# Digibloc DD12 USER MANUAL



290-867

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# AVAB today - August 1989

The AVAB group of companies is completely dedicated to the design, manufacturing and installation of state-of-the-art lighting control systems, luminaires, rigging control systems and stage machinery for theatres. AVAB is the technology leader in the field of lighting and rigging control equipment and in high precision profile lanterns and followspots. AVAB is completely independent of any industrial conglomerates. AVAB Elektronik AB was founded in 1971 and has since been supplying equipment to the theatre and studio market world wide.

# BACKGROUND

AVAB Elektronik AB was founded in 1971 and started development of portable dimming systems for the theatre market. These proved very successful and very soon they captured practically the whole lighting control equipment market for touring theatres in Sweden.

In 1975 AVAB installed the first two AVAB 2000 computer lighting control systems.

In 1977 AVAB developed the AVAB 2001 computer lighting control system for 96 channels. This was a portable board built into an aluminum Haliburton attaché case. This was the product that made AVAB's name known in a lot of foreign markets, France being one of the largest. Close to 300 units of this board were sold, most of them outside the Scandinavian countries.

AVAB America, Inc. was founded in 1978 and have developed a range of digital dimmers for the American market.

Almost since the start, Norway had been an important market for AVAB. In 1980 AVAB Norge A/S was founded. Since then they have managed many of the biggest installations in that country.

Emil Niethammer GmbH, the German lantern manufacturer was acquired by AVAB in 1983, enlarging the delivery program to a complete range of high quality theatre lighting equipment.

In 1985 AVAB installed their new computerized Rigging Control System at the Södra Teatern in Stockholm, Sweden. This was the beginning of a completely new product line. In this and other installations AVAB worked very closely with Skandinavisk Lyftservice and S&M Teknik, two mechanical companies in Uppsla Sweden. The following year these companies became AVAB Uppsala, the fully integrated mechanical branch of AVAB Elektronik AB.

In 1989 the name was changed to just AVAB to indicate that AVAB is not just an electronics company.

# PRODUCTS

# SOME HI-TECH PRODUCTS DEVELOPED BY THE AVAB GROUP

### AVAB Expert LIGHTING CONTROLLER

The state-of-the-art controller for up to 512 control channels. This board is being delivered to most countries in western Europe, plus North America and Australia.

### AVAB VIKING<sup>2</sup>

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The biggest lighting controller in the world. Up to 1000 separate control channels. Controls Remote controlled instruments, color changers, hoists etc.

The superior Screen Editor concept makes it very easy to use.

### AVAB DIGITAL DIMMERS

The digital dimmers have been pioneered by AVAB. First in the United States and then in Europe.

AVAB has introduced the PDD Professional Digital Dimmer system, a 220/240V version of the second generation AVAB America DDII dimmers. It has quickly become the standard dimmer for professional theatre and broadcast television in Sweden.

The digital dimmer is by definition completely stable and reliable. Free from problems that can easily occur in analog and multiplexed analog systems. It also incorporates programming facilities for different response curves and even a back-up for the front end controller.

### VARIMOT MOTORIZED LANTERNS

The Varimot series is a range of motorized 2000W luminaires for high precision remote positioning of the light beam.

The units can be controlled from the AVAB VIKING board or from the AVAB 302 dedicated control board. The system allows positioning accuracy of better than 2 cm at a throw of 30 meters.

### UNISPOT FOLLOWSPOTS

Unispot is the high precision family of followspots manufactured by Emil Niethammer GmbH in Stuttgart.

The whole family is characterized by having the world's finest optics and precision engineered mechanics. There are versions for both HMI 2500W and quartz 2000W lamps.

### THE AVAB RIGGING CONTROL SYSTEM

The Rigging Control System was developed out of the VIKING concept. It controls up to 250 DC motors, giving the director, set designer and operator exactly the same programming and overriding possibilities as in an advanced lighting control board. The vertical and horizontal motion on stage is controlled to split millimeter precision.

### STAGE RIGGING AND MACHINERY INSTALLATIONS

AVAB has in Uppsala, Sweden a very modern facility for production of stage mechanics and theatre sets. A large number of installations have been made in Sweden and also in Norway.







# Digibloc III - General

Digibloc III is the second generation of digital dimmers developed by AVAB and Juliat.

