

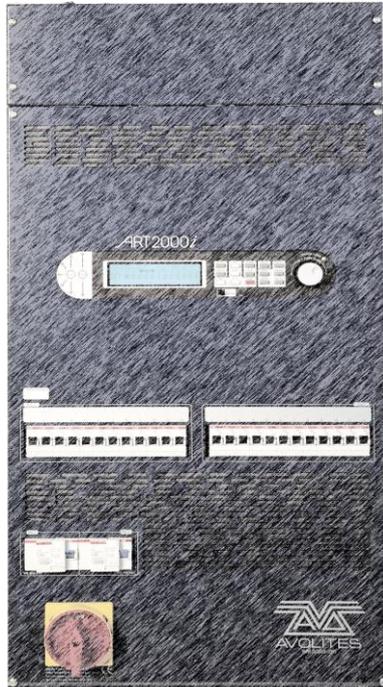


ART2000i

Digital Dimming System

Operator's Manual

software version OS4R2i



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***8200-
0160***

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INTRODUCTION

1. The ART2000*i* digital dimming system

This manual is designed to help you get the most out of your Avolites ART2000*i* Digital Install dimming system. Even if you hate reading manuals, read this section because the next couple of pages contain some **important safety information** which you should be aware of.

At the end of the manual there is a quick summary of how the DMX control system works, a Glossary explaining some of the technical terms used in the manual, and an Index which can be used to find what you need in the manual.

1.1 What it does

The ART2000*i* system is a Professional grade installation dimmer. The ART2000 controls up to 48 individual channels. Two modules of a maximum of 12 channels can be installed in a system frame. Two system frames can be joined to create a 48 channel system.

The following module types are currently available:

- 12 channel 16Amp dimming module
- 6 channel 32Amp dimming module
- 12 channel 16amp distribution module for powering moving lights

When loaded with 16A modules the system can be fitted with a patch bay consisting of 24 double dimmer outlets and 48 individual building circuits. Any building circuit can be patched to any dimmer outlet using the hot-patch. Alternatively the building circuits can be wired direct to the Dimming system if a patch is not required.

The 'Load Check' indication for each dimmer channel or relay module channel give confirmation that a load is present and the Channel status matrix allows you to quickly check what's connected.

The design incorporates full monitoring and status feedback via the backlit LCD display. For simple events or in emergency situations you can operate the dimming without a console by setting up a lighting state using the internal memories and encoder to set levels, and you can record 12 memories for replaying scenes. A Panic input allows a pre determined memory to be replayed across any number of systems, including temporary or visiting Avolites ART2000 and ART4000 touring racks.

Other features include full DMX patch and merge (2 DMX lines), dimmer curve and output limit selection per channel, power OK indicators, and optional RCB protection.

1.2 Important safety information

This system connects to 3-phase power which has the potential to give a fatal electric shock. There are no user serviceable parts inside the unit and servicing must always be carried out by a competent person with the knowledge and understanding of systems using three phase mains power. ALWAYS Disconnect the mains before opening the front panel.

This manual is however not a safety manual.

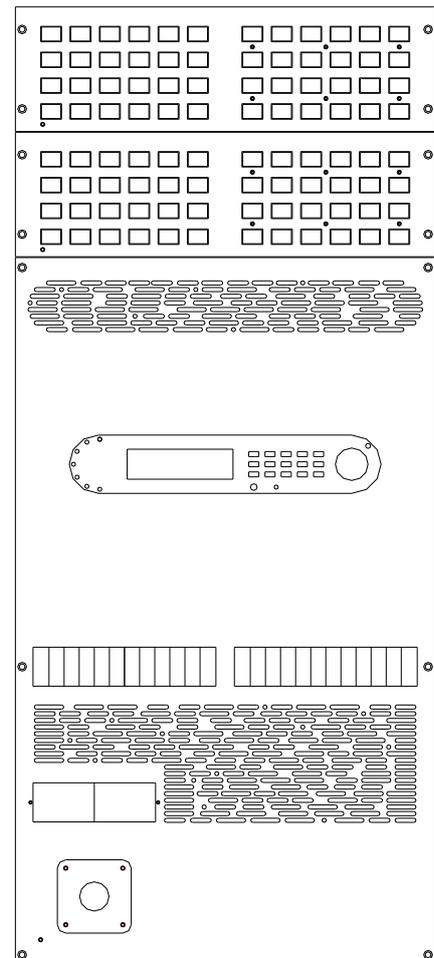
The system should be installed and operated only by competent persons. For the installation of this system, read the Installation manual Avolites stock no. 8200-0159 or download this from the Avolites Web Site.

When installing you should check local regulations regarding the separation of lighting fixtures on different phases. If you are in any doubt as to the safe installation of the system you should employ the services of a qualified local electrical contractor.

Do not operate the system with any dimmer modules or front panel missing because this makes live parts accessible.

Ensure that the neon power connection lights on the control panel are correctly illuminated. These lights will indicate most connection errors. The system may be damaged if it is turned on with the power feed connected incorrectly.

Do not to use the RCBs as an ON/OFF switch, as arcing will reduce the RCB's protection ability.



ART2000i with patch fitted

2. Features of the ART2000i

This chapter gives a quick rundown on what each part of the ART2000 system does. If you are new to the system, read this!

Some Parts described in this manual may not be on your system because the ART2000 system can be supplied in various configurations from the factory.

