

On Stage Slide Projection

# DMX-CARD MIDI-CARD

## Manual





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# DMX-CARD and MIDI-CARD

## General Information

Both DMX-CARD and MIDI-CARD are designed exclusively for Kodak EKTAPRO slide projectors. They are the easiest way to link the fascinating world of slide projection with the rather “tough” world of onstage technology. The cards integrate the slide projectors into DMX-512 and MIDI systems. This means that you don't have to work yourself deep into slide projection, you can use the slide projector like any other DMX or MIDI device.

## Introduction

This manual is divided into three chapters.

Chapter one describes the installation of the card into the EKTAPRO slide projector, the controls on the card, the adjustment of the projector plus the use with different series of projectors.

Chapter two is about the DMX-CARD. Here you'll find detailed information about commands and addressing; this enables every stage technician to use the slide projector comfortably as any other DMX-device.

Chapter three is dealing with the MIDI-CARD, explaining the commands you need to control the slide projector.



# Using AV-Cards

## General

Both DMX-CARD and MIDI-CARD are designed for the extension slot of Kodak EKTAPRO slide projectors. Suitable projectors are EKTAPRO models 7000, 7010, 7020, 9000, 9010 and 9020. If you have installed a DMX-CARD or a MIDI-Card in one of these projectors up to 3 additional projectors can be controlled via a daisy chain using the "PBUS"ports . This requires that the projectors use different addresses (address-dial on the projector). Connect the projectors with cable E-1.

*Note: Using the card to control two or more projectors with the same address will lead to malfunction and possible data loss!*

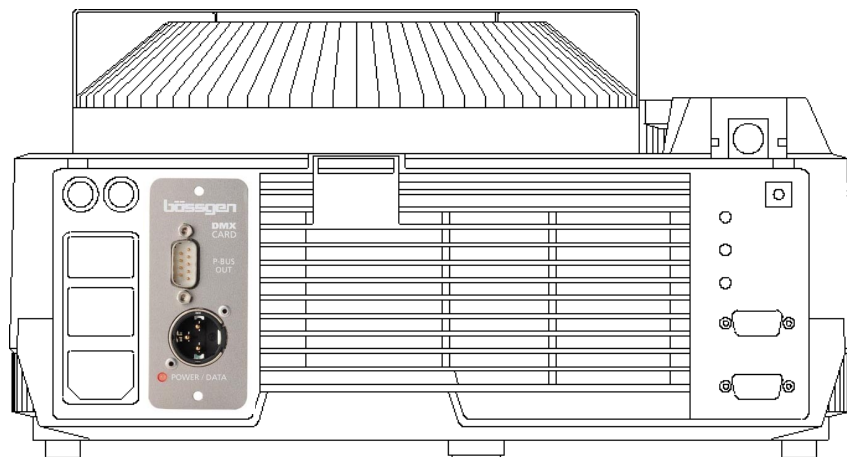
## Installation of the Cards

Turn off and disconnect the projector before installing the card. Disconnect any other device connected to the projector. Remove the black cover from the projectors extension slot. Now the card can be inserted carefully into the slot. Make sure the card is connected properly to the projector by gently pushing the cards contacts into the slots socket. Fix the card with the two screws that initially were holding the slots cover. The card is now properly installed.

Set the projectors address by turning the address dial using a screwdriver.

*Note: Changes to the address dial take no effect unless the projector is turned off and on again.*

You can't reconnect and turn on the projector now. The card's red light will be on.



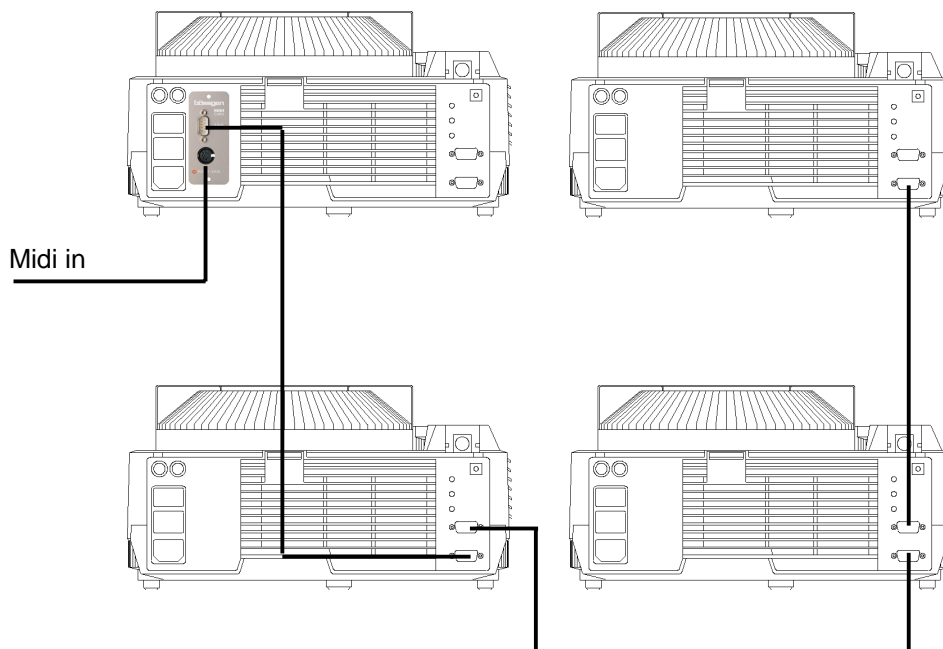
## Using the Cards with EKTAPRO 4010/4020/5000/5020