It is the third generation developed by AVAB.

AVAB started to make digital dimmers 1982 even before there were lightboards giving digital signals!

Digibloc III is equipped with advanced digital functions. It can be connected in large clusters to a central PC computer monitoring and checking the whole system. Even if the units are widely spread out, everything can be controlled and remote programmed from the main computer.

# PC LINK

A standard PC computer can be used as a control central for hundreds of distributed Digibloc III systems.

All units can be remotely programmed and controlled from this central computer.

Messages can be sent from dimmer to computer and vice versa.

# ENHANCED DMX512 AND AVA B

Of course, the Digibloc III is equipped with the new world standard for light transmission – DMX512. AVAB has enhanced the standard by including error checks to ensure completely error free transmission. It can also communicate with the old world standard – AVAB! This standard has also been enhanced in this dimmer to include error check.

Read more about the different protocols in the special Protocol Appendix.

# DIGITAL BACKUP SYSTEM WITH MIDI

The backup system consists of 24 faders where each fader contains a preset. These-presets can be mixed together on a Highest Level basis. The fader movements can also be recorded as MIDI information and played back in real time.

# **Getting Started**

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When you turn on the dimmer it will great you welcome and display the current software version of the system.

After a few seconds it will shift to show you the Main screen. On this screen you can see the Unit number and the Start channel (the fist channel the unit will listen to). Also the Unit name (if defined by in the PC Link option) is displayed on the second row of the display.

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# INTRODUCTION

# General

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Through the LCD display and the four keys on the front panel, all operations can be carried out. The four keys take you through a menu system where all functions of the Digibloc can be accessed. Each menu contains a number of different items or parameters. These can be easily changed.

# How to enter Setup mode

Press the SELECT key. This will enter setup mode.

# How to choose a menu or menu item

Press the + and - keys until the correct menu/item is shown on the display.

# How to select a menu or menu item

Press the SELECT key to select the menu or item currently shown on the display.

# How to change a menu item

Once the item is selected with the SELECT key (described above), it can be changed with the + and - keys. A blinking cursor tells you that an item can be changed.

Press + or - until the desired alternative for the item is shown on the display.

When the desired alternative is shown, press SELECT to enter this value. This will remove the blinking cursor and the item can not be changed any more. You can now select other items in the menu.

# How to leave a menu or item

Press the EXIT key.

Each time you press EXIT you will step one step backwards in the menu system.

Example: If you are in the Parameter menu at Protocol, you will first step back to the Parameter menu. Next time you press EXIT you will leave setup mode.











### PARAMETER MENU

# General

The Parameter menu contains the different operating parameters for the system such as Unit address and Start channel.

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### Unit Address

This is the address of this dimmer pack. It is used when connecting several units together to a central computer. This address MUST be different in each unit.

### Start Address

This is the first channel number that shall be received by this unit. This channel will control dimmer output number 1. The following 11 channels are automatically assigned to dimmer outputs 2-12.

### Compensation

With this function On, the dimmer will compensate for voltage fluctuations in the incoming power.

### Protocol

Selects which light transmission protocol that shall be used. The choices are: AVAB, DMX512 and Auto. In the Auto position the dimmer configures itself to the incoming signal. In parenthesis will be given the protocol the dimmer has found.

### Language

Here you can select the language for all displays.

### Timeout

This parameter defines if the dimmer shall switch off the light in the dimmer if data from the lightboard if missing.

Note: Find the item you want to change with the + and – keys. Press SELECT to select it. Use the + and - keys to select alternative. Press EXIT to leave the item.

# **CHANNELS MENU**

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The channel menu allows you to set channels to specific levels. This will be made in a special Manual field. This field works on a Highest Level basis together with the incoming light field and the Backup fields.

### Channel

Specifies which channel to work with.

On the display, the channel numbers will be shown like this: 13/1. This is both the external channel number (offsetted by the Start channel parameter) and the internal channel number (1-12). When you have selected the desired channel number, press SELECT. This will select the chosen channel and automatically move to the Level item for setting level.

### Level

Set level for the selected channel. When you have set the desired level, press SELECT. This will automatically move you to the Channel item for entering a new channel. Press EXIT to leave.

