

BARCO Projection Systems
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R9827530

**PROJECTOR CONTROL
SOFTWARE FOR DOS**

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CHAPTER 1 PREFACE

The Projector Control Software for CRT projectors runs on an IBM PC (or compatible) quipped with DOS 3.00 or later.

The only requirements are :

- possibility to display 25 x 80 characters.
- the installation of a serial communication port.

The availability of a mouse or other pointing device is a great advantage to use this software easily.

BARCO provides also D9-D9 communication cables to connect the PC to the projector :

cable length	order number
15m.	98 27560
30m.	98 72570

The Projector Control Software is made to be used with one (or more) BARCO CRT projector(s). The possibilities with this software will be explained in this manual.

The projectors have to be of BARCO's digitally controlled family, e.g. all 700, 800, 1100, 1200, 1600 series. Earlier types of projectors are not equipped with this facility. To take advantage of the full power of this software, it is important to know the basic principles of BARCO's digitally controlled series of projectors. This will be explained in chapter 2.

Note : the BARCOVISION in the 700 series is not standard equipped with a RS232 communication port. This feature can be ordered as an option.

CHAPTER 2 BARCO'S DIGITALLY CONTROLLED PROJECTORS

Basic principles

BARCO's digitally controlled projector series differ from the earlier models in the following key areas :

- IR remote controlled
- Digitally stored settings for each input
- Projector adjustments are menu driven with on screen displays.

To implement these features, BARCO's digitally controlled series of projectors differ from the earlier families in two very important ways:

- most of the analog potentiometers are replaced by digitally controlled potentiometers.
- the digitally controlled series are equipped with a microprocessor module called the '*controller*'.

On this controller, an EEPROM (a memory device to which you can write at all times and which holds its memory when the power is switched off) is installed.

This EEPROM stores the adjustment data for the digitally controlled potentiometers and dumps its data into these potentiometers during power up or when changing from one source to another. This EEPROM also stores other data such as the runtime and the serial number of the projector.

Depending on the projector's family (700, 800, 1100, 1200, 1600) a number of different values for the potentiometers make up an adjustment of a projector. Loading these values from the EEPROM into the potentiometers actually effects a complete new adjustment of the entire projector.

The EEPROM stores a number of different adjustments. One adjustment value is called a setting. A set of values (settings) is called a block.

Depending on the projector's family, the setup of the EEPROM is different. The 800, 1100 and 1600 family have 38 blocks and each block consists of 208 settings. The 1200 family has 35 blocks and each block consists of 208 settings. The 700 family has 8 blocks and each block consists 224 settings.

In the future, other families(and other EEPROM configurations) may be defined.

The header of a block

Each block is labelled by a header. Such a header contains information concerning the corresponding projector configuration/input source references.

Header information :

- Source number
- Source type
- Horizontal period (timing)
- Vertical frequency
- Installation (projector configuration)

Source number can be 1 to 5 (to 7 if the projector is equipped to project HDTV images, aspect ratio 16:9) if there is no RCVDS 800 installed. The source number refers to the selected input if no HDTV images are displayed :

- 1 : Video
- 2 : S-Video
- 3 : RGB TTL
- 4 : RGsB analog

- 5 : RGBS analog
- 6 : RG3sB*
- 7 : RGB3S*

* only for sources with three level sync.

If there is one or more (max 10) RCVDS 800 installed, the source number can be 1 to 99. Each of the source numbers between 1 and 89 correspond to an input module of one of the RCVDS's. Source numbers 91 to 99 are the same as source numbers 1 to 9, but can hold completely different groups of 'alternate' settings for sources with the same header. If no RCVDS 800 is installed, alternate settings for source numbers 1 - 5(7) are available as source numbers 91 - 95(97). An 8 bit value is used to store the source number.

Source type indicates which kind of source is connected.

There are eight different source types defined :

- Video
- S-Video
- RGB TTL
- RGsB analog
- RGBS analog
- RG3sB
- RGB3S
- Internal cross hatch pattern

Horizontal timing indicates the horizontal period of the source for which the block is created. An 8 bit value is used to store the horizontal timing.

Vertical frequency : An 8 bit value which indicates the vertical frequency of the source for which the block is created.

Installation : information concerning the projector configuration the block is created for : Front or rear screen, table or ceiling mount

38 different blocks for the 800,1100 and 1600 series or 35 blocks for the 1200 series or 8 blocks for the 700 series can be stored in the EEPROM. Each block can be free or closed. A block is closed after the user adjusts a setting. A block is normally free before it is closed (used), or after the closed block is deleted.

The selection of a block

In the normal operating mode, the projector will operate with settings from a block whose header matches those characteristics of the existing input source. When the controller detects a change (e.g. a new source is selected, or the existing source frequency changes) it will search the EEPROM memory to find a closed block with a header which matches the new input source conditions. The matching doesn't have to be completely perfect because there is always an uncertainty regarding the measurements of the horizontal period and the vertical frequency; therefore, a certain range of values are considered as matching.

If the block contains a value HT for the horizontal timing, then measuring a horizontal timing of $HT \pm 2$ is considered as a matching horizontal timing ($= \pm 500$ nanosec for the horizontal period).

If the block contains a value VF for the vertical frequency then measuring a vertical frequency of $VF \pm 3$ (3 Hz) is considered as a matching vertical frequency.

If there is a block with a matching header, the contents of this block will be loaded in the potentiometers and the displayed image will be adapted accordingly.

Linear Digital Interpolation (LDI).

If there is no block with a matching header, the projector will automatically search for a solution with existing closed blocks. Adjustments are generally most depended on the horizontal frequency, so a closed block will be searched for with the same horizontal period. The first block with matching horizontal period will be loaded into a free block. If there is no matching of the horizontal period, the two blocks with a horizontal period closest to the new horizontal period (one with a higher, one with a lower value) are taken and an linear interpolation of the settings is loaded into a free block. If there are only blocks available with higher or lower periods, the closest one is taken without any interpolation.

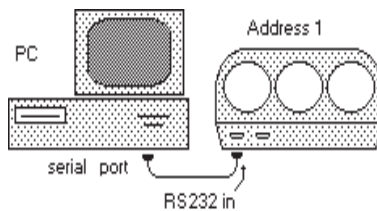
One exception in copying the settings to a free block is the four blanking settings. These four settings will be set to null, or “no blanking at all”.

The block is not closed after copying but will be closed from the moment one of the settings is changing. Therefore, it is not necessary to enter the adjustment mode. Changing an analog image control (e.g. contrast) is sufficient to close the block.

CHAPTER 3 PC - PROJECTOR CONNECTIONS

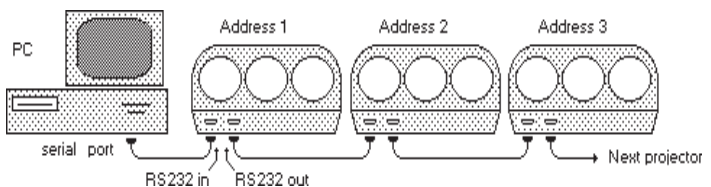
The connection of a IBM PC (or compatible) to one of BARCO's digitally controlled series is established with a serial RS232 connection.

Connect one of the serial ports of the PC to the D9 connector labelled "RS232 IN" on the (first) projector.



The computer operates in the terminal mode, the projector operates in the modem mode. The signals to be connected are TxD, RxD and GND .

In case of a serial connection of projectors, connect the PC to the first one, then the second projector has to be connected to the first projector (and the third one to the second one ,...). This is done by connecting the "RS232 OUT" D9 connector of the first projector to the "RS232 IN" connector on the second projector (and so on for the following projectors).



As the PC can communicate with several projectors via one communication line, it is necessary that every projector has its own unique address.

This address is set with DIP switches on the controller module inside the projector (see installation manual of the projector).

Up to 256 different projectors from the 800, 1100, 1200, 1600 series can be hooked up to one PC (eight DIP switches).

Up to 16 different projectors from the 700 series can be hooked up to one PC (four DIP switches)

It is very important that each projector has a unique address in an installation. Before you continue, be sure that you know all the addresses and you have checked that each address is unique.

In addition, check to ensure all the projectors are working on the same baudrate.

It is important to know that the address of a projector is not only significant for PC communication, but also for the IR communication (using the remote control, RCU800).

The remote control must also be programmed with an address. This address can go from 0 to 9.

0, 'zero address', is a special address. With this address programmed on the remote control, all projectors will respond, independent of their address setting. If the remote control works on an address between 1 and 9, then only the projector with the same address will respond. Changing the address on your projector can have an influence on the communication with your remote control.

For the PC communication, selection of address 0 only allows you to communicate with the projector programmed on address 0. All other projectors will not respond.

CHAPTER 4 GETTING STARTED

Installation

The Projector Control Software works most efficiently and gives a faster response when running from a hard disk. To install the Projector Control Software to a hard disk, perform the following :

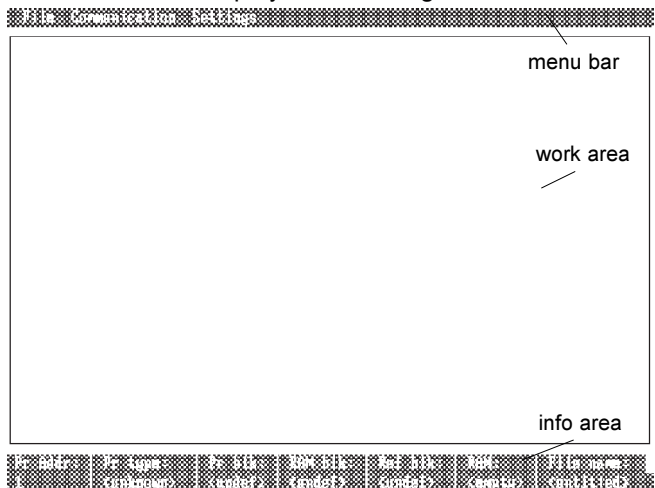
- 1) Insert the Projector Control Software disk in drive a:
- 2) Type A: and press <ENTER>.
- 3) Type A2C and press <ENTER>.

This will copy the Projector Control Software onto the C-drive under the sub-directory BPS.

If no hard disk is available and the software has to run from a floppy disk, all features of the software are available. However, it is advisable to make a copy of the original floppy disk, for backup purposes.

Starting up

The program starts by typing : 'PROJCTRL' and ENTER. The monitor will display the following screen :



There are some basic principles on how to use the Projector Control Software. The following chapters explain these principles. They are the same as currently used by most of the modern PC software.

To function properly, a number of files must be available in the same directory as the file "projctrl.exe". These files are :

comm.cnf : contains the information concerning the communication parameters (baudrate, serial port, ...)

default.dsc : dsc files are description files. They contain information about the properties of the projectors usable with the communication software. default.dsc is used for a number of projectors. This file is at least necessary to start up.

defname.lst : this file contains all the names used in the communication software.

If one of these files are not in the same directory as projctrl.exe, a warning is given and the software will not start up.

The display areas

Fig. below shows the display after starting up.

The different parts of the screen are :

- menu bar
- work area
- info area



The **menu bar** contains the names of several drop-down menus (also known as 'pull-down' menus). These drop-down menus contain the different commands which can be used.

The **work area** contains extra information (when necessary) after a command is selected. The kind of information depends on the particular command that was selected.

The **info area** contains extra information, permanently available for the user.

Using a mouse

The Projector Control Software checks to see if there is software for a mouse installed on your system. If you want to use a mouse, be sure this software is loaded on the PC before starting up the Projector Control Software.

The mouse is a hand-held pointing device. A pointer (a white rectangular cursor) moves across the screen as you move the mouse across your desk. You can pick up the mouse and reposition it without moving the pointer on the screen. If your mouse has more than one button, only the left button of the mouse is used.

Some terms concerning the use of a mouse :

- **Point** : move the pointer on top of something on the screen.
- **Click** : Press and release the button within a short time.
- **Double click** : two clicks in succession, relatively fast.
- **Drag** : holding down the button until the pointer is where you want it to be, then release the button.

Accessing a command in a drop down-menu

Menus are lists of commands. When you select a menu, it 'drops-down' on your screen showing all the commands you can choose from that menu.

A command in a menu can be accessed by using a mouse or using the keyboard. Both methods will be explained. As an example, the command "Setup communication ..." in the "Communication" menu will be accessed.

Using a keyboard

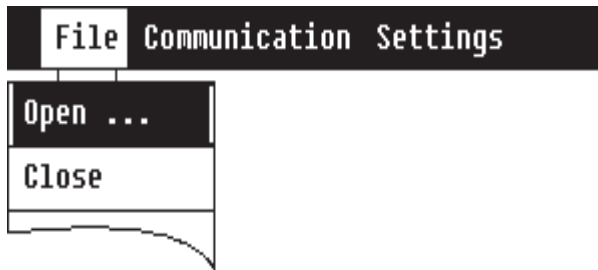
After starting up the Projector Control Software, all the characters in the menu bar are reversed. (i.e. dark characters on a bright background on the monitor screen).

Hold down the <ALT> key and release it. You will see that "File" will not be reversed any more.



When you use the left and right arrow keys in this situation, other menu names will be reversed. If you press the up, the down or the ENTER key at this moment, the reversed menu will be "dropped down"

Another way to select a menu is pressing the capital keys of the menu names, then that menu will be dropped down (so pressing "f" or "F" will drop down the File menu..)



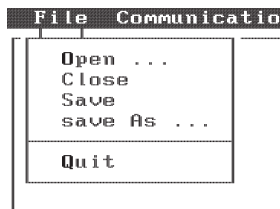
A more direct way to get access is by pressing <ALT> and one of the capital letters at the same time. This drops down immediately one of the menus.

Within the menu one of the items will be reversed. This item will be executed after <ENTER> is pressed. Using the up and down keys will reverse other items.

Certain names will not be accessible. This depends on the state of the computer at that moment. They will not be reversed.

Each name in a menu has a highlighted capital letter (not necessarily the first one). Pressing this letter will directly execute the command.

The three main drop-down menus are:



File Communication Settings	
Receive ...	
Transmit ...	
get Overview ...	
Projector block ...	
Memory block ...	
reFERENCE block ...	
Next address	F10
Previous address	F9
Edit address set ...	
Identify projector	
Setup communication ...	
remote Control	

n Settings	
Picture	
Geometry	
Convergence	
coLor	
common Access	
Print	

Here are two ways to access the "Setup communication" command in the menu "communication" :

A long way:

- 1) Press <ALT>
- 2) Press the right arrow key.
- 3) Press <ENTER>
- 4) Press the down arrow key seven times

5) Press <ENTER>

6) To exit this command : Press <ESC>

A Short way:

1) Press <ALT> and “C” at the same time.

2) Press “S”

3) To exit this command : Press <ESC>.

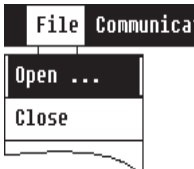
Using a mouse

To select a menu :



Point in the menu bar. You will see that the menu name you are pointing at will not be reversed any more.

To choose a command :



- select the menu that contains the command you want.

- drag down the menu. As you pass over each command, it is reversed. If you release the mouse button on an executable command, this command will be executed.

e.g. : To start “Communication setup ...” : point with the mouse on the word “Communication” in the menu bar, drop down the menu by moving the mouse pointer down until “Communication setup ...” is reversed and at that moment, release the mouse button.

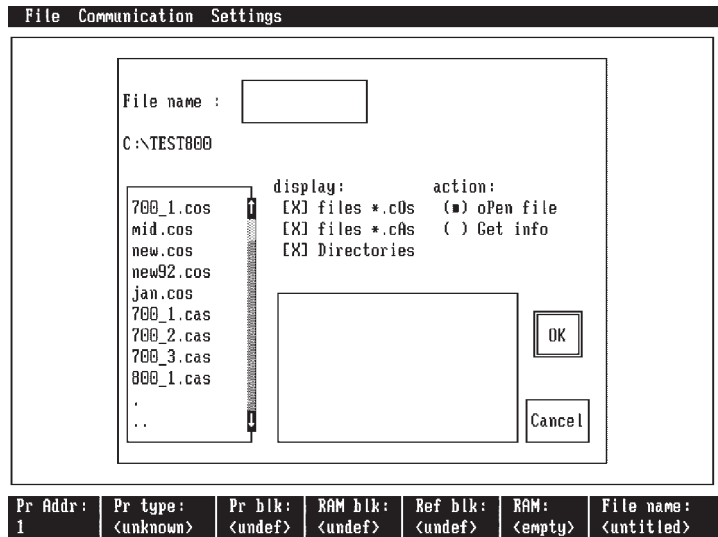
Exit this command by pressing the <ESC> key.

Using the dialogue box

What is a dialogue box?

A dialogue box is the window that appears on the screen when you have accessed a command that needs extra information or gives you requested information (the command in the menu will end in an ellipsis (...), for example : "Open ...").

A dialogue box is located in the work area. Try accessing "Open ..." in the "File" menu. Once a dialogue box appears, you must fill it in before going on. Sometimes you will type in text. Other times you will simply select an option within the dialogue box.



The window contains a number of items. Certain items can be highlighted. This indicates that an action with the keyboard will be done on that highlighted item.

When the user has only a keyboard, he can select the item that has to be highlighted by using the <TAB> key. This will un-highlight an item and highlight another item. When an item is highlighted, a cursor in the item will indicate this. Pressing <SHIFT> and <TAB> together will move the highlight in the other direction.

Certain items can be marked. An item can be marked or un-marked with the mouse, or with the keyboard when it is highlighted.

Normally (there are some exceptions that will be explained case by case) the command is executed when <ENTER> is pressed, independent of the item that is highlighted. The normal way to give a command is by first selecting it in the drop-down menu, giving extra information in the dialogue box and then pressing <ENTER>.

The radio button

- Selection A
- Selection B
- Selection C

When the user has to select one choice from different possible choices (like selecting a baudrate) radio buttons are used. The different choices are always organized vertically. One of these choices is always selected. This is marked with a square between the rounded brackets.

Selection of one of the choices can be done with :

- a mouse by pointing on the item and giving a single click. The previously marked item will be unmarked and the pointed item will be marked.

- the keyboard. The user has to highlight the item he wants with the <TAB> key and :
 - * press the spacebar to mark or unmark
 - or
 - * use the up and down keys to scroll through the different choices.