2.1 The Optional hot-patch panel

On top of the rack is the optional hot-patch panel. See picture on this page. This allows you to decide how the 24 dimmer channels are connected to a maximum of 48 building circuits. The lower half of the panel has the dimmer channel outputs. Each dimmer channel having two outputs wired in parallel, so each socket will have live and neutral

connected (220V).

For the occasional use of 110V lamps Avolites has a custom Wieland™ Series Lead, part number 03-13-0040.

2.2 Blanked Patch

The patch area may be blanked of on the right side if a 32A channel block is fitted, or the patch area can be fully blanked if the system is directly wired to the building. See picture on the next page

2.3 Vent Area

Directly Below the optional patch is the ventilation outlet. The warm air from the dimmer is expelled through here, take care not obstruct this area, as this will cause overheating of the system.

The Ventilation inlet is below the channel breakers, do not obstruct this area, as overheating may occur. This area can be fitted with an air filter. If an air filter is fitted it should be checked periodically to ensure it has not become clogged. Separate instructions will be issued when an air filter is fitted and these should be referred to with due consideration of the general building environment such as the level of dust.

2.4 Control Panel

The control panel has neon indicators on the left, five amber neon's indicate a correct mains supply, if any of the two fault indicators are lid a mains fault is present.

Next to the neon's is the Back lid LCD screen, the contrast of this screen can be controlled with the rotary pot to the right of it marked "Contrast".

The screen is used to show all relevant dimmer data.

To the right of the screen is the keypad. All the system functions can be accessed using these keys.

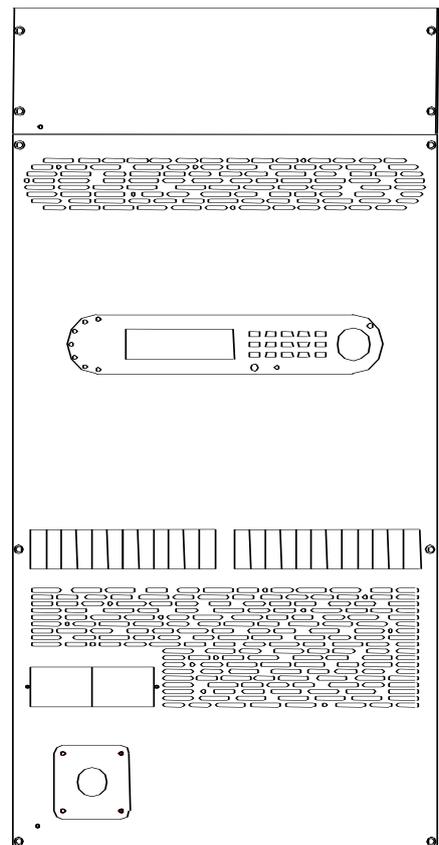
To the right of that is the encoder, with the Encoder Active Indicator.

This encoder is used to activate channels and memories. If the encoder is active the indicator is lid. The encoder can be used when the dimmer is in "Test-on", "memory-playback" and "remote-master" mode

The system reset switch is located just under the keypad and requires a pointy implement to be activated.

2.5 Power-blocks

The row of channel breakers indicate the type of power block fitted. The ART2000 install currently supports 3 different power blocks:



ART2000i without Patch

- **12x16A Dimmer module:** Each channel has a 16A C-type circuit breaker, for dimming incandescent and other loads
- **12x16A Breaker module:** Each channel has a 16A C-type circuit breaker, for powering moving lights (not dimmed mains) manually switched using the front circuit breakers.
- **6x32A Dimmer module:** Each channel has a 32A C-type circuit break for dimming incandescent and other loads

Note: Fans and other basic loads can be switched with a dimmer channel using the "Relay" curve. To allow DMX control. We do not recommend powering Moving lights through dimmed circuits as this may damage the moving light. In all cases you should confirm with the manufacturer of the piece of equipment you are connecting that controlling it through a 'Phase Controlled Dimmer' is acceptable.

- **Blank panel:** If a bay is to be left empty a blanking panel will be fitted to balance the air flow inside the dimmer and prevent live parts to be exposed.

Dimmer Channel Mapping

The ART2000 system allocates dimmer channels depending on the type of Power-blocks fitted to the frame or frames, up to a maximum of 48 dimmer channels.

A single frame fitted with a 12 channel Power-block and a 6 channel power-block will use dimmer channel 1-12 and 13-18, and the same frame fitted with two 12 channel Power-blocks will allocated channels 1-12 for the first block and 13-24 for the next block. In the case of two frames joined, the first two blocks (left frame) are allocated channels 1-12 and 13-24 and the next two blocks (right frame) have channels 25-36 and 37-48 allocated in the case of 12 channel modules.

Mixed systems of 16 and 32 Amps will always have the 32 fitted in the right most position of a frame. Systems with only one power block will have this fitted in the left position and the right position will be blanked.

| Module Type | Allocated channels |
|--------------------------------|--------------------|
| 12 channel 16A dimmer | 12 |
| 6 channel 32A dimmer | 6 |
| 12 channel 16A breaker | 0 |
| No Bay fitted (blanking plate) | 0 |

2.6 RCB protection Option

The ART2000i can be fitted with an RCB breaker (residual current breaker) per power block. This breaker will disconnect the power block if more than 30mA earth fault is detected.

