well.

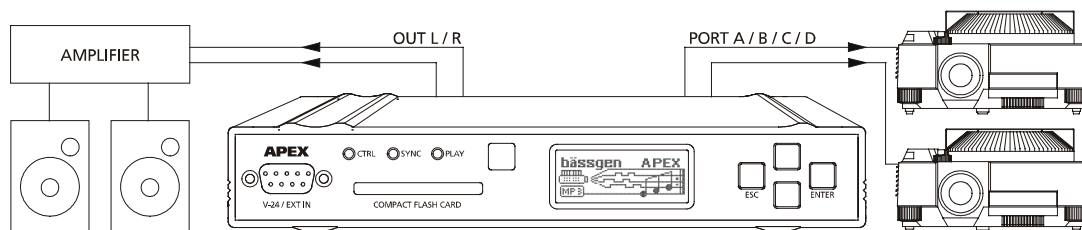
Manual operation

On manual operation without sound APEX just has to be connected to projectors and perhaps to a power unit. Operating is done by means of remote control as described in the section dealing with manual operation.

Operation with Compact-Flash card

The new technique able to record sound directly in the control device make use of other sound-recording devices redundant. That's the most important operating mode of APEX. Principle is quite simple:

Control device will record both sound and control commands and play them back synchronously. No synchronizing needn't be done anymore. No device has to be synchronized to another one. Any such procedure will internally be carried out. So wiring is quite simple:



Sound has to be connected to respective installation; projectors are directly controlled by APEX. Wiring is clear and simple. The show will be started directly at APEX.

Operation with different devices

With the four projectors not being sufficient anymore there are simple extension possibilities. Synchronizing signal APEX emits will simply be transmitted to a further device, BASIX or QUATRIX for example:

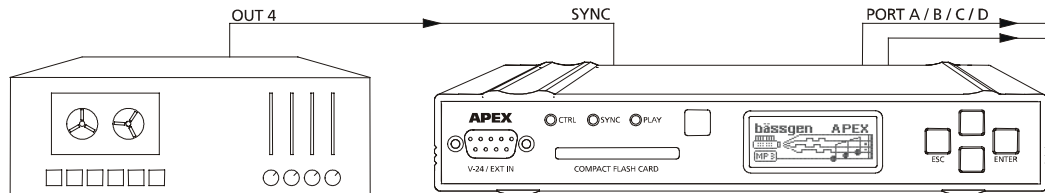
Speakers Support

Recently live shows have become more and more popular. Spectators don't want to see recorded shows anymore, they prefer interactive ones. Speaking technique that's nothing more than a recorded show except for the difference it will automatically stop at stops having been defined to be restarted by the speaker.

APEX will automatically react. If the show includes a stop mark, APEX will stop. By pressing "Enter" at remote control, the show will restart at that stop. The "Enter"-key at the device itself has the same function and is quite useful. Imagine accumulators of IR-remote control getting week while a show is being run...

How to play back a slide show from an analogous tape

With a slide show recorded on tape, output of the track with sync signals (usually track 4) of a tape-recorder will have to be connected to the SYNC-socket of APEX. Starting the recorder will start the slide show. The green LED being labeled SYNC will state reception of valid control signals.



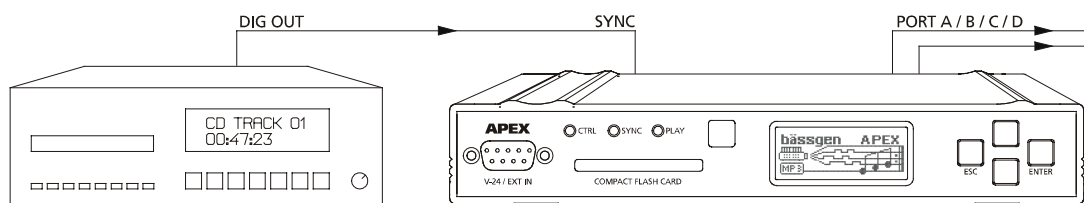
If slide shows requiring more than four projectors are played back, control signal has to be transmitted to different control devices. With extensive shows APEX is usually combined to QUATRIX control devices or similar. Such devices are equipped with a SIG OUT-socket. A control signal may well first be transmitted to QUATRIX and then to APEX. Command signal will be the same. What projectors will be going to react will depend on address settings. Please refer to reference section for more details. By means of a branch cable a control signal may be transmitted to different control devices.

Playing back a slide show from CD or DAT

Traditional 4-channel tape-recorders having been used in slide-AV technique for a long time have more and more been replaced by digital sound recording mediums. The first digital devices used for that purpose were DAT-recorders. Nowadays, mostly CD-players are used in slide shows set to sound.

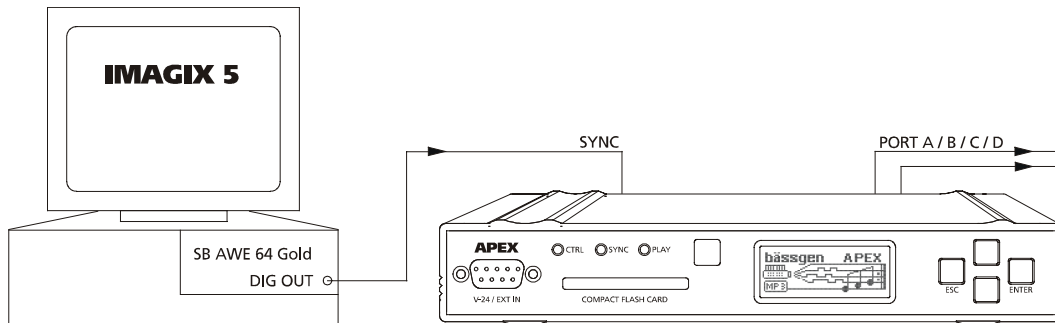
With CD-standard being designed for stereo, there was at first no possibility to include control information beside sound. We developed a special procedure: the last of the 16 bits used for sound recording is used for synchronous signals. Sound meddling due to that operation is so low it doesn't by no means affect quality in slide-AV ("quantization noise"). Secondary noise from projectors will always be far louder. A programming software (IMAGIX) encodes digital data into sound. On playing back, APEX will decode respective data and sift them out from sound.

APEX has to be connected to the digital audio-output a CD-player. It will therefore receive complete (audio-) information being included on CD. Commands included will directly be executed.



PC-programming by digital sound-blaster

With your PC being equipped with a sound-blaster with a digital S/PDIF-output (Soundblaster AWE 64 Gold for example) APEX may be connected according to subsequent drawing on programming.



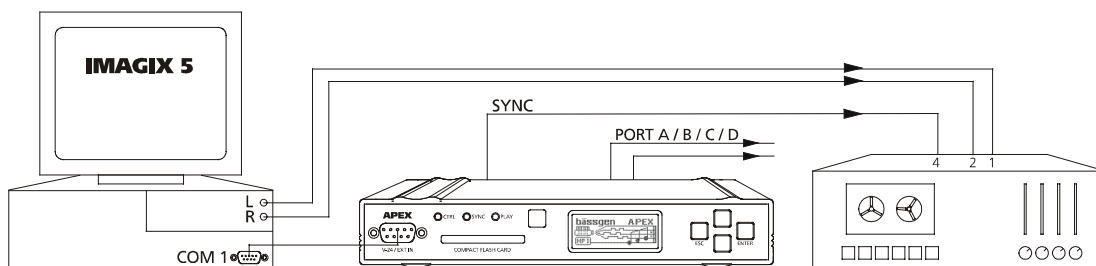
The software IMAGIX 5 will encode control signals into sound on playing back. Projectors therefore may be controlled on programming already. APEX will decode control signals from sound signals. APEX reacts as if a digital playing back of a slide show from CD was running. APEX "doesn't know" whether signals are emitted by a CD or generated right at the moment. No special settings will therefore be required.

Said procedure will work with the operating modes „FreeTrac“ and „Digital Plus-Trac“ to be set in IMAGIX 5. Both operating modes are able to integrate control signals into sound.

PC-programming – analogous recording, connecting APEX by serial COM-port

With PC's being equipped with standard sound-blasters only, APEX may also be connected to PC by a serial interface (COM1 etc.). PlusTrac-signal will internally be generated by APEX. That's the operating mode PC-software IMAGIX is working with in its versions 2 and 3.

Wiring has to be done as follows:



Important! On work with IMAGIX 5 the operating mode „Standard PlusTrac“ has to be set. Control signal won't be included in digital sound but APEX will receive commands emitted by a COM-port. APEX will then generate an analogous signal that may be recorded on tapes.

On tape-recording, both sound-channels will directly be recorded on three re-recorder tracks from both the sound-blaster and the control signal generated by APEX.

APEX – its reference

General information

The reference section will be going to provide detailed explanations on any menu function together with other technical information. Get somewhat familiar with it. You will then know what possibilities APEX is offering even if you will be going to need them later on only. We therefore recommend that section be read at least once.

Files on the card

All files being recorded on the card must be included in its main directory. Sub-directories are not supported by current software. The LCD-display being quite small long names with many directories couldn't be shown without difficulties. The card has a maximum storage capacity of 500 files.

Exception:

Special BATCH-files to be used in external triggering of APEX by means of DMX-512-signals are to be included in special sub-directories being on the card!

