



ART Dimming
Module
Operators Manual

***8200-
0150***

Avolites Stock Number 8200-0150

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The small print :

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ART 4000 Operators Manual

1.1 Safety first

If you need to carry out any maintenance work on the dimmer make sure it is isolated from the mains supply. Voltages in excess of 415 volts may be present. Do not rely on a circuit breaker for safety isolation. Always remove the power leads.

When connecting power to a module or a system, make sure the earth cable is connected first followed by neutral, then the three phases.

If using a dimming system that has a voltage meter on it, use this to carry out a final voltage check before powering up modules, in particular make sure the phase neutral voltage is correct.

1.2 What's inside

The Art dimming system uses the latest technology to provide trouble free dimming. All channels are rated for delivering 100% of the rated power continuously with an ambient temperature of 40 deg Celsius.

Two processors are used to accurately control the dimming levels, read DMX, Analogue voltage levels, buttons and drive the LED's and displays.

The fans are temperature controlled. This has two important advantages, the fan life is maximised and at the same time the minimum of dust is distributed within the dimming module.

2. Front Panel Load OK and Fault Mimic

When the module is powered and a channel circuit breaker turned on two indicators provide immediate information on what the channel is doing. By checking there are no RED indicators lit you know all circuit breakers controlling loads are in the on position.

The LOAD OK indicator lights in Green to indicate that a load is connected to the channel and the channel is at level zero.

The FAULT indicator lights in red if the circuit breaker has tripped.

3. LCD Display

Use the Contrast control located to the right of the module to adjust for the best viewing angle.

4. Setting the DMX address for the Module

The Art dimmer can operate in one of two patch modes, Full Patch or Module Patch. Full patch means each dimmer channel can be connected to any DMX channel, whilst Module Patch means the first channel of the module, has a base address and subsequent channels are incremented from this.

Within this manual these modes will be referred to as Full Patch or Module Patch.

4.1 Setting DMX address per module

There are two patch modes, Full and Module. Full patch mode allows each dimmer channel to connect to any DMX address. Module patch mode, patches the first channel on the module at a DMX address and the remaining channels are offset from that address.

- Make sure you are in the Module Patch mode. When in this mode the LCD display will indicate the start address of Line A and Line B.

If the display indicates FUL PCH see section 11.1 Enabling and Disabling Full Patch Mode on page 8 to find out how to change the patch mode

- Press either the DMX A button or the DMX B button to select the line you wish to set the address on.

The screen now displays the current address for the line you are setting

- Use the UP and DOWN buttons to increment or decrement the address. Hold the X 10 button down and use the UP and DOWN buttons to increment or decrement the address in units of 10.
- Press ENTER to store your change.

No change takes place until the ENTER button is pressed. If you do not press a button for more than 10 seconds the menu will time out

4.2 Setting the DMX address for each Channel

There are two patch modes, Full and Module. Full patch mode allows each dimmer channel to connect to any DMX address. Module patch mode, patches the first channel on the module at a DMX address and the remaining channels are offset from that address.

- Make sure you are in Full Patch Mode.

The Display should indicate FUL PCH, if you can see individual DMX addresses then you are in the Module Patch mode. To change into Full Patch see section 11.1 Enabling and Disabling Full Patch Mode on page 8

- Press either the DMX A button or the DMX B button to select the line you wish to set the address on.

The screen now displays Dim chan: 01 to Line A DMX:001

- Use the UP and DOWN buttons to select which Dimmer channel you wish to set.
- Press the ENTER button once you have set the Dimmer channel.
- Use the UP and DOWN buttons to select which DMX channel the Dimmer channel will respond to.
- Press ENTER. The next Dimmer channel is automatically selected. Continue setting DMX channels as above.
- Finish and store the changes you have made by pressing EXIT, you are then prompted to press ENTER to save and EXIT to abandon your changes.

No changes are saved until ENTER is pressed

5. Using the Front Panel Faders

The Front Panel Faders can be used in one of two ways, to control a Dimmer channel or to control a Memory. Before controlling a memory you must first store one! See section 7, Programming Backup Memories on page 6 to find out how to do this.

Because you may wish to make quite sure the Front Panel Faders are not in use you can press the TEST OFF button to disable them.

5.1 Controlling a Dimmer channel with the Front Panel Faders

- Press the TEST ON button.
- Adjust the fader levels as required.

You may wish to make sure the Front Panel Faders are all at minimum before pressing the TEST ON buttons to prevent lights from coming unintentionally!

- Press the TEST OFF button to disable the Front Panel Faders.