One of the projectors used can be an EKTAPRO model 4010, 4020, 5000 or 5020. As these projectors do not have a "PBUS OUT" they can be only used as the last projector in a daisy chain. The address of series 4000 and 5000 projectors is "0" and can't be changed, therefore the addresses of the other projectors have to be changed accordingly. It may seem unusual to use "0" for the last device of a daisy chain, but this has no negative effect on the overall systems performance.

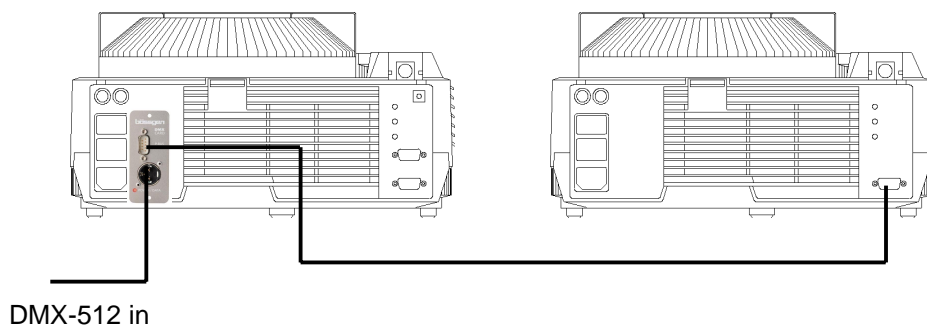
The combination of an EKTAPRO 7020 and a 4020 or of a 9020 and a 5020 is a very cheap possibility to control 2 slide projectors via DMX-512 or MIDI.

## Examples

4 EKTAPRO 7020 with MIDI-CARD



EKTAPRO 9020 and 5020 with DMX-CARD





## Details of the DMX-CARD

In chapter one you learned how to install the card and how to connect the projectors. Now you'll learn about controlling the projectors features using the DMX-CARD.

The DMX-CARD is a true DMX-512 receiver. We proceed on the assumption that you are familiar with the basics of the DMX-512 protocol. If you are not, please refer to literature dealing with those basics.

The connection of up to 4 slide projectors is described in chapter 1.

The LED on the Card will light up red-colored if the card is supplied with power. If the Card is receiving a DMX-512 signal the LED's color will change to green.



## DMX-Addressing

The DMX-CARD is receiving all 512 channels of the DMX-512 protocol. The channels which are selected by the addressing will be decoded and used as commands for the projectors.

Every projector uses 3 successive DMX-512 addresses. The first address is calculated of the cards and the projectors address:

$$\text{first address} = \text{projector address} \times 3 + \text{Card address}$$

If, for example, the projectors address is 3 and the address you've chosen for the card is 110, the projector will be controlled via the addresses 119, 120 and 121. ( $110 + 3 \times 3 = 119$  and the two following addresses). The address dial of Kodak EKTAPRO projectors is hexadecimal, this means that there are 16 possible settings, the last is F (= decimal 15).

*Note:*

*If the result of the address calculation would be higher than 512, you have to subtract 512.*

*Example:*

*Card address: 500*

*projector address: 5*

$$\text{projector address} \times 3 + \text{Card address} = \text{first address}$$

$$5 \times 3 + 500 = 515$$

$$515 - 512 = 3$$

*Projectors addresses in this example are 3,4 and 5.*

*Note:*

*EKTAPRO 4000 and 5000 series projectors have no extension slot but can be used as the last device of a daisy chain. These projectors are always set to address "0". This requires to set the addresses of the other projectors to other numbers than "0".*

## Allocation of addresses

Every projector is controlled via 3 addresses. The first address defines the projectors brightness: 0% = black, 100% = full.