Menu functions

„Play File“

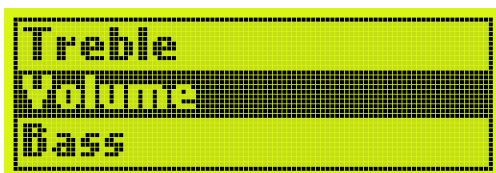
From that menu a list may be opened, showing the files being "able to be played back" that are recorded on the storage card. "ENTER" makes appear all files able to be played back. Files on that card but not being able to be played back won't be shown. Under the up-dated software version 1.00, the following files allow playing back: MP3-files, IMAGIX-files and Batch-files (*.BAT).



„Tone“

That menu enables modifying both tone and volume.

The following menu will appear:



Select parameter you wish to adjust:

„Treble“ (pitch tones) and „Bass“ (low tones) both have a setting range ranking from -15 dB to +15 dB. Tone therefore can be set to perfection.

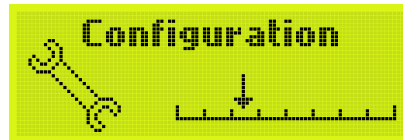
Notice: On amplifying either treble or bass (increase, i.e. a positive DB-value); the internal signal processor may reduce overall volume to prevent overshooting causing distortions. It seems at first sight as if reducing bass was carried out by amplifying treble. That's wrong. On increasing volume on your amplifier you will get aware of the difference.

Volume setting range ranks from -30 dB to 0 dB. -30 dB means strong reducing; 0 dB corresponds to nominal volume.

Important notice! A subsequent amplifier must compensate any volume reducing. We absolutely recommend that setting be kept at 0 dB. Better modify volume by means of an audio mixer or an amplifier succeeding APEX. It's no use to reduce volume at first and to amplify it afterwards. Any secondary noise, hum etc. will as well be amplified to the extent a subsequent amplifier will have to amplify volume. Clicks due to switching on and off devices connected will also get stronger. Therefore, whenever possible, volume setting should be kept at 0dB.

„Configuring“

„Configuring“ is a kind of gateway giving access to a wide range of sub-menus. Almost all of them are dealing with configuring.



Menü „Input select“

Menu to select source for external synchronizing of APEX. Whenever APEX will be to play back a slide show from an external medium such as tape or CD that setting will become important. With slide shows being played back internally from storage card that setting won't be important anymore. It should be left at „Input autosense“. Following settings are available:



Input autosense

Default setting. Any type of signal stated afterwards will automatically be identified by APEX. There are hardly any applications for which that setting wouldn't be sufficient.



Input digital

Only digital sources are accepted. (optical or coaxial)

Input coaxial

Only both digital and coaxial (i.e. electrical) sources are accepted.

Input optical

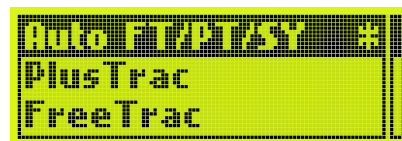
Control signal has to be both digital and optical (to be connected at optical input)

Input analogous

Control signal must be an analogous one, i.e. usually a signal from a tape-recorder.

„Signal select“

By that menu item type of control signal to which APEX will have to react may be defined. In most cases, standard setting „Auto FT/PT/SY“ will be correct. It is able to correctly identify the most important signals. That setting also has to be selected whenever APEX is to play back a slide show from storage card. The following settings are available:



Auto FT/PT/SY

APEX will automatically identify the following signals: FreeTrac, PlusTrac, Dataton Syncode.

PlusTrac

Only slide shows showing PlusTrac-format will be executed. That setting may be used for diagnostics purposes, in case control signal by which a slide show was realized is unknown.

FreeTrac

Only slide shows showing FreeTrac-format will be executed. That setting may be used for diagnostics purposes, in case control signal by which a slide show was realized is unknown.

Dataton Syncode

Only slide shows showing Dataton Syncode-format will be executed

**Leica DU24**

Slide shows having been realized by Leica DU24 A or DU24P may be played back by APEX by means of that setting.

Simda F100/101

That setting allows playing back slide shows having been realized by Simda F100 or Simda F101.

UD-2000 signals

That setting allows playing back slide shows having been realized by Bässgen UD-2000.

**UX-2000 signals**

That setting allows playing back slide shows having been realized by Bässgen UX-2000. Blinking effects will not be executed.

Kodak PCOM

That setting selected, APEX will work as an emulator of projector control language PCOM by Kodak. Input V24 IN allows transmitting commands showing PCOM-format to APEX. Those commands will then be executed by the projectors having been connected, regardless what projectors have been selected and connected. APEX may therefore be used as a "translator".

Practical example to illustrate that option:

A computer-controlled slide show realized by Kodak Ektapro-projectors is supposed to be shown by Götschmann Mittelformat-projectors for a special event. PCOM-signals emitted by a computer are transmitted to APEX that ensures direct control of the Götschmann-projectors. No storage card will be needed.

1000 Hz pulse

There are still tapes from former times having been designed for slide show set to sound for a single projector. Advancing of projector was enabled by a short sound of about 1000 Hz. Such slide shows often are to be presented by using mixing technique. That setting allows doing so. The 1000 Hz-impulse enables the same action as "Enter" in manual mode on work with the IR-remote control. APEX will automatically identify number of projectors connected.

DMX-512 input

That setting allows direct control of projectors being connected to APEX by a light control system being based on the DMX-512-standard. That application is recommended for use in theatres for examples. Lighting engineers do not have to get familiar with a new software, work can be done by traditional light control systems.

Notice:

APEX provides two different possibilities of DMX-512 control. Direct control directly controls projectors; fading modulations are generated by light control. Another possibility is triggering by DMX-512 signals. It allows starting a batch-file by my means of a DMX-512-signal. That batch file is able to play back MP3-files as well for example.

Both possibilities will be detailed in the following section: "Operation by DMX-512".



```

Kodak PCOM
1000 Hz pulse
DMX-512 input #
  
```

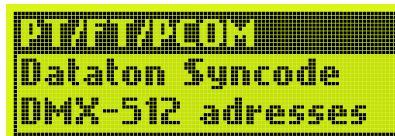
„Address select“

Address-menu sets addresses required for different control signals and operating modes. Control software for the different systems is usually designed for more than four projectors. By setting respective addresses, APEX gets information to what signals the up to four projectors are to react. Only commands for projectors to which an address will have been assigned will be executed. Any other signal will be left aside any maybe executed by another control device. The menu includes three items:



```

Signal select
Address select
Config ports
  
```



```

PT/FT/PCOM
Dataton Syncode
DMX-512 addresses
  
```

PT/FT/PCOM

The first menu items allows address settings for the following control signals: FreeTrac, PlusTrac and Kodak PCOM. All those languages are designed for 16 projectors to be labeled by A to P. The same menu will therefore be used for all of them. After opening of that menu, the addresses set at present will be displayed. Pressing "Enter" makes appear select menu of the four ports. An own address has to be set for each port (standard setting ABCD will be sufficient in most cases!). Pressing "Enter" again will finally make appear address select:

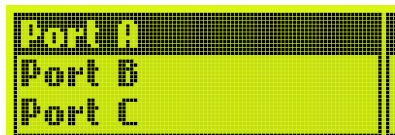
One out of 16 possible addresses may now be selected. "ESC" once pressed and another port select, next address may be set. On quitting by pressing "ESC" several times, the four addresses will be displayed once again.



```


Adress settings

Proj.: A B C D
  
```



```

Port A
Port B
Port C
  
```



```

Port A Adr = A #
Port A Adr = B
Port A Adr = C
  
```


Dataton Syncode

APEX is also able to play back slide shows having been realized on tape by the system of Dataton AB, format Syncode II. That system uses a different address scheme. There are addresses from 10 to 77. Only up to 7 digits are admitted. Entire numbering is done by an octal system. On the whole up to 56 projectors may be controlled.

An address may be assigned to each port, another one is assigned to the two additional relays on the AC-24-socket. "Enter" once pressed, present setting will be displayed. Pressing "Enter" once again will make appear port select. Port once selected, the menu to select addresses will appear.

```
Current Syncode
address settings
10 11 12 13 (30)
```

```
Port A
Port B
Port C
```

```
Port A Adr = 10 #
Port A Adr = 11
Port A Adr = 12
```

DMX-512 addresses

In that menu, addresses for the DMX-512-input are to be set. With the DMX-512-system, there are 512 individual addresses labeled from 001 to 512. As already mentioned, there are two types of control. Direct projector control takes three addresses a projector. In the present select menu, base address is set. With triggering mode for batch files only one address will be needed.

```
DMX trigger adr.
DMX projector adr.
```

```
DMX-ADR = 024 #
DMX-ADR = 025
DMX-ADR = 026
```

Once being in that menu there is another branching for the two options described. In both cases a menu will appear in which an address may directly be selected. With direct projector control that address will be base address. How to establish other addresses will be described in the following section: "Operation with DMX-512".

„Config ports“

That setting is very important and should always be checked. It's the only menu item that has to be absolutely correct, otherwise no operating with projectors will be possible at all.

```
Signal select
Address select
Config ports
```

Menu item once selected, a new menu to select port will appear. As a matter of fact, each port has to be individually adapted to projector connected. That procedure provides great flexibility; even different projectors may be combined. Even if it isn't always recommended, there will always be applications in which combining of different projectors may be useful.

```
Port A
Port B
Port C
```

Port once selected, select menu showing the different projector types will appear. Default setting is "Standard 2". In the following section detailed explanations will be given.

```
Standard 2 #
Standard 3
Standard 4
```

Standard 1 to Standard 4

For all projectors whose triac is directly controlled, a setting from STANDARD 1 to STANDARD 4 has to be selected. This means any projector to be connected by means of cables Q-1, Q-2, or Q-5 and a triac adapter TA 4001. The overview to follow will illustrate which setting may be used with different types of projectors.