Use the Test switch regularly to test the RCB.

2.7 Mains Isolator option

The system can be fitted with an isolator switch to isolate the dimmer from the mains connection.

The isolator can be pad-locked in the off position.

The front panel cannot be removed if the isolator is in the ON position.

3. Quick start for commissioned systems

Before you Turn on the power, either by means of the optional isolator on the front or an isolator in the building ensure that no DMX levels are up at to prevent large inrush currents.

The control module will start up and display the following screen:

| | |
|---------------------------------------|-----------------------|
| Line A 001 Dmx ok | Line B 001 No Dmx |
| Status Running OK | Mode Test Off |
| ----- | |
| OS 4R1i | UCode 1.0 PDE 1.0/1.2 |
| The ART team wishes you happy dimming | |

Now you can send DMX levels or switch the channel.

If the display shows other messages, this may indicate that a problem has been found. See the Troubleshooting section on page 19 for details of what to do.

If you cannot read the display you may need to adjust the display contrast control at the bottom right hand corner of the display.

3.1 Patching dimmer channels to lights (optional)

If a patch is fitted you need to patch each fixture you wish to use to use to a dimmer channel by connecting cables on the hot-patch panel. At the bottom of the hot patch panel are the dimmer outlets from the power-blocks. At the top of the hot patch panel are the circuit connections which link to building wiring and on to your fixtures.

If no patch is fitted follow on from here.

3.2 Channel Status

Independent of the patch, connected channels are detected and shown on the load status screen where:.

| | |
|---|----|
| A unloaded dimmer channel | NL |
| Breaker tripped (with or without a load) | BT |
| All OK | |

If the screen below is not seen, press EXIT to switch to this screen.

```

Line A 001 Dmx ok      Line B 001 No Dmx
Status Running OK     Mode   Test Off
-----
Chan.   1  2  3  4  5  6  7  8  9 10 11 12
Bay 1  NL NL
Bay 2  BT BT
Bay 3
Bay 4

```

The above example shows channels 1-12 with no load, channel 13 and 14 with a tripped breaker and channels 15-24 are loaded.

3.3 Testing channels using the local control faders

When you are setting up the rig or testing circuits, it is useful to be able to fade up a channel from the dimmer system. Each dimmer or relay channel on the ART2000 can be manually controlled using the Encoder and the Level Matrix Screen. Note that this test function can be disabled to prevent accidental usage. The Test On or Off mode is displayed as "Faders on" or "Faders off" on the LCD screen.

3.3.1 Using the Encoder

- ➔ Press TEST ON to enable the Encoder
- ➔ Turn the Encoder to the desired the channel you want to change
- ➔ Press the Encoder to change from Channel select to level adjust mode
- ➔ Turn the Encoder to alter the level of the selected channel
- ➔ Press the Encoder again to return in Channel select mode.

Note: The system clears the manual level data if TEST OFF is selected, record the data into a memory if it will be needed again.

The Caption bar above the level screen shows the mode the encoder is set to.

```

Line A 001 Dmx ok      Line B 001 No Dmx
Status Running ok     Mode   Test On
-----
Channel-Level-----
Chan.   1  2  3  4  5  6  7  8  9 10 11 12
Bay 1  011012013014015016017018019010010010
Bay 2  021022020000000000000000000000000000

```

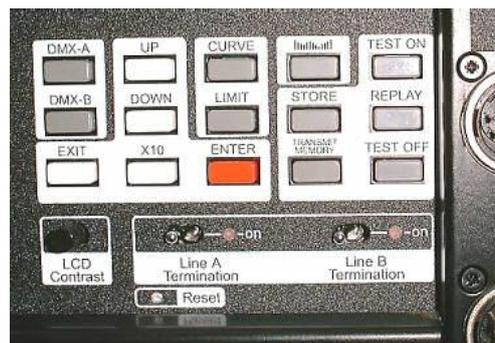
The Manual Level Data is combined with the DMX input using highest-takes-precedence (HTP) rule, in other words if the DMX input is turning the channel on full, you will not be able to take control using the manual control.

You can also program 12 memories into the ART2000 rack, which is useful in case of emergency, or for very simple setups where you do not need a control console. This is described on page 16.

4. Setting user options

The ART2000 has a simple user interface. Most functions have their own buttons, removing the need for multiple menus.

This section describes how to configure the ART2000 rack to your requirements.



4.1 Setting the DMX start address

For many productions, you will just set one start address for all 24 or 48 dimmers. Channel 1 will operate from the DMX start address you set, and the other 23 or 47 channels will follow in a continuous block of channels. This is called "Rack Patch" mode, because the whole rack is patched in one go.

You can set the DMX start address differently for the two DMX inputs, so for example channel 1 can be controlled by DMX channel 100 on one console and DMX channel 300 on the other console. This can be useful if two consoles are controlling the rig, as sometimes happens if you are using moving lights with external dimmers to control the lamp, and normal static lights in the same show.

You can also allocate each channel to an individual DMX control channel. This is called Channel Patch mode and is described later.

4.1.1 Setting the DMX start address

- ➔ Press the DMX A button to change the start address for DMX line A
 - ➔ Press the UP or DOWN buttons to change the start address shown on the screen
 - ➔ To change in decades, hold down the X10 button and press Up or Down
 - ➔ Press ENTER to store the new start address.
-

The display shows

```

Line A 001  Dmx ok   Line B 001  No Dmx
Status Running ok   Mode   Test Off
-----
Change Line A Module start address
Current start address is 001
      New start address is 000
Dmx address 000 is not supported
  
```

You can set the start address for DMX line B by using the DMX B button in the same way.