5.2 Controlling a Memory with the Front Panel Faders

You must record a memory before you can replay it! See section 7, Programming Backup Memories, on page 6 to find out how to do this.

- Press the REPLAY button.
- Adjust the Front Panel Faders as required.
- Press the TEST OFF button to disable the Front Panel Faders.

5.3 Controlling memories on other modules

Modules can broadcast on the DMX line A, that other modules should be in memory replay mode. The master module can only control modules looped out of it. In most cases you will therefore want to use the first module on the DMX line. In the case of a single rack this will be module A, if you have a number of racks, look for the module which connects to your lighting desk.

5.4 Turning on Memory Transmit mode

- Press the TRANSMIT MEMORY button.

This function can be locked out. If the message Function Locked Out. See section 11.4, Enabling and Disabling the Transmit memory on page 9 to find out how to enable it

- Press the ENTER button. This is a security measure to prevent accidental setting.

The display now shows SEND MEM. Dimmers down stream display REC MEM to indicate they are receiving memory information and are under the control of another module

DMX input A, B and Analogue inputs are disabled – Take care because lights will go out if being controlled from a DMX or Analogue source.

The Front Panel Faders now control the 12 memories on all the dimmers down stream of this module

- Press the EXIT button to leave Transmit Memory mode.

6. Checking Dimmer channel levels

- Press the button. (Between CURVE and TEST ON.)
- The display now shows the level each channel is being driven at. This is taken as the highest level between the two DMX inputs and the Analogue input.
- Press EXIT to leave this mode.

7. Programming Backup Memories

The memory can be built from any combination of the DMX inputs, Analogue inputs and Front Panel Faders. In other words, what is on stage will be recorded.

- Press STORE.
- Select which 'Pot' (Front Panel Fader) you wish to store the memory on. Use the UP and DOWN buttons to select this.
- Press ENTER.
- You can now decide if you wish to store information only on this module, or on all modules down stream of this module. Use the UP and DOWN buttons to select what you wish to do.

Programming Global Memories can be locked out. If the message Function Locked Out appears see section 11.5 on page 9 to find out how to enable it

- The memory is now stored.

8. Setting Curves

This function can be locked out. If the message Function Locked Out appears see section 11.3 Enabling and Disabling the setting of Channel Curves on page 9 to find out how to enable it

- Press CURVE.
- Use the UP and DOWN buttons to select the channel that you wish to set a different curve onto.
- Press ENTER.
- Select the curve for that channel by using the UP and DOWN buttons.
- Press ENTER. The next channel is automatically selected.
- Continue setting curves as required.
- Press EXIT to finish setting curves.
- Press ENTER to save your changes, or EXIT to abandon them.

~ *Tip: Once you have set a curve you may wish to protect your settings by Disabling the function. See section 11.3 Enabling and Disabling the setting of Channel Curves on page 9 to find out how to enable it.*

See section 20, Appendix 1 – Dimmer Curves on page 14 for details of the dimmer curves.

9. Setting the Limit Level for a channel

This function can be locked out. If the message Function Locked Out appears see section 11.2, Enabling and Disabling the Channel Limit on page 8 to find out how to enable it

- Press LIMIT.
- Use the UP and DOWN buttons to select the channel you wish to Limit.
- Press ENTER.
- Select the Limit Level for that channel by using the UP and DOWN buttons, this is set in percentage terms and in 5% increments or decrements.
- Press ENTER. The next channel is automatically selected.
- Continue setting Limit Levels as required.
- Press EXIT to finish setting Limit Levels.
- Press ENTER to save your changes, or EXIT to abandon them.

~ *Tip: Once you have set a Limit Level you may wish to protect your settings by Disabling the function. See section 11.2, Enabling and Disabling the Channel Limit on page 8 to find out how to enable it.*

10. Single and Three Phase operation

10.1 Who needs to read this section?

The ART module can be manufactured in single and 3 phase forms. The following section only applies to modules manufactured as 3 phase modules but being used in a single phase environment.

10.2 Phase detection

The ART dimmer automatically detects how many phases are being supplied to it. As such it can run Single or Three phase and automatically decide how to respond. If for any reason it cannot decide what phases have been applied, or what the phase relationship is it will display on the screen "Phase Detection Failed, UP for 3 phase DOWN for Single", allowing you to select the operational mode.

Phase detection may fail, for instance, if one or more of the control over voltage fuses blows, or if there is no power applied to one or more phases.

10.3 Single Phase operation 3 phase module

If you have a 3 phase module the neutral will be rated at 63Amps Care MUST be taken not to exceed this and to ensure this, the module should be protected with an external 63 Amp single phase circuit breaker. Failure to do this will cause the neutral cable to overheat with possible disastrous consequences.