The check box

[] Option

[X] Option

The check box is used to switch something ON or OFF. The check box is displayed with square brackets. It is "on" when a "X" appears between these brackets. When it is "off" there is nothing between them. The option can be switched using :

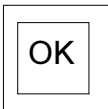
- a mouse by pointing to the item and clicking the mouse button.
- a keyboard, this is done by first highlighting the item with the <TAB> key and then pressing the spacebar.

The command button

The command button indicates what will be carried out when :

- clicking the mouse pointer on the command button.
- the button is marked and <ENTER> is pressed.

The command button is marked when the item is double framed. It is not marked when it is single framed.

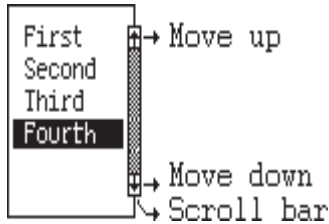


Test

The text box

When the user has to type information, this is done with a text box. The text you type appears to the left of the insertion point, the cursor. The text you type is inserted.

The lister



A lister contains a number of selectable names (such as the different file names in a directory). When a lister is highlighted, one of these names is reversed.

* In the case of keyboard access another name can be reversed by using the up and down arrow keys (in the case of a vertical lister. In the case of a horizontal lister, the left and right arrow keys must be used).

If there are more names available in the lister than can be displayed, these names will become visible when using the arrow keys at the edges of the lister. Using <PgUp> and <PgDn> will make the lister jump with the number of names available in the lister (<ctrl>+<PgUp> and <ctrl>+<PgDn> for a horizontal lister).

* In the case of mouse access, you can drag in the lister with the mouse. You can also use the scroll bar. When you click in the dotted area, the lister will display the next or the previous "page".

In the dotted area, a square is "reversed". This indicates the



relative position of what is displayed on the screen in the complete lister. Pointing with the mouse in that reversed square, dragging that square to another place in the scroll bar and releasing the mouse button immediately display the content of the lister in that area (relative to the scroll bar) on the screen. When you hold down the mouse button while pointing in the “move up” or “move down” area, the contents of the lister will be scrolled.

What will happen when pressing space bar or <ENTER> will be explained separately for every case .

CHAPTER 5 SETTING UP THE COMMUNICATION

There are two aspects in setting up the communication :

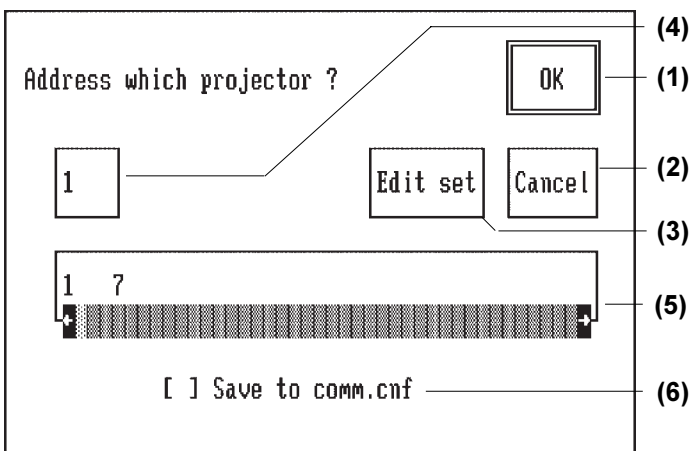
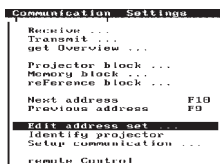
- * The definition of a set of projectors (addresses of projectors) you want to communicate with.

The 'Set of addresses' should be edited so that every projector connected to the PC has its own address in the set. This allows the user to select with which projector he wants to communicate with. This set of address is also used in Common Access actions (see chapter 12)

- * Selecting the communication port and the baudrate you want to work with.

Defining the set of addresses

The definition of this set is done using “Edit address set ...” in the “Communication” menu. By selecting that command, the following dialogue box appears.



This dialogue box is the first possibility to change the address for the communication you are working on.

If command button 'OK' (1) is marked, the action will be changing the address when <ENTER> is pressed.

If 'Cancel' (2) is marked, nothing will happen.

When 'Edit set' (3) is marked, pressing <ENTER> will give you a new dialogue box where the editing of the address set happens. This will be explained in greater detail in a later paragraph.

You can use the text box (4), to select a new address. Type in the new address. Take care, if you type in a number which is not in the "address set" (the address set is displayed in the lister (5)), this new entered address will be accepted.

This allows you to address a new projector without first editing the address set.

Another way to select a single address in this dialogue box is using the lister (5).

A single click (or space bar) on one of the addresses displays that address in the text box (4). If <ENTER> is pressed at that moment (or a double click) the dialogue box will disappear, and the communication address will be changed. This is visible in the info area (see next chapter). If you double click (or press <ENTER>) directly on an address in the lister, the communication address will be changed immediately and the dialogue box disappears.



Address changing is an action that often has to be done frequently. There are two other ways to change the address :

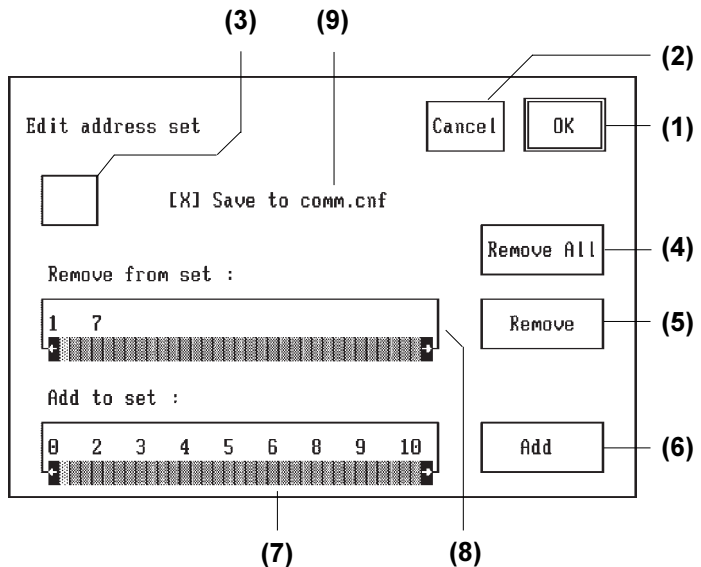
- Using "Next address F10" and "Previous address F9" in the "Communication" menu.
- Pressing F9 or pressing F10 at any moment (the

only exception is while a menu is dropped down).
F9 changes the address to the previous one in the set, F10 to the next one.

There is still a third way, using the simulated remote control on the PC, see chapter 10.

The information concerning the address set is stored in a separate file : comm.cnf. When check box (6) is "on", the new address will be saved in comm.cnf file as the new start up address for the Projector Control Software.

When <ENTER> is pressed while 'Edit set' (3) is marked (or a double click in (3)), the following dialogue box appears :



The address set is the collection of addresses you can work with. Using the keys F9 and F10 (or those commands in the communication menu) lets you pass through this set. Using this dialogue box, you can edit this set.

There are two major things you can do: adding and removing addresses from the set.

If command button 'OK' (1) is marked, pressing <ENTER> or clicking the mouse button will exit this dialogue box and the changes will be stored.

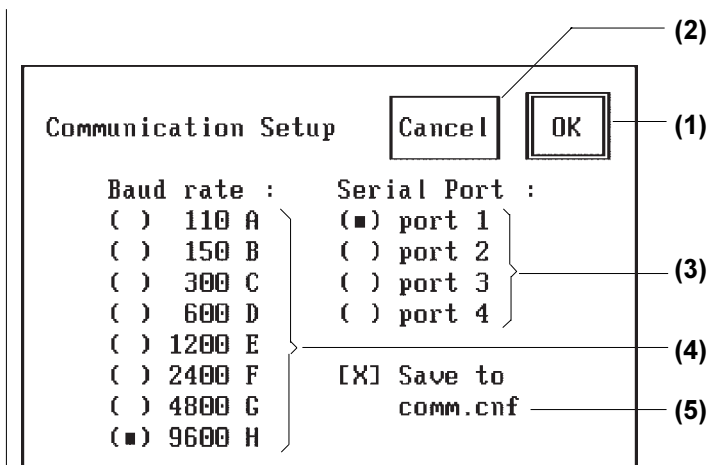
If 'Cancel' (2) is marked, the changes will be lost.

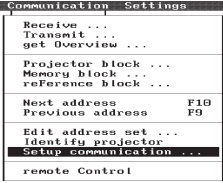
When 'Remove' (5) is marked, the address in the text box (3) will be removed from the set when <ENTER> is pressed.

When 'Add' (6) is marked, the address in the text box will be added to the set (the same happens with a double click in (5) or (6)). Regardless of which item is marked, the address in text box (3) is also added or removed when <Alt>+<A> or <Alt>+<R> is pressed.

The listers (7) and (8) can also be used to remove or add addresses to the set. Therefore, select the respective lister and select an address. Press <ENTER>, to carry out the command (the same will happen when double clicking on an address in the lister (7) and (8)).

Set up of communication port and baudrate





This dialogue box appears when “Setup communication ...” in the “Communication” menu is activated.

The baudrate and serial port used at the moment are marked in (3) and (4).

Command buttons (1) and (2) have their normal function :

When (1) is marked, pressing <ENTER> or giving a double click will change baudrate and serial port. If (2) is marked, nothing will change.

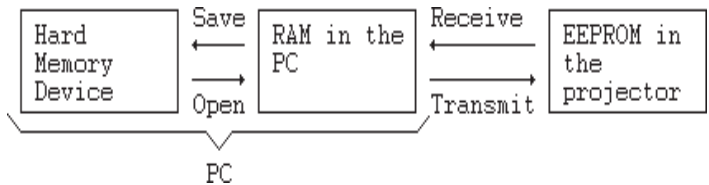
The selected baudrate in this dialogue box has to be the same as the baudrate of all the projectors connected to the PC. Baudrate set up of the projector(s) is done by setting DIP switches (see the installation manual of the projector).

Baudrate and serial port can be changed in (3) and (4). It is advised to try to work on the highest baudrate (9600). On lower rates, the communication becomes slower.

If check box (5) is “on”, the changes will be saved in the comm.cnf file. If so, next time the Control 800 software will start automatically with the saved baudrate and serial port.

CHAPTER 6 APPLICATION WINDOW

The application window gives you information concerning the status of the PC. There are different possibilities where the data can be stored :



The hard memory device can be :

- a floppy disk
- a hard disk of a PC.

On hard memory devices, the data is stored in the form of files. Several items can be stored in the RAM of the PC. The settings stored in one block or the settings of all the blocks of a projector, a reference settings block and an overview of settings can be stored in the RAM.

The info fields

Pr Addr:	Pr type:	Pr blk:	RAM blk:	Ref blk:	RAM:	File name:
1	<unknown>	<undef>	<undef>	<undef>	<empty>	<untitled>

- Projector type
- Projector block
- RAM block
- Reference block
- RAM status
- File name

Proj. Address : indicates the address of the projector which is communicating with the PC. How this can be accessed will be explained later on.

Projector Type : when the RAM is not empty, this field indicates from which type of projector the contents of the RAM is.

Projector Block : indicates which block in the projector is selected. This is used to select one of the blocks in the projector that settings will be received from, or transmitted to.

RAM Block : indicates which block in the RAM of the PC is selected. This can be used when the RAM contains all the blocks of a projector. Then it is possible to select one of those blocks. This can be used to look at the contents of that block or to transmit that block to the projector.

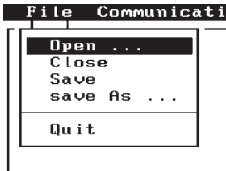
Reference Block : indicates if a reference block is selected or not. That reference block can be used to compare settings of another block. If there is a reference block selected, a "X" appears in that field, otherwise there is nothing in it.

RAM status : indicates in which state the RAM of the PC is. If it is <empty> then the RAM is ready to receive data. If it is <one_block> the RAM contains the settings of one block. If it is <all_blocks> the RAM contains the settings of all the blocks of a projector.

File name is <untitled> if there is no data in the RAM coming from a hard memory device. If the data in the RAM comes from a hard memory device, this field displays the file name of the data.

CHAPTER 7 TRANSFERRING BLOCKS

Opening a file



With the "Open ..." command from the menu "File", data from a file is loaded into the RAM.

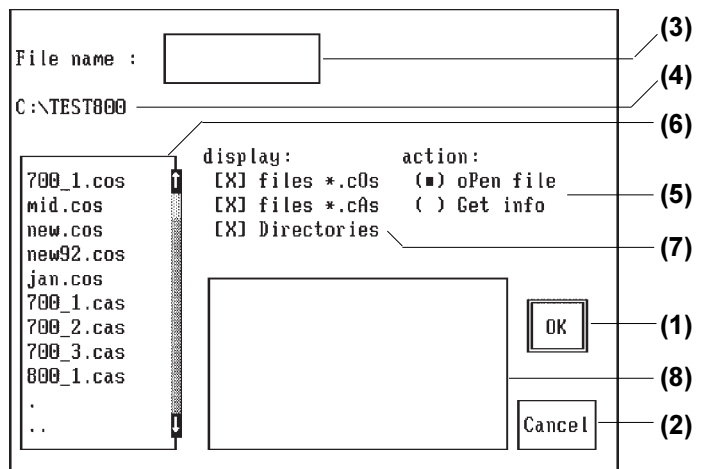
There are two kinds of files that can be used: files with one block of settings and files with all the blocks of settings of a projector.

A file which contains the settings of one block always has the COS (Copy One Setting) extension.

A file with all the settings of a projector has always the CAS (Copy of All Settings) extension.

It is impossible to open a file with other extensions or to open files with correct extensions, but with the wrong length.

The following dialogue box appears after starting the "Open ..." command.



If command button “OK” (1) is marked, the required action will take place.

If command button “Cancel” (2) is marked, no action will take place when <ENTER> is pressed.

In the text box (3) you can type the file name to which the required action has to take place.

Another way to specify a file name is using the lister (6). When the space bar is pressed or a single click is used on one of the items in lower case in the lister, then that item is placed in the text box (3) and (3) is highlighted. If the <ENTER> key or a double click is used, the required action is directly executed on the pointed item.

There are three kinds of items available in the lister :

- those in lower case are file names,
- those surrounded by square brackets indicate another drive ([--A--] stands for drive A...)
- those in upper case are sub-directories.

When you double click (or use the <ENTER>) on sub-directories, the directory is changed (e.g. you are in the directory C:\ and double click on BARCO. Then you will be in C:\BARCO).

The directory you are working in is displayed in item (4), path name.

Using “..” takes you back one level in the directory tree (e.g. a double clicking on “..” in C:\BARCO\SETTING takes you back to C:\BARCO).

Using “.” doesn’t have any consequence.

You can select what has to be displayed in the lister using the three check boxes in (7).

If Files *.cOs is “on”, the lister will display the files with settings of one block.

If Files *.cAs is “on”, the lister will display the files with the settings of all the blocks of a projector.

If Directories is “on”, the lister will display the sub-directories in the directory.

There are two actions possible on a file name. An action is selected using the radio buttons in (5).

- When "**oPen** file" is selected, the action will be : to open the file and place the contents in the RAM.

- Get info gives you an extra feature. When saving a file (see later), it is possible to add some extra information to the file (e.g. the date of saving, the type of projector, the installation specs, ...). When "Get info" is selected, the user will see this extra information in the info box (8).

Saving a file

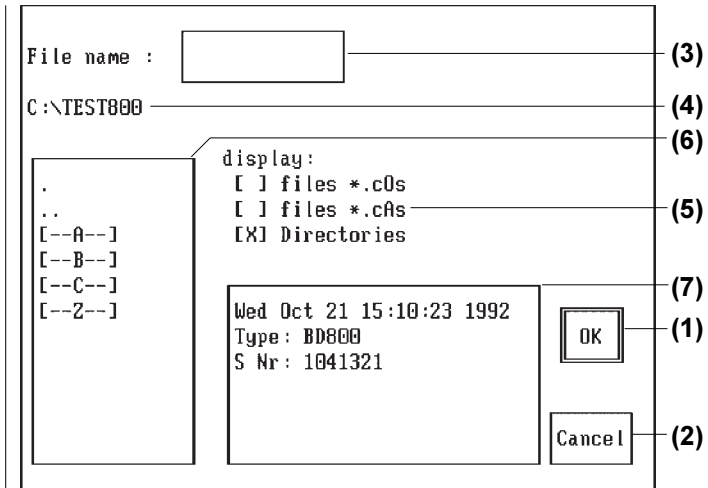


The contents in the RAM (one block, or all blocks) can be saved in a file.

The command “Save” and “save As ...” can only be activated when there are settings in the RAM of the PC.

“Save” directly copies the contents of the RAM in the file specified in the info area. If there is no file name (“<untitled>”, meaning that the contents of the RAM are coming from a projector) specified, the user gets the same dialogue box as with “save As ...”.

When “save As ...” is activated, this dialogue box appears:



For items (1) ... (6) : see the explanation in 'Opening a file'.

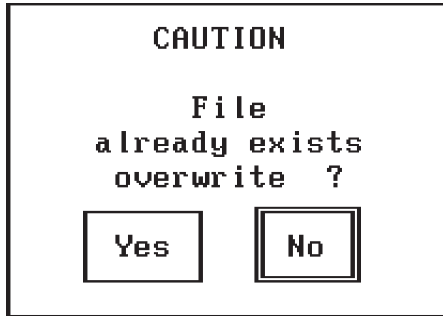
Item (7), the info box, may now be edited. When it is highlighted, you can type comments in this box. The info box has limited editing features. Most editing operations can be achieved by using the arrow keys.

If this area is not initialised, an initialised comment area appears (when you open a file which already has information in the comment area) some information is automatically placed in the comment area.

The date and the time; and if the RAM content comes from a projector (receive active) the type and the serial number of the projector are listed. For example :

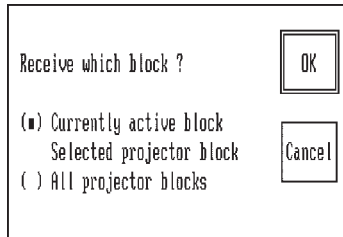
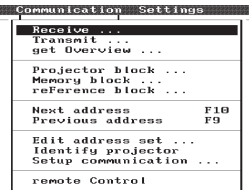
```
Thu Jul 30 10:00:05 1992
Type : BG800
S Nr. : 1039723
```

When the file name you specify already exists, a warning appears to ask whether or not to overwrite this file.