The display looks like this:

```

Line A 001 Dmx ok      Line B 001 No Dmx
Status Running OK     Mode   Test Off
-----
Change dimmer channel curve
dimmer channel 48 curve: Linear Curve
dimmer channel 01 curve: Linear Curve
dimmer channel 02 curve: Linear Curve

```

The available dimmer curves are:

- **Linear Curve** - linear response with standard tungsten halogen lamps
- **Relay On >50%** - channel turns on full wave, if input above 50%
- **Relay Off >50%** - channel turns off full wave, if input above 50%
- **5% Pre heat** - channel stays on at 5%, input scaled over remaining 95% using a linear curve
- **10% Pre heat** - channel stays on at 10%, input scaled over remaining 90% using a linear curve
- **15% Pre heat** - channel stays on at 15%, input scaled over remaining 85% using a linear curve

You can modify all 24 or 48 channels in one go by holding X10 and pressing CURVE. The following screen display is shown:

```

Line A 001 Dmx ok      Line B 001 No Dmx
Status Running ok     Mode   Test Off
-----
channel Curve setup for all channels
selected Curve is: Linear Curve
press ENTER to change ALL channels
press EXIT to abandon

```

Use the UP and DOWN buttons to select the desired curve, then press Enter.

4.4 Limiting the output of a dimmer

Each dimmer channel can have its own "Limit" setting. This allows you to restrict the maximum output of the dimmer. You might want to do this to match the intensity of different lamps. The dimmer will scale its output over the remaining DMX data range.

Tip: The limit function can also be used to "slow down" the fading response of theatrical lights, which are often not used at full power. You can use this to match a 500W lamp fade speed to a 650W lamp.

4.4.1 Setting the dimmer limit

- ➔ *Press the LIMIT button*
 - ➔ *Select the channel you want to set using the UP / DOWN buttons, then press ENTER.*
 - ➔ *Select the Limit you want for that channel using the UP/DOWN buttons, then press ENTER.*
-

To modify the limit for all 48 channels in one go, hold X10 and press LIMIT. The following screen display is shown:

```

Line A 001   Dmx ok   Line B 001   No Dmx
Status Running ok   Mode   Test Off
-----
Channel Limit setup for all channels
selected Limit is: no limit set
press ENTER to change ALL channels
press EXIT to abandon

```

Use the UP and DOWN buttons to select the desired limit, then press Enter.

4.5 Soft Patch

The ART2000 system allows you to allocate any DMX address to any dimmer channel on an individual basis. You can also set different allocations on DMX line A and line B.

It is important to know that the Art2000 will truncate the dimmer channels depending on the bay requirements. Consider the following set-ups:

Example 1

| | | |
|-------|-----------------|------------------------------|
| Bay 1 | 12x 16A dimmer | Dimmer channel 1-12 |
| Bay 2 | 12x 16A dimmer | Dimmer channel 13-24 |
| Bay 3 | 12x breaker | No dimmer channels allocated |
| Bay 4 | 12x 16 A dimmer | Dimmer channel 25-36 |

Example 2

| | | |
|-------|-------------------|------------------------------|
| Bay 1 | 12x 16A dimmer | Dimmer channel 1-12 |
| Bay 2 | 12x 16A dimmer | Dimmer channel 13-24 |
| Bay 3 | 12x 16A contactor | Dimmer channel 25-36 |
| Bay 4 | 12x 16A breaker | No dimmer channels allocated |

Example 3:

| | | |
|-------|---------------|----------------------|
| Bay 1 | 6x 32A dimmer | Dimmer channel 1-6 |
| Bay 2 | 6x 32A dimmer | Dimmer channel 7-12 |
| Bay 3 | 6x 32A dimmer | Dimmer channel 13-18 |
| Bay 4 | 6x 32A dimmer | Dimmer channel 19-24 |

The main application of the softpatch is to patch around faults or problems. You should preferably use the patching facility in your control console to allocate dimmers to DMX channels.

When the ART system leaves the factory the soft Patch is pre-loaded with a patch starting at DMX 001 dimmer channel 1 till DMX 048 dimmer channel 48. This is called a "one-to-one" (1:1) patch. (see also 5.3 Wipe-all function) In most cases you may want to start from a different start address like 200 or 127. You can select a start point for the 1:1 patch after the patch mode is set to softpatch.

Changing the patch mode

To use the soft Patch, you need to change the mode for DMX line A or B. The mode can be different for each line.

4.5.1 Turning on the softpatch

- ➔ Hold X10 and press DMX-A or DMX-B. The display will show the Soft-Patch screen.
- ➔ Press UP / DOWN to change the **NO** into **Yes**, and press ENTER. The 1:1 Patch screen will now appear
- ➔ If you do **not** want a 1:1 patch to be loaded press EXIT,
- ➔ if you want to load a 1:1 Patch change the **NO** into **Yes** using the UP / DOWN button.
- ➔ Select the start address where the 1:1 patch needs to start from and press Enter.