The second address is selecting the slide from the slide tray:

0% home position of the slide tray

38% for example equals slide number 38.

As there are only 80 slides in the tray, numbers over 80 equal 0.

The third address controls the projectors shutter. The shutter is a mechanical part of the projector that switches off the projectors light flow instantly, without dimming the lamp.

numbers < 50% = shutter open

numbers > 50% = shutter closed

With these three addresses you can control all important features of the Kodak slide projectors and integrate them easily into your lighting system.

## Summary

Every projector uses 3 DMX 512 addresses

BRIGHTNESS	=	CARD ADDRESS + 3 x EKTAPRO ADDRESS
SLIDE SELECTION	=	CARD ADDRESS + 3 x EKTAPRO ADDRESS + 1
SPECIAL	=	CARD ADDRESS + 3 x EKTAPRO ADDRESS + 2

The data assigned to the address is interpreted as follows:

Brightness channel 0% - 100%	=	Brightness of the projector lamp
Slide channel 0% - 80%	=	Slide number 0 - 80
Special channel > 50%	=	Shutter closed (opened if < 50%)

*If you are using control devices with a direct output from 0-255, you'll find a conversion table on the appendix where you find the Hex-codes for the slidenumbers.*

## Technical Appendix DMX-CARD

### DMX-Port

- 1 = GROUND
- 2 = DMX +
- 3 = DMX -



DMX-Port complies with DMX 512/1990 (4uS)

## Conversion Hexadecimal – Percent

The following table shows the conversion of hexadecimal to decimal readings. The changing of slide is controlled by decimal readings from 0%-80% (81%-100% are not used). If you DMX signal generator is programmed with hexadecimal readings you'll find the correct reading in the table (slide number 38 for example equals a hexadecimal reading of 60 or 61).

There is no conversion needed for controlling the projectors brightness as the DMX-CARD is using all 256 steps here and is converting them to one of the 1001 steps the EKTAPRO uses internally.

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		



## Details of the MIDI-CARD

In chapter one you learned how to install the card and how to connect the projectors. Now you'll learn about controlling the projectors features using the MIDI-CARD.

The MIDI-CARD is a true MIDI receiver. We proceed on the assumption that you are familiar with the basics of the MIDI protocol. If you are not, please refer to literature dealing with those basics.

The connection of up to 4 slide projectors is described in chapter 1.

The LED on the Card will light up red-colored if the card is properly supplied with power. If the Card is receiving a MIDI-signal the LED's color will change to green.



## MIDI-Addressing

The MIDI standard uses 16 MIDI channels. The midi channel of the projector is set using the projectors address dial (address 3 = MIDI channel 3). The EKTAPROs address dial is hexadecimal, there are 16 switching positions, the highest reading is "F" (equals decimal 15).

*Note:*

*EKTAPRO 4000 and 5000 series projectors have no extension slot but can be used as the last device of a daisy chain. These projectors are always set to address "0". This requires to set the addresses of the other projectors to other numbers than "0".*

## MIDI-Commands

Every projector is controlled via one MIDI channel.

The Brightness is controlled via the "Control Change" command (ID = 1). The MIDI-CARD is converting the readings from 0 to 127 to the EKTAPROs internal 1001 steps.

The slide change is controlled via the "Program Change" command. The reading of the new program number (0-80) equals the slide numbers.

The projectors shutter is controlled via the "Note On" command. "Note On" of "cis 1" closes the shutter, "Note On" of "dis 1" opens it again. The shutter is a mechanical part of the projector that switches off the projectors light flow instantly, without dimming the lamp.

Three more of the projectors functions can be controlled by "Note On" commands: slide transport forward, backward and home. You'll find all the commands in the summary.

### Summary of MIDI commands

The projectors MIDI address is the same as the projectors address. There are no additional settings needed on the MIDI-CARD.

The projectors features are controlled using the following MIDI commands:

Command	MIDI-command
Brightness	Modulation control 0..127 converted to 0..1000
Slide selection	Program Change 0..80 equals slide 0 – 80
close shutter	Note On cis 1 (note 37)
open shutter	Note On dis 1 (note 39)
slide fwd	Note On d1 (note 38)
slide back	Note On c1 (note 36)
home	Note On g1 (note 43)

### Technical appendix MIDI-CARD

MIDI-CARD uses a MIDI IN PORT, complying with MIDI specifications.



**Notes**