Receiving settings from a projector

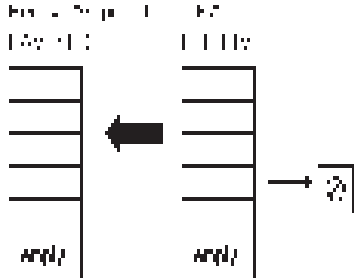
When "Receive ..." in the "Communication" menu is started. The following dialogue box appears on the screen:



Receiving data from the projector means that data contained in one or all blocks in the projector's EEPROM is transmitted to the RAM in the PC.

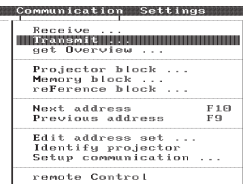
There are three possible ways of receiving settings from a projector.

c) Receive all the settings available in the projector. When this command is executed all the closed blocks will be transmitted from the projector to RAM of the PC. While receiving, a box appears on the screen of the PC which indicates which blocks are being received.

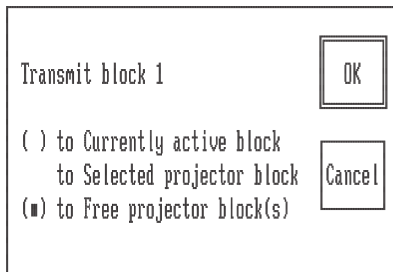


After receiving, the info area will display the type of the contents of the RAM (one block or all blocks).

Transmitting settings to a projector

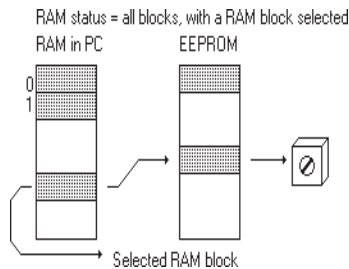
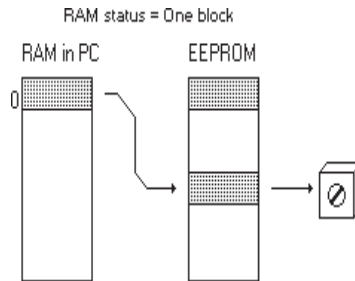


Transmitted data goes from the RAM in the PC to the EEPROM in the projector. Selecting “Transmit ...” in the “Communication” menu results in the following dialogue box:



There are three different ways of transporting data from the RAM to the projector.

a) Transporting one block from RAM to the projector and overwriting the current active block in the EEPROM of the projector. This is possible if the RAM status is “one block”, or if it is “all blocks” and there is a block selected in the RAM. This can be done using “Memory block ...” in the menu “Communication”, see chapter 8. The selection is indicated in the info area under 'RAM blk'. When the selection "to currently active block" is executed, both of the above situations will result in the block from the RAM in the PC overwriting the block in the projector's EEPROM.



b) Transporting one block from RAM to the projector and overwriting another block other than the current active one. Provided projector block is selected using "Projector block ..." in "Communication" (see chapter 8) "to Selected projector block" in the dialogue box above may be selected.

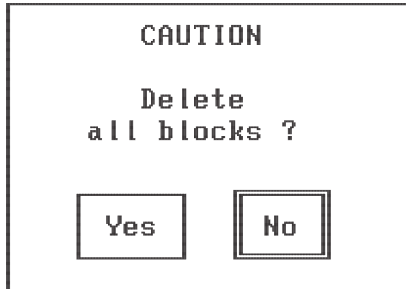
c) Transporting blocks from RAM to free blocks in the projector or to all blocks in the projector :

When data is present in RAM (coming from a file or projector), there exists not only the data of the settings of the potentiometers but also the headers (source type, horizontal and vertical frequency, installation). This header data is not used during the first 2 types of transmissions.

When using "to Free projector block(s)", the header(s) is also transmitted. When one block is transmitted (RAM status is "one block" or RAM status is "all blocks" with a RAM block selection), this results in the creation of a new block in the EEPROM if this header does not exist in the EEPROM. If there is already a block in the EEPROM with the same header as the one you would like to transmit, the system asks whether to overwrite or not.

When the RAM status is "all blocks" and there is no RAM block selected, all the data in the EEPROM of the projector will be deleted before the transmission of the blocks in the RAM starts.

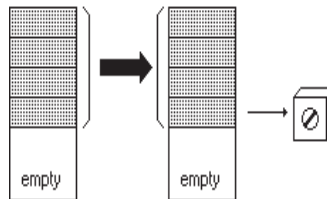
But the system asks : Delete all blocks? If "no" is selected, no blocks are deleted and the transmission is aborted.



RAM status = All blocks, NO RAM block selected

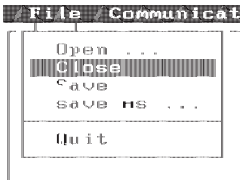
RAM in PC

EEPROM



PREVIOUS CONTENT EEPROM IS DELETED

Closing the RAM



When there is data in the RAM (RAM status is not "<empty>"), no receive or open actions of the PC can be done. It is not possible to overwrite the contents of the RAM. The RAM will be 'emptied' with "Close" in the "File" menu. After accessing this command, the RAM status is <empty> and new data can be put into the RAM.

CHAPTER 8 BLOCK MANIPULATIONS



With “get Overview ...” in the “communication” menu, it is possible to get an overview of the different blocks that are closed in the projector..

In the “Communication” menu, there are also three ways of selecting a block.

- Selecting a block in the projector : “Projector block ...”.
- Selecting a block in the RAM of the PC: “Memory block ...”.
- Selecting a block from the RAM of the PC to use it as a reference block, this is done with “reFereNce block ...”.

Overview of the blocks in the projector

When “get Overview ...” is activated, the PC will ask the projector how its EEPROM is organized. After the projector has answered, the following dialogue box appears on the screen:

Src	Type	Fh(kHz)	Fv(Hz)	Config	Block
1	Video	15.7	60	Front/Table	4
1	Video	15.6	50	Front/Table	5
4	RGsB	78.4	70	Front/Table	1
4	RGsB	90.9	50	Front/Table	2
Int	- *	15.6	50	Front/Table	3
Free	-	-	-	-	6
Free	-	-	-	-	7
Free	-	-	-	-	8

This is a dialogue box which does not require any further information from the user. Press <ENTER> or the space bar when “OK” is marked (or click in the “OK” field). This dialogue box disappears without any extra action.

The dialogue box in the example tells the user that the EEPROM has three closed blocks.

e.g. : Block 1 is working on source number 1; source type : Video, horizontal frequency of 15.6 kHz, vertical frequency of 50 Hz and is set for a Front/Table configuration (installation).

Using the scroll bar is necessary to get a complete overview when there are more than eight blocks closed in the EEPROM.

Selecting and deleting blocks in the projector



After selecting “Projector block ...” in the "communication" menu, the following dialogue box appears :

Select projector block

Cancel OK

Src	Type	Fh(kHz)	Fv(Hz)	Config	Block
1	Video	15.7	60	Front/Table	4
1	Video	15.6	50	Front/Table	5
4	RGBs	78.4	70	Front/Table	1
4	RGBs	90.9	50	Front/Table	2
Int	- *	15.6	50	Front/Table	3
Free	-	-	-	-	6
Free	-	-	-	-	7
Free	-	-	-	-	8

Action :

Select

Delete

Undelete

All

This dialogue box permits the user to carry out totally different actions: selecting and deleting a block in the projector. Enter your choice with the radio buttons in (5).

If a block is selected, then this selection will be marked in the info area under “Pr blk:”. This can be used when data transmissions have to be done to and from a specific block in the projector (see chapter 7).

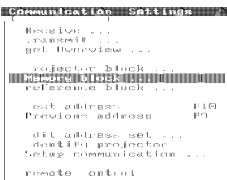
If “Select “ is marked, and ‘All’ (4) is also marked, no projector block will be selected.

Deleting a block means clearing a block in the EEPROM of the projector (block free).

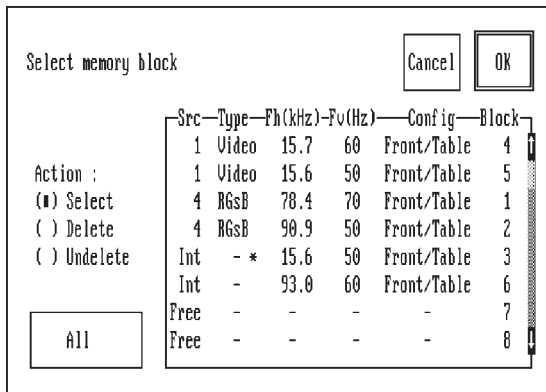
It can be used for a new adjustment. However, a confirmation will always be asked for after your request to delete a block.

When “Delete” is selected and ‘All’ (4) is marked, all the blocks in the projector will be deleted. Here, also a confirmation will be asked for.

Selecting and deleting blocks in the RAM



After selecting “Memory block ...” in the “Communication” menu , the following dialogue box appears :

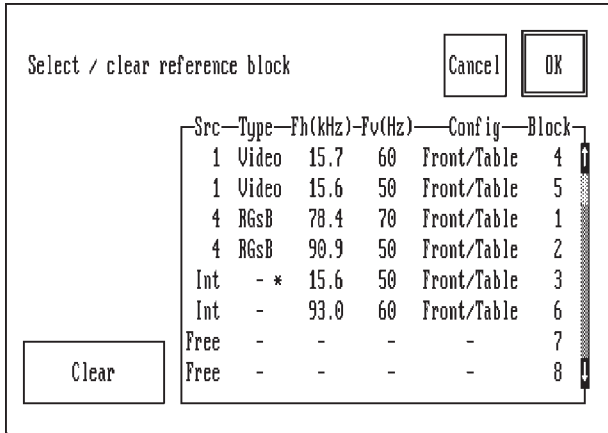


This is almost the same as in 'Selecting and deleting blocks in the projector'. The only difference is the title (select memory block). All the actions are the same here. The difference is, they don't take place on blocks in the EEPROM of the projector, but on blocks in the RAM of the PC.

Selecting a reference block



A reference block is used to compare the values of settings of two blocks (see chapter 11). To be able to compare, it is necessary to have a reference. The reference is selected with “reReference block ...” in “Communication” menu. This is only accessible if there are blocks in the RAM of the PC. After selecting this item we have:



This dialogue box gives an overview of the contents of the RAM (so if you want to select a reference block, it should first be loaded in RAM). If you selected the ‘reReference block’ with RAM status “one block”, there would only be one line in the lister. Press <ENTER> (or double click) when a line in the lister is marked. That will select the marked block as reference block.

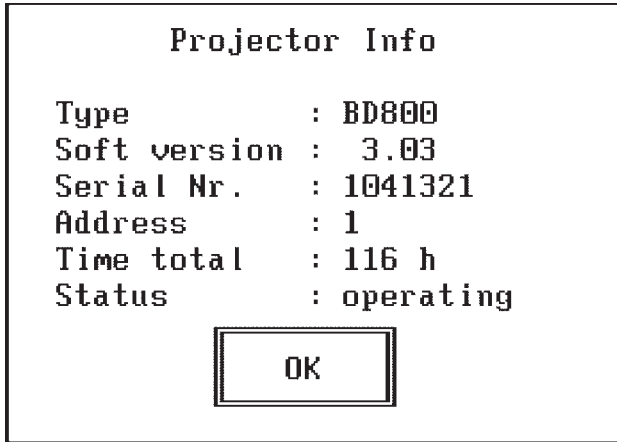
The “Clear” command key will clear the previously selected reference block.

If a reference block is selected, a “X” will be marked in the info box “Ref blk”. Otherwise, nothing is indicated in that info box.

CHAPTER 9 PROJECTOR STATUS INFORMATION



Selecting the item “Identify projector” gives you the following dialogue box on the screen :



It gives similar information as the start up screen of the projector. In addition, the operational status of the projector is displayed. This status can be “operating”, “paused” or “stand by”.

Using a mouse, pointing on a field in (2) representing a key on the RCU and pressing the mouse button is the same as pressing the corresponding key on the RCU800.

With a mouse, it is possible to change the working address. First click in the field "Adr" in (2) and then click on one of the numeric keys in (2). You can set the communication address between 0 and 9.

An important difference is the address 0. On the simulated PC display of the RCU800, only a projector with address 0 will respond to commands issued from the PC. However, when the projector's actual RCU800 is set for address 0, all projectors regardless of address will respond.

If only a keyboard is available, the left part (1) of the simulated RCU 800 indicates which keys are required to effect the desired action. The arrow keys and the numeric keys on the keyboard have the same function as those on the RCU800. To access a picture control (analog image control) (Contrast, brightness, color, tint and sharpness) the "+" and "-" keys on the keyboard have to be used. Which picture control you will access is displayed in (3). You can select another control using the <TAB> (or shift + <TAB>) key. This will display the different picture controls.

CHAPTER 11 VIEW, COMPARE AND DIRECT ACCESS SETTINGS

This pull down menu will display a number of items depending on the projector type and on the configuration of the projector's RAM content. However "Common access" and "Print" will always displayed.

The items above "Common access" and "Print" all represent a certain kind of adjustments.

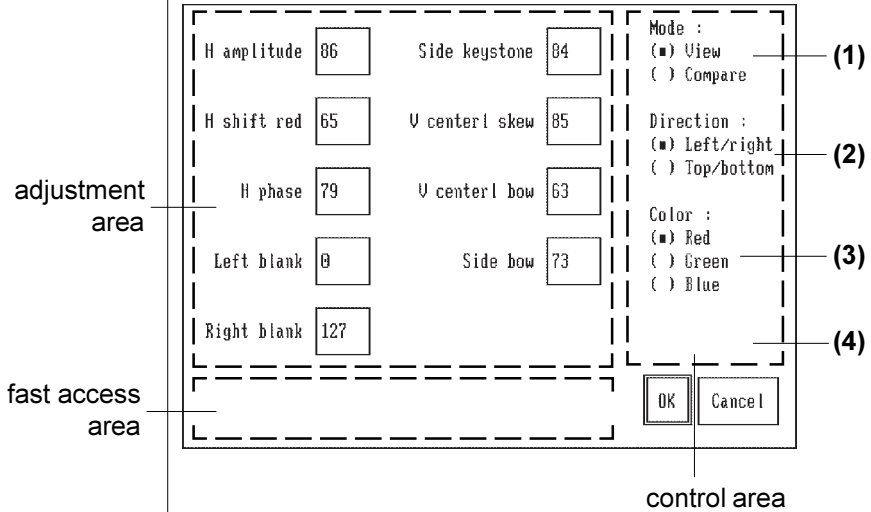
These adjustments could be :

- Picture
- Geometry
- Convergence
- Color..

The contents of the dialogue boxes appearing after selecting one of these adjustments also depends on the projector type and the configuration.

To explain the functionality of these dialogue boxes, we select "Geometry" as an example and that for a BARCO-DATA 800.

The following image (or similar) will be displayed after selecting "Geometry".



Three different areas can be distinguished.

- Control area
- Fast access area
- Adjustment area

Control area

In this area, the functionality and the contents of the dialogue box can be controlled. (Depending on the selected type, a number of items are available)

Four different items can be controlled.

a) Action (Mode)

This part of the control area will only be displayed when previously a reference block is defined (see chapter 8).

When "View" is selected, the values of the adjustments are displayed beside the adjustment names in the adjustment area. (This will be the same as without a reference block)

When "Compare" is selected, the numeric fields list the difference between the values of the selected block and the reference block :

selected block values - reference block values

b) Direction

The number of settings exceeds the available space in the dialogue box, e.g. top/bottom settings and left/right settings. Notice that the dialogue box contains the left/right settings of the geometry.

To select the "top/bottom" settings use the radio buttons under "Direction". The following dialogue box will appear.

c) Color

V amplitude	<input type="text" value="41"/>	Top keyst red	<input type="text" value="44"/>	Mode :
				<input checked="" type="radio"/> View
				<input type="radio"/> Compare
V shift red	<input type="text" value="65"/>	Bottom keyst red	<input type="text" value="46"/>	Direction :
				<input type="radio"/> Left/right
				<input checked="" type="radio"/> Top/bottom
V linearity	<input type="text" value="53"/>	H center l red	<input type="text" value="94"/>	Color :
				<input checked="" type="radio"/> Red
Top blanking	<input type="text" value="127"/>	Top bow red	<input type="text" value="68"/>	<input type="radio"/> Green
				<input type="radio"/> Blue
Bottom blank	<input type="text" value="0"/>	Bottom bow red	<input type="text" value="68"/>	
				<input type="button" value="OK"/>
				<input type="button" value="Cancel"/>

Some settings have different values for Red, Green and Blue. The values of these settings may be displayed by selecting the appropriate color using the radio buttons under "Color".

d) Direct access

If the switch box "Direct access" is selected you have the possibility to directly access the settings in the potentiometers of the projector, and in the EEPROM.

"Direct Access" is not accessible when a reference block is selected, because of that moment, the values in the adjustment area do not indicate a value in a projector or file, but the difference with the values in the reference block.

To use the "Direct access" feature to change a particular setting, use the mouse or <TAB> key to highlight the value of the setting you want to change, use the back space key to clear this value, type in a new value and press <ENTER>. This will change the value for the setting in the projector.


This will also result in a new value in the RAM of the PC when you exit this dialogue box.

However, there is an alternative way available to change the settings in the PC (and in the RAM of the projector). When an item is highlighted, press ENTER without changing the value of the setting, or select the item with the mouse and double click on the setting. The following box appears in the Fast Access area.




Moving the mouse cursor on one of the items in this box and holding the mouse button down results in a change of the selected setting (the setting which is selected will be displayed with a double box in the adjustment area).


All the items in the box can also be accessed using the keyboard :

 or F2

Modify the selected setting to its minimum value.

 or F3


Decrease the value of the selected setting fast.

 or F4


Decrease the value of the selected setting slowly.

 or F5


Modify the value of the selected setting to its average value.

 or F6

Increase the value of the selected setting slowly.

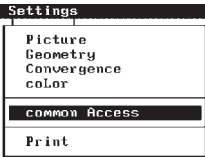
 or F7

Increase the value of the selected setting fast.

 or F8

Modify the value of the selected setting to its maximum value.