Power supply of APEX in that case will be directly ensured by projector. As soon as at least one of those projectors will have been connected to APEX and switched on, power will be supplied to APEX.

| Projector type | |
|----------------|--|
| STANDARD 1 | All projectors with linear magazines except Zett Royal AV; shows with less than 80 slides |
| STANDARD 2 | All projectors with carousel magazines and projectors with linear magazines except Zett Royal AV |
| STANDARD 3 | Zett Royal AV-projectors; shows with less than 80 slides |
| STANDARD 4 | Zett Royal AV-projectors; shows with more than 80 slides |

Technical notices:

With the settings Standard 3 and 4, transport backwards of projector will be enabled by an impulse having been extended from 0.3 sec. to 0.8 sec. Moreover, on transport backwards, both relays will be enabled. Especially projectors by ZETT are equipped with one transport magnet only. Transport direction therefore depends on duration of impulse. Older projectors by Leitz Pradovit also need that setting. Except transport backwards Standard 3/4 correspond to settings 1 and 2.

Difference between Standard 1 and 2 (i.e. 3 and 4) lies in move optimizing. With carousel magazines a short move should always be established. Because of the system counting by 80 that setting has proved to be well-adapted in long slide shows whenever linear magazines are used. Post-synchronizing will then be easier.

Setting projector cycle time

Once being in the menu and after selecting a setting from "Standard 1" to Standard 4" by "Enter", you may get one level deeper by pressing "Enter" (with * already set) once again. Cycle time may be set there.



That setting is only relevant with the STANDARDS 1-4!

That setting provides information to APEX on maximum time projectors need for a full slide run (forward or backwards). As soon as APEX will have transmitted a slide exchange command to projector, no other command will be emitted for that time, to ensure projector will correctly execute exchange command received. Even with a new command coming from storage card/CD, any such command will be stored and retained by APEX for period having been defined.

Default setting for cycle time is 1,5 sec..

We recommend relying on a rather high value. It might therefore be useful to add about 0.2 sec. to default setting.

Technical notice

To establish correct value just enable a sequence of 10 slide exchanges followed by a zero reset. APEX then will have to reset projector to zero by 10 internal backwards commands. After each slide exchange, there should be a short pause. The shorter cycle time set is, the shorter pause will be. With time set being too short, APEX will enable another command prior to the first one having been completely executed. This might cause slide exchange to fail. Synchrony will be lost. Please

also consider that some projectors may get slower with ambient temperature being low or heavy slides (glass frames!).

APEX – selectable cycle times:

| Cycle time | Cycle time |
|------------|------------|
| 0.5 sec | 1.5 sec |
| 0.6 sec | 1.6 sec |
| 0.7 sec | 1.8 sec |
| 0.8 sec | 2.0 sec |
| 0.9 sec | 2.5 sec |
| 1.0 sec | 3.0 sec |
| 1.1 sec | 3.5 sec |
| 1.2 sec | 4.0 sec |
| 1.3 sec | 4.5 sec |
| 1.4 sec | 5.0 sec |

Those times may be set for each projector separately. As that menu follows projector type selecting, it will only become effective for one port.

That setting therefore has to be carried for each projector separately. Don't forget to store configuring, once APEX having been completely configured. You then won't need to care about anymore.

Ektapro/Leica RT

That setting prepares APEX for control of the serial projectors Kodak Ektapro or Leica RT. Projectors have to be connected by means of Q-3 cable. Power supply of APEX then has to be ensured by a 24-AC power unit.



```

Ektapro/Leica RT # |
Ektapro/Leica Hi   |
Auxiliary port      |
  
```

Setting Auto-Standby-time

Projector once having been selected (menu item shows an *) you may, by means of "Enter" accede to a menu allowing setting of auto-standby time. That setting is only relevant on work with Kodak EKTAPRO or Leica RT. Auto-standby time means the period after which projectors are automatically set to standby once they are not used anymore. "Not used anymore" means the lamp must be faded down, no slide exchange must take place. That auto-standby function may also be disabled.

Default setting is 25 seconds.



```

AutoStby 25 sec. # |
AutoStby 1 min.    |
AutoStby 2 min.    |
  
```

If a projector will automatically have been set to standby that state will automatically be ended by a slide exchange or fading up taking place.

Notice:

Do not end standby state at projector directly. Never set projector manually to standby. Projector won't transmit information on that manual function to APEX. APEX will consider projector being active although it is on standby. Commands might therefore not be executed.

Ektapro/Leica HI

That menu item corresponds exactly to the previous one except the fact projector is set to Hi-Lite mode. That function is only available with projector types Ektapro 7020/9020 or Leica RTm. Auto-standby may also be set.



```

Ektapro/Leica HI # |
Auxiliary port      |
Rollei DUAL 66P     |
  
```

Auxiliary port

With a port being set to operating mode "Auxiliary port", no more projector can be connected to that one. Instead of said port, three external relays will now be available. With Dataton Syncode, there is an own addressing for the addresses of those relays. With standard signal, usual address settings will be used. Plus-Trac-signal shows 12 relay commands corresponding to the addresses ABC – EFG – IJK – MNO. For more complex systems being controlled by relays, we recommend our QUATRIX-device providing even more flexibility with regard to addressing.

Rollei DUAL 66 P

That menu item allows switching respective port from APEX to serial control of a Rollei 66 Dual P-projector. It has to be connected by a Q-3-cable. Serial control of that projector allows direct slide access (random access). But beside that advantage, there are disadvantages as well. The same projector may also be turned into a standard projector by means of a Q-1-cable, standard control on the one hand ensures power supply of APEX by means of projector, on the other hand, that mode may be useful in long slide shows where magazines of 80 are used. With standard control, APEX always focuses on magazines of 80. If a show is to be restarted at slide 125, the second magazine (slides from 81-160) will just have to be inserted. With serial mode, the first magazine first has to be passed completely (almost impossible).

Rollei MSC 3x0 P

The double projectors MSC 300 P and MSC 330 P may as well be controlled by APEX. Said projectors are special as they have two lenses but only one magazine. They are more or less two individual projectors. Connecting to APEX is done by a Q-3-cable. Power supply of APEX is to be ensured by an AC-24 power unit. With regard to control, those projectors need two addresses. With one port being addressed to address B, respective projector will be controlled by the addresses B and C. If a Rollei MSC 330 P is connected to port A of APEX and a Kodak Ektrapro to port B, address setting of the four ports must be ACDE (not ABCD), as the Rollei will already use the addresses A and B. The second light system will always use address having been assigned to port plus 1.



```
Rollei DUAL 66P
Rollei MSC3x0 P #
TA-4002/S-AV
```

TA-4002/S-AV

Particular port setting for the special triac adapter TA-4002. That adapter causes an automatic zero reset position of older Kodak carousel projectors, type S-AV 2050. That triac-adapter has to be connected to APEX by a Q-5-cable. An external AC-24 power unit has to be connected all the same. After switching on of the whole system, consisting of APEX and the projectors (caution: all components must be switched on together. If that wasn't possible, APEX has to be switched on last!). APEX will rest untill all projectors having having been configured to TA-4002 will have been reset to zero. Afterwards, APEX will start usual functioning. External power supply input port is equipped with allows checking whether projectors have reached zero position (for that reason, an AC-24 power supply unit is required). Transport direction, forward or backwards, of projectors having reached zero position can be set by means of "Advanced functions". Beyond present menu function, there is another menu to set cycle time of projector. Please refer to section Standard 2.



```
Rollei MSC3x0 P
TA-4002/S-AV #
Simda Rev. 3.3
```

The whole menu item is designed for S-AV carousel projectors. Its importance is dwindling, as that complicated procedure is made redundant by the new Kodak Ektrapro projectors. On switching on, Ektrapro projectors are internally reset to

zero. With permanent slide shows it therefore no problem to just switch power on in the morning. Projectors will always run synchronously.

Simda Rev. 3.3

Beside a traditional 12-pole standard connection socket, some models of carousel projectors by Simda are equipped with a serial interface. With software version 3.3 those projectors may also be serially controlled. They are to be connected by a Q-4-cable; power supply will be ensured by projector.

Some types of projectors by Simda are equipped with an integrated triac with a standard 14-pole socket. They may be connected by a Q-1 cable (Standard 2). Other models have a 12-pole socket and may be connected by the triac-adaptor TA-4001 and Q-5-cable.

Summary

By means of "Config ports" APEX has been optimally adjusted to projectors. APEX internally consists of different "virtual projectors". Any command received, regardless whether it was emitted by the storage card, a CD, remote control or tape is at first executed by those virtual projectors. Synchronously and depending on projectors' configuring selected, APEX makes work real projectors according to state of the virtual ones.

- Personal notes - configuring -

| | | | |
|--|--|--|--|
| | | | |
| | | | |
| | | | |
| | | | |

„Config memory“

That menu is to supervise configuring memory of APEX. Up to five complete configuring may be saved.



„Save configs“

With „Save configs“ selected, a further menu will appear asking in which one out of the five memories configuring will have to be saved. Configuring is saved by pressing "Enter". APEX will afterwards quit menu system and return to base screen. Command will have been executed. The five memories are labeled 0 to 4. Memory 0 will include configuring to be loaded each time APEX is switched on. The other memories will only be read with respective menu item from "Read configs"-memory having been started up.