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### **BACKUP MENU**

# General

The backup menu allows you to set the backup masters to specific levels. Each Backup master is running its own field. These fields works on a Highest Level basis together with the incoming light field and the Manual field. (mi

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### Master

Specifies which Backup master to work with. Use numbers 1-24. When you have selected the desired master number, press SELECT. This will select the chosen master and automatically move to the Level item for setting level.

### Level

Set level for the selected master. When you have set the desired level, press SELECT. This will automatically move you to the Master item for entering a new master. Press EXIT to leave.

**MESSAGE MENU** 

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The message menu allows you to send one of 10 user defined messages to the central computer.

These messages are defined in the central computer but can be displayed on and transmitted from the dimmer.

This can be used for sending messages back to the control room and the central computer.

Use the + and - keys to choose the message

Press SELECT to send the chosen message.

Note: If no computer if connected there will be no messages defined in the dimmer. In that case the display will show No Messages Defined.

# CURVE MENU

# General

The curve menu allows you to assign different dimmer curves to each channel. Ľ,

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### Channel

Specifies which channel to work with. On the display, the channel numbers will be shown like this: 13/1. This is both the external channel number (offsetted by the Start channel parameter) and the internal channel number (1-12). When you have selected the desired channel number, press SELECT. This will select the chosen channel and automatically move to the Curve name for setting curve.

### Curve

Assigns a curve to the selected channel. When you have set the desired curve, press SELECT. This will automatically move you to the Channel item for entering a new channel. Press EXIT to leave.

The different curves are displayed as follows:

Linear	Standard linear curve (Default)		
On/Off	On/Off curve		
Fluo.	Special curve for Fluorescent load		
D4	Not defined		
D5	Not defined		
U1-U5	User definable curves. The curves are defined in the PC.		

# **RESET MENU**

# General

The Reset menu allows you to clear different groups of parameters in the dimmer back to their initial condition.

Select the group of parameters you want to reset and press SELECT.

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Resets all parameters in the dimmer to their default condition.

### Backup

Resets the Backup presets and the Backup masters to zero.

### Channel

Resets the Manual channel field to zero.

### Curves

Resets the Curve assignments to default linear.

### Parameters

Resets all parameters in the Parameter menu to their default values.

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# INTRODUCTION

General

Through the PC Link system, several dimmer packs can be connected to a central PC computer. All dimmer units can then be remotely programmed and controlled.

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All faults in the dimmer pack such as Lamp Fault, Triac Fault, Fuse Fault etc. can be reported and shown on the computer screen.

All parameters in the dimmer can be changed.

Messages can be sent from computer to dimmer and vice versa. This means that an operator in the control room can communicate with a technician out in the theatre through the dimmer system.

The PC Link software is contained on an auto-loading diskette. Just insert the disk and reset the computer.

When the program starts up, it will show you one status box for each dimmer unit in the system. In this box you will see the overall status a dimmer unit. You can see the unit number and the start channel. You can see if it is responding to PC aand if it receives light data correctly. If there is a fault on the dimmer you will have a special error popup together with the status box.

The status boxes for all the units in the system can be freely moved and geographically organised on 10 different pages.

In this way you can have a display of the units that corresponds to their geographical position in the theatre.

# Help function

In all situations, you can always press ? to access the built in help function. It will give you a help popup explaining the available commands. Press any key to remove this popup.

# How to select a Unit

Enter the number of the unit you want to select and press U. This will reverse the colors of the unit selected. This unit can now be moved to a new position on the screen with the arrow keys. The deselect the unit again, press U.

# How to select another page

In the system there are 10 different pages available. Each page can hold a number of dimmer units. Each page can be used to show a specific part of a big dimmer system such as Stage Left, Stage Right etc.

To select a page, enter the page number (1-10) and press P. You can also use the + and - keys to increase/decrease the page number. If you select a unit that is not currently visible, the correct page is automatically selected for you.

PC LINK

# OPERATING

# How to give a name to a Page

Each page can be given a name to explain to the operator the meaning of the page.

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This gives you the possiblity to edit the page name in the upper left corner of the screen.

Enter a new name and press RETURN.

# How to rearrange the units on the screen

When a unit is selected it can be freely moved around the screen with the arrow keys. Position the unit where you want it. The position will be remembered automatically when you leave the program or when you store to disk.