11. Enabling and Disabling functions

Various functions can be locked out preventing accidental alteration. These are:

Channel Limit

Channel Curve

Transmit memory

Remote Storage of Memory

Additionally the Patch Mode can be set as Full or by Dimmer channel.

All of the above are set through the User Setting Menu.

11.1 Enabling and Disabling Full Patch Mode

- Hold down the X10 button and press and release the TEST ON button. Release the X 10 button.
- Press the UP button twice.

The screen now displays Select a Funct = User Settings

- Press ENTER to enter the user settings function.
- Patch Mode is now displayed on the screen. Use the UP and DOWN buttons to allow or disallow FULL mode.
- If you wish to alter other user settings press ENTER to scroll through these.
- Press EXIT

The screen now displays Select a Funct = Save settings

- Press ENTER to save the settings.
- Press ENTER again to confirm the action. The dimmer is now restarted, because of this lights may momentarily go out.

11.2 Enabling and Disabling the Channel Limit

- Hold down the X10 button and press and release the TEST ON button. Release the X 10 button.
- Press the UP button twice.

The screen now displays Select a Funct = User Settings

- Press ENTER to enter the user settings function.
- Press the ENTER button again to scroll to the Channel Limit option.
- Channel Limit is now displayed on the screen. Use the UP and DOWN buttons to allow or disallow this.
- If you wish to alter other user settings press ENTER to scroll through these.
- Press EXIT

The screen now displays Select a Funct = Save settings

- Press ENTER to save the settings.
- Press ENTER again to confirm the action. The dimmer is now restarted, because of this lights may momentarily go out.

11.3 Enabling and Disabling the setting of Channel Curves

- Hold down the X10 button and press and release the TEST ON button. Release the X 10 button.
- Press the UP button twice.

The screen now displays Select a Funct = User Settings

- Press ENTER to enter the user settings function.
- Press the ENTER button two times to scroll to the Channel Curve option.
- Channel Curve is now displayed on the screen. Use the UP and DOWN buttons to allow or disallow this.
- If you wish to alter other user settings press ENTER to scroll through these.
- Press EXIT

The screen now displays Select a Funct = Save settings

- Press ENTER to save the settings.
- Press ENTER again to confirm the action. The dimmer is now restarted, because of this lights may momentarily go out.

11.4 Enabling and Disabling the Transmit memory

- Hold down the X10 button and press and release the TEST ON button. Release the X 10 button.
- Press the UP button twice.

The screen now displays Select a Funct = User Settings

- Press ENTER to enter the user settings function.
- Press the ENTER button three times to scroll to the Transmit Memory option.
- Transmit Memory is now displayed on the screen. Use the UP and DOWN buttons to allow or disallow this.
- If you wish to alter other user settings press ENTER to scroll through these.
- Press EXIT

The screen now displays Select a Funct = Save settings

- Press ENTER to save the settings.
- Press ENTER again to confirm the action. The dimmer is now restarted, because of this lights may momentarily go out.

11.5 Enabling and Disabling the Remote Storage of a Memory

- Hold down the X10 button and press and release the TEST ON button. Release the X 10 button.
- Press the UP button twice.

The screen now displays Select a Funct = User Settings

- Press ENTER to enter the user settings function.

- Press the ENTER button four times to scroll to the Remote Store option.
- Remote Store is now displayed on the screen. Use the UP and DOWN buttons to allow or disallow this.
- If you wish to alter other user settings press ENTER to scroll through these.
- Press EXIT

The screen now displays Select a Funct = Save settings

- Press ENTER to save the settings.
- Press ENTER again to confirm the action. The dimmer is now restarted, because of this lights may momentarily go out.

12. Front Panel Fuses

The ART module has a fully protected power supply. Should it be overvoltage the front panel fuses will blow, in all probability protecting the internal electronics and your lamps. This will happen if the input voltage on any phase exceeds 265 volts.

Before replacing a fuse the fault should be rectified.

13. Reset

The ART dimming modules are processor controlled. Like everything they may go wrong. We have taken every care to make sure this hardly ever happens, but if it does pressing RESET may just help. You can do this by pressing the switch marked RESET on the front panel with a blunt object such as a pencil, paper clip etc. This is the equivalent of powering down and turning back on but may well be easier and quicker.

14. Servicing

Periodically but at least every year each module should be opened and the Solid State Relay screws, Power terminal strip screws and circuit breaker screws checked for tightness.