„Read configs“

That menu item allows reloading of one of the configurings having been saved. Present configuration of APEX will be replaced by the one from respective memory. That function allows quick switching between established settings. That may be quite useful in festivals etc.



„Default configs“

That menu item selected, APEX will be reset to base configuring. That's default configuring with which any device will be delivered.

That configuring will only replace present configuring. In case it was to be saved in a memory, saving will have to be done by means of the function "Save configs".



„Diagnostics“

„Diagnostics“ menu mainly provides test functions supervising certain inputs etc. They provide precious help in failure detecting. Present software version of APEX will also be shown.



Revision + ID

With that menu item selected, APEX will display its present software state together with its serial number. Serial number consists of 10 digits. It may as well include the letters A-F.



MP3-Encoder Key

MP3-Encoder Key will be needed to enable the MP3-Tool, as already described in the present manual. It consists of 16 digits.

DMX-512-Input

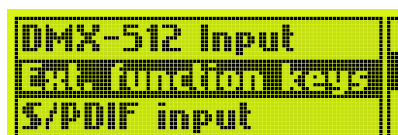
That diagnostics function helps to check a DMX-512 signal being connected. Two subsequent DMX-512-channels may be displayed. Please note that a DMX-512-input will only be checked with signal input having been set to DMX-512 by means of "Signal-select".

| DMX | DEC | HEX | PERC |
|-----|-----|-----|------|
| 010 | 178 | B2 | 70% |
| 011 | 0 | 00 | 0% |

DMX-signal values are displayed in decimals, hexadecimals and percent. Channels may be modified by means of cursor keys (up and down).

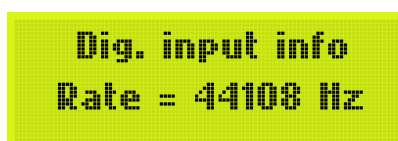
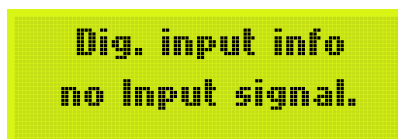
Ext. Function keys

APEX is equipped with four external inputs allowing direct playing back of four MP3-files or other ones in media applications. Those four external inputs enable batch-files as already described. Connections of those four external keys may be checked by means of „Ext. function keys“-menu. As soon as a key will have been enabled, the respective "-"-sign will turn into an "X"-sign.



S/PDIF input

That function allows measuring sample frequency of a digital audio signal at Sync input. Value being stable indicates signal is correct. If frequency deviates by some Hertz from CD-frequency of 44100 Hz, function won't be affected. APEX isn't a calibrated measuring device. That function is supposed to ensure verifying of both electric and optic connection. A message will be displayed in case there was no signal.



AC line state

That menu function allows checking whether projectors being connected to the four ports are supplying 24 V alternate current. Frequency of power supply mentioned will be shown; in Europe it usually ranks at 50Hz. With a Kodak Ektapro or no projector connected, frequency shown will be 0Hz.



```

AC line state
CF-Card directory
CF-Card status
  
```

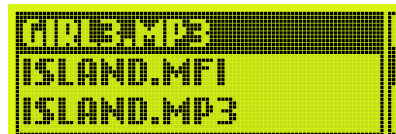


```

AC line frequency
A=0 Hz    C=0 Hz
B=0 Hz    D=0 Hz
  
```


CF-Card directory

That menu allows displaying all files being included in the main directory of the storage card. Index-files of the MP3-files are showing the extension *.MFI (MPEG File Index). That function allows checking whether the *.MFI-files required for correct operation are present. Current up-dated software version doesn't support sub-directories. Operation of APEX won't be affected if there are sub-directories containing files on the storage card. The card will then just show less memory capacity. No sub-directories are used at present, as they would only render menu structure more complicated. Moreover, the LCD-display is too small to allow displaying of a complete name.



```

DIRB.MP3
ISLAND.MFI
ISLAND.MP3
  
```



```

AC line state
CF-Card directory
CF-Card status
  
```

Notice:

Triggering APEX by DMX-512 requires a specific sub-directory; it won't be displayed in that menu.

CF-Card status

That function shows number of files on the storage card as well as available memory space remaining.



```

CARD status
Files: 33
Free: 17.0 MB
  
```


„Advanced functions“

„Advanced functions“ offers a wide range of more sophisticated functions. In standard applications it mostly won't be needed as default settings are sufficient. All the same there are some useful settings for special applications. Those settings make APEX a very flexible system.

```
Diagnostics
Advanced function
Infrared remote
```

„AC line sync“

That function requires some technical knowledge. It is only related to connection of 24V-projectors by means of triac. It isn't dealing with sera projectors such as Kodak Ektapro. Any brightness control by a triac requires synchronizing to power frequency of respective projector. That is due to technical particularities of type of brightness control (phase-control). APEX will synchronize each port individually. The different projectors therefore may also be connected to different phases of alternate power supply. That situation is quite frequent in larger rooms (town halls etc.). If one of projectors connected didn't supply any alternate power, a failure being quite rare but possible with special scene modifications, no operation will be possible. APEX therefore provides the option to have synchronizing done by one of the other projectors. That menu allows setting port that will be to ensure synchronizing. With conditions being normal, each port should use its own synchronizing ("Port A from A" etc.). Modifying those settings requires good technical knowledge. A port check allows assigning any synchronizing source to each port.

```
AC line sync
Cue play offset
PT step delay
```

```
Port A
Port B
Port C
```

```
PORT A from A #
PORT A from B
PORT A from C
```

„Cue play offset“

By means of that function, APEX will add a defined value X to slide number at any command signal arriving. It allows correct playing back a slide show with slides showing a shifted order in the magazine. That may be quite useful in festivals for example. But please always consider that slide shows will not all be shown correctly if an Offset has been entered by mistake. As soon as Offset will have been set, magazine state display at APEX will flash. Values up to 80 may be set. In case of a carousel magazine of 80 slides that corresponds to a shift of -1. That value has to be reset to 0 as soon as it won't be needed anymore!

```
Cue play offset 0#
Cue play offset 1
Cue play offset 2
```

Same as all other settings that value will as well be saved in a configuring memory. It is therefore possible to prepare playing back different slide shows from one magazine in a slide-festival.

„PT step delay“

„PT step delay“ means the time period during which APEX will wait after till a projector transports forwards after having been faded down. With PlusTrac-signal that time is usually set to 0,9 sec fixiert. But other time periods may be needed as well. With FreeTrac and productions with IMAGIX starting version 4 that setting doesn't matter. That time period is used with productions by IMAGIX up to version 3

```
Cue play offset
PT step delay
Autolink
```

```
0.8 sec.
0.9 sec. #
1.0 sec.
```

and on using DISS-command. In common applications that value shouldn't be modified.

Values ranking from 0 sec to 1,5 sec may be set by steps of 0,1 sec. Default setting is 0,9 sec.

„Autolink“

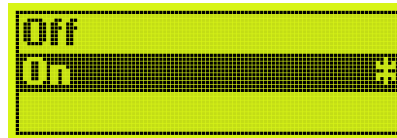
Autolink-function is very important when it comes to operating APEX together with slide-projectors in the Speaker Support field. In that case „Autolink“ should be switched on. It will entail the following actions:



If an MP3-file gets started by means of „Play File“, an IMAGIX-file showing the same name (except for extension) will automatically be started at the same time. Moreover, an MP3-file will be started in a way to make sure stop marks (if any) included in the IMAGIX-file will really stop sound. The philosophy of APEX also allows standalone playing back. That mode is anything but desirable in Speaker Support. For more information about possible operating modes with regard to playing back please refer to commands overview.

Default setting will always be Autolink on.

Furthermore, playing back of an IMAGIX-file will be started in an operating mode making sure that the IMAGIX-player won't continue working with respective MP3-file being stopped.



Notice:

To start a Speaker Support Show you may start either the IMAGIX-file or the MP3-file. "Autolink" makes sure they will both be started in the correct mode. Filename must be the same (except extension). Example: „TEST.MP3“ and „TEST.IMX“.

„External input keys“

That menu allows assigning functions to the four external inputs of APEX. The four external inputs are located on four contacts of the V24/EXT IN-socket. Numbers of contacts may be checked either directly in the menu or in the technical addendum. To enable function the two pins shown just have to be connected by a contact. Pin 5 is the mass of APEX, the other one will be maintained at about +6V by means of a Pull-up resistor.

Select input to be used for a special function.



"off" may be activated with any external key. That function blocks external key and disables any function. Furthermore, a previously defined BAT-file may directly be started at any input. That file may include further commands of any kind. At last, the "XX.BAT if idle"-function has to be stated. With that setting being active, a BAT-file will only be started with APEX being on idle state. Let's assume an application in media showroom. If music is to be triggered by means of a light barrier, it must be made sure, that music won't start anew if the light barrier is interrupted once again. That's exactly what „XX.BAT if idle“ is doing. APEX will only have to react, once the piece of music having run down.

Please also refer to the parameter „Exit at End“ in „Advanced functions“, that is also related to that function.

At the external keyboard inputs, E1 and E2-key, there are two more special settings: „Start func“ (with E1) and „Stop func“ (with E2). That function is the standard being used to control „Speaker Support“-slide shows. With the slide

show running and being automatically stopped at a previously programmed position, it may be restarted by means of „Start func“. Therefore, if a speaker is quite far from APEX, both the ESC-key and the ENTER-key may be imitated by means of a cable-connected remote control.