If you want to move a unit from one page to another, there is an built-in fetch command. Select the page you want to fetch the unit to. Enter the number of the unit to fetch and press F. The selected unit will be fetched to the current page. You can then move it with the arrow keys.

# Zoom

Each unit box can be zoomed to show more information. When you have selected the desired unit, press Z. This will show you more parameters for the unit. To de-zoom, press Z again.

# Change mode

To change any of the parameters, make sure that you are in Zoom mode for the selected unit. Press C.

This will enter Change mode. Now you change all the parameters directly on screen. Use the up and down arrows to move to the desired parameter. To change a parameter, enter a new value and press RETURN.

To toggle an On/Off parameter, just press RETURN.

When you are satisfied with your changes, press ESC to leave Change mode.

# How to send a message to a unit

Select the unit to send a message to OR deselect all units to send a message to all units.

Press M.

This will give you a message popup where you can write your message. Press RETURN to send the message.

The message will appear on the display of the dimmer. To remove it from the display, press EXIT.

# OPERATING

# **Fault History**

All faults in the dimmer units such as Load/Fuse faults will be recorded in the PC. The PC records the time when each fault occured and also the time when the fault was corrected. You can easily get a list of these faults for an individual unit or for all units in the system. hi

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Press H to see the Fault History for all units.

Enter the number of the desired unit and press H to see only faults on a specific unit.

To remove the Fault History list, press R.

# Printer

Press O to output a listing of the complete system setup to the printer port.

# Disk storage

All parameters such as the layout of the screens and all the unit parameters can be stored to disk. This is done automatically when you quit the program by pressing Q.

You can also request the system to save all parameters by pressing ????.

### **User Messages**

In the dimmer, you can specify 10 different answer messages. In this way the user can specify the messages that can be given in response to messages sent from the PC to the dimmer unit. These messages are defined in the PC and automatically transmitted to the dimmer units. These are the messages that will appear in the Message menu in the dimmer.

To define the user messages, press D.

This will give you a popup of the 10 messages. Select the message you want to change with the up and down arrows. Enter a new message or edit the old one and press RETURN.

To leave the message popup, press ESC.

This will also transmit the messages to all dimmer units connected, ready to be shown on the Message menu.

# How to quit the program

Press Q. This will quit the program and automatically store all changes you have made.





# Appendices ø P ø Ø .

# General

MIDI is an international standard which allows communication of musical performance by means of digital signals.

MIDI enables interconnection of instruments (and other equipment) from different manufacturers.

There are various kinds of MIDI devices on the market, such as synthesizers, sequencers, effect generators etc. Now there are also lighting dimmers, light boards and other AVAB equipment which can communicate with MIDI signals.

# MIDI and sound

When MIDI was invented is was mainly intended for use with sound equipment, basically synthesizers.

It was the first means for connecting synthesizers from different manufacturers together. Therefore, the basic form of MIDI is concentrated on controlling musical parameters usually found on synthesizers: Notes, Pitch, Modulation, Sustain etc.

Each time you play a note on the keyboard the synthesizer will send a message on MIDI which tells the receiving unit which note you pressed and how hard you played it.

In this way the receiving unit can reproduce the notes you play on the sending unit.

When you move the Pitch Wheel or the Modulation Wheel information about what is happening is transmitted in the same way.

This means that you can synchronize two instruments (or more) perfectly together.

The next step was to record the information transmitted over MIDI into a sequencer. A sequencer is similar to a tape recorder, but instead of recording sound on a magnetic media it records MIDI data into a memory. The sequencer can be a program in a computer or a unit by itself.

Similar to a tape recorder the sequencer has several tracks (usually 16 or 32) which can contain data for the different instruments. MIDI includes 16 different channels. A unit which sends or receives on

MIDI can be setup to do this on a specific channel (1-16).

With a sequencer you can decide on which channel a specific track will be transmitted on.

This gives you the possibility to connect different synthesizers (each one with a different sound) listening on different MIDI channels.

In this way you play the sounds of a whole orchestra from the sequencer.



# POSSIBILITIES

The difference from working with a multi-track tape recorder is that the sound itself is not recorded anywhere.

It is just the information for creating the sound that is recorded (which notes, what length etc.).

This gives you the possibility to create qualified high-quality recordings without the need for making overdubs and mixings.

With a sequencer you can easily build or adjust your music, add new instruments, new notes, copy parts and do all kinds of manipulation.