CHAPTER 12 COMMON ACCESS

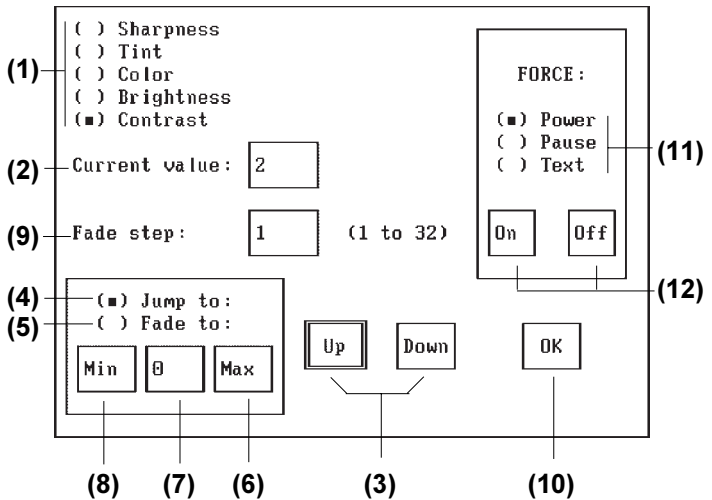


Using “Common access” in the “Settings” menu, it is possible to access a number of projectors “simultaneously”. The projectors which are addressed are all the projectors defined in the address set (see chapter 5, Defining the set of addresses).

It is very important that for every address in the address set there is a projector with that address connected to the PC and that it is switched on (standby is not sufficient, except when you want to power on all the projectors).

The projectors are not really accessed simultaneously. They are accessed one by one. But as this is going reasonably fast, the user gets the impression that everything happens simultaneously.

Selecting the command brings the following dialogue box on the screen :



Using the radio buttons of the analog image controls (1), you select which adjustment you want to access .

Test box (2) will constantly give you the current value of the selected adjustment. Before the adjustment is accessed, the projectors in the set can have different values. At that moment, the value in test box (2) will be that of the projector indicated in the left corner of the info field. (Proj. Address).

Using command buttons (3) will increment (Up) or decrement (Down) the value of the selected adjustment with one step.

Depending on the selection of (4) "Jump" or (5) "Fade", the adjustment will be immediately adapted to the new desired value (with Jump) or a gradual transition will be made from the current value to the new value (with Fade). Text box (9), fade step, determines the speed of this transition. In fact, fade step is the amount of change used with each step in the fade action. A higher value for fade step results in a faster fade action. Adapt this value by activating text box (9) and using <BACK-SPACE> and the numeric keyboard to change the value. The fade step value must be between 1 and 32. Try out different values for fade step to determine which value fits the best for your application.

Use (6) (Max), (7) or (8) (Min) to select to which value the adjustment has to jump or fade. If you use (7), you must fill in the desired value for the adjustment in (7) (use <BACK-SPACE> and the numeric keyboard) and press <ENTER> to activate the action.

You can also force the state of the projector to :

Power

Pause

Text

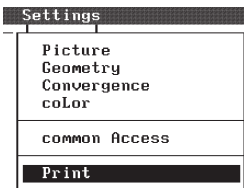
Select the desired state by using the radio buttons in the "Force" area.

The action is triggered using one of the buttons "ON" or "OFF" (12). For example, when you want to switch all the projectors off (when they are on), select "power" with the radio button and click on "OFF".
Use command button (10) "OK" to end the "common access" action.

CHAPTER 13 PRINTING SETTINGS

When there is a block selected in the RAM (RAM status is “one block” or “all blocks” with a RAM block selected) it is possible to get a print out of the values in this block. This is done using the DOS spooler.

If you are going to print data, it is necessary to install the DOS spooler first. Therefore, use the “PRINT” command in the DOS environment before starting up "projctrl".



Selecting “Print ...” in the “settings” menu will start the print out of the settings of the selected block.

If the DOS spooler is not installed, the next message appears on the screen.



It is strongly advised not to communicate with the projector while the spooler is active. Invalid data might be received or transmitted.

CHAPTER 14 SERIAL COMMUNICATION PC - PROJECTOR

Hardware

■ These connectors are labelled "RS232 In" and "RS232 Out".

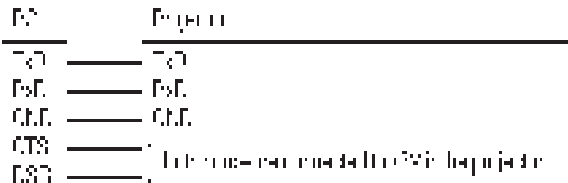
The left side "RS232 In" connector is a D9 pin female type and is used to connect the projector with a computer, or with a previous projector in a chain.

The right side "RS232 Out" connector is a D9 pin male type. This connector may be used to drive the next projector in a chain.

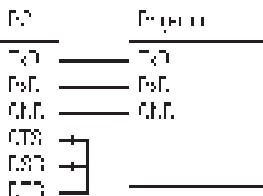
■ The computer (or the previous projector) is in the terminal mode, the (next) projector is in the modem mode. The pin out is the "standard" PC-AT convention, which is :

1:	CD	Carrier detect
2:	RxD	Received Data
3:	TxD	Transmitted Data
4:	DTR	Data Terminal Ready
5:	GND	Signal Ground
6:	DSR	Data Set Ready
7:	RTS	Request To Send
8:	CTS	Clear To Send
9:		Ring Indicator

■ To establish communication with the projector these connections have to be made:



An alternative is (and the absolute minimum of wires necessary):



The connection from DTR to CTS and DSR has to be made in the plug connected to the computer.

The disadvantage of this system is; the PC always thinks there is a projector connected to it, even if there is no projector, or if the projector is switched off.

■ The used buffers are standard RS232 devices.

Control signals :	Data bits :
OFF = -9V	1 = -9V
ON = +9V	0 = +9V

and they have the correct impedance.

RS232 protocol

■ Bytes are sent with :

- 8 bits
- No parity
- 1 stopbit

■ On the projector side, the user can choose between 8 baudrates for the 800, 1100, 1200 and 1600 series :

110, 150, 300, 600, 1200, 2400, 4800, 9600.

and between 2 baudrates for the 700 series :

1200 and 9600

Communication protocol

■ Using this software, it is possible to address up to 256 projectors from one computer. Due to the fact that this is normally not supported by RS232 type communications, special features have been incorporated into the projector.

As already indicated in chapter 3, each projector should have a unique address.

When transmitting data from the computer to the projector(s) the start of the transmission is indicated using the STX (02) byte. All the projectors in the chain are constantly checking if there is a STX byte on the serial line. After receiving STX, an address byte is transmitted by the computer. All the projectors compare this address byte with their own address. The projector which recognises his address will interpret the following bytes and do what is requested by the computer. The other projectors will restart checking for STX on the serial line.

If 02 appears in the data bytes following STX, the projectors which did not recognise their address will be confused. They might even interpret the following bytes in a wrong way, reacting unpredictably.

To avoid this, a protocol is used which avoids the appearance of 02 (STX) in the data bytes.

The protocol introduces an offset byte in the transferred bytes (ADR being the byte indicating the address of the projector for which the data is meant and DATi the data bytes) :

```

STX  ADR  DAT1 ... DATn
becomes :
STX  OFFS  ADRe  DAT1e ... DATne

```

ADRe, DAT1e ... DATne are bytes which are “encoded” in a way that none of them is equal to 02. Their relation with the original bytes is :

```

ADRe = ADR + OFFS
DATie = DATi + OFFS

```

Because the number of bytes used in a transmission is always smaller than 254 we are sure that we will always find a byte OFFS so that all the encoded bytes and OFFS are different from 02.

This is a possibility to find OFFS and Checksum :

```

#define STX 'x02'
unsigned char find_offacs (unsigned char *pstart_loc)
{
    /* find offset and check sum */
    /* pstart_loc : pointer to record to be scanned */

    int count;
    int check[256]; /* check[i] == TRUE means code 'i' occurs in record
*/
    unsigned checksum;

    checksum = 0; /* initialize checksum */
    for (count = 0; count <= 255; count++) /* init code checking array */
        check[count] = FALSE;
    for (count = 0; count < 6; count++) /* scan codes in record */
    {
        check[pstart_loc[count]] = TRUE; /* mark in checking array */
        checksum += pstart_loc[count]; /* build checksum value */
        checksum %= 256; /* keep least significant byte */
        check[checksum] = TRUE; /* mark in checking array */
        for (count = 1; check[count] == TRUE; count++);
        /* search checking array */
    }
    /* skip value 0 and continue as long as code 'count' is marked TRUE
*/
    pstart_loc[6] = (byte) checksum; /* store checksum in record
*/
    return ((unsigned char) (STX-count));
    /* offset=STX-not_occurring_code */
}

```

- There are two formats of data transfers :
 - a short one : called "record"
 - a long one : called "block"

The short format, record, consists of 7 bytes :

ADR address projector
 CMD Command
 DAT1 Data byte 1
 DAT2 Data byte 2
 DAT3 Data byte 3
 DAT4 Data byte 4
 CHKS Check sum

CMD is the command given to the projector with address ADR. DAT1-4 can contain additional information (explained later in this text), however, this information is not always used. It is advised to set all non used data bytes to 0 (zero). CHKS is :

$$(ADR + CMD + DAT1 + DAT2 + DAT3 + DAT4) \text{ MOD } 256$$

The transmission of the record on the serial line will be:

STX OFFS ADR_e CMD_e DAT1_e DAT2_e DAT3_e DAT4_e CHKS_e

- The long format, block, consists of a record of 9 bytes followed by either 208, 224 or 240 other data bytes plus their check sum.

Projector type	block length
800, 801, 1100, 1101, 1600, 500	208
701	224
808, 1208, 1209	240

The transmission will be :

STX OFFS ADR_e CMD_e DAT1_e DAT2_e DAT3_e DAT4_e CHKS_e
 D0_e D1_e ... D207_e CHKS_{Be}

with

$$Die = Di + OFFS$$

$$CHKSB_e = (CHKSb + OFFS) \text{ MOD } 256$$

$$CHKSb = (\text{SUM } (i = 0 \text{ to } 207) Di) \text{ MOD } 256$$

Handshake

■ Because only the signals RxD and TxD are used for the communication, there is no way to detect if there is a projector listening and (if there is one listening) if it receives the data correctly. Therefore, the communication works with an acknowledge protocol using the standard ASCII bytes ACK and NAK (06H and 15H). This protocol is only active for communication from computer to projector.

■ For communication from projector to computer there is no acknowledgement available. However there is only communication in this direction after a question is sent from the computer (the master) to the projector. It is very important that when the computer asks the projector for information that it be able to immediately receive the data from the projector. Otherwise it is possible that the projector sends the information to the computer before the computer is ready to receive it. In this case, the projector will not know that its data was not received, and at the same time the computer will be waiting to receive data that was already sent. After a "time out", the computer will think that there is no projector responding.

■ For the record format (short) the projector returns an ACK byte if it has received the data correctly or a NAK byte if the received data is not correct (NOTE : check sum is not an executable command). If there is no projector responding, then no byte is returned.

computer to projector :

| 06H | 15H |

projector to computer :

ACK or
NAK

■ For the block format (long) the projector returns an ACK (or NAK) after the first part (the record) and a second ACK (or NAK) after the second part.

computer to projector :

Record

290 Data Bytes

projector to computer :

ACK

ACK

How the projector answers

■ When the computer communicates with the projector, it is possible that the computer asks for data from the projector. The returned data can be a record or a block.

■ Suppose the computer asks for information to the projector and the projector returns the information in record format, look at the bytes which are transmitted on the RS232 bus :

record from computer to projector :

STX OFFS ADRP_e CMD_e Dat1_e Dat2_e Dat3_e Dat4_e CHKS_e

record from projector to computer :

ADRP CMD Dat1b Dat2b Dat3b Dat4b CHKSb

with :

ADRP = ADRPe - OFFS

CMD = CMDe - OFFS

The projector will always return its address and the received command to the computer.

computer to projector :

REC

projector to computer :

■ For a block return, the same thing happens. But the record is followed by the 209 bytes (208, 24 or 240 data bytes plus their check sum).

computer to projector :

REC

projector to computer :

The command codes

In Appendix A all the command codes for the communication are listed. Here we will discuss them more in detail.

ADDR

01H

This code is emitted by the infra red remote control when the address of the remote control is programmed. All projectors react by displaying the address they are working on. This is

not usable for RS232 communication, because in a chain of projectors only the projector with the correct address will display its address.

■ Transmitting the following codes is the same as using the keys of the remote control unit :

ENTER	07H
EXIT	08H
ADJUST	09H
TEXT	0DH
STDBY	0EH
PARK	0FH
NUM_0	10H
NUM_1	11H
NUM_2	12H
NUM_3	13H
NUM_4	14H
NUM_5	15H
NUM_6	16H
NUM_7	17H
NUM_8	18H
NUM_9	19H
CUR_UP	21H
CUR_DN	22H
CUR_RI	23H
CUR_LE	24H
CON_UP	28H
CON_DN	29H
BRI_UP	2AH
BRI_DN	2BH
SAT_UP	2CH
SAT_DN	2DH
HUE_UP	2EH
HUE_DN	2FH
SHA_UP	36H
SHA_DN	37H

■ There are a number of codes which could be implemented in the infra red remote control, but they are not at the moment. These are :

CUR_HOME	25H	Has no influence with current software in projector
TOGG_A	27H	toggles from picture adjustments (brightness...) to sound adjustments (volume...). These are be useful for remote control units made for retro projectors.
VOL_UP	38H	Volume control
VOL_DN	39H	
BAS_UP	3AH	Bass control
BAS_DN	3BH	
TRE_UP	3CH	Treble control
TRE_DN	3DH	
BAL_UP	3EH	Balance control
BAL_DN	3FH	
MONO	1DH	Toggle mono / stereo
EXPAND	1EH	Toggle normal / expand
MUTE	1FH	Mute of the sound
SEL_SOUND	40H	Force to picture
SEL_PICT	41H	Force to sound

■ This command asks the projector to return the currently selected source and attributes.

READ_SOURCE 4AH

Info sent : Dat1 = 0, Dat2 = 0, Dat3 = 0, Dat4 = 0

For 800, 1100, 1200 and 1600 series : The returned bytes hold the following information :

- Dat1 Horizontal period : $H_p = \text{Dat1} \times 250\text{ns}$
- Dat2 Source number
- Dat3 Source type and installation :

bits 0,1 = installation :

for 800,1100,1600	1200
0 = Rear/ Ceiling	0 = Front/Ceiling
1 = Front / Table	1 = Rear/Table
2 = Front/ Ceiling	2 = Rear/Ceiling
3 = Rear / Table	3 = Front/Table

bit 2 : set if HDTV

bits 4,5,6,7 :

0 = Video	8 = Forced video
1 = SVHS	9 = Forced SVHS
2 = TTL	A = Forced TTL
3 = RGsB	B = Forced RGsB
4 = RGBS	C = Forced RGBS
5 = Internal	

Dat4 Vertical frequency in Hz.

Remarks :

1) *The selected block is not closed.*

When the projector is working with a not closed block (copied or interpolated from other block(s)), also indicated on the controller unit inside the projector with the 'Block Match' LED, the most significant bit of the returned Source Number byte is set to 1.

e.g. When input 4 is selected, Dat2 will be :

block matched : 4

no block matched : 132 (=128 + 4)

2) *No coincidence.*

No coincidence for a selected source happens when the sync pulses are missing, the source is not switched on, ... The contents of the returned bytes to the PC depend on the soft version of the projector.

2.1) *Controller soft version V2.03 or earlier.*

- Text ON mode :

TEXT is switched ON and OFF using the 'text' key on the RCU800.

In text on mode, the projector displays 'Input no longer available, check' as a warning for the user.

After this, READ_SOURCE will return :

Dat2 = 127 (indicating internal pattern)

Dat3 : most sign nibble = 5 (indicating internal pattern)

The frequencies will be those of the warning message.

- Text OFF mode :

In this mode, all the parameters returned by the READ_SOURCE will not be update. They remain the same as before the no coincidence state. That can be : the previously selected source, or the source itself if it was in coincidence before going into no coincidence.

2.1 *Controller soft version V2.04 or higher.*

Without coincidence READ_SOURCE will return :

Dat 1 = 0, indicating the no coincidence state.

Dat 2 = requested source number (see also point 1)

Dat 3 = the source type and installation related to the requested source number.

Dat 4 = 0, indicating the no coincidence state.

For 700 series :

	V700	V701, D701
Hor. period	Dat1x362 ns	Dat1x300 ns
Vert. period	Dat2x185 µs	Dat2x154 µs
Dat 3 Source number		
Dat 4 Source type		
bits 0, 1	: installation	
	0 = Front/ceiling	
	1 = Rear/table	
	2 = Rear/ceiling	

3 = Front/table

bit 2 : set if block not closed

bits 3. 4. 5 : input selection

0 = Video

1 = S-Video

2 = RGB

3 = RGB3S

4 = Component Video

5 = reserved

6 = reserved

7 = internal

Dat1 = 0 for no coincidence

■ This command asks the projector to return the status in which it is working.

READ_STATUS 4BH

Information sent : Dat1=0, Dat2=0, Dat3=0, Dat4=0

Returned information is :

Dat 1 :

bit 7 : Fast / Slow 1 = Fast

bit 6 : Green convergence 1 = Installed
 installed

Dat2 : cursor position

Dat3 :

bit 3 : PC mode 1 = PC mode

bit 2 : Text on/off 1 = text on

bit 1 : Pause 1 = pause

bit 0 : Standby 1 = standby

bit 7 : if set,

following additional info is available :

Dat4	Projector type
0	800
1	801
2	1200
3	1100
4	1600
5	700
6	1208
7	1101
8	500
9	808
10	1209
11	701
12	RCVDS

- This function asks the projector's serial number.

READ_SERNR 4DH

It is returned in BCD format (Di):

Dat1 = D7D6

Dat2 = D5D4

Dat3 = D3D2

Dat4 = D1D0

The serial number = D6D5D4D3D2D1D0

D7 = FH, otherwise the serial number is not programmed yet.

- This command switches off the text which was first programmed using PLACE_TEXT

CONTROL_TEXT 4EH

With Dat1 = 00 the text which was previously placed using PLACE_TEXT is cleared.

Dat4 : timercount : 00 = forever
Dat4 x 250 msec. Limited to 7FH :
256 x 250ms = 64sec

In box mode 1 only one of the four places is available. It is impossible to display text in 2 or more place at the same moment. For box mode 2 and 3, the whole area can be accessed at the same moment.

The text to be displayed is transmitted to the projector with the 208 bytes following the record. The format used for the text is ASCII.