Screen shot after X10 and DMX A:

```

Line A 001  Dmx ok   Line B 001  No Dmx
Status Running ok   Mode   Test Off
-----
Do you want to use a softpatch for Line A
      Yes

```

Screen shot after ENTER:

```

Line A 001  Dmx ok   Line B 001  No Dmx
Status Running ok   Mode   Test Off
-----
Do you want to start with a 1:1 softpatch?
      No

```

To switch of the soft-patch, repeat the above procedure selecting NO when asked if a soft-patch is to be used. The soft Patch information is not lost when you switch off the softpatch.

When a DMX line is in softPatch mode, the top line of the display shows "Patch" rather than the base DMX address.

If you need to allocate an individual dimmer channel to a different DMX address you do the following:

4.5.2 Patching individual dimmer channels

- ➔ Press DMX-A or DMX-B (the DMX input must be set to softpatch mode)
- ➔ The middle line of the display shows the active dimmer. Press UP / DOWN to select the dimmer channel you want to change, then press ENTER
- ➔ Press UP / DOWN to set the DMX address for this dimmer channel, then press ENTER
- ➔ Repeat for other dimmers, or press EXIT to finish

The display shows

```

Line A Patch Dmx ok   Dmx B 001   No Dmx
Status Running ok   Mode Test off
-----
Dmx A softpatch
Dimmer Channel 48   Dmx address 048
Dimmer Channel 01   Dmx address 001
Dimmer Channel 02   Dmx address 002

```

4.5.3 "Parking" DMX channels

You can set the DMX address of a channel to 000, this "parks" the dimmer channel so it is not controlled by that DMX line. This is useful if you want a dimmer to be controllable from only one of the two DMX lines, or if you want to disable a dimmer.

4.5.4 Behaviour of "X10 and UP /DOWN "

When scrolling through dimmer channels the X10 and UP or DOWN combination will jump to the first dimmer channel of the following or preceding bay. Thus in a frame with four 12 channel modules pressing X10 and UP when selecting dimmer channels will result in the channel jumping from 01 to 13, 25 and 37.

When changing DMX addresses the X10 and UP or DOWN combination will jump in decades. Thus start addresses 015 changes into 25, 35 etcetera.

4.5.5 When DMX data has been interrupted

The ART2000 system can detect the availability and usability of Dmx Data and will show this in the screen:

```

Line A Patch Dmx ok   Dmx B 001   No Dmx
Status Running ok   Mode Test off
-----

```

- "Dmx ok " indicates Dmx data which can be used (Line A in above screen shot)
- "No Dmx" indicated either no dmx connected or bad Dmx (Line B in above screen shot)

The ART2000i will retain the last received DMX data if a single Dmx Data stream is interrupted (this in accordance with DMX 512 1990).

You can clear this data by pressing X10 and TEST OFF and all the channels held at a level by the interrupted Dmx data will fade to off.

When two data streams are present and one is interrupted the ART2000i will fade out the "locked" data from the interrupted Dmx stream after 5 seconds and in 5 seconds. This will allow you to regain control over channels held at a level by the interrupted Dmx Stream.

4.6 Storing dimmer level memories

The ART2000 system can store 12 memories internally. A memory contains the state of all the 48 channels. This can be useful to keep the show going if the control console stops working, or if you have a very simple static set-up which does not require a control console.

If you have multiple racks of Avolites ART dimmers (2000, 4000 or 6000), you can instruct all connected ART systems to store a "Global" memory. Once you have stored memories, you can play back these memories from one control module, allowing you access to all the channels on all the racks using the controls on the first rack. If you are planning on doing this, the first rack in the DMX line will be the Master rack, and all the others will be Slaves. The Master rack will use the DMX-A line to command the downstream racks to save or play back the memory, and so it is best if only ART systems are connected to the DMX line downstream from the Master, since other systems may interfere with memory replay or recording.

4.7 Storing a memory

When you store a memory, the current state of all the dimmers channels is recorded. Memories can either be stored as "local" (just the current rack) or "global" (the current rack will store the memory and instruct all downstream systems to store as well). This is particularly handy when storing memories on a multiple dimmer system setup, as you will only have to store 12 global memories, and not 12 memories for every system.

Use the following procedure to store a memory

4.7.1 Storing a memory

- ➔ Press the *STORE* button
- ➔ Select the memory number you want to store in using the *UP / DOWN* buttons, then press *ENTER*
- ➔ Select "*Local*" or "*Global*" using the *UP/DOWN* buttons, then press *ENTER*.

Screen shot after memory 6 has been entered:

```
Line A 001 Dmx ok Line B 001 No Dmx
Status Running ok Mode Test off
-----
Store a memory to a channel fader
Store memory 06 as a local memory
```

4.8 Replaying a memory

You can replay a memory either locally (just the current rack) or globally (the current rack and all downstream racks). When you replay a memory locally, the output is HTP mixed to any DMX levels which may be present, however when memories are replayed globally DMX input is suspended.

Use the following procedure to replay a local memory.

4.8.1 Replaying a local memory

- Press the *REPLAY* button
 - Turn the Encoder to select the memory you want to replay (1-12)
 - Press the Encoder to change to Level mode
 - Turn the encoder to bring up the memory
-

If you want to replay a memory globally (i.e. turn on Memory 1 on all the racks), you need to carry out the following procedure at the Master rack (the one which is first in the DMX line).

Note: that the DMX line will be interrupted; if you have other equipment connected after the master dimmer rack they will lose DMX.