Take Ext 1 as an example: special setting has been selected. Both the external keys E3 and E4 aren't equipped with any special setting; "reserved" will appear at respective position.

If a BAT-file having been selected doesn't exist, respective function will remain disabled. As any other setting, those configuring will have to be saved in the configuring memory, to make sure they will still be active on restart.

```
Start func      #
run E1.BAT
E1.BAT if idle
```

„IR function keys“

Same as with „External input keys“-function functions may be assigned to the four keys F1 to F4 of infrared remote control. At first, a menu will appear from which key to which a function is to be assigned may be selected. There are now three options for any key: "off" will completely block function key; "Run XX.BAT" will configure APEX in a way to make sure respective batch-file will be started on pressing an Fx-key. "Run XX.BAT if idle" makes APEX will only react to command on being on idle state. That's to make sure a show being run won't be interrupted. The four files are named F1.BAT to F4.BAT.

```
External input key
IR function keys
Exit at end
```

```
IR-Key F1
IR-Key F2
IR-Key F3
```

```
off
Run F2.BAT      #
F2.BAT if idle
```

Menü „Exit at End“

By means of that setting you may configure state to which APEX will have to switch over to, playing back of an MP3-file once having been completed. If "off" is set APEX will switch over to "Pause" after a file will have been played completely back. It will all the same never switch completely over to idle state. A time period may be set as well. That period having run down, APEX will be going to switch back to base state.

```
off
1 sec.          #
2 sec.
```

The function described is very important with regard to external inputs. A time period may be set making sure a whole installation may only be restarted the period fixed having run down. That function might be quite useful in a museum. A pause of at least two minutes should be integrated after every show to make sure spectators have enough time to leave media-room.

„Default diss. Rate“

By that menu a standard mixing time will be established. That time period is used on manual mixing by means of the "Enter"-key of infrared remote control or on work with timer. Time periods ranking from 0sec to 20 sec may be set. Default setting is 2sec.

```
Diss. Rate = 0s
Diss. Rate = 1s
Diss. Rate = 2s #
```

„Serial Baudrate“

Set serial data rate for the RS232/V24-interface. Any standard baud rate from 300 up to 38400 baud may be set. Default setting is 9600 baud. That setting is very important if APEX is supposed to be controlled by either an external control system or a PC.

```
Default diss. rate
Serial baudrate
Global autoloop
```

```
Baud = 4800
Baud = 9600 #
Baud = 19200
```

„Global Autoloop“

In certain applications a continuous presentation is to be run. That presentation is supposed to start anew, once APEX will have returned to idle state. The function „Global Autoloop“ will be going to take over the task requested. A BAT-file from the storage card will be needed; its name is „AUTOLOOP.BAT“. APEX will execute the AUTOLOOP.BAT-file whenever it is in idle state, granted that that file exists and the parameter „Global Autoloop“ will have been enabled. Playing back of one or more files may be started in that file for example.

„Player Loop“

Enable a loop function separately for both the MP3-player and the IMAGIX-player. This means, as soon as one player will have finished playing back its file, it will restart independently from the other. That function may be used in short advertising shows that are to be set to sound by a piece of music showing a different length without synchronized running being required.

```
Global autoloop
Player loop
Power fail save
```

```
MP3-Player
IMAGIX-Player
```

AUTOEXEC.BAT

We want to mention another characteristic of APEX that is working without menu setting. If there is an "AUTOEXEC.BAT"-file on the storage card, it will be executed just once on putting APEX into operation. It helps to carry out a media application in the morning, when power is switched on: let that be an announcement or making travel projectors to a previously established position.

„Power fail save“

In some applications APEX should continue playing at the position at which it has been interrupted by a power failure. There are also applications in which that function shouldn't be active (if other systems not being equipped with that characteristic are integrated). That function may be enabled or disabled in APEX. If "Power fail save" is set to "on", playing position will be saved in an internal non-transitory memory in case of power failure. On switching on APEX will continue playing at the position having been saved.

Caution! It is forbidden to exchange storage card following a power failure. APEX wouldn't be able to find correct position on the other storage card as such position will partly be saved in sector addresses. Please also note it will always take a short while on switching on, time needed for initializing a storage card.

Menü „No cue -> aux off“

That setting allows establishing of functions of auxiliary relays in case control signal should fail. As long as control signal is active state of auxiliary relays will be defined. With a production being played back from a CD action of relays once CD having reached its end hasn't been defined yet. There are two options: 1) relays are supposed to maintain their last state. 2) Relays are supposed to switch over to inactive state with a defined time period having run down. That time period may be set by the „No cue hold time“-function. The 12 relays available are divided up into three groups. That function may be set for each of them individually.

```
No cue -> aux off
No cue -> no lamp
No cue hold time
```

```
Relais A-E-H-M #
Relais B-F-J-N
Relais C-G-K-O
```

„No cue -> no lamp“

That menu function allows a setting similar to the one having been described. It determines whether projector lamps shall maintain their state in case of a control signal failure. That setting can be applied separately to each port. Respective entries have to be marked in the port-menu to follow. Several entries may be marked as well.

```
Port A #
Port B #
Port C
```

„No cue hold time“

To set time period after which functions of the menu items described are to be enabled following a control signal failure. Settings ranking from 1sec. to 10min. are possible.

```
Hold aux 8 sec.
Hold aux 15 sec. #
Hold aux 30 sec.
```

„Dig. Ch. toggle“

On programming a production on either DAT or CD, control signal will be encoded into the digital audio signal. Information will be included in the 16th bit. Control signal will be integrated in the left channel; a time-code, if there is any, will be integrated in the right channel. That menu function enables APEX to decode signals in which that order will have been reversed as well.

```
Dig. ch. toggle
FreeTrac group
TA-4002 autozero
```

„FreeTrac group“

Control signal FreeTrac is designed for control of 2 x 16 projectors. If the second group including projector 16 to 31 is to be used, APEX will have to be set to that group. IMAGIX 5-software only supports standard group ranking from 0 to 15.

```
00..15 (standard) #
16..31
```

„TA-4002 autozero“

Present manual already explained the following earlier on: the triac adapter TA4002 allows enabling an automatic zero reset of Kodak S-AV-projectors after switching on. APEX will at first set projectors to zero prior to beginning evaluating control signals. That function allows determining whether projectors are to be set to zero by forward or backward commands.

```
TA-4002 autozero
Min Volt level
Max Volt level
```

```
Step backward #
Step forward
```

„Min Volt level“

That menu item will only be effective with 24V-projectors being connected that are not controlled by serial interface. Base brightness of projectors may be set in three different levels. APEX is designed in a way to make sure low current is still flowing though a lamp even if it's faded down. Temperature of filament will therefore be higher; lifetime of a lamp will be extended. If depending on lamp that idle current lead to lighting idle current may be lowered.

```
Standard level #
Lower level
Lowest level
```

„Max Volt level“

That menu item will only be effective with 24V-projectors being connected that are not controlled by serial interface. Maximal brightness of a projector may be selected in three different levels. Standard setting will in most cases be sufficient. „High Volt level“ allows generating even more lamp brightness but this might result in more voltage fluctuation and higher tolerance of triac being used. Such fluctuations lead to strong flickering of a lamp faded up. We recommend returning to "Standard level"-setting. "Economy level" considerably lowers brightness and may be used on testing. Lifetime of a lamp will be extended.

```
Standard level #
High Volt level
Economy level
```

„Syncode Aux Mode“

That setting allows determining whether the two auxiliary relays APEX is equipped with on its AC-24 socket are to be decoded either as relays W and Y or EW and EY on playing back a slide show having been programmed by Dataton Syncode II.

```
Syncode aux mode
Slide adv. mode
Remote proj. coun
```

```
Aux W   Y   #
Aux EW  EY
```

„Slide adv. mode“

Different older control devices such as Kodak PDC used to switch lamp off during slide-exchange when playing back a slide show showing PlusTrac-format. Bässgen-devices never did. If a projector whose lamp is bright is advanced, fading up to follow can be observed. That behaviour may be simulated by "Smooth advance". On normal mixing, projector being faded down will be advanced. That function therefore won't become effective in that case anyway.

```
Normal advance #
Smooth advance
```

Remote proj. cnt“

With APEX being operated manually it will identify number of projectors connected and always switch over to next projector. In three projectors for example slides are always shown in the order A-B-C, A-B-C... There are applications requiring modifying of that order. Example: only two projectors are supposed to be used. The third one will be used manually to show a map from time to time. Menu item „Remote proj. cnt“ allows overwriting automatic identifying. Number of projectors with which APEX is to work will then have to be set.

```
Slide adv. mode
Remote proj. coun
DMX Slide mode
```

```
Autosense #
1 Projector
2 Projectors
```

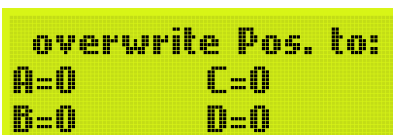
„DMX Slide mode“

That menu item is only related to direct projector control by means of a DMX-512 signal. One channel of a DMX-512 signal will be used to select slide number. In the "Hexadecimal"-mode value of respective channel will directly be read as slide number. Values 0..80 therefore control slide number; values 81..255 are not used. In the "Percentage"-mode, values of the DMX-channel will at first be converted into a value ranking from 0...100%. The first 801 values will be taken to select slides. Light control systems that are only able to operate lamps in entire percentage steps may therefore be used as well.