For box mode 2 (medium box) the text is transmitted with 2 times 180 bytes (used of the 208, the rest of the bytes has no meaning, but they have to be transmitted). For box mode 3, the text is transmitted with 3 blocks of 156 bytes. For these 2 modes it is very important that everything is transmitted, otherwise the area which was not transmitted will be undefined. For example, for box mode 3: first define area 1 with Dat2 = 1 and Dat3 = 0 (do not display yet), then define the second area (Dat2 = 2 and Dat3 = 0), and then define the third area with Dat2 = 3 and Dat3 = 1, displaying the whole screen at once.

With the 800 series of projectors, it is possible to display green text in a box on the screen. With future projectors, it will be possible to display other colors on the screen. The software is already adapted so that all these colors can be programmed. This is done using control bytes in the text string. The useful control bytes at this moment are:

8CH : start inserting text on green
8DH : stop insertion

Every line on the screen has to start with the control character 8CH and has to stop with 8DH. If there is a line or a part of a line which does not have to be inserted, this is easily done using 00H instead of the text bytes. For example for a small box:

- Using this command the projector transmits a block to the PC.

BLK_E2_PC 72H

Dat1 to Dat4 have to hold the necessary information as described in READ_SOURCE. Then the projector will return the block in his EEPROM with the corresponding header. If a not existing block is requested, no error information is returned. So take care.

A special case is used to get an overview of all blocks of the projector : (except "common" and "sigmator" blocks)

Dat1	Dat2	Dat3	Dat4	returned block
FF	FF	FF	FF	overview of blocks
FE	FF	FF	FF	sigmator block
EF	FF	FF	FF	common block

Then the configuration of the EEPROM is returned to the computer in the way described in appendix B.

- This function deletes a block in the EEPROM :

BLK_DEL 73H

Dat1 to Dat4 have to hold the header of the block as described in READ_SOURCE.

- This command puts the projector in "forced block mode".

FORCE_BLK 74H

(not available in the 700 series)

This commands allows the user to force the projector to work with a specific block in the EEPROM. Normally, everything is managed automatically by the software in the projector and the block is selected by looking at the selected source number, the horizontal and the vertical frequency and the installation (front, rear, table, ceiling). Using this command, the user can limit this automatic selection and force the projector to a block or to a subset of blocks. There are two data bytes relevant when using this command:

Dat1 : Source Number (from 0 to 100)
 Dat2 : Source Type : 80H = Video
 90H = SVHS
 A0H = TTL
 B0H = RGsB
 C0H = RGSB

Dat3 and Dat4 : meaningless

When not in the forced block mode, Source number in the header of a block in the EEPROM is related to the input selection :

Without RCVDS	With RCVDS
1 : Video	1 : Slot 1
2 : SVHS	2 : Slot 2
3 : TTL	3 : Slot 3
4 : RGsB	...
5 : RGSB	

In forced block mode, this relationship disappears. A block in the EEPROM intended to be used in forced block mode only holds information concerning the input selection of the projector with "source type". This "source type" also holds the information if the block is "normal" or "forced" (0H = Video normal, 8H = Video forced,...).

After putting the projector in forced block mode using the force_blk command, the projector will switch to the desired input selection (according to Dat2) and search a block with matching "source number" (according to Dat1), frequencies and installation. In this way the projector will work with a "subset" of blocks in the EEPROM (It is possible that there is only one block in this subset). These blocks in this subset all have the same "source number" and "source type" in their header. Which block is selected in the subset depends on the deflection frequencies and installation of the connected source. Using an RCVDS, the relation of the source number with the slot number disappears in the forced block mode. Therefore the user first has to select the required input slot (using NUM_x) before using force_blk with the correct type specification.

Let's look at an example. Suppose the EEPROM is configured in this way :

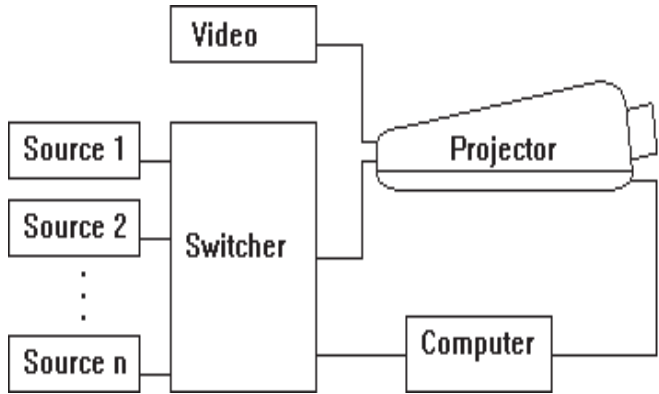
EEPROM

SNr	Type	Hper	Vfr	Ints	208 Data bytes						
1	0	255	50	Fr/T	...						
2	1	255	50	Fr/T	...						
3	2	182	60	Fr/T	...						
3	2	255	60	Fr/T	...						
4	3	150	50	Fr/T	...						
10	B	150	50	Fr/T	...	} Forced Block Mode					
10	B	100	70	Fr/T	...						
11	B	150	50	Fr/T	...						
⋮											
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>											
} Headers											

For source type Video, SVHS and TTL, everything is normal. However the EEPROM is organised so that RGSB also has blocks to work in forced block mode. When selecting "4", the fifth block in the EEPROM will be used (suppose the deflection frequencies and installation are correct). When the command FORCE_BLK is used with Source number = 10 and Source type = B (forced RGSB) the projector will select the sixth or seventh block, according to the deflection frequencies. With Source Number = 11, the eighth block will be selected. The projector returns to the normal mode when selecting another source using the RCU or the NUM_x command using the PC communication.

How can we create a block in the EEPROM intended for forced block usage? This is done by using the force_blk command with the desired source number and appropriate source type, connect the source to the projector and adjust the source. In this way the block is automatically created.

This forced block mode can be useful when using non-BARCO switchers. Suppose this configuration is used :



And the EEPROM looks like :

EEPROM

SNr Type Hper Vfr Ints 208 Data bytes

1	0	255	50	Fr/T	...
10	B	255	50	Fr/T	...
11	B	255	50	Fr/T	...
11	B	180	50	Fr/T	...
12	B	128	50	Fr/T	...
13	B	100	60	Fr/T	...
13	B	128	60	Fr/T	...
14	B	255	50	Fr/T	...

⋮

--	--	--	--	--	--

Headers

The computer in this installation drives the switcher and the projector. After selecting a new input port in the switcher, the

computer uses FORCE_BLK to select one of the special blocks in the EEPROM. When selecting source number 11 or 13, there are two blocks available for that source, for two different deflection frequencies.

■ You can write directly data in a potentiometer using

WRITE_POT 79H

Write_pot and read_pot gives direct access to the settings in the digital potentiometers and the EEPROM. With write_pot the data in the potentiometer is changed.

Dat1 : kind of setting

Dat2 : coordinates of setting

Dat3 : delta/value

Dat4 :

0 Dat3=delta (with storage in E²PROM)

1 Dat3=immediate value (with storage in E³PROM)

2 Dat3=delta (no storage in E²PROM)

3 Dat3=immediate value (no storage in E²PROM)

available from version

G1200 : V5.14

*801 : V5.12

V701 : V2.02

G1208 : V5.21

D701 : V1.02

If the value in the addressed potentiometer was V before the command, It is V+delta after the command. The corresponding contents of the EEPROM is also changed. See appendix C for coding of the potentiometers

■ You can read out of a potentiometer using

READ_POT 7AH

Read_pot reads the contents of the addressed EEPROM.

Dat1 and Dat2 are the same as with write_pot. The contents of the potentiometer is returned in Dat3.

■ This function copies the cut off and gain settings

E2-COPY 42H

For 701, 808, 1209, 801(V5.30)

Offers the possibility to copy the custom cut off and gain settings to one of the "fixed" color temperature settings (3200K, 6500K or 9300K)

Bytes sent :

Dat1 = destination

<u>destination</u>	<u>meaning</u>
02H	3200K cut offs
03H	3200K gains
04H	6500K cut offs
05H	6500K gains
06H	9300K cut offs
07H	9300K gains

Dat2 = source

<u>source</u>	<u>meaning</u>
00H	custom cut off settings
01H	custom gain settings

Dat3 = length = always 3

Dat4 = mode = always 0

READ_VERSION_ID 49H

Information sent : Dat1=0, Dat2=0, Dat3=0, Dat4=0

Information returned :

identification number :

$2^{24} \cdot \text{Dat4} + 2^{16} \cdot \text{Dat3} + 2^8 \cdot \text{Dat2} + 2^0 \cdot \text{Dat1}$

This identification number is unique and enables one to distinguish customized releases of the same version.

LOCK_IR 50H

available in 800 ,1100, 1200, 1600, 1208 from V4.00
 in 700, 701 from V1.12

Dat2, Dat3, Dat4 = 00

Dat1 = MASK :

value	allowed IR-command
01H	Stand by
02H	Pause
04H	Text
08H	Adjust keys (Adj, Enter, Exit, cursors)
10H	Numeric keys
20H	Picture control keys
40H	Sound control keys
80H	(reserved)

E.G. : To enable all IR commands : Dat1 = 7FH
 To enable all except stand by : Dat1 = 7EH

FORCE_TOGG 51H

Dat2, Dat3 = 00H

Dat1		Dat4	
		1	/ 0
00H	none	-	-
01H	pause	pause	operate
02H	mute	mute	mute off
03H	mono/stereo	mono	stereo
04H	normal/expanded	normal	expanded
05H	sound/pict	sound	pict
06H	text	on	off
07H	sync	fast	slow
08H	enhanced blue	on	off
09H	adjust	adj	operational
0AH	power	on	stand by

0BH	reserved for RCVDS	beeper on	beeper off
0CH	reserved	8 bl	1 bl

CONTROL_IRIS 62H

not for 700 series

data sent :

Dat2=Dat3=Dat4=0

Dat1	function
00H	start IRIS
01H	focus the lens
02H	learn the screen
03H	auto converge current block
04H	auto converge all blocks
FFH	stop action

REQ_SHAPE 78H

Dat2 BCD encoded coordinates
bits7-4 : Y coordinate
bits3-0 : X coordinate

Dat3	color	01H : R on
		02H : G on
		04H : B on
		+ combinations

Dat1

0H	internal convergence pattern
1H	horizontal line (full width) in center of zones with coordinate Y
2H	vertical line (full height) in center of zones with coordinate X
3H	reserved
4H	reserved
5H	horizontal and vertical line together, crossing in zone XY

Available in operational mode only :

- 6H place convergence contour around zone XY
- 7H erase shape; switch color as in Dat3
- 8H vert. bars; switch color as in Dat3; width in pixels in Dat4
- 9H hor. bars, switch color as in Dat3; height in lines in Dat4
- AH reserved

CHAPTER 15 HOW TO USE RESCTRL

Introduction

RESCTRL is a program that allows the user to control a number of projectors using a IBM PC or compatible. A table first has to be defined in which the user specifies which actions have to be taken on which projector and on which moment. After this table is specified, RESCTRL is started with this table. After a translation phase (translating the table in parameters more suited for the computer) RESCTRL goes resident (if no syntax errors are found in the table). This means that the user of the PC can still use the PC for any other application, RESCTRL is running in background. When the clock of the PC fits one of the moments defined in the list, the appropriate action is taken.

Preparations

The connections

See chapter 3 "PC-PROJECTOR CONNECTIONS", and chapter 14 "SERIAL COMMUNICATION PC-PROJECTOR" (first paragraph, hardware) of the manual "Projector Control Software". As indicated in the manual, up to 256 projectors of the 800, 1100, 1200, 1600 series and up to 16 projectors of the 700 series can be connected to one PC. However, when using more than one projector, be sure all of the projectors have a unique address and the baud rate is the same.

Set up of the serial communication port of the PC

The RS232 communication uses 8 bits No parity 1 stop bit

The projector can work with different baud rates :

for the 800, 1100, 1200, 1600 series :

110, 150, 300, 600, 1200, 2400, 4800, 9600

for the 700 series :

1200, 9600

See the user manual of the projector(s) to set up the baud rate of the projector(s).

Try to work on the highest baud rate usable in the installation, this will minimise the time requested for the communication.

The serial communication port of the PC can be set up correctly using the DOS command "mode". See your DOS manual for further details on that command.

As an example, communication port 1 is set to 9600 baud, no parity, 8 bits and 1 stop bit using :

```
mode com1:96,n,8,1
```

The set up of the communication port has to be done before starting RESCTRL. It is very important not to touch the settings of the communication port once RESCTRL is active.

Once all the projectors are connected to the PC, all the projectors are set at the same baud rate and the serial communication port is set according to the projectors, RESCTRL can be used. However, it is still necessary to specify the table which holds the different actions to be taken.

Defining the action table

What is specified in the action table

The action table holds a number of actions, up to a maximum of 128, which have to be defined by the user before starting RESCTRL. Each action consists of a number of specifications;

Date Specifies the date on which the action has to be taken. It is possible to omit this specification, then the action will be taken on each day.

Time Specifies the time of the date on which the action has to be taken.

Address Specifies the address of the projector for which the action is specified.

Command Specifies which action has to be taken

Data_1 Some commands request extra information. This specification holds one extra specification

Data_2 Some commands request more than one extra information. This specification holds the second extra specification.

How can we specify an action table

The action table is specified in a text file. This text file can be edited using an editor (such as “edlin” or, more user friendly, “edit” from DOS 5 and later).

Syntax of the action table

RESCTRL will only start and work correctly if the syntax of the action table is correct. This chapter describes the syntax to be used in the action table.

Comments

It is possible to add comments in the action table file. This allows the user to add extra information to the file. Comments are not regarded by RESCTRL, they will not result in any action. Comments are identified by a semicolon “;” on the first place of a line in the action table file.

For example :

```
;This file is created on 1 July 1992  
;by Marc Writefile
```

Different actions

Each action starts on a new line in the file. The maximum number of characters in each line is 80. The different specifications in the action have to be separated by one or more spaces or tabs.

All the actions have to be listed in the sequence they will be activated. It is not recommended to define two (or more) actions for the same moment.

For example :

```
;first and second action
12-8-92          12:00:00          1    FORCE
POWER           ON
12-8-92          12:00:30          1    PAUSE
```

Specification of a date

Each action line consists of a number of specifications (date, time, address, command, data_1, data_2 with data_1 and data_2 only required for certain commands). It is required that those specifications are in the correct sequence in each line. The "date" specification is the first one. The date consists of the day in the month, the month and the year. These three sub-specifications have to be separated by minus signs "-" or by a backslash "\". First sub-specification is the day in the month, second is the month and third is the year (take care of the correct sequence).

For example, 21 July 1992:

```
21\7\92          ...
21-7-92          ...
```

It is possible to omit the date specification. When you omit this specification, the requested actions will be taken every day (as long as RESCTRL is active), the action becomes "date-independent". When the date specification is omitted, an asterisk "*" has to be placed on the place of the date. If you work with date-independent actions mixed with date-dependent actions, the date-independent actions have to be listed first in the action table file. For the two action series (date-dependent and date-independent) the actions have to be listed in the sequence they will be activated.

For example, here we have two date-independent actions and three date-dependent actions:

```
;Date independent actions
*          12:00:00          ...
*          12:00:30          ...
;Date dependent actions 21-7-92          12:30:00
... 21-7-92          12:30:30          ...
22-7-92          12:30:30          ...
```

The first two actions in this example will be taken every day (thus also on 21 July 1992 and 22 July 1992), the last three only on the dates specified.

When you specify nothing on the place of the date (no explicit date and no “*”), the date will be take of the action specified in the previous line, of the previous action. However, the first action in the action table always requires a date specification.

For example, the example from above can also be written like this :

```
;Date independent actions
*          12:00:00          ...
12:00:30          ...
;Date dependent actions 21-7-92
12:30:00          ...
12:30:30          ...
22-7-92          12:30:30          ...
```

Specification of the time

The time consists of the hour, the minutes and the seconds. These three sub-specifications have to be separated by colon “:”. First sub-specification is the hour, second is the minutes and third is the seconds.

For example:

```
21-7-92          12:30:45          ...
21-7-92          12:31:00          ...
```

Specification of the address of the projector

After the time specification, the address of the projector for which the action is made has to be given. Be sure that the address specified corresponds with a projector existing in the installation.

For example:

21-7-92 12:30:45 2 ...

In this example, the projector with address 2 will be accessed.

Specification of the command

Appendix D lists the different commands and their extra information (if requested) which can be used.

A number of commands don't request any extra information (such as STDBY), others request one or two extra information items.

For example :

21-7-92	12:30:00	1
STDBY	12:30:30	2
CONTR_IRIS		
FOCUS	12:50:00	3
SET	CONTRAST	64

Starting up RESCTRL

Using RESCTRL

There are two possible ways to start RESCTRL:

RESCTRL <filename>

RESCTRL /COM:x <filename>

With the second command, the communication port the users wants to use for the connection of the PC to the projector(s) is explicitly mentioned (in "x"). When it is not mentioned (first command) RESCTRL takes communication port 1 as default.

<filename> holds the name of the file holding the action table.

For example, using communication port 2 and filename is "LIST.ACT":

```
RESCTRL /COM:2 LIST.ACT
```

Phases of RESCTRL

RESCTRL works with two phases:

Translation

In the translation phase, the actions listed in <filename> are decoded and translated in a format which is much more convenient for RESCTRL in resident state. In this translation phase, the syntax is checked. If a fault is discovered, the translation is stopped and a message is displayed on the screen.

For example, the contents of "LIST.ACT" is:

```
12-7-92          12:00:30          1  STNDBY
13-7-92          30:12:00          2   SET
CONTRAST         50
```

The second line has a fault (Hour "30" is invalid)

When starting RESCTRL with:

```
RESCTRL LIST.ACT
```

results in:

```
C:\BARCO>RESCTRL LIST.ACT BARCO Projection Sys-
tems 1992. RESCTRL V1.00
```

```
Line 2 : 30:12:00 invalid time, process terminated.
```

```
C:\BARCO>_
```

Other syntax faults result in similar messages.

If no faults are recognised, RESCTRL starts its resident part and gives the user the DOS prompt back. The result is:

```
C:\BARCO>RESCTRL LIST.ACT BARCO Projection Sys-
tems 1992. RESCTRL V1.00
```

```
File syntax OK. RESCTRL installed successfully
```

```
C:\BARCO>_
```

Resident part

Once RESCTRL has installed the resident part, the user has control of the PC. When the current moment meets one of the dates and times defined in the action list, the PC will take the action. RESCTRL stays resident in the memory of the until it is released.