4.8.2 Replaying a global memory

- Press the *TRANSMIT MEMORY* button on the Master rack
 - Press *ENTER* to confirm
 - Turn the encoder to select the memory you want to replay (1-12)
 - Press the encoder to change to Level mode
 - Turn Encoder to bring up the global memory
 - To stop transmitting memories, Press the *TRANSMIT MEMORY* button on the Master rack
 - Press *ENTER* to confirm
-

You can pre-view what channels are stored at what level in a memory without replaying it

4.8.3 Pre-viewing a memory

- Press *X10* and *STORE*
 - Use *UP* and *DOWN* to cycle through the 12 memories
-

Memory pre-view screen shot

| | | | | | | | | | | | | |
|-------------------------------|--------|------------|--------|----|----|----|----|-----|-----|----|----|----|
| Line A 001 | Dmx ok | Line B 001 | No Dmx | | | | | | | | | |
| Status Running | ok | Mode Test | off | | | | | | | | | |
| MEMORY 01 STORED LEVEL | | | | | | | | | | | | |
| Chan. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Bay 1 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 255 | 00 | 00 | 00 |
| Bay 1 | 00 | 00 | 00 | 00 | 45 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| Bay 1 | 00 | 00 | 00 | 00 | 00 | 00 | 09 | 00 | 00 | 00 | 00 | 00 |
| Bay 1 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 255 | 00 | 00 | 00 | 00 |

Pressing the *EXIT* button will restore the normal screen.

5. Special functions

5.1 Panic input

The ART2000i has a Panic input which can be connected during the installation (see the installation manual for details).

When this input is activated the Dimming system enters a special mode where all the inputs are ignored and only memory 12 is replayed at 100%.

The master dimming system will display a warning message indicating:

```

Line A 001 Dmx ok   Line B 001 No Dmx
Status Running ok   Mode Test off
-----
Panic input is active on Master module!
De-activate Panic input
to resume normal operation

```

All other downstream DMX connected ART systems will show "Remote memory active".

5.2 Visiting ART systems

Any ART family member can be controlled by the Master Install dimmer, therefore all the remote functions like Global store and remote memory replay will function across the whole system including the Panic function.

The visiting touring racks can easily be "patched" into the building if the optional hot patch panel is installed on the install dimmers.

Consideration should be given to how the visiting systems are powered and they should obviously be properly connected to ground.

5.3 Wipe-all function

The ART2000 system has a Wipe-all function to quickly restore factory settings:

5.3.1 *Wipe all function*

- ➔ *Power down the control unit (rotary switch)*
 - ➔ *Press and hold the UP and DOWN button*
 - ➔ *Power up the control unit*
 - ➔ *Wait for the start-up screen to state "happy dimming"*
-

The ART2000 factory settings are:

- Line A and B are set to "rack patch" mode.
- Line A and B are set to start address 000.
- All channels have the linear curve, and no limit applied.

6. Troubleshooting

The ART2000 system includes many self-testing features. If there is an internal problem in the system, the control module will usually detect the problem and tell you about it.

The Status line on the display tells you if the system is happy and healthy, or if there is something you need to worry about. "Running OK" means that everything is good. "warning" means that there is a problem, but the dimmer will carry on working.

6.1 System setup

You can display more information about the system by holding down the X10 button and pressing the LEVEL button. (Above STORE).

| | | | |
|-------------------------------------|--------|------------|---------------------------|
| Line A 001 | Dmx ok | Line B 001 | No Dmx |
| Status Running | ok | Mode Test | off |
| ----- BAY STATUS ----- | | | |
| | Found | Chan | Control Temp OverTemp Run |
| Bay 1 | Yes | 12 | 123 20 No 81 |
| Bay 2 | Yes | 12 | 456 21 No 71 |
| Bay 3 | No | 00 | 789 -127 No 00 |
| Bay 4 | Yes | 12 | 101 21 No 61 |

This screen shows the status of the bays, where:

| | | |
|----------|-----|---|
| Found | Yes | indicates module detected |
| | No | indicates module not present or undetected |
| Chan | 00 | No channels detected |
| | 12 | 12 channel dimmer or relay module detected |
| Control | | A run counter inside the dimmer controller (should not be stationary) |
| Temp | | Temperature of the module (± 3 degrees C) |
| OverTemp | | Indicates the state of the over temperature switch on the module |
| Run | | A run counter on the Module controller (should not be stationary) |

To see the software details press UP or DOWN when the above screen is active:

| | | | |
|---|--------|------------|--------|
| Line A 001 | Dmx ok | Line B 001 | No Dmx |
| Status Running | ok | Mode Test | off |
| ----- SOFTWARE VERSION ----- | | | |
| ART OS4R1 Ucode 1.0 PDE1.0/1.2 | | | |

Pressing the EXIT button will restore the normal screen.

The internal software can be updated using PC software and special cable, (Avolites part number 1808-0016) available from Avolites. Full instructions are given by the PC software.

6.2 Overheating

If the system detects that it is overheating (heatsink temperature over 80°C), it will display the following warning:

```
Line A 001  Dmx ok   Line B 001  No Dmx
Status Running ok   Mode Test off
-----
          WARNING
-----
Bay 1 temperature is over 80 C!"
Is the fan working for this bay?"
Bay will shut down at 90 C!"
```

Ensure that all fan vents are clear and that sufficient air flow is available to naturally cool the module.