# MIDI and light - new possibilities

By "MIDI-fying" our products AVAB has started a revolution in the lighting business, making it possible to do things that were never possible before.

### Real-time Record

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You can record what is going on on, for example, a light board into a sequencer. The Light board sends out information about the keys that were pressed, the faders that were moved etc.

This means that you can run the board manually to a piece of music and record all the manual operations (moving masters, flash, GO etc.) into one of the tracks of the sequencer.

Then you can playback that track of the sequencer into the light board and the board will repeat exactly your manual operations.

You can then add new operations on another track of the sequencer while the first track controls the light you recorded before.

In this way you can build up unlimited complex lighting shows in a completely new way perfectly synchronized with music if you want.

### User Keys

You can easily connect programmable user keys. A user key can send any combination of other keys or fader movements.

To define a user key you just press Record and then do the action you want for the user key on the light board.

The action is then automaticly recorded into the user key.

When you press the user key again then the action is repeated.

### Synthesizer

You can connect a standard MIDI equipped synthesizer to your light board and change all keys of the synthesizer to flash keys for individual channels. Depending on how hard you press the keys the lamps will lit with different levels.

# POSSIBILITIES

### Data Transfer

You can connect two pieces of equipment together and transfer data (light presets, sequence, times etc.) directly between the different machines.

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### Synchronize

You can synchronize two devices (light boards etc.) together perfectly. This means, for example, that you can start crossfades on different boards from one board.

When you move a master on one board the master on the slave boards will also move.

### 16 different channels

MIDI contains 16 different transmission channels. This means that you can connect a lot of different equipment on the same cable where each unit transmits and receives on different channels within that cable. In the Expert you can select the transmission/receiving channel independentaly for each function such as Flash, Synchronization, Transfer etc.

Note: Due to the somewhat limited transmission speed of MIDI (31.25 kBaud), the bandwidth of the MIDI bus is limited. This means that if you are using a lot of masters sending out MIDI information and, at the same time, have a lot of other MIDI information on the same cable, it could mean that some data may be slightly delayed.



# AN OVERVIEW

# A world standard

The way to communicate between electronic devices is called a protocol. There are a great number of these in the world even for lightboards. USITT (United States Institute of Theatre Technology) tried to standardize these protocols in 1988 after pressure from lighting hire companies in New York. They decided to accept 3 sorts of protocol as a standard. All manufactures are recommended to follow these protocols.

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# Analog protocol

Control voltage 0 to +10 volt. 0 volt stands for darkness, +10 volt for full light. One wire is demanded for each dimmer.

# Digital protocol – DMX 512

Digital signal is transmitted by a two-wire, shielded, balanced cable (RS485). 512 dimmers can be controlled with this kind of cable.

# Analog multiplexed protocol - AMX 192

This protocol comes from Strand and is a concession to Strand. Everybody judges this protocol as dying out.

192 analog pulses is multiplexed on a two-wire cable where the pulse height in current decides the channel level. Simply speaking, AMX192 is simular to an AM radio and DMX512 is simular to a FM radio.

# AVAB follow these standards

AVAB already have a protocol like DMX512 but for 256 channels. This protocol has been in the market so long that it is considered a world standard and is supported by many other manufactures. Besides, AVAB's lightboards and digital dimmers follows the DMX512 protocol and the analog protocol as well.

The analog protocol works in parallel with the digital on AVAB's dimmers according to the principle Highest Level Takes Precedence

The user can anytime change between three different protocols on AVAB's dimmers: AVAB, DMX512 and Analog.

AVAB's lightboards can change between AVAB and DMX512.

If you want analog outputs on an AVAB lightboard you connect a so-called Mux-box which converts the digital signal to analog signals.

# WHY UPDATES

# ADVANTAGE OR DISADVANTAGE

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All AVAB computerised lightboards and digital dimmers are constantly being updated at a low cost. Are these updates really necessary, and who makes the benefit?

There are two different kinds of updates:

1) Updates correcting program malfunctions known as bugs.

2) Updates containing new or/and improved features.

# Updates to fix bugs

A program should, of course, be free from bugs when sold to end-users. This is not a reality! According to the world leading manufacturers of software (word processing, databases, administration programs) a program is never 100% bug-free.