To release RESCTRL use "RESCTRL -R", this results in:
C:\BARCO>RESCTRL -R BARCO Projection Systems 1992.
RESCTRL V1.00
RESCTRL removed.
C:\BARCO>_

APPENDIX A

Command codes (cat. 1)

For detailed explanation see chapter 14

ADDR	01H	emitted by RCU during address setting
ENTER	07H	
EXIT	08H	mode selection keys
ADJUST	09H	
TEXT	0DH	toggle
STDBY	0EH	toggle
PARK	0FH	toggle
NUM_0	10H	Numeric entry codes
NUM_1	11H	"
NUM_2	12H	"
NUM_3	13H	"
NUM_4	14H	"
NUM_5	15H	"
NUM_6	16H	"
NUM_7	17H	"
NUM_8	18H	"
NUM_9	19H	"
MONO	1DH	toggle mono / stereo \
EXPAND	1EH	toggle expand / normal Only on local command
MUTE	1FH	mute sound / of Retro projectors.
CUR_UP	21H	Cursor keys up
CUR_DN	22H	down
CUR_RI	23H	right
CUR_LE	24H	left
CUR_HOME	25H	
TOGG_A	27H	Toggle for sound / picture
CON_UP	28H	analog controls for picture
CON_DN	29H	
BRI_UP	2AH	
BRI_DN	2BH	
SAT_UP	2CH	Color saturation up

SAT_DN	2DH	Color saturation down
HUE_UP	2EH	Color tint up
HUE_DN	2FH	Color tint down
SHA_UP	36H	Color sharpness up
SHA_DN	37H	Color sharpness down
VOL_UP	38H	Analog sound controls volume up
VOL_DN	39H	" volume down
BAS_UP	3AH	" bass up
BAS_DN	3BH	" bass down
TRE_UP	3CH	" treble up
TRE_DN	3DH	" treble down
BAL_UP	3EH	" balance up
BAL_DN	3FH	" balance down

Command codes for PC (Cat 2)

SEL_SOUND	40H	forces sound/picture to sound
SEL_PIC	41H	forces sound/picture to picture
	42H	E2-copy
	49H	reads version identification
READ_SOURCE	4AH	reads currently selected source and attributes
READ_STATUS	4BH	reads current menu , cursor position, status byte
		status byte : bit 0 = Standby (1 = standby)
		bit 1 = Pause (1 = pause)
		bit 2 = Text mode (1 = scale on)
		bit 3 = PC mode
READ_VER	4CH	reads projector soft version
		byte 0 = alpha type identifier
		byte 1 = bcd version (proceeds decimal separator)
		byte 2 = bcd version (follows decimal separator)
READ_SERNR	4DH	read projector serial number
CONTR_TXT	4EH	control functions for on screen text
		d1 =function (0 = erase)

	50H	LOCK_IR
	51H	force the toggle to a position
READ_TIME	60H	read run time from projector EEPROM
PLACE_TXT	70H	write on screen text d1 = box type d2 = location d3 = function d4 = timing
BLK_PC_E2	71H	invokes block transfer from PC to EEPROM
BLK_E2_PC	72H	invokes block transfer from EEPROM to PC
BLK_DEL	73H	deletes a block in EEPROM
FORCE_BLK	74H	forces the use of a given block
REQ_SHAPE	78H	request shape
WRITE_POT	79H	write data to indicated potentiometer
READ_POT	7AH	read data to indicated potentiometer

APPENDIX B PLACE OF ADJUSTMENTS IN BLOCKS

General

for D701 :

Byte

5	Sharpness	87	Red Gain
4	Hue	88	Green Gain
10	Saturation	89	Blue Gain
3	Brightness	15	G Conv V 22
14	Contrast	16	G Conv H 22
7	Red Gain	17	G Conv V 3
8	Green Gain	18	G Conv H 3
9	Blue Gain	19	G Conv V 8
11	Red Cut Off	20	G Conv H 8
12	Green Cut Off	21	G Conv V 17
13	Blue Cut Off	22	G Conv H 17
0	3200K	23	G Conv V 13
0	6500K	24	G Conv H 13
0	9300K	25	G Conv V 12
0	Cut off	26	G Conv H 12
0	Cut off	27	G Conv V 14
0	Cut off	28	G Conv H 14
0	Gain	29	G Conv V 11
0	Gain	30	G Conv H 11
0	Gain	31	G Conv V 6
0	R	32	G Conv H 6
0	G	33	G Conv V 15
0	B	34	G Conv H 15
72	Red Cut Off	35	G Conv V 7
73	Green Cut Off	36	G Conv H 7
74	Blue Cut Off	37	G Conv V 16
75	Red Gain	38	G Conv H 16
76	Green Gain	39	G Conv V 9
77	Blue Gain	40	G Conv H 9
78	Red Cut Off	41	G Conv V 18
79	Green Cut Off	42	G Conv H 18
80	Blue Cut Off	43	G Conv V 19
81	Red Gain	44	G Conv H 19
82	Green Gain	45	G Conv V 10
83	Blue Gain	46	G Conv H 10
84	Red Cut Off	47	G Conv V 4
85	Green Cut Off	48	G Conv H 4
86	Blue Cut Off	49	G Conv V 23

50	G Conv H 23	100	B Conv V 10
51	G Conv V 5	101	R Conv H 10
52	G Conv H 5	102	B Conv H 10
53	G Conv V 24	103	R Conv V 11
54	G Conv H 24	104	B Conv V 11
55	G Conv V 20	105	R Conv H 11
56	G Conv H 20	106	B Conv H 11
57	G Conv V 1	107	R Conv V 12
58	G Conv H 1	108	B Conv V 12
59	G Conv V 2	109	R Conv H 12
60	G Conv H 2	110	B Conv H 12
61	G Conv V 21	111	R Conv V 13
62	G Conv H 21	112	B Conv V 13
63	R Conv V 1	113	R Conv H 13
64	B Conv V 1	114	B Conv H 13
65	R Conv H 1	115	R Conv V 14
66	B Conv H 1	116	B Conv V 14
67	R Conv V 2	117	R Conv H 14
68	B Conv V 2	118	B Conv H 14
69	R Conv H 2	119	R Conv V 15
70	B Conv H 2	120	B Conv V 15
71	R Conv V 3	121	R Conv H 15
72	B Conv V 3	122	B Conv H 15
73	R Conv H 3	123	R Conv V 16
74	B Conv H 3	124	B Conv V 16
75	R Conv V 4	125	R Conv H 16
76	B Conv V 4	126	B Conv H 16
77	R Conv H 4	127	R Conv V 17
78	B Conv H 4	128	B Conv V 17
79	R Conv V 5	129	R Conv H 17
80	B Conv V 5	130	B Conv H 17
81	R Conv H 5	131	R Conv V 18
82	B Conv H 5	132	B Conv V 18
83	R Conv V 6	133	R Conv H 18
84	B Conv V 6	134	B Conv H 18
85	R Conv H 6	135	R Conv V 19
86	B Conv H 6	136	B Conv V 19
87	R Conv V 7	137	R Conv H 19
88	B Conv V 7	138	B Conv H 19
89	R Conv H 7	139	R Conv V 20
90	B Conv H 7	140	B Conv V 20
91	R Conv V 8	141	R Conv H 20
92	B Conv V 8	142	B Conv H 20
93	R Conv H 8	143	R Conv V 21
94	B Conv H 8	144	B Conv V 21
95	R Conv V 9	145	R Conv H 21
96	B Conv V 9	146	B Conv H 21
97	R Conv H 9	147	R Conv V 22
98	B Conv H 9	148	B Conv V 22
99	R Conv V 10	149	R Conv H 22

150	B Conv H 22	174	Right Bow
151	R Conv V 23	172	Right Keyst
152	B Conv V 23	173	Left Bow
153	R Conv H 23	171	Left Keyst
154	B Conv H 23	179	H Centerl Bow
155	R Conv V 24	180	H Centerl Skew
156	B Conv V 24	178	Top Bow
157	R Conv H 24	176	Top Keyst
158	B Conv H 24	177	Bottom Bow
159	Fine Sh H R	175	Bottom Keyst
161	Fine Sh H B	169	H Amplitude
164	Fine Sh V R	186	Left Blank
166	Fine Sh V B	187	Right Blank
160	Coarse H Shift	184	Top Blanking
163	Coarse V Shift R	185	Bottom Blank
165	Coarse V Shift G	198	R Contr H Eq
170	Coarse V Shift B	197	G Contr H Eq
167	V Amplitude	196	B Contr H Eq
168	V Linearity	202	Contr V Eq 0
183	H Phase	195	Contr H Edge
181	V Centerl Bow	199	Contr V Edge
182	V Centerl Skew		

for V700 :

Byte

4	Saturation	26	G Conv H 12
6	Hue	27	G Conv V 14
11	Sharpness	28	G Conv H 14
5	Contrast	29	G Conv V 11
3	Brightness	30	G Conv H 11
7	Red Gain	35	G Conv V 7
8	Green Gain	36	G Conv H 7
9	Blue Gain	37	G Conv V 16
188	Red Cut Off	38	G Conv H 16
189	Green Cut Off	39	G Conv V 9
190	Blue Cut Off	40	G Conv H 9
15	G Conv V 22	41	G Conv V 18
16	G Conv H 22	42	G Conv H 18
17	G Conv V 3	71	R Conv V 3
18	G Conv H 3	72	B Conv V 3
19	G Conv V 8	73	R Conv H 3
20	G Conv H 8	74	B Conv H 3
21	G Conv V 17	87	R Conv V 7
22	G Conv H 17	88	B Conv V 7
23	G Conv V 13	89	R Conv H 7
24	G Conv H 13	90	B Conv H 7
25	G Conv V 12	91	R Conv V 8

92	B Conv V 8	134	B Conv H 18
93	R Conv H 8	147	R Conv V 22
94	B Conv H 8	148	B Conv V 22
95	R Conv V 9	149	R Conv H 22
96	B Conv V 9	150	B Conv H 22
97	R Conv H 9	159	Fine Sh H R
98	B Conv H 9	161	Fine Sh H B
103R	Conv V 11	164	Fine Sh V R
104B	Conv V 11	166	Fine Sh V B
105R	Conv H 11	160	Coarse H Shift
106B	Conv H 11	163	Coarse V Shift R
107R	Conv V 12	165	Coarse V Shift G
108B	Conv V 12	170	Coarse V Shift B
109R	Conv H 12	167	V Amplitude
110B	Conv H 12	168	V Linearity
111R	Conv V 13	183	H Phase
112B	Conv V 13	181	V Centerl Bow
113R	Conv H 13	182	V Centerl Skew
114B	Conv H 13	174	Right Bow
115R	Conv V 14	172	Right Keyst
116	B Conv V 14	173	Left Bow
117	R Conv H 14	171	Left Keyst
118	B Conv H 14	179	H Centerl Bow
123	R Conv V 16	180	H Centerl Skew
124	B Conv V 16	178	Top Bow
125	R Conv H 16	176	Top Keyst
126	B Conv H 16	177	Bottom Bow
127	R Conv V 17	175	Bottom Keyst
128	B Conv V 17	169	H Amplitude
129	R Conv H 17	186	Left Blank
130	B Conv H 17	187	Right Blank
131	R Conv V 18	184	Top Blanking
132	B Conv V 18	185	Bottom Blank
133	R Conv H 18		

for V701 :

Byte

4	Saturation	0	3200K
6	Hue	0	6500K
11	Sharpness	0	9300K
5	Contrast	0	Cut off
3	Brightness	0	Cut off
7	Red Gain	0	Cut off
8	Green Gain	0	Gain
9	Blue Gain	0	Gain
188	Red Cut Off	0	Gain
189	Green Cut Off	0	R
190	Blue Cut Off	0	G

0	B	90	B Conv H 7
72	Red Cut Off	91	R Conv V 8
73	Green Cut Off	92	B Conv V 8
74	Blue Cut Off	93	R Conv H 8
75	Red Gain	94	B Conv H 8
76	Green Gain	95	R Conv V 9
77	Blue Gain	96	B Conv V 9
78	Red Cut Off	97	R Conv H 9
79	Green Cut Off	98	B Conv H 9
80	Blue Cut Off	103R	Conv V 11
81	Red Gain	104B	Conv V 11
82	Green Gain	105R	Conv H 11
83	Blue Gain	106B	Conv H 11
84	Red Cut Off	107R	Conv V 12
85	Green Cut Off	108B	Conv V 12
86	Blue Cut Off	109R	Conv H 12
87	Red Gain	110B	Conv H 12
88	Green Gain	111R	Conv V 13
89	Blue Gain	112B	Conv V 13
15	G Conv V 22	113R	Conv H 13
16	G Conv H 22	114B	Conv H 13
17	G Conv V 3	115R	Conv V 14
18	G Conv H 3	116B	Conv V 14
19	G Conv V 8	117R	Conv H 14
20	G Conv H 8	118B	Conv H 14
21	G Conv V 17	123R	Conv V 16
22	G Conv H 17	124B	Conv V 16
23	G Conv V 13	125R	Conv H 16
24	G Conv H 13	126B	Conv H 16
25	G Conv V 12	127R	Conv V 17
26	G Conv H 12	128B	Conv V 17
27	G Conv V 14	129R	Conv H 17
28	G Conv H 14	130B	Conv H 17
29	G Conv V 11	131R	Conv V 18
30	G Conv H 11	132B	Conv V 18
35	G Conv V 7	133R	Conv H 18
36	G Conv H 7	134B	Conv H 18
37	G Conv V 16	147R	Conv V 22
38	G Conv H 16	148B	Conv V 22
39	G Conv V 9	149R	Conv H 22
40	G Conv H 9	150B	Conv H 22
41	G Conv V 18	159	Fine Sh H R
42	G Conv H 18	161	Fine Sh H B
71	R Conv V 3	164	Fine Sh V R
72	B Conv V 3	166	Fine Sh V B
73	R Conv H 3	160	Coarse H Shift
74	B Conv H 3	163	Coarse V Shift R
87	R Conv V 7	165	Coarse V Shift G
88	B Conv V 7	170	Coarse V Shift B
89	R Conv H 7	167V	Amplitude

168V Linearity	178 Top Bow
183H Phase	176 Top Keyst
181V Centerl Bow	177 Bottom Bow
182V Centerl Skew	175 Bottom Keyst
174 Right Bow	169H Amplitude
172 Right Keyst	186 Left Blank
173 Left Bow	187 Right Blank
171 Left Keyst	184 Top Blanking
179H Centerl Bow	185 Bottom Blank
180H Centerl Skew	

for G800 :

Byte

6 Sharpness	41 G Conv V 18
5 Hue	42 G Conv H 18
4 Saturation	43 G Conv V 19
8 Brightness	44 G Conv H 19
7 Contrast	45 G Conv V 10
9 Left Blank	46 G Conv H 10
10 Right Blank	47 G Conv V 4
11 Red Gain	48 G Conv H 4
12 Blue Gain	49 G Conv V 23
15 G Conv V 22	50 G Conv H 23
16 G Conv H 22	51 G Conv V 5
17 G Conv V 3	52 G Conv H 5
18 G Conv H 3	53 G Conv V 24
19 G Conv V 8	54 G Conv H 24
20 G Conv H 8	55 G Conv V 20
21 G Conv V 17	56 G Conv H 20
22 G Conv H 17	57 G Conv V 1
23 G Conv V 13	58 G Conv H 1
24 G Conv H 13	59 G Conv V 2
25 G Conv V 12	60 G Conv H 2
26 G Conv H 12	61 G Conv V 21
27 G Conv V 14	62 G Conv H 21
28 G Conv H 14	63 R Conv V 1
29 G Conv V 11	64 B Conv V 1
30 G Conv H 11	65 R Conv H 1
31 G Conv V 6	66 B Conv H 1
32 G Conv H 6	67 R Conv V 2
33 G Conv V 15	68 B Conv V 2
34 G Conv H 15	69 R Conv H 2
35 G Conv V 7	70 B Conv H 2
36 G Conv H 7	71 R Conv V 3
37 G Conv V 16	72 B Conv V 3
38 G Conv H 16	73 R Conv H 3
39 G Conv V 9	74 B Conv H 3
40 G Conv H 9	75 R Conv V 4

76 B Conv V 4	126B Conv H 16
77 R Conv H 4	127R Conv V 17
78 B Conv H 4	128B Conv V 17
79 R Conv V 5	129R Conv H 17
80 B Conv V 5	130B Conv H 17
81 R Conv H 5	131R Conv V 18
82 B Conv H 5	132B Conv V 18
83 R Conv V 6	133R Conv H 18
84 B Conv V 6	134B Conv H 18
85 R Conv H 6	135R Conv V 19
86 B Conv H 6	136B Conv V 19
87 R Conv V 7	137R Conv H 19
88 B Conv V 7	138B Conv H 19
89 R Conv H 7	139R Conv V 20
90 B Conv H 7	140B Conv V 20
91 R Conv V 8	141R Conv H 20
92 B Conv V 8	142B Conv H 20
93 R Conv H 8	143R Conv V 21
94 B Conv H 8	144B Conv V 21
95 R Conv V 9	145R Conv H 21
96 B Conv V 9	146B Conv H 21
97 R Conv H 9	147R Conv V 22
98 B Conv H 9	148B Conv V 22
99 R Conv V 10	149R Conv H 22
100B Conv V 10	150B Conv H 22
101R Conv H 10	151R Conv V 23
102B Conv H 10	152B Conv V 23
103R Conv V 11	153R Conv H 23
104B Conv V 11	154B Conv H 23
105R Conv H 11	155R Conv V 24
106B Conv H 11	156B Conv V 24
107R Conv V 12	157R Conv H 24
108B Conv V 12	158B Conv H 24
109R Conv H 12	159H Shift Red
110B Conv H 12	160H Shift Green
111R Conv V 13	161H Shift Blue
112B Conv V 13	163Bottom Blank
113R Conv H 13	164V Shift Red
114B Conv H 13	165V Shift Green
115R Conv V 14	166V Shift Blue
116B Conv V 14	167V Amplitude
117R Conv H 14	168V Linearity
118B Conv H 14	169H Phase
119R Conv V 15	170Top Blanking
120B Conv V 15	171 Side Keystone
121R Conv H 15	172V Centerl Skew
122B Conv H 15	173 Side Bow
123R Conv V 16	174V Centerl Bow
124B Conv V 16	175 Top Bow Red
125R Conv H 16	176 Bottom Bow Red