The module should also be checked for an excessive build up of dust, especially on the fan blades and the fans should be checked to ensure they turn freely.

Avolites can complete this servicing if required for a reasonable charge.

15. DMX input connections

The Art dimming system is fully DMX512 (1990) compliant.

Some manufacturers are applying high voltages to pins 4 and 5 of the DMX input connector. Care should be taken to ensure this out of specification equipment is not connected to the ART dimming system because it may cause damage to the line receivers.

If in doubt about a piece of equipment meter the voltages between the following pins:

1 and 4

1 and 5

4 and 5

None of these voltages should be above 12 volts.

15.1 DMX Line A input connector

Pin	Usage
1	Ground
2	DMX line A input anti phase (-)
3	DMX line A input phase (+)
4	DMX line B input anti phase (-)
5	DMX line B input phase (+)

Note: Opto isolated from the dimmer electronics.

The B line pins are wired to the B connectors. There is no electronics between these. The purpose of wiring the B line to the A connector is to make connection of two lined more convenient. This is fully compliant with the DMX 512 (1990) and earlier specifications.

15.2 DMX Line A output connector

Pin	Usage
1	Ground
2	DMX line A output anti phase (-)*
3	DMX line A output phase (+)*
4	DMX line B output anti phase (-)
5	DMX line B output phase (+)

*These pins are driven by the dimmer when in Transmit Memory mode. The changeover for this is by relay.

Note: Opto isolated from the dimmer electronics.

The B line pins are wired to the B connectors. There is no electronics between these. The purpose of wiring the B line to the A connector is to make connection of two lined more convenient. This is fully compliant with the DMX 512 (1990) and earlier specifications.

15.3 DMX Line B input connector

Pin	Usage
1	Ground
2	DMX line A input anti phase (-)
3	DMX line A input phase (+)
4	No connection
5	No connection

Note: Opto isolated from the dimmer electronics.

15.4 DMX Line B output connector

Pin	Usage
1	Ground
2	DMX line A output anti phase (-)
3	DMX line A output phase (+)
4	No connection
5	No connection

Notes: These lines are a loop through. There is no electronics between the input and output connector.

15.5 Analogue – 15 pin D type female connector

Pin	Usage
1 to 12	Channels 1 to 12 0 to +10 volts*
15	Ground

*Voltages in excess of 18 volts may cause internal damage.

Note: Ground is connected to Mains Earth and the Dimmer electronics ground.

16. DMX layouts

Mostly DMX just works, if it does not check termination. This is the most common reason for non working or flickering DMX. There should only be one terminator on any DMX line and this should be at the end of the line. If necessary unplug the line from the desk and measure the resistance between pins 2 and 3 of the DMX line. This should not be less than 90 ohms or more than 200 ohms. If it is check you have only one termination plug or switch on.

Never Star out or make splitter leads.

On complicated systems we recommend using an Avolites DMX Splitter box. Often using a split DMX system makes cabling much easier and this in it self saves the added expense of the splitter.

Avolites manufactures two types:

A rack mount 1u 19inch, this has 8 outputs, which are opto isolated from the input and each pair is isolated from each other.

A truss or otherwise mounting unit. This has 6 outputs each pair is opto isolated and all outputs are isolated from the input.

Both run from 85 to 160volts AC without adjustment and come complete with spare drivers receivers and isolators.

Further discussion is out of the scope of this manual.

17. Software versions

To find out exactly what software you are running do the following:

- Press X10 and test on together.
- Press the DOWN button.
- Press ENTER.
- Note the date and numbers displayed on the screen.
- To leave this, press EXIT then DOWN twice, then ENTER.

18. Its blown up, what do I do

OK you are a long way from Avolites and need a few pointers. Mostly the problem will be a DMX or solid state relay driver problem. The processor board plugs in and the following listing gives what a few of the ICs do. For more detailed information you are going to need a set of schematics, or and spares.

18.1 Which chips do what

Usage	IC Number, description of use and part number.
DMX line A receive	IC 4 is the line receiver (75176) IC 6 is the opto isolator (6N137)
DMX line A transmit	IC 4 is the line receiver (75176) IC 7 is the opto isolator (6N137) IC 8 is the opto isolator for transmit enable (CNY17F)
DMX line B receive	IC 1 is the line receiver (75176) IC 2 is the opto isolator (6N137)
Solid State relay driver, channel 1 to 6	IC 18 (UDN2981A)
Solid State relay driver, channel 7 to 12	IC 21 (UDN2981A)

19. Schematics

These are available on request and at reasonable cost from Avolites.

20. Appendix 1 – Dimmer Curves