Most programs however, have reached a very stable status before they are released. The bugs that can be found in a good program are often smaller bugs which do not affect the main features of the program.

Thus, there obviously is a need for updates. Mostly for the sake of the buyer, since it can take even years before some bugs appear. A manufacturer who does not allow for updates is leaving the customer Stranded after the bill has been paid!!

# Updates to provide new functions

In a large control system, the most expensive part is the hardware. A good hardware is never out of date as long as it can adapt to software improvements. In fact, such a system will never be out of date (exept for design perhaps).

This is great from the customers point of view, provided that the company which has manufactured the system is capable of and willing to provide updates with improved features.

AVAB usually build a product around a general computer which can be used for a lot of different tasks. This means that the hardware leaves an open end to the future. New features can easily be added with new software.

Today, the software is the most important part of a computer system. It is the software that creates all the features and functions of the system. To make good software is not an easy task. It takes a lot of experiance, knowledge and time.

AVAB was one of the first lighting manufacturers in the world to use computers in their products. Therefore AVAB has gained a lot of experiance in making computer software.

AVAB will continue to improve the software several years after a product has been delivered.

# **DIGITAL DIMMERS**

# Stability

Digital dimmers are very stable. A digital dimmer receives a numerical value from the lightboard. It then puts the output level to exactly that value. This value will produce exactly the same output voltage during the life of the dimmer.

Analog dimmers on the other hand have to make analog comparisons which accuracy depend on the electrical properties of individual components. These properties (foremost in transistors) change with time and temperature.

A digital dimmer is more serviceable. If it happens to break it can be repaired and restored to its original condition. Exactly! An analog dimmer will become worse and worse until it cannot be repaired at all. E.

A digital dimmer need no maintenance. It will aiways work exactly.

# Example

The San Francisco Opera has a number of AVAB digital dimmers and a few older analog dimmers (about 350). Two persons spend 5 days per year just to calibrate these analog dimmers. This does not include the time that is needed to mend the broken dimmers but only the calibration.

# **Facilities**

These days, digital dimmers are not more expensive than analog dimmers to buy. The digital dimmer on the other hand gives you possibilities that was not possible before.

### Built-in backup

The memory of the dimmer can register up to 24 presets. This is included in the system without extra costs. The only extra cost is a 24 channel lightboard that controls the backup. Since the backup unit is placed in the digital dimmer it is the most decentralized and secure backup solution existing.

### Free choice of curve

Optional dimmer curves can be assigned to any dimmer. Each dimmer can be connected with one of 5 curves: Linear, Square Law, etc. A must for an installation using different types of loads.

### Accuracy

Since a digital dimmer fires exactly it will become possible to connect with most kinds of loads: Inductive loads, motors, neon, fluorescental loads, etc.

# Fault controls

The fundamental advantage of digital transmission is the ability to make fault controls. Fault detection methods makes it possible to confirm that the information received by the dimmer is exactly the same as the information transmitted.

AVAB has added real fault control to the world standard DMX512. This is an important thing that is missing in the DMX-standard.

We call this DMX512 Enhanced.

This means that a dimmer using DMX512 Enhanced is much more tolerant to losses or disturbances in the data flow than a dimmer which only follows DMX512 standard. This will help you to avoid surprising flashes in the light when the data line is disturbed.

Fault control is also added on the normal AVAB protocol – AVAB256 Enhanced.

# **Experience of digital dimmers**

AVAB produced the first digital dimmer in the world. It was delivered in 1982, AVAB is now releasing its third generation of digital dimmers. These almost unmodified dimmers have been delivered since 1984.

It is a market tested, reliable, and stable product. It is known to function in hundreds of small and large installations, much thanks to our long experience of this technology. Dimmers are often placed in an environment full of disturbance where it can be difficult to run a computer.

The trick is a good utilization of the watch-dog channels that will restart the processor after serious disturbances.

When AVAB first started to deliver digital dimmers they were very simple. They did not even take digital signals since no lightboards were able to produce any.

Now they have all kinds of functions and exclusive features. A great advantage of digital dimmers is that they can easily be upgraded.

# Warning

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Many manufactures claim that they have some kind of digital dimmer. They try to confuse their customers by putting equal-sign between digital transmission and digital dimming. Watch out for this! The dimmer must have a computer to process a digital value.



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Expense in strength

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