177	Top Keyst Red	187	H Centerl Blue
178	Bottom Keyst Red	188	H Centerl Red
179	Top Bow Green	189	H Centerl Green
180	Bottom Bow Green	190	Amplitude
181	Top Keyst Green	13	Red Cut Off
182	Bottom Keyst Green	14	Blue Cut Off
183	Top Bow Blue	195	Volume Left
184	Bottom Bow Blue	196	Volume Right
185	Top Keyst Blue	197	Bass
186	Bottom Keyst Blue	198	Treble

for G801(S) :

Byte

4	Saturation	43	G Conv V 19
5	Hue	44	G Conv H 19
6	Sharpness	45	G Conv V 10
7	Contrast	46	G Conv H 10
8	Brightness	47	G Conv V 4
11	Red Gain	48	G Conv H 4
12	Blue Gain	49	G Conv V 23
15	G Conv V 22	50	G Conv H 23
16	G Conv H 22	51	G Conv V 5
17	G Conv V 3	52	G Conv H 5
18	G Conv H 3	53	G Conv V 24
19	G Conv V 8	54	G Conv H 24
20	G Conv H 8	55	G Conv V 20
21	G Conv V 17	56	G Conv H 20
22	G Conv H 17	57	G Conv V 1
23	G Conv V 13	58	G Conv H 1
24	G Conv H 13	59	G Conv V 2
25	G Conv V 12	60	G Conv H 2
26	G Conv H 12	61	G Conv V 21
27	G Conv V 14	62	G Conv H 21
28	G Conv H 14	63	R Conv V 1
29	G Conv V 11	64	B Conv V 1
30	G Conv H 11	65	R Conv H 1
31	G Conv V 6	66	B Conv H 1
32	G Conv H 6	67	R Conv V 2
33	G Conv V 15	68	B Conv V 2
34	G Conv H 15	69	R Conv H 2
35	G Conv V 7	70	B Conv H 2
36	G Conv H 7	71	R Conv V 3
37	G Conv V 16	72	B Conv V 3
38	G Conv H 16	73	R Conv H 3
39	G Conv V 9	74	B Conv H 3
40	G Conv H 9	75	R Conv V 4
41	G Conv V 18	76	B Conv V 4
42	G Conv H 18	77	R Conv H 4

78	B Conv H 4	128B	Conv V 17
79	R Conv V 5	129R	Conv H 17
80	B Conv V 5	130B	Conv H 17
81	R Conv H 5	131R	Conv V 18
82	B Conv H 5	132B	Conv V 18
83	R Conv V 6	133R	Conv H 18
84	B Conv V 6	134B	Conv H 18
85	R Conv H 6	135R	Conv V 19
86	B Conv H 6	136B	Conv V 19
87	R Conv V 7	137R	Conv H 19
88	B Conv V 7	138B	Conv H 19
89	R Conv H 7	139R	Conv V 20
90	B Conv H 7	140B	Conv V 20
91	R Conv V 8	141R	Conv H 20
92	B Conv V 8	142B	Conv H 20
93	R Conv H 8	143R	Conv V 21
94	B Conv H 8	144B	Conv V 21
95	R Conv V 9	145R	Conv H 21
96	B Conv V 9	146B	Conv H 21
97	R Conv H 9	147R	Conv V 22
98	B Conv H 9	148B	Conv V 22
99	R Conv V 10	149R	Conv H 22
100B	Conv V 10	150B	Conv H 22
101R	Conv H 10	151R	Conv V 23
102B	Conv H 10	152B	Conv V 23
103R	Conv V 11	153R	Conv H 23
104B	Conv V 11	154B	Conv H 23
105R	Conv H 11	155R	Conv V 24
106B	Conv H 11	156B	Conv V 24
107R	Conv V 12	157R	Conv H 24
108B	Conv V 12	158B	Conv H 24
109R	Conv H 12	190H	Amplitude
110B	Conv H 12	169H	Phase
111R	Conv V 13	159H	Shift Red
112B	Conv V 13	160H	Shift Green
113R	Conv H 13	161H	Shift Blue
114B	Conv H 13	174V	Centerl Bow
115R	Conv V 14	172V	Centerl Skew
116B	Conv V 14	173	Side Bow
117R	Conv H 14	171	Side Keystone
118B	Conv H 14	167V	Amplitude
119R	Conv V 15	168V	Linearity
120B	Conv V 15	164V	Shift Red
121R	Conv H 15	165V	Shift Green
122B	Conv H 15	166V	Shift Blue
123R	Conv V 16	179H	Centerl Bow
124B	Conv V 16	180H	Centerl Skew
125R	Conv H 16	177	Top Bow
126B	Conv H 16	175	Top Keyst
127R	Conv V 17	178	Bottom Bow

176 Bottom Keyst	14 Blue Cut Off
9 Left Blank	195 Volume Left
10 Right Blank	196 Volume Right
163 Top Blanking	197 Bass
170 Bottom Blank	198 Treble
13 Red Cut Off	

for G808 :

Byte

4 Saturation	17 G Conv V 3
5 Hue	18 G Conv H 3
6 Sharpness	19 G Conv V 8
7 Contrast	20 G Conv H 8
8 Brightness	21 G Conv V 17
9 Left Blank	22 G Conv H 17
10 Right Blank	23 G Conv V 13
163 Top Blanking	24 G Conv H 13
170 Bottom Blank	25 G Conv V 12
11 Red Gain	26 G Conv H 12
12 Blue Gain	27 G Conv V 14
13 Red Cut Off	28 G Conv H 14
14 Blue Cut Off	29 G Conv V 11
0 3200K	30 G Conv H 11
0 6500K	31 G Conv V 6
0 9300K	32 G Conv H 6
0 Cut off	33 G Conv V 15
0 Cut off	34 G Conv H 15
0 Cut off	35 G Conv V 7
0 Gain	36 G Conv H 7
0 Gain	37 G Conv V 16
0 Gain	38 G Conv H 16
0 R	39 G Conv V 9
0 G	40 G Conv H 9
0 B	41 G Conv V 18
72 Red Cut Off	42 G Conv H 18
74 Blue Cut Off	43 G Conv V 19
75 Red Gain	44 G Conv H 19
77 Blue Gain	45 G Conv V 10
78 Red Cut Off	46 G Conv H 10
80 Blue Cut Off	47 G Conv V 4
81 Red Gain	48 G Conv H 4
83 Blue Gain	49 G Conv V 23
84 Red Cut Off	50 G Conv H 23
86 Blue Cut Off	51 G Conv V 5
87 Red Gain	52 G Conv H 5
89 Blue Gain	53 G Conv V 24
15 G Conv V 22	54 G Conv H 24
16 G Conv H 22	55 G Conv V 20

56	G Conv H 20	106B Conv H 11
57	G Conv V 1	107R Conv V 12
58	G Conv H 1	108B Conv V 12
59	G Conv V 2	109R Conv H 12
60	G Conv H 2	110B Conv H 12
61	G Conv V 21	111R Conv V 13
62	G Conv H 21	112B Conv V 13
63	R Conv V 1	113R Conv H 13
64	B Conv V 1	114B Conv H 13
65	R Conv H 1	115R Conv V 14
66	B Conv H 1	116B Conv V 14
67	R Conv V 2	117R Conv H 14
68	B Conv V 2	118B Conv H 14
69	R Conv H 2	119R Conv V 15
70	B Conv H 2	120B Conv V 15
71	R Conv V 3	121R Conv H 15
72	B Conv V 3	122B Conv H 15
73	R Conv H 3	123R Conv V 16
74	B Conv H 3	124B Conv V 16
75	R Conv V 4	125R Conv H 16
76	B Conv V 4	126B Conv H 16
77	R Conv H 4	127R Conv V 17
78	B Conv H 4	128B Conv V 17
79	R Conv V 5	129R Conv H 17
80	B Conv V 5	130B Conv H 17
81	R Conv H 5	131R Conv V 18
82	B Conv H 5	132B Conv V 18
83	R Conv V 6	133R Conv H 18
84	B Conv V 6	134B Conv H 18
85	R Conv H 6	135R Conv V 19
86	B Conv H 6	136B Conv V 19
87	R Conv V 7	137R Conv H 19
88	B Conv V 7	138B Conv H 19
89	R Conv H 7	139R Conv V 20
90	B Conv H 7	140B Conv V 20
91	R Conv V 8	141R Conv H 20
92	B Conv V 8	142B Conv H 20
93	R Conv H 8	143R Conv V 21
94	B Conv H 8	144B Conv V 21
95	R Conv V 9	145R Conv H 21
96	B Conv V 9	146B Conv H 21
97	R Conv H 9	147R Conv V 22
98	B Conv H 9	148B Conv V 22
99	R Conv V 10	149R Conv H 22
100	B Conv V 10	150B Conv H 22
101	R Conv H 10	151R Conv V 23
102	B Conv H 10	152B Conv V 23
103	R Conv V 11	153R Conv H 23
104	B Conv V 11	154B Conv H 23
105	R Conv H 11	155R Conv V 24

156B Conv V 24	4 Stigmators
157R Conv H 24	2 Stigmators
158B Conv H 24	5 Stigmators
186H Amplitude	0 Stigmators
169H Phase	1 Stigmators
159H Shift Red	6 Stigmators
160H Shift Green	3 Stigmators
161H Shift Blue	7 Stigmators
181V Centerl Bow	12 Stigmators
182V Centerl Skew	10 Stigmators
173Side Bow	13 Stigmators
171 Side Keystone	8 Stigmators
167V Amplitude	9 Stigmators
168V Linearity	14 Stigmators
164V Shift Red	11 Stigmators
165V Shift Green	15 Stigmators
166V Shift Blue	20 Stigmators
179H Centerl Bow	18 Stigmators
180H Centerl Skew	21 Stigmators
177Top Bow	16 Stigmators
175Top Keyst	17 Stigmators
178Bottom Bow	22 Stigmators
176Bottom Keyst	19 Stigmators
184Centre Focus	23 Stigmators
183Centre Focus	28 Stigmators
185Centre Focus	26 Stigmators
188Top Focus	29 Stigmators
187Bottom Focus	24 Stigmators
189Left Focus	25 Stigmators
190Right Focus	30 Stigmators
192Top Focus	27 Stigmators
191Bottom Focus	31 Stigmators
193Left Focus	36 Stigmators
194Right Focus	34 Stigmators
196Top Focus	37 Stigmators
195Bottom Focus	32 Stigmators
197Left Focus	33 Stigmators
198Right Focus	38 Stigmators
206R Contr H Eq	35 Stigmators
205G Contr H Eq	39 Stigmators
204B Contr H Eq	44 Stigmators
210Contr V Eq	42 Stigmators
203Contr H Edge	45 Stigmators
207Contr V Edge	40 Stigmators
199Soft Edge Bott	41 Stigmators
200Soft Edge Top	46 Stigmators
201Soft Edge Right	43 Stigmators
202Soft Edge Left	47 Stigmators

for G1200 :

Byte

4	Saturation	48	G Conv H 4
5	Hue	49	G Conv V 23
204	Sharpness	50	G Conv H 23
7	Contrast	51	G Conv V 5
8	Brightness	52	G Conv H 5
173	Left Blank	53	G Conv V 24
174	Right Blank	54	G Conv H 24
170	Top Blanking	55	G Conv V 20
163	Bottom Blank	56	G Conv H 20
11	Red Gain	57	G Conv V 1
12	Blue Gain	58	G Conv H 1
13	Red Cut Off	59	G Conv V 2
14	Blue Cut Off	60	G Conv H 2
15	G Conv V 22	61	G Conv V 21
16	G Conv H 22	62	G Conv H 21
17	G Conv V 3	63	R Conv V 1
18	G Conv H 3	64	B Conv V 1
19	G Conv V 8	65	R Conv H 1
20	G Conv H 8	66	B Conv H 1
21	G Conv V 17	67	R Conv V 2
22	G Conv H 17	68	B Conv V 2
23	G Conv V 13	69	R Conv H 2
24	G Conv H 13	70	B Conv H 2
25	G Conv V 12	71	R Conv V 3
26	G Conv H 12	72	B Conv V 3
27	G Conv V 14	73	R Conv H 3
28	G Conv H 14	74	B Conv H 3
29	G Conv V 11	75	R Conv V 4
30	G Conv H 11	76	B Conv V 4
31	G Conv V 6	77	R Conv H 4
32	G Conv H 6	78	B Conv H 4
33	G Conv V 15	79	R Conv V 5
34	G Conv H 15	80	B Conv V 5
35	G Conv V 7	81	R Conv H 5
36	G Conv H 7	82	B Conv H 5
37	G Conv V 16	83	R Conv V 6
38	G Conv H 16	84	B Conv V 6
39	G Conv V 9	85	R Conv H 6
40	G Conv H 9	86	B Conv H 6
41	G Conv V 18	87	R Conv V 7
42	G Conv H 18	88	B Conv V 7
43	G Conv V 19	89	R Conv H 7
44	G Conv H 19	90	B Conv H 7
45	G Conv V 10	91	R Conv V 8
46	G Conv H 10	92	B Conv V 8
47	G Conv V 4	93	R Conv H 8

94 B Conv H 8	144B Conv V 21
95 R Conv V 9	145R Conv H 21
96 B Conv V 9	146B Conv H 21
97 R Conv H 9	147R Conv V 22
98 B Conv H 9	148B Conv V 22
99 R Conv V 10	149R Conv H 22
100B Conv V 10	150B Conv H 22
101R Conv H 10	151R Conv V 23
102B Conv H 10	152B Conv V 23
103R Conv V 11	153R Conv H 23
104B Conv V 11	154B Conv H 23
105R Conv H 11	155R Conv V 24
106B Conv H 11	156B Conv V 24
107R Conv V 12	157R Conv H 24
108B Conv V 12	158B Conv H 24
109R Conv H 12	9 H Amplitude
110B Conv H 12	169H Phase
111R Conv V 13	159H Shift Red
112B Conv V 13	160H Shift Green
113R Conv H 13	161H Shift Blue
114B Conv H 13	181 V Centerl Bow
115R Conv V 14	182 V Centerl Skew
116B Conv V 14	172 Side Bow
117R Conv H 14	171 Side Keystone
118B Conv H 14	167 V Amplitude
119R Conv V 15	168 V Linearity
120B Conv V 15	164 V Shift Red
121R Conv H 15	165 V Shift Green
122B Conv H 15	166 V Shift Blue
123R Conv V 16	179H Centerl Bow
124B Conv V 16	180H Centerl Skew
125R Conv H 16	178 Top Bow
126B Conv H 16	176 Top Keyst
127R Conv V 17	177 Bottom Bow
128B Conv V 17	175 Bottom Keyst
129R Conv H 17	184 Green Focus
130B Conv H 17	183 Red Focus
131R Conv V 18	185 Blue Focus
132B Conv V 18	188 Top Focus
133R Conv H 18	187 Bottom Focus
134B Conv H 18	189 Left Focus
135R Conv V 19	190 Right Focus
136B Conv V 19	192 Top Focus
137R Conv H 19	191 Bottom Focus
138B Conv H 19	193 Left Focus
139R Conv V 20	194 Right Focus
140B Conv V 20	196 Top Focus
141R Conv H 20	195 Bottom Focus
142B Conv H 20	197 Left Focus
143R Conv V 21	198 Right Focus

for G1208 :

Byte

4	Saturation	22	G Conv H 17
5	Hue	23	G Conv V 13
204	Sharpness	24	G Conv H 13
7	Contrast	25	G Conv V 12
8	Brightness	26	G Conv H 12
173	Left Blank	27	G Conv V 14
174	Right Blank	28	G Conv H 14
170	Top Blanking	29	G Conv V 11
163	Bottom Blank	30	G Conv H 11
11	Red Gain	31	G Conv V 6
12	Blue Gain	32	G Conv H 6
13	Red Cut Off	33	G Conv V 15
14	Blue Cut Off	34	G Conv H 15
0	3200K	35	G Conv V 7
0	6500K	36	G Conv H 7
0	9300K	37	G Conv V 16
0	Cut off	38	G Conv H 16
0	Cut off	39	G Conv V 9
0	Cut off	40	G Conv H 9
0	Gain	41	G Conv V 18
0	Gain	42	G Conv H 18
0	Gain	43	G Conv V 19
0	R	44	G Conv H 19
0	G	45	G Conv V 10
0	B	46	G Conv H 10
72	Red Cut Off	47	G Conv V 4
74	Blue Cut Off	48	G Conv H 4
75	Red Gain	49	G Conv V 23
77	Blue Gain	50	G Conv H 23
78	Red Cut Off	51	G Conv V 5
80	Blue Cut Off	52	G Conv H 5
81	Red Gain	53	G Conv V 24
83	Blue Gain	54	G Conv H 24
84	Red Cut Off	55	G Conv V 20
86	Blue Cut Off	56	G Conv H 20
87	Red Gain	57	G Conv V 1
89	Blue Gain	58	G Conv H 1
15	G Conv V 22	59	G Conv V 2
16	G Conv H 22	60	G Conv H 2
17	G Conv V 3	61	G Conv V 21
18	G Conv H 3	62	G Conv H 21
19	G Conv V 8	63	R Conv V 1
20	G Conv H 8	64	B Conv V 1
21	G Conv V 17	65	R Conv H 1

66	B Conv H 1	116B	Conv V 14
67	R Conv V 2	117R	Conv H 14
68	B Conv V 2	118B	Conv H 14
69	R Conv H 2	119R	Conv V 15
70	B Conv H 2	120B	Conv V 15
71	R Conv V 3	121R	Conv H 15
72	B Conv V 3	122B	Conv H 15
73	R Conv H 3	123R	Conv V 16
74	B Conv H 3	124B	Conv V 16
75	R Conv V 4	125R	Conv H 16
76	B Conv V 4	126B	Conv H 16
77	R Conv H 4	127R	Conv V 17
78	B Conv H 4	128B	Conv V 17
79	R Conv V 5	129R	Conv H 17
80	B Conv V 5	130B	Conv H 17
81	R Conv H 5	131R	Conv V 18
82	B Conv H 5	132B	Conv V 18
83	R Conv V 6	133R	Conv H 18
84	B Conv V 6	134B	Conv H 18
85	R Conv H 6	135R	Conv V 19
86	B Conv H 6	136B	Conv V 19
87	R Conv V 7	137R	Conv H 19
88	B Conv V 7	138B	Conv H 19
89	R Conv H 7	139R	Conv V 20
90	B Conv H 7	140B	Conv V 20
91	R Conv V 8	141R	Conv H 20
92	B Conv V 8	142B	Conv H 20
93	R Conv H 8	143R	Conv V 21
94	B Conv H 8	144B	Conv V 21
95	R Conv V 9	145R	Conv H 21
96	B Conv V 9	146B	Conv H 21
97	R Conv H 9	147R	Conv V 22
98	B Conv H 9	148B	Conv V 22
99	R Conv V 10	149R	Conv H 22
100B	Conv V 10	150B	Conv H 22
101R	Conv H 10	151R	Conv V 23
102B	Conv H 10	152B	Conv V 23
103R	Conv V 11	153R	Conv H 23
104B	Conv V 11	154B	Conv H 23
105R	Conv H 11	155R	Conv V 24
106B	Conv H 11	156B	Conv V 24
107R	Conv V 12	157R	Conv H 24
108B	Conv V 12	158B	Conv H 24
109R	Conv H 12	9	H Amplitude
110B	Conv H 12	169H	Phase
111R	Conv V 13	159H	Shift Red
112B	Conv V 13	160H	Shift Green
113R	Conv H 13	161H	Shift Blue
114B	Conv H 13	181V	Centerl Bow
115R	Conv V 14	182V	Centerl Skew