If the temperature continues to rise the following message will appear:

```
Line A 001  Dmx ok   Line B 001  No Dmx
Status  warning          Mode Test off
-----
          WARNING
-----
Bay 1 has shut down at 90 C!
Check for cause of over-heating!
Bay may resume operation if cooled.
```

The affected dimmer module is shut down.

6.3 Module sensing

If the system detects that it cannot communicate with a module which was OK at power-up, it displays the following message:

```
Line A 001  Dmx ok   Line B 001  No Dmx
Status warning          Mode Test off
-----
          WARNING
-----
Bay 1 not found
```

A module not being correctly fitted in a bay or being removed whilst powered up usually causes this.

6.4 Problems with setup changes

If the system cannot write setup changes into its permanent memory it displays the message below. The system will continue to operate but setup changes will be lost when it is powered down.

```
Line A 001  Dmx ok   Line B 001  No Dmx
Status Warning          Mode Test off
-----
          WARNING
-----
There was a problem saving data!
Please try again.
```

Please Contact Avolites for service if this problem occurs.

6.5 Dimmer Engine Control Problems

If the system cannot start-up one or more of the four dimmer engines the following message will appear

```

Line A 001  Dmx ok      Line B 001  No Dmx
Status Warning          Mode Test off
-----WARNING-----
Bay 1 dimming control stopped!
...control now restarted

```

The system will restart the dimmer engine within about 10 seconds. Stopping dimmer engines is generally a sign of bad mains, or bad connections on the control board

The remaining bays will work as normal and the dimmer can be used

6.6 Software upgrade

Any ART system running OS 2.0 or higher software can be upgraded using a serial cable and a PC.

The Software will be made available free of charge, on the Avolites web site under "Downloads", you will also find data on how to make the cable

Alternatively you can buy the cable from Avolites, part number: 1808-0016

6.7 Resolving circuit problems

If a dimmer circuit does not operate as you expect, don't panic! There are several possible causes.

Check the lamp: on the hot-patch panel on top of the rack, check that the patch cable is fully inserted

Check the control setup: If all the above is OK, then you may have a DMX control problem. Make sure that the rack is set to the same DMX channel as the control console. If the display shows that the DMX line you are using is in Channel Patch mode, make sure the dimmer channel has not been patched somewhere else or has been "parked".

If you are experiencing common faults or patterns (such as every 3rd channel not working) this can indicate a phase supply problem.

You may be able to solve problems by restarting the dimmer rack or pressing the reset button using a small pointed implement.

CHAPTER SEVEN

7. Introduction to DMX

This section is for those who are put off by dip switches, lights that move unexpectedly and strange digital control systems that fly down microphone cables.

7.1 Ordinary lighting

Standard lighting consists of a variety of light bulbs connected to dimmers. The lights may be anything from par cans to theatrical lanterns, and the dimmer controls the intensity of the light. A typical controller for standard lighting has a set of sliders, and each slider controls the intensity of one dimmer using a low-voltage control signal of 0 to 10 volts. The standard way to link the sliders to the dimmers is by using a multicore cable with one core for each dimmer channel.

7.2 The problem with big lighting rigs

Because each dimmer channel needs its own control signal, if you have a large lighting rig, the control cable can end up being huge, with big expensive connectors. If you are using intelligent lighting, like scans, this gets even worse, because some of the more complicated fixtures use 20 channels or more per fixture. You soon need a better way of getting the control signals from the control console to the equipment.

7.3 The DMX control system

Fortunately, there is an easy to use system for controlling intelligent lighting and dimmers with large numbers of channels. It is called DMX-512, which stands for Digital MultipleX, and it sends up to 512 control signals down a 2 core or 4 core screened cable. The cable can be simply daisy-chained from each lighting device to the next - all DMX devices have a loop-through connector which allows you to link to the next device. Normally a 5-pin XLR connectors is used and in the case of the ART system, all 5 pins should be connected.

Control consoles using the DMX system send out the level for channel 1, followed by the level for channel 2, then 3, then 4 and so on, all the way up to a maximum of 512 (though not all DMX systems send out all the channels). It then goes back to channel 1 and goes round again.

All the units connected to the DMX receive all the channels, and you tell them which channels to respond to by setting the "start address" on each unit. The computer inside the dimmer or fixture waits for the correct channels to come up, then reads in the levels for those channels and uses them to set the dimmer levels or the fixture positions.

7.4 A few cautions about using DMX

DMX is a robust system which normally works very well, provided you keep to a few simple rules. Here are a few tips for making DMX work well.

- DMX cabling should be twisted-pair shielded data cable. Microphone cable is not recommended because it degrades the signal, especially on long runs.

- Always “terminate” the last dimmer or fixture on the DMX line, either with a special termination plug, or the ART2000 rack has terminator switches which do this for you. The termination is a 120 ohm resistor across the DMX data lines which prevents data interference on the line. It might work without but...
- Don’t split the DMX cable. Loop it from one unit to the next. If you have to split it, use a proper active splitter unit like the Avolites Rack splitter or Avolites truss splitter, part numbers 33-65-1000 (19” mounting, 8 outputs) or 33-65-2000 (truss mounting splitter using a self-fixing strap, 6 outputs).
- The DMX specification says you should not have more than 32 unit loads on one DMX line. Either use several DMX lines (Avolites consoles usually have more than one) or use a DMX splitter unit. Again, you will probably get away with using more if you have to, but the DMX signal will be weaker than it should be.
- Don’t run your DMX lines near high voltage cables or neon supplies. They may pick up interference which will stop the system working.