„Overwrite Pos.“

According to APEX, projectors have to be set to 0 on switching on. Being based on that assumption, APEX will count any transport step, especially in traditional projectors (without serial control). With a power failure occurring at slide 30, projectors will have to be set to zero; the whole device will have to be switched on and you will have to wait till APEX will have set projectors to correct position again. "Overwrite Pos" is able to somewhat shorten that procedure: 1) that function will be selected. 2) CD or tape will shortly be switched on. 3) APEX will show position to which it will have to advance. 4) By pressing "Enter" that function will be taken over. Projectors will now have to be manually set to correct position to ensure synchronous running.



That function is useless with serial projectors such as Kodak Ektapro as they are able to quickly switch to zero and to reach target position directly then.

„RS232 Echo“

An echo on the RS232-interface may be switched on or off. With the echo-function being switched on, APEX will return all bytes having been transmitted as commands to the V24-input socket as a copy. That function may be quite useful with some of the tests that can be carried out by means of APEX in connection with a terminal program.

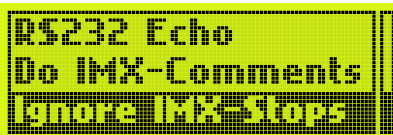


„Do IMX-Comments“

That menu function being set to „on“, the comments included in the IMAGIX-file will be interpreted as commands to be executed once respective line being carried out. Such comments may be edited by IMAGIX 2 (MS-DOS) or IMAGIX 3. That function allows programming complex processes. Default setting is "off". Comment lines beginning with "#" will be ignored in any case.

„Ignore IMX-Stops“

That menu function being set to „on“, APEX will ignore stops having been programmed in an IMAGIX-file. For Speaker Support slide shows such stops are very important. Default setting is "off". It is normally only set to "on" for test purposes.



„Infrared remote“

That menu allows setting of operating mode of IR-remote control. A detailed description was already given in the following section: "Manual operating by infrared remote control."

„Timer functions“

That menu allows controlling timer being integrated in APEX. It makes it easy to carry out an endless-loop production working with constant mixing and exposure times. That simple type of projection is not always recommended but there are always applications where it will be quite useful.



Advanced function:
Infrared remote
Timer functions

„Timer start/stop“

That function allows starting i.e. stopping of timer.



Timer start/stop
Time per slide
Slides per proj.

„Time per slide“

That menu allows setting exposure time during which a slide is projected. Mixing time used will be "Default diss. Rate" having been set at APEX (see respective menu function).

„Slides per proj.“

Timer APEX is equipped with has an additional function. It is able to restart from the beginning once a certain number of slides having passed. Endless-loop projections to be run with magazines filled at half for example may be realized. In any case, writing a short program onto the storage card is more recommended than operation by timer.



8 slides/proj
9 slides/proj
10 slides/proj #

APEX – its command language

Command language used in APEX has been developed for advanced users and commercial applications. Basic knowledge in command-line orientated programming will be needed. By means of that language, APEX may be configured for use in a wide range of applications.

As mentioned earlier on, APEX may be operated by means of a command language, i.e., commands consisting of ASCII-lines. They enable controlling the players being integrated. That command language is the backbone of APEX. It is used on serial triggering of APEX by means of RS-232-commands or on using BATCH-files. Those are ordinary text files enclosing a set of commands having been integrated. A separate line has to be used for each command.

Notice:

Seen the fact an MS-DOS file-system is used, filenames mustn't enclose more than 8 signs as well as an extension of 3 signs at maximum. Extension will define file-type and can't be freely chosen. On working with sound-files, APEX will always be looking for files showing the extension "MP3". Using mutated vowels such as ä, ö, ü as well as dots, colons or blanks in filenames is also forbidden!

Particularities in serial control

On controlling APEX by serial commands, baud rate having been set in the menu of APEX will always be used. Use the option "V24 Echo" on doing tests with a terminal program. That option will return signs having been typed and will therefore enable you to detect spelling errors for example.

Any command has to be completed by and end-of-line (0D hex.).

Player Address

The different players integrated in APEX have invariable addresses by which they may be called. When it comes to ASSIGN, there are different addresses, as only one player at a time may be called by that command. All other commands allow calling different players at the same time. Addresses may simply be added as they are construed in powers of two. Exact simultaneous calling of different players is therefore possible.

Table below will show the different addresses being used with APEX:

| Player | Address | Address f. ASSIGN |
|-----------------|---------|-------------------|
| MP3-Player A | 1 | 1 |
| IMAGIX – Player | 32 | 6 |

Further player addresses are reserved but haven't been implemented in current software yet.

Options

Some commands are furthermore equipped with one or more options. They are preceded by a backslash, followed by a sign (number or letter). Options will be explained together with respective command.

Time data

In some commands exact time data are transmitted. Such time data are always expressed in milliseconds (1 millisecond = 1 / 1000 second).

MP3-files are made of "frames" whose length may slightly vary according to bit rate and sampling rate. Variation is about 25ms. More precision can't be achieved as only whole frames may be played back. As a time unit, we all the same used milliseconds, as it is easy to use and doesn't depend on sampling rate etc.

Short commands

Any command of command language mentioned may be abbreviated. An abbreviated command consists exactly of the first two command letters. Therefore, instead of "PLAY", you may also write "PL". In applications with serial transmission where time is critical (i.e. low baud rate) time may be saved by doing so. Commands being incorporated in IMAGIX can only be entered that way, entries being limited to 20 signs (please refer to following section).

Commands being embedded in IMAGIX-files

That function should be used by experienced users. It enables trouble shooting even in complex installations!

The IMAGIX-player being integrated in APEX plays back files showing the extension .IMX. Such files may directly be edited by IMAGIX 3-software. IMAGIX 3 is a classic line editor. A comment may be added to any command line, its length being limited to 20 signs. An IMAGIX-file being played back, it is possible to cause APEX to interpret respective comment as a command from command language. That function first has to be enabled by means of „Do IMX Comments“ (from the menu „Adv. Functions“). That function having been enabled, APEX will be going to interpret any comment in an IMAGIX-file as a command to be directly executed by APEX. Highly complex processes may be programmed. MP3-players may be started or external devices may simultaneously be controlled by means of TASC/THEX-commands for example. Range of possibilities is wide, but use requires sound experience in programming. As a matter of fact, by using the possibilities described a great number of problems arising in a media station may be solved.

Real comments to be used in such a program that mustn't be transmitted to the command interpreter of APEX will have to be preceded by an "#". Such lines will be completely ignored by APEX.

Commands

ASSIGN

ASSIGN will open both a file and a player. No data will yet be read from the file, no playing back will yet take place. Calling several players at the same time by ASSIGN is forbidden.

General pattern:

ASSIGN player filename options

Caution: ASSIGN is ruled by a different address assignment than other commands! ASSIGN must always be used with only one player at a time.

Addresses (for ASSIGN only)

| | |
|----------------|---|
| MP3-player | 1 |
| IMAGIX -player | 6 |

Options:

Player selected being the MP3-player and /i being entered under "options" means: ignore stop marks from IMAGIX-player. In that case, the MP3-player will continue working even with the IMAGIX-player getting stopped by an X-mark. With no option entered, ASSIGN will set the MP3-player to the operative mode in which stopping of the IMAGIX-player will also stop the MP3-player. That feature is very important with Speaker Support mode.

Player selected being the IMAGIX-player, three different options will be available: /1 or /6. That option establishes the source of the time base the IMAGIX-player will be going to work on. If the IMAGIX-player is opened by /1, it will run as a slave of the MP3-player. If the MP3-player stops, the IMAGIX-player will stop as well. With IMAGIX-player being opened by /6, it will work freely, ruled by its own internal clock.

Notice:

With a player being started at APEX manually, the menu function "Autolink" being active, and both an MP3-file and an IMAGIX-file of the same name existing, both will be started together. As a time base the IMAGIX-player will always use the MP3-player 1 having been started at the same time. The MP3-player will obey to the stop marks of the IMAGIX-file.

Examples:

ASSIGN 1 TEST.MP3

MP3-player is going to be opened for TEST.MP3

ASSIGN 6 TEST.IMX /1

IMAGIX-Player is going to be opened for TEST.IMX, MP3-player will be registered as a time base.

PREPARE

PREPARE will make one or more players ready for playing back. Reading from the storage card will already get started; all buffer memories will be filled with data. That command is especially important with the two players of the 4-channel version having to work absolutely synchronously. Even if extremely short answering times are requested, procedure will get quicker if PREPARE is called first, prior to PLAY, a command going to be described later on. In applications, where fractions of seconds do not matter, PREPARE may well be left aside, as PLAY will implicitly call PREPARE at first if that command hadn't been called already.

General pattern:

PREPARE player

PREPARE may be called for several players by simply adding the numbers of the different players. Please refer to examples:

PREPARE 1

MP3-player will be prepared.

PREPARE 33

Both the MP3-player and the IMAGIX-player will be made ready for playing back
($33 = 1 + 32$)

PLAY

PLAY starts one or more players synchronously. That/those player(s) first has/have to be opened by ASSIGN; a filename will have to be assigned otherwise that command will not become effective. If PREPARE wasn't called that step will be carried out now.

General pattern:

PLAY player

Examples:

PLAY 1

MP3-player will be started.

PLAY 33

Both the MP3-player and the IMAGIX-player will be started ($33 = 1 + 32$)

PAUSE

PAUSE interrupts one or more players synchronously. The player(s) must first have been started by PLAY, otherwise command will not become effective. One (or more) player(s) being on PAUSE may be restarted at the same position by PLAY.