172 Side Bow	6 Stigmators
171 Side Keystone	3 Stigmators
167V Amplitude	7 Stigmators
168V Linearity	12 Stigmators
164V Shift Red	10 Stigmators
165V Shift Green	13 Stigmators
166V Shift Blue	8 Stigmators
179H Centerl Bow	9 Stigmators
180H Centerl Skew	14 Stigmators
178Top Bow	11 Stigmators
176Top Keyst	15 Stigmators
177Bottom Bow	20 Stigmators
175Bottom Keyst	18 Stigmators
184Centre Focus	21 Stigmators
183Centre Focus	16 Stigmators
185Centre Focus	17 Stigmators
188Top Focus	22 Stigmators
187Bottom Focus	19 Stigmators
189Left Focus	23 Stigmators
190Right Focus	28 Stigmators
192Top Focus	26 Stigmators
191Bottom Focus	29 Stigmators
193Left Focus	24 Stigmators
194Right Focus	25 Stigmators
196Top Focus	30 Stigmators
195Bottom Focus	27 Stigmators
197Left Focus	31 Stigmators
198Right Focus	36 Stigmators
206R Contr H Eq	34 Stigmators
205G Contr H Eq	37 Stigmators
204B Contr H Eq	32 Stigmators
210Contr V Eq	33 Stigmators
203Contr H Edge	38 Stigmators
207Contr V Edge	35 Stigmators
200Soft Edge Top	39 Stigmators
199Soft Edge Bott	44 Stigmators
202Soft Edge Left	42 Stigmators
201Soft Edge Right	45 Stigmators
4 Stigmators	40 Stigmators
2 Stigmators	41 Stigmators
5 Stigmators	46 Stigmators
0 Stigmators	43 Stigmators
1 Stigmators	47 Stigmators

for G1200 :

Byte

4	Saturation	48	G Conv H 4
5	Hue	49	G Conv V 23
204	Sharpness	50	G Conv H 23
7	Contrast	51	G Conv V 5
8	Brightness	52	G Conv H 5
173	Left Blank	53	G Conv V 24
174	Right Blank	54	G Conv H 24
170	Top Blanking	55	G Conv V 20
163	Bottom Blank	56	G Conv H 20
11	Red Gain	57	G Conv V 1
12	Blue Gain	58	G Conv H 1
13	Red Cut Off	59	G Conv V 2
14	Blue Cut Off	60	G Conv H 2
15	G Conv V 22	61	G Conv V 21
16	G Conv H 22	62	G Conv H 21
17	G Conv V 3	63	R Conv V 1
18	G Conv H 3	64	B Conv V 1
19	G Conv V 8	65	R Conv H 1
20	G Conv H 8	66	B Conv H 1
21	G Conv V 17	67	R Conv V 2
22	G Conv H 17	68	B Conv V 2
23	G Conv V 13	69	R Conv H 2
24	G Conv H 13	70	B Conv H 2
25	G Conv V 12	71	R Conv V 3
26	G Conv H 12	72	B Conv V 3
27	G Conv V 14	73	R Conv H 3
28	G Conv H 14	74	B Conv H 3
29	G Conv V 11	75	R Conv V 4
30	G Conv H 11	76	B Conv V 4
31	G Conv V 6	77	R Conv H 4
32	G Conv H 6	78	B Conv H 4
33	G Conv V 15	79	R Conv V 5
34	G Conv H 15	80	B Conv V 5
35	G Conv V 7	81	R Conv H 5
36	G Conv H 7	82	B Conv H 5
37	G Conv V 16	83	R Conv V 6
38	G Conv H 16	84	B Conv V 6
39	G Conv V 9	85	R Conv H 6
40	G Conv H 9	86	B Conv H 6
41	G Conv V 18	87	R Conv V 7
42	G Conv H 18	88	B Conv V 7
43	G Conv V 19	89	R Conv H 7
44	G Conv H 19	90	B Conv H 7
45	G Conv V 10	91	R Conv V 8
46	G Conv H 10	92	B Conv V 8
47	G Conv V 4	93	R Conv H 8

94 B Conv H 8	144B Conv V 21
95 R Conv V 9	145R Conv H 21
96 B Conv V 9	146B Conv H 21
97 R Conv H 9	147R Conv V 22
98 B Conv H 9	148B Conv V 22
99 R Conv V 10	149R Conv H 22
100B Conv V 10	150B Conv H 22
101R Conv H 10	151R Conv V 23
102B Conv H 10	152B Conv V 23
103R Conv V 11	153R Conv H 23
104B Conv V 11	154B Conv H 23
105R Conv H 11	155R Conv V 24
106B Conv H 11	156B Conv V 24
107R Conv V 12	157R Conv H 24
108B Conv V 12	158B Conv H 24
109R Conv H 12	9 H Amplitude
110B Conv H 12	169H Phase
111R Conv V 13	159H Shift Red
112B Conv V 13	160H Shift Green
113R Conv H 13	161H Shift Blue
114B Conv H 13	181V Centerl Bow
115R Conv V 14	182V Centerl Skew
116B Conv V 14	172 Side Bow
117R Conv H 14	171 Side Keystone
118B Conv H 14	167V Amplitude
119R Conv V 15	168V Linearity
120B Conv V 15	164V Shift Red
121R Conv H 15	165V Shift Green
122B Conv H 15	166V Shift Blue
123R Conv V 16	179H Centerl Bow
124B Conv V 16	180H Centerl Skew
125R Conv H 16	178Top Bow
126B Conv H 16	176Top Keyst
127R Conv V 17	177Bottom Bow
128B Conv V 17	175Bottom Keyst
129R Conv H 17	184Centre Focus
130B Conv H 17	183Centre Focus
131R Conv V 18	185Centre Focus
132B Conv V 18	188Top Focus
133R Conv H 18	187Bottom Focus
134B Conv H 18	189Left Focus
135R Conv V 19	190Right Focus
136B Conv V 19	192Top Focus
137R Conv H 19	191Bottom Focus
138B Conv H 19	193Left Focus
139R Conv V 20	194Right Focus
140B Conv V 20	196Top Focus
141R Conv H 20	195Bottom Focus
142B Conv H 20	197Left Focus
143R Conv V 21	198Right Focus

206R Contr H Eq	16 Stigmators
205G Contr H Eq	17 Stigmators
204B Contr H Eq	22 Stigmators
210Contr V Eq	19 Stigmators
203Contr H Edge	23 Stigmators
207Contr V Edge	28 Stigmators
199Soft Edge Bott	26 Stigmators
200Soft Edge Top	29 Stigmators
201Soft Edge Right	24 Stigmators
202Soft Edge Left	25 Stigmators
4 Stigmators	30 Stigmators
2 Stigmators	27 Stigmators
5 Stigmators	31 Stigmators
0 Stigmators	36 Stigmators
1 Stigmators	34 Stigmators
6 Stigmators	37 Stigmators
3 Stigmators	32 Stigmators
7 Stigmators	33 Stigmators
12 Stigmators	38 Stigmators
10 Stigmators	35 Stigmators
13 Stigmators	39 Stigmators
8 Stigmators	44 Stigmators
9 Stigmators	42 Stigmators
14 Stigmators	45 Stigmators
11 Stigmators	40 Stigmators
15 Stigmators	41 Stigmators
20 Stigmators	46 Stigmators
18 Stigmators	43 Stigmators
21 Stigmators	47 Stigmators

Convergence

Define the following zones :

1	2	3	4	5
6	7	8	9	10
11	12		13	14
15	16	17	18	19
20	21	22	23	24

For vision 700, 701 the zones 2, 6, 7, 4, 9, 10, 15, 16, 21, 18, 19, 23 do not exist.

For red and blue convergence :

Byte		Zone
63	red vertical	1
64	blue vertical	1
65	red horizontal	1
66	blue horizontal	1
67	red vertical	2
68	blue vertical	2
69	red horizontal	2
70	blue horizontal	2
	and so on ...	
155	red vertical	24
156	blue vertical	24
157	red horizontal	24
158	blue horizontal	24

For green convergence : (V=Vertical, H=Horizontal)

Byte	Direction	Zone
15	V	22
16	H	22
17	V	3
18	H	3
19	V	8
20	H	8
21	V	17
22	H	17
23	V	13
24	H	13
25	V	12
26	H	12
27	V	14
28	H	14
29	V	11
30	H	11
31	V	6
32	H	6
33	V	15
34	H	15
35	V	7
36	H	7
37	V	16
38	H	16
39	V	9
40	H	9
41	V	18
42	H	18
43	V	19
44	H	19
45	V	10
46	H	10
47	V	4
48	H	4
49	V	23
50	H	23
51	V	5

52	H	5
53	V	24
54	H	24
55	V	20
56	H	20
57	V	1
58	H	1
59	V	2
60	H	2
61	V	21
62	H	21

Special case : return of EEPROM configuration from projector to computer (used to get overview of all blocks)

800, 1100, 1200, 1600 :

Byte

1	Hor period of header of Block	nr. 1
2	Source number	1
3	Source type	1
4	Vertical frequency	1
5	Hor period of header of Block	nr. 2
6	Source number	2
7	Source type	2
8	Vertical frequency	2

and so on ...

149	Hor period of header of Block	nr. 38
150	Source number	38
151	Source type	38
152	Vertical frequency	38

700, 701 :

Byte

1	Hor period of header of Block	nr. 1
2	Vertical period	1

3	Source number	1
4	Source type	1
5	FF	
6	Hor period	nr. 2
7	Vertical period	2
8	Source number	2
9	Source type	2
10	FF	2
	and so on ...	

APPENDIX C ENCODING FOR DIRECT POTENTIOMETER ACCESS

Coordinates (transmitted in Dat2) are only required for potentiometers in the convergence :

	X=0	1	2	3	4
Y=0					
1					
2					
3					
4					

Y and X are encoded as two nibbles in Dat2 : Y : X.

Kind :

00H Convergence Green Vert.

01H Convergence Green Hor.

02H Convergence Red Vertical

03H Convergence Red Horizontal

04H Convergence Blue Vertical

05H Convergence Blue Horizontal

06H Blanking Left

07H Blanking Right

08H Shift Red Horizontal

09H Shift Green Horizontal

0AH Shift Blue Horizontal

0BH NU
0CH Blanking Bottom
0DH Shift Red Vertical

0EH Shift Green Vertical
0FH Shift Blue Vertical
10H Amplitude Vertical
11H Linearity Vertical
12H Phase horizontal
13H Blanking Top
14H Side Keystone
15H Vertical Centerline Skew
16H Side Bow
17H Vertical Centerline Bow
18H Top Bow Red
19H Bottom Bow Red
1AH Top Keystone Red
1BH Bottom Keystone Red
1CH Top Bow Green
1DH Bottom Bow Green
1EH Top Keystone Green
1FH Bottom Keystone Green
20H Top Bow Blue
21H Bottom Bow Blue
22H Top Keystone Blue
23H Bottom Keystone Blue
24H Hor. Centerline Bow Red
25H Hor. Centerline Bow Blue
26H Hor. Centerline Bow Green

27H Horizontal Amplitude
28H Horizontal Centerline Skew

29H Left Keystone
2AH Right Keystone
2BH Left Bow
2CH Right Bow
2DH Coarse Shift Red
2EH Coarse Shift Blue

2FH Vertical S correction
30H Saturation
31H Hue
32H Sharpness
33H Contrast
34H Brightness
35H Volume

36H Bass
37H Treble
38H Balance

39H Red Gain
3AH Blue Gain
3BH Red Cut Off
3CH Blue Cut Off
3DH Green Gain
3EH Green Cut Off
3FH Seagull NZ

40H Seagull EW
41H Blue correction Breaks
42H Blue correction Slope
43H Peaking
44H Midlights Red
45H Midlights Blue
46H Red Vertical Corn
47H Blue Vertical Corn
48H Red Horizontal Sides
49H Blue Horizontal Sides
4AH Hor Cent. Bow coarse
4BH N/S Bow coarse
4CH Horizontal Linearity
4DH Left Edge
4EH Right Edge

50H Focus Midpoint Red
51H Focus Midpoint Green
52H Focus Midpoint Blue

53H NU
54H Focus Bottom Red
55H Focus Top Red
56H Focus Left Red
57H Focus Right Red
58H Focus Bottom Green
59H Focus Top Green
5AH Focus Left Green
5BH Focus Right Green
5CH Focus Bottom Blue
5DH Focus Top Blue
5EH Focus Left Blue
5FH Focus Right Blue

60H Bottom Soft Edge
61H Top Soft Edge
62H Right Soft Edge
63H Left Soft Edge
64H Horizontal Edge Correction
65H Contrast Equalisation Blue
66H Contrast Equalisation Green
67H Contrast Equalisation Red
68H Vertical Edge Correction
69H Stop Position Soft Edge (Horz)
6AH Start Position Soft Edge (Horz)
6BH Vertical Contrast Equalisation
6CH Stop Position Soft Edge (Vert)
6DH Start Position Soft Edge (Vert)

70H Dynamic Astigmatism Red axial

71H Dynamic Astigmatism Red diagonal
72H Dynamic Astigmatism Green axial

73H Dynamic Astigmatism Green diagonal
74H Dynamic Astigmatism Blue axial
75H Dynamic Astigmatism Blue diagonal

Softedge Lite/Advanced

80H Left Start
81H Left length
82H Right start
83H Right Length
84H Gamma Red Low
85H Gamma Red High
86H Gamma Green Low
87H Gamma Green high
88H Gamma Blue low
89H Gamma Blue High

APPENDIX D: THE COMMANDS FOR RESCTRL.

RCU commands

These commands have the same result as using the RCU:
First, commands without extra information.

ENTER

Adjustment keys

EXIT

ADJUST

TEXT

STDBY

PARK

MUTE

CUR_UP	Cursor key :	up
CUR_DN		down
CUR_LE		left
CUR_RI		right
CON_UP	Contrast :	up
CON_DN		down
BRI_UP	Brightness:	up
BRI_DN		down
SAT_UP	Saturation:	up
SAT_DN		down
HUE_UP	Hue:	up
HUE_DN		down
SHA_UP	Sharpness:	up
SHA_DN		down
VOL_UP	Volume:	up
VOL_DN		down
BAS_UP	Bass:	up
BAS_DN		down
TRE_UP	Treble:	up
TRE_DN		down
BAL_UP	Balance:	up
BAL_DN		down

One RCU commands requests extra information :

NUM	0	selection "0"
NUM	1	selection "1" ...
NUM	9	selection "9"

Extra commands

LOCK_IR <mask> Programs the projector to filter out certain infra red commands. Which IR commands are filtered is encoded in <mask>. <mask> is binary ORed using the following possibilities:

MASK_STDBY	0000 0001
MASK_PARK	0000 0010
MASK_TEXT	0000 0100
MASK_ADJUST	0000 1000
MASK_NUM	0001 0000
MASK_PICT	0010 0000
MASK_SOUND	0100 0000
CONTR_IRIS	
START	Starts up the
IRIS FOCUS	Focus the lens
LEARN	Learn the screen
AUTO_1	Auto converge current block
AUTO_A	Auto converge all blocks

Available from :

Starting up for 801, 808, 1208, 1209.

V4.00 for 800, 1100, 1200 and 1600.

V1.12 for 700, 701

FORCE

PAUSE	ON	OFF
MUTE	ON	OFF
MONO	ON	OFF
NORMAL	ON	OFF
SOUND	ON	OFF
TEXT	ON	OFF
FAST	ON	Fast sync
	OFF	Slow sync
ENH_BL	ON	Enhanced blue
	OFF	

ADJUST	ON	Adjustment mode
	OFF	
POWER	ON OFF	

The FORCE command (needing two extra informations: what has to be forced and in which state it has to be forced) forces certain states in the projector to a certain state which can otherwise only be toggled.

This command will only be recognised by projectors having V4.00 or later.

SET <adj> <value>

Using this command the user can directly control a number of adjustments (<adj>) in the projector. The different <adj> are:

H_SHIFT_R
H_SHIFT_G
H_SHIFT_B
V_SHIFT_R
V_SHIFT_G
V_SHIFT_B
H_AMP
V_AMP
COLOR
TINT
SHARPNESS
CONTRAST
VOLUME
BASS
TREBLE
BALANCE
GAIN_R
GAIN_B
CUT_OFF_R
CUT_OFF_B

<value> holds the value on which the user wants the adjustment to be set. PAGE10/numpages 10

This command will only be recognised by projectors having V4.00 or later.

GLOSSARY

baudrate : communication speed for data transport between PC and projector.

block : the collection of settings for the digitally controlled potentiometers + the header

check box : menu on the PC display where you switch an item on or off.

controller : microprocessor module inside the projector.

dialogue box : menu where you can fill in extra information.

drop-down menu : menus are lists of commands. This menu drops down on your PC display showing all the commands you can choose from that menu.

header : identification information for a block.

horizontal timing : indicates for which horizontal frequency a block is created.

info area : lower part of the display where the system gives information concerning the RAM, address, ...

installation : information concerning the projector configuration. front-rear, table-ceiling.

menu bar : upper part of the display with the menu names.

RAM : random access memory

scroll bar : contains a lister, white box and arrows. It scrolls a window or a dialogue box.

setting : a value for a digitally controlled potentiometer. Normally assumes a 7 bit value.

source number : indicates the input.

source type : indicates the kind of source which is connected.

work area : the area where dialogue boxes will be displayed.