CHAPTER EIGHT

8. System specification

The figures below give the specification of the standard ART2000 system.

| Power Ratings | Minimum | Maximum |
|--|-----------|-----------|
| Mains input voltage (phase - neutral)* | 110V/220V | 120V/240V |
| Mains input frequency | 42Hz | 72Hz |
| Current drawn per phase | | 274A |
| Current per channel | | 16A/32A |

*System is manufactured for either 110V or 240V

| Environmental ratings | Minimum | Maximum |
|-------------------------------|---------|--------------------|
| Ambient temperature | 0°C | 40°C |
| Internal heatsink temperature | | 70°C |
| Relative humidity | - | 90% non-condensing |

| Fan cooling airflow (cubic ft/min) | Minimum | Maximum |
|---|---------|---------|
| Normal operation | 40 CFM | 100 CFM |
| Maximum load | | 480 CFM |

| Physical information | |
|---|-----------------------------|
| Dimensions Base frame | Height x with x depth in mm |
| Single frame no patch | 1000 x 500 x 200 |
| Single frame with patch | 1000 x 1150 x 200 |
| Double frame no patch | 1000 x 1000 x 200 |
| Double frame with patch | 1000 x 1150 x 200 |
| Weight patched 24 off 16A channel frame with mains isolator | Approximately 60Kg |

| Channel/Phase information | 12 channel module | 6 channel module | 3 channel module |
|----------------------------------|-------------------------|------------------------|------------------------|
| Red phase | 1,4,7,10 | 1,3 | 1 |
| Yellow phase | 2,5,8,11 | 2,4 | 2 |
| Blue phase | 3,6,9,12 | 3,5 | 3 |

9. Glossary of technical terms

| | |
|----------------------|---|
| ADDRESS | see START ADDRESS |
| BAY | The ART2000 touring systems frames have 2 or 4 bays depending on the model, each of which can hold either a dimmer module, relay module or power distribution module. See Power Block. |
| CHANNEL | One circuit of a dimmer/distribution system, which may be connected to one or more lamps in parallel. Also used to refer to the slider controlling the dimmer on the control console and the control value in the DMX system which links the two. The term is fairly ambiguous and should be clarified when used. |
| CIRCUIT | The connection between the dimming system and a fixture. When a Hot Patch is fitted Circuits are Patched to Dimmers. |
| SOFT PATCH | Patching mode where each dimmer channel can be assigned to any DMX Address (they do not need to be in a sequence) |
| CURVE | How the output of the dimmer corresponds to the input. Used to correct for non-linear response of some types of lamp. |
| DIMMER | Device which allows control over the intensity of a lighting fixture. |
| DMX | DMX512(1990) a specification for communication between control desks and dimmers or fixtures, Originally for Dimmers it has been adopted as a control protocol for most lighting systems. It can carry 512 different slots of 8-bit data. |
| HOT-PATCH | A plugging system which allows you to connect any dimmer channel output to any Multicore channel. The "hot" refers to the patch carrying mains voltage. |
| HTP | Highest Takes Precedence, a mechanism for determining the output level of a Channel held in more than one Playback Channel. The Channel outputting the Highest value at any given time will always determine the level of the Channel. Also see LTP. |
| INTELLIGENT LIGHTING | Generally refers to some type of motorised light or colour changer. Also called Intelligent Fixture, Device, Instrument, Moving Light. |
| MODULE/POWER-BLOCK | An electronics pack containing either 12 dimmer channels or 12 power distribution channels. |
| MULTICORE | A cable/connector system which can carry multiple connections. Often used to connect 6 lights to a |

| | |
|---------------|---|
| | Dimmer rack instead of using 6 separate cables. Sometimes the brand name of the connector is used, e.g. Socapex or Harting. |
| POWER BLOCK | The power electronics module used in the ART2000i. Available in different specifications at the time of writing: 12 * 16Amps, 6 * 32Amps and mains distribution. |
| PHASES | Mains power is supplied in three different live conductors, each called a phase. Consult a qualified electrician for more details. |
| PREHEAT | If a small voltage is left applied to a lamp when the channel is turned off, it turns on faster because the filament is warm but not necessarily glowing. |
| RACK PATCH | Patching mode where dimmers are allocated to sequential DMX control channels |
| RCB | Residual Current Breaker. Helps to protect the user against electrocution by detecting an imbalance between the current leaving the unit down the live conductor and the current returning down the neutral, and isolating the supply the current differs by more than 30mA. |
| RISE TIME | The time taken for the mains output to rise to full voltage when the dimmer channel turns on. This happens 100 times per second and has a large effect on the amount of interference generated by the dimmer. It also affects the acoustic noise made by a lamp filament. (Larger rise time generally equals less electrical and filament noise). |
| START ADDRESS | The first DMX channel used by the dimmer or fixture. Usually a block of channels is used, starting from the Start Address. |
| TERMINATION | The end of a DMX run should always be fitted with a terminating resistor to prevent data problems. The ART2000 rack has switches to do this. |
| TN-S | Type of three phase power system with neutral bonded to earth at the substation, and a separate earth conductor throughout the system. |

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