General pattern:

PAUSE player

Examples:

PAUSE 1

MP3-player will be stopped.

PAUSE 33

Both the MP3-player and the IMAGIX-player will be stopped ($33 = 1 + 32$)

STOP

STOP will be going to stop one or more players completely. The file enclosed on the storage card will as well be closed; the assignment player-to-file will be cancelled. That file may only be restarted after another ASSIGN-command having been issued.

General pattern:

STOP player

Example:

STOP 1

MP3-player will be definitely stopped.

MAXPLAY

MAXPLAY enables setting a stop mark in a file. APEX will automatically stop playing back once having reached that mark. Many applications require a certain sequence of a file be played back. MAXPLAY sets a virtual end-of-file. Together with LOCATE, a sequence may be established by a few commands. That sequence may then be started without a controlling computer having to supervise switch-off.

General pattern:

MAXPLAY player time

In the parameter "player" the MP3-player has to be named; time means maximum playback position expressed in milliseconds. Only MP3-players may be called by that command. The IMAGIX-player isn't able to interpret that command.

Example:

MAXPLAY 1 180000

MP3-player will be limited to a playback position of 3.00 min (min. = 180 sec. = 180000 ms)

LOCATE

LOCATE is very important. That command sets a player (one or more players) to a position having been established. Such player(s) must be on PAUSE, if not, it/they will automatically be set to PAUSE. LOCATE once having been called, the player(s) will at first have to be restarted by means of PLAY to make them start playing back at that position.

General pattern:

LOCATE player time

In the parameter "player" the MP3-player has to be named; time means the new playback position expressed in milliseconds.

Example:

LOCATE 33 184000

Both the MP3-player and the IMAGIX-player will be set to a playback position of 3:04 min. (3:04 min = 184 sec. = 184000 ms; 33 = 1 + 32)

LPLAY

LPLAY (= LOCATE + PLAY) will at first execute a LOCATE-command followed by a PLAY-command for the players having been selected. One or more players (having of course been opened by ASSIGN at first) may be started at an established position by just one command.

General pattern

LPLAY player time

In the parameter "player" a player has to be named; time means the new playback position expressed in milliseconds.

Example:

LPLAY 33 210000

Both the MP3-player and the IMAGIX-player will be set to a playback position of 3:30 min. and started from there (3:30 min = 210 sec. = 210000 ms; 33 = 1 + 32)

LCPREP

LCPREP (= LOCATE + PREPARE) will at first execute a LOCATE-command followed by a PREPARE-command for the players having been selected. One or more players (having of course been opened by ASSIGN at first) may be set to a position having been established and made ready for start by just one command.

General pattern:

LCPREP player time

In the parameter "player" a player has to be named; time means the new playback position expressed in milliseconds.

Example:

LCPREP 33 210000

Both the MP3-player and the IMAGIX-player will be set to a playback position of 3:30 min. and made ready for start. (3:30 min = 210 sec. = 210000 ms; 33 = 1 + 32). Start will be executed by a PLAY-command to follow.

LINK

LINK is mainly used to simply start a slide show. A filename will be transmitted to that command; APEX will then look for an IMAGIX-file and an MP3-file showing the same name. The only difference will be their extension. Both files will then be started at the same time. That procedure corresponds to manual start of a file with "Autolink"-option having been set (please refer to reference: Menu of APEX).

General pattern:

LINK filename

Example

LINK TEST.MP3

APEX will start both TEST.MP3 and TEST.IMX, if found, together with the correct options to play a slide show back (Speaker Support).

CALL

CALL will call up a BATCH (= batch processing). By that command, BAT-files being on the storage card may be started by means of serial interface. As mentioned earlier on, BAT-files always enclose further commands in an ordinary ASCII-format.

Extension must always be *.BAT.

A BAT-file mustn't call further BAT-files. CALL may therefore only be executed serially. It mustn't be executed within a BAT-file.

General pattern:

CALL filename

Example

CALL TEST.BAT

That command causes searching for the file TEST:BAT on the storage card and executing of commands being enclosed.

DIR

DIR is supposed to transmit information on the files enclosed on the storage card to a device being remote controlled by APEX by means of the V24/RS-232 serial interface. Once having received a DIR-command APEX will return any file-names found on the storage card by its serial interface. Each name will be transmitted in an own line; a blank line stands for end of transmission. That

command doesn't support any parameters. A possibly required file-selection is to be done by the machine asking for such information.

Make sure „Trigger Mode“ is set to „Serial“, otherwise transmitting would not be going to be done by means of the V24-interface. Although possible, executing that command within a Batch-file is generally useless.

General pattern:

DIR

Example

DIR

That command causes transmitting of any file found on the storage card by means of serial interface.

MUTE

MUTE will mute the MP3-player. That function may be reversed by DEMUTE.

General pattern:

MUTE player

For the MP3-player only.

Example

MUTE 1

That command will mute the MP3-player.

DEMUTE

DEMUTE reverses muting of the MP3-player.

General pattern:

DEMUTE player

For the MP3-player only.

Example

DEMUTE 1

That command will demute the MP3-player.

TASC

TASC (=Transmit ASCII) transmits any ASCII-string by means of serial interface. Purpose of that command is to control further devices by means of APEX (another APEX, video-players, special effects-devices etc.). That command may be incorporated in Batch-files or in an IMAGIX-file. TASC is only able to transmit concrete ASCII-signs. Transmission of binary signs is done by THEX.

General pattern:

TASC string

A string may also include blanks. Any sign from the first to the last concrete one will be transmitted. Strings are limited to 64 signs at maximum.

Example

TASC Candlelight magic

That command will transmit the string Candlelight magic by means of serial interface.

THEX

THEX (=Transmit HEX) transmits any binary sign by means of serial interface. Purpose of that command is to control further devices by means of APEX (another APEX, video-players, special effects-devices etc.). That command may be incorporated in Batch-files or in an IMAGIX-file. THEX is supposed to transmit binary signs. To transmit huge volumes of ASCII-signs TASC should be used.

General pattern:

THEX xx xx xx xx

The dyads xx represent bytes in hexadecimal that will be transmitted. Blanks between the hex-signs may be omitted; but number of hexadecimal signs must be even-numbered. Those signs will afterwards be transmitted; one byte for two signs each. THEX may be followed by 64 signs at maximum.

Examples

THEX =D 0A

That command issues an end-of-line consisting of CR-LF.

THEX 41420D0A

That command issues the string „AB as well as the CR-LF dyad.

VOLUME

VOLUME enables modifying volume of the MP3-player.

VOLUME, general pattern:

VOLUME player value option

Player stands for the address of the MP3-Player. Value stands for the new volume value expressed in dB. Values ranking from 0 to 30dB are admissible. Values entered may be positive or negative, absolute amount will always be calculated. 0dB means full volume, the standard value on switching APEX on. Volume may be reduced down to 30dB. If "/D" is added as an option, the value won't be an absolute volume value in dB but a relative one being based on current volume. Positive values will increase volume by the number of dB required.

Examples:

VOLUME 1 -10

The MP3-player will be set to a volume of -10 dB.

VOLUME 1 +1 /D

Volume of the MP3-player will be increased by 1 dB.

Notice:

Excessive volume reducing has to be compensated by means of a subsequent amplifier. Secondary noise and interferences will be amplified to the same extent.

BASS, TREBLE

Those commands are used to remotely control integrated tone regulation of APEX.

General pattern of command:

BASS player value option

TREBLE player value option

Player is the address of the MP3-player. Value stands for the new value of an increase/decrease in dB. Admissible are values ranking from -15 to +15dB. If "/D" is added as an option, the value won't be an absolute volume value in dB but a

relative one being based on present volume. Positive values will increase amplifying of respective tone level by the number of dB required.

Examples:

BASS 1 -5

Basses in the MP3-player are reduced by 5 dB.

TREBLE 1 +4 /D

Trebles in the MP3-player are going to be increased by 4 dB, taking the value having been set at present as a base.

Notice:

If basses and/or trebles are increased, APEX will automatically reduce overall volume, depending on value of increase. Such reduction is necessary, as a simple increase of a tone level might cause over-shootings that can't be expressed in the digital range within the 16-bit resolution being used. Strong increase of the nonlinear distortion factor would result. That is the somewhat strange characteristic of pure digital tone regulating. It doesn't at all matter in equilibrating acoustics of the room where a show is going to take place.

APEX – controlling by DMX-512

APEX is easy to control by a DMX-512 light mixer system and offers a wide range of options in that field. Integrating sound or noise may easily be realized. There are two different options: triggering by a batch-file by means of DMX-512 signals or direct projector control. With the second option, sound unit of APEX will remain unused.

APEX – triggering by DMX-512 / the \DMX-512\ folder

Technical principle is quite simple: by means of the PC a folder showing the name \DMX-512\ has to be generated on the storage card. That folder will now be enclosing a large number of BAT-files. Those BAT-files are all named XX.BAT.

XX expresses brightness value of respective DMX-channel in hexadecimals.

DMX-512-address has to be correctly set in the menu „DMX trigger adr.“ APEX will now react to one single DMX-512-channel only. 255 different batch-files may be controlled.

Simple example:

- 1) APEX will have been addressed to DMX-channel 234 in respective menu.
- 2) Value on channel 234 will jump from 0 to 3F (hex).
- 3) APEX will execute the BAT-file 3F.BAT in the \DMX-512\ folder.
- 4) Nothing will happen as long as the value on channel 234 won't have gone to change.
- 5) Value on channel 234 once having changed, a new BAT-file will be started.
- 6) Case apart: value being 0 will always stop all players.

Direct projector control by means of DMX-512

With that operating mode being active, projectors will be directly controlled by DMX-512. Any fading modulations will directly be generated by a light mixer. That makes APEX an ideal device when it comes to integrating slide shows in theater plays.

DMX-addressing

APEX receives all the 512 channels being part of DMX-512-protocol. By addressing, selected channels will be decoded and transmitted to projectors as commands.

Each projector will always take three subsequent DMX-512-addresses. Base address, i.e. the first one, will be established on base of the address set in the menu „DMX projector adr“ of APEX as well as on base of code letter of projector according to the following scheme:

| |
|---|
| $\text{Base address} = \text{projector address} \times 3 + \text{„DMX projector adr.“}$ |
|---|

With address 110 having been selected in the menu, projector A will take the addresses 110, 111 und 112. Projector B will take the addresses 113, 114 and 115, etc.

Notice:

If, due to address calculating, number of addresses exceeds 512, 512 will be deducted from that address, i.e. there will be a transition towards low addresses. Example: Address button set to 500; projector address: 515. That address will be an equivalent of address 3.

Functioning of addresses assigned

Any projector will be controlled by three addresses. Base address will directly control lamp brightness of projector. Projecting lamp may be controlled like a spotlight. 0% = lamp faded down, 100% full brightness..

Subsequent address will select a slide. Either percentage or hexadecimal scale may be used. Both options may be set in the menu “DMX slide mode” being part of “Advanced functions”.

Percentage scale:
0% means home position of projector. At 38% of that channel, slide 38 will be selected. As projectors only count up to 80, slide 0, i.e. home position will be selected once a value of 80% having been exceeded.

Hexadecimal scale:
00 means home position of projector. At 2F on that channel, slide 47 will be selected. As projectors only count up to 80, slide 0, i.e. home position of projector, will be selected, once the value of 50 (hex) having been exceeded.

With a scene change in a theatre, slides may therefore easily be exchanged.

Third projector address will control its shutter. That's a mechanical stop that may be set into beam channel. Very hard light changes may therefore be achieved., as lamp sluggishness will be cut. That channel once having reached a value equal to or exceeding 50%, shutter will be shut. It will remain open with lower values.

The three addresses described therefore allow controlling of complete projector. By means of the DMX-512 option, Kodak Ektapro or Leica RT-slide projectors may easily be integrated in lighting engineering.

Summary:

Information DMX-512 signal includes will be interpreted as follows:

| | | | |
|--------------------------|--------------------|---|---|
| Brightness channel | 0% - 100% | = | Projector brightness 0 – 100% |
| Slide number channel | 0%-80% or 0-80 hex | = | a slide no out of 0-80 will be selected |
| Special function channel | > 50% | = | stop shut, otherwise open |

For work with light mixer emitting directly values from 0-255 a conversion table stating what hex values will select what slides has been included in the technical addendum. Control is given in % as some less sophisticated DMX-controls only enable brightness settings in steps being expressed in %.

DMX-512 corresponds to requirements of DMX-512/1990 (4uS)-standard.

Summary

The two examples illustrate how sound and noise be integrated in an installation and be enabled in a very reliable way, without any wear being caused.

Conversion table: Hexadecimals – Percentages

The following table will be going to state conversion from hexadecimal values into decimal ones. In control of lamp brightness; that doesn't matter at all. APEX will be going to use all of the 256 brightness values and convert them according to the 1001 brightness levels Kodak EKTAPRO-projectors use internally. When it comes to control of magazine position, APEX will convert hexadecimal values received into decimals, on condition operating mode working on percentages will have been selected ("DMX slide mode"). Values ranking from 0 – 80% will show magazine state; the ones from 81% - 100% will remain unused. Conversion is stated hereafter under form of a table. With special cases it may be quite useful to have information on system APEX uses to carry out conversion, as not all DMX-512 devices work the same way.

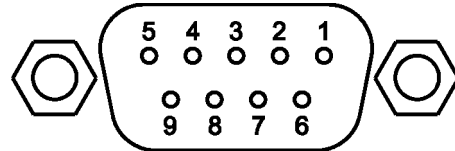
| Percent | HEX | Percent | HEX | Percent | HEX |
|---------|---------|---------|---------|---------|---------|
| 0 % | 00 - 01 | 34 % | 56 - 57 | 68 % | AC - AF |
| 1 % | 02 - 03 | 35 % | 58 - 59 | 69 % | B0 - B1 |
| 2 % | 04 - 05 | 36 % | 5A - 5D | 70 % | B2 - B3 |
| 3 % | 06 - 09 | 37 % | 5E - 5F | 71 % | B4 - B7 |
| 4 % | 0A - 0B | 38 % | 60 - 61 | 72 % | B8 - B9 |
| 5 % | 0C - 0D | 39 % | 62 - 63 | 73 % | BA - BB |
| 6 % | 0E - 0F | 40 % | 64 - 67 | 74 % | BC - BD |
| 7 % | 10 - 13 | 41 % | 68 - 69 | 75 % | BE - C1 |
| 8 % | 14 - 15 | 42 % | 6A - 6B | 76 % | C2 - C3 |
| 9 % | 16 - 17 | 43 % | 6C - 6F | 77 % | C4 - C5 |
| 10 % | 18 - 1B | 44 % | 70 - 71 | 78 % | C6 - C7 |
| 11 % | 1C - 1D | 45 % | 72 - 73 | 79 % | C8 - CB |
| 12 % | 1E - 1F | 46 % | 74 - 75 | 80 % | CC - CD |
| 13 % | 20 - 21 | 47 % | 76 - 79 | 81 % | CE - CF |
| 14 % | 22 - 25 | 48 % | 7A - 7B | 82 % | D0 - D3 |
| 15 % | 26 - 27 | 49 % | 7C - 7D | 83 % | D4 - D5 |
| 16 % | 28 - 29 | 50 % | 7E - 81 | 84 % | D6 - D7 |
| 17 % | 2A - 2B | 51 % | 82 - 83 | 85 % | D8 - D9 |
| 18 % | 2C - 2F | 52 % | 84 - 85 | 86 % | DA - DD |
| 19 % | 30 - 31 | 53 % | 86 - 89 | 87 % | DE - DF |
| 20 % | 32 - 33 | 54 % | 8A - 8B | 88 % | E0 - E1 |
| 21 % | 34 - 37 | 55 % | 8C - 8D | 89 % | E2 - E3 |
| 22 % | 38 - 39 | 56 % | 8E - 8F | 90 % | E4 - E7 |
| 23 % | 3A - 3B | 57 % | 90 - 93 | 91 % | E8 - E9 |
| 24 % | 3C - 3D | 58 % | 94 - 95 | 92 % | EA - EB |
| 25 % | 3E - 41 | 59 % | 96 - 97 | 93 % | EC - EF |
| 26 % | 42 - 43 | 60 % | 98 - 9B | 94 % | F0 - F1 |
| 27 % | 44 - 45 | 61 % | 9C - 9D | 95 % | F2 - F3 |
| 28 % | 46 - 47 | 62 % | 9E - 9F | 96 % | F4 - F5 |
| 29 % | 48 - 4B | 63 % | A0 - A1 | 97 % | F6 - F9 |
| 30 % | 4C - 4D | 64 % | A2 - A5 | 98 % | FA - FB |
| 31 % | 4E - 4F | 65 % | A6 - A7 | 99 % | FC - FD |
| 32 % | 50 - 53 | 66 % | A8 - A9 | 100 % | FE - FF |
| 33 % | 54 - 55 | 67 % | AA - AB | | |

Technical addendum

Assignment of connection sockets

V24-in-socket

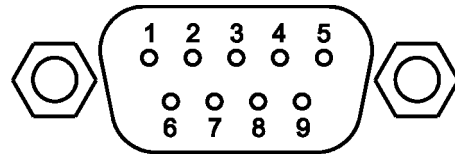
- 1 Ext 1 (External input 1)
- 2 TxD (Data input)
- 3 RxD (Data output)
- 4 Positive pole - DMX-512
- 5 Ground APEX
- 6 Ext 2 (External input 2)
- 7 Negative pole - DMX-512
- 8 Ext 3 (External input 3)
- 9 Ext 4 (External input 4)



PIN 1, 6, 8, 9 are equipped with internal Pull-up resistors against +6 V.

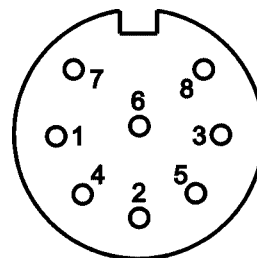
Socket - Port A - D

- 1 Snap Relay negative (Rel3)
- 2 RXD Data input RS232
- 3 TXD Data output RS232
- 4 Gate Triac
- 5 Ground APEX
- 6 all relays positive (jointly)
- 7 24 V AC Input
- 8 Transport forward, negative
- 9 Transport backward, negative



AC-24-socket

- 1 AUX-relay positive pole
- 2 Ground APEX
- 4 AUX-relay 1, negative
- 5 24 V-input, power supply
- 7 AUX-relay 2, negative



Remaining pins are not used in APEX.

Personal notes

This image shows a full page of blank graph paper. The grid consists of small, uniform squares formed by thin, light blue lines. There are no margins, text, or other markings